United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Billings Field Office
5001 Southgate Drive
Billings, Montana 59101-4669
www.blm.gov/mt

In Reply Refer To:
1600/3100 (MT0010)

Dear Reader:

The Bureau of Land Management (BLM) Billings Field Office has prepared an Environmental Assessment (EA) to analyze the potential effects from offering ten nominated lease parcels with 1282.44 acres of federal surveyed minerals for competitive oil and gas leasing in a sale tentatively scheduled to occur on October 21, 2014.

The EA with an unsigned Finding of No Significant Impact (FONSI) is available for a 30-day public comment period. Written comments must be postmarked by June 20, 2014 to be considered. Comments may be submitted using one of the following methods:

Email:	MT_BillingsFO_Lease_EA@blm.gov
Mail:	Billings Field Office
Attn:	Craig Drake
	5001 Southgate Drive
	Billings, MT 59101

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

Upon review and consideration of public comments, the EA will be updated as needed. Based on our analysis, parcels recommended for leasing in our assessment would be included as part of a competitive oil and gas lease sale tentatively scheduled to occur on October 21, 2014.

Prior to issuance of any leases, the Decision Record and FONSI will be finalized and posted for public review on our BLM website. Please refer to the Montana/Dakotas BLM website at http://blm.gov/qtld for availability of the updated EA and the Lease Sale Notice. From this home page, go to the heading titled "Frequently Requested," where you will find a number of links to information about our oil and gas program. Current and updated information about our EAs, Lease Sale Notices and corresponding information can be found on the link titled "Oil and Gas

Lease Sale Information." Once there, click on 2014, and search for the October 21, 2014 lease sale to review information and analysis.

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

Sincerely,

James M. Sparks
Field Manager

United States Department of the Interior
Bureau of Land Management

Environmental Assessment DOI-BLM-MT-0010-2014-0011-EA
May 19, 2014

Project Title: Oil and Gas Lease Parcel Sale,
October 21, 2014

Location: Billings Field Office (see Figures 5-9 (Maps) and attached Appendix A for lis
lease parcels with number and legal description)

U.S. Department of the Interior
Bureau of Land Management
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BLM

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 October 22, 2014.

The analysis area includes the area surrounding the 10 nominated parcels in Yellowstone County (Figure 5).

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 25, 2014; comments were received through April 09, 2014.

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 10 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 13 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, and Confederated Tribes of the Umatilla Indian Reservation, in order to identify issues that may arise from the proposed action with regard to the Nez Perce National Historic Trail.

The BLM focuses its analysis on issues that are truly significant to the action in question, rather than amassing needless detail (40 CFR 1500.1(b)). Issues have a relationship with the proposed action; are within the scope of analysis; and are amenable to scientific analysis.

Identified Issues from Internal and External Scoping:

Internal Scoping Issues:

- Conservation of Greater Sage-Grouse Habitat
- Conservation of wildlife habitat, other than GSG
- Conservation of riparian, aquatic wildlife and water resources
- Potential conflicts with preserving Cultural Resources and Special Designations, such as National Historic Trails
- Potential conflicts with current Right of Way holders

External Scoping Issues:

- Split estate surface owners expressed concerns about oil and gas development causing adverse impacts to natural resources and anthropogenic values (domestic livestock, disruption and disturbance to residence).

- Interested public sent in approximately forty letters expressing opposition to leasing several parcels (MTM 105431-HW and FC mostly) for a number of reasons, including but not limited to: adverse impacts expected to occur from oil and gas development to wildlife resources, water resources, property values, quality of life, road conditions, human health and safety and overall environmental degradation.
- Special interest /non-profit groups expressed interest in ensuring a thorough environmental analysis is conducted that identifies adverse impacts to the environment.

Issues considered but not analyzed in detail:

The BLM considered the following issues, but decided not to analyze them in further detail. The aspects of the existing environment that the BLM determined to not be present or not potentially impacted by this project include: Areas of Critical Environmental Concern (ACECs); hazardous or solid wastes; Wild and Scenic Rivers; Wilderness Areas; Wild Horse and Burros; Lands with Wilderness Characteristics; and forest products. Thus, the EA contains no further discussion of these issues or resources.

2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION

2.1 Alternative A - No Action

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

The No Action Alternative would exclude all parcels (10 @ 1282.44 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.

2.2 Alternative B – Proposed Action

The Proposed Action Alternative would be to offer ten parcels of federal minerals for oil and gas lease, covering 1,282.44 acres administered by the Billings Field Office, in conformance with the existing land use planning decisions. The ten 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 proposed stipulations are listed in Appendix A. Map 1 indicates the general location of each parcel.

Of the 1,282.44 acres of federal mineral estate considered in this EA, approximately 240 surface acres in 2 parcels are managed by the BLM. Eight parcels (1,042.44 acres) are split-estate (private surface underlain by 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 being 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, 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 term and would continue for as long thereafter as oil or gas is produced in paying quantities. If a lessee fails to produce oil and gas, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease, ownership of the minerals leased would revert back to the federal government, and the lease could be resold.

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

2.3 Alternatives Considered, but Eliminated from Further Analysis

Initially, the BLM received 13 Expressions of Interest, an alternative that included leasing all 13 nominated parcels (1682.44 acres) was considered. Three of the parcels, however, are considered unsuitable for leasing at this time. Parcels MTM 105431-HW, MTM 105431-F4, and MTM 105431-E9 all contain resources that are subject to proposed stipulations under the Draft Billings Resource Management Plan.

Parcel MTM 105431-HW contains the unincorporated town of Dean, Montana, a reach of stream designated by MT FWP as Suitable Yellowstone Cutthroat trout recovery habitat and also falls within a state designated Source Water Protection Area. Parcels MTM 105431-E9 and F4 are in close proximity to Greater sage-grouse and Sharptail grouse leks. All of these conditions are addressed with major stipulations to oil and gas development in the Draft Billings 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, Yellowstone cutthroat trout and water resource 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 and Cutthroat trout habitat requirements and development related disturbance impacts. The Draft Billings and Pompey's Pillar National Monument RMP/EIS revision (in progress) would provide stipulations relative to oil and gas development and sage-grouse and Yellowstone Cutthroat trout based upon our current understanding, including those areas where no development may be the appropriate management response. The RMP/EIS also considers alternatives that place major stipulations on Source Water Protection Areas and areas containing unincorporated towns.

Conclusion
The three parcels proposed for deferral encompass 400 acres of federal mineral estate (including 320 acres of BLM administered surface estate). The decision of whether or not to lease the above referenced parcels will be deferred until such time that a final decision on the Billings Field Office RMP has been rendered and will not be considered further in this analysis.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction
This chapter describes the affected environment (i.e., the physical, biological, social, and economic values and resources) within the analysis area, which includes the ten nominated parcels in Yellowstone County (Map 1) 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 scaling and precision parameters associated with the Geographic Information System (GIS), in addition to being referenced to a different land survey.

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 lands described above consist 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.

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 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 **1**) show that there is little risk to the general public from air quality in the Billings Field Office. During 2010-2012, 84 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 1: USEPA Air Quality Index Report – Billings Field Office Summary (2010-2012).

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	1,096	924	84	157	15	0

[1] Source: EPA Air Data website (http://www.epa.gov/airdata/ad_rep_aqi.html, accessed December 4, 2013)

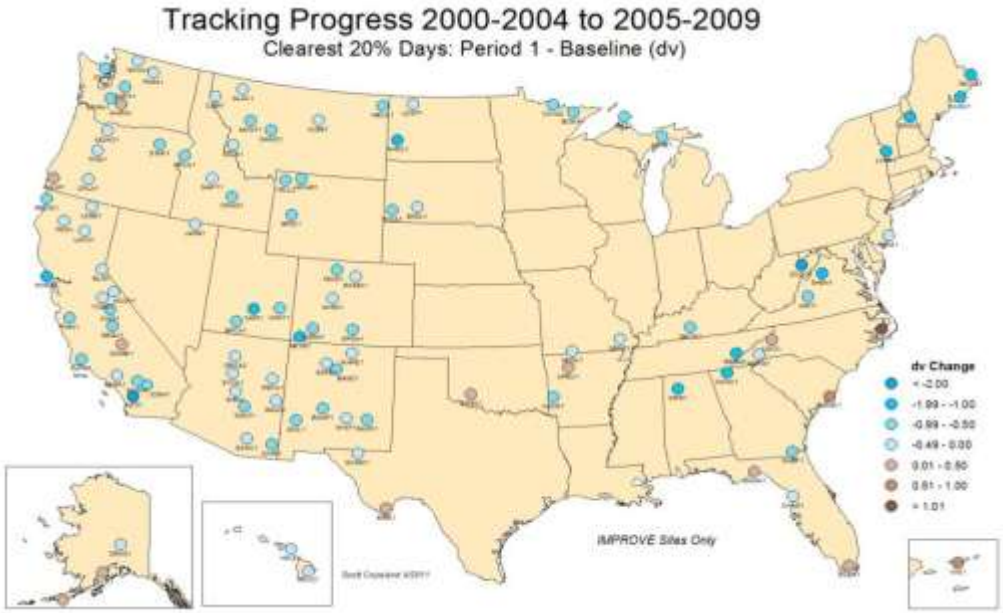
An SO_2 nonattainment area has been designated by the USEPA near Laurel, Montana. The circular nonattainment area extends 2 kilometers from the center of a tank at an oil refinery located in the southern portion of Laurel. The lease parcels are not located within the nonattainment area.

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).

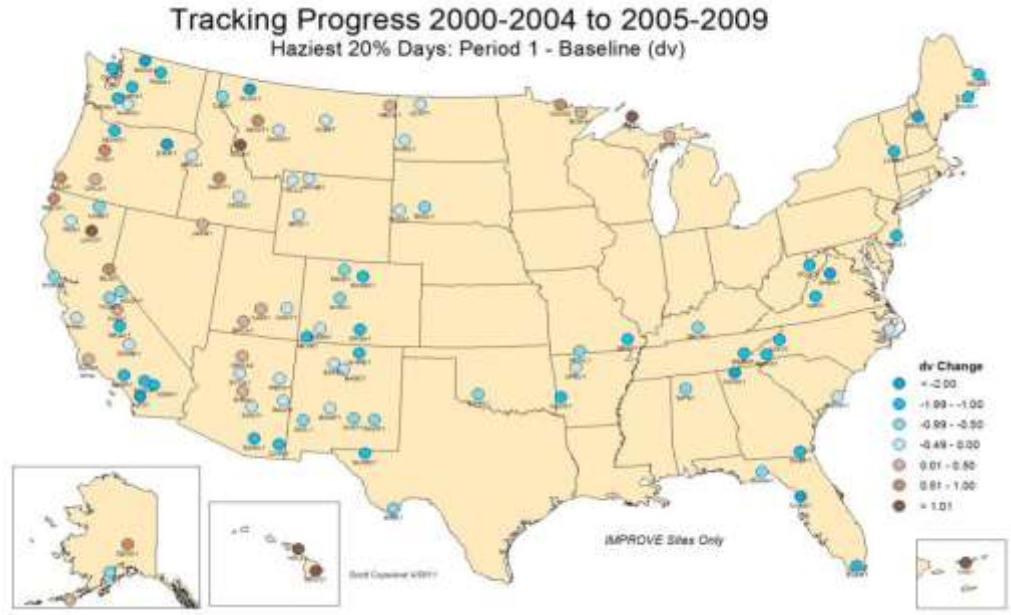
Air resources also include visibility, which can be degraded by regional haze due in part to sulfur, nitrogen, and particulate emissions. Based on trends identified during 2005-2009, visibility has improved at the nearest IMPROVE monitors located in and near Yellowstone National Park on the clearest and haziest days, as shown in Figure 1 and **Figure 2**.

