United States Department of the Interior

Bureau of Land Management

ENVIRONMENTAL ASSESSMENT DOI-BLM-MT-C040-2014-0002-EA
February 10, 2014

Project: Oil and Gas Lease Parcel, July 15, 2014 Sale
and Reinstatement of Lease SDM 098206

Location: South Dakota Field Office. Harding and Fall River Counties, South Dakota

Prepared by: South Dakota Field Office
310 Roundup Street
Belle Fourche, South Dakota 57717
Phone: 605-892-7000
Fax: 605-892-7015

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
South Dakota Field Office
310 Roundup Street
Belle Fourche, South Dakota 57717-1698
http://www.blm.gov/mt

TAKE PRIDE IN AMERICA

In Reply Refer To:

1600/3100 (MTC0400)

February 10, 2014

Dear Reader:

The Bureau of Land Management (BLM) South Dakota Field Office has prepared an Environmental Assessment (EA) to analyze the potential effects from reinstating lease SDM 098206 and offering fifteen nominated lease parcels for competitive oil and gas leasing in a sale tentatively scheduled to occur on July 15, 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 March 12, 2014 to be considered. Comments may be submitted using one of the following methods:

Email: BLM_MT_South_DakotaFO_Lease_EA@blm.gov

Mail: South Dakota Field Office
Attention: Oil and Gas EA
310 Roundup Street
Belle Fourche, South Dakota 57717

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, competitive bid 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 July 15, 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 www.blm.gov/mt. From this home page, go to the lower-right hand box titled "Frequently Requested," where you will find a number of links to information about our oil and gas program. Current and updated information about our environmental assessments can be found on the link titled "Oil and Gas Info / Sales" listed under the heading "Frequently Requested". Click on the word "Sales". Once there, click on "2014", where you will find the SDFO EA for the July 15, 2014 lease sale for your review.

If you have any questions, or would like more information about lease sale notices of the issuance of the EA, Decision Record and FONSI, please contact me at 605-892-7000.

Sincerely,

Marian M. Atkins, Field Manager
South Dakota Field Office

South Dakota Field Office Oil and Gas Lease Sale EA
DOI-BLM- MT-C040-2014-0002-EA

CONTENTS

Page

1.0 PURPOSE and NEED....5
1.1 Introduction....5
1.2 Purpose and Need for the Proposed Action....6
1.3 Conformance with BLM Land Use Plan(s)....7
1.4 Public Scoping and Identification of Issues....8
2.0 DESCRIPTION OF ALTERNATIVES, INCLUDING PROPOSED ACTION....9
2.1 Alternative A – No Action....9
2.2 Alternative B- Proposed Action....9
2.3 Alternative C-BLM Preferred....10
2.4 Additional Considerations for Alternatives B and C....10
3.0 AFFECTED ENVIRONMENT....11
3.1 Introduction....11
3.2 Air Resources....11
3.3 Soil Resources....19
3.4 Water Resources....19
3.5 Vegetation Resources....21
3.6 Special Status Species....23
3.7 Fish and Wildlife....30
3.8 Cultural Resources....32
3.9 Native American Religious Concerns....35
3.10 Paleontology....37
3.11 Visual Resources....39
3.12 Forest and Woodland Resources....40
3.13 Livestock Grazing....40
3.14 Recreation and Travel Management....40
3.15 Lands and Realty....41
3.16 Minerals....41
3.17 Special Designations....43
3.18 Social and Economic Conditions....43
4.0 ENVIRONMENTAL IMPACTS....50
4.1 Assumptions and Reasonably Foreseeable Development Scenario Summary....50
4.2 Alternative A (No Action)....53
4.3 Alternative B (Proposed Action)....55
4.4 Alternative C (BLM Preferred)....87
5.0 CONSULTATION AND COORDINATION....96
5.1 Persons, Agencies, and Organizations Consulted....96
5.2 Summary of Public Participation....97
5.3 List of Preparers....98
6.0 REFERENCES....100
7.0 DEFINITIONS....107

APPENDICES

Appendix A – Descriptions of Lease Parcels and Lease Stipulations for Sale

Appendix B - Stipulations Applied to Lease Parcels for Sale

Appendix C – Lease Reinstatement for SDM 098206

Appendix D - Maps

TABLES

Table 1: Air Quality Index Report – Analysis Area Summary (2010-2012)

Table 2: USFWS Riparian and Wetland Areas for All Lease Parcels

Table 3: Aquatic sensitive or specials status wildlife species in the analysis area

Table 4: Endangered or sensitive aquatic wildlife species that occur in, or their ranges overlap with, the lease parcels

Table 5: Analysis area occurrence of BLM terrestrial sensitive species and USFWS threatened, endangered, candidate or proposed terrestrial species

Table 6: SD Rare Species of Concern and BLM Sensitive Plants on or near Lease parcels

Table 7: List of Native American Tribes with aboriginal ties or interests in the area

Table 8: VRI Classes for the analysis area

Table 9: Lease parcels located within BLM grazing allotments

Table 10: Existing Development Activity

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

Table 12: Current Contributions of Federal Oil and Gas Leasing, Exploration, Development, and Production to the Local Economy

Table 13: Disturbance Associated with New Drilled Wells and Existing Active Wells in Planning Area (Short-Term Disturbance – Two Years)

Table 14: Disturbance Associated with New Drilled Wells and Existing Active Wells (Long-Term Disturbance).

Table 15: Summary Comparison of Estimated Average Annual Economic Impacts

Table 16: BLM projected annual emissions of GHGs associated with oil and gas exploration and development activity in the SDFO.

Table 17: Selected Methane Emission Reductions Reported Under the EPA Natural Gas STAR Program

Table 18: Projected non-BLM GHG emissions associated with the SDFO Reasonably Foreseeable Development Scenario for fluid mineral exploration and development

Table 19: List of Preparers

Table 20: List of Reviewers

FIGURES

Figure A. Visibility trends on haziest and clearest days, 2000-2009

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

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

South Dakota Field Office Oil and Gas Lease Sale EA
DOI-BLM- MT-C040-2013-0002-EA

1.0 PURPOSE AND NEED

1.1 Introduction

It is the policy of the Bureau of Land Management (BLM) to make mineral resources available for use and to encourage development of mineral resources to meet national, regional, and local needs. This policy is based on various laws, including the Mineral Leasing Act of 1920 and the Federal Land Policy and Management Act of 1976. The Federal Onshore Oil and Gas Leasing Reform Act of 1987 Sec. 5102(a)(b)(1)(A) directs the BLM to conduct quarterly oil and gas lease sales in each state whenever eligible lands are available for leasing. The Montana State Office conducts mineral estate lease auctions for lands managed by the federal government, whether the surface is managed by the Department of the Interior (BLM or Bureau of Reclamation), United States Forest Service, or other departments and agencies. In some cases the BLM holds subsurface mineral rights on split estate lands where the surface estate is owned by another party, other than the federal government. Federal mineral leases can be sold on such lands as well. The Montana State Office has historically conducted four 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: if they are in areas open to leasing; if new information has come to light which might change previous analyses conducted during the land use planning process; if there are special resource conditions of which potential bidders should be made aware; and which stipulations should be identified and included as part of a lease. Ultimately, all of the lands in proposed lease sales 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 all 15 nominated lease parcels located in the South Dakota Field Office (SDFO) decision space (see Map 1), to be included as part of a competitive oil and gas lease sale tentatively scheduled to occur on July 15, 2014. The EA will use three alternatives to discuss different leasing scenarios that address resource concerns.

The analysis area includes15 nominated parcels: SDM 79010-AJ, in Harding County (Map 2); and the following parcels in Fall River County (Maps 3) SDM 97300-PU, PV, PW, PX, PY, P4, P6, P7, P8, P9, QF, PN, PP and 33. There are 18 other nominated parcels within the USFS administrative boundary; and these will be covered under a Determination of NEPA Adequacy (DNA), number DOI-BLM-MT-C040-2014-0003-DNA.

Leases are held by the winner of the competitive oil and gas lease sale for ten years. If the lease is not held by production, it is terminated. Within the ten year time frame, a Class I or Class II reinstatement will be offered by the BLM if the leasee does not pay the rental payment on time or if they do not pay enough rent. The type of class reinstatement is dependent upon the situation. If the leasee submits the required paperwork, a good reason as to their tardiness and

the required fees, a reinstatement package is compiled by the State Office to be submitted to the Field Office and then to the Washington DC office for Federal Register positing.

The Field Office is responsible for conducting an EA/DNA on the lands in the lease to determine if any additional stips are required or if the lands cannot be reinstated. If the Field Office makes the determination that the lands cannot be reinstated, then they would be deferred from competitive leasing until the issues were resolved for those lands. The lease can decide to reject the lease with the additional stipulations. In this case the lease would be terminated and the lands would be available for nomination.

Procedures for this action are outlined in an Instruction Memorandum (IM) No. MT-2014-014, dated November 15, 2013 which transmits and provides additional guidance regarding WO IM No. 2013-177, dated August 13, 2013. To conserve time and resources, this Environmental Assessment will analyze the terminated lease SDM 98206 (Map 4) in addition to the July 2014 nominated lease parcels. The lessee filed a Class II Reinstatement. The Draft Land Use Plan will be used to analyze this lease in accordance with WO IM No. 2013-177. The 2013 Draft South Dakota Resource Management Plan and Environmental Impact statement is past the public comment period. It is available at: http://www.blm.gov/mt/st/en/fo/south_dakota_field/rmp.html The lease includes 720.00 acres, of which 160 acres reside under state administered surface, while the remaining 560 acres is under private surface.

There are certain characteristics which define and influence social and economic activity taking place in South Dakota. These characteristics may include local populations, the presence and proximity of cities or regional business centers, longstanding industries, infrastructure, predominant land and water features, and amenities unique to the area. While the exploration and development of federal mineral estates may take place on well-defined parcels, the social and economic impacts of these activities may extend well beyond parcel boundaries. In order to accurately portray the relationship of current BLM management, and to examine the effects of leasing additional parcels for mineral development, the geographic scope of this analysis had to be extended. While there are only two South Dakota counties (Fall River and Harding) which have parcels nominated for the July 2014 lease sale, Butte, Custer, and Pennington counties were identified as likely to be impacted by additional leasing. While the distribution of effects stemming from additional fluid minerals leasing will vary across the impact area, the distribution of economic effects stemming from the sale will be based on the number of acres leased, levels of production, and the business patterns of these counties.

1.2 Purpose and Need for the Proposed Action

The purpose of offering parcels for competitive and non-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.

Another purpose of this environmental assessment is to address more areas for which existing stipulations will be applied due to changing knowledge and new inventory data. Thus, this environmental assessment will maintain the Miles City District Oil and Gas RMP/EIS Amendment, which adopted these stipulations. Stipulations for which maintenance is being done includes the following: (NSO 11-2) Surface occupancy and use is prohibited within riparian areas, 100-year floodplains of major rivers, and on water bodies and streams; (CSU 12-1) Prior to surface disturbance on slopes over 30 percent, an engineering/reclamation plan must be approved by the authorized officer…; (TL 13-1) Surface use is prohibited from December 1 to March 31 within crucial winter range for wildlife; (LN 14-2) 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) Greater Sage-Grouse Habitat Lease Notice - 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. If the U.S. Fish and Wildlife Service lists the greater sage-grouse as threatened or endangered under the Endangered Species Act, the BLM would enter into formal consultation on proposed permits that may affect the sage-grouse and its habitat. Restrictions, modifications, or denial of permits could result from the consultation process; and (LN 14-15) Sprague's Pipit lease notice - If the U.S. Fish and Wildlife Service lists the Sprague's pipit as threatened or endangered under the Endangered Species Act, the BLM would enter into formal consultation on proposed permits that may affect the Sprague's pipit and its habitat. Restrictions, modifications, or denial of permits could result from the consultation process.

1.3 Conformance with Land Use Plan(s)

This EA is tiered to and conforms with the information and analysis contained in the Land Use Plans: Final South Dakota Resource Management Plan, approved in April 1986, and the Miles City District Oil and Gas RMP/EIS Amendment, approved on February 2, 1994.

The proposed action is in conformance with the applicable LUPs because it is specifically provided for in the following LUP decisions: See the Summary on page iii of the Miles City District Oil and Gas RMP/EIS, which gives the lands subject to leasing under various stipulations provided for in the preferred alternative, the section in Appendix B, pages 139-175, which gives the lease forms and stipulations for alternatives, and map numbers 3, 4, and 5, which show where stipulations apply. Lease stipulations are commonly added to lease parcels. Lease terms are added to all lease parcels.

Analysis of the 15 sale parcels and SDM 098206 is documented in this EA, and was conducted by South Dakota Field Office, Miles City Field Office, and Montana State Office resource specialists who relied on professional knowledge of the areas involved and review of current databases and file information to ensure that appropriate stipulations were recommended for a specific parcel. A site visit was also conducted by BLM staff. Parcel SDM 97300-AJ was visited on November 19, 2013 by Wildlife Biologist Rebecca Newton. Pictures and written report of this site visit can be found within the administrative record.

Analysis has identified the need to defer entire parcels from leasing pending further environmental review. A new resource management plan is being prepared by the South Dakota Field Office, which has identified new management actions needed to protect resources. In certain cases, parcels must be deferred due to public safety concerns pending completion of the RMP.

Lease SDM 98206 will be analyzed according to WO IM No. 2013-177, dated August 13, 2013. As specified the Draft Land Use Plan will be used to analyze the reinstatement of this lease. The 2013 Draft South Dakota Resource Management Plan and Environmental Impact statement is past the public comment period. It is available at:
http://www.blm.gov/mt/st/en/fo/south_dakota_field/rmp.html

At the time of this review it is unknown whether a particular nominated 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 South Dakota 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). A more complete description of mitigation, BMPs, and conditions of approval related to oil and gas lease activities can be found in the Final South Dakota Resource Management Plan, approved in April 1986, and the Miles City District Oil and Gas RMP/EIS Amendment approved on February 2, 1994, the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development-The Gold Book, 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 and posted on the South Dakota Field Office website National Environmental Policy Act (NEPA) notification log. Scoping was initiated December 16, 2013; and the comment period was open through Decmber 31, 2013. Letters were sent to surface owners, agency and tribal representatives.

Scoping comments pertained to general concerns/questions related to mineral ownership and split estate questions, while other scoping comments were specific to resource concerns. Refer to Chapter 5 of this EA for a more complete summary of the scoping comments received.

Substantive comments or issues identified through scoping related to oil and gas leasing included topics directly related to the Black Hills Army Depot: preservation of cultural and historic resources, and public safety concerns if a lease is developed.

Internal scoping related to oil and gas leasing identified the following issues: protection of cultural and tribal areas; protestion of fossil resources, minimization of surface (soil) disturbance and protection measures for sensitive or limited soils and steep slopes; protection of sensitive riparian habitats from operations, identification of mitigation measures to minimize impacts from operations to wildlife, and wildlife habitat concerns, including sage-grouse.

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 15 parcels within the South Dakota 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.

The terminated lease SDM 098206 would not be reinstated under the No Action Alternative.

2.2 Alternative B – Proposed Action

The Proposed Action Alternative would be to offer 15 parcels of federal minerals for oil and gas leasing, covering 5,195.19 acres of federal minerals administered by the South Dakota Field Office, in conformance with the existing land use planning decisions. The parcels are located in Harding and Fall River Counties, South Dakota. Parcel number, size, and detailed locations and associated stipulations are listed in Appendix A. Maps 1 through 3 indicate the location of each parcel.

Of the 5,195.19 acres of federal mineral estate considered in this EA, 1 parcel contains 80 acres of surface lands managed by the BLM. The remaining 14 parcels are all split estate (private surface with federal mineral estate), covering 5,115.19 acres.

The lease SDM 098206 would be reinstated under the Proposed Action Alternative. The 720.00 acres would be offered in conformance with stipulations proposed in the draft land use plan.

2.3 Alternative C - BLM Preferred Alternative

Under the BLM Preferred Alternative, 1 lease parcel, containing 80 acres of federal minerals under BLM surface, 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.

A total of 14 lease parcels, containing 5,115.19 acres of federal minerals under private surface would be deferred. All of these parcels fall within the Black Hills Army Depot and are being considered in the Field Office's on-going planning efforts. Therefore, all 14 lease parcels will be deferred at this time pending further review and analysis.

The lease SDM 098206 would be reinstated under the BLM Preferred Alternative. The 720.00 acres would be offered in conformance with stipulations proposed in the draft land use plan.

2.4 Additional Considerations for Alternatives B and C

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

Standard operating procedures, best management practices and required conditions of approval (COA) and the application of lease stipulations change over time to meet overall RMP objectives. The COA's 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. For example, if climate change results in hotter and drier conditions, RMP objectives would be unreachable under current management. In this situation, management practices might need to be modified to continue meeting overall RMP management objectives. An example of a climate related modification is the imposition of additional conditions of approval to reduce surface disturbance and implement more aggressive dust treatment measures. Both actions reduce fugitive dust, which would otherwise be exacerbated by the increasingly arid conditions that could be associated with climate change.

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

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

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the affected existing environment (i.e., the physical, biological, social, and economic values and resources) within the analysis area which includes the15 nominated parcels in Harding and Fall River Counties that maybe 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 cited and analyzed further in Chapter 4. If the lease parcel does not contain the resource, then the lease parcel will be omitted from the description of that specific resource.

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

Only those aspects of the affected environment that are potentially impacted by this project are described in detail. The following aspects of the existing environment were determined to be not present or not potentially impacted by this project and include: lands with wilderness characteristics, cave and karst resources, wild and scenic rivers; and wilderness study areas (WSAs). These resources and resource uses will not be discussed further in this EA.

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 pollutant emissions and 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 the South Dakota Department of Environment and Natural Resources. 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

Based on data from monitors located in Meade County (near Harding County) and Custer County (near Fall River County), air quality within Fall River and Harding counties is believed to be much better than required by the NAAQS. The EPA air quality index (AQI) is an index used for reporting daily air quality (http://www.epa.gov/oar/data/geosel.html) to the public. The index tells how clean or polluted an area's air is and whether associated health effects might be a concern. The EPA calculates the AQI for five criteria air pollutants regulated by the Clean Air Act (CAA): ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established NAAQS to protect public health. An AQI value of 100 generally corresponds to the primary NAAQS for the pollutant. 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.

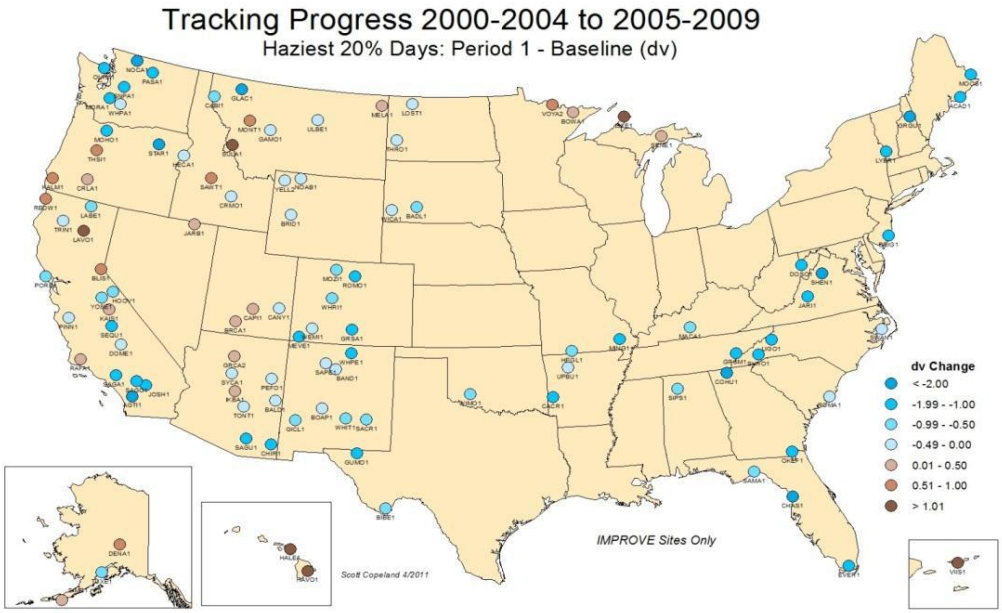
AQI data show that there is little risk to the general public from air quality in the analysis area (Table 1). Based on available aggregate data for Meade and Custer counties (the nearest counties with monitoring data) for years 2010–2012, more than 94 percent of the days were rated "good" and the three-year median daily AQI was 32 and 35 for monitors in Custer and Meade counties, respectively.

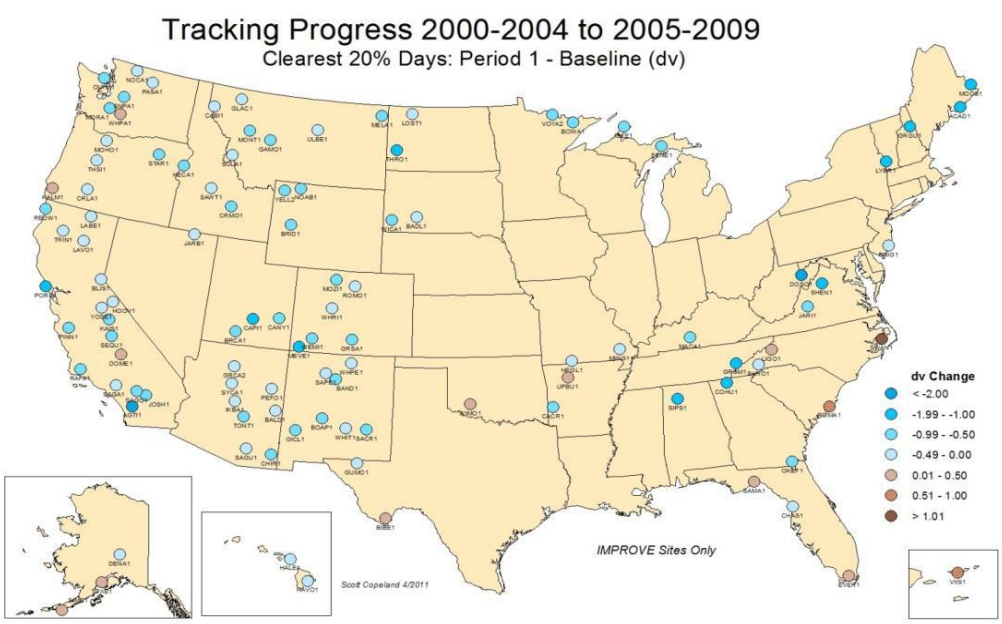
Table 1: Air Quality Index Report – Analysis Area Summary (2010-2012)								
County[1]	# Days in Period	Median AQI	# Days rated Good	Percent of Days Rated Good	# Days Rated Moderate	# Days Rated Unhealthy for Sensitive Groups	# Days Rated Unhealthy	# Days Rated Very Unhealthy
Custer	1,095	32	1,032	94%	71	1	1	0
Meade	1,075	35	1,046	97%	29	0	0	0

Source: EPA 2013a.

Emissions within Fall River and Harding counties are low, due to a small populations and little industrial activity. Based on 2011 emission inventory data available from the EPA National Emission Inventory, non-biogenic emissions were: 35,732 tons per year (tpy) CO, 2,726 tpy NO_x, 3,324 tpy PM_{10} , 2,805 tpy $PM_{2.5}$, 223 tpy SO_2, and 9,542 tpy VOC (EPA 2013b). As described above, these emissions occur in an area with good air quality.

Air resources also include visibility, which can be degraded by regional haze caused in part by sulfur, nitrogen, and particulate emissions. Based on trends identified during 2000-2009, visibility has improved slightly near the analysis area on the haziest and clearest days. Blue-shaded circles in Figure A indicate negative deciview (dv) changes, which mean that people can see more clearly at greater distances.





Source: IMPROVE 2011.

Figure A. Visibility trends on haziest and clearest days, 2000-2009.

3.2.2 Climate Change

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

or as a result of human activity" (IPCC 2007). Climate change and climate science are discussed in detail in the Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota, Bureau of Land Management (Climate Change SIR, 2010). This document is incorporated by reference into this EA.

The Intergovernmental Panel on Climate Change (Climate Change SIR, 2010) states, "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." Global average temperature has increased approximately 1.4°F since the early 20th century (Climate Change SIR 2010). Warming has occurred on land surfaces, oceans and other water bodies, and in the troposphere (lowest layer of earth's atmosphere, up to 4-12 miles above the earth). Other indications of global climate change described by the IPCC (Climate Change SIR 2010) include:

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

As discussed and summarized in the Climate Change SIR, 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 caused, in part, by the atmospheric buildup of greenhouse gases (GHGs), which may persist for decades or even centuries. Each GHG has a global warming potential that accounts for the intensity of each GHG's heat trapping effect and its longevity in the atmosphere (Climate Change SIR 2010). Increased GHG emissions of CO_2, methane, N_2O, and halocarbons since the start of the industrial revolution have substantially increased atmospheric concentrations of these compounds compared to background levels. At such elevated concentrations, these compounds absorb more energy from the earth's surface and re-emit a larger portion of the earth's heat back to the earth rather than allowing the heat to escape into space than would be the case under more natural conditions of background GHG concentrations.

A number of activities contribute to the phenomenon of climate change, including emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildfires, activities using combustion engines, changes to the natural carbon cycle, and changes to radiative forces and reflectivity (albedo) due to soot deposition and other surface changes. It is important to note that GHGs will have a sustained climatic impact over different temporal scales due to their differences in global warming potential (described above) and lifespans in the atmosphere. For example, CO_2 may last 50 to 200 years in the atmosphere while methane has an average atmospheric life time of 12 years (Climate Change SIR, 2010).

With regard to statewide GHG emissions, South Dakota ranks in the lowest decile when compared to all states. The estimate of South Dakota's 2007 GHG emissions of 31.6 million

metric tons (MMt) of carbon dioxide equivalent (CO_2e) accounted for approximately 0.45 percent of the U.S. GHG emissions (WRI 2012).

Some information and projections of impacts beyond the project scale are becoming increasingly available. Chapter 3 of the Climate Change SIR describes impacts of climate change in detail at various scales, including the state scale when appropriate. The following summary characterizes potential changes identified by the EPA (EPA 2008) that are expected to occur at the regional scale, where the Proposed Action and its alternatives could occur. The EPA identifies South Dakota as part of the Great Plains region (EPA 2008):

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

Other impacts could include:

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

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

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

normally limit populations; while concurrently, drought weakens trees, making them more susceptible to mortality due to insect attack.

More specific to South Dakota, 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 the mid-21st century.
- Precipitation may increase in winter and spring by up to 25 percent and 20 percent, respectively. Precipitation may decrease by as much as 5 percent during summer and fall.
- Predicted median runoff for 2041–2060 compared to 1901–1970 is expected to decrease by 2–5 percent throughout South Dakota.
- South Dakota's wetland extent and quality is predicted to remain fairly stable if temperature increases are limited to approximately 2°C or if a temperature increase of up to 4°C were accompanied by a 10 percent increase in precipitation.
- 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 western South Dakota based on a 1°C global average temperature increase to be 393 percent.

While long-range regional changes might occur within this analysis area, it is impossible to predict precisely when they could occur. The following example summarizing climate data for the West North Central Region (MT, ND, SD, and WY) illustrates this point at a regional scale. A potential regional effect of climate change is earlier snowmelt and associated runoff. This is directly related to spring-time temperatures. Over a 112-year record, overall warming is clearly evident with temperatures increasing 0.21 degrees per decade (Figure B). This would suggest that runoff may be occurring earlier than in the past. However, data from 1991-2005 indicates a 0.45 degree per decade cooling trend (Figure C). This example is not an anomaly, as several other 15-year windows can be selected to show either warming or cooling trends. Some of these year-to-year fluctuations in temperature are due to natural processes, such as the effects of El Niños, La Niñas, and the eruption of large volcanoes (Climate Change SIR 2010). This information illustrates the difficulty of predicting actual short-term regional or site-specific changes or conditions which may be due to climate change during any specific time frame.

