

**DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
OKLAHOMA FIELD OFFICE**

**Project: April 2011 Competitive Oil and Gas Lease Sale**

**EA Log Number: DOI-BLM-NM-040-2011-007-EA**

**Location: Various Locations in Custer, and Pittsburg County, Oklahoma.**

**Finding of No Significant Impact**

Based on the analysis of potential environmental impacts contained in the attached environmental assessment, I have determined the Preferred Alternative is not expected to have significant impacts on the environment. The impacts of offering fluid minerals leases in the areas described with this EA have been previously analyzed in the 1994 Oklahoma and Texas Resource Management Plan and the lease stipulations that accompany the tracts offered for lease would mitigate the impacts of future development on these tracts. Therefore, preparation of an Environmental Impact Statement is not warranted.

Prepared by:

\_\_\_\_\_ Date:  
Name, Title

Reviewed by:

\_\_\_\_\_ Date:  
Name, Title

Approved by:

\_\_\_\_\_ Date:  
Name, Field Office Manager

**BUREAU OF LAND MANAGEMENT  
OKLAHOMA FIELD OFFICE**

**ENVIRONMENTAL ASSESSMENT FOR  
April 2011 OIL AND GAS LEASE SALE  
DOI-BLM-NM-040-2011-007-EA**

**1.0 Introduction**

It is the policy of the Bureau of Land Management (BLM) as derived from various laws, including the Mineral Leasing Act of 1920 (MLA), as amended [30 U.S.C. 181 *et seq.*], and the Federal Land Policy and Management Act of 1976 (FLPMA), as amended, to make mineral resources available for disposal and to manage for multiple resources which include the development of mineral resources to meet national, regional, and local needs.

The BLM New Mexico State Office conducts a quarterly competitive lease sale to sell available oil and gas lease parcels in New Mexico, Oklahoma, Texas, and Kansas. A Notice of Competitive Lease Sale, which lists lease parcels to be offered at the auction, is published by the BLM State Office at least 90 days before the auction is held. Lease stipulations applicable to each parcel are specified in the Sale Notice. The decision as to which public lands and minerals are open for leasing and what leasing stipulations may be necessary, based on information available at the time, is made during the land use planning process. Surface management of non-BLM administered land overlaying federal minerals is determined by the BLM in consultation with the appropriate surface management agency or the private surface owner.

In the process of preparing a lease sale the BLM State Office sends a draft parcel list to each field office where the parcels are located. Field Office staff then review the legal descriptions of the parcels to determine if they are in areas open to leasing; if appropriate stipulations have been included; if new information has become available which might change any analysis conducted during the planning process; if appropriate consultations have been conducted, and if there are special resource conditions of which potential bidders should be made aware. The parcels nominated for this sale, along with the appropriate stipulations from the RMP, were posted online for a two week public scoping period. Comments received are reviewed and incorporated into the environmental assessment (EA).

Once the draft parcel review is completed and returned to the State Office, a list of available lease parcels and stipulations is made available to the public through a Notice of Competitive Lease Sale (NCLS). On rare occasions, additional information obtained after the publication of the NCLS may result in deferral of certain parcels prior to the lease sale.

The following Environmental Assessment (EA) documents the Oklahoma Field Office review of the four (4) parcels offered in the April 2011 Competitive Oil and Gas Lease Sale that are under the administration of the Oklahoma Field Office. It serves to verify conformance with the approved land use plan, provides the rationale for deferring or dropping parcels from a lease sale, as well as providing rationale for attaching additional lease stipulations to specific parcels.

This EA is made available for public review and comment for 30 days, and comments provided prior to the lease sale will be considered and incorporated below as appropriate

### **1.1 Purpose and Need**

The purpose is to consider opportunities for private individuals or companies to explore for and develop oil and gas resources on public lands through a competitive leasing process.

The need of the action is established by the BLM's responsibility under the MLA, as amended, to promote the exploration and development of oil and gas on the public domain. The MLA also establishes that deposits of oil and gas owned by the United States are to be subject to disposition in the form and manner provided by the MLA under the rules and regulations prescribed by the Secretary of the Interior, where consistent with the FLPMA, the National Environmental Policy Act (NEPA) of 1969, as amended (Public Law 91-90, 42 USC 4321 iet seq.), and other applicable laws, regulations, and policies.

The BLM will decide whether or not to offer nominated parcels for lease and, if so, under what terms and conditions.

### **1.2 Conformance with Applicable Land Use Plan and Other Environmental Assessments**

The applicable land use plan for this action is the 1994 Oklahoma Resource Management Plan (RMP). The RMP designated approximately 1.5 million acres of federal minerals open for continued oil and gas development and leasing under Standard Terms and Conditions. The RMP also describes specific stipulations that would be attached to new leases offered in certain areas. Therefore, it is determined that the action alternatives conform to fluid mineral leasing decisions in the 1994 Oklahoma RMP and are consistent with the goals and objectives for natural and cultural resources.

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this environmental assessment (EA) is tiered to and incorporates by reference the information and analysis contained in the 1994 Oklahoma Resource Management Plan and its Final Environmental Impact Statement. While it is

unknown precisely when, where, or to what extent well sites or roads would be proposed, the analysis of projected surface disturbance impacts, should a lease be developed, is based on potential well densities listed in the Reasonable Foreseeable Development (RFD) Scenario included in the 1994 Oklahoma RMP. While an appropriate level of site-specific analysis of individual wells or roads would occur when a lease holder submits an Application for Permit to Drill (APD), assumptions based on the RFD scenario may be used in the analysis of impacts in this EA.

The Federal Land Policy and Management Act of 1976 (FLPMA) established guidelines to provide for the management, protection, development, and enhancement of public lands (Public Law 94-579). Section 103(e) of FLPMA defines public lands as any lands and interest in lands owned by the U.S. The mineral estate is an interest owned by the U.S. While the BLM has no authority over use of the surface by the surface owner, the BLM is required to declare how the federal mineral estate will be managed in the RMP, including identification of all appropriate lease stipulations. (43 Code of Federal Regulations (CFR) 3101.1 and 43 CFR 1601.0-7(b); BLM Manual Handbook 1601.09 and 1624-1).

### **1.3 Federal, State or Local Permits, Licenses or Other Consultation Requirements**

Purchasers of oil and gas leases are required to obey all applicable federal, state, and local laws and regulations including obtaining all necessary permits required should lease development occur.

Oklahoma Field Office (OFO) biologists reviewed the proposed action and determined it would be in compliance with threatened and endangered species management and consultation guidelines outlined in the biological assessments (BA) Oklahoma RMP BA dated March 4, 1993. No further consultation with the U.S. Fish and Wildlife Service (FWS) is required at this stage for any of the proposed parcels.

Compliance with Section 106 responsibilities of the National Historic Preservation Act are adhered to by following the BLM Manual 8100, 36CFR Part 800, 43CFR Part 7, and the Cultural Resources Handbook H-8100-1 (For New Mexico, Oklahoma, Kansas, and Texas). When draft parcel locations are received by the Oklahoma Field Office, cultural resource staff reviews the location for any known Cultural Resources on BLM records.

