

# U.S. Department of the Interior

---

## Bureau of Land Management

---

Environmental Assessment  
DOI-BLM-NM-040-2015-61-EA  
October 2015

---

### April 2016 Competitive Oil and Gas Lease Sale

*Beaver, Creek, Dewey, Roger Mills, and Major Counties, Oklahoma;  
Cheyenne, Lane, Logan and Sherman Counties, Kansas; and Denton, Burleson,  
Houston, Live Oak, McMullen, Trinity, and Washington Counties, Texas*

---

U.S. Department of the Interior

Bureau of Land Management

Oklahoma Field Office

7906 E. 33<sup>rd</sup> Street

Tulsa, Oklahoma 74145

Phone: 918.621.4100

Fax: 918.621.4130



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

**Project:** April 2016 Competitive Oil and Gas Lease Sale  
**EA Log Number:** DOI-BLM-NM-040-2015-061-EA  
**Location:** Beaver, Creek, Dewey, Roger Mills, and Major Counties, Oklahoma; Cheyenne, Lane, Logan and Sherman Counties, Kansas; and Denton, Burleson, Houston, Live Oak, McMullen, Trinity, and Washington Counties, Texas

**Finding of No Significant Impact**

---

Based on the analysis of potential environmental impacts contained in the attached Environmental Assessment (EA), I have determined the Proposed Action Alternative is not expected to have significant impacts on the environment.

The impacts of leasing the fluid minerals estate in the areas described within this EA have been previously analyzed in the Oklahoma Resources Management Plan (RMP) (1994), as amended; and the Texas RMP (1996), as amended; and the Kansas RMP (1991) and the lease stipulations that accompany the tracts proposed for leasing would mitigate the impacts of future development on these tracts. Therefore, preparation of an Environmental Impact Statement (EIS) is not warranted.

Prepared by:

---

Jackie Badley, Natural Resource Specialist

---

Date

Reviewed by:

---

Stephen G. Tryon, Oklahoma Field Office Manager

---

Date

Approved by:

---

Amy Lueders, State Director

---

Date

## 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 of 1976 (FLPMA), as amended, to make mineral resources available for leasing, development, 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 (NMSO) conducts a quarterly competitive lease sale to offer available oil and gas lease parcels in New Mexico, Oklahoma, Texas, and Kansas. A Notice of Competitive Lease Sale (NCLS), which lists lease parcels to be offered at the auction, is published by the NMSO 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 land and minerals are open for leasing and what leasing stipulations are 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 NMSO sends a draft parcel list to any field offices in which 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 new information has become available which might change any analysis conducted during the planning process; if appropriate consultations have been conducted of which potential bidders should be made aware. The parcels nominated for this sale, along with the appropriate stipulations from the Resource Management Plan (RMP), the Sabine National Forest (SNF), the Davy Crockett National Forest (DCF), the Sam Houston National Forest (SHNF), the Bureau of Reclamation, and the Army Corp of Engineers (USACE) are 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 NMSO, a list of nominated lease parcels with specific, applicable stipulations is made available online to the public through the 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.

This EA documents the review of the forty four (44) parcels nominated for the April 2016 Competitive Oil and Gas Lease Sale. Thirteen (13) of the 44 parcels are located on split-estate private surface, two (2) of the 44 parcels is located on surface estate administered by the Bureau of Reclamation (BOR), nine (9) of the 44 parcels are located on surface estate administered by the Army Corp of Engineers (ACE), and twenty (20) of the 44 parcels are located on surface estate administered by the SNF, DCF and SHNF with the Federal mineral estate under each administered by the Oklahoma Field Office (OFO). It serves to verify conformance with the approved land use plan as well as demonstrates the effectiveness of attaching the lease stipulations to specific parcels. Where the surface is administered by the Forest Service and the mineral estate is also federally owned, the Forest Service and BLM share the responsibility for enforcing mineral leasing policies and regulations. Forest Service regulations under 36

CFR 228.102(e) allow the agency to authorize the BLM to lease individual, specified areas of land administratively available for lease and include the stipulations determined to be necessary. The Forest Service is responsible for reviewing the effects of leasing the proposed parcels, although the final decision is made by the BLM authorizing official.

The BLM issues and administers oil and gas leases managed by other surface management agencies (SMAs) only after the agency authorizes leasing for specific lands. Once a Federal lease is issued on other SMAs, the BLM has the full responsibility and authority to approve and regulate all surface disturbing and downhole activities associated with oil and gas exploration and development through analysis and approval of the surface use plan of operation (SUPO) component of an Application for Permit to Drill (APD). The BLM also has the authority and responsibility to provide final approval of all APDs including those for operations on Federal leases on other SMA lands. Each APD includes a SUPO and a drilling plan.

The parcels and applicable stipulations were posted online for a two-week public scoping period beginning on August 31, 2015. In addition, this EA will be made available for public review and comment for 30 days beginning on October 29, 2015. Any comments provided prior to the lease sale will be considered and incorporated into the EA as appropriate.

## **1.1 Purpose and Need and Decision to be Made**

The purpose is to provide opportunities for private individuals or companies to explore for and develop Federal oil and gas resources through a competitive leasing process.

The need for 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 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 *et seq.*), and other applicable laws, regulations, and policies.

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

## **1.2 Land Use Plan Conformance**

The applicable land use plans for this action are the Oklahoma Resources Management Plan (RMP) (1994), as amended; the Kansas RMP (1991), as amended; and the Texas RMP (1996), as amended. These RMPs are currently being revised by what has been named the Oklahoma, Kansas, and Texas RMP Revision and Environmental Impact Statement (EIS). The scoping period for the revision occurred from November 2013 through January 2014. The final Scoping Summary Report was published on June 5, 2014. The revision will contemplate, among other things, mineral development in the planning area, and disclose impacts associated with potential energy development scenarios that are within the scope of the planning document. While the planning effort is underway, the 1994 Oklahoma RMP, as amended;



the Kansas RMP (1991); and the 1996 Texas RMP, as amended, are still the applicable land use plans, and decisions made under those plans are properly applied to the parcels nominated in this lease sale.

The Oklahoma RMP, as amended, describes specific split estate tracts in Oklahoma and the stipulations that would be attached to each tract if they were offered for lease. These stipulations which include seasonal timing limitations and other controlled surface use stipulations were designed to minimize or alleviate potential impacts to special resource values. All of the Oklahoma parcels under consideration fall within the identified tracts and the applicable stipulations identified in the Oklahoma RMP would be attached to each parcel. If all Oklahoma nominated and RMP identified tracts were leased, leasing the parcel would be in conformance with the Oklahoma RMP. Leasing the parcels would also be consistent with the RMPs goals and objectives for natural and cultural resources.

The Kansas and Texas RMP(s), as amended, do not specifically describe individual tracts of split estate; rather they broadly describes the split estate situation in Kansas and Texas and includes “all Federal minerals underlying other Federal Surface Management Agencies (SMAs) lands as wells as split-estate (non-federal surface over Federal minerals).” However, the Kansas RMP does specifically identify the legal description and applicable special stipulations for individual tracts. The RMP identifies the potential stipulations that could be attached to split-estate tracts that are proposed for leasing and states “All new leases and all expired leases that are reissued would be leased with surface resource protection stipulations. Mandatory stipulations would be incorporated into each lease where those stipulations apply. In addition, optional stipulations will be included where resource values exist that warrant special protections”. The potential stipulations could include seasonal timing limitations and other controlled surface use stipulations which were designed to minimize or alleviate potential impacts to special resource values. The Kansas and Texas parcels under consideration falls within this planning area and the applicable stipulations identified in the RMP would be attached to the parcels. If the parcels are leased, leasing the parcels would be in conformance with the RMP(s). Leasing the split-estate parcels would also be consistent with the RMPs goals and objectives for natural and cultural resources.

For SMA parcels, the Oklahoma and Texas RMP state “the SMA is contacted for consent to lease and also for identification of specific agency surface protection stipulations.” BOR and USACE were contacted regarding parcels in their jurisdiction. They submitted letters of Consent to Lease, along with specific stipulations to attach to each parcel. Leasing the SMA parcels is consistent with the Oklahoma, Kansas, and Texas RMP.

Pursuant to 40 CFR 1508.28 and 1502.21, this EA is tiered to and incorporates by reference the information and analysis contained in the Oklahoma, Kansas, and Texas RMPs (1994 and 1996), as amended. 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 both RMPs. 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 scenarios may be used in the analysis of impacts in this EA.

FLPMA established guidelines to provide for 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 US, the BLM has no authority over use of the surface by the surface owner; however, 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 CFR 3101.1 and 43 CFR 1601.0-7(b); BLM Manual Handbook 1601.009 and 1621-1).

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

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

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 Oklahoma, Kansas, and Texas RMP biological assessments (BA). No further consultation with US Fish and Wildlife (USFWS) is required at this leasing stage.

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

Tribal consultations would be completed when specific locations for proposed projects are received, reviewed by the State Historic Preservation Office (SHPO), the Bureau of Indian Affairs (BIA), and specific Tribes. When particular Tribes respond during consultation, that tribe would be directly involved in negotiations with the BLM to determine if the project should be moved, or other mitigation required.

In Section 1835 of the Energy Policy Act of 2005 (43 USC 1508), 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 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.

NMSO 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 (BMPs). 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

The parcels included in the Proposed Action, along with the appropriate stipulations from the RMP and BOR, USACE, and USFS, 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 August 31, 2015.

An internal review of the Proposed Action, along with the appropriate stipulations from the RMP, BOR, USACE, and USFS, was conducted by an interdisciplinary team of OFO resource specialists on August 20, 2015, to identify and consider potentially affected resources and associated issues. During the meeting, the interdisciplinary team also identified and subsequently addressed any unresolved issues or conflicts related to the Proposed Action.

- What effect *will* the proposed action have on atmospheric pollutants and contaminants?
- What effect *will* the proposed action have on climate change?
- What effect *will* the proposed action have on the watershed condition?
- What effect *will* the proposed action have on soil loss and contamination?
- What effect *will* the proposed action have on water quality in stream systems?
- What effect *will* the proposed action have on floodplains and the integrity of the floodplains?
- What effect *will* the proposed action have on wetland and riparian areas?
- What effect *will* the proposed action have on prime or unique farmlands?
- What effect *will* the proposed action have on known and newly discovered artifacts or areas of cultural, paleontological, and archeological significance?
- What effect *will* the proposed action have on the spread of non-native species?
- What effect *will* the proposed action have on vegetation loss, fragmentation, and regrowth?
- What effect *will* the proposed action have on federally listed and state-listed species that have the potential to be located on the proposed lease tracts?
- What effect *will* the proposed action have on Migratory Bird species?
- What effect *will* the proposed action have on wildlife and their habitat in general?
- What effect *will* the proposed action have on the management of fluid mineral drilling wastes produced and the potential for contamination in the proposed lease area?
- What effect *will* the proposed action have on locatable minerals management?
- What effect *will* the proposed action have on visual quality?
- What effect *will* the proposed action have on recreation in the recreational areas or on BLM owned lands?
- What effect *will* the proposed action have on state and local economies?
- What effect *will* the proposed action have on minority and low income populations?

Several issues were considered during internal 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 the IDT, following onsite visits, review of the three RMPs, as amended and other data sources, to not be present:

- Areas of Critical Environmental Concern
- Livestock Grazing
- Wild Horse and Burros
- Public Health and Safety
- Rights-of-way
- Wild and Scenic Rivers
- Wilderness and Wilderness Study Areas
- Lands with wilderness characteristics
- Cave and Karst

## 2.0 PROPOSED ACTION AND ALTERNATIVES

---

### 2.1 Alternative A—No Action

The BLM NEPA Handbook (H-1790-1) states that for EAs on externally initiated proposed actions, the no action alternative generally means that the action would not take place. In the case of a lease sale, this would mean that an expression of interest to lease (parcel nomination) would be deferred, and the forty-four (44) parcels would not be offered for lease during the April 2016 Competitive Oil and Gas Lease Sale. Surface management and any ongoing oil and gas development on surrounding federal, private, and state leases would continue under current guidelines and practices. The selection of the no action alternative would not prevent these parcels from being nominated in a future lease sale.

### 2.2 Alternative B—Proposed Action

The Proposed Action would be to lease Federal minerals on forty-three (43) of forty-four (44) nominated lease parcels including:

- Twelve (12) entire parcels totaling 1135.66 acres administered by the BLM Oklahoma Field Office (OFO) and on private surface (split-estate) in Beaver, Major, and Roger Mills Counties, OK; Logan, Sherman, Lane, and Cheyenne Counties, KS, and Trinity and Houston Counties, TX.
- Two (2) entire parcels totaling 1611.54 acres administered by the Bureau of Reclamation in Live Oak and McMullen Counties, TX
- Nine (9) parcel totaling 3000.13 acres administered by the United States Army Corp of Engineers (USACE) in Creek and Dewey Counties, OK; and Washington, Burleson, and Denton Counties, KS; 1 parcel totaling 481 acres administered by the Sabine National Forest in San Augustine County, TX.
- 1 parcel totaling 2298.160 acres administered by the Sam Houston National Forest in Walker County, TX.
- Eighteen (18) parcels totaling 28,226.61 acres administered by the Davy Crocket National Forest in Trinity and Houston Counties, TX.

totaling 36,753.10 acres offered for sale in the April 2016 Competitive Oil and Gas Lease Sale with the addition of further stipulations and lease notices to certain parcels administered by the OFO.

Standard terms and conditions as well as stipulations listed in the Oklahoma RMP (1994), as amended, and Texas RMP (1996), as amended, and stipulations identified by the SMAs would apply. A complete description of these parcels, including any stipulations, is provided in Table 1. A description of each stipulation is included in Appendix 1.

**Table 1. Alternative B--Proposed Action Parcels**

<b>Parcel</b>	<b>Comments</b>	<b>Acres</b>
<b><u>NM-201604-001</u></b>  T.0160S. R.0280W, 06 PM, KS Sec. 027 W2NE, NW  <b>Lane County, KS</b>	<u>Lease with the following Stipulations:</u> WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	240.000
<b><u>NM-201604-002</u></b>  T.0150S, R.0320E, 06 PM, KS Sec. 001 NESW  <b>Logan County, KS</b>	<u>Lease with the following Stipulations:</u> ORA-1: Floodplain Protection WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	40.000
<b><u>NM-201604-003</u></b>  T.0150S, R.0320W, 06 PM, KS Sec. 009 NESE  <b>Logan County, KS</b>	<u>Lease with the following Stipulations:</u> ORA-2:Wetland/Riparian Protection WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	40.000
<b><u>NM-201604-004</u></b>  T.0150S, R.0320W, 06 PM, KS Sec. 010 SENW  <b>Logan County, KS</b>	<u>Lease with the following Stipulations:</u> ORA-2: Wetland/Riparian Protection WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	40.000
<b><u>NM-201604-005</u></b>  T.0020S. R.0420W, 06 PM, KS Sec. 010 SWNW  <b>Cheyenne County, KS</b>	<u>Lease with the following Stipulations:</u> ORA-1: Floodplain Protection ORA-2: Wetland/Riparian Protection WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	40.000
<b><u>NM-201604-006</u></b>  T.0060N, R.0370W, 06 PM, KS Sec. 033 E2, SW  <b>Sherman County, KS</b>	<u>Lease with the following Stipulations:</u> WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	480.00

Parcel	Comments	Acres
<b><u>NM-201604-007</u></b>  T.0010S, R.0220W, 11 PM, OK Sec. 004 Lots 1, 2  <b>Beaver County, OK</b>	<u>Lease with the following Stipulations:</u> ORA-3: Season of Use Stipulation Lesser Prairie Chicken WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	15.960
<b><u>NM-201604-008</u></b>  T.0210S, R.0120W, 17 PM, OK Sec. 001 Lot 3  <b>Major County, OK</b>	<u>Lease with the following Stipulations:</u> ORA-2:Wetland/Riparian Protection WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	40.030
<b><u>NM-201604-009</u></b>  T.0170N, R.0220E, 17 PM, OK Sec. 034 ACCR & RIP to Lot 2; Sec. 034 Lying in Sec. 27; Sec. 035 ACCR & RIP to Lot 1; Sec. 035 Lying in Sec. 27; Sec. 035 See exh_for M&B  <b>Roger Mills County, OK</b>	<u>Lease with the following Stipulations:</u> ORA-2: Wetland/Riparian Protection ORA-3: Season of Use Stipulation Lesser Prairie Chicken WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	36.250
<b><u>NM-201604-011</u></b>  T.0180, R.0100W, 17 PM, OK Sec. 031 S2NE, E2SE  <b>Creek County, OK</b>	<b><u>Other Surface Management Agency (SMA):</u></b> Army Corp of Engineers- Heyburn Lake Project  <u>Lease with the following Stipulations:</u> COE-SS 1-A: Army Corp Stipulations ORA-2: Wetland/Riparian Protection WO-ESA-7: Endangered Species Act Consultation WO-NHPA: National Historic Preservation Act Consultation	160.000
<b><u>NM-201504-012</u></b>  T.0190N, R.0150W, 17 PM, OK Sec. 001 Lots 1-17; Sec. 001 SENE, SWSW, NESE; Sec. 002 Lots 1-14; Sec. 002 SWNW, SESW, SWSE, E2SE  <b>Dewey County, OK</b>	<b><u>Other Surface Management Agency (SMA):</u></b> Army Corp of Engineers- Canton Lake Project  <u>Lease with the following Stipulations:</u> COE-SS 1-A: Army Corp Stipulations WO-ESA-7: Endangered Species Act Consultation WO-NHPA: National Historic Preservation Act Consultation	1,174.050

Parcel	Comments	Acres
<b><u>NM-201604-013</u></b>  TR NR-34-1 thru NR-34-8; TR NR-39-; TX  <b>Live Oak County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Bureau of Reclamation- Nueces River Project  <u>Lease with the following Stipulations:</u> BOR Nueces River Project: No Surface Occupancy ORA-2: Wetland/Riparian Protection WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	976.800
<b><u>NM-201604-014</u></b>  TR NR-17-1; TR NR-43-1 thru NR-43-3; TR NR-44; TR NR-47-3; TR NR-58; TX  <b>McMullen/Live Oak County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Bureau of Reclamation- Nueces River Project  <u>Lease with the following Stipulations:</u> BOR Nueces River Project: No Surface Occupancy ORA-2: Wetland/Riparian Protection WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	634.740
<b><u>NM-201604-015</u></b>  TR SAF-S40-0001; TX  <b>San Augustine County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Sabine National Forest  <u>Lease with the following Stipulations:</u> SAF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-CSU-16-08: Texas Natural Heritage Program Area TXFG1996-LN-17-01: Standard Red-Cockaded Woodpecker	481.000
<b><u>NM-201604-016</u></b>  TR SHF-J11-0001; TX  <b>Walker County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Sam Houston National Forest  <u>Lease with the following Stipulations:</u> SHF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-NSO-14-01: Recreation Areas TXFG1996-NSO-14-03: Lake Conroe TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-CSU-16-02: Trails TXFG1996-LN-17-07: Red-Cockaded Woodpecker Habitat Management Foraging Areas	2, 298.160
<b><u>NM-201604-017</u></b>  TR DCF-K2III-0001; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-01: Standard Red-Cockaded Woodpecker	2, 336.550



Parcel	Comments	Acres
<b><u>NM-201604-018</u></b>  TR DCF-K2III-0002; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-01: Standard Red-Cockaded Woodpecker	1, 413.970
<b><u>NM-201604-019</u></b>  TR DCF-K2III-0003; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-01: Standard Red-Cockaded Woodpecker	547.460
<b><u>NM-201604-020</u></b>  TR DCF-K2III-0004; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-01: Standard Red-Cockaded Woodpecker	1, 763.390
<b><u>NM-201604-021</u></b>  TR DCF-K2III-0005; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-01: Standard Red-Cockaded Woodpecker	2, 369.170
<b><u>NM-201604-022</u></b>  TR DCF-K2III-0006; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-01: Standard Red-Cockaded Woodpecker	2, 002.310
<b><u>NM-201604-023</u></b>  TR DCF-K2III-0007; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-01: Standard Red-Cockaded Woodpecker	1, 910.970

Parcel	Comments	Acres
<b><u>NM-201604-024</u></b>  TR DCF-K2III-0008; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-01: Standard Red-Cockaded Woodpecker TXFG1996-LN-17-09: Special Use Permit Sites - Trinity County Airport Extension	1, 514.740
<b><u>NM-201604-025</u></b>  TR DCF-K2AI-0004; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-CSU-16-07: River Bottom Areas TXFG1996-LN-17-07: Red-Cockaded Woodpecker Habitat Management Foraging Areas TXFG1996-LN-17-08: Bald Eagle	2, 344.930
<b><u>NM-201604-026</u></b>  TR DCF-K2AI-0001; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-TL-15-01: Turkey Nesting Area TXFG1996-CSU-16-07: River Bottom Areas TXFG1996-LN-17-07: Red-Cockaded Woodpecker Habitat Management Foraging Areas	1, 095.780
<b><u>NM-201604-027</u></b>  TR DCF-K2AI-0002; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-TL-15-01: Turkey Nesting Area TXFG1996-CSU-16-07: River Bottom Areas TXFG1996-LN-17-07: Red-Cockaded Woodpecker Habitat Management Foraging Areas	2, 352.470
<b><u>NM-201604-028</u></b>  TR DCF-K2AI-0003; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-TL-15-01: Turkey Nesting Area TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-07: Red-Cockaded Woodpecker Habitat Management Foraging Areas	2, 256.210

Parcel	Comments	Acres
<b><u>NM-201604-029</u></b>  TR DCF-K2ACI-0001; TR DCF-K2AC-0001; TR DCF-K1R-0001; TR DCF-K10I-0001; TR DCF-K2ABI-0001; TR DCF-K2AB-0001; TX  <b>Houston County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-CSU-16-02: Trails TXFG1996-LN-17-07: Red-Cockaded Woodpecker Habitat Management Foraging Areas	580.000
<b><u>NM-201604-030</u></b>  TR DCF-K2AJ-0001; TX  <b>Trinity/Houston County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-TL-15-01: Turkey Nesting Area TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-07: Red-Cockaded Woodpecker Habitat Management Foraging Areas	30.000
<b><u>NM-201604-031</u></b>  TR DCF-K32-0001; TX  <b>Houston County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-TL-15-01: Turkey Nesting Area TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-07: Red-Cockaded Woodpecker Habitat Management Foraging Areas	48.000
<b><u>NM-201604-032</u></b>  TR DCF-K2II-0001; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-01: Red-Cockaded Woodpecker Habitat Management Foraging Areas	1,620.770
<b><u>NM-201604-033</u></b>  TR DCF-K2II-0002; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-01: Red-Cockaded Woodpecker Habitat Management Foraging Areas	2,492.590

Parcel	Comments	Acres
<b><u>NM-201604-034</u></b>  TR DCF-K2II-0003; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> DCF-WO-10/05/2006: Secretary of Agriculture Rules and Regulations Compliance TXFG1996-CSU-16-01: Streamside Management Zone TXFG1996-LN-17-01: Red-Cockaded Woodpecker Habitat Management Foraging Areas	1,547.300
<b><u>NM-201604-035</u></b>  TR DCF-K50A-0001; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	26.780
<b><u>NM-201604-036</u></b>  TR DCF-KIF-0001; TX  <b>Houston County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	54.000
<b><u>NM-201604-037</u></b>  TR DCF-K50-0001; TR DCF-K2III-0009; TX  <b>Trinity County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> US Forest Service- Davy Crockett National Forest  <u>Lease with the following Stipulations:</u> WO-ESA-7: Threatened & Endangered Consultation WO-NHPA: Tribal and Cultural Resources Consultation	82.640
<b><u>NM-201604-038</u></b>  TR 301; TR 303; TR 304; TR 305; TX  <b>Washington County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> Army Corp of Engineers- Somerville Lake  <u>Lease with the following Stipulations:</u> COE-NSO-Somerville Lake ORA-2: Wetland/Riparian Protection WO-ESA-7: Endangered Species Act Consultation WO-NHPA: National Historic Preservation Act Consultation	161.250
<b><u>NM-201604-039</u></b>  TR 307; TR 308; TX  <b>Washington County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> Army Corp of Engineers- Somerville Lake  <u>Lease with the following Stipulations:</u> COE-NSO-Somerville Lake ORA-2: Wetland/Riparian Protection WO-ESA-7: Endangered Species Act Consultation WO-NHPA: National Historic Preservation Act Consultation	405.600

Parcel	Comments	Acres
<b><u>NM-201604-040</u></b>  TR 206; TR 232; TX  <b>Washington County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> Army Corp of Engineers- Somerville Lake  <u>Lease with the following Stipulations:</u> COE-NSO-Somerville Lake ORA-2: Wetland/Riparian Protection WO-ESA-7: Endangered Species Act Consultation WO-NHPA: National Historic Preservation Act Consultation	269.100
<b><u>NM-201604-041</u></b>  TR 205; TR 208; TR 209; TR 211; TR 214; TR 215; TR 220; TX  <b>Burleson County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> Army Corp of Engineers- Somerville Lake  <u>Lease with the following Stipulations:</u> COE-NSO-Somerville Lake ORA-2: Wetland/Riparian Protection WO-ESA-7: Endangered Species Act Consultation WO-NHPA: National Historic Preservation Act Consultation	229.530
<b><u>NM-201604-042</u></b>  TR 404; TR 405; TR 407; TR 408; TR 411; TR 412; TR 413-1; TR 413-2; TX  <b>Burleson County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> Army Corp of Engineers- Somerville Lake  <u>Lease with the following Stipulations:</u> COE-NSO-Somerville Lake ORA-2: Wetland/Riparian Protection WO-ESA-7: Endangered Species Act Consultation WO-NHPA: National Historic Preservation Act Consultation	173.930
<b><u>NM-201604-043</u></b>  TR 600; TR 602; TR 606; TR 608; TX  <b>Washington County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> Army Corp of Engineers- Somerville Lake  <u>Lease with the following Stipulations:</u> COE-NSO-Somerville Lake ORA-2: Wetland/Riparian Protection WO-ESA-7: Endangered Species Act Consultation WO-NHPA: National Historic Preservation Act Consultation	167.770
<b><u>NM-201604-044</u></b>  TR F-519; TR F-520A; TR 520B; TR 524; TX  <b>Denton County, TX</b>	<b><u>Other Surface Management Agency (SMA):</u></b> Army Corp of Engineers- Lewisville Lake  <u>Lease with the following Stipulations:</u> COE-NSO-Lewisville Lake ORA-2: Wetland/Riparian Protection WO-ESA-7: Endangered Species Act Consultation WO-NHPA: National Historic Preservation Act Consultation	258.900

Some of the proposed parcels may be within floodplains and would have lease stipulation ORA-1 Floodplain Protection attached. The Floodplain Protection stipulation informs the lessee and operator that surface occupancy of these areas and surface disturbance within up to 200 meters of the outer edge of the floodplain may not be allowed in order to protect the integrity and functionality of the floodplain and associated watercourse. Furthermore, controlled surface use requiring special mitigation measures may be required and will be developed during the application for permit to drill.

Some of the proposed parcels would also have ORA-2 Wetland/Riparian Protection stipulations added. ORA-2 is intended for the protection of wetland and/or riparian areas and states that “Surface occupancy of these areas will not be allowed without the specific approval, in writing, of the BLM. Impacts or disturbance to wetlands and riparian habitats which occur on this lease must be avoided or mitigated.”

Proposed parcels -007 and -009 are within Lesser/Greater Prairie Chicken Habitat and would have ORA-3 stipulations added to it, which states that no surface occupancy of the lease would occur from February 15 to May 15.

Two lease stipulations, WO-ESA-7 and WO-NHPH, would also be attached to all twenty-three parcels. These notices would notify the lease holder that the BLM reserves direction to modify, if necessary, any action proposed on the lease to ensure:

- Threatened, endangered, or other special status species, and their habitats (WO-ESA-7) and
- Historic properties and/or resources protected under the National Historic Preservation Act, American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, Executive Order 13007, or other statutes and executive orders (WO-NHPH)

would not be adversely affected. Under the Endangered Species Act (ESA) of 1973, as amended, Section 7 Consultation with the USFWS would occur if development is proposed on a lease containing habitat suitable for these special status species. Under the National Historic Preservation Act (NHPA) and other authorities, the BLM would undergo consultation with the State Historic Preservation Officer and any interested or affected tribes prior to approving any development activities.

Once sold, the lease purchaser would have the exclusive right to use as much of the leased lands as would be necessary to explore and drill for oil and gas within the lease boundaries, subject to stipulations attached to the lease; restrictions deriving from specific, nondiscretionary statutes; and such reasonable measures as may be required by the authorized officer to minimize adverse impacts to other resource values, land uses or users not addressed in the lease stipulations at the time operations are proposed (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, exclusive right to develop the leasehold reverts back to the federal government and the lease can be reoffered in another lease sale.

### ***Reasonably Foreseeable Development***

At the leasing stage, it is uncertain if Applications for Permit to Drill on leased parcels will be received, nor is it known if or to what extent development would occur. Such development may include constructing a well pad and access road, drilling a well using a conventional pit system or closed-loop system, hydraulically fracturing the well, installing pipelines and/or hauling produced fluids, regularly monitoring the well, and completing work-over tasks throughout the life of the well. In Oklahoma and Texas, typically, all of these actions are undertaken during development of an oil or gas well; it is reasonably foreseeable that they may occur on leased parcels. See Appendix 3 for a complete description of the phases of oil and gas development.

Drilling of wells on a lease would not be permitted until the lease owner or operator secures approval of a drilling permit and a surface use plan as specified under Onshore Oil and Gas Orders (43 CFR 3162). A permit to drill would not be authorized until site-specific NEPA analysis is conducted.

Standard terms and conditions, stipulations listed in the Oklahoma and Texas RMPs, and any new stipulations would apply as appropriate to each lease. In addition, site specific mitigation measures and BMPs would be attached as Conditions of Approval (COAs) for each proposed exploration and development activity authorized on a lease.

## **2.3 Alternatives Considered But Eliminated From Detailed Analysis**

The OFO considered one alternative that would lease all forty four (44) parcels but it was eliminated from further analysis because one (1) parcel (Table 2) was not described in the 1994 Oklahoma RMP or analyzed in the FEIS and is thus not in conformance with the RMP. The parcel will be deferred until the RMP Revision is completed.

Table 2. Proposed Action—Parcels Deferred

Parcel	Comments	Acres
<b><u>NM-201604-010</u></b>  T.0080N, R.0240W, IM PM, OK Sec. 022 S2SE  <b>Beckham County, OK</b>	Not analyzed in the Oklahoma RMP	80.000

### **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.

#### ***Beaver County, Oklahoma (Parcels -007)***

The proposed lease parcel is in the extreme southern part of Beaver County. Beaver County is in the eastern part of the Oklahoma Panhandle. The county is bounded on the north by Kansas and on the south by Texas. Adjacent counties in Oklahoma are Texas County on the west and Harper and Ellis Counties on the east. The county has an area of 1,817 square miles (1,162,829 acres).

Beaver County has the Beaver and Cimarron Rivers. The Beaver River and its tributaries flow with water intermittently. In part, this is because the underground source of river, the Ogallala Aquifer, being the water table beneath far western Oklahoma and parts of seven other Western states as well, has been subject to depletion in recent decades due to increased irrigation and drinking water withdrawals.

#### ***Creek County, Oklahoma (Parcel -011)***

The proposed parcel is located in the center of the county. Creek County is in the east central part of Oklahoma, bordered by Pawnee County on the north, Okfuskee County on the south, Okmulgee County on the east, and Payne and Lincoln Counties on the west. The county covers an area of 970 square miles (620,800 acres) of which 20 square miles (12,800 acres) is water. Creek County is part of the metropolitan Tulsa area.

It is drained by the Cimarron River, and the Deep Fork and Little Deep Fork of the North Canadian River. Heyburn Lake is contained within the County. Keystone Lake is partially within Creek County.

#### ***Dewey County, Oklahoma (Parcel -012)***

The proposed lease parcel is in the northeast corner of Dewey County, near Canton Lake. Beaver County is in the western part of Oklahoma. The county is bounded on the north by Woodward and Major counties and on the south by Custer County. The county is bounded on the east by Blaine County, and to the west by Roger Mills and Ellis Counties. The county has an area of 1,008 square miles (645,120 acres).

Most of the county is in the Gypsum Hills physiographic region, except that the western one-fourth of the county is in the High Plains region. It is drained by the Canadian and North Canadian Rivers. Canton Lake, built on the Canadian River in 1966, is the only significant lake or reservoir in the county.

#### ***Major County, Oklahoma (Parcel -008)***

The proposed parcel is located in near the center of the county. Major County is in the northwestern part of Oklahoma. The county is bordered by Woods County on the north; by Woodward County on the west; by Dewey County on the south; and by Garfield County on the East. The county covers an area of about 958 square miles (613,120 acres).



Drained by the Canadian and North Canadian rivers the county lies mostly in the Gypsum Hills physiographic region. The western one-fourth of the county is situated in the High Plains region.

***Roger Mills County, Oklahoma (Parcel -009)***

The proposed parcel is in the northwest bend of Roger Mills County. Roger Mills County is a western border county, lying about midway between the northern and southern State lines. The Canadian River forms the northern boundary of the county, separating it from Ellis County. Dewey and Custer Counties adjoin it on the east, Beckham County on the south and on the west by Texas. It has an area of 1,135 square miles (726,400 acres).

The Canadian River forms the northern border of the county. The Washita River passes by the towns of Cheyenne and Strong City as it crosses the county from west to east.

***Logan County, Kansas (Parcels -002, -003 and -004)***

The proposed parcels are in the western part of Logan County. Logan County is in north-central Kansas and has an area of about 1,073 square miles (686,720 acres). The county is bordered on the north by Thomas County; on the east by Gove County, on the west by Wallace County, and on the south by Scott and Wichita Counties.

The Smoky Hill River and the north fork of the Smoky Hill River converge in Logan County, Kansas.

***Lane County, Kansas (Parcel -001)***

The proposed parcel is along the eastern border of Grady County at about 1,200 feet elevation. Grady County is in the west central part of Kansas. It is bordered by Gove County to the north; Trego County to the east; Finney County to the south; and Logan County to the west. The county has an area of about 717 square miles (458,880 acres).

Lane County has no permanently flowing streams, but contains the headwater areas of Walnut Creek and also is drained by tributaries to Smoky Hill River on the north and tributaries to Pawnee River on the south.

***Cheyenne County, Kansas (Parcel -005)***

Cheyenne County is in northwestern corner of Kansas. It is bordered by the State of Colorado on the west, Sherman County on the south, the State of Nebraska on the north, and Rawlins County on the east. It has an area of about 1,021 square miles (653,440 acres).

Lane County contains tributaries of the Arikaree River and is bordered to the North by the Republican River.

***Sherman County, Kansas (Parcel -006)***

Sherman County is in northwestern corner of Kansas. It is bordered by the State of Colorado on the west, Wallace County on the south, the Cheyenne County the north, and Thomas County on the east. It has an area of about 1,056 square miles (675,840 acres).

Lane County contains the south fork of the Soloman River.

***Burleson County, Texas (Parcel -041 and -042)***

Burleson County is in the east-central part of Texas. It is bordered by Lee County on the west, Wallace County on the south, the Robertson County on the north, and Brazos County on the east. The county covers 977 square miles (625,280 acres).

The entire county lies in the drainage area of the Brazos River, which marks its eastern border. The Old River is a perennial stream that flows through Burleson County.

***Denton County, Texas (Parcel -044)***

Denton County is in the north-central part of Texas. It is bounded by Cooke County on the north, on the west by Collin County, on the south by Tarrant county, and on the east by Wise County. The county covers 1,237 square miles (791,680 acres). Denton County is part of the Dallas-Ft.Worth-Arlington Texas metroplex.

Denton County is drained by two forks of the Trinity River. The largest body of water in Denton County is Lewisville Lake, which was formed in 1954 when the Garza–Little Elm Reservoir was merged with Lake Dallas.

***Houston County, Texas (Parcel -036)***

Houston County is in the eastern part of Texas. It is bounded by Walker County on the north, on the west by Leon County, on the south by Walker county, and on the east by Angelina County. The county covers 1,237 square miles (791,680 acres). Water makes up 28,160 acres of water, most of which is in Lake Texoma.

The Neches River forms the northeastern boundary of the county, and the Trinity River is the western boundary.

***Live Oak County, Texas (Parcel -013, -014, and-036)***

Live Oak County is in the southeastern part of Texas. It is bounded by Karnes County on the north, on the west by Duval County, on the south by Jim Wells County, and on the east by Bee County. The county covers 1,237 square miles (791,680 acres). Water makes up 28,160 acres of water, most of which is in Lake Texoma.

Live Oak County is home to Choke Canyon reservoir, and two forks of the Frio River.

