BLM

BIA

US Department of the Interior

Bureau of Land Management

Oklahoma Field Office

Amarillo Field Office

Bureau of Indian Affairs

Southern Plains Region

Eastern Oklahoma Region

Joint Environmental Impact Statement/

BLM Resource Management Plan
And BIA Integrated Resource Management Plan

Analysis of the Management Situation

June 2015

BLM Mission Statement

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BIA Mission Statement

The Bureau of Indian Affairs' mission is to enhance the quality of life, to promote economic opportunity, and to carry out the responsibility to protect and improve the trust assets of American Indians, Indian tribes, and Alaska Natives.

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Full Phrase
ACEC	area of critical environmental concern
AMS	analysis of the management situation
BIA	United States Department of the Interior, Bureau of Indian Affairs
BLM	United States Department of the Interior, Bureau of Land Management
CLS	coal lease stipulation
CFR	Code of Federal Regulations
decision area	BLM- and BIA-administered surface lands and subsurface mineral estate in the planning area
EIS	environmental impact statement
EPA	Environmental Protection Agency
ESA	Federal Endangered Species Act
federal mineral estate	subsurface mineral estate administered by the BLM
FLPMA	Federal Land Policy and Management Act of 1976
Forest Service	United States Department of Agriculture, National Forest Service
FRCC	fire regime condition class
Indian mineral estate	subsurface mineral estate administered by the BLM and BIA
LAA	lease applications areas
LSAAP	Lone Star Army Ammunition Plant, Texas
MCF	thousand cubic feet
NAAQS	National Ambient Air Quality Standards
National Park Service	United States Department of Interior, National Park Service
NEPA	National Environmental Policy Act of 1969
NRCS	Natural Resources Conservation Service
NSO	no surface occupancy
ODWC	Oklahoma Department of Wildlife Conservation
OFO	Oklahoma Field Office
OHV	off-highway vehicle
planning area	Lands in Oklahoma, Kansas, Texas, and Nebraska, regardless of ownership
PSD manager	Manager, Program Support Division, Mid-Continent Coordinating Center
RFD	reasonable foreseeable development scenario
RMP	resource management plan
RMP	resource management plan amendment
ROW	right-of-way
SMA	surface management agency
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Department of Interior, Fish and Wildlife Service
USGS	US Geological Survey

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Full Phrase
VCC	vegetation condition class
VRI	visual resource inventory
VRM	visual resource management

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CHAPTER 1
INTRODUCTION

The US Department of the Interior, Bureau of Land Management (BLM), Oklahoma Field Office (OFO), in collaboration with the US Department of the Interior, Bureau of Indian Affairs (BIA), is preparing an environmental impact statement (EIS). This document will also result in a BLM resource management plan (RMP) and a BIA Integrated RMP. The BLM RMP will guide the management of BLM-administered lands and federal mineral estate in Oklahoma, Kansas, and Texas. These lands are currently managed under the 1994 Oklahoma RMP (BLM 1994a), the 1991 Kansas RMP (BLM 1991), and the 1996 Texas RMP (BLM 1996a), as amended (BLM 1994b, 1996b, 2000, 2004, 2014a).

The BIA Integrated RMP includes management direction for allotted and tribal surface mineral interests. These lands are administered by the BIA Eastern Oklahoma and Southern Plains Regional Offices in Oklahoma, Kansas, Texas, and Nebraska.

The BLM and BIA are the co-lead agencies preparing the joint EIS/BLM RMP and BIA Integrated RMP. Based on findings of the EIS, the BLM will sign a record of decision on the approved RMP for the lands it administers and for federal mineral estate. The BIA will sign two separate records of decision for management decisions for Indian mineral interests and lands administered by each of the regional offices.

This EIS is prepared in accordance with the National Environmental Policy Act of 1969 (NEPA); Council on Environmental Quality regulations for implementing NEPA (40 Code of Federal Regulations [CFR], Parts 1500-1508); US Department of the Interior NEPA regulations (43 CFR, Part 46); and the requirements of the BLM's NEPA Handbook, H-1790-1 (BLM 2008) and the BIA's NEPA Guidebook, 59 Indian Affairs Manual 3-H.59 (BIA 2012).

The BLM RMP is being prepared using BLM planning regulations and guidance issued under the authority of the Federal Land Policy and Management Act of 1976 (FLPMA) (43 US Code [USC], Section 1701 et seq.), as amended, and the BLM's Land Use Planning Handbook, H-1601-1 (BLM 2005).

1.1 PURPOSE OF THE ANALYSIS OF THE MANAGEMENT SITUATION

When revising an RMP, the BLM must analyze inventory data and other information to identify issues and opportunities. This is called the analysis of the management situation (AMS), which provides an understanding of resources and uses in the planning area. It is a snapshot in time, which the BLM continues to refine through additional compilation and analysis of data and information. The BLM will consider these preliminary and subsequent assessments of conditions, current management, and management opportunities in the joint EIS/BLM RMP and BIA Integrated RMP.

The AMS provides the foundation for the RMP/EIS and summarizes the issues relevant to resource management; however, it is not meant to be an exhaustive review of everything known about the resources, uses, and activities in the planning area. Sufficient detail is provided to create a platform for resolving planning issues by developing alternatives. The AMS also provides a summary of current management practices, including direction from existing plans and agency policy, and a discussion of local resources and social and economic conditions.

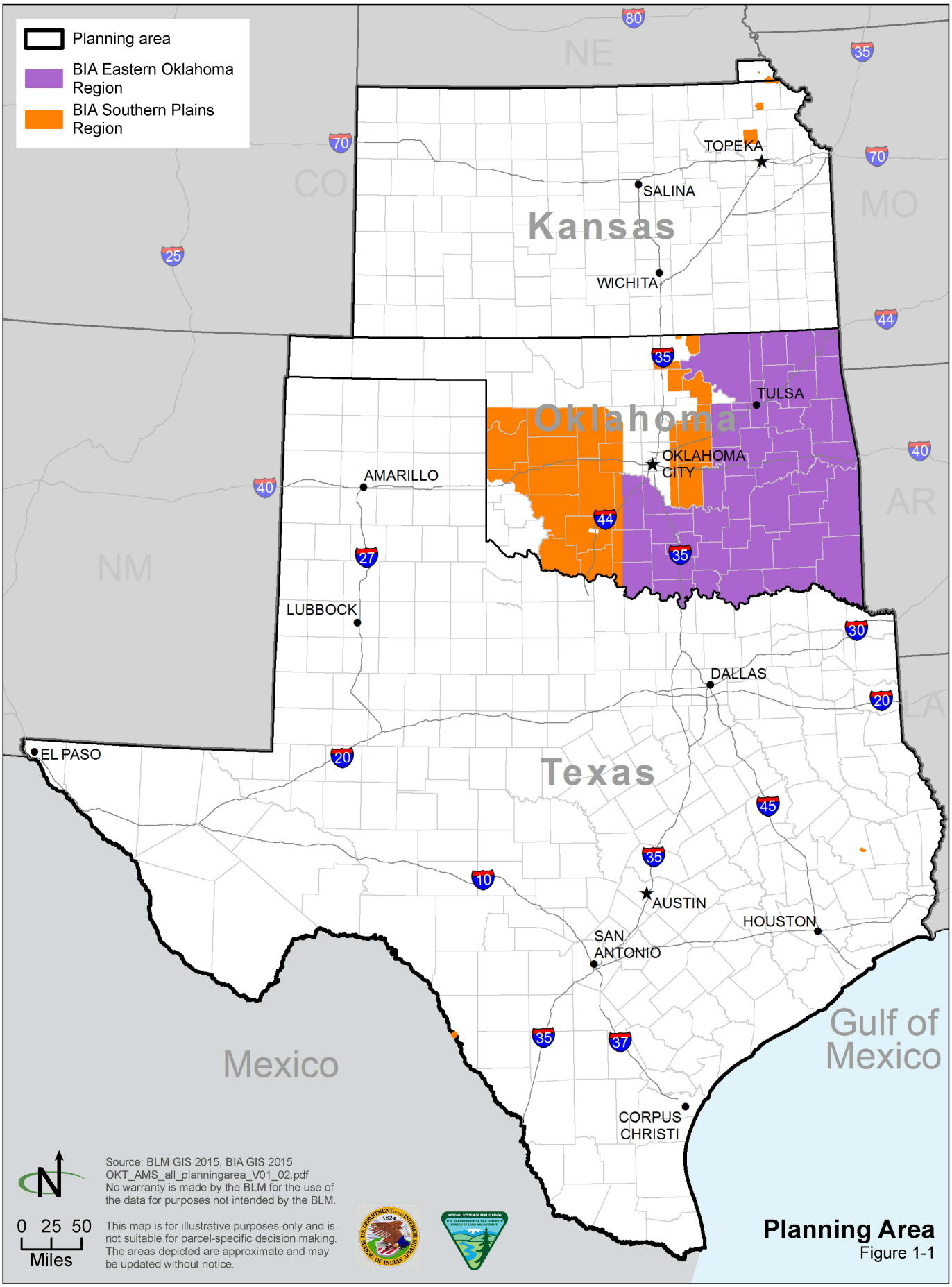
Consistent with multiple-use principles, the AMS provides the basis for formulating a range of reasonable alternatives (43 CFR, Part 1610.4-4). The AMS will be integrated into the subsequent joint EIS/BLM RMP and BIA Integrated RMP as part of the alternatives and affected environment analysis. Alternatives presented in the joint EIS/BLM RMP and BIA Integrated RMP will draw on the management opportunities and will examine the adequacy of current management.

Geographic Information System Data and Graphics

Geographic information systems (GIS) have been used in developing all maps, figures, and data and are based on preliminary analyses of datasets as of June 9, 2015. Most calculations in this document are rounded to the nearest one hundred acres. Calculations depend on the quality and availability of data. Given the scale of the analysis, the compatibility constraints between datasets, and the lack of data for some resources, all calculations are approximate; they are for comparison and analysis only and are not intended for use beyond this document. Likewise, the figures are provided for illustrative purposes and are subject to the same limitations. New data may be added and existing data may be refined before the draft joint EIS/BLM RMP and BIA Integrated RMP is published. Specific analyses, uses, and displays of data may vary from those that appear in the draft joint EIS/BLM RMP and BIA Integrated RMP as appropriate to the needs of that document.

1.2 DESCRIPTION OF THE PLANNING AREA, GEOGRAPHIC SCOPE, AND RESOURCES/PROGRAMS

The planning area is Oklahoma, Kansas, and Texas, regardless of landownership, and lands administered by the BIA Southern Plains Region in Richardson County, Nebraska (**Figure 1-1**, Planning Area). The 269,650,000-acre planning area is composed of federal, tribal trust or restricted (BIA), allotted, state, county, and private lands. Federal lands are administered by the BLM; US Department of Agriculture (USDA), Forest Service (Forest



Planning Area
Figure 1-1

Service); USDA, Agricultural Research Service; US Department of Justice, Federal Bureau of Prisons; US Department of Defense; US Department of Energy; US Army Corps of Engineers (USACE); International Boundary and Water Commission; and US Department of the Interior, National Park Service, Bureau of Reclamation, and Fish and Wildlife Service (USFWS). The planning area encompasses 437 counties (105 in Kansas, 1 in Nebraska, 77 in Oklahoma, and 254 in Texas).

The decision area for the joint EIS/BLM RMP and BIA Integrated RMP is where there are federal, tribal, or allottee interests. The decision area covers only the BLM- and BIA-administered surface lands and subsurface mineral estate in the planning area, with the exception of oil and gas mineral estate in Osage County. Individual trust lands are held in trust by the US government for the benefit of individual Indian allottees or their heirs.

The BLM decision area is composed of approximately 46,900 acres of BLM-administered surface lands and 4,754,700 acres of federal mineral estate. BLM-administered federal mineral estate is composed of split-estate land (private surface over federal minerals, which totals 576,000 acres) and lands managed by other federal agencies not covered under a land use plan (such as Forest Service) or congressionally withdrawn (National Park Service and some Fish and Wildlife Service refuges). The BLM decision area is limited to such lands and federal mineral estate in Oklahoma, Kansas, and Texas (BLM GIS 2015). **Table 1-1** identifies the acreage of the various landownerships in the planning area.

Table 1-1
Land Status in the Joint EIS/BLM RMP and BIA Integrated RMP Planning Area

Land Status	Surface Administration (Acres)[1]	Surface Percentage of Planning Area	BLM-Administered Mineral Estate[1] (Acres)	BLM-Administered Mineral Estate Percentage of Planning Area
BLM	46,900	0.0	46,900	0.0
BIA	853,000	0.3	N/A	N/A
Bureau of Prisons	700	0.0	700	0.0
Bureau of Reclamation	211,500	0.1	210,300	0.1
Department of Defense	837,800	0.3	805,000	0.3
Department of Energy	15,100	0.0	15,100	0.0
International Boundary Water Commission	39,900	0.0	110,900	0.0
National Park Service	1,271,100	0.5	N/A	N/A
Forest Service	1,265,900	0.5	N/A	N/A
Agricultural Research Service	2,800	0.0	2,800	0.0
USFWS	783,500	0.3	554,400	0.2
USACE	2,319,100	0.9	2,243,800	0.8
State	1,467,800	0.5	14,500	0.0

Table 1-1
Land Status in the Joint EIS/BLM RMP and BIA Integrated RMP Planning Area

Land Status	Surface Administration (Acres)[1]	Surface Percentage of Planning Area	BLM-Administered Mineral Estate[1] (Acres)	BLM-Administered Mineral Estate Percentage of Planning Area
Private, other, or unknown[2]	260,534,900	96.6	642,600	0.2
Total	**269,650,000**	**100**	**4,754,700**	**1.7**

[1]Rounded to the nearest 100 acres
[2]BLM-adminstered mineral estate acres include split estate minerals (private surface, federal minerals), public domain lands, and segregated coal.
Sources: BLM GIS 2015; BIA GIS 2015

Any minerals known to be held in full or in part by the USFWS are included in the BLM-administered federal mineral decision space (see **Table 1-2**, USFWS Lands with Federal Minerals). If any minerals are identified as being on land administered by the USFWS in the future, they will be dealt with on a case-by-case basis and are not analyzed in this plan.

Table 1-2
USFWS Lands with Federal Minerals

USFWS Unit Name	Unit Type	Approximate Acres of BLM-Administered Federal Mineral Estate[1]
Kansas—USFWS Region 6		
Flint Hills	National Wildlife Refuge	18,600
Great Plains	Nature Center	10
Kirwin	National Wildlife Refuge	10,800
Marais des Cygnes	National Wildlife Refuge	7,700
Quivira	National Wildlife Refuge	22,200
Oklahoma—USFWS Region 2		
Deep Fork	National Wildlife Refuge	9,900
Optima	National Wildlife Refuge	4,300
Ozark Plateau	National Wildlife Refuge	4,000
Sequoyah	National Wildlife Refuge	20,900
Tishomingo	National Wildlife Refuge	16,500
Washita	National Wildlife Refuge	8,100
Wichita	National Wildlife Refuge	59,000
Texas—USFWS Region 2		
Aransas	National Wildlife Refuge	116,500
Caddo Lake	National Wildlife Refuge	7,600
Hagerman	National Wildlife Refuge	11,300
Laguna Atascosa	National Wildlife Refuge	91,300

Table 1-2
USFWS Lands with Federal Minerals

USFWS Unit Name	Unit Type	Approximate Acres of BLM-Administered Federal Mineral Estate[1]
Lower Rio Grande Valley	National Wildlife Refuge	92,400
San Bernard	National Wildlife Refuge	51,800
Santa Ana	National Wildlife Refuge	2,100
Total		**555,100**

[1]Rounded to the nearest 100 acres, all lands may not include federal minerals
Source: BLM GIS 2015

The BIA decision areas include 394,200 surface acres and 2,012,200 mineral estate acres for BIA Eastern Oklahoma Regional Office. Approximately 1,474,500 acres of BIA Eastern Oklahoma Regional Office are limited to coal or other minerals in Osage County. The BIA decision area also includes 457,500 surface acres and 632,000 mineral estate acres for the BIA Southern Plains Regional Office (BIA GIS 2015). The BIA decision area includes such lands and mineral estate in Oklahoma, Kansas, and Texas and Richardson County, Nebraska.

The calculations and acreages presented in this document are based on the decision area being comprised of the following four parts:

- BLM surface, which includes
  - all lands in Oklahoma that are potentially under BLM administration
  - the Crossbar Ranch in Texas
  - BLM helium pipeline facility in Satanta, Kansas
  - a study area buffer boundary around the disputed area along the Red River in Texas and Oklahoma
- BLM-administered federal minerals, which include federal minerals described in Table 1-1
- BIA surface, which includes lands identified by the BIA Southern Plains and Eastern Oklahoma Regions as those potentially held in trust
- BIA-administered federal minerals, which include lands identified by the BLM as BIA mineral estate; these lands are identified only when a specific application is made and additional areas of BIA minerals may exist. Additionally, anywhere BIA surface has been identified, BIA mineral estate is assumed to exist. All of Osage County is included in the BIA-administered federal mineral estate, but only coal and other solid minerals would be covered under this plan.

1.2.1 BLM Resources and Programs

The following resources and resource uses are discussed in the AMS for the BLM decision area:

- Resources
  - Air
  - Climate
  - Geology
  - Soil
  - Water
  - Vegetation
  - Fish and wildlife
  - Special status species, including threatened and endangered
  - Wild horses and burros
  - Cultural resources
  - Paleontological resources
  - Visual resources
  - Wilderness characteristics
  - Wildland fire management
  - Caves and karst resources
- Resource Uses
  - Energy and minerals
  - Renewable energy
  - Recreation and visitor services
  - Comprehensive travel and transportation management
  - Lands and realty
  - Livestock grazing
  - Prime and unique farmlands and agriculture

Special designations, tribal uses, and social and economic features are also discussed.

1.2.2 BIA Resources

The following resources are discussed in the AMS for the BIA decision area:

- Air
- Climate

- Geology
- Soil
- Water
- Vegetation
- Fish and wildlife
- Special status species
- Cultural resources
- Paleontological resources
- Visual resources
- Wildland fire management
- Caves and karst resources
- Energy and minerals
- Renewable energy
- Recreation and visitor services
- Lands and realty
- Livestock grazing
- Prime and unique farmlands and agriculture
- National trails
- National and state byways

Tribal uses and social and economic features are also discussed.

1.3 KEY FINDINGS

There have been many changes in resource conditions, laws, and policies since the BLM completed land use plans and amendments. A revision is needed to provide a comprehensive framework for the BLM's management and allocation of public lands and resources under the jurisdiction of the OFO. Other reasons for the revision are to consolidate existing land use plan and amendments, to reevaluate resource availability, and to resolve resource conflicts or issues.

The BIA fulfills its Indian trust responsibilities on tribal and allotted lands under current policy and guidance; however, the BIA Eastern Oklahoma and Southern Plains Regional Offices do not have an overarching planning document that outlines the steps to meet this mission. A comprehensive framework for fulfilling these trust responsibilities is needed.

A preliminary list of key issues to be addressed has been compiled, based on internal scoping primarily derived from the BLM's staff and managers' knowledge of local

conditions. These planning issues and management concerns were expanded and refined through external scoping.

The following description provides the preliminary planning issues and management concerns that were developed primarily through internal scoping. Broadly defined planning issue statements identified in internal and external scoping are listed in **Table 1-3**. More detailed information on each planning issue is included in the Final Joint EIS/BLM RMP and BIA Integrated RMP Scoping Summary Report (BLM 2014b).

Table 1-3
Planning Issue Categories and Statements

Issue	Planning Issue Category	Planning Issue Statement
1.	Energy development	*How can the BLM and BIA allow development of federal, tribal, and allotted energy resources and honor valid existing lease rights, while protecting air, visual resources, wildlife, water, and the natural environment?*
2.	Minerals and mining	*How can the BLM and BIA allow development of federal, tribal, and allotted other mineral resources and honor valid existing lease rights, while protecting air, water, and the natural environment?*
3.	Cultural and historic resources	*How can the BLM and BIA manage cultural and historic resources for the benefit of Native American tribes and individual Indians, while protecting those resources?*
4.	Fences and trespassing	*How should the BLM manage the land it administers in the Red River area to reduce conflicts with adjacent property owners?*
5.	Recreation and other uses along the Red River	*What uses should be allowed along the Red River and what restrictions, if any, should apply to those uses in order to protect other users and resources?*
6.	Access and transportation	*What access points and trails should be open in the Red River area?*
7.	Public health and safety	*How can the BLM minimize public health and safety risks in the Red River area?*
8.	Lands and realty	*What criteria should the BLM use for disposing of or acquiring BLM-administered lands?*
9.	Fish and wildlife	*How should the BLM allow use of the lands it administers for recreation and other resource uses, while protecting fish and wildlife?*
10.	Socioeconomics	*How can the BLM realize the socioeconomic benefits of the resources in the area, while minimizing conflicts with other uses and protecting sensitive resources in the planning area?*
11.	Tribal Interests	*How can the BIA minimize trespassing on tribal and allotted lands, especially during the hunting season?*

Table 1-3
Planning Issue Categories and Statements

Issue	Planning Issue Category	Planning Issue Statement
12.	Issues not addressed in previous RMPs	*How will the BLM address resources not addressed in the current RMPs?*
13.	Climate change and future water needs	*How are the BLM and BIA going to plan for future water needs and for climate change and its effects, including water shortage?*

Source: BLM 2014b

1.4 REFERENCES

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CHAPTER 2
AREA PROFILE

2.1 REGIONAL CONTEXT

The planning area is primarily within three physiographic provinces: western Kansas, the Oklahoma panhandle, and west Texas are in the Great Plains province; north-central Texas, central Oklahoma, and eastern Kansas and Nebraska are in the Central Lowland province; and east/southeast Texas and far southeast Oklahoma are in the Coastal Plain province. A very small portion of eastern Oklahoma is also in the Ouachita and Ozark Plateaus provinces.

Kansas is the fifteenth-largest state, with a total area of 82,277 square miles. It is bordered to the east by Missouri, to the south by Oklahoma, to the west by Colorado, and to the north by Nebraska. Major rivers include the Missouri River along the northeast border with Missouri, and the Arkansas, Kansas, Saline, Smoky Hill, and Republican rivers.

Oklahoma is the twentieth-largest state, with a total area of 69,898 square miles. It is bordered to the east by Arkansas and Missouri, to the south by Texas, to the west by Texas and New Mexico, and to the north by Kansas and Colorado. Three significant rivers drain into the Mississippi River before entering the Gulf of Mexico: the Arkansas, Canadian, and Red rivers.

Nebraska is the sixteenth-largest state, with a total area of 77,354 square miles. It is bordered to the east by Iowa and Missouri, to the south by Kansas and Colorado, to the west by Colorado and Wyoming, and to the north by South Dakota. The two major rivers of Nebraska are the Missouri River, forming the eastern borders with Iowa, Missouri, and South Dakota; and the Platte River system, a tributary of the Missouri River.

Texas is the second-largest state, with a total area of 268,581 square miles. It is bordered to the east by Arkansas, Louisiana, and the Gulf of Mexico; to the south by Mexico; to the west by New Mexico; and to the north by Oklahoma. The Rio Grande forms the US-Mexico border. Other major rivers, which drain into the Gulf of Mexico, are the Pecos,

Colorado, Brazos, and Sabine rivers. The Red River forms part of the Texas-Oklahoma border.

2.1.1 Ecoregions

Ecoregions defined by the US Environmental Protection Agency (EPA) are derived from the seminal work *Ecoregions of the Conterminous United States*, by J. M. Omernik (1987). These ecoregions form a framework for researching, assessing, managing, and monitoring environmental resources. Ecoregions denote areas whose ecosystems are generally similar. In ecoregions, the type, quality, and quantity of environmental resources are also similar.

The planning area is within portions of 19 EPA Level III ecoregions (Woods et al. 2005; Chapman et al. 2001; Griffith et al. 2004; EPA 2013). Acres of each ecoregion within the planning and decision areas are summarized in **Table 2-1**, Ecoregions in the Planning and Decision Areas, and are shown in **Figure 2-1**, Level III Ecoregions.

The Draft Southern Great Plains Rapid Ecoregional Assessment (Assal et al. 2015) area encompasses nearly 180 million acres in the south-central US. It is in portions of five states: the northern Texas panhandle, western Oklahoma, eastern New Mexico, eastern Colorado, and western Kansas. The area includes three ecoregions, as defined by Omernik (1987), which coincide with the EPA level III ecoregions: the Central Great Plains, the High Plains or Western High Plains, and the Southwestern Tablelands.

The Draft Southern Great Plains Rapid Ecoregional Assessment (Assal et al. 2015) identifies 19 conservation elements, which are ecological resources of concern (Assal et al. 2015), including 6 ecological community conservation elements. These are mixed-grass prairie, short-grass prairie, riparian areas and wetlands, playas and saline lakes, lakes and reservoirs, and prairie streams and rivers. These conservation elements are described in detail in the Draft Southern Great Plains Rapid Ecoregional Assessment (Assal et al. 2015).

2.1.2 References

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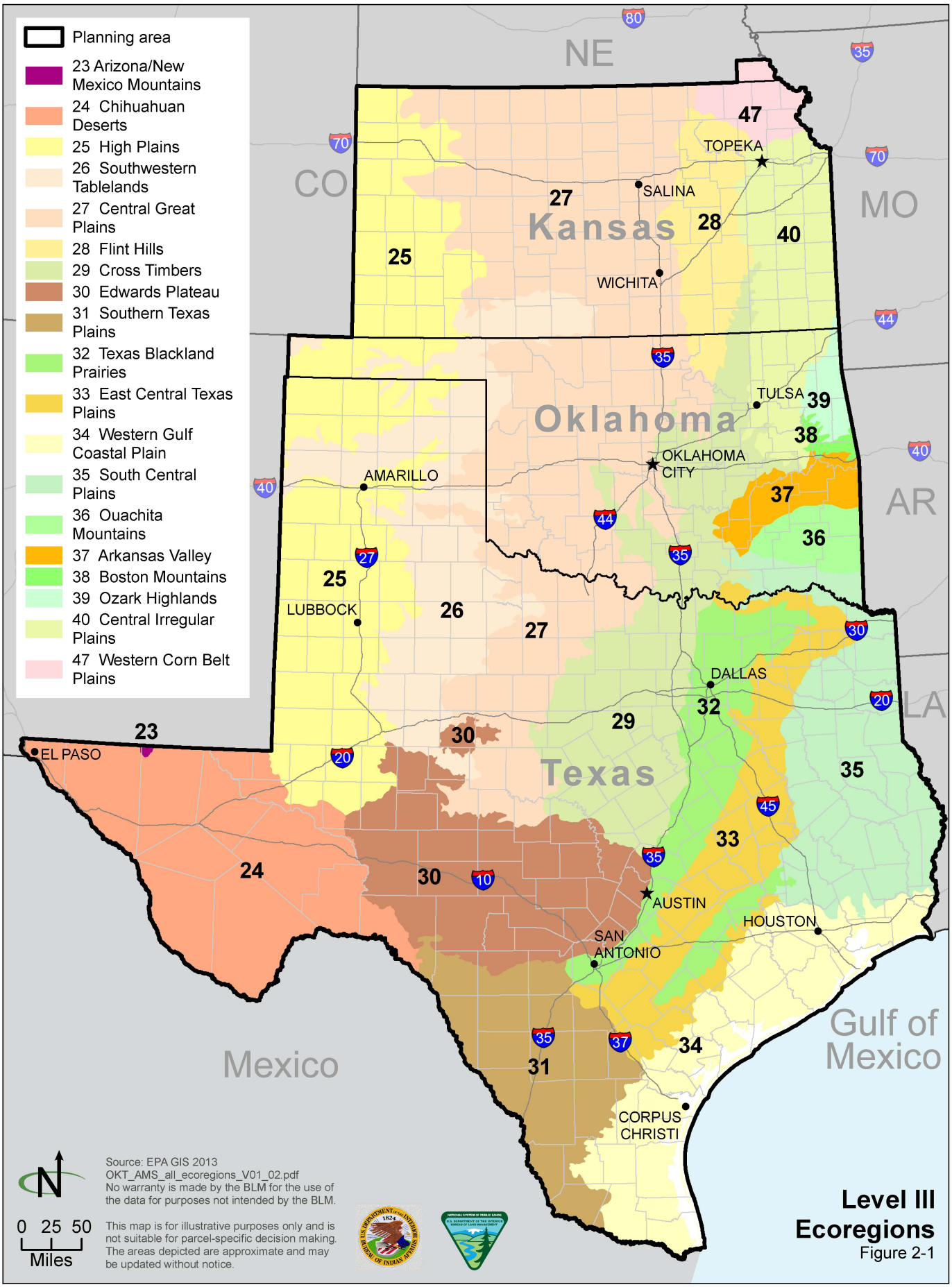
Chapman, S. S., J. M. Omernik, J. A. Freeouf, D. G. Huggins, J. R. McCauley, C. C. Freeman, and G. Steinauer et al. 2001. Ecoregions of Nebraska and Kansas (color poster with map, descriptive text, summary tables, and photographs). US Geological Survey, Reston, Virginia (map scale 1:1,950,000).

EPA (US Environmental Protection Agency). 2013. Primary Distinguishing Characteristics of Level III Ecoregions of the Continental United States. September 2013. Internet website: http://www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm.

Table 2-1
Ecoregions in the Planning and Decision Areas

Ecoregion (Ecoregion Number)	Planning Area	BLM-Administered Surface Lands	BLM-Administered Federal Mineral Estate
Arizona/New Mexico Mountains (23)	52,400	0	0
Chihuahuan Deserts (24)	22,632,200	0	179,000
High Plains (25)	33,675,300	30	91,900
Southwestern Tablelands (26)	19,458,200	11,900	99,000
Central Great Plains (27)	53,137,200	34,700	672,900
Flint Hills (28)	6,902,200	0	232,300
Cross Timbers (29)	21,791,800	240	827,700
Edwards Plateau (30)	18,524,000	0	51,500
Southern Texas Plains (31)	13,201,000	0	97,300
Texas Blackland Prairies (32)	10,719,900	0	184,300
East Central Texas Plains (33)	13,776,800	0	131,900
Western Gulf Coastal Plain (34)	14,769,400	0	347,100
South Central Plains (35)	17,423,100	0	566,000
Ouachita Mountains (36)	2,589,300	0	95,000
Arkansas Valley (37)	3,077,300	70	635,000
Boston Mountains (38)	530,500	0	95,200
Ozark Highlands (39)	1,548,200	0	27,900
Central Irregular Plains (40)	10,722,600	0	349,100
Western Corn Belt Plains (47)	2,635,000	22,000	11,900

Source: EPA GIS 2013


Planning area
23 Arizona/New Mexico Mountains
24 Chihuahuan Deserts
25 High Plains
26 Southwestern Tablelands
27 Central Great Plains
28 Flint Hills
29 Cross Timbers
30 Edwards Plateau
31 Southern Texas Plains
32 Texas Blackland Prairies
33 East Central Texas Plains
34 Western Gulf Coastal Plain
35 South Central Plains
36 Ouachita Mountains
37 Arkansas Valley
38 Boston Mountains
39 Ozark Highlands
40 Central Irregular Plains
47 Western Corn Belt Plains
NE
CO
MO
AR
LA
Kansas
Oklahoma
Texas
Mexico
Gulf of Mexico
TOPEKA
SALINA
WICHITA
TULSA
OKLAHOMA CITY
AMARILLO
LUBBOCK
EL PASO
DALLAS
AUSTIN
HOUSTON
SAN ANTONIO
CORPUS CHRISTI
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0 25 50
Miles
Source: EPA GIS 2013
OKT_AMS_all_ecoregions_V01_02.pdf
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
This map is for illustrative purposes only and is not suitable for parcel-specific decision making. The areas depicted are approximate and may be updated without notice.
Level III Ecoregions
Figure 2-1

EPA GIS (US Environmental Protection Agency, Geographic Information System). 2013. GIS data of ecoregions. Internet website: www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm.

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Omernik, J. M. 1987. Ecoregions of the conterminous United States (map supplement). Annals of the Association of American Geographers 77(1):118-125.

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2.2 BLM RESOURCES

2.2.1 Air

Air quality 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.

Indicators

The federal Clean Air Act (42 USC, Sections 7401-7642) established the principal framework for national, state, and local efforts to protect air quality. The EPA sets regulations and standards to implement the requirements of the Clean Air Act. While the EPA retains authority for certain air quality rules, including most pertaining to emission standards for mobile sources, it may authorize states and, in some cases, tribal governments to implement portions of the Clean Air Act. The EPA has approved Oklahoma's, Kansas's, and Texas's state implementation plans, which means those states may implement certain provisions of the Clean Air Act. While Oklahoma, Texas, and Kansas all contain both BLM- and BIA-administered land, only BIA-administered land is being analyzed in Nebraska. As such, air quality impacts in the BIA decision area in Nebraska are discussed exclusively in **Section 2.6.1**, Air .

Ambient Air Quality Standards

Under the Clean Air Act, the EPA has set time-averaged National Ambient Air Quality Standards (NAAQS, **Table 2-2**, National Ambient Air Quality Standards) for six air pollutants considered to be key indicators of air quality: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and two categories of particulate matter (particulate matter less than 10 microns in diameter [PM_{10}] and particulate matter less than 2.5 microns in diameter [$PM_{2.5}$]).

Table 2-2
National Ambient Air Quality Standards

Pollutant	Averaging Time	National Standards		
		Primary	Secondary	Form
Ozone	8-hour	0.075 ppm[1]	Same as primary	Annual 4th-highest daily maximum 8-hr concentration, averaged over three years
Carbon monoxide	8-hour	9 ppm	--	Not to be exceeded more than once a year
	1-hour	35 ppm	--	
Nitrogen dioxide	Annual (arithmetic mean)	0.053 ppm	Same as primary	Annual mean
	1-hour	100 ppb	--	98th percentile, averaged over three years
Sulfur dioxide	3-hour	--	0.5 ppm	Not to be exceeded more than once a year
	1-hour	75 ppb[2]	--	99th percentile of 1-hour daily maximum concentrations, averaged over three years
PM_{10}	24-hour	150 µg/m^3	Same as primary	Not to be exceeded more than once a year, on average, over three years
$PM_{2.5}$	Annual (arithmetic mean)	12 µg/m^3	15 µg/m^3	Annual mean, averaged over three years
	24-hour	35 µg/m^3	Same as primary	98th percentile, averaged over three years
Lead[3]	Rolling three-month average	0.15 µg/m^3	Same as primary	Not to be exceeded

Source: EPA 2014a

[1]**ppm**—parts per million. Final rule signed March 12, 2008. The 1997 standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over three years) and related implementation rules remain in place. In 1997, the EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once a year) in all areas, although some areas have obligations under that standard (anti-backsliding). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 12 ppm is less than or equal to 1.

[2]**ppb**—parts per billion. Final rule signed June 2, 2010. The 1971 annual and 24-hour sulfur dioxide standards (0.03 ppm annual and 0.14 ppm 24-hour) were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard. One exception is in areas designated as nonattainment for the 1971 standards; in such cases the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

[3]**µg/m^3**—micrograms per cubic meter. Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m^3) remains in effect until one year after an area is designated for the 2008 standard. The one exception is in areas designated as nonattainment for the 1978 standard; in such cases the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

The two-tiered standards may be primary or secondary. Primary standards set limits to protect public health, including the health of sensitive populations, such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Averaging periods vary by pollutant, based on potential health

and welfare effects of each pollutant. States may set their own ambient air quality standards, but they must be at least as stringent as the national standards.

National ambient air quality standards are shown in **Table 2-2**. States can set their own standards, but they must be at least as stringent as the national standards. Oklahoma, Texas, and Kansas have adopted the national standards as the state standards for all criteria pollutants. For actions on lands within the boundaries of Indian reservations, national standards apply when they differ from the state standards.

In addition to criteria pollutants, the Clean Air Act regulates toxic air pollutants, or hazardous air pollutants, that are known to cause or are suspected to cause cancer or other serious health effects or adverse environmental impacts. The EPA has issued rules covering 80 categories of major industrial sources, as well as categories of smaller sources. Controls are usually required at the source to limit the release of these toxics into the atmosphere.

Clean Air Act General Conformity

Section 176(c) of the Clean Air Act requires that federal actions conform to the appropriate state implementation plan. The EPA has promulgated rules establishing conformity analysis procedures for transportation-related actions and for other general federal agency actions (40 CFR, Parts 6, 51, and 93).

The EPA general conformity rule requires preparation of a formal conformity determination document for federal agency actions that are undertaken, approved, or funded in federal nonattainment or maintenance areas. This rule applies when the total net change in direct and indirect emissions of nonattainment pollutants (or their precursors) exceeds specified thresholds. Because some counties in the planning area are in nonattainment for the NAAQS, the general conformity rule would apply (see *Current Condition*, below).

Prevention of Significant Deterioration

In addition to the NAAQS, the prevention of significant deterioration regulations set forth a permit process that applies to new major sources or major modifications of existing sources for pollutants. It is applicable where the emission source is inside an attainment or unclassifiable area, as defined by the NAAQS. Furthermore, the prevention of significant deterioration program requires the use of best available control technologies and provides for an air quality impact analysis and public involvement. The purpose of the prevention of significant deterioration program is to protect public health and welfare. It also preserves, protects, and enhances the air quality of national parks and wilderness areas, national monuments, seashores, and other areas of recreation, scenic, or historic value.

Prevention of significant deterioration regulations prevent areas that are in attainment of the NAAQS from being polluted up to the level of the standards. The Clean Air Act directs the EPA to classify air sheds as Class I, Class II, or Class III. Class I air sheds are national parks and wilderness areas of a certain size that were in existence before 1977 or

additional areas that have since been designated by federal regulation. Class I air sheds represent areas that should be given special protection. Class II air sheds are areas that would receive less protection than Class I areas. Class III air sheds require the least stringent air quality protection, and air quality in these areas would be permitted to degrade air quality up to the NAAQS (National Park Service 2006).

There are five Class 1 air sheds within the planning area: none in Kansas, two in Oklahoma, and three in Texas. The North Mountain Unit and the Charons Garden Unit of the Wichita Mountains Wilderness are in southern Oklahoma; Big Bend National Park, Carlsbad Caverns National Park, and Guadalupe Mountains National Park are all in western Texas (National Park Service 2011). There are no tribal Class 1 air sheds in the planning area (National Park Service 2011). Class II air sheds are the remaining areas outside nonattainment and maintenance areas. No areas have been designated as Class III.

Prevention of significant deterioration regulations limits the total increase in ambient pollution levels above established baseline levels for sulfur dioxide, nitrogen dioxide, and PM_{10}.

Current Condition

The planning area encompasses Oklahoma, Kansas, Texas, and Nebraska. The area of analysis for directly emitted pollutants (pollutants other than ozone) is generally limited to a few miles downwind of a source. The area of analysis for ozone is larger; this is because it is formed by photochemical reactions of other pollutants in the atmosphere, primarily volatile organic compounds and nitrogen oxides. Ozone may form later and at a greater distance from the sources of precursor emissions.

The Clean Air Act requires each state to identify areas that have ambient air quality in violation of federal standards using monitoring data collected through state monitoring networks, as follows:

- Areas that violate air quality standards are designated as nonattainment for the relevant criteria air pollutants.
- Areas that comply with air quality standards are designated as attainment for the relevant criteria air pollutants.
- Areas that have been redesignated from nonattainment to attainment are considered maintenance areas.
- Areas of uncertain status are generally designated as unclassifiable but are treated as attainment areas for regulatory purposes.

Most of the counties in the planning area are either in attainment with or unclassified for the national standards. All counties in Oklahoma are either in attainment or unclassified. Several counties and portions of counties in Texas and one portion of a county in Kansas are not in attainment (see **Table 2-3**, Nonattainment Areas in the Planning Area). The county in Nebraska is in attainment for the national standards and is discussed in **Section 2.6.1**, Air.