Tribal Consultations will not be completed until specific locations for proposed projects are received, reviewed by the State SHPO, the BIA and specific Tribes. When particular Tribes respond during consultation, that tribe will be directly involved in negotiations with the BLM to determine if the project should be moved, or other mitigation will be required.

In Section 1835 of the Energy Policy Act of 2005 (43 U.S.C. 15801), Congress directed the Secretary of the Interior to review current policies and practices with respect to management of federal subsurface oil and gas development activities and their effects on the privately owned surface. The Split Estate Report, submitted in December 2006, documents the findings resulting from consultation on the split estate issue with affected private surface owners, the oil and gas industry, and other interested parties.

The New Mexico State BLM office contacts the surface owners and notifies them of the expression of interest and the date the oil and gas rights would be offered for competitive bidding. The BLM would provide the surface owners with its website address so they may obtain additional information related to the oil and gas leasing process, the imposition of any stipulations on that lease parcel, federal and state regulations, and best management practices. The surface owners may elect to protest the leasing of the minerals underlying their surface.

If the BLM receives a protest, the parcel would remain on the lease sale; however, the BLM would resolve any protest prior to issuing an oil and gas lease for that parcel. If the protest is upheld, the BLM would return the payments received from the successful bidder for that parcel. After the lease sale has occurred, the BLM would post the results on its website and the surface owner may access the website to learn the results of the lease sale.

#### **1.4 Identification of Issues**

An internal review of the Proposed Action was conducted by an interdisciplinary team of Oklahoma Field Office resource specialists on November 6, 2010 to identify and consider potentially affected resources and associated issues. Also during the meeting, the interdisciplinary team developed the Preferred Alternative, presented in section 2.3 below, to address the unresolved conflicts related to the Proposed Action.

The parcels included in the Proposed Action, along with the appropriate stipulations from the RMP, were posted online at [http://www.blm.gov/nm/st/en/prog/energy/oil\\_and\\_gas/oil\\_and\\_gas\\_lease.html](http://www.blm.gov/nm/st/en/prog/energy/oil_and_gas/oil_and_gas_lease.html) for a two week public scoping period beginning December 2 - 16, 2010.

Based on these efforts, the following issues have been determined relevant to the analysis of this action:

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

- *Lessen the impact of atmospheric pollutants and contaminants.*

##### ***Climate***

- *Lessen the impact that development of fossil fuels has on climate change.*

**Cultural Resources**

- *Preservation of known and newly discovered artifacts of cultural and archeological significance.*

**Floodplains**

- *Protection of floodplains by specifying surface disturbance limits to protect the integrity of the floodplains. Use of specific lease stipulations.*

**Invasive Species**

- *Prevention of the spread of non-native species through use of Best Management Practices for surface disturbance according to Executive Order 13112.*

**Threatened and Endangered Species**

- *There are 22 federally listed, and 15 State-listed species that may be located on the proposed lease tracts. Management activities need to be incorporated into leases to preserve these species and their habitat. Use of specific lease stipulations.*

**Hazard Waste**

- *The management of fluid mineral drilling and the hazardous wastes produced and ultimate disposal of those wastes.*

**Water Quality**

- *Control nonpoint-source pollution in accordance with the OKRMP, which emphasizes the improvement of water quality in stream systems. Prevention of excess erosion, sediment transport, and hazardous waste off of drilling sites.*

**Wetland and Riparian Areas**

- *Preservation of wetland and riparian areas by Executive Order 11990, and the use of specific Best Management Practices and specific lease stipulations.*

**Mineral Resources**

- *Locatable minerals management on federal minerals will be addressed, as well as reclamation of those lands.*

**Watersheds**

- *Watershed concerns include prevention of non-point source pollution from oil and gas drilling that impacts rivers and streams.*

**Vegetation**

- *Use of best management practices to reclaim vegetation to original status.*

**Special Status Species**

- *Specify drilling management activities that need to be incorporated into leases to preserve these species and their habitat.*

**Wildlife**

- *Specify drilling management activities that need to be incorporated into leases to lessen impacts on wildlife and their habitat in general.*

Several issues were considered during project scoping but dismissed from detailed analysis because there would be no potentially significant effects related to the issues resulting from any of the alternatives presented below. The following elements are determined by an interdisciplinary team of resource specialists, following their onsite visit and review of the RMP and other data sources, to not be present:

- Areas of Critical Environmental Concern-None identified.
- Caves and Karsts- None identified.
- Environmental Justice- Not relevant at leasing stage.
- Livestock grazing- No public grazing.
- Native American Religious Concerns- Not relevant at leasing stage.
- Prime or Unique Farmlands- None identified.
- Rights of Way- No oversight by BLM, fee surface.
- Recreation- No oversight by BLM, fee surface.
- Public Health- Not relevant at leasing stage.
- Visual Resources- Not applicable on fee surface.
- Wild and Scenic Rivers- None identified.
- Wilderness or Wilderness Study Areas- None identified.
- Wild Horses and Burros- None present.

## **2.0 Alternative A - No Action**

The BLM NEPA Handbook (H-1790-1) states that for Environmental Assessments (EAs) on externally initiated proposed actions, the No Action Alternative generally means the continuation of current management practices and trends.

The No Action alternative would withdraw all lease parcels from the April 2011 lease sale. The parcels would remain available for inclusion in future lease sales. Surface management would remain the same and ongoing oil and gas development would continue on surrounding federal, private, state, and Indian leases.

If the BLM does not lease these Federal minerals, an assumption is that it is not expected that demand would decrease for oil and gas. Demand would likely be addressed through production elsewhere or imports. Due to less stringent environmental regulations in some areas outside of the U.S., it is possible that there would be increased emissions of volatile organic compounds (VOC), air borne dust, and greenhouse gasses (GHGs) during exploration and production operations. In addition, it is anticipated that there would be additional emissions of GHGs during transportation of these commodities to US ports.

It is an assumption that the No Action Alternative (no lease option) may result in a reduction in domestic production of oil and gas. This would likely result in

reduced Federal and State royalty income, and the potential for Federal lands to be drained by wells on adjacent private or state lands.

## 2.1 Alternative B - Proposed Action

The Proposed Action would be to offer for oil and gas leasing three split-estate parcels of federal minerals covering 169.70 acres administered by the Oklahoma Field Office. Standard terms and conditions as well as stipulations listed in the RMP would apply.

A lease notice, WO-ESA-7, would also be attached to each parcel. This notice would notify the lease holder that the BLM reserves discretion to modify, if necessary, any action proposed on the lease to ensure that threatened, endangered, or other special status plants or animals, or their habitats would not be adversely affected. Endangered Species Act, Section 7 consultation with the US Fish and Wildlife Services would occur if development is proposed on a lease containing habitat suitable for these special status species.

Proposed lease parcel number, location, size,, and stipulations and notices are listed Table 2-1.