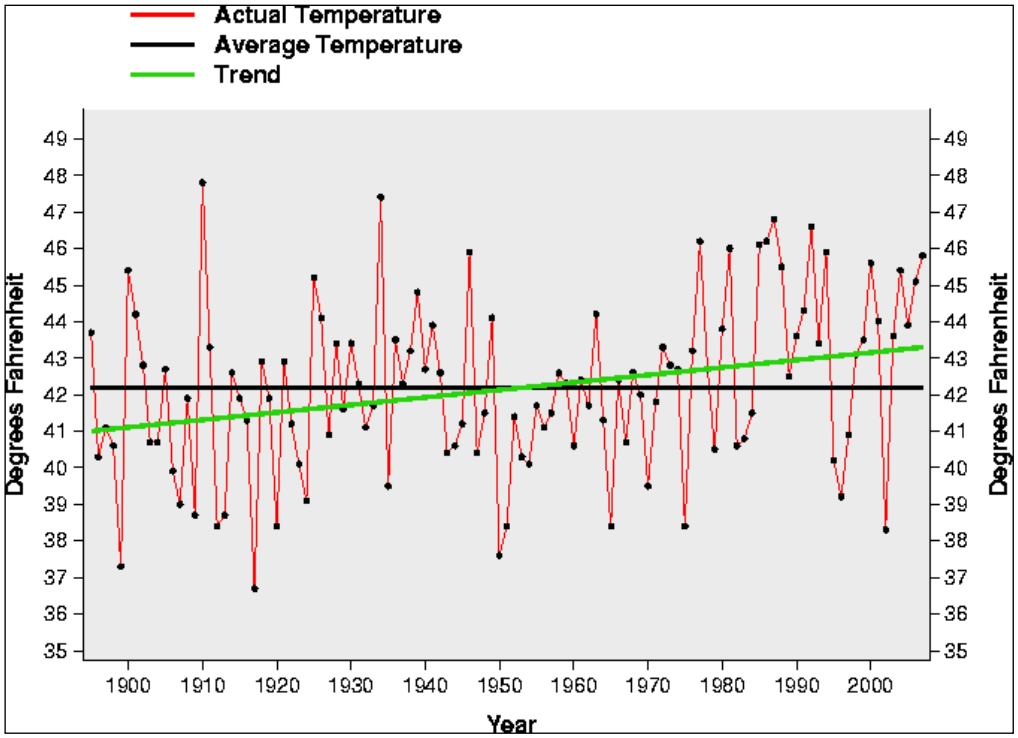


Figure B. Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1895-2007. (Source: NOAA website http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html)

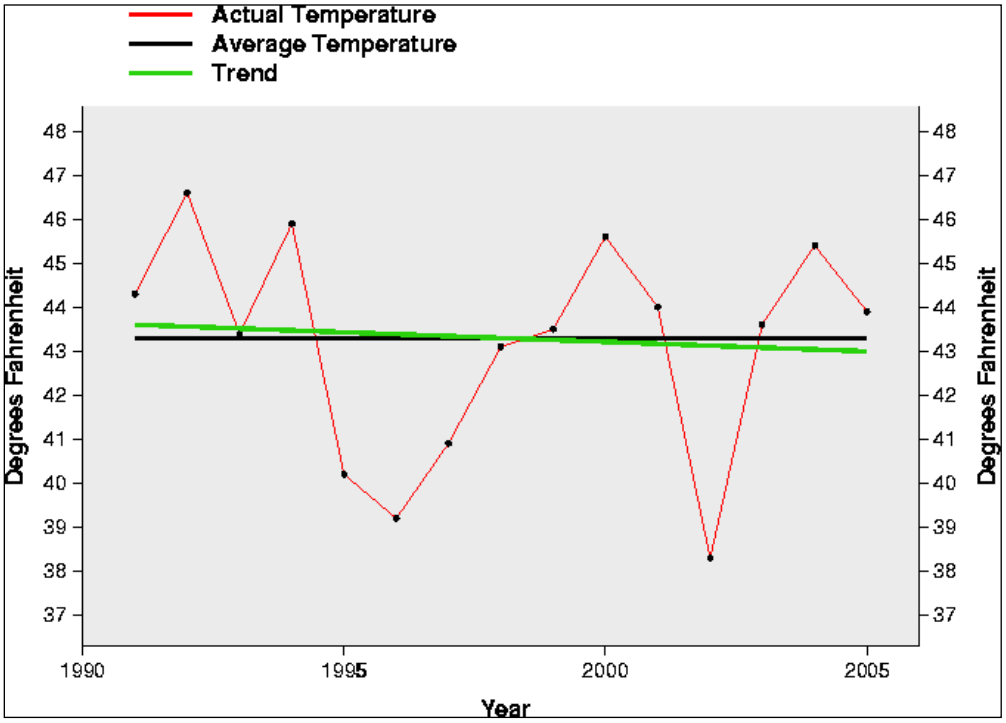


Figure C. Regional climate summary of spring temperatures (March-May) for the West North Central Region (MT, ND, SD, WY), from 1991-2005. (Source: NOAA website **http://www.ncdc.noaa.gov/oa/climate/research/cag3/wn.html**)

3.3 Soil Resources

Soils are investigated to determine erosion hazard and reclamation suitability by evaluating slope and soil properties such as texture, organic matter content, structure, permeability, depth, available water capacity, and salt concentration. Detailed soil surveys have been published by the Natural Resources Conservation Service (NRCS) for South Dakota.

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.

Key management concerns regarding soil resources are surface use effects on steep slopes and sensitive soils. As slopes become steeper, the risk of soil instability increases. Actions that alter soil characteristics, such as plant cover, soil structure, permeability, and bulk density and compaction, may increase erosion. Sensitive soils are determined based on low fugitive dust resistance and low restoration potential. Sensitive soil characteristics are defined to include: erodibility (by water and wind), compaction, hydric status, fugitive dust resistance, and restoration potential. Soils in the lease parcels commonly have some limitations, such as high sodium and other salt content, poor water holding capacity, inadequate rotting depth, and highly erosive qualities, resulting in difficulties in establishing vegetation and reclaiming a disturbed surface. Sensitive soils would require unconventional and/or site-specific reclamation measures.

3.4 Water Resources

3.4.1 Surface Hydrology

Surface water quality in the planning area is variable due to the highly erratic discharge and highly erosive nature of the geologic parent material and soils. Perennial streams retain water year-round and have variable flow regimes. Perennial streams including Alum, Coal, Crooked, and Softwater Creeks cross 8 of the proposed lease parcels. Intermittent streams flow during the part of the year when they receive sufficient water from springs, groundwater, or surface sources such as snowmelt or storm events. Ephemeral streams flow only in direct response to precipitation and snowmelt. Ephemeral and intermittent streams cross 14 of the proposed lease parcels Since many of the smaller tributaries are underlain by Pierre shale or other heavy clay soils, runoff from intense rainfall is rapid and can change from zero to flood stage within a single day. Lease SDM 98206 contains the Perennial stream Dogie Creek and four ephemeral and intermittent streams.

Total dissolved solids (TDS) range from 200 parts per million (PPM) at high flows to 4,000 PPM during low flows. Sodium and sulfate concentrations in the heavy clay soils and irrigation return flows contribute to an increase in the TDS levels. Major ions include calcium, magnesium, sodium, and sulfate. In late summer, TDS in small water impoundments can approach levels that are toxic for livestock and other animals. The planning area has high suspended sediment concentrations and discharges due to highly erosive soils and less resistant types of bedrocks that

formed as sedimentary deposits. Occasionally, a spring or seep can be found near floodplains along drainageways, but these are small and have limited potential.

Approximately 22 acres of 100-year floodplain are present within 2 of the proposed lease parcels. These floodplains are associated with Crooked and Dogie Creeks.

The lease parcels are located within 3 watersheds [HUC 8 (Hydrologic Unit Code); subbasins]: Angostura Reservoir (HUC 10120106), North Fork Grand River (HUC 10130301), and Upper Little Missouri River (HUC 10110201). The acreage of the lease parcels comprises between less than 0.01 and 0.5 percent of each watershed.

The Angostura Reservoir watershed contains proposed parcels SDM 97300-33, PN, PP, PU, PV, PW, PX, PY, P4, P6, P7, P8, P9, and QF; comprising 0.5 percent of the watershed. These parcels are located in Fall River County.

The North Fork Grand River watershed contains proposed parcel SDM 79010-AJ; comprising 0.01 percent of the watershed. The parcel is located in Harding County.

The Upper Little Missouri River watershed contains the lease SDM 098206; comprising less than 0.01 percent of the watershed. The parcel is located in Harding County.

3.4.2 Groundwater

The quality and availability of ground water varies greatly across South Dakota. Residents in western South Dakota commonly get their ground water from aquifers consisting of unconsolidated, alluvial valley-fill materials or consolidated sedimentary rock formations.

Alluvial aquifers within the area generally consist of Quaternary alluvium and undifferentiated Quaternary/Tertiary sediments, which include sand and gravel deposits. Alluvial aquifers occur in terrace deposits and within the floodplains, and along the channels of larger streams, tributaries, and rivers, and are important sources of groundwater. Wells within alluvial aquifers are typically less than 100 feet deep. Wells completed in coarse sand and gravel alluvial aquifers can yield as much as 100 gpm, although the average yield is 15 gpm.

Within the analysis area, the primary bedrock aquifers occur in the sandstones of the Tertiary Fort Union formation (Cenozoic rocks) and the Cretaceous Hell Creek and Fox Hills formations (Mesozoic rocks). Wells within the Fort Union formation aquifers are typically 300 to 900 feet deep, but can be from 1,000 to 3,000 feet deep locally. These wells may produce as much as 500 gpm, but yields of 1 to 50 gpm are typical. Well depths within the Hells Creek and Fox Hills formation aquifers are highly variable, but are typically less than 800 feet deep, although a few wells are as deep as 2,000 feet in Montana and 3,000 feet in Wyoming. Groundwater yields from these aquifers are generally from 5 to 50 gpm (Whitehead 1996).

In much of the project area, near-surface thick shale deposits such as the Pierre, Mowry, and Belle Fourche, severely limit the economic availability of water wells, or provide water of quality too poor for most uses. The water in some shallow aquifers is suitable only for livestock

consumption. Shallow western South Dakota aquifers typically yield less water and water produced is more salty, or mineralized compared to some moderately deep formations that are expensive to drill but produce palatable water.

3.5 Vegetation Resources

The mixed grassland community is dominated by perennial grasses. Perennial grasses can be both warm season and cool season grasses. Furthermore, these perennial grasses can be both tall and short grasses. The mixed grass prairie within the planning area consists of multiple ecological sites, varying from clayey and shallow clay to thin upland and sandy ecological sites.

3.5.1 Western Wheatgrass (Clayey Ecological Sites)

The identified clayey ecological sites primarily have a climax plant cover of western wheatgrass (*Pascopyrum smithii)* and green needlegrass (*Nassella viridula)*. The deeper soils have an understory of blue grama (*Bouteloua gracilis)*, buffalograss (*Bouteloua dactyloides*), and sedges (*Carex sp*.). Forbs such as black sampson (*Echinacea angustifolia*) and American vetch (*Vicia americana*) may be present on some of the sites. Wyoming big sagebrush (*Artemisia tridentata ssp. Wyomingensis*) is a minor component of the clayey ecological sites and may become significant on the claypan sites. The low lying Wyoming big sagebrush is often found in the slick spots. While Wyoming big sagebrush is a minor component of the plant community, it is an important habitat component for many wildlife species.

3.5.2 Sandreed and Bluestem (Sandy Ecological Sites and Thin Claypan Ecolgical Sites)

The sandy ecological sites contains a unique climax plant cover. The dominant warm season grasses are prairie sandreed (*Calamovilfa longifolia*), sand bluestem (*Andropogon hallii*), and little bluestem (*Schizachyrium scoparium*). Cool season grasses primarily include needle-and-thread (*Hesperostipa comata*) and western wheatgrass. Shrubs can include sand sagebrush (*Artemisia filifolia*). Thin claypan ecological sites may contain little bluestem along with needle-and-thread, blue grama, sideoats grama (*Bouteloua curtipendula*), threadleaf sedge (*Carex filifolia*), western wheatgrass, prairie sandreed and forbs such as sageworts (*Artemisia* spp.).

3.5.3 Wetland-Riparian

Riparian-wetland areas are a small part of a larger area composed primarily of the rolling prairies of the Great Plains. Literature defines riparian and wetland areas as those saturated or inundated at a frequency and duration sufficient to produce vegetation typically adapted for life in saturated soil conditions. These areas are also transitional areas between permanently saturated wetlands and upland areas often referred to as riparian areas; these transition areas have vegetation or physical characteristics reflective of permanent surface or subsurface water influence (Prichard et. al 1999).

Wetlands provide watering points for wildlife and livestock and provide habitat diversity. Riparian-wetland areas are among the most productive and important ecosystems, comprising approximately one percent of the public lands. Riparian and wetland areas are commonly associated with lakes, reservoirs, estuaries, potholes, springs, bogs, and wet meadows as well as ephemeral, intermittent, or perennial streams. Within wetlands, riparian areas are those areas geographically delineated by distinctive resource values and characteristics that compose aquatic

and riparian ecosystems. Characteristically, riparian-wetland areas display a greater diversity of plant, fish, wildlife, and other animal species and vegetative structure than adjoining ecosystems. Some of the common vegetative species that occur in riparian-wetland areas include prairie cordgrass (*Spartina pectinata*), inland saltgrass (*Distichlis spicata*), three-square bulrush (*Scirpus pungens)* and baltic rush (*Juncus balticus*). Many riparian areas in the analysis area do not support woody vegetation species, however sandbar willow (*Salix exigua*), peachleaf willow (*Salix amygdaloides*), plains cottonwood (*Populus deltoides*), green ash (*Fraxinus pennsylvanica*) and boxelder (*Acer negundo*) can be found in some sites. Healthy riparian systems filter and purify water as it moves through the riparian-wetland zone, reduce sediment loads and enhance soil stability, provide micro-climate moderation when contrasted to temperature extremes in adjacent areas, and contribute to ground water recharge and base flow (Hansen et. al. 1995).

Using data from the USFWS National Wetland Inventory, 10 proposed lease parcels contain approximately 28.5 acres of delineated riparian or wetland areas (see Table 2). Approximately 22.7 acres of these areas are the result of dikes, impoundments, or excavations that were constructed for agricultural purposes, as sources of stock water, or for other uses.

Table 2: USFWS Riparian and Wetland Areas for All Lease Parcels[1]

Riparian/Wetland Type	Classification	Acres
Freshwater Emergent Wetland	Palustrine, Emergent, Seasonally Flooded	1.2
	Palustrine, Emergent, Seasonally Flooded, Diked/Impounded	1.8
	Palustrine, Emergent, Semipermanently Flooded, Diked/Impounded	2.4
	Palustrine, Emergent, Temporary Flooded	1.0
	Palustrine, Emergent, Temporary Flooded, Diked/Impounded	1.5
Freshwater Forested Shrub-Scrub Wetland	Palustrine, Scrub-Shrub, Temporary Flooded	0.1
Freshwater Pond	Palustrine, Aquatic Bed, Artificially Flooded, Excavated	0.7
	Palustrine, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	10.2
	Palustrine, Unconsolidated Shore, Seasonally Flooded	3.0
	Palustrine, Unconsolidated Shore, Seasonally Flooded, Diked/Impounded	1.1
	Palustrine, Unconsolidated Shore, Temporary Flooded	0.5
	Palustrine, Unconsolidated Shore, Temporary Flooded, Diked/Impounded	1.4
Lake	Lacustrine, Littoral, Aquatic Bed, Semipermanently Flooded, Diked/Impounded	3.6

[1] (USFWS 2010)

3.5.4 Invasive, Non-Native Species

Competition from invasive, non-native plants constitutes a potential threat to native plant species and wildlife habitat within the project area. Several invasive, non-native plant species occupy the project area including: Canada thistle (*Cirsium arvense)*, leafy spurge (*Euphorbia esula),* salt cedar *(Tamarix ramonsissima)*, crested wheatgrass *(Agropyron cristatum*), field brome *(Bromus arvensis),* cheatgrass/downy brome *(Bromus tectorum),* and foxtail barley *(Hordeum jubatum).* Crested wheatgrass occurs in areas as a result of being planted to increase forage production or to stabilize soils by reducing erosion. Cheatgrass/downy brome, field brome, and foxtail barley are all aggressive invasive species that out-compete desirable vegetation for water and soil nutrients. These species may also reduce cattle grazing performance, wildlife habitat quality, and native species diversity. Cheatgrass/downy brome is an invasive species well known for completely replacing native vegetation and changing fire regimes.

3.5.5 Noxious Weeds

Noxious weeds occur in scattered isolated populations throughout the planning area. The most common species of noxious weeds are salt cedar, leafy spurge, and Canada thistle. Noxious weed control is the responsibility of the Surface Management Agency in cooperation with the local county weed and pest board. Chemical, mechanical and biological control methods are utilized with chemical control being the more predominant.

3.5.6 Forest and Woodland Resources

Forests, as such, do not occur on the lands nominated for lease. Small quantities of deciduous trees occur in some draws, and pine and juniper trees may occur. Woody areas are of some value to numerous species as wildlife habitat and for personal use firewood.

3.6 Special Status Species

A number of bird, fish, mammal, and insect species are considered special status species for BLM within the planning area. The State of South Dakota's sensitive species are given the designation of state listed or species of management concern. BLM's special status species include sensitive, state listed, federally listed, proposed to be listed, and candidate species.

3.6.1 Special Status Animal Species

3.6.1.1 Aquatic Wildlife

Table 3: Aquatic sensitive or specials status wildlife species in the analysis area

Species	Scientific Name	USFWS/BLM Sensitive	In Range	Suitable Habitat present
Pallid sturgeon	*Scaphirhynchus albus*	Endangered	No	N/A
Topeka shiner	*Notropis topeka*	Endangered	No	N/A
Blue sucker	*Cycleptus elongatus*	Sensitive	No	N/A
Banded killifish	*Fundulus diaphanus*		Yes	Unlikely

Species	Scientific Name	USFWS/BLM Sensitive	In Range	Suitable Habitat present
Blacknose shiner	*Notropis heterolepis*		Unlikely	Unlikely
Longnose sucker	*Catostomus catostomus*		Unlikely	No
Northern Redbelly X Finescale Dace		Sensitive	No	N/A
Paddlefish	*Polyodon spathula*	Sensitive	No	N/A
Pearl dace	*Margariscus margarita*	Sensitive	Unlikely	Unlikely
Sicklefin chub	*Macrhybopsis meeki*	Sensitive	No	N\A
Sturgeon Chub	*Macrhybopsis gelida*	Sensitive	Yes	Yes
Snapping Turtle	*Cheldy serpentine*	Sensitive	Yes	Yes
Spiny softshell turtle	*Apalone spinifera*	Sensitive	Unlikely	possible
Northern leopard frog	*Rana pipiens*	Sensitive	Yes	Yes
Plains spadefoot	*Spea bombifrons*	Sensitive	Yes	Yes
Scaleshell mussel	*Leptodea leptodon*	Endangered	No	No
Higgins eye (pearlymussel)	*Lampsilis higginsii*	Endangered	No	No

Table 4: Endangered or sensitive aquatic wildlife species that occur in, or their ranges overlap with, the lease parcels.

Lease Parcel	Endangered or Sensitive Species
SDM 97300 PU	Pallid sturgeon, Paddlefish, Sauger, Blue Sucker, Sturgeon Chub, Paddlefish, Softshelled Turtle, Snapping Turtle, Northern Leopard Frog, Plains Spadefoot Toad
SDM 97300 PV	Northern Leopard Frog, Plains Spadefoot Toad
SDM 97300 PW	Sauger, Softshelled Turtle, Snapping Turtle, Northern Leopard Frog, Plains Spadefoot Toad
SDM 97300 PY	Snapping Turtle, Northern Leopard Frog, Plains Spadefoot Toad
SDM 97300 P4	Northern redbelly X Finescale dace, Snapping Turtle, Northern Leopard Frog, Plains Spadefoot Toad
SDM 97300 P6	Snapping Turtle, Northern Leopard Frog, Plains Spadefoot Toad
SDM 97300 P7	Northern redbelly X Finescale dace, Snapping Turtle, Northern Leopard Frog, Plains Spadefoot Toad
SDM 97300 P8	Northern redbelly X Finescale dace, Snapping Turtle, Northern Leopard Frog, Plains Spadefoot Toad
SDM 97300 P9	Northern redbelly X Finescale dace, Snapping Turtle, Northern Leopard Frog, Plains Spadefoot Toad
SDM 97300 QF	Northern redbelly X Finescale dace, Snapping Turtle, Northern Leopard Frog, Plains Spadefoot Toad
SDM 97300 PN	Northern redbelly X Finescale dace, Snapping Turtle, Northern Leopard Frog, Plains Spadefoot Toad
SDM 97300 PP	Northern redbelly X Finescale dace, Snapping Turtle, Northern Leopard Frog,

	Plains Spadefoot Toad
SDM 97300 33	Northern redbelly X Finescale dace, Snapping Turtle, Northern Leopard Frog, Plains Spadefoot Toad

3.6.1.2 Terrestrial Wildlife

Table 5: Analysis area occurrence of BLM terrestrial sensitive species and USFWS threatened, endangered, candidate or proposed terrestrial species

Species	Scientific Name	USFWS or BLM Status	In Current Range	Suitable Habitat Present
Mammals				
Gray Wolf*	*Canis lupus*	Endangered	No	No
Black-footed ferret	*Mustela nigripes*	Endangered	Unlikely	possible
Black-tailed prairie dog	*Cynomys ludovicianus*	Sensitive	Yes	Yes
River Otter	*Lontra canadensis*		No	No
Swift fox	*Vulpes velox*	Sensitive	Yes	Yes
Long-legged Myotis	*Myotis evotis*	Sensitive	Yes	Yes
Long-eared Myotis	*Myotis vollans*	Sensitive	Yes	Yes
Fringe-tailed Myotis	*Myotis thysanodes pahasapensis*	Sensitive	No	No
Northern Myotis	*Myotis septentrionalis*	Proposed warranted for listing endangered	Yes	Yes
Townsend's big-eared bat	*Corynorhinus townsendii*	Sensitive	Yes	Yes
Birds				
Common loon	*Gavia immer*	Sensitive	Yes	Yes
Franklin's gull	*Laris pipixcan*	Sensitive	Yes	Yes
Interior least tern	*Sterna antillarum athalassos*	Endangered	Yes	No
Black tern	*Chlidonias niger*	Sensitive	Yes	Yes
White-faced ibis	*Plegadis chihi*	Sensitive	Yes	Yes
Whooping crane	*Grus americana*	Endangered	Yes	Yes
Yellow rail	*Coturnicops noveboracensis*	Sensitive	Yes	Yes
Piping plover	*Charadrius melodus*	Threatened	Yes	No
Marbled godwit	*Limosa fedoa*	Sensitive	Yes	Yes
Long-billed curlew	*Numenius americanus*	Sensitive	Yes	Yes
Bobolink	*Dolichonnyx oryzivorus*	Sensitive	Yes	Yes
Greater sage-grouse	*Centrocercus urophasianus*	Sensitive	Yes	Yes
Burrowing owl	*Athene cunicularia*	Sensitive	Yes	Yes
Three-toed woodpecker	*Picoides tridactylus*	Sensitive	No	No
Trumpeter swan	*Cygnus buccinator*	Sensitive	Yes	Yes
Bald eagle***	*Haliaeetus leucocephalus*	Sensitive	Yes	Yes
Golden eagle	*Aquila chrysaetos*	Sensitive	Yes	Yes
Ferruginous hawk	*Buteo regalis*	Sensitive	Yes	Yes
Swainson's hawk	*Buteo swainsoni*	Sensitive	Yes	Yes
Peregrine falcon	*Falco peregrinus*	Sensitive	Yes	Unlikely
Northern goshawk	*Accipiter gentilis*	Sensitive	Yes	Unlikely
Sage thrasher	*Oreoscoptes montanus*	Sensitive	Yes	No
Sprague's pipit	*Anthus spragueii*	Sensitive	Yes	Possible
Loggerhead shrike	*Lanius ludovicianus*	Sensitive	Yes	Yes

Species	Scientific Name	USFWS or BLM Status	In Current Range	Suitable Habitat Present
Chestnut-collared longspur	*Calcarius ornatus*	Sensitive	Yes	Yes
McCown's longspur	*Calcarius mccownii*	Sensitive	Yes	Possible
Baird's sparrow	*Ammodramus bairdii*	Sensitive	Yes	Yes
Brewer's sparrow	*Spizella breweri*	Sensitive	Yes	No
LeConte's sparrow	*Ammodramus leconteii*	Sensitive	Yes	Yes
Prairie falcon	*Falco mexicanus*	None	Yes	Yes
Yellow-billed Cuckoo	*Coccyzus americanus*	Sensitive	Yes	Yes
Lewis's woodpecker	*Melanerpes lewis*	None	No	No
Red-headed woodpecker	*Melanerpes erythrocephalus*	Sensitive	Yes	Yes
Black-backed woodpecker	*Picoides arcticus*	Sensitive	No	No
Sage sparrow	*Amphispiza belli*	Sensitive	Yes	No
Dickcissel	*Spiza Americana*	Sensitive	Yes	Yes
Blue-gray gnatcatcher	*Polioptila caerulea*	Sensitive	No	No
Reptiles				
Greater short-horned lizard	*Phrynosoma hernandesi*	Sensitive	Yes	Yes
Milk snake	*Lampropeltis triangulum*	Sensitive	Yes	Yes
Western hog-nosed snake	*Heterodon nasicus*	Sensitive	Yes	Yes
Plants				
Narrowleaf Penstemon	*Penstemon angustifolius*	Sensitive	Yes	Possible
Narrowleaf Milkweed	*Asclepias stenophylla*	Sensitive	Yes	Possible
Schweinitz' Flatsedge	*Cyperus schweinitzii*	Sensitive	Yes	Possible
Double Bladderpod	*Physaria brassicoides*	Sensitive	Yes	Possible
Little Indian Breadroot	*Pediomelum hypogaeum*	Sensitive	Yes	Possible
Plains Phlox	*Phlox andicola*	Sensitive	Yes	Possible
Barr's Milkvetch	*Astragalus barrii*	Sensitive	Yes	Possible
Bractless Blazingstar	*Mentzelia nuda*	Sensitive	Yes	Possible
Scribner's Panic grass	*Dichanthelium oligosanthes* (Schult.) Gould var. *scribnerianum* (Nash) Gould	Sensitive	Yes	Possible
Blue Toadflax	*Nuttallanthus texanus*	Sensitive	Yes	Possible
Pale-spiked Lobelia	*Lobelia spicata*	Sensitive	Yes	Possible
Fendler Cat's-eye	*Cryptantha fendleri*	Sensitive	Yes	Possible

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

*Gray wolf will be moved to the bureau sensitive list if delisted by the USFWS. At the time of this document's writing, the gray wolf as been delisted east of the Missouri River in South Dakota but retains its federal status as endangered west of the Missouri River in South Dakota.

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

3.6.1.2.1 Threatened, Endangered, Candidate, and Proposed Species

Birds

Two species of birds listed as endangered are found within the planning area. The interior least tern (*Sterna antillarum)* occurs along some of the rivers within the planning area but are not expected to occur in the lease units as suitable habitat for this species does not exist. The other species is the whooping crane (*Grus Americana)* whichmigrates through the area seasonally and has some potential of occurring in fields or wetlands during migration.

The piping plover (*Charadrius melodus*) is a threatened species which occurs in the planning area but is not known to occur on the lease units. The piping plover nests along some of the rivers within the planning area but has little potential to occur within the lease units because of lack of suitable wetland habitat.

The greater sage-grouse (*Centrocercus urophasianus*) was recently listed as a candidate species. Several petitions have been submitted to list greater sage-grouse as threatened; the first petitions were submitted to the USFWS in 2002. In January 2005 the USFWS determined that listing under the ESA was not warranted, but recent court actions have instructed the USFWS to reconsider that decision. On March 5, 2010, the USFWS determined that the greater sage-grouse is warranted (for listing) but precluded by more precarious listing needs, making it a candidate species. Greater sage-grouse conservation is a priority for the BLM, and emphasis has been placed on planning efforts throughout their range in North America, including South Dakota. Greater sage-grouse are found mainly in Butte and Harding counties in northwestern South Dakota. Fall River County also historically contained sufficient habitat to support greater sage-grouse, though the species has become exceedingly rare in that area. The proposed lease parcels inFall River County may provide habitat for sage-grouse as there is an active lek and historic sage-grouse data for the area. The lease parcels located in Harding County for the sale and reinstatement would likely be considered poor habitat for sage-grouse because of the overall lack of sagebrush canopy cover, land conversion for agriculture, and ongoing energy development; however, it may provide limited brood-rearing habitat. The South Dakota population is considered non-migratory and is mainly associated with big and silver sagebrush communities.

The Sprague's pipit (*Anthus spragueii*) became warranted (for listing) in September 2010 but was precluded from listing, making it a candidate species. This pipit is known to occur in Harding, Perkins, and Stanley counties and could potentially be found in other northwestern South Dakota counties. Sprague's pipit use grasslands of intermediate height and sparse to intermediate vegetation densities with other habitat features including low visual obstruction, moderate litter cover and little or no woody vegetation (Effects of Management Practices on Grassland Birds: Sprague's Pipit, 2004). The parcel SDM 098206 in Harding county may provide habitat for Sprague's pipits, although the occurrence of this species on BLM administered surface or minerals is unknown.

Mammals

Two species of mammals that are listed as endangered may be found within the planning area but not within the proposed lease units. The black-footed ferret (*Mustela nigripes*) has been reintroduced in South Dakota into parts of their former range from a captive breeding population. These reintroduction sites are not within the proposed lease units. The historic range of the ferret

in South Dakota corresponds to the range of the black-tailed prairie dog (see discussion under sensitive mammal species). The historic range of gray wolves (*Canis lupus)* included all of South Dakota; currently, breeding populations of wolves exist in the adjoining states of Wyoming, Minnesota, and Montana, and some individuals move from these populations into and through South Dakota.

The northern long-eared bat (also referred to as northern myotis; *Myotis septentrionalis*) has been proposed as warranted for listing as an Endangered species. The species has undergone dramatic declines in the eastern US due to white-nose syndrome. Concern for the species has increased as white-nose syndrome has been found in caves and abandoned mines further and further west. Northern long-eared bats inhabit the Black Hills and nearby regions.

Fish
Two fish species listed as endangered occur in the South Dakota RMP planning area. These species are not known to occupy BLM lands and would not occupy the proposed and reinstatement lease units or be affected by BLM management of federal minerals. Of these two species, the pallid sturgeon *(Scaphirhynchus albus)* is found in the Missouri River in South Dakota. The Topeka shiner *(Notropis topeka)* is found mainly in eastern rivers and tributaries of South Dakota.

Invertebrates
Recently two species of butterfly found in South Dakota were warranted for listing as ESA species. The Dakota skipper (*Hesperia dacotae*) was warranted for listing as threatened, and the Poweshiek skipperling (*Oarisma poweshiek*) was warranted for listing as endangered. Both species are only found on the far eastern side of South Dakota.

3.6.1.2.2 Other Sensitive Species

Birds. There are 36 bird species considered sensitive by BLM in the South Dakota planning area, with almost all of them having the potential to occur on BLM surface or federal mineral, split-estate parcels. The birds found in the planning area occupy a wide range of habitat types, including sagebrush steppe/grasslands, riparian areas, wetlands, and forests. However, the lease parcels under consideration are primarily in sagebrush steppe/grassland habitats, and the species which rely heavily on these habitats will likely be the most affected by disturbance.

Sagebrush canopy cover is limited within the lease parcels, and sagebrush obligate species would not be expected to occupy these habitat types; however, the proposed and reinstatement lease parcels have good habitat for a large number of the sensitive bird species that use the short, and midgrass prairie habitats. The following birds may occur on these units for some or all of their life cycle.

Baird's Sparrow (*Ammodramus bairdii*)
Le Conte's Sparrow (*Ammodramus leconteii*)
Chestnut-collared longspur (*Calcarius ornatus*)
Dickcissel (*Spiza americana*)

Bobolink (*Dolichonyx oryzivorus*)
Loggerhead shrike (*Lanius ludovicianus*)
Long-billed Curlew (*Numenius americanus*)
Marbled Godwit (*Limosa fedoa*)
Swainson's hawk (*Buteo swainsoni*)
Ferruginous Hawk (*Buteo regalis*)
Golden Eagle (A*quila chrysaetos*)
Burrowing Owl (*Athene cunicularia*)

Mammals
The two sensitive mammal species that have the potential to occur in the proposed and reinstatement lease parcels are the swift fox and the black-tailed prairie dog. Both species are associated with prairie communities and are found in western South Dakota.

Swift fox are found within the western part of South Dakota and have the potential to occur in the proposed lease area. There is a small native population in Fall River County and a re-introduced population on the Bad River Ranch in Stanley County in central South Dakota. There also has been documented movement of individuals across western South Dakota. The swift fox uses large tracts of short or mid-grass prairie for its habitat.