Table 2-3
Nonattainment Areas in the Planning Area

County	Part of County Designated Nonattainment	Pollutant	Status
Kansas			
Saline County	Saline County*	Lead (2008)	Nonattainment
Texas			
Brazoria County	Houston-Galveston-Brazoria	8-Hr Ozone (1997)	Severe 15
	Houston-Galveston-Brazoria	8-Hr Ozone (2008)	Marginal
Chambers County	Houston-Galveston-Brazoria	8-Hr Ozone (1997)	Severe 15
	Houston-Galveston-Brazoria	8-Hr Ozone (2008)	Marginal
Collin County	Dallas-Fort Worth	8-Hr Ozone (1997)	Serious
	Frisco*	Lead (2008)	Nonattainment
	Dallas-Fort Worth	8-Hr Ozone (2008)	Moderate
Dallas County	Dallas-Fort Worth	8-Hr Ozone (1997)	Serious
	Dallas-Fort Worth	8-Hr Ozone (2008)	Moderate
Denton County	Dallas-Fort Worth	8-Hr Ozone (1997)	Serious
	Dallas-Fort Worth	8-Hr Ozone (2008)	Moderate
El Paso County	El Paso County*	PM-10 (1987)	Moderate
Ellis County	Dallas-Fort Worth	8-Hr Ozone (1997)	Serious
	Dallas-Fort Worth	8-Hr Ozone (2008)	Moderate
Fort Bend County	Houston-Galveston-Brazoria	8-Hr Ozone (1997)	Severe 15
	Houston-Galveston-Brazoria	8-Hr Ozone (2008)	Marginal
Galveston County	Houston-Galveston-Brazoria	8-Hr Ozone (1997)	Severe 15
	Houston-Galveston-Brazoria	8-Hr Ozone (2008)	Marginal
Harris County	Houston-Galveston-Brazoria	8-Hr Ozone (1997)	Severe 15
	Houston-Galveston-Brazoria	8-Hr Ozone (2008)	Marginal
Johnson County	Dallas-Fort Worth	8-Hr Ozone (1997)	Serious
	Dallas-Fort Worth	8-Hr Ozone (2008)	Moderate
Kaufman County	Dallas-Fort Worth	8-Hr Ozone (1997)	Serious
	Dallas-Fort Worth	8-Hr Ozone (2008)	Moderate

Table 2-3
Nonattainment Areas in the Planning Area

County	Part of County Designated Nonattainment	Pollutant	Status
Liberty County	Houston-Galveston-Brazoria	8-Hr Ozone (1997)	Severe 15
	Houston-Galveston-Brazoria	8-Hr Ozone (2008)	Marginal
Montgomery County	Houston-Galveston-Brazoria	8-Hr Ozone (1997)	Severe 15
	Houston-Galveston-Brazoria	8-Hr Ozone (2008)	Marginal
Parker County	Dallas-Fort Worth	8-Hr Ozone (1997)	Serious
	Dallas-Fort Worth	8-Hr Ozone (2008)	Moderate
Rockwall County	Dallas-Fort Worth	8-Hr Ozone (1997)	Serious
	Dallas-Fort Worth	8-Hr Ozone (2008)	Moderate
Tarrant County	Dallas-Fort Worth	8-Hr Ozone (1997)	Serious
	Dallas-Fort Worth	8-Hr Ozone (2008)	Moderate
Waller County	Houston-Galveston-Brazoria	8-Hr Ozone (1997)	Severe 15
	Houston-Galveston-Brazoria	8-Hr Ozone (2008)	Marginal
Wise County	Dallas-Fort Worth	8-Hr Ozone (2008)	Moderate

Source: EPA 2014b
*Only a portion of the county is designated nonattainment.

Table 2-4, Air Quality Monitoring Values in the Planning Area by State[1], divided by state, shows the locations of the network of air monitoring stations in the planning area, the pollutants monitored at each station, and the last three available years of monitoring data for each station. Some monitoring stations have multiple monitors on-site. When data for various pollutants at a station have come from different monitors, this is noted under the pollutant name in the table. Rows in bold indicate the pollutant exceeded the NAAQS or that monitors have recorded the pollutant at 100 percent of the NAAQS.

Air quality monitors in Kansas, Oklahoma, and Texas all reported exceedances of the NAAQS for ozone and lead. High temperatures and drought may have contributed to ozone exceedances. One $PM_{2.5}$ monitor in Harris County, Texas, reported exceedances of $PM_{2.5}$ in 2011 and 2012. This resulted in an exceedance of the NAAQS when a three-year average was calculated for 2011-2013. Air quality monitoring values for Richardson County in Nebraska are discussed in **Section 2.6.1**, Air.

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
Kansas							
Health Department, 1900 East 9th, Wichita (Sedgwick County)							
Carbon Monoxide *Monitor 1*	1 Hour	3.6	2.2	2.1	2.63 ppm	35 ppm	8
	8-Hour Averaging End Hour	3.4	1.5	1.4	2.1 ppm	9 ppm	23
Nitrogen Dioxide *Monitor 3*	1 Hour	69	85	40	65 ppb	100 ppb	65
Ozone *Monitor 1*	**8-Hour Averaging End Hour**	**0.076**	**0.08**	**0.071**	**0.076 ppm**	**0.075 ppm**	**101**
$PM_{2.5}$ *Monitor 1*	24 Hour	25	18	18	20.3 µg/m	35 µg/m	58
	Annual Mean	9.2	8.4	8.5	8.7 µg/m	12 µg/m	73
$PM_{2.5}$ *Monitor 2*	24 Hour	25	16	17	19.3 µg/m	35 µg/m	55
	Annual Mean	8.7	8.3	8	8.3 µg/m	12 µg/m	69
12831 W. 117 North (not in a city; in Sedgwick County)							
Ozone	**8-Hour Averaging End Hour**	**0.08**	**0.08**	**0.071**	**0.077 ppm**	**0.075 ppm**	**103**
304 E. Avenue B (not in a city; in Saline County)							
Lead *Monitor 1*	**24 Hour**	**0.937**	**0.58**	**0.588**	**0.70 µg/m**	**0.15 µg/m**	**467**
Lead *Monitor 2*	**24 Hour**	**-**	**-**	**0.524**	**-**	**0.15 µg/m**	**-**
County Road 1103 (not in a city; in Linn County)							
Nitrogen Dioxide	1 Hour	10	13	10	33 ppb	100 ppb	33
Ozone	8-Hour Averaging End Hour	0.073	0.078	0.062	0.071 ppm	0.075 ppm	95
$PM_{2.5}$	24 Hour	22	17	18	19 µg/m	35 µg/m	54
	Annual Mean	9.8	8.3	8.3	8.8 µg/m	12 µg/m	73

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
SO_2	1 Hour	8	7	6	7 ppb	75 ppb	9
Cedar Bluff Reservoir, Pronghorn and Muley (not in a city; in Trego County)							
Ozone	8-Hour Averaging End Hour	0.077	0.074	0.067	0.073 ppm	0.075 ppm	97
SO_2	1 Hour	3	4	3	3.3 ppb	75 ppb	4
2501 Randolph Avenue, Topeka (Shawnee County)							
Ozone	8-Hour Averaging End Hour	0.075	0.079	0.066	0.073 ppm	0.075 ppm	97
$PM_{2.5}$	24 Hour	20	18	20	19.3 µg/m	35 µg/m	55
	Annual Mean	9.6	8.6	8.4	8.9 µg/m	12 µg/m	74
PM_{10}	24 Hour	35	-	-	-	150 µg/m	-
Konza Prairie Biological Station (not in a city; in Riley County)							
Ozone	8-Hour Averaging End Hour	0.07	0.078	0.058	0.069 ppm	0.075 ppm	92
2010 Metropolitan, Leavenworth (Leavenworth County)							
Ozone	8-Hour Averaging End Hour	0.074	0.08	0.066	0.073 ppm	0.075 ppm	97
13899 W. 159th (not in a city; in Johnson County)							
Ozone	8-Hour Averaging End Hour	0.073	0.084	0.064	0.074 ppm	0.075 ppm	99
$PM_{2.5}$	24 Hour	18	15	17	16.7 µg/m	35 µg/m	48
	Annual Mean	8.3	7.1	7.2	7.5 µg/m	12 µg/m	63
City Fire Station, 1010 Center, Goodland (Sherman County)							
PM_{10}	24 Hour	51	106	75	77 µg/m	150 µg/m	51
K-96 and Hydraulic, Wichita (Sedgwick County)							
$PM_{2.5}$ *Monitor 1*	24 Hour	-	-	19	-	35 µg/m	-

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
	Annual Mean	-	-	8.8	-	12 µg/m	
PM_{10} *Monitor 3*	24 Hour	56	43	22	40 µg/m	150 µg/m	27
85th and Antioch, Overland Park (Johnson County)							
$PM_{2.5}$	24 Hour	21	16	18	18 µg/m	35 µg/m	51
	Annual Mean	9.1	7.9	8	8.3 µg/m	12 µg/m	69
Fire Station #11, Wichita (Sedgwick County)							
$PM_{2.5}$	24 Hour	25	18	20	21 µg/m	35 µg/m	60
	Annual Mean	9.1	8.5	9.5	9.0 µg/m	12 µg/m	75
Fire Station #12, Wichita (Sedgwick County)							
$PM_{2.5}$	24 Hour	24	18	22	21 µg/m	35 µg/m	60
	Annual Mean	9	9.3	9.5	9.3 µg/m	12 µg/m	78
One Main Place at Main and Douglas, Wichita (Sedgwick County)							
Carbon Monoxide	1 Hour	2.8	7.1	-	-	35 ppm	-
	8-Hour Averaging End Hour	2	5.7	-	-	9 ppm	-
Fire Station #2, 200 E. 53rd Street N (not in a city; in Sedgwick County)							
Ozone	8-Hour Averaging End Hour	0.062	-	-	0.062	0.075 ppm	83
Union and E. North/NE corner intersection, Coffeyville (Montgomery County)							
SO_2	1 Hour	30	-	-	-	75 ppb	-
Oklahoma							
South Highway 59, RR1, 1795 Dahlonegah Park Road, Stilwell, Cherry Tree (Adair County)							
Carbon Monoxide	1 Hour	0.7	0.7	0.7	0.7 ppm	35 ppm	2
	8-Hour Averaging End Hour	0.3	0.5	0.5	0.4 ppm	9 ppm	4
Ozone	**8-Hour Averaging End Hour**	**0.077**	**0.083**	**.066**	**0.075 ppm**	**0.075 ppm**	**100**
SO_2	1 Hour	9	6	5	6.7 ppb	75 ppb	9

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
Nitrogen Dioxide	1 Hour	14	21	-	18 ppb	100 ppb	18
Oklahoma Christian University, 2501 E. Memorial Road, Oklahoma City (Oklahoma County)							
Carbon Monoxide *Monitor 1*	1 Hour	1.3	1.3	1.1	1.2 ppm	35 ppm	3
	8-Hour Averaging End Hour	1.1	0.7	0.9	0.9 ppm	9 ppm	10
Lead *Monitor 6*	24 Hour	0.006	0.007	0.005	0.006 µg/m	0.15 µg/m	4
Nitrogen Dioxide *Monitor 1*	1 Hour	39	37	37	38 ppb	100 ppb	38
Ozone *Monitor 1*	**8-Hour Averaging End Hour**	**0.084**	**0.081**	**0.072**	**0.079 ppm**	**0.075 ppm**	**105**
PM_{10} *Monitor 1*	24 Hour	45	73	62	60 µg/m	150 µg/m	40
$PM_{2.5}$ *Monitor 1*	24 Hour	23	19	21	21 µg/m	35 µg/m	60
	Annual Mean	9.7	9.4	8.9	9.3 µg/m	12 µg/m	78
SO_2 *Monitor 1*	1 Hour	5	5	3	4 ppb	75 ppb	5
3520 ½ N. Peoria, Tulsa (Tulsa County)							
Carbon Monoxide *Monitor 1*	1 Hour	2.5	1.8	1.6	2 ppm	35 ppm	6
	8-Hour Averaging End Hour	1.4	1.2	1.3	1.3 ppm	9 ppm	14
Lead *Monitor 1*	24 Hour	0.008	0.026	0.009	0.014 µg/m	0.15 µg/m	9
Lead *Monitor 6*	24 Hour	0.017	0.027	0.008	0.017 µg/m	0.15 µg/m	11
Nitrogen Dioxide *Monitor 1*	1 Hour	42	42	38	41 ppb	100 ppb	41

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
Ozone *Monitor 1*	**8-Hour Averaging End Hour**	**0.085**	**0.085**	**0.072**	**0.081 ppm**	**0.075 ppm**	**108**
PM_{10} *Monitor 1*	24 Hour	53	70	67	63 µg/m	150 µg/m	42
$PM_{2.5}$ *Monitor 1*	24 Hour	24	20	20	21 µg/m	35 µg/m	60
	Annual Mean	11.2	9.7	9.2	10.0 µg/m	12 µg/m	83
$PM_{2.5}$ *Monitor 2*	24 Hour	-	20	21	20.5 µg/m	35 µg/m	59
	Annual Mean	-	9.6	9.3	9.5 µg/m	12 µg/m	79
SO_2 *Monitor 1*	1 Hour	25	16	20	20	75 ppb	27
12575 NW 10th (Water Tower), Yukon (Canadian County)							
Lead *Monitor 6*	24 Hour	-	-	0.004	-	0.15 µg/m	-
Nitrogen Dioxide	1 Hour	-	-	41	-	100 ppb	-
Ozone	**8-Hour Averaging End Hour**	**0.083**	**0.075**	**0.071**	**0.076 ppm**	**0.075 ppm**	**101**
8900 S. Air Depot, Oklahoma City (Oklahoma County)							
Lead *Monitor 6*	24 Hour	0.007	0.304	0.008	0.106 µg/m	0.15 µg/m	71
723 East Second Street, Picher (Ottawa County)							
Lead *Monitor 1*	24 Hour	0.05	0.168	0.021	0.080 µg/m	0.15 µg/m	53
190 S. Main Street, Cardin (Ottawa County)							
Lead *Monitor 1*	24 Hour	0.141	0.144	0.123	0.136 µg/m	0.15 µg/m	91
Lead *Monitor 2*	24 Hour	0.121	0.084	0.049	0.085 µg/m	0.15 µg/m	57
108 N. Main Street, Savanna (Pittsburg County)							
Lead *Monitor 1*	**24 Hour**	**0.021**	**0.023**	**0.811**	**0.285 µg/m**	**0.15 µg/m**	**190**
Lead *Monitor 2*	**24 Hour**	**0.021**	**0.009**	**0.607**	**0.212 µg/m**	**0.15 µg/m**	**141**

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
124 North Riverside Drive West, Tulsa (Tulsa County)							
Lead *Monitor 6*	24 Hour	-	-	0.011	-	0.15 µg/m	-
SO_2 *Monitor 1*	1 Hour	-	-	48	-	75 ppb	-
2443 South Jackson Avenue, Tulsa (Tulsa County)							
Lead *Monitor 6*	24 Hour	0.019	0.026	0.016	0.020 µg/m	0.15 µg/m	13
Lead *Monitor 7*	24 Hour	0.02	0.025	0.016	0.020 µg/m	0.15 µg/m	13
SO_2 *Monitor 1*	1 Hour	34	24	19	43 ppb	75 ppb	57
NE 10th and Stonewall, Oklahoma City (Oklahoma County)							
Nitrogen Dioxide	1 Hour	55	60	46	54 ppb	100 ppb	54
Ozone	**8-Hour Averaging End Hour**	**0.082**	**0.079**	**0.073**	**0.078 ppm**	**0.075 ppm**	**104**
207 Cherokee Boulevard, Roland (Sequoyah County)							
Nitrogen Dioxide *Monitor 1*	1 Hour	38	31	28	32 ppb	100 ppb	32
Ozone *Monitor 1*	8-Hour Averaging End Hour	0.073	0.077	0.067	0.072	0.075 ppm	96
$PM_{2.5}$ *Monitor 1*	24 Hour	23	22	22	22.3 µg/m	35 µg/m	64
	Annual Mean	11.6	10.2	9.7	10.5 µg/m	12 µg/m	88
$PM_{2.5}$ *Monitor 2*	24 Hour	22	23	-	22.5 µg/m	35 µg/m	64
	Annual Mean	11	10	-	10.5 µg/m	12 µg/m	88
814 Waldron Road, Durant (Bryan County)							
Ozone	8-Hour Averaging End Hour	-	-	0.069	-	0.075 ppm	-

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
Western Delaware Tribal Complex, Anadarko (Caddo County)							
Ozone *Monitor 1*	**8-Hour Averaging End Hour**	**0.084**	**0.078**	**0.065**	**0.076 ppm**	**0.075 ppm**	**101**
PM_{10} *Monitor 1*	24 Hour	47	-	-	-	150 µg/m	-
PM_{10} *Monitor 2*	24 Hour	47	-	-	-	150 µg/m	-
$PM_{2.5}$ *Monitor 1*	24 Hour	24	-	-	-	35 µg/m	-
	Annual Mean	11.3	-	-	-	12 µg/m	-
$PM_{2.5}$ *Monitor 2*	24 Hour	24	-	-	-	35 µg/m	-
	Annual Mean	11.3	-	-	-	12 µg/m	-
PO Box 948 Tahlequah, Park Hill (Cherokee County)							
Ozone	8-Hour Averaging End Hour	0.077	0.08	0.065	0.074 ppm	0.075 ppm	99
S.E. 19th Street, Moore (Cleveland County)							
Ozone	**8-Hour Averaging End Hour**	**0.081**	**0.079**	**0.069**	**0.076 ppm**	**0.075 ppm**	**101**
Professional Development Center, 2211 NW 25 Lawton, Lawton (Comanche County)							
Ozone	**8-Hour Averaging End Hour**	**0.079**	**0.08**	**0.072**	**0.077 ppm**	**0.075 ppm**	**103**
Mannford Water Plant, Mannford (Creek County)							
Ozone	**8-Hour Averaging End Hour**	**0.083**	**0.083**	**0.068**	**0.078 ppm**	**0.075 ppm**	**104**
Seiling Municipal Airport, Seiling (Dewey County)							
Ozone	8-Hour Averaging End Hour	0.078	0.076	0.069	0.074 ppm	0.075 ppm	99
Lake Waurika Corp. of Eng. Office, Waurika (Jefferson County)							
Ozone	**8-Hour Averaging End Hour**	**0.084**	**-**	**0.074**	**-**	**0.075 ppm**	**-**

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
North of Newkirk on Highway 77, East Home Road (not in a city; in Kay County)							
Ozone	**8-Hour Averaging End Hour**	**0.081**	**0.078**	**0.073**	**0.077 ppm**	**0.075 ppm**	**103**
Noble Foundation Red River Research Farm (not in a city; in Love County)							
Ozone	**8-Hour Averaging End Hour**	**-**	**-**	**0.078**	**-**	**0.075 ppm**	**-**
310 E. Burr Oak, Goldsby (McClain County)							
Ozone	8-Hour Averaging End Hour	0.08	0.076	0.066	0.074 ppm	0.075 ppm	99
Cherokee Heights Drive (not in a city; in Mayes County)							
Ozone	**8-Hour Averaging End Hour**	**0.083**	**0.088**	**0.065**	**0.079 ppm**	**0.075 ppm**	**105**
12880 A NE 10th, Choctaw (Oklahoma County)							
Ozone	**8-Hour Averaging End Hour**	**0.081**	**0.08**	**0.069**	**0.077**	**0.075 ppm**	**103**
Quapaw Tribe's Industrial Park, Miami (Ottawa County)							
Ozone	**8-Hour Averaging End Hour**	**0.079**	**0.083**	**0.066**	**0.076 ppm**	**0.075 ppm**	**101**
104 Airport Road, McAlester (Pittsburg County)							
Ozone	**8-Hour Averaging End Hour**	**0.078**	**0.076**	**0.071**	**0.075 ppm**	**0.075 ppm**	**100**
$PM_{2.5}$	24 Hour	20	19	21	20 µg/m	35 µg/m	57
	Annual Mean	10.4	9.6	9.7	9.9 µg/m	12 µg/m	83
Behind Environmental Office on Hardesty Road (not in a city; in Pottawatomie County)							
Ozone	8-Hour Averaging End Hour	-	-	0.065	-	0.075 ppm	-
1100 South Osage Drive, Skiatook (Tulsa County)							
Ozone	**8-Hour Averaging End Hour**	**0.085**	**0.084**	**0.071**	**0.08 ppm**	**0.075 ppm**	**107**

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
502 East 144th Place, Glenpool (Tulsa County)							
Ozone	**8-Hour Averaging End Hour**	**0.08**	**0.083**	**0.069**	**0.077 ppm**	**0.075 ppm**	**103**
18707 E. 21st Street, Tulsa (Tulsa County)							
Ozone	**8-Hour Averaging End Hour**	**0.082**	**0.082**	**0.068**	**0.077 ppm**	**0.075 ppm**	**103**
Muskogee City-County Port Authority, 5201 Three Forks Road (not in a city; in Muskogee County)							
PM_{10}	24 Hour	85	87	39	70 µg/m	150 µg/m	47
NW 5th and Shartel, Oklahoma City (Oklahoma County)							
PM_{10} *Monitor 1*	24 Hour	59	55	56	57 µg/m	150 µg/m	38
PM_{10} *Monitor 2*	24 Hour	62	43	52	52 µg/m	150 µg/m	35
$PM_{2.5}$ *Monitor 1*	24 Hour	22	19	19	20 µg/m	35 µg/m	57
	Annual Mean	10.2	9.8	9.1	9.7 µg/m	12 µg/m	81
$PM_{2.5}$ *Monitor 2*	24 Hour	22	17	-	-	35 µg/m	-
	Annual Mean	10.2	8.7	-	-	12 µg/m	-
306 E. Otoe, Ponca City (Kay County)							
SO_2	1 Hour	-	40	30	35 ppb	75 ppb	47
3500 Port Place, Muskogee (Muskogee County)							
SO_2	1 Hour	94	63	37	65 ppb	75 ppb	87
1710 West Charles Page Boulevard, Tulsa (Tulsa County)							
SO_2	1 Hour	68	55	42	55 ppb	75 ppb	73
1115 SE 9th Street, Pryor Creek (Mayes County)							
Lead	24 Hour	0.006	0.013	-	-	0.15 µg/m	-
1800 Airport Road, Healdton (Carter County)							
Ozone	**8-Hour Averaging End Hour**	**0.085**	**0.078**	**-**	**-**	**0.075 ppm**	**-**

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
3rd Street and Boundary, Walters (Cotton County)							
Ozone	**8-Hour Averaging End Hour**	**0.083**	**0.082**	**-**	**-**	**0.075 ppm**	**-**
HC 15 Box 72, Smithville (McCurtain County)							
Ozone	8-Hour Averaging End Hour	0.07	0.07	-	-	0.075 ppm	-
Site ID 401139020 (not in a city; in Osage County)							
Ozone	8-Hour Averaging End Hour	0.079	0.07	-	-	0.075 ppm	-
4616 E. 15th Street, Tulsa (Tulsa County)							
PM_{10} *Monitor 1*	24 Hour	96	139	-	-	150 µg/m	-
PM_{10} *Monitor 2*	24 Hour	70	110	-	-	150 µg/m	-
104 Gilcrease Road, Tulsa (Osage County)							
SO_2	1 Hour	45	58	-	-	75 ppb	-
2712 South Midwest Boulevard, Midwest City (Oklahoma County)							
Lead	24 Hour	0.005	-	-	-	0.15 µg/m	-
521 SE 1st Street, Pryor Creek (Mayes County)							
$PM_{2.5}$	24 Hour	8	-	-	-	35 µg/m	-
	Annual Mean	6.9	-	-	-	12 µg/m	-
901 Emporia, Muskogee (Muskogee County)							
$PM_{2.5}$	24 Hour	20	-	-	-	35 µg/m	-
	Annual Mean	11.7	-	-	-	12 µg/m	-
314 West Cleveland, Ponca City (Kay County)							
SO_2	1 Hour	34	-	-	-	75 ppb	-
Texas							
1415 Hinton Street, Dallas (Dallas County)							
Carbon Monoxide *Monitor 3*	1 Hour	1.7	1.8	2	1.8 ppm	35 ppm	5

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
	8-Hour Averaging End Hour	1.3	1.7	1.7	1.6 ppm	9 ppm	18
Ozone ***Monitor 3***	**8-Hour Averaging End Hour**	**0.084**	**0.087**	**0.081**	**0.084 ppm**	**0.075 ppm**	**112**
Lead *Monitor 1*	24 Hour	0.099	0.058	0.008	0.055 µg/m	0.15 µg/m	37
Nitrogen Dioxide *Monitor 2*	1 Hour	55	49	49	51 ppb	100 ppb	51
$PM_{2.5}$ *Monitor 1*	24 Hour	23	20	23	22 µg/m	35 µg/m	63
	Annual Mean	10.4	9.7	9.6	9.9 µg/m	12 µg/m	83
$PM_{2.5}$ *Monitor 2*	24 Hour	20	21	26	22 µg/m	35 µg/m	63
	Annual Mean	10.3	9.5	9.1	9.6 µg/m	12 µg/m	80
SO_2 *Monitor 3*	1 Hour	8	6	5	6 ppb	75 ppb	8
J Harold Tillman Hlt Court, 222 S. Campbell, El Paso (El Paso County)							
Carbon Monoxide *Monitor 1*	1 Hour	4.1	7.6	10.9	7.5 ppm	35 ppm	21
	8-Hour Averaging End Hour	2.4	4.4	2.8	3.2 ppm	9 ppm	36
Lead *Monitor 1*	24 Hour	0.162	0.055	0.065	0.094 µg/m	0.15 µg/m	63
Lead *Monitor 2*	24 Hour	0.04	0.097	0.048	0.062 µg/m	0.15 µg/m	41
PM_{10} *Monitor 2*	24 Hour	113	55	82	83 µg/m	150 µg/m	55
PM_{10} *Monitor 3*	24 Hour	119	54	57	77 µg/m	150 µg/m	51
Ivanhoe Fire Station, 10834 Ivanhoe, El Paso (El Paso County)							
Carbon Monoxide *Monitor 1*	1 Hour	2.3	6.2	10.8	6.4 ppm	35 ppm	18

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
	8-Hour Averaging End Hour	1.6	1.8	1.9	1.8 ppm	9 ppm	20
Ozone *Monitor 1*	8-Hour Averaging End Hour	0.066	0.057	0.06	0.061 ppm	0.075 ppm	81
PM_{10} *Monitor 1*	24 Hour	81	35	66	61 µg/m	150 µg/m	41
250 Rim Road, El Paso (El Paso County)							
Carbon Monoxide *Monitor 1*	1 Hour	2.3	2.9	3	2.7 ppm	35 ppm	8
	8-Hour Averaging End Hour	1.4	1.5	1.2	1.4 ppm	9 ppm	16
Lead *Monitor 1*	24 Hour	-	0.084	0.07	-	0.15 µg/m	-
Nitrogen Dioxide *Monitor 1*	1 Hour	61	53	51	55 ppb	100 ppb	55
Ozone *Monitor 2*	8-Hour Averaging End Hour	0.07	0.074	0.073	0.072 ppm	0.075 ppm	96
$PM_{2.5}$ *Monitor 1*	24 Hour	25	14	20	20 µg/m	35 µg/m	57
	Annual Mean	11.5	7.4	8.6	9.2 µg/m	12 µg/m	77
SO_2 *Monitor 1*	1 Hour	10	5	5	7 ppb	75 ppb	9
800 S San Marcial Street, El Paso (El Paso County)							
Carbon Monoxide *Monitor 2*	1 Hour	4.9	4.9	3.9	4.6 ppm	35 ppm	13
	8-Hour Averaging End Hour	2.8	3.8	2.4	3 ppm	9 ppm	33
Nitrogen Dioxide *Monitor 1*	1 Hour	63	64	56	61 ppb	100 ppb	61

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
Ozone *Monitor 1*	8-Hour Averaging End Hour	0.07	0.069	0.069	0.069 ppm	0.075 ppm	92
$PM_{2.5}$ *Monitor 1*	24 Hour	27	21	23	23.7 µg/m	35 µg/m	68
	Annual Mean	12	9.9	9.7	10.5 µg/m	12 µg/m	88
SO_2 *Monitor 1*	1 Hour	11	12	9	11 ppb	75 ppb	15
650 R E Thomason Loop, El Paso (El Paso County)							
Carbon Monoxide	1 Hour	4.3	4.2	4.3	4.3 ppm	35 ppm	12
	8-Hour Averaging End Hour	2.8	2.7	2.6	2.7 ppm	9 ppm	30
Lead	24 Hour	0.029	0.115	0.028	0.057 µg/m	0.15 µg/m	38
Nitrogen Dioxide	1 Hour	61	59	56	59 ppb	100 ppb	59
Ozone	8-Hour Averaging End Hour	0.068	0.065	0.06	0.064 ppm	0.075 ppm	85
5050a Yvette Drive, El Paso (El Paso County)							
Carbon Monoxide	1 Hour	1.8	2.7	1.2	1.9 ppm	35 ppm	5
	8-Hour Averaging End Hour	1	0.9	0.7	0.9 ppm	9 ppm	10
Lead	24 Hour	0.017	0.024	0.027	0.023 µg/m	0.15 µg/m	15
Ozone	8-Hour Averaging End Hour	0.071	0.068	0.066	0.068 ppm	0.075 ppm	91
SO_2	1 Hour	4	3	2	3 ppb	75 ppb	4
6767 Ojo De Agua, El Paso (El Paso County)							
Carbon Monoxide *Monitor 1*	1 Hour	-	-	1.1	-	35 ppm	-

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
	8-Hour Averaging End Hour	-	-	0.7	-	9 ppm	-
Lead *Monitor 1*	24 Hour	-	-	0.021	-	0.15 µg/m	-
Lead *Monitor 2*	24 Hour	-	-	0.021	-	0.15 µg/m	-
PM_{10} *Monitor 1*	24 Hour	-	-	56	-	150 µg/m	-
PM_{10} *Monitor 2*	24 Hour	-	-	50	-	150 µg/m	-
301 East Robinson, El Paso (El Paso County)							
Lead	24 Hour	0.039	0.046	-	-	0.15 µg/m	-
4510 ½ Aldine Mail Road (not in a city; in Harris County)							
Carbon Monoxide *Monitor 1*	1 Hour	1.8	2.5	3.9	2.7 ppm	35 ppm	8
	8-Hour Averaging End Hour	1.5	1.7	1.6	1.6 ppm	9 ppm	18
Nitrogen Dioxide *Monitor 1*	1 Hour	42	42	45	43 ppb	100 ppb	43
Ozone *Monitor 2*	**8-Hour Averaging End Hour**	**0.083**	**0.075**	**0.074**	**0.077 ppm**	**0.075 ppm**	**103**
PM_{10} *Monitor 3*	24 Hour	45	46	58	50 µg/m	150 µg/m	33
$PM_{2.5}$ *Monitor 5*	24 Hour	21	26	22	23 µg/m	35 µg/m	66
	Annual Mean	11.5	11.2	10.7	11.1 µg/m	12 µg/m	93
4401 ½ Lang Road, Houston (Harris County)							
Carbon Monoxide *Monitor 1*	1 Hour	2.6	2.7	3.2	2.8 ppm	35 ppm	8
	8-Hour Averaging End Hour	2.1	1.9	2.3	2.1 ppm	9 ppm	23

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
Nitrogen Dioxide *Monitor 1*	1 Hour	52	51	49	51 ppb	100 ppb	51
Ozone *Monitor 2*	**8-Hour Averaging End Hour**	**0.078**	**0.081**	**0.073**	**0.077 ppm**	**0.075 ppm**	**103**
PM_{10} *Monitor 1*	24 Hour	46	53	55	51 µg/m	150 µg/m	34
2311 Texas Avenue, Houston (Harris County)							
Carbon Monoxide	1 Hour	2.2	2	2.6	2.3 ppm	35 ppm	7
	8-Hour Averaging End Hour	1.7	1.5	1.8	1.7 ppm	9 ppm	19
Nitrogen Dioxide	1 Hour	60	60	58	59 ppb	100 ppb	59
Ozone	**8-Hour Averaging End Hour**	**0.079**	**0.082**	**0.072**	**0.078 ppm**	**0.075 ppm**	**104**
7421 Park Place Boulevard, Houston (Harris County)							
Carbon Monoxide	1 Hour	3.1	2.3	3.1	2.8 ppm	35 ppm	8
	8-Hour Averaging End Hour	2.2	1.5	1.7	1.8 ppm	9 ppm	20
Nitrogen Dioxide	1 Hour	54	53	57	55 ppb	100 ppb	55
Ozone	**8-Hour Averaging End Hour**	**0.079**	**0.077**	**0.074**	**0.077 ppm**	**0.075 ppm**	**103**
SO_2	1 Hour	34	26	35	32 ppb	75 ppb	43
9525 1/2 Clinton Drive, Houston (Harris County)							
Carbon Monoxide *Monitor 1*	1 Hour	1.5	1.4	1.8	1.6 ppm	35 ppm	5
	8-Hour Averaging End Hour	1.2	1.2	1.4	1.3 ppm	9 ppm	14

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
Nitrogen Dioxide *Monitor 1*	1 Hour	58	54	58	57 ppb	100 ppb	57
Ozone *Monitor 3*	**8-Hour Averaging End Hour**	**0.08**	**0.081**	**0.067**	**0.076 ppm**	**0.075 ppm**	**101**
PM_{10} *Monitor 1*	24 Hour	92	128	80	100 µg/m	150 µg/m	67
PM_{10} *Monitor 2*	24 Hour	79	104	76	86 µg/m	150 µg/m	57
$PM_{2.5}$ *Monitor 1*	24 Hour	23	23	22	23 µg/m	35 µg/m	66
	Annual Mean	12.2	11.7	11.2	11.7 µg/m	12 µg/m	98
$PM_{2.5}$ *Monitor 2*	24 Hour	22	31	22	25 µg/m	35 µg/m	71
	Annual Mean	**13.2**	**12.7**	**11.8**	**12.6 µg/m**	**12 µg/m**	**105**
SO_2 *Monitor 2*	1 Hour	41	29	21	30 ppb	75 ppb	40
4514 1/2 Durant Street, Deer Park (Harris County)							
Carbon Monoxide *Monitor 2*	1 Hour	1.5	1.3	1.9	1.6 ppm	35 ppm	5
	8-Hour Averaging End Hour	1	0.9	1.3	1.07 ppm	9 ppm	12
Lead *Monitor 1*	24 Hour	0.005	0.028	0.008	0.014 µg/m	0.15 µg/m	9
Nitrogen Dioxide *Monitor 1*	1 Hour	40	37	38	38 ppb	100 ppb	38
Ozone *Monitor 1*	**8-Hour Averaging End Hour**	**0.083**	**0.085**	**0.069**	**0.079 ppm**	**0.075 ppm**	**105**
PM_{10} *Monitor 1*	24 Hour	41	47	49	46 µg/m	150 µg/m	31
PM_{10} *Monitor 2*	24 Hour	41	47	44	44 µg/m	150 µg/m	29

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
$PM_{2.5}$ *Monitor 8*	24 Hour	-	-	16	-	35 µg/m	-
	Annual Mean	-	-	9	-	12 µg/m	-
SO_2 *Monitor 2*	1 Hour	27	23	9	20 ppb	75 ppb	27
4472 Mazanec Road, Waco (McLennan County)							
Carbon Monoxide	1 Hour	2.7	0.8	0.2	1.2 ppm	35 ppm	3
	8-Hour Averaging End Hour	1.1	0.5	0.3	0.63 ppm	9 ppm	7
Nitrogen Dioxide	1 Hour	32	26	24	27 ppb	100 ppb	27
Ozone	8-Hour Averaging End Hour	0.078	0.073	0.072	0.074 ppm	0.075 ppm	99
SO_2 *Monitor 1*	1 Hour	4	7	7	6 ppb	75 ppb	8
3317 Ross Avenue, Fort Worth (Tarrant County)							
Carbon Monoxide *Monitor 1*	1 Hour	1.5	1.5	2.2	1.7 ppm	35 ppm	5
	8-Hour Averaging End Hour	1.2	1.3	1.1	1.2 ppm	9 ppm	13
Nitrogen Dioxide *Monitor 1*	1 Hour	41	53	48	47 ppb	100 ppb	47
Ozone *Monitor 2*	**8-Hour Averaging End Hour**	**0.082**	**0.077**	**0.081**	**0.08 ppm**	**0.075 ppm**	**107**
$PM_{2.5}$ *Monitor 1*	24 Hour	22	22	26	23 µg/m	35 µg/m	66
	Annual Mean	10.7	10.5	10.4	10.5 µg/m	12 µg/m	88
5504 South Collins Street, Arlington (Tarrant County)							
Carbon Monoxide	1 Hour	1.4	1.6	1.4	1.5 ppm	35 ppm	4

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
	8-Hour Averaging End Hour	1	1	1	1 ppm	9 ppm	11
Nitrogen Dioxide	1 Hour	41	37	38	39 ppb	100 ppb	39
Ozone	**8-Hour Averaging End Hour**	**0.08**	**0.092**	**0.068**	**0.08 ppm**	**0.075 ppm**	**107**
3724 North Hills Drive, Austin (Travis County)							
Carbon Monoxide *Monitor 1*	1 Hour	0.7	0.8	0.6	0.7 ppm	35 ppm	2
	8-Hour Averaging End Hour	0.5	0.4	0.4	0.4 ppm	9 ppm	4
Nitrogen Dioxide *Monitor 2*	1 Hour	-	40	33	-	100 ppb	-
Ozone *Monitor 2*	8-Hour Averaging End Hour	0.075	0.074	0.069	0.073 ppm	0.075 ppm	97
SO_2 *Monitor 2*	1 Hour	-	5	5	-	75 ppb	-
1441 99th Street, San Antonio (Bexar County)							
Lead	24 Hour	-	0.058	0.043	0.05 µg/m	0.15 µg/m	33
7471 South 5th Street, Frisco (Collin County)							
Lead	**24 Hour**	**0.449**	**0.462**	**0.195**	**0.369 µg/m**	**0.15 µg/m**	**246**
6931 Ash Street, Frisco (Collin County)							
Lead *Monitor 1*	**24 Hour**	**0.627**	**0.262**	**0.055**	**0.315 µg/m**	**0.15 µg/m**	**210**
Lead *Monitor 2*	**24 Hour**	**0.587**	**0.246**	**0.061**	**0.298 µg/m**	**0.15 µg/m**	**199**
6601 Eubanks, Frisco (Collin County)							
Lead *Monitor 1*	**24 Hour**	**1.85**	**1.396**	**0.327**	**1.191 µg/m**	**0.15 µg/m**	**794**
Lead *Monitor 2*	**24 Hour**	**0.302**	**1.199**	**0.447**	**0.649 µg/m**	**0.15 µg/m**	**433**

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
7202 Stonebrook Parkway, Frisco (Collin County)							
Lead	**24 Hour**	**1.07**	**0.423**	**0.395**	**0.629 µg/m**	**0.15 µg/m**	**419**
1262 ½ Mae Drive, Houston (Harris County)							
Lead *Monitor 1*	24 Hour	0.016	0.009	0.011	0.012 µg/m	0.15 µg/m	8
Nitrogen Dioxide *Monitor 1*	1 Hour	53	53	54	53 ppb	100 ppb	53
Ozone *Monitor 2*	**8-Hour Averaging End Hour**	**0.082**	**0.083**	**0.069**	**0.078 ppm**	**0.075 ppm**	**104**
2988 Temtex Boulevard, Terrell (Kaufman County)							
Lead	**24 Hour**	**0.428**	**0.154**	**0.333**	**0.305 µg/m**	**0.15 µg/m**	**203**
7100 State Highway 136 (not in a city; in Potter County)							
Lead	24 Hour	0.081	0.079	0.008	0.056 µg/m	0.15 µg/m	37
6655 Bluebird Lane, Leon Valley (Bexar County)							
Nitrogen Dioxide *Monitor 1*	1 Hour	-	42	40	-	100 ppb	-
Ozone *Monitor 2*	**8-Hour Averaging End Hour**	**0.078**	**0.081**	**0.076**	**0.078 ppm**	**0.075 ppm**	**104**
$PM_{2.5}$ *Monitor 1*	24 Hour	26	18	26	23 µg/m	35 µg/m	66
	Annual Mean	9.7	8.7	8.3	8.9 µg/m	12 µg/m	74
14620 Laguna Road (not in a city; in Bexar County)							
Nitrogen Dioxide	1 Hour	35	34	35	35 ppb	100 ppb	35
Ozone	8-Hour Averaging End Hour	0.071	0.07	0.069	0.07 ppm	0.075 ppm	93
$PM_{2.5}$ *Monitor 1*	24 Hour	27	23	19	23 µg/m	35 µg/m	66
	Annual Mean	9.5	8.6	7.8	8.6 µg/m	12 µg/m	72