Table 2-1: Parcels offered under the Proposed Action:

Parcel	Comments	Acres
<u>NM-201104-029</u> T.0150N, R.0140W, IM PM, OK Sec. 005 LOTS 4; Dewey County	<u>Private Surface</u> <u>Lease with the following Stipulations:</u> ORA-1, Floodplain Protection ORA-2, Wetland/Riparian Protection WO-ESA-7, Threatened and Endangered Species	49.7
<u>NM-201104-030</u> T. 0030N, R.0160E, IM PM, OK Sec. 016 SWSW; Pittsburgh County	<u>Private Surface</u> <u>Lease with the following Stipulations:</u> ORA-1, Floodplain Protection ORA-2, Wetland/Riparian Protection WO-ESA-7, Threatened and Endangered Species NM-10, Coal Protection	40
<u>NM-201104-031</u> T. 0030N, R.0160E, IM PM, OK Sec. 021 NWNE; Sec. 021 NWNENE, E2NENW, SWNENW; Pittsburgh County	<u>Private Surface</u> <u>Lease with the following Stipulations:</u> ORA-1, Floodplain Protection ORA-2, Wetland/Riparian Protection WO-ESA-7, Threatened and Endangered Species NM-10, Coal Protection	80

Once sold, the lease purchaser has the exclusive right to use as much of the leased lands as is necessary to explore and drill for all of the oil and gas within the lease boundaries, subject to the stipulations attached to the lease (43 CFR



3101).

Oil and gas leases are issued for a 10-year period and continue for as long thereafter as oil or gas is produced in paying quantities. If a lease holder 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 reverts back to the federal government and the lease can be resold. Four proposed lease tracts have been previously leased.

Drilling of wells on a lease is not permitted until the lease owner or operator meets the site-specific requirements specified in 43 CFR 3162.

In addition, the Proposed Action includes the deferral of parcel NM-2-11104-032 (see Table 2-2) until and administrative determination can be made as to its conformance with the Texas Resource Management Plan.

Table 2-2: Parcel Deferred

Parcel	Comments	Acres
<u>NM-201104-032</u> T.039, R.000, TX PM TX, TR 72; Brazoria County	<b>United States Fish and Wildlife Service-SMA</b> Deferred- Deferred pending an administrative review of its conformance with the Texas Resource Management Plan concerning the tract location within the boundary of the San Bernard National Wildlife Refuge.	608.786

An alternative of offering all parcels with a no surface occupancy (NSO) stipulation was not analyzed in detail because those areas for which NSO was considered appropriate were analyzed in the Oklahoma RMP/EIS.

No other alternatives to the proposed action were identified and considered which would meet the purpose and need of the proposed action.

### 3.0 Description of Affected Environment

This section describes the environment that would be affected by implementation of the alternatives described in Section 2. Aspects of the affected environment described in this section focus on the relevant resources and issues. Only those elements of the affected environment that have potential to be significantly impacted are described in detail.

This section describes the environment that would be affected by implementation of the alternatives described in Section 2. Aspects of the affected environment described in this section focus on the relevant major resources or issues. Certain critical environmental components require analysis under BLM policy. Only those aspects of the affected environment that are potentially impacted are described

in detail.

The three proposed lease parcels are located in Custer, and Pittsburg County, Oklahoma. The individual parcels are described in Table 2-1. Generalized descriptions of the Oklahoma environment are contained in Chapter 3 of the Oklahoma RMP/ROD beginning on page 3-1.

### **3.1 Air Quality**

The Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including seven nationally regulated ambient air pollutants. Regulation of air quality is also delegated to some states. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. Greenhouse Gasses and the potential effects of GHG emissions on climate are not regulated by the EPA, however climate has the potential to influence renewable and non-renewable resource management.

The potential lease tracts are all located in rural areas of Oklahoma. Air quality in these areas is generally good. None of the potential lease tracts are located in any of the areas designated by the Environmental Protection Agency as “non-attainment areas” for any listed pollutants regulated by the Clean Air Act.

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

Greenhouse gases, including carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>), and the potential effects of GHG emissions on climate, are not regulated by the EPA under the Clean Air Act. However, climate has the potential to influence renewable and non-renewable resource management. The EPA’s Inventory of US Greenhouse Gas Emissions and Sinks found that in 2006, total US GHG emissions were over 6 billion metric tons and that total US GHG emissions have increased by 14.1% from 1990 to 2006. The report also noted that GHG emissions fell by 1.5% from 2005 to 2006. This decrease was, in part, attributed to the increased use of natural gas and other alternatives to burning coal in electric power generation.

The levels of these GHGs are expected to continue increasing. The rate of increase is expected to slow as greater awareness of the potential environmental and economic costs associated with increased levels of GHGs result in behavioral and industrial adaptations.

## 3.2 Climate

Oklahoma is located in a temperate region and experiences occasional extremes of temperature and precipitation typical in a continental climate (University of Oklahoma, 2008). Most of the state lies in an area known as Tornado Alley characterized by frequent interaction between cold and warm air masses producing severe weather. - An average 54 tornadoes strike the state per year—one of the highest rates in the world. Because of its position between zones of differing prevailing temperature and winds, weather patterns within the state can vary widely between relatively short distances.

The humid subtropical climate (Koppen *Cfa*) of the eastern part of Oklahoma influenced heavily by southerly winds bringing moisture from the Gulf of Mexico, but transitions progressively to a semi-arid zone (Koppen *BSk*) in the high plains of the Panhandle and other western areas from frequently touched by southern moisture. Precipitation and temperatures fall from east to west accordingly, with areas in the southeast averaging an annual temperature of 62 °F (17 °C) and an annual rainfall of 56 inches (1,420 mm), while areas of the panhandle average 58 °F (14 °C), with an annual rainfall under 17 inches (430 mm). All of the state frequently experiences temperatures above 100 °F (38 °C) or below 0 °F (–18 °C), <sup>[35]</sup> and snowfall ranges from an average of less than 4 inches (10 cm) in the south to just over 20 inches (51 cm) on the border of Colorado in the panhandle.

Table 3.3 summarizes components of climate that could affect air quality in the region.

Climate Component	Temperature
Mean maximum summer temperatures	90.0°F
Mean minimum winter temperatures	32.0°F
Mean annual temperature	62.0°F
Mean annual precipitation	36.0 inches
Mean annual snowfall	12.0 inches
Mean annual wind speed	12.2 mile per hour (mph)

In addition to the air quality information in the RMPs cited above, new information about GHGs and their effects on national and global climate conditions has emerged since the RMPs were prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO<sub>2</sub>) methane (CH<sub>4</sub>); nitrous oxide (N<sub>2</sub>O); water vapor; and several trace gasses on global climate. Through complex interactions on a global scale, GHG emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic

conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming.