Figure 1: Trends in haze index (deciview) on clearest days, 2005-2009



Source: IMPROVE 2011

Figure 2: Trends in haze index (deciview) on haziest days, 2005-2009



Source: IMPROVE 2011

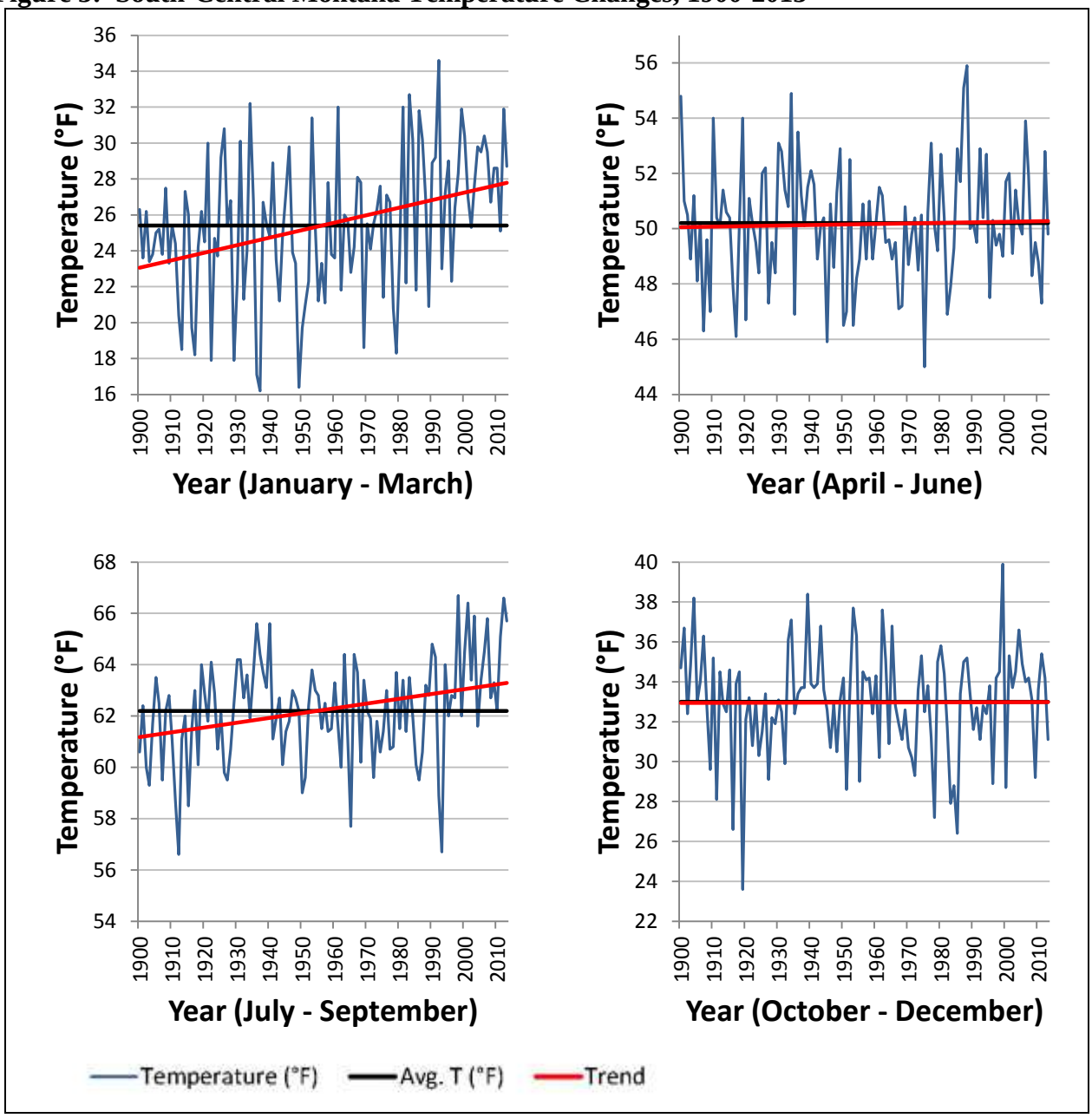
3.2.2 Climate Change

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. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use." (IPCC 2013). Climate change and climate science are discussed in detail in the Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota, Bureau of Land Management (Climate Change SIR 2010). This document is incorporated by reference into this EA.

The IPCC states, "Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased." (IPCC 2013). The global average surface temperature has increased approximately 1.54°F from 1880 to 2012 (IPCC 2013). 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).

In south-central Montana, surface air temperatures over the past 114 years have increased by an average of 0.16°F annually (NOAA 2014). Quarterly temperature increases over this period are shown in **Figure 3**. Average temperature increases were 0.42°F for January-March, 0.02°F for April-June, 0.19°F for July-September, and 0.03°F for October-December.

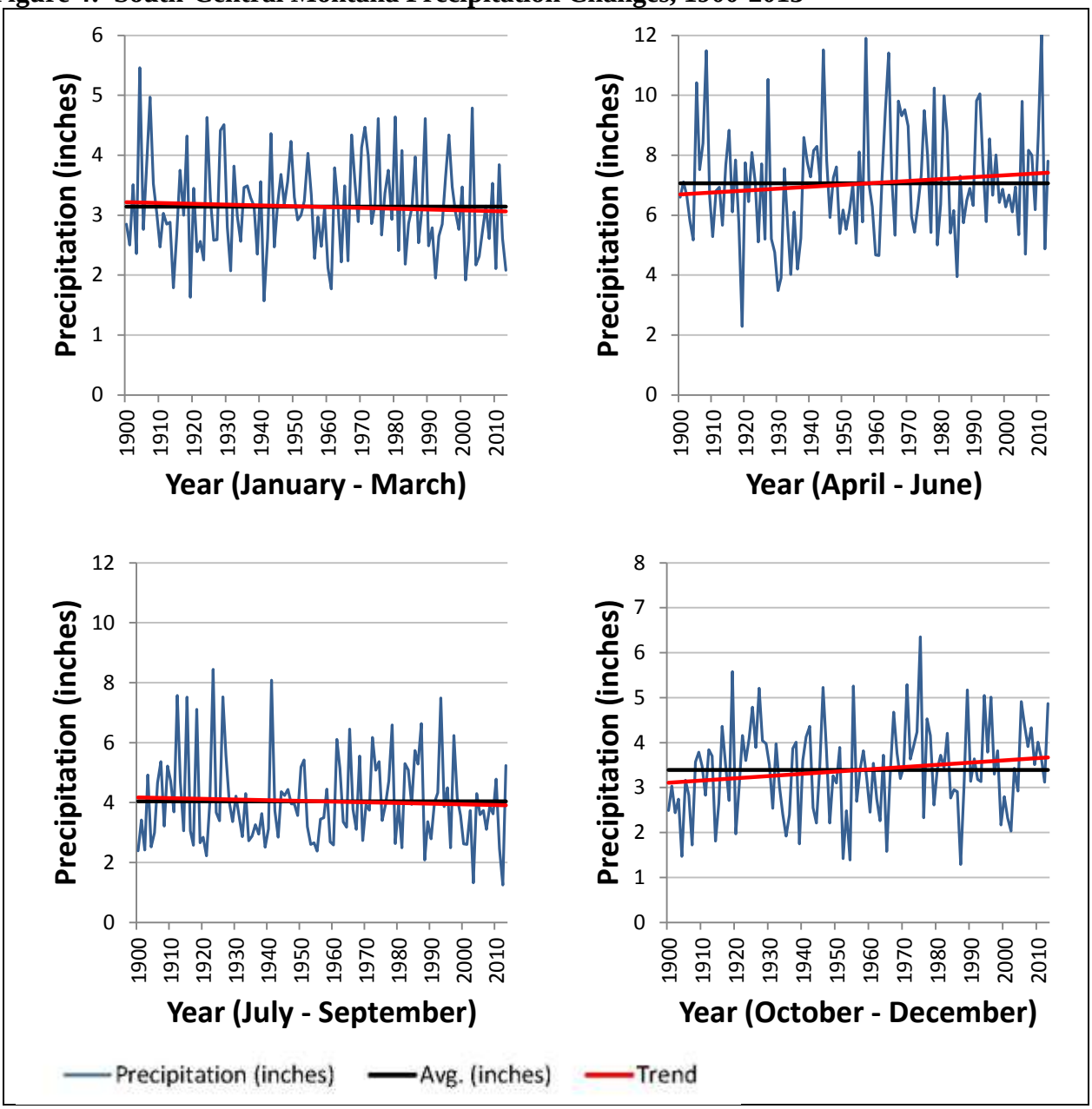
Figure 3: South-Central Montana Temperature Changes, 1900-2013



Source: Adapted from NOAA 2014

Long-term precipitation changes have also been observed globally and in south-central Montana. Total precipitation and shifts in precipitation timing and intensity have been observed. Within south-central Montana, annual precipitation has changed at an annual rate of 0.08 inches per decade from 1900-2013. **Figure 4** illustrates quarterly precipitation changes. Precipitation has increased during the second and fourth calendar quarters, while decreasing in the first and third quarters.

Figure 4: South-Central Montana Precipitation Changes, 1900-2013



Source: Adapted from NOAA 2014

As discussed 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 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, combustion of fossil fuels, changes to the natural carbon cycle, and changes to radiative forces and reflectivity (albedo). GHGs 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 may last 50 to 200 years in the atmosphere while methane has an average atmospheric life time of approximately 12 years (Climate Change SIR 2010).

With regard to statewide GHG emissions, Montana ranks in the lowest decile when compared to all the states (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 regional impacts is 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 bullets summarize potential changes that are expected to occur at the regional scale. The EPA identifies this area as part of the Mountain West and Great Plains region.

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. 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.

3.3 Soil Resources

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

Soil restoration potential rates each soil for its inherent ability to recover from degradation, which is often referred to as soil resilience. The ability to recover from degradation means the ability to restore functional and structural integrity after a disturbance. Soil functions that are important include sustaining biological activity, diversity and productivity; capture, storage and release of water; storing and cycling nutrients and other elements; filtering, buffering, degrading, immobilizing and detoxifying contaminants; providing support for plant and animal life

"High potential" indicates that the soil has features that are very favorable for recovery. Good performance can be expected. "Moderate potential" indicates that the soil has features that are generally favorable for recovery. Fair performance can be expected. "Low potential" indicates that the soil has one or more features that are unfavorable for recovery. Poor performance can be expected.

Table 2 shows the acres by soil map unit within each lease parcel, the map unit restoration potential rating, and if soil/slope stipulations have been applied to the lease parcel.

Table 2: Lease Parcels, Soil Map Units, Acres of Soil Type per Lease Unit, and Soil Restoration Potential

Lease Parcel Approx. acres	Soil Map Unit [2]	Acres per lease parcel / percent lease parcel [3]	Soil Restoration Potential
MTM-105431-FA 160 acres	MY	109 / 68%	Moderate
	SM	37 / 23%	Moderate
	EC	11 / 7%	Moderate
MTM-105431-FB 40 Acres	258F	36 / 90%	Moderate
	El	4 / 10%	Moderate
MTM-105431-FC 322 Acres	My	305 / 95%	Moderate
	Sm	6 / 2 %	Moderate
	Ms	12 / 4%	High
MTM-105431-FD 40 Acres	383-E	20 / 50%	Moderate
	Bl	12 / 24%	High
	Ms	4 / 8%	High
	Rk	3 / 8%	Not Rated (rock)
MTM-105431-FE 80 Acres	Rk (rock)	39 / 49%	Not Rated (rock)
	Ms	23 / 29%	High
	285-F	9 / 11%	Moderate
	80-D	10 / 13%	Moderate
MTM-105431-FF 40 Acres	My	40 / 100%	Moderate

MTM-105431-F3 320 Acres	Pc	187 / 58%	High
	Hm	35 / 11%	High
	Mw	28 / 9%	Moderate
	Pl	20 / 6%	High
	Ax	24 / 8%	Low
	Av	21 / 7%	Low
MTM-105431-F5 160 Acres	Ec	35 / 22%	Moderate
	El	21 / 7%	Moderate
	Kn	16 / 10%	High
	He	16 / 10%	High
	El	2 / 1%	Moderate
	Lr	8 / 5%	High
	Pl	10 / 6%	High
	Pl	10 /6%	High
MTM-105431-F6 80 Acres	Kn	14 / 18%	High
	Hz	6 / 8%	High
	Hz	6 /8%	High
MTM-105431-F7 40 Acres	383E	34 /85%	Moderate
	Bf	4 /10 %	High

Lease parcels highlighted indicate where CSU 12-1 Stipulations will be applied in the proposed action.

[2]Soil Map Units <1% of the lease parcel are not listed.

[3]Acres rounded to the nearest whole acre, percent rounded to the nearest whole percent.

Two soil map units (Av, Ax) have a low soil restoration potential. These map units occur in three lease parcels (MTM-105431- F3, F5, F6), however on two of the lease parcels (F5 and F-6) soils map units with a low soil restoration potential compose less than 1 % of the acreage. These soils have a high presence of salt, which impacts the vegetative productivity of the site.

3.4 Water Resources

3.4.1 Surface Hydrology

Surface water resources across the 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.

The ten parcels available for lease sale are within the Upper Yellowstone-Lake Basin sub-basin (HUC-10070004). There are two parcels identified as having surface water resources, MTM 105431-FC and F6. Parcel FC contains an ephemeral drainage with a reservoir on the eastern end. The reservoir, on private surface, fluctuates dramatically seasonally and from year to year depending on climatic conditions. Parcel F6, on BLM public surface, contains a short reach of Twelve Mile Creek and a small intermittent tributary. Both of these stream reaches are intermittent and fluctuate from mostly dry to consistent perennial flow, depending on

climatological conditions. Other parcels contain ephemeral drainages that have surface discharge during periods of heavy precipitation, including during site visits in mid-April.