The black-tailed prairie dog is found in colonies in the open grasslands of the planning area. There is one known prairie dog colony in the proposed lease unit SDM 97300-AJ in Harding County and there is potential for them to occur in other proposed and reinstatement lease units.

Reptiles and Amphibians
There are four sensitive species of reptiles and amphibians listed by BLM that have potential to occur on the proposed and reinstatement lease units.

The snapping turtle is highly aquatic and found mainly in permanent water with soft mud bottoms and aquatic vegetation across South Dakota. This species inhabits aquatic habitats across the planning area and has the potential to occur in all lease units.

The Western hog-nosed snake generally uses open prairies or sandy areas near floodplains or water but will burrow in grasslands with well-drained soils. It can be observed throughout the planning area and has the potential to occur in all lease units.

The short-horned lizard is a ground-dwelling lizard that inhabits semiarid shortgrass or sage prairies with rocky or sandy areas. This species is distributed over the northwest and southwest corners of South Dakota, inhabiting many of the butte and badland areas. It can be observed throughout the planning area and has the potential to occur in all lease units.

The plains spadefoot toad, which inhabits grasslands and floodplains with sandy or loose soil, are sporadically distributed throughout western South Dakota in most west river counties. They have the potential to occur on all lease units.

The northern leopard frog is South Dakota's most familiar frog and is found throughout South Dakota in a variety of habitats from temporary wetlands to large lakes. Populations in the planning area appear to be healthy. They have the potential to occur on all lease units.

Fish

There are nine sensitive fish species which live in the planning area but do not occur on the proposed and reinstatement lease units. The species are banded killifish, blacknose shiner, blue sucker, longnose sucker, northern redbelly dace x finescale dace hybrid, paddlefish, pearl dace, sicklefin chub, and sturgeon chub.

3.6.2 Special Status Plant Species

Following is a list of South Dakota's rare and BLM's sensitive plants that may have existing populations and/or suitable habitat on or near the lease parcels by county:

Table 6: SD Rare Species of Concern and BLM Sensitive Plants on or near Lease parcels

Plant Name	Counties it may occur in	Habitat description
White-veined wintergreen	Lawrence	
Dakota buckwheat	West river counties	Badlands outcrops of western SD
Sand Puffs	Harding	Prairie sand and blowouts of northwest SD
Bahia	Butte & Dewey	
Marsh Alkali Aster	Lawrence & Harding	
Inflated Sedge	Several historical collections from NW, SW, and NE SD	
Great Basin Navarretia	Harding	

3.7 Fish and Wildlife

Falling within the Northern Great Plains ecosystem, the proposed and reinstatement lease parcels are important to many wildlife species due to habitat diversity that supports breeding populations.

The assortment of topography, vegetation, and climate occurring in the planning area provides habitats for a variety of wildlife species. The presence of any species may be seasonal or year-round based on individual species requirements and resource availability. Wildlife found within this area are representative of those species found within the Northern Great Plains ecosystem, including grasslands, sagebrush, and riparian habitats.

Riparian and wetland habitats are used extensively by wildlife, including neotropical migrant birds (species that breed in North America and over-winter in Central and South America); such as finches, warblers, thrushes, and orioles in the spring and fall. Buttes and rock areas are used by roosting and nesting golden eagles and prairie falcons, along with many other bird and bat

species. These buttes and rock areasalso provide important cover for large mammals, such as mountain lions and bobcats, and for small mammals such as ground squirrels and rabbits.

3.7.1 Aquatic Wildlife - Riparian, wetland, and other aquatic habitats in the vicinity of the proposed lease parcels include a suite of native and non-native game and non-game fish species. Representative families may include minnows (Cyprinidae), suckers (Catostomidae), catfish (Ictaluridae), trout (Salmonidae), and sunfish (Centrarchidae) (Hoagstrom et al. 2011). Freshwater mussels, invertebrates, and amphibians also spend all or most of their lifecycles in these aquatic systems and provide the food and nutrients necessary to support fish and other predators. Development of the lease parcels is not likely to directly impact aquatic systems; however, activities that disturb soil and contribute to erosion or pollution may degrade aquatic habitats down-grade from the sites of disturbance.

3.7.12 Terrestrial Wildlife

Birds

Raptors - Approximately 25 species of raptors could use the proposed and reinstatement lease parcels during migration and as breeding habitat. Raptors (predatory birds such as hawks, eagles, owls, and falcons) can be found throughout much of the area.

Common breeding species include the red-tailed hawk *(Buteo jamaicensis)*, prairie falcon *(Falco mexicanus)*, American kestrel *(Falco sparverius)*, northern harrier *(Circus cyaneus)*, and great-horned owl *(Bubo virginianus)*. Other less common breeding species that may be found locally include the ferruginous hawk *(Buteo regalis)*, Swainson's hawk (*Buteo swainsoni*), and long-eared owl *(Asio otus)*. Nesting habitats are found across the grassland, shrub-land, and buttes, and in cottonwood, ash, and ponderosa pine where available. Prey species are more likely to be available for a wide range of raptors when plant communities are structurally diverse and support mixtures of grasses, forbs, and shrubs. Some of the breeding species also winter within the planning area; however, the rough-legged hawk *(Buteo lagopus)* only uses the proposed lease units for its wintering grounds.

Grassland and Neotropical Birds - The proposed and reinstatement lease units support a wide variety of grassland and neotropical migrant bird species (more than 250 species). Populations of some of these species are declining as a consequence of land use practices and other factors. Many species of grassland birds nest and raise their young on these lease parcels. Neotropical migrants exhibit quite variable habitat requirements and are found in most habitat types.

Upland gamebirds - Upland gamebird species are the most popular game birds in the South Dakota planning area and are hunted in parts of this area. The sharp-tailed grouse *(Tympanuchus phasianellus) is* native to the analysis area along with slight potential for the greater sage grouse (discussed in the sensitive species section). Other upland gamebirds that may occur are gray partridge *(Perdix perdix)*, ring-necked pheasant (*Phasianus colchicus*), and wild turkey (*Meleagris gallopavo*). These species are generally in the area yearlong.

Waterfowl, Shorebirds and Wading Birds - Approximately 70 species of birds may use wetlands within or adjacent to the proposed and reinstatement lease parcels when surface water is present during migration and as breeding habitat. Representative breeding species include the Canada goose *(Branta canadensis)*, mallard *(Anas platyrhynchos)*, gadwall *(A. strepera)*, American avocet *(Recurvirostra americana)*, and Wilson's phalarope *(Steganopus tricolor)*. Vegetation cover for nest concealment from predators and for protection from other disturbances is important to these species during the breeding season.

Mammals

Many species of mammals that occur on these lease parcels are small terrestrial mammals such as rabbits, skunks, weasels, squirrels, ground squirrels, pocket gophers, mice, voles, and shrews, along with several species of bats which are not as visible but play an important ecological role in their associated habitats. The proposed and reinstatement lease parcels also provide habitat for many species of medium sized mammals, including coyote, red fox, bobcat, badger, and raccoon which are the main predators of the area. These species play an important ecological role in their associated habitats. The larger mammals that may occur on these lease unit and which are much more visible include, mule deer, white-tailed deer, and pronghorn antelope. These species concentrate within wintering habitat where increased stress from disturbance may affect the population.

Reptiles and Amphibians

Snakes, lizards, turtles, frogs, toads, and salamanders are all likely to inhabit or at some point occupy the proposed lease parcels. Seven species of amphibian and up to 14 reptiles have the potential to occur on or near one or more of the proposed and reinstatement lease parcels. They feed variably on invertebrates and small rodents, among other things, and may be difficult to detect with the exception of when frogs are calling (Kiesow 2006). Reptiles and amphibians are particularly sensitive to disturbances and pollution (Kiesow 2006).

3.8 Cultural Resources

The BLM is responsible for identifying, protecting, managing, and enhancing cultural resources which are located on public lands, or that may be affected by BLM undertakings on non-Federal lands, in accordance with the National Historic Preservation Act (NHPA) of 1966, as amended. The procedures for compliance with the NHPA are outlined in regulation under 36 CFR 800. Cultural resources include archaeological, historic, and architectural properties, as well as traditional life-way values and/or traditional cultural properties important to Native American groups.

Common prehistoric archaeological site types in Harding and Fall River counties of western South Dakota are rock art, artifact scatters, burials, bison or antelope bone beds, eagle-trapping pits, tool stone procurement and tool manufacture. Also, these areas contain numerous rock cairns, rock shelters, stone alignments, stone circles, vision quest locales, and camp or occupation areas. Common historic archaeological sites are the remains of farmsteads,

homesteads, depressions, artifact scatters, foundations, cabins, sheepherder camps, line camps, CCC camps, wells and historic inscriptions (Sundstrom 2009).

A literature search (Level I or Class I) of records at the South Dakota Archaeological Research Center was conducted for each of the 15 nominated and SDM 98602 lease parcels and within a one-mile search radius. Records were reviewed to determine what types and numbers of known cultural resources are present within or adjacent to the lease parcels. Additional cultural resource information was reviewed for the general area in the 1986 South Dakota Resource Management Plan and the South Dakota Statewide Comprehensive Historic Preservation Plan (Sundstrom 2009). Requests were made to tribal historic preservation offices in South Dakota, North Dakota, and Montana for additional cultural information.

There is 1 lease sale parcel and 1 lease reinstatement parcelin Harding County that are being considered for this Environmental Analysis. Based on the review of available information, 80 acres of the 800.00 acres of surface areas within the identified lease parcels have been previously inventoried for cultural resources. An additional 200 acres of cultural resource inventories have been completed for oil and gas development, livestock pipeline developments, and sample archaeological surveys in a 2-mile radius of the lease parcel and reinstatement parcel. Records indicate there is one cultural resource site located inside Lease Parcel SDM 79010-AJ. Site 39HN1125 was documented during a BLM contract survey of cultural resources on BLM land parcels in Harding County, South Dakota (Walker-Kuntz, Sunday 2009). The report is documented under BLM Project No. 09-MT040-05 and is in the process of review by interested Tribal members consulting on oil and gas leasing in Harding County. Site 39HN1125 is a prehistoiric artifact scatter that contains one cream colored chert scraper with cortex. No other associated artifacts or features were observed in the surrounding area and no subsurface testing was conducted. The site is unevaluated for the National Register of Historic Places and must be avoided until appropriate tribal consultation and site evaluation is completed. There are no other recorded cultural resource sites in a 2 plus mile radius of the lease parcel. There are no previously documented cultural resource sites within or in a one-mile radius of reinstatement Lease Parcel SDM 098206. Recorded cultural resource sites witin 2-miles from the lease parcel include prehistoric artifact scatter site (39HN364), stone quarry site (39HN378), rock cairn site (39HN363), and a prehistoric occupation site (39HN444).

The remaining 14 lease sale parcels in Fall River County totaling 5,115.19 acres, are located within the the Black Hills Army Depot (BHAD) and Igloo historic town site (39FA3003) just west of Provo, South Dakota. Site 39FA3003 is considered eligible for the National Register of Historic Places as a Historic District based on it's significance to an historic military era. Cultural resource surveys for mainly utilities, some oil development, fencing, and disposal sites have been conducted throughout a small portion of the BHAD site and adjacent to the site boundary. Numerous historic properties have been previously documented inside BHAD and immediately adjacent.

The write up for site 39FA3003, BHAD/Igloo includes the following information on the State of South Dakota Archaeological Site Form.

"In 1941 Provo was chosen as the site of the Black Hills Ordnance Depot. The town at that time had 20 residents, 6 houses, a store, no electricity and no running water. In 1942 government

buildings, workshops, a utility plant, was built by workers who slept in cars and tents. Later that year homes, schools and a hospital was built. The first ammunition arrived in 1942 and 500 families arrived in 1943. Private businesses allowed to operate at the depot included a store, gas station, a restaurant, a bowling alley and a barber shop. The population soon exceeded 4000. The community wanted a new name and a 14 year old boy suggested "Igloo" after the shape of the storage buildings. By 1950 only 700 people remained. In 1956 the population grew back to 2500 because of the Korean War. In 1964 the government appropriations and cut-backs caused the community to die again. The site was used as a dump site for sewage ash/gold extraction by a Minnesota Company. The company defaulted and the state had to bury 300,000 tons of ash. The ordinance, gas, etc. was removed by the army but parts of the site are included in the Federal Superfund Cleanup. Archaeological features include wells, cisterns, gates, sidewalks, roads, an airfield, and historic artifact scatters."

Other contributing elements of BHAD have been previously documented including BHAD marker monument, historic roads, wells and cisterns, an air strip and a side walk (39FA1200, 39FA3003.2006.01, 02, 03, 04, 39FA3003.2008.01, 02, 39FA3003.2009.01). Segments of the historic railroad sites 39FA2000 and 39FA2003 are also located inside BHAD.

Additional cultural resource sites documented adjacent to BHAD include the BHAD Air Strip 39FA3003.2010.01, Igloo Road 39FA3003.2010.03, Prehistoric artifact scatters listed as isolated finds and Native American occupations (39FA710 and 39FA712), a farmstead (39FA711), prehistoric lithic isolated finds (39FA930, 39FA931, and 39FA932), historic artifact scatters and depressions (39FA1662 and 39FA1663), earthen ramps (39FA1647 and 39FA1648), and historic railroads (39FA2000, and 39FA2003), and the Historic Cheyenne to Deadwood Stage Coach and Wagaon Road (39FA2006).

Site 39FA0003 is documented on portions of SDM 97300-PN and SDM 97300-PR, inside the boundary of BHAD. Site 39FA0003 was recorded very early on by W. H. Over as being a rock shelter near FA26, rock shelter. There is no legal description and no map in Over's notes. The exact location of site 39FA0003 is unknown.

Cultural resource sites that are located inside the Lease Parcels in BHAD include, BHAD-39FA3003, 39FA3, 39FA710, 39FA930, 39FA931, 39FA1200, 39FA2000, 39FA2003, and contributing elements (39FA3003.2006.01, 02, 03, 04, 39FA3003.2008.01, 02, 39FA3003.2009.01).

There are 15 lease parcels and 1 reinstatement lease totaling 5,915 acres that are proposed for the July 2014 oil lease sale. Cultural resource surveys have covered approximately 4 percent of the lease parcels. Of the 29 previously recorded cultural resource sites 1 is located inside a lease parcel in Harding County, and 15 are located inside the lease parcels at BHAD in Fall River County. Known sites include 10 that are considered eligible for the National Register of Historic Places (NRHP), 3 sites that are unevaluated and 3 sites that have been evaluated and are not eligible for nomination to the NRHP. The remaining 13 cultural resource locations are in a 1 to 2 mile radius of the lease parcels and will not be effected by the proposed leasing.

The Bureau of Land Management follows standard procedures for the consideration of potential impacts to cultural resources resulting from Oil and Gas leasing and development projects. These procedures allow for a "phased" approach to the identification and evaluation of cultural

properties. The detailed Level I/Class I overview of cultural resource information (previous survey and known sites) was compiled for all proposed lease parcels identified from Expressions of Interest (EOIs). In addition, tribal consultation efforts were initiated to identify culturally significant areas or traditional cultural properties in close proximity to the proposed lease parcels that may be of particular concern to tribes. This information is then compiled into this Environmental Assessment and a decision is made to lease the parcel or defer leasing on the parcel.

In all cases the Standard Lease Notice and the following stipulation (Cultural Resource CR 16-1) identified in IM-2005-003 would be attached to the leases recommended for sale:

> "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."

Once a parcel has been leased, a Level III/Class III cultural resources inventory is required prior to any ground disturbing activities. Any cultural properties identified within the Area of Potential Effect (APE) are evaluated for significance and eligibility to the National Register of Historic Places. In a majority of cases, potential impacts to cultural resources are avoided through project abandonment or redesign. In rare instances, potential impacts are mitigated through other means in consultation with the South Dakota State Historic Preservation Office, the Advisory Council on Historic Preservation, and tribes that have expressed interest or concern. Specific "Guidance for Cultural Resource Investigations on Oil and Gas Projects" has been outlined in Instruction Memo MT-2006-040.

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.

According to Bulletin #38 of the National Register, sites of traditional cultural significance refer to "beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices." Critical issues related to TCPs as cultural sites include continuity over time, community identity, and traditional use. A TCP can be defined generally as a place "that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and (b) are important in maintaining the continuing cultural identity of the community."

Past information exchange during previous projects has resulted in a good record of topographic areas in South Dakota that are considered culturally sensitive to some Native American Tribes. Summary reports that included the cultural resource site and survey information as well as surrounding prominent topographic features for each lease parcel were sent to Tribal Historic Preservation Officers. Copies were also sent to Tribal Chairmen or Tribal Presidents for the tribes listed in the Table below. These summary report cover letters requested any additional information, concerns, or comments for culturally sensitive areas that may be affected by leasing the parcels (letter dated December 19, 2013). No comments have been received from these tribes to date.

Table 7: List of Native American Tribes with aboriginal ties or interests in the area.

Cheyenne River Sioux Tribe
Crow Creek Sioux Tribe
Crow Tribe of Montana
Fort Peck Tribes
Lower Brule Sioux Tribe
Northern Cheyenne Tribe
Oglala Sioux Tribe
Rosebud Sioux Tribe
Sisseton-Wahpeton Oyate Tribes
Standing Rock Sioux Tribe
Three Affiliated Tribe, (Mandan, Hidatsa, Arikara Nations)
Yankton Sioux Tribe

Cultural resource and Traditional Cultural Property (TCP) information were reviewed for the lease parcel areas in the 1986 South Dakota Resource Management Plan and the South Dakota Statewide Comprehensive Historic Preservation Plan (Sundstrom 2009). Important TCPs in the western part of South Dakota include the North Cave Hills, South Cave Hills, and Slim Buttes in Harding County, Bear Butte in Meade County, and the sacred Black Hills. Information obtained previously during consultation meetings with local tribes also identify prominent buttes in western South Dakota as having cultural significance. Requests were made to tribal historic preservation offices in South Dakota, North Dakota, and Montana for additional cultural information or areas of concern. Presently, there are no known TCPs inside the proposed lease parcels. Lease Parcel SDM79010-AJ is located 2.5 miles north of Corey and Teepee Buttes and

it is 9.2 miles northeast of the North Cave Hills. The 15 lease parcels located in Fall River County at BHAD/Igloo are located approximately 12 to 15 miles southwest of the Black Hills.

Lease parcel SDM 098206, the reinstatement lease, is located 1.8 miles southwest of Dogie Butte a prominent butte in northwestern Harding County, and 18 miles west of the North Cave Hills. Since this area has not been surveyed and it is unknown if TCPs exisit in this parcel, the NSO-11-23 Traditional Cultural Properties stipulation will be applied under the Draft RMP/EIS. This stipulation can be waivered pending tribal consultation.

3.10 Paleontology

The geologic formations present in the western part of South Dakota extend into several of the neighboring states and Canada, with only minor sedimentary or depositional differences. The formations encompass the last of the dinosaurs in the Cretaceous Period to the rapid development of early mammals in the Paleocene and Eocene Epochs of the Tertiary Period. These formations are found in eastern Montana, northeastern Wyoming, northwestern Nebraska, western South Dakota and North Dakota, and southernmost Saskatchewan and Manitoba.

The key geologic formations found in the South Dakota area containing significant paleontological resources falls into three main ages:

(1) The Upper Jurassic Morrison Formation and the overlying Lower Cretaceous Lakota Sandstone contain well-known dinosaur material. The Lakota Sandstone is also noted for the fossil plant material it contains. The Morrison Formation and Lakota Sandstone are found in the terrain surrounding the Black Hills, although exposures are mostly small in extent and somewhat difficult to explore.

(2) The second interval includes the Late Cretaceous Hell Creek Formation and the overlying Ludlow Formation, which contain records of the last of the dinosaurs (Hell Creek Fm) and the beginning of the radiation of the mammals (Ludlow Fm). These formations occur throughout the northwestern corner of South Dakota, although exposures are not as extensive as in neighboring Montana and Wyoming.

(3) The third major time frame is represented by the Slim Buttes Formation and the various formations combined into the White River Group and the Arikaree Group, spanning the Eocene to Miocene Epochs. The Slim Buttes Formation is limited in exposure and also occurs in the northwest corner of the state. The White River and Arikaree Groups occur in many portions of western South Dakota and neighboring states. Outside of Badlands National Park, exposures tend to be found as ridgelines, sides of buttes, or other actively eroding surfaces, with large areas of alluvium or deep soils covering the bedrock in most areas.

The Eocene/Oligocene/Miocene formations have also produced a huge number of significant mammal fossils over the last 130 years.

Areas in South Dakota were grouped together where the exposed or underlying bedrock had the potential to produce significant numbers of the material of interest. Values were assigned based on the Potential Fossil Yield Classification (PFYC) system to rank a formation's potential fossil yield of vertebrates or other scientifically significant fossils . These values are as follows:

(1) ***Very Low*** – Class 1: Igneous and metamorphic geologic units-not likely to contain recognizable fossils.
(2) ***Low*** – Class 2: Sedimentary geologic units- not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils.
(3) ***Moderate or Unknown*** –Class 3: Fossiliferous sedimentary geologic units – content varies in significance, abundance, and predictable occurrence. Some units of unknown potential.
(4) ***High*** –Class 4: are considered Class 5 fossils that do not have the potential for human or natural degradation.
(5) ***Very High*** –Class 5: Highly fossiliferous geologic units- regularly produce vertebrate fossils or scientifically significant vertebrate fossils. Situated to be subject to human or natural degradation.

The northern boundary of the state in the western half encompasses the tertiary deposits, which contain some significant or rare fossils. These deposits were designated a Class 4 grading to a Class 3. Included in this grouping are the following formations; Slim Buttes, Tongue River, Cannonball, and Ludlow.

South of these formations is the Hell Creek. This is a very significant formation with numerous vertebrate fossils of the Upper Cretaceous. Among these fossils are dinosaurs, plants, small mammals, reptiles, and birds. This formation and the thin overlying material was rated a Class 5. Of primary concern would be the regions where the Hell Creek is exposed with no plant cover. Included in this group are the Hell Creek and Fox Hills formations.

South of the Hell Creek Formation is the Pierre Shale and its related formations. These are marine shales that do produce some invertebrates along with some marine vertebrates and fish. Included are the Pierre Shale, Niobrara, Carlile, Greenhorn, and Belle Fourche formations. This area was assigned a Class 3 to Class 4.

Review of the PFYC ranks indicate 4 lease parcels and the lease reinstatement SDM 98206 are located within formations rated Class 4 or 5. The parcels were identified within the Hell Creek, Ludlow, and Slim Buttes formations that are considered significant PFYC formations to the field office. Previous research projects and paleontological surveys in southwestern North Dakota and northwestern South Dakota on BLM land and other lands have located significant fossil remains. The remaining 11 parcels are located in PFYC Class 3. Although formations in the Class 3 category are not considered as prospective as the Hell Creek and Ludlow formations, they do have potential to produce and are basically unknown until better field survey can define the presence or absence of fossil remains.

Most paleontological localities recorded with BLM offices resulted from researchers performing field work. A few localities have been found during BLM-required mitigation of surface-

disturbing activities. Some localities are simply local knowledge. Investigating illegal collecting activities has revealed the locations of some fossil resources. There are presently no known localities or previous research areas for fossil or paleontological resources inside or adjacent to the nominated and reinstatement parcels.

3.11 Visual Resources

Visual Resource Management (VRM) is the system used to designate and manage the visual resources on public land. A Class II VRM area classification means that the character of the landscape has unique combinations of visual features such as land, vegetation, and water. 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.

A Class III VRM area classification 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.

A Class IV VRM area classification 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.

No Visual Resource Management (VRM) classes have been established in the project area by a formal written decision document. The South Dakota RMP revision will formally address VRM through a range of alternatives based on the VRI data and other resource concerns, however in the interim, and as directed by BLM Manual 8400 (Visual Resource Management), the affected environment is described using the existing Visual Resource Inventory (VRI) classes. The BLM acres included in the lease parcels are within VRI class IV (Table 8), and thereby assigned VRM class IV.

VRI is only applied to federally managed surface acres; therefore the affected environment for visual resources only consists of 80 acres of the 5,195.19 acres in the proposed action.

Table 8: VRI Classes for the analysis area

Leasing Areas	VRM Class II Acres	VRM Class III Acres	VRM Class IV Acres
HARDING COUNTY	***0 acres***	***0 acres***	***80 total acres***
SDM 79010-AJ	0	0	80

3.12 Forest and Woodland Resources

None of the potential lease parcels contain forest or woodland resources.

3.13 Livestock Grazing

The eighty acre lease parcel SDM79010-AJ, located in Harding County, South Dakota, is the only surface lease parcel within this EA . This parcel is located in the Crooked Creek grazing allotment which is allocated 24 animal unit months (AUMS) of BLM administered lands and authorized to be grazed by sheep. Within the allotment the BLM parcel is surrounded by 6,080 private acres and is grazed with approximately 2,200 sheep utilizing approximately 1,779 AUMS each year when grazed from May 1 through August 31. The allotment has several range improvements including fences, pipelines, stock ponds, wells, roads and windmills. Table 9 identifies allotment specific information for each of the lease parcels and whether or not they are part of an allotment or unallocated for livestock grazing.

Table 9: Lease parcels located within BLM grazing allotments

Parcel ID	Allotment Name and Number	Livestock Kind	Season of Use	Allotment Category	Surface Ownership
SDM 79010-AJ	Crooked Creek #01765	Cattle	05/01-08/31	Custodial	Private surface with unfenced BLM in allotment

The remaining lease sale and reinstatement parcels are not located within grazing allotments.

3.14 Recreation and Travel Management

BLM only manages recreational opportunities and experiences on BLM-administered surface. Recreational activities enjoyed by the public on BLM lands within the analysis area include hunting, hiking, camping, fishing, photography, off-road vehicle activities, picnicking, and winter activities such as snowmobiling. Benefits and experiences enjoyed by recreational users include opportunities for solitude, spending time with families, enhancing leisure time, improving sports skills,
enjoying nature and enjoying physical exercise.

None of the 15 lease sale and 1 reinstatement parcels fall within SRMAs or recreation areas.

The affected environment consists of 80 acres of BLM-administered public lands (surface).

The 80 BLM-administered acres proposed for lease consist of one small and isolated tract with limited legal public access (i.e., no public easements or rights-of-way across private property). The lack of public access limits use of the BLM parcels for recreational use by the general public. The types of limited public use on these lease parcels can be characterized as casual dispersed recreational activities including hiking, hunting, camping, and wildlife viewing. If these lease parcels were developed there would be little change in both the physical and social setting through the introduction of roads, equipment, noise and traffic associated with drilling operations detracting from the peaceful setting provided by the state along this stretch of land.

3.15 Lands and Realty

Lands and realty actions will only occur on BLM-administered surface. The affected environment consists of 80 acres of BLM-administered public lands (or 1.5 percent of the total acreage proposed for lease).

There are no Rights-of-Ways across the 80 acre BLM parcel in Harding County.

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 377 federal oil and gas leases covering approximately 184,077 acres in the SDFO. The number of acres leased and the number of leases can vary on daily basis as leases are relinquished, expired, or are terminated. Existing production activity occurs on approximately 158 leases, covering 96,454 acres or 52 percent of this lease acreage. Information on numbers and status of wells on these leases and well status and numbers of private and state wells within the external boundary of the field office is displayed in Table 10. Numbers of townships, leases 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	PRIVATE AND STATE WELLS
Drilling Well(s)	1	0
Producing Gas Well(s)	28	33
Producing Oil Well(s)	34	94
Water Injection Well(s)	3	5
Shut-in Well(s)	7	4
Temporarily Abandoned Well(s)	1	8

From AFMSS January 2013

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

	July 15, 2014 Sale Parcels		Lease Reinstatement
	Harding County	Fall River County	Harding County
Number of Townships Containing Lease Parcels	1	1	1
Total Acres Within Applicable Township(s)	10,144	22,860	22,892
Acres of Federal Oil and Gas Minerals	80	17,981	6,680
Percent of Township(s)	<1%	79%	29%
Acres Leased Federal Oil and Gas Minerals	0	80	6,657
Percent of Township(s)	0%	<1%	29%
Acres Leased Federal Oil and Gas Minerals Held by Production	0	80	3,028
Percent of Township(s)	0%	<1%	13%
Federal Wells	1 active, 0 abandoned	2 active, 4 abandoned	0 active, 3 abandoned
Private and State Wells	13 active, 3 abandoned	0 active, 3 abandoned	0 active, 0 abandoned

3.16.2. Solid Minerals

3.16.2.1. Coal
There is no current coal production, nor any leased coal, in the lease parcel areas.

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, such as bentonite. There is currently no locatable mineral production or potential for economic production in the lease parcel areas, although some bentonite does exist.

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

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

3.17 Special Designations

3.17.1 National Historic/Scenic Trails
None of the potential lease parcels are within or affect areas with National Historic or Scenic Trails.

3.17.2 Areas of Critical Environmental Concern (ACECs)
None of the potential lease parcels are within or affect Areas of Critical Environmental Concern.

3.18 Social and Economic Conditions

3.18.1 Social and Environmental Justice
Harding County is in the northwestern corner of South Dakota and directly south of western North Dakota where extensive oil and gas exploration and development is currently occurring. The 2010 population of Harding County was 1,255, which was a decline of 7% from the 2000 figure. In comparison, the state population increased 8% between 2000 and 2010. The 2010 population of Buffalo, the county seat of Harding County, was 188 in 2010.

The 2010 population density for Harding County was very low at 0.5 persons per square mile in 2010, compared to 10.7 for South Dakota as a whole. The areas in the vicinity of the leases are

home to large farms and ranches. There is current oil and gas development in Harding County with 164 leases covering 92,948 acres. Of these leases 62% of the leases covering 71% acres are within existing oil fields. The majority of these leases are managed by the BLM, within only 9% managed by the USFS (14,369 acres). Lease AJ and SDM 98206 is located in Harding county; these parcels comprise of 80 acres BLM surface and federal minerals, and 720 acres split estate.

In 2010, the percent American Indian was 1.5% in Harding County compared to 8.8% for the state as a whole. Tribes in South Dakota, North Dakota, Montana and elsewhere have an interest in lands in Harding County. Lease SDM 98206 contains areas that need additional cultural information from interested Tribes.

Fall River County is in the southwestern corner of South Dakota. The 2010 population of Fall River County was 7,094 which was a decline of 5% from the 2000 figure. In comparison, the state population increased 8% between 2000 and 2010. The 2010 population of Hot Springs, the county seat of Fall River County, was 3,711 in 2010.