Greenhouse gases that are included in the US Greenhouse Gas Inventory are: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). CO<sub>2</sub> and methane (CH<sub>4</sub>) are typically emitted from combustion activities or are directly emitted into the atmosphere. On-going scientific research has identified the potential impacts of greenhouse gas emissions (including CO<sub>2</sub>; CH<sub>4</sub>; nitrous oxide (N<sub>2</sub>O), water vapor; and several trace gasses) on global climate. Through complex interactions on regional and global scales, these greenhouse gas emissions cause a net warming effect of the atmosphere (which makes surface temperatures suitable for life on Earth), primarily by decreasing the amount of heat energy radiated by the Earth back into space. Although greenhouse gas levels have varied for millennia (along with corresponding variations in climatic conditions), recent industrialization and burning of fossil carbon sources have caused CO<sub>2</sub> concentrations to increase dramatically, and are likely to contribute to overall climatic changes, typically referred to as global warming. Increasing CO<sub>2</sub> concentrations also lead to preferential fertilization and growth of specific plant species.

In 2007, the Intergovernmental Panel on Climate Change (IPCC) predicted that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2006) supports these predictions, but has acknowledged that there are uncertainties regarding how climate change may affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures. It is not, however, possible at this time to predict with any certainty the causal connection of site specific emissions from sources to impacts on the global/regional climate relative to the Preferred Alternative and subsequent actions of oil and gas development.

A 2007 US Government Accountability Office (GAO) Report on Climate Change found that, "federal land and water resources are vulnerable to a wide range of effects from climate change, some of which are already occurring. These effects include, among others: 1) physical effects such as droughts, floods, glacial melting, and sea level rise; 2) biological effects, such as increases in insect and disease infestations, shifts in species distribution, and changes in the timing of natural events; and 3) economic and social effects, such as adverse impacts on tourism, infrastructure, fishing, and other resource uses."

A number of activities contribute to the phenomenon of climate change, including emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildfires, activities using combustion engines, changes to the natural carbon cycle, and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs will have a sustained climatic impact over different temporal scales due to their differences in global warming potential (described above) and lifespans in the atmosphere.

### **3.3 Cultural Resources**

Approximately 18,000 archeological sites are recorded in Oklahoma and over 1,000 historic properties in the state are listed on the National Register of Historic Places.

Blanket cultural resource surveys have not been conducted on the proposed lease parcels. Site-specific cultural resource surveys and appropriate mitigation measures are required as part of the APD process after parcels are leased.

### **3.4 Floodplains**

Some or portions of the all of lease tracts are located within floodplains.

### **3.5 Invasive, Non-native Species**

Invasive species are well adapted plants and animals that have been introduced into an area where they don't naturally occur. These new environments don't have the natural constraints needed to keep the invader species in check and the invader species can out-compete the native plants and damage existing ecosystems. Invasive plants like sericea lespedeza and eastern red cedar severely impact open rangelands and forests, while stream banks and sandy floodplains are being invaded by salt cedar. These three plant species are damaging more wildlife habitat and productive landscapes than any other species.

### **3.6 Threatened or Endangered Species**

OFO endangered species specialists also reviewed the locations of the sale parcels and compared them to the best T/E species information currently available and determined that all of the proposed for lease sale contain potential habitat for a listed species. These tracts have been identified in Table 1 (Appendix 1).

Under Section 7 of the Endangered Species Act of 1973 (as amended), the BLM is required to consult with the U.S. Fish and Wildlife Service (FWS) on any proposed action which may affect federally listed threatened or endangered species or species proposed for listing. A detailed listing of threatened and endangered species within Oklahoma may be found on pages 3-11 to 3-13 of the

OKDRMP/EIS.

### **3.7 Wastes, Hazardous or Solid**

The Resource Conservation and Recovery Act (RCRA) of 1976 established a comprehensive program for managing hazardous wastes from the time they are produced until their disposal. U.S. Environmental Protection Agency (EPA) regulations define solid wastes as any “discarded materials” subject to a number of exclusions. On July 6, 1988, EPA determined that oil and gas exploration, development and production wastes would not be regulated as hazardous wastes under RCRA. The Comprehensive Environmental Response Compensation and Liability Act (CERCLA) of 1980, deals with the release (spillage, leaking, dumping, accumulation, etc.), or threat of a release of hazardous substances into the environment. Despite many oil and gas constituent wastes being exempt from hazardous waste regulations, certain RCRA exempt contaminants could be subject to regulations as hazardous substances under CERCLA.

No hazardous or solid waste materials are known to be present on the proposed lease parcels.

### **3.8 Water Quality – Surface/Ground**

Information on water quality conditions in Oklahoma can be found on pages 3-5 through 3-7 of the OKRMP/ROD.

### **3.9 Wetlands /Riparian Zones**

Two of the proposed lease tracts (refer to Table 2 in Appendix 1) contain, or potentially contain, wetlands and/or riparian zones. Additional information on, and discussion of, wetlands and riparian zones appears on pages 3-8 through 3-10 and 4-6 of the OKRMP/ROD.

### **3.10 Mineral Resources**

Oil and gas development began in Oklahoma more than 100 years ago and virtually all of the area with high potential for oil and gas production is under prior existing leases held by production.

Mineral resources of the OFO are described on pages 3-16-3-21 of the OKRMP/ROD.

### **3.11 Paleontology**

All Cultural Resource Surveys for projects in the Oklahoma Field Office area of responsibility are required to include statements on any new paleontological

material discovered during inventory. These reports are reviewed and new fossil material is reported to paleontologists. Protection and preservation of significant fossil materials in specific locations will be required in any BLM permitted projects.

### **3.12 Soils**

The State's varied climate and topography have combined to produce broad differences in state soils. In the eastern part of the states soils have been developed where leaching is intense and conditions are humid. Western soils developed in an area of lesser rainfall. Further discussion of soil resources in Oklahoma may be found on pages 3-8 in the OKRMP/ROD.

### **3.13 Watershed -Hydrology**

A proposed Oklahoma lease tracts fall within the Canadian river basin.

Information on watershed-hydrology units can be found on pages 3-19 to 3-24 of the OKRMP/ROD.

### **3.14 Vegetation**

Proposed lease tracts are located in 3 Oklahoma counties. Pages 3-8 thru-3-11 of the OKRMP/ROD provide further details on vegetation resources in the leasing area.

### **3.15 Special Status Species**

In accordance with BLM Manual 6840, BLM manages certain sensitive species not federally listed as threatened or endangered. Included in this category are state listed endangered species and federal candidate species which receive no special protections under the Endangered Species Act. Special status species (SSS) which occur in Oklahoma are listed on pages 3-11 through 3-13 of the PRMP/FEIS.

### **3.16 Wildlife**

Counties in Oklahoma where the proposed lease tracts occur contain diverse wildlife populations as well as habitats. Generally speaking the eastern one-third of Oklahoma receives ample rainfall and supports the much of the oak, pine and hickory forests. The bulk of the central portion of Oklahoma is within the cross timbers area where the transition begins from eastern deciduous forests to the more arid portions of western Oklahoma. The faunal diversity follows this same transition from cypress swamps and alligators in the southeast tip of the state to piñon-juniper and mule deer in the furthest western portion of the Oklahoma panhandle. Regional information on wildlife and their habitats in Oklahoma is

contained on pages 3-8 to 3-10 of the OKRMP/ROD.