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

3.5 Vegetation Resources

3.5.1 Vegetation Communities: Upland

The ten proposed lease parcels occur in west central Yellowstone County. This area typically receives between 11-14 inches of precipitation annually. Cool season bunchgrasses such as bluebunch wheatgrass *(Agropyron spicatum*), needle-and-thread (*Hesperostipa comata)*, crested wheatgrass (*Agropyron cristatum),* and prairie junegrass (*Koeleria macrantha)* are common. Often big sagebrush (*Artemisia Tridentata)* is common and important with the vegetative community. Where soils are shallow and on slopes ponderosa pine (*Pinus ponderosa*) and rocky mountain juniper (*Juniperus scopulorum*) trees are often found. Tree densities vary from small dense islands to solitary or nearly solitary trees within grass/shrubland. In dry overflow channels rhizomatous grasses such as western wheatgrass (*Pascopyrum smithii)*, and silver sagebrush *(Artemisia cana)* may be present and could dominate these generally small areas.

Parcels MTM-105431 F5, and F6 are also known to contain salt influenced vegetative species such as greasewood (*Sarcobatus vermiculatus),* saltgrass (*Distichlis spicata*), alkali sacaton (*Sporobolus airiodes*), and bottlebrush squirrel tail (*Elymus elymoides*) these species are

typically found in low lying areas where salts accumulate and soils are heavy (clay texture dominated). These species may also be found within the other lease parcels.

The Montana Natural Heritage Tracker (MTNHT) was queried. No threatened, endangered, candidate, or special status plant species exist in the areas proposed for leasing.

3.5.2 Vegetative Communities: Wetland/Riparian

One parcel has been identified as containing riparian resources. Parcel MTM 105431-F6 has a short reach of Twelve Mile Creek running through it with an intermittent tributary as well. Both of these stream reaches are intermittent with poorly developed riparian areas, however riparian communities do exist and are composed primarily of rush (juncus sp.) and sedge (carex sp.). A riparian assessment has not been completed on these areas.

Within other parcels, riparian resources have not been identified, although their presence is possible. Much of the leasing parcel area is very arid, but very small riparian communities may be present where ephemeral and intermittent drainages have received above normal precipitation for two of the last three years. It is also possible that the BLM is not aware of springs or small riparian areas, particularly on split estate parcels. If riparian areas are discovered during future development activities, conditions of approval would be established to prevent disturbance and adverse impacts to riparian function.

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. These species could also affect upland health standards, wildlife habitat quality, and native species diversity. The only noted invasive plant species within these lease parcels is trace amounts of Japanese brome and cheat grass, however a weed inventory and mitigation plan would be required during the APD stage before development occurred.

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). The only noxious weed recorded on the parcels is trace amounts of whitetop (Cardaria draba), in or near the intermittent stream bottoms of parcel MTM 105431-F5 and F6. 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.

3.6 Special Status Species

3.6.1 Special Status Animal Species

3.6.1.1 Terrestrial Wildlife

Table 3: 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

Species	USFWS Status	BLM Status	In Current Range	Suitable Habitat Present
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 longspur	BCC	Sensitive	Yes	Yes
McCown's longspur	BCC	Sensitive	Yes	Yes
Baird's sparrow	BCC	Sensitive	Yes	Yes
Brewer's sparrow	BCC	Sensitive	Yes	Yes
LeConte's sparrow	None	Sensitive	Yes	Yes
Nelson's Sharp-tailed sparrow	None	Sensitive	Yes	Yes
Prairie falcon	BCC	None	Yes	Yes
Sage sparrow	BCC	Sensitive	Yes	Yes
Grasshopper sparrow	BCC	None	Yes	Yes
Dickcissel	BCC	Sensitive	Yes	Yes
Blue-gray gnatcatcher	None	Sensitive	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	None	Sensitive	Yes	Yes

Species	USFWS Status	BLM Status	In Current Range	Suitable Habitat Present
snake				

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

There are no documented populations or habitats for sensitive or special status mammal species in the lease parcels. Black-tailed prairie dogs are known to inhabit areas near and around the parcels. Table 3 identifies the occurrence of BLM terrestrial Sensitive Species and USFWS Threatened, Endangered, Candidate or Proposed Terrestrial Species in the BLM Billings Field Office planning area.

Birds

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. In 2009, Montana Fish, Wildlife, and Parks (MT FWP), developed and designated sage-grouse core habitat areas. MT FWP Core Area maps were later updated in March, 2011. The BLM issued Instruction Memorandum No. 2012-043, "Greater Sage-Grouse Interim Management Policies and Procedures, Dec. 22, 2011" that identified Preliminary Priority Habitat (PPH) and Preliminary General Habitat (PGH). Greater sage-grouse use a variety of shrub-steppe habitats throughout their life cycle and are considered obligate users of several sagebrush species (USFWS 2005). Primary ongoing threats to greater sage-grouse include loss and deterioration of habitat from such factors as the spread of noxious weeds, infrastructure development, oil and gas development, wildfire, and conifer invasion (USFWS 2005).

The planning area includes approximately 3.68 million acres (all ownerships) of greater sage-grouse habitat, which includes approximately 336,000 acres (9.1 percent) on BLM public lands.

The analysis area is located within designated sage-grouse general habitat. There are two active leks within the analysis area, one within four miles of several parcels and another with three miles. These leks have seen a steady decline in male attendance over the past decade, with approximately 45% few males attending than the long term average. Two other active leks located five and eight miles north of the analysis area show a 50% decline from the long term average.

Overall, the analysis area is located on the southern fringe of general sage-grouse habitat, with all but four parcels in rugged breaks country that is not preferred by sage-grouse. Parcels F2, F5, F6 and F7 are in grass/shrubland habitat conducive to sage-grouse and comprise 640 acres. These parcels are located 2-3 miles from the nearest sage-grouse lek site.

Bald Eagle and Golden Eagle
Bald eagles are not uncommon to the analysis area; however no nests or specific sites are documented in the parcels. Golden eagles are common to the analysis area and are reported to nest near the north-west corner of parcel FC (surface owner report).

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. Although specific surveys have not been conducted, occurrence of BLM sensitive raptors, within this analysis area, would not be uncommon.

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 migratory birds and the fact that these parcels lie adjacent to a major river course makes it possible for any number of species to be present during migration.

Reptiles
BLM and Montana Natural Heritage Tracker databases do not indicate the presence of sensitive reptile species in these parcels. The habitat in most parcels is conducive to supporting populations of greater short-horned lizard, milk snake and western hog-nosed snake.

Fish
There are no sensitive fish populations within or in close proximity to the lease parcels.

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, ranging from moderate/high cover grasslands to Ponderosa Pine forests.

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 but are not limted to mule deer and white-tailed deer, elk and antelope with rare occurrences of black bear and mountain lion. These animals are considered priority species due to the public's interest in them for hunting and aesthetic enjoyment. Parcels FB, FC, FD, FE, F3 and F5 contain mule deer and antelope 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.

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 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 when present.

The most common game birds in and around these lease parcels are wild turkey, pheasant, sharptail grouse, Hungarian partridge and sage-grouse. Sage-grouse are addressed in the Special Status Species section above.

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, with substantial overlap seen in the archaeological record across the region.

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.

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, historic emigrant and stage trails, Indian war period battle sites, ranch development, railroad installations, mining operations, and Native American sites.

The existence of cultural resources within a specific location is determined through examination of existing records and cultural resource inventory at locations 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 Bureau of Land Management maintains General Land Office (GLO) records of land patents across the United States. These records indicate where historic homesteads not recorded during a cultural resource inventory might exist. The results of these two reviews are as follows:

Cultural Resource Inventory Report Overview

In the SHPO's Cultural Resources Annotated Bibliography System (CRABS) four (4) cultural resource inventories occurred within/partially within, or at least in the same section as the proposed lease parcels (Table 4). Of the ten (10) proposed leases, four (MTM 105431-FA, FC, FD and FE) have no record of previous cultural resource inventories. Because all four parcels were patented by homesteaders, the possibility of undocumented historic structures exists at these locations. Because of the lack of information on file regarding cultural surveys or cultural sites, there may be eligible sites in some of these lease areas that have not yet been identified, and that may be affected by the proposed leasing and subsequent development.

Table 4: Cultural Resource Inventories

MS #	Author	Title	Date
10693	Munson, Gene Et. Al	CULTURAL RESOURCE INVENTORY AND ASSESSMENT: BILLINGS NORTH	1986
14691	Wood, Garvey C.	EMPIRE SAND AND GRAVEL - FIVE MILE/ALKALAI CREEK ADDITIONAL BORROW SOURCE AND WASTE AREA. BILLINGS NORTHWEST	1993

26686	Peterson, Lynelle and John O Pouley	ARCHAEOLOGICAL INVESTIGATIONS FOR THE RATTLESNAKE BUTTE PROJECT: A 3-D GEOPHYSICAL SEISMIC SURVEY IN YELLOWSTONE COUNTY MONTANA	2002
27615	Brumley, John H.	CULTURAL RESOURCE INVENTORY OF THE TRIANGLE TELEPHONE COOPERATIVES 2004 REED POINT AND MOLT EXCHANGES IN STILLWATER COUNTY, MONTANA	2004

Cultural Resource Site Overview

A search of the SHPO's Cultural Resources Information System (CRIS) reveals a total of three (3) previously recorded cultural resources documented within the lease parcels. Another five (5) occur outside of the prescribed parcels but within the same sections. Of the three within the lease parcels, two (2) are prehistoric and one (1) is historic in nature. The prehistoric sites are a lithic scatter and lithic quarry with material scatter. The historic site is a homestead.

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 or railroads.

Additional cultural resources outside the parcels scheduled for the lease sale include the Canyon Creek Battlefield site (24YL0702), the Nez Perce National Historic Trail (NPNHT), the Auto Tour Route following the trail, and several historic sites associated with Calamity Jane. Canyon Creek Battlefield is the location of an encounter between the Nez Perce Tribe and the US Cavalry in 1877. The site is on the National Register of Historic Places (NRHP) and is a unit of the National Park Service. Although these cultural resources do not intersect with any of the parcels considered for lease, development on parcels MTM 105431-FB, MTM 105431-FA and MTM 105431-FE may be within the viewshed of these resources.

Sites listed as "Unresolved" or "Undetermined" in the SHPO's Cultural Resources Information System (CRIS) warrant the same treatment as if they have been determined eligible. The distribution of all prehistoric and historic in the parcels is shown in Table 5.

Table 5: Cultural Resources

Lease Number	Site Number	Site Type	Site Description	NRHP Status
MTM 105431-F5	24YL0154	Historic	Homestead foundation, associated features	NE
MTM 105431-F6	24YL0697	Prehistoric	Lithic scatter	NE
MTM 105431-FF	24YL0580	Prehistoric	Lithic quarry and scatter	U

NE – Not Eligible; U – Unevaluated

3.9 Native American Religious Concerns

BLM's management of Native American Religious concerns is guided through its 8120 Manual: Tribal Consultation Under Cultural Resources Authorities and 8120 Handbook: *Guidelines for Conducting Tribal Consultation*. Further guidance for consideration of fluid minerals leasing is contained in BLM Washington Office Instruction Memorandum 2005-003: Cultural Resources, Tribal Consultation, and Fluid Mineral Leasing. The 2005 memo notes leasing is considered an undertaking as defined in the National Historic Preservation Act. Generally areas of concern to Native Americans are referred to as "Traditional Cultural Properties" (TCPs) which are defined as cultural properties eligible for the National Register because of its association with cultural practices or beliefs that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community (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 were sent to the appropriate authorities of the Nez Perce, Umatilla, Colville, Crow and Northern Cheyenne governments on March 24, 2014. On March 28, 2014, the Tribal Historic Preservation Officer (THPO) of the Nez Perce Tribe, expressed concern via e-mail about possible impacts to the Nez Perce National Historic Trail (NPNHT). Mr. Baird asked whether lease parcels intersect with the NPNHT, which they do not. This is the only comment that has been provided as of this time (8 May 2012). Should additional comments be provided, attempts would be made to accommodate Native American concerns as they become available.