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
SO_2 *Monitor 1*	1 Hour	-	29	15	-	75 ppb	-
4503 Croix Parkway (not in a city; in Brazoria County)							
Nitrogen Dioxide	1 Hour	36	31	32	33 ppb	100 ppb	33
Ozone	**8-Hour Averaging End Hour**	**0.081**	**0.078**	**0.081**	**0.08 ppm**	**0.075 ppm**	**107**
109b Brazoria Highway 332 West, Lake Jackson (Brazoira County)							
Nitrogen Dioxide	1 Hour	20	19	22	20 ppb	100 ppb	20
Ozone	8-Hour Averaging End Hour	0.073	0.071	0.067	0.070 ppm	0.075 ppm	93
12532 ½ Nuestra Drive, Dallas (Dallas County)							
Nitrogen Dioxide	1 Hour	44	43	39	42 ppb	100 ppb	42
Ozone	**8-Hour Averaging End Hour**	**0.088**	**0.086**	**0.077**	**0.084 ppm**	**0.075 ppm**	**112**
PM_{10} *Monitor 1*	24 Hour	31	53	39	41 µg/m	150 µg/m	27
3277 W Redbird Lane, Dallas (Dallas County)							
Nitrogen Dioxide	1 Hour	53	47	39	46 ppb	100 ppb	46
Ozone	**8-Hour Averaging End Hour**	**0.082**	**0.085**	**0.074**	**0.080 ppm**	**0.075 ppm**	**107**
Denton Airport South, Denton (Denton County)							
Nitrogen Dioxide	1 Hour	37	40	39	29 ppb	100 ppb	29
Ozone	**8-Hour Averaging End Hour**	**0.095**	**0.081**	**0.085**	**0.087 ppm**	**0.075 ppm**	**116**
2725 Old Fort Worth Road, Midlothian (Ellis County)							
Nitrogen Dioxide *Monitor 1*	1 Hour	42	40	35	39 ppb	100 ppb	39

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
Ozone *Monitor 1*	**8-Hour Averaging End Hour**	**0.08**	**0.078**	**0.075**	**0.078 ppm**	**0.075 ppm**	**104**
$PM_{2.5}$ *Monitor 5*	24 Hour	20	23	25	23 µg/m	35 µg/m	66
	Annual Mean	10.2	10.1	8.9	9.7 µg/m	12 µg/m	81
SO_2 *Monitor 1*	1 Hour	11	15	16	14 ppb	75 ppb	19
900 Fm 667 Ellis County (not in a city; in Ellis County)							
Nitrogen Dioxide	1 Hour	33	30	29	29 ppb	100 ppb	29
Ozone	8-Hour Averaging End Hour	0.075	0.071	0.072	0.073 ppm	0.075 ppm	97
SO_2	1 Hour	6	6	8	7 ppb	75 ppb	93
9511 Avenue V ½, Galveston (Galveston County)							
Nitrogen Dioxide	1 Hour	28	29	32	30 ppb	100 ppb	30
Ozone	**8-Hour Averaging End Hour**	**0.079**	**0.081**	**0.064**	**0.075 ppm**	**0.075 ppm**	**100**
$PM_{2.5}$	24 Hour	-	-	27	-	35 µg/m	-
	Annual Mean	-	-	7.6	-	12 µg/m	-
1405 Sheldon Road, Channelview (Harris County)							
Nitrogen Dioxide *Monitor 2*	1 Hour	50	48	46	48 ppb	100 ppb	48
Ozone *Monitor 3*	8-Hour Averaging End Hour	0.081	0.077	0.061	0.073 ppm	0.075 ppm	97
16822 Kitzman (not in a city; in Harris County)							
Nitrogen Dioxide *Monitor 1*	1 Hour	29	26	28	28 ppb	100 ppb	28
Ozone *Monitor 2*	**8-Hour Averaging End Hour**	**0.086**	**0.081**	**0.08**	**0.082 ppm**	**0.075 ppm**	**109**

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
6400 Bissonnet Street, Houston (Harris County)							
Nitrogen Dioxide	1 Hour	45	43	44	44 ppb	100 ppb	44
Ozone	**8-Hour Averaging End Hour**	**0.087**	**0.077**	**0.078**	**0.081 ppm**	**0.075 ppm**	**108**
4407 Independence Parkway South, Houston (Harris County)							
Nitrogen Dioxide	1 Hour	55	55	53	54 ppb	100 ppb	54
Ozone	8-Hour Averaging End Hour	0.073	0.075	0.064	0.071 ppm	0.075 ppm	95
4522 Park Road, Seabrook (Harris County)							
Nitrogen Dioxide	1 Hour	32	35	29	32 ppb	100 ppb	32
Ozone	**8-Hour Averaging End Hour**	**0.079**	**0.086**	**0.067**	**0.077 ppm**	**0.075 ppm**	**103**
SO_2	1 Hour	15	12	9	12 ppb	75 ppb	16
Highway 134 and Spur 449 (not in a city; in Harrison County)							
Nitrogen Dioxide	1 Hour	28	20	19	22 ppb	100 ppb	22
Ozone	8-Hour Averaging End Hour	0.076	0.072	0.07	0.073 ppm	0.075 ppm	97
PM_{10}	24 Hour	32	36	53	40 µg/m	150 µg/m	27
$PM_{2.5}$	24 Hour	19	24	23	22 µg/m	35 µg/m	63
	Annual Mean	11.9	10.4	9.4	10.6 µg/m	12 µg/m	88
3790 S Houston Street, Kaufman (Kaufman County)							
Nitrogen Dioxide	1 Hour	33	26	28	29 ppb	100 ppb	29
Ozone	8-Hour Averaging End Hour	0.074	0.073	0.075	0.074 ppm	0.075 ppm	99
SO_2	1 Hour	13	10	15	13 ppb	75 ppb	17

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
9472a Highway 1484, Conroe (Montgomery County)							
Nitrogen Dioxide	1 Hour	30	26	25	27 ppb	100 ppb	27
Ozone	**8-Hour Averaging End Hour**	**0.08**	**0.082**	**0.075**	**0.079 ppm**	**0.075 ppm**	**105**
Corsicana Airport, Corsicana (Navarro County)							
Nitrogen Dioxide	1 Hour	31	28	28	29 ppb	100 ppb	29
Ozone	8-Hour Averaging End Hour	0.074	0.07	0.074	0.073 ppm	0.075 ppm	97
SO_2	1 Hour	51	33	30	38 ppb	75 ppb	51
4100 Fairway Drive, Grapevine (Tarrant County)							
Nitrogen Dioxide	1 Hour	42	46	43	44 ppb	100 ppb	44
Ozone	**8-Hour Averaging End Hour**	**0.091**	**0.086**	**0.083**	**0.087 ppm**	**0.075 ppm**	**116**
8406 Georgia Avenue, Temple (Bell County)							
Ozone	8-Hour Averaging End Hour	-	-	0.053	-	0.075 ppm	-
1605 Stone Tree Drive, Killeen (Bell County)							
Ozone	**8-Hour Averaging End Hour**	**0.075**	**0.078**	**0.071**	**0.075 ppm**	**0.075 ppm**	**100**
F Range (1,000 yard marker off Wilderness Trail; not in a city; in Bexar County)							
Ozone	**8-Hour Averaging End Hour**	**0.075**	**0.087**	**0.083**	**0.082 ppm**	**0.075 ppm**	**109**
Nitrogen Dioxide	1 Hour	28	25	-	-	100 ppb	-
6590 Hillcrest Road, Frisco (Collin County)							
Ozone	**8-Hour Averaging End Hour**	**0.091**	**0.084**	**0.078**	**0.084 ppm**	**0.075 ppm**	**112**

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
792 E. Northside Drive, Pilot Point (Denton County)							
Ozone	**8-Hour Averaging End Hour**	**0.091**	**0.078**	**0.084**	**0.084 ppm**	**0.075 ppm**	**112**
320 Old Hueco Tanks Road, Socorro (El Paso County)							
Carbon Monoxide *Monitor 1*	1 Hour	2.2	1.7	-	-	35 ppm	-
	8-Hour Averaging End Hour	1.3	1.2	-	-	9 ppm	-
Ozone *Monitor 1*	8-Hour Averaging End Hour	0.066	0.038	0.066	0.057 ppm	0.075 ppm	76
PM_{10} *Monitor 1*	24 Hour	95	46	137	93 µg/m	150 µg/m	62
PM_{10} *Monitor 2*	24 Hour	-	22	233	-	150 µg/m	-
7330 ½ North Wayside, Houston (Harris County)							
Ozone	**8-Hour Averaging End Hour**	**0.08**	**0.075**	**0.07**	**0.075 ppm**	**0.075 ppm**	**100**
SO_2	1 Hour	11	8	10	10 ppb	75 ppb	13
13826 ½ Croquet, Houston (Harris County)							
Ozone	**8-Hour Averaging End Hour**	**0.085**	**0.077**	**0.078**	**0.08 ppm**	**0.075 ppm**	**107**
SO_2	1 Hour	24	13	17	18 ppb	75 ppb	24
9726 ½ Monroe, Houston (Harris County)							
Ozone	**8-Hour Averaging End Hour**	**0.076**	**0.079**	**0.069**	**0.075 ppm**	**0.075 ppm**	**100**
PM_{10}	24 Hour	52	76	50	59 µg/m	150 µg/m	39
SO_2	1 Hour	21	12	15	16 ppb	75 ppb	21
3333 ½ Highway 6 South, Houston (Harris County)							
Ozone	**8-Hour Averaging End Hour**	**0.081**	**0.081**	**0.077**	**0.080 ppm**	**0.075 ppm**	**107**

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
PM_{10}	24 Hour	45	56	72	58 µg/m	150 µg/m	39
8622 Garth Road, Unit A (not in a city; in Harris County)							
Ozone	8-Hour Averaging End Hour	-	0.071	0.061	-	0.075 ppm	-
SO_2	1 Hour	-	9	8	-	75 ppb	-
Ozone	8-Hour Averaging End Hour	-	-	0.061	-	0.075 ppm	-
5425 Polk Avenue, Suite H, Houston (Harris County)							
Ozone	**8-Hour Averaging End Hour**	**0.08**	**0.075**	**-**	**-**	**0.075 ppm**	**-**
SO_2	1 Hour	25	16	-	-	75 ppb	-
1650 Airport Drive, Cleburne (Johnson County)							
Ozone	**8-Hour Averaging End Hour**	**0.079**	**0.082**	**0.077**	**0.079 ppm**	**0.075 ppm**	**105**
Corpus Christi State School (Airport Road), Corpus Christi (Nueces County)							
Ozone *Monitor 2*	8-Hour Averaging End Hour	0.075	0.069	0.066	0.07 ppm	0.075 ppm	93
SO_2 *Monitor 1*	1 Hour	9	5	7	7 ppb	75 ppb	9
9860 La Branch, Corpus Christi (Nueces County)							
Ozone	8-Hour Averaging End Hour	0.073	0.065	0.066	0.068 ppm	0.075 ppm	91
SO_2	1 Hour	10	4	4	6 ppb	75 ppb	8
3033 New Authon Road (not in a city; in Parker County)							
Ozone	**8-Hour Averaging End Hour**	**0.088**	**0.076**	**0.074**	**0.079 ppm**	**0.075 ppm**	**105**
Nitrogen Dioxide	1 Hour	26	23	-	-	100 ppb	-

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
361 Tombigbee Road (not in a city; in Polk County)							
Ozone	8-Hour Averaging End Hour	0.073	0.067	0.065	0.068 ppm	0.075 ppm	91
Palo Duro Canyon State Park (not in a city; in Randall County)							
Ozone	8-Hour Averaging End Hour	0.076	0.074	0.07	0.073 ppm	0.075 ppm	97
14290 Morris Dido Newark Road, Pecan Acres (Tarrant County)							
Ozone	**8-Hour Averaging End Hour**	**0.08**	**0.087**	**0.077**	**0.081 ppm**	**0.075 ppm**	**108**
Nitrogen Dioxide	1 Hour	41	41	-	-	100 ppb	-
FAA site off Alta Vista Road, Fort Worth (Tarrant County)							
Ozone *Monitor 2*	**8-Hour Averaging End Hour**	**0.097**	**0.079**	**0.08**	**0.085 ppm**	**0.075 ppm**	**113**
Nitrogen Dioxide *Monitor 1*	1 Hour	45	44	-	-	100 ppb	-
12200 Lime Creek Road (not in a city; in Travis County)							
Ozone *Monitor 1*	8-Hour Averaging End Hour	0.071	0.076	0.07	0.072 ppm	0.075 ppm	96
Nitrogen Dioxide *Monitor 1*	1 Hour	21	19	-	-	100 ppb	-
PM_{10} *Monitor 1*	24 Hour	33	32	51	39 µg/m	150 µg/m	26
$PM_{2.5}$ *Monitor 5*	24 Hour	21	17	24	21 µg/m	35 µg/m	60
	Annual Mean	8.3	7.8	7.2	7.8 µg/m	12 µg/m	65
16289 North Evans Road #2, Selma (Bexar County)							
PM_{10}	24 Hour	45	50	58	51 µg/m	150 µg/m	34
401 South Frio Street, San Antonio (Bexar County)							
PM_{10}	24 Hour	36	42	71	50 µg/m	150 µg/m	33

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
717 South Akard, Dallas (Dallas County)							
PM_{10} *Monitor 1*	24 Hour	49	63	76	63 µg/m	150 µg/m	42
PM_{10} *Monitor 2*	24 Hour	46	64	93	68 µg/m	150 µg/m	45
$PM_{2.5}$ *Monitor 5*	24 Hour	21	22	26	23 µg/m	35 µg/m	66
	Annual Mean	11.1	10.7	10.6	10.8 µg/m	12 µg/m	90
Earhart Elementary School, 3434 Bickers, Dallas (Dallas County)							
PM_{10}	24 Hour	57	62	77	65 µg/m	150 µg/m	43
Riverside High School, 301 Midway Drive, El Paso (El Paso County)							
PM_{10}	24 Hour	91	50	121	87 µg/m	150 µg/m	58
2700 Harrison Avenue, El Paso (El Paso)							
PM_{10}	24 Hour	60	39	60	53 µg/m	150 µg/m	35
2516 Texas Avenue, Texas City (Galveston County)							
PM_{10} *Monitor 1*	24 Hour	46	54	44	48 µg/m	150 µg/m	32
PM_{10} *Monitor 2*	24 Hour	47	54	46	49 µg/m	150 µg/m	33
SO_2 *Monitor 1*	1 Hour	26	11	10	16 ppb	75 ppb	21
1001 ½ Red Bluff, Pasadena (Harris County)							
PM_{10}	24 Hour	38	62	66	55 µg/m	150 µg/m	37
5707 Up River Road, Corpus Christi (Nueces County)							
PM_{10} *Monitor 1*	24 Hour	67	45	55	56 µg/m	150 µg/m	37
PM_{10} *Monitor 2*	24 Hour	68	53	52	58 µg/m	150 µg/m	39
$PM_{2.5}$ *Monitor 5*	24 Hour	26	25	26	26 µg/m	35 µg/m	74
	Annual Mean	9.3	9.6	9.2	9.4 µg/m	12 µg/m	78

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
8900 West Freeway, White Settlement (Tarrant County)							
PM_{10} *Monitor 1*	24 Hour	45	63	63	57 µg/m	150 µg/m	38
PM_{10} *Monitor 2*	24 Hour	40	66	57	54 µg/m	150 µg/m	36
2600b Webberville Road, Austin (Travis County)							
PM_{10} *Monitor 1*	24 Hour	33	28	57	39 µg/m	150 µg/m	26
$PM_{2.5}$ *Monitor 2*	24 Hour	22	23	27	24 µg/m	35 µg/m	69
	Annual Mean	10.6	10.1	8.2	9.6 µg/m	12 µg/m	80
2315 W 10th Street, Texarkana (Bowie County)							
$PM_{2.5}$	24 Hour	23	19	28	23 µg/m	35 µg/m	66
	Annual Mean	10.9	10.5	10.4	10.6 µg/m	12 µg/m	88
7210 ½ Bayway Drive, Baytown (Harris County)							
$PM_{2.5}$	24 Hour	21	22	21	21 µg/m	35 µg/m	60
	Annual Mean	11.9	10.6	9.6	10.7 µg/m	12 µg/m	89
3810 Huisache Street, Corpus Christi (Nueces County)							
$PM_{2.5}$ *Monitor 1*	24 Hour	23	41	29	31 µg/m	35 µg/m	89
	Annual Mean	9.9	10.6	9.6	10.0 µg/m	12 µg/m	83
$PM_{2.5}$ *Monitor 2*	24 Hour	29	26	28	28 µg/m	35 µg/m	80
	Annual Mean	10.3	9.7	9.8	9.9 µg/m	12 µg/m	83
SO_2 *Monitor 1*	1 Hour	18	13	4	12 ppb	75 ppb	16
600 ½ Congress Street, Fort Worth (Tarrant County)							
$PM_{2.5}$	24 Hour	23	21	26	23 µg/m	35 µg/m	66
	Annual Mean	10.7	10.5	10.5	10.6 µg/m	12 µg/m	88
4205 NE 24th Avenue, Amarillo (Potter County)							
SO_2	1 Hour	-	-	25	-	75 ppb	-

Table 2-4
Air Quality Monitoring Values in the Planning Area by State[1]

Pollutant	Averaging Time	2011	2012	2013	3-Year Average[1]	NAAQS	Percent of NAAQS[1]
700 West San Francisco Avenue, El Paso (El Paso County)							
Carbon Monoxide	1 Hour	5.1	3.7	-	-	35 ppm	-
	8-Hour Averaging End Hour	2.7	2	-	-	9 ppm	-
SO_2	1 Hour	11	8	-	-	75 ppb	-

Source: US EPA 2014c
*Exceptional events data are excluded.
[1]Monitored concentrations are the maximum second highest for 24-hour PM_{10}; the fourth highest daily maximum for 8-hour O_3; 98th percentile for 24-hour $PM_{2.5}$ and 1-hour NO_2; 99th percentile for 1-hour SO_2; highest for lead and 1-hour CO and 8-hour CO; and maximum arithmetic mean for annual $PM_{2.5}$. Average values for $PM_{2.5}$ are monitored for each year to determine three-year average.

Trends
The planning area is in attainment for most pollutants, but exceeds the NAAQS for ozone and lead in many of the counties in the planning area. Warm weather and drought over the past few years could have contributed to the exceedances in the NAAQS for ozone.

Forecast
Air pollutants, especially ozone, will continue to be a concern in the planning area. New sources of ozone precursor emissions, particularly from the oil and gas sector and electrical generating plants, continue to be proposed in the planning area. At the same time, federal, state, local, and tribal jurisdictions continue to seek ways to reduce emissions from these industries through voluntary and regulatory mechanisms. Climate scientists have predicted drought conditions and high temperatures, which could contribute to increased ozone exceedances in the future.

A driver to reduce ozone concentrations is to avoid designating the area as nonattainment for the ozone NAAQS. The EPA revised the ozone standard in 2008 to be more stringent; it issued a proposed rule in 2010 to further revise the 8-hour primary standard from 0.075 ppm to a lower level in the range of 0.060 to 0.070 ppm. Air monitoring concentration levels shown in **Table 2-4** for the past three years exceed the lower level of this proposed range. These levels also frequently exceed the original 0.075 ppm standard. The EPA is reviewing the ozone standard and must promulgate a new standard by the end of 2015, in accordance with court proceedings.

Key Features
No key features for air quality have been identified in the planning area.

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2.2.2 Climate

Climate is defined as the generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. Climate is both a driving force and a limiting factor for biological, ecological, and hydrologic processes, as well as for resource management of public lands.

Climate change is a statistically significant and long-term change in climate patterns. The terms climate change and global warming are often used interchangeably, although they are not the same thing. Climate change is any deviation from the average climate, whether warming or cooling, and can result from both natural and man-made sources. Natural contributors include fluctuations in solar radiation, volcanic eruptions, and plate tectonics. Global warming refers to the apparent warming of climate observed since the early twentieth century. It is primarily attributed to human activities, such as fossil fuel combustion, industrial processes, and land use changes.

Indicators

Greenhouse gases are chemical compounds in the earth's atmosphere. These compounds allow incoming, short-wave, solar radiation but absorb long-wave infrared radiation reemitted from the earth's surface, thereby trapping heat. The 2013 Intergovernmental Panel on Climate Change Fifth Assessment Report states that the atmospheric concentrations of well-mixed, long-lived greenhouse gases have increased to levels unprecedented in at least the last 800,000 years. Further, human influence has been detected in the warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes. It is 95 to 100 percent probable that human influence has been the dominant cause of the observed warming since the mid-twentieth century (Intergovernmental Panel on Climate Change 2013).

Greenhouse gases are carbon dioxide, methane, nitrous oxide, water vapor, and several trace gases. Some greenhouse gases, such as carbon dioxide, occur naturally and are emitted into the atmosphere through both natural processes and human activities; others are created and emitted solely through human activities. The greenhouse gases that enter the atmosphere due to human activities are the following:

- Carbon dioxide from burning fossil fuels, solid waste, and trees and wood products
- Methane emitted during the production and transport of coal, natural gas, and oil and by livestock grazing, deforestation, and agricultural practices
- Nitrous oxide from agricultural and industrial activities and the combustion of fossil fuels and solid waste
- Fluorinated gases, which result from a variety of industrial processes

Although greenhouse gas levels have varied for millennia (along with corresponding variations in climate), industrialization and burning of fossil carbon sources have caused greenhouse gas concentrations to increase measurably at a global scale. Because climate change is a global phenomenon, the degree of change and specific effects from these changes cannot be quantified at the regional or local scale.

Renewable and nonrenewable resource management actions could impact climate change due to greenhouse gas emissions and other human-caused effects. However, the assessment of greenhouse gas emissions and climate change is extremely complex. This is because of the inherent interrelationships among its sources, causation, mechanisms of action, and impacts.

Given the global and complex nature of climate change, it is not currently possible to link projected greenhouse gas emissions associated with any particular activity to specific environmental impacts at a specific site or location. The uncertainty in applying results from global climate models to the regional or local scale (a process known as downscaling) limits the ability to quantify potential future impacts from greenhouse gas emissions at this scale.

Current Condition

The planning area is classified as part of the Great Plains region. The climate of the planning area tends to be characterized by long hot summers and severe winters. Annual average temperatures in the Great Plains region range from 40 ºF to more than 70 ºF, with extremes as low as -70 ºF and as high as 121 ºF (National Climate Assessment 2014). Average annual rainfall tends to be less than 30 inches, with some areas receiving more than 50 inches and some receiving less than 15. The region tends to be susceptible to droughts (National Climate Assessment 2014).

Table 2-5, Average Temperatures and Precipitation in the Planning Area (1981-2010), shows monthly climate normal data for three representative cities in the planning area,

Table 2-5
Average Temperatures and Precipitation in the Planning Area (1981-2010)

Location	Average Maximum Temperature (°F)			Average Minimum Temperature (°F)			Average Precipitation (Inches)		
	Jan.	July	Annual	Jan.	July	Annual	Jan.	July	Annual
Wichita, Kansas	42.5	92.3	67.9	21.9	69.8	45.9	0.83	3.32	2.72
Galveston, Texas	61.0	89.2	76.4	45.1	77.9	62.8	3.69	3.85	3.59
Muskogee, Oklahoma	48.4	92.5	71.4	26.1	71.2	48.9	2.09	3.33	3.77
Falls City, Nebraska	36.0	88.8	63.9	17.0	66.3	41.75	0.65	5.04	2.90

Source: National Oceanic and Atmospheric Administration 2015

from 1981 to 2010. Climate normals are three-decade averages of climatological variables produced every ten years by the National Oceanic and Atmospheric Administration, National Climatic Data Center.

As of January 14, 2015, the White House and the EPA are seeking to use authority granted under 111(b) of the Clean Air Act to directly regulate methane emissions from the oil and gas industry. The oil and gas industry will need to reduce methane emissions by 40 to 45 percent from the 2012 levels by 2025. These reductions will apply to new, not existing, oil and gas sources (White House 2015). This could one day expand to include existing methane sources, through 111(d) of the Clean Air Act. This could impact greenhouse gas emissions in the planning area in the future. Additionally, methane and VOCs contribute to the creation of ozone, a greenhouse gas regulated by the NAAQS. (See **Section 2.2.1**, Air, for more information about NAAQS.) Reducing methane emissions could subsequently reduce ozone in the future.

Trends

Atmospheric concentrations of naturally emitted greenhouse gases have varied over time, and earth's climate has fluctuated accordingly. Since the beginning of the industrial revolution, human activities have increased greenhouse gas concentrations and introduced man-made compounds that act as greenhouse gases in the atmosphere.

In its latest report, the Intergovernmental Panel on Climate Change stated that the atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years (Intergovernmental Panel on Climate Change 2013). From preindustrial times until today, global average concentrations in the atmosphere have increased by around 40 percent for carbon dioxide, 150 percent for methane, and 20 percent for nitrous oxide (Intergovernmental Panel on Climate Change 2013).

Forecast

Climate changes over the past 100 years are well documented, and climate change is expected to continue. Fossil fuel combustion and other human-caused greenhouse gas-producing activities are ongoing, although public awareness and future regulations may reduce annual greenhouse gas emissions. Total US greenhouse gas emissions decreased from 2011 to 2012, largely due to reductions in power plant greenhouse gas emissions (EPA 2014a). Data from 2013 and 2014 are not yet available. Regulations such as the January 14, 2015, methane reduction discussed under *Current Conditions* are likely to contribute to similar reductions. However, due to the long atmospheric lifetime of most greenhouse gases, climate change impacts will continue to increase for many years after greenhouse gas emissions decrease (EPA 2013). Climate change may increase air pollution levels if temperatures increase and droughts are extended.

Over the past 100 years, annual temperature and precipitation have increased, and climate models predict that they will continue to increase through the twenty-first century. Extreme weather events such as severe drought and intense rainfall are also expected to increase in frequency (National Conference of State Legislatures 2008). Global mean surface temperature predictions from 2046 to 2065 range between an increase of 1.0°C (1.8°F) and 2.0°C (3.6°F). For 2081 through 2100, the projected global mean surface temperature increase is between 1.0°C (1.8°F) and 3.7°C (6.7°F; Intergovernmental Panel on Climate Change 2013).

In the Great Plains, climate change projections indicate that droughts, heat waves, and extreme rainfall would occur with greater frequency and intensity. This will likely result in challenges related to water quantity and agriculture (National Climate Assessment 2014). Currently, the southern portion of the Great Plains region has an average of seven days a year where maximum temperatures exceed 100 ºF. Mid-century projections show the number of days with temperatures exceeding 100 ºF will quadruple (National Climate Assessment 2014). Projections also show an increase in the length of dry spells in Texas and Oklahoma. Additionally, the sea level rise expected as a result of climate change would increase the potential for storms to damage the Gulf Coast of Texas (National Climate Assessment 2014).

Key Features

No key features have been identified for climate.

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2.2.3 Geology

Geologic resources are defined through descriptions of the geology of the planning area and identification of geologic hazards. Geologic hazards are adverse geologic conditions that are capable of causing damage or loss of property and life. Geologic information is used to evaluate the potential development of mineral resources and to regulate land uses based on slope stability and accessibility. Several geologic type localities and areas of paleontological significance occur in the planning area. Mineral occurrence and management is discussed in detail in **Section 2.3.2**, and paleontological resources are discussed in **Section 2.2.12**.

Indicators

Indicators of geologic change were not used due to the rate and unpredictability of geologic changes, from sedimentation over millions of years to sudden shifts in surface geology as a result of faulting. Instead, indicators were formed based on the potential effects of geologic hazards on management scenarios. As such the indicators are as follows:

- Location of the management activity to geologic hazards, including fault features and areas of repeat earthquake activity
- Occurrence of hydrogen sulfide

- Occurrence of overpressure zones
- Occurrence or zones of loss circulation
- Alterations to the structure, chemistry, or interaction of subterranean water resources due to geologic changes from natural and man-made occurrences

Current Condition

The planning area is composed of five geophysical provinces: the Central Lowlands, the Coastal Plains, the Great Plains, the Ouachita, and the Ozark Plateau (US Geological Survey [USGS] 1946).

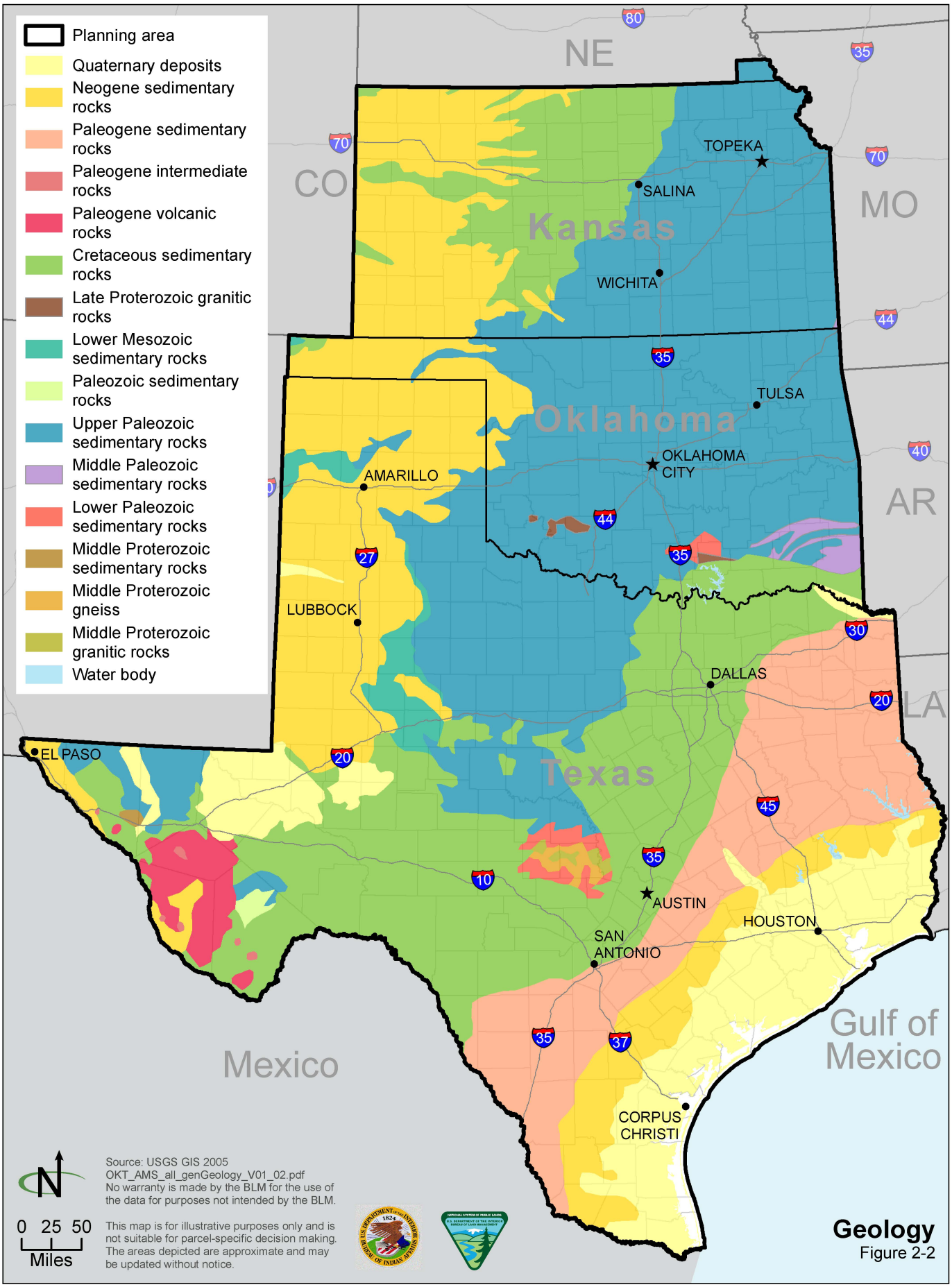
The Central Lowlands and Great Plains were once covered by a vast inland extension of the Gulf of Mexico. They are composed of sedimentary rock from material eroded from the Appalachian Mountains, the Rocky Mountains, and ancient upland areas near the Great Lakes (Lew 2004). The plains were under swampy conditions during the Carboniferous period; this has resulted in large deposits of coal, oil, and natural gas spanning from Texas through Alberta, Canada (Lew 2004).

The Coastal Plains were gradually built up by unconsolidated sediments washed out from the Appalachian Mountains, Central Lowlands, and Great Plains. The Coastal Plains are composed of successive layers of sedimentation, with swamps, marshes, and lagoons fronted by sand bars and reefs (Lew 2004).

The Ozark Plateau and Ouachita Mountains consist of a group of low mountains, sometimes referred to as the interior highlands. These features are the result of intense folding of sedimentary rocks and do not exceed 2,700 feet in elevation (Lew 2004).

The geology in the planning area is diverse, with rock deposits ranging from the late Proterozoic (540 to 2,500 million years ago) to Quaternary (present to 2 million years ago; see **Figure 2-2**). While the surface geology of the planning area is composed of sedimentary rocks deposited since the middle Proterozoic, the planning area is predominantly composed of the North American Craton, or continental crust, which has remained relatively stable for the last 600 million years. The geologic history of the planning area is discussed in detail in the forthcoming reasonable foreseeable development scenario (RFD) being prepared by the OFO (BLM 2015b)

Areas in the planning area with mineral potential are those of high, medium, and low oil and gas potential, coal deposits, evaporate deposits, and sand and gravel resources. Mineral potential and resources are discussed in **Section 2.3.2**, Energy and Minerals. There are several geological hazards associated with oil and gas deposits, including the presence of hydrogen sulfide, zones of loss circulation, overpressure zones, and the potential to impact subterranean water resources, mainly aquifers, by altering the feature or introduction of materials. The BLM manages fluid mineral development through its Oil and Gas Inspections and Enforcement Program. Through the program, BLM staff complete thousands of inspections per year on production, drilling, abandonment work



Geology
Figure 2-2

overs, records verifications, undesirable events, and alleged thefts. They also make environmental-based inspections. Additional geologic hazards in the planning area are earthquake hazards centralized in Oklahoma and fault features throughout the planning area.

Hydrogen Sulfide

Hydrogen sulfide (H_2S) is a colorless gas with the characteristic foul odor of rotten eggs. It is heavier than air, corrosive, flammable, explosive, and very poisonous. At low concentrations it can irritate the eyes and act as a depressant; at high concentrations it can irritate the upper respiratory tract and, during long exposure, lead to pulmonary edema (USGS 2010). A 30-minute exposure to 500 ppm results in headache, dizziness, excitement, staggering gait, and diarrhea, followed sometimes by bronchitis or bronchopneumonia (USGS 2010). 43 CFR part 3160 Onshore Oil and Gas Order No. 6, Hydrogen Sulfide Operations, delegates the BLM to protect public health and safety and personnel essential to maintain control of the well emitting H_2S. The order identifies national requirements and minimum standards of performance expected from operators when conducting operations involving oil or gas wells known to contain or, reasonably expected to contain, H_2S. These requirements and standards also pertain to the emission of SO_2 as a result of flaring H_2S. Corrective actions may be required for any violations that occur.

Overpressure Zones

Overpressure zones are areas where subsurface pressure is abnormally high and exceeds hydrostatic pressure at a given depth, usually in buried fluid-filled sediments. This could result in the rapid escape of the over-pressured fluids, leading to a well blowout, which can harm individuals on the drilling rig (Schlumberger 2015).

Zones of Loss Circulation

Lost circulation is the reduced or total absence of returning fluid flow during drilling, generally classified as seepage (less than 3 m^3/hr), partial loss returns (greater than 3 m^3/hr), and total loss returns, where no fluid returns (Schlumberger 2015). The loss of fluid generally translates into financial loss to the drilling company, well damage, and potential risk to the drilling rig and personnel. Depending on the area being drilled, the lost fluid could adversely affect karst resources or aquifers.

Groundwater

Additional federal and state regulations and restrictions are applied to the lease stipulations and applications for permit to drill in areas with known groundwater features. These areas are not considered geologic hazards, but are considered areas of heightened concern due to appropriate geology resulting in the existence of water resources. Water resources and their management are discussed in detail in **Section 2.2.6**, and the location of water resources in the planning area are shown in that section.

Fault and Earthquakes

Faults are discontinuous features in a volume or rock, typically expressed as a fracture or break, with a surficial expression fault line. Faults are rarely individual occurrences; they

are more typically formed in a fault zone and result when a body of rock breaks under stress, which most often manifests in an earthquake (see **Figure 2-3**).

Earthquakes are ground-shaking events that occur at various magnitudes as a result of movement within the earth's crust that releases seismic waves. Earthquakes can vary from slight tremors to building-collapsing events, as shown on the Modified Mercalli Intensity Scale (**Table 2-6**, Modified Mercalli Intensity Scale). Management for earthquake occurrence is at the county level and includes building code modifications to withstand earthquake activity.

Earthquake potential for the planning area is high, with the most violent earthquakes (see **Figure 2-4**) occurring in central Oklahoma, where peak horizontal acceleration reaches 40 to 50 percent. This means very strong perceived shaking and moderate to heavy damage to structures; it corresponds to a VIII on the Modified Mercalli Intensity scale. Since January 1, 2015, there have been 312 earthquakes with magnitudes of between 3 and 4.3; this corresponds to II to IV on the Modified Mercalli Intensity scale, or unfelt to moderately perceived shaking with no to very light damage (USGS 2015).

Trends

An increased understanding of area geology and geologic hazards can be expected as more knowledge is gained through oil and gas exploration and drilling and through geologic mapping.

Forecast

Additional subsurface geologic information should continue to be gathered over the next decade in relation to oil, gas, and coal exploration and development.

Key Features

Sound geologic information is used for effective planning for development of mineral resources and avoidance and mitigation for geologic hazards. The planning area has been assessed for mineral potential under the reasonably foreseeable development scenario. Geologic information should be gathered and shared to improve planning for development of other mineral resources and natural gas production.