***McMullen County, Texas (Parcel -014)***

McMullen County is in the southern part of Texas. It is bounded by Atascosca County on the north, on the west by LaSalle County, on the south by Duval County, and on the east by Live Oak County. The county covers 714 square miles (456,960 acres).

Most of the county is drained by the Nueces River, which flows northeasterly from the southwestern corner of the county and bisects its eastern border. The northern half of McMullen County is drained by the Frio River, which empties into the Choke Canyon Reservoir in the northeastern corner of the county.

### ***Trinity County, Texas (Parcel -033, -034, -035, and -037 )***

Trinity County is in the southern part of Texas. It is bounded by Angelina County on the north, on the west by Walker County, on the south by San Jacinto County, and on the east by Polk County. The county covers 1,157 square miles (740,480 acres).

The Trinity River flows from northwest to the southeast across the county, and drains into Lake Livingston.

### ***Washington County, Texas (Parcel -038, -039, -040, and -037 )***

Live Oak County is in the southeast part of Texas. It is bounded by Brazos County on the north, on the west by Austin County, on the south by Lee County, and on the east by Waller County. The county covers 622 square miles (398,080 acres).

The county is drained by the Brazos River which flows along the eastern edge.

## **3.1 Air Resources**

Air quality and climate are components of air resources which may be affected by BLM applications, activities, and resource management. 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. Much of the information referenced in this section is incorporated from the Air Resources Technical Report for BLM Oil and Gas Development in New Mexico, Kansas, Oklahoma, and Texas (Air Resources Technical Report)(BLM 2015). This document summarizes the technical information related to air resources and climate change associated with oil and gas development and the methodology and assumptions used for analysis.

### **3.1.1 Air Quality**

The Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality nationwide, including six “criteria” air pollutants. These criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter (PM<sub>10</sub> & PM<sub>2.5</sub>), sulfur dioxide (SO<sub>2</sub>) and lead (Pb). EPA has established National Ambient Air Quality Standards (NAAQS) for criteria air pollutants. The NAAQS are protective of human health and the environment. EPA has approved Kansas’ State Implementation Plan, Texas’ State Implementation Plan and Oklahoma’s State Implementation Plan, and each state enforces state and federal air quality regulations on all public and private lands within the state, except for tribal lands.

The area of the analysis is considered a Class II air quality area by the EPA. There are three classifications of areas that attain national ambient air quality standards, Class I, Class II and Class III. Congress established certain national parks and wilderness areas as mandatory Class I areas where only a small

amount of air quality degradation is allowed. All other areas of the U.S. are designated as Class II, which allow a moderate amount of air quality degradation. No areas of the U.S. have been designated Class III, which would allow more air quality degradation. The primary sources of air pollution are dust from blowing wind on disturbed or exposed soil, exhaust emissions from motorized equipment, oil and gas development, agriculture, and industrial sources.

### ***Kansas Parcels***

Proposed parcels -001, -002, -003, 004, -005 and -006 are greater than 100 miles from the nearest “non-attainment” area. See Appendix 4.

### ***Oklahoma Parcels***

All parcels in Oklahoma are greater than 100 miles from the nearest “non-attainment” area. Proposed parcels -08, -09, and -010 are over 80 miles to the nearest Class I Airshed (Wichita Mountains, OK). All other Oklahoma parcels are greater than 100 miles to the nearest Class I Airshed. See Appendix 4.

### ***Texas Parcels***

Proposed parcel -044 is within the Dallas-Ft. Worth (DFW) non-attainment area. The area is in non-attainment as a result of increased levels of ozone (O<sub>3</sub>). The nearest Class I airshed (Wichita Mountains, OK) is over 150 miles northwest. See Appendix 4.

The proposed parcels -038, -039, and -40 are approximately 75 miles northwest of the Houston-Livingston “non-attainment” area. All other parcels are over 100 miles away from the Houston-Livingston ‘non-attainment’ area.

### **Dallas-Ft. Worth “Non-Attainment” Area**

The project area is located within the Dallas-Ft. Worth (DFW) non-attainment area (Figure 1). The DFW non-attainment area includes 10 counties (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Counties) being designated non-attainment and classified as moderate under the 2008 eight-hour ozone NAAQS. The attainment deadline for the DFW moderate non-attainment area is December 31, 2018.

The Texas Commission on Environmental Quality (TCEQ) maintains an emission inventory of current information for sources of NO<sub>x</sub> and VOC—those that most contribute to ozone levels. The total inventory of NO<sub>x</sub> and VOC emissions for an area is derived from estimates developed for five general categories of emissions sources: point, area, non-road mobile, on-road mobile, and biogenic. Unlike other non-attainment areas in Texas, where industrial point sources account for a greater proportion of the total NO<sub>x</sub> emissions in the area, point sources account for only about one-tenth of the total NO<sub>x</sub> emissions in the DFW area. The majority of NO<sub>x</sub> emissions in the DFW area come from on-road mobile sources (cars and trucks) and non-road mobile sources (i.e. construction equipment, aircraft, and locomotives). TCEQ has implemented several ozone emission reduction strategies to meet the 2018 attainment date set by EPA and seem to be working. Despite a continuous increase in the population of the DFW area, the area is exhibiting decreasing trends for ozone and its precursors, NO<sub>x</sub> and VOC. The

eight-hour ozone design value in 2010 is 18% lower than the eight-hour ozone design value in 1991. The number of eight-hour ozone exceedance days over the past 20 years has also decreased significantly from 26 days in 1991 to 8 days in 2010. Over the same time period the number of ozone monitors in the DFW area more than doubled (TCEQ 2011).

Modeling and data analyses have consistently shown that NO<sub>x</sub> reductions are far more effective at reducing ozone in DFW than VOC reductions. In 2008, biogenic emissions are 66% of the total VOCs in the DFW area. Oil and gas VOC emissions for the same area are 14% of the total VOCs. Thus, even if VOC emissions from oil and gas activities were controlled, there would be enough biogenic VOCs to carry ozone reactions forward.

Emissions of ozone and fine particle smog forming compounds from all Barnett Shale activities were approximately 191 tons per day (tpd) on an annual average basis in 2009. During the summer, VOC emissions increased raising the NO<sub>x</sub> and VOC total to 307 tpd, greater than the combined emissions from the major airports and on-road motor vehicles in the DFW area. Emissions in 2009 for air toxic compounds were approximately 6 tpd on an annual average, with peak summer emissions of 17 tpd (Armendariz 2009).

### ***Current Pollution concentrations***

“Design Concentrations” are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. Several of the pollutant concentrations are not expected to be elevated in rural areas, thus there is no available data or no monitoring conducted for several pollutants. The 2013 design concentrations of criteria pollutants are listed in Table 3.

**Table 3. 2014 Design Concentrations of Criteria Pollutants (EPA 2015: <http://www3.epa.gov/airtrends/values.html>)**

Pollutant	Design Value	Averaging period	NAAQS
O <sub>3</sub>	0.074 ppm (Eastern OK)	8-hour	0.075 ppm <sup>1</sup>
	0.074 ppm (Central OK)		
	0.073 ppm (Wichita, KS)		
	0.083 ppm (Dallas, TX)		
	0.080 ppm (San Antonio, TX)		
	0.080 ppm (Houston, TX)		
PM <sub>2.5</sub>	9.3µg/m <sup>3</sup> (Eastern OK)	Annual	12.0 µg/m <sup>3,2</sup>
	9.3 µg/m <sup>3</sup> (Central OK)		
	9.5 µg/m <sup>3</sup> (Wichita, KS)		
	10.7 µg/m <sup>3</sup> (Dallas, TX)		
	8.5 µg/m <sup>3</sup> (San Antonio, TX)		
	11.6 µg/m <sup>3</sup> (Houston, TX)		
PM <sub>2.5</sub>	21 µg/m <sup>3</sup> (Eastern OK)	24-hour	35 µg/m <sup>3,3</sup>
	21 µg/m <sup>3</sup> (Central OK)		
	23 µg/m <sup>3</sup> (Wichita, KS)		

Pollutant	Design Value	Averaging period	NAAQS
	24 $\mu\text{g}/\text{m}^3$ (Dallas, TX) 21 $\mu\text{g}/\text{m}^3$ (San Antonio, TX) 24 $\mu\text{g}/\text{m}^3$ (Houston, TX)		
PM <sub>10</sub>	No data (Eastern OK)	24-hour	150 $\mu\text{g}/\text{m}^3$ <sup>3,5</sup>
	0.0 exceedances/ year (Central OK)		
	2.2 exceedances/year (Wichita, KS)		
	0.0 exceedances/ year (Denton, TX)		
	0.0 exceedances/year (Houston, TX) 0.0 exceedances/year (San Antonio, TX)		
NO <sub>2</sub>	6 ppb (Eastern OK)	Annual	53 ppb
	7 ppb (Central OK)		
	8 ppb (Wichita, KS)		
	10 ppb (Dallas, TX)		
	11 ppb (San Antonio, TX)		
	13 ppb (Houston, TX)		
NO <sub>2</sub>	30 ppb (Eastern OK)	1-hour	100 ppb <sup>3</sup>
	51 ppb (Central OK)		
	55 ppb (Wichita, KS)		
	49 ppb (Dallas, TX)		
	33 ppb (San Antonio, TX)		
	54 ppb (Houston, TX)		
	0 ppb (Central OK)		
	No Data (Western OK) No Data ppb (Dallas, TX)		
SO <sub>2</sub>	37 ppb (Eastern OK)	1-hour	75 ppb <sup>6</sup>
	4 ppb (Central OK)		
	No Data (Wichita, KS)		
	5 ppb (Dallas, TX)		
	No data (San Antonio, TX)		
	24 ppb (Houston, TX)		
CO	0.9 ppm (Eastern OK)	8-hour	9 ppm <sup>4</sup>
	1.5 ppm (Central OK)		
	No Data (Wichita, KS))		
	1.6 ppm (Dallas, TX)		
	No Data (San Antonio, TX)		
	2.7 ppm (Houston, TX)		
CO	0.9 ppm (Eastern OK)	1-hour	35 ppm <sup>4</sup>
	0.7 ppm (Central OK)		
	No Data (Wichita, KS)		
	1.1 ppm (Dallas, TX)		
	No data (San Antonio, TX)		
	2 ppm (Houston, TX)		

<sup>1</sup> Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years

<sup>2</sup> Annual mean, averaged over 3 years

<sup>3</sup>98th percentile, averaged over 3 years

<sup>4</sup> Not to be exceeded more than once per year

<sup>5</sup> Not to be exceeded more than once per year on average over 3 years

<sup>6</sup> 99<sup>th</sup> percentile of 1-hour daily maximum concentrations, averaged over 3 years

Air quality in a given region can be measured by its Air Quality Index (AQI) value. The AQI is reported according to a 500-point scale for each of the major criteria air pollutants, with the worst denominator determining the ranking. For example, if an area has a CO value of 132 on a given day and all other pollutants are below 50, the AQI for that day would be 132. The AQI scale breaks down into six categories: good (AQI<50), moderate (50-100), unhealthy for sensitive groups (100-150), unhealthy (>150), very unhealthy and hazardous. The AQI is a national index, the air quality rating and the associated level of health concern is the same everywhere in the country. The AQI is an important indicator for populations sensitive to air quality changes.

Mean AQI values in or near the proposed lease parcels were generally in the good range (AQI<50) in 2013 (Table 4). The air quality index near the Texas parcel annually reaches “unhealthy for sensitive groups” on a number of days each year, while Oklahoma air quality has not reached “unhealthy for sensitive groups” in nearly a decade. Over the past decade, there appears to be a trend toward improved air quality, with fewer “very unhealthy” and “unhealthy” days and a downward trend in the total number of “unhealthy for sensitive groups” days in the past decade (Table 5). Recent years’ improvement in the air quality index may be due to reduced air pollution resulting from local, state and national regulations aimed at reducing ozone and particulate matter concentrations.

**Table 4. 2013 AQI Data (2014a).**

	Eastern OK	Central OK	Western OK	Denton, TX
% Days classified as “Good”	69.5%	69.4%	77.3%	70.1%
% Days classified as “Unhealthy for Sensitive Groups”	0.5%	8.2%	0.0%	5.6%
Median AQI	43	44	40	42
Maximum AQI	108	122	97	137

**Table 5. Number of Days classified as “unhealthy for sensitive groups” or worse (EPA 2014a). Unhealthy for sensitive groups/unhealthy/very unhealthy**

County	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Eastern OK	0/0	0/0	6/0	3/0	0/0	1/0	0/0	9/2	5/0	2/0
Central OK	6/0	11/0	30/1	6/0	4/0	5/0	3/0	25/0	21/0	3/0
Western OK	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Denton, TX	19/3	35/3	26/6	9/3	10/0	14/0	8/0	27/2	14/0	21/0

### 3.1.2 Climate

Kansas has what is typically described as a continental climate—meaning without the influence of any major bodies of water. Summers are warm, with the majority of the annual precipitation occurring during this period. Winters tend to be cold with an occasional mild spell and moderate snowfall amounts.

Oklahoma’s climate ranges from humid subtropical in the east to semi-arid in the west. Warm, moist air moving northward from the Gulf of Mexico often exerts much influence, particularly over the southern and eastern portions of the state, where humidity, cloudiness and precipitation are resultantly greater than in the western and northern sections. Summers are long and usually quite hot. Winters are short and less severe than those of the more northern Plains states. Periods of extreme cold are infrequent, and those lasting more than a few days are rare.

Texas lies within both “cool” and “warm” parts of the Temperate Zone of the northern hemisphere. There are three major climatic types which are classified as Continental, Mountain, and Modified Marine. There are no distinct boundaries which divide these climate types. Most of the State, climatologically, has a Modified Marine climate which is classified and named “subtropical” with four subheadings. A marine climate is caused by the predominant onshore flow of tropical maritime air from the Gulf of Mexico. The onshore flow is modified by a decrease in moisture content from east to west and by intermittent seasonal intrusions of continental air. The four subheadings of Subtropical—humid, subhumid, semi-arid and arid—account for the changes in moisture content of the northward flow of Gulf air across the State (Larkin and Bomar 1983).

**Table 6. Summary of climate components that could affect air quality in the region.**

	Average Annual Temp. (°F)	Average Daytime High in July (°F)	Average Daytime Low in January (°F)	Total Annual Precipitation (Inches)	Total Annual Snowfall (Inches)	Mean Annual Wind Speed (mph)	Prevailing Wind Direction
Lane	55.9	92.6	19.2	18.6	31.1	21.70	Southwest
Logan	53.3	91.3	15.3	18.5	25.6	22.46	Southeast
Cheyenne	53.5	92	15	20	35.1	22.79	Southwest
Sherman	52.8	90.7	14.9	18.76	25.3	21.21	Southwest
Beaver	56.2	95.0	17.3	21.27	6.3	11.0	South
Creek	60.5	95.0	26.0	40.56	7.4	6.0	South/ Southeast
Major	59.6	96.8	23.0	27.86	11.9	10.7	South/ Southwest
Dewey	56.6	92.3	20.2	25.44	8.2	9.8	South/ Southwest
Roger Mills	58.0	94.7	20.6	27.17	8.7	13	South/ Southwest
Burleson	68.7	97.0	40.4	37.8	0.3	6.0	West/ Southwest
Denton	64.5	96.0	33.0	34.8	1.4	16.3	South/ Southeast



Live Oak	70.7	98.0	43.4	26.4	0.2	5.5	South/ Southeast
McMullen	65.0	97.0	33.0	43.62	1.0	15.95	South
Trinity	66.75	95.0	38.5	40.9	0.3	14.96	East/ Southeast
Washington	66.60	95.0	38.2	40.9	0.3		East/South east

In addition to the air quality information in the Oklahoma and Texas RMPs, new information about greenhouse gases (GHGs) and their effects on national and global climate conditions has emerged since the RMP was prepared. Global mean surface temperatures have increased nearly 0.8°C (1.4°F) from 1880 to 2012 (Goddard Institute for Space Studies, 2013). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Without additional meteorological monitoring and modeling systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions; what is known is that increasing concentrations of GHGs are likely to accelerate the rate of climate change.

GHGs that are included in the US GHG 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 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 GHG emissions (including CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O; and several trace gases) on global climate. Through complex interactions on regional and global scales, these GHG emissions cause a net warming effect of the atmosphere (which make surface temperatures suitable for life on Earth), 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), 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. Increasing CO<sub>2</sub> concentrations may 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°C to 5.8°C (2.5°F 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 increase in daily minimum temperatures are 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 proposed lease parcel 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 CO<sub>2</sub> and CH<sub>4</sub>) 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 life span of the atmosphere.

## **3.2 Soils**

The varied climate and topography of Kansas, Oklahoma and Texas have combined to produce broad differences in state soils. In the eastern part of the state, soils have been developed where leaching is intense and conditions are humid. These conditions produce soils low in phosphorous and potassium, while at the same time being moderately to strongly acidic.

The Natural Resource Conservation Service (NRCS) has surveyed the soils in the proposed parcels. One of sixty-five soil types were identified as occurring in at least one of the 23 proposed parcels.

The NRCS has assigned a wind erodibility index value to each soil type. The value indicates the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. The higher the value indicates higher susceptibility and more tons per acre lost per year from wind, with the highest value being 330. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

The NRCS has also assigned an erosion Factor K, which indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised USLE to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

### **3.2.1 Farmlands, Prime or Unique**

The Farmland Protection Policy Act (FPPA), Public Law 97-98, as amended, directs Federal agencies to identify and take into account the adverse effects of Federal programs on the preservation of farmland. The FPPA is intended to minimize the extent Federal programs have on the conversion of farmland to nonagricultural uses. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, oilseed crops, and is also available for these uses. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity,

acceptable salt and sodium content, and few or no rocks. Unique farmland is land other than prime farmland that is used for the production of specific high value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop.

### **3.3 Water Resources**

#### **3.3.1 Surface water**

Kansas has five river systems and more than 50,000 streams large enough to be named. The Missouri, Kansas (commonly known as the Kaw) and Arkansas rivers are considered navigable by the state of Kansas, none of which are in the proposed lease area. Approximately 1% of the land in Cheyenne County is water. Within the county, eighteen streams are registered with the Kansas Surface Water Register. An unknown number of additional perennial and intermittent streams are located within the county, along with an unknown number of ephemeral surface water resources found in tributaries, playas, stock tanks, ponds, and wetlands. Factors that currently affect surface water resources include drought, groundwater pumping, agricultural and recreational use, and oil and gas development. Statewide, irrigation is the largest water user in Kansas, accounting for 80-85 percent of all water diverted in most years. Municipal use is the second largest water use category. About 90 percent of the water used is pumped from ground water sources.

Oklahoma and Texas both have abundant surface water resources include rivers, streams, and man-made and natural reservoirs. Oklahoma has two major river basins: the Red River and Arkansas River basins. Texas has 23 surface water basins, including 15 major river basins and eight coastal basins, each with varying hydrological regimes and abilities to provide water supplies.

Precipitation is the source of virtually all surface water in Oklahoma. The entire state is drained by the Arkansas and Red Rivers and their tributaries. A large number of reservoirs, lakes, and ponds have been constructed on rivers and streams for flood control and to provide a dependable supply of surface water for municipalities, irrigation, recreation, and generation of electricity. About 80 percent of all water used by municipalities and industries is taken from surface water sources. Each year, approximately 10.5 million acre-feet of water flows into Oklahoma through its two major river basins, while an average of 36 million acre-feet flows out of the state each year.

Texas has approximately 191,000 miles of streams and 196 major reservoirs. Texas' water availability models estimate that available surface water during drought was 13.3 million acre-feet in 2010. Of this amount, only 9.0 million acre-feet can be used as existing supply due to physical and legal constraints. Existing surface water supply is projected to decrease to 8.4 million acre-feet by 2060, primarily from sedimentation of existing reservoirs.

In Denton and Burleson Counties, Texas, portions of the proposed lease parcels (-038, -039, -040, -041, -042, -043, -044) are underneath Lake Lewisville. Parcels (-038, -039, -040, -041) in Washington County, Texas are underneath Lake Somerville. Proposed parcels (-013 and -014) are underneath the Nueces River.

### **3.3.2 Groundwater**

#### ***Kansas***

In some areas, including parts of Kansas, ground water is the only reliable source of large volumes of water. Kansans rely on ground water for 85% of their water needs, including municipal, industrial, agricultural, and rural domestic water supplies. In fact, Kansas relies on ground water to supply a higher percentage of its water needs than almost any other state in the U.S. Eastern and western Kansas differ dramatically in their reliance on ground water. In the western two-thirds of the state, where precipitation amounts are usually small, relatively abundant ground-water resources provide most of the water. Ground-water resources are limited in the eastern third of the state, but precipitation is more abundant and surface water provides most of the water supplies. Ground water supplies approximately 4.8 billion gallons per day. Municipal and rural-water supply systems provide ground water to approximately 51% of the state's population (1.2 million people). Approximately 94% of the ground water withdrawn (4.5 billion gallons per day) is used for irrigation, 2% for industry, 3% for public municipal supplies, 0.5% for livestock use, and 0.4% for rural domestic use. (Kansas Geological Survey, 2008)

#### ***Oklahoma***

Groundwater can be found throughout most of the state and is considered one of the states' most valuable resources. Groundwater supplied 18 percent of the state's drinking water. About 14.7% of the state's fresh groundwater withdrawals were for public water supply system uses. Reported domestic groundwater withdrawals in 2000 accounted for 3.3 percent of total withdrawals from the state's aquifers. Irrigation accounted for 74.5 percent of groundwater withdrawal and is the largest single use of freshwater in the state in 2000. Industrial, mining, and power generation accounted for 1.6 percent of groundwater withdrawals in 2000 (EPA 2009).

The Oklahoma Water Resources Board (OWRB) lists twenty-one major aquifers in Oklahoma. There are two types: alluvial and terrace aquifers and bedrock aquifers. Alluvial and terrace aquifers consist of sand and gravel along major rivers, including the North Canadian and Cimarron Rivers. Bedrock aquifers, such as the Central Oklahoma, the Rush Springs, Ogallala, and the Ozark Plateau aquifers, cover large areas of the state and consist of hardened materials ranging from sandstone to limestone and gypsum. Large areas of the state generally contain local, low yield aquifers or do not produce groundwater (EPA 2009).

Freshwater stored in Oklahoma's aquifers results from downward movement of precipitation and surface waters that enter each aquifer at its recharge area. The system is dynamic; aquifers are recharged continually by percolation down to the water table. The rate of ground-water movement in the state's aquifers is highly variable, probably three to one hundred feet per year in most aquifers, and may reach one hundred to one thousand feet (or more) per year, where the rock is highly porous, cavernous, or fractured (EPA 2009).

Long term groundwater level declines have not been as serious in Oklahoma as in surrounding states. Severe drought conditions in recent years are affecting the state's aquifers' ability to recover from

earlier and continuing declines. When there is an increase in rainfall water levels in most alluvial aquifers can recover more quickly from declines, than bedrock aquifers. The greatest protection against overuse of groundwater has come from the permit system operated by Oklahoma Water Resources Board to limit withdrawals (EPA 2009).

### ***Texas***

Groundwater is a major source of water in Texas, providing about 60 percent of the 16.1 million acre-feet of water used in the state. Groundwater deposits underlie about 76 percent of Texas. Texas has numerous aquifers capable of producing groundwater for households, municipalities, industry, farms, and ranches. The Texas Water Development Board (TWDB) recognizes 9 major aquifers and 21 minor aquifers.

The source of most groundwater in Texas is precipitation. Most of the recharge occurs as rainfall on the outcrops of the water-bearing formations, although lesser amounts of recharge probably result from seepage from streams that cross the outcrop areas. The water that enters the formations moves generally down the dip of the water-bearing beds into the artesian sections of the aquifers. Several factors affect recharge including: the intensity and amount of rainfall, the slope of the land surface, the type of soil, the permeability of the aquifer, the rate of evapotranspiration, and the quantity of water in the aquifer.

Between 1994 and 2004, water levels in the state's aquifers declined in some parts of the state and rose in others. Water levels continued to decline in much of the Ogallala Aquifer in West Texas, with declines greater than 40 percent in parts of the aquifer. However, other parts of the Ogallala Aquifer showed water level rises, presumably due to increased recharge resulting from fallow fields in areas of dry land farming. Water levels have risen more than 40 feet in 10 years in the Houston area because of reduced pumping to prevent land subsidence. Water levels have fallen more than 40 feet, however in the suburbs north of Houston.

Although the vast majority of groundwater used for drinking in Texas meets states and federal requirements for safety, in some parts of the state naturally occurring levels of total dissolved solids, arsenic, and radionuclides, as well as human-cause contamination, prevent the water from meeting those standards.

### ***DRASTIC Index***

The EPA developed DRASTIC to be a standardized system for evaluating groundwater vulnerability to pollution. The primary purpose of DRASTIC is to provide assistance in resource allocation and prioritization of many types of groundwater-related activities and to provide a practical educational tool. DRASTIC was not designed to deal with pollutants introduced in the shallow or deep subsurface by methods such as leaking underground storage tanks, animal waste lagoons, or injections wells. All pollution is introduced at the ground surface.

DRASTIC considers seven hydrogeologic factors including: depth to water, net recharge, aquifer media, soil media, topography, impact of the vadose zone media, and hydraulic conductivity of the aquifer. In DRASTIC methodology, each of these factors has a "range" and associated "rating." Factor "ratings,"

multiplied by their assigned “weights,” are then added together to yield a DRASTIC index, a numerical indicator of an aquifer’s relative susceptibility to impacts from surface activities in a given location. The smallest possible DRASTIC index rating is 23, and the largest is 226. The higher the DRASTIC index the greater the vulnerability of the aquifer to contamination. A site with low DRASTIC index is not free from groundwater contamination, but is less susceptible to contamination compared with the sites with high DRASTIC indices. DRASTIC ratings for the proposed parcel aquifers range from very low to very high. DRASTIC ratings will be evaluated at the Application for Permit to Drill stage.

### 3.4 Floodplains, Wetlands, Riparian Areas

#### 3.4.1 Floodplains

For administrative purposes, the 100-year floodplain serves as the basis for floodplain management for Federal actions. These are in general relatively narrow areas along natural drainage ways that carry large quantities of runoff following periods of high precipitation.

After further review, proposed parcels -002 and -005, are identified I the RMP as within mapped floodplains.

#### 3.4.2 Wetlands, Riparian Areas

Wetland habitats provide important wintering and migration habitat for several species of Migratory Birds. Wetlands also provide a link between land and water and are some of the most productive ecosystems in the world. Executive Order (EO) 11990 on the Protection of Wetlands provides opportunity for early review of Federal agency plans regarding new construction in wetland areas. Under EO 11990, each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency’s responsibilities for conduction federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating and licensing activities.

The presence or absence of wetlands within the parcels was evaluated using the National Wetland Inventory (NWI). NWI was established by the US Fish and Wildlife Service (FWS) to conduct a nationwide inventory of US wetlands to provide biologists and others with information on the distribution and type of wetlands to aid in conservation efforts. NWI developed a wetland classification system (Cowardin et al. 1979) that is now the official Federal standard for wetland classification. All but three parcels have been identified as having wetland characteristics within the parcel (Table 11).

**Table 7. Proposed parcels with wetland characteristics.**

Wetland Characteristics	Parcel
Yes – Identified in RMP	-003, -004, -005, -008, -009,
Yes – Not Identified in RMP	-002, -011, -012, -013, -014, -038, -039, -040, -041, -042, -043, -044
No	-001, -004, -006, -007, -035, -036, -037

## **3.5 Heritage Resources**

### **3.5.1 Cultural Resources**

To comply with the National Historic Preservation Act a finding of “no historic properties affected” was determined for the lease sale. Additionally, no other significant cultural resources (such as local or state listed properties, or national or state historic trails or battlefields) will be affected by the lease sales.

To support this recommendation a cultural resource background review (Class I level) was done to determine if important resources were in or near the lease sale parcel locations (CRR#BLM-NM-040-2016-01). If such were present, a consideration to withdraw a parcel from sale would be made. No important resources were identified.

The Texas and Oklahoma state historic preservation offices have informed the BLM that oil and gas lease sales are not considered to be “undertakings” as defined in the regulations (36 CFR 800) implementing section 106 of the National Historic Preservation Act because they are administrative actions that do not entail earth disturbing actions. Thorough section 106 compliance is normally done when a lease holder files an Application for Permit to Drill.

### **3.5.2 Paleontology**

When a lease a lease holder submits an Application for Permit to Drill an assessment of potential effects to paleontology resources will be made; it is only at that time that detailed engineering and well locations will be identified such that a finer assessment of potential affects can be made.

### **3.5.3 Native American Religious Concerns**

Consultation notification of the lease sale was sent to the Apache Tribe, the Cherokee Nation, the Cheyenne and Arapaho Tribes, the Comanche Nation, the Creek Nation, the Kiowa Tribe, the Osage Nation, the Kickapoo Tribe, the Alabama Quassarte Tribal Town, the Seminole Nation, the Wichita and Affiliated Tribes, Alabama-Coushatta Tribe of Texas, the Jena Band of the Choctaw, and the Tonkawa Tribe. The Comanche responded that they have no known listings in the area. None of the proposed parcels have been recommended for withdrawal from the sale. Consultations with affected tribes will also be done when a lease holder submits an Application for Permit to Drill. At that time, detailed engineering and well locations will be identified such that a finer assessment of potential affects can be made.

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

Noxious weeds can have a disastrous impact on biodiversity and natural ecosystems. Noxious weeds affect native plant species by out-competing native vegetation for light, water and soil nutrients. Noxious weeds cause \$2 to \$3 million in estimated losses to producers annually. These losses are attributed to: (1) decreased quality of agricultural products due to high levels of competition from

noxious weeds; (2) decreased quantity of agricultural products due to noxious weed infestations; and (3) costs to control and/or prevent the spread of noxious weeds.

### ***Kansas***

The State of Kansas has twelve noxious weeds and mandates that they be treated, controlled, and eradicated. The Early Detection & Distribution Mapping System (2014) at the University of Georgia has identified 76 species in Cheyenne County; 41 species in Lane County; 63 species in Logan County; and 61 species in Sherman County as being exotic to the US and listed as a problem somewhere in the US. All four counties have documented occurrences of at least one of the three state listed species (Table 12).

**Table 8. Invasive species listed by the State of Kansas.**

<b>Species</b>	<b>Documented in County</b>
Musk thistle <i>Carduus nutans</i>	Lane, Logan, Cheyenne, and Sherman
Canada thistle <i>Cirsium arvense</i>	Lane, Logan, Cheyenne, and Sherman
Field bindweed <i>Convolvulus arvensis</i>	Logan, Lane, Sherman
Hoary Cress <i>Cardaria draba</i>	None
Johnsongrass <i>Sorghum halepence</i>	Cheyenne, Lane, Logan, and Sherman
Kudzu <i>Pueraria lobata</i>	None
Leafy spurge <i>Euphorbia esula</i>	None
Pignut <i>Hoffmannseggia densiflora</i>	None
Quackgrass <i>Agropyron repens</i>	None
Russian knapweed <i>Centaurea repens</i>	None
Sericea lespedeza <i>Lespedeza cuneata</i>	None

Suitable habitat, in the form of disturbed sites, roadsides, fields, and agricultural areas, occurs within all of the proposed lease parcels, despite the species not being previously documented in the county. There is potential that all three plants may be present on the proposed parcels, although the extent is unknown.

### ***Oklahoma***

The State of Oklahoma has listed three noxious weeds and has them as a public nuisance in all counties across the state and mandates that they be treated, controlled, and eradicated. The Early Detection & Distribution Mapping System (2014) at the University of Georgia has identified 52 species in Major County; 39 species in Beaver County; 89 species in Dewey County; 51 species in Roger Mills County; and



90 species in Creek County as being exotic to the US and listed as a problem somewhere in the US. Only five counties have documented occurrences of at least one of the three state listed species (Table 12). One county (Beaver) did not have any documented state listed species.

**Table 13. Invasive species listed by the State of Oklahoma.**

Species	Documented in County
Musk thistle <i>Carduus nutans</i>	Creek, Dewey, Major, Roger Mills
Canada thistle <i>Cirsium arvense</i>	Creek, Dewey, Major, Roger Mills
Scotch thistle <i>Onopordum acanthium</i>	Creek, Dewey, Major, Roger Mills

Suitable habitat, in the form of disturbed sites, roadsides, fields, and agricultural areas, occurs within all of the proposed lease parcels, despite the species not being previously documented in the county. There is potential that all three plants may be present on the proposed parcels, although the extent is unknown.

### **Texas**

The State of Texas listed 27 plant species as having a serious potential to cause economic or ecological harm to the state (4 TAC §19.300, as amended). The EDDMS has identified 157 species in Grayson County as being exotic to the US and listed as a problem somewhere in the US. Seven of the 157 species were also listed by the State of Texas (Table 13). One species (hydrilla) is also identified on the Federal Noxious Weeds list. Sixteen additional species on the Federal Noxious Weeds list have distributions in Texas; however, EDDMS does not identify them as occurring in Grayson County.

**Table 14. Invasive and Non-native Species documented in Proposed Lease Parcel Counties.**

Species	Documented in County
Giant reed <i>Arundo donax</i>	Burleson, Denton, Houston, Live Oak, Trinity, and Washington
Balloonvine <i>Cardiospermum halicacabum</i>	Burleson and Trinity
Hydrilla <i>Hydrilla verticillata</i>	Burleson, Houston, McMullen
Alligatorweed <i>Alternanthera philoxeroides</i>	Trinity
Kudzu <i>Pueraria Montana var. lobata</i>	Denton
Hedge bindweed <i>Calystegia sepium</i>	Burleson and Trinity
Chinese tallowtree <i>Triadica sebifera</i>	Houston

Species	Documented in County
Waterhyacinth <i>Eichhornia crassipes</i>	Live Oak and Trinity
Salt cedar <i>Tamarix L.</i>	Denton and Burleson

### 3.7 Vegetation

Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. A Roman numeral hierarchical scheme has been adopted for different levels of ecological regions. Level I is the coarsest level, dividing North America into 15 ecological regions. Level II divided the continent into 52 regions. At level III, the continental U.S. contains 104 regions whereas the conterminous U.S. has 48. Level IV ecoregions are further subdivisions of level III ecoregions. In each state, there are 12 level III ecoregions. Kansas has 12 level IV ecoregions, Oklahoma has 46 level IV ecoregions and Texas has 56 level IV ecoregions with most continuing into ecologically similar parts of adjacent states.

Twelve ecoregions make up the proposed lease parcel areas (Table 14). All of the disturbed parcels have non-native species present and in some cases weedy species are more prominent.

**Table 9. Ecoregions of the proposed lease parcels.**

Parcels	Level III Ecoregion (EPA region)	Level IV Ecoregion (EPA region)	Description of Level IV Ecoregion
-001	High Plains (25)	Rolling Plains and Breaks (25b)	Plains, sand hills, depressions, and scattered, mostly stabilized dunes. Small interdune wetlands occur and are important habitat for many wetland species. Sand and silt deposits laid by rivers and reworked by wind naturally support sand sage-brush-bluestem prairie. Today, native range is found in areas too sandy or too steep for farming. Elsewhere, irrigated cropland growing grain sorghum occurs.
-002	High Plains (25)	Flat Rolling Plains (25c)	Irregular, rolling to broken plains. Natural vegetation is short grass prairie. Today less rugged areas have been widely overgrazed.
-003	Western High Plains (25)	Flat to Rolling Cropland (25d)	Was historically a mixedgrass prairie. Today, a mosaic of cropland agriculture and rangeland occurs throughout the region. Soils are silty, well drained, deep, and moderately permeable; formed in loess on uplands.
-004	Western High Plains (25)	Flat to Rolling Cropland (25d)	Natural vegetation is short grass prairie that is distinct from the mixed grass and tall grass prairies of moister ecoregions to the east; it is adapted to the ecoregion's limited, erratic precipitation and high evaporation rates. Today groundwater-irrigated cropland, mainly growing wheat and grain sorghum, is extensive. Rangeland is found on land that is too sandy or too rugged for farming; it has been widely overgrazed.
-005	Western High Plains (25)	Flat to Rolling Cropland (25d)	It was once covered by a distinctive mosaic of savanna, woodland, forest and prairie. Prairie was most extensive on fire-prone sites on soils derived from shale. Today, its undulating plains are mostly pastureland or hayland, whereas its scattered hills and ridges remain wooded.