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

3.9.1 Nez Perce Tribe, Confederated Tribes of the Colville Reservation and Confederated Tribes of the Umatilla Indian Reservation

The Nez Perce National Historical Trail (NPNHT) follows the same journey undertaken by a band of the Nez Perce Indian tribe in 1877 during their attempt to flee the U.S. Cavalry. The

1,170 mile (1,883 km) trail was created in 1986 as part of the National Trails System Act and is managed by the U.S. Forest Service. The trail traverses through portions of the states of Oregon, Idaho, Wyoming, and Montana and connects 38 separate sites across these four states that commemorate significant events which occurred to the Nez Perce during their attempt to escape capture by the U.S. Cavalry who were under orders to move the Nez Perce onto a reservation. The trail passes through areas managed by the National Park Service, USFS National Forests, and Bureau of Land Management and private property. Little of the trail is actually a foot trail although much of the journey can be closely followed by roads. The formally recognized corridor of the NPNHT is located on a northwest-southeast diagonal between parcel MTM 105431-FB west of the corridor and MTM 105431-FE and MTM 105431-FA, east of the corridor. The parcels are more than a mile away from the corridor.

3.9.2 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: pgs 3-78 and 3-79).

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

3.9.3 Crow

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

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

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

3.10 Paleontology

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

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

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

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

bearing units of the Fort Union Formation and contain fossils of turtles, fish, reptiles and mammals.

Potential Fossil Yield Classification System

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

Using the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential for fossil resources (Table 6). Areas with a PFYC rating of 3 or higher would be inventoried for paleontological resources prior to surface disturbing activities. Rankings of 4 and 5 may require on-site monitoring during surface disturbing activities.

Table 6: Potential Fossil Yield Classification (PFYC) Description

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

Although no paleontological locales have been identified within any of the parcels selected for the lease sale, the potential for discovery of unrecorded paleontological locations exists. Table 7 provides the PFYC class acreage totals for each unit and for the combined lease nominations. The total acreage for PFYC classes 1 and 2 is 184 acres, or about 12% of the total lease acreages. The remaining 88% is divided among PFYC classes 3a, 3b, and 5. All of the lease parcels contain geologic units classified as PFYC Class 3a, 3b and/or 5. In fact, MTM 105431-FB, FD, FE, F3, F5 and F6 have no Class 5 land (Table 8). All parcels except MTM 105431-FC and FE are dominated by units of moderate to unknown fossil yield potential (3a).

Table 7: Potential Fossil Yield Classification Acres

Lease Sale Parcel Number	PFYC Class 1 Acres	PFYC Class 2 Acres	PFYC Class 3a Acres	PFYC Class 3b Acres	PFYC Class 4 Acres	PFYC Class 5 Acres
MTM 105431-FA	0	0	21	0	0	137.5
MTM 105431-FB	0	0	40	0	0	0

Lease Sale Parcel Number	PFYC Class 1 Acres	PFYC Class 2 Acres	PFYC Class 3a Acres	PFYC Class 3b Acres	PFYC Class 4 Acres	PFYC Class 5 Acres
MTM 105431-FC	0	0	145	0	0	185
MTM 105431-FD	0	0	40	0	0	0
MTM 105431-FE	0	0	28	49.5	0	0
MTM 105431-FF	0	0	31	0	0	9
MTM 105431-F3	0	42	277	0	0	0
MTM 105431-F5	0	38	129	0	0	0
MTM 105431-F6	0	38	40	0	0	0
MTM 105431-F7	0	0	27	0	0	20
TOTALS	0	118	778	49.5	0	343

Table 8: Potential Fossil Yield Classification Percentages

Lease	All PFYC Percentages					
	2	3a	3b	4	5	Total
MTM 105431-FA		13			87	100%
MTM 105431-FB		100				100%
MTM 105431-FC		44			56	100%
MTM 105431-FD		100				100%
MTM 105431-FE		36	64			100%
MTM 105431-FF		77			23	100%
MTM 105431-F3	13	87				100%
MTM 105431-F5	23	77				100%
MTM 105431-F6	49	51				100%
MTM 105431-F7		57			43	100%

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 approximately 12 miles of the Nez Perce (Nimíipuu or Nee-Me-Poo) National Historic Trail. The BiFO managed the portion of trail lies 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 formally recognized corridor of the NPNHT is located on a northwest-southeast diagonal between parcel MTM 105431-FB west of the corridor and MTM 105431-FE and MTM 105431-FA, east of the corridor. The parcels are more than a mile away from the corridor.

3.13 Livestock Grazing

Only lease parcels MTM-105431 F5 and F6 are located on federal surface and within a federal grazing allotment. Lease parcel MTM-105431 F3 is located on private surface but is located in a federal grazing allotment. The remaining lease parcels are located on private land not within a federal grazing allotment. It is assumed that some level of grazing does occur on all lease parcels regardless of surface ownership. Table 9 lists the lease parcels that occur within a federal grazing allotment.

Table 9: Federal Grazing Allotments in Lease Parcels

Lease Parcel	Surface ownership [1]	Allotment number	Allotment Name	Permitted Federal AUMs	Federal Range Improvements Within The Allotment[2]
MTM-105431-F3	Private	5309	Charter	78	Charter Fence
MTM-105431-F5	Public	5354	Ballek	21	Right away Fence Balek Fence Shepherd/Acton Cattle guard
MTM-105431-F6	Public	5324	Kembel	15	No Range Improvements

[1]Indicates the surface ownership status of the lease parcel within the allotment
[2]Range improvements located within the allotment may or may not be located within the lease parcel.

3.14 Recreation and Travel Management

3.14.1 Recreation

The BLM has an important niche in recreation in Montana, providing opportunities for Off-highway vehicle use, camping, hiking, driving for pleasure, picnicking, hunting, whitewater rafting, wildlife viewing, and a wide variety of other pursuits. This role in outdoor recreation is under stress from changing populations, new technologies, and access issues. Population increases, particularly in the metropolitan areas such as Billings and 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.

Parcels MTM 105431-F5 and F6 are the only two parcels with BLM managed surface lands. These parcels, with a total of 240 acres, have limited recreation use, with the majority taking place during fall hunting seasons for deer, antelope and upland bird species.

3.14.2 Travel Management

Comprehensive travel management is integral to the character of recreational settings. Travel management decisions support planning decisions such as protecting and/or enhancing landscape character. In general BLM policy, travel is permitted on designated or seasonally limited routes, except in established OHV areas open for motorized use. In the Billings 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.

The BLM only manages travel routes on lands where BLM manages the surface. Of the ten parcels being considered in this EA, only one, parcel MTM 105431-F5, has a primitive travel route that extends for ½ mile along its western edge. This route provides some motorized access to the BLM public lands within the parcel. The route is not a high-use route or a main access artery. Its primary use is for ranching access.

3.15 Lands and Realty

Parcel MTM 105431-F5 has two BLM authorized Rights-of-Way (ROW); a twelve inch buried crude oil pipeline held by Phillips 66 and a 12.47 and 7.2 KV overhead electrical power line held by Yellowstone Valley Electric Cooperative. ROW issues were not identified in any other parcels.

3.16 Minerals

3.16.1 Fluid Minerals

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

Currently there are 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 10. Numbers of townships, lease acres within those townships, and development activity for all jurisdictions are summarized in Table 11.

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 10: Existing Development Activity

	Federal Wells	Non-Federal Wells
Drilling Well(s)	0	1
Producing Gas Well(s)	4	244
Producing Oil Well(s)	8	577
Water Injection Well(s)	0	14

Shut-in Well(s)	2	91
Temporarily Abandoned Well(s)	0	43
Gas Storage Wells	0	11
Abandoned Wells	45	2,381

Data source: BLM SDE GIS data, oil and gas surface well location layer data, May 2014

Table 11: Oil and Gas Leasing and Existing Development within Townships Containing Lease Parcels

	Yellowstone County
Number of Townships Containing Lease Parcels	4
Total Acres Within Applicable Township(s)	1282.44
Federal Oil and Gas Minerals	1282.44
Percent of Township(s)	1.3%
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

	Yellowstone County
Private and State Wells	Producing Gas Well(s) 0 Producing Oil Well(s) 0 Water Injection Well(s) 0 Shut-in Well(s) 17 Temporarily Abandoned Well(s) 0

3.16.2. Solid Minerals

3.16.2.1. Coal

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

3.16.2.2. Locatable Minerals

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

3.16.2.3. Salable Minerals

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

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

3.17 Social and Economic Conditions

3.17.1 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 had an estimated population of 151,882 residents in 2012, which made it the county with the largest population in the State (US Census 2013a). The county seat of Yellowstone County is Billings had an estimated population of 106,954 residents in 2012 (US Census 2013b). 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 1,668,346 acres of land in farms and 1,330 farms in 2012 (NASS 2014a). In 2013, the County ranked eleventh for barley production and twelfth for winter wheat production across Montana counties (NASS 2014b). Additionally, in 2012 Yellowstone County ranked ninth in alfalfa hay production and fourth in in cattle and calves across Montana counties (NASS 2013). This information helps highlight the importance of agriculture in the County. Additional information describing the area is found in the Economics section below.

Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…" (Executive Order 12989).

Minority populations as defined by Council on Environmental Quality (CEQ) guidance under the National Environmental Policy Act (CEQ 1997) include individuals in the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population is identified where "(a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater…" (CEQ 1997). Additionally, "[a] minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 1997). Low-income populations are determined by the U.S. Census Bureau based upon poverty thresholds developed every year.

U.S. Census data is used to determine whether the populations residing in the study area constitute an "environmental justice population" through meeting either of the following criteria:

- At least one-half of the population is of minority or low-income status; or
- The percentage of population that is of minority or low-income status is at least 10 percentage points higher than for the entire State of Montana.

CEQ guidance does not provide specific criteria for determining low-income populations as it does for minority populations so for this planning effort we will use the criteria for minority populations, which are discussed above, as the criteria for low-income populations. We identify

low-income and minority population percentages that are "meaningfully greater" as at least 10 percentage points higher than for the entire State of Montana.

Data for the identification of low-income is from the U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE). The SAIPE program produces yearly single year poverty estimates for states, counties, and school districts and is considered the most accurate for these geographic scales, especially for areas with populations of 65,000 or less. Minority populations are identified using the U.S. Census Population Estimates program which provides estimates for the resident population by age, sex, race, and Hispanic origin at the national, state and county scales. Estimates from SAIPE and the Population Estimates program are used in federal funding allocations. The analysis was conducted at the county level due to the availability of the most current data.

Table 12 presents percentages of: a) individuals in poverty and b) the population's race and ethnicity for the State of Montana and Yellowstone County. Table 12 indicates that Yellowstone County does not have an environmental justice minority population since neither the neither minority nor low-income status in the study area meets the above criteria. Therefore no additional analysis is needed for this EA.

Table 12: Percentages of Individuals in Poverty and Race and Ethnicity Percentages for the State of Montana and Yellowstone County based on 2012 Estimates.

	Percent of Population (All Ages)								
		Race[2]						Ethniciy[2]	
	In Poverty[1]	White Alone	Black or African American Alone	American Indian and Alaska Native Alone	Asian Alone	Native Hawaiian and Other Pacific Islander Alone	Two or more races	Hispanic	Aggregated Minority[2,3]
Montana	15.6	89.7	0.6	6.5	0.7	0.1	2.5	3.1	12.8
Yellowstone County	12.7	91.4	0.8	4.3	0.8	0.1	2.6	4.9	12.4

[1]Source: U.S. Census. 2013. 2012 Poverty and Median Household Income Estimates. Small Area Income and Poverty Estimates (SAIPE) Program. Release date: December 2013.
[2]Source: U.S. Census. 2013. Annual Estimates of the Resident Population by Sex, Race, and Hispanic Origin for the United States, States, and Counties. Population Division. Release date: June 2013.
[3] The term "aggregated minority" refers to that part of the total population which is not classified as Non-Hispanic White Only by the U.S. Census Bureau. By using this definition of aggregated minority, the percentage is inclusive of Hispanics, other minority single race categories and multiple race categories that include a minority race category. This definition is most inclusive of populations that may be considered as a minority population under EO 12898.

3.17.2 Economics

Certain existing demographic and economic features influence and define the nature of local economic and social activity. Among these features are the local population, the presence and proximity of cities or regional business centers, longstanding industries, infrastructure, predominant land and water features, and unique area amenities. Several additional parcels in

Yellowstone County have been nominated for leasing in the October 2014 lease sale. While the majority of nominated land is unoccupied there are social and economic linkages which connect nominated parcels to communities in the surrounding area. This is especially true of Billings, where several companies specializing in oil and gas related activities are based out of.

In 2012, Yellowstone County, Montana was estimated to have a total population of 151,882 people, with 66,135 households earning an average annual household income of $94,977 (IMPLAN, 2012). In 2012, the 8-county area economy supported approximately 103,725 jobs in 225 industrial sectors, equating to approximately 1.5 people or 0.6 households per job. The top five industries operating in the local economy included: food service and drinking places, wholesale trade, private hospitals, real estate, and employment services (IMPLAN, 2012). A large share of this economic activity is based out of the city of Billings, which serves as the area's largest business center and the county seat of Yellowstone.