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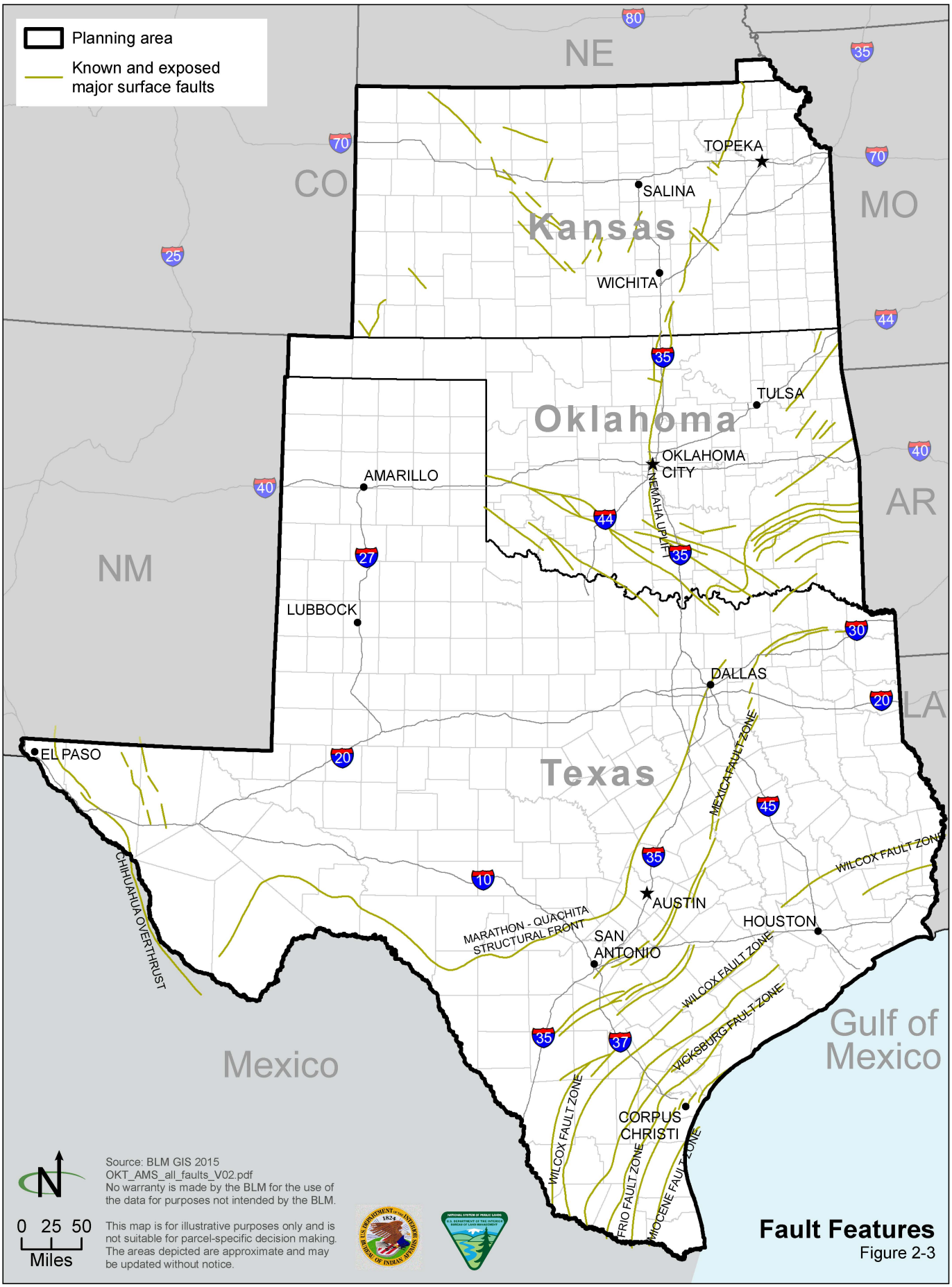
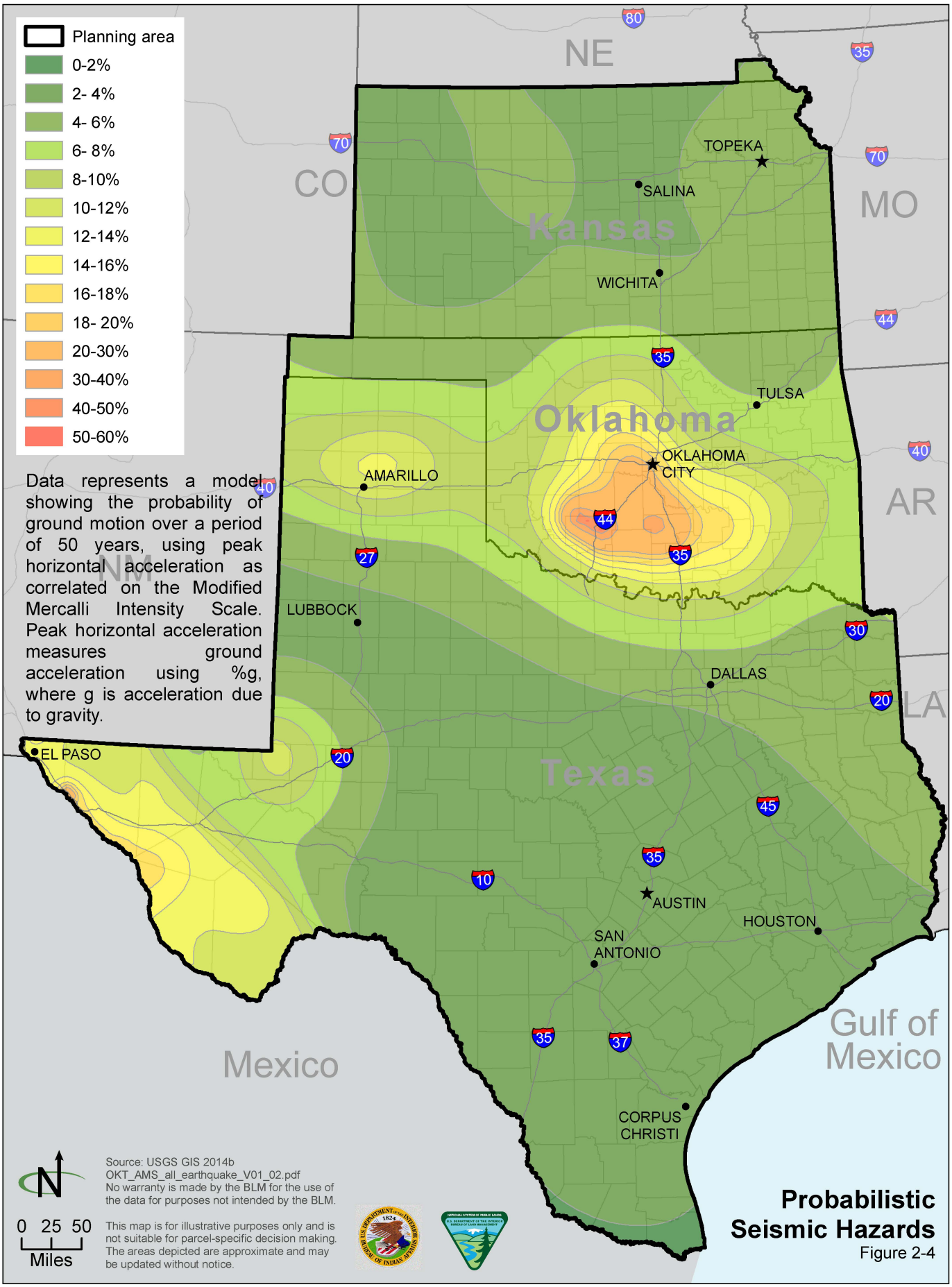


Fault Features
Figure 2-3



Probabilistic Seismic Hazards

Figure 2-4

Table 2-6
Modified Mercalli Intensity Scale

I Value	Peak Acceleration (g)	Perceived Shaking	Potential Damage	Full Description, Shortened from *Elementary Seismology*
I	<0.17	None felt	None	Not felt.
II	0.17-1.4	Weak	None	Felt by people seated or those on the upper floors of buildings.
III	0.17-0.14	Weak	None	Felt by almost all indoors. Hanging objects swing. Vibration is like of a passing light truck. It may not be recognized as an earthquake.
IV	1.4-3.9	Light	None	Vibration feels like a passing heavy truck. Stopped cars rock; hanging objects swing; windows, dishes, and doors rattle and glasses clink. In the upper range of IV, wooden walls and frames creak.
V	3.9-9.2	Moderate	Very Light	Felt outdoors. Sleepers are wakened. Liquids are disturbed, some spilled. Small unstable objects are displaced or upset. Doors swing; pictures move; pendulum clocks stop.
VI	9.2-18	Strong	Light	Felt by all. People walk unsteadily. Many become frightened. Windows crack; dishes, glassware, knickknacks, and books fall off shelves; pictures fall off walls; furniture is moved or overturned. Weak plaster, adobe buildings, and some poorly built masonry buildings crack. Trees and bushes shake visibly.
VII	18-34	Very Strong	Moderate	Difficult to stand or walk and is noticed by drivers. Furniture is broken. Poorly built masonry buildings are damaged. Weak chimneys break at roof line. Plaster, bricks, stones, tiles, cornices, unbraced parapets, and porches fall. Some cracks appear in better masonry buildings. Waves are generated on ponds.

Table 2-6
Modified Mercalli Intensity Scale

I Value	Peak Acceleration (g)	Perceived Shaking	Potential Damage	Full Description, Shortened from *Elementary Seismology*
VIII	34-65	Severe	Moderate/Heavy	Drivers' ability to steer is affected. Extensive damage to unreinforced masonry buildings, including partial collapse, and some masonry walls fall. Chimneys and monuments are twisted and fall. Wood-frame houses move on foundations if not bolted; loose partition walls are thrown out. Tree branches break.
IX	65-124	Violent	Heavy	General panic. Damage to masonry buildings ranges from collapse to serious damage, unless buildings are of modern design. Wood-frame structures rack and, if not bolted, shift off foundations. Underground pipes break.
X	>124	Extreme	Very	Poorly built structures are destroyed with their foundations. Even some well-built wooden structures and bridges are heavily damaged and need to be replaced. Water is thrown on water body banks.
XI	>124	Not mapped because these intensities are typically limited to areas with ground failure.		Rails are bent greatly. Underground pipelines are completely out of service.
XII	>124	Not mapped because these intensities are typically limited to areas with ground failure.		Damage is nearly total. Large rock masses are displaced. Lines of sight and level are distorted. Objects are thrown into the air.

Sources: USGS 2000; Richter 1958

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2.2.4 Soil Resources

Soils in the planning area are diverse. Soil development is influenced by the length of time the soil has been forming and the surrounding climate, topography, ecosystems, and organic and mineral material (parent material) deposited during formation. These variables create complex and diverse soil patterns that influence the use and management of the soil resource. They provide the foundation for other resources and resource uses.

The characteristics and distribution of soil types in the planning area affect the use and management of the land and the quality of surface water, air, forage, and tree growth. Soil characteristics are important to consider when siting construction activities, such as oil and gas well development, road construction, and building placement. They are also important considerations when planning recreation, such as off-highway vehicle (OHV) access and trail development, rangeland and timber stand improvements, surface water quality protection by minimizing erosion, and surface stabilization.

Indicators

Indicators are key soil characteristics that are sensitive to change in the environment. Indicators of soil resource condition (quality) can be categorized into four general groups: visual, physical, chemical, and biological. Visual indicators are those that are caused by environmental factors, such as wind or water. Physical indicators are related to the arrangement of solid particles and pores within the soils composition. The soil's chemical condition affects soil-plant relations, water quality, buffering capacities, availability of nutrients and water to plants and other organisms, mobility of contaminants, and some physical conditions, such as the tendency for crust to form. Biological indicators reflect activities of living organisms and their influence on soil health.

The BLM uses indicators for soil resources in the planning area to determine soil and site stability. Examples of these indicators are as follows:

- Erodibility—Sensitivity of the soil structure to the effects of wind and water or susceptibility of soil to erosion
- Visual—Exposure of subsoil, change in soil color, ephemeral gullies, ponding, runoff, plant response, weed species, blowing soil, plant roots exposed, and deposition
- Physical—Depth, bulk density, porosity, aggregate stability, texture, crusting, and compaction. Physical indicators primarily reflect limitations to root growth, seedling emergence, infiltration, and movement of water within the soil profile
- Chemical—pH, salinity, organic matter, cation-exchange capacity, nutrient cycling, and the concentrations of elements that may be potential contaminants or those that are needed for plant growth and development, and chemical composition that results in corrosive soils
- Biological—Measurements of microorganisms and macroorganisms, their activity, and byproducts

The BIA uses its branch of Agricultural and Rangeland Development to preserve natural resources on trust lands and shared off-reservation resources under the authority of the American Indian Agricultural Resource Management Act (Public Law 103-177) and the Indian Self Determination Act (Public Law 93-638). Preservation of these natural resources includes conducting soil and range inventories to collect data on soil productivity, erosion, and stability problems and other physical land factors. These data are used for program development, conservation planning, and water rights claim settlements (BIA 2015). The indicators assessed for soil resource productivity are the same as those described above.

Current Condition

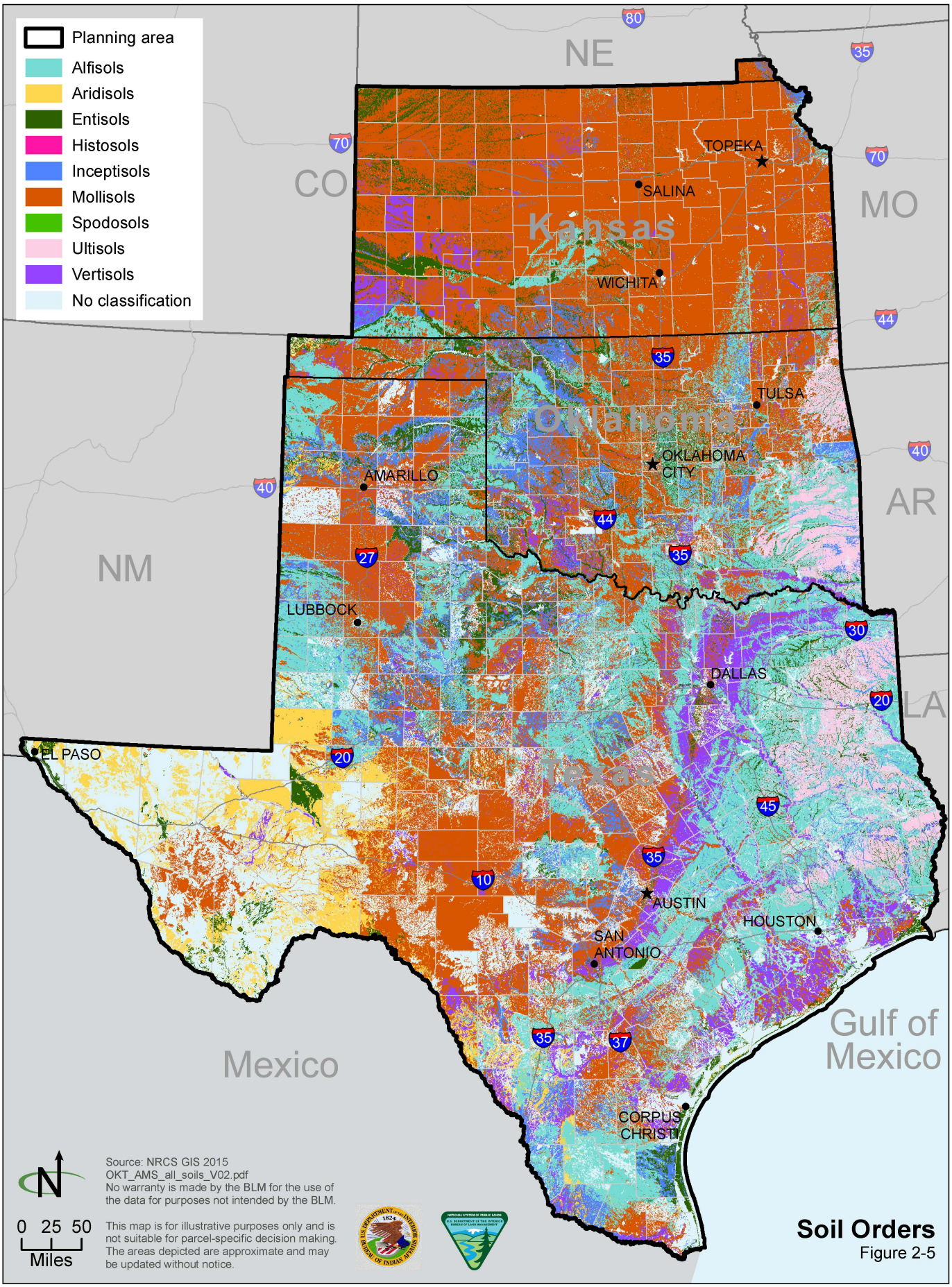
To broadly characterize the soils in the planning area, the highest level of soil taxonomy—soil orders—were used. Soils are classified into 12 soil orders, and have been mapped for the US by the USDA, Natural Resources Conservation Service (NRCS). Seven of the soil orders are found in the decision area (NRCS 2015a): mollisols, alfisols, aridisols, inceptisols, entisols, ultisols, and vertisols (see **Table 2-7** and **Figure 2-5**, Soil Orders). Miscellaneous or null areas have little or no soil material and thus support scant or no vegetation, for example rock outcrops. Additionally these areas may be water features, such as reservoirs. The composition of soil series in each association is variable and is based on the overall map unit.

Alfisols have clay-enriched subsoils and are also important for agricultural production. They are considered to be fertile, but their nutrients may be moderately leached or have been lost (University of Idaho 2013).

Table 2-7
Soil Orders in the Decision Area

Soil Order	BLM-Administered Surface Lands	BLM-Administered Federal Mineral Estate	BIA-Administered Tribal And Allotted Lands	BIA-Administered Tribal and Allotted Subsurface Minerals Estate
Kansas				
Alfisols	0	12,100	20	20
Entisols	0	73,100	600	600
Inceptisols	0	2,700	300	300
Mollisols	0	409,100	28,900	28,900
Vertisols	0	10,900	0	0
Null	0	160,800	10	10
Nebraska				
Alfisols	0	0	10	10
Entisols	0	0	100	100
Inceptisols	0	0	100	100
Mollisols	0	0	700	700
Oklahoma				
Alfisols	100	434,800	181,500	811,500
Entisols	25,500	177,400	90,300	141,300
Inceptisols	50	68,000	81,800	266,100
Mollisols	400	381,300	338,200	1,134,900
Utisols	0	195,000	55,600	72,800
Vertisols	50	36,500	36,600	86,600
Null	8,900	612,500	32,500	96,500
Texas				
Alfisols	800	299,600	1,600	1,700
Aridosols	0	65,400	0	0
Entisols	400	220,500	600	700
Inceptisols	1,800	96,000	1,800	1,800
Mollisols	8,400	366,900	80	80
Utisols	0	43,100	900	900
Vertisols	0	187,900	80	80
Null	500	890,100	900	900

Source: NRCS GIS 2015



Soil Orders
Figure 2-5

Aridisols are calcium carbonate-containing soils that are characterized as dry most of the year. As a result, aridisols have limited leaching and so have a subsurface horizon in which clays, calcium carbonate, silica, salts, and gypsum can accumulate (University of Idaho 2013).

Entisols are a catch-all for soils that do not fit in the other eleven soil orders. They are described as new soils developed in unconsolidated parent material that usually do not have genetic horizons, except for horizon A (University of Idaho 2013).

Inceptisols are soils that exhibit minimal horizon development. They are slightly more developed than entisols but still lack the features and characteristics of other soil orders. They are often found on fairly steep slopes, on young geomorphic surfaces, and on erosion-resistant parent materials (University of Idaho 2013). Mollisols are soils that have a dark-colored surface horizon. They are fertile or have a high capacity to support plant growth due to appropriate chemical, physical, and biological characteristics. These qualities are attributable to the long-term addition of organic materials derived from plant roots (University of Idaho 2013). As such, mollisols are considered to be among the most important and productive agricultural soils.

Ultisols are strongly leached, acid forest soils with relatively low fertility. They are found in older stable landscapes where primary minerals have weathered intensely and much of the calcium, magnesium, and potassium have leached out (University of Idaho 2013).

Finally, vertisols are clay-rich soils with high shrink and swell potential. This prevents the formation of distinct and well-developed horizons and can create serious engineering problems (University of Idaho 2013).

The NRCS has also conducted soils surveys and classified soils into map units broken out by land resource region at a scale of 1:10,000,000, major land resource areas at a scale of 1:7,500,000, and land resource units at a scale of 1:250,000. These units are derived from the aggregation of map units from the State Soils Geographic database. Map units are identified during soil surveys at the county level, which can be used for management involving site-specific disturbance. Soil map units may be designated based on the soil's series, slope, aspect, or texture. Soil series are two or more geographically associated soils that have similar formation, chemistry, or physical properties. Examples of soil series properties are runoff capabilities, erosion hazards, associated native vegetation, wildlife habitat, and suitability for community development. In the planning area there are eight land resource regions, comprising 49 major land resource areas (Center for Environmental Informatics 2015) and over 1,200 different map units, consisting of associations of different major soil series, as found in the NRCS SURRGO2 Data.

Ecological site descriptions were subsequently developed for the soils in each major land resource areas (NRCS 2015b). Ecological site descriptions are a description of the original or natural plant community that can be supported at a given site based on multiple environmental factors, such as soils, topography, climate, and fire. State and transition models have been developed for some areas and are being developed in others.

State and transition models describe the variability of a particular site and can help determine if an ecological threshold has been crossed. This type of knowledge can be invaluable for habitat restoration and surface management planning.

Trends

Localized impacts on soil resources may develop as a result of increased mineral activity, OHV and other recreation use, recreation facilities development, such as trails or campgrounds, livestock grazing, and right-of-way (ROW) development. Increased mineral development, recreation, and the continued dependence on other natural resources would place an increased demand on public lands and the soil resource.

The most significant regional or national demand placed on soils in the planning area results from the development of fluid and nonfluid mineral resources. Minerals extraction generally involves disturbing the surface and impacting soil resources; it can be long term. Disturbance is associated with such activities as pipeline installation, power line construction, seismic exploration, and exploratory drilling. The development of ROWs can include a number of surface-disturbing activities, such as road building, trenching, and construction site clearing.

All of these activities have the potential to create both short- and long-term impacts on soils. The cumulative amount of surface disturbance or vegetative manipulation that can be supported by soils in the planning area has not been determined. However, it is widely recognized that there is a limit to the level of disturbance that can accumulate in any watershed before natural flow conditions are significantly affected. The initial disturbance caused by these activities creates the larger impact; over the long term these disturbance values diminish due to the estimated results of such best management practices as interim reclamation over the life of the plan.

The effects of climate change on soil resource may be subtle and could be difficult to detect until a change threshold has been crossed. Land uses could result in greater impacts on the soil resource. This would be the case particularly of those lands with surface disturbance, when combined with warmer temperatures and changes in rainfall and runoff and the resulting shifts in vegetative communities.

Forecast

Soil resources are currently evaluated case-by-case in NEPA documents. This may or may not adequately provide for future protection of the resource. The degree of degradation to soils is expected to be high under current management.

Key Features

Demands are placed on soil resources when other resources are developed. The most significant regional or national demand placed on soils in the planning area results from the development of fluid and nonfluid mineral resources. Soil can be disturbed by a variety of surface uses, such as livestock grazing, OHV use, recreation facilities development, such as trails and campgrounds, and ROW and mineral development. The initial disturbances are generally offset through the use of conditions of approval, best

management practices, and other mitigation measures assessed and assigned through NEPA and the permitting process.

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2.2.5 Water Resources

The State of Kansas uses its water plan (2009) to coordinate the management, conservation, and development of its water resources. It recommends ways that the state can best achieve the proper use and control of water resources and contains hydrologic, climatic, and demographic characteristics. It also contains the following statewide management categories and policies:

- Water resource objectives
- Water management and conservation
- Public water supply and quality

- Flood, wetland, and riparian management
- Water-based recreation
- Data and research
- Public information and education
- Enhanced stream corridor and wetland management to address reservoir sedimentation

Additionally, the state water plan contains twelve river basin plans (containing basin plan description, basin management categories, and basin priority issues). Also included is a Kansas water plan atlas, containing statewide and basin-specific maps illustrating various resource conditions (Kansas Water Office 2015). The Kansas Water Office, in coordination with local, state, federal, and interstate partners, is developing the five-year update of the Kansas Water Plan.

The Oklahoma Comprehensive Water Plan contains technical data, information, and policy recommendations manifested in an executive report, 13 companion watershed planning region reports, and many additional technical study findings and reports. The final 2012 Oklahoma Comprehensive Water Plan Update Executive Report serves as a concise compilation of technical and policy information. In addition to background information on water planning and management in Oklahoma, the executive report includes a statewide assessment of water supplies, future projections of demand, and potential options to alleviate anticipated deficits of particular concern.

Thirteen regional planning reports, including 82 basin/watershed reports, provide the major technical component of the 2012 Oklahoma Comprehensive Water Plan Update. Each watershed planning region report presents information from both a regional and local perspective, including water supply and demand analysis results, forecasted water supply shortages, potential supply solutions and alternatives, and supporting technical information (Oklahoma Water Resources Board 2015).

In addition to incorporating the regional water plans, the 2012 State Water Plan in Texas serves as a guide to state water policy and includes legislative recommendations that the Texas Water Development Board believes are needed and desirable to facilitate voluntary water transfers. The plan also identifies river and stream segments of unique ecological value and sites of unique value for the construction of reservoirs that the Texas Water Development Board recommends for protection (Texas Water Development Board 2015a).

The primary message of Texas's 2012 water plan is that in serious drought conditions, Texas does not and will not have enough water to meet the needs of its people, its businesses, and its agricultural enterprises. The plan presents the information regarding the recommended conservation and other types of water management strategies that would be necessary to meet the state's needs in drought conditions, the cost of such strategies, and estimates of the state's financial assistance that would be required to

implement these strategies. The plan contains descriptions of population and water demand projections, climate, water supplies, water supply needs, and water management strategies Texas (Water Development Board. 2015b).

Indicators

Indicators of water resources are as follows:

- State and federal water quality standards
- Water supply
- BLM rangeland health standards

Current Condition

Precipitation

Precipitation, as rain and snow, is the primary source of water in Kansas and Nebraska. Average annual precipitation from 1951 to 1980 increases from west to east and ranges from about 16 to 40 inches in Kansas. The climate of the western third of Kansas and Nebraska, where the average annual precipitation generally is less than 20 inches per year, is considered to be semiarid. This area receives little precipitation chiefly because it is distant from the Gulf of Mexico, which is the principal source of moisture-laden air for the Kansas, Missouri, and Nebraska area. Scant precipitation is also partly because the area is in the rain shadow of the Rocky Mountains.

Much of the precipitation is returned to the atmosphere by evapotranspiration. Some of the precipitation either flows directly into streams as overland runoff or percolates into the soil. Then it moves downward into aquifers, where it is stored for a time and subsequently released as base flow to streams. Average annual runoff (the total discharge into a stream from surface and groundwater sources) increases from west to east and ranges from about 0.2 inch to 5 inches in Kansas. Runoff is less than precipitation everywhere. Evapotranspiration rates are high, especially in the western three-quarters of Kansas. Only a small percentage of the precipitation is available to recharge aquifers in most places (Miller and Appel 1997).

Precipitation is the source of all the water in Oklahoma and Texas. Average annual precipitation ranges from about 8 inches per year in southwestern Texas to about 56 inches per year in southeastern Texas. In general, precipitation increases rather uniformly from west to east in the two states. Much of the precipitation flows in one of two ways: directly into rivers and streams as overland runoff or indirectly as base flow that discharges from aquifers where the water has been stored for some time.

Average annual runoff in the two-state area ranges from about 0.2 inch in the western part of the Oklahoma panhandle and parts of west Texas to about 20 inches in southeastern Oklahoma. Precipitation is greater than runoff everywhere in the two states. Much of the precipitation that falls is returned to the atmosphere by evapotranspiration.

Part of the precipitation percolates downward through the soil and permeable rocks and is available for aquifer recharge throughout the area (Ryder 1996).

Surface Water

Watersheds in the US were delineated by the USGS using a national standard hierarchical system. This is based on surface hydrologic features and are classified into hydrologic units: first field (region), second field (subregion), third field (accounting unit), and fourth field (cataloguing unit). Each hydrologic unit is identified by a unique hydrologic unit code: 2-digit (region), 4-digit (subregion), 6-digit (accounting unit), and 8-digit (cataloging unit).

The planning area is in Region 11 Arkansas-White-Red and Region 12 Texas-Gulf. The Arkansas River, White River, and Red River drain eastward toward the Mississippi River in Region 11. Rivers in Region 12 drain southeastward toward the Gulf of Mexico.

The second level of classification divides the regions into subregions. The third level of classification further subdivides many of the subregions into accounting units. The accounting units nest in or are equivalent to the subregions. The fourth level of classification is the cataloging unit, which subdivides the subregions and accounting units into smaller areas.

A cataloging unit is a geographic area representing part or all of a surface drainage basin, a combination of drainage basins, or a distinct hydrologic feature (USGS 2015). Cataloging units sometimes are called watersheds. A cataloguing unit is the most widely used hydrological unit in water resource planning, management, and policy (Daniels et al., undated). Due to the large number of watersheds in Kansas, Oklahoma, and Texas, accounting units are provided in **Table 2-8**, Hydrologic Accounting Units in the BLM Decision Area; the accounting units are shown in **Figure 2-6**.

The Southern Great Plains Rapid Ecoregional Assessment—Pre-assessment report (Assal et al. 2015) covers eastern Colorado and New Mexico, western Kansas and Oklahoma, and northern Texas. Streams and rivers of the Southern Great Plains ecoregion are highly variable in size, type, and flow patterns. Their hydrologic and geomorphic characteristics, however, change progressively along a predictable and consistent gradient from their headwaters to the main-stem rivers. Small headwater streams of the Southern Great Plains undergo intermittent channel drying, especially in areas that lack the groundwater springs that typically promote more consistent flows.

The drainage area of medium-sized reaches in the middle sections of a watershed can be engulfed by storms and thus are more prone to flooding than the upper reaches. In contrast, most of the large main-stem rivers in the Southern Great Plains are buffered against all but the largest flood events by virtue of their floodplains, where water can dissipate laterally when large flows do occur. These larger river sections also are less likely to undergo periods of channel drying than upstream sections.

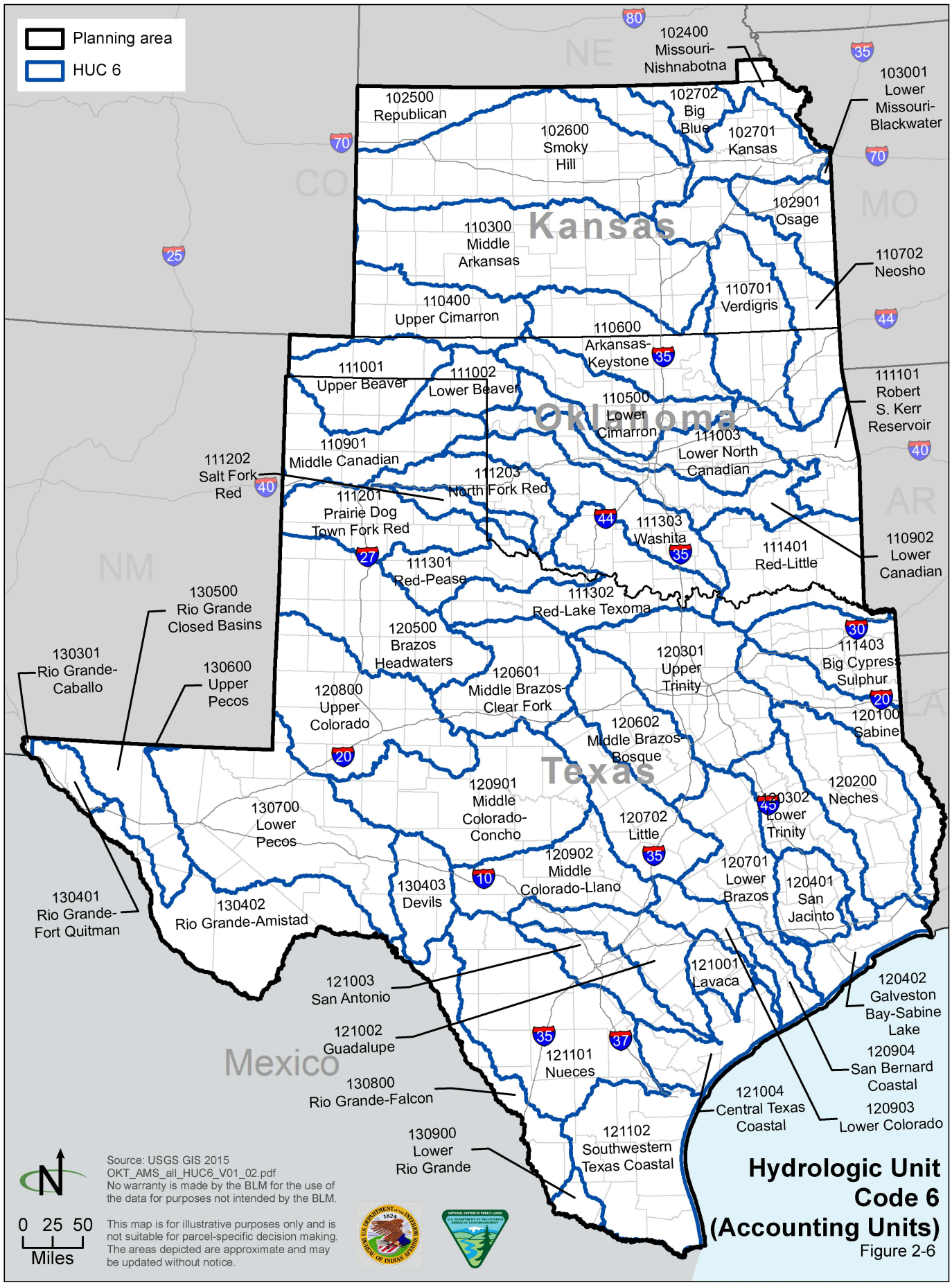
Table 2-8
Hydrologic Accounting Units in the BLM Decision Area

Accounting Unit Name	Acres of BLM-Administered Surface Land	Acres of BLM-Administered Federal Mineral Estate
Kansas		
Arkansas-Keystone	0	3,700
Big Blue	0	35,300
Kansas	0	122,100
Lower Cimarron	0	0
Middle Arkansas	0	93,900
Missouri-Nishnabotna	0	200
Neosho	0	49,300
Osage	0	56,200
Republican	0	104,200
Smoky Hill	0	143,500
Upper Beaver	0	100
Upper Cimarron	0	14,200
Verdigris	0	46,956
Oklahoma		
Arkansas-Keystone	50	55,700
Lower Beaver	0	14,300
Lower Canadian	1,600	288,200
Lower Cimarron	700	76,600
Lower North Canadian	30	110,500
Middle Canadian	0	100
Neosho	0	86,800
North Fork Red	500	64,300
Prairie Dog Town Fork Red	0	300
Red-Lake Texoma	3,500	262,500
Red-Little	0	230,100
Red-Pease	7,000	9,900
Robert S. Kerr Reservoir	0	435,200
Salt Fork Red	10	9,100
Upper Beaver	70	22,300
Upper Cimarron	10	7,700
Verdigris	0	82,700
Washita	100	128,700
Texas		
Big Cypress-Sulphur	0	295,800
Brazos Headwaters	0	2,300
Central Texas Coastal	0	112,500
Devils	0	36,600
Galveston Bay-Sabine Lake	0	7,900
Guadalupe	0	15,400

Table 2-8
Hydrologic Accounting Units in the BLM Decision Area

Accounting Unit Name	Acres of BLM-Administered Surface Land	Acres of BLM-Administered Federal Mineral Estate
Lavaca	0	16,300
Little	0	300,500
Lower Beaver	0	0
Lower Brazos	0	41,500
Lower Canadian	0	20
Lower Colorado	0	12,000
Lower Pecos	0	2,300
Lower Rio Grande	0	37,300
Lower Trinity	0	1,900
Middle Brazos-Bosque	0	101,600
Middle Brazos-Clear Fork	0	5,400
Middle Canadian	11,800	59,800
Middle Colorado-Concho	0	31,100
Middle Colorado-Llano	0	3,200
Neches	0	218,600
North Fork Red	40	21,800
Nueces	0	27,200
Prairie Dog Town Fork Red	0	2,600
Red-Lake Texoma	3,300	53,600
Red-Little	0	35,000
Red-Pease	18,100	18,200
Rio Grande Closed Basins	0	25,600
Rio Grande-Amistad	0	28,300
Rio Grande-Falcon	0	46,000
Rio Grande-Fort Quitman	0	90,700
Sabine	0	38,200
Salt Fork Red	0	100
San Antonio	0	31,000
San Bernard Coastal	0	43,200
San Jacinto	0	45,000
Southwestern Texas Coastal	0	162,300
Upper Beaver	0	400
Upper Trinity	0	220,600
Washita	50	200

Source: USGS GIS 2015


Planning area
HUC 6
NE
CO
MO
AR
NM
LA
Kansas
Oklahoma
Texas
Mexico
102400 Missouri-Nishnabotna
103001 Lower Missouri-Blackwater
102500 Republican
102702 Big Blue
102701 Kansas
102600 Smoky Hill
102901 Osage
110300 Middle Arkansas
110702 Neosho
110701 Verdigris
110400 Upper Cimarron
110600 Arkansas-Keystone
111001 Upper Beaver
111002 Lower Beaver
111101 Robert S. Kerr Reservoir
110500 Lower Cimarron
111003 Lower North Canadian
110901 Middle Canadian
111202 Salt Fork Red
111203 North Fork Red
111201 Prairie Dog Town Fork Red
111303 Washita
111401 Red-Little
110902 Lower Canadian
111301 Red-Pease
111302 Red-Lake Texoma
130500 Rio Grande Closed Basins
120500 Brazos Headwaters
111403 Big Cypress-Sulphur
130301 Rio Grande-Caballo
130600 Upper Pecos
120301 Upper Trinity
120601 Middle Brazos-Clear Fork
120800 Upper Colorado
120100 Sabine
120602 Middle Brazos-Bosque
120901 Middle Colorado-Concho
120200 Neches
130700 Lower Pecos
120302 Lower Trinity
120702 Little
120902 Middle Colorado-Llano
120701 Lower Brazos
120401 San Jacinto
130403 Devils
130401 Rio Grande-Fort Quitman
130402 Rio Grande-Amistad
121001 Lavaca
121003 San Antonio
120402 Galveston Bay-Sabine Lake
121002 Guadalupe
121101 Nueces
120904 San Bernard Coastal
130800 Rio Grande-Falcon
121004 Central Texas Coastal
120903 Lower Colorado
130900 Lower Rio Grande
121102 Southwestern Texas Coastal
N
0 25 50
Miles
Source: USGS GIS 2015
OKT_AMS_all_HUC6_V01_02.pdf
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.
This map is for illustrative purposes only and is not suitable for parcel-specific decision making. The areas depicted are approximate and may be updated without notice.
Hydrologic Unit Code 6 (Accounting Units)
Figure 2-6

The channel geomorphology of streams and rivers in the Southern Great Plains can be coarsely described as meandering and braided, with channel-bed substrates of mostly sand (Assal et al. 2015).

Perennial streams contain water throughout the year; intermittent streams contain water during wet portions of the year; ephemeral channels contain water only during and immediately after rainstorms. The number of miles of these stream types is shown in **Table 2-9**.

Table 2-9
Streams in the Decision Area for BLM

State	BLM-Administered Surface Lands in Miles			BLM-Administered Federal Mineral Estate in Miles		
	Perennial	Intermittent	Ephemeral	Perennial	Intermittent	Ephemeral
Kansas	0	0	0	339.6	1387.5	3.7
Oklahoma	11.5	21.0	0	1,528.9	3,456.6	6.4
Texas	9.9	74.2	0	1,059.6	3,531.9	0
Nebraska	0	0	0	0	0	0

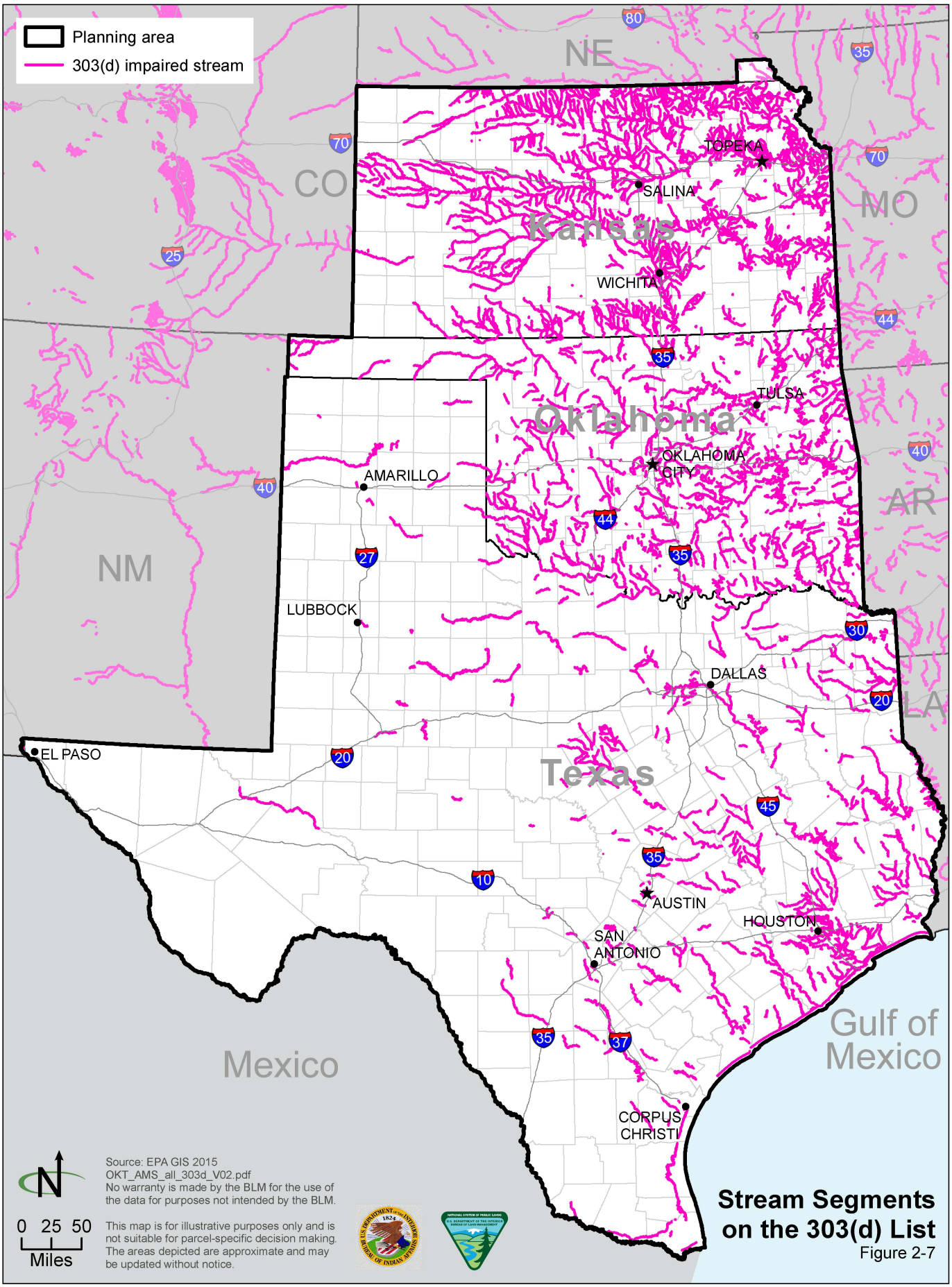
Source: National Hydrography Dataset GIS 2013

Water quality standards consist of the designation of beneficial uses, water quality criteria to protect the designated uses, and antidegradation policies. Under Section 303(d) of the Clean Water Act, states, territories, and authorized tribes are required to develop lists of impaired waters that are too polluted or otherwise degraded to meet the water quality standards set by states, territories, or authorized tribes. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop total maximum daily loads for these waters. The latter is a calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards (EPA 2015a). There are 472 stream segments in the decision area in Kansas, Oklahoma, and Texas that are on the 303(d) list of impaired waters (see **Figure 2-7**, Stream Segments on the 303(d) List, and **Table 2-10**; EPA GIS 2015).