Parcels	Level III Ecoregion (EPA region)	Level IV Ecoregion (EPA region)	Description of Level IV Ecoregion
-006	Central Great Plains (27)	Prairie Tableland (27d)	The ecoregion is nearly level, dominated by cropland, and underlain by Permian red shale, soft sandstone, and siltstone. Natural vegetation is mixed grass prairie; it is distinct from the sand sagebrush–bluestem prairie.
-007	High Plains (25)	Canadian/Cimarron High Plains (25e)	Natural vegetation is short grass prairie; it is adapted to the ecoregion's limited, erratic precipitation and high evaporation rates. Today, groundwater-irrigated cropland, mainly growing wheat and grain sorghum, is extensive. Rangeland is found on land that is too sandy or too rugged for farming; it has been widely overgrazed.
-008	Central Great Plains (27)	Gypsum Hills (27n)	Gypsum is widely exposed and especially significant; it is prone to chemical erosion, forms karst features such as solution caves and cavities, and impacts both soil and vegetation. Solution caves are important shelter and hibernating sites for wildlife and serve as summer roosts for bats.
-009	Central Great Plains (27)	Rolling Red Hills (27o)	Rough plains that are covered by prairie grasses and eastern redcedar, scattered oaks and elms. Terrain and vegetation are transitional between the less rugged, grass-covered ecoregions to the west and the hilly, oak savanna regions to the east. The abundance of upland trees and the number of tree species have greatly increased due, in part, to fire suppression. Natural riparian forests and wetlands have been degraded or lost due to channelization and land use changes. Today, land use is a mixture of rangeland and cropland.
-011	Cross Timbers (29)	Northern Cross Timbers (29h)	Blackjack oak-post oak savanna occurs on sandy soils, tall grass prairie is native on fine-textured soils, and forests dominated by sugar maple grow in the shelter of larger canyons. Eastern redcedar is native fire-protected areas; it is now common due to the combined effects of grazing and fire suppression. Cultivation has largely destroyed the native prairie.
-012	Central Great Plains (27)	Pleistocene Sand Dunes (27l)	Widely support sand sagebrush–bluestem prairie, but where moisture is sufficient, oak savanna stabilizes dunes. Small interdune wetlands occur where the water table is high; they are important habitat for migrating shorebirds and waterfowl.
-013	Southern Texas Plains (31)	Texas-Tamaulpan Thomscrub (31c)	Cut by arroyos and streams, and covered with low-growing vegetation. The thorn woodland and thorn shrubland vegetation is distinctive, and these Rio Grande Plains are commonly called the “brush country”. Three cen
-014	Southern Texas Plains (31)	Texas-Tamaulpan Thomscrub (31c)	Cut by arroyos and streams, and covered with low-growing vegetation. The thorn woodland and thorn shrubland vegetation is distinctive, and these Rio Grande Plains are commonly called the “brush country”.
-034	Southern Central Plains (35)	Southern Tertiary Uplands	Longleaf pine often occurred on sand ridges and uplands, but open forests are also found. On more mesic sites, some American beech or magnolia-beech-loblolly pine forests occurred.

Parcels	Level III Ecoregion (EPA region)	Level IV Ecoregion (EPA region)	Description of Level IV Ecoregion
-035	Southern Central Plains (35)	Southern Tertiary Uplands (35e)	Longleaf pine often occurred on sand ridges and uplands, but open forests are also found. On more mesic sites, some American beech or magnolia-beech-loblolly pine forests occurred.
-036	Southern Central Plains (35)	Southern Tertiary Uplands (35e)	Longleaf pine often occurred on sand ridges and uplands, but open forests are also found. On more mesic sites, some American beech or magnolia-beech-loblolly pine forests occurred.
-037	Southern Central Plains (35)	Southern Tertiary Uplands (35e)	Longleaf pine often occurred on sand ridges and uplands, but open forests are also found. On more mesic sites, some American beech or magnolia-beech-loblolly pine forests occurred.
-038	East Texas Southern Plains (33)	Southern Post Oak Savanna (33b)	Historically a post oak savanna, current land cover is a mix of post oak woods, improved pasture, and rangeland, with some invasive mesquite to the south.
-039	East Texas Southern Plains (33)	Southern Post Oak Savanna (33b)	Historically a post oak savanna, current land cover is a mix of post oak woods, improved pasture, and rangeland, with some invasive mesquite to the south.
-040	East Texas Southern Plains (33)	Southern Post Oak Savanna (33b)	Historically a post oak savanna, current land cover is a mix of post oak woods, improved pasture, and rangeland, with some invasive mesquite to the south.
-041	East Texas Southern Plains (33)	Southern Post Oak Savanna (33b)	Historically a post oak savanna, current land cover is a mix of post oak woods, improved pasture, and rangeland, with some invasive mesquite to the south.
-042	East Texas Southern Plains (33)	Southern Post Oak Savanna (33b)	Historically a post oak savanna, current land cover is a mix of post oak woods, improved pasture, and rangeland, with some invasive mesquite to the south.
-043	East Texas Southern Plains (33)	Southern Post Oak Savanna (33b)	Historically a post oak savanna, current land cover is a mix of post oak woods, improved pasture, and rangeland, with some invasive mesquite to the south.
-044	Cross Timbers (29)	Grand Prairie (29d)	The original vegetation was tallgrass prairie in the upland areas and elm, pecan, and hackberry in riparian areas where deeper soils have developed in floodplain deposits or where the underlying clays have been exposed by limestone erosion.

## 3.8 Wildlife

### 3.8.1 Threatened and Endangered Species

The purpose of the Endangered Species Act (ESA) is to ensure that federal agencies and departments use their authorities to protect and conserve endangered and threatened species. Section 7 of ESA requires that federal agencies prevent or modify any projects authorized, funded, or carried out by the agencies that are "likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat of such species."

### 3.8.2 Special Status Species

Wildlife species may be classified as threatened or endangered at either the state or the federal level. Federally, a species is listed as threatened or endangered under ESA and protection of the species is overseen by the US Fish and Wildlife Service. At a state level, Kansas, Oklahoma and Texas has an endangered species statute that gives the state the authority to list a wildlife species as threatened or endangered within the state although it might not be classified as threatened or endangered federally through ESA.

### 3.8.3 Migratory Birds

Executive Order (EO) 13186, 66 Fed. Reg. 3853, (January 17, 2001) identifies the responsibility of federal agencies to protect migratory birds and their habitats, and directs executive departments and agencies to undertake actions that will further implement the Migratory Bird Treaty Act (MBTA). Under the MBTA, incidental, unintentional, and accidental take, killing, or possession of a migratory bird or its parts, nests, eggs or products, manufactured or not, without a permit is unlawful. EO 13186 includes a directive for federal agencies to develop a memorandum of understanding (MOU) with the USFWS to promote the conservation of migratory bird populations, including their habitats, when their actions have, or are likely to have, a measurable negative effect on migratory bird populations.

For the purpose of this biological evaluation, the term “migratory birds” applies generally to native bird species protected by MBTA. This includes native passerines (flycatchers and songbirds) as well as birds of prey, migratory waterbirds (waterfowl, wading birds, and shorebirds), and other species such as doves, hummingbirds, swifts, and woodpeckers. The term “migratory” is a misnomer and should be interpreted broadly to include native species that remain in the same area throughout the year as well as species that exhibit patterns of latitudinal or elevational migration to avoid winter conditions of cold or a shortage of food. For most migrant and native resident species, nesting habitat is of special importance because it is critical for supporting reproduction in terms of both nesting sites and food. Also, because birds are generally territorial during the nesting season, their ability to access and utilize sufficient food is limited by the quality of the territory occupied. During non-breeding seasons, birds are generally non-territorial and able to feed across a larger area and wider range of habitats.

Among the wide variety of species protected by the MBTA, special concern is usually given to the following groups:

- Species that migrate across long distances, particularly Neotropical migrant passerines that winter in tropical or Southern Hemisphere temperate zones.
- Birds of prey, which require large areas of suitable habitat for finding sufficient prey.
- Species that have narrow habitat tolerances and hence are vulnerable to extirpation from an area as a result of a relatively minor habitat loss.
- Species that nest colonially and hence are vulnerable to extirpation from an area and hence are vulnerable to extirpation from an area as a result of minor habitat loss.

### **3.8.4 Wildlife**

There is a variety of wildlife that occurs or has the potential to occur in the proposed parcels including: turkey, white-tailed deer, squirrels, chipmunks, rabbits, cottontails, gophers, armadillos, coyotes, skunks, fox, bobcat, opossums, raccoon, free-tailed bats, cave myotis, several species of rats and mice, numerous bird species, and several species of lizards, and venomous and non-venomous snakes.

### **3.9 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. The EPA regulations define solid wastes as any “discarded materials” subject to a number of exclusions. On January 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 currently known to be present on any of the proposed lease parcels. However, hazardous and/or solid wastes may be used during the development phase. See Appendix 3—Phases of Oil and Gas Development for a description of anticipated wastes.

### **3.10 Mineral Resources**

#### ***Kansas***

The economic value of natural gas and petroleum far exceeds all other natural resources produced in the state. Natural gas and petroleum remain the most important energy resources in Kansas, accounting for nearly all primary energy produced in the state. Of the U.S. states, Kansas is ranked eighth in natural gas production and ninth in oil production. Kansas is also the leading U.S. producer of helium, a product of natural gas, mostly from the Hugoton field.

Industrial minerals that are produced in Kansas include limestone (cement, crushed rock, and building stone), sand and gravel, clay and shale, gypsum, and salt. Lead and zinc mining ceased in 1970, and only one small coal mine still operates in eastern Kansas.

Sand and gravel operations are the most common and widespread of the natural resource facilities in the state. Most of the over 400 dredges and pits are located along the state's major river systems, the Kansas River in northeastern Kansas and the Arkansas River in central and western Kansas.

Gypsum is used as a cement additive and to produce gypsum wallboard (sheetrock) and a variety of plasters. Gypsum is produced from open pits and underground mines. A facility in south-central Kansas is one of the larger mines and plants in the U.S.

Thick salt deposits in central Kansas are mined with underground and solution mining. The underground operations produce salt that contains impurities (shale and anhydrite) that restricts its use to applications such as road de-icing. Solution-mined salt, produced by dissolving the salt with water and then evaporating the brine, is suitable for table salt and other uses requiring purity.

More than 100 years of oil and gas development in Kansas has resulted in an extensive infrastructure of existing roads and pipelines. Kansas has approximately 32,000 active wells. The BLM's records indicate a total of 639 active wells on Federal leases in the state. Impacts from this development would remain on the landscape until final abandonment and reclamation of facilities occurs as wells are plugged when they are no longer economically viable. (BLM 1991).

#### ***Oklahoma***

Oklahoma's mineral resources include: nonfuel minerals such as limestone, gypsum, salt, clays, iodine, and sand and gravel; coal; and petroleum. In recent years, the mineral industry has been the State's greatest source of revenue. Although Oklahoma's petroleum production accounts for about 95 percent of Oklahoma's annual mineral output, nonfuel minerals and coal represent a significant part of the current economy and an important source of future wealth. Leading commodities produced include crushed stone, Portland cement, construction sand and gravel, industrial sand and gravel, iodine, and Grade A helium (USGS 2011). Other commodities now produced in Oklahoma, or for which there are current mining permits, include clays and shale, salt, lime, granite, rhyolite, dolomite, sandstone, volcanic ash, coal, and Tripoli. Deposits and resource that are not mined now, or with no current mining permits, include asphalt, lead, zinc, copper, iron, manganese, titanium, and uranium.

The Federal mineral estate (oil and gas) in Oklahoma totals 1,998,932 acres, with 330,800 (20%) acres currently leased. Most of the state is in a high oil and gas occurrence and development potential category (BLM 1993).

### ***Texas***

Texas has produced more oil and natural gas than any other state and to date remains the largest daily producer. Oil and natural gas are found in most parts of the state. No state or any other region worldwide has been as heavily explored or drilled for oil and natural gas as Texas. As of October 30, 2013, the Railroad Commission of Texas (RRC) lists 412,660 wells (active and inactive well but not including plugged and abandoned) statewide (RRC 2013). In Texas, an average of 409,298,430 barrels (BBL) of crude oil and 7,608,711,578 thousand cubic feet (MCF) were produced from 2007-2012 (RRC 2013a). Oil and natural gas production in Texas can be divided into seven major producing basins. The Permian Basin dominates oil production in the state, and the Gulf Coast Basin dominates natural gas production. Major oil fields in Texas include Wasson, Yates, and Spraberry in West Texas, as well as the largest Texas oil field, East Texas field in the East Texas Basin. Major natural gas fields in Texas include Newark East field in the Fort Worth basin; Carthage field in East Texas; Panhandle, West, field in the Anadarko Basin; and Giddings field in the Gulf Coast basin (Kim and Ruppel 2005).

### **3.11 Visual Resources**

BLM Manual H-8410-1 lays out the visual resource inventory process for determining visual values. The inventory consists of scenic quality evaluation, sensitivity level analysis, and a delineation of distance zones. The purpose of the analysis is to determine the area's Visual Resource Management Class (VRM), which defines the degree of acceptable visual change within a characteristic landscape on BLM lands. Because the proposed parcels are on private surface a VRM class has not been established for the areas.

The existing landscape throughout all of the proposed parcel counties include oil and gas development visual impacts from facilities, lease roads, pipelines, utility lines, and above ground components such as tanks, pumpjacks, wellheads, fences, and signs. Visual impacts from agricultural/farming and timber production activities include croplands, pastures, timber plots, clear cuts, outbuildings (i.e. barns, storage sheds, and chicken coops), irrigation pipes/ditches/pivots, and improved and unimproved roads to access outbuildings, crops, pastures, plots, etc. Oil/gas development, agriculture/farming, and timber production facilities are readily visible from residences, highways, and country roads in all of the counties, including each proposed parcel.

The Rio Grande River in Texas has been designated as wild and scenic river. None of the proposed lease parcels in Texas adjoin any part of the Rio Grande River. There are no designated wild and scenic rivers in Kansas or Oklahoma.



## **3.12 Recreation**

With all of the different ecoregions across the three state area, there is a diverse collection of wildlife species to watch, hunt, or fish. Through intense habitat conservation and management each State wildlife department is able to provide quality hunting opportunities across each state for species such as: antelope, bear, dove, crane, deer, elk, furbearers (e.g. coyotes, bobcat, raccoon), feral hogs, mountain lion, quail, peregrine, pheasant, rabbit, squirrel, turkey, and waterfowl.

Outdoor recreation occurs in or near each of the proposed parcels to some degree in the form of hunting, wildlife watching, off-highway vehicle driving, equestrian riding, biking and hiking. Because most of the proposed parcels are on private land, the degree of recreation in or near each proposed parcel is limited by access. Recreation on these parcels typically is limited to individuals who have permission to access the land from the landowner. Parcels -011, -012, -013, -014, -035, -036, -037, -038, -039, -040, -041, -042, -043, and -044 are public land owned by another surface management agency and access to the public is determined by the specific agency.

## **3.13 Socioeconomics and Environmental Justice**

### **3.13.1 Socioeconomics**

#### ***Kansas***

Kansas's economy is based upon a combination of agriculture production, manufacturing, service industries and mineral extraction. Kansas has ranked among the top 10 or 15 states in agricultural production and minerals extraction annually. Kansas is the leading wheat producing state; over one sixth of the Nations wheat is produced on Kansas farms.

The Kansas economy has expanded from its original base in agribusiness into an economy with a diverse mix of growing industries. Wichita remains one of the great aviation hubs on the planet, earning the city the title of "Air Capital of the World." The state is one of the nation's fastest-growing bioscience hubs thanks to the under-construction National Bio and Agro-Defense Facility and the Kansas City Animal Health Corridor, a region that houses the world's largest concentration of animal health interests. Kansas has also emerged as a leader in wind energy and other forms of renewable energy, food processing and distribution.

The top five agricultural products grown or raised in Kansas include cattle and calves, wheat, corn, sorghum, and soybeans. Kansas is ranked first grain sorghum production, growing more than 46% of the nation's crop. Kansas is ranked second in sorghum for silage production and wheat production. Kansas is ranked third in cattle production and beef processing, and fourth in sunflower production. (BEA 2012)

#### ***Oklahoma***

Oklahoma's population of nearly 3.8 million is mostly urban, with almost 70 percent of the State's population residing in cities or towns. While over 90 percent of the State's land is in farms and ranches,

the large size of typical Oklahoma farms and modern farming methods have resulted in relatively few people residing in rural areas.

Oklahoma's economy is based upon a combination of agriculture production, manufacturing, service industries and mineral extraction. Manufacturing contributes \$18.6 billion to Oklahoma's economy and has been the fastest growing industry in the state. The oil and gas industry is a major contributor to the Oklahoma economy bringing in \$15.9 billion through the extraction of more than 13 million barrels of oil and over 54 trillion cubic feet of natural gas (BEA 2012).

In and near all of the proposed parcels, the economy is very dependent on agricultural and livestock production. Crops grown include wheat, corn, grain sorghum, forage sorghum and alfalfa. Beef cattle are the predominant livestock produced in some of the proposed parcels. Oil and gas production is widespread and very important to each proposed parcel county. Other minerals, except for coal in Coal and Le Flore County, are of minor importance.

### ***Texas***

Texas added 4,293,741 residents in the last decade (2000-2010), a 20.6 percent increase to a new population total of 25,145,561 people. Texas nationally ranked number 1 for the highest numeric increase in population and number 2 as the most populous state, behind California. Texas' rapid growth over the past decade was almost entirely concentrated in its major urban areas. The Dallas-Ft. Worth and Houston metro areas together accounted for almost half of the population of Texas and over half of the state's growth.

The economy of Texas is one of the largest and most rapidly growing economies in the United States. As of 2013 is home to six of the top 50 companies on the Fortune 500 list. Texas is the largest exporter of goods and grosses more than \$100 billion a year in trade with other nations. The top eleven industries contributing to Texas' economy include: manufacturing; mining and logging; construction; service-providing industries; professional and business services; education and health services; financial activities; trade, transportation and utilities; information, leisure and hospitality; other services; and government.

Texas saw an increase in employment in 2012, gaining 260,800 seasonally adjusted nonfarm jobs, representing an annual growth of 2.5 percent. Over the same period, U.S. nonfarm employment only rose 1.4 percent. All Texas industries except the information industry saw job increases. The state's trade, transportation, and utilities industries ranked first in job creation, adding 56,000 jobs for an annual employment growth rate of 2.6 percent in 2012. The leisure and hospitality services ranked second in job creation, adding 47,500 jobs for a 4.5 percent rate increase. Construction was the state's fastest growing industry segment, with a 6.6 percent growth rate and 36,800 added jobs. The Texas unemployment rate remained below the national unemployment rate in 2012 and even decreased in 2012 (EDT 2013).

### **3.14.2 Environmental Justice**

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The impetus behind environmental justice is to ensure that all communities, including minority, low-income or federally recognized tribes, live in a safe and healthful environment. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work. Executive Order 12989, issued on 11 February 1994, addresses concerns over disproportionate environmental and human health impacts on minority and low-income populations. Under Executive Order 12898 agencies must develop strategies that identify and address these effects by: promoting enforcement of all health and environmental statutes in areas with minority and low-income populations; ensuring greater public participation; improving research and data collection relating to the health and environment of minority and low-income populations; and identifying differential patterns of consumption of natural resources among minority and low-income populations.

## **4.0 ENVIRONMENTAL CONSEQUENCES**

---

### **4.1 Assumptions for Analysis**

The act of leasing parcels would, by itself, have no impact on any resources in the OFO. All impacts would be linked to as yet undetermined future levels of lease development. The effects of oil and gas leasing in Kansas, Oklahoma and Texas are analyzed in the Kansas RMP (1991), Oklahoma RMP (1994), as amended, and Texas RMP (1996), as amended (Chapter 4). That analysis, which assumes that the impacts from an average well, pipeline and access road would total 4.25 acres of surface disturbance in Kansas; and 5.65 acres of surface disturbance in Oklahoma and Texas is incorporated by reference into this document.

The surface of proposed lease parcels -011, -012, -013, -014, -038, -039, -040, -041, -042, -043, and -044 are all managed by other surface management agencies, which have added No Surface Occupancy stipulations to parcels under their jurisdiction. As a result of these stipulations, accessing the minerals in these leases would occur through directional drilling where surface disturbance would occur outside the boundaries of the lease parcel. Exploration/development of the lease would produce no effect on any resources, except for minerals, within the boundaries of the lease parcel as a result of the no surface occupancy stipulation. However, when the minerals are accessed from a surface location outside the lease parcel, effects to the resources at the access site are likely. The effects described in section 4.3 apply to all proposed lease parcels, assuming that the three parcels are accessed through directional drilling with surface disturbance outside the proposed lease parcel boundaries.

If lease parcels were developed, short-term impacts would be stabilized or mitigated within five years and long-term impacts are those that would substantially remain for more than five 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, all of the proposed parcels would be deferred and not offered for sale. Analysis of the No Action alternative is presented in the following sections. 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.

#### **4.2.1 Mineral Resources**

There would be no new impacts from oil and gas production on the proposed parcel land. Oil and gas development of federal, state, private, and Indian minerals would continue on the land surrounding the proposed parcels. No additional natural gas or crude oil from the proposed parcels would enter the public markets and no royalties would accrue to the federal or state treasuries. An assumption is that the No Action Alternative (no lease option) would not affect current domestic production of oil and gas. However, this may result in reduced Federal and State royalty income, and the potential for Federal land to be drained by wells on adjacent private or state land. Oil and gas 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 the proposed parcels, the assumption is that the public's demand for the resource would not be expected to change. Instead, the mineral resource foregone 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 offset in supply would result in a no net gain for oil and gas domestic production.

#### **4.2.2 Environmental Justice**

By not leasing the proposed parcels under the No Action Alternative, there may be negative effects on the overall employment opportunities related to the oil and gas and service support industry, as well as a loss of the economic benefits to state and county governments related to royalty payments and severance taxes. However, there would be no increase in activity and noise associated with these proposed leases unless the land is used for other purposes.

#### **4.2.3 All Other Resources**

No other resources would be affected under the No Action Alternative, as there would be no surface disturbance that could detrimentally affect these resources. The No Action Alternative would result in the continuation of the current land and resource uses on the parcels. However, the selection of the no action alternative would not preclude these parcels from being nominated and considered in a future lease sale, which would result in impacts as described under the action alternatives.

### **4.3 Effects from the Proposed Action**

#### **4.3.1 Air Resources**

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

While the act of leasing Federal minerals would produce no impacts to air quality, subsequent exploration/development of the proposed lease could increase air borne soil particles blown from new well pads or roads, exhaust emissions from drilling equipment, compressor engines, vehicles, dehydration and separation facilities coupled with volatile organic compounds during drilling or production activities.

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, electrical lines compressor station), number of days to complete each kind of construction, number of days for each phase of the 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 geological formations from which production occurs. Currently, it is not feasible to directly quantify emissions. What can be said is that emissions associated with oil and gas exploration and production would incrementally contribute to increases in air quality emissions into the atmosphere.

During drilling and completion, the following source of emissions are anticipated during any oil and gas exploration or development: combustion engines (i.e. fossil fuel fired internal combustion engines used to supply electrical or hydraulic power for hydraulic fracturing to drive the pumps and rigs used drill the well, drill out the hydraulic stage plugs and run the production tubing in the well; generators to power drill rigs, pumps, and other equipment; compressors used to increase the pressure of the oil or gas for transport and use; tailpipe emissions from vehicles transporting equipment to the site), venting (i.e. fuel storage tanks vents and pressure control equipment), mobile emissions (i.e. vehicle bringing equipment, personnel, or supplies to the location) and fugitive sources (i.e. pneumatic valves, tank leaks, dust). A number of pollutants associated with combustion of fossil fuels are anticipated to be released during drilling including: CO, NO<sub>x</sub>, SO<sub>2</sub>, Pb, PM, CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O. Venting may release VOC/HAP, H<sub>2</sub>S, and CH<sub>4</sub>. Mobile source emissions are likely to include fugitive particulate matter from dust or inordinate idling. The actual emissions of each pollutant will be entirely dependent on the factors described in the previous paragraph.

During the completion phase, the most significant emissions of criteria pollutants emitted by oil and gas operations in general are VOCs, particulate matter and NO<sub>2</sub>. VOCs and NO<sub>x</sub> contribute to the formation of ozone, which is a pollutant of concern in Oklahoma and Texas. Data provided to EPA's Natural Gas STAR Program show that some of the largest air emissions in the natural gas industry occur as natural gas wells that have been fractured are being prepared for production. During well completion, "flowback", fracturing fluids, water, and reservoir gas come to the surface at high velocity and volume. This mixture includes a high volume of VOCs and methane, along with air toxics such as benzene, ethylbenzene, and n-hexane. The typical flowback process lasts from three to 10 days. Pollution also is emitted from other processes and equipment in during production and transportation of the oil and gas from the well to a processing facility.

All proposed parcels except -035, -036, -037, -038, -039, -040, -041, -042, -043, and -044 are a significant distance (>75 miles) from any nonattainment areas, while all proposed parcels are a significant distance (>50 miles) from any Class I airsheds. The additional NO<sub>x</sub> and VOCs emitted from any new oil and gas development, by means of just drilling or drilling *and* hydraulic fracturing the well, on these leases are

anticipated to be too small to have a significant effect on the overall ozone levels of the area Dallas-Ft. Worth “non-attainment” area near parcel -041 and -042. The increase in particulate matter is also expected to be too small to have a significant effect on the overall air quality of the Class I airsheds or to the overall PM<sub>10</sub> levels of the Lamar, CO “non-attainment” area.

Although the hydraulic fracturing of wells within a lease parcel is hard to predict, it is anticipated that with more wells being drilled, there will be an increase in the amount of wells being hydraulically fractured and completed. There is a higher probability of dust particulates in the atmosphere from the increase in vehicular traffic due to the increase in the number of wells hydraulically fractured.

### ***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, flared 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 reclaim areas of the pad not required for production facilities and to reduce the amount of dust from the pads. In addition, the BLM encourages oil and natural gas companies to adopt proven, cost-effective technologies and practices that improve operational efficiency and reduce natural gas emissions.

In October 2012, EPA promulgated air quality regulations for completion of hydraulically fractured gas wells. These rules require air pollution mitigation measures that reduce the emissions of volatile organic compounds during gas well completions. Mitigation includes a process known as “Green Completion” in which natural gas brought up during flowback must be recaptured and reroute into the gathering line.

#### ***4.3.1.2 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 science 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.

While the act of leasing Federal minerals would have no impact on climate as a result of GHG emissions, subsequent exploration/development of the proposed lease could have effects on global climate through GHG emissions. However, those effects on global climate change cannot be determined. (Refer to cumulative effects section, 4.3.15). It is unknown whether the petroleum resources specific to these leases in the Proposed Action are gas or oil or a combination thereof.

Production statistics developed from EIA and DOI are shown in Table 17 for the US, Oklahoma, and Texas, as well as federal mineral estate in each state obtained from BLM's Automated Fluid Minerals Support System (AFMSS).

**Table 10. 2014 Oil and Gas Production, (U.S. Department of Interior Office of Natural Resources Revenue, 2015), (U.S. Energy Information Administration, 2015), (U.S. Energy Information Administration, 2015a)**

Location	Oil (bbl)	% U.S. Total	Gas (MMcf)	% U.S. Total
United States	3,161,866,000	100	27,271,326	100
Kansas	49,521,000	1.6	292,467*	1.1
Federal leases KS	267,542	0.01	4,807	0.02
Oklahoma	128,026,000	4.0	2,310,114	8.5
Federal leases OK	253,262	0.01	12,267	0.05
Texas (onshore)	1,154,855,000	36.5	8,627,615	31.6
Federal leases TX	411,954	0.02	35,086	0.14

In order to estimate the contribution of Federal oil and gas leases to greenhouse gases in Kansas, Oklahoma and Texas it is assumed that the percentage of total U.S. production is comparable to the percentage of total emissions. Therefore, emissions are estimated based on production starting with total emissions for the United States from EPA's *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2010* (EPA, 2015), and applying production percentages to estimate emissions for Texas. It is understood that this is a rather simplistic technique and assumes similar emissions in basins that may have very different characteristics and operational procedures, which could be reflected in total emissions. This assumption is adequate for this level of analysis due to the unknown factors associated with eventual exploration and development of the leases. However, the emissions estimates derived in this way, while not precise, will give some insight into the order of magnitude of emissions from federal oil and gas leases administered by the BLM and allow for comparison with other sources in a broad sense.

Table 7 shows the estimated greenhouse gas emissions for oil and gas field production for the U.S., Kansas, Oklahoma, Texas, and Federal leases in Kansas, Oklahoma and Texas. Because oil and gas leaves the custody and jurisdiction of the BLM after the production phase and before processing or refining, only emissions from the production phase are considered here. It should also be remembered that



following EPA protocols, these numbers do not include fossil fuel combustion which would include such things as truck traffic, pumping jack engines, compressor engines and drill rig engines. Nor does it include emissions from power plants that generate the electricity used at well sites and facilities. The estimates are only for operations, not for construction and reclamation of the facilities, which may have a higher portion of a project's GHG contribution. Note that units of Metric tons CO<sub>2</sub><sup>e</sup> have been used in the table above to avoid very small numbers. CO<sub>2</sub><sup>e</sup> is the concentration of CO<sub>2</sub> that would cause the same level of radiative forcing as a given type and concentration of greenhouse gas.

Table 7 also provides an estimate of direct emissions that occur during production of oil and gas. This phase of emissions represents a small fraction of overall emissions of CO<sub>2</sub><sup>e</sup> from the life cycle of oil and gas. For example, acquisition (drilling and development) for petroleum is responsible for only 8% of the total CO<sub>2</sub>e emissions, whereas transportation of the petroleum to refineries represents about 10% of the emissions, and final consumption as a transportation fuel represents fully 80% of emissions (U.S.DOE, NETL, 2008).

**Table 7. 2013 Oil and Gas Field Production Potential Emissions (U.S. EPA, 2015)**

Location	Oil (Metric Tons CO <sub>2</sub> e)		Gas (Metric Tons CO <sub>2</sub> e)		Total O&G Production (Metric Tons CO <sub>2</sub> e)	%U.S. Total GHG Emission s
	CO <sub>2</sub>	CH <sub>4</sub>	CO <sub>2</sub>	CH <sub>4</sub>		
<b>United States</b>	500,000	31,300,000	15,900,000	47,000,000	94,700,000	1.42
<b>Kansas</b>	8,000	500,800	174,900	51,700	735,400	0.011
<b>Federal Leases KS</b>	50	3,130	3,180	9,400	15,760	.00024
<b>Oklahoma</b>	20,000	1,252,000	1,351,500	3,995,000	6,618,500	0.099
<b>Federal Leases OK</b>	50	3,130	7,950	23,500	34,630	0.00052
<b>Texas</b>	182,500	11,424,500	5,024,400	14,852,000	31,483,400	0.47
<b>Federal Leases TX</b>	100	6,260	22,260	65,800	94,420	0.0014

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 (CEQ), and thus are not required to be analyzed under NEPA. GHG 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 GHG emissions resulting from consumption.

### ***Mitigation***

The EPA's GHG emissions data describes "Natural Gas Systems" and "Petroleum Systems" as two major categories of US sources of GHG 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 water (via leaks, spills and unauthorized flaring and venting).

The EPA data show that improved practices and technology and changing economics have reduced CO<sub>2</sub> emissions from oil and gas exploration and development (Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2010 (EPA 2012)). One of the factors in this improvement is the adoption by industry of the BMPs proposed by the EPA's Natural Gas Energy Star program. The OFO will work with industry to facilitate the use of the relevant BMPs for operations proposed on Federal mineral leases where such mitigation is consistent with agency policy. While EPA data shows that methane emissions increased from oil and gas exploration and development from 1990-2010, reductions in methane emissions from oil and gas exploration and development should occur in future years as a result of EPA's recently finalized oil and gas air emissions regulations.

### **4.3.2 Soils**

While the act of leasing Federal minerals would produce no impacts to soils, subsequent exploration/development of the proposed lease may produce impacts by physically disturbing the topsoil and exposing 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 topsoil productivity and soil 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 during all phases of development. Vehicle traffic related wind erosion would be limited to approved travel routes in which the surface has not been paved or dressed in a material to prevent soil movement. The extent of wind erosion related to vehicle traffic will be dependent on a number of factors including: length of well bore; whether hydraulic fracturing is used during completion; whether telemetry is used during production; or whether the well is gas, oil, condensate, or a combination thereof. 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 on well sites, access roads, gas pipelines and facilities.

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.

Contamination of soil from drilling, hydraulic fracturing, and production wastes mixed into soil or spilled on the soil surfaces could cause a long-term reduction in site productivity. Contaminants spilled on soil would have the potential to pollute and/or change the soil chemistry. See section 4.3.10 – Wastes, Hazardous or Solid for a more in-depth analysis of spill contamination. These direct impacts can be reduced or avoided through proper design, construction, maintenance and implementation of BMPs.

### ***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.

During the life of the development, all disturbed areas not needed for active support of production operations should undergo “interim” reclamation in order to minimize the environmental impacts of development on other resources and uses. Upon abandonment of wells and/or when access roads are no longer in service final reclamation would be implemented. Earthwork for interim and final reclamation must be completed within 6 months of well completion or well plugging (weather permitting).

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

Fluid impermeable containment systems (i.e. liners, dikes, berms) would be placed in, under and/or around any tank, pit, drilling cellar, ditches associated with the drilling process, or other equipment that use or has the potential to leak/spill hazardous and non-hazardous fluids, to completely prevent soil contamination (e.g. liners) at the site or to prevent the spill from going beyond the immediate site (e.g. dikes, berms).

#### ***4.3.2.1 Farmlands, Prime or Unique***

While the act of leasing Federal minerals would produce no impacts to prime or unique farmlands, subsequent exploration/development of the proposed lease would remove the area from production for the life of the well. Direct impacts resulting from the construction of well pads, access roads, and reserve pits can affect the soil properties, increase erosion, and reduce water infiltration potentially affecting the characteristics unique to prime or unique farmlands.

The amount of farmlands lost depends on the amount and type of development proposed during the APD process. It is anticipated that there would be no permanent loss of prime or unique farmland once all reclamation activities are complete. Initial construction and development would result in greater surface disturbance and more area temporarily lost for production. Acres not needed during the production phase would be reclaimed and returned to prime or unique farmlands suitable for production. When the well is no longer productive, the entire site would be reclaimed and returned to prime or unique farmlands.

### ***Mitigation***

During the APD process, efforts would be made to relocate the disturbance onto soils identified as “not prime farmland”; however, if relocation is not an option the following mitigation measure would be placed on the project.

When removing soil, the three major mineral soil horizons (A, B, and C) would be removed and stockpiled independent of one another. All separation would occur prior to implementation of any other construction activities. During the interim and final reclamation phases, the three independently stockpiled soil layers would be replaced in the reverse order that they were removed with the C horizon placed first followed by B, then A.

The soil and water resources mitigation measures would also minimize the impacts to prime or unique farmlands.

### **4.3.3 Water Resources**

While the act of leasing Federal minerals would produce no impacts to water resources, subsequent exploration/development of the proposed lease may produce impacts. Surface disturbance from the construction of well pads, access roads, pipelines, and utility lines can result in degradation of surface water and groundwater quality from non-point source pollution, increased soil losses, and increased gully erosion.

### ***Quality***

Potential impacts that would occur due to construction of well pads, access roads, fracturing ponds, pipelines, and utility lines include increased surface 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 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 would likely be greater.

Contamination of groundwater could occur without adequate cementing and casing of the proposed well bore. For fracturing fluid to escape the wellbore and affect the usable quality water or contaminate or cross contaminate aquifers, the fluid would have to breach several layers of steel casing and cement. Failure of the cement or casing surrounding the wellbore is a possible risk to water supplies. If the annulus is improperly sealed, natural gas, fracturing fluids, and formation water containing high concentrations of dissolved solids may be transferred directly along the outside of the wellbore among the target formation, drinking water aquifers, and layers of rock in between. Complying with BLM and state regulations regarding casing and cementing, implementing BMPs, testing casings and cement prior to continuing to drill or introducing additional fluids and continual monitoring during drilling and hydraulic fracturing allow producers and regulators to check the integrity of casing and cement jobs and greatly reduce the chance of aquifer contamination.

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.

An expressed public concern about subsurface hydraulic fracturing operations in deep shale formations is that the process might create fractures that extend well beyond the target formation to water aquifers, allowing methane, contaminants naturally occurring in formation water, and/or fracturing fluids to migrate from the target formation into drinking water supplies (Zoback et al 2010). Typically, many thousands of feet of rock separate most major formation in the U.S. from the base of aquifers that contain drinkable water (GWPC 2009). The direct contamination of underground sources of drinking water from fractures created by hydraulic fracturing would require hydrofractures to propagate several thousand feet beyond the upward boundary of the target formations through many layers of rock. It is extremely unlikely that the fractures would ever reach fresh water zones and contaminate freshwater aquifers (Zoback et al 2010, RRC 2013b). During the APD review, the exact difference between the base of treatable water and the top of the target formation for the specific site would be reviewed to determine the potential for direct contamination of underground sources.