All parcels nominated and being considered for leasing in the October 2014 lease sale are located in the Southern Montana County of Yellowstone. Oil and gas production in Yellowstone has been tapering off and production of the Three Forks Formation in Eastern Montana has ramped up. Although county wide production of oil exceed more than 30,000 bbls and 600 MCF of natural gas on annual average in the early 1990s, average annual production fell to 16.735 bbls of oil and 72 MCF of gas between 2009 and 2013 (Montana Board of Oil and Gas, Annual Production by County 2014). Although minerals administered by the BLM are associated with only a fraction of the county's oil and gas activity, the leasing and development of these minerals supports local employment and income and generates public revenue for many surrounding communities. The economic contributions of Federal fluid minerals are largely influenced by the number of acres leased and estimated levels of production and can be measured in terms of the jobs, income, and public revenue it generates.

Mineral rights can be owned by private individuals, corporations, Indian tribes, or by local, State, or Federal Governments. Typically companies specializing in the development and extraction of oil and gas lease the mineral rights for a particular parcel from the owner of the mineral rights. As of April, 2014, 2,155 acres were leased from the BLM for oil and gas development in Yellowstone County. Federal oil and gas leases are generally issued for 10 years unless drilling activities result in one or more producing wells, or the lease is part of a communitization agreement and incorporated into an existing field or unit. Once production of federal minerals from a lease has begun, the lease is considered to be held by production and the lessee is required to make royalty payments to the Federal Government. Of 2,155 acres leased from the BLM in Yellowstone, only 200 acres were held by production at the time of this analysis.

Leasing mineral rights for the development of Federal minerals generates public revenue through the bonus bids paid at lease auctions and annual rents collected on leased parcels not held by production. Nominated parcels approved for leasing are offered by the BLM at a minimum rate of $2.00 per acre at the lease sale. These sales are competitive and parcels with high potential for oil and gas production command bonus bids in excess of the minimum bid. Between 2009 and 2013, only three parcels totaling 987 acres have been auction for leasing in Yellowstone County. All of which were sold for $2 an acre, generating a total of $1,974 in federal lease revenue over the last five years. In addition to bonus bids, lessees are required to pay rent annually until the

lease is classified as held by production, or until the lease expires. These rent payments are equal to $1.50 an acre for the first five years and $2.00 an acre for the second five years of the lease. On annual average, total annual lease bonus and rental revenue to the Federal Government from leasing BLM minerals in Yellowstone County is estimated to be approximately $1,115.

Forty-nine percent of these Federal leasing revenues from public domain minerals are distributed to the State who distributes 25 percent of federal revenue from public domain minerals back to the counties where the leases exist. About 73 percent of the leased BLM minerals within the Billings Field Office are leased on public domain minerals. With federally acquired minerals (acquired under Bankhead Jones authority), 25 percent of Federal revenues are distributed directly to the appropriate counties. Of the $1,115 in federal revenue generated from bonus bids and rent associated with BLM mineral leases in Yellowstone County, $474 is estimated to be distributed back to the state of Montana who then distributes a portion of this revenue back to the county. Between leasing revenue collected from public domain and acquired minerals, Yellowstone County receives about $175 from federal mineral leasing auction and rent revenue on annual average.

As mentioned above, Federal oil and gas production in Montana is subject to production taxes or royalties. The Federal oil and gas royalties on production from public domain minerals equal 12.5 percent of the value of production (43 CFR 3103.3.1). Forty-nine percent of these royalties from public domain minerals are distributed to the State, of which 25 percent is distributed back to the county of production (Title 17-3-240, MCA). If production comes from acquired Federal minerals under the Bankhead Jones authority, 25 percent of the Federal revenues are distributed directly to the counties of production.

The economic contribution of oil and gas related activities to the local economy can be measured by estimating the employment and labor income generated by 1) payments to counties associated with the leasing and rent 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. As of 2012, the extraction of oil and natural gas (NAICS sector 20), drilling oil and gas wells (NAICS sector 28), and support activities for oil and gas operations (NAICS sector 29) supported an estimated 1,718 jobs[1] and $60 million in employee compensation and proprietor income in Yellowstone County (IMPLAN, 2012).

Currently, the BLM leases 2,155 acres of Federal minerals in Yellowstone County. Total Federal revenues from Federal oil and gas leasing, rents, and royalty payments associated with the leasing of these minerals averages an estimated $5,200. Federal revenues disbursed to the State of Montana on annual average is estimated $2,200 per year and those redistributed back to local governments in Yellowstone County are estimated to be about $800 on annual average. These

[1] IMPLAN job estimates are not full-time equivalents and include all full-time, part-time, and temporary positions supported oil and gas activities within the planning area. These activities may support, or partially support a number of jobs annually. In this respect, 1 job in IMPLAN lasting 12 months = 2 jobs lasting 6 months each = 3 jobs lasting 4 months

revenues help fund traditional county functions such as enforcing laws, administering justice, collecting and disbursing tax funds, providing for orderly elections, maintaining roads and highways, providing fire protection, and/or keeping records. Other county functions that may be funded include administering primary and secondary education and operating clinics/hospitals, county libraries, county airports, local landfills, and county health systems.

On annual average the leasing, development, and extraction of Federal minerals administered by the BLM supports about 30 local jobs (full and part-time) and about $1 million in local labor income. This amounts to less than 1 percent of total employment and income (i.e. wages and proprietor's income) in Yellowstone County.

4.0 ENVIRONMENTAL IMPACTS

4.1 Assumptions and Reasonably Foreseeable Development Scenario Summary

This chapter describes the environmental effects (direct, indirect, and cumulative) that would result from the alternatives. This analysis is tiered to the final environmental impact statement (EIS) for the Billings RMP/ROD. The analysis contained within that RMP/FEIS remains adequate. The RMP determined which areas are available for oil and gas leasing and under what conditions those leases are to be offered and sold.

The act of leasing parcels would not result in any activity that might affect impacts to the various resources. Direct effects of leasing are creation of valid existing right(s) and related to revenue generated by the lease sale receipts.

Potential indirect effects associated with a lease sale would result from any future developments. The BLM assumes there is a high interest in development of any leased parcels but, eEven if lease parcels are leased, it remains unknown and is speculative to assume whether development would actually occur, and if so, it is speculative to assume 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 with public review opportunities 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.

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 10 nominated lease parcels. The lease parcels are identified within areas of low to moderate development potential. The projected number of wells is used to conduct analysis for economic resources. 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 and Lake Basin Fault Zone areas. This area is identified on Map 3. A detailed description of the RFD forecast in the analysis area is found in Appendix B.

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 B-1 in Appendix B and were used by cultural resources to determine the number of cultural sites potentially impacted within the nominated lease parcels. 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.

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.

The assumptions were not applied to Alternative A because the lease parcels would not be offered 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.

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.

4.2 Alternative A (No Action)

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

Under Alternative A, zero parcels would 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.

4.2.2Economics

4.2.2.1 Direct and Indirect Effects:

The economic contributions of activities associated with oil and gas development on BLM administered Federal minerals are measured in terms of 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. Forward and backward linkages between businesses and people in communities surrounding parcels leased for the development of Federal minerals has enabled the oil and gas industry to attract new revenue to the region, growing the local economy and creating new employment and income opportunities in a wide range of industrial sectors. Table 13 is a summary of local revenues, employment, and labor income impacts of each alternative.

Alternative A is the no action alternative. Under Alternative A, no additional parcels would be leased and no additional public revenue would be generated. The economic contributions of activities associated with oil and gas development would remain consistent with existing conditions described in the Economics section of Chapter 3. Economic effects are summarized and displayed in comparative form in Table 13.

Table 13: Summary Comparison of Estimated Average Annual Economic Impacts

Alternative	Acres Leased	Change in Local Revenue to Counties	Change in Total Employment (full and part-time jobs)	Change in Total Labor Income
A	0	0	0	0
B	1,282	$466	0	$0

*These impacts would be in addition to impacts from existing Federal leases, rents, royalties and related activities.

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 Alternative B (Proposed Action)

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 0.25 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 14 discloses projected annual GHG source emissions from BLM-permitted activities associated with the RFD.

Table 14: BLM Projected Annual Emissions of Greenhouse Gases Associated with Oil and Gas Exploration and Development Activity in the Billings Field Office.

Source	BLM Long-Term Greenhouse Gas Emissions in tons/year			Emissions (metric tons/yr)
	CO_2	CH_4	N_2O	CO_2e
Conventional Natural Gas	355	5	0.0	422
*****Coal Bed Natural Gas (none forecasted in RFD)	0.0	0	0.0	0.0
Oil	8,353	54	2.3	8,619
Total	**8,708**	**59**	**2.3**	**9,041**

*****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 1,602 acres of lease parcels with federal minerals could be leased. These acres constitute approximately 0.18 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, 0.18 percent of the total estimated BLM RFD emissions of approximately 9,041 metric tons/year would be approximately 16 metric tons/year of CO_2e if the parcels included in 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 15 (reproduced from Table 6-2 in Climate Change SIR 2010), display common methane emission technologies reported under the USEPA Natural Gas STAR Program and associated emission reduction, cost, maintenance and payback data.

Table 15: Selected Methane Emission Reductions Reported Under the USEPA Natural Gas STAR Program [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

Table 15: 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)
Valves					
Test and repair pressure safety valves	170	NR	$0.1K – $1K	3 – 10 yr	NR
Inspect and repair compressor station blowdown valves	2,000	<$1K	$0.1K – $1K	0 – 1 yr	NR
Compressors					
Install electric compressors	40 – 16,000	>$10K	>$1K	>10 yr	NR
Replace centrifugal compressor wet seals with dry seals	45,120	$324K	Negligible	10 mo	$7
Flare Installation	2,000	>$10K	>$1K	None	NR

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

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

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

K = 1,000

mo = months

Mcf = thousand cubic feet of methane

NR = not reported

yr = year

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

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

The probability and magnitude of these effects are dependent upon local site characteristics, climatic events, and the specific mitigation applied to the project. Within 2-5 years following reclamation, vegetative cover and rates of erosion would return to pre-disturbance conditions (FSEIS 2008). Exceptions would be sites poorly suited to reclamation (approximately 44 acres, three percent of the parcels), which would require unconventional and/or site-specific reclamation measures. Prime farmland if irrigated (approximately 6 acres, <1% percent of the parcels) would be avoided or require site-specific reclamation as well.

4.3.4.2 Mitigation

Measures would be taken to reduce, avoid, or minimize potential impacts to soil resources from exploration and development activities. Prior to authorization, proposed actions would be evaluated on a case-by-case basis and would be subject to mitigation measures in order to maintain the soil system. Mitigation could include avoiding areas with low restoration potential, 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 lease parcels.

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. Impacts to vegetation would depend on the vegetation type/community, soil

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

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

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

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

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

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

4.3.6.1.1 Invasive, Non-Native Species (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.

Direct impacts would occur during oil and gas development. 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.

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.

NSO 11-2 stipulation, applied in parcel MTM 105431-F6, would minimize potential direct impacts to riparian resources. The potential for indirect impacts from the exploration and development of oil and gas within uplands or adjacent to riparian-wetland areas may include reduced 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.

Given that not all riparian resources are mapped or known by BLM specialists, if riparian areas are discovered during the APD process or development stages, conditions would be applied to conserve riparian resources and riparian functionality.

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 10 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.

Indirect impacts to wildlife resources include loss of habitat from development infrastructure, mortalities resulting from collisions with vehicles and power lines, electrocution on power lines, and displacement of wildlife species from initial disturbance caused by human presence. Indirect

impacts would include habitat fragmentation and subsequent avoidance due to vehicle traffic, human presence, and other continual development activities.

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

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

The use of standard leasing terms and RMP stipulations on these lands (refer to Appendix A) would minimize, but not preclude impacts to wildlife if development occurs. Oil and gas development which results in surface disturbance could directly and indirectly impact wildlife species. These impacts could include loss or reduction in suitability of habitat, improved habitat for undesirable (non-native) competitors, species or community shift to species or communities more tolerant of disturbances, nest abandonment, mortalities resulting from collisions with vehicles and power lines, electrocutions from power lines, barriers to species migration, habitat fragmentation, increased predation, habitat avoidance, and displacement of wildlife species resulting from human presence. The scale, location, and pace of development, combined with implementation of mitigation measures and the specific tolerance of the species to human disturbance all influence the severity of impacts to wildlife species and habitats, including Threatened, Endangered, Candidate, Proposed, and other special status species.

The reasonably foreseeable development scenario indicates development of the leases resulting in approximately 3.5 acres of surface disturbance (somewhere within the analysis area), which would have minimal impacts on wildlife resources in the analysis area. Overall, this would only result in less than one tenth of one percent of the analysis area being disturbed by the lease parcels being developed (direct habitat alteration/loss).