Table 2-10
Stream Segments on the 303(d) List of Impaired Waters in the Decision Area for BLM

State	BLM-Administered Surface Land (Miles)	BLM-Administered Federal Mineral Estate (Miles)
Kansas	0	385.0
Oklahoma	48.2	1,572.3
Texas	0.4	721.3

Source: EPA GIS 2015



Stream Segments on the 303(d) List

Figure 2-7

Groundwater

An aquifer system is a grouping of two or more aquifers and can be of two types (Ryder 1996):

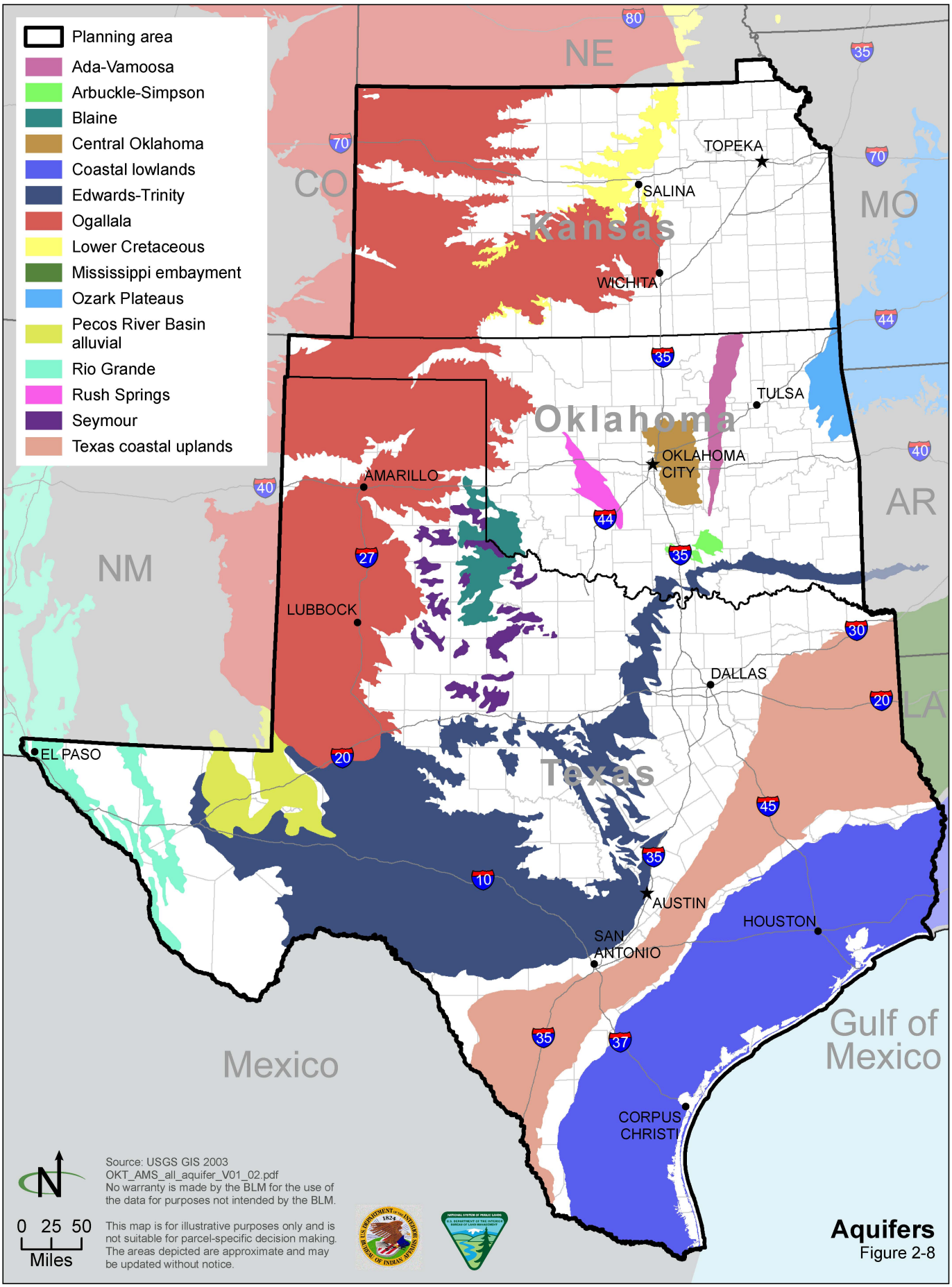
- Vertically stacked aquifers—These are separated by confining units but are hydraulically connected; in other words, their flow systems function in a similar manner, and a change in conditions in one aquifer affects the others.
- A set of disconnected aquifers—These are not physically connected but share common geologic and hydrologic characteristics and can thus be studied and described together.

Both types of aquifer systems are in Oklahoma and Texas. The aquifers in Oklahoma and Texas are in geologic units that range from unconsolidated sand along major streams to consolidated carbonate rocks and sandstones that extend over wide areas. These aquifers are grouped into 16 major aquifers or aquifer systems on the basis of differences in their rock types and groundwater flow systems. Alluvial aquifers occur along major streams. Where they are exposed at the land surface, the aquifers generally contain water that is fresh to slightly saline (Ryder 1996).

The aquifers in the Kansas, Missouri, and Nebraska area vary in composition, such as unconsolidated sand and gravel, semiconsolidated sediments, or consolidated sandstone, limestone, or dolomite. The aquifers have been defined primarily on the basis of differences in their rock types and groundwater flow systems and secondarily by the chemical quality of water they contain.

Some of the aquifers are grouped into systems of two or more aquifers that are hydraulically connected. Portions of the High Plains aquifer, the Great Plains aquifer system, and the Ozark Plateaus aquifer system are in Kansas. One additional aquifer system, the Western Interior Plains, is present only in the subsurface; it contains saline water or brine and is not as well-known as the aquifers that primarily contain freshwater (Miller and Appel 1997).

The High Plains aquifer underlies parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming (Robson and Banta 1995). The Ogallala aquifer is the leading geologic formation of in the High Plains aquifer system. The Great Plains aquifer system underlies most of Nebraska, about half of Kansas, the eastern third of Colorado, and small parts of New Mexico, Oklahoma, Texas, South Dakota, and Wyoming (Miller and Appel 1997). The Western Interior Plains aquifer system underlies most of Kansas, the eastern and southern parts of Nebraska, and a small area in west-central Missouri (Miller and Appel 1997). Aquifers are listed in **Table 2-11** and are also shown in **Figure 2-8**.



Aquifers
Figure 2-8

Table 2-11
Aquifers in the Decision Area for BLM

Aquifer Name	BLM-Administered Surface Lands (Acres)	BLM-Administered Federal Mineral Estate (Acres)
Texas coastal uplands aquifer system	0	433,300
Seymour	40	430
Rush Springs	30	8,900
Rio Grande	0	116,300
Ozark Plateaus	0	6,100
Mississippi embayment aquifer system	0	600
Lower Cretaceous	0	52,700
High Plains (Ogallalla)	120	144,000
Edwards-Trinity aquifer system	0	289,500
Coastal lowlands aquifer system	0	413,400
Central Oklahoma	240	18,800
Blaine	0	7,200
Arbuckle-Simpson	0	0
Ada-Vamoosa	0	21,800

Source: USGS GIS 2003

Range Improvements Involving Water

There are two types of range improvements: nonstructural and structural (BLM 2015a). Seedings and prescribed burns are examples of nonstructural range improvements; fences and such facilities as wells or water pipelines are examples of structural improvements. Many structural improvements are considered permanent because they are not easily removed from the land. There are no water-related range improvements on BLM grazing allotments.

The following fundamentals of rangeland health must exist on BLM-administered lands (43 CFR, Part 4100, Subpart 4180):

- Watersheds are in, or are making significant progress toward, properly functioning physical condition, including their upland, riparian-wetland, and aquatic components; soil and plant conditions support infiltration, soil moisture storage, and the release of water that are in balance with climate and landform and maintain or improve water quality, water quantity, and timing and duration of flow.
- Ecological processes, including the hydrologic cycle, nutrient cycle, and energy flow, are maintained, or there is significant progress toward their attainment, in order to support healthy biotic populations and communities.
- Water quality complies with State water quality standards and achieves, or is making significant progress toward achieving, established BLM management objectives such as meeting wildlife needs.

Floodplains

A floodplain is a geographic area of relatively level land that is occasionally subject to inundation by surface water from rivers or streams. A 100-year flood is one having a one percent chance of being equaled or exceeded in magnitude in any given year; a 100-year floodplain is a one covered by water in the event of a 100-year flood. The number of acres in 100-year floodplains is in **Table 2-12**, 100-Year Floodplains in the BLM Decision Area.

Table 2-12
100-Year Floodplains in the BLM Decision Area

State	Acres of BLM-Administered Surface Land (Acres)	Acres of BLM-Administered Federal Mineral Estate (Acres)
Kansas	0	157,100
Oklahoma	2,200	537,100
Texas	12,400	1,262,000

Source: Federal Emergency Management Agency GIS 2013

Water Use

One of the primary responsibilities of the BLM in the planning area is leasing coal and leasable minerals; such as oil and gas. These activities use water, generate contaminated water, and use substances capable of contaminating water. Releasing contaminated water or substances capable of contaminating water can affect the quality of surface and groundwater and, therefore, the uses of the surface and groundwater, such as domestic water consumption.

A federal coal lease grants the right to explore for, extract, remove, and dispose of some or all of the coal deposits that may be found on the leased lands. Coal leases are granted on the condition that the lessee will obtain the appropriate permits and licenses from the BLM, the Office of Surface Mining, and any affected state and local governments.

In some areas, development of coal resources may conflict with the protection and management of other resources or public land uses. In such cases, the BLM may identify mitigating measures that may appear on leases as either stipulations to uses or restrictions on operations. If the lessee fails to comply with the provisions of the Mineral Leasing Act of 1920, as amended, or fails to comply with any applicable regulations, lease terms, or stipulations, the BLM may take legal steps to cancel the lease (BLM 2015b). Large quantities of water are often needed to remove impurities from the coal. In addition, coal-fired power plants use large quantities of water for producing steam and for cooling. The development of coal is discussed further in **Section 2.3.1**, Energy and Minerals, Coal.

The Mineral Leasing Act of 1920, as amended, and the Mineral Leasing Act for Acquired Lands of 1947, as amended, give the BLM responsibility for oil and gas leasing on about 564 million acres of BLM-administered lands, national forest lands, and other federal

lands across the nation, as well as state and private surface lands where the federal government has retained the mineral rights.

While the BLM provides technical assistance to Indian tribes and Indian mineral owners, it does not lease Indian minerals (BLM 2015c). Oil and gas leases in Kansas, Oklahoma, and Texas are identified in **Table 2-13**, Oil and Gas Statistics (Fiscal Year 2014). The development of oil and gas is discussed further in **Section 2.3.1**, Energy and Minerals, Fluid Minerals.

Table 2-13
Oil and Gas Statistics (Fiscal Year 2014)

State	Total Number of Oil and Gas Leases in Effect	Total Number of Acres Under Lease as of the Last Day of Fiscal Year 2014
Kansas	467	120,562
Oklahoma	1,275	301,977
Texas	727	429,232

Source: BLM 2014a, 2014b

The Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (commonly referred to as The Gold Book, BLM 2007) was developed to assist operators. It provides information on the requirements for obtaining permit approval and conducting environmentally responsible oil and gas operations on federal lands and on private surface over federal minerals (split-estate). In 2007 the Gold Book was updated to incorporate changes resulting from the new Onshore Oil and Gas Order No. 1 regulations (BLM 2015d). The Gold Book contains information on conducting operations to minimize impacts on water resources.

Hydraulic fracturing is a technique used in “unconventional” gas production. Unconventional gas reservoirs can cost-effectively produce gas only by using a special stimulation technique, like hydraulic fracturing, or other special recovery process and technology. This is often because the gas is highly dispersed in the rock, rather than occurring in a concentrated underground location (EPA 2015b).

Hydraulic fracturing produces fractures in a rock formation in order to stimulate the flow of natural gas or oil, thereby increasing the volumes of gas or oil that can be recovered. Wells may be drilled vertically hundreds to thousands of feet below the land surface and may include horizontal or directional sections extending thousands of feet (EPA 2015b).

Fractures are created by pumping large quantities of fluids at high pressure down a wellbore and into the target rock formation. Hydraulic fracturing fluid commonly consists of three components, as follows:

- Water
- Proppant (such as sand, ceramic pellets, or other small uncompressible particles that hold open the newly created fractures [EPA 2015b])
- Chemical additives that open and enlarge fractures in the rock formation that can extend several hundred feet from the well bore

Once the injection process is completed, the internal pressure of the rock formation causes fluid to return to the surface through the wellbore. This fluid is known as both flowback and produced water. It may contain the injected chemicals plus naturally occurring materials, such as brines, metals, radionuclides, and hydrocarbons. The flowback is typically stored on-site in tanks or pits before treatment, disposal, or recycling, though in the BLM's hydraulic fracturing regulation, scheduled to be effective in June 2015, produced water will be stored almost exclusively in tanks. In many cases, it is injected underground for disposal. In areas where that is not an option, it may be treated and reused or processed by a wastewater treatment facility and then discharged to surface water (EPA 2015b).

The protection of underground sources of drinking water from hydraulic fracturing is focused in the EPA Underground Injection Control program, which regulates the subsurface emplacement of fluid. While the Safe Drinking Water Act specifically excludes hydraulic fracturing from Underground Injection Control regulation under Safe Drinking Water Act Section 1421 (d)(1), the use of diesel fuel during hydraulic fracturing is still regulated by the Underground Injection Control program (EPA 2015c). The EPA is conducting a study to better understand any potential impacts of hydraulic fracturing for oil and gas on drinking water resources (EPA 2015d).

The EPA is developing a proposed rule to amend the Effluent Limitations Guidelines and Standards for the Oil and Gas Extraction Category (40 CFR, Part 435). The proposed rule is scheduled for publication in 2015. It would address discharges of wastewater pollutants from onshore unconventional oil and gas extraction facilities to publicly owned treatment works. The EPA continues to collect and analyze information and will examine a variety of options for these discharges (EPA 2015e).

In Oklahoma, total withdrawals from surface water and groundwater sources during 2005 were about 1,559 million gallons/day: 989 million gallons/day, or 63 percent, from surface water sources and 570 million gallons/day, or 37 percent, from groundwater sources. The three largest water use categories are as follows:

- Public supply, about 646 million gallons/day, or 41 percent of total withdrawals
- Irrigation, 495 million gallons/day, or 32 percent of total withdrawals
- Livestock and aquaculture, 181 million gallons/day, or 12 percent of total withdrawals

All other categories—e.g. thermo-electric power generation, self-supplied domestic and commercial, and industrial and mining—were 237 million gallons/day, or 15 percent of total withdrawals (Tortorelli 2009).

Trends

Urban and agricultural development and energy infrastructure and development (especially for coal, oil, and gas) have influenced the quantity and quality of water in the planning area.

Streams and rivers of the Southern Great Plains have been severely affected by multiple stressors that have profoundly changed the ways in which these systems function. Dominant agents of change are agricultural development and associated activities, although energy development and urbanization contribute to the degradation and fragmentation of streams and rivers. In particular, urban centers have led to the channelization of many Southern Great Plains rivers and streams, which decreases habitat heterogeneity and severs important connections with floodplains. Projected average temperatures and precipitation patterns associated with climate change also represent significant potential agents of change to streams and rivers (Assal et al. 2015).

Development has frequently included dams, ditches, groundwater pumping, and other human alteration. This has altered the hydrology, thereby affecting the flow regime, reducing water tables, and increasing sedimentation (Assal et al. 2015).

Lakes are water impoundments created by natural processes along stream courses and in depressions on landscapes. Reservoirs are man-made impoundments developed to control flooding, enhance water storage for use off stream (for example, irrigation), and to create hydraulic head for electric power generation. Many natural lakes, such as Lake Meredith in Texas, were converted to reservoirs by dam construction. In addition to Lake Meredith, other large reservoirs created by damming rivers or converting large lakes to reservoirs in the Southern Great Plains are Cedar Bluff and Cheney Reservoirs in Kansas, Tom Steed Reservoir and Great Salt Plains Lake in Oklahoma, and Lake Kemp in Texas (Assal et al. 2015).

Groundwater withdrawal for irrigating crops and providing livestock watering ponds is an important driver of change for saline lakes. The discharge rates in 75 percent of the saline lakes on the Llano Estacado (part of which is in northern Texas) are greatly diminished, or the springs have dried up altogether. Another negative outcome of overdrafting the groundwater is saltwater intrusion into underlying aquifers in the region. Playas that receive irrigation tail water from croplands may remain wetter longer than they did historically. Tail water also carries pesticides, heavy metals, sediments, and excessive nutrients into the wetlands (Assal et al. 2015).

Playa lakes are integral wetlands of the Southern Great Plains. They are found in semiarid environments throughout the world but are most numerous in the Playa Lakes Region of southwestern Kansas, southeastern Colorado, the Oklahoma Panhandle, eastern New Mexico, and northwestern Texas. Threats to playas are physical alteration, direct

application of agricultural chemicals, overgrazing, and sedimentation. Of these, sedimentation is the most serious. Approximately 90 percent of playas surrounded by cropland have lost their original volume due to sedimentation (Wishart 2011).

The infrastructure used to support industrial activities across the prairie landscape has redistributed water resources, for drilling, hydraulic fracturing, and coal bed methane extraction. The hydrology of major streams in the region has been altered by impoundments, withdrawals (municipal and irrigation), groundwater depletion, and a multitude of upland land use changes. As a result, timing and flow, water temperature, dissolved nutrients, and sediment levels have been altered (Assal et al. 2015).

Water quality in the region has been affected by herbicides, urban pollutants, and fecal contamination. Groundwater depletion is a regional major concern. It is centered on the Ogallala aquifer, which declined by an average of 10 feet during a 40-year period in the middle of the twentieth century (Assal et al. 2015).

Because the Southern Great Plains is an arid landscape that nonetheless supports landscape-scale agricultural production, irrigation demand is high. To irrigate croplands, surface waters are diverted and groundwater is pumped to the surface, fundamentally altering the flow regimes of Southern Great Plains streams and rivers (Assal et al. 2015).

In Oklahoma, public-supply water withdrawals increased steadily from 1990 to 2000 and then decreased slightly in 2005, mainly because of a decrease in surface water withdrawals. Irrigation water withdrawals increased to about 864 million gallons/day, or 44 percent, from 1990 to 1995 and then decreased steadily to 495 million gallons/day in 2005. Total livestock and aquaculture water withdrawals steadily increased from 1990 to 2005. The largest increase in the other water use categories was thermo-electric power generation, which has steadily increased and almost doubled from 1990 to 2005 (Tortorelli 2009).

Forecast

During the last 30 years, northern portions of the Great Plains have seen average winter temperatures rise to 7 degrees Fahrenheit above historical averages. Average year-round temperatures are also increasing. During this century, temperatures are projected to continue increasing, especially in the southern and central Great Plains during the summer. Projections for future precipitation patterns vary within the region. Northern areas may become wetter, while southern areas may become drier, especially during the summer. Projections for future precipitation patterns vary within Texas, Oklahoma, and Kansas. Northeastern Kansas may become wetter, while western Texas may become drier (EPA 2015g).

Oil, gas, and coal development (and associated water use and degradation) is expected to vary. Development is influenced by the price of these commodities, and as the price increases, the development of these commodities is expected to increase.

Reservoirs affect sediment and nutrient flows to downstream reaches. Upstream inflows and surface runoff, particularly in agricultural areas, can be enriched with nitrogen from inorganic fertilizers and animal wastes. They can be contaminated with chemicals and can contain significant amounts of fine-grained sediments (Assal et al. 2015).

Measures are being taken to prevent or slow future sedimentation effects on playas, to restore degraded playas, and to conserve these wetlands. These include taking land out of production through the Conservation Reserve Program, controlling erosion through contour farming, and creating buffers of native vegetation around the playas (Wishart 2011).

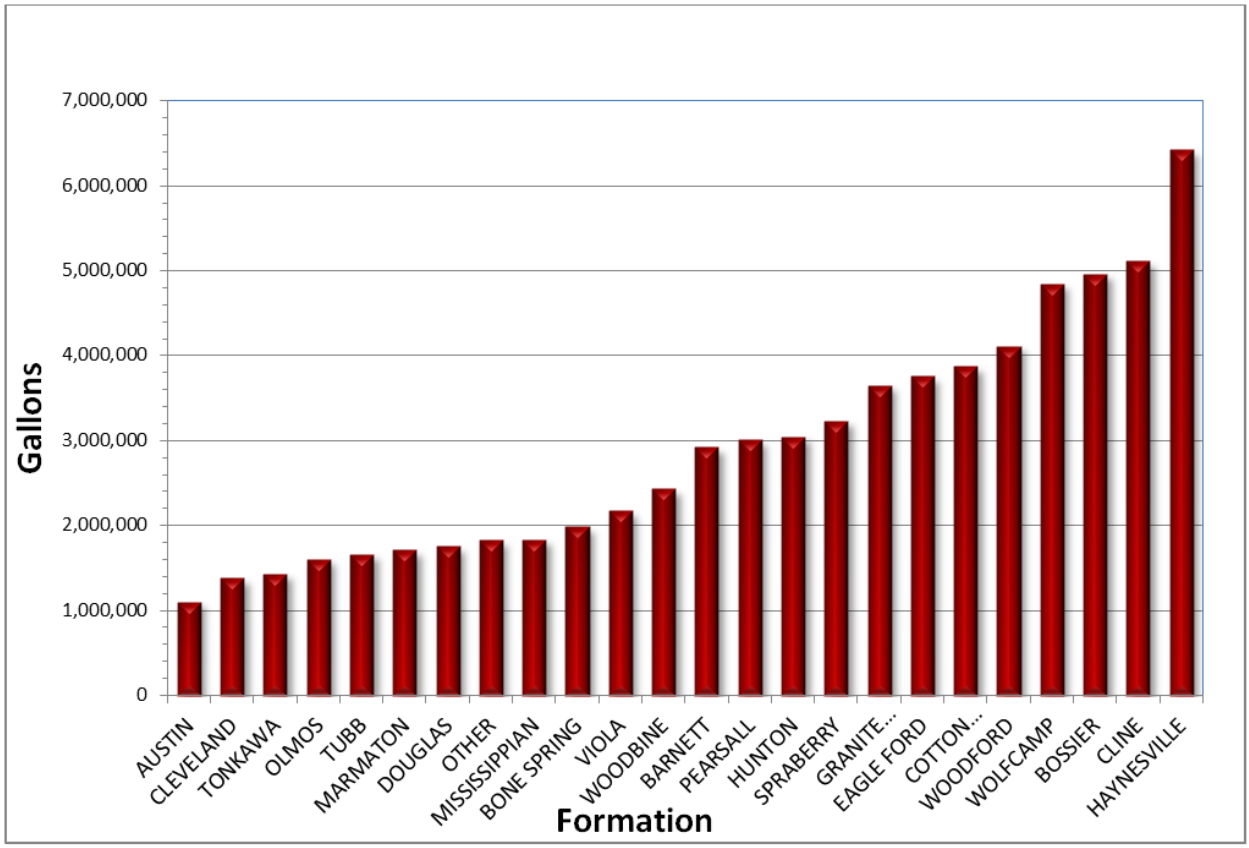
Activities associated with energy development, such as drilling and hydraulic fracturing, can affect the distribution and levels of surface water and groundwater. For example, an average of 4.8 million gallons of water are typically used to fracture natural gas shales in every horizontal well drilled, including the Woodford and Barnett shales being developed in Oklahoma and Texas, respectively. In these regions, however, the water stress is already considered medium to extremely high. In some areas of the southern mixed-grass prairie, hydraulic fracturing is contributing significantly to groundwater depletion. In the Southern Great Plains ecoregion, the southern mixed-grass prairie generally includes the grasslands of south-central Nebraska, the central third of Kansas and Oklahoma, small parts of the eastern Texas panhandle, and the western half of north-central Texas (Assal et al. 2015).

There are many energy resource extraction projects occurring within the Southern Great Plains, particularly those associated with several shale gas/oil formations. These formations include the Barnett play in north-central Texas and the Woodford play in central Oklahoma. Hydraulic fracturing, which can have potentially negative effects on streams and rivers, is the primary type of energy development in these areas. Primary threats to aquatic systems from hydraulic fracturing are groundwater withdrawals and discharges of water with high levels of total dissolved solids (Assal et al. 2015). Hydraulic fracturing fluid use by rock formation is shown in **Figure 2-9** and **Figure 2-10**.

Also of concern where fossil fuels are being developed is the possibility of spills and other accidents and intentional dumping of contaminated fluids. These actions contaminate land and water resources. Fluids associated with energy development and its waste products may contain high levels of salinity, radioactivity, hydrocarbons, and other contaminants. Shale-oil fields underlie most of the Southern Great Plains, so development risks exist across the region. Energy development may also contribute to land cover change, resulting in increased erosion (Assal et al. 2015).

The effects of energy development can include potential changes to groundwater flows and contamination from hydraulic fracturing (making spring-fed lakes particularly at risk), road and pipeline construction disturbance, and contamination from surface spills (Assal et al. 2015).

Figure 2-9
Average Fracturing Fluid Volume per Well by Formation



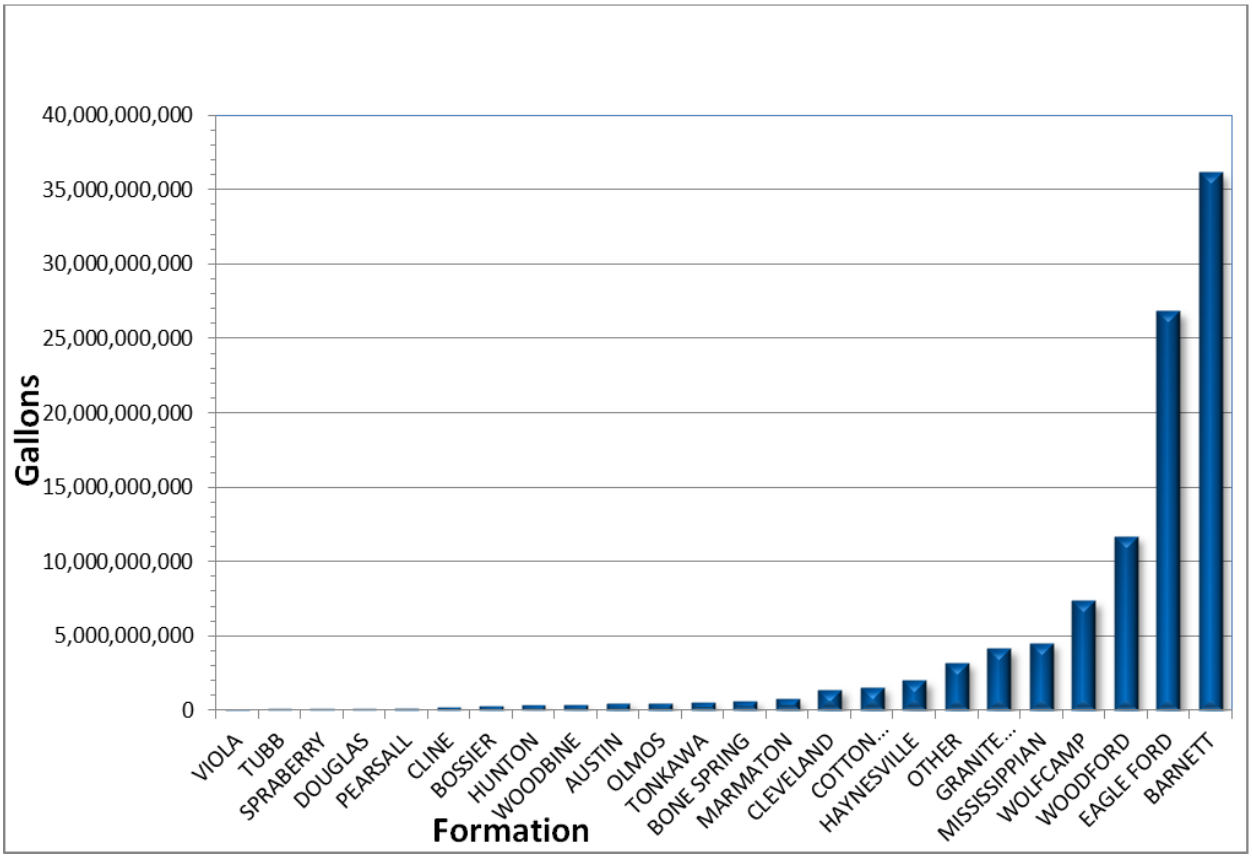
Source: Assal et al. 2015

Groundwater withdrawals for irrigation and municipal use are already having notable effects on the discharge rates of springs that discharge into saline lakes of the Southern Great Plains. Additional withdrawals for hydraulic fracturing could further affect the hydroperiod (the period in which a soil area is waterlogged) and ecological function of these wetlands (Assal et al. 2015).

Diverting surface water can reduce streamflow within stream channels and sometimes completely dewater stream channels. Pumping groundwater can have a very large footprint on the landscape because water being extracted miles away from an active stream channel can reduce water levels in the aquifers from which these stream channels receive inflow (Assal et al. 2015).

This is particularly troublesome for the Southern Great Plains because the rate of recharge to the underlying aquifer is very slow. Pumping from this aquifer can influence streamflow in multiple ways, depending on its proximity to the stream channel. If a well is within the alluvial sediment, a cone of depression can be created, which can reverse the flow of groundwater away from stream channels. Pumping farther away from stream channels can decrease the overall elevations of regional aquifers and decrease the amount

Figure 2-10
Cumulative Fracturing Fluid Volumes by Formation



Source: Assal et al. 2015

of groundwater input to streams and rivers. Reducing groundwater input to streams and rivers in an environment as arid and hydrologically variable as the Southern Great Plains can drastically reduce perennial pool habitats (Assal et al. 2015).

In addition, dams have been constructed to store water for both irrigation and municipal use and to provide recreational opportunities. The net result of damming streams and rivers in the Southern Great Plains is a high level of discontinuity in the historically continuous river networks of this region. Increasing human densities will lead to increased use of lakes and reservoirs, for both recreation and municipal water needs (Assal et al. 2015).

Land use change can lead to increased sedimentation and nutrient inputs in affected watersheds. An example of such change is the conversion of grassland to cropland in the Southern Great Plains during the 1970s and 1980s. Another example is increased livestock grazing without appropriate buffer strategies, conservation tillage practices, and irrigation management (Assal et al. 2015).

Grassland conversion is anticipated to continue through 2100, primarily because of cultivation and to a lesser extent urban and other development. Conversion from irrigated

farming to dryland farming (a method of farming in semiarid areas without the aid of irrigation, using drought-resistant crops and conserving moisture) will reduce water lost to evaporation and leakage from storage lakes and reservoirs. On the other hand, both direct and indirect inputs of irrigation tailwater could diminish as more farmland is transitioned to dryland farming. Another significant factor that could affect water levels in managed reservoirs is the transfer of water and the sale of water rights (particularly to municipalities). This is because water may be diverted to remote areas and water storage may be discontinued or significantly decreased (Assal et al. 2015).

Winter wheat is a common crop in the shortgrass ecoregion because it does not require irrigation. With water becoming increasingly expensive to pump as the main aquifer under the Southern Great Plains (Ogallala) is mined, the emphasis on dryland farming will increase as more drought- and herbicide-tolerant varieties of corn, soybeans, and other crops are developed (Assal et al. 2015).

Key Features

The key feature involving surface water resources is the Red River. Groundwater is a key feature where coal, oil, and gas development occurs.

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2.2.6 Vegetation

Upland Vegetation

Vegetation provides an enormous variety of functions in an ecosystem and also provides for a variety of human and animal uses. Vegetation stabilizes soils, prevents erosion, uses carbon dioxide, releases oxygen, increases species diversity, and provides habitat and food for animals and resources for human use.

Ecosystems reflect complex sets of interactions among plants, animals, soil, water, air, temperature, topography, fire, and humans. Influences exerted on one component affect other components in the system.

Vegetation provides many functions within ecosystems. Many of the BLM's land management policies are directed toward managing for healthy vegetative communities, which support resistant and resilient ecological systems.

Noxious Weeds and Nonnative Invasive Plants

Noxious weeds are native or nonnative plants that are unwanted in a particular area at a particular time, as designated by each state in the planning area. Although noxious weeds are usually nonnative, a distinction is made in this document because they can and do include undesirable native plants. Invasive plants disrupt or have the potential to disrupt or alter the natural ecosystem function, composition, or diversity of the site they occupy. These species can complicate the use of local natural resources and may interfere with management objectives for the site.

Invasive plants are widespread and can damage crops, affect entire industries, and harm the environment and public health. For centuries, people have moved plants, animals, and microbes around the world. Most countries now rely on plants and animals from other regions of the world in order to meet their dietary needs. Organisms that have been moved from their native habitat to a new location, especially from a different country, are typically referred to as nonnative.

Prevention is generally recognized as the most cost-effective and efficient method of reducing the likelihood for weed introduction and spread, as opposed to eradication and control (Davies and Sheley 2007). One way to target prevention is to identify vectors that are major dispersers of an invasive plant species, such as attachment on animals or humans, transportation via wind or water, and self-propulsion (Davies and Sheley 2007).

On BLM-administered lands, the degree of impact from invasive plants depends on the growth characteristics of that species, the density and size of infestation, the land cover type being invaded, the resources threatened and potential economic impacts, and cost of control or eradication. Noxious weeds documented on BLM-administered grazing allotments in the planning area are musk thistle (*Carduus nutans*) and salt cedar (*Tamarix* spp.) and an additional native, invasive plant, mesquite (*Prosopis* spp.).

Wetlands and Riparian Areas

Riparian areas are those next to rivers, creeks, lakes, springs, and wetlands. They are a transition zone between upland and aquatic ecosystems. Riparian areas occur where water is perennial, intermittent, or ephemeral. Riparian areas are defined by the BLM as "a form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittent flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas" (Leonard et al. 1992).

Wetlands occur between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water (Cowardin et al. 1979). Soil, water conditions, and vegetation type distinguish wetlands from all other ecosystems. The USACE regulates wetlands and defines them as "those areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (USACE 1987).

Wetlands must have one or more of the following attributes:

- At least periodically, the land supports predominantly hydrophytes (plants that grow only in water or very moist soil)
- The substrate is predominantly undrained hydric soil (soil formed under conditions of saturation, flooding, or ponding)
- The substrate is not solid, is saturated with water, or is covered by shallow water at some time during the growing season of each year

Both riparian areas and wetlands are composed of aquatic vegetation with unique soil characteristics that developed under the influence of perennial water. The increased moisture found in these areas produces unique plant communities that differ noticeably from the surrounding upland vegetation.

Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows. This in turn results in the following (BLM 1998):

- Reduces erosion, improves water quality, filters sediment, captures bedload, and aids floodplain development
- Improves floodwater retention and groundwater recharge
- Promotes root mass development, which stabilizes streambanks against cutting action
- Develops diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses
- Supports greater biodiversity

Special Status Plant Species

Special status species are federal-listed listed and proposed species, federal candidate species, and state-listed species. Other sensitive species are those designated by the BLM and special management species.

The BLM focuses on protecting and enhancing the habitats of threatened, endangered, and other special status species to ensure their continued existence. BLM special status species are as follows:

- Species listed under or proposed for listing under the Endangered Species Act—The act provides a program for conserving threatened and endangered plants and animals and their habitats. The lead federal agencies for implementing the Endangered Species Act are the USFWS and the National Oceanic and Atmospheric Administration, National Marine Fisheries Service.
- Species designated as sensitive by the BLM State Director—These require special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. All federal candidate species, proposed species, and species delisted for five years or less are considered BLM sensitive species.

Indicators

Upland Vegetation

Typically, BLM Standards and Guidelines can be used as qualitative measurements for upland vegetation in the planning area. No standards and guidelines have been developed for the planning area; however, details for the two standards that upland vegetation sites should meet were developed by the New Mexico State Office (BLM 2001) and are included below.

Upland Sites Standard—Upland ecological sites are in a productive and sustainable condition within the capability of the site. Upland soils are stabilized and exhibit infiltration and permeability rates that are appropriate for the soil type, climate, and landform. The kind, amount, and pattern of vegetation provide protection on a given site to minimize erosion and to assist in meeting state and tribal water quality standards.

Biotic Communities Standard—Biotic communities are native, endangered, threatened, and special status species. Ecological processes, such as hydrologic and nutrient cycles and energy flow, support productive and diverse native biotic communities. Desired plant community goals are maintaining and conserving productive and diverse populations of plants and animals within the capability of the ecological site, which sustain ecological functions and processes.

Wetlands and Riparian Areas

Typically, the BLM uses proper functioning condition, a qualitative method for assessing the condition of riparian areas and wetlands. Proper functioning condition refers to both the assessment process and the on-the-ground condition of riparian areas and wetlands. The assessment process consists of an approach that considers the hydrology, vegetation, and erosion/deposition attributes of the area; the on-the-ground condition refers to how well the physical processes are functioning. This condition is a state of resiliency that allows a riparian area or wetland to hold together during times of high water flow with a high degree of reliability. This resiliency allows an area to then produce desired values

over time, including fish habitat, neotropical bird habitat, and forage. Riparian areas and wetlands that are not functioning properly cannot sustain these values.

A riparian area or wetland is considered to be in proper functioning condition when adequate vegetation and landforms are present to accomplish the following:

- Dissipate stream energy associated with high water flow, thereby reducing erosion and improving water quality
- Filter sediment, capture bedload, and aid floodplain development
- Improve floodwater retention and groundwater recharge
- Develop root masses that stabilize stream banks against cutting action
- Support greater biodiversity

If a riparian area or wetland is not in proper functioning condition, it is placed into one of the following categories:

- **Functional-At Risk—**Riparian areas and wetlands are in functional condition, but an existing soil, water, or vegetation attribute makes them susceptible to degradation
- **Nonfunctional—**Riparian areas and wetlands are not providing adequate vegetation or landforms to dissipate stream energy associated with high flows and thus are not maintaining or improving the condition of the area
- **Unknown**—Sufficient information on which to make any determination for riparian areas and wetlands is lacking

Noxious Weeds and Nonnative Invasive Plants
Indicators include the presence of a noxious weeds or invasive plants, the size of the population, acres of treatment completed to control these populations, and success of the control treatment.