Typically flowback is hauled away to be injected into disposal wells. It is estimated that approximately 30 percent of the injected water returns without too much of a quality decrease, whereas the remaining 40 percent is more degraded. Since the flowback would be disposed of at a regulated and permitted facility, it is assumed that they would ensure all water quality regulations and laws are followed and that BMPs are in place to prevent contamination of aquifers, thus having no impact on water quality in the aquifers from flowback.

Petroleum products and other chemicals used during drilling or hydraulic fracturing, accidentally spilled, could result in surface and groundwater contamination. Similarly, possible leaks from reserve and evaporation pits could degrade surface and groundwater quality. Authorization of the proposed projects

would require full compliance with BLM directives and stipulations that relate to surface and groundwater protection.

### ***Quantity***

Impacts of water use for oil and gas development and production depend on local water availability and competition for water from other users. Overall, impacts range from declining water levels at the regional or local scales and related decreases in base flow to streams (Nicot and Scanlon 2012). Water supplied for hydraulic fracturing could come from surface or groundwater sources. If surface water is used, there would be a temporary decrease in the source's water levels. The time it takes to return to baseline conditions is dependent on the amount of rainfall received and other competing uses of the resource.

Typically when groundwater is used, impacts to the aquifer would be minimal due to the size of the aquifers impacted and recharge potential across the entire aquifer. However, localized aquifer effects are expected. A cone of depression may occur in the immediate vicinity of the existing water well used to supply the fracturing water. With each rain event, the aquifer is expected to recharge to some degree, but it is unknown if or when it would recharge to baseline conditions after pumping ceases. The time it takes depends greatly on rainfall events, drought conditions, and frequency of pumping that has already occurred and will continue to occur into the future.

The amount of water actually used for development is highly dependent on a number of factors including: length of well bore, closed-loop or reserve pit drilling system, type of mud, whether hydraulic fracturing would be used during stimulation, whether recycled water would be used, dust abatement needs, type and extent of construction, to name a few. The impacts of water use on water quality and quantity would be analyzed in more detail during the APD review.

### ***Mitigation***

Fluid impermeable containment systems (i.e. liners, dikes, berms) would be placed in, under and/or around any tank, pit, drilling cellar, ditches associated with the drilling process, or other equipment that use or has the potential to leak/spill hazardous and non-hazardous fluids, to prevent chemicals from penetrating the soil and impacting the aquifer or from moving off-site to a surface water source.

Complying with BLM and state regulations regarding casing and cementing, implementing BMPs, testing casings and cement prior to continuing to drill or introducing additional fluids and continual monitoring during drilling and hydraulic fracturing allow producers and regulators to check the integrity of casing and cement jobs and greatly reduce the chance of aquifer contamination.

RRC requires operators to disclose all chemicals used along with the amount of water used to hydraulically fracture wells in Texas.

#### **4.3.4 Floodplains, Wetlands, Riparian Areas**

##### **4.3.4.1 Floodplains**

While the act of leasing Federal minerals would produce no direct impacts to floodplains, subsequent exploration/development of the proposed lease parcel may produce impacts. Surface disturbance from the development of well pads, access roads, pipelines, and utility lines 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***

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 BLM.” In addition to ORA-1, the BLM identified the need to develop a Floodplain Protection Lease Notice that would also be attached to these parcels. This notice would inform the lessee and operator that surface occupancy of these areas and surface disturbance within up to 200 meters of the outer edge of the floodplain may not be allowed in order to protect the integrity and functionality of the floodplain and associated watercourse.

Controlled surface use requiring special mitigation measures may be required and will be developed during the APD process.

##### **4.3.4.2 Wetlands, Riparian Areas**

While the act of leasing Federal minerals would produce no direct impacts to wetlands or riparian areas; no adverse impacts are expected for wetlands or riparian areas if exploration/development occurred on this lease parcel in the future.

##### ***Mitigation***

The NM-201604-003 and -004 in Logan County, KS parcels will have stipulation protection, ORA-2 Wetland/Riparian Protection.

The NM-201604-005 in Cheyenne County, KS parcel will have stipulation protection, ORA-2 Wetland/Riparian Protection.

The NM-201604-008 in Major County, OK parcel will have stipulation protection, ORA-2 Wetland/Riparian Protection.

The NM-201604-009 in Roger Mills County, OK parcel will have stipulation ORA-2: Wetland/Riparian Protection, ORA-3: Season of Use.

The NM-201604-011 in Creek County, OK parcel will have stipulation ORA-2: Wetland/Riparian Protection.

The NM-201604-012 in Dewey County, OK parcel will have stipulation ORA-2: Wetland/Riparian Protection.

The NM-201604-013 and -014 in Live Oak/McMullen Counties, TX parcels will have stipulation ORA-2: Wetland/Riparian Protection.

The NM-201604-038, -039, -040, and -043 in Washington County, TX parcels will have stipulation ORA-2: Wetland/Riparian Protection.

The NM-201604-041 and -042 in Burleson County, TX parcels will have stipulation ORA-2: Wetland/Riparian Protection.

The NM-201604-044 in Denton County, TX parcel will have stipulation ORA-2: Wetland/Riparian Protection.

### **4.3.5 Heritage Resources**

#### ***4.3.5.1 Cultural Resources***

While the act of leasing Federal minerals would produce no direct impacts to cultural resources, subsequent development of a lease could. To comply with Section 106, a cultural resources survey will need to be conducted for all surface disturbance activities related to development of the lease. Direct and indirect effects cannot be predicted without analysis of site-specific development at the APD stage of development. Potential impacts at that stage could include increased human activity in the area increasing the 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.

Many cultural resource issues exist beyond the NHPA, such as state and municipal registers of historic sites, National Heritage Areas, National Trails, or other heritage designations. Leasing the proposed parcels would have no effect on any of these types of cultural resources.

Please refer to the Cultural and Paleontological Resources Summary and BLM Cultural Determination in Appendix 5 for more information.

#### ***4.3.5.2 Paleontology***

While the act of leasing Federal minerals would produce no direct impacts to paleontological resources, subsequent development of a lease could. Direct and indirect effects cannot be predicted without analysis of site-specific development at the APD stage of development. Potential impacts at that stage could include increased human activity in the area increasing the 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, the



benefits to paleontology resources derived from the future development are the paleontology survey that adds to literature, information, and knowledge of cultural resources.

Protection and preservation of significant fossil materials in specific locations would be required for any BLM permitted project.

#### ***4.3.5.3 Native American Religious Concerns***

The proposed action is not known to physically threaten any TCPs, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies and rituals pursuant to AIRFA or EO 13007. There are currently no known remains that fall within the purview of NAGPRA or ARPA that are threatened by leasing.

#### ***Mitigation Common to all Heritage Resources***

Specific mitigation measures, including but not limited to, site avoidance or excavation and data recovery would be determined when site-specific APDs and cultural surveys are received. As well, a second NHPA section 106 evaluation would be completed. The Oklahoma State Historic Preservation Office confirmed that studies will need to be done at the APD stage.

Standard Conditions of Approval are attached to each APD including:

- In the event that lease development practices are found in the future to have an adverse effect on significant cultural resources, the operator and the BLM, in consultation with the affected tribe(s), and various State Historic Preservation Offices will take action to mitigate or negate those effects. Measures include, but are not limited to physical barriers to protect resources, relocation of practices responsible for the adverse effects, or other treatments as appropriate.

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

While the act of leasing Federal minerals would not contribute to the spread or control of invasive or non-native species, subsequent exploration/development of the proposed lease may. Any surface disturbance could establish new populations of invasive non-native species, although the probability of this happening cannot be predicted using existing information. Noxious weed seeds can be carried to and from the project areas by construction equipment, the drilling rig and transport vehicles. At the APD stage, BLM requirements for use of weed control strategies would minimize the potential for the spread of these species.

#### ***Mitigation***

Mitigation is deferred to site-specific development at the APD stage. BMPs require that all Federal actions involving surface disturbance or reclamation take reasonable steps to prevent the introduction or spread of noxious weeds, including requirements to use weed-free hay, mulch and straw.

#### **4.3.7 Vegetation**

While the act of leasing Federal minerals would produce no impacts to vegetative resources, subsequent exploration/development of the proposed lease would have impacts to vegetation. The level of impact depends on the vegetation type, the vegetative community composition, soil type, hydrology, and the topography of the parcel. Surface-disturbing activities could affect vegetation by removing, trampling, or killing the vegetation; churning soils; losing substrates for plant growth; impacting biological crusts; disrupting seedbanks; burying individual plants; reducing germination rates; covering plants with fugitive dust; and generating sites for undesirable weedy species. In addition, development could reduce available forage or alter livestock distribution leading to overgrazing or other localized excess grazing impacts to palatable plant species. If these impacts occurred after seed germination but prior to seed establishment, both current and future generations could be affected.

Vegetation would be lost within the construction areas of pads, roads, and rights of ways. Those areas covered in compacted native substrates, such as pads and roads, would have no vegetation for the life of the well. Interim and final reclamation should result in vegetation establishment in three to five growing season (one to two years) with appropriate techniques used and adequate precipitation. Inadequate precipitation over several growing seasons could result in loss of vegetative cover, leading to weed invasion and deterioration of native vegetation.

#### ***Mitigation***

Mitigation is primarily deferred to site-specific development at the APD stage. If potential wells are productive disturbed areas not needed for the production facility would be reclaimed. In the case of non-productive wells, all disturbed areas would be reclaimed through reseeding or vegetative cover reestablishment. BMPs identified in BLM guidance documents such as the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development: The Gold Book (USDI, 2007) recommends areas to be restored with native vegetation in regards to both species and structure. This recommendation is contingent upon the wishes of the surface owner.

#### **4.3.8 Wildlife**

##### ***4.3.8.1 Threatened and Endangered Species***

Protective stipulation WO-ESA-7 would be attached to any lease of a tract which falls within an area of potential wildlife habitat. WO-ESA-7 states that, "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 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.”

#### Kansas

Federally-listed endangered, threatened, proposed, and candidate species which occur or have the potential for occurrence in Logan County Kansas is the lesser prairie-chicken (*Tympanuchus pallidicinctus*), Sprague’s pipit (*Anthus spragueii*) and the Black-footed ferret (*Mustela nigripes*).

Federally-listed endangered, threatened, proposed, and candidate species which occur or have the potential for occurrence in Sherman County Kansas is the lesser prairie-chicken (*Tympanuchus pallidicinctus*) and Sprague’s pipit (*Anthus spragueii*).

Federally-listed endangered, threatened, proposed, and candidate species which occur or have the potential for occurrence in Lane County Kansas is the lesser prairie-chicken (*Tympanuchus pallidicinctus*), Sprague’s pipit (*Anthus spragueii*) and the whooping crane (*Grus Americana*) per the United States Department of the Interior, Fish and Wildlife Service, Kansas Ecological Services Office County list dated July 2010.

Federally-listed endangered, threatened, proposed, and candidate species which occur or have the potential for occurrence in Cheyenne County Kansas is the Sprague’s pipit (*Anthus spragueii*) per the United States Department of the Interior, Fish and Wildlife Service, Kansas Ecological Services Office County list dated July 2010.

#### Oklahoma

##### Oklahoma

Federally-listed endangered, threatened, proposed, and candidate species located in Roger Mills County, Oklahoma consist of the interior least tern (*Sterna antillarum*), red knot (*Calidris canutus rufa*) piping plover (*Charadrius melodus*), Lesser Prairie Chicken (*Tympanuchus pallidicinctus*) and the whooping crane (*Grus Americana*).

Federally-listed endangered, threatened, proposed, and candidate species located in Creek County, Oklahoma consist of the interior least tern (*Sterna antillarum*), red knot (*Calidris canutus rufa*) piping plover (*Charadrius melodus*), and the American burying beetle (*Nicrophorus americanus*).

Federally-listed endangered, threatened, proposed, and candidate species located in Dewey County, Oklahoma consist of the interior least tern (*Sterna antillarum*), red knot (*Calidris canutus rufa*) piping plover (*Charadrius melodus*), Lesser Prairie Chicken (*Tympanuchus pallidicinctus*), Arkansas River shiner (*Notropis girardi*) and the whooping crane (*Grus Americana*).

Federally-listed endangered, threatened, proposed, and candidate species located in Beaver County, Oklahoma consist of the interior least tern (*Sterna antillarum*), red knot (*Calidris canutus rufa*) piping plover (*Charadrius melodus*), Lesser Prairie Chicken (*Tympanuchus pallidicinctus*), Arkansas River shiner (*Notropis girardi*) and the whooping crane (*Grus Americana*). Beaver county also has critical habitat for the Arkansas River Shiner.

## Texas

The Service federally-listed endangered, threatened, proposed, and candidate species for McMullen County, Texas consist of the least tern, red knot, golden orb, Gulf Coast jaguarondi, ocelot and the piping plover.

The Service federally-listed endangered, threatened, proposed, and candidate species for Trinity County, Texas consist of the least tern, piping plover, red knot, red-cockaded woodpecker, Neches river rose mallow, Texas prairie dawn-flower, Neches River rose mallow critical habitat.

The Service federally-listed endangered, threatened, proposed, and candidate species for Houston County, Texas consist of the least tern, piping plover, red knot, red-cockaded woodpecker, Neches river rose mallow and Neches River rose mallow critical habitat.

The Service federally-listed endangered, threatened, proposed, and candidate species for Washington County, Texas consist of the least tern, red knot, golden orb, Gulf Coast jaguarondi, ocelot and the piping plover.

The Service federally-listed endangered, threatened, proposed, and candidate species for Burleson County, Texas consist of the least tern, red knot, piping plover, whooping crane, smooth pimple back and Texas fawnsfoot, Navasota ladies'-tresses.

The Service federally-listed endangered, threatened, proposed, and candidate species for Denton County, Texas consist of the least tern, red knot, whooping crane and the piping plover.

## Mitigation

WO-ESA-7 will apply to all tracts for the above listed Counties. In addition, the NM-201304-007, NM-201604-009, NM-201604-011, NM-201604-012 will have ORA-3: Season of Use.

### ***4.3.8.2 Special Status Specie***

## Kansas

The Kansas Department of Wildlife, Parks and Tourism for Logan County has the plains minnow, greentoad, eastern spotted skunk, whooping, least tern, piping plover, snowy plover and the black-footed ferret.

The Kansas Department of Wildlife, Parks and Tourism for Sherman County has the eastern spotted skunk, whooping, least tern, piping plover, snowy plover and the black-footed ferret.

The Kansas Department of Wildlife, Parks and Tourism for Lane County has the eastern spotted skunk, whooping crane, least tern, piping plover, snowy plover, and the black-footed ferret.

The Kansas Department of Wildlife, Parks and Tourism for Cheyenne County has the eastern spotted skunk, whooping crane, least tern, piping plover, plains minnow, snowy plover, flathead chub, Topeka shiner, and the black-footed ferret.

## Oklahoma

No state listed species for Oklahoma Counties

## Texas

The Texas Parks and Wildlife department threatened and endangered species for the above listed Counties consist of the American peregrine falcon, Bachman's sparrow, Bald Eagle, peregrine falcon, piping plover, red-cockaded woodpecker, swallow-tailed kite, wood stork, Rafinesque's big-eared bat, red wolf, Louisiana pigtoe, sandbank pocketbook, southern hickorynut, Texas heelsplitter, Texas pigtoe, alligator snapping turtle, Louisiana pine snake, northern scarlet snake, timber/canebrake rattlesnake, black spotted newt, sheep frog, interior least tern, white-faced ibis, wood stork, white-tailed hawk, red wolf, golden orb, ocelot, reticulate collared lizard, Texas horned lizard, Texas indigo snake, Texas tortoise, white-tailed hawk, whooping crane, wood stork, jaguarondi, red wolf, golden orb and the ocelot.

### ***4.3.8.3 Migratory Birds***

The Service estimates that many migratory birds are killed annually throughout the United States in oil field production skim pits, reserve pits, and centralized oilfield wastewater disposal facilities. Numerous grasshoppers, moths, June bugs, and the like become trapped on the surface in tanks and on pits, and become bait for many species of migratory birds. Open tanks and pits then become traps to many species of birds protected under the MBTA. Properly covered tanks and pits (and regularly inspected covered tanks and pits) is imperative to continued protection of migratory birds in the well pad area.

### ***Mitigation***

Per the MOU between BLM and the Service, entitled "To Promote the Conservation of Migratory Birds," the following temporal and spatial conservation measures must be implemented as part of the Conditions of Approval with a permit to drill:

1. Avoid any take of migratory birds and/or minimize the loss, destruction, or degradation of migratory bird habitat while completing the proposed project or action.
2. If the proposed project or action includes a reasonable likelihood that take of migratory birds will occur, then complete actions that could take migratory birds outside of their nesting season. This includes clearing or cutting of vegetation, grubbing, etc. The primary nesting season for migratory birds varies greatly between species and geographic location, but generally extends from early April to mid-July. However, the maximum time period for the migratory bird nesting season can extend from early February through late August. Strive to complete all disruptive activities outside the peak of migratory bird nesting season to the greatest extent possible.
3. If no migratory birds are found nesting in proposed project or action areas immediately prior to the time when construction and associated activities are to occur, then the project activity may proceed as planned.

Additionally, WRGCOA #4 (Burying Transmission Lines) and Notice to Lessees (NTL) 96-01-TDO (Modification of Oil and Gas Facilities to Minimize Bird and Bat Mortality) address measures designed to protect migratory birds from accidental deaths associated with power line collisions/electrocutions, open-vent exhaust stacks and open pits and tanks (see attached).

#### **4.3.8.4 Wildlife**

While the act of leasing Federal minerals would produce no direct impacts to wildlife, subsequent development of a lease may produce impacts. Impacts could result from increased habitat fragmentation, noise, or other disturbance during development. Although reclamation and restoration efforts for surface disturbance could provide for the integrity of other resources, these efforts may not always provide the same habitat values (e.g. structure, composition, cover, etc.) in the short or in some instance, the long-term in complex vegetative community types (e.g., shrub oak communities). The short-term negative impact to wildlife would occur during the construction phase of the operation due to noise and habitat destruction. In general, most wildlife species would become habituated to the new facilities. For other wildlife species with a low tolerance to activities, the operations on the well pad would continue to displace wildlife from the area due to ongoing disturbances such as vehicle traffic, noise and equipment maintenance. The conditions of approval would alleviate most losses of wildlife species, such as; fencing the reserve pits, netting storage tanks, installation or other modifications of cones on separator stacks, and timing stipulations. The magnitude of above effects would be dependent on the rate and location of the oil and gas development, but populations could likely not recover to pre-disturbance levels until the activity was completed and the vegetative community restored.

#### ***Mitigation Common to ALL Species***

Measures would be taken to prevent, minimize, or mitigate impacts to fish and wildlife animal species from exploration and development activities. Prior to authorization, activities would be evaluated on a case-by-case basis, and the project would be subject to mitigation measures. Mitigation could potentially include rapid re-vegetation, noise restrictions, project relocation, or pre-disturbance wildlife species surveying.

The Wildlife Resource General Conditions of Approval (WRGCOAs) included in the approved APD and use of standard Best Management Practices (BMPs) should provide extra measures of protection to general wildlife populations and habitats in the area. Impacts to the wildlife resource component of the environment can be avoided or minimized by adopting the WRGCOAs and BMPs. Notice to Lessees (NTL) 96-01-TDO (Modification of Oil and Gas Facilities to Minimize Bird and Bat Mortality) address measures designed to protect migratory birds from accidental deaths associated with power line collisions/electrocutions, open-vent exhaust stacks and open pits and tanks.

#### **4.3.9 Wastes – Hazardous or Solid**

While the act of leasing Federal minerals would produce no impacts on the environment from hazardous or solid wastes, subsequent exploration/development of the proposed lease could have result in the introduction of hazardous and non-hazardous substances to the site. Hazardous substances may be produced, used, stored, transported or disposed of as a result of the project. Properly used, stored, and disposed of hazardous and non-hazardous substances greatly decreases the potential for any impact on any environmental resources. One way operators and the BLM ensure hazardous and non-hazardous substances are properly managed in through the preparation of a Spill Prevention, Control, and Countermeasure (SPCC) plan.

In hydraulic fracturing, chemical substances other than water make up a small percentage of the fluid composition; however, the very large volumes used require correspondingly large volumes of a variety of compounds. These substances range from the relatively benign to the highly toxic at certain concentrations. In addition to these added chemicals, naturally occurring toxicants such as heavy metals, volatile organics, and radioactive compounds are mobilized during extraction and return to the surface with the produced water. Of the millions of gallons of water used to hydraulically fracture a well one time, less than 30 percent to more than 70 percent may remain underground (Bamberger and Oswald 2012). Although the risk is low, the potential exists for unplanned releases that could have serious effects on human health and environment. A number of chemical additives are used that could be hazardous, but are safe when properly handled according to requirements and long-standing industry practices. In addition, many of these additives are common chemicals which people regularly encounter in everyday life (GWPC 2009).

Surface spills of drilling mud and additives, hydraulic fracturing fluids and additives, flowback water, and other produced water can happen at a variety of points in the development and production phases. Spills that occur can span a range of different spill sizes and causes of failure at any point in the process. For example, small spills often happen as the result of poor pipe connections or leaks; large spills sometimes occur as the result of a major well blowout, but such blowouts rarely occur. Additionally, spills from some parts of the phases may be the result of human error (i.e. vehicle collisions, improper handling, improper equipment operation or installation, etc.), while others stem from equipment failure (i.e. broken pipes, torn pit liners, leaking tanks, etc.) or acts of nature (Fletcher 2012). The most common cause of spills comes from equipment failure and corrosion (Wenzel 2012).

The cause of the spill, the spill size, the hazard rating of the spilled material, response time to clean up the spill and the effectiveness of the cleanup, all play a critical role in determining the overall impact on the environment. The volume of a spill can significantly vary with spill types. Pipe spills are not expected to release more than 1,000 gallons into the environment; retaining pit spills and truck spills are not expected to release more than 10,000 gallons of fluid; and blowouts are expected to cause the largest spills, with the potential to release tens of thousands of gallons into the environment. Small spills occur with greater frequency than large spills. Secondary containment or recovery for small spills would likely minimize if not eliminate any potential release into the environment. However, for spills on the order of several thousands of gallons of fluid, it is expected that less than half the fluid may be captured by secondary containment or recovery. The vast majority of operations do not incur reportable spills (5 gallons or more), indicating the fluid management process can be, and usually is managed safely and effectively (Fletcher 2012).

### ***Mitigation***

Specific mitigation is deferred to the APD process. The following measures are common to most projects: all trash would be placed in a portable trash cage and hauled to an approved landfill, with no burial or burning of trash permitted; chemical toilets would be provided for human waste; fresh water zones encountered during drilling operations would be isolated by using casing and cementing

procedures; a berm or dike would enclose all production facilities if a well is productive; and all waste from all waste streams on site would be removed to an approved disposal site.

#### **4.3.10 Mineral Resources**

While the act of leasing Federal minerals would produce no impacts to mineral resources, subsequent exploration/development of the proposed lease could impact the production horizons and reservoir pressures. If production wells are established, the resources allotted to the wells would eventually be depleted. The amount and location of direct and indirect effects cannot be predicted until site-specific development information is available typically during the APD stage.

Other mineral resources could be impacted as a result of exploration/development through the loss of available surface or subsurface area needed to develop or access the other mineral resource overlapping the proposed lease parcel. The extent of the impacts, if any cannot be predicted until site-specific development information is available typically during the APD stage.

##### ***Mitigation***

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

#### **4.3.11 Visual Resources**

While the act of leasing Federal minerals would produce no impacts to visual resources, subsequent exploration/development of the proposed lease could impact visual quality through: increased visibility of constructed features such as roads, well pads, pipelines, tank batteries; road degeneration from heavy trucks and vehicles following rain and snow; dust and exhaust from construction, drilling, and production vehicles and equipment; vegetation removal and construction of steep slopes; unreclaimed sites; and discarded equipment. Well pads, power lines, access roads, and associated production facilities and storage tanks have the greatest potential to alter visual conditions for the life of the well. Vegetation removal would present an obvious contrast in color with the surrounding vegetation and affect foreground and middleground distance zones for more than a decade. These impacts would be most obvious immediately after construction. Impacts would decrease as the disturbed surface began to blend in color, form, and texture, when interim or final reclamation occurs. Long-term visual impacts could persist as long as the well is producing, which could be a couple of years to more than 50 years. Long-term impacts may include vegetation removal, alteration of the landscape, and installation of equipment and facilities.

##### ***Mitigation***

Additional mitigation is deferred to site-specific development at the APD stage.



#### 4.3.12 Recreation

While the act of leasing Federal minerals would produce no impacts to recreation resources, subsequent exploration/development of the proposed lease could impact recreation quality and opportunities through: increased vehicle traffic and human presence, loss of areas to recreate, blocked access, and increased noise and visual disturbance.

##### ***Mitigation***

Mitigation is deferred to site-specific development at the APD stage.

#### 4.3.13 Socioeconomics and Environmental Justice

No minority or low income populations would be directly affected in the vicinity of the proposed lease parcel. Indirect impacts could include an increase in overall employment opportunities related to the oil and gas and service support industry in the region, as well as the economic benefits to State and County governments related to royalty payments and severance taxes. Other impacts could include a small increase in activity and noise disturbance in areas used for agriculture and recreational activities. However, these impacts would apply to all land users in the area.

Oil and gas development, especially during drilling and hydraulic fracturing, can create short-term increases in traffic volume, dust and noise and negatively impact nearby residents or businesses. These nuisance impacts are usually limited to the construction, drilling, completion and/or hydraulic fracturing phases of the well. These impacts would be significantly reduced during production, when the site would be visited periodically for inspection and/or to haul produced fluids.

##### ***Mitigation***

Mitigation is deferred to site-specific development at the APD stage.

#### 4.3.14 Cumulative Effects

The NMSO manages approximately 41 million acres of Federal mineral estate. Of the 41 million acres, 35 million acres are available for oil and gas leasing. Approximately 16 percent of the 35 million acres is currently leased (73% of the leases are in production and 63% of the lease acres are in production).

**Table 11. Actual –Acres of Federal Minerals/Acres Available/Acres Leased**

State	Federal O&G Mineral Ownership	Acres Available	Acres Leased	Percent Leased
KS	744,000	614,586	120,405	20%
NM	34,774,457	29,751,242	4,640,312	16%
OK	1,998,932	1,668,132	286,883	17%
TX	3,404,298	3,013,207	417,282	14%
Totals/Average	40,921,687	35,047,167	5,464,882	16%

**Table 12. Parcels nominated and offered in the April 2016 Oil and Gas Lease Sale.**

Field Office	No. of Nominated Parcels	Acres of Nominated Parcels	No. of Parcels to be Offered	Acres of Parcels to be Offered
Kansas	6	880.00	6	880.00
Oklahoma	6	1,506.29	5	1,426.29
Texas	32	34,446.81	32	34,446.81
Totals	44	36,833.10	43	36,753.10

**Table 13. Foreseeable – Acres of Federal Minerals/Acres Available/Acres Leased**

State	Federal O&G Mineral Ownership	Acres Available	Acres Leased	Percent Leased
KS	744,000	614,586	121,285	20%
NM	34,774,457	29,751,242	4,640,312	16%
OK	1,998,932	1,668,132	288,309	17%
TX	3,404,298	3,013,207	451,729	15%
Totals/Average	40,921,687	35,047,167	5,501,635	16%

The cumulative impacts fluctuate with the gradual reclamation of well abandonments and the creation of new additional surface disturbances in the construction of new access roads and well pads. The on-going process of restoration of abandonments and creating new disturbances for drilling new wells gradually accumulates as the minerals are extracted from the land. Preserving as much land as possible and applying appropriate mitigation measures will alleviate the cumulative impacts.

Analysis of cumulative impacts for reasonably foreseeable development of oil and gas wells in Kansas was analyzed in the Kansas RMP (1991)(pg. 105-118). Potential development of all available federal minerals in Kansas including those in the proposed lease parcels was included as part of the analysis. Total surface disturbance projected by the plan was based on an estimated 20 Federal wells being drilled annually in Kansas with an estimated 85 acres of disturbance. Over the last 10 years there have only been two to three Federal wells drilled each year.

More than 100 years of oil and gas development and agriculture practices in Kansas has resulted in an extensive infrastructure of existing roads and pipelines. Kansas has approximately 32,000 active wells (639 on Federal leases). Kansas has 65,531 farms, spanning over 46,345,827 acres. Impacts from both developments would remain on the landscape until final plugging, abandonment and reclamation of well facilities or until crop production and agriculture activities cease.

Analysis of cumulative impacts for reasonably foreseeable development of oil and gas wells in Oklahoma and Texas were analyzed in the Oklahoma RMP (1994), as amended, and Texas RMP (1996), as amended, respectively. Potential development of all available federal minerals in Oklahoma and Texas including those in the proposed lease parcels was included as part of the analysis. Total surface disturbance projected by the plan was based on an estimated 20 Federal wells being drilled annually in

Oklahoma and Texas, each, with an estimated 113 acres of disturbance. Over the last 10 years there have been no changes to the basic assumptions or projections described in the either RMP's, analysis.

More than 100 years of oil and gas development in Oklahoma Texas has resulted in an extensive infrastructure of existing roads and pipelines. The Oklahoma Corporation Commission reports a total of 115,000 oil wells and 65,000 natural gas wells that are drilled and not plugged in Oklahoma. A total of 74,319 thousand barrels of oil was produced in 2011 with an average of 62 rotary rigs in operation per month. They also report a total of 1,827,328 million cubic feet of natural gas was produced in 2011 with an average of 120 rotary rigs in operation per month.

As of September 4, 2014, the Railroad Commission of Texas lists 287,550 current oil wells statewide including 218,582 active wells and 68,968 inactive wells (RRC 2014). The RRC lists 132,914 current gas wells in the state including 104,973 active wells and 27,941 inactive wells. In 2013, a total oil production of 757,548,412 bbl of oil and 16,298,326,842 mcf of gas (natural gas, gas well gas, and casinghead gas) was produced in the state (RRC 2014a). Impacts from this development would remain on the landscape until final abandonment and reclamation of facilities occurs as wells are plugged when they are no longer economically viable.

#### ***4.3.15.1 Effects on Air Quality***

The following analysis of cumulative impacts of the proposed action on air quality will be limited to the counties in which the proposed lease parcels occur.

The primary activities that contribute to levels of air pollutants in the 11 counties are predominately combustible engines of road and non-road, diesel and gasoline vehicles and equipment. The Air Resources Technical Report includes a description of the varied sources of national and regional emissions that are incorporated here to represent the past, present and reasonably foreseeable impacts to air resources (BLM 2014). It includes a summary of emissions on the national and regional scale by industry source. Sources that are considered to have notable contributions to air quality impacts and GHG emissions include electrical generating units, fossil fuel production (nationally and regionally) and transportation.

The very small increase in emissions that could result from approval of the proposed action or preferred alternative would not result in the area violating the NAAQS for any criteria pollutant or violating the Class I airshed protections. In October 2012, EPA regulations that require control of VOC emissions from oil and gas development became effective. These regulations will reduce VOC emissions from oil and gas exploration and production emissions that contribute to the formation of ozone. Emissions from any lease development are not expected to impact the 8-hour average ozone concentrations, or any other criteria pollutants in the area of the proposed lease.

#### ***4.3.15.2 Cumulative Effects on Climate Change***

The cumulative impacts of GHG emissions and their relationship to climate change are evaluated at the national and global levels in the Air Resources Technical Report (BLM 2014). The very small increase in GHG emissions that could result from approval of the proposed action would not produce climate

change impacts that differ from the No Action Alternative. This is because climate change is a global process that is impacted by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from the proposed action cannot be translated into effects on climate change globally or in the area of this site-specific action. It is currently not feasible to predict with certainty the net impacts from particular emissions associated with Federal actions; however, EPA's recently finalized oil and gas air quality regulations have a co-benefit of methane reduction that will reduce greenhouse gas emissions from any oil and gas development that would occur on this lease.

## 5.0 CONSULTATION/COORDINATION

---

This section includes the resource specialists located within the OFO that specifically participated and provided input in the lease parcel review process and the development of this EA document.

ID Team Member	Title	Organization
Ryan Howell	Archaeologist	BLM
Becky Peters	Wildlife Biologist	BLM
Pat Stong	Geologist	BLM
Jackie Badley	Natural Resource Specialist	BLM
Gary McDonald	Environmental Specialist	BLM
Larry Levesque	Planning and Environmental Coordinator	BLM

On August 24, 2015, a briefing for the BLM NM State Director was held via Web-Ex and teleconference with the Oklahoma Field Office to review Field Office recommendations for nominated parcels.

### 5.1 Public Involvement

The nominated parcels, along with the appropriate stipulations from the Oklahoma RMP (1994), as amended, and Texas RMP (1996), as amended were posted online for a two week review period beginning August 31, 2015. No comments were received. This EA will be made available for public review and comment for 30 days beginning October 29, 2015. Any comments provided prior to the lease sale will be considered and incorporated into the EA as appropriate.

## 6.0 REFERENCES

---

- Bamberger, M. and R.E. Oswald. 2013. Impacts of Gas Drilling on Human and Animal Health. *New Solutions: A Journal of Environmental and Occupational Health Policy* 22: 51-77.  
<http://baywood.metapress.com/app/home/contribution.asp?referrer=parent&backto=issue,5,9;journal,6,88;linkingpublicationresults,1:300327,1>.
- CCSP, 2008: *Climate Models: An Assessment of Strengths and Limitations*. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research [Bader D.C., C. Covey, W.J. Gutowski Jr., I.M. Held, K.E. Kunkel, R.L. Miller, R.T. Tokmakian and M.H. Zhang (Authors)]. Department of Energy, Office of Biological and Environmental Research, Washington, D.C., USA, 124 pp.
- EDDMapS. 2013. Early Detection & Distribution Mapping System. The University of Georgia – Center for Invasive Species and Ecosystem Health. Available at: <http://www.eddmaps.org>.
- Energy Information Administration, 2012. National and Statewide Production Reports.  
<http://www.eia.gov/petroleum/data.cfm#crude> and  
<http://www.eia.gov/dnav/ng/hist/n9010us2a.htm>.
- Environmental Protection Agency (EPA). 2013. Air Trends: Design Values.  
<http://www.epa.gov/airtrends/values.html>.
- EPA. 2013a. Air Data: Air Quality Index Report. [http://www.epa.gov/airquality/airdata/ad\\_rep\\_aqi.html](http://www.epa.gov/airquality/airdata/ad_rep_aqi.html).
- EPA. 2012. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2010. EPA 430-R-12-001.  
<http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html>.
- EPA. 2011. Technology Transfer Network: Clearinghouse for Inventories and Emissions Factors.  
<http://www.epa.gov/ttn/chief/eiinformation.html>.
- EPA. 2009. State of the Ground Water Report. Ground Water Center, Source Water Protection Branch, EPA, Region 6. Dallas, Texas. Available at:  
<http://www.epa.gov/region6/water/swp/groundwater/2008-report.pdf>.
- EPA, Natural Gas Star Program (2006 data). Environmental Protection Agency, Washington, D.C.  
<http://www.epa.gov/gasstar/accomplishments/index.html>.
- Fletcher, S. M. 2012. Risk Assessment of Groundwater Contamination from Hydraulic Fracturing Fluid Spills in Pennsylvania. Thesis (S.M. in Technology and Policy)--Massachusetts Institute of Technology, Engineering Systems Division, Technology and Policy Program.  
<http://hdl.handle.net/1721.1/72885>.
- Goddard Institute for Space Studies. 2013. Annual Mean Temperature Change for Three Latitude Bands. Datasets and Images. GISS Surface Temperature Analysis, Analysis Graphs and Plots. New York, New York. <http://data.giss.nasa.gov/gistemp/graphs/Fig.B.lrg.gif>.