## **4.0 Environmental Consequences and Potential Mitigation Measures**

### **4.1 Assumptions for Analysis**

The act of leasing parcels would, by itself, have no impact on any resources in the RFO. All impacts would be linked to as yet undetermined future levels of lease development.

If lease parcels were developed, short-term impacts would be stabilized or mitigated within 5 years and long-term impacts are those that would substantially remain for more than 5 years. Potential impacts and mitigation measures are described below.

Cumulative impacts include the combined effect of past projects, specific planned projects and other reasonably foreseeable future actions such as other infield wells being located within these leases. Potential cumulative effects may occur should an oil and gas field be discovered if these parcels are drilled and other infield wells are drilled within these leases or if these leases become part of a new unit. All actions, not just oil and gas development may occur in the area, including foreseeable non-federal actions.

### **4.2 Effects from the No Action Alternative**

Under the No Action Alternative, the proposed parcels would not be leased. There would be no subsequent impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas. The No Action Alternative is also used as the baseline for comparison of alternatives.

It is an assumption that the No Action Alternative (no lease option) may result in a slight reduction in domestic production of oil and gas. This would likely result in reduced Federal and State royalty income, and the potential for Federal lands to be drained by wells on adjacent private or state lands. Consumption is driven by a variety of complex interacting factors including energy costs, energy efficiency, availability of other energy sources, economics, demography, and weather or climate. If the BLM were to forego leasing and potential development of those minerals, the assumption is that the public's demand for the resource would not be expected to change. Instead, the undeveloped resource would be replaced in the short- and long-term by other sources that may include a combination of imports, using alternative energy sources (e.g. wind, solar), and other domestic production. This displacement of supply would offset any reductions in emissions achieved by not leasing the subject tracts in the short-term.



### **4.3 Analysis of the Action Alternative**

The act of leasing parcels would, by itself, have no impact on any resources in the OFO. The environmental consequences of oil and gas leasing in Oklahoma are analyzed in the OKRMP/ROD (pages 4-1 to 4-29). That analysis, which assumes that the impacts from an average well, pipeline and access road would total 4.25 acres of surface disturbance in Oklahoma is incorporated by reference into this document. All impacts would be tied to as yet undetermined future levels of lease development.

Short-term impacts are those which can be stabilized or mitigated rapidly (within 5 years). Long-term impacts are those that would substantially remain for more than 5 years.

#### **4.3.1 Air Quality Impacts from the Action Alternative**

Leasing the subject tracts would have no direct impacts to air quality. Any potential effects to air quality from sale of lease parcels would occur at such time that the leases were developed. Potential impacts of development could include increased air borne soil particles blown from new well pads or roads, exhaust emissions from drilling equipment, compressors, vehicles, and dehydration and separation facilities and volatile organic compounds during drilling or potential leaks.

The reasonable and foreseeable development scenario developed for the EIS's of the OKRMP/ROD assumed 20 wells would be drilled annually in each state on federal lands. However, it is unknown whether the petroleum resources specific to these leases in the Proposed Action are gas or oil or a combination thereof, as well as the actual potential for those resources. In addition, oil wells are on a tighter spacing than gas wells, therefore the specific number of wells that would be drilled as a result of issuing the leases is unknown. Current APD permitting trends within the field office confirm that these assumptions are still accurate.

Therefore, in order to reasonably quantify emissions associated with well exploration and production activities, certain types of information are needed. Such information includes a combination of activity data such as the types of equipment needed if a well were to be completed successfully (e.g. compressor, separator, dehydrator), the technologies which may be employed by a given company for drilling any new wells, area of disturbance for each type of activity (e.g. roads, pads, electric lines, compressor station), number of days to complete each kind of construction, number of days for each phase of drilling process, type(s), size, number of heavy equipment used for each type of construction (backhoe, dozer, etc.), number of wells of all types (shallow, deep, exploratory, etc.), compression per well (sales, field booster), or average horsepower for each type of compressor. The degree of impact will also vary according to the

characteristics of the geologic formations from which production occurs. Since this type of data is unavailable at this time, including scenarios for oil and gas development, it is unreasonable to quantify emissions. What can be said is that exploration and production would contribute to incremental increases in overall air quality emissions associated with oil and gas exploration and production into the atmosphere.

Leasing the subject tracts would have no direct impacts to air quality. Any potential effects to air quality from sale of lease parcels would occur at such time that the leases were developed.

Potential impacts of development could include increased air borne soil particles blown from new well pads or roads, exhaust emissions from drilling equipment, compressors, vehicles, and dehydration and separation facilities, and volatile organic compounds during drilling or potential leaks.

The reasonable and foreseeable development scenario developed for the EIS's of the OKRMP/ROD assumed 20 wells would be drilled in Oklahoma on federal lands. However, it is unknown whether the petroleum resources specific to these leases in the Proposed Action are gas or oil or a combination thereof, as well as the actual potential for those resources. In addition, oil wells are on a tighter spacing than gas wells, therefore the specific number of wells that would be drilled as a result of issuing the leases is unknown.

Therefore, in order to reasonably quantify emissions associated with well exploration and production activities, certain types of information are needed. Such information includes a combination of activity data such as the types of equipment needed if a well were to be completed successfully (e.g. compressor, separator, dehydrator), the technologies which may be employed by a given company for drilling any new wells, area of disturbance for each type of activity (e.g. roads, pads, electric lines, compressor station), number of days to complete each kind of construction, number of days for each phase of drilling process, type(s), size, number of heavy equipment used for each type of construction (backhoe, dozer, etc.), number of wells of all types (shallow, deep, exploratory, etc.), compression per well (sales, field booster), or average horsepower for each type of compressor. The degree of impact will also vary according to the characteristics of the geologic formations from which production occurs. Since this type of data is unavailable at this time, including scenarios for oil and gas development, it is unreasonable to quantify emissions. What can be said is that exploration and production would contribute to incremental increases in overall air quality emissions associated with oil and gas exploration and production into the atmosphere.

## **Mitigation**

The BLM encourages industry to incorporate and implement “Best Management Practices” (BMPs), which are designed to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. Typical measures include: adherence to BLM’s Notice to Lessees’ (NTL) 4(a) concerning the venting and flaring of gas on Federal leases; for natural gas emissions that cannot be economically recovered, flare hydrocarbon gases at high temperatures in order to reduce emissions of incomplete combustion; water dirt roads during periods of high use in order to reduce fugitive dust emissions; collocate wells and production facilities to reduce new surface disturbance; implementation of directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores; require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; and 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.

The EPA data shows that improved practices and technology, and changing economics have reduced emissions from oil and gas exploration and development. One of the factors in this improvement is the adoption, by industry of the Best Management Practices proposed by the EPA’s Natural Gas Energy Star program. The OFO will work with industry to facilitate the use of the relevant BMP’s for operations proposed on federal mineral leases where such mitigation is consistent with agency policy.