Special Status Plant Species
Special status plant species indicators are population levels and density, distribution and range, connectivity of populations and habitats, age class structure, and genetic diversity. Population and biological data for special status species are tracked by the USFWS, the Oklahoma Natural Heritage Inventory, the Kansas Natural Heritage Inventory, and the Texas Parks and Wildlife Department.

Current Condition
Today only small fragments of native ecosystem remain in the Southern Great Plains region (Assal et al. 2015). Much of the Southern Great Plains region has been converted to farmland or grazed intensively by domestic livestock.

Upland Vegetation

The planning area is within portions of 19 EPA Level III ecoregions (Woods et al. 2005; Chapman et al. 2001; Griffith et al. 2004; EPA 2013). The number of acres of each ecoregion within the planning and decision areas are summarized in **Table 2-1** and are shown in **Figure 1-1** (**Section 2.1.1**, Ecoregions). Additional information gathered in the Draft Southern Great Plains Rapid Ecoregional Assessment is also found in **Section 2.1.1**, Ecoregions.

Oklahoma

Oklahoma's Comprehensive Wildlife Conservation Strategy (Oklahoma Department of Wildlife Conservation [ODWC] 2005) identifies and discusses upland habitats in the state. Upland habitats are short-grass, mixed-grass, and tall-grass prairies, shinnery oak, sand sagebrush, sand plum, sumac, and mesquite shrublands. Other examples of upland habitat are post oak, blackjack oak, pinyon pine, shortleaf pine, loblolly pine, and juniper savannahs and woodlands and oak, hickory, and mixed deciduous forests. These habitats are fully described in the Comprehensive Wildlife Conservation Strategy (ODWC 2005).

Kansas

Kansas's Comprehensive Wildlife Plan (Wasson et al. 2005) also identifies and discusses upland habitats in the state. These are short-grass, mixed-grass, and tall-grass prairies, sand prairie, sandsage shrubland, and deciduous forest. These habitats are fully described in the Comprehensive Wildlife Plan (Wasson et al. 2005).

Additionally, the Kansas Natural Heritage Inventory maintains a list of rare natural plant communities in the state (Kansas Natural Heritage Inventory 2012a). The inventory includes several upland vegetation communities, including varieties of short-grass, mixed-grass, and tall-grass prairies, sandsage-grass shrubland associations, and maple, basswood, oak, and dogwood forests.

Texas

The Texas Conservation Action Plan (TWPD 2012) includes a list of many upland vegetation communities in the state, including native grasslands. These habitats are fully described in the Conservation Action Plan (TWPD 2012).

Wetlands and Riparian Areas

Currently, no proper functioning condition assessments have been completed within the analysis area. Wetlands and riparian areas occur throughout the analysis area, and these habitats are discussed generally for the states within the planning area, below.

Oklahoma

Oklahoma's Comprehensive Wildlife Conservation Strategy (ODWC 2005) discusses conservation landscapes, or habitats, in the state. Wetlands and riparian areas, as described in the document, include herbaceous wetlands, small and large rivers, sloughs, ponds, and sandy-bottom and gravel-bottom streams and associated riparian forests, oak and hickory bottomland hardwood forests, and limestone caves, seeps, and springs. These

habitats are fully described in the Comprehensive Wildlife Conservation Strategy (ODWC 2005).

Kansas

Kansas's Comprehensive Wildlife Plan (Wasson et al. 2005) also discusses key habitats in the state. Wetlands and riparian areas identified in the document are playa lake, herbaceous wetland, seeps and springs, small and large rivers, and deciduous floodplain forests. These habitats are fully described in the Comprehensive Wildlife Plan (Wasson et al. 2005).

Additionally, the Kansas Natural Heritage Inventory is a list of rare natural plant communities in the state (Kansas Natural Heritage Inventory 2012a). The inventory includes many wetland or riparian communities, such as freshwater and alkaline wetlands, playas, and marshes and willow, cottonwood, oak, hickory, ash, and elm floodplain forests.

Texas

Wetland and riparian habitats addressed in the Texas Conservation Action Plan (TWPD 2012) are desert cienegas (a spring or marshy area where groundwater bubbles to the surface), plains playas, forested bottomlands, bogs and fens, and freshwater and saltwater marshes. Riparian plant communities in Texas include woodlands and forests dominated by cottonwood, ash, willow, hackberry, walnut, sycamore, cypress, and other trees. These habitats are fully described in the Conservation Action Plan (TWPD 2012).

Red River, Oklahoma/Texas

The Red River is a portion of the Oklahoma/Texas border and is in the planning area. The BLM estimates 31,500 acres, more or less, of public land along the Red River between the North Fork of the river and the 98th meridian.

According to the Texas Conservation Action Plan (TWPD 2012), the Red River contains periodically flooded or subirrigated (i.e., subsurface water flooded) woodlands and forests containing oak, juniper, elm, and other species. Associated instream and adjacent wetlands are common.

Noxious Weeds and Nonnative Invasive Plants

Noxious weeds can directly or indirectly injure or damage crops, livestock, or other interests of agriculture, irrigation, navigation, natural resources, or public health. Noxious weeds, as designated by Oklahoma, Kansas, Nebraska, and Texas, are summarized in **Table 2-14**, Noxious Weeds Potentially in the Planning Area.

Table 2-14
Noxious Weeds Potentially in the Planning Area

Scientific Name (Synonym)	Common Name	Noxious in Oklahoma?	Noxious in Kansas?	Noxious in Texas?	Noxious in Nebraska?
Acroptilon repens	Russian knapweed	—	NW	—	—
Alhagi maurorum (*A. camelorum*)	Camelthorn	—	—	NP	—
Alternanthera philoxeroides	Alligatorweed	—	—	NP	—
Ambrosia grayi	Bur ragweed	—	NW	—	—
Arundo donax	Giant reed	—	—	NP	—
Calystegia sepium	Hedge bindweed	—	—	NP	—
Cardaria draba	Hoary cress	—	NW	—	—
Cardiospermum halicacabum	Balloonvine	—	—	NP	—
Carduus acanthoides	Plumeless thistle	—	—	—	NW
C. nutans	Musk thistle, nodding plumeless thistle	NW	NW	—	—
Centaurea biebersteinii	Spotted knapweed	—	—	—	NW
C. diffusa	Diffuse knapweed	—	—	—	NW
Cirsium arvense	Canada thistle	NW	NW	—	NW
C. vulgare	Bull thistle	—	CO	—	—
Convolvulus arvensis	Field bindweed	—	NW	NP	—
Cuscuta japonica	Japanese dodder	—	—	NP	—
Eichhornia azurea	Rooted waterhyacinth	—	—	NP	—
E. crassipes	Floating water hyacinth	—	—	NP	—
Elymus repens (*Agropyron r.*)	Quackgrass	—	NW	—	—
Euphorbia esula	Leafy spurge	—	NW	—	NW
Hoffmannseggia glauca	Pignut, hog potato	—	NW	—	—
Hydrilla verticillata	Hydrilla	—	—	NP	—
Ipomoea aquatica	Water spinach	—	—	NP	—
Lagarosiphon major	Lagarosiphon	—	—	NP	—
Landoltia punctata (*Spirodelta oligorrhiza*)	Giant duckweed	—	—	NP	—
Lespedeza cuneata	Chinese lespedeza	—	NW	—	—
Lythrum salicaria	Purple loosestrife	—	—	NP	NW

Table 2-14
Noxious Weeds Potentially in the Planning Area

Scientific Name (Synonym)	Common Name	Noxious in Oklahoma?	Noxious in Kansas?	Noxious in Texas?	Noxious in Nebraska?
Melaleuca quinquenervia	Paperbark	—	—	NP	—
Myriophyllum spicatum	Eurasian watermilfoil	—	—	NP	—
Nassella trichotoma	Serrated tussock	—	—	NP	—
Onopordum acanthium	Scotch thistle	NW	—	—	—
Orobanche ramosa	Branched broomrape	—	—	NP	—
Panicum repens	Torpedograss	—	—	NP	—
Pistia stratiotes	Waterlettuce	—	—	NP	—
Pueraria lobata	Kudzu	—	NW	NP	—
Rosa multiflora	Multiflora rose	—	CO	—	—
Rottboellia cochinchinensis	Itchgrass	—	—	NP	—
Salvinia spp.	Salvinia	—	—	NP	—
Schinus terebinthifolus	Brazilian peppertree	—	—	NP	—
Solanum viarum	Tropical soda apple	—	—	NP	—
Sorghum halepense	Johnsongrass	—	NW	—	—
Tamarix spp.	Saltcedar	—	—	NP	NW
Triadica sebifera (*Sapium sebiferum*)	Chinese tallow tree	—	—	NP	—

Sources: NRCS 2014a, 2014b, 2014c, 2014g; Kansas Department of Agriculture 2014; Oklahoma State University 2012
Noxious weed codes:
NW—Oklahoma, Kansas, or Nebraska noxious weed
NP—Texas noxious plant
CO—Kansas county option. Each county in the state has the option to list weed as noxious.

In addition to noxious weeds, nonnative invasive plants can also be problematic where they are found. Many nonnative invasive plants were formerly recommended forage species that are now recognized as invasive (Oklahoma Invasive Plant Council 2014); as such, they are now widespread due to ranching and grazing. Many of these species have the ability to displace native plants (Kansas Native Plant Society 2006) and have apparent, substantial, or severe ecological impacts (Texas Invasive Plant and Pest Council 2011). **Table 2-15**, Nonnative Invasive Weeds Potentially Found in the Planning Area, summarizes nonnative invasive weeds that could occur in the planning area. Not all of the nonnative invasive species listed in the table necessarily occur in the planning area, though all have potential to occur in portions of it, depending on soil, disturbance, and hydrologic regimes and current and past land uses.

Table 2-15
Nonnative Invasive Weeds Potentially Found in the Planning Area

Scientific Name	Common Name	Status[1]
Acer ginnala	Amur maple	NE-2
Acroptilon repens	Russian knapweed	NE-2
Ailanthus altissima	Tree of heaven	OK-WL, TX-Mod
Alliaria petiolata	Common garlic-mustard	KS-Inv, NE-2
Albizia julibrissin	Mimosa, silk tree	OK-PS
Alternanthera philoxeroides	Alligator weed	OK-PS, TX-Mod
Arundo donax	Giant reed	OK-WL, TX-High, NE-1
Bothriochloa bladhii	Caucasian bluestem	OK-PS, KS-Inv, NE-2
B. ishaemum	Yellow bluestem,	OK-PS, KS-Inv, NE-2
Bromus inermus	Smooth brome	KS-Inv
B. japonicus	Japanese brome	OK-PS, KS-Inv
B. racemosus	Meadow brome	OK-PS
B. tectorum	Cheatgrass	OK-PS, KS-Inv
Broussonetia papyrifera	Paper mulberry	OK-WL, TX-Mod
Carduus nutans	Musk thistle, nodding plumeless thistle	OK-PS, KS-Inv
Centaurea melitensis	Malta star-thistle	TX-Mod
C. moncktonii	Black knapweed	NE-2
C. solstitialis	Yellow star-thistle	KS-Inv, NE-2
Celastrus orbiculatus	Oriental bittersweet	NE-1
Cirsium arvense	Canada thistle	OK-PS, KS-Inv
C. vulgare	Bull thistle	OK-PS
Clematis terniflora	Sweet autumn virgin’s-bower	NE-2
Colocasia esculenta	Elephant ears	TX-Mod
Conium maculatum	Poison hemlock	OK-PS
Convolvulus arvensis	Field bindweed	OK-PS, KS-Inv
Cryptostegia grandiflora	Palay rubbervine	TX-High
Cynodon dactylon	Bermuda grass	TX-Mod
Cynoglossum officinale	Houndstongue	NE-2
Cyperus rotundus	Nut grass	OK-WL
Dipsacus fullonum	Fuller’s teasel	KS-Inv
Dipsacus lacinatus	Cut-leaf teasel	KS-Inv, NE-2
Egeria densa	Brazilian water weed	OK-WL
Eichhornia crassipes	Water hyacinth	OK-WL, TX-High, NE-1
Elaeagnus angustifolia	Russian olive	OK-WL, KS-Inv
E. pungens	Thorny olive	OK-WL
E. umbellatum	Autumn olive	OK-WL, KS-Inv
Erodium cicutarium	Red stem stork’s bill	OK-WL
Euonymus fortune	Chinese spindle-tree	KS-Inv

Table 2-15
Nonnative Invasive Weeds Potentially Found in the Planning Area

Scientific Name	Common Name	Status[1]
Euphorbia esula	Leafy spurge	KS-Inv
Falcaria vulgaris	Sickleweed	NE-2
Firmiana simplex	Chinese parasoltree	TX-Mod
Galega officinalis	Goat's-rue	NE-2
Galium verum	Yellow bedstraw	NE-2
Hydrilla verticillata	Hydrilla	OK-PS, TX-High, NE-1
Hypericum perforatum	St. John's wort	NE-2
Imperata cylindrical	Cogongrass	TX-High
Kochia scoparia	Mexican fireweed	OK-PS
Lespedeza cuneata	Sericea lespedeza	OK-PS, KS-Inv
Ligustrum japonicum	Japanese privet	OK-WL, TX-Mod
L. lucidum	Glossy privet	TX-High
Ligustrum sinense	Chinese privet	OK-PS
Lolium arundinaceum	Tall fescue	OK-WL
L. pretense	Meadow ryegrass	OK-WL
L. temulentum	Darnel ryegrass	OK-WL
Lonicera japonica	Japanese honeysuckle	OK-PS, KS-Inv, NE-2
L. mackii	Bush honeysuckle	OK-WL, KS-Inv
L. tatarica	Tatarian honeysuckle	KS-Inv
Lygodium japonicum	Japanese climbing fern	OK-WL, TX-High
Lythrum salicaria	Purple loosestrife	OK-PS, KS-Inv
Macfadyena unquis-cati	Catclaw vine	TX-Mod
Melia azedarach	Chinaberry tree	OK-WL, TX-High
Microstegium vimineum	Nepalese browntop	OK-PS
Mililotus officinalis	Yellow sweet clover	OK-WL
Myriophyllum aquaticum	Parrot's feather	OK-PS, TX-High
M. spicatum	Eurasian watermilfoil	OK-PS, KS-Inv, NE-2
Najas minor	Brittle naiad	NE-1
Nandina domestica	Heavenly bamboo	TX-Mod
Paulownia tomentosa	Princess tree	OK-WL
Perilla frutescens	Beefsteak plant	OK-PS
Phyllostachys aurea	Golden bamboo	TX-High
Pistacia chinensis	Chinese pistache	TX-Mod
Potentilla recta	Sulphur cinquefoil	OK-PS
Pueraria lobata	Kudzu	OK-PS, TX-High, NE-2
Pyracantha coccinea	Scarlet firethorn	TX-Mod
Pyrus calleryana	Callery pear	OK-WL
Rapistrum rugosum	Bastard cabbage	TX-High
Rhamnus cathartica	Common buckthorn	KS-Inv

Table 2-15
Nonnative Invasive Weeds Potentially Found in the Planning Area

Scientific Name	Common Name	Status[1]
Rosa multiflora	Multiflora rose	OK-PS, KS-Inv
Saccharum ravennae	Revennagrass	OK-PS
Salsola tragus	Russian thistle, tumbleweed	OK-PS
Salvinia molesta	Giant salvinia	NE-1
Schedonorus arundinaceus	Tall mountain-fescue	KS-Inv
S. pratensis	Meadow mountain-fescue	KS-Inv
Securigera varia	Common crown-vetch	KS-Inv, NE-2
Sorghum halepense	Johnsongrass	OK-PS, KS-Inv, TX-High
Tamarix chinensis	Chinese salt cedar	OK-PS
T. parviflora	Small-flowered tamarisk	OK-PS, KS-Inv
T. ramosissima	Salt cedar, tamarisk	OK-PS, KS-Inv, TX-High
Triadica sebifera (*Sapium sebiferum*)	Chinese tallow tree	TX-Mod
Ulmus pumila	Siberian elm	OK-WL
Verbascum thapsus	Common mullein	OK-PS

Sources: Oklahoma Invasive Plant Council 2014, Kansas Native Plant Society 2006, Texas Invasive Plant and Pest Council 2011, Nebraska Weed Control Association 2014
[1]Status Codes:
OK-PS—Oklahoma problem species
OK-WL—Oklahoma watch list species
KS-Inv—Kansas invasive weed
TX-Mod—Texas moderate rated
TX-High—Texas high rated
NE-1—Invasive plant not currently documented in Nebraska but would pose a significant risk if introduced
NE-2—Top priority invasive species

The Oklahoma Invasive Plant Council maintains a list of problem and watch list species that pose a potential threat of invasion in the state (Oklahoma Invasive Plant Council 2014). It is based on a 2009 invasive plant audit for Oklahoma conducted by The Nature Conservancy (Pruett 2009). These nonnative invasive species are in addition to the three-state-listed noxious weeds described above. The Oklahoma Invasive Plant Council lists 32 problem species and 21 watch list species in the state (see **Table 2-15**). Additionally, the Oklahoma Invasive Plant Council maintains a list of noxious and nonnative invasive species in states bordering Oklahoma: Kansas, Missouri, Arkansas, Texas, New Mexico, and Colorado. This list can be found on the Oklahoma Invasive Plant Council invasive weed database (Oklahoma Invasive Plant Council 2014).

The Kansas Native Plant Society maintains an invasive plant list for the state (Kansas Native Plant Society 2006). These nonnative invasive species are in addition to the state-

listed noxious weeds summarized above. The Kansas Native Plant Society lists 30 of the most invasive plant species in the state (see **Table 2-15**).

The Nebraska Weed Control Association is composed of county representatives to advance and improve weed control programs in the state (Nebraska Weed Control Association 2014). The association maintains a watch list for invasive plant species by ecoregion in Nebraska; these nonnative invasive species are in addition to the state-listed noxious weeds summarized above. There are 25 category 1 and 2 invasive plants listed for regions of Nebraska containing the planning area (see **Table 2-15**).

The Texas Invasive Plant Inventory (Texas Invasive Plant and Pest Council 2011) categorizes nonnative invasive plants that threaten the state's wildlands. Categorization is based on an assessment of the ecological impacts of each plant. The inventory lists 29 species and assigns a ranking to each, based on the level of threat to the ecological health of wildlands presented by each species. Threat is determined through evaluation of that species' ecological impact, its ability to invade natural vegetation communities, and the current extent of invasion. Moderate-rated species can have a substantial and apparent ecological impact on physical processes, plant and animal communities, and vegetation structure. High-rated species can have severe ecological impacts on these systems. Texas moderate- and high-rated nonnative invasive species are listed in **Table 2-15**.

Though many noxious weeds and nonnative, invasive plant species have been documented in or have the potential to occur in the planning area, several key species present management challenges on BLM-administered lands in the planning area. Historically, native grassland (prairie) ecosystems were maintained by naturally occurring or managed low-intensity fire and grazing by native herbivores (Assal et al. 2015). Fires restricted the extent of native invasive woody shrubs, including eastern redcedar (*Juniperus virginiana*) and mesquite (*Prosopis* spp.). Fires removed seedlings and saplings, while native grassland plants and perennial grasses adapted to frequent, low-severity fires (Barbour et al. 1999, in Assal et al. 2015). Woodlands have expanded at the expense of native prairie grasslands due to altered fire regimes and fire suppression, intensive livestock grazing, climate change, and removal of native herbivores (Weltzin et al. 1997). These invasive woody species have been documented on BLM-administered grazing allotments in the planning area.

One non-woody noxious weed is also especially problematic in the region. Musk thistle (*Carduus nutans*) is extremely prolific and invades native meadows and grasslands. Because it is unpalatable to cattle, selective grazing leads to severe degradation of native vegetation and a competitive advantage to musk thistle. Musk thistle has been documented in BLM-administered grazing allotments in the planning area.

In riparian systems, flow regime alterations and soil disturbance facilitate invasion by the noxious weed salt cedar (*Tamarix* spp.). This further alters water and nutrient availability, reduces habitat for sensitive wildlife, and facilitates fires and floods.

Special Status Plant Species

Federal- and state-listed plant species documented in or with the potential to occur in the planning area are listed in **Table 2-16**. Key species for the planning area are described in detail below.

Table 2-16
Federal or State-Listed Plants Documented in or with Potential to Occur in the Planning Area

Scientific Name (Synonym)	Common Name	Federal Status[1]	State Status[1] (State where Listed)
Abronia macrocarpa	Largefruit sand verbena	E	SE (TX)
Ambrosia cheiranthifolia	Rio Grande ragweed	E	SE (TX)
Asclepias meadii	Mead's milkweed	T	
Astrophytum asterias	Sanddollar	E	SE (TX)
Ayenia limitaris	Rio Grande ayenia	E	SE (TX)
Callirhoe scabriuscula	Texas poppymallow	E	SE (TX)
Coryphantha ramillosa	Whiskerbush	T	ST (TX)
Cryptantha crassipes	Terlingua Creek cryptantha	E	SE (TX)
Echinocereus chisoensis var. *c*	Chisos Mountain hedgehog cactus	T	ST (TX)
E. fendleri ssp. *fendleri* (*E. f.* var. *kuenzleri*)	Pinkflower hedgehog cactus	E	
E. reichenbachii ssp. *fitchii* (*E. r.* var. *albertii*)	Fitch's hedgehog cactus	E	SE (TX)
E. viridiflorus var. *davisii*	Davis' hedgehog cactus	E	SE (TX)
Echinomastus mariposensis (*Neolloydia m.*)	Lloyd's fishhook cactus	T	ST (TX)
Escobaria minima (*Coryphantha m.*)	Nellie cory cactus	E	SE (TX)
E. sneedii var. *sneedii* (*Coryphantha s.*)	Sneed's pincushion cactus	E	SE (TX)
Festuca ligulata	Guadalupe fescue	C	
Frankenia johnstonii	Johnston's seaheath	E	SE (TX)
Gaura neomexicana ssp. *coloradensis*	Colorado butterfly plant	T	
Geocarpon minimum	Tinytim	T	
Helianthus paradoxus	Paradox sunflower	T	ST (TX)
Hibiscus dasycalyx	Neches River rose-mallow	T	
Hoffmannseggia tenella	Slender rushpea	E	SE (TX)
Hymenoxys texana	Prairiedawn	E	SE (TX)
Leavenworthia texana	Texas golden gladecress	E	
Lesquerella pallida	White bladderpod	E	SE (TX)
L. thamnophila	Zapata bladderpod	E	SE (TX)
Manihot walkerae	Walker's manihot	E	SE (TX)

Table 2-16
Federal or State-Listed Plants Documented in or with Potential to Occur in the Planning Area

Scientific Name (Synonym)	Common Name	Federal Status[1]	State Status[1] (State where Listed)
Penstemon haydenii	Blowout beardtongue	E	SE (NE)
Phlox nivalis ssp. *texensis*	Texan phlox	E	SE (TX)
Platanthera leucophaea	Eastern prairie fringed orchid	T	ST (OK)
P. praeclara	Western prairie fringed orchid	T	ST (OK, NE)
Potamogeton clystocarpus	Little aguja pondweed	E	SE (TX)
Ptilimnium nodosum	Harperella	E	E (OK)
Quercus hinckleyi	Hinckley oak	T	ST (TX)
Schwalbea americana	Chaffseed	E	
Sclerocactus brevihamatus ssp. *tobuschii* (*Ancistrocactus t.*)	Shorthook fishhook cactus	E	SE (TX)
Spiranthes diluvialis	Ute ladies'-tresses	T	ST (NE)
Spiranthes parksii	Navasota lady's tresses	E	SE (TX)
Streptanthus bracteatus	Bracted twistflower	C	
Styrax platanifolius ssp. *texanus* (*S. t.*)	Texas snowbell	E	SE (TX)
Thymophylla tephroleuca	Ashy pricklyleaf	E	SE (TX)
Trifolium stoloniferum	Running buffalo clover	E	
Zizania texana	Texas wildrice	E	SE (TX)

Source: NRCS 2014d, 2014e, 2014f, 2015
[1]Status Codes:
E—Federal Endangered, T—Federal Threatened, C—Federal Candidate
SE—State Endangered, ST—State Threatened

Several key special status plant species are described below. While this is not an official designation, these species are relatively important in the planning area for several reasons. They occur in native prairie grasslands (eastern and western prairie fringed orchids) and riparian areas (harperella), which are some of the most threatened habitats in the planning area. These species have the potential to occur in portions of the planning area where most of the BLM- and BIA-administered surface lands are located (i.e., the Central Great Plains ecoregion; see **Section 2.1.1**, Ecoregions). Finally, these species are the only threatened or endangered species listed by the State of Oklahoma, which is where most BLM activities in the planning area occur.[1]

Eastern prairie fringed orchid (*Platanthera leucophaea*), Federal Threatened, State Threatened (Oklahoma). Eastern prairie fringed orchid is a perennial herb in the orchid

[1]George Thomas, BLM, personal communication via e-mail with Kevin Rice, EMPSi, regarding special status species list and definition, February 13, 2015.

family (Orchidaceae) that flowers in late June or early July. Plants grow from an underground tuber and regenerate vegetatively through the tuber rootstock and buds and by seed. Successful seedling establishment requires development of a mycorrhizal association with a favorable soil-inhabiting fungus. Disturbance, either from animals or the death of other plants, appears to be important in seedling establishment (USFWS 1999). Occasionally plants will enter dormancy and not emerge aboveground during the growing season (Bowles et al. 1992). Dormancy in this species is not well understood (USFWS 1999).

Eastern prairie fringed orchid occurs in a wide variety of habitats, from mesic prairie to wetland communities, such as sedge meadows, marsh edges, and even bogs, with sunny open conditions (USFWS 1999). The species formerly occurred from eastern Iowa, Missouri, and Oklahoma eastward across southern Wisconsin, northern and central Illinois, southern Michigan, northern Indiana and Ohio, and northwestern Pennsylvania to western New York and southern Ontario. Disjunct populations also occurred in New Jersey, Virginia, and Maine.

Eastern prairie fringed orchid has declined more than 70 percent from original county records in the US; at the time of listing 59 populations were extant in 6 states (USFWS 1999). Plants have not been relocated in Oklahoma. The specie's distribution has not changed appreciably since 1991 (USFWS 2010). Declines in populations have been due mainly to conversion of habitat to cropland and pasture (USFWS 1999). Remaining populations continue to be threatened by succession to woody vegetation, competition from nonnative species, pesticide impacts on pollinators, over-collection, drainage and development of wetland habitats, and climate change (USFWS 1999, 2010).

Western prairie fringed orchid (*Platanthera praeclara*), Federal Threatened, State Threatened (Oklahoma, Nebraska). Western prairie fringed orchid is a terrestrial perennial herb in the orchid family (Orchidaceae) that flowers from mid-June to late July. Plants grow from an underground tuber and regenerate vegetatively through the tuber rootstock and buds, as well as via seed. Successful seedling establishment requires development of a mycorrhizal association with a favorable soil-inhabiting fungus. Dormancy in the species generally lasts between one and three years (Sather 1997 in USFWS 2009), though more than half of dormancy episodes are less than one year long (Quintana-Ascencio et al. 2004 in USFWS 2009).

Western prairie fringed orchid is known to occur only west of the Mississippi River. Western prairie fringed orchid occurs most often in unplowed, calcareous tallgrass prairie and sedge meadows and also in disturbed sites, including borrow pits, previously cultivated fields, and roadside ditches (USFWS 1996). Extant populations in eastern Kansas occur in mesic (moderately moist) to wet-mesic upland prairies, and occurred historically along the floodplains of several larger rivers (USFWS 1996; Freeman and Brooks 1989 in USFWS 2009). Although moist soil near the ground surface is critical to maintain western prairie fringed orchid populations, standing water may adversely affect populations, depending on the depth and duration of flooding (USFWS 2009). Drought has significant and, in some cases, widespread effects on western prairie fringed orchid

flowering and survival (USFWS 2009). Threats identified are conversion of habitat to cropland, overgrazing, invasive species, over-collection, climate change, and herbicide and pesticide impacts on the plant and its pollinators (USFWS 2009).

Harperella (*Ptilimnium nodosum*), Federal Endangered, State Endangered (Oklahoma). Harperella is an annual aquatic herb in the carrot family (Apiaceae) that blooms from May to October. Population sizes may vary dramatically from year to year in response to water levels (USFWS 1990). Only 45 occurrences in 24 watersheds are known, with the largest concentration found along the Maryland/West Virginia border and in Arkansas. Around 25 percent of known occurrences have not been seen in 20 years (Oklahoma Biological Survey 2013).

Harperella occurs in seasonally flooded rocky streams and coastal plain ponds (USFWS 1990). In Oklahoma, harperella occurs in the southeastern portion of the state in riverine habitat and includes two stands of approximately 500 plants (Oklahoma Biological Survey 2013). Threats to the species are fluctuating water levels from dredging, dam and reservoir construction and wetland draining, reductions in water quality from pollution, algae, erosion and siltation from logging and road construction, and invasive plants (Oklahoma Biological Survey 2013). Specific threats to the Oklahoma population are increased siltation from timber harvesting, runoff from ranching and poultry farming, the possibility of out-of-state water transfers, and recreational activity (Oklahoma Biological Survey 2013). The region has experienced drought conditions since 2010, which could eventually affect river flow (Oklahoma Biological Survey 2013).

Additional Rare Plant Species

In addition to federal- and state-listed species, the Oklahoma Natural Heritage Inventory maintains a list of rare and vulnerable plant species in the state (Oklahoma Natural Heritage Inventory 2005). Similarly, the Kansas Natural Heritage Inventory maintains a list of Kansas rare plants (Kansas Natural Heritage Inventory 2012b). Nearly 400 species, in addition to the three federal-listed species, are on the Kansas element tracking list. Each species is assigned a global and state conservation status rank based on the NatureServe system (NatureServe, n.d.). Neither Oklahoma nor Kansas lists special status plant species in their respective wildlife action plans (ODWC 2005; Wasson et al. 2005). The Texas Conservation Action Plan (Texas Parks and Wildlife Department 2012) lists 445 plant Species of Greatest Conservation Need (inclusive of federal- and state-listed species).

Trends

Upland Vegetation

Upland vegetation in the analysis area has been heavily impacted by human settlement and associated development, agricultural conversion, intensive grazing, woodland and invasive species spread, and altered fire regimes.

Native grassland systems in particular are considered one of the most at-risk habitats in the analysis area (Assal et al. 2015). Short-grass, mixed-grass, and tall-grass prairie in the

analysis area have been converted into a mosaic of cultivated croplands, prairie remnants, and expanding woodlands (Samson and Knopf 1994). In the southern Great Plains ecoregion, approximately 40 to 90 percent of mixed-grass and 50 to 75 percent of short-grass prairie has been under cultivation at some point since European settlement (Bragg and Steuter 1996; Weaver et al. 1996).

Most areas of the prairie that have not been cultivated are intensively grazed by domestic cattle. The effects of grazing and grazing management on plant and animal communities can include loss of riparian vegetation, removal of vegetative cover, and dispersal of seeds from invasive plant species (Chaney et al. 1990; Vavra et al. 2007). The frequency and extent of fire in these systems has dramatically declined as a result of fire suppression and reduction in fuels due to grazing. This can give rise to changes in the plant community and invasions of native or nonnative species including juniper, mesquite, and eastern redcedar (Bidwell et al. 1996; Weaver et al. 1996).

Wetlands and Riparian Areas

Wetlands in the planning area are generally under the jurisdiction of the USACE regulatory division. It is responsible for protecting aquatic resources, including wetlands, in the planning area, while allowing reasonable development through informed permit decisions. Wetlands at the highest risk may be those considered nonjurisdictional and isolated. These are not protected under any regulation and typically are unique and are some of the most important wetlands, disconnected from river and stream systems as stand-alone features; playas, some bogs, and fens are examples.

Riparian areas throughout the analysis area are fertile and often valued as prime farmland. Many riparian areas on nonfederal lands have been cleared for use as pastureland or for row crops or other agricultural activities. Many of these activities use fertilizers and pesticides, increasing the potential for both ground and surface water pollution. Riparian areas are often considered prime waterfront property by developers on private lands. Urban encroachment, channelization, and other water resource development activities have contributed to the destruction and alteration of native riparian areas. Additionally, hydrology in many of the major streams in the region has been altered as a result of impoundments, withdrawals, and adjacent upland land use changes.

Noxious Weeds and Invasive Nonnative Species

Invasive plants are generally spreading or increasing in density in some parts of the planning area, especially in oil and gas fields, along roadways, transmission lines, and other rights-of-ways and at the margins of agricultural operations. Typically, as ground disturbance increases in areas of known populations, the likelihood that invasive plants would move into this disturbance increases. Noxious weeds and native, invasive species have been documented on BLM-administered lands in the planning area, as discussed in *Current Condition* above. These weeds will continue to be treated in accordance with applicable land use planning documents and regulations.

Efforts have limited the spread and reduced the size of invasive plant populations in other areas. Such efforts are spot treating noxious weeds, applying herbicide before seeding, mowing or Dixie harrowing and seeding, using prescribed fire, and follow-up seeding with native species post-treatment.

Weed management in ongoing on the BLM Cross Bar Cooperative Management Area (Cross Bar Ranch) in Texas. Weeds targeted for treatment are generally native and nonnative invasive woody shrubs, including mesquite and salt cedar. Treatments have included spot application of herbicide (BLM 2011) and prescribed burning (BLM 2015).

Special Status Plant Species

Special status plant habitat, particularly native prairie grassland, shrubland, wetland, and riparian habitats, have been impacted by similar land uses, as described above. These land uses include development, agricultural conversion, intensive grazing, woodland and invasive species spread, altered fire regimes, and drought and other climate change-related effects.

Forecast

Upland Vegetation

Upland vegetation in the analysis area will continue to face the effects of development, agricultural conversion, intensive grazing, woodland and invasive species spread, and altered fire regimes.

Climate change will also be an important factor in upland vegetation in the planning area, including native prairie grasslands. Current climate change models are projecting a range of potential shifts in climate, including increasing temperatures and more intense rainfall. This is despite a decrease in average amounts of total annual precipitation (Karl et al. 2009), which may influence distribution of species in these systems.

Wetlands and Riparian Areas

Development projects, agricultural conversion, and water resource projects will likely continue in the planning area and will have the potential to impact wetlands under the jurisdiction of the USACE. Before issuing permits, the USACE will require that unavoidable impacts on the aquatic environment be offset by mitigation requirements. This could include restoring, enhancing, creating, and preserving aquatic functions and values.

Development projects, agricultural conversion, and other projects will also likely continue to impact riparian areas. Spread of invasive weeds also has the potential to impact riparian areas through native species replacement, community structural modification, and water availability changes.

Noxious Weeds and Invasive Nonnative Species

Invasive plant species are expected to continue to spread. The degree to which these species spread is directly related to human activities and control efforts in the area. Some

of these species are very invasive and are readily transported to uninfested areas. Surface-disturbing activities and vehicular travel mainly contribute to weed proliferation, although natural elements, such as wind and wildlife, could also contribute. Range animals, such as livestock, also increase the opportunities for invasive plant species to spread and become established through transfer or, if unsatisfactory range management occurs, through overgrazing.

While it is difficult to predict future introductions of other listed invasive species, the most likely areas for introduction are those where new disturbances occur. Historic evidence indicates that new invasive species would be introduced in the planning area and become established if not eradicated immediately.

Native woody shrub invaders, such as mesquite and eastern red cedar, are a management challenge in prairie grassland; however, options for control do exist, particularly where native vegetation persists (Assal et al. 2015). Control of invasive plants would depend on the cost and feasibility of available treatment methods. Resource management strategies would contribute to maintaining current levels or reducing the expansion of these species. Examples of these strategies are minimizing surface disturbance and surface-disturbing activities, requiring prompt reclamation of these disturbed areas, and reducing traffic through infested areas. Research continues in developing new herbicide formulations and the existence and effectiveness of biological agents, including pathogens, to use as tools to control invasive plant species that could spread into and outcompete native plant communities.

Noxious weed and invasive plant programs through the NRCS, Oklahoma State University, Oklahoma Invasive Plant Council, Oklahoma Biological Survey, and others will continue to increase awareness of invasive plants in the planning area. Recognition of the sources of invasives and economic and ecological impacts of invasives, along with early detection and prevention programs, can help prevent additional infestations. Control and management strategies will continue to prevent further expansion of current infestations in the planning area.

Special Status Plant Species

Special status plant habitats are expected to continue to be impacted by land uses similar to those described above. These land uses include development, agricultural conversion, intensive grazing, woodland and invasive species spread, altered fire regime, and drought and other climate change-related effects.

Key Features

Upland Vegetation

Some of the important functions of native grasslands are providing habitat for special status plant and animal species, controlling erosion (especially bordering croplands), slowing surface flows for groundwater recharge, filtering runoff of pollution and sediment, improving carbon storage, supporting pollinator processes, and retaining and building soil quality.

Wetlands and Riparian Areas

Riparian and wetland areas provide keystone habitat for riparian and wetland obligate and dependent bird species. Long-distance migration requires exceptional energy reserves, and migratory birds must rest and replenish fat reserves while traveling between wintering and breeding areas. Riparian and wetland areas provide migration stopover sites as they contain trees and shrubs that are required for roosting or foraging by most riparian birds. Riparian forests support a greater diversity of wildlife than nearly all nonaquatic areas or upland forests. Mammals depend on the vegetation found in riparian areas for food and shelter. The increased humidity of riparian areas makes them important habitat for amphibians, snakes, and turtles.

Fishes in riparian stream areas are intimately linked to the habitat afforded to them. Vegetation rooted at the water's edge provides escape cover, shade, and food for fish. This is especially critical along intermittent streams, where remnant summer pools provide refugia for fish.

Riparian areas are crucial to the protection and enhancement of the water resources of the US. They are extremely complex ecosystems that help provide optimum food and habitat for stream communities and are useful in mitigating or controlling nonpoint source pollution.

Noxious Weeds and Invasive Nonnative Species

Any vegetative community is susceptible to invasive plants, but sites that are especially vulnerable are those where soils have been disturbed and the native plant community has been displaced or destroyed. Developed corridors, such as roads, oil and gas-related facilities, and pipelines, are vulnerable as vehicles can transport seeds from other locations. Riparian areas also provide optimal growing conditions, including nutrient-rich soils and ample moisture. Other areas that can easily be invaded are those where native or desirable vegetation has been compromised or destroyed through overgrazing, recreation, mining, and mineral development and those that have experienced wildfires.

Key features for invasive species are areas of potential infestations. These include oil and gas facilities and associated developments, riparian zones, and transportation and utility corridors.

Special Status Plant Species

Important habitat for special status plant species includes undisturbed native prairie grasslands, native shrublands, wetlands, and riparian areas.

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2.2.7 Fish and Wildlife

Indicators

Indicators of impacts on fish, wildlife, and migratory birds are as follows:

- Amount and condition of available habitat
- Likelihood of mortality, injury, or direct disturbance
- Likelihood of habitat disturbance

Fisheries

Impacts specific to aquatic species and their habitats are the following:

- Sediment and turbidity—Increased sediment loading in waters containing sediment-intolerant fish species, loss of recruitment, stress, nutrient loading, and habitat loss
- Habitat alteration—Changes in habitat that make it nonfunctional for select species or more conducive to competitive species
- Loss or reduction of streamside vegetation/cover— Increased temperatures, stress, reduced productivity, and impacts on food webs

- Water Quality alteration—Actions that alter important water quality parameters, including pH, dissolved oxygen, temperature, hardness, alkalinity/salinity, and turbidity
- Water depletions—Loss of physical habitat, water quality changes, sediment accumulation, habitat complexity loss, and food source reduction
- Potential direct mortalities to aquatic wildlife from motorized vehicles

Wildlife and Migratory Birds
Impacts on wildlife and migratory birds are the following:

- Disturbance or loss of plant communities, food supplies, cover, breeding sites, and other habitat components necessary for population maintenance used by any species to a degree that would lead to substantial population declines
- Disturbance, fragmentation, or loss of seasonally important habitat (e.g., critical for overwintering or successful breeding) to a degree that would lead to substantial population declines
- Interference with a species' movement pattern that decreases its ability to breed or overwinter successfully to a degree that would lead to substantial population declines

Current Condition

Fisheries
The BLM manages subsurface minerals for reservoirs throughout Kansas, Oklahoma, and Texas and small isolated tracts of surface estate, which overlap or border fish-bearing streams. These lands contain a diverse assortment of game and nongame fish species. Common fish species found throughout the planning area are largemouth bass (*Micropterus salmoides*), smallmouth bass (*M. dolomieui*), spotted bass (*M. punctulatus*), striped bass (*Morone saxatilis*), white bass (*M. chrysops*), channel catfish (*Ictalurus punchtatus*), blue catfish (*I. furcatus*), flathead catfish (*Pylodictis olivaris*), rainbow trout (*Salmo gairdneri*), walleye (*Stizostedion vitreum*), white crappie (*Pomoxis annularis*), black crappie (*P.s nigromaculatus*), bluegill (*Lepomis macrochirus*), green sunfish (*L. cyanellus*), and redear sunfish (*L. microlophus*). The BLM does not manage fish populations or habitat for reservoirs in the planning area; instead these areas are managed by the state wildlife departments, in coordination with the surface owner or land manager.