- Groundwater Protection Council (GWPC). 2009. Modern Shale Gas Development in the United States: A Primer. Prepared for the U.S. Department of Energy, Office of Fossil Energy, and National Energy Technology Laboratory (NETL). DE-FG26-04NT15455. Oklahoma City, OK. Available at: [http://www.netl.doe.gov/technologies/oil-gas/publications/eports/shale\\_gas\\_primer\\_2009.pdf](http://www.netl.doe.gov/technologies/oil-gas/publications/eports/shale_gas_primer_2009.pdf).
- Kansas Ground Water: An Introduction to the State's Water Quantity, Quality, and Management Issues, compiled by Rex Buchanan and Robert W. Buddemeier. Available at: [http://www.kgs.ku.edu/Publications/Bulletins/ED10/03\\_use.html](http://www.kgs.ku.edu/Publications/Bulletins/ED10/03_use.html)
- Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2015: The Physical Basis (Summary for Policymakers). Cambridge University Press. Cambridge, England and New York, New York. <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf>.
- Johnson, K. 1998. Geology and Mineral Resources of Oklahoma. Oklahoma Geological Survey Information Series #2. Norman, Oklahoma. Available at: <http://www.ogs.ou.edu/pubsscanned/InfSeries/infseries2.pdf>.
- Karl, Thomas L., Jerry M. Melillo, and Thomas C. Peterson, (eds.). Global Climate Change Impacts in the United States, Cambridge University Press, 2009.
- Kim, E.M. and S.C. Ruppel. 2005. Oil and Gas Production in Texas. Bureau of Economic Geology, The University of Texas, Austin. Austin, TX. Available at: <http://www.beg.utexas.edu/UTopia/images/pagesizemaps/oilgas.pdf>.
- National Academy of Sciences. 2006. Understanding and Responding to Climate Change: Highlights of National Academies Reports. Division on Earth and Life Studies. National Academy of Sciences. Washington, D.C. [http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb1048006.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1048006.pdf).
- Nicot, J.-P. and B.R. Scanlon. 2012. Water use for shale-gas production in Texas, U.S. Environmental Science and Technology 46:3580—3586.
- Economic Development & Tourism (EDT). 2013. Overview of the Texas Economy. Updated: Sept. 2013. Office of the Governor Economic Development & Tourism. Available at: <http://www.governor.state.tx.us/files/ecodev/texas-economic-overview.pdf>
- Oklahoma Corporation Commission (OCC). 2012. 2011 Report on Oil and Natural Gas Activity Within the State of Oklahoma. Technical Services Department Oil and Gas Division. Oklahoma City, Oklahoma. Available at: <http://www.occeweb.com/og/2011%20Annual%20Report.pdf>.
- Oklahoma Water Resources Board (OWRB). 2011. 2012 Oklahoma Comprehensive Water Plan. Available at: <https://www.owrb.ok.gov/supply/ocwp/ocwp.php>.
- Osborn, N.I. and R.H. Hardy. 1999. Statewide Groundwater Vulnerability Map of Oklahoma. Oklahoma Water Resources Board Technical Report 99-1. Available at:

<http://www.owrb.ok.gov/studies/reports/gwvulnerability/entire-report.pdf>.

Railroad Commission of Texas (RRC). 2014. Well Distribution by County – Well Countys, as of September 4, 2014. Available at: <http://www.rrc.state.tx.us/oil-gas/research-and-statistics/well-information/well-distribution-by-county-well-counts/>

RRC. 2014a. Texas Monthly Oil and Gas Production . Available at: <http://www.rrc.state.tx.us/oil-gas/research-and-statistics/production-data/texas-monthly-oil-gas-production/>

RRC. 2013. Hydraulic Fracturing Frequently Asked Questions. Railroad Commission of Texas. Available at: <http://www.rrc.state.tx.us/about/faqs/hydraulicfracturing.php>

Texas Administrative Code. 2012. Quarantines and noxious plants, Chapter 19 (07 September 2012). State of Texas.

Texas Commission on Environmental Quality and Texas State Soil and Water Conservation Board (TCEQ/TSSWCB). (2005). Texas Nonpoint Source Management Program, Appendix D. Joint Report SFR-068/04. <https://www.tsswcb.texas.gov/files/docs/admin/Sunset2009/21G-NPS%20MGMT%20Program.pdf>

Texas Water Development Board (TWDB). 2012. Water for Texas 2012 State Water Plan. Available at: <http://www.twdb.state.tx.us/waterplanning/swp/index.asp>

TWDB. 2011. Aquifers of Texas--Report 380. Available at: [http://www.twdb.state.tx.us/publications/reports/numbered\\_reports/doc/R380\\_AquifersofTexas.pdf](http://www.twdb.state.tx.us/publications/reports/numbered_reports/doc/R380_AquifersofTexas.pdf)

Labor Market & Career Information Department (LMCI) (2013). Texas Labor Market Information, Unemployment by County. Texas Workforce Commission. Available at: <http://www.tracer2.com/cgi/dataAnalysis/AreaSelection.asp?tableName=Labforce&orderBy=area>

US Census Bureau. (2012). State and County Quick Facts: Data derived from Population Estimates, American Community Survey, Census of Population and Housing, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits, Consolidated Federal Funds Report. <http://quickfacts.census.gov/qfd/index.html>.

US Bureau of Labor Statistics (BLS). 2013. Economy at a Glance: Oklahoma. Southwest Information Office. Dallas, Texas. Available at: [http://www.bls.gov/eag/eag.ok.htm#eag\\_ok.f.p](http://www.bls.gov/eag/eag.ok.htm#eag_ok.f.p)

US. Bureau of Economic Analysis (BEA). 2012. Regional Data: Oklahoma 2011. Gross Domestic Production by State. Washington, D.C. Available at: <http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=1#reqid=70&step=10&isuri=1&7007=2011&7093=Levels&7090=70&7035=-1&7036=-1&7001=1200&7002=1&7003=200&7004=NAICS&7005=-1&7006=40000>.



- USDA (Department of Agriculture, Natural Resource Conservation Service [NRCS]). Web Soil Survey.  
<http://websoilsurvey.nrcs.gov/>.
- USDI (US Department of the Interior, Bureau of Land Management [BLM]). 2007. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development: The Gold Book (4<sup>th</sup> ed), P-417.
- USDI (BLM). February 1996. Texas Resource Management Plan and Final Environmental Impact State. Tulsa, Oklahoma.
- USDI (BLM). May 1996. Record of Decision and Final Texas Resource Management Plan. Tulsa, Oklahoma.
- USDI (BLM). February 1994. Oklahoma Resource Management Plan and Final Environmental Impact State. Tulsa, Oklahoma.
- USDI (BLM). May 1994. Record of Decision and Final Oklahoma Resource Management Plan. Tulsa, Oklahoma.
- USDI (BLM). 2014. Air Resources Technical Report. New Mexico State Office.  
[http://www.blm.gov/nm/st/en/prog/more/air\\_resources/air\\_resources\\_technical.html](http://www.blm.gov/nm/st/en/prog/more/air_resources/air_resources_technical.html).
- USDI, US Geological Survey (USGS). 2011. 2008 Minerals Yearbook: Oklahoma [Advance Release]. Available at: <http://minerals.usgs.gov/minerals/pubs/state/2008/myb2-2008-ok.pdf>.
- US Government Accountability Office Report (2007). Climate Change: Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources. GAO-07-863. 1st paragraph, 1st page, GAO Highlights. <http://www.gao.gov/products/GAO-07-863>.
- Wenzel, C. 2012. A Case Study—Hydraulic Fracturing Geography: The Case of the Eagle Ford Shale, TX, USA. Thesis (M.S.)--Texas State University-San Marcos, Department of Geography.  
<https://digital.library.txstate.edu/handle/10877/4247>.
- Zoback, M., S. Kitasei, and B. Copithorne. 2010. Addressing the Environmental Risks from Shale Gas Development. Briefing Paper 1. Worldwatch Institute Natural Gas and Sustainable Energy Initiative. Available at: <http://www.worldwatch.org/files/pdf/Hydraulic%20Fracturing%20Paper.pdf>.

## **7.0 AUTHORITIES**

---

Code of Federal Regulations (CFR)

40 CFR All Parts and Sections inclusive Protection of Environment, Revised as of January 1, 2001.

43 CFR All Parts and Sections inclusive – Public Lands: Interior. Revised as of October 1, 2000.

US Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors). 2001.

The Federal Land Policy and Management Act, as amended. Public Law 94-579.

## APPENDIX 1. OKLAHOMA FIELD OFFICE LEASE STIPULATION SUMMARY

<b><u>Stipulation</u></b>	<b><u>Description/Purpose</u></b>
BOR – Nueces River Project	<p><b>NO SURFACE OCCUPANCY – NUECES RIVER PROJECT</b></p> <p>No surface access or surface occupancy is allowed. Drilling beneath Choke Canyon Reservoir (defined by the published maximum water surface elevation of 233 feet msl) is prohibited unless approved by Regional Director contingent upon completion of a risk analysis. All areas within 2,000 feet of any major structure, including but not limited to the dam, spillway, or embankment, are restricted areas. Drilling operations in, on, or under the restricted areas, including drilling outside of the restricted areas which would cause a bore hole to be under the restricted area, will not be permitted. All storage tanks and slush pits will be protected by dikes of sufficient capacity to protect the reservoir from pollution to maximum water surface elevation 233 ft. for Choke Canyon Reservoir.</p>
COE SS-1A Heyburn Lake & Canton Lake	<p><b>NO SURFACE USE OCCUPANCY</b></p> <p>No surface occupancy is allowed on this lease in order to protect the reservoir. All areas within 3,000 feet of any major structure, including but not limited to the dam, spillway, or embankment, are restricted areas. Drilling operations in, on, or under the restricted areas, including drilling outside of the restricted areas which would cause a bore hole to be under the restricted area, will not be permitted. All storage tanks and slush pits will be protected by dikes of sufficient capacity to protect the reservoir from pollution. There will be no surface or subsurface entry within 2,000 feet of the dam structure.</p>
COE-Somerville & Lewisville Lakes	<p><b>NO SURFACE USE OCCUPANCY</b></p> <p>No surface occupancy is allowed within 3,000 horizontal feet of prime facilities critical to the operation of Somerville Lake, including but not limited to the dam, spillway, outlet structure, levees and related structures.</p>
FS WO – 10/05/2006 Sabine, Sam Houston, & Davy Crockett	<p><b>STIPULATION FOR LANDS OF THE NATIONAL FOREST SYSTEM UNDER JURISDICTION OF DEPARTMENT OF AGRICULTURE</b></p> <p>The permittee/lessee must comply with all the rules and regulations of the Secretary of Agriculture set forth at Title 36, Chapter II, of the code of Federal Regulations governing the use and management of the National Forest System (NFS) when not inconsistent with the rights granted by the Secretary of the Interior in the permit. The Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFS prior to approval of an exploration plan by the Secretary of the Interior, (2) uses of all existing improvements, such as Forest development roads, within and outside the area permitted by the Secretary of the Interior, and (3) use and occupancy of the NFS not authorized by an exploration plan approved by the Secretary of the Interior.</p>
TXFG 1996-NSO-14-01	<p><b>NO SURFACE OCCUPANCY – RECREATION AREAS</b></p> <p>No surface occupancy is allowed within recreation areas in order to meet visual quality objectives and to protect recreation area values.</p>
TXFG 1996-NSO-14-03	<p><b>NO SURFACE OCCUPANCY – LAKE CONROE</b></p> <p>No surface occupancy is allowed in order to meet visual quality objectives and to protect lakeshore areas.</p>
TXFG 1996-TL-15-01	<p><b>TIMING LIMITATION – TURKEY NESTING AREA</b></p> <p>No surface use is allowed during turkey nesting season, February 15 through May 15 in order to avoid disturbance of actual or probable turkey nesting locations.</p>
TXFG 1996-CSU-16-01	<p><b>CONTROLLED SURFACE USE - NATIONAL FORESTS IN TEXAS - STREAMSIDE MANAGEMENT ZONE</b></p>

	Portions of this lease contain streamside management zones (floodplains, wetlands). Site-specific proposals for surface-disturbing activities within these areas will be analyzed and will normally result in establishment of protective requirements or limitations for the affected site. Surface occupancy for oil and gas wells will not be allowed within the streamside management zone.
TXFG 1996-CSU-16-02	<b>CONTROLLED SURFACE USE – TRAILS</b> Portions of this lease contain designated trails management zone corridors (up to 300 ft. or as appropriate for type of trail use). Site-specific proposals for surface-disturbing activities within these areas will be analyzed and may result in establishment of protective requirements or limitations such as no surface occupancy.
TXFG 1996-CSU-16-03	<b>CONTROLLED SURFACE USE – TOLEDO BEND RESERVOIR SHORELINE</b> Proposals for a structure, facility, or motorized uses on Toledo Bend Reservoir lands between the 172' and 175' MSL contours, or on a strip of land extending inland 200 meters from the 175' contour, may be subject to special requirements or limitations such as no surface occupancy, such to be determined on a case-by-case basis.
TXFG 1996-16-07	<b>CONTROLLED SURFACE USE – RIVER BOTTOM AREAS</b> Drilling and production facilities will be located at least 100 feet from the river, and production facilities will be required to be screened from the river. Mineral extraction activity must be conducted in a manner that minimizes surface disturbance, sedimentation and pollution, and scenery impairment.
TXFG 1996-CSU-16-08	<b>CONTROLLED SURFACE USE – TEXAS NATURAL HERITAGE PROGRAM AREA</b> No surface occupancy is allowed. Site-specific proposals for surface-disturbing activities within these areas will be analyzed and may result in establishment of protective requirements, limitations or relocations.
TXFG 1996-LN-17-01	<b>LEASE NOTICE- NATIONAL FORESTS IN TEXAS – RED- COCKADED WOODPECKER</b> Portions of the land in this lease are, or may be, occupied by clusters of the endangered red-cockaded woodpeckers (RCWs). Exploration and development proposals may be modified and/or limited, including no surface occupancy within ¼ mile of an active red-cockaded woodpecker cluster and ½ mile if foraging habitat is limited.
TXFG 1996-LN-17-07	<b>LEASE NOTICE – RED-COCKADED WOODPECKER HABITAT MANAGEMENT FORAGING AREAS</b> Portions of the land in this lease are, or may be, occupied by clusters of the endangered red-cockaded woodpeckers (RCWs). Exploration and development proposals may be modified and/or limited, in accordance with the <i>Recovery Plan for the Red-cockaded Woodpecker</i> , second revision approved January 27, 2003.
TXFG 1996-LN-17-08	<b>LEASE NOTICE – BALD EAGLE</b> Portions of the land in this lease are within one mile of a bald eagle nesting site. Site-specific proposals for surface-disturbing activities within these areas will be analyzed and may result in establishment of protective requirements, limitations or relocations to ensure nesting success.
TXFG 1996-LN-17-09	<b>LEASE NOTICE – SPECIAL USE PERMIT SITES TRINITY COUNTY AIRPORT EXTENSION</b> Surface occupancy will be permitted when it does not unreasonably interfere with the privileges granted by the existing special use authorization.
WO-ESA-7	<b>THREATENED &amp; ENDANGERED SPECIES CONSULTATION</b> 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 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.
WO-NHPA	<p><b>CULTURAL RESOURCES AND TRIBAL CONSULTATION</b></p> <p>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, Executive Order 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 (e.g., State Historic Preservation Officer (SHPO) and tribal consultation) 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.</p>
ORA-1 OK, TX	<p><b>FLOODPLAIN PROTECTION:</b> A result of EO 11988 Floodplain Management of May 24, 1977. 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.</p>
ORA-2 OK, TX	<p><b>WETLAND/RIPARIAN:</b> Mandated by EO 11990 Protection of Wetlands of May 24, 1977. All or portions of the lands under this lease contain wetland and/or riparian areas. 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 for permit to drill.</p>
ORA-3 OK	<p><b>SEASON OF USE:</b> Surface occupancy of this lease will not be allowed from February 15 – May 15 for protection of the lesser/greater prairie-chicken breeding season.</p>
LN-3	<p><b>FLOODPLAIN MANAGEMENT:</b> All or portions of the lands under this lease lie in and/or adjacent to a major watercourse and may be subject to periodic flooding. Surface occupancy of these areas and surface disturbance within up to 200 meters of the outer edge of the floodplain may not be allowed in order to protect the integrity and functionality of the floodplain and associated watercourse. Controlled surface use requiring special mitigation measures may be required and will be developed during the application for permit to drill. These would be required as part of the environmental analysis, approval for drilling or any other operation on this lease. These measures could include modifications or relocation of proposed well locations; burial of linear facilities such as pipelines; modifications in surface activities; minimizing surface disturbance by co-locating roads, utilities and pipelines in common rights-of-ways; interim reclamation of all surface disturbance initiated immediately after construction; reduction of long term noise producing activities; suitable off-site mitigation or other reasonable measures to mitigate impacts to floodplains.</p>

**APPENDIX 2. NOMINATED LEASE SALE PARCELS.**

---

# BLM New Mexico Competitive Oil and Gas Lease Sale April 2016 Kansas Nominated Lease Sale Parcels

KSNM 201604 043

KSNM 201604 003

KSNM 201604 001

KSNM 201604 002

KSNM 201604 042

- Major Roads
  - Interstates
  - Nominated Lease Sale Parcels
  - Relevant Counties
- KS Ownership**
- OWNER**
- Kansas Dept. of Wildlife and Parks
  - KS Dept. of Wildlife and Parks/BOR
  - U.S. Army Corps of Engineers
  - U.S. Army Corps of Engineers
  - U.S. Bureau of Reclamation
  - U.S. Dept. of Agriculture - NRCS
  - U.S. Dept. of Army
  - U.S. Fish and Wildlife Service
  - U.S. Forest Service



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.



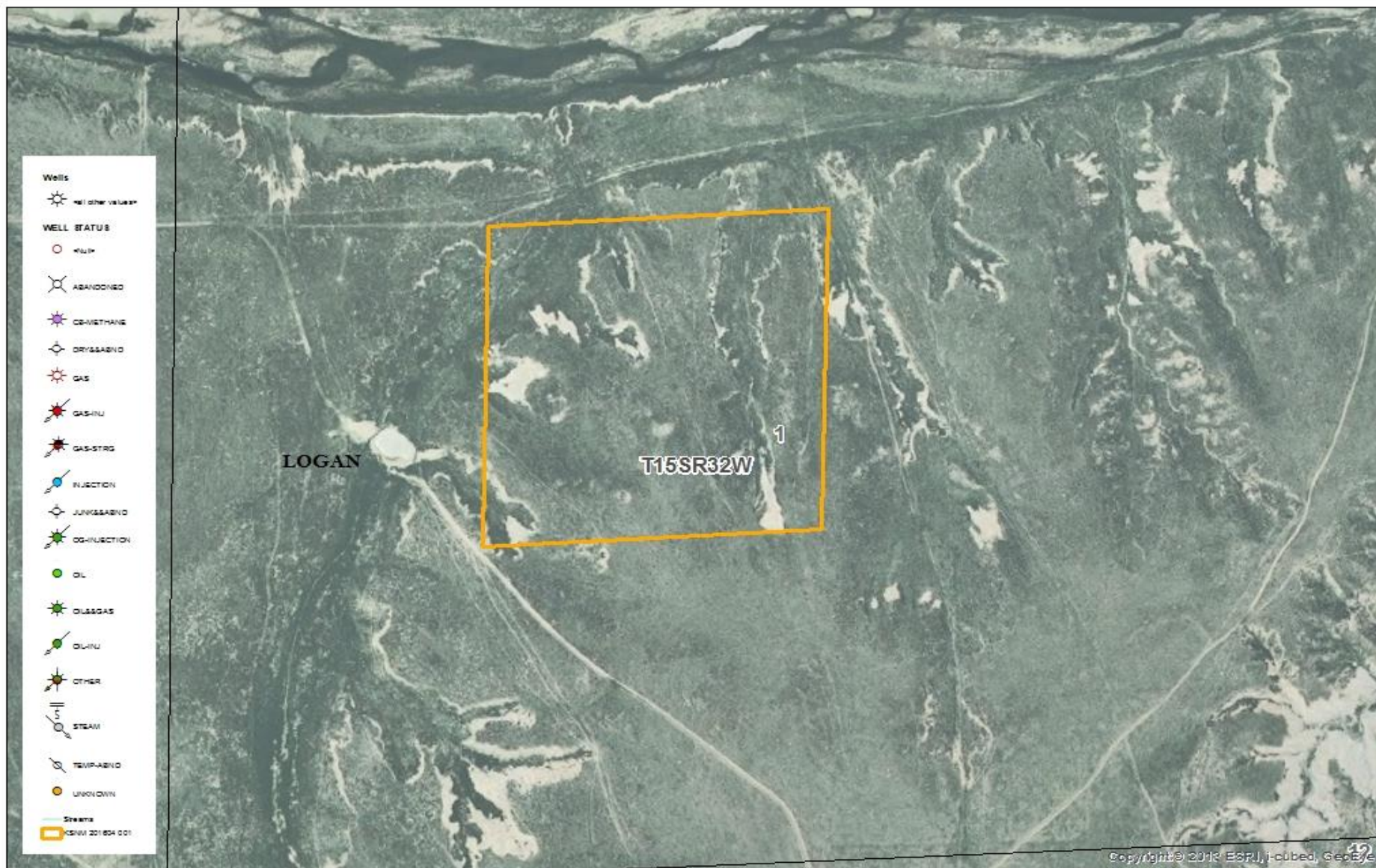
1:2,228,000

0 50 100 200 Miles



July 29, 2015 Oklahoma GIS Team





No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.



Nominated Lease Sale Parcels  
KSNM 2016104 001  
Logan County, KS

1:8,000

0 250 500 1,000 Feet

NAD 83  
USA  
Albers Contiguous  
Equal Area Conic

Bureau of Land Management  
Tulsa Field Office  
7906 E 33 St, Ste 101  
Tulsa, OK 74145



DJM 7/31/2014





No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

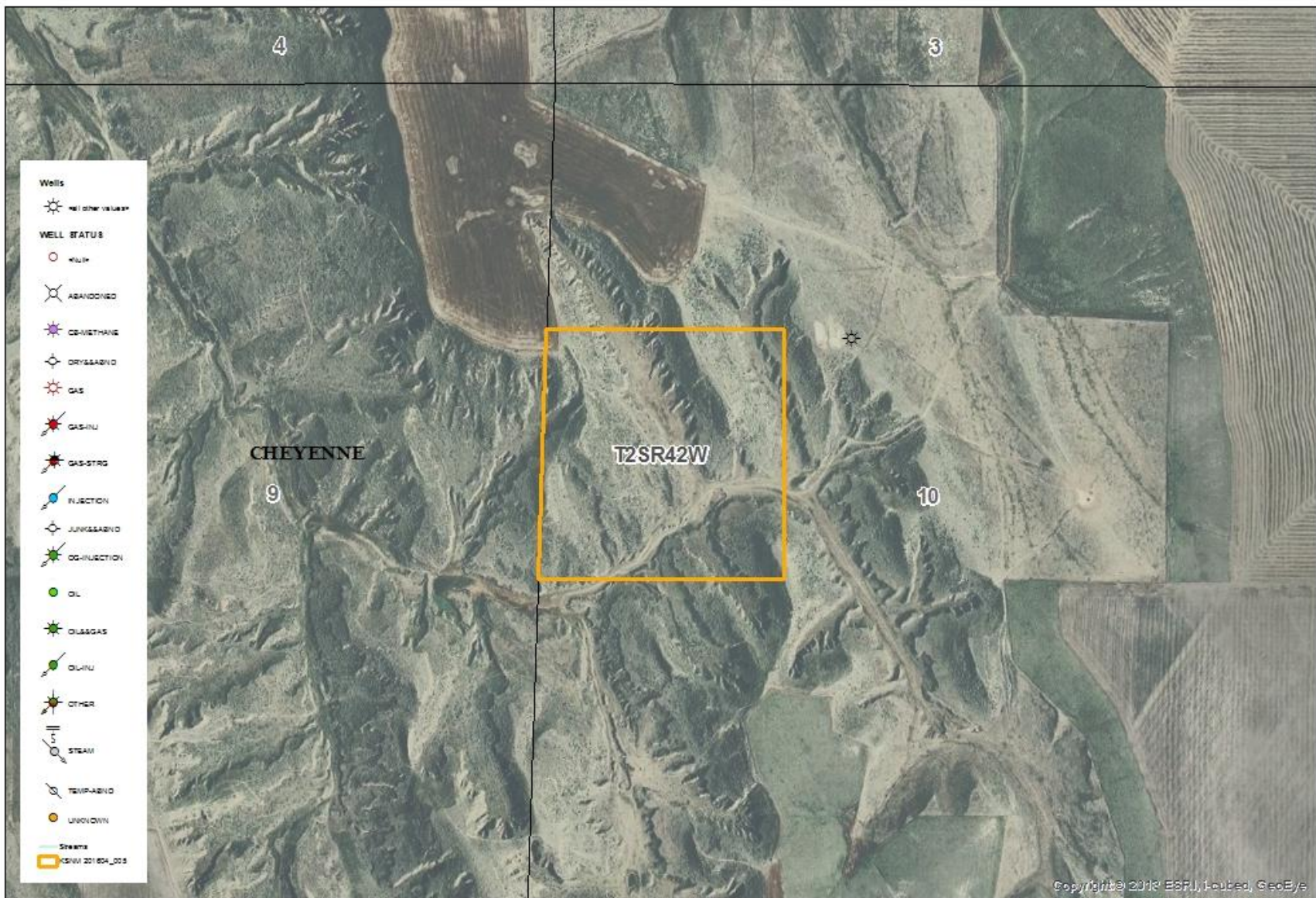


1:8,000  
 0 250 500 1,000 Feet

NAD 83  
 USA  
 Area is Contiguous  
 Equal Area Cont







No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.



Nominated Lease Sale Parcels  
KSNM 2016104 005  
Cheyenne County, KS

1:8,000  
0 250 500 1,000 Feet

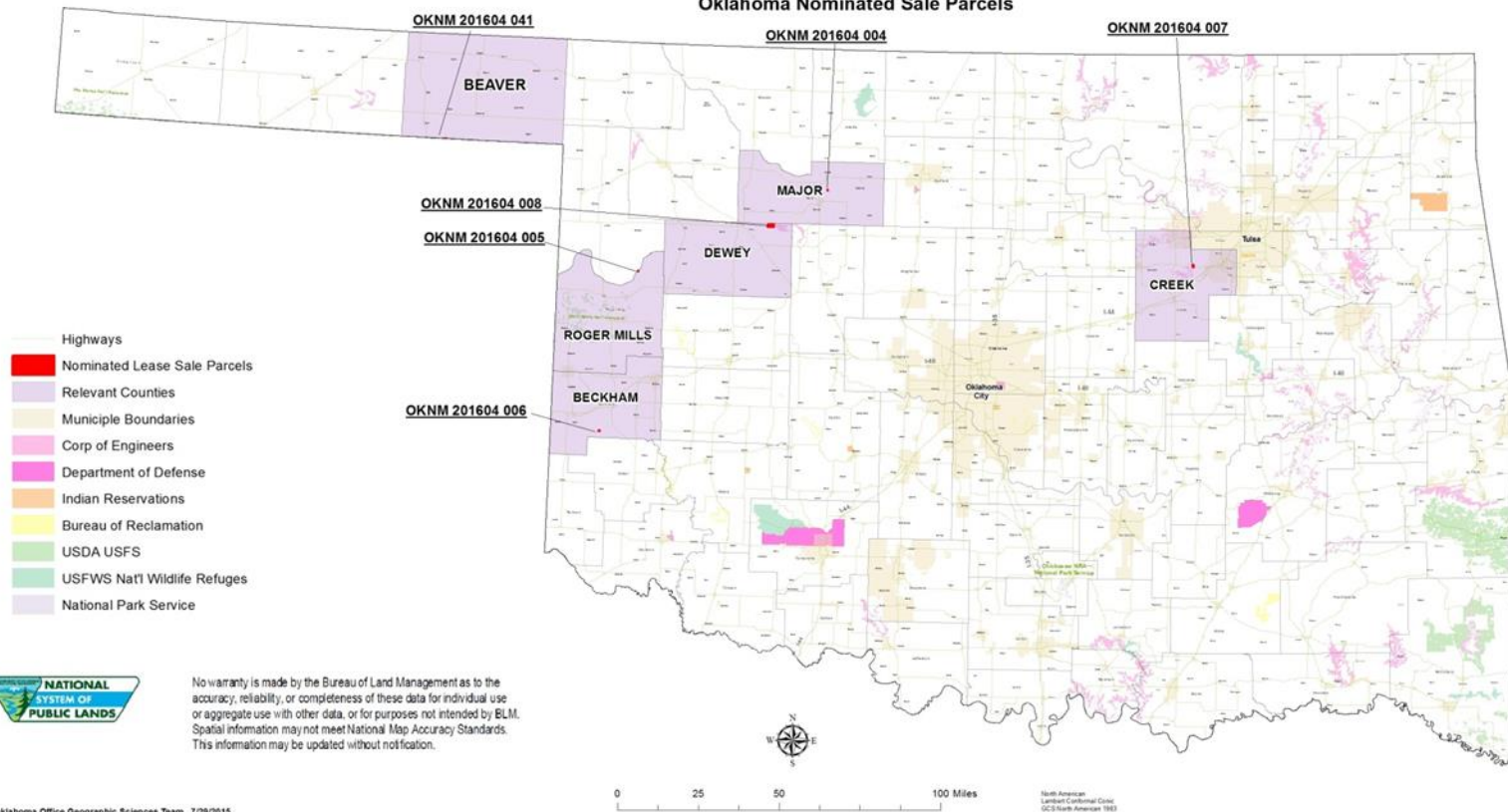
NAD 83  
USA  
Albers Contiguous  
Equal Area Conic

Bureau of Land Management  
Tulsa Field Office  
7906 E 33 St, Ste 101  
Tulsa, OK 74145

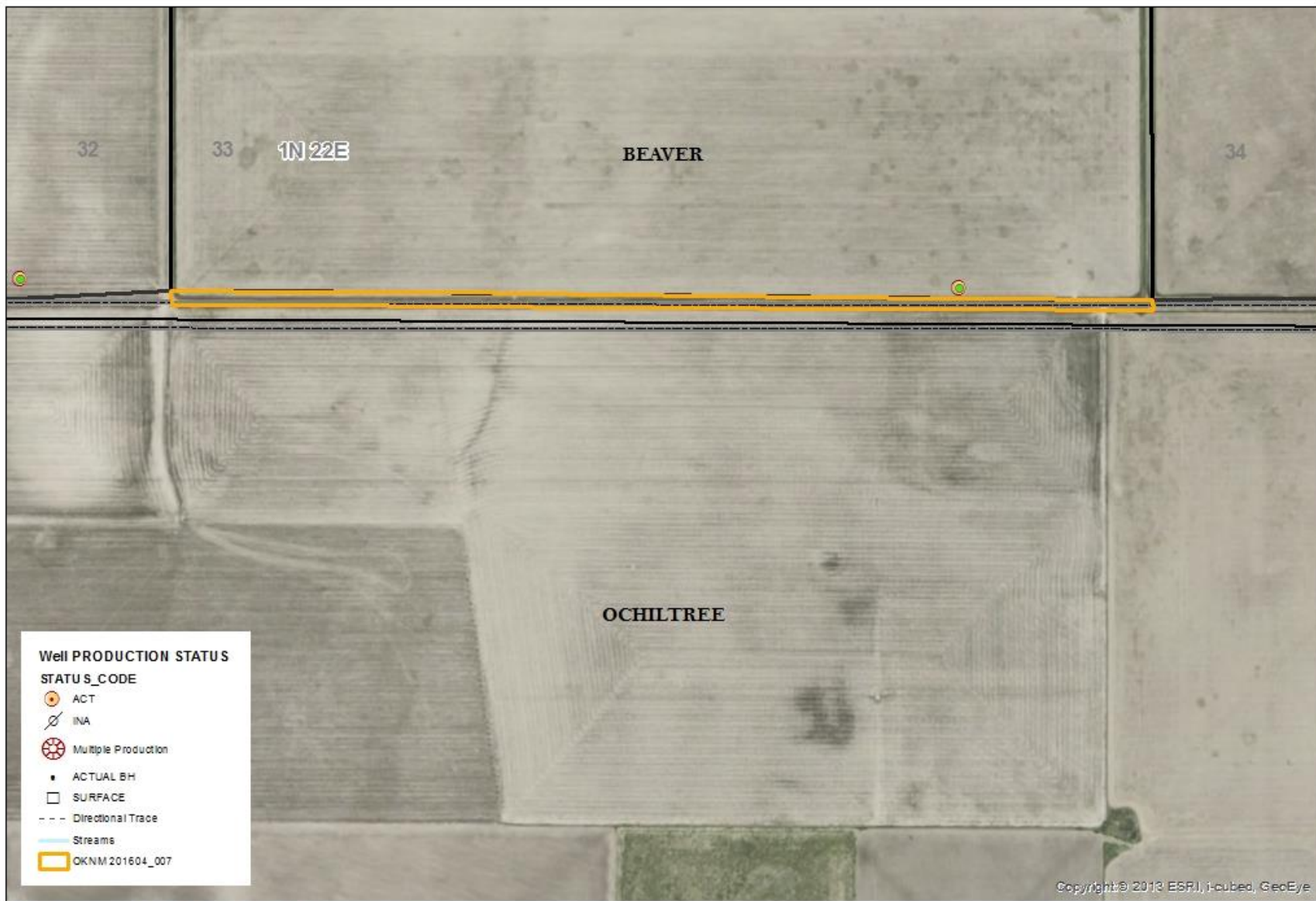


DJM 8/31/2015

**BLM New Mexico Competitive Oil and Gas Lease Sale  
April 2016  
Oklahoma Nominated Sale Parcels**







No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.



Nominated Lease Sale Parcels  
OKNM 201604 007  
Beaver County, OK

1:8,000

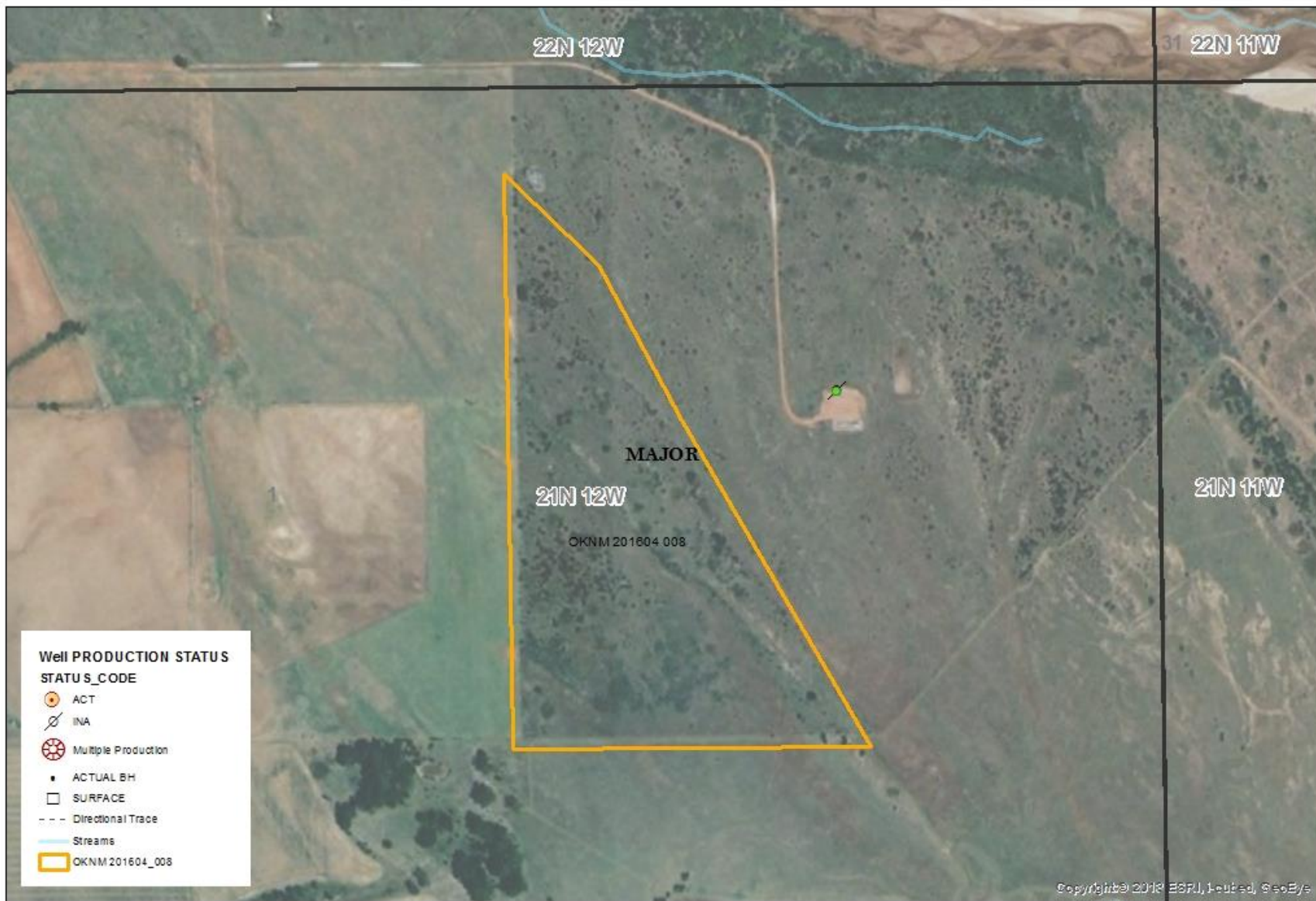
0 500 1,000 2,000 Feet

NAD 83  
USA  
Albers Contiguous  
Equal Area Conic

Bureau of Land Management  
Tulsa Field Office  
7906 E 33 St, Ste 101  
Tulsa, OK 74145



DJM 8/31/2015



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.