### **4.3.2 Climate**

The assessment of GHG emissions, their relationship to global climatic patterns, and the resulting impacts is an ongoing scientific process. It is currently not feasible to know with certainty the net impacts from the proposed action on climate—that is, while BLM actions may contribute to the climate change phenomenon, the specific effects of those actions on global climate are speculative given the current state of the science. The BLM does not have the ability to associate a BLM action’s contribution to climate change with impacts in any particular area. The technology to be able to do so is not yet available. 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 and determining the significance of any discrete amount of GHG emissions is beyond the limits of existing science. When further information on the impacts to climate change is known, such information would be incorporated into the BLM’s planning and NEPA documents as appropriate.

Leasing the subject tracts would have no direct impacts on climate as a result of

GHG emissions. There is an assumption, however, that leasing the parcels would lead to some type of development that would have indirect effects on global climate through GHG emissions. However, those effects on global climate change cannot be determined. (Refer to the cumulative effects section, Chapter 4 for additional information.) It is unknown whether the petroleum resources specific to these leases in the Proposed Action are gas or oil or a combination thereof.

Potential impacts of development could include increased air borne 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 GHG and volatile organic compounds during drilling or potential leaks. The amount of increased emissions cannot be quantified at this time since it is unknown how many wells might be drilled, the types of equipment needed in the case a well were to be completed successfully (compressor, separator, dehydrator, etc.), or what technologies may be employed by the companies drilling any new wells. The degree of impact will also vary according to the characteristics of the geologic formations from which production occurs.

The reasonable and foreseeable development scenario developed for the EIS for the Texas RMP assumed 20 wells would be drilled annually on federal lands in the state. Current APD permitting trends within the field office confirm that these assumptions are still accurate. This level of exploration and production would contribute a small incremental increase in overall hydrocarbon emissions, including GHG's, released into the planet's atmosphere. When compared to total national or global emissions the amount released as a result of potential production from the proposed lease tracts would not have a measurable effect on climate change due to uncertainty and incomplete and unavailable information.

Consumption of oil and gas developed from the proposed lease parcels is expected to produce GHGs. Consumption is driven by a variety of complex interacting factors including energy costs, energy efficiency, availability of other energy sources, economics, demography, and weather or climate. If the BLM were to forego its leasing decisions and potential development of those minerals, the public's demand for the resource would not be expected to change, instead the resource foregone would be replaced by other sources that may include a combination of imports, fuel switching, and other domestic production. This displacement of supply would offset any reductions in emissions achieved by not leasing the subject tracts.

Environmental impacts of GHG emissions from oil and gas consumption are not effects of the proposed action as defined by the Council on Environmental Quality, and thus are not required to be analyzed under NEPA. Greenhouse gas emissions from consumption of oil and gas are not direct effects under NEPA because they do not occur at the same time and place as the action. They are also not indirect effects because oil and gas leasing and production would not be

a proximate cause of greenhouse gas emissions resulting from consumption.

The assessment of greenhouse gas emissions and climate change is in its formative phase; therefore, it is not yet possible to know with confidence the net impacts to climate of global emissions. 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. The Department of the Interior is exploring whether global and regional climate modeling can be scaled to the point that it can be used to manage parks and refuges (GAO-07-863, 2007). When further information on the impacts to climate change is known, such information would be incorporated into the BLM's planning and NEPA documents as appropriate.

The assessment of greenhouse gas emissions and climate change is in its formative phase; therefore, it is not yet possible to know with confidence the net impacts to climate of global emissions. 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. The Department of the Interior is exploring whether global and regional climate modeling can be scaled to the point that it can be used to manage parks and refuges (GAO-07-863, 2007). When further information on the impacts to climate change is known, such information would be incorporated into the BLM's planning and NEPA documents as appropriate.

## **Mitigation**

The EPA's inventory data describes "Natural Gas Systems" and "Petroleum Systems" as the two major categories of total US sources of GHG gas emissions. The inventory identifies the contributions of natural gas and petroleum systems to total CO<sub>2</sub> and CH<sub>4</sub> emissions (natural gas and petroleum systems do not produce noteworthy amounts of any of the other greenhouse gases). Within the larger category of "Natural Gas Systems", the EPA identifies emissions occurring during distinct stages of operation, including field production, processing, transmission and storage, and distribution. "Petroleum Systems" sub-activities include production field operations, crude oil transportation and crude oil refining. Within the two categories, the BLM has authority to regulate only those field production operations that are related to oil and gas measurement, and prevention of waste (via leaks, spills and unauthorized flaring and venting).

The EPA data shows that improved practices and technology, and changing economics have reduced emissions from oil and gas exploration and development (Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006). One of the factors in this improvement is the adoption, by industry of the Best Management Practices proposed by the EPA's Natural Gas Energy Star

program. The OFO will work with industry to facilitate the use of the relevant BMP's for operations proposed on federal mineral leases where such mitigation is consistent with agency policy.

#### **4.3.3 Cultural Resources**

See attached Cultural Resource Clearance

Direct and indirect effects cannot be predicted without analysis of site-specific development proposals. These proposals would occur at the APD stage of development. Potential impacts at that stage could include increased human activity and possibility of removal of, or damage to, heritage artifacts. The increase in human activity in the area increases the possibility of irretrievable loss of information pertaining to the heritage of the project region. Conversely, the benefits to heritage resources derived from the future development are the heritage and historic survey that adds to literature, information, and knowledge of cultural resources.

#### **Mitigation**

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

#### **4.3.4 Floodplains**

The act of leasing Federal minerals produces no impacts to floodplains. However, the subsequent development may produce impacts in the form of surface disturbance. Surface disturbance from the development of well pads, access roads, pipelines, and powerlines can result in impairment of the floodplain values from removal of vegetation, removal of wildlife habitat, impairment of water quality, decreased flood water retention and decreased groundwater recharge.

#### **Mitigation**

Protective stipulation ORA-1 would be attached to any lease of a tract which falls within a floodplain. ORA-1 states that, "All or portions of the lands under this lease lie in and or adjacent to a major watercourse and are subject to periodic flooding. Surface occupancy of these areas will not be allowed without the specific approval, in writing, of the Bureau of Land Management." This stipulation would be attached to portions of parcels listed in Table 2-1 for the purpose of protecting streams, rivers and floodplains, and specify that surface disturbance would not be allowed within up to 200 meters of the outer edge of 100-year floodplains to protect the integrity of those floodplains.

#### **4.3.5 Invasive, Non-native Species**

Any surface disturbance can increase the possibility of establishment of new populations of invasive non-native species. The likelihood of this happening cannot be predicted with existing information. At the APD stage, BLM requirements for use of weed control strategies would minimize the potential for spread of these species.

##### **Mitigation**

Mitigation is deferred to site-specific development at APD stage. Best management practices require that all actions on public lands that involve surface disturbance or rehabilitation, reasonable steps are required to prevent the introduction or spread of noxious weeds, including requirements for using weed seed-free hay, mulch and straw.

#### **4.3.6 Threatened or Endangered Species**

Leasing the tracts would have no direct impacts to Threatened or Endangered Species. If the lease results in development, approximately 4.25 acres of existing vegetation would be removed by drill pad, pipeline, and access road construction. There would be a long-term change in plant and animal species composition and altered utilization of the site and surrounding area by wildlife. Site-specific biological resource surveys would be required at the project stage and, depending on location and nature of the proposed development and the results of surveys, additional Section 7 consultation could be required.