Wildlife

<u>Upland Game</u>
Important upland game species in the planning area are bobwhite quail (*Colinus virginianus*), scaled quail (*Callipepla squamata*), greater prairie-chicken (*Tympanuchus cupido*), wild turkey (*Meleagris gallopavo*), mourning dove (*Zenaida macroura*), white-winged dove (*Z. asiatica*), and chachalacas (*Ortalis vetula*). In addition, the ring-necked

pheasant (*Phasianus colchicus*), a nonnative species, is an important game bird in the region.

Big Game

Big game species in the planning area are white-tailed deer (*Odocoileus virginianus*), mule deer (*O. hemionus*), pronghorn (*Antilocapra americana*), javelina (*Tayassu tajacu*), black bear (*Ursus americanus*), and elk (*Cervus elaphus*). Distribution and abundance of big game species varies by habitat type and ecoregion. White-tailed deer, mule deer, pronghorn, and elk are found in all four states in the planning area, whereas the javelina range is restricted to Texas.

Small Mammals

Bats are found throughout the planning area, with approximately 22 species found in Oklahoma, 31 in Texas, and 15 in Kansas (Kansas State University Agricultural Experiment Station and Cooperative Extension Service 2005; ODWC 2014; Texas Parks and Wildlife 2007). Roost sites are widely distributed and include rock crevices, trees, caves, buildings, and bridges. (The location and distribution of cave and karst resources in the decision area are described under Section 2.2.16.) Terrestrial mammals, such as squirrels, cottontails, and mice, are also common throughout much of the decision area. In southeastern Oklahoma, Clark et al. (1998) found that relative abundances of all small mammals were significantly greater in fencerows, in lowland prairie, and in lowland prairie with more forbs and shrubs than upland prairie.

Amphibians and Reptiles

A rich diversity of amphibians and reptiles is found throughout the decision area. Aquatic environments, such as reservoirs with subsurface BLM management, provide habitat for numerous species of turtles, frogs, amphibians, and other reptiles.

Migratory Birds

Decision area lands are used for nesting and foraging grounds by large numbers of migratory birds. (Migratory bird survey data are collected by the USGS Wildlife Research Center in Patuxent, Maryland.) There are over 60 breeding bird survey routes in Oklahoma and in Kansas and approximately 200 in Texas (Pardieck et al. 2014). Data are available online by survey route at https://www.pwrc.usgs.gov/BBS/Public DataInterface/index.cfm.

The 2008 USFWS Birds of Conservation Concern report identifies migratory nongame birds that, without additional conservation action, are likely to become candidates for listing under the Endangered Species Act (USFWS 2008). For Kansas, Oklahoma, and Texas, a total of 117 birds are on this list from ten regions. The regions in Kansas are short-grass prairie, central mixed-grass prairie, and eastern tall-grass prairie. In Oklahoma, the regions are short-grass prairie, central mixed-grass prairie, oaks and prairies, eastern tall-grass prairie, Mississippi alluvial valley, and west Gulf coastal plain. In Texas, the regions are short-grass prairie, central mixed-grass prairie, Chihuahuan desert, Edwards plateau, oaks and prairies, west gulf coastal plain, Tamaulipan

brushlands, and Gulf-coastal prairie (USFWS 2008). **Table 2-17** shows the Birds of Conservation Concern in each region.

Table 2-17
USFWS Birds of Conservation Concern

Bird of Conservation Concern	Shortgrass prairie	Central mixed-grass prairie	Edwards plateau	Oaks and prairies	Eastern tallgrass prairie	Mississippi alluvial plan	West Gulf coastal plain	Chihuahuan desert	Tamaulipan Brushlands	Gulf-coastal prairie
Pied-billed Grebe					x					
Horned grebe					x					
Audubon's shearwater										x
Band-rumped storm-petrel										x
American bittern					x	x				x
Least bittern					x	x	x			x
Reddish egret										x
Black-crowned night-heron					x					
Lesser prairie-chicken	x	x								
Little blue heron		x		x			x			
Swallow-tailed kite				x		x	x			x
Mississippi kite		x								
Bald eagle	x	x	x	x	x	x	x	x		x
Golden eagle	x							x		
Peregrine falcon			x	x	x	x		x		x
Prairie falcon	x									
Harris's hawk									x	
Swainson's hawk		x							x	
Ferruginous hawk								x		
Common black-hawk								x		
White-tailed hawk										x
American kestrel							x			
Black rail		x		x	x	x				x
Yellow rail						x	x			x
Snowy plover	x	x						x	x	x
Wilson's plover										x
Mountain plover	x	x	x					x	x	x
American oystercatcher										x
Solitary sandpiper		x			x		x		x	x
Upland sandpiper	x	x	x	x	x					x
Lesser yellowlegs									x	x

Table 2-17
USFWS Birds of Conservation Concern

Bird of Conservation Concern	Shortgrass prairie	Central mixed-grass prairie	Edwards plateau	Oaks and prairies	Eastern tallgrass prairie	Mississippi alluvial plan	West Gulf coastal plain	Chihuahuan desert	Tamaulipan Brushlands	Gulf-coastal prairie
Long-billed curlew	x	x	x	x				x	x	x
Whimbrel					x					x
Hudsonian godwit		x		x	x	x	x			x
Marbled godwit		x			x	x				x
Red knot					x					x
Buff-breasted sandpiper		x		x	x	x	x			x
Short-billed dowitcher		x			x	x				x
Least tern										x
Black tern					x					
Common tern					x					
Gull-billed tern									x	x
Sandwich tern										x
Black skimmer										x
Red-billed pigeon									x	
Green parakeet									x	
Red-crowned parrot									x	
Black-billed cuckoo					x					
Yellow-billed cuckoo								x		
Flammulated owl								x		
Elf owl								x	x	
Short-eared owl					x	x				x
Burrowing owl	x							x	x	
Lucifer hummingbird								x		
Buff-bellied hummingbird									x	
Whip-poor-will					x					
Chuck-will’s widow							x			
Red-headed woodpecker		x		x	x	x	x			
Lewis’s woodpecker	x									
Scissor-tailed flycatcher		x		x						
Willow flycatcher	x									
Northern flicker					x					
Acadian flycatcher					x					
Loggerhead shrike		x		x	x		x	x		x
Brown-headed nuthatch							x			

Table 2-17
USFWS Birds of Conservation Concern

Bird of Conservation Concern	Shortgrass prairie	Central mixed-grass prairie	Edwards plateau	Oaks and prairies	Eastern tallgrass prairie	Mississippi alluvial plan	West Gulf coastal plain	Chihuahuan desert	Tamaulipan Brushlands	Gulf-coastal prairie
Northern beardless-tyrannulet									x	
Rose-throated becard									x	
Gray vireo			x					x		
Bell's vireo	x	x		x	x			x	x	
Verdin									x	
Bendire's thrasher								x		
Curve-billed Thrasher									x	
Bewick's wren					x		x			
Sedge wren						x				x
Wood thrush					x	x	x			
Sprague's pipit	x	x		x			x	x	x	x
Tropical parula									x	
Summer tanager									x	
White-collared seedeater									x	
Virginia's warbler								x		
Prairie warbler							x			
Worm-eating warbler							x			
Louisiana waterthrush							x			
Swainson's warbler				x		x	x			x
Blue-winged warbler					x					
Cerulean warbler					x	x	x			
Prothonotary warbler					x	x	x			x
Kentucky warbler					x	x	x			
Colima warbler								x		
Red-faced warbler								x		
Yellow warbler								x		
Grace's warbler								x		
Botteri's sparrow										x
Bachman's sparrow							x			
Field sparrow					x					
Grasshopper sparrow					x					x
Rufous-crowned sparrow			x							
Black-chinned sparrow								x		
Cassin's sparrow		x						x	x	

Table 2-17
USFWS Birds of Conservation Concern

Bird of Conservation Concern	Shortgrass prairie	Central mixed-grass prairie	Edwards plateau	Oaks and prairies	Eastern tallgrass prairie	Mississippi alluvial plan	West Gulf coastal plain	Chihuahuan desert	Tamaulipan Brushlands	Gulf-coastal prairie
Henslow's sparrow		x		x	x	x	x			x
Harris's sparrow		x	x	x						
Leconte's sparrow						x				x
Nelson's sharp-tailed sparrow										x
Seaside sparrow										x
Lark bunting	x	x						x	x	
Baird's sparrow								x		
McCown's longspur	x	x	x					x		
Smith's longspur		x		x	x		x			
Chestnut-collared longspur	x	x	x					x	x	
Varied bunting								x	x	
Painted bunting						x	x	x	x	x
Dickcissel					x	x			x	x
Rusty blackbird						x				
Orchard oriole			x	x	x	x	x			
Hooded oriole									x	
Altamira oriole									x	
Audubon's oriole									x	

Source: USFWS 2008

The Important Bird Areas (IBA) Program is an effort by the National Audubon Society and local partners to identify and conserve areas vital to birds and other species in the habitat. Identifying vital areas worldwide is an important step to improving public awareness and support and ensuring that all IBAs are properly managed and conserved. Bird habitats are threatened by habitat loss and fragmentation from human development. Coupled with global warming and introduced predators, these factors pose serious threats to populations of birds across America and around the world. By working to identify and implement conservation strategies in IBAs, Audubon and partners hope to avoid additional populations being listed as endangered or threatened or dropping to dangerously low levels. Approximately 441,400 acres of BLM-administered federal mineral estate lands overlap with IBAs in the planning area. No BLM-administered surface lands in the planning area are IBAs (see **Table 2-19**; Audubon GIS 2015).

Table 2-18
Important Bird Areas in the Planning Area

Name	Importance	Acreage	Notes
Kansas			
Cheyenne Bottoms Preserve and Wildlife Area	Global	27,552	Whooping crane and 47 other bird species
Cimarron National Grassland	Global	108,178	Lesser prairie-chicken, golden eagle, 3 other species
Flint Hills Region	Global	3,300,112	Sprague's pipit, greater prairie-chicken and 13 other species
John Redmond Reservoir and Flint Hills National Wildlife Refuge	State	18,464	Snow goose
Kirwin National Wildlife Refuge	State	10,779	N/A
Marais des Cygnes Wildlife Area and National Wildlife Refuge	Global	15,145	Red-headed woodpecker and 2 other species
Neosho Wildlife Area	State	3,247	
Quivira National Wildlife Refuge	Global	22,136	Whooping crane and 3 other bird species
Red Hills Region	Global	2,298,319	Lesser prairie-chicken
Oklahoma			
Salt Plains National Wildlife Refuge	Global	32,000	Whooping crane and 5 other species
Selman Ranch	State	13,998	Lesser prairie-chicken and 4 other species
Tallgrass Prairie Preserve	Global	38,702	Greater prairie-chicken and 5 other species
Wichita Mountains National Wildlife Refuge	Global	59,021	Painted bunting and 3 other species
Texas			
Balcones Canyonlands National Wildlife Refuge	Global	80,003	Golden-cheeked warbler
Balcones Canyonlands Preserve	Global	27,928	Golden-cheeked warbler, dicksissel, and 120 other species
Blackjack Peninsula of Aransas National Wildlife Refuge	Global	70,504	Whooping crane and 4 other species
Brown Property	Global	321	Golden-cheeked warbler
Columbia Bottomlands	State	177,004	Bell's vireo, bald eagle, hooded warbler, and 5 other species
Deadman Island/Long Reef	State	5	Black skimmer, Sandwich tern, and 14 other species

Table 2-18
Important Bird Areas in the Planning Area

Name	Importance	Acreage	Notes
Dressing Point	Global	5	Black skimmer and 4 other species
Fort Hood	Global	217,008	Golden-cheeked warbler
Green Island	Global	25	Reddish egret and 4 other species
Jigsaw Islands	Global	2	Black skimmer, royal tern, and 5 other species
Katy Prairie Conservancy	Global	17,500	Buff-breasted sandpiper, northern bobwhite, wood stork, and 5 other species
Laguna Vista Spoils	Global	2	Black skimmer and 4 other species
Lavaca Bay Spoils	Global	12	Black skimmer and 4 other species
Little Pelican Island	State	N/A	Black skimmer, brown pelican, and 3 other species
Mustang Bayou Island	State	2	Royal tern, brown pelican, and 16 other species
Nature Conservancy Dolan Falls Preserve	Global	18,523	Golden-cheeked warbler, Bell's Vireo, painted bunting
Nature Conservancy Independence Creek Preserve	Global	19,741	Painted bunting, Bell's vireo
Nature Conservancy Love Creek Preserve	Global	1,401	Golden-cheeked warbler, Bell's vireo, painted bunting, olive-sided flycatcher
North Deer Island	Global	143	Brown pelican and 4 other species
Port Bolivar Bird Sanctuaries—Bolivar Flats	Global	1,796	Clapper rail, snowy plover, and 20 other species
Port Bolivar Bird Sanctuaries—Horseshoe Marsh	State	N/A	Piping plover, brown pelican, and 11 other species
Sabal Palm Sanctuary	State	526	Green kingfisher, buff-bellied hummingbird, and 8 other species
Southernmost Edwards Plateau	Global	15,308	Golden-cheeked warbler
Sundown Island	Global	69	Black skimmer, brown pelican, and 15 other species
Yoakum Dunes Preserve	Global	7,099	Lesser prairie-chicken

Source: National Audubon Society Important Bird Areas. http://netapp.audubon.org/IBA/Map/All
N/A: Not available

Trends

Fisheries

Dams, diversions, and alterations of instream flow, in combination with and independent of adjacent land use activities, has historically affected fish and other aquatic invertebrates in the planning area. This has created unsuitable conditions for some species (Anderson et al. 1995). Additionally, the introduction and spread of aquatic nuisance species has disrupted ecological processes and displaced native species.

Wildlife and Migratory Birds

For the short-grass prairie (high plains) in western Oklahoma, Texas Panhandle and western Kansas, invasive weeds, water quality changes, and habitat loss and fragmentation threaten habitat for migratory birds. The trend for most species is unknown, but many species appear to be declining (OK Department of Wildlife Conservation 2005). In Kansas, agricultural practices and poorly managed grazing systems are primary causes of habitat fragmentation (Wasson et al. 2005). Similar trends are apparent in the mixed-grass prairie of western Oklahoma, the tall-grass prairie, and Osage Plain regions. Certain areas also face water quality decline, often nutrient loading from agricultural runoff, and habitat loss and fragmentation. These are mixed-grass prairie and oak woodland habitat of central Oklahoma and northern Texas and the western Gulf coastal plain and mountains of eastern Oklahoma, Kansas, and Texas. Agricultural practices are a primary driver of fragmentation (Wasson et al. 2005). These threats as well as heavy recreational use impact the Ozark Mountains area of northeastern Oklahoma (OK Department of Wildlife Conservation 2005).

Climate conditions play an important role in wildlife production and habitat quality and quantity. Persistent droughts have contributed to range-wide bobwhite quail population declines since the 1960s (ODWC 2011). Similar declines have been observed with the greater prairie-chickens due to woody encroachment of native grasslands, which can reduce suitable habitat (Kansas Department of Wildlife, Parks, and Tourism 2014). For other upland game species, such as the wild turkey, long-term population trends have generally increased since the second half of the twentieth century, in part due to restocking and restoration. Private landowner conservation programs, such as the Conservation Reserve Program, have helped to preserve wildlife habitat on nonfederal lands in the planning area. These programs offer eligible farmers and ranchers monetary incentives for protecting their land.

Variable changes in bat abundance over a 40-year survey period have been documented in the Red Hill region of Kansas and Oklahoma, an area that lies at the peripheries of four bat species' distributions. Increasing abundance of some hibernacula may reflect range expansions or changes in the quality of hibernacula or other habitat aspects (Prendergast et al. 2010). Decision area lands in this region are primarily restricted to BLM subsurface tracts. Factors contributing to the decline of bat populations are loss of habitat from surface mining operations, urbanization, lake and reservoir construction, and cave commercialization and vandalism (ODWC 2014). Bat fatalities are also associated with wind energy operations (Arnett et al. 2009). A study in southeastern Oklahoma found that

trends related to the abundance and distribution of other terrestrial small mammals is largely influenced by humans and varies by species (Clark et al. 1998). For example, deer mice (*Peromyscus maniculatus*) populations have responded positively to agricultural conversion and livestock grazing, whereas western harvest mice (*Reithrodontomys megalotis*) have been reduced in cultivated areas (Clark et al. 1998).

Forecast

Fish stocking in reservoirs with BLM subsurface management is expected to continue, as is the spread of aquatic invasive species. Migratory bird populations will continue to be impacted by habitat fragmentation and climate change, reducing effective habitat availability for nesting, migratory stopovers, and winter habitat for many species. Private landowner conservation incentives and federal and state wildlife regulations will help to preserve important fish and wildlife habitat.

Key Features

Several specific regions in the decision area provide important habitat for fish and wildlife species. The 11,800-acre Cross Bar Ranch north of Amarillo along the Canadian River is the only BLM-administered surface tract in Texas. Other key areas are the Red River Management Area along the Oklahoma and Texas border and various reservoirs with BLM subsurface management. Caves and karst resources, described under Section 2.2.16, also provide valuable habitat for bats, arachnids, troglobites (permanent cave-dwelling species), and various other animals.

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2.2.8 Special Status Species

Special status species is a universal term used in the scientific community. It refers to species that are considered sufficiently rare that they require special consideration and protection and should be listed or have been listed as rare, threatened, or endangered by the federal or state governments or both. The authority for this policy and guidance regarding the evaluation of special status species comes from the Endangered Species Act of 1973, as amended; the FLPMA; and BLM Special Status Species Management (Manual 6840).

Indicators

A species is listed under the Endangered Species Act when it is determined to be endangered or threatened because of any of the following factors:

- The present or threatened destruction, modification, or curtailment of its habitat or range

- Overuse for commercial, recreational, scientific, or education purposes
- Disease or predation
- Inadequacy of existing regulatory mechanisms
- Other natural or man-made factors affecting survival

Important habitat features are vertical and horizontal structure, moisture, sunlight, and temperature. If only one of these conditions is inappropriate, a species may not be able to survive. Some species depend on more than one habitat type and need a variety of habitats near each other to survive. Habitat does not have to be completely eliminated to lose its usefulness to an organism.

Indicators for federal-listed species and other special status species (e.g., state threatened or endangered species and species of greatest conservation need) may include population surveys, habitat assessments, and other monitoring studies.

Current Condition

Federal-Listed and Proposed Species
According to the ESA, an endangered species is any species that is in danger of extinction throughout all or a significant portion of its range; a threatened species is any that is likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

The OFO manages habitats for species listed by the USFWS as endangered, threatened, or proposed under the authority of the ESA. For federal-listed and proposed species occurring within the planning area, see **Table 2-19**.

Table 2-19
Federal-Listed and Proposed Species Occurring in the Planning Area

Group	Common Name	Scientific Name (Synonym)	Federal Status*	Other Status* (State)	State Where Present
Amphibians	Houston toad	*Anaxyrus houstonensis*	E	SE (TX)	TX
Amphibians	Salado salamander	*Eurycea chisholmensis*	T		TX
Amphibians	San Marcos salamander	*E. nana*	T	ST (TX)	TX
Amphibians	Georgetown salamander	*E. naufragia*	T		TX
Amphibians	Texas blind salamander	*E. rathbuni*	E	SE (TX)	TX
Amphibians	Barton Springs salamander	*E. sosorum*	E	SE (TX)	TX

Table 2-19
Federal-Listed and Proposed Species Occurring in the Planning Area

Group	Common Name	Scientific Name (Synonym)	Federal Status*	Other Status* (State)	State Where Present
Amphibians	Jollyville salamander	*E. tonkawae*	T		TX
Amphibians	Austin blind salamander	*E. waterlooensis*	E		TX
Birds	Sprague's pipit	*Anthus spragueii*	C	BCC	OK, TX
Birds	Rufa red knot	*Calidris canutus rufa*	T		TX
Birds	Piping plover	*C. melodus*	T	ST (OK, TX, NE)	OK, KS, TX
Birds	Mountain plover	*C. montanus*	C	ST (NE), BCC, SINC (KS)	OK, KS
Birds	Western yellow-billed cuckoo	*Coccyzus americanus occidentails*	T	BCC	TX
Birds	Golden-cheeked warbler	*Dendroica chrysoparia*	E	SE (TX)	TX
Birds	Southwestern willow flycatcher	*Empidonax traillii extimus*	E	SE (TX), BCC	TX
Birds	Northern aplomado falcon	*Falco femoralis septentrionalis*	E	SE (TX)	TX
Birds	Whooping crane	*Grus americana*	E	SE (OK, TX, NE)	OK, KS, TX
Birds	Eskimo curlew	*Numenius borealis*	E	SE (TX, NE)	KS, TX
Birds	Red-cockaded woodpecker	*Picoides borealis*	E	SE (TX), REA	OK, TX
Birds	Least tern	*Sterna antillarum*	E	SE (KS), BCC	KS

Table 2-19
Federal-Listed and Proposed Species Occurring in the Planning Area

Group	Common Name	Scientific Name (Synonym)	Federal Status*	Other Status* (State)	State Where Present
Birds	Interior least tern	*S. antillarum athalassos*	E	SE (KS, TX, NE), BCC	OK, KS, TX
Birds	Mexican spotted owl	*Strix occidentalis lucida*	T	ST (TX)	TX
Birds	Attwater's greater prairie chicken	*Tympanuchus cupido attwateri*	E	SE (TX)	TX
Birds	Lesser prairie-chicken	*Tympanuchus pallidicinctus*	T	BCC	OK, TX
Birds	Black-capped vireo	*Vireo atricapilla*	E	SE (TX)	OK, KS, TX
Fishes	Ozark cavefish	*Amblyopsis rosae*	T		OK
Fishes	Leon Springs pupfish	*Cyprinodon bovinus*	E	SE (TX)	TX
Fishes	Comanche Springs pupfish	*C. elegans*	E	SE (TX)	TX
Fishes	Devils River minnow	*Dionda diaboli*	T	ST (TX)	TX
Fishes	Arkansas darter	*Etheostoma cragini*	C	ST (KS)	OK, KS
Fishes	Fountain darter	*E. fonticola*	E	SE (TX)	TX
Fishes	Big Bend gambusia	*Gambusia gaigei*	E	SE (TX)	TX
Fishes	San Marcos gambusia (extinct)	*G. georgei*	E	SE (TX)	TX
Fishes	Clear Creek gambusia	*G. heterochir*	E	SE (TX)	TX
Fishes	Pecos gambusia	*G. nobilis*	E	SE (TX)	TX
Fishes	Rio Grande silvery minnow	*Hybognathus amarus*	E	SE (TX)	TX
Fishes	Smalleye shiner	*Notropis buccula*	E		TX
Fishes	Arkansas River shiner	*N. girardi*	T	SE (KS), ST (TX)	OK, KS, TX
Fishes	Sharpnose shiner	*Notropis oxyrhynchus*	E		TX

Table 2-19
Federal-Listed and Proposed Species Occurring in the Planning Area

Group	Common Name	Scientific Name (Synonym)	Federal Status*	Other Status* (State)	State Where Present
Fishes	Topeka shiner	*N. topeka*	E	ST (KS) SE (NE)	KS
Fishes	Neosho madtom	*Noturus placidus*	T	ST (KS)	OK, KS
Fishes	Leopard darter	*Percina pantherina*	T		OK
Fishes	Smalltooth sawfish	*Pristis pectinata*	E	SE (TX)	TX
Fishes	Pallid sturgeon	*Scaphirhynchus albus*	E	E (KS, NE)	KS, NE
Invertebrates	Ouachita Rock pocketbook	*Arkansia wheeleri*	E		OK
Invertebrates	Pecos assiminea snail	*Assiminea pecos*	E	SE (TX)	TX
Invertebrates	Coffin Cave mold beetle	*Batrisodes texanus*	E		TX
Invertebrates	Helotes mold beetle	*Batrisodes venyivi*	E		TX
Invertebrates	Robber baron cave meshweaver	*Cicurina baronia*	E		TX
Invertebrates	Madla Cave meshweaver	*C. madla*	E		TX
Invertebrates	Bracken bat cave meshweaver	*C. venii*	E		TX
Invertebrates	Government Canyon bat cave meshweaver	*C. vespera*	E		TX
Invertebrates	Warton Cave meshweaver	*C. wartoni*	C		TX
Invertebrates	Diminutive amphipod	*Gammarus hyalleloides*	E		TX
Invertebrates	Pecos amphipod	*G. pecos*	E		TX
Invertebrates	Comal Springs riffle beetle	*Heterelmis comalensis*	E		TX
Invertebrates	Texas fatmucket	*Lampsilis bracteata*	C	ST (TX)	TX
Invertebrates	Scaleshell	*Leptodea leptodon*	E	SE (NE)	OK

Table 2-19
Federal-Listed and Proposed Species Occurring in the Planning Area

Group	Common Name	Scientific Name (Synonym)	Federal Status*	Other Status* (State)	State Where Present
Invertebrates	American burying beetle	*Nicrophorus americanus*	E	SE (KS, NE)	OK, KS, TX
Invertebrates	Rattlesnake master-borer moth	*Papaipema eryngii*	C		OK
Invertebrates	Texas hornshell	*Popenaias popeii*	C	ST (TX)	TX
Invertebrates	Diamond Y spring snail	*Pseudotryonia adamantina*	E		TX
Invertebrates	Phantom Cave snail	*Pyrgulopsis texana*	E		TX
Invertebrates	Golden orb	*Quadrula aurea*	C	ST (TX)	TX
Invertebrates	Winged mapleleaf	*Q. fragosa*	E		OK
Invertebrates	Smooth pimpleback	*Q. houstonensis*	C	ST (TX)	TX
Invertebrates	Texas pimpleback	*Q. petrina*	C	ST (TX)	TX
Invertebrates	A ground beetle	*Rhadine exilis*	E		TX
Invertebrates	A ground beetle	*R. infernalis*	E		TX
Invertebrates	Tooth Cave ground beetle	*R. persephone*	E		TX
Invertebrates	Peck's Cave amphipod	*Stygobromus pecki*	E	SE (TX)	TX
Invertebrates	Comal Springs dryopid beetle	*S. comalensis*	E		TX
Invertebrates	Tooth Cave pseudoscorpion	*Tartarocreagris texana*	E		TX
Invertebrates	Gov. Canyon bat cave spider	*Tayshaneta microps*	E		TX
Invertebrates	Tooth Cave spider	*T. myopica*	E		TX
Invertebrates	Kretschmarr Cave mold beetle	*Texamaurops reddelli*	E		TX
Invertebrates	Cokendolpher Cave harvestman	*Texella cokendolpheri*	E		TX
Invertebrates	Reddell harvestman	*T. reddelli*	E		TX
Invertebrates	Bone Cave harvestman	*T. reyesi*	E		TX
Invertebrates	Texas fawnsfoot	*Truncilla macrodon*	C	ST (TX)	TX

Table 2-19
Federal-Listed and Proposed Species Occurring in the Planning Area

Group	Common Name	Scientific Name (Synonym)	Federal Status*	Other Status* (State)	State Where Present
Invertebrates	Phantom spring snail	*Tryonia cheatumi*	E		TX
Invertebrates	Gonzales springsnail	*T. circumstriata*	E		TX
Mammals	Finback whale	*Balaenoptera physalus*	E	SE (TX)	TX
Mammals	Gray wolf	*Canis lupus*	E	SE (TX)	TX
Mammals	Red wolf	*C. rufus*	E	SE (TX)	TX
Mammals	Ozark big-eared bat	*Corynorhinus townsendii ingens*	E		OK
Mammals	Jaguarundi	*Herpailurus yaguarondi*	E	SE (TX)	TX
Mammals	Ocelot	*Leopardus pardalis*	E	SE (TX)	TX
Mammals	Mexican long-nosed	*Leptonycteris nivalis*	E	SE (TX)	TX
Mammals	Humpback whale	*Megaptera novaeangliae*	E	SE (TX)	TX
Mammals	Black-footed ferret	*Mustela nigripes*	E	SE (KS, NE)	KS
Mammals	Gray myotis	*Myotis grisescens*	E	SE (KS)	OK, KS
Mammals	Northern long-eared Bat	*M. septentrionalis*	PE		OK, KS
Mammals	Indiana bat	*M. sodalis*	E		OK
Mammals	Jaguar	*Panthera onca*	E	SE (TX)	TX
Mammals	West Indian manatee	*Trichechus manatus*	E	SE (TX)	TX
Mammals	Louisiana black bear	*Ursus americanus luteolus*	T	ST (TX)	TX
Reptiles	Loggerhead sea turtle	*Caretta caretta*	T	ST (TX)	TX
Reptiles	Green sea turtle	*Chelonia mydas*	T	ST (TX)	TX
Reptiles	Leatherback sea turtle	*Dermochelys coriacea*	E	SE (TX)	TX

Table 2-19
Federal-Listed and Proposed Species Occurring in the Planning Area

Group	Common Name	Scientific Name (Synonym)	Federal Status*	Other Status* (State)	State Where Present
Reptiles	Atlantic hawksbill sea turtle	*Eretmochelys imbricata*	E	SE (TX)	TX
Reptiles	Kemp's ridley sea turtle	*Lepidochelys kempii*	E	SE (TX)	TX
Reptiles	Louisiana pine snake	*Pituophis ruthveni*	C	ST (TX)	TX
Plants	Large-fruited sand-verbena	*Abronia macrocarpa*	E	SE (TX)	TX
Plants	South Texas ambrosia	*Ambrosia cheiranthifolia*	E	SE (TX)	TX
Plants	Mead's milkweed	*Asclepias meadii*	T		KS
Plants	Star cactus	*Astrophytum asterias*	E	SE (TX)	TX
Plants	Texas ayenia	*Ayenia limitaris*	E	SE (TX)	TX
Plants	Texas poppy-mallow	*Callirhoe scabriuscula*	E	SE (TX)	TX
Plants	Bunched cory cactus	*Coryphantha ramillosa* ssp. *ramillosa*	T	ST (TX)	TX
Plants	Terlingua Creek cat's-eye	*Cryptantha crassipes*	E	SE (TX)	TX
Plants	Chisos mountains hedgehog cactus	*Echinocereus chisoensis* var. *chisoensis*	T	ST (TX)	TX
Plants	Pinkflower hedgehog cactus	*E. fendleri* ssp. *fendleri (E. f.* var. *kuenzleri)*	E		TX
Plants	Davis's green pitaya	*Echinocereus viridiflorus* var. *davisii*	E	SE (TX)	TX
Plants	Black lace cactus	*E. reichenbachii* ssp. *fitchii (E. r.* var. *albertii)*	E	SE (TX)	TX
Plants	Lloyd's fishhook cactus	*Echinomastus mariposensis (Neolloydia m.)*	T	ST (TX)	TX
Plants	Nellie's cory cactus	*Escobaria minima (Coryphantha m.)*	E	SE (TX)	TX
Plants	Sneed's pincushion cactus	*E. sneedii* var. *sneedii (Coryphantha s.)*	E	SE (TX)	TX
Plants	Guadalupe fescue	*Festuca ligulata*	C		TX
Plants	Johnston's frankenia	*Frankenia johnstonii*	E	SE (TX)	TX
Plants	Earth fruit	*Geocarpon minimum*	T	ST (TX)	TX

Table 2-19
Federal-Listed and Proposed Species Occurring in the Planning Area

Group	Common Name	Scientific Name (Synonym)	Federal Status*	Other Status* (State)	State Where Present
Plants	Pecos sunflower	*Helianthus paradoxus*	T	ST (TX)	TX
Plants	Neches River rose-mallow	*Hibiscus dasycalyx*	T		TX
Plants	Slender rushpea	*Hoffmannseggia tenella*	E	SE (TX)	TX
Plants	Texas prairie dawn	*Hymenoxys texana*	E	SE (TX)	TX
Plants	Texas golden gladecress	*Leavenworthia texana*	E		TX
Plants	Walker's manioc	*Manihot walkerae*	E	SE (TX)	TX
Plants	Texas trailing phlox	*Phlox nivalis* ssp. *texensis*	E	SE (TX)	TX
Plants	White bladderpod	*Physaria pallida (Lesquerella p.)*	E	SE (TX)	TX
Plants	Zapata bladderpod	*P. thamnophila (Lesquerealla t.)*	E	SE (TX)	TX
Plants	Eastern prairie-fringed orchid	*Platanthera leucophaea*	T	ST (OK)	OK
Plants	Western prairie-fringed orchid	*P. praeclara*	T	ST (OK, NE)	OK
Plants	Little aguja pondweed	*Potamogeton clystocarpus*	E	SE (TX)	TX
Plants	Harperella	*Ptillium nodosum*	E	SE (OK)	OK
Plants	Hinckley's oak	*Quercus hinckleyi*	T	ST (TX)	TX
Plants	Chaffseed	*Schwalbea americana*	E		TX
Plants	Tobusch fishhook cactus	*Sclerocactus brevihamatus* ssp. *tobuschii (Ancistrocactus t.)*	E	SE (TX)	TX
Plants	Lloyd's mariposa cactus	*Sclerocactus mariposensis*	T	ST (TX)	TX
Plants	Navasota ladies'-tresses	*Spiranthes parksii*	E	SE (TX)	TX
Plants	Bracted twistflower	*Streptanthus bracteatus*	C		TX

Table 2-19
Federal-Listed and Proposed Species Occurring in the Planning Area

Group	Common Name	Scientific Name (Synonym)	Federal Status*	Other Status* (State)	State Where Present
Plants	Texas snowbells	*Styrax platanifolius* spp. *texanus (S. t.)*	E	SE (TX)	TX
Plants	Ashy dogweed	*Thymophylla tephroleuca*	E	SE (TX)	TX
Plants	Running buffalo-clover	*Trifoloium stoloniferum*	E		KS
Plants	Texas wild-rice	*Zizania texana*	E	SE (TX)	TX

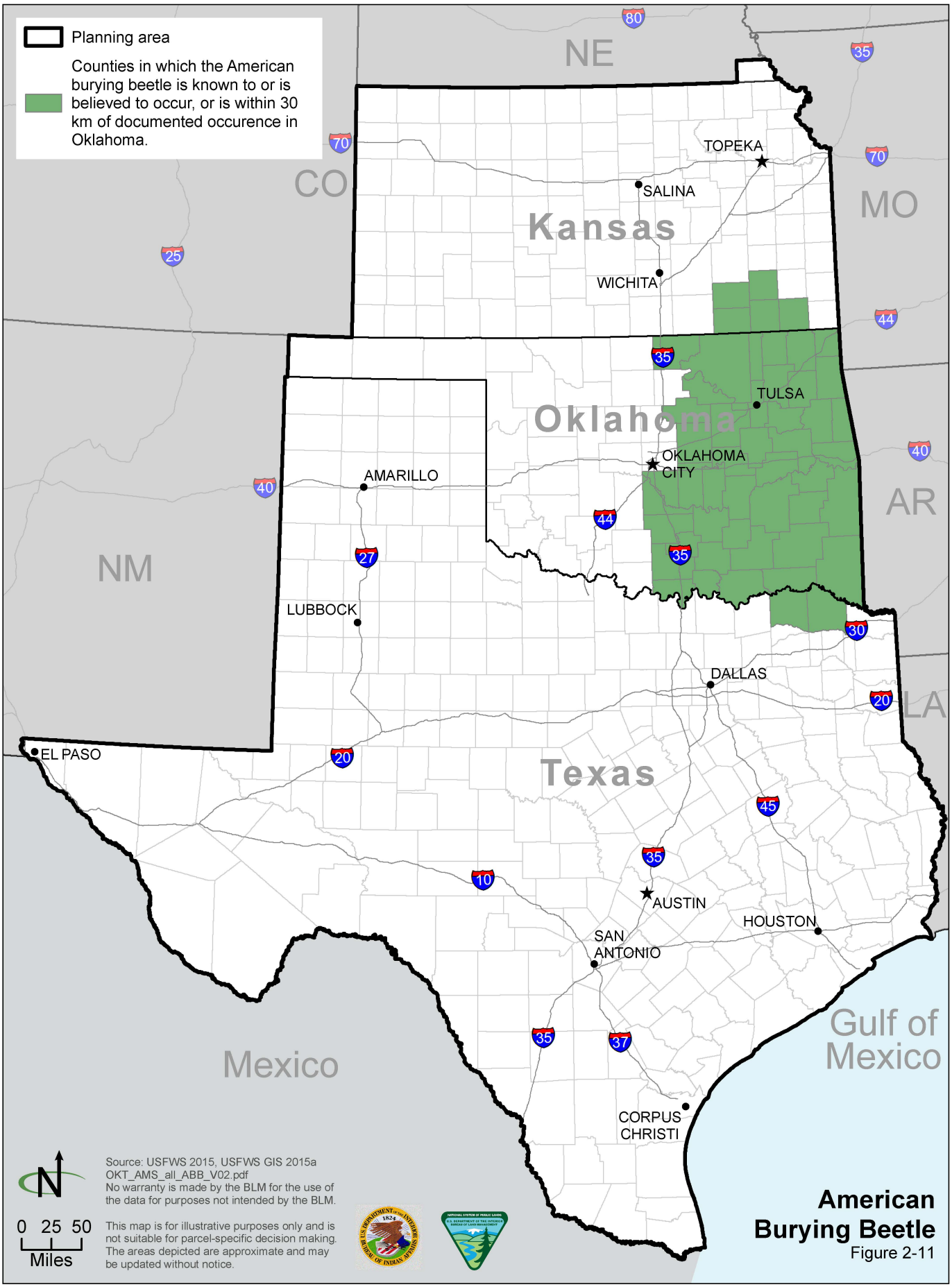
Sources:[2] USFWS 2008; NRCS 2014e, 2014f, 2014g; Nebraska Natural Heritage Program 2013
*Status Codes:
E—Federal-listed Endangered, T—Federal-listed Threatened, C—Federal-listed Candidate, P—Proposed for Listing, BCC—Bird of Conservation Concern, SE—State Endangered, ST—State Threatened
SINC—Species in Need of Conservation, REA—Southern Great Plains Rapid Ecoregional Assessment

In addition, the USFWS has designated critical habitat in the BLM decision area for the following species: Arkansas River shiner (730 acres), Houston toad (10 acres), whooping crane (101,210 acres), piping plover (48,580 acres), zapata bladderpod (5,120 acres), leopard darter (140 acres), and Georgetown salamander (170 acres; USFWS GIS 2014).

Federal-listed key species, including those listed in the Draft Southern Great Plains Rapid Ecoregional Assessment or with known occurrences in the decision area, are discussed in detail below.

American burying beetle (*Nicrophorus americanus).* Federal-listed Endangered
The American burying beetle is approximately 1.0 to 1.5 inches in length, the largest member of its genus in North America. The species is identifiable by its large size and by a large orange-red pronotal disk (the flat, upper-most part of the prominent plate-like structure that covers all or part of the thorax of some insects) (USFWS 1988). Once widely distributed throughout eastern North America, populations have disappeared from most of their historic range. The species occupies a range of habitats, such as tall-grass prairie, woodlands, and forests. In the planning area, the American burying beetle is found primarily in eastern Oklahoma (USFWS 2015), although field surveys have documented occurrences in Kansas and Texas (USFWS 2008; see **Figure 2-11**). In Oklahoma, the highest concentration of beetles is found at Camp Gruber, 32,000 acres of cross-timber habitat with an oak-hickory forest and tall-grass prairie mosaic pattern (USFWS 2008). This area contains decision area BLM subsurface lands.