Nominated Lease Sale Parcels  
OKNM 201604 008  
Major County, OK

1:8,000  
0 250 500 1,000 Feet

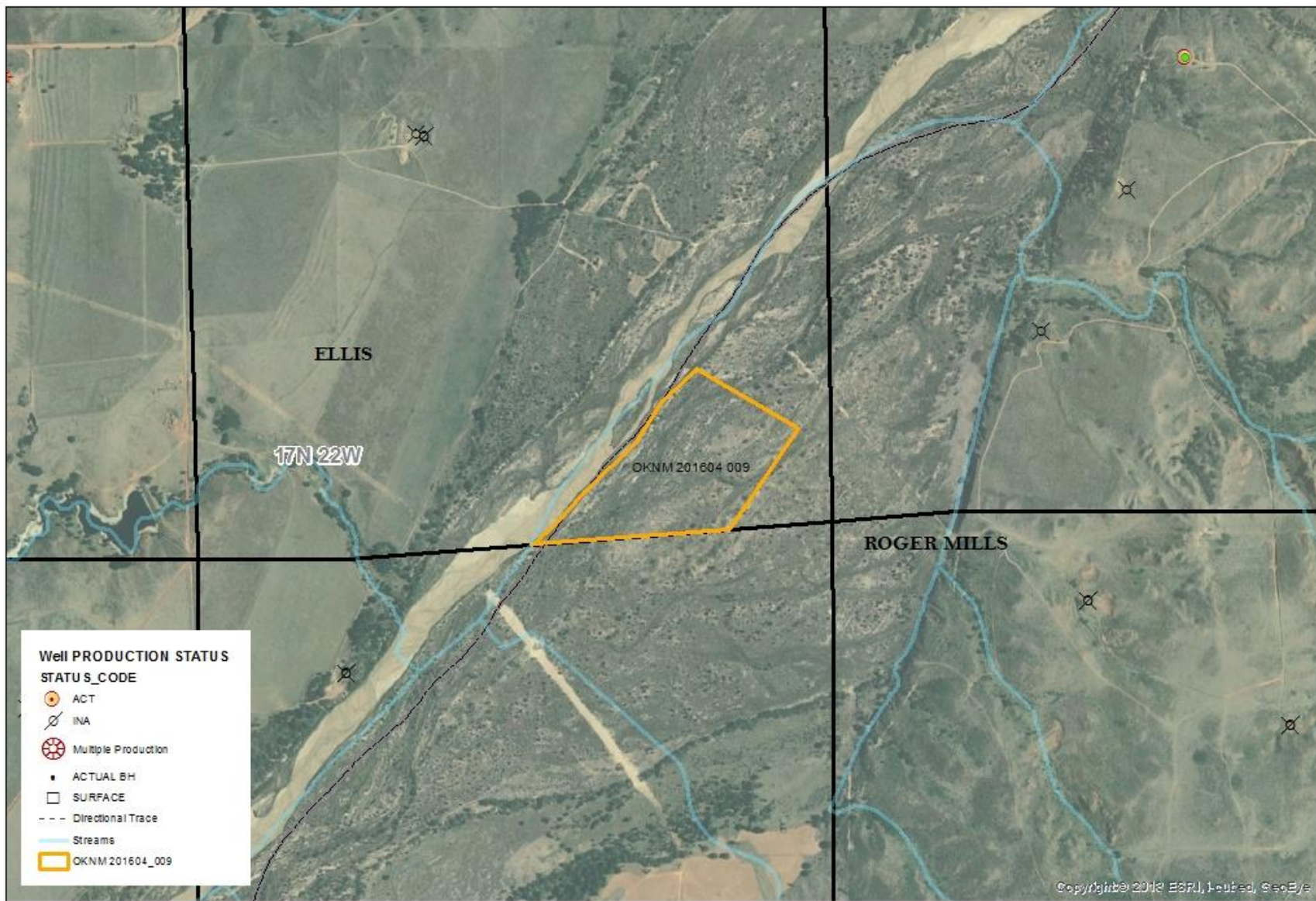
NAD 83  
USA  
Albers Contiguous  
Equal Area Conic

Bureau of Land Management  
Tulsa Field Office  
7906 E 33 St, Ste 101  
Tulsa, OK 74145



DJM 8/31/2015





No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.



Nominated Lease Sale Parcels  
OKNM 201604 009  
Roger Mills County, OK

1:12,000  
0 500 1,000 2,000 Feet

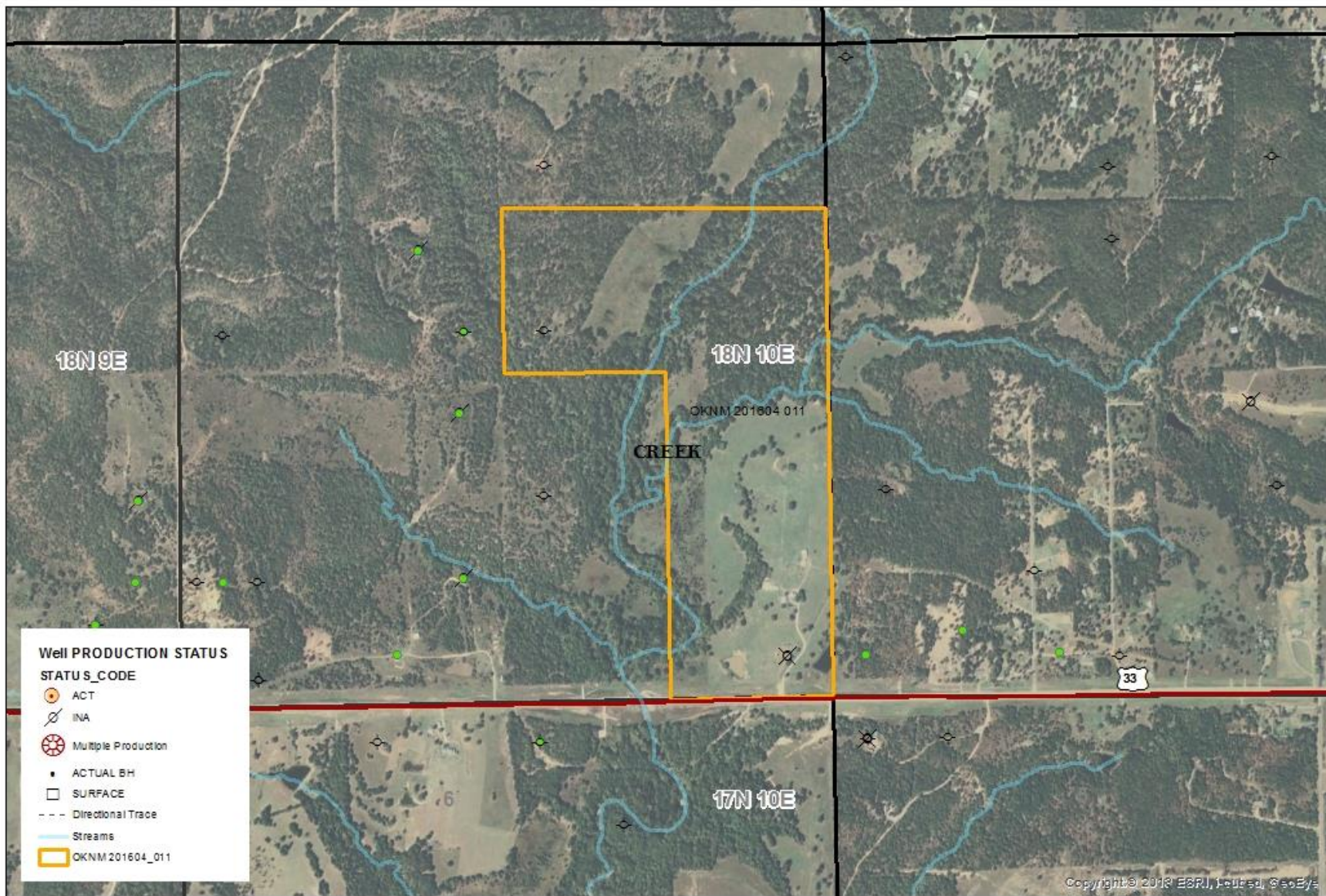
NAD 83  
USA  
Albers Contiguous  
Equal Area Conic

Bureau of Land Management  
Tulsa Field Office  
7906 E 33 St, Ste 101  
Tulsa, OK 74145



DJM 8/31/2015





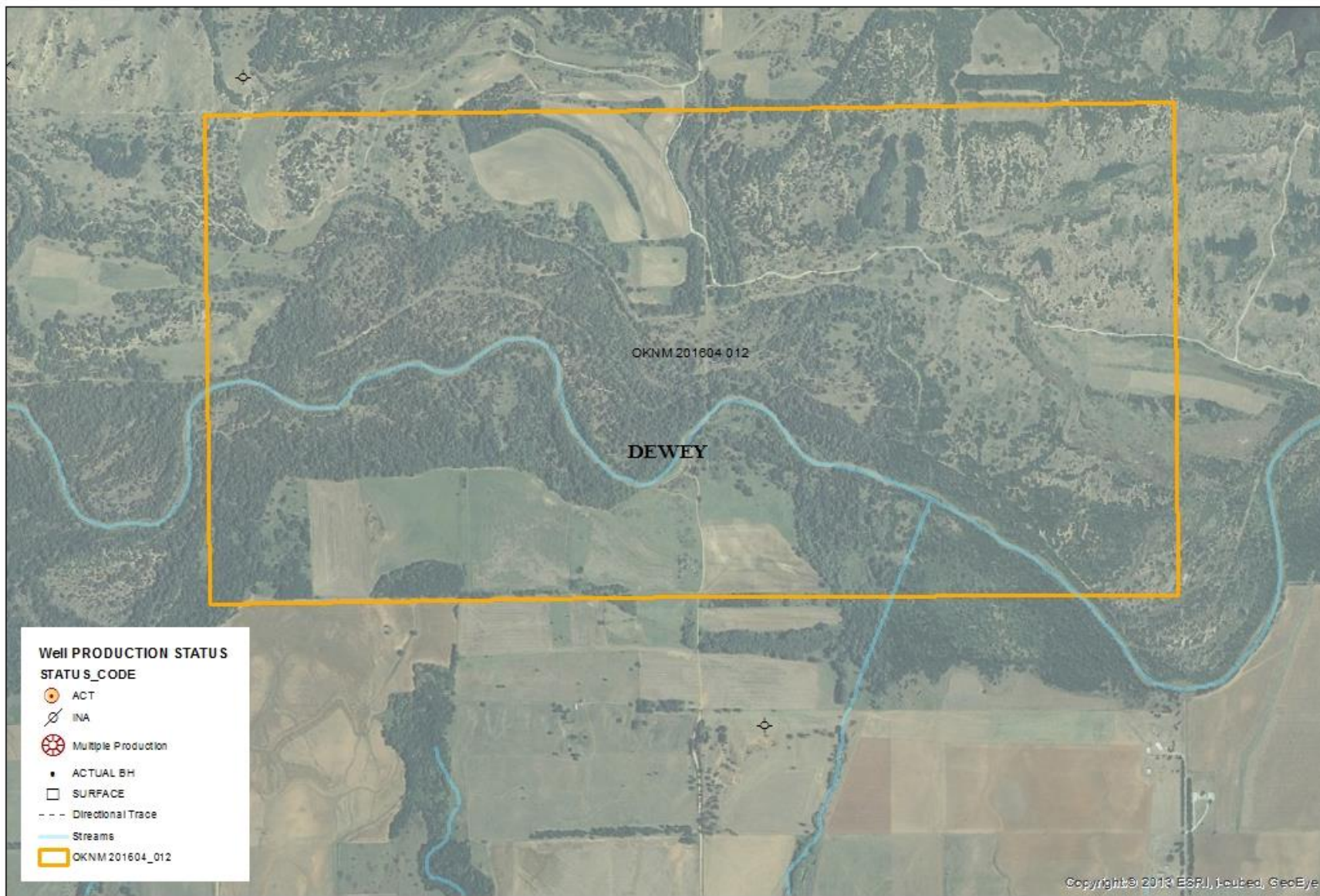
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.



NAD 83  
 USA  
 Albers Contiguous  
 Equal Area Conic







No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.



Nominated Lease Sale Parcels  
OKNM 201604 012  
Dewey County, OK

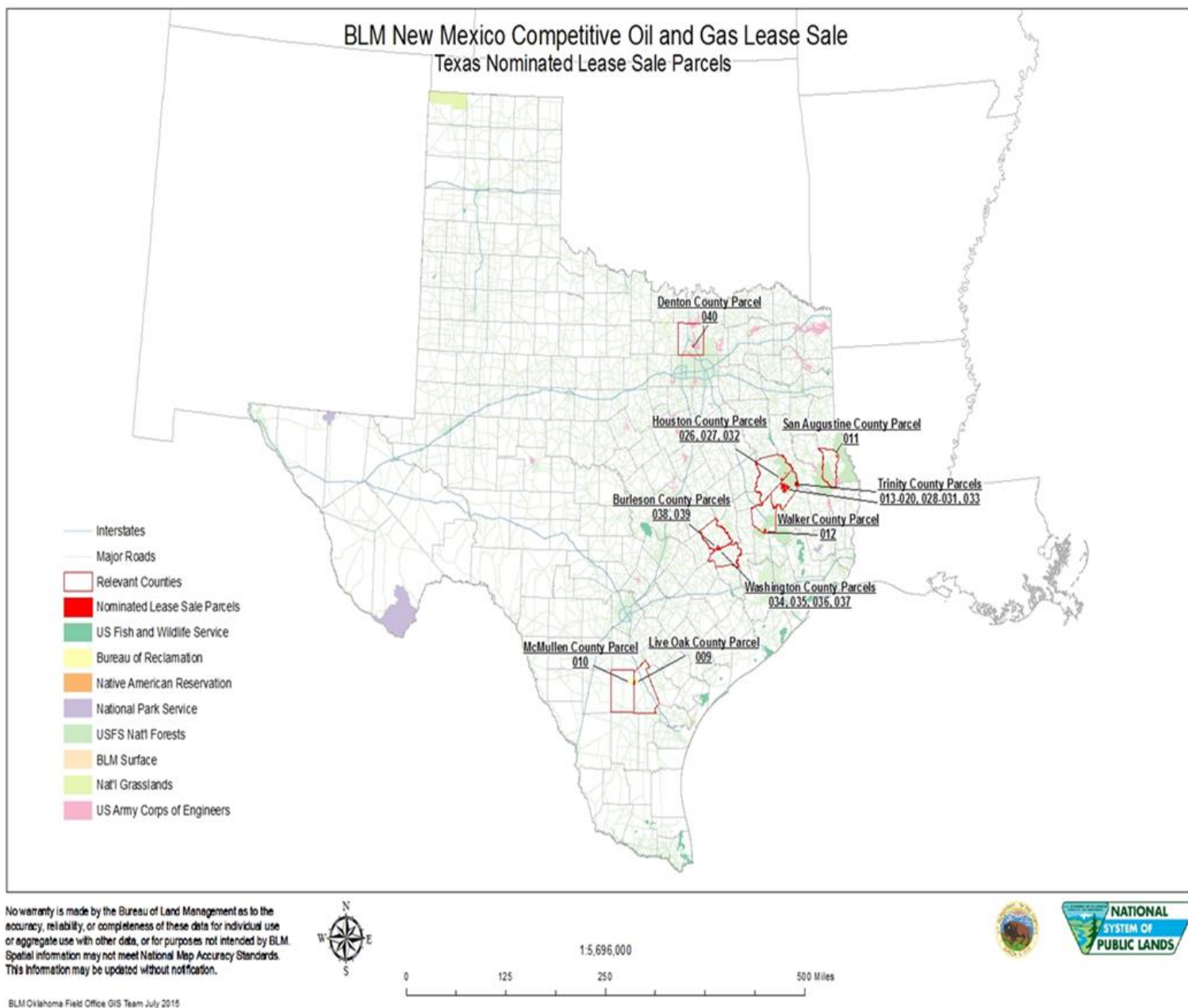
1:16,000  
0 500 1,000 2,000 Feet

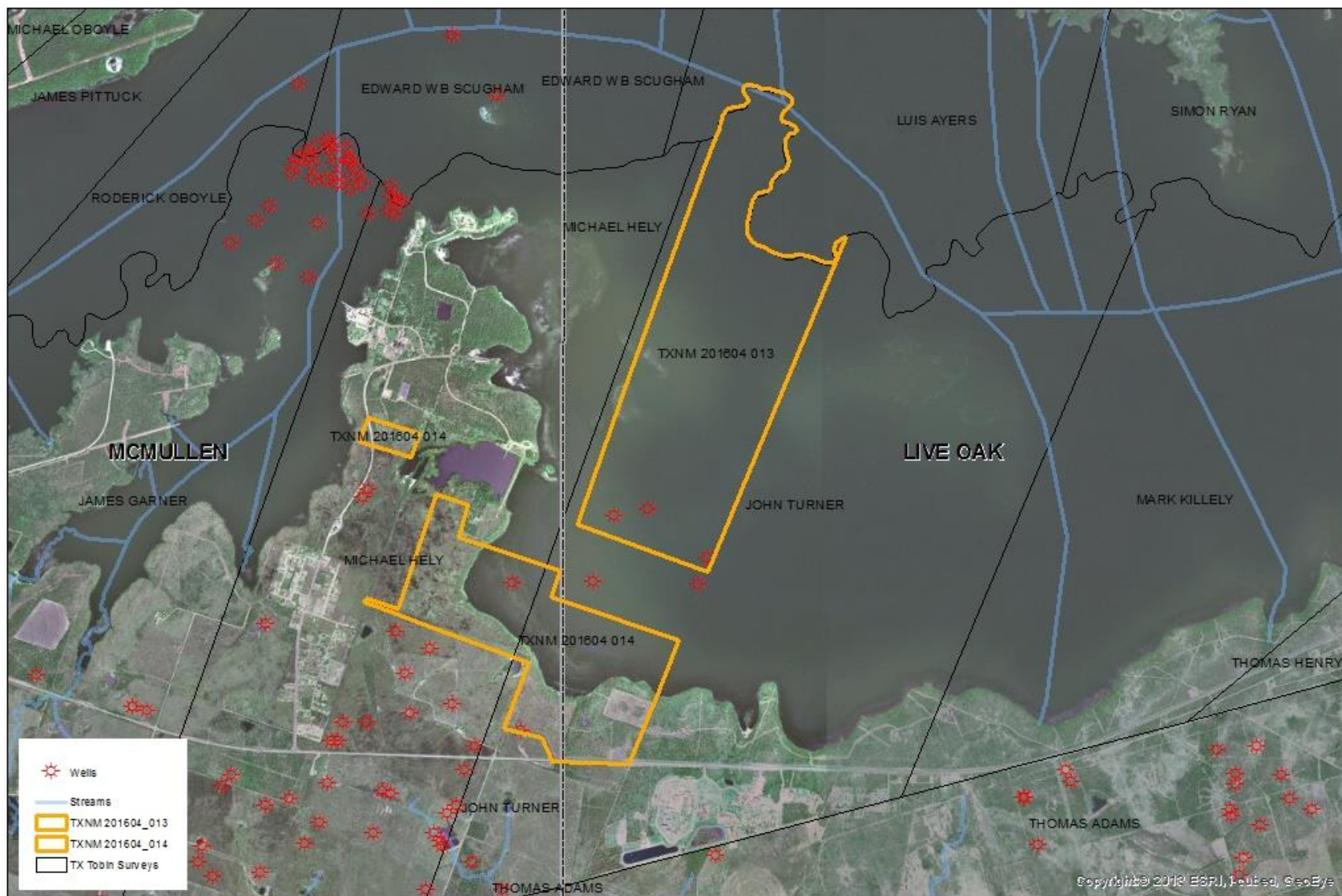
NAD 83  
USA  
Albers Contiguous  
Equal Area Conic

Bureau of Land Management  
Tulsa Field Office  
7906 E 33 St, Ste 101  
Tulsa, OK 74145









No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

DJM 6/2/2015



# **Nominated Lease Sale Parcel TXNM 201604 013 & 014 Live Oak & McMullen Counties, TX**

Scale 1:42,000

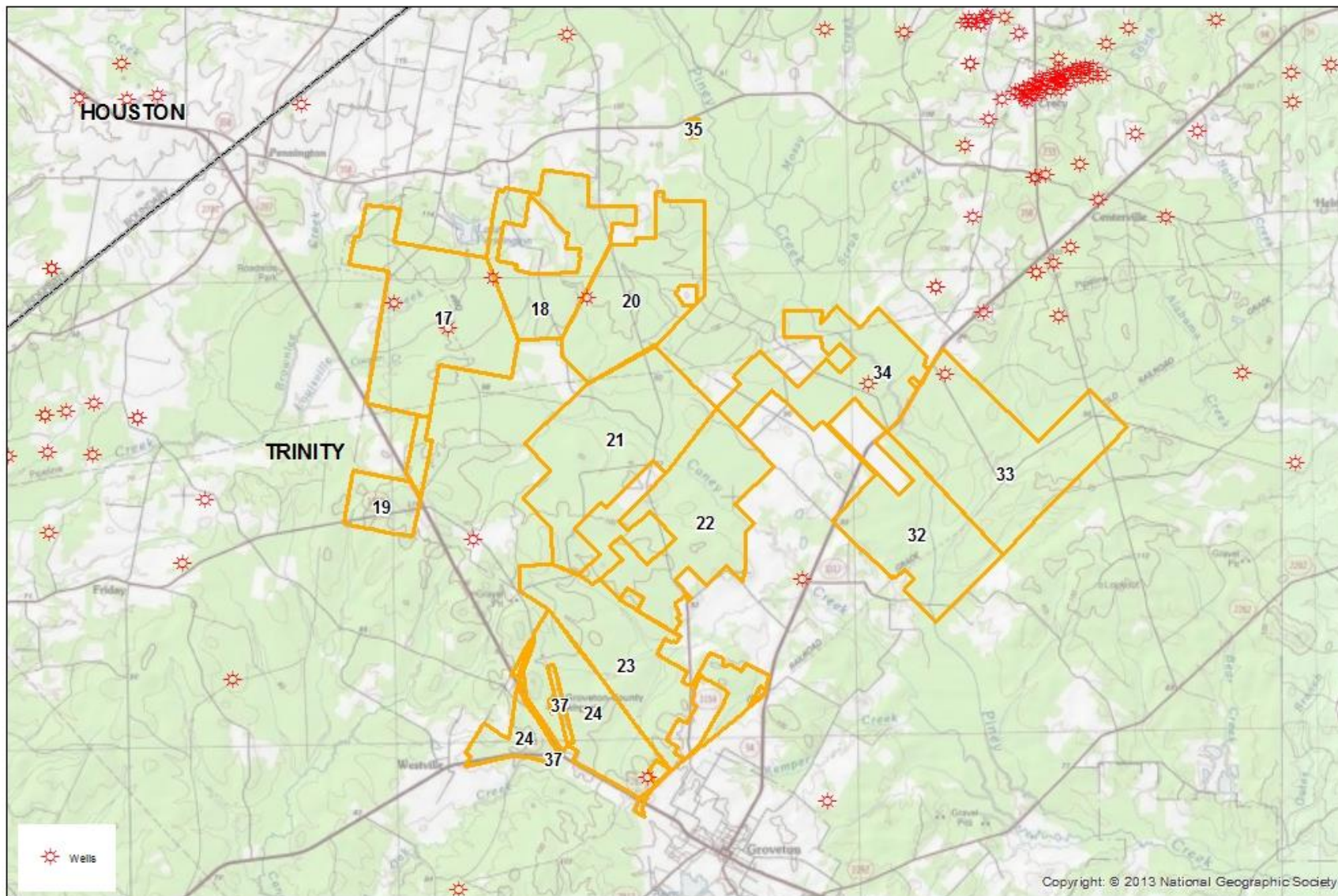
0 2,500 5,000 10,000 Feet

NA D 1983  
USA Contiguous  
Albers Equal Area Conic



Bureau of Land Management  
Oklahoma Field Office  
7906 East 33rd Street, Suite 101  
Tulsa, OK 74145





No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

DJM 8/3/2015



# **Nominated Lease Sale Parcel** **TXNM 201604 017-028, 032-035, 037** **Trinity County, TX**

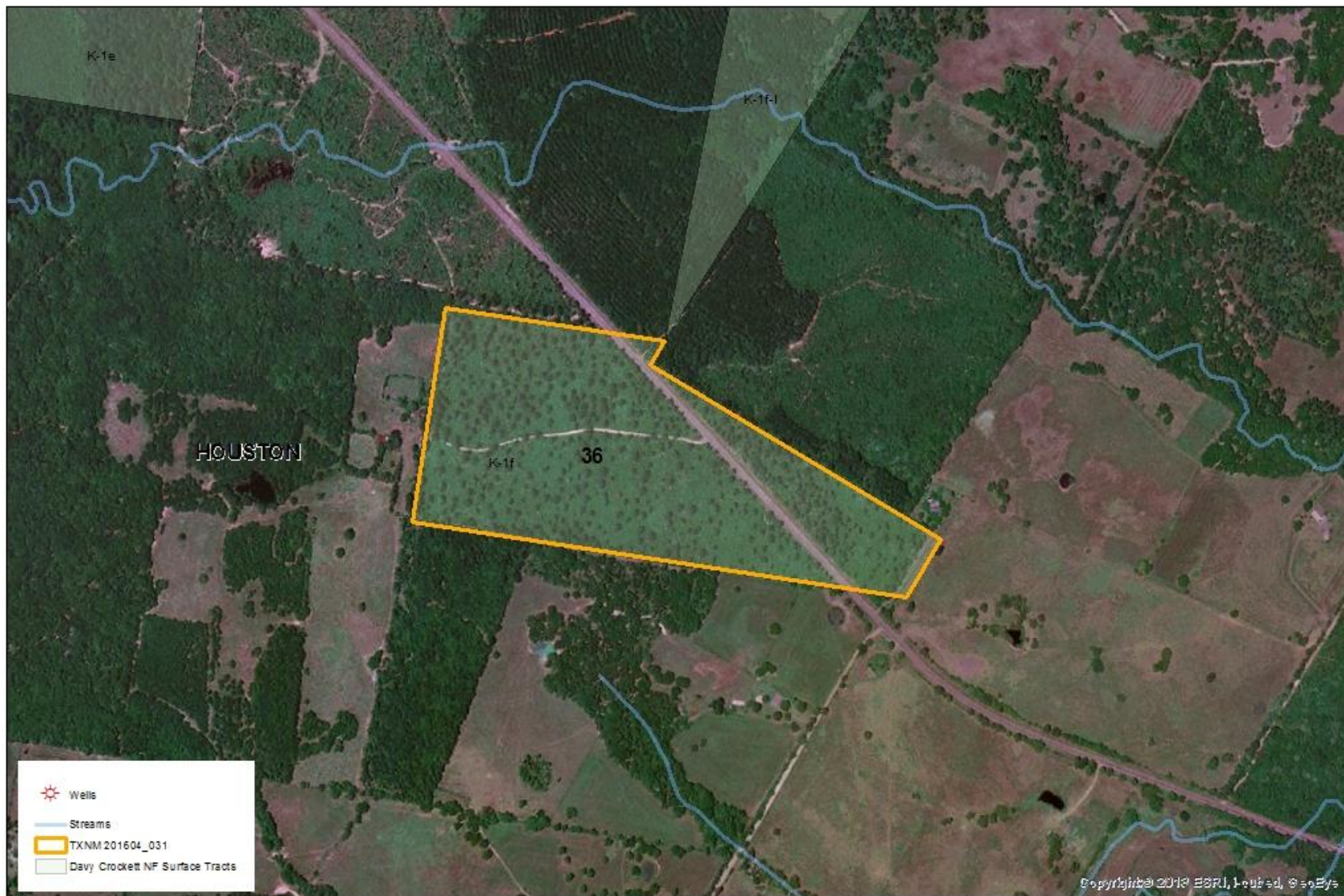
Scale 1:108,000  
 0 5,000 10,000 20,000 Feet

NAD 1983  
 USA Contiguous  
 Albers Equal Area Conic



Bureau of Land Management  
 Oklahoma Field Office  
 7906 East 33rd Street, Suite 101  
 Tulsa, OK 74145





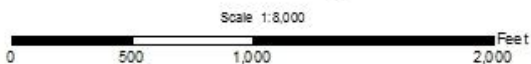
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

DJM 8/3/2015



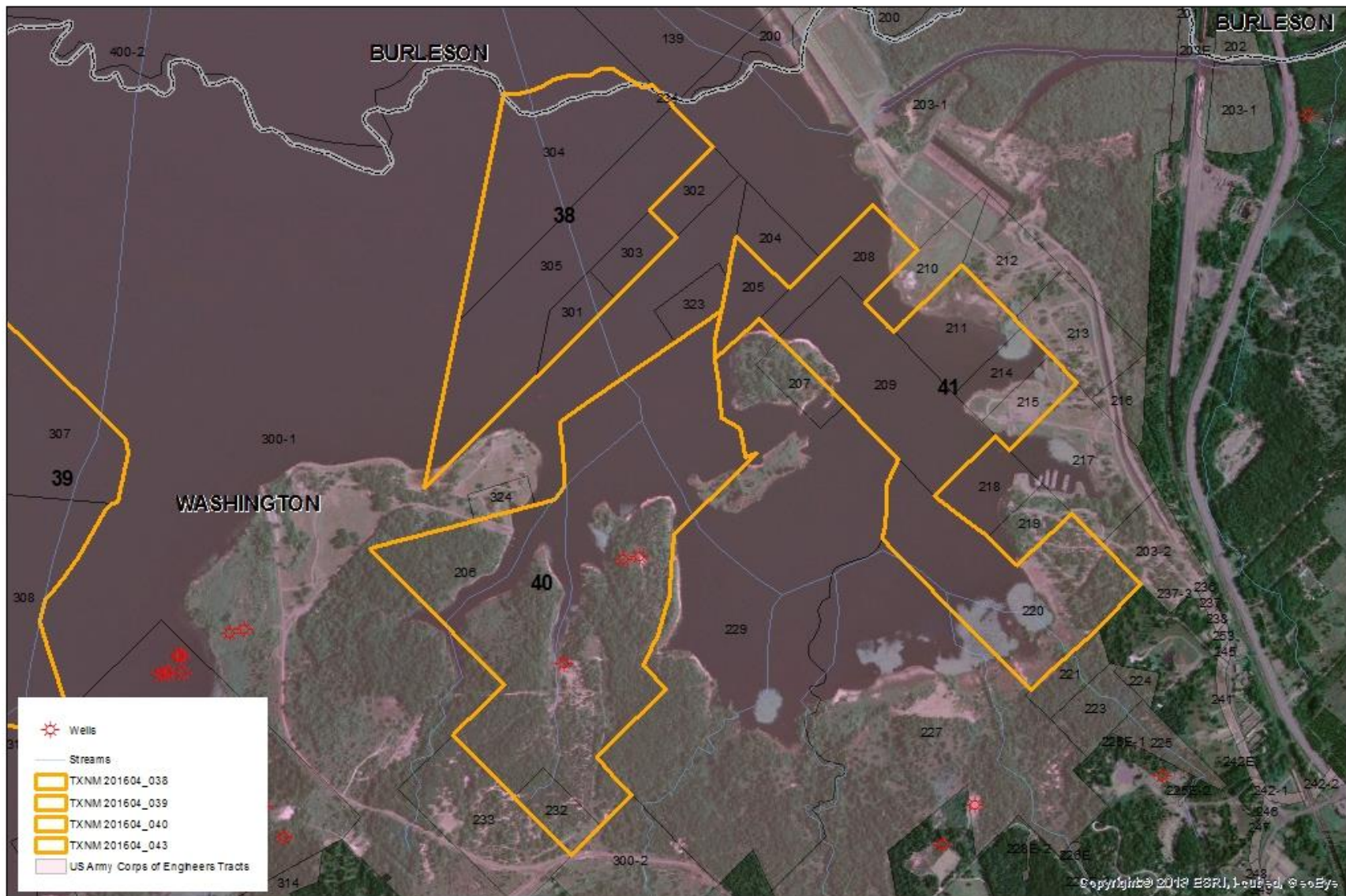
# **Nominated Lease Sale Parcel** **TXNM 201604 036** **Houston County, TX**

NAD 1983  
 USA Contiguous  
 Albers Equal Area Conic



Bureau of Land Management  
 Oklahoma Field Office  
 7906 East 33rd Street, Suite 101  
 Tulsa, OK 74145





No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

DJM 8/3/2015



# **Nominated Lease Sale Parcel** **TXNM 201604 038, 040, 041** **Washington County, TX**

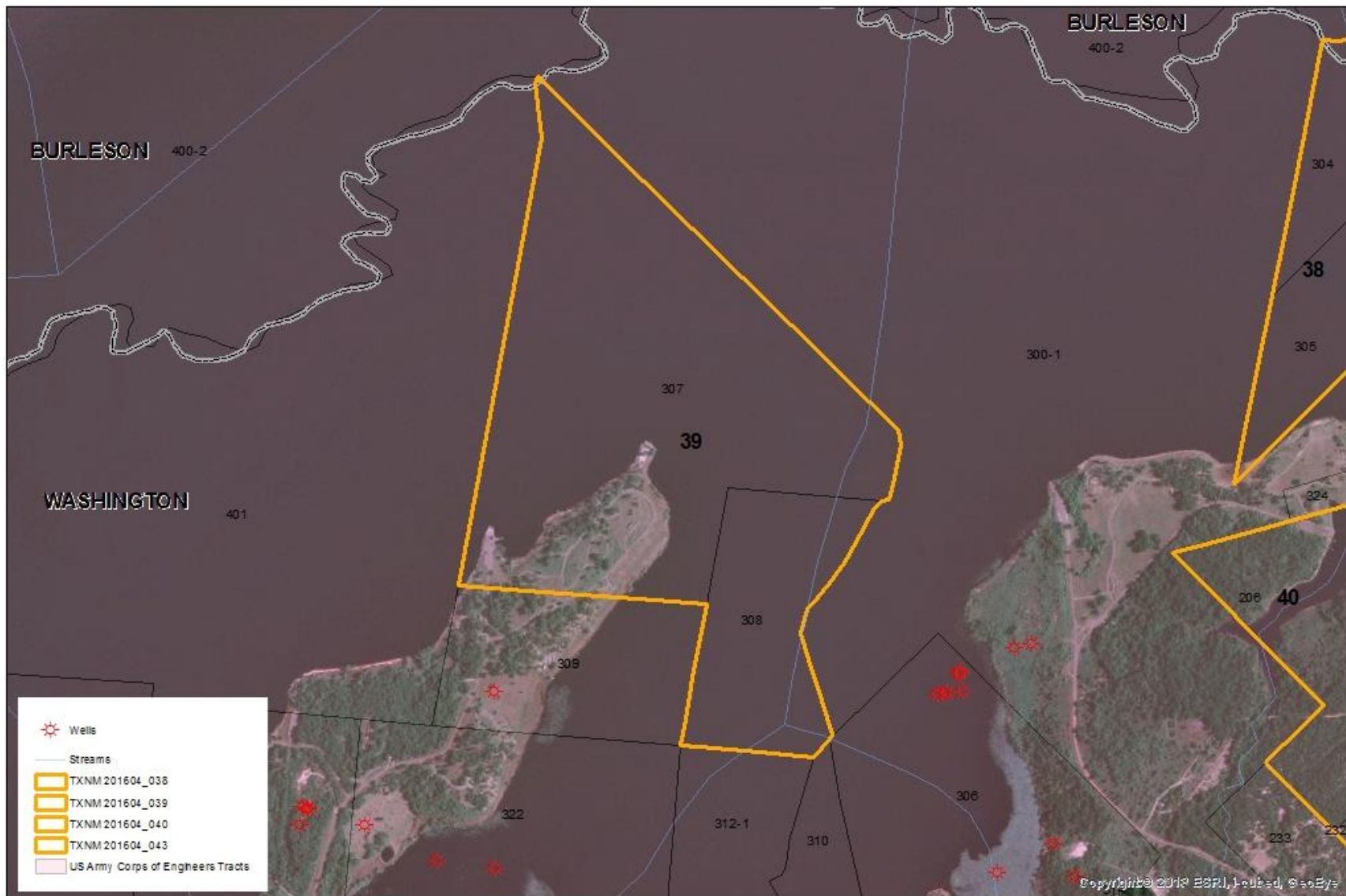
Scale 1:18,000  
 0 500 1,000 2,000 Feet

NAD 1983  
 USA Contiguous  
 Albers Equal Area Conic



Bureau of Land Management  
 Oklahoma Field Office  
 7906 East 33rd Street, Suite 101  
 Tulsa, OK 74145





No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

DJM 8/3/2015



# **Nominated Lease Sale Parcel TXNM 201604 039 Washington County, TX**

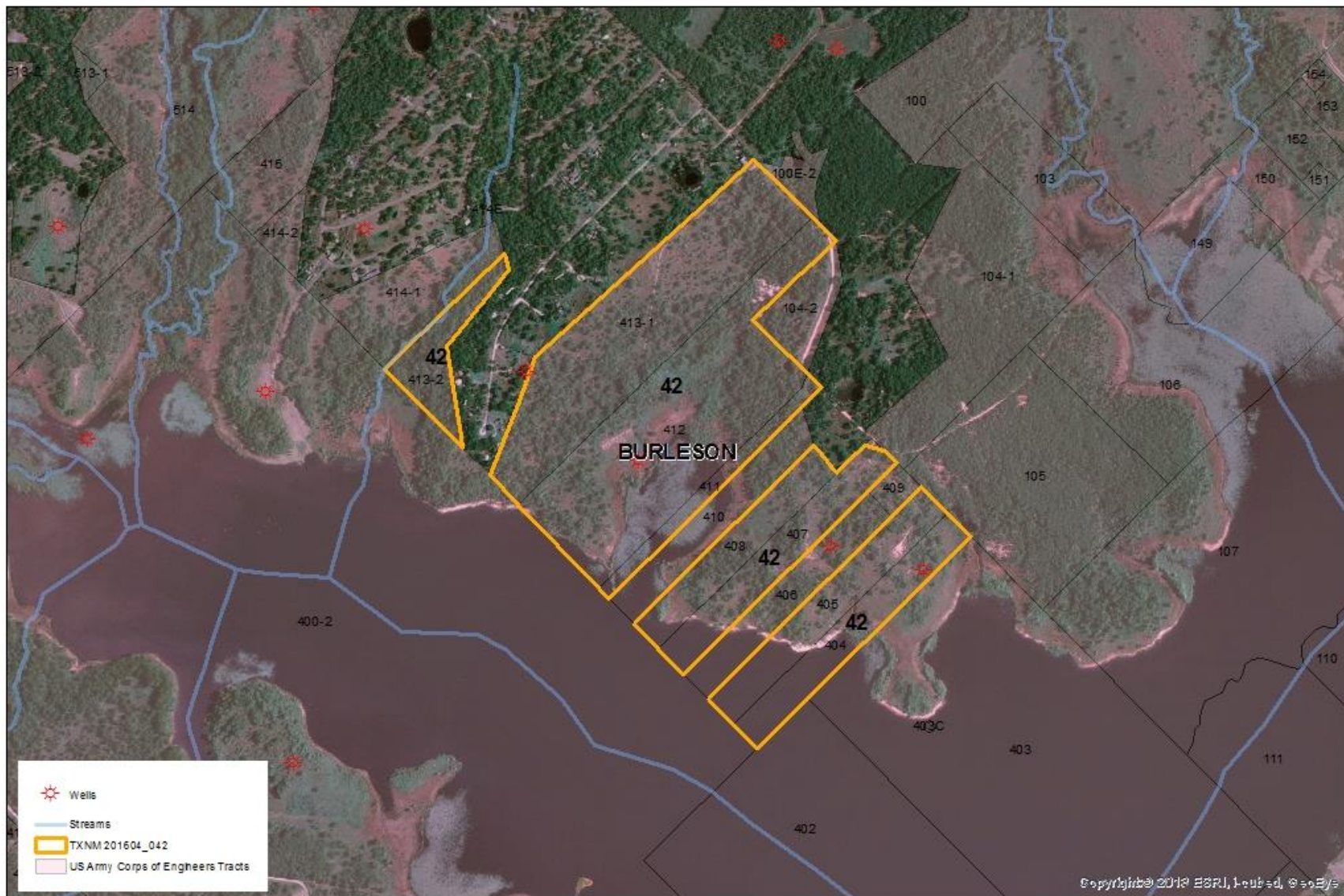
Scale 1:16,000  
0 500 1,000 2,000 Feet

NAD 1983  
USA Contiguous  
Albers Equal Area Conic



Bureau of Land Management  
Oklahoma Field Office  
7906 East 33rd Street, Suite 101  
Tulsa, OK 74145





No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.