Stipulations designed to conserve wildlife habitat and minimize disturbance and disruption to wildlife populations have been applied where issues have been identified. These stipulations

include timing limitations for activities in big game winter range and near sage-grouse and sharptailed grouse lek sites.

4.3.8.1.1 Threatened, Endangered Proposed, and Candidate Species

Threatened and Endangered Species Consultation

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

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

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

Table 16: Threatened and Endangered, Proposed and Candidate Wildlife Species Summary of Determinations for the Billings 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 BLM Sensitive 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:
Suitable habitat within various lease parcels exists to support USFWS Candidate species, Greater Sage-Grouse. Development potential indicates approximately 3.5 acres of surface disturbance would be possible with development associated with this proposed action. The analysis area, which is a loosely drawn polygon surrounding the parcels in Yellowstone County, consists of approximately 76,000 acres. The disturbance of 3.5 acres would result in less than 1/100 of a percent disturbance or habitat alteration. Furthermore, several stipulations are applied to the parcels near sage-grouse leks and in sage-grouse habitat that help conserve habitat qualities and minimize disruptive activities during crucial time periods (lekking and nesting seasons). The overall impact to sage-grouse, with stipulations applied and design features to conserve habitat, would be minimal.

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.

Wildlife inventories would be conducted in suitable habitat at APD stage of development to determine the presence or absence of sage-grouse. If sage-grouse are found in the area, Conditions of Approval would be applied for the protection of habitat.

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 or damaging 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.

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 105431-FB, FE and FA do not contain recorded cultural resources that appear on the site database, but may be within the viewshed of the Nez Perce National Historic Trails which is a nationally significant cultural and historic resource. Stipulations CR 16-1 (above) and CSU 12-4 (pertains to viewshed) would be attached to these parcels. As there is one known and unevaluated cultural resource within MTM 105431-FF lease sale parcel, a No Surface Occupancy (NSO) stipulation (NSO 11-11) would be attached to this parcel, 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 parcel. 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, no ground disturbance can occur without further authorization from BLM and the surface management agency. 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 Nez Perce, Umatilla, Colville, 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.

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.

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. Stipulation CSU 12-4 may be applied to lease parcels MTM 105431-FB, FE and FA if development would enter into the viewshed of the NPNHT or Canyon Creek Battlefield.

4.3.14 Special Designations

4.3.14.1 National Historic Trails

The formally recognized corridor of the Nez Perce National Historic Trail is located on a northwest-southeast diagonal between parcel MTM 105431-FB west of the corridor and MTM 105431-FE and MTM 105431-FA, east of the corridor. Stipulation CR 16-1 would be applied. The topography of the area tends to preclude visual impacts to the NPNHT from development activities on these parcels.

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. A visual impact assessment would be conducted within parcels MTM 105431-FB and MTM 105431-FE. If a visual impact is suggested, stipulation CR 16-1 would be applied to reduce visual impacts. However, in most surface-disturbing situations cultural resources would be avoided by project redesign or relocation. Should an adverse impact be unavoidable, significant properties would be site-specifically mitigated prior to implementation of a project.

4.3.15 Livestock Grazing
4.3.15.1 Direct and Indirect Effects
Leasing the parcels would have no direct impacts on livestock grazing. Any potential effects from the sale of leases would occur at the time the leases are developed.

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

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

4.3.16 Recreation and Travel Management
4.3.16.1 Direct and Indirect Effects
Leasing the parcels would have no direct impacts on recreation and travel management. Any potential effects from the sale of leases would occur at the time the leases are developed.

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

The degree of these impacts can only be determined at the APD stage, due to the unknown location of potential development.

4.3.17 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. LN 14-1 will be applied to parcel MT 105431-F5 due to existing ROWs.

4.3.17.2 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. Potential lease buyers are notified of existing ROWs and potential conflicts with development through the application of LN 14-1 (see Appendix A). 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.

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

Issuing a lease provides opportunities to explore for and develop oil and gas. Additional natural gas or crude oil produced from any or all of the 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, lease parcel F6 would be offered for lease subject to major (NSO) constraints. Six parcels, FA, FB, FC, FD, FE, and FF, would be offered for lease with moderate (CSU) constraints. Three parcels, F3, F5 and F7 would be offered for lease with minor contraints (Timing Limits) and lease notices.

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.

4.3.20 Social and Economic Conditions
4.3.20.1 Social and Environmental Justice
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 additional 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 and affect the quality of life of the 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 and effect on quality of life would depend on the activity affected, traffic patterns within the area, noise and light levels, length of time and season these activities occur, etc. Until actual well development locations are identified it is difficult to ascertain whether there would be any impacts to property values. As discussed in the Economics section, 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.

4.20.1.1 Alternative A (No Action)
Economic effects are summarized and displayed in comparative form in Table 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 employment or income would be generated if none of the parcels are leased.

Alternative B (Proposed Action)

4.3.20.2 Economics
4.3.20.2.1 Direct and Indirect Effects
Under Alternative B, 10 parcels in Yellowstone County would be made available for leasing at the October 2014 lease auction. The leasing of an additional 1,282 acres of BLM administered minerals in Yellowstone County is not anticipated to generate much additional public revenue, stimulate economic activity, or boost production associated with Federal minerals. It is estimated that the leasing of all minerals nominated for the October auction would generate about $2,500 in one-time bonus bids and $2,200 annually in rent revenue for the Federal government. Forty-nine

percent of Federal revenue collected from public domain minerals and 25 percent of Federal revenue from acquired minerals (acquired under Bankhead Jones authority) are redistributed to the State. Montana then distributes 25 percent of public domain revenue and all of acquired mineral revenue back to the counties where the leases exist. Approximately 73 percent of federal leased by the BLM in Yellowstone County are public domain minerals. If these additional parcels were to be leased, an additional $1,000 would be paid to the State of Montana and Yellowstone County would receive an additional $400 to fund schools, roads, and the general government.

Once oil and gas extraction begins, annual rent payments on leased minerals stops and lessees begin to pay royalties equal to 12.5 percent of the value of production (43 CFR 3103.3.1). Although the leasing of these 10 parcels would result in a 60 percent increase in BLM leased minerals in Yellowstone County, the potential for development and production off these lease is very low. Even if production resulted in a 5% increase in oil and gas production on BLM minerals, royalties associated with future development are only estimated to generate an additional $41 annually in federal oil and gas royalties. Of this new federal revenue, an estimated $17 could be disbursed to the State and $6 is estimated to be redistributed back to the Yellowstone County.

The total economic impact of leasing activities proposed under Alternative B is equal to direct and indirect effects of drilling activities, as well as the direct and indirect effects of additional public revenue redistributed back to the five counties. As shown in Table 17, the bonus bids, rents, royalties, and drilling and support activities associated with leasing an additional 1,282 acres of federal minerals is estimated to support no additional jobs and approximately $50 in labor income (IMPLAN, 2012).

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 2014). 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 CO2e 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 $749 (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.

4.3.21 Cumulative Impacts

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

The lack of measurable direct and indirect effects to economic conditions under the No Action Alternative translates to a lack of measurable cumulative effects. Under this alternative the BLM

will not make any additional Federal minerals available for leasing and Federal minerals leased from the Billings Field Office will likely continue at existing levels. Current levels of BLM mineral leasing in Yellowstone County will continue to support jobs and income in the local economy and the economic contributions of oil and gas activities associated with these leases will continue to be similar to those discussed in Chapter 3.

Cumulative economic impacts associated with Federal mineral leasing under the alternatives are shown below in Table 17 and Table 18.

Table 17: Summary Comparison of Cumulative Annual Economic Impacts by Alternative

Activity	A	B
Existing Acres leased	2,155	2,155
Acres that would be leased based on this EA	0	1,282
Total acres leased	2,155	3,437
Acres held by production	1,764	1,764
Total acres leased for which lease rents would be paid	391	1,673
Total average annual Federal lease and rental revenue	$1,115	$3,616
Average annual distribution to State*	$474	$1,538
Average annual distribution to Counties**	$175	567
Average annual oil production (bbl)***	361	365
Average annual gas production (MCF)***	4	4
Total Average annual Federal O&G royalties	$4,090	$4,131
Average annual distribution to State*	$1,739	$1,757
Average annual distribution to Counties**	$642	$648
Total average annual Federal Revenues	$5,206	$7,747
Total average annual State Revenues	$2,213	$3,294
Total average annual revenue distributed to counties	$817	$1,216

*49 percent of Federal revenue from public domain minerals and 25 percent of Federal revenue from acquired minerals are distributed back to the State.
**Montana distributes 25 percent of public domain revenue and all of acquired mineral revenue received from the Federal Government back to the counties where revenue was generated.
***Estimated as BLM's share of Federal minerals production in Yellowstone County.

Table 18: Summary Comparison of Employment and Income Supported by BLM Minerals in Yellowstone County

Industry	Total Jobs Supported		Total Income Supported ($1000)	
	Alt. A	Alt. B	Alt. A	Alt. B
Total Contribution of BLM Minerals	30	30	$1,019,610	$1,019,660

IMPLAN, 2012

4.3.21.2 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.

4.3.21.2.1 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.

4.3.21.3 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.

4.3.21.3.1 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 0.23 percent of this total. Table 19 displays projected GHG emissions from non-BLM activities included in the Billings Field Office RFD. Total projected emissions of non-BLM activities in the RFD are 13,064 metric tons/year of CO_2e. When combined with projected annual BLM emissions, this totals 22,105 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 19: 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	3,947	45	0.01	4,446
Coal Bed Natural Gas (none forecasted in RFD)	0	0	0	0
Oil	8,353	54	0.04	8,619
Total	**12,300**	**99**	**0.06**	**13,064**

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 37 million metric tons of CO_2e (CCS 2007). Potential emissions from development of lease parcels in Alternative B of this project represent approximately 4×10^{-5} 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 6,702 million metric tons, and net emissions of 5,797 million metric tons (when CO_2 sinks were considered) of CO_2e in 2011 (EPA 2013c). Potential annual emissions under Alternative B of this project would amount to approximately 2.4×10^{-7} percent of gross U.S. total emissions. Global GHG emissions for 2004 (IPCC 2007) indicated approximately 49 gigatonnes (10^9 metric tons) of CO_2e emitted. Potential annual emissions under Alternative B would amount to approximately 3.3×10^{-8} 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).

4.3.21.3.2 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).

4.3.21.3.4 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.

4.3.21.3.5 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.

4.3.21.3.6 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.

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

The cumulative effects of Alternative B are summarized in Table 17 and Table 18. The leasing of an additional 1,282 acres of Federal minerals by the Billings Field Office would result in a total of 3,437 acres of BLM leased minerals in Yellowstone County. The leasing of these minerals by the BLM would generate about $3,600 in Federal revenue. The redistribution of Federal revenue associated with leasing of these Federal minerals is estimated to generate nearly $1,500 in State revenue for Montana and approximately$500 in local public revenue in Yellowstone County. Federal oil and gas production associated with BLM minerals in Yellowstone may increase slightly, anticipated Federal royalty revenue from production on these minerals is estimated to be approximately $4,100 annually. The redistribution of Federal royalty payments resulting from extraction of BLM minerals in Yellowstone County would provide the State of Montana with $1,700 in public revenue with Yellowstone County receiving roughly $650 from production on BLM minerals within county lines.

Oil and gas related activities associated with Federal minerals leased from the Billings Field Office generates public revenue, stimulates economic activity in the public and private sectors, and can be attributed with supporting employment and income opportunities throughout the local rural economy. Total Federal revenue associated with the leasing and production of BLM administered minerals in Yellowstone County under Alternative B is estimated to exceed $7,700. The redistribution of Federal revenue from these minerals is anticipated to generate nearly $3,300 in State revenue for Montana, and approximately $1,200 will likely be returned to Yellowstone County to fund law enforcement and fire departments, roads and highway maintenance, public education, local clinics/hospitals and county libraries. Public services and infrastructure investments by the State and local municipalities with redistributed Federal dollars supports employment and income in the public sector and in industries providing goods and services to the public sector. The drilling, servicing, and production resulting from BLM leasing of Federal minerals in Yellowstone also stimulates economic activity in the private sector, directly and indirectly supporting local employment and income in nearly every part of the economy. While production is anticipated to increase slightly over the life of these new leases, increased produced will continue to support 30 local jobs and $1 million in local wages and proprietor's income.

The annual SCC associated with oil and gas development within Yellowstone County is $2,072 (in 2011 dollars) based on 3,437 cumulative acres. As noted earlier, the estimated SCC is not directly comparable to economic contributions.

5.0 CONSULTATION AND COORDINATION

5.1 Persons, Agencies, and Organizations Consulted

Coordination with MT FWP and USFWS was conducted for the two 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. 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, and Nez Perce Tribal representatives in order to identify issues that may arise from the proposed action with regard to the Nez Perce National Historic Trail.