The 2010 population density for Fall River County was low at 4.1 persons per square mile in 2010, compared to 10.7 for South Dakota as a whole. The areas in the vicinity of the leases are home to large ranches. There is current oil and gas development in Fall River County, with 204 active leases (84,239 acres), with only 37% of these leases in existing oil fields. The vast majority of these lands are within the USFS National Grassland administrative boundary; with only 80 acres of these active leases managed by the BLM (this area is not in an active field). All of the leases analyzed in this document within Fall River County are on split-estate were BLM does not manage the surface.

In 2010, the percent American Indian was 6.7% in Fall River County compared to 8.8% for the state as a whole. Tribes in South Dakota, North Dakota, Montana and elsewhere have an interest in lands in Fall River County. However lands proposed for lease in this EA are within the BHAD area and tribes have not brought up any TCP concerns. Please see Chapter 5 of this EA.

More information regarding the social demographics of the analysis area, please see the next section.

3.18.2 Economics

There are certain characteristics which define and influence social and economic activity taking place in South Dakota. These characteristics may include local populations, the presence and proximity of cities or regional business centers, longstanding industries, infrastructure, predominant land and water features, and amenities unique to the area. While the exploration and development of federal mineral estates may take place on well-defined parcels, the social and economic impacts of these activities may extend well beyond parcel boundaries. In order to accurately portray the relationship of current BLM management, and examine the effects of leasing additional parcels for mineral development, the geographic scope of this analysis had to be extended. While there are only two South Dakota counties (Fall River and Harding,) which have parcels covered by this EA; Butte, Custer, Lawrence, and Pennington counties were identified as likely to be impacted by additional leasing. While the distribution of effects

stemming from additional fluid minerals leasing will vary across the impact area, the distribution of economic effects stemming from the sale will be based on the number of acres leased, levels of production, and the business patterns of these counties.

Affected Environment

Parcels in Fall River and Harding counties have been nominated for mineral leasing at the upcoming auction or petitioned for reinstatement. In 2010, these counties were reported to have populations of 7,094 and 1,255 residents with 3,200 and 515 households, respectively. The populations of Fall River and Harding counties have slowly been declining. Between 2000 and 2010, these populations declined by 4.8 and 7.2 percent, or by 359 and 98 residents, respectively (U.S. Department of Commerce, 2012). Populations of these two counties are not very racially or ethnically diverse. In 2010, 90 percent or more of residents in these counties identified themselves as being white alone, and only 1-3 percent of residents reported having Hispanic ancestry. Although overall diversity in the region remains low, South Dakota has historically had high concentrations of Native American populations. Sioux tribe members currently live in Fall River and Harding counties and account for 1 percent and 5 percent of total populations in these respective counties (U.S. Department of Commerce, 2012).

Employment in the region is supported by a varying number of industrial sectors. In 2012, Fall River supported 3,135 jobs in 117 industries, while Harding County supported 967 jobs in 65 industries. The majority of local economic activity is related to the Agriculture and Mining sectors, which are the driving force behind the local economy in both Fall River and Harding Counties (IMPLAN 2012).

Total personal income (TPI) in 2012, was estimated to be $278 million in Fall River, $47 million in Harding, and. This breaks down to an average household income of $87,176 and $92,099; and per capita of $39,323 and $37,793 respectively (IMPLAN 20102). Total personal income includes labor and non-labor income, including money earned on investments (interest, dividends, and rents) and transfer payments relating to age (Medicare and Social Security payments) or poverty (Medicaid or welfare assistance). In 2012 labor earnings (wages) accounted for 45 to 54 percent of TPI in Fall River and Harding counties, while investment earnings accounted for 29 to 33 percent and income maintenance related payments accounted for 26 and 12 percent of county TPI (U.S. Department Commerce, 2012).

Nature of the Oil and Gas Industry in South Dakota:

While several South Dakota counties lease land for the development of minerals estates, Custer, Fall River, and Harding are the only three counties with oil and gas production. In 2010, there were 138 producing oil wells and 92 producing gas wells, with more than 98 percent of the state's production taking place in Harding County (IPAA, 2012). The average wellhead price for oil in South Dakota was $60.04/bbl in 2010. While estimates for natural gas wellheads have been unavailable in recent years, the average price in South Dakota was last reported as $7.94/ MCF in 2008. Between 2008 and 2009 natural gas prices plummeted, in neighboring North Dakota where the average wellhead prices fell from $8.55 to $3.74 in single year. Because of Harding County's close proximity to North Dakota, it is highly likely that South Dakota wellhead prices drastically fell during this period as well. The cost of drilling and equipping wells in South Dakota is also likely to have fallen in recent years. In 2009 the average cost of drilling and

equipping a well was $3,860,085 (oil), $2,071,750 (gas), and $1,939,751 (dry). While updated cost estimates for oil and dry wells are unavailable for 2010, the cost of drilling and equipping a gas well fell by nearly 84 percent to $340,438 (IPAA, 2011, 2012).

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

Leasing:

As of January 2014, there were a total of 368 federal mineral leases in Fall River and Harding counties. Although there were approximately 84,240 acres of federal minerals leased in Faller River County and 92,948 acres leased in Harding County, the Bureau of Land Management only administers one 80 acre parcel in Fall River and 147 leases totaling 77,059 acres in Harding County. Approximately 88 percent of these minerals are public domain, while the remaining 12 percent were acquired under the Bankhead-Jones Land Act. Federal oil and gas leases generate a one-time lease bid as well as annual rents (BLM, LR200). Parcels containing federal minerals, which have been approved for leasing, are auctioned off periodically to interested parties starting at a minimum bid of $2.00 per acre. Many parcels leased at auction generate bonus bids in excess of the minimum bid. In 2011 the average bonus bid in South Dakota was $39.00 per acre. Once federal minerals are leased, leases are subject to annual rent or royalty payments. Rent on leased minerals is $1.50 per acre per year for the first five years and $2.00 per acre per year thereafter.

Typically, oil and gas leases expire after 10 years unless drilling activity on these parcels results in one or more producing wells. Once production begins, federally leased minerals are considered to be held by production and lease holders are required to pay royalties on production instead of annual rent. Approximately 25 percent of federally leased minerals within the planning area are held by production. The SDFO also considers mineral leases to be held by production if they have been incorporated into fields or units working cooperatively to increase extraction capabilities. According to the field office, approximately 61 percent of federal minerals leased from the BLM in Fall River and Harding counties are considered to be held by production.

Forty-nine percent of federal leasing revenues from public domain minerals are distributed to the state. For revenues received from public domain lands, the state of South Dakota distributes the revenues to public schools or other public educational institutions within the counties in which the minerals were produced (SD statute 13-14-3.1). In addition to receiving a portion of federal revenue from public domain minerals, approximately 25% of federal revenue collected from minerals acquired through the Bankhead-Jones Act are distributed directly back to the counties. Based on the average bonus bid for BLM minerals in South Dakota, the auction of 77,139 acres of BLM minerals in Fall River and Harding counties has generated more than $3 million in federal revenue, and continues to generate approximately $52,000 annually in rent. Fall River and Harding counties have received millions from the redistribution of bonus bid revenues and are estimated to receive more than $24,000 annually from the distribution of federal rental payments.

Production:

Average annual output per producing well in South Dakota is estimated to be 10,716 barrels for oil wells and 15,357 Mcf for natural gas wells (IPAA, 2012). As of January 2014 there were 406 active wells in Fall River and Harding counties, 46 of these wells were located on federal lands. Between the two counties with nominated parcels there were 20 producing wells on National Forest Lands and 45 producing wells on BLM lands (DENR SD, 2014). Although BLM minerals are leased in Fall River, all active wells on BLM minerals are located in Harding County. On annual average 373,225 bbls of oil and 156,200 Mcf of natural gas are extracted from BLM minerals in Harding County.

Federal oil and gas production in South Dakota is subject to production taxes or royalties. On public domain lands, these federal oil and gas royalties generally equal 12.5 percent of the value of production (43 CFR 3103.3.1). Forty-nine percent of these royalties are distributed to the state. In South Dakota, all of the royalty revenues that the state receives are redistributed to the counties of production to support public education. Estimated annual BLM-federal royalty revenues were estimated to be $ 2.87 million; of which about $ 1.32 million were distributed back to Fall River and Harding counties.

Local Economic Contribution:

Although only two South Dakota counties had parcels nominated for mineral leasing in the upcoming lease auction or for reinstatement, future oil and gas development on these lands has the potential to stimulate economic activity in a number of sectors throughout the region. Increased activity in the mining sector, which includes oil and gas related industries, creates a ripple-like effect in the local economy as money spent in the oil and gas related industries is spent and re-spent in other industrial sectors. This ripple effect, also called the "multiplier effect", reflects changes in economic sectors that may not be directly impacted by oil and gas development, but are linked to industries that are directly impacted. These ripple effects are termed indirect impacts (for changes in industries that sell inputs to the industries that are directly impacted) and induced impacts (for changes in household spending as household income increases or decreases due to the changes in production).

Since many of the companies drilling and servicing oil and gas wells operate out of nearby counties, this analysis extended the impact area to include Butte, Custer, Lawrence, and Pennington. Modeling all six of these counties as a regional economy more accurately capture economic contributions in the region by including business patterns between counties and accounting for household spending by oil and gas workers who may live outside the two counties with nominations. The economic contribution of oil and gas activities to a local economy is measured by estimating the employment and labor income generated by 1) payments to counties associated with the leasing, rent, and production of federal minerals, 2) local royalty payments associated with production of federal oil and gas, and 3) economic activity generated from drilling and associated activities. Activities related to oil and gas leasing, exploration, development, and production form a basic industry that brings money into the state and region and creates jobs in other sectors. Extraction of oil and natural gas (IMPLAN sector 20), drilling oil and gas wells (IMPLAN sector 28), and support activities for oil and gas operations (IMPLAN sector 29) supported an estimated 161 total jobs and approximately $4.3 million in total employee compensation and proprietor's income in the local economy (IMPLAN, 2012).

Total federal revenues from BLM-federal oil and gas leasing, rents, and royalty payments are an estimated $2.7 million annually. Federal revenues distributed to the state of South Dakota average an estimated $1.3 million per year. The state redistributes all of this to the public school districts and other public educational institutions within the South Dakota counties with federal leases and production (South Dakota statute13-14-3.1). The estimated annual local economic contribution associated with BLM-federal leases, rents, drilling, production, and royalty payments combined to support about 55 total local jobs and more than $2.1 million in local labor income (IMPLAN, 2012). This amounts to about 0.06 percent of the local employment and 0.05 percent local labor and proprietor's income. Table 12 shows the current contributions of leasing federal oil and gas minerals and the associated exploration, development, and production of federal oil and gas minerals to the local economy.

Table 12: Current Contributions of Federal Oil and Gas Leasing, Exploration, Development, and Production to the Local Economy

Industry	Employment (jobs)		Labor Income (Thousands of 2010 dollars)	
	Area Totals	BLM-Related	Area Totals	BLM-Related
Agriculture	3,046	0	$108,592	$3
Mining	480	24	$37,864	$721
Utilities	339	0	$36,526	$24
Construction	6,268	10	$298,962	$468
Manufacturing	3,386	0	$176,430	$23
Wholesale Trade	2,300	1	$153,824	$55
Retail Trade	3,366	3	$163,834	$106
Transportation & Warehousing	12,607	2	$362,794	$30
Information	1,131	0	$50,110	$18
Finance & Insurance	3,991	1	$193,355	$51
Real Estate & Rental & Leasing	1,846	1	$34,422	$21
Prof, Scientific, & Tech Services	3,687	2	$187,607	$126
Mngt of Companies	771	1	$75,444	$127
Admin, Waste Mngt & Rem Serv	2,630	1	$76,224	$29
Educational Services	1,489	0	$39,625	$8
Health Care & Social Assistance	12,333	2	$727,412	$141
Arts, Entertainment, and Rec	3,364	0	$70,283	$7
Accommodation & Food Services	11,824	2	$221,078	$34
Other Services	4,957	2	$166,195	$53
Government	15,971	2	$893,081	$80
Total	95,787	55	4,073,662	2,127
BLM as Percent of Total	---	0.06%	---	0.05%

Source: IMPLAN, 2012

4.0 ENVIRONMENTAL IMPACTS

4.1 Assumptions and Reasonably Foreseeable Development Scenario Summary

At this stage of the leasing process, the act of leasing parcels would not result in any activity that might affect various resources. Even if lease parcels are leased, it remains unknown whether development would actually occur, and if so, where specific wells would be drilled and where facilities would be placed. This would not be determined until the BLM receives an 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 NEPA analysis to more fully analyze and disclose site-specific effects of specifically identified activities. In all potential exploration and development scenarios, the BLM would require the use of 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 COAs, based on site-specific analysis that could include moving the well location, restrict timing of the project, or require other reasonable measures to minimize adverse impacts (43 CFR 3101.1-2 Surface use rights; Lease Form 3100-11, Section 6) to protect sensitive resources, and to ensure compliance with laws, regulations, and land use plans.

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

The following assumptions are from the Reasonably Foreseeable Development RFD Scenario developed for the South Dakota Field Office. The BLM administers approximately 1,471,000 acres (about 44 percent) of the federal oil and gas mineral lands available for leasing within the South Dakota Field Office's geographic area of responsibility. The South Dakota RFD forecasts the following level of development in the planning area.

4.1.1 Reasonably Foreseeable Development Scenario Summary and Assumptions

The following assumptions are from the RFD developed for the South Dakota FO RMP Revision. The RFD forecasts the following level of development in the South Dakota planning area.

No alternative would affect the demographics, social trends, or social organization in the area.

The South Dakota RFD scenario analyzes the potential for oil and gas development in the field office including both conventional oil and gas and CBNG. The potential is mapped in the RFD scenario. For this planning area average drilling densities per township over the life of the plan are as follows:

- High potential – 10 to 29 wells per township;

- Moderate potential – 2 to 10 wells per township;
- Low potential – 1 to 2 wells per township;
- Very low potential – less than 1 well per township;
- No potential – areas of the Black Hills where igneous rocks are at or near the surface.

Conventional activity would center on reserve growth (further development of existing fields). The projection of coal bed natural gas activity is unlikely; however it is part of the scenario of activity that could occur within the forecast period of twenty years. Disturbance projections from the RFD scenario follow (Tables 13 and 14).

Table 13: Disturbance Associated with New Drilled Wells and Existing Active Wells in Planning Area (Short-Term Disturbance – Two Years).

Wells			Acres of Surface Disturbance			
Type	Total	BLM Managed	Access Roads and Flow Lines	Well Pad	Total	BLM Managed
New Exploratory and Development Wells CBNG (2010-2029)	74	4	0.6	0.5	83	4
New Exploratory and Development Gas Wells (2010-2029)	112	23	0.6	0.5	123	25
New Exploratory and Development Oil Wells (2010-2029)	337	71	2.9	4	2,325	490
Total New Exploratory and Development Wells (2010-2029)	524	98			2,531	520
Existing Active Gas Wells (as of August 2008)	100	31	0.3	0.25	55	17
Projected New Gas Wells (August 2008-December 2009)	7	2	0.3	0.25	4	1
Existing Active Oil Wells (as of August 2008)	308	30	1.5	1.75	1,001	98
Projected New Oil Wells (August 2008-December 2009)	21	2	1.5	1.75	68	7
Total Existing and Projected Wells (August 2008-December 2009)	436	65			1,128	122
Total Wells	960	163		Total Short-Term Disturbance	3,659	642

Table 14: Disturbance Associated with New Drilled Wells and Existing Active Wells (Long-Term Disturbance).

Wells			Acres of Surface Disturbance			
Type	Total	BLM Managed	Access Roads and Flow Lines	Well Pad	Total	BLM Managed
New Producing CBNG Wells (2010-2029)	68	4	0.3	0.25	37	2
New Producing Gas Wells (2010-2029)	67	14	0.3	0.25	37	8
New Producing Oil Wells (2010-2029)	202	43	1.5	1.75	657	140
Total New Producing Wells (2010-2029)	337	60			731	148
Existing Active Gas Wells (as of August 2008) [1]	25	9	0.3	0.25	14	5
Projected Producing Gas Wells (August 2008-December 2009)	4	1	0.3	0.25	2	1
Existing Active Oil Wells (as of August 2008) [1]	271	25	1.5	1.75	881	81
Projected Producing Oil Wells (August 2008-December 2009)	13	1	1.5	1.75	41	4
Total Existing and Projected Wells (August 2008-December 2009)	313	37			938	91
Total Wells	650	97		Total Long-Term Disturbance	1,669	239

1 - minus abandonments during August 2008-December 2009 period

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

Alternative A (No Action Alternative)

Under the No Action Alternative, the 15 proposed parcels would not be leased. SDM 98206 would not be renewed. There would be no new impacts from oil and gas production on the parcel lands. No additional natural gas or crude oil would enter the public markets, and no royalties would accrue to the federal or state treasuries. The No Action Alternative would result in the continuation of the current land and resource uses on the parcels.

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

Analysis Assumptions for Alternative B
Under alternative B, the 15 proposed parcels would all be leased, and SDM 98206 would be renewed. By itself, the act of leasing the parcels would have no impact on any natural resources in the area administered by the South Dakota Field Office. Standard terms and conditions as well as special stipulations would apply to the lease parcels. All impacts would be linked to the resource potential. These areas are in the low and high development areas as identified in the RFD. High development potential would result in 10 to 29 wells drilled per township, and low development potential would result in one to two wells per township.

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

See Appendix A for stipulations which would be applied to the parcels, and where they would be applied.

Analysis Assumptions for Alternative C
By itself, the act of leasing the parcels in Alternative C would have no impact on any natural resources in the area administered by the South Dakota Field Office. Standard terms and conditions as well as special stipulations would apply to the lease parcels. All impacts would be linked to the resource potential. These areas are in the low and high development areas as identified in the RFD. High development potential would result in 10 to 29 wells drilled per township, and low development potential would result in one to two wells per township. Within Alternative C, 14 parcels would be deferred.

One lease sale parcel and one reinstatement parcel located in Harding County South Dakota are offered within Alternative C. If the parcels are developed, short-term impacts would be stabilized or mitigated rapidly (within two to five years). Long-term impacts are those that would substantially remain for more than five years.

See Appendix A for stipulations which would be applied to the parcels, and where they would be applied.

4.2 Alternative A (No Action Alternative)

4.2.1 Direct Effects Common to All Resources
Under Alternative A, the 15 parcels would not be offered for competitive oil and gas lease sale. Under this alternative, the state and private minerals could still be leased in surrounding areas.

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

lease parcels. The No Action alternative would result in the continuation of the current land and resource uses and would cause no social or environmental justice impacts.

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

4.2.2 Economics

The economic contributions of the oil and gas industry to the local economy were discussed earlier in the Affected Environment section. These contributions were measured by estimating the employment and labor income generated by 1) payments to counties associated with the leasing and rent of federal minerals, 2) royalty payments associated with production of federal oil and gas, and 3) economic activity generated from drilling and associated activities. Activities related to oil and gas leasing, exploration, development, and production stimulate economic activity and brings money into the region and creates jobs in various industrial sectors. The economic impacts of changing the level of oil and gas activities in the region will depend on the number of acres leased, rents paid, and level of production. Table 15 summarizes changes in local revenues, employment, income, population, and households.

Under Alternative A, none of the nominated parcels would be leased. Consequently, local revenues, employment, and wages would remain at current levels described in the Affected Environment section. Alternative A would not generate any additional revenue from leasing, rents, or royalties associated with production, and would not support any additional jobs or income in the region.

Table 15: Summary Comparison of Estimated Average Annual Economic Impacts

Alternative	Additional Acres Leased	Leased Acres Renewed	Change in Revenue to Local Counties	Change in Total Employment (full and part-time jobs)	Change in Total Local Wage and Proprietor's Income ($1000)	Change in Local Population	Change in Number of Households
Alt. A	0	0	$0	0	$0	0	0
Alt. B	5,195	720	$ 169,095	1	$33	0	0
Alt. C	80	720	$ 153,324	1	$26	0	0

4.2.2.1 Direct and Indirect Effects:

Economic effects are summarized and displayed in comparative form in Table 15. Under Alternative A, none of the nominated parcels would be leased. Consequently, no federal, state, or local revenues would be generated from leasing, rents, or royalties associated with production.

No additional employment or income would be generated from the nominated parcels if none of the parcels are leased.

4.3 Alternative B (Proposed Action)

Under Alternative B, 15 parcels, 5,195.19 federal mineral acres under (80 acres of federal surface and 5,115.19 acres of private surface), would be offered for competitive oil and gas lease sale. No parcels would be deferred.

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 Miles City District Oil and Gas RMP/EIS Amendment 1994 Land Use Plan.

4.3.3 Air Resources

4.3.3.1 Direct and Indirect Effects

4.3.3.1.1 Air Quality

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

Potential impacts of development could include increased airborne soil particles blown from new well pads or roads; exhaust emissions from drilling equipment, compressors, vehicles, and dehydration and separation facilities, as well as potential releases of GHGs and 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 the criteria pollutant concentrations are below applicable air quality standards indicating good air quality. The potential level of development and mitigation described below is expected to maintain this level of air quality by limiting emissions. In addition, pollutants would be regulated through the use of state-issued air quality permits or air quality registration processes developed to maintain air quality below applicable standards.

4.3.3.1.2 GHG Emissions at the SDFO and Project Scales

Sources of GHGs associated with development of lease parcels under Alternative B 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 authorized for any parcels being considered in this EA. Potential development activities would be analyzed 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 SDFO RFD, Table 16 discloses projected annual GHG source emissions from BLM-permitted activities associated with the RFD.

Table 16: BLM projected annual emissions of GHGs associated with oil and gas exploration and development activity in the SDFO.

Source	BLM Long-Term GHG Emissions for RFD (tons/year)				Emissions (metric tons/yr)
	CO_2	CH_4	N_2O	CO_2e	CO_2e
Conventional Natural Gas	456	99	0.01	2,542	2,307
Coal Bed Natural Gas	284	17	0.00	648	588
Oil	704,440	804	12.53	725,203	658,079
Total	**705,180**	**920**	**12.54**	**728,393**	**660,974**

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 5,195 acres of lease parcels with BLM managed federal minerals would be leased. These acres constitute approximately 0.15 percent of the total federal mineral estate of approximately 3,374,457 acres identified in the SDFO RFD (Climate Change SIR 2010). Applying this percentage to total estimated GHG emissions would result in approximately 1,018 metric tons/year CO_2e (i.e., 0.15 percent of 660,974 metric tons/year) if the parcels within Alternative B were to be developed.

4.3.3.1.3 Climate Change

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

It is currently not possible to know with certainty the net impacts from developing lease parcels on climate. The inconsistency in results of scientific models used to predict climate change at the global scale coupled with the lack of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future impacts of decisions made at this level. It is therefore beyond the scope of existing science to relate a specific source of 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 and climate change 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 volatile organic compounds (VOCs));
- operate gas or electric turbines rather than internal combustions engines for compressors;
- use nitrogen oxides (NO_x) emission controls for all new and replaced internal combustion oil and gas field engines;
- water dirt and gravel roads during periods of high use and control speed limits to reduce fugitive dust emissions;
- perform 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;
- use cleaner technologies on completion activities (i.e. green completions), and other ancillary sources;
- use centralized tank batteries and multi-phase gathering systems to reduce truck traffic;
- forward looking infrared (FLIR) technology to detect fugitive emissions; and
- perform air monitoring for NO_x and ozone (O_3).

Specifically with regard to reducing GHG emissions, Section 6.0 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 17 (reproduced from Table 6-2 in Climate Change SIR), display common methane emission technologies reported under the EPA Natural Gas STAR Program and associated emission reduction, cost, maintenance and payback data.

Table 17: Selected Methane Emission Reductions Reported Under the EPA Natural Gas STAR Program [1]

Source Type / Technology	Annual Methane Emission Reduction [1] (Mcf/yr)	Capital Cost Including Installation ($)	Annual Operating and Maintenance Cost ($)	Payback (Years or Months)	Payback Gas Price Basis ($/Mcf)
Wells					
Reduced emission (green) completion	7,000 [2]	$1K – $10K	>$1,000	1 – 3 yr	$3
Plunger lift systems	630	$2.6K – $10K	NR	2 – 14 mo	$7
Gas well smart automation system	1,000	$1.2K	$0.1K – $1K	1 – 3 yr	$3
Gas well foaming	2,520	>$10K	$0.1K – $1K	3 – 10 yr	NR
Tanks					
Vapor recovery units on crude oil tanks	4,900 – 96,000	$35K – $104K	$7K – $17K	3 – 19 mo	$7
Consolidate crude oil production and water storage tanks	4,200	>$10K	<$0.1K	1 – 3 yr	NR
Glycol Dehydrators					
Flash tank separators	237 – 10,643	$5K – $9.8K	Negligible	4 – 51 mo	$7
Reducing glycol circulation rate	394 – 39,420	Negligible	Negligible	Immediate	$7
Zero-emission dehydrators	31,400	>$10K	>$1K	0 – 1 yr	NR
Pneumatic Devices and Controls					
Replace high-bleed devices with low-bleed devices					
End-of-life replacement	50 – 200	$0.2K – $0.3K	Negligible	3 – 8 mo	$7
Early replacement	260	$1.9K	Negligible	13 mo	$7
Retrofit	230	$0.7K	Negligible	6 mo	$7
Maintenance	45 – 260	Negl. to $0.5K	Negligible	0 – 4 mo	$7
Convert to instrument air	20,000 (per facility)	$60K	Negligible	6 mo	$7
Convert to mechanical control systems	500	<$1K	<$0.1K	0 – 1 yr	NR
Valves					
Test and repair pressure safety valves	170	NR	$0.1K – $1K	3 – 10 yr	NR
Inspect and repair compressor station blowdown valves	2,000	<$1K	$0.1K – $1K	0 – 1 yr	NR

Table 17: Selected Methane Emission Reductions Reported Under the EPA Natural Gas STAR Program [1]

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

Source: Multiple EPA 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, which may sequester GHGs. 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. For analysis purposes, the Miles City FO RFD was selected based on the high potential development scenario. Similar emission reductions may be possible in the SDFO. For emission sources subject to BLM (federal) jurisdiction, the estimated emission reduction represents 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. EPA promulgated new regulations that will require methane emission reductions from certain types of 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 leases would occur at the time the leases are developed. Land uses associated with oil and gas exploration and development could cause surface disturbances. Such acts reduce ground cover (e.g., biological soil crust, vegetation, litter, and rock) exposing the soil resource to accelerated erosion by wind and water. Along with this, soils have altered structure, heterogeneity (variable characteristics), temperature regimes, nutrient cycling, biotic richness, and diversity. Soils could be mixed, resulting in decreased bulk density, and altered porosity, infiltration, air-water relationships, salt content, and pH (Perrow and Davy, 2003; Bainbridge 2007). Soil compaction could also occur, increasing bulk density, and reducing porosity,

infiltration, moisture, air, nutrient cycling, productivity, and biotic activity (Logan 2001; Perrow and Davy, 2003; Bainbridge 2007). Altering such characteristics diminishes the soil system's ability to withstand future disturbances (e.g., wildland fire, drought, high precipitation events, etc.). The probability and magnitude of these effects are dependent upon local site characteristics, climatic events, and the specific mitigation applied to the project. Generally sites would be revegetated and erosion would return to natural rates within 2 to 5 years. Exceptions would be sites poorly suited to reclamation.

4.3.4.2 Mitigation

Measures would be taken to reduce, avoid or minimize potential impacts to soil resources from exploration and development activities. Prior to authorization, proposed actions would be evaluated on a case-by-case basis and would be subject to mitigation measures in order to maintain the soil system. Mitigation could include avoiding areas poorly suited to reclamation, limiting the total area of disturbance, rapid reclamation, erosion/sediment control, soil salvage, decompaction, revegetation, weed control, slope stabilization, surface roughening, and fencing. Development on steep slopes would have specially stipulated provisions to plan for the problems of reclamation, while sensitive soils would have no stipulated provision to plan for the problems of reclamation, since such reclamation stipulations have not been approved in a current land use plan.

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 on water resources from sale of lease parcels would occur at the time the leases are developed. 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 and 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, drilling fluids, fracking fluids, or produced fluids could potentially impact surface and ground water resources in the long term. 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.

Water withdrawals for drilling operations would lead to reduced aquifer water levels, reduced streamflow, and impacts to some water quality parameters associated with stream flow. These impacts to water quality may include increased water temperature, decreased concentrations of dissolved oxygen, and increases in other parameters such as salinity levels and sodium adsorption ratio. Groundwater removal would result in a depletion of flow in nearby streams and springs if the aquifer is hydraulically connected to such features. Typically produced water from conventional oil and gas wells is from a depth below useable aquifers or coal seams (FSEIS 2008).

4.3.5.2 Mitigation

Stipulations addressing steep slopes, waterbodies, streams, 100-year floodplains of major rivers, riparian areas, and wetlands would minimize potential impacts and would be included with the lease when necessary (refer to Appendix A). Stipulation NSO 11-2 Riparian Area/Floodplain will be applied to 10 parcels. 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.

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 State of North Dakota water rights regulations and a source of water would need to be secured by industry that would not harm senior water rights holders.

4.3.6 Vegetation Resources

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

Oil and gas development would result in a loss of vegetation for livestock grazing (e.g., direct removal, introduction of unpalatable plant species, thus reducing animal unit months, 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 would also result from construction of roads, well pads and associated infrastructure and would vary depending on the extent of development. These impacts would 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.

4.3.6.1 Direct and Indirect Effects

Impacts to vegetation would depend on the vegetation type/community, soil community and the topography of the lease parcels. The lease parcels contain mainly grassland vegetation communities with some sagebrush present within the grassland communities. Habitat disturbance in grasslands generally can be mitigated with seeding to ensure re-establishment of perennial vegetation occurs to limit soil erosion. Erosion potential of the soils can be a limiting factor for vegetation re-establishment. The impacts associated with well pads and roads, however, would be very site-specific. Roads increase the potential for invasive species and create barriers for natural seed dispersal for some species causing fragmentation of habitats.
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).

Additionally, surface disturbing activities directly affect vegetation by 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.

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 replacing areas of native vegetation and changing fire regimes.

Rare plants are not known to be present within the affected area.

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 or other chemical spills could contaminate soils as to render them temporarily unsuitable for plant growth until cleanup measures were fully implemented. If cleanup measures were less successful, longer term impacts could be expected.