# **Nominated Lease Sale Parcel** **TXNM 201604 042** **Burleson County, TX**

Scale 1:12,000  
 0 500 1,000 2,000 Feet

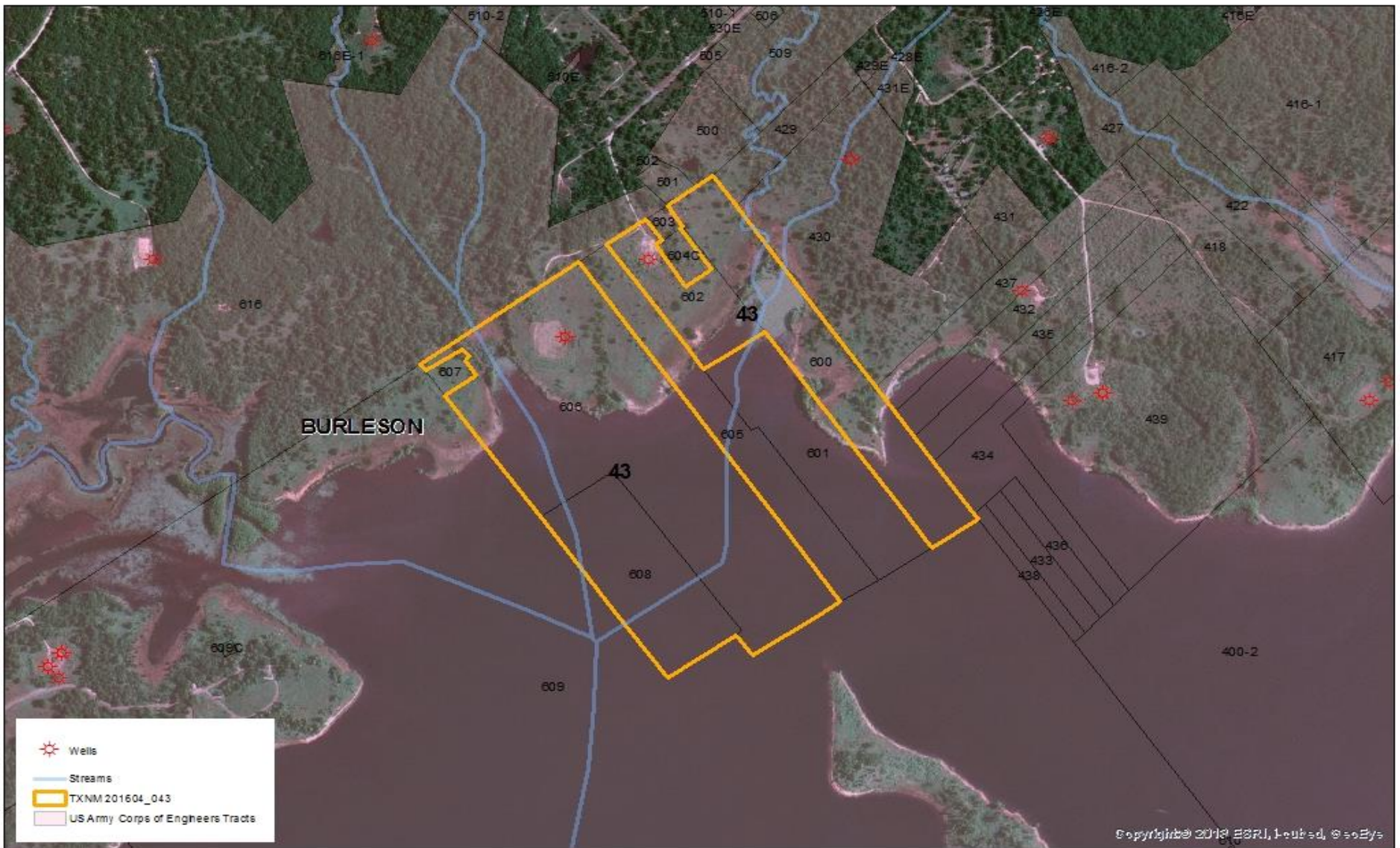
NAD 1983  
 USA Contiguous  
 Albers Equal Area Conic



Bureau of Land Management  
 Oklahoma Field Office  
 7906 East 33rd Street, Suite 101  
 Tulsa, OK 74145

DJM 8/3/2015





No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

DJM 8/3/2015

### Nominated Lease Sale Parcel TXNM 201604 043 Burleson County, TX

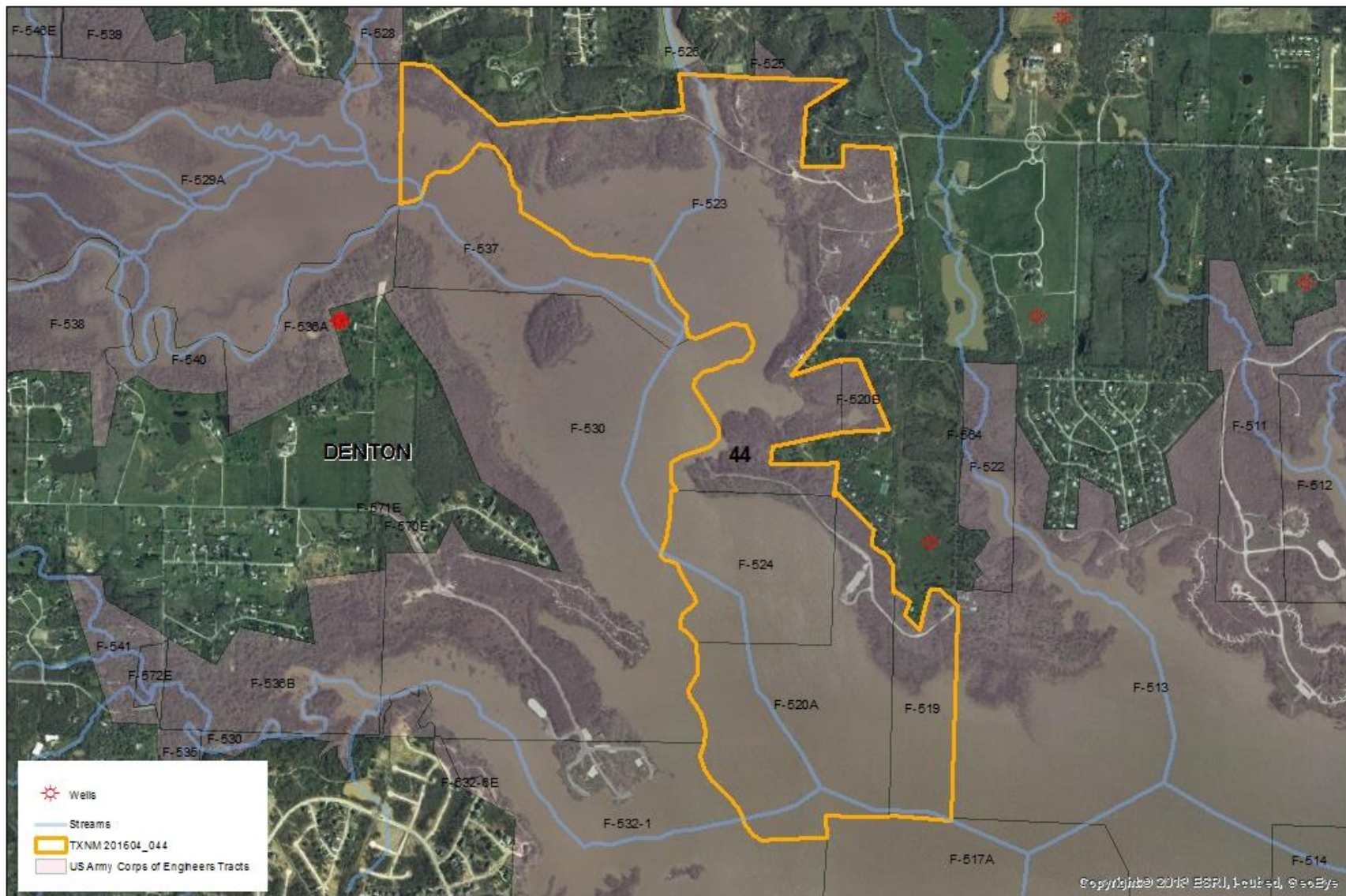
NAD 1983  
USA Contiguous  
Albers Equal Area Conic



Bureau of Land Management  
Oklahoma Field Office  
7906 East 33rd Street, Suite 101  
Tulsa, OK 74145







No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification.

DJM 8/3/2015



### Nominated Lease Sale Parcel TXNM 201604 044 Denton County, TX

Scale 1:12,000  
0 1,000 2,000 4,000 Feet

NAD 1983  
USA Contiguous  
Albers Equal Area Conic



Bureau of Land Management  
Oklahoma Field Office  
7906 East 33rd Street, Suite 101  
Tulsa, OK 74145



## **APPENDIX 3: PHASES OF OIL AND GAS DEVELOPMENT**

---

### **Construction Activities**

Clearing of the proposed well pad and access road would be limited to the smallest area possible to provide safe and efficient work areas for all phases of construction. First all new construction areas need to be cleared of all vegetation. All clearing activities are typically accomplished by cutting, mowing and/or grading vegetation as necessary. Cut vegetation may be mulched and spread on site or hauled to a commercial waste disposal facility.

Next, heavy equipment including but not limited to bulldozers, graders, front-end loaders, and/or track hoes are used to construct at a minimum the pad, but other features, as needed for development, may include, but is not limited to an access road, reserve pit, pipeline, and/or fracturing pond. Cut and fills may be required to level the pad or road surfaces. If a reserve pit is authorized, it would be lined using an impermeable liner or other lining mechanism (i.e. bentonite or clay) to prevent fluids from leeching into the soil. Access roads may have cattle guards, gates, drainage control, or pull-outs installed, among a host of other features that may be necessary based on the site specific situation. Long-term surfaces are typically dressed with a layer of crushed rock or soil cemented. Construction materials come from a variety of sources, but in Oklahoma, Texas, and Kansas, the most common are commercial. Areas not needed for long-term development (i.e. portions of the pipeline or road right-of-way) are reclaimed by recontouring the surface and establishing vegetation.

If a pipeline is needed, the right-of-way would be cleared of all vegetation. The pipeline would be laid out within the cleared section. A backhoe, or similar piece of equipment, would dig a trench at least 36 inches below the surface. After the trench is dug, the pipes would be assembled by welding pieces of pipe together and bending them slightly, if necessary, to fit the contour of the pipeline's path. Once inspected, the pipe can be lowered into the trench and covered with stockpiled subsoil that was originally removed from the hole. Each pipeline undergoes hydrostatic testing prior to natural gas being pumped through the pipeline. This ensures the pipeline is strong enough and absent of any leaks.

### **Drilling Operations**

When the pad is complete, the drilling rig and associated equipment would be moved onsite and erected. A conventional rotary drill rig with capability matched to the depth requirements of the proposed well(s) would be used. The well could be drilled as a vertical or horizontal well to target the desired formation. The depth of the well is entirely dependent on the target formation depth and could be several hundred feet vertical depth to over 20,000 feet vertical depth.

When a conventional reserve pit system is proposed, drilling fluid or mud is circulated through the drill pipe to the bottom of the hole, through the bit, up the bore of the well, and finally to the surface. When mud emerges from the hole, it enters into the reserve pit where it would remain until all fluids are evaporated and the solids can be buried.

A closed-loop system, operates in a similar fashion except that when the mud emerges from the hole, it passes through a series of equipment used to screen and remove drill cuttings (rock chips) and sand-sized solids rather than going into the pit. When the solids have been removed, the mud would be placed into holding tanks, and from the tank, used again.

In either situation the mud is maintained at a specific weight and viscosity to cool the bit, seal off any porous zones (thereby protecting aquifers or preventing damage to producing zone productivity), control subsurface pressure, lubricate the drill string, clean the bottom of the hole, and bring the drill cuttings to the surface. Water-based or oil-based muds can be used and is entirely dependent on the site-specific conditions.

## **Completion Operations**

Once a well has been drilled, completion operations would begin once crews and equipment are available. Well completion involves setting casing to depth and perforating the casing in target zones.

Wells are often treated during completion to improve the recovery of hydrocarbons by increasing the rate and volume of hydrocarbons moving from the natural oil and gas reservoir into the wellbore. These processes are known as well-stimulation treatments, which create new fluid passageways in the producing formation or remove blockages within existing passageways. They include fracturing, acidizing, and other mechanical and chemical treatments often used in combination. The results from different treatments are additive and complement each other.

### ***Hydraulic Fracturing***

Hydraulic fracturing (HF) is one technological key to economic recovery of oil and gas that might have been left by conventional oil and gas drilling and pumping technology. It is a formation stimulation practice used to create additional permeability in a producing formation, thus allowing gas to flow more readily toward the wellbore. Hydraulic fracturing can be used to overcome natural barriers, such as naturally low permeability or reduced permeability resulting from near wellbore damage, to the flow of fluids (gas or water) to the wellbore (GWPC 2009). The process is not new and has been a method for additional oil and gas recovery since the early 1900s; however, with the advancement of technology it is more commonly used.

Hydraulic fracturing is a process that uses high pressure pumps to pump fracturing fluid into a formation at a calculated, predetermined rate and pressure to generate fractures or cracks in the target formation. For shale development, fracture fluids are primarily water-based fluids mixed with additives which help the water to carry proppants into the fractures, which may be made up of sand, walnut hulls, or other small particles of materials. The proppant is needed to “prop” open the fractures once the pumping of fluids has stopped. Once the fracture has initiated, additional fluids are pumped into the wellbore to continue the development of the fracture and to carry the proppant deeper into the formation. The additional fluids are needed to maintain the downhole pressure necessary to accommodate the increasing length of opened fracture in the formation.

Hydraulic fracturing of horizontal shale gas wells is performed in stages. Lateral lengths in horizontal wells for development may range from 1,000 feet to more than 5,000 feet. Depending on the lengths of the laterals, treatment of wells may be performed by isolating smaller portions of the lateral. The fracturing of each portion of the lateral wellbore is called a stage. Stages are fractured sequentially beginning with the section at the farthest end of the wellbore, moving uphole as each stage of the treatment is completed until the entire lateral well has been stimulated.

This process increases the flow rate and volume of reservoir fluids that move from the producing formation into the wellbore. The fracturing fluid is typically more than 99 percent water and sand, with small amounts of readily available chemical additives used to control the chemical and mechanical properties of the water and sand mixture (see discussion about Hazardous and Solid Wastes below). Because the fluid is composed mostly of water, large volumes of water are usually needed to perform hydraulic fracturing. However, in some cases, water is recycled or produced water is used.

Before operators or service companies perform a hydraulic fracturing treatment, a series of tests is performed. These tests are designed to ensure that the well, casing, well equipment, and fracturing equipment are in proper working order and will safely withstand the application of the fracture treatment pressures and pump flow rates.

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

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

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

## Production Operations

Production equipment used during the life of the well may include a 3-phase separator-dehydrator; flow-lines; a meter run; tanks for condensate, produced oil, and water; and heater treater. A pump jack may be required if the back pressure of the well is too high. Production facilities are arranged to facilitate safety and maximize reclamation opportunities. All permanent above-ground structures not subject to safety considerations are painted a standard BLM or company color or as landowner specified.

Workovers may be performed multiple times over the life of the well. Because gas production usually declines over the years, operators perform workover operations which involve cleaning, repairing and maintaining the well for the purposes of increasing or restoring production.

## Hazardous or Solid Wastes Associated with Oil and Gas Development

Anticipated use or produced hazardous materials during the development may come from drilling materials; cementing and plugging materials; HF materials; production products (natural gas, condensates, produced water); fuels and lubricants; pipeline materials; combustion emissions; and miscellaneous materials. Appendix 3, Table 1 includes some of the common wastes (hazardous and non-hazardous) that are produced during oil and gas development.

**Appendix 3, Table 1. Common wastes produced during oil and gas development.**

Phase	Waste
Construction	<ul style="list-style-type: none"><li>• Domestic wastes (i.e. food scraps, paper, etc.)</li><li>• Excess construction materials</li><li>• Used lubricating oils</li><li>• Solvents</li><li>• Woody debris</li><li>• Paints</li><li>• Sewage</li></ul>
Drilling	<ul style="list-style-type: none"><li>• Drilling muds, including additives (i.e. chromate and barite) and cuttings</li><li>• Well drilling, completion, workover, and stimulation fluids (i.e. oil derivatives such as polycyclic aromatic hydrocarbons (PAHs), spilled chemicals, suspended and dissolved solids, phenols, cadmium, chromium, copper, lead, mercury, nickel)</li><li>• Equipment, power unit and transport maintenance wastes (i.e. batteries; used filters, lubricants, oil, tires, hoses, hydraulic fluids; paints; solvents)</li><li>• Fuel and chemical storage drums and containers</li><li>• Cementing wastes</li><li>• Production testing wastes</li><li>• Excess construction materials</li><li>• Scrap metal</li><li>• Sewage</li><li>• Rigwash</li><li>• Excess drilling chemicals</li><li>• Processed water</li><li>• Contaminated soil</li><li>• Domestic wastes</li></ul>
HF	See below



Phase	Waste
Production	<ul style="list-style-type: none"> <li>Power unit and transport maintenance wastes (i.e. batteries; used filters, lubricants, filters, tires, hoses, coolants, antifreeze; paints; solvents, used parts)</li> <li>Discharged produced water</li> <li>Production chemicals</li> <li>Workover wastes (e.g. brines)</li> <li>Tank or pit bottoms</li> <li>Contaminated soil</li> <li>Scrap metal</li> </ul>
Abandonment/ Reclamation	<ul style="list-style-type: none"> <li>Construction materials</li> <li>Decommissioned equipment</li> <li>Contaminated soil</li> <li>Insulating materials</li> <li>Sludge</li> </ul>

### Hydraulic Fracturing

Chemicals serve many functions in hydraulic fracturing, from limiting the growth of bacteria to preventing corrosion of the well casing. Chemicals are needed to insure the hydraulic fracturing job is effective and efficient. The fracturing fluids used for shale stimulations consist primarily of water but also include a variety of additives. The number of chemical additives used in a typical fracture treatment varies depending on the conditions of the specific well being fractured. A typical fracture treatment will use very low concentrations of between 3 and 12 additive chemicals depending on the characteristics of the water and the shale formation being fractured. Each component serves a specific, engineered purpose. The predominant fluids currently being use for fracture treatments in the shale gas plays are water-based fracturing fluids mixed with friction-reducing additives, also known as slickwater (GWPC 2009).

The make-up of fracturing fluid varies from one geologic basin or formation to another. Because the make-up of each fracturing fluid varies to meet the specific needs of each area, there is no one-size-fits-all formula for the volumes for each additive. In classifying fracture fluids and their additives it is important to realize that service companies that provide these additives have developed a number of compounds with similar functional properties to be used for the same purpose in different well environments. The difference between additive formulations may be as small as a change in

**Figure 1. Typical Chemical Additives Used In Fracturing Fluids (GWPC 2009)**

Compound	Purpose	Common application
Acids	Helps dissolve minerals and initiate fissure in rock (pre-fracture)	Swimming pool cleaner
Sodium Chloride	Allows a delayed breakdown of the gel polymer chains	Table salt
Polyacrylamide	Minimizes the friction between fluid and pipe	Water treatment, soil conditioner
Ethylene Glycol	Prevents scale deposits in the pipe	Automotive anti-freeze, deicing agent, household cleaners
Borate Salts	Maintains fluid viscosity as temperature increases	Laundry detergent, hand soap, cosmetics
Sodium/Potassium Carbonate	Maintains effectiveness of other components, such as crosslinkers	Washing soda, detergent, soap, water softener, glass, ceramics
Glutaraldehyde	Eliminates bacteria in the water	Disinfectant, sterilization of medical and dental equipment
Guar Gum	Thickens the water to suspend the sand	Thickener in cosmetics, baked goods, ice cream, toothpaste, sauces
Citric Acid	Prevents precipitation of metal oxides	Food additive; food and beverages; lemon juice
Isopropanol	Used to increase the viscosity of the fracture fluid	Glass cleaner, antipersprant, hair coloring

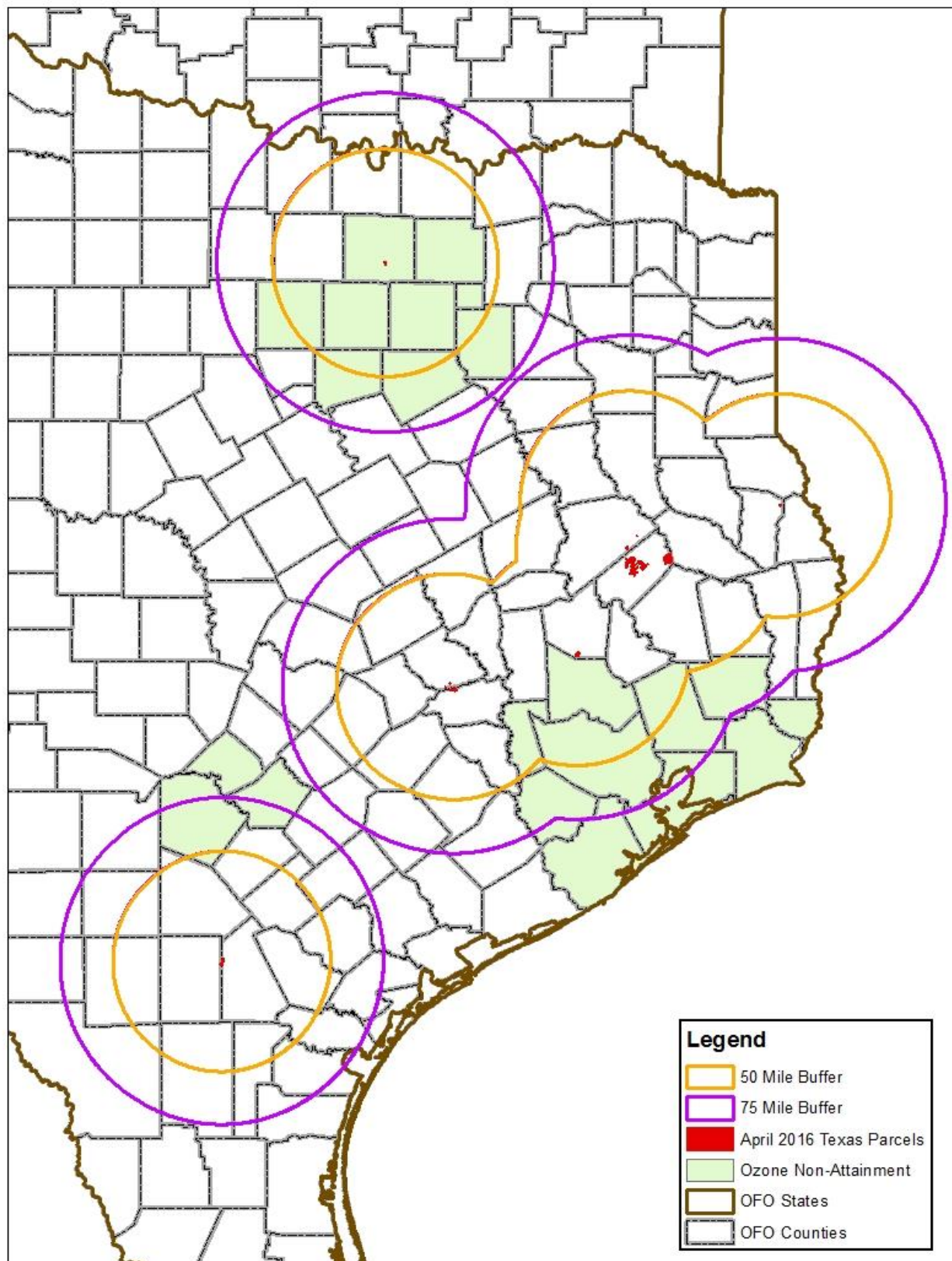
concentration of a specific compound (GWPC 2009).

Typically, the fracturing fluids consist of about 99 percent water and sand and about 1 percent chemical additives. The chemical additives are essential to the process of releasing gas trapped in shale rock and other deep underground formation.

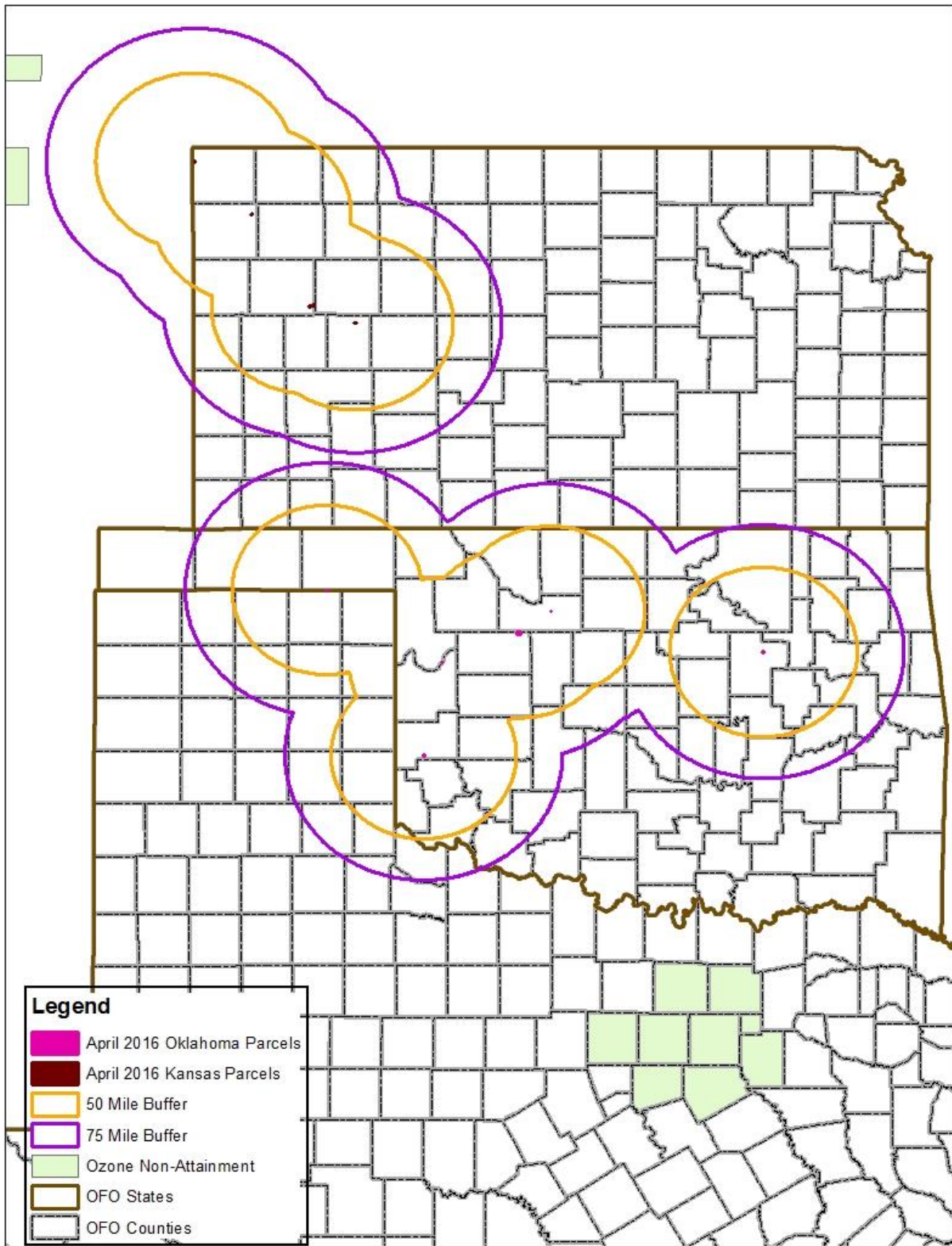
### ***NORM***

Some soils and geologic formations contain low levels of radioactive material. This naturally occurring radioactive material (NORM) emits low levels of radiation, to which everyone is exposed on a daily basis. When NORM is associated with oil and natural gas production, it begins as small amounts of uranium and thorium within the rock. These elements, along with some of their decay elements, notably radium<sub>226</sub> and radium<sub>228</sub>, can be brought to the surface in drill cuttings and produced water. Radon<sub>222</sub>, a gaseous decay element of radium, can come to the surface along with the shale gas. When NORM is brought to the surface, it remains in the rock pieces of the drill cuttings, remains in solution with produced water, or, under certain conditions, precipitates out in scales or sludges. The radiation is weak and cannot penetrate dense materials such as the steel used in pipes and tanks.

## APPENDIX 4. AIR QUALITY ANALYSIS.







## **APPENDIX 5. CULTURAL RESOURCES EVALUATION.**

---



## United States Department of the Interior

### BUREAU OF LAND MANAGEMENT

Oklahoma Field Office  
7906 E. 33<sup>rd</sup> Street, Suite 101  
Tulsa, Oklahoma 74145  
www.blm.gov/nm



In Reply Refer To:

April 2016 Lease Sales, Kansas  
Legal location: Cheyenne, Lane, Logan, Sherman Counties  
EA# DOI-BLM-NM-040-2015-61-EA  
CRR# NM-040-2016-01  
Lease# multiple  
Environmental Protection Specialist: Jackie Badley.

A Class I level cultural resource review was done on each parcel and zero historic properties were identified within 1 mile of the proposed lease parcels. During the APD process a second section 106 of the NHPA evaluation will be made.

The Kansas State Historic Preservation Office responded with concurrence in a letter dated August 21, 2015. None of the proposed parcels have been recommended for withdrawal from the sale.

A finding of *no historic properties affected* has been made for the project as staked at the time of survey and it is recommended the project proceed as planned.

*If archeological material such as chipped stone tools, pottery, bone, historic ceramics, glass, metal, or building structures are exposed; stop work at that spot immediately and contact the BLM at (918) 621-4153 or (918) 621-4100, and the Oklahoma State Historic Preservation Office at (405) 521-6249.*

  
Ryan Howell

; 9/10/15  
Date



## United States Department of the Interior

### BUREAU OF LAND MANAGEMENT

Oklahoma Field Office  
7906 E. 33<sup>rd</sup> Street, Suite 101  
Tulsa, Oklahoma 74145  
[www.blm.gov/nm](http://www.blm.gov/nm)



In Reply Refer To:

April 2016 Lease Sales, Oklahoma  
Legal location: Beaver, Major, Dewey, Creek Beckham, and Roger Mills Counties, OK  
EA# DOI-BLM-NM-040-2015-61-EA  
CRR# NM-040-2016-01  
Lease# multiple  
Environmental Protection Specialist: Jackie Badley

A Class I level cultural resource review was done on each parcel and zero historic properties were identified within 1 mile of the proposed lease parcels. During the APD process a second section 106 of the NHPA evaluation will be made. The Oklahoma Archaeological Survey office confirmed that studies will need to be done at the APD stage.

Consultation notification of the lease sale was sent to the Apache Tribe, the Cherokee Nation, the Cheyenne and Arapaho Tribes, the Comanche Nation, the Creek Nation, the Kiowa Tribe, the Osage Nation, the Kickapoo Tribe, the Alabama Quassarte Tribal Town, the Seminole Nation, and the Wichita and Affiliated Tribes. The Comanche, Alabama Quassarte Tribal Town, and Kiowa Nation responded that they have no known listings in the area. The Oklahoma State Historic Preservation Office responded with concurrence in a letter dated August 31, 2015. The Oklahoma Archaeological Survey responded with concurrence in a letter dated August 26, 2015. None of the proposed parcels have been recommended for withdrawal from the sale.

A finding of *no historic properties affected* has been made for the project as staked at the time of survey and it is recommended the project proceed as planned.

***If archeological material such as chipped stone tools, pottery, bone, historic ceramics, glass, metal, or building structures are exposed; stop work at that spot immediately and contact the BLM at (918) 621-4153 or (918) 621-4100, and the Oklahoma State Historic Preservation Office at (405) 521-6249.***

;   
Ryan Howell Date





## United States Department of the Interior

### BUREAU OF LAND MANAGEMENT

Oklahoma Field Office  
7906 E. 33<sup>rd</sup> Street, Suite 101  
Tulsa, Oklahoma 74145  
www.blm.gov/nm



In Reply Refer To:

April 2016 Lease Sales, Texas

Legal location: Live Oak, McMullen, San Augustine, Walker, Trinity, Houston,  
Washington, Burleson, Denton Counties, Texas

EA# DOI-BLM-NM-040-2015-61-EA

CRR# NM-040-2016-01

Lease# Multiple

Environmental Protection Specialist: Jackie Badley

A Class I cultural resource review was for each parcel and over 100 historic properties and ineligible archaeological resources were identified within 1 mile of many of the lease boundaries. Each parcel APE is large enough such that during the APD process the citing of wells can be done to avoid historic properties that may be identified at that time. During the APD process a second section 106 of the NHPA evaluation will be made.