Furthermore, the lease notice (WO-ESA-7) would be attached to any leases in counties containing suitable habitat for Threatened or Endangered (T/E) species. If any surface disturbing actions are proposed as a result of this proposed lease a biological evaluation shall be conducted and site-specific mitigating measures would be developed.

##### **Mitigation**

Mitigation is deferred to site-specific development at APD stage. Best management practices will be required if any threatened or endangered species are found.

#### **4.3.7 Water Quality: Surface and Groundwater**

While the act of leasing a parcel would produce no impacts, subsequent development of the lease would lead to surface disturbance from the construction of well pads, access roads, pipelines, and powerlines which can result in degradation of surface water quality and groundwater quality from non-point source pollution, increased soil losses, and increased gully erosion.

Potential direct impacts that would occur due to construction of well pads, access roads, pipelines, and powerlines include increased surface water runoff and off-site sedimentation brought about by soil disturbance; increased salt loading and water quality impairment of surface waters; channel morphology changes due to road and pipeline crossings; and possible contamination of surface waters by produced water. The magnitude of these impacts to water resources would depend on the proximity of the disturbance to the drainage channel, slope aspect and gradient, degree and area of soil disturbance, soil character, duration and time within which construction activity would occur, and the timely implementation and success or failure of mitigation measures.

Direct impacts would likely be greatest shortly after the start of construction activities and would likely decrease in time due to natural stabilization, and reclamation efforts. Construction activities would occur over a relatively short period; therefore, the majority of the disturbance would be intense but short lived. Direct impacts to surface water quality would be minor, short-term impacts which may occur during storm flow events. Indirect impacts to water-quality related resources, such as fisheries, would not occur.

Petroleum products and other chemicals, accidentally spilled, could result in surface and groundwater contamination. Similarly, possible leaks from reserve and evaporation pits could degrade surface and ground water quality. Authorization of the proposed projects would require full compliance with BLM directives and stipulations that relate to surface and groundwater protection.

## **Mitigation**

The use of a plastic-lined reserve pits would reduce or eliminate seepage of drilling fluid into the soil and eventually reaching groundwater. Spills or produced fluids (e.g., saltwater, oil, and/or condensate in the event of a breach, overflow, or spill from storage tanks) could result in contamination of the soils onsite, or offsite, and may potentially impact surface and groundwater resources in the long term. The casing and cementing requirements imposed on proposed wells would reduce or eliminate the potential for groundwater contamination from drilling muds and other surface sources.

### **4.3.8 Wetlands/Riparian Zones**

Three potential lease tracts contain wetlands or potential wetlands. Leasing the proposed tracts will result in no direct impacts to wetlands. Potential indirect results may occur if wells incorporating these Federal minerals are drilled as a result of this lease.



## **Mitigation**

Protective stipulation ORA-2 would be attached to the leases since they contain wetlands and or riparian zones. ORA-2 states that, "All or portions of the lands under this lease contain wetlands and or riparian zones. Surface occupancy of these areas will not be allowed without the specific approval, in writing, of the Bureau of Land Management. Impacts or disturbance to wetlands and riparian habitats which occur on this lease must be avoided or mitigated. The mitigation shall be developed during the application to drill process."

### **4.3.9 Mineral Resources**

If the proposed leases result in wells those wells have the potential to affect production horizons and reservoir pressures. If the wells are producers the resources allotted to these wells will eventually be depleted. The amount and location of direct and indirect effects cannot be predicted until the site-specific APD stage of development. None of the lease parcels appear to present any conflict with the development of other mineral resources such as coal or sand and gravel.

## **Mitigation**

Potential mitigation is deferred to the site-specific APD stage of development. Spacing orders and allowable production orders are designed to conserve the oil and/or gas resource and provide maximum recovery.

### **4.3.10 Paleontology**

Direct and indirect effects cannot be predicted without analysis of site-specific development proposals. These proposals would occur at the APD stage of development. Potential impacts at that stage could include increased human activity and possibility of removal of, or damage to, paleontology resources. The increase in human activity in the area increases the possibility of irretrievable loss of information pertaining to the paleontology of the project region. Conversely, a benefit to paleontology resources could occur if potential future development results in a paleontology survey that adds to literature, information, and knowledge of paleontology resources.

## **Mitigation**

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

#### **4.3.11 Soils**

While the act of leasing a tract would produce no impacts, subsequent development of the lease would physically disturb the topsoil and would expose the substratum soil on subsequent project areas. Direct impacts resulting from the oil and gas construction of well pads, access roads, and reserve pits include removal of vegetation, exposure of the soil, mixing of horizons, compaction, loss of top soil productivity and susceptibility to wind and water erosion. Wind erosion would be expected to be a minor contributor to soil erosion with the possible exception of dust from vehicle traffic. These impacts could result in increased indirect impacts such as runoff, erosion and off-site sedimentation. Activities that could cause these types of indirect impacts include construction and operation of well sites, access roads, gas pipelines and facilities.

Contamination of soil from drilling and production wastes mixed into soil or spilled on the soil surfaces could cause a long-term reduction in site productivity. Some of these direct impacts can be reduced or avoided through proper design, construction and maintenance and implementation of best management practices.

Additional soil impacts associated with lease development would occur when heavy precipitation causes water erosion damage. When water saturated segment(s) on the access road become impassable, vehicles may still be driven over the road. Consequently, deep tire ruts would develop. Where impassable segments are created from deep rutting, unauthorized driving may occur outside the designated route of access roads.

#### **Mitigation**

The operator would stockpile the topsoil from the surface of well pads which would be used for surface reclamation of the well pads. The impact to the soil would be remedied upon reclamation of well pads when the stockpiled soil that was specifically conserved to establish a seed bed is spread over well pads and vegetation re-establishes.

Reserve pits would be re-contoured and reseeded as described in attached Conditions of Approval. Upon abandonment of wells and/or when access roads are no longer in service the Authorized Officer would issue instructions and/or orders for surface reclamation/restoration of the disturbed areas as described in attached Conditions of Approval.

Road constructions requirements and regular maintenance would alleviate potential impacts to access roads from water erosion damage.

#### **4.3.12 Watershed Protection**

As with soils, the amount and location of direct and indirect effects cannot be predicted until the site-specific APD stage of development. If wells are drilled as a result of the proposed leases, site construction (pad, pipeline and road) will remove vegetation and compact approximately 4.25 acres in Oklahoma. This will increase the potential for sheet erosion and could decrease the permeability of compacted areas.

##### **Mitigation**

Best Management Practices would be incorporated into Special Conditions of Approval attached to a permit to drill. These typically include: Six inches of top soil from the proposed location shall be stock piled and be available for reshaping during the restoration process. No cut and/or fill shall take place outside of the staked surveyed area. Stockpiled soil shall be protected from wind and water erosion through prompt establishment and maintenance of an effective, quick growing vegetative cover.