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.

4.3.6.2 Mitigation

Reclaimed land would be seeded to native vegetation. Nurse crops may be used to control erosion and weed invasion. Grassland habitats may resemble their pre-project conditions in 2 to 5 years depending on soils and re-vegetation success.

Mitigation would be addressed at the site specific APD stage of exploration and development. If needed, COAs would potentially include re-vegetation with desirable plant species, soil enhancement practices, direct live haul of soil material for seed bank re-vegetation, reduction of livestock grazing, fencing of reclaimed areas, and the use of seeding strategies consisting of native grasses, forbs, and shrubs.

4.3.7 Riparian-Wetland Habitats

4.3.7.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on riparian-wetland habitats. Any potential effects on riparian-wetland habitats from sale of lease parcels would occur at the time the leases are developed. The exploration and development of oil and gas within uplands or adjacent to riparian-wetland areas could reduce riparian/wetland functionality by changing native vegetative species, composition, richness, and diversity; accelerating erosion; increasing sedimentation; and changing hydrologic characteristics. Healthy and diverse riparian and wetland areas are important for watershed functionality. Impacts that reduce the functioning condition of riparian and wetland areas would impair the ability of riparian/wetland areas to reduce nonpoint source pollution (MDEQ 2007) and provide other ecosystem benefits.

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

4.3.7.2 Mitigation

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

4.3.8 Wildlife

4.3.8.1 Direct and Indirect Effects

Leasing these parcels would have no direct or indirect impacts on wildlife. Impacts (both direct and indirect) would occur when the lease is developed in the future. Any potential effects on wildlife from sale of lease parcels would occur at the time the leases are 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

The use of standard lease terms and stipulations on these lands (refer to Appendix A) would minimize, but not preclude impacts to wildlife. Oil and gas development which results in surface disturbance could directly and indirectly impact aquatic and terrestrial wildlife species. These impacts may 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 and dispersal, 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.

4.3.8.1.1 Threatened, Endangered, Proposed, and Candidate Species

Habitat within the lease parcels exists which may support USFWS Threatened, Endangered, Proposed, or Candidate species including the whooping crane, greater sage-grouse, and Sprague's pipit.

Birds

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

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

Sage-grouse are offered species-specific protections through stipulations. However, the proposed lease parcels are located at distances greater than 2 miles from sage-grouse leks, and specific stipulations for sage-grouse do not apply to these parcels. As stated in chapter 3, the parcel in Harding County may provide only limited habitat for sage-grouse due the lack of appropriate sagebrush canopy cover and the extent of disturbance from both tillage agriculture and energy development. The Harding County parcel is outside Priority and General habitats for sage-grouse; however, the reinstatement lease parcel is within sage-grouse General Habitat. Although stipulations do not apply to any of the lease parcels, a sage-grouse Lease Notice (LN 14-11) will be attached to these parcels because of some potential for sage-grouse to use habitat within the parcels at least seasonally. The lease notice would require an operator to implement specific measures to reduce impacts of oil and gas operations on sage-grouse populations and habitat quality. The application of this lease notice would be expected to reduce, but not eliminate, impacts to sage-grouse and their habitat.

It has been shown that oil and gas development negatively impacts sage-grouse (Holloran 2005, Walker et al. 2007, Tack 2009, other citations). The development of two to ten wells per township would be additive to the current well density. There may be impacts to sage-grouse

when these leases are developed to well densities exceeding the threshold that affects sage-grouse during one or more of their life-stages.

Impacts to leks from energy development are most severe near the lek, and remained discernable out to distances greater than 6 km (3.6 miles; Holloran 2005, Walker et al. 2007), and have resulted in the extirpation of leks within gas fields (Holloran 2005, Walker et al. 2007). Holloran (2005) showed that lek counts decreased with distance to the nearest active drilling rig, producing well, or main haul road, and that development influences counts of displaying males to distances between 4.7 and 6.2 km (2.9 and 3.9 miles). All well-supported models in Walker et al. (2007) indicate a strong effect of energy development, estimated as proportion of development within either 0.8 km (0.5 miles) or 3.2 km (2 miles), on lek persistence. Buffer sizes of 0.25 mi., 0.5 mi., 0.6 mi. and 1.0 mi. result in an estimated lek persistence of 5 percent, 11 percent, 14 percent, and 30 percent. Lek persistence in the absence of coalbed natural gas development averages approximately 85 percent. Models with development at 6.4 km (4 miles) had considerably less support, but the regression coefficient indicated that impacts were still apparent out to 6.4 km (4 miles; Walker et al. 2007). Tack (2009) found impacts of energy development on lek abundances (numbers of males per lek) out to 7.6 miles.

Noise has been shown to affect sage-grouse and associated sagebrush obligates. Sage-grouse are known to select highly visible leks with good acoustic properties. Effects to sage-grouse would be a decrease in numbers of males on leks and activity levels and lower nest initiation near oil and gas development. There is recent science that demonstrates the effects of noise on sage-grouse breeding behavior (Crompton and Dean 2005, Holloran 2005, Blickley et al. 2012, Patricelli et al. 2012). In brief, sound levels >40 decibels (dbA) reduced breeding activity and increased stress levels (as measured by hormone levels) in sage-grouse (Blickley and Patricelli 2012). In addition, sage-grouse numbers on leks within 1.6 km (1 mile) of coal bed natural gas compressor stations in Campbell County, Wyoming were shown to be consistently lower than on leks not affected by this disturbance (Braun et al. 2002). Holloran (2005), Holloran et. al (2005a, 2005b), and Anderson (2005) reported that lek activity by sage-grouse decreased downwind of drilling activities, suggesting that noise had measurable “negative” impacts on sage-grouse. Patricelli et al. (2012) recommend that noise levels should not exceed 30 dBA to 32 dBA at the edge of a lek (10 dBA above ambient noise, with an ambient level estimated on undisturbed leks as 20 -22 dBA).

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

Sprague’s pipit is known to occur in Harding county, but there is no detailed information on the location of habitats. During a site visit of parcel AJ, it was found that the parcel did not contain the correct habitat for this species. The Sprague’s pipit lease notice, LN 14-15, issued on lease

SDM 98206. It would be applied if Sprague's pipits are found in the area during an inventory conducted at the APD stage of development to determine the presence or absence of Sprague's pipits. If Sprague's pipits are found, protective measures would be applied as conditions of approval to minimize impacts to Sprague's pipits and their habitat. In the event oil and gas development is proposed within Sprague's pipit habitat, at the APD stage BLM would conference with the USFWS pursuant to section 7(a)(4) of ESA, or if the Sprague's pipit has been listed as threatened or endangered, BLM would consult with the USFWS pursuant to section 7(a)(2).

Mammals
The potential occurrence of the black-footed ferret or the gray wolf is very low, so the habitat disturbance impacts that may result from leasing these parcels would be negligible.

Northern long-eared bats are known to occur throughout the Black Hills and as far away from the forests therein as Wall, SD. There are no studies showing the affects of oil and gas development on bats, though it is well known that wind turbines are responsible for large numbers of bat deaths at wind energy facilities each year (Kunz et al. 2007, Arnett et al. 2008). Northern long-eared bats tend to have their hibernacula in caves and abandoned mines, though they will also day-roost under the bark of trees, in rock outcrops, and periodically in buildings. Should a lease within northern long-eared bat habitat reach the APD stage, BLM would conference with USFWS pursuant to section 7(a)(4) of ESA, or if the northern long-eared bat has been listed as threatened or endangered, BLM would consult with the USFWS pursuant to section 7(a)(2).

Fish
The potential for occurrence of the pallid sturgeon and the topeka shiner is extremely low, so the habitat disturbance impacts that may result from leasing these parcels would be negligible.

Insects
The potential for occurrence of the American Burying Beetle, the Poweshiek skipperling or the Dakota Skipper butterfly is low, so habitat disturbance that may result from leasing these parcels would be negligible.

4.3.8.1.2 Other Special Status Species
As noted, up to 44 wildlife species that BLM has designated as "sensitive" have the potential to occur within the parcel areas. Stipulations are not provided for all BLM sensitive species in the current Resource Management Plans. For those species afforded some protections through existing stipulations, impacts would be minimized, but not eliminated. Impacts to BLM sensitive species would be similar to those described above, unless they are afforded protective measures from other regulations such as the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703.) or the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668c). BLM does not consult with the USFWS on "sensitive" species and likewise would not receive terms and conditions from USFWS requiring additional protections of those species.

Birds

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 April 15 and July 15. 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.

All raptor species known to exist within the analysis area are considered migratory under MBTA. Surveys for raptor nests have not occurred in or adjacent to the lease parcels. 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 March 1 and August 1. Mitigation measures would be assigned at the APD stage to ensure there would be no measurable negative effect on raptor populations, including bald and golden eagles. These mitigation measures would be required as Conditions of Approval. The application of stipulations and COA's at the project level is expected to comply with MBTA and BGEPA.

Mammals
The habitat disturbance that may result from leasing these parcels and the avoidance measures would result in minor impacts to mammals at the site-specific scale and negligible at the population and landscape scales. The impacts to mammals will be lessened by restrictions on sagebrush habitat and riparian areas.

Reptiles and Amphibians
The habitat disturbance that may result from leasing these parcels and the avoidance measures would result in minor impacts to reptiles and amphibians at the site-specific scale and negligible at the population and landscape scales. The impacts to reptile and amphibians will be lessened by restrictions on riparian areas.

Fish
The habitat disturbance that may result from leasing these parcels and the avoidance measures would result in minor impacts to fish at the site-specific scale and at the population and landscape scales. The impacts to fish will be lessened by restriction on riparian areas, erosion control, and floodplains.

4.3.8.1.3 Other Fish and Wildlife
The types and extent of impacts to wildlife species and habitats from development are similar to those described above for other species. Impacts include loss of habitat from development infrastructure, mortalities resulting from collisions with vehicles and power lines, electrocution on power lines, and displacement of wildlife species from initial disturbance caused by human presence. Indirect impacts would include habitat fragmentation and subsequent vehicle traffic, human presence, and other continual development activities.

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

It is anticipated that some development may occur adjacent to existing disturbances of some type. Depending on proximity to disturbance activities and species tolerance, wildlife species present in these areas may be acclimated to disturbances with no negative effects to their population, may remain in disturbed areas despite negative effects to their population, or may be displaced to other areas .

Potential impacts to aquatic wildlife from development could include: overland oil spills, underground spills from activities associated with horizontal drilling or other practices, spills from drilling mud or other extraction and processing chemicals, and surface disturbance activities that create a localized erosion zone. Oil spills and other pollutants from the oil

extraction process could harm the aquatic wildlife species in two different ways if the spill substances enter the habitat. First, toxicological impacts from direct contact could have immediate lethal effects to eggs, larvae, juveniles, and adults. Second, toxic effects to lower food web levels (e.g. aquatic macro-invertebrates) would indirectly affect fish, amphibian, reptiles, and predators higher in the food chain by concentrating chemicals in prey species, degrading water quality and degrading or eliminating food resources.

Additional mitigation will occur as conditions of approval at the APD stage. These conditions might include the placement of earthen berms and oil skimmers (in ephemeral drainages where fish passage will not be blocked) which should help protect aquatic wildlife habitat in case of oil spills.

Oil development is allowed within big game crucial winter range with a timing restriction from December 1 to March 31. The proposed lease parcel AJ and the lease reinstatement parcel SDM 098206 have been identified as providing big game winter range. This stipulation does not apply to operation and maintenance of production facilities. The goal of this stipulation is to protect crucial big game habitats from disturbance during the winter use season. This stipulation provides protection to big game winter habitats and species only during that timeframe, and does not provide protection during the long-term operation and maintenance periods. Development can occur outside of those dates and will exist thereafter until reclamation, thus only delaying impacts until after that year of construction.

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

White-tailed deer may also be impacted by this project due to habitat fragmentation and disturbance. Winter range for white-tailed deer exists across the planning area, but covers much less area than other big game ranges. Approximately 3,833 acres of white-tailed deer winter range have been identified across all lease parcels combined.

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

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

Although limited research exists that documents impacts to sharp-tailed grouse from development activities, it is expected that sharp-tailed grouse would be impacted similarly to sage grouse. Sharp-tailed grouse would be impacted by this project from habitat fragmentation and disturbance. Vehicles and human activity during breeding and nesting seasons may reduce breeding activity, displace nesting hens and reduce the suitability of habitat for brood-rearing. Mortality may increase as a result of collisions with vehicles or other structures.

Surveys for sharp-tailed grouse leks would need to occur within 2 miles of lease parcels lacking sufficient inventory data in order to provide some protections through NSO and timing stipulations for this species. No known sharp-tailed grouse leks exist within the lease parcels. However, five parcels within Fall River County are within two miles of known sharp-tailed grouse leks; P7, P9, PN, PX, and Q7. A timing stipulation will be applied to these parcels. One sharp-tailed grouse lek has been identified approximately 5 miles northeast of SDM 098206. It is unknown if any recent surveys have been conducted adjacent to the other parcels. Wild turkeys, pheasants, and hungarian partridge may also be affected by disturbance and direct mortality through nest destruction and vehicle collisions during the development stages. See the other special status species section above for impacts to sage-grouse.

4.3.8.2 Mitigation

Measures would be taken to prevent, minimize, or mitigate impacts to fish and wildlifespecies 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 include rapid revegetation, project relocation, or pre-disturbance wildlife species surveying. If oil and gas development is proposed in suitable habitat for threatened or endangered species, consultation with the USFWS would occur to determine if additional terms and conditions would need to be applied. Lease stipulations to mitigate impacts on wildlife will be placed on leases for crucial winter range (timing limitation), Sprague's pipit (lease notice) Sage-grouse (lease notice), Endangered Species Act (Section 7 Consultation), and steep slopes (controlled surface use) stipulations which will protect additional habitat.

4.3.9 Special Status Plant Species

4.3.9.1 Direct and Indirect Effects

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

4.3.9.2 Mitigation

Stipulations applied to wildlife resources, steep slopes, waterbodies, streams, 100-year floodplains of major rivers, riparian areas, and wetlands would likely also provide protections for special status plant species. Proposed development would be analyzed on a site-specific basis prior to approval of oil and gas exploration or development activities at the APD stage**.** Mitigation would also be addressed at the site-specific APD stage. Surveys to determine the existence of any BLM Special Status Species would 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 in accordance with any stipulations incorporated into the terms of the lease for the protection of resource values. However, it is during surface disturbing activities associated with the proposed development of the lease that there is a potential for cultural resources to be affected by the proposed action. It is only when the decision is made to develop the lease that drilling locations are known and cultural resource investigations can be completed for the proposed development and any other ancillary activities such as roads, transmission lines, and pipelines.

When the Application for a Permit to Drill (APD) is received, specific oil and gas development actions are proposed, the site status number is assigned, the resulting area of potential effect (APE) is defined, and then assessments of the impacts on cultural resources can be undertaken in order to comply with Section 106 of the National Historic Preservation Act (NHPA). A Class III cultural resource inventory will be necessary for those parcels where the proposed APE has not been previously surveyed and/or for those parcels where the APE has been judged inadequately surveyed in the past. Lease Notice LN 14-2 will apply to all parcels (Appendix A). In the event that cultural resources are identified within the APE, an evaluation of National Register eligibility will occur for each identified cultural property. Measures for the protection of cultural resources determined to be eligible to the National Register of Historic Places (NRHP) will have to be followed for those cultural resources directly and/or indirectly impacted by the proposed development in accordance with Cultural Resource Stipulation CR 16-1 (Appendix B).

Direct and indirect impacts are not anticipated from leasing nominated parcels. It is at the APD stage of development that specific impacts can be correctly assessed. Potential direct impacts to cultural resources at the APD stage include damage to archaeological sites through construction activities (e.g. pad construction, road building, well drilling, etc.). Other effects to cultural resources from surface disturbance activities include the destruction, damage, or alteration to all or part of the cultural resource and diminishing the property's significant historic features as a result of the introduction of visual, atmospheric, or audible elements. This could include altering or diminishing the elements of a National Register eligible property and diminish an eligible property's eligibility status.

Potential indirect impacts from lease development may include increased erosion resulting from surface disturbing activities, increased vandalism resulting from improved access to the area, abrasive dust and vibrations from drilling equipment and damage to rock art sites from gas emissions. Indirect effects from development activities 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. Conversely, 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 lack of inventory or investigation.

Climate change may have an effect on cultural resources by changing the frequency and severity of natural events, such as heavy rain and wildfires (Agee 1993, Maslin 2004). Heavy rain increases the likelihood of flooding and soil erosion which could impact an archaeological site

by exposing, removing, and displacing archaeological materials. Wildfires can affect the morphology of artifacts through fracturing and discoloration which can reduce an artifact's ability to render information about the past (Winthrop 2004). Wildfires can also destroy organic materials such as bone, wood, and pollen that provide information about past environments and subsistence. Furthermore, fire suppression activities (e.g. fire retardant and fire line construction) and increased artifact exposure from vegetation burn-off, can also have an adverse impact on archaeological sites.

The Proposed Action Alternative B would be to offer15 parcels of federal minerals for oil and gas leasing, covering 5,195.19 acres and reinstate one lease parcel covering 720 acres that are administered by the South Dakota Field Office.

Of the total acres proposed for lease, 5,915 acres approximately 4 percent have been covered by adequate cultural resource inventory surveys in the past. Sixteen cultural resource sites are known to be located inside the proposed lease parcels. These include one site in harding county and 15 sites inside or adjacent to the Black Hills Army Depot (BHAD), Historic Town Site of Igloo, Historic District site 39FA3003. Site 39HN1125 is an artifact scatter site that is unevaluated for the National Register of Historic Places (NRHP) and will need to be avoided by all develop related activities. Site 39FA3003, BHAD has the potential to be officially listed on the NRHP. It must be avoided by all development activities or be formally evaluated in consultation with the appropriate historic preservation offices to determine effects. All BHAD contributing elements that are located inside lease parcels including sites (39FA1200, 39FA3003.2006.01, 02, 03, 04; 39FA3003.2008.01, 02; and 39FA3003.2009.01) also must be avoided by all planned development activities. Sites 39FA710, 39FA930, and 39FA931 are all prehistoric isolated find sites. Site 39FA710 is unevaluated and will need to be protected; avoidance by all development actitivies until the site is properly evaluated for the NRHP. Sites 39FA930 and 39FA931 were previously evaluated and determined to be not eligible for the NRHP. No further work or protection is warranted for these locations. Sites 39FA2000 and 39FA2003 are historic railroads that are eligible for the NRHP. Railroad segments that are located inside the lease parcels will need to be avoided by all development. Site 39FA3 is an unevaluated prehistoric occupation site that is mapped inside lease parcel SDM 97300-PN. Documents for site 39FA3 do not contain appropriate locational data so the mapped location is assumed. The mapped location for site 39FA3 must be taken into consideration during development activities. This area will need to be considered when appropriate cultural inventories are completed at the development stage.

Other cultural resource inventories in the vicinity of the lease parcels have documented additional cultural resource sites adjacent to the BHAD area include the BHAD Air Strip 39FA3003.2010.01, Igloo Road 39FA3003.2010.03, prehistoric artifact scatters listed as isolated finds and Native American occupations (39FA710 and 39FA712) that are unevaluated for the NRHP or contain incomplete information and should be re-evaluated; an unevaluated farmstead (39FA711); prehistoric lithic isolated finds determined not eligible (39FA930, 39FA931, and 39FA932); unevaluated historic artifact scatters and depressions (39FA1662, 39FA1644, and 39FA1663); unevaluated earthen ramps (39FA1647 and 39FA1648), and NRHP eligible historic railroads (39FA2000, and 39FA2003), and a portion of the Historic Cheyenne to Deadwood Stage Coach and Wagaon Road (39FA2006) that is determined not eligible.

Recorded cultural resource sites within 2-miles of the reinstatement lease in Harding County include unevaluated sites relating to prehistoric artifact scatter site (39HN364), stone quarry site (39HN378), rock cairn site (39HN363), and a prehistoric occupation site (39HN444). These site are well outside the reinstatement lease area and will not be effected by future development.

4.3.10.2 Mitigation

Under Alternatives B, it is recommended that all lease parcels, be leased with cultural resource Lease Notice 14-2. In addition Cultural Resource Lease Stipulation 16-1 will be applied to all parcels, to protect known resource values, additional site specific avoidance and/or mitigation measures, would have to be determined after project specific development proposals are received and Level III/Class III cultural resource inventories have been completed. In almost all situations, direct impacts to cultural resources will be avoided by project redesign and/or relocating the surface disturbing activities (e.g., roads, well pads and pipelines, etc.). See Appendix A for specific legal location description and Appendix B for description of Lease Stipulations.

Lease SDM 098206 would be reinstated with four stipulations applied from the Draft LUP. The full descriptions of the stipulations can be found within Appendix C. They include CR 16-1, LN 14-2, NSO 11-22, and NSO 11-23.

BLM has discretional control over mitigation stipulations measures imposed on a project. Although a lessee has a right to develop a lease, BLM may require development activities to be moved up to 200 meters in any direction. This should allow nearly all cultural properties to be avoided. Should development uncover subsurface sites, the lessee is required to halt all work until the site can be evaluated and proper mitigation measures can be implemented.

Site 39FA3003 is a Historic District site that has the potential for significance on a National Level. It is already important on a State Level and must be avoided until a proper official nomination can be completed. Lease parcels that are proposed inside or partially inside the BHAD boundary must not be allowed for develop until a the official nomination can be completed or a decision is made in the BLM Resource Management Plan for how to lease BHAD. Until the final BLM Resource Mangement Plan is finalized or the National Register of Historic Places nomination is completed for the BHAD Historic District Site 39FA3003 along with it's contributing elements, we recommend the following 14 leases or the portions of these leases that overlap the site boundary be deferred (SDM 97300- PU, PV, PW, PX, PY, P4, P6, P7, P8, P9, QF, PN, PP and 33). Although the site locations for the following sites are outside proposed leases, avoidance is recommended with a 200 feet standard protective buffer for sites 39FA1125, 39FA710, 39FA 711, 39FA 712, 39FA1662, 39FA1644, 39FA1647, 39FA1648, 39FA1663, 39FA2000, and 39FA2003 during any ground disturbance related to oil development for the remaining leases.

The use of standard lease terms, and the cultural lease notice, protect significant cultural resource values on these lease parcels (refer to Appendix B). 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.

4.3.11 Native American Religious Concerns

4.3.11.1 Direct and Indirect Effects

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

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

The Proposed Action Alternative would be to offer 15 parcels of federal minerals for oil and gas leasing, covering 5,195.19 acres and reinstate 1 lease of 720 acres administered by the South Dakota Field Office.

Information on TCPs and other culturally sensitive areas was researched in past documentation and records for the area (Sundstrom 2009); and was sought from Native American Tribes with request letters and a report of known previous cultural resource sites and projects (December 17, 2013. Previous cooperative meetings have been held to collect culturally sensitive information from local tribes. Presently, there are no known TCPs inside the proposed lease parcels. Lease parcel SDM 098206, the reinstatement lease, is located 1.8 miles southwest of Dogie Butte a prominent butte in northwestern Harding County, and 18 miles west of the North Cave Hills. Lease Parcel SDM79010-AJ is located 2.5 miles north of Corey and Teepee Buttes and it is 9.2 miles northeast of the North Cave Hills. The 15 lease parcels located in Fall River County at BHAD/Igloo are located approximately 12 to 15 miles southwest of the Black Hills. Based on this analysis, there will be no direct or indirect effects to these properties from leasing.

4.3.11.2 Mitigation

Cultural Resources Lease Stipulation 16-1 will apply to all lease parcels proposed for leasing (Appendix A). The application of Stipulation 16-1 to lease parcels ensures that BLM's obligations under NHPA, American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, and other statutes as applicable will be met. At the APD stage when specific oil and gas development actions are proposed, the area of potential effect (APE) will be defined and the interested federally recognized tribe s will be consulted further. Additional stipulations may be necessary if TCPs or properties of religious and cultural importance are identified at the APD stage.

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 would occur at the time the leases are developed.

The surface disturbances associated with oil and gas exploration and development activities could have indirect effects to paleontological resources primarily in areas classified as Potential Fossil Yield Classification (PFYC) 4 or 5 areas. 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. However, in most surface-disturbing situations, paleontological resources would 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 can also potentially lead to the discovery of paleontological localities that would otherwise remain undiscovered due to burial or omission during review inventories. The scientific study to retrieve and interpret important paleontological resource information provides a better understanding of the nature and distribution of those resources. The retrieval and interpretation of information is most successful and meaningful when a site is left intact.

As a section of the Omnibus Public Lands Act (March 30, 2009), the Paleontological Resources section of the Act (Title VI, Subtitle D) specifically addressed management of paleontological resources on public lands. As a result of this act, a map of the planning area which shows the area according to its potential fossil yield was developed to provide a tool for predicting the potential management areas have for fossil locales. The BLM PFYC classification system outlines BLM's approach to assessment and mitigation of paleontological resources. The PFYC system uses five classes for geologic units: Class 1: Very Low; Class 2, Low; Class 3, Moderate (3a), or Unknown (3b); Class 4, High; and Class 5, Very High. This classification approach is meant to reflect the probability of impacting significant fossils. The intent of the classification system is to eliminate or reduce adverse impacts to paleontological resources from authorized actions.

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

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

Of the 15 nominated lease parcels, 4 parcels are in areas classified as high potential for significant fossil finds (Class 4 or 5) according to the PFYC system map. Lease reinstatement SDM 098206 is also within the high potential fossil yield class. The remaining 11 lease parcels are located in an area considered moderate or unknown for paleontological resources (Class 3). Presently, there are no known localities or previous research areas for significant fossil or paleontological resources inside or adjacent to the nominated parcels. The potential for direct, indirect and cumulative affects to paleontological resources is moderate based on the formations the leases are located in. To offer the best protection to the resource, Lease Notice 14-12would be applied to all 15 lease notices for they fall within Class 3, 4, and 5.

4.3.12.2 Mitigation

The use of standard lease terms and the Lease Notice 14-12 should protect the paleontological resource values on these lease parcels (refer to Appendix A and B). The application of these requirements at the leasing phase provides protection to paleontological values. The paleontological lease notice would be applied to those lease parcels that fall within the PFYC 3, 4 or 5 areas, requiring a field survey prior to surface disturbance. These inventory requirements should result in the identification of paleontological resources and avoidance or mitigation of significant localities before permit approval and prior to surface disturbance. However, the application of standard lease terms only allows the relocation of activities up to 200 meters, unless documented in the NEPA document, and cannot result in moving the activity off lease.

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

For known highly significant paleontological resources, the act of leasing a nominated parcel would not impact paleontological resources; however, subsequent development could have impacts on those resources. For areas known to contain or have the potential to contain paleontological resources, such as PFYC Class 3, 4, and 5, a survey would be conducted in areas of specific development according to Lease Notice 14-12. Based on the above analysis, Lease Notice 14-12 will be applied to all 15 proposed leases applied per guidance identified in Instructional Memorandums 2009-011 and 2008-009. See Appendix A for specific legal description.

Controlled surface use stipulation, CSU- 12-9, will be applied to the lease reinstatement SDM 098206. Within the draft RMP/EIS, LN 14-12 will be formally adopted as a CSU stipulation. Please see Appendix C for specific legal description and language of the stipulation.

4.3.13 Visual Resources

4.3.13.1 Direct and Indirect Effects

While the act of leasing federal minerals produces no visual impacts, subsequent development (indirect effects) of a lease parcel would likely result in some level of modification to the existing landscape.

VRM is only applied to federally managed surface acres; therefore the affected environment for visual resources only consists of approximately 80 acres of the 5,195.19 acres in the proposed action. No Visual Resource Management (VRM) classes have been established in the project area by a formal written decision document. The South Dakota RMP revision will formally address VRM through a range of alternatives based on the VRI data, however in the interim, and as directed by BLM Manual 8400 (Visual Resource Management), the affected environment is described using the existing Visual Resource Inventory (VRI) classes. The BLM acres included in the lease parcels are in VRI class IV, and thereby assigned VRM Class IV.

A Class IV VRM area classification 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

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.

A Class IV VRM area classification 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.

4.3.14 Forest and Woodland Resources

4.3.14.1 Direct and Indirect Effects

None of the parcels contain forest and woodland resources. There would be no effect.

4.3.14.2 Mitigation

Mitigation measures would not apply.

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 would result in a loss of vegetation for livestock grazing (e.g., direct removal, introduction of unpalatable plant species, thus reducing animal unit months, 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 would also result from construction of roads, well pads and associated infrastructure and would vary depending on the extent of development. These impacts would 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.

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 which could lead to overgrazing or other localized excess grazing impacts. Construction of roads, especially in areas of rough topography can improve livestock distribution throughout an allotment.

4.3.15.2 Mitigation

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

4.3.16 Recreation and Travel Management

4.3.16.1 Direct and Indirect Effects

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

As oil and gas development occurs, new routes are created which often attract recreationists seeking additional or new areas to explore for 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 could be minimized and avoided through mitigation and reclamation of industrial routes when no longer needed.

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. Potential public safety hazards/risks include: moving equipment,

operator vehicles, transport vehicles for oil and gas, oil and gas wells, etc. However, this will be addressed in more detail at the development stage.
For those areas with isolated tracks of BLM public lands that generally do not have existing public access, recreation opportunities that occur in these areas are limited to use with adjacent land owner permission or hunting by an outfitter; therefore, oil and gas activities would have little or no impact on recreational experiences in this area.

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

4.3.16.2 Mitigation

To reduce the threat of loss of important sense of place, solitude and possible increase of stress developments, including roads and trails,shall be situated no closer than 200 meters to the Cheyenne River. Ideally developments would be located out of sight from the river, however topography may limit locations.

4.3.17 Lands and Realty

4.3.17.1 Direct and Indirect Effects

Leasing the parcels would have no direct impacts on lands and realty. Any potential effects from the sale of leases would occur at the time the leases are developed.
Rights-of-way could be required across federal surface for “off-lease” or third party facilities required for potential development of the parcel.

4.3.17.2 Mitigation

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

4.3.18 Minerals

4.3.18.1 Fluid Minerals

4.3.18.1.1 Direct and Indirect Effects

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

Issuing a lease provides opportunities to explore for and develop oil and gas. Additional natural gas or crude oil produced from any or all of the 16 parcels (sale and reinstatement) would enter the public markets. The production of oil and gas results in the irreversible and irretrievable loss of these resources. Royalties and taxes would accrue to the federal and state treasuries from the lease parcel lands.