Table 20 lists persons, agencies, and organizations that were consulted during development of this EA along with the findings and conclusions associated with consultations.

Table 20: 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 (MT FWP), Region 5	I.M. #MT-2008-008, 2/26/2007; MT FWP and BLM Guidance on Coordination During Oil and Gas Lease Parcel Reviews	Consulted with MT FWP, submitted a list of conditions recommended to protect and conserve sensitive wildlife habitats in and around the leasing parcels.
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 during 2013 Oil & Gas EA discussions.
Confederated Tribes of the Umatilla Reservation	Section 106 of the National Historic Preservation Act	Comments/response was not received.
Confederated Tribes of the Colville Indian Reservation	Section 106 of the National Historic Preservation Act	Comments/response was not received.
Crow Tribe	Section 106 of the National Historic Preservation Act	Comments/response was not received.
Northern Cheyenne Tribe	Section 106 of the National Historic Preservation Act	Comments/response was not received.

5.2 Summary of Scoping

Public scoping for this project was conducted through a 15-day scoping period advertised on the BLM Montana State Office website and posting on the field office website NEPA notification log. Scoping was initiated March 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 27 surface owner notification letters were distributed for the oil and gas leasing analysis process in the Billings Field Office, six of which were for parcels being deferred. The BLM received approximately 40 comment letters/emails and numerous phone calls with regard to split estate development potential and issues.

5.3 List of Preparers

Table 21: 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, Travel Management
Jennifer Macy	Archeologist	Archeology, Paleontology, Special Designations
Jessica Montag	Sociologist	Social Conditions
Ernie McKenzie	Wildlife Biologist	EA Lead, Water, Riparian, Fisheries, Wildlife
Larry Padden	Natural Resource Specialist	Invasive Plant Species and Noxious Weeds

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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
Table A-1

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED STIPULATIONS FOR ENTIRE PARCEL IF LEASED	PROPOSED FOR DEFERRAL- NO LEASING
MTM 105431-FA	T. 1 N, R. 23 E, PMM, MT SEC. 24 NE; YELLOWSTONE COUNTY 160.00 AC PD	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **LN 14-2** (ALL LANDS) **CSU 12-1** (ALL LANDS) **CSU 12-4** (ALL LANDS) **LN 14-12** (ALL LANDS)	
MTM 105431-FB	T. 1 N, R. 23 E, PMM, MT SEC. 28 SWSW; YELLOWSTONE COUNTY 40.00 AC PD	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **LN 14-2** (ALL LANDS) **CSU 12-1** (ALL LANDS) **TL 13-1** (ALL LANDS) **CSU 12-4** (ALL LANDS) **LN 14-12** (ALL LANDS)	
MTM 105431-FC	T. 1 N, R. 24 E, PMM, MT SEC. 4 LOTS 1-4; SEC. 8 SE; YELLOWSTONE COUNTY 322.44 AC PD	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **LN 14-2** (ALL LANDS) **CSU 12-1** SEC 8 NWSE, SWSE; **TL 13-1** SEC 8 SE; **LN 14-12** (ALL LANDS)	
MTM 105431-FD	T. 1 N, R. 24 E, PMM, MT SEC. 14 SWSE; YELLOWSTONE COUNTY 40.00 AC PD	**CR 16-**1 (ALL LANDS) **TES 16-2** (ALL LANDS) **LN 14-2** (ALL LANDS) **CSU 12-1** (ALL LANDS) **TL 13-1** (ALL LANDS) **LN 14-12** (ALL LANDS)	
MTM 105431-FE	T. 1 N, R. 24 E, PMM, MT SEC. 32 E2SE; YELLOWSTONE COUNTY 80.00 AC PD	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **LN 14-2** (ALL LANDS) **CSU 12-1** (ALL LANDS) **TL 13-1** (ALL LANDS) **LN 14-12** (ALL LANDS)	
MTM 105431-FF	T. 2 N, R. 24 E, PMM, MTSEC. 24 NWSW;YELLOWSTONE COUNTY40.00 ACPD	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **LN 14-2** (ALL LANDS) **TL 13-3** (ALL LANDS) **CSU 12-4** (ALL LANDS) **LN 14-12** (ALL LANDS) **LN 14-11** (ALL LANDS)	

MTM 105431-E9	T. 2 N, R. 25 E, PMM, MT SEC. 28 NENW; YELLOWSTONE COUNTY 40.00 AC PD	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **LN 14-2** (ALL LANDS) **NSO 11-4** (ALL LANDS) **TL 13-1** (ALL LANDS) **TL 13-3** (ALL LANDS) **LN 14-12** (ALL LANDS) **LN 14-11** (ALL LANDS)	**(ALL LANDS)** Entire parcel is within 0.6 miles of a greater sage-grouse lek. The Billings Draft RMP Revision identifies this with a major stipulation, NSO. Deferred until Billings Field Office completes resource management plan revision.
MTM 105431-F3	T. 2 N, R. 26 E, PMM, MT SEC. 3 S2; YELLOWSTONE COUNTY 320.00 AC **50% U.S. MINERAL INTEREST 2/** ACQ	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **LN 14-2** (ALL LANDS) **TL 13-1** SEC 3 SWSE, SESE, NESE; **TL 13-3** SEC 3 SW; **LN 14-12** (ALL LANDS) **LN 14-11** (ALL LANDS)	
MTM 105431-F4	T. 2 N, R. 26 E, PMM, MTSEC. 8 NE, SW;YELLOWSTONE COUNTY320.00 ACACQ	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **LN 14-2** (ALL LANDS) **NSO 11-4** (ALL LANDS) **TL 13-3** (ALL LANDS) **NSO 11-2** SEC 8 SWSW **LN 14-12** (ALL LANDS) **LN 14-11** (ALL LANDS)	SEC. 8 SW, S2NE These portions of this parcel are within 0.6 miles of a greater sage-grouse lek. SEC. 8 (ALL LANDS) This entire parcel falls within 1/2 mile of a sharptail grouse lek.The Billings Draft RMP Revision identifies this with a major stipulation, NSO. Deferred until Billings Field Office completes resource management plan revision.
MTM 105431-F5	T. 2 N, R. 26 E, PMM, MT SEC. 10 NE; YELLOWSTONE COUNTY 160.00 AC ACQ	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **LN 14-2** (ALL LANDS) **TL 13-1** (ALL LANDS) **TL 13-3** SEC 10 W2NE; **LN 14-1** (ALL LANDS) **LN 14-12** (ALL LANDS) **LN 14-11** (ALL LANDS)	

MTM 105431-F6	T. 2 N, R. 26 E, PMM, MT SEC. 14 N2NE; YELLOWSTONE COUNTY 80.00 AC PD	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **LN 14-2** (ALL LANDS) **NSO 11-2** (ALL LANDS) **LN 14-12** (ALL LANDS) **LN 14-11** (ALL LANDS)	
MTM 105431-F7	T. 2 N, R. 26 E, PMM, MT SEC. 22 SWSW; YELLOWSTONE COUNTY 40.00 AC PD	**LN 14-12** (ALL LANDS) **LN 14-11** (ALL LANDS)	
MTM 105431-HW	T. 5 S, R. 16 E, PMM, MTSEC. 13 NWNE;STILLWATER COUNTY40.00 ACPD	**CR 16-1** (ALL LANDS) **TES 16-2** (ALL LANDS) **LN 14-2** (ALL LANDS) **NSO 11-2** (ALL LANDS) **TL 13-1** (ALL LANDS) **LN 14-12** (ALL LANDS)	**ALL LANDS**(Yellowstone Cutthroat trout Suitable Recovery Habitat, Source Water Protection Area, and Unincorporated town within lease parcel. Deferred until Billings Field Office completes resource management plan revision.)

Billings Field Office
October 22, 2013 OG Sale

Table A-2 -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 12-4	**CONTROLLED SURFACE USE STIPULATION** Prior to surface disturbance, a surface use plan of operations (SUPO) for oil and gas activities must be approved for black-footed ferret reintroduction areas by the authorized officer in consultation with the U.S. Fish and Wildlife Service (USFWS).
Cultural 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 14-11	**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

Stipulation Number	Stipulation Name/Brief Description
	leased lands are examined to determine if paleontological resources are present and to specify mitigation measures. Guidance for application of this requirement can be found in WO IM 2008-009 dated October 15, 2007, and WO IM 2009-011 dated October 10, 2008. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or project proponent shall contact the BLM to determine if a paleontological resource inventory is required. If an inventory is required, the lessee or project proponent will complete the inventory subject to the following: ● the project proponent must engage the services of a qualified paleontologist, acceptable to the BLM, to conduct the inventory. ●the project proponent will, at a minimum, inventory a 10-acre area or larger to incorporate possible project relocation which may result from environmental or other resource considerations. ●paleontological inventory may identify resources that may require mitigation to the satisfaction of the BLM as directed by WO IM 2009-011.
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.
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 13-3	**TIMING LIMITATION STIPULATION** No surface use is allowed in grouse nesting habitat within two miles of a lek between March 1 and June 15.

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 ten nominated lease parcels. The ten lease parcels are identified within moderate and low 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 ten lease parcels have been analyzed under the Bull Mountain Basin (low potential) and Lake Basin (moderate potential) development zones (Map 3).

All 10 lease parcels are in Yellowstone County and are located in a zone of low to moderate development potential. The RFD scenario for moderate potential zones forecasts up to 20 wells per year with one to four federal wells per year. Assumed disturbance factors are two acres per drill site and 1.5 acres for ancillary facilities and access roads. The parcels total 1,282.44 acres, approximately 1.3 percent of the four townships they are located within.

The potential number of acres disturbed by exploration and development activities is shown in Table B-3. 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 B-1. 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.