#### **4.3.13 Vegetation**

Leasing would have no direct affect on vegetation or forestry. If oil and/or gas development occurs as a result of leasing, site clearing would remove vegetation from approximately 4.25 acres used as drill pad, access road and pipeline construction for each well drilled.

##### **Mitigation**

If potential wells are productive disturbed areas not needed for the production facility will be reclaimed resulting in approximately 2 acres impacted for the life of each well. In the case of non-productive wells all disturbed areas shall be reseeded and vegetative cover reestablished. Vegetation would be established on all areas of the location to be reclaimed. This phase of the reclamation process should be accomplished by using seed or sod. Current policy recommends that these areas be restored with native vegetation in regards to both species and structure. This recommended reclamation is contingent upon the wishes of the surface owner.

#### **4.3.14 Special Status Species**

No direct or indirect effects are expected based on existing information. Further site-specific inventories would be conducted, if necessary, at the project (APD) stage to determine if additional analysis would be required.

##### **Mitigation**

Potential mitigation is deferred to the site-specific APD stage of development.

#### **4.3.15 Wildlife**

Leasing the tracts will have no direct impacts to wildlife. If the lease results in development, approximately 4.25 acres in Oklahoma of existing vegetation would be removed by drill pad, pipeline, and access road construction. The proposed action would result in long-term change in plant and animal species composition and altered utilization of the site and surrounding area by wildlife.

#### **Mitigation**

Wildlife impacts are deferred to the site-specific APD stage of development.

#### **4.4 Cumulative Effects**

Analysis of cumulative impacts for reasonably foreseeable development of oil and gas wells on public lands Oklahoma was presented in the OKRMP/EIS (pages 4-1 to 4-5). Potential development of all available federal minerals in Oklahoma including those in the proposed lease parcels was included as part of the analysis. Total surface disturbance projected by the plans was based on an estimated 20 federal wells being drilled annually in Oklahoma. The estimated 20 federal wells in Oklahoma were projected to disturb approximately 85 acres. Over the last 10 years there have been no changes to the basic assumptions or projections described in the OKRMP/EIS analysis.

More than 100 years of oil and gas development in Oklahoma have resulted in an extensive infrastructure of existing roads and pipelines. The extent of this development is illustrated by the following statistics. Oklahoma Corporation records show that 432,868 wells have been drilled in Oklahoma from 1904 to 2006. Impacts from this development will remain on the landscape until final abandonment and reclamation of facilities occurs as wells are plugged when they are no longer economically viable.

##### **4.4.1 Climate Change**

This section incorporates an analysis of the contributions of the proposed action to GHG emissions and a general discussion of potential impacts to climate. The EPA's Inventory of US Greenhouse Gas Emissions and Sinks found that in 2007, total U.S. GHG emissions were over 7 billion metric tons and that total U.S. GHG emissions have increased by 17% from 1990 to 2007. Emissions increased from 2006 to 2007 by 1.4 percent (99.0 Tg. CO<sub>2</sub>e). The following factors were primary contributors to this increase: (1) cooler winter and warmer summer conditions in 2007 than in 2006 increased the demand for heating fuels and contributed to the increase in the demand for electricity, (2) increased consumption of fossil fuels to generate electricity and (3) a significant decrease (14.2 percent) in hydropower generation used to meet this demand (EPA 2009).

On-going scientific research has identified the potential effects of anthropogenic GHG emissions such as carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and several trace gasses; changes in biological carbon sequestration; and other changes due to land management activities on global climate. Through complex interactions on a global scale, GHG emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although natural GHG atmospheric concentration levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase.

Analysis of cumulative impacts for reasonably foreseeable development (RFD) of oil and gas wells on public lands in the Farmington Field Office was presented in the 2003 Resource Management Plan (RMP). Potential development of all available federal minerals in the field office, including those in the proposed lease parcels, was included as part of the analysis.

This incremental contribution to global GHG gases cannot be translated into effects on climate change globally or in the area of this site-specific action. As oil and gas production technology continues to improve, and because of the potential development of future regulation or legislation, one assumption is that reductions in the rate or total quantity of GHG emissions associated with oil and gas production are likely. As stated in the direct/indirect effects section under climate change, the assessment of GHG emissions and the resulting impacts on climate is an ongoing scientific process. It is currently not feasible to know with certainty the net impacts from the proposed action on global or regional climate—that is, while BLM actions may contribute to the climate change phenomenon, the specific effects of those actions on global climate are speculative given the current state of the science. Therefore, the BLM does not have the ability to associate an action's contribution in a localized area to impacts on global climate change. Further, an IPCC assessment states that difficulties remain in attributing observed temperature changes at smaller than continental scales. It is currently beyond the scope of existing science to predict climate change on regional or local scales resulting from specific sources of GHG emissions.

Currently, global climate models are inadequate to forecast local or regional effects on resources (USFS, 2008). However, there are general projections regarding potential impacts to natural resources and plant and animal species that may be attributed to climate change from GHG emissions over time; however these effects are likely to be varied, including those in the southwestern United States. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils. Cool season plant species' spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened/endangered plants may be accelerated. Due to loss of habitat or competition from other species whose ranges may shift

northward, the population of some animal species may be reduced or increased. Less snow at lower elevations would likely impact the timing and quantity of snowmelt, which, in turn, could impact water resources and species dependant on historic water conditions (USFS, March 2008).

The absence of a regulatory requirement to measure GHG emissions and the variability of oil and gas activities on federal minerals in Oklahoma prevent accurate quantification of GHG emissions that might occur as a result of making the proposed tracts available for leasing. We can however make some generalizations: leasing the proposed tracts may contribute to ongoing drilling of an average of 20 wells a year on federal leases in the states of Oklahoma.. A total of 2427 wells were drilled in Oklahoma in 2006. This total, when compared to the estimates used for the cumulative analysis previously referenced, shows that wells drilled on federal leases wells may be expected to produce approx. 0.002 % of the GHG emissions produced from wells drilled in Oklahoma. The amount of GHG emissions are small, incremental contributions to the total emissions from the 3 state area, and are also insignificant when compared to global GHG emission levels. These small incremental contributions to global GHG gases cannot be translated into incremental effects on climate change globally or in the area of this site-specific action (see 1508.27a). The total amount of GHG emissions from oil and gas activities is expected to continue decreasing as improved technology and changing economics result in more complete control of GHG emissions at all stages of oil and natural gas systems.

## **5.0 Consultation/Coordination**

This section includes individual comments received from the public and the resource specialists located within the Oklahoma Field office that participated in the development of this document.

**Table 5.1 Summary of Contacts Made During Preparation of Document and Interdisciplinary Team**

<b>ID Team Member</b>	<b>Title</b>	<b>Organization</b>
Richard Fields	Archaeologist	BLM
Larry Levesque	Wildlife Biologist	BLM
Lisa Fretz	Realty Specialist	BLM
Galen Schwertfeger	Environmental Protection	BLM
Kurt Preston	Geologist	BLM

## **5.1 Public Involvement**

The parcels nominated for this sale, along with the appropriate stipulations from the RMP, were posted online for a two week review period. No comments were received.

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