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

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

Under Alternative B, all of the lease parcels would be offered for lease subject to major (NSO) or moderate (CSU) constraints and/or standard lease terms and conditions. Lease SDM 098206 would also be reinstated.

4.3.18.2 Solid Minerals

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

4.3.19 Special Designations
4.3.18.1 Direct and Indirect Effects
None of the parcels are on areas with special designations, including Wilderness Study Areas, Special Recreation Management Areas (SRMA), or any other such categories.

4.3.19.2 Mitigation
Mitigation measures would not apply.

4.3.20 Social and Economic Conditions
4.3.20.1 Social
4.3.20.1.1 Direct and Indirect Effects
While the act of leasing federal minerals itself would result in no social impacts, subsequent development of a lease may generate impacts to people living near or using the area in the vicinity of the lease. Oil and gas exploration, drilling, or production could create an inconvenience to these people due to increased traffic and traffic delays, noise and visual impacts. This could be especially noticeable in areas where oil and gas development has been minimal. The amount of inconvenience would depend on the activity affected, traffic patterns within the area, noise levels, length of time, and season these activities occurred, etc. Creation of new access roads into an area could allow increased public access and exposure of private property to vandalism. For leases where the surface is privately owned and the subsurface is federally owned, surface owner agreements, standard lease stipulations, and BMPs could address many of the concerns of private surface owners.

New revenues could benefit the residents of Harding and Fall River counties. See “Direct and Indirect Effect to Economic Conditions”.

There would be no disproportionate effects to low income or American Indian populations from leasing**.** However, concerns about lease development were not received from interested Tribes for this sale, and 4 out of 15 parcels are adjacent to culturally sensitive sites. There are low income people in the counties, but they do not appear to be associated with any specific BLM resources or activities.

4.3.20.2 Economics

4.3.20.2.1 Direct and Indirect Effects

Under Alternative B an additional 5,195 acres of BLM minerals will be auctioned for leasing at the upcoming lease sale. In addition to the 15 parcels nominated for leasing, an expired 720 acre lease would be reinstated. While the leasing and future development of these minerals are anticipated to have a positive effect on local employment and income, these impacts will be spread disproportionately across the six county planning area and will likely be most concentrated in Fall River and Harding counties.

Public Revenues related to leasing, rent, and production:
Leasing an additional 5,195 acres of federal minerals, and reinstating a lease on 720 acres of previously leased federal minerals, (Alternative B) would increase estimated average annual oil and gas leasing and rent revenues to the federal government by an estimated $ 342,481. Estimated average annual leasing and rent revenues that would be distributed to state and local governments in Fall River and Harding counties would increase by an estimated $169,095. Average annual federal oil and gas royalties would increase by an estimated $ 8,219 under Alternative B. Average annual royalties distributed to the state and counties would in turn increase by an estimated $ 3,791.

Total average annual BLM federal revenues related to leasing 83,054 acres (77,139 acres currently leased and 5,915 additional acres considered for leasing under Alternative B) of federal minerals and associated annual rent and royalty revenues related to average annual production of BLM federal minerals would amount to an estimated $3.26 million. This would be an estimated average annual increase of about $ 342,481compared to current management and Alternative A. Total annual revenues distributed to the state and counties would be an estimated $1.51 million, a $ 169,095 increase in federal revenue sharing from Alternative A.

Local Economic Contribution:
The estimated combined total annual employment and income supported by federal oil and gas leasing, distributions of royalties to local governments, drilling wells, and production would amount to about 58 total jobs and $2.20 million in wages and proprietor’s income within the local economy (IMPLAN, 2012). Table 15 shows that this would be an annual increase of about 1 total jobs and more than $33,000 in labor income over levels anticipated with Alternative A. While increased oil and gas activity associated with these minerals is anticipated to have a positive economic impact on local communities within the planning area, the leasing and future

development of federal minerals considered under Alternative B are not anticipated to effect local populations.

4.3.21 Cumulative Impacts- Alternative B

Cumulative impacts are those impacts resulting from the incremental impact of an action when added to other past, present, and reasonably foreseeable actions regardless of what agency or person undertakes such other actions. This section describes cumulative impacts to resources associated with this project. The ability to assess the potential cumulative impacts at the leasing stage for this project is limited for many resources due to the lack of site-specific information for potential future activities. Upon receipt of an APD for any of the lease parcels addressed in this document, more site-specific planning would be conducted in which the ability to assess contributions to cumulative impacts in a more detailed manner would be greater due to the availability of more refined site-specific information about proposed activities. The average current density of wells per township in the proposed lease areas are two to ten. The majority of the leases are in the moderate development potential area, which is expected to host up to ten wells per township. There could be small localized areas with drilling at rates higher than ten wells per township. In the very low development potential area, less than one well might be drilled per township.

4.3.21.1 Past, Present and Reasonably Foreseeable Future Actions

Past, present, or reasonably foreseeable future actions that affect the same components of the environment as the Proposed Action are: grazing, roads, wildfire and prescribed fire, range improvement projects, and utility right-of-ways.

4.3.21.2 Cumulative Impacts by Resource

Cumulative effects for all resources in the South Dakota Field Office are described in the Land Use Plans: Final South Dakota Resource Management Plan, approved in April 1986, and the Miles City District Oil and Gas RMP/EIS Amendment, approved on February 2, 1994. 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 within these land use plans for air, climate, and socio-economics resources.

4.3.21.2.1 GHG Emissions and Cumulative Impacts on Climate Change

The cumulative effects analysis area is the SDFO, with additional discussion at statewide, 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 SDFO RFD are compared with recent available inventory data at the state, national, and global scales. GHG emission 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.

Table 18 displays projected GHG emissions from non-federal activities included in the SDFO RFD. When non-federal and federal Alternative B potential GHG emissions are summed, total Alternative B GHG emissions would be 195,129 metric tons/year CO_2e. Potential federal and non-federal cumulative GHG emissions under Alternative B would be approximately 23 percent of the estimated CO_2e emissions of 855,085 for the entire RFD.

Table 18: Projected non-BLM GHG emissions associated with the SDFO Reasonably Foreseeable Development Scenario for fluid mineral exploration and development.

Source	Non-BLM Long-Term GHG Emissions (tons/year)				Emissions (metric tons/yr)
	CO_2	CH_4	N_2O	CO_2e	CO_2e
Conventional Natural Gas	1,796	384	0.03	9,870	8,956
Coal Bed Natural Gas	1,386	306	0.02	7,826	7,102
Oil	190,614	215	3.53	196,215	178,053
Total	**193,796**	**905**	**3.58**	**213,911**	**194,111**

South Dakota's Contribution to U.S. and GHGs

South Dakota's GHG inventory http://www.wrapair.org/ClimateChange/SD_GHG_I&F_Report_WRAP_08-20-07.pdf, CCS 2007) shows that activities within the state contribute 0.5 percent of U.S and 0.074 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 largest source of South Dakota's emissions is agriculture, which accounts for approximately 46 percent of the state's emissions. The next largest contributors are the electricity generation and transportation sectors (each at approximately 19 percent).

GHG emissions from all major sectors in South Dakota in 2005 added up to a total of approximately 36.5 million metric tons of CO_2e (CCS 2007). Potential emissions from development of Alternative B federal and non-federal lease parcels represent approximately 0.53 percent of the statewide total of GHG emissions based on the 2005 statewide inventory.

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 cumulative emissions under Alternative B of this project would amount to approximately 0.0028 percent of gross U.S. total emissions. Global GHG emissions for 2004 (IPCC 2007, summarized by the Climate Change SIR 2010) indicated approximately 49 gigatonnes (10^9 metric tons) of CO_2e emitted. Potential annual emissions under Alternative B would amount to approximately 0.00002 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 the region are currently EPA Natural Gas STAR Program Partners and future EPA regulations may impose GHG emission controls for a variety of industries, including the oil and gas industry (Climate Change SIR 2010).

4.3.21.2.2 Cumulative Impacts of Climate Change

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

4.3.21.3 Cumulative Impacts to Wildlife

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

Further construction of roads, production well pads, and other facilities would result in long term (>5 years) loss of natural vegetation communities and other habitats 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, likely displacing the larger and more mobile animals into adjacent habitat, and increasing competition with existing local populations. Less mobile animals or those tied to specific and limited resources would be more likely to suffer direct mortality and habitat loss when they are unable to disperse from areas of development or find sufficient habitat..

Certain species are localized to specific areas and rely on 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 populations or individuals of various species or populations may be able to adapt to these human influences over time. In particular, generalist species such as fox, raccoons, and coyotes are likely to adapt readily to additional development while native migratory birds, pronghorn antelope, and other sensitive wildlife are likely to decline in numbers and/or in use of disturbed areas.

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

4.3.21.4 Cumulative Impacts to Economics

Oil and gas activity in South Dakota is anticipated to continue to increase and remain heavily concentrated in Fall River and Harding counties. While some of this new activity will likely be attributable to federal minerals, development of BLM minerals within the planning only accounts for only a small share of the region's oil and gas development. Dependency on BLM minerals for oil and gas exploration, drilling, and extraction in the region is unlikely to change. Revenue associated with the leasing and development of an additional 5,915 acres (5,195 acres of newly leased and reinstating 720 acres) of BLM minerals would provide an estimated $ 212,646 to the local general governments and $1.3 million per year for education in Harding and Fall River counties. Leasing the additional acres and anticipated exploration, development, and production would have almost no effect on local populations, total local employment, number of households, average income per household, and total personal income, e.g. the effects would be less than half of one percent of current levels. The economic effects would continue to be spread unevenly among the counties and are unlikely to have any effect on local economic diversity (as indicated by the number of economic sectors), economic dependency (where one or a few industries dominate the economy), or economic stability (as indicated by seasonal unemployment, sporadic population changes and fluctuating income rates).

4.4 Alternative C (BLM Preferred)

4.4.1 Direct Effects Common to All Resources

Under Alternative C, 1 parcel, containing 80 surveyed federal mineral acres (80 acres of federal) would be offered for competitive oil and gas lease sale. The remaining 14 parcels, 5,115.19 surveyed acres (5,115.19 acres of private and/or state surface) would be deferred pending further review. The lease SDM 098206, 720.00 acres, would be reinstated under the BLM Preferred Alternative.

The action of leasing the lease parcels in Alternative C 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.

4.4.2 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 lease parcels in Alternative C. 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 Alternative C 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 Land Use Plans: Final South Dakota Resource Management Plan, approved in April 1986, and the Miles City District Oil and Gas RMP/EIS Amendment , approved on February 2, 1994.

4.4.3 Air Resources

4.4.3.1 Air Quality

4.4.3.1.1 Direct and Indirect Effects

Alternative C effects to air quality would be slightly less than those for Alternative B.

4.4.3.1.2 Mitigation

Mitigation would be the same as Alternative B.

4.4.3.2 GHG Emissions

4.4.3.2.1 Direct and Indirect Effects

Under Alternative C, approximately 800 acres of lease parcels with federal minerals would be leased or reinstated. These acres constitute 0.024 percent of the total federal mineral estate of approximately 3,374,457 acres identified in the RFD. Therefore, based on the approach described above to estimate GHG emissions, 0.024 percent of the RFD total estimated BLM emissions of 660,784 metric tons/year would be approximately 157 metric tons/year of CO_2e if the parcels within Alternative C were to be developed.

4.4.3.2.2 Mitigation

Mitigation would be the same as Alternative B.

4.4.3.3 Climate Change

4.4.3.3.1 Direct and Indirect Effects

Effects to climate change would be slightly less than those for Alternative B.

4.4.3.3.2 Mitigation

Mitigation would be the same as Alternative B.

4.4.4 Soil Resources
4.4.4.1 Direct and Indirect Effects
Direct and indirect effects would be the same as Alternative B; however the total area impacted is 98% less due to 14 of the 15 parcels recommended as deferred until further review.

4.4.4.2 Mitigation
Mitigation would be the same as Alternative B.

4.4.5 Water Resources
4.4.5.1 Direct and Indirect Effects
Direct and indirect impacts would be same as Alternative B; however the area potentially impacted would be 800 acres due to the reduced number of lease parcels proposed.

Hydraulic fracturing is a common process and applied to nearly all wells drilled. Authorization of the proposed projects would require full compliance with local, state, and federal directives and stipulations that relate to surface and groundwater protection. Hydraulic fracturing fluid is roughly 99 percent water but also contains numerous chemical additives as well as propping agents, such as sands. Currently, water use to drill one well ranges between 1 and 6 million gallons. In fracturing a well, companies have estimated that generally they use a proportion of 0.5 percent hydraulic chemical fluid mix in water. That translates to a minimum of 5,000 gallons (higher specific gravity accounting for it being less than 7500 gallons) of chemicals into one well for every 1.5 million gallons of water used to fracture a well (Paschke, Dr. Suzanne. USGS, Denver, Colorado. September 2011).

Chemicals added to stimulation fluids include friction reducers, surfactants, gelling agents, scale inhibitors, acids, corrosion inhibitors, antibacterial agents, and clay stabilizers. Oil and gas wells are cased and cemented at a depth below all usable water zones; consequently impacts to water quality at springs and residential wells are not expected. Contamination of groundwater could occur without adequate cementing and casing of the proposed well bore.

Casing specifications are designed and submitted to the BLM. The BLM independently verifies the casing program, and the installation of the casing and cementing operations are witnessed by certified Petroleum Engineering Technicians. Surface casing setting depth is determined by regulation. Adherence to APD COAs and other design measures would minimize potential effects to groundwater

4.4.5.2 Mitigation
Mitigation would be the same as Alternative B.

4.4.6 Vegetation Resources
4.4.6.1 Direct and Indirect Effects
Direct and indirect impacts would be same as Alternative B;

4.4.6.2 Mitigation
Mitigation would be the same as Alternative B.

4.4.7 Riparian-Wetland Habitats
4.4.7.1 Direct and Indirect Effects
Direct and indirect impacts would be same as Alternative B; however the area potentially impacted would be 800 acres due to the reduced number of lease parcels proposed.

4.4.7.2 Mitigation
Mitigation would be the same as Alternative B.

4.4.8 Wildlife
4.4.8.1 Direct and Indirect Effects
Direct and indirect impacts would be same as Alternative B; however the area potentially impacted would be reduced by 98%, due to approximately 5,115.19 acres of lease parcels proposed for deferral pending further review. No parcels are proposed for deferral because of wildlife resource concerns.

Sage-grouse habitat delineations have been developed for the sage-grouse conservation alternatives in the South Dakota RMP. None of the parcels are within the delineated polygons that would result in deferrals for sage-grouse.

4.4.8.2 Mitigation
Mitigation would be that same as Alternative B.

4.4.9 Special Status Plant Species
4.4.9.1 Direct and Indirect Effects
Direct and indirect impacts would be same as Alternative B; however the area potentially impacted would be reduced by 98%, due to approximately 5,115.19 acres of lease parcels proposed for deferral pending further review.

4.4.9.2 Mitigation
Mitigation would be that same as Alternative B.

4.4.10 Cultural
4.4.10.1 Direct and Indirect Effects
Under the BLM Preferred Alternative, 1 of the lease parcels would be offered with Cultural Resources Lease Stipulation CR 16-1 and/or lease notice 14-2 (Appendix A) for protection of important culturally sensitive resources under the competitive oil and gas lease sale and lease issuance. Lease SDM 098206 would be reinstated with four stipulations which would protect culturally sensitive resources when/if the lease is developed (Appendix C).

Direct and indirect impacts would be same as Alternative B; however the area potentially impacted would be reduced by 98%, due to 5,115.19 acres of lease parcels proposed for deferral pending further review. The deferred lease parcels located in Fall River County under this alternative would result in no direct or indirect effects to cultural resources in these areas.

4.4.10.2 Mitigation
Mitigation would be the same as Alternative B.

4.4.11 Native American Religious Concerns

4.4.11.1 Direct and Indirect Effects

Under the BLM Preferred Alternative, 1 of the lease sale parcels would be offered with Cultural Resources Lease Stipulation CR 16-1 and/or lease notice 14-2 (Appendix A) for protection of important culturally sensitive resources under the competitive oil and gas lease sale and lease issuance. Lease SDM 098206 would be reinstated with four stipulations which would protect culturally sensitive resources when/if the lease is developed (Appendix C).

Direct and indirect impacts would be same as Alternative B, however the area potentially impacted would be reduced by 98%, due to 5,115.19 acres of lease parcels proposed for deferral pending further review.

4.4.11.2 Mitigation

Mitigation would be the same as Alternative B.

4.4.12 Paleontology

4.4.12.1 Direct and Indirect Effects

The nominated lease parcel and SDM 098206 are in areas classified as high (Class 4 or 5) according to the PFYC system map. Presently, there are no known localities or previous research areas for significant fossil or paleontological resources inside or adjacent to the nominated parcels. The potential for direct, indirect and cumulative affects to paleontological resources is moderate based on the formations the leases are located in. For the lease parcel that are recommended for leasing, Lease Notice 14-12 would be applied to offer the best protection to paleontological resources that fall in the Class 3, 4, and 5. Stipulation CSU-12-9 will be applied to SDM 098206.

Once a parcel is leased, the application of standard lease terms (movement of activities by 200 meters or delay of up to 60 days) would protect vulnerable significant paleontological resource values on these lease parcels. In most instances this may be sufficient to provide the necessary protection to paleontological values. However, the application of standard lease terms may not always adequately protect paleontological values. In order to protect paleontological values, paleontological resources management relies on the application of Lease Notice 14-12 at the leasing phase to notify the lessee that potentially significant paleontological resources are or are likely to be present on the lease parcels.

The paleontological Lease Notice 14-12 requires a field survey prior to surface disturbance. Paleontological resource surveys conducted prior to surface-disturbing activities could locate additional paleontological resources and would result in a better understanding of the nature and distribution of those resources.

Direct and indirect impacts would be same as Alternative B.

4.4.12.2 Mitigation

Mitigation would be the same as Alternative B.

4.4.13 Visual Resources
4.4.13.1 Direct and Indirect Effects
Direct and indirect impacts would be same as Alternative B

4.4.13.2 Mitigation
Mitigation would be the same as Alternative B.

4.4.14 Livestock Grazing
4.4.14.1 Direct and Indirect Effects
Direct and indirect effects to livestock grazing would be similar to those described under Alternative B.

4.4.14.2 Mitigation
Mitigation would be the same as Alternative B.

4.4.15 Recreation and Travel Management
4.4.15.1 Direct and Indirect Effects
Direct and indirect impacts would be same as Alternative B.

4.4.15.2 Mitigation
Mitigation would be the same as Alternative B.

4.4.16 Lands and Realty
4.4.16.1 Direct and Indirect Effects
Direct and indirect impacts would be same as Alternative B.

4.4.16.2 Mitigation
Mitigation would be the same as Alternative B.

4.4.17 Minerals
4.4.17.1 Fluid Minerals
4.4.17.1.1 Direct and Indirect Effects
Direct and indirect impacts would be same as Alternative B.
Direct and indirect impacts would be same as Alternative B; however the area potentially impacted would be reduced by 98%, due to approximately 5,115.19 acres of lease parcels proposed for deferral pending further review. One lease sale parcel and lease reinstatement SDM 098206 would be offered for lease subject to major (NSO) or moderate (CSU) constraints and/or standard lease terms and conditions.

If lease parcels are deferred, some development plans could be delayed, relocated, or completely dropped because of the need to include federal acreage as part of an exploration or development plan. In addition, less natural gas or crude oil would enter the public markets.

4.4.18 Special Designations
4.4.18.1 Direct and Indirect Effects

None of the parcels are on areas with special designations, including Wilderness Study Areas, Special Recreation Management Areas (SRMA), or any other such categories.

4.4.18.2 Mitigation
Mitigation measures would not apply.

4.4.19 Social and Economic Conditions
4.4.19.1 Social
The social effects would be the same as for Alternative B.

There would be no disproportionate effects to American Indians from leasing or development. There are low income people in the counties, but they do not appear to be associated with any specific BLM resources or activities.

4.4.19.1.1Direct and Indirect Effects
Direct and indirect impacts would be same as Alternative B.

4.4.19.2 Economics
4.4.19.2.1 Direct and Indirect Impacts
Under Alternative C, 14 nominated parcels would be deferred and an additional 80 acres of BLM minerals would be auctioned for leasing at the upcoming lease sale. In addition to the 80 acre parcel nominated for leasing, an expired 720 acre lease would be reinstated. While the leasing and future development of these minerals are anticipated to have a positive effect on local employment and income, these impacts will be spread disproportionately across the six county planning area and will likely be most concentrated in Fall River and Harding counties.

Public Revenues related to leasing, rent, and production:
Leasing an additional 80 acres of federal minerals, and reinstating a lease on 720 acres of previously leased federal minerals, (Alternative C would increase estimated average annual oil and gas leasing and rent revenues to the federal government by an estimated $676,133. Estimated average annual leasing and rent revenues that would be distributed to state and local governments in Fall River and Harding counties would increase by an estimated $ 337,737. Average annual federal oil and gas royalties would increase by an estimated $ 4,727under Alternative C. Average annual royalties distributed to the state and counties would in turn increase by an estimated $ 2,180.

Total average annual BLM federal revenues related to leasing 173,009 acres (172,209 acres currently leased and 800 additional acres considered for leasing under Alternative B) of federal minerals and associated annual rent and royalty revenues related to average annual production of BLM federal minerals would amount to an estimated $3.23 million. This would be an estimated average annual increase of about $ 310,089 compared to current management and Alternative A. Total annual revenues distributed to the state and counties would be an estimated $1.50 million, a $ 153,324 increase in federal revenue sharing from Alternative A.

Local Economic Contribution:
The estimated combined total annual employment and income supported by federal oil and gas leasing, distributions of royalties to local governments, drilling wells, and production would amount to about 60 total jobs and $2.38 million in wages and proprietor's income within the local economy (IMPLAN, 2012). Table 15 shows that this would be an annual increase of about 1 total jobs and $26,000 in labor income over levels anticipated with Alternative A. While increased oil and gas activity associated with these minerals is anticipated to have a positive economic impact on local communities within the planning area, the leasing and future development of federal minerals considered under Alternative B are not anticipated to effect local populations.

4.4.20 Cumulative Impacts- Alternative C

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.

4.4.20.1 Past, Present and Reasonably Foreseeable Future Actions

Past, present, or reasonably foreseeable future actions that affect the same components of the environment as the Proposed Action are: grazing, roads, wildfire and prescribed fire, range improvement projects, and utility right-of-ways.

4.4.20.2 Cumulative Impacts by Resource

Cumulative effects for all resources in the SDFO are described in the Land Use Plans: Final South Dakota Resource Management Plan, approved in April 1986, and the Miles City District Oil and Gas RMP/EIS Amendment approved on February 2, 1994. Anticipated exploration and development activity associated with the lease parcels considered in this EA are within the range of assumptions used and effects described in this cumulative effects analysis for 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.

4.4.20.3 GHG Emissions and Cumulative Impacts on Climate Change

Alternative C GHG emissions and cumulative impacts on climate change would be less than those for Alternative B. GHG emissions from all major sectors in South Dakota in 2005 added up to a total of approximately 36.5 million metric tons of CO_2e (CCS 2007). Potential emissions from development of federal and non-federal lease parcels under Alternative C have the potential to represent approximently 0.53 percent of the statewide 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 cumulative annual emissions under Alternative C would amount to approximately 0.0029 percent of gross U.S. total emissions. Global GHG emissions for 2004 (IPCC 2007, summarized by the Climate Change SIR 2010) indicated approximately 49 gigatonnes (10^9 metric tons) of CO_2e emitted. Potential annual emissions under Alternative C would amount to approximately 0.00040 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 C, 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 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 C. This is likely because many operators in the region are currently EPA 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).

4.4.20.4 Cumulative Impacts of Climate Change

Cumulative impacts of climate change on resources would be slightly less than those for Alternative B.

4.4.20.5 Cumulative Impacts to Wildlife

Cumulative impacts to wildlife under this alternative would be the same as those listed under Alternative B.

4.21.2.6 Cumulative Impacts to Cultural Resources

Long term oil and gas exploration and extraction activities could compound the effects of vandalism of archaeological and paleontological materials by increased visibility and providing easier access to such localities.

Indirect and cumulative effects from oil and gas development and associated road construction include potential erosion in areas of exposed surfaces. The removal of vegetation and cover within these areas may promote a change in conditions that could lead to additional erosion from natural elements.

Additional effects also include vehicular access to the historic properties, which could promote future vandalism of cultural sites, and/or disturbance to contributing features and artifacts by recreationists.

There will be no effect to cultural resources within this analysis area for the action alternatives provided that all eligible and potentially eligible properties, Traditional Cultural Properties, and culturally significant areas are avoided or have mitigation measures developed in consultation with the SHPO, THPO's and other interested parties.

4.4.21.7 Cumulative Impacts to Economic Conditions:

Oil and gas activity in South Dakota is anticipated to continue to increase and remain heavily concentrated in Fall River and Harding counties. While some of this new activity will likely be attributable to federal minerals, development of BLM minerals within the planning only accounts for only a small share of the region's oil and gas development. Dependency on BLM minerals for oil and gas exploration, drilling, and extraction in the region is unlikely to change. Revenue associated with the leasing and development of an additional 800 acres (80 acres of newly leased and reinstating 720 acres) of BLM minerals would provide an estimated $ 210,438 to the local general governments and $1.29 million per year for education in Harding and Fall River counties. Leasing the additional acres and anticipated exploration, development, and production would have almost no effect on local populations, total local employment, number of households, average income per household, and total personal income, e.g. the effects would be less than half of one percent of current levels. The economic effects would continue to be spread unevenly among the counties and are unlikely to have any effect on local economic diversity (as indicated by the number of economic sectors), economic dependency (where one or a few industries dominate the economy), or economic stability (as indicated by seasonal unemployment, sporadic population changes and fluctuating income rates).

5.0 CONSULTATION AND COORDINATION:

5.1 Persons, Agencies, and Organizations Consulted

BLM has coordinated with SDGFP and USFWS in the completion of this EA in order to prepare analysis, identify protective measures, and apply stipulations associated with the 15 lease parcels being analyzed.

The BLM consults Native Americans under a variety of laws, regulations, executive orders, and manual guidance including: the National Environmental Policy Act and Section 106 of the National Historic Preservation Act. BLM sent letters to tribes in Montana, North and South Dakota informing them of the potential for the 15 parcels to be leased and inviting them to submit issues and concerns BLM should consider in the environmental analysis.

BLM corresponded with THPOs and other cultural resource specialists from the Rosebud Sioux Tribe, Sisseton Wapeton Oyate Tribe, Oglala Sioux Tribe, Crow Creek Sioux Tribe, Lower Brule Sioux Tribe, Cheyenne River Sioux Tribes, Standing Rock Sioux Tribe, Fort Peck Sioux Tribe; Mandan, Hidatsa, and Arikara Nation, Crow Tribe of Montana, and Northern Cheyenne Tribe of Montana. In a summary report the BLM provided an overview of the federal oil and gas leases as well as specific information on previous cultural resource surveys and recorded cultural resource sites within and surrounding the 15 parcels nominated for the July 2014 competitive oil and gas lease sale. This report was sent to the THPOs from each of the above listed tribes, then courtesy copies of the cover letters asking for information or comments was sent to Tribal Chairmen or Presidents for each of the tribes listed above.

Information on TCPs as well as concerns for other culturally sensitive areas was obtained previously from interested consulting Native American Tribes. There are areas identified in Harding County as well as all of the Black Hills that are known Traditional Cultural Properties

(TCP). These areas are 9 to 15 miles from the proposed lease parcels. No other correspondence regarding culturally sensitive areas was received from the tribes at this time.

Past coordination and consultation with interested Native American Indian Tribes resulted in an understanding there are culturally sensitive properties of religious and cultural importance to tribes all throughout western South Dakota. To ensure there will be no direct, indirect, or cumulative effects; the cultural resource lease stipulation will be applied to all 15 proposed oil lease parcels and the 1 lease reinstatement in Harding and Fall River counties. If further information is received for culturally sensitive properties, then proper avoidance measures will be developed during cooperative meetings with the interested Native American Tribes and the State Historic Preservation Office.

The Black Hills Ordnance Depot was officially designated in February 1942 in Fall River County. The site consisted of 21,095.85 acres, and was utilized for long-term storage of ammunition. In August 1962, the site was renamed the Black Hills Army Depot. The facility was developed with industrial storage, administrative buildings,housing, and related support facilities and utilities. The Depot was used for the receipt, storage, maintenance, inspection, testing, restoration, issuance and shipping of ammunition, propellants, and chemical toxics, the unpacking and functional packing of small arms ammunition, and the demilitarization of unsafe, obsolete and surplus ammunition, chemical ammunition, ammunition components, chemical toxics and general supplies. On June 30, 1967, the Black Hills Army Depot (BHAD) was closed and in 1968 was declared surplus by the Department of the Army. Lands outside the BHAD security fence was given to the USFS National Grasslands, while lands within the security fence were bequeathed to the General Services Administration (GSA). The City of Edgemont, South Dakota, purchased all surface lands within the boundary fence from GSA. Currently, the entire site is used for livestock grazing. In 1981 a study conducted by Ecology and Environment, Inc. determined that a change in land use which would generate direct human contact, such as housing or crops for human consumption, should be avoided. (http://denr.sd.gov/des/gw/Superfund/Federal_Facilities.aspx#Black)

On the Black Hills Army Depot, burning grounds and storage areas are suspected of being contaminated with ordnance, explosive waste and chemical warfare material. Some of the items reported to be disposed of were mustard, cyanogen chloride, and phosgene bombs, unexploded ordnance, ammunition, ammunition components, and tracers. Large numbers of high density anomalies have been found onsite. BHAD is a site of public safety concern due to historic uses and high potential for the persistence of ordnances, toxic chemicals, and the byproducts of deteriated chemicals on the surface or underground.

5.2 Summary of Public Participation

Public scoping for this project was conducted through a 15-day scoping period advertised on the BLM Montana State Office website and posting on the field office website NEPA notification log. Scoping was initiated December 16, 2013;comments were received through December 31, 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 23 surface owner notification letters, and 7 agency scoping letters were distributed for the oil and gas leasing analysis process in the SDFO. In addition, 11 tribal letters with detailed reports of known cultural resources were sent. The written and verbal communication resulted in two replies pertaining to this EA. One comment was received by phone regarding the lease sale process and surface owner rights and responsibilities.