Consultation notification of the lease sale was sent to the Alabama-Coushatta Tribe of Texas, the Comanche Nation, the Jena Band of the Choctaw, and the Tonkawa Tribe. The Comanche responded that they have no known listings in the area. None of the proposed parcels have been recommended for withdrawal from the sale.

A determination of No Historic Properties Affected has been made and none of the proposed parcels have been recommended for withdrawal from the sale. The Texas State Historic Preservation Office declines to comment on lease sales since TXSHPO believes this action does not have the potential to adversely affect historic properties (In a letter dated February 26, 2013 responding to the July 17, 2013 Lease Sale Cultural Resource Report Number NM-040-2013-43). Therefore Section 106 of the National Historic Preservation Act as amended compliance has been completed.

  
Ryan Howell

9/18/15  
Date

## **APPENDIX 6. BIOLOGICAL EVALUATION.**

---



## United States Department of the Interior

BUREAU OF LAND MANAGEMENT  
OKLAHOMA FIELD OFFICE  
7906 E. 33<sup>rd</sup> St., Suite 101  
TULSA, OK 74145-1352  
<http://www.blm.gov>



RE: Biological Evaluation for the January 22, 2014 Federal Oil & Gas Lease Sale Kansas  
201604-01 – Lane County, Kansas  
201604-002 – Logan County, Kansas  
201604-003 – Logan County, Kansas  
201604-004 – Logan County, Kansas  
201604-005 – Cheyenne County, Kansas  
201601-006 – Sherman County, Kansas  
(DOI-BLM-NM-040-2015-061).

The Bureau of Land Management's (BLM) environmental assessment (EA) for this project contains all pertinent information regarding the specific characteristics of the proposed leasing of federal oil & gas minerals. The purpose of this report is to document BLM's "No Effect" for threatened & endangered species based on the administrative action on making the proposed parcels available for leasing.

### *Wetland and Riparian Habitat*

Wetland habitats provide important wintering and migration habitat for several species of Migratory Birds. Wetlands also provide a link between land and water and are some of the most productive ecosystems in the world. Executive Order (EO) 11990 on the Protection of Wetlands provides opportunity for early review of Federal agency plans regarding new construction in wetland areas. Under EO 11990, each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for conduction federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating and licensing activities.

### NM-201401-002, 003 and 004 – Logan County, Kansas

Located on a tributary of the Smokey Hill River

### NM-2201401-006 – Sherman County, Kansas

No wetland issues

### NM-201604-001 – Lane County, Kansas

No wetland issues

### NM-201604-005 – Cheyenne County, Kansas

This tract contains a wetland – This parcel will have ORA 2 wetland/riparian protection.

### *Threatened and Endangered Species*

The purpose of the Endangered Species Act (ESA) is to ensure that federal agencies and departments use their authorities to protect and conserve endangered and threatened species.

Section 7 of the ESA requires that federal agencies prevent or modify any projects authorized, funded, or carried out by the agencies that are "likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat of such species."

Federally-listed endangered, threatened, proposed, and candidate species which occur or have the potential for occurrence in Logan County Kansas is the lesser prairie-chicken (*Tympanuchus pallidicinctus*), Sprague's pipit (*Anthus spragueii*) and the Black-footed ferret (*Mustela nigripes*).

Federally-listed endangered, threatened, proposed, and candidate species which occur or have the potential for occurrence in Sherman County Kansas is the lesser prairie-chicken (*Tympanuchus pallidicinctus*) and Sprague's pipit (*Anthus spragueii*).

Federally-listed endangered, threatened, proposed, and candidate species which occur or have the potential for occurrence in Lane County Kansas is the lesser prairie-chicken (*Tympanuchus pallidicinctus*), Sprague's pipit (*Anthus spragueii*) and the whooping crane (*Grus Americana*) per the United States Department of the Interior, Fish and Wildlife Service, Kansas Ecological Services Office County list dated July 2010.

Federally-listed endangered, threatened, proposed, and candidate species which occur or have the potential for occurrence in Cheyenne County Kansas is the Sprague's pipit (*Anthus spragueii*) per the United States Department of the Interior, Fish and Wildlife Service, Kansas Ecological Services Office County list dated July 2010.

The group of species referred to in this BE as Special Status Species includes state listed threatened or endangered plant or animal species under the Kansas Department of Wildlife, Parks and Tourism.

The Kansas Department of Wildlife, Parks and Tourism for Logan County has the plains minnow, greentoad, eastern spotted skunk, whooping, least tern, piping plover, snowy plover and the black-footed ferret.

The Kansas Department of Wildlife, Parks and Tourism for Sherman County has the eastern spotted skunk, whooping, least tern, piping plover, snowy plover and the black-footed ferret.

The Kansas Department of Wildlife, Parks and Tourism for Lane County has the eastern spotted skunk, whooping crane, least tern, piping plover, snowy plover, and the black-footed ferret.

The Kansas Department of Wildlife, Parks and Tourism for Cheyenne County has the eastern spotted skunk, whooping crane, least tern, piping plover, plains minnow, snowy plover, flathead chub, Topeka shiner, and the black-footed ferret.

#### Piping Plovers

Habitat: Piping Plovers are found on mudflats, sandy beaches and shallow wetlands with sparse vegetation. They may be found along the margins of lakes and large rivers where there is exposed (bare) sand or mud.

#### Lesser Prairie-Chicken (LPC)

Habitat: The sand shinnery and sand sagebrush native rangelands of northwest Oklahoma are crucial for survival of this species.

#### Whooping Crane

Habitat: Whooping Cranes pass through Oklahoma each spring and fall during migration. While in our state, they are typically found in shallow wetlands, marshes, the margins of ponds and lakes, sandbars and shorelines of shallow rivers, wet prairies and crop fields near wetlands.



#### Interior Least Tern

Habitat: Terns live along large rivers and may sometimes be found hunting fish in shallow wetlands and the margins of ponds and lakes. Least Terns require bare sand and gravel for nesting and typically nest in small colonies consisting of two to 20 pairs along large rivers on sand bars and scoured bends.

#### Eastern Spotted Skunk

Habitat: Spotted Skunks may occur in suitable habitat anywhere in the state. The marked counties are those for which occurrence has been documented or within which critical habitat has been designated.

#### Snowy Plover

Habitat: Snowy Plovers may occur occasionally anywhere in the state where habitat is suitable. With the exception of Reno and Rice, the marked counties are those for which observation records are known.

#### Black-Footed Ferret

Habitat: Ferrets are totally dependent upon prairie dog burrows for cover and upon prairie dogs and other small mammals for food. Blackfooted Ferrets once ranged over approximately the western 2/3 of Kansas in association with black-tailed prairie dogs. Extensive conversion of rangeland to cropland plus widespread poisoning of prairie dogs have destroyed most of the state's ferret habitat. There remains some larger areas of short-grass prairie in western Kansas that may still have isolated prairie dog towns capable of supporting Black-footed Ferrets.

#### Green Toad

Habitat: In Kansas, the toad is currently known from isolated populations in three counties. The preferred habitat for Green Toad is arid grassland plains and valleys with few or no trees or shrubs. Soils with good water holding capacity seem to be required. During unfavorable climatic periods, the animals seek refuge underground in rodent burrows, ant nests, or cracks in the soil surface.

#### Plains Minnow

Habitat: Plains Minnows are protected by the Kansas Nongame and Endangered Species Conservation Act and administrative regulations applicable thereto. Any time an eligible project is proposed that will impact the species' preferred habitats within its probable range, the project sponsor must contact the Ecological Services Section, Kansas Department of Wildlife, Parks and Tourism, 512 SE 25th Ave., Pratt, Kansas 67124-8174. Department personnel can then advise the project sponsor on permit requirements.

WO-ESA-7 will apply to all tracts for the above listed Kansas Counties.

#### *Wildlife*

The private lands of Kansas are home to a diversity of unique and interesting wildlife species. Several species may inhabit the project area, such as, dove, turkey, deer, rabbit, squirrels, raccoons, and coyotes. Additionally, many species of songbirds may utilize the project area. Due to this project area located on privately owned surface, comprehensive biological inventories are not available

#### *Migratory Birds*

Executive Order (EO) 13186, 66 Fed. Reg. 3853, (January 17, 2001) identifies the responsibility of federal agencies to protect migratory birds and their habitats, and directs executive departments and agencies to undertake actions that will further implement the Migratory Bird Treaty Act (MBTA). Under the MBTA, incidental, unintentional, and accidental take, killing, or possession of a migratory bird or its parts, nests, eggs or products, manufactured or not, without a permit is unlawful. The MBTA has no provisions for a permitting process which allows for regulated "take" of migratory birds. EO 13186 includes a directive for federal agencies to develop a memorandum of understanding (MOU) with the

Service to promote the conservation of migratory bird populations, including their habitats, when their actions have, or are likely to have, a measurable negative effect on migratory bird populations.


Twenty-seven Birds of Conservation Concern are listed for the Central Mixed-Grass Prairie (Bird Conservation Region 19) *BCC 2008* list, where the Sherman and Lane Counties tracts are located, the lesser prairie-chicken, little blue heron, Mississippi kite, Bald Eagle, Swainson's hawk, black rail, snowy plover, mountain plover, solitary sandpiper, upland sandpiper, long-billed curlew, hudsonian godwit, marbled godwit, buff-breasted sandpiper, short-billed dowitcher, red-headed woodpecker, scissor-tailed flycatcher, loggerhead shrike, Bell's vireo, Sprague's pipit, Cassin's sparrow, lark bunting, Henslow's sparrow, Harris's sparrow, McCown's longspur, Smith's longspur and the chestnut-collared longspur. The North American Breeding

Six-teen Birds of Conservation Concern are listed for the Short-Grass Prairie (Bird Conservation Region 18) *BCC 2008* list, where the Logan and Cheyenne Counties tracts are located, the lesser prairie-chicken, Bald Eagle, golden eagle, prairie falcon, snowy plover, mountain plover, upland sandpiper, long-billed curlew, burrowing owl, Lewis's woodpecker, willow flycatcher, Bell's vireo, Sprague's pipit, lark bunting McCown's longspur and the chestnut-collared longspur.

The proposed lease sale parcels and all subsequent activities resulting from it are subject to all state and federal regulations and proposed lease stipulations designed to reduce environmental risks. Lease stipulations are legally binding restrictions and operating requirements that become part of lease contracts

This lease sale, in and of itself, has no impact on threatened or endangered species, wetland or migratory birds to analyze or consult on. Additionally, site-specific analysis and mitigation will occur once the parcels are leased and an Application for Permit to Drill is submitted.

In conclusion, we have determined that the proposed action will have, "No Effect" on listed species/designated critical habitat

  
Becky Peters, Wildlife Biologist

08/10/2015  
Date



## United States Department of the Interior

BUREAU OF LAND MANAGEMENT  
OKLAHOMA FIELD OFFICE  
7906 E. 33<sup>rd</sup> St., Suite 101  
TULSA, OK 74145-1352  
<http://www.blm.gov>



RE: Biological Evaluation for the April, 2016 Federal Oil & Gas Lease Sale Oklahoma Counties, (DOI-BLM-NM-040-2015-061).

NM-201604-007 - Beaver County, Oklahoma Sec. 04-T10S-R22E

NM-201604-008 - Major County, Oklahoma Sec. 01-T21N-R12W

NM-201604-009 - Roger Mills County, Oklahoma Sec. 34 & 35-T17N-R22W

NM-201604-011 - Creek County, Oklahoma Sec. 31-T18N-R10E

NM-201604-012 - Dewey County, Oklahoma Sec. 01 & 02-T19N-R15W

The Bureau of Land Management's (BLM) environmental assessment (EA) for this project contains all pertinent information regarding the specific characteristics of the proposed leasing of federal oil & gas minerals. The purpose of this report is to document BLM's "No Effect" for threatened & endangered species based on the administrative action on making the proposed parcels available for leasing.

### *Wetland and Riparian Habitat*

Wetland habitats provide important wintering and migrational habitat for Central Flyway Birds. Wetlands also provide a link between land and water and are some of the most productive ecosystems in the world. Executive Order 11990 on the Protection of Wetlands provides opportunity for early review of Federal agency plans regarding new construction in wetland areas. It also urges all Federal agencies to avoid supporting, assisting, or financing new construction in wetlands unless there is "no practicable alternative

### Major, Oklahoma

Sec. 1-T21N-R12W

This tract consists of rolling hill grassland grading to scattered sandplum, grassland dunes, to a treed riparian zone.

### Roger Mills County, Oklahoma

Sec. 34 & 35-T17N-R22W

South Canadian River bottom.

### Creek County, Oklahoma

Sec. 31-T18N-R10E

The Service NWI map showed Freshwater Forested/Shrub, Riverine, wetland issues.

### Dewey County, Oklahoma

Sec. 01 & 02-T19N-R15W

South Canadian River bottom.

Beaver County, Oklahoma

Sec. 04-T10S-R22E

Upland cultivated field

*Threatened and Endangered Species*

The purpose of the Endangered Species Act (ESA) is to ensure that federal agencies and departments use their authorities to protect and conserve endangered and threatened species. Section 7 of the ESA requires that federal agencies prevent or modify any projects authorized, funded, or carried out by the agencies that are "likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat of such species."

Federally-listed endangered, threatened, proposed, and candidate species located in Major County, Oklahoma consist of the interior least tern (*Sterna antillarum*), red knot (*Calidris canutus rufa*) piping plover (*Charadrius melodus*), Arkansas River shiner (*Notropis girardi*), and the whooping crane (*Grus Americana*). Major county also has critical habitat for the Arkansas River Shiner.

Federally-listed endangered, threatened, proposed, and candidate species located in Roger Mills County, Oklahoma consist of the interior least tern (*Sterna antillarum*), red knot (*Calidris canutus rufa*) piping plover (*Charadrius melodus*), Lesser Prairie Chicken (*Tympanuchus pallidicinctus*) and the whooping crane (*Grus Americana*).

Federally-listed endangered, threatened, proposed, and candidate species located in Creek County, Oklahoma consist of the interior least tern (*Sterna antillarum*), red knot (*Calidris canutus rufa*) piping plover (*Charadrius melodus*), and the American burying beetle (*Nicrophorus americanus*).

Federally-listed endangered, threatened, proposed, and candidate species located in Dewey County, Oklahoma consist of the interior least tern (*Sterna antillarum*), red knot (*Calidris canutus rufa*) piping plover (*Charadrius melodus*), Lesser Prairie Chicken (*Tympanuchus pallidicinctus*), Arkansas River shiner (*Notropis girardi*) and the whooping crane (*Grus Americana*).

Federally-listed endangered, threatened, proposed, and candidate species located in Beaver County, Oklahoma consist of the interior least tern (*Sterna antillarum*), red knot (*Calidris canutus rufa*) piping plover (*Charadrius melodus*), Lesser Prairie Chicken (*Tympanuchus pallidicinctus*), Arkansas River shiner (*Notropis girardi*) and the whooping crane (*Grus Americana*). Beaver county also has critical habitat for the Arkansas River Shiner.

The group of species referred to in this BE as Special Status Species includes state listed threatened or endangered plant or animal species under the Oklahoma Department of Wildlife Conservation.

The Oklahoma Department of Wildlife Conservation has no species listed for the above mentioned counties.

#### Piping Plovers

Habitat: Piping Plovers are found on mudflats, sandy beaches and shallow wetlands with sparse vegetation. They may be found along the margins of lakes and large rivers where there is exposed (bare) sand or mud.

#### Red Knot

Habitat: Red knots are found in intertidal, marine habitats, especially near coastal inlets, estuaries, and bays. During breeding season it can be found in dryer areas of the tundra or sparsely vegetated hillsides.

#### Lesser Prairie-Chicken (LPC)

Habitat: The sand shinnery and sand sagebrush native rangelands of northwest Oklahoma are crucial for survival of this species.

#### Whooping Crane

Habitat: Whooping Cranes pass through Oklahoma each spring and fall during migration. While in our state, they are typically found in shallow wetlands, marshes, the margins of ponds and lakes, sandbars and shorelines of shallow rivers, wet prairies and crop fields near wetlands.

#### Interior Least Tern

Habitat: Terns live along large rivers and may sometimes be found hunting fish in shallow wetlands and the margins of ponds and lakes. Least Terns require bare sand and gravel for nesting and typically nest in small colonies consisting of two to 20 pairs along large rivers on sand bars and scoured bends. Colonies also occur on salt flats such as the large one at Salt Plains National Wildlife Refuge.

#### Arkansas River Shiner

Habitat: The Arkansas River Shiner inhabits the shallow braided channels of wide sandy prairie rivers in the Arkansas River system. Schools of shiners often gather on the lee side of sandbars and ridges of sand in the river channel. They spawn after heavy summer rains and their eggs drift with the water current and develop as they are carried downstream.

Arkansas River shiner critical habitat is designated in the Cimarron River and the South Canadian River.

#### American Burying Beetle

Habitat: Generalists; found in various habitat types including open fields and grasslands, oak-pine woodlands, oak-hickory forest, and edge habitat. Reproductive habitat tends to be more specialized, but not fully understood.

According to above information all or portions of these leases could contain Federal and/or state listed threatened or endangered species or/and their habitats. Any proposed surface disturbing activity may require an inventory and consultation with the Service and/or the state wildlife agency. The consultation could take up to 180 days to complete. Surface occupancy could be restricted or not allowed as a result of the consultation. Appropriate modifications to the imposed restrictions will be made for the maintenance and operations of producing oil and gas wells.

### *Wildlife*

The private lands of Oklahoma are home to a diversity of unique and interesting wildlife species. Several species may inhabit the project area, such as, dove, turkey, deer, rabbit, squirrels, raccoons, and coyotes. Additionally, many species of songbirds may utilize the project area. Due to this project area located on privately owned surface, comprehensive biological inventories are not available

### *Migratory Birds*

Executive Order (EO) 13186, 66 Fed. Reg. 3853, (January 17, 2001) identifies the responsibility of federal agencies to protect migratory birds and their habitats, and directs executive departments and agencies to undertake actions that will further implement the Migratory Bird Treaty Act (MBTA). Under the MBTA, incidental, unintentional, and accidental take, killing, or possession of a migratory bird or its parts, nests, eggs or products, manufactured or not, without a permit is unlawful. EO 13186 includes a directive for federal agencies to develop a memorandum of understanding (MOU) with the Service to promote the conservation of migratory bird populations, including their habitats, when their actions have, or are likely to have, a measurable negative effect on migratory bird populations. Whereas the MBTA only protects migratory birds, EO 13186 provides for the protection of both migratory birds and migratory bird habitat.

Major, Roger Mills, and Dewey Counties are located within the Bird Conservation Region 19, Central Mixed-Grass Prairie. Twenty-seven birds of conservation concern have been identified in this region.

Creek County is located within the Bird Conservation Region 21, Oaks and Prairies. Nineteen birds of conservation concern have been identified in this region.

Beaver County is located within the Bird Conservation Region 18, Shortgrass Prairie. Sixteen birds of conservation concern have been identified in this region.

The proposed lease sale parcels and all subsequent activities resulting from it are subject to all state and federal regulations and proposed lease stipulations designed to reduce environmental risks. Lease stipulations are legally binding restrictions and operating requirements that become part of lease contracts. Following are additional stipulations that are required of the five individual parcels, if permitted.

The NM-201304-007 in Beaver County, OK. parcel will have stipulation WO-ESA-7: Threatened and Endangered Species protection, and ORA-3: Season of Use.

The NM-201604-008 in Major County, OK. parcel will have stipulation WO-ESA-7: Threatened and Endangered Species protection, ORA-2 Wetland/Riparian Protection.

The NM-201604-009 in Roger Mills County, OK. parcel will have stipulation WO-ESA-7: Threatened and Endangered Species protection, ORA-2: Wetland/Riparian Protection, ORA-3: Season of Use.

The NM-201604-011 in Creek County, OK. parcel will have stipulation WO-ESA-7: Threatened and Endangered Species protection, and ORA-2: Wetland/Riparian Protection.

The NM-201604-012 in Dewey County, OK. parcel will have stipulation WO-ESA-7: Threatened and Endangered Species protection, ORA-2: Wetland/Riparian Protection and ORA-3: Season of Use.

This lease sale, in and of itself, has no impact on threatened or endangered species, wetland or migratory birds to analyze or consult on. Additionally, site-specific analysis and mitigation will occur once the parcels are leased and an Application for Permit to Drill is submitted.

In conclusion, we have determined that the proposed action will have, "No Effect" on listed species/designated critical habitat

  
Becky Peters Wildlife Biologist

08/06/2015  
Date





## United States Department of the Interior

BUREAU OF LAND MANAGEMENT  
OKLAHOMA FIELD OFFICE  
7906 E. 33<sup>rd</sup> St., Suite 101  
TULSA, OK 74145-1352  
<http://www.blm.gov>



RE: Biological Evaluation for the July, 2013 Texas Lease Sale

NM-201604-013 - Live Oak County, Texas  
NM-201604-014 - McMullen/Live Oak Counties, Texas  
NM-201604-035 - Trinity County, Texas  
NM-201604-036 - Houston County, Texas  
NM-201604-037 - Trinity County, Texas  
NM-201604-038 - Washington, Texas  
NM-201604-039 - Washington, Texas  
NM-201604-040 - Washington, Texas  
NM-201604-041 - Burleson County, Texas  
NM-201604-042 - Burleson County, Texas  
NM-201604-043 - Washington, Texas  
NM-201604-044 - Denton County, Texas

(DOI-BLM-NM-040-2015-061).

The Bureau of Land Management's (BLM) environmental assessment (EA) for this project contains all pertinent information regarding the specific characteristics of the proposed leasing of federal oil & gas minerals. The purpose of this report is to document BLM's "No Effect" for threatened & endangered species based on the administrative action on making the proposed parcels available for leasing.

### *Wetland and Riparian Habitat*

Wetland habitats provide important wintering and migration habitat for several species of Migratory Birds. Wetlands also provide a link between land and water and are some of the most productive ecosystems in the world. Executive Order (EO) 11990 on the Protection of Wetlands provides opportunity for early review of Federal agency plans regarding new construction in wetland areas. Under EO 11990, each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for conduction federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating and licensing activities.

NM-201604-013 Live Oak County, Texas  
Special Stipulation-bureau of Reclamation will apply

NM-201604-014 McMullen/Live Oak Counties, Texas  
Special Stipulation-bureau of Reclamation will apply

NM-201604-035 Trinity County, Texas  
No stipulations apply

NM-201604-036 Houston County, Texas  
No stipulations apply

NM-201604-037 Trinity County, Texas  
No stipulations apply

NM-201604-038, -039, 040, 043 Washington County, Texas  
U.S. Army COE-Special Stipulation 1-A will apply

NM-201604-041, 042 Burleson County, Texas  
U.S. Army COE-Special Stipulation 1-A will apply

NM-201604-044, Denton County, Texas  
U.S. Army COE-Special Stipulation 1-A will apply

*Threatened and Endangered Species*

The purpose of the Endangered Species Act (ESA) is to ensure that federal agencies and departments use their authorities to protect and conserve endangered and threatened species. Section 7 of the ESA requires that federal agencies prevent or modify any projects authorized, funded, or carried out by the agencies that are "likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of critical habitat of such species."

The U.S. Fish and Wildlife Service (Service) federally-listed endangered, threatened, proposed, and candidate species for Live Oak County, Texas consist of the least tern, piping plover, red knot, whooping crane, golden orb, Gulf Coast jagurundi, ocelot.

The Service federally-listed endangered, threatened, proposed, and candidate species for McMullen County, Texas consist of the least tern, red knot, golden orb, Gulf Coast jaguarondi, ocelot and the piping plover.

The Service federally-listed endangered, threatened, proposed, and candidate species for Trinity County, Texas consist of the least tern, piping plover, red knot, red-cockaded woodpecker, Neches river rose mallow, Texas prairie dawn-flower, Neches River rose mallow critical habitat.

The Service federally-listed endangered, threatened, proposed, and candidate species for Houston County, Texas consist of the least tern, piping plover, red knot, red-cockaded woodpecker, Neches river rose mallow and Neches River rose mallow critical habitat.

The Service federally-listed endangered, threatened, proposed, and candidate species for Washington County, Texas consist of the least tern, red knot, golden orb, Gulf Coast jaguarondi, ocelot and the piping plover.

The Service federally-listed endangered, threatened, proposed, and candidate species for Burleson County, Texas consist of the least tern, red knot, piping plover, whooping crane, smooth pimple back and Texas fawnsfoot, navasoto lanies' tresses.

The Service federally-listed endangered, threatened, proposed, and candidate species for Denton County, Texas consist of the least tern, red knot, whooping crane and the piping plover.

WO-ESA-7 would apply to all counties in Texas.

#### *Special Status Species*

The Texas Parks and Wildlife department threatened and endangered species for the above listed Counties consist of the American peregrine falcon, Bachman's sparrow, Bald Eagle, peregrine falcon, piping plover, red-cockaded woodpecker, swallow-tailed kite, wood stork, Rafinesque's big-eared bat, red wolf, Louisiana pigtoe, sandbank pocketbook, southern hickorynut, Texas heelsplitter, Texas pigtoe, alligator snapping turtle, Louisiana pine snake, northern scarlet snake, timber/canebrake rattlesnake, black spotted newt, sheep frog, interior least tern, white-faced ibis, wood stork, white-tailed hawk, red wolf, golden orb, ocelot, reticulate collared lizard, Texas horned lizard, Texas indigo snake, Texas tortoise, white-tailed hawk, whooping crane, wood stork, jaguarondi, red wolf, golden orb and the ocelot.

#### Texas golden glade

Habitat: Edaphically influenced herbaceous communities on shallow calcareous soils in vernal moist to wet glades on glauconite or ironstone outcrops of the Weches Formation.

#### Bachman's sparrow

Habitat: Old field, Savanna, Woodland - Conifer, Woodland - Hardwood

#### Bald Eagle

Habitat: Bald Eagles typically nest in forested areas adjacent to large bodies of water, staying away from heavily developed areas when possible. Bald Eagles are tolerant of human activity when feeding, and may congregate around fish processing plants, dumps, and below dams where fish concentrate. For perching, Bald Eagles prefer tall, mature coniferous or deciduous trees that afford a wide view of the surroundings. In winter, Bald Eagles can also be seen in dry, open uplands if there is access to open water for fishing.

#### Piping plover

Habitat: Shorebirds live on sandy beaches and lakeshores.

#### Red-cockaded woodpecker

Habitat: Open pine forests with large, widely-spaced older trees provide essential habitat for the red-cockaded woodpecker.

Swallow-tailed kite

Habitat: Nesting and foraging habitats include various pine forests and savannas, cypress swamps and savannas, cypress-hardwood swamps, hardwood hammocks, mangrove swamps, narrow riparian forests, prairies, and freshwater and brackish marshes.

Rafineque's big eared bat

Habitat: This is a bat of forested regions.

Louisiana pigtoe

Habitat: Freshwater, This species occurs in streams and moderate-size rivers; usually in flowing water and not generally known from impoundments; on substrates of mud, sand, and gravel; to depths of 20 feet but usually less.

Sandbank pocketbook

Habitat: Freshwater, it may occur in small to large rivers with moderate flows on gravel, gravel-sand, and sand bottoms

Southern hickorynut

Habitat: Freshwater, This species is found in medium sized gravel in water with low to moderate current in small to large sized rivers.

Texas heelsplitter

Habitat: Freshwater, This species is found in flowing water but not necessarily in riffles or shoals. It prefers mud or sand in small to medium rivers and may also be found in reservoirs.

Texas pigtoe

Habitat: A freshwater mussel, this species has been collected in rivers with mixed mud, sand, and fine gravel in protected areas

Alligator snapping turtle

Habitat: Habitat consists of slow-moving, deep water of rivers, sloughs, oxbows, and canals or lakes associated with rivers (e.g., large impoundments); also swamps, bayous, and ponds near rivers, and shallow creeks that are tributary to occupied rivers, sometimes including swift upland streams. This turtle sometimes enters brackish waters near river mouths. Usually it occurs in water with a mud bottom and some aquatic vegetation but may use sand-bottomed creeks.

Louisiana pine snake

Habitat: In Texas, these snakes occur in longleaf pine-oak sandhills interspersed with moist bottomlands; sometimes in adjacent blackjack oak woodlands and in sandy areas of short-leaf pine/post oak forest; the snake prefers openly wooded areas over dense forest; it is frequently found in fields, farmland, and tracts of second-growth timber.

Northern scarlet snake

Habitat: Hardwood, mixed, or pine forest/woodland and adjacent open areas with sandy or loamy well-drained soils. Specific habitats include pine flatwoods, dry or dry prairie, salt grass prairie, maritime hardwood hammock, bottomland forest, sandhills, margins of irrigation canals in sawgrass prairies, borders of swamps and plowed fields, abandoned fields, and roadsides.

Timber/canebrake rattlesnake

Habitat: Timber rattlesnakes prefer moist lowland forests and hilly woodlands or thickets near permanent water sources such as rivers, lakes, ponds, streams and swamps where tree stumps, logs and branches provide refuge.

Golden orb

Habitat: Freshwater

Gulf Coast jaguarundi

Habitat: They spend most of their time on the ground, but can be agile climbers when inspired, such as when they are pursued. They hunt small rodents, reptiles, and birds in dense vegetation, especially thornscrub.

Ocelot

Habitat: Dense, thorny, low brush such as spiny hackberry, lotebush, and blackbrush offer the Ocelot the best habitat. The Texas ocelot prefers elevated terrain.

Whooping Crane

Habitat: Whooping cranes winter on the Aransas National Wildlife Refuges 22,500 acres of salt flats and marshes. The area's coastal prairie rolls gently here and is dotted with swales and ponds. They summer and nest in poorly drained wetlands in Canada's Northwest Territories at Wood Buffalo National Park.

Black-spotted newt

Habitat: Adults, juveniles, and larvae inhabit permanent and temporary ponds, roadside ditches, and quiet stream pools, habitats that are relatively uncommon in at least the northern part of the range. Terrestrial; Freshwater

Sheep frog

Habitat: In Texas, fairly common in various habitats but seldom seen.

American peregrine falcon

Habitat: They can be found nesting at elevations up to about 12,000 feet, as well as along rivers and coastlines or in cities, where the local Rock Pigeon populations offer a reliable food supply. In migration and winter you can find Peregrine Falcons in nearly any open habitat, but with a greater likelihood along barrier islands, mudflats, coastlines, lake edges, and mountain chains.

Interior Least Tern

Habitat: Terns live along large rivers and may sometimes be found hunting fish in shallow wetlands and the margins of ponds and lakes. Least Terns require bare sand and gravel for nesting and typically nest in small colonies consisting of two to 20 pairs along large rivers on sand bars and scoured bends.

Peregrine falcon

Habitat: They can be found nesting at elevations up to about 12,000 feet, as well as along rivers and coastlines or in cities, where the local Rock Pigeon populations offer a reliable food supply.

In migration and winter you can find Peregrine Falcons in nearly any open habitat, but with a greater likelihood along barrier islands, mudflats, coastlines, lake edges, and mountain chains.

White-faced ibis

Habitat: Marshes, swamps, ponds and rivers.

Reticulate collared lizard

Habitat: This lizard inhabits thorn-scrub vegetation, usually on well-drained rolling terrain of shallow gravel, caliche, or sandy soils.

Texas horned lizard

Habitat: They can be found in arid and semiarid habitats in open areas with sparse plant cover. Because horned lizards dig for hibernation, nesting and insulation purposes, they commonly are found in loose sand or loamy soils.

Texas indigo snake

Habitat: The Texas Indigo snake is found in grassland, coastal sand dunes, lightly vegetated areas near permanent water, Shelters in burrows.

Texas tortoise

Habitat: Open scrub woods, arid brush, lomas, grass-cactus association; often in areas with sandy well-drained soils.

White tailed hawk

Habitat: Open country, primarily savanna, prairie, and arid habitats of mesquite, cacti, and bushes, very rarely in open forest.

Wood stork

Habitat: Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water.

Red wolf

Habitat: Brushy and forested areas, as well as coastal prairies.

Bobcats

Habitat: Bobcats live in a variety of habitats, but they favor rocky canyons or outcrops when they are available. Otherwise, they choose thickets for protection and den sites. These cats are highly adaptable, and in most places have been able to thrive in spite of increasing habitat loss due to human settlement.

Eastern cottontails

Habitat: Typically eastern cottontails occupy habitats in and around farms including fields, pastures, open woods, thickets associated with fencerows, wooded thickets, forest edges, and suburban areas with adequate food and cover. They are also found in swamps and marshes and usually avoid dense woods. They are seldom found in deep woods.

Striped skunks

Habitat: The skunk is found in wooded or brushy areas and farmlands. They prefer taking shelter in rocky outcrops or under large boulders, but when these are unavailable, skunks choose to den in the abandoned burrows of other animals.

Eastern flying squirrel

Habitat: Inhabit forested areas where suitable trees are present to afford den sites.

Road runner

Habitat: Inhabit desert and shrubby country in the southwestern United States and northern Mexico.

Coati

Habitat: Inhabit wooded areas and in some of the rocky canyons that enter the mountains from the lowlands.

Elf owl

Habitat: In Texas, elf owls are found in the arid Big Bend and Trans-Pecos areas of the lower Chihuahuan desert.

According to above information all or portions of these leases could contain Federal and/or state listed threatened or endangered species or/and their habitats. Any proposed surface disturbing activity may require an inventory and consultation with the Service and/or the state wildlife agency. The consultation could take up to 180 days to complete. Surface occupancy could be restricted or not allowed as a result of the consultation. Appropriate modifications to the imposed restrictions will be made for the maintenance and operations of producing oil and gas wells.

*Wildlife*

Counties in Texas where the proposed lease tracts occur contain diverse wildlife populations as well as habitats. Generally speaking the eastern one-third of Texas receives ample rainfall and supports much of the oak, pine and hickory forests. The bulk of the central portion of Texas is within the cross timbers area where the transition begins from eastern deciduous forests to the more arid portions of western Texas. 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 Texas panhandle. Regional information on wildlife and their habitats in Texas is contained on pages 1-12 of the TXRMP 1996, as amended.

*Migratory Birds*

Executive Order (EO) 13186, 66 Fed. Reg. 3853, (January 17, 2001) identifies the responsibility of federal agencies to protect migratory birds and their habitats, and directs executive departments and agencies to undertake actions that will further implement the Migratory Bird Treaty Act (MBTA). Under the MBTA, incidental, unintentional, and accidental take, killing, or possession of a migratory bird or its parts, nests, eggs or products, manufactured or not, without a permit is unlawful. EO 13186 includes a directive for federal agencies to develop a memorandum of understanding (MOU) with the Service to promote the conservation of



migratory bird populations, including their habitats, when their actions have, or are likely to have, a measurable negative effect on migratory bird populations.

For the purpose of this BE, the term “migratory birds” applies generally to native bird species protected by the Migratory Bird Treaty Act (MBTA). This includes native passerines (flycatchers and songbirds) as well as birds of prey, migratory waterbirds (waterfowl, wading birds, and shorebirds), and other species such as doves, hummingbirds, swifts, and woodpeckers. The term “migratory” is a misnomer and should be interpreted broadly to include native species that remain in the same area throughout the year as well as species that exhibit patterns of latitudinal or elevational migration to avoid winter conditions of cold or a shortage of food. For most migrant and native resident species, nesting habitat is of special importance because it is critical for supporting reproduction in terms of both nesting sites and food. Also, because birds are generally territorial during the nesting season, their ability to access and utilize sufficient food is limited by the quality of the territory occupied. During non-breeding seasons, birds are generally non-territorial and able to feed across a larger area and wider range of habitats.

Among the wide variety of species protected by the MBTA, special concern is usually given to the following groups:

- Species that migrate across long distances, particularly Neotropical migrant passerines that winter in tropical or Southern Hemisphere temperate zones.
- Birds of prey, which require large areas of suitable habitat for finding sufficient prey.
- Species that have narrow habitat tolerances and hence are vulnerable to extirpation from an area as a result of a relatively minor habitat loss.
- Species that nest colonially and hence are vulnerable to extirpation from an area and hence are vulnerable to extirpation from an area as a result of minor habitat loss.

Because of the many species that fall within one or more of these groups, BLM focuses on species identified by the Service as Birds of Conservation Concern (BCC).

The proposed lease sale parcels and all subsequent activities resulting from it are subject to all state and federal regulations and proposed lease stipulations designed to reduce environmental risks. Lease stipulations are legally binding restrictions and operating requirements that become part of lease contracts.

This lease sale, in and of itself, has no impact on threatened or endangered species, wetland or migratory birds to analyze or consult on. Additionally, site-specific analysis and mitigation will occur once the parcels are leased and an Application for Permit to Drill is submitted.

In conclusion, we have determined that the proposed action will have, "No Effect" on listed species/designated critical habitat.

 \_\_\_\_\_;  
Becky Peters, Wildlife Biologist

08/10/2015 .  
Date