Figure 5: Map 1 - Yellowstone County Lease Parcels October 2014

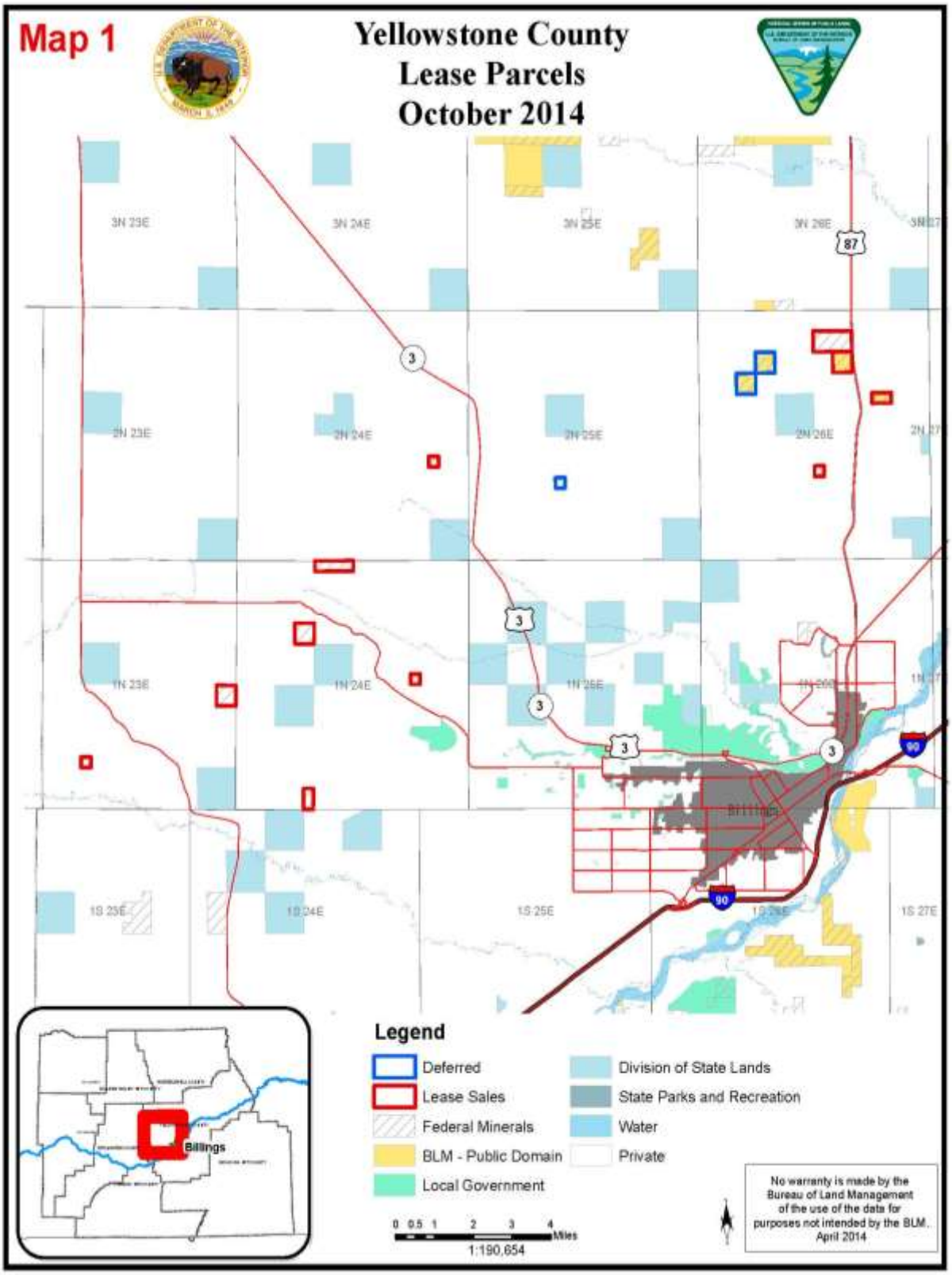

Figure 6: Map 2 - Stillwater County Lease Parcel HW, October 2014

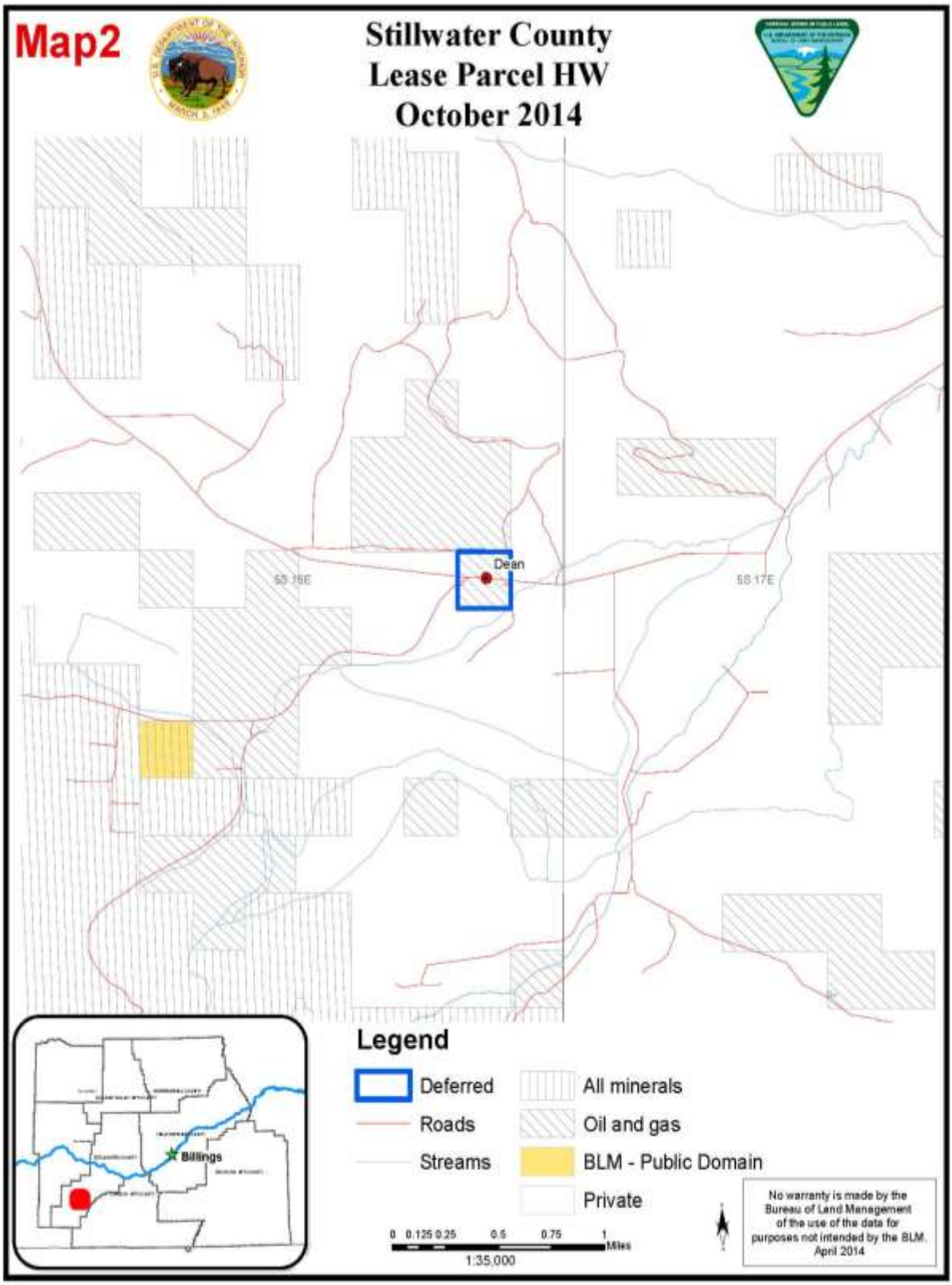

Figure 7: Map 3 - Yellowstone County Oil and Gas Development Potential, October 2014

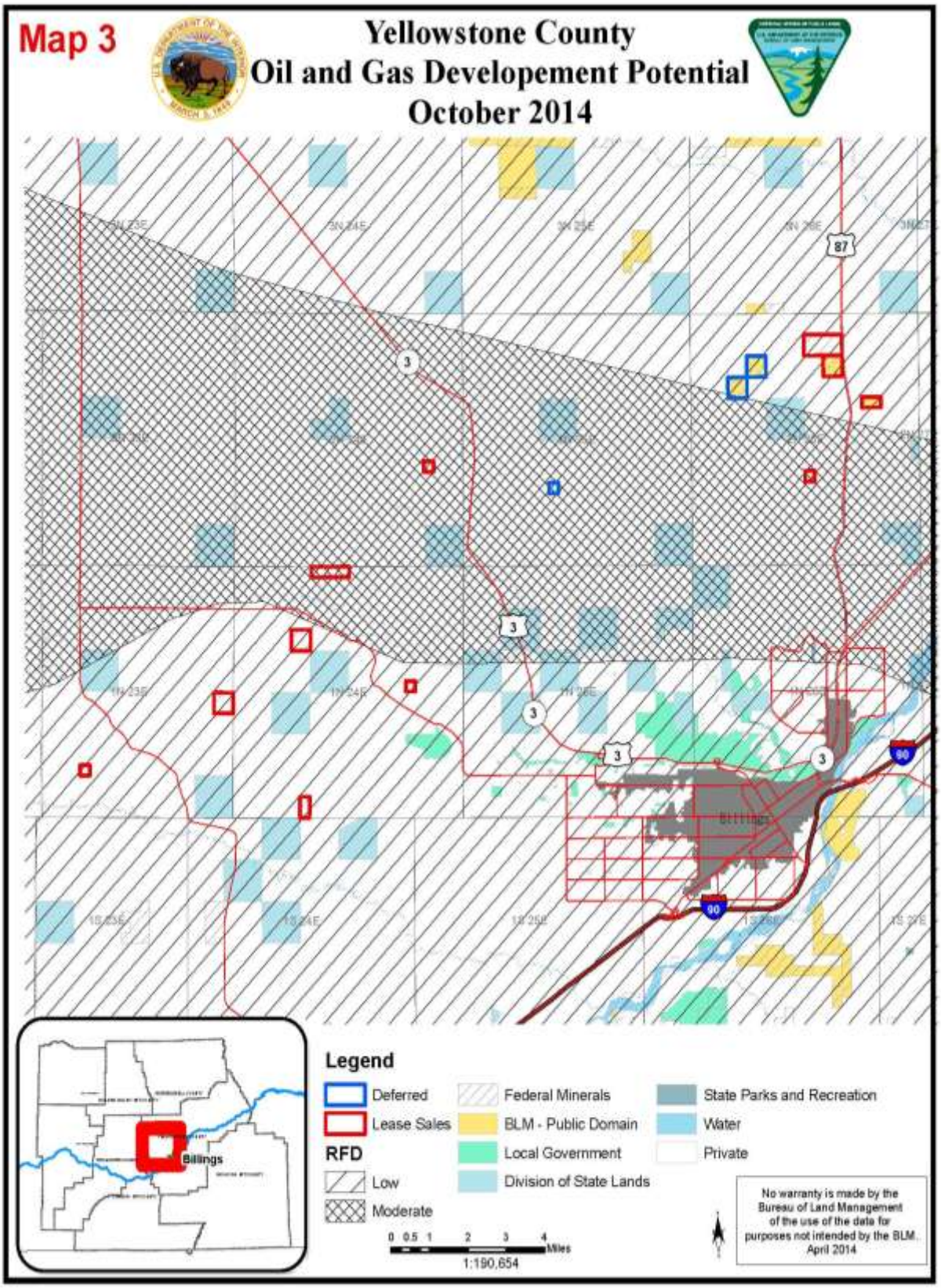

Figure 8: Map 4 - Yellowstone County Lease Parcels / Wildlife, October 2014

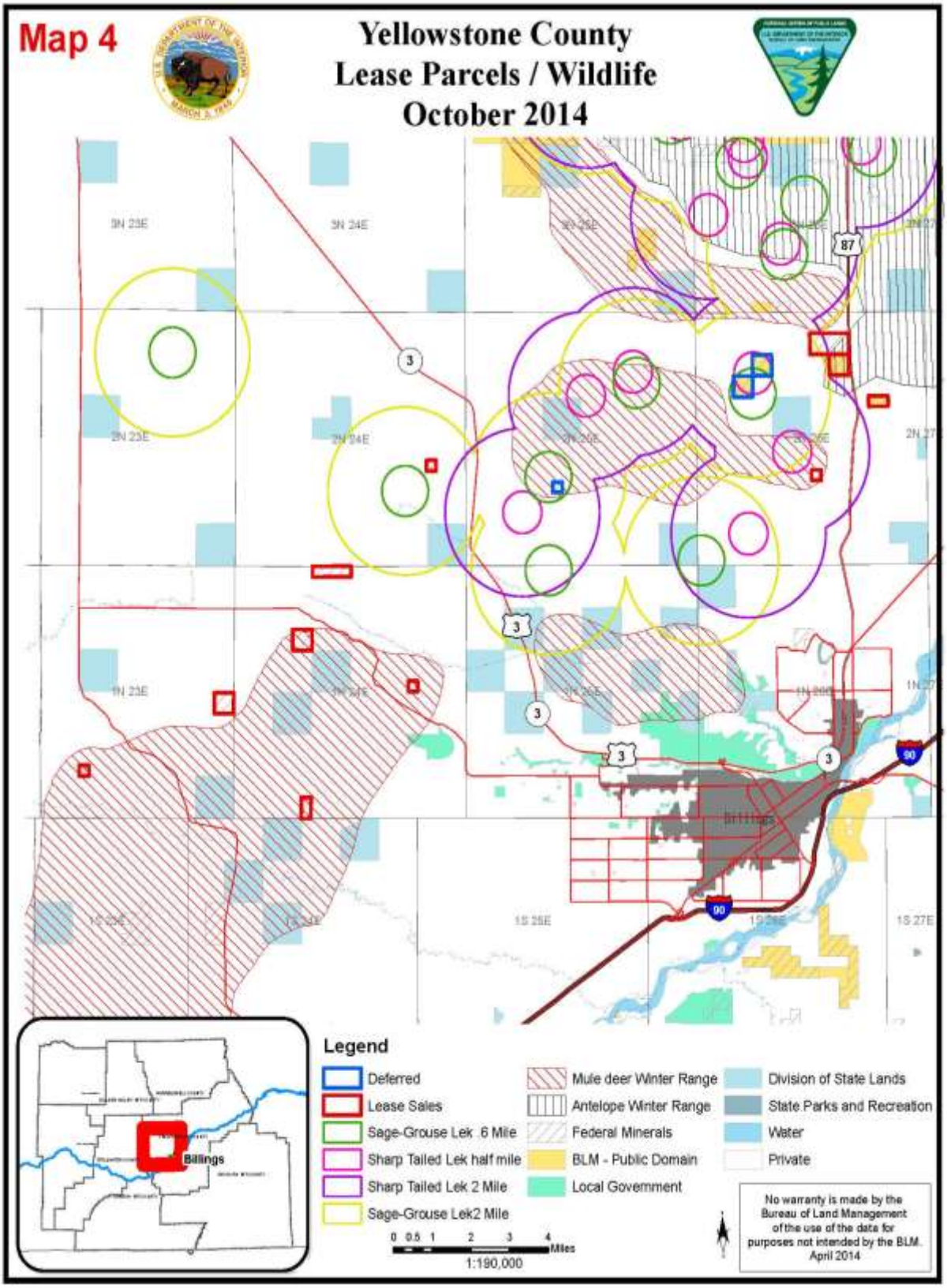

Figure 9: Map 5 - Special Designation Nez Perce National Historic Trail, October 2014