The one written comment letter contained two concerns regarding the nominated leases within the Black Hills Army Depot/Igloo Army Depot. The author cited public safety concerns if the lease would be developed there is an "unknown when you disturb the surface by drilling and making oil sites." Black Hills Army Depot/Igloo Army Depot is considered eligible for the National Register of Historic Places (NRHP) under section 106 of the National Historic Preservation Act, according to the South Dakota State Historic Preservation Office and board members at the South Dakota State Historical Society. The second concern cited "the natural curiosity of humans to explore and look for relics and souvinours from the base." Exploration and harvesting of artifacts would compromise the historic site. This letter will be replied to in February 2014. The parcels in question within the letter are deferred in the preferred alternative within the EA. The 14 parcels are deferred due to public safety concerns and cultural resource concerns. This area will be analyzed for management actions under the pending BLM RMP/EIS.

The Environmental Assessment and associated Finding of No Significant Impact is being made available to the public on February 10, 2014 with comments accepted until March 12, 2014. Comments will be received from the public during this time frame.

Table 19: List of Preparers

Name	Title	Responsible for the Following Section(s) of this Document
Brenda Shierts	Cultural Resource Specialist	Cultural Resources, Paleontology
Rebecca Newton	Wildlife Biologist	Wildlife, Sensitive Species,
Bitsy Stiller	Recreation Planner	Recreation, Visual Resource Management
Carmen Drieling	Range Management Specialist	Vegetation, Grazing, Soil
Christopher Robinson	Hydrologist	Water, Riparian
Gerald Moller	Range Technician	Invasive Species
Russell Pigors	Physical Scientist	Minerals, Lands and Realty
Susan Bassett	Air Resource Specialist	Air Resources, Climate Change
	Social Scientist	Social Analysis
John Thompson	Planning &Environmental Specialist	Economic Analysis
Jennifer Dodd	Economic Modeler; U.S. Forest Service Enterprise Team	Economic Modeling
Jennifer Frazer	Natural Resource Specialist (GIS)	Preparer, GIS Analyses and Maps
Lane Carano	Legal Land Examiner-Sale Lead	Expressions of Interest/Lease Sale

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

Table 20: List of Reviewers		
Name	**Title**	**Reviewed the Following Section(s) of this Document**
Jake Chaffin,	Wildlife Biologist	Wildlife, Sensitive Species,
John Carlson	Wildlife Biologist	Greater sage-grouse
Christina Miller	Outdoor Receration Planner	Recreation, Noise
David Lefevre	NLCS Program Lead	VRM, National Historic Trails
Gary Smith	Archaeologist	Archaeology
Mark Sant	Tribal Coordinator	Tribal
Gregory Liggett	Paleonotologist	Peleonotology
Wendy Velman	Botanist	Vegetation, Invasive Species
Susan Bassett	Air Resource Specialist	Air Quality, Climate Change
Ruth Miller	Planner	All
John Thompson	Economist	Economics
Casey Buechler	Mineral Resource Specialist	All

6.0 REFERENCES

50 CFR Part 17 [Docket No. FWS–R6–ES–2009–0081] [MO 92210-0-0008]

Agee, J. 1993. *Fire Ecology of Pacific Northwest Forests*. Island Press. Washington.

Albers, Patricia and William James 1984 A History of Joint Migrations, Water and Land-Use By the Assiniboine, Cree, Chippewa And Metis In The Northern Plains From Prehistoric Times to 1879. Consultant's report prepared for the Billings Area Office, Bureau of Indian Affairs.

All census data http://quickfacts, census.gov/qfd/index.html 7/13/2010

All census data: http://quickfacts.census.gov/qfd/index.html 10/20/2010

Arnett, E.B., W. K. Brown, W. P. Erickson, J. K. Fiedler, B.L. Hamilton, T.H. Henry, A. Jain, G.D. Johnson, J. Kerns, R.R.Koford, C.P. Nicholson, T.J. O'Connell, M.D. Piorkowski, and R.D.Tankersley, Jr. 2008. Patterns of bat fatalities at wind energy facilities in North America. The Journal of Wildlife Management 72: 61-78.

Arno, Stephen F. and George E. Gruell. 1983. Fire history at the forest grassland ecotone in southwestern Montana. Journal of Range Management. 36(3): 332-336.

Bainbridge, DA. 2007. A Guide for Dryland Restoration: New Hope for Arid Lands. Island Press. Washington, DC.

Bald Eagle Protection Act of 1940 (16 U.S.C. 668-668d, 54 Stat. 250) as amended -- Approved June 8, 1940, and amended by P.L 86-70 (73 Stat. 143) June 25, 1959; P.L. 87-884 (76 Stat. 1346) October 24, 1962; P.L. 92-535 (86 Stat. 1064) October 23, 1972; and P.L. 95-616 (92 Stat. 3114) November 8, 1978.

Blickley, Jessica L., Diane Blackwood, and Gail L. Patricelli. 2012. Experimental evidence for the effects of chronic anthropogenic noise on abundance of greater sgae-grouse at leks. Conservation Biology. 26 (3): 461-471.

Blickley, Jessica L. and Gail L. Patricelli. 2012. Potential acoustic masking of greater sgae-grouse (*Centrocercus urophasianus*) display components by chronic industrial noise. Ornithological Monographs. 74: 23-35.

BLM Annual Report, 2008, Federal Oil and Gas Leases Issued in FY2008

BLM Annual Report, 2008, Federal Total Reported Royalty Revenues

BLM Federal Land Status Records (LSR), 2013, South Dakota Master Title Plats (MTPs), November 2013.

BLM LR2000, 2013, Authorized Rights-of-Way, November 2013

BLM LR2000, 2013, Authorized Leases/Leases Held by Production, December, 2013

Bramblett, R.G., T.R. Johnson, A.V. Zale, and D.G. Heggem. 2005. Development and evaluation of a fish assemblage index of biotic integrity for Northwestern Great Plains streams. Transactions of the American Fisheries Society. 134: 624-640.

Braun, C.E., O.O. Oedekoven, and C.L. Aldridge. 2002. Oil and gas development in western North America: effects on sagebrush steppe avifauna with particular emphasis on sage grouse. Transactions of the North American Wildlife and Natural Resources Conference 67:337-349.

Bureau of Land Management. 1998. Areas of Critical Environmental Concern Environmental Assessment and Proposed Amendment of the Billings, Powder River and South Dakota Resource Management Plans. August 1998. Bureau of Land Management, Miles City Field Office. Miles City, MT.

Canadian Wildlife Service and U.S. Fish and Wildlife Service. 2007. International recovery plan for the whooping crane. Ottawa: Recovery of Nationally Endangered Wildlife (RENEW), andU.S. Fish and Wildlife Service, Albuquerque, New Mexico. 162 pp. http://ecos.fws.gov/docs/recovery_plan/070604_v4.pdf

CCS. 2007. Montana Greenhouse Gas Inventory and Reference Case Projections 1990-2020. Center for Climate Strategies (CCS) and Montana Department of Environmental Quality. September 2007.

Clark, Lance R. and R. Neil Sampson. 1995. Forest Ecosystem Health in the Inland West: A Science and Policy Reader. Forest Policy Center, American Forests.

Climate Change SIR. 2010. Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota, Bureau of Land Management. Report on Greenhouse Gas Emissions and Climate Change for Montana, North Dakota, and South Dakota. Technical report prepared for the Montana/Dakotas Bureau of Land Management by URS Corporation. URS Project 22241790.

DeMaillie, Raymond and David Miller 2001 Assiniboine. In: Plains, Raymond DeMallie (Editor), Pp: 572-595, *Handbook of North American Indians Volume 13.* Smithsonian Institution Press, Washington D.C

Division, Annual Review 2000-2008 County Drilling and Production Statistics

EPA. 2004. Study to Evaluate the Impacts to USDWs by Hydraulic Fracturing of Coalbed Methane Reservoirs. http://www.epa.gov/safewater/uic/wells_coalbedmethanestudy.html accessed 5/26/10.

EPA. 2008. Knowledge Building Series: Climate Change 101. EPA Climate Change Information, US Environmental Protection Agency Region 8.

EPA. 2010. Our Nation's Air: Status and Trends Through 2008. EPA-454/R-09-002. February.

EPA. 2013a. AirData Air Quality Index Report [Website]. U.S. Environmental Protection Agency. Accessed December 4, 2013. http://www.epa.gov/airquality/airdata/ad_rep_aqi.html

EPA. 2013b. The 2011 National Emissions Inventory [Website]. Version 1. U.S. Environmental Protection Agency. Accessed December 4, 2013. http://www.epa.gov/ttn/chief/net/2011inventory.html

EPA. 2013c. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2011. U.S. Environmental Protection Agency. EPA 430-R-13-001. April 13. http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html

EPA. 2013d. The Social Cost of Carbon Website. U.S. Environmental Protection Agency. Accessed July 18, 2013. http://www.epa.gov/climatechange/EPAactivities/economics/scc.html

Eubanks, Ellen. 2004. Riparian Restoration. 0423 1201P. San Dimas, CA: U.S. Department of Agriculture, Forest Service, San Dimas Technology and Development Center. 137 p. http://www.fs.fed.us/t-d/php/library_card.php?p_num=0423%201201P

Federal funds under Mineral Leasing and Taylor Grazing Acts allocated to districts by area of producing lands. South Dakota Statutes and Codes 13-14-3.1

Friesen, Nathan. 2010. E-mail dated 10/06/2010 from Nathan Friesen of the Heritage Resources Branch of Saskatchewan Tourism, Parks, Culture and Sport to Mark Sant, BLM Montana State Office concerning Montana Oil and Gas lease near the Canadian Border.

Hamlin, K.L. 1978. Population ecology and habitat relationships of mule deer and white-tailed deer in the prairie agricultural habitats of eastern Montana. Montana Deer Studies. Montana Department of Fish, Wildlife and Parks, Project W-120-R-10, Job Progress Report.

Hamlin, K.L. 1978. Population ecology and habitat relationships of mule deer and white-tailed deer in the prairie agricultural habitats of eastern Montana. Montana Deer Studies. Montana Department of Fish, Wildlife and Parks, Project W-120-R-10, Job Progress Report.

Hanebury, L. 2010. Personal communication. Fish and Wildlife Biologist, USFWS, March 11, 2010.

Hansen, P.L., W. H. Thompson, J. G. Massey, and M. Thompson. 2008. Classification and management of upland, riparian, and wetland sites of USDI Bureau of Land

Management's Miles City Field Office, Eastern Montana, USA. Prepared for the Miles City Field Office by Ecological Solutions Group, LLC. Stevensville, MT.

Hoagstrom, C.W., G. Adams, R.M. Neumann, and D.W. Willis. 2011. Guide to the fishes of South Dakota. Forum Communications, Fargo, ND.

Holloran, M.J. 2005. Greater Sage-Grouse (*Centrocercus urophasianus*) Population Response to Natural Gas Development in Western Wyoming. December, 2005. (Doctoral Dissertation, University of Wyoming). Laramie, WY. Available at: http://www.uwyo.edu/wycoopunit/showthesis.asp?thesisid=182.

Holloran, M.J. and S.H. Anderson. 2005a. Greater sage-grouse population response to natural gas development in western Wyoming: are regional populations affected by relatively localized disturbances? In Wildlife Management Institute (Ed.), *Transactions from the 70th North American Wildlife and Natural Resources Conference* (March 16–19, 2005, Arlington, VA). Wildlife Management Institute.

Holloran, M. J, and S. H. Anderson. 2005b. Spatial Distribution of Greater Sage-Grouse nests in Relatively Contiguous Sagebrush Habitats. *The Condor,* 107:742–752.

IMPLAN, 2012. Minnesota IMPLAN Group 2012

IMPROVE 2011. Spatial and Seasonal Patterns and Temporal Variability of Haze and its Constituents in the United States, Report V. Interagency Monitoring of Protected Visual Environments (IMPROVE). http://vista.cira.colostate.edu/improve/publications/Reports/2011/PDF/IMPROVE_V_FullReport.pdf. June 2011.

Independent Petroleum Association of America, The Oil and Gas Producing Industry in Your State 2011-2012, SD, pg. 90-91.

Ingelfinger, F. 2001. The Effects of Natural Gas Development on Sagebrush Steppe Passerines in Sublette County, Wyoming. Thesis. University of WY, Laramie, Wyoming.

IPCC. 2007. Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report: Climate Change 2007. http://www.ipcc.ch/publications_and_data/ar4/syr/en/contents.html.

Jerde, Tom and Dennis Joyes 2009 Pots from the Hills: Prehistoric Ceramics from Northeastern Montana. *Archaeology in Montana* 50(1): 33-68.

Kiesow, A.M. 2006. Field guide to amphibians and reptiles of South Dakota. South Dakota Department of Game, Fish, and Parks, Pierre, SD.

Kunz, T.H., E.B. Arnett, W.P. Erickson, A.R. Hoar, G.D. Johnson, R.P. Larkin, M.D. Strickland, R.W. Thresher, and M.D. Tuttle. 2007. Ecological impacts of wind energy development

on bats: Questions, research needs, and hypotheses. Frontiers in Ecology and the Environment 5(6): 315-324.

Levick, L., J. Fonseca, D. Goodrich, M. Hernandez, D. Semmens, J. Stromberg, R. Leidy, M. Scianni, D. P. Guertin, M. Tluczek, and W. Kepner. 2008. The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest. U.S. Environmental Protection Agency and USDA/ARS Southwest Watershed Research Center, EPA/600/R-08/134, ARS/233046, 116 pp. http://azriparian.org/docs/arc/publications/EphemeralStreamsReport.pdf accessed 7/22/10.

Life on the edge: The ecology of Great Plains prairie streams. 2004. *BioScience*, 54(3): 205 – 216.

Maslin, Mark. 2004. Global Warming: A Very Short Introduction. Oxford University Press. New York.

Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755) as amended by: Chapter 634; June 20, 1936; 49 Stat. 1556; P.L. 86-732; September 8, 1960; 74 Stat. 866; P.L. 90-578; October 17, 1968; 82 Stat. 1118; P.L. 91-135; December 5, 1969; 83 Stat. 282; P.L. 93-300; June 1, 1974; 88 Stat. 190; P.L. 95-616; November 8, 1978; 92 Stat. 3111; P.L. 99-645; November 10, 1986; 100 Stat. 3590 and P.L. 105-312; October 30, 1998; 112 Stat. 2956.

Minerals Management Service, Stacey Browne, 2008

Office of Natural Resource Revenue Total Reported Federal Royalty Revenues, South Dakota, 2010

Patricelli, Gail L., Jessica L. Blickley, and Stacie L. Hooper. 2013. The impacts of noise on greater sage-grouse: A discussion of current management strategies in Wyoming with recommendations for further research and interim protections. Prepared for the BLM Lander Field Office and Wyoming State Office, and Cheyenne and Wyoming Game and Fish Department.

Perrow, MR and AJ Davy. 2003. Handbook of Ecological Restoration: Vol. 1 Principles of Restoration. Cambridge University Press. New York, NY.

Peterson L. and S. Deaver. 2002. An Ethnographic Overview of Southeast Montana, February 2001. Prepared for the BLM State Office, Billings, MT.

Prichard, D., et al. 1993, Revised 1995. Riparian Area Management. Process for Assessing Proper Functioning Condition. U.S. Department of the Interior Bureau of Land Management. Technical Reference 1737-9. 51 pp. ftp://ftp.blm.gov/pub/nstc/techrefs/Final%20TR%201737-7.pdf

Royalty Production. 43 CFR 3103.3.1

Sawyer, H., R. Nielson, D. Strickland, and L. McDonald. 2005. Annual Report. Sublette Mule Deer Study(Phase II): Long-term monitoring plan to assess potential impacts of energy development on mule deer in the Pinedale Anticline Project Area. Western Ecosystems Technology, Inc. Cheyenne, WY.

Smeins, F. E. and S. D. Fuhlendorf. 1997. Biology and ecology of Ashe juniper. *In:* Juniper Symposium Proceedings. Texas A&M University, College Station, Texas, USA.

South Dakota Department of Education, Susan Woodmansey, 2010

South Dakota Department of Environment and Natural Resource. Superfund Action at Federal Facility Site. http://denr.sd.gov/des/gw/Superfund/Federal_Facilities.aspx#Pine

Sundstrom, Linea, 2009 "Class I South Dakota Cultural Landscape Overview (Selected Archaeological Regions) and Resource Management Plan/Environmental Impact Statement Overview of Affected Environment Cultural Resource", Bureau of Land Management, South Dakota Field Office, 310 Roundup Street, Belle Fourche, SD 57717.

Tack, J.D. 2010. Sage Grouse and the Human Footprint: Implications for Conservation of Small and Declining Populations. Thesis. University of Montana, Missoula, MT. USA.

U.S. Department of Commerce. 2012. Bureau of Economic Analysis, Regional Economic Information System, Washington, D.C. Table CA05N.

U. S. Fish and Wildlife Service. 2010. Black-footed ferret website http://www.fws.gov/mountain-prairie/species/mammals/blackfootedferret/

U.S. Fish and Wildlife Service (USFWS) 2010. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, DC. FWS/OBS-79/31. http://www.fws.gov/wetlands/ USGS 2009. National Hydrography Dataset (NHD). http://nhd.usgs.gov/ accessed 11/2009.

U.S. Fish and Wildlife Service (USFWS) 2010. Pallid Sturgeon species description and ESA status and review. http://www.fws.gov/mountain-prairie/missouririver/moriver_pallidsturgeon.htm

U.S. Fish and Wildlife Service. 1989. Black footed ferret survey guidelines for compliance with the Endangered Species Act. 15 pgs.

U.S. Fish and Wildlife Service. 1989. Black footed ferret survey guidelines for compliance with the Endangered Species Act. 15 pgs.

U.S. Fish and Wildlife Service. 2002. Endangered and Threatened Wildlife and Plants;Designation of Critical Habitat for the Northern Great Plains Breeding Population

of the Piping Plover; Final Rule5 0 CFR Part 17. 57638 Federal Register / Vol. 67, No. 176. http://www.fws.gov/mountain-prairie/species/birds/pipingplover/.

U.S. Fish and Wildlife Service. 2010. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service. FWS/OBS-79/31.

U.S. Fish and Wildlife Service. 2010. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List Sprague's Pipit as Endangered or Threatened throughout Its Range.

USDA, NRCS. 2010. The PLANTS Database (http://plants.usda.gov, 9 November 2010). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDI (United States Department of the Interior) and USDA (United States Department of Agriculture). 2007. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. BLM/WO/ST-06/021+3071/REV 07. Bureau of Land Management. Denver, Colorado. 84 pp.

USDI (United States Department of the Interior) and USDA (United States Department of Agriculture). 2007. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. BLM/WO/ST-06/021+3071/REV 07. Bureau of Land Management. Denver, Colorado. 84 pp.

USDI BLM. 2009. Instruction Memorandum No. MT-2009-039. 2009 Montana/Dakota's Special Status Species List.

USDI Bureau of Land Management. 1985 (signed 1986). South Dakota Resource Area Resource Management Plan/Environmental Impact Statement for the South Dakota Resource Area of the Miles City District. Final. U.S. Department of the Interior, Bureau of Land Management.

USDI Bureau of Land Management. 1992 (signed 1994). *Final Oil and Gas RMP/EIS Amendment for the Billings, Powder River and South Dakota Resource Areas.* U.S. Department of the Interior, Bureau of Land Management, Miles City District.

Walker, B. L., D, E. Naugle, K.E. Doherty. 2007. Greater Sage Grouse Population Response to Energy Development and Habitat Loss. Journal of Wildlife Managment 71(8):2644-2654; 2007).

Walker-Kuntz, Sunday. 2008. Harding County, South Dakota Proposed Oil and Gas Leases Class III Inventory (EDD070017). Bureau of Land Management Project No. 09-MT040-05. On file BLM South Dakota Field Office, 310 Roundup Street, Belle Fourche, SD.

Whitehead, R.L. 1996. Ground Water Atlas of the United States: Montana, North Dakota, South Dakota, Wyoming. U.S. Department of the Interior, U.S. Geological Survey Hydrologic Investigations Atlas 730-I.

Winthrop, K. 2004. *Bare Bones Guide to Fire Effects on Cultural Resources for Cultural Resource Specialists*. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado.

WRI. 2012. Climate Analysis Indicators Tool (CAIT), Version 4.0. [Website]. World Resources Institute (WRI). http://cait.wri.org/cait-us.php?page=yearly. Accessed January 6, 2012.

Youmans, H.B. and Swenson, J.E. 1982. Winter distribution of habitat use by mule deer and white-tailed deer in southeastern Montana. Appendix to Big Game Survey and Inventory (Deer).

Zelt et al. 1999 Environmental Setting of the Yellowstone River Basin, Montana, North Dakota, and Wyoming, Water-Resources Investigations Report 98-4269 http://pubs.usgs.gov/wri/wri984269/ accessed 7/15/10.

7.0 DEFINITIONS

NAICS: 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 South 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). IMPLAN Version 3 and the 2010 IMPLAN data set was used in this analysis is.

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNAIVE C	PROPOSED FOR DEFERRAL-NO LEASING
SDM 79010-AJ	T. 23 N, R. 6 E, BHM, SD SEC. 25 SWNW; SEC. 26 SENE; HARDING COUNTY 80.00 AC PD	**CR 16-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-12** (ALL LANDS) **NSO 11-2** SEC. 25 SWNW; **TES 16-2** (ALL LANDS) **TL 13-1** (ALL LANDS)		NONE
SDM 97300-PN	T. 10 S, R. 2 E, BHM, SD SEC. 2 POR W2SW LYING INSIDE BHAD BDY (61.33 AC); SEC. 3 POR LOT 1 & N2S2NE LYING INSIDE BHAD BDY (48.08 AC); SEC. 3 POR S2S2NE LYING INSIDE BHAD BDY (39.10 AC); SEC. 3 LOTS 2-4; SEC. 3 S2NW,N2SW,SWSW,E2SE; SEC. 4 SESE; FALL RIVER COUNTY 587.25 AC ACQ **3/**	**CR 16-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-11** (ALL LANDS) **LN 14-12** (ALL LANDS) **NSO 11-2** SEC. 2 POR W2SW LYING INSIDE BHAD BDY (61.33 AC); SEC. 3 POR LOT 1 & N2S2NE LYING INSIDE BHAD BDY (48.08 AC); SEC. 3 POR S2S2NE LYING INSIDE BHAD BDY (39.10 AC); SEC. 3 LOT 2; SEC. 3 NESW, NESE; **TES 16-2** (ALL LANDS) **TL 13-3** SEC. 3 LOT 4; SEC. 3 SWNW, WSSW; SEC. 4 SESE;		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNAIVE C	PROPOSED FOR DEFERRAL-NO LEASING
SDM 97300-PP	T. 10 S, R. 2 E, BHM, SD SEC. 3 SESW,W2SE; FALL RIVER COUNTY 120.00 AC PD	**CR 16-1** (ALL LANDS) **NSO 11-2** SEC. 3 SESW, NWSE; **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-11** (ALL LANDS) **LN 14-12** (ALL LANDS) **TES 16-2** (ALL LANDS)		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.
SDM 97300-PU	T. 10 S, R. 2 E, BHM, SD SEC. 7 LOTS 3,4; SEC. 7 SESW,SWSE; SEC. 18 LOT 1; SEC. 18 NE,E2NW; FALL RIVER COUNTY 418.33 AC ACQ **3/**	**CR 16-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-11** (ALL LANDS) **LN 14-12** (ALL LANDS) **TES 16-2** (ALL LANDS)		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.
SDM 97300-PV	T. 10 S, R. 2 E, BHM, SD SEC. 7 NESW; SEC. 18 LOT 2; FALL RIVER COUNTY 72.83 AC PD	**CR 16-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-11** (ALL LANDS) **LN 14-12** (ALL LANDS) **TES 16-2** (ALL LANDS)		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.
SDM 97300-PW	T. 10 S, R. 2 E, BHM, SD SEC. 7 E2SE; SEC. 8 SW,W2SE; FALL RIVER COUNTY 320.00 AC ACQ **3/**	**CR 16-1** (ALL LANDS) **CSU 12-3** SEC. 7 NESE; SEC. 8 N2SW, SESW, W2SE; **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-11** (ALL LANDS) **LN 14-12** (ALL LANDS) **NSO 11-2** SEC. 7 E2SE; SEC. 8 S2SW, SWSE; **TES 16-2** (ALL LANDS)		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNAIVE C	PROPOSED FOR DEFERRAL-NO LEASING
SDM 97300-PX	T. 10 S, R. 2 E, BHM, SD SEC. 9 NENE,NW; SEC. 10 W2NW,NWSW; FALL RIVER COUNTY 320.00 AC ACQ **3/**	**CR 16-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-11** (ALL LANDS) **LN 14-12** (ALL LANDS) **NSO 11-2** SEC. 9 SWNW; SEC. 10 SWNW; **TES 16-2** (ALL LANDS) **TL 13-3** SEC. 9 NENE, NW; SEC. 10 NWNW;		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.
SDM 97300-PY	T. 10 S, R. 2 E, BHM, SD SEC. 10 NE,E2W2; SEC. 11 SWSW; FALL RIVER COUNTY 360.00 AC PD	**CR 16-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-11** SEC. 10 NE, E2W2; **LN 14-12** (ALL LANDS) **NSO 11-2** SEC. 10 E2SW; **TES 16-2** (ALL LANDS)		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.
SDM 97300-P4	T. 10 S, R. 2 E, BHM, SD SEC. 10 SE; SEC. 11 N2SW,SESW; FALL RIVER COUNTY 280.00 AC ACQ **3/**	**CR 16-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-11** SEC. 10 SE; SEC. 11 NWSW; **LN 14-12** (ALL LANDS) **NSO 11-2** SEC. 10 NESE,S2SE; SEC. 11 N2SW,SESW; **TES 16-2** (ALL LANDS)		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNAIVE C	PROPOSED FOR DEFERRAL-NO LEASING
SDM 97300-33	T. 10 S, R. 2 E, BHM, SD SEC. 11 POR SWNE LYING INSIDE BHAD BDY; FALL RIVER COUNTY 3.80 AC ACQ 3/	**CR 16-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-12** (ALL LANDS) **TES 16-2** (ALL LANDS)		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.
SDM 97300-P6	T. 10 S, R. 2 E, BHM, SD SEC. 17 ALL; FALL RIVER COUNTY 640.00 AC ACQ 3/	**CR 16-1** (ALL LANDS) **CSU 12-3** SEC. 17 NWNE, NENW; **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-11** (ALL LANDS) **LN 14-12** (ALL LANDS) **NSO 11-2** SEC. 17 NWNE,S2NE,N2NW; **TES 16-2** (ALL LANDS)		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.
SDM 97300-P7	T. 10 S, R. 2 E, BHM, SD SEC. 18 LOTS 3,4; SEC. 18 E2SW,SE; SEC. 19 LOTS 1,2; SEC. 19 NE,E2NW,N2SE,SWSE; SEC. 20 SW; SEC. 30 W2NE,E2NW; FALL RIVER COUNTY 1051.70 AC ACQ 3/	**CR 16-1** (ALL LANDS) **CSU 12-1** SEC. 20 SESW; **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-11** (ALL LANDS) **LN 14-12** (ALL LANDS) **NSO 11-2** SEC. 19 SWSE; SEC. 20 SWSW; SEC. 30 SWNE, E2NW; **TES 16-2** (ALL LANDS) **TL 13-3** SEC. 20 S2SW; SEC. 30 SWNW;		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.

APPENDIX A

PARCEL NUMBER	PARCEL DESCRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNAIVE C	PROPOSED FOR DEFERRAL-NO LEASING
SDM 97300-P8	T. 10 S, R. 2 E, BHM, SD SEC. 19 LOTS 3,4; SEC. 19 E2SW; SEC. 30 POR LOT 4 & NESW LYING INSIDE BHAD FNC (43.61 AC); SEC. 30 LOTS 1-3; FALL RIVER COUNTY 290.28 AC PD	**CR 16-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-11** (ALL LANDS) **LN 14-12** (ALL LANDS) **NSO 11-2** SEC. 19 LOT 4; SEC. 30 LOT 1; **TES 16-2** (ALL LANDS)		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.
SDM 97300-P9	T. 10 S, R. 2 E, BHM, SD SEC. 20 S2SE; SEC. 21 S2S2; SEC. 22 SWSW; SEC. 27 NWNW; SEC. 28 N2N2; SEC. 29 N2NE; FALL RIVER COUNTY 560.00 AC PD	**CR 16-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-11** SEC. 20 SWSE; **LN 14-12** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-3** SEC. 20 S2SE; SEC. 29 N2NE; SEC. 28 NWNW;		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.
SDM 97300-QF	T. 10 S, R. 2 E, BHM, SD SEC. 28 POR S2NE & SENW LYING INSIDE BHAD FNC (76.00 AC); SEC. 28 POR SWNW LYING INSIDE BHAD FNC (5.00 AC); SEC. 29 POR S2NE & SENW LYING INSIDE BHAD FNC (10.00 AC); FALL RIVER COUNTY 91.00 AC PD	**CR 16-1** (ALL LANDS) **LN 14-2** (ALL LANDS) **LN 14-3** (ALL LANDS) **LN 14-12** (ALL LANDS) **TES 16-2** (ALL LANDS) **TL 13-3** SEC. 28 POR SWNW LYING INSIDE BHAD FNC (5.00 AC); SEC. 29 POR S2NE & SENW LYING INSIDE BHAD FNC (10.00 AC);		DEFER ALL LANDS Pending further review of Cultural Resources and Public Safety issues being analyzed in the current SDFO planning effort.

Appendix B - Stipulations Applied to each parcel and used during the analysis			
Stipulations and Lease Notices applied to lease parcels and used in the analysis for this portion of the July 15, 2014 Sale			
Stipulation #	**Stipulation Name**	**Stipulation**	**Reason**
Cultural Resources Lease Stipulation CR 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.	-
Controlled Surface Use CSU 12-1	Controlled Surface Use Slopes over 30 percent	Prior to surface disturbance on slopes over 30 percent, an engineering/reclamation plan must be approved by the authorized officer. Such plan must demonstrate how the following will be accomplished: - Site productivity will be restored. - Surface runoff will be adequately controlled. - Off-site areas will be protected from accelerated erosion, such as rilling, gullying, piping, and mass wasting. - Water quality and quantity will be in conformance with state and federal water quality laws. - Surface-disturbing activities will not be conducted during extended wet periods. - Construction will not be allowed when soils are frozen.	To maintain soil productivity, provide necessary protection to prevent excessive soil erosion on steep slopes and to avoid areas subject to slope failure, mass wasting, piping, or having excessive reclamation problems.
Controlled Surface Use CSU 12-3	Controlled Surface Use Black-footed Ferret Habitat	Surface occupancy or use is subject to the following special operating constraints: Prior to surface disturbance, prairie dog colonies and complexes 80 acres	Assure compliance with the ESA by locating and protecting black-footed ferrets and their habitat.

		or more in size will be examined to determine the absence or presence of black-footed ferrets. The findings of this examination may result in some restrictions to the operator's plans or may even preclude use and occupancy that would be in violation of the Endangered Species Act (ESA). The lessee or operator may, at their own option, conduct an examination on the leased lands to determine if black-footed ferrets are present, if the proposed activity will have an adverse effect, or if the area can be cleared. This examination must be done by, or under the supervision of, a qualified resource specialist approved by the Surface Management Agency (SMA). An acceptable report must be provided to the SMA documenting the presence or absence of black-footed ferrets and identifying the anticipated effects of the proposed action on the black-footed ferret and its habitat.	
Lease Notice 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.	This notice would be consistent with the present Montana State Office guidance for cultural resource protection related to oil and gas operations (NTL-MSO-85-1).
Lease Notice LN 14-3	LEASE NOTICE FOSSIL DISCOVERY	The lessee or operator shall immediately bring to the attention of the Surface Management Agency (SMA) any paleontological resources or any other objects of scientific interest discovered as a result of approved operations under this lease, and shall leave such discoveries intact and undisturbed until directed to proceed by the SMA.	
Lease Notice 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.	
Lease Notice LN 14-12	LEASE NOTICE PALEONTOLOGICAL RESOURCE INVENTORY REQUIREMENT	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.	This lease has been identified as being located within geologic units rated as being moderate to very high potential for containing significant paleontological resources. The locations meet the criteria for class 3, 4 and/or 5 as set forth in the Potential Fossil Yield Classification System, WO IM 2008-009, Attachment 2-2. The BLM is responsible for assuring that the leased lands are examined to determine if paleontological resources are present and to specify mitigation measures. Guidance for application of this requirement can be found in WO IM 2008-009 dated October 15, 2007, and WO IM 2009-011 dated October 10, 2008.
No Surface Occupancy NSO 11-2	No Surface Occupancy Riparain Area, flood plains	No surface occupancy or use is allowed within riparian areas, 100-year flood plains of major rivers, and on water bodies and streams.	To protect the unique biological and hydrological features associated with riparian areas, 100-year flood plains of major rivers, and water bodies and streams; and to maintain riparian/wetlands function and water quality. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes.
Endangered Species Act Section 7 Consultation Stipulation 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. The BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat.	-

		The BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.	
Timing Limitation TL 13-1	Timing Limitation Winter Range	No surface use is allowed within crucial winter range for wildlife for the following time period: December 1 to March 31 This stipulation does not apply to the operation and maintenance of production facilities.	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.
Timing Limitation TL 13-3	Timing Limitation Sharptail and Sage-grouse Nesting Habitat	No surface use is allowed in grouse nesting habitat within two miles of a lek during the following time period: March 1 to June 15 This stipulation does not apply to the operation and maintenance of production facilities.	To protect sharptail and sage grouse nesting habitat from disturbance during spring and early summer in order to maximize annual production of young, and to protect nesting activities adjacent to nesting sites for the long-term maintenance of grouse populations in the area.

APPENDIX C: Lease Reinstatement

LEASE NUMBER	PARCEL DECRIPTION	PROPOSED FOR LEASING ALTERNATIVE B	PROPOSED FOR LEASING IF EA INCLUDES ALTERNATIVE C	PROPOSED FOR DEFERRAL / NO LEASING
SDM 098206	T. 22 N, R. 2 E, BHM, SD SEC. 13 E2; SEC. 24 N2; SEC. 25 SWNE, NWSE; HARDING COUNTY 720.00 AC	**CR 16-1** (ALL LANDS) **CSU 12-9** - Paleontological resource Inventory (ALL LANDS) **CSU 12-21** - Sensitive Soils SEC. 13 E2; SEC. 24 N2; SEC. 25 SWNE, NWSE; **CSU 12-22**- Greater Sage-Grouse General Habitat (ALL LANDS) **LN 14-2** - Cultural Survey (ALL LANDS) **LN 14-16** - Migratory Birds (ALL LANDS) **LN 14-17** - Special Status Species (ALL LANDS) **NSO 11-22** – National Register of Historic Places (NRHP) Eligibile Properties/Districts (ALL LANDS) **NSO 11-23** – Traditional Cultural Properties (ALL LANDS) **NSO 11-60**– Water, Riparian, Wetland, Floodplains SEC. 13 NWNE, S2NE, W2SE; SEC. 24 N2; **NSO 11-61** – Crucial Winter Range (Greater Sage-grouse) (ALL		NONE

		LANDS) **TES 16-2** (ALL LANDS) **TL 13-11** - Sensitive Raptor Species SEC. 13 E2 **TL 13-25**– Sprague's Pipit (ALL LANDS)		

Stipulations Applied to Lease SDM 098206			
Stipulations and Lease Notices applied to lease parcel and used in the analysis in accordance to WO IM No. 2013-177, dated August 13, 2013			
Stipulation #	**Stipulation Name**	**Stipulation**	**Reason**
Cultural Resources Lease Stipulation CR 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.	-
Controlled Surface Use CSU 12-9	Paleontological Resource Inventory	Controlled Surface Use: In areas known to have a high potential (Classes 3, 4 and 5) for containing significant paleontological resources, the Lessee shall be required to conduct a paleontological inventory prior to any surface disturbance. The lessee must engage the services of a qualified paleontologist, acceptable to the Surface Management Agency, to conduct the inventory. An acceptable inventory report is to be submitted to the BLM for	Preserve and protect scientifically significant vertebrate fossils and paleontological locales.

		review and approval at the time a surface-disturbing plan of operations is submitted.	
Controlled Surface Use CSU 12-21	Sensitive Soils	Controlled Surface Use: Surface occupancy and use will be controlled on sensitive soils. Sensitive soils are determined using a combination of slope and soil erodibility. Prior to surface disturbance on sensitive soils, a reclamation plan must be approved by the administrative officer. The plan must demonstrate the following: (1) no other practicable alternatives exist for relocating the activity, (2) the activity will be located to reduce impacts to soil and water resources, (3) site productivity will be maintained or restored, (4) surface runoff and sedimentation will be adequately controlled, (5) on- and off-site areas will be protected from accelerated erosion, (6) that no areas susceptible to mass wasting would be disturbed and (7) surface-disturbing activities will be prohibited during extended wet periods.	To maintain the chemical, physical, and biotic properties of soils, this includes maintaining soil productivity, soil stability, and soil biotic properties. This will prevent excessive erosion, potential mass wasting, and improve the likelihood of successful reclamation.
Controlled Surface Use CSU 12-22	Greater Sage-grouse General Habitat	Controlled Surface Use: To protect nesting Greater Sage-Grouse, surface occupancy and use within 2 miles of an lek may be restricted or prohibited. Prior to such activities a plan to mitigate impacts to nesting greater sage-grouse and Greater Sage-Grouse nesting habitat will be prepared by the proponent and implemented upon approval by the authorized officer.	Reduce collision hazards to sage grouse from power lines and reduce raptor predation on sage grouse within Greater Sage-Grouse General Habitat Areas (GHAs).
Lease Notice LN 14-2	LEASE NOTICE CULTURAL RESOURCE SURVEY	An inventory of those portions of the leased lands subject to proposed disturbance may be required prior to any surface disturbance to determine if cultural resources are present and to identify needed mitigation measures. Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee or operator shall: 1. The lessee or operator shall	Compliance with Section 106 of the National Historic Preservation Act is required for all actions which may affect cultural properties eligible to the National Register of Historic Places. Section 6 of the Oil and Gas Lease Terms (Form 3100-11) requires that operations be conducted in a manner that

		engage the services of a cultural resource consultant acceptable to the Surface Management Agency (SMA) to conduct a cultural resource inventory of the area of proposed surface disturbance. The operator may elect to inventory an area larger than the standard ten-acre minimum to cover possible site relocation which may result from environmental or other considerations. An acceptable inventory report is to be submitted to the SMA for review and approval no later than that time when an otherwise complete application for approval of drilling or subsequent surface-disturbing operation is submitted. 2. Implement mitigation measures required by the SMA. Mitigation may include the relocation of proposed lease-related activities or other protective measures such as data recovery and extensive recordation. Where impacts to cultural resources cannot be mitigated to the satisfaction of the SMA, surface occupancy on that area must be prohibited. The lessee or operator shall immediately bring to the attention of the SMA any cultural resources discovered as a result of approved operations under this lease, and shall not disturb such discoveries until directed to proceed by the SMA.	minimizes adverse impacts to cultural and other resources.
Lease Notice LN 14-16	Migratory Birds	Migratory Bird Treaty Act. The Operator is responsible for compliance with provisions of the Act by implementing one of the following measures; a) avoidance by timing; ground disturbing activities will not occur from April 15 to July 15, b) habitat manipulation; render proposed project footprints unsuitable for nesting prior to the arrival of migratory birds (blading or pre-clearing of vegetation must occur prior to April 15 within the year and area scheduled for activities between April 15 and July 15 of that year to deter nesting, or c) survey-buffer-monitor; surveys will be conducted by a BLM approved biologist within the area of the proposed action and a	

		300 foot buffer from the proposed project footprint between April 15 to July 15 if activities are proposed within this timeframe. If nesting birds are found, activities would not be allowed within 0.1 miles of nests until after the birds have fledged. If active nests are not found, construction activities must occur within 7 days of the survey. If this does not occur, new surveys must be conducted. Survey reports will be submitted to the appropriate BLM Office.	
Lease Notice LN 14-17	Special Status Species	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 proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or requirements of the Endangered Species Act as amended, 16 U.S.C. § et seq., including completion of any required procedure for conference or consultation.	
No Surface Occupancy NSO 11-22	National Register of Historic Places (NRHP) Eligible Properties/Districts	Occupancy and use is prohibited within, and for a distance of 300 feet from the boundaries of cultural properties and archaeological/historic districts determined to be eligible or potentially eligible for the National Register of Historic Places, except for the Fort Meade Recreation Area National Historic District and the Bear Butte National Historic Landmark, which are closed to oil and gas leasing.	To protect significant cultural properties and archaeological districts and their settings, and to avoid disturbance or inadvertent impacts to these resources.
No Surface Occupancy	Traditional Cultural Properties	Occupancy and Use is prohibited within, and for a distance of ½ mile	To avoid disturbance and to protect archaeological

NSO 11-23		from the boundaries of cultural properties determined to be of importance to Native American Tribal groups, sites determined to be Traditional Cultural Properties, and/or designated for traditional use. Such properties include (but are not limited to) burial locations, pictograph/petroglyph, vision quest locations, certain stone alignments, buttes or other uplift type landforms, plant gathering locations, and areas considered sacred or used for religious purposes.	properties of known significance to Native American groups, as well as, traditional cultural properties and the setting in which they occur.
No Surface Occupancy NSO 11-60	Water, Riparian, Wetland, Floodplains	No Surface Occupancy: Surface occupancy and use is prohibited within perennial or intermittent streams, lakes, ponds, reservoirs, 100-year floodplains, wetlands, and riparian areas.	To protect the unique biological and hydrological features and functions associated with perennial and intermittent streams, lakes, ponds, reservoirs, floodplains, wetlands, and riparian areas.
No Surface Occupancy NSO 11-61	Crucial Winter Range (Greater Sage-grouse)	Surface occupancy and use is prohibited.	To protect winter ranges crucial to the survival of 80% of the species identified as BLM priority species for management in the most severe of winters.
Endangered Species Act Section 7 Consultation Stipulation 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. The BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.	-

Timing Limitation TL 13-11	Sensitive Raptor Species: Golden eagle, burrowing owl, ferruginous hawk, Swainson's hawk, osprey, prairie falcon, and northern goshawk. Does not include peregrine falcon or bald eagle.	Timing Restriction: Surface use is prohibited within ½ mile of active raptor nest sites from March 1 through July 31.	To protect nesting activities associated with raptors identified as BLM priority species for management.
Timing Limitation TL 13-25	Spraque's Pipit	Timing Restriction: Surface use is prohibited from April 15 through July 15 in Sprague's pipit habitat.	To protect nesting activities of the Sprague's pipit, as BLM priority species for management.

APPENDIX D: MAPS

Map 1:

Overview vicinity map of Lease Parcels and Lease Reinstatement SDM 098206 covered in EA.

Map 2:

Detail map of sale parcel SDM 97300-AJ in Harding County.

Map 3:

Detail map of sale parcels in Fall River County.

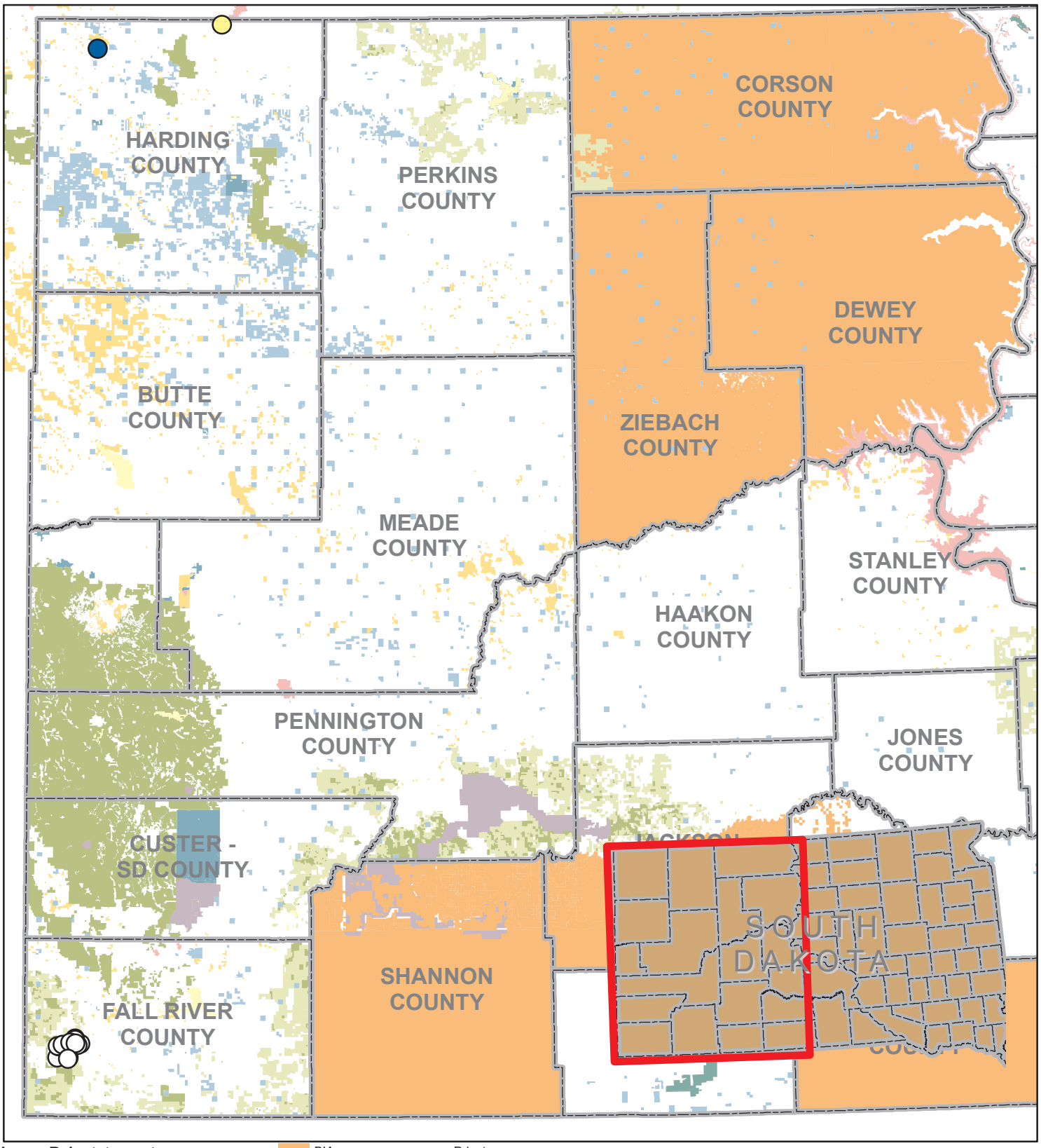
Map features the following parcels: SDM 97300-PU, PV, PW, PX, PY, P4, P6, P7, P8, P9, QF, PN, PP and 33.

Map 4:

Detail map of Lease Reinstatement parcel SDM 098206

Nominated Parcels for July 2014 Oil and Gas Sale and Lease Reinstatement within EA

Date: 12/20/2013



Lease Reinstatement

- SDM 098206 (Private and State Surface)

Parcels in July 2014 Lease Sale

- BLM SURFACE
- PRIVATE SURFACE

BIA
BLM - Bnkhd Jns
BLM
BOR
DOD/COE/DOE
Local Gov
NPS

Private
State
State - FWP/GFP
USFWS
USFS
USFS - NG

Projected Coordinate System: NAD 1983 Albers
Geographic Coordinate System: GCS North American 1983
Datum: D North American 1983

1:1,579,735

0 4.759.5 19 28.5 38 Miles

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
NORTH DAKOTA FIELD OFFICE

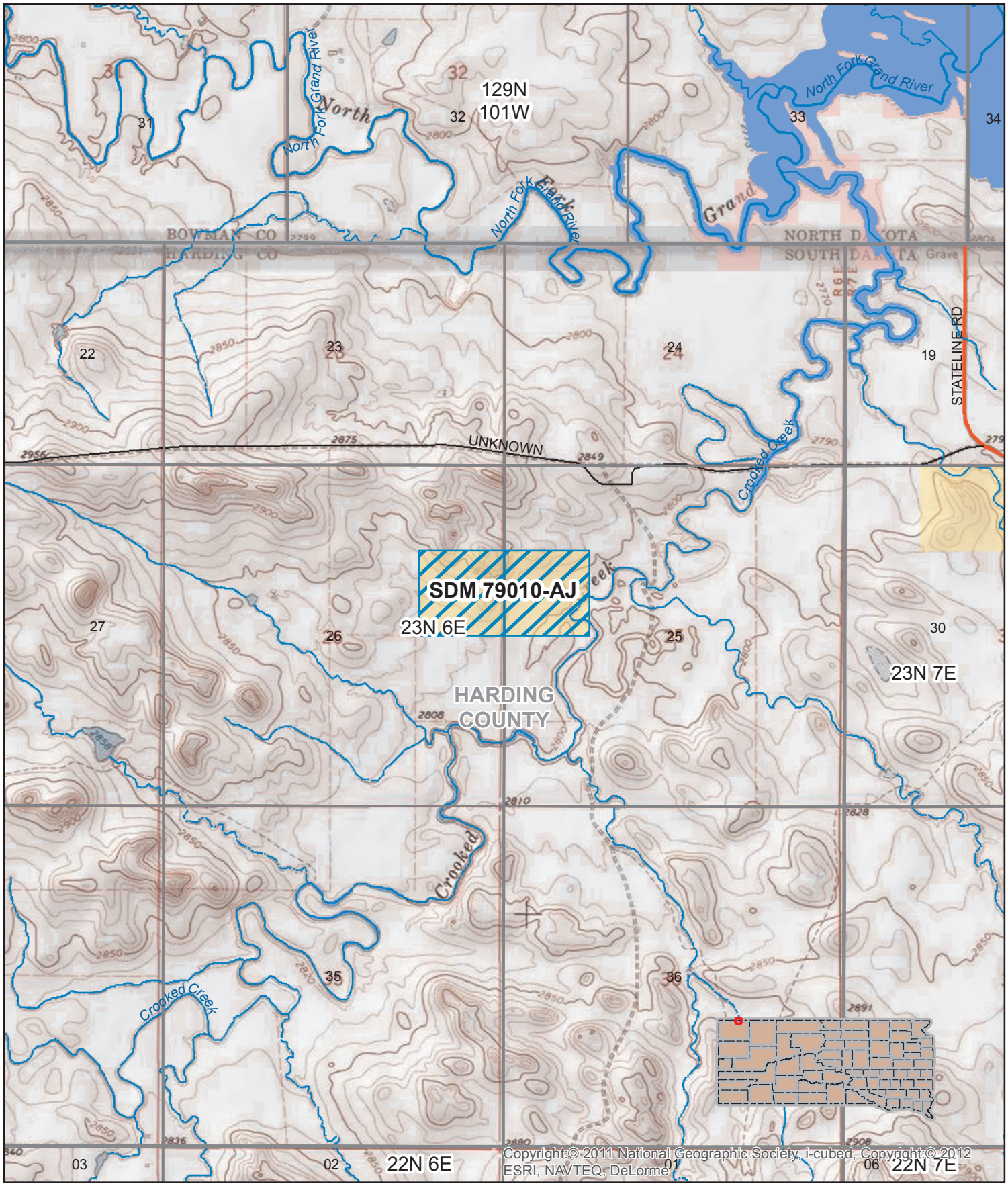
N W E S

CAUTION:
Land ownership data is derived from less accurate data than the 1:24000 scale base map. Therefore, land ownership may not be shown for parcels smaller than 40 acres, and land ownership lines may have plotting errors due to source data.

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

July 15, 2014 Competitive Oil and Gas Lease Sale
EA Parcel in Harding County

December 17, 2013



BLM

DOD/COE

Projected Coordinate System: NAD 1983 Albers
Geographic Coordinate System: GCS North American 1983
Datum: D North American 1983

1:24,000

0 0.0425 0.085 0.17 0.255 0.34 Miles

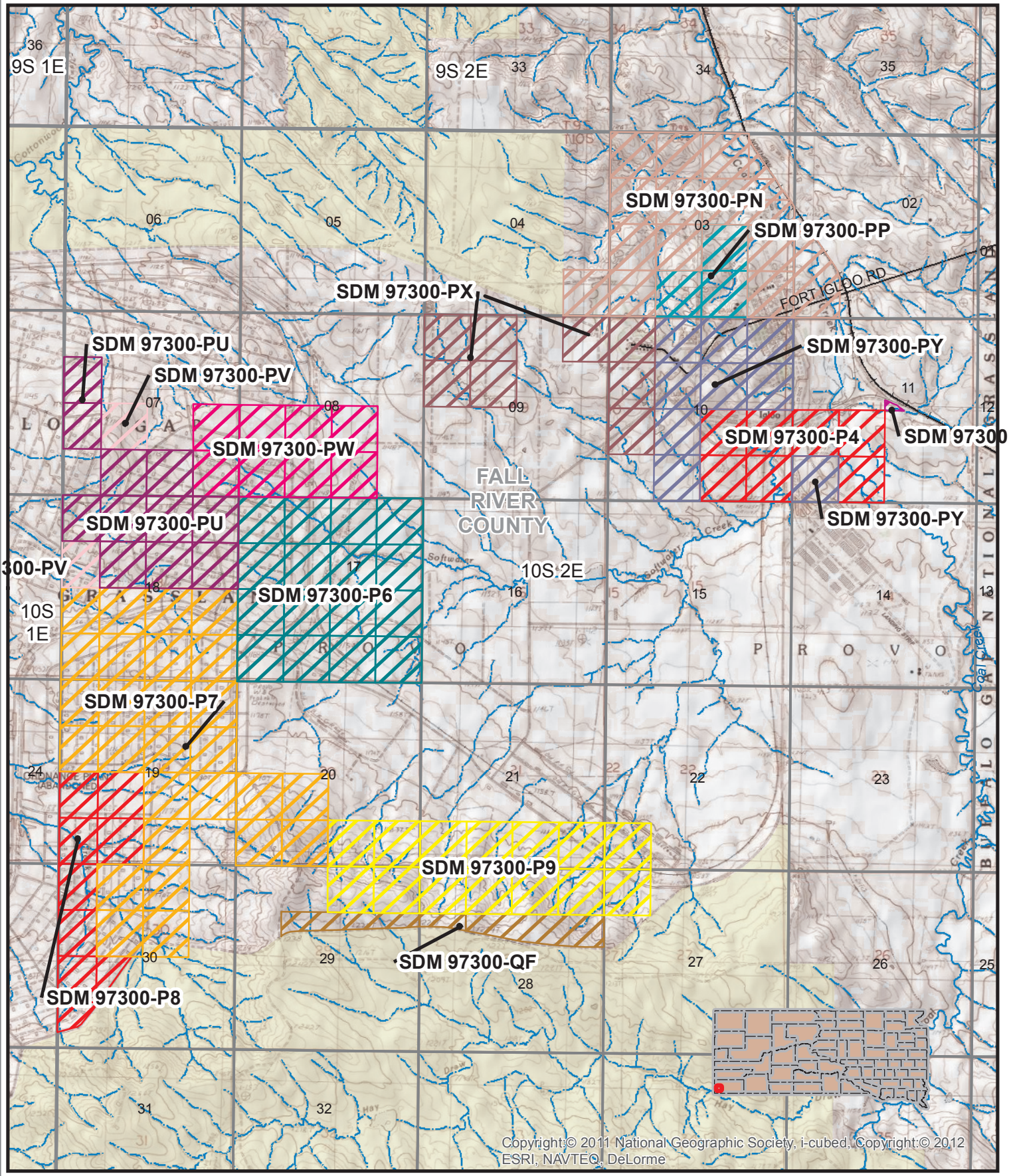
UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOUTH DAKOTA FIELD OFFICE

Data Notes
Land ownership data is derived from tract records extracted from LR2000 state base. Ownership is shown at the section level for tracts shown for periods smaller than 40 acres and land ownership lines may have plotting errors due to source data.

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

July 15, 2014 Competitive Oil and Gas Lease Sale
EA Parcels in Fall River County

December 17, 2013



Projected Coordinate System: NAD 1983 Albers
Geographic Coordinate System: GCS North American 1983
Datum: D North American 1983

1:43,819

0 0.075 0.15 0.3 0.45 0.6 Miles

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOUTH DAKOTA FIELD OFFICE

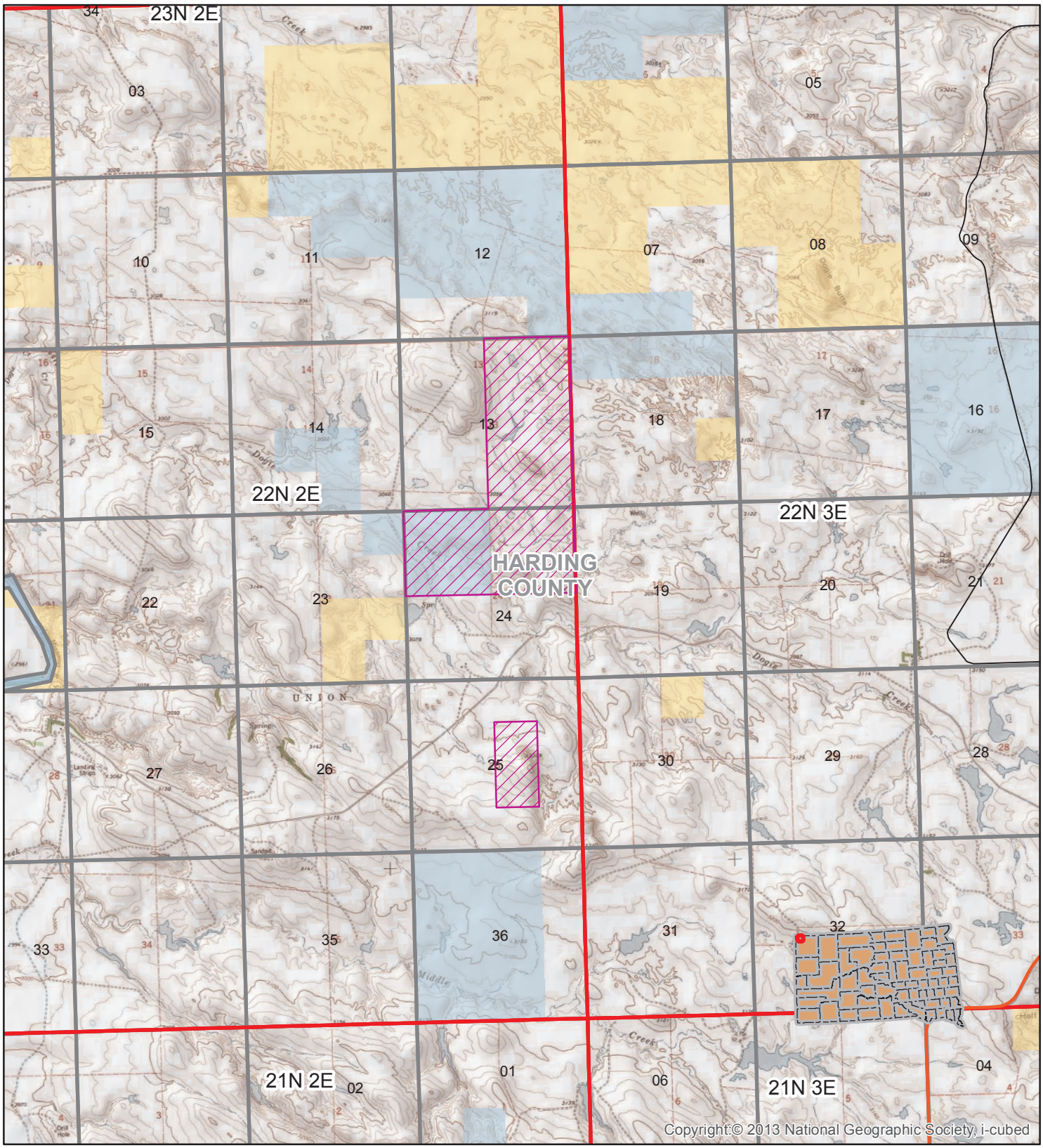
Data Notes
Land ownership data is derived from tract records and from the 1:24000 scale base quadrangle map. Land ownership is shown for parcels smaller than 40 acres and land ownership may have plotting errors due to source data.

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

USFS - NG

Reinstatement of Lease SDM 098206

12/20/2013



SDM 098206

State

BLM

Water

Private

Projected Coordinate System: NAD 1983 Albers
Geographic Coordinate System: GCS North American 1983
Datum: D North American 1983

1:50,000

0 0.125 0.25 0.5 0.75 1 Miles

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOUTH DAKOTA FIELD OFFICE

CAUTION:
Land ownership data is derived from less accurate data than the 1:24000 scale base map. Therefore, land ownership may not be shown for parcels smaller than 40 acres, and land ownership lines may have plotting errors due to source data.

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

N W E S