[2]George Thomas, BLM, personal communication via e-mail with Kevin Rice, EMPSi, regarding special status species list and definition, February 13, 2015.



American Burying Beetle
Figure 2-11

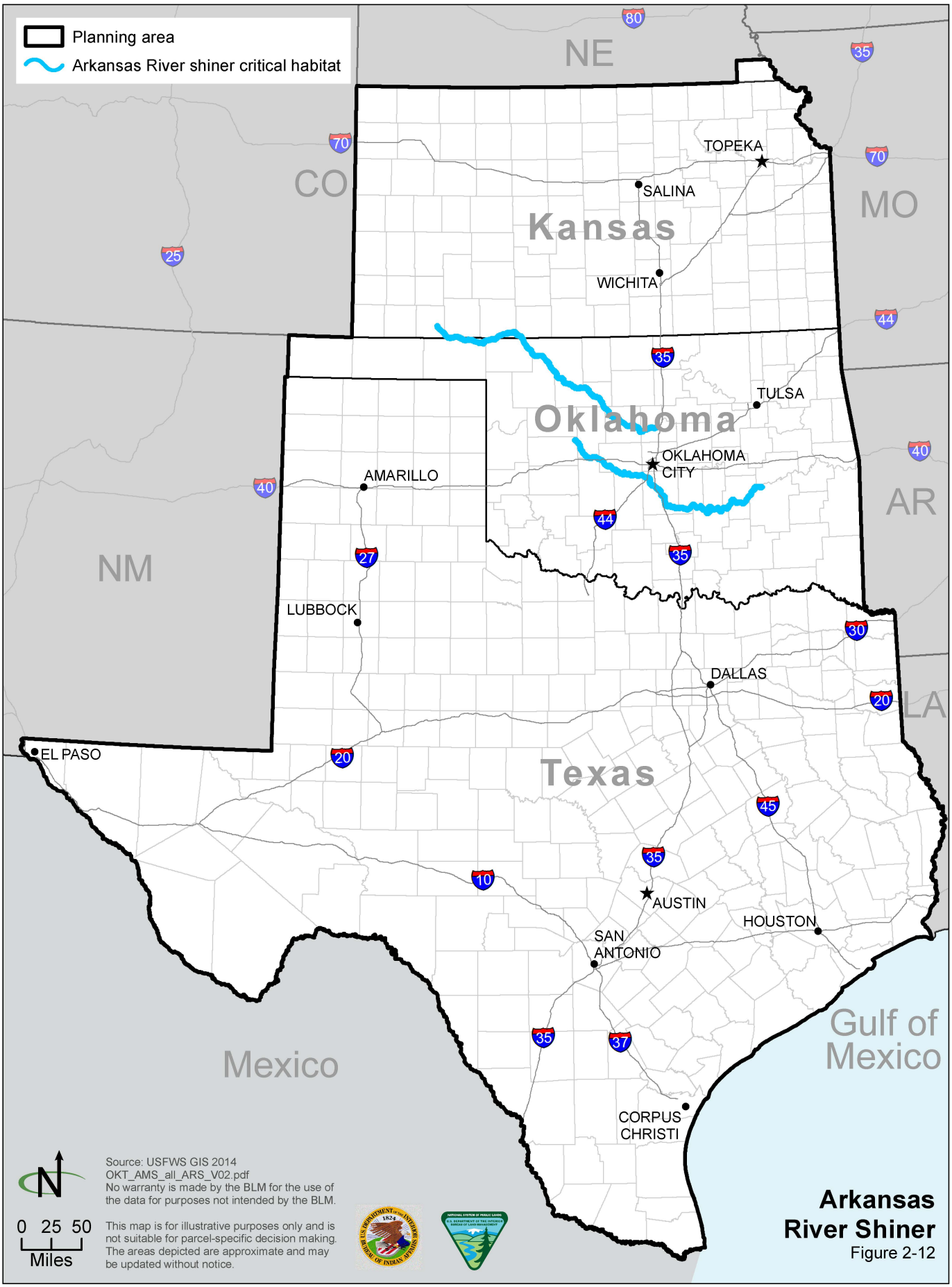
Arkansas River shiner (*Notropis girardi*). Federal-listed as Threatened
The Arkansas River shiner is a small streamlined minnow found in the Arkansas River Basin. The species inhabits shallow braided channels with pool, riffle, run, and backwater components. Water quality is characterized by low contaminant concentration and seasonally variable temperature, turbidity, conductivity, dissolved oxygen, and pH (USFWS 2001).

Historically, the Arkansas River shiner was widespread and abundant throughout the Arkansas River basin in Kansas, New Mexico, Oklahoma, and Texas; however, the species has been reduced from more than 80 percent of its original range. Current populations are almost entirely restricted to approximately 500 miles of the Canadian River in Oklahoma, Texas, and New Mexico (USFWS 1998; see **Figure 2-12** for critical habitat distribution in the planning area). The construction of reservoirs has fragmented, inundated, dewatered, or otherwise directly affected habitat for the Arkansas River shiner, and depletions and diversions continue to threaten the species. Water quality degradation caused by concentrated animal feeding, municipal sewage effluent, and other sources have impacted aggregations (USFWS 2009).

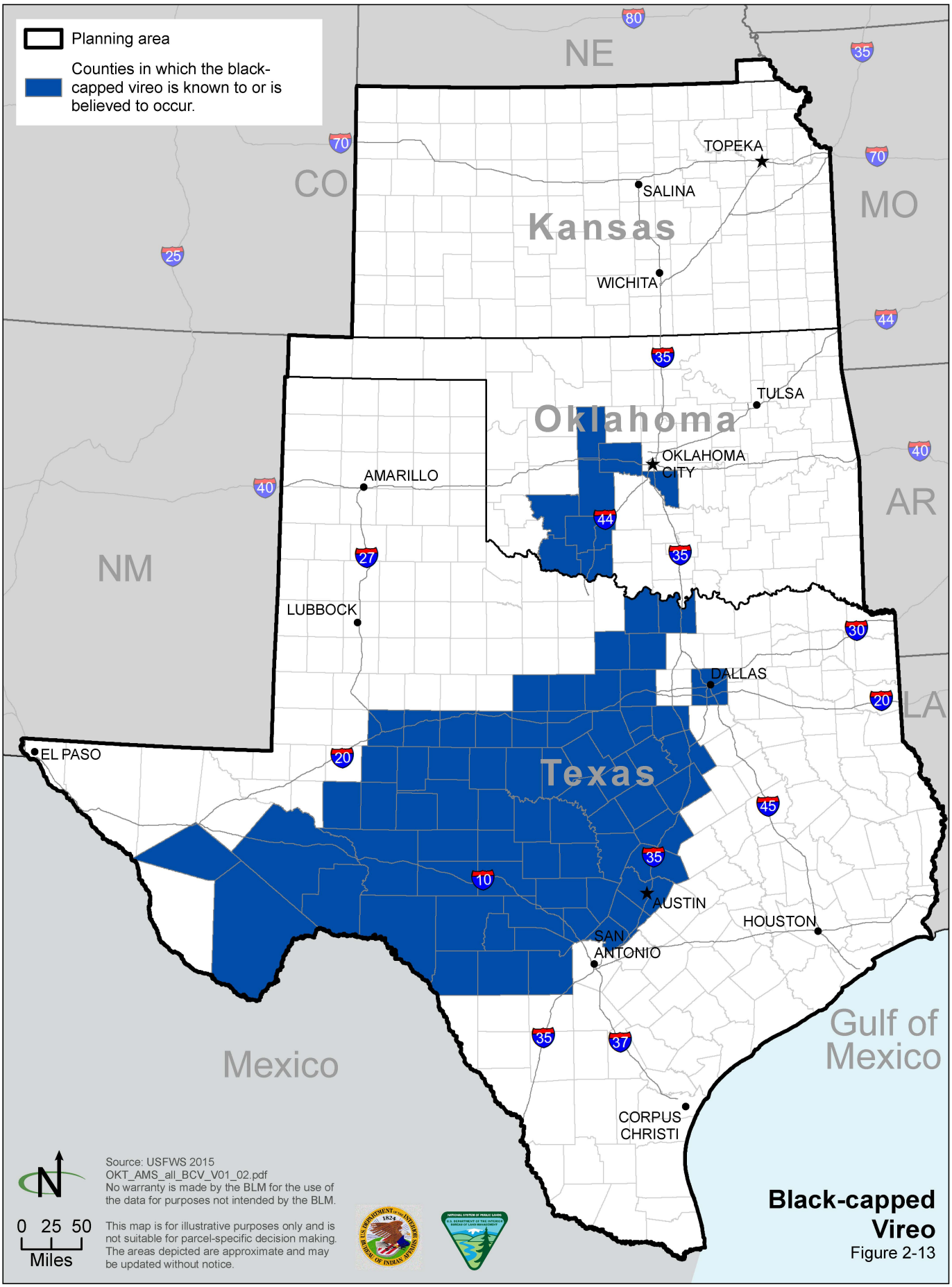
Black-capped vireo (*Vireo atricapilla*). Federal-listed as Endangered
This vireo has white eye rings, olive upper parts, a white breast and belly with yellowish flanks, and a black head (in adult males). It is similar in appearance to the solitary vireo, but somewhat smaller. A long-distance migrant, it nests in Texas and Oklahoma and winters in Mexico. It feeds on insects (especially caterpillars), spiders, and fruits. It is found in shrubland and chaparral habitat, in dense low thickets and oak scrub, mostly on rocky hillsides or steep ravines in rugged terrain. Nests are in tangles of shrubby growth close to the ground in small trees or shrubs, with vegetation extending to the ground, among barren or less vegetated areas.

Historically the black-capped vireo was found from south-central Kansas through central Oklahoma and Texas into northeastern Mexico. Its present range extends from Blaine County, Oklahoma (two locations, only one of which [Wichita Mountains] has substantial numbers), south through central and western Texas into Mexico, where it is thought to be more prevalent. Threats include habitat loss and degradation from human development, fire suppression, effects of grazers, and range management practices that remove low woody vegetation and promote juniper (*Juniperus* sp.) invasion. In addition, it is a frequent host of the brown-headed cowbird (*Molothrus ater*), which may reduce nesting success by 80 to 100 percent in some years (NatureServe 2015; see **Figure 2-13** for the species' range in the planning area).

Interior least tern (*Sterna antillarum athalassos*). Federal-listed as Endangered
Interior least terns nest locally along the Colorado, Red, Arkansas, Missouri, Ohio, and Mississippi Rivers. Least terns nesting on the California coast and along interior rivers are listed as Endangered by USFWS, except areas within 50 miles of the Texas coast. The least tern is the smallest North American tern, gray above, with a black cap and nape, white forehead, and a black line running from the crown through the eye to the base of



Arkansas River Shiner
Figure 2-12



Black-capped Vireo

Figure 2-13

the bill. Interior populations mainly eat aquatic invertebrates, primarily cyprinids. They nest in shallow depressions on the ground on sandy beaches, salt flats, or sparsely vegetated river or lake banks in North America and winter in Mexico and Central America. Least terns were formerly more widespread and common but now survive only in scattered remnants. Their habitat has been decimated by human use of beaches and sandbars and by upstream dams that remove alluvium and create scour in river channels, reducing sandbars and beaches used by least terns for nesting (NatureServe 2015; see **Figure 2-14** for the species range within the planning area).

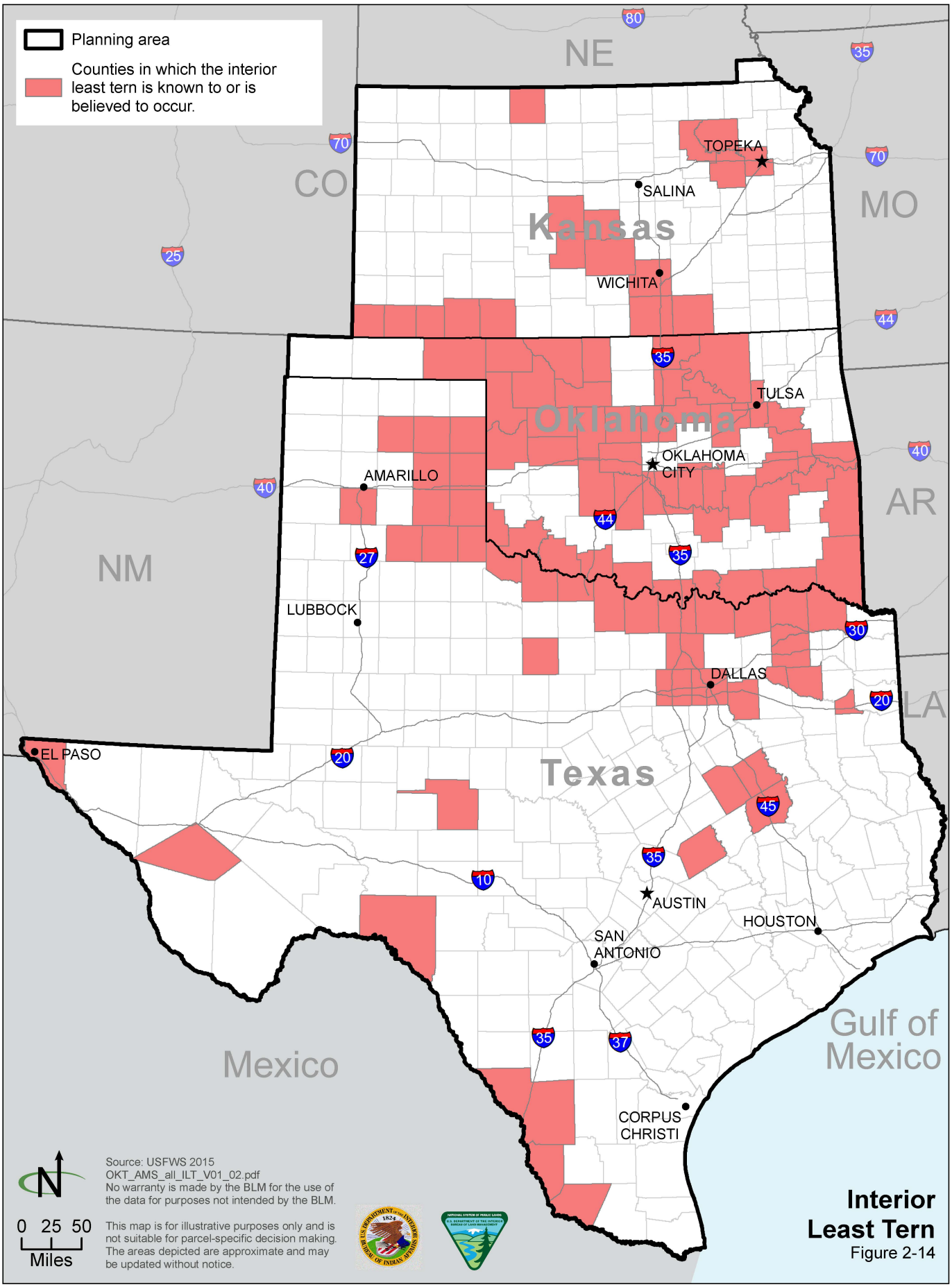
Lesser prairie-chicken (*Tympanuchus pallidicinctus*). Federal-listed as Threatened

The lesser prairie-chicken is characterized by brown and buff-colored barring, similar in appearance to the greater prairie-chicken but slightly smaller. It inhabits mixed-grass/dwarf shrub communities that occur on sandy soils. Principally these communities are the sand sagebrush (*Artemisia filifoilia*)-bluestem (*Andropogon* spp.) association in Colorado, Kansas, and Oklahoma and to a lesser extent Texas and New Mexico. Leks typically occur on knolls or ridges with relatively short or sparse vegetation. Nesting sites are in sand sagebrush or shinnery oak grasslands with high canopy cover in relatively tall dense vegetation. The species' diet includes insects, seeds, acorns, vegetative material, and cultivated grains, such as sorghum.

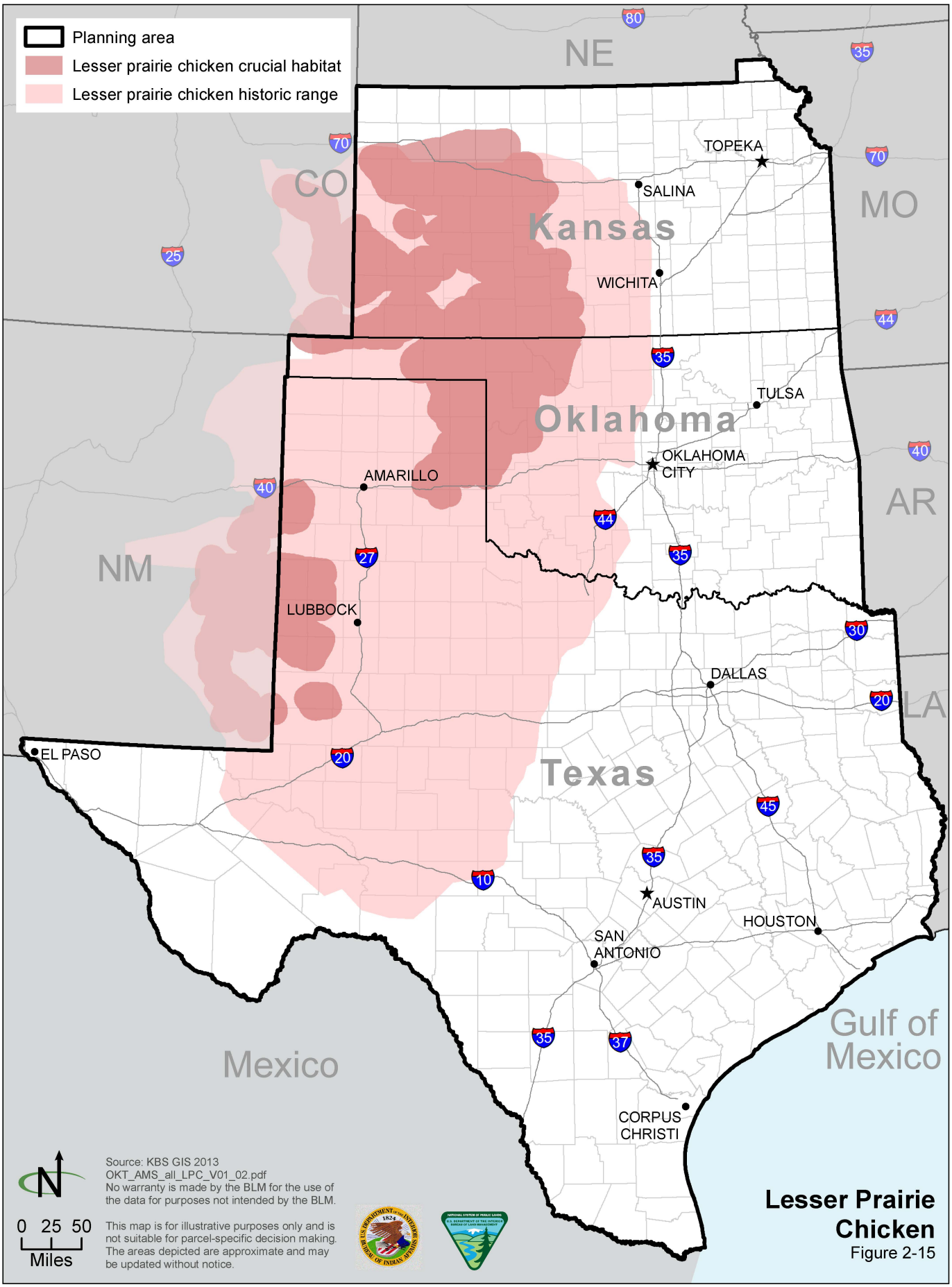
In spring and fall, adults congregate on leks where males engage in communal courtship displays; the number of males attending a lek is influenced by habitat and population density. Droughts and hot dry weather during nesting season negatively impact grass height and may reduce hatching success. Lesser prairie-chickens form flocks in fall and winter and generally do not migrate. Males and females both demonstrate strong site fidelity. The lesser prairie-chicken has a small, fragmented range in the southwestern Great Plains region. Distribution and abundance have declined due to habitat loss, degradation, and fragmentation caused by conversion of native rangelands to cropland, spread of invasive species, and cumulative habitat degradation caused by inappropriate livestock grazing practices, energy development, woodland spread due to fire suppression, and structural and transportation developments (NatureServe 2015). Additionally, aboveground vertical structures, such as power poles, fence posts, oil and gas wells, provide a perch for raptors and can cause general habitat avoidance and displacement (NatureServe 2015). In the planning area, populations are primarily concentrated in western Kansas and the Oklahoma and Texas panhandle region (see **Figure 2-15**).

Red-cockaded woodpecker (*Picoides borealis*). Federal-listed as Endangered

A small woodpecker closely related to the hairy woodpecker (*Picoides villosus*]. Adult males have red streaks (cockades) on either side of the head. They live in groups, unlike other woodpeckers, with a single breeding pair and sometimes helpers, which incubate eggs, feed nestlings and fledglings, and defend territories. The species roosts in cavities excavated in mature pine trees. Rat snake predation takes a heavy toll on nestlings, and flying squirrels (*Gluacomys volans*) may seize and destroy nests. Nesting groups are highly territorial, and competition for cavities is strong with other woodpeckers and



Interior Least Tern
Figure 2-14



Lesser Prairie Chicken
Figure 2-15

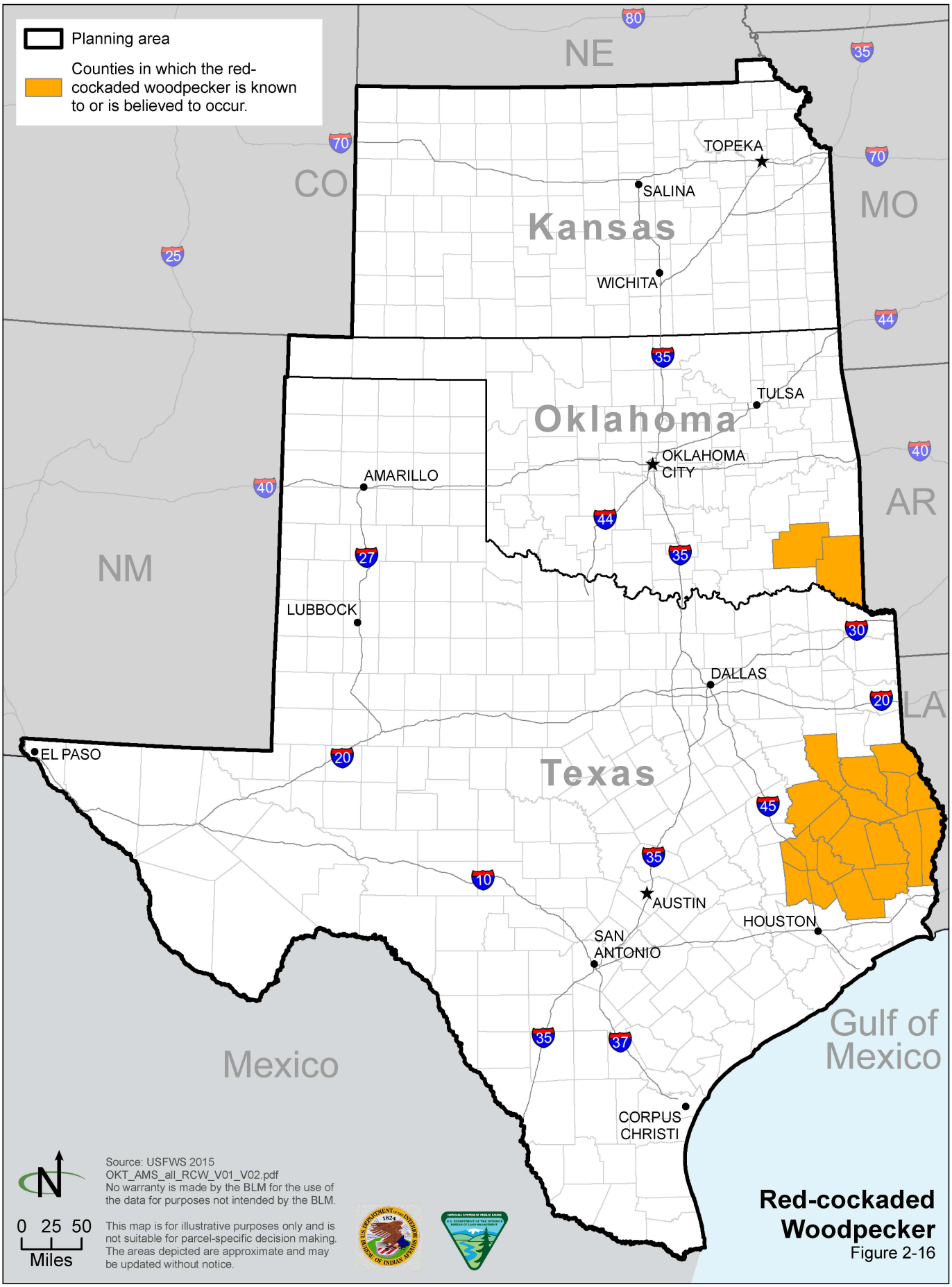
flying squirrels. Home ranges are approximately 100 to 125 acres. Historically found from New Jersey to Texas, this species is now reduced to small fragmented populations in the southeastern US. It is highly imperiled in Oklahoma and Texas; Kansas and Nebraska are not part of its range (see **Figure 2-16**). It requires mature old growth pine trees for cavity nesting and foraging. Deforestation and short rotation timber management practices have removed habitat, while fire suppression has allowed pine stands to be invaded by hardwoods (NatureServe 2015).

Whooping crane (*Grus americana*). Federal-Listed as Endangered

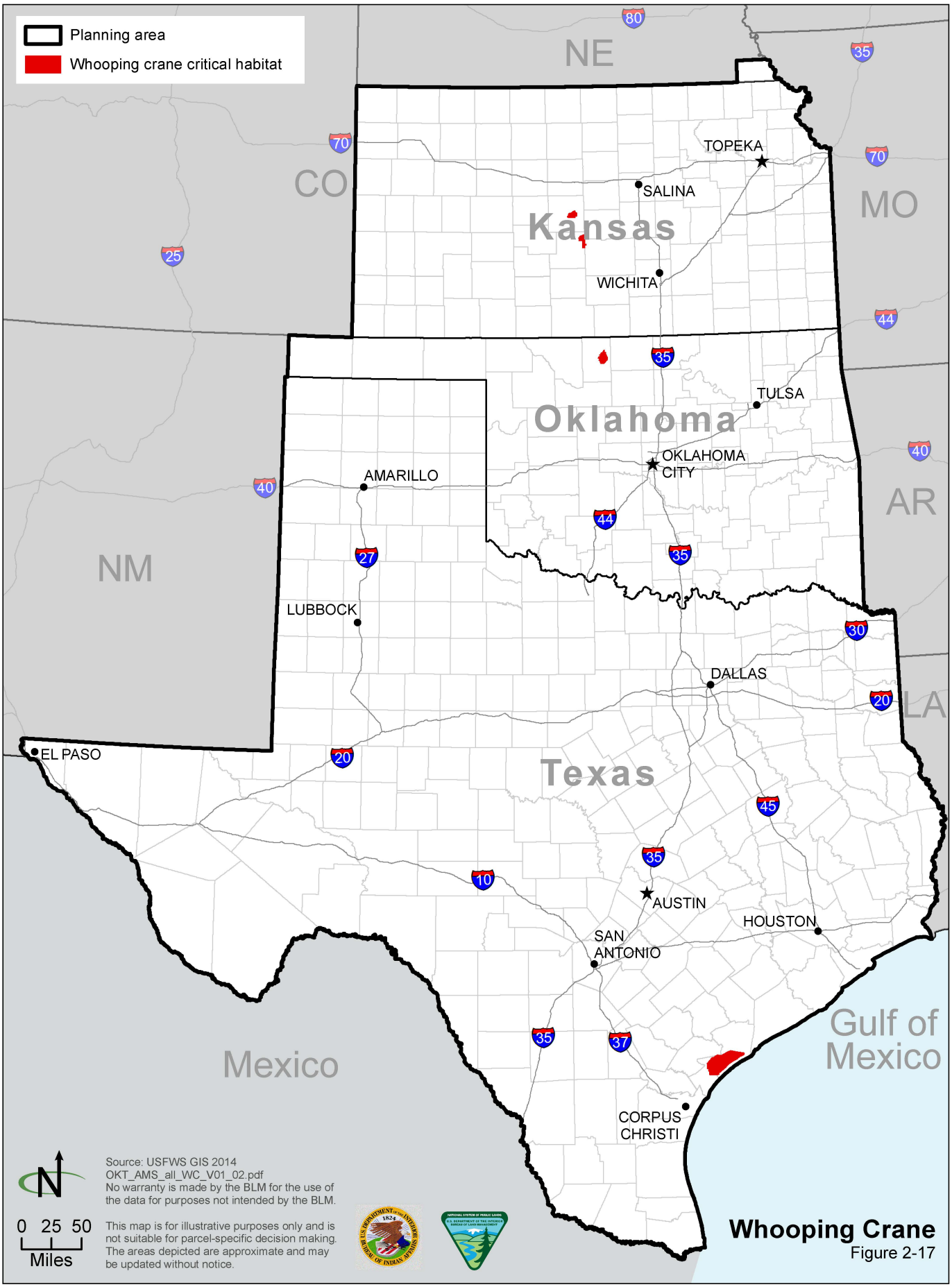
The whooping crane is a tall, mostly white, long-legged bird with red facial skin. During summer, it feeds on insects, crustaceans, and berries; its winter diet also includes grains, acorns, fishes, amphibians, and marine worms.

The species' preferred habitat is wetland, lagoon, riparian tidal flat and shallow water, and grassland or cropland. It nests in dense emergent vegetation, such as bulrushes in shallow ponds, marshes, wet prairies, and lake margins. The nest is made of marsh vegetation, rising about 8 to 20 inches above the surrounding water level. Breeding territories are very large, averaging 1,900 acres, and pairs mate for life. Habitat during migration and winter includes marshes, shallow lakes, lagoons, salt flats, grain and stubble fields, and barrier islands. The remaining birds migrate mainly through the Great Plains south to Texas for the winter. Mated pairs and families establish and defend winter territories on coastal marshes in Texas. Pairs or family groups begin northward migration in April.

The whooping crane is on the brink of extinction; the wild population reached a low of 14 birds and has since improved to over two hundred, with intensive captive breeding, including migration following ultralight aircraft. Ultralight aircrafts act as surrogate parents and guide captive-hatched whooping cranes along a planned migration route. At present, one self-sustaining population nests in Canada and winters along the Texas coast; two additional reintroduced populations exist; one migrates from Wisconsin to Florida, and one in Florida does not migrate. Historically, whooping cranes suffered from hunting and habitat loss from conversion of prairie to cropland. The remaining wild cranes are vulnerable to catastrophic natural events. Ongoing human threats are loss of coastal wetlands, oil spills, collisions with power lines and structures during migration, and poaching. In addition, because of delayed sexual maturity and low annual reproductive output, the population of this species grows slowly and is especially vulnerable to poor survivorship. The population shrinking to such small numbers results in a loss of genetic variability that increases the birds' vulnerability to disease. The Aransas reintroduced population migrates through western Kansas and Oklahoma and central Texas en route to its wintering ground at Aransas National Wildlife Refuge on the coast in south Texas, a distance of 4,000 km (NatureServe 2015; see **Figure 2-17** for the species range in the planning area).



Red-cockaded Woodpecker
Figure 2-16



Whooping Crane
Figure 2-17

Other Special Status Species

Special status species are those that are not listed under the Endangered Species Act but still warrant some protection or for which insufficient data have been collected for the USFWS to make a determination for listing. These include state threatened and endangered species, species of greatest conservation concern, and rare plant communities. Federal land management agencies are mandated to manage special status species so that they should not need to be listed under the Endangered Species Act in the future.

Lists of other special status species are maintained by Kansas, Oklahoma, and Texas. In coordination with the state heritage programs, the OFO has identified those species occurring within the planning area, as shown in **Table 2-20**.

Table 2-20
Special Status Species Occurring in the Planning Area but not Listed on the ESA

Group	Common Name	Scientific Name (Synonym)	Status* (State)	State Where Present
Amphibians	Green toad	*Bufo debilis*	ST (KS)	KS
Amphibians	Red-spotted toad	*B. punctatus*	SINC (KS)	KS
Amphibians	Cascade Caverns salamander	*Eurycea latitans*	ST (TX)	TX
Amphibians	Longtail salamander	*E. longicauda*	ST (KS)	KS
Amphibians	Cave salamander	*E. lucifuga*	SE (KS)	KS
Amphibians	Blanco blind salamander	*E. robusta*	ST (TX)	TX
Amphibians	Comal blind salamander	*E. tridentifera*	ST (TX)	TX
Amphibians	Eastern narrowmouth toad	*Gastrophryne carolinensis*	ST (KS)	KS
Amphibians	Sheep frog	*Hypopachus variolosus*	ST (TX)	TX
Amphibians	White-lipped frog	*Leptodactylus fragilis*	ST (TX)	TX
Amphibians	Black-spotted newt	*Notophthalmus meridionalis*	ST (TX)	TX
Amphibians	Eastern newt	*N. viridescens louisianensis*	ST (KS)	KS
Amphibians	Spring peeper	*Pseudacris crucifer*	SINC (KS)	KS
Amphibians	Strecker's chorus frog	*P. streckeri*	ST (KS)	KS
Amphibians	Crawfish frog	*Rana areolata*	SINC (KS)	KS
Amphibians	Green frog	*R. clamitans melanota*	ST (KS)	KS
Amphibians	Mexican burrowing toad	*Rhinophrynus dorsalis*	ST (TX)	TX
Amphibians	South Texas siren (large form)	*Siren* sp.	ST (TX)	TX
Amphibians	Mexican treefrog	*Smilisca baudinii*	ST (TX)	TX
Amphibians	Grotto salamander	*Typhlotriton spelaeus*	SE (KS)	KS
Birds	Bachman's sparrow	*Aimophila aestivalis*	ST (TX), BCC, REA	TX

Table 2-20
Special Status Species Occurring in the Planning Area but not Listed on the ESA

Group	Common Name	Scientific Name (Synonym)	Status* (State)	State Where Present
Birds	Botteri's sparrow	*Aimophila botterii arizonae*	ST (TX), BCC	TX
Birds	Texas Botteri's sparrow	*A. b. texana*	ST (TX), BCC	TX
Birds	Henslow's sparrow	*Ammodramus henslowii*	BCC, SINC (KS)	KS
Birds	Golden eagle	*Aquila chrysaetos*	BCC, SINC (OK, KS)	OK, KS, TX
Birds	Short-eared owl	*Asio flammeus*	BCC, SINC (KS)	KS
Birds	Burrowing owl	*Athene cunicularia*	BCC, REA	OK, KS, TX
Birds	White-tailed hawk	*Buteo albicaudatus*	ST (TX), BCC	TX
Birds	Zone-tailed hawk	*B. albonotatus*	ST (TX)	TX
Birds	Gray hawk	*B. nitidus*	ST (TX)	TX
Birds	Ferruginous hawk	*B. regalis*	BCC, SINC (KS), REA	OK, KS, TX
Birds	Whip-poor-will	*Camprimulgus vociferus*	BCC, SINC (KS)	KS
Birds	Northern beardless-tyrannulet	*Camptostoma imberbe*	ST (TX), BCC	TX
Birds	Snowy plover	*Charadrius nivosus*	BCC, REA	OK, KS, TX
Birds	Black tern	*Chlidonias niger*	BCC, SINC (KS)	KS
Birds	Chihuahuan raven	*Corvus cryptoleucus*	SINC (KS)	KS
Birds	Bobolink	*Dolichonyx oryzivorus*	SINC (KS)	KS
Birds	Reddish egret	*Egretta rufescens*	ST (TX), BCC	TX
Birds	Swallow-tailed kite	*Elanoides forficatus*	ST (TX), BCC	TX
Birds	American peregrine falcon	*Falco peregrinus anatum*	ST (TX), BCC	TX
Birds	Cactus ferruginous Pygmy-owl	*Glaucidium brasilianum cactorum*	ST (TX)	TX
Birds	Bald eagle	*Haliaeetus leucocephalus*	ST (TX), BCC SINC (OK, KS)	OK, KS, TX

Table 2-20
Special Status Species Occurring in the Planning Area but not Listed on the ESA

Group	Common Name	Scientific Name (Synonym)	Status* (State)	State Where Present
Birds	Black rail	*Laterallus jamaicensis*	BCC, SINC (KS)	KS
Birds	Wood stork	*Mycteria americana*	ST (TX)	TX
Birds	Long-billed curlew	*Numenius americanus*	BCC, SINC (KS), REA	OK, KS, TX
Birds	Rose-throated becard	*Pachyramphus aglaiae*	ST (TX), BCC	TX
Birds	Tropical parula	*Parula pitiayumi*	ST (TX), BCC	TX
Birds	White-faced Ibis	*Plegadis chihi*	ST (TX)	TX
Birds	Cerulean warbler	*Setophaga cerulea*	BCC, SINC (KS)	KS
Birds	Yellow-throated warbler	*Setophaga dominica*	SINC (KS)	KS
Birds	Sooty tern	*Sterna fuscata*	ST (TX)	TX
Birds	Curve-billed thrasher	*Toxostoma curvirostre*	BCC, SINC (KS)	KS
Birds	Greater prairie chicken	*Tympanuchus cupido*	SINC (OK)	OK
Fishes	Lake sturgeon	*Acipenser fulvescens*	SINC (KS), ST (NE)	KS
Fishes	River goby	*Awaous banana*	ST (TX)	TX
Fishes	Mexican stoneroller	*Campostoma ornatum*	ST (TX)	TX
Fishes	Highfin carpsucker	*Carpiodes velifer*	SINC (KS)	KS
Fishes	Southern redbelly dace	*Chrosomus erythrogaster*	SINC (KS)	KS
Fishes	Banded sculpin	*Cottus carolinae*	SINC (KS)	KS
Fishes	Mexican goby	*Ctenogobius claytonii*	ST (TX)	TX
Fishes	Blue sucker	*Cycleptus elongatus*	ST (TX), SINC (KS)	KS, TX
Fishes	Proserpine shiner	*Cyprinella proserpina*	ST (TX)	TX
Fishes	Spotfin shiner	*C. spiloptera*	SINC (KS)	KS
Fishes	Conchos pupfish	*C. eximius*	ST (TX)	TX
Fishes	Pecos pupfish	*C. pecosensis*	ST (TX)	TX
Fishes	Gravel chub	*Erimystax x-punctatus*	SINC (KS)	KS
Fishes	Creek chubsucker	*Erimyzon oblongus*	ST (TX)	TX
Fishes	Greenside darter	*Etheostoma blennioides*	SINC (KS)	KS
Fishes	Bluntnose darter	*E. chlorosoma*	SINC (KS)	KS
Fishes	Slough darter	*E. gracile*	SINC (KS)	KS
Fishes	Rio Grande darter	*E. grahami*	ST (TX)	TX
Fishes	Sunburst darter	*E. mihileze*	SINC (KS)	KS

Table 2-20
Special Status Species Occurring in the Planning Area but not Listed on the ESA

Group	Common Name	Scientific Name (Synonym)	Status* (State)	State Where Present
Fishes	Johnny darter	*E. nigrum*	SINC (KS)	KS
Fishes	Highland darter	*E. teddyroosevelt*	SINC (KS)	KS
Fishes	Redfin darter	*E. whipplei*	SINC (KS)	KS
Fishes	Banded darter	*E. zonale*	SINC (KS)	KS
Fishes	San Felipe gambusia	*Gambusia clarkhubbsi*	ST (TX)	TX
Fishes	Blotched gambusia (wild extinct)	*G. senilis*	ST (TX)	TX
Fishes	Rio Grande chub	*Gila pandora*	ST (TX)	TX
Fishes	Western silvery minnow	*Hybognathus argyritis*	ST (KS)	KS
Fishes	Plains minnow	*H. placitus*	ST (KS)	KS
Fishes	Northern hog sucker	*Hypentelium nigricans*	SINC (KS)	KS
Fishes	Chestnut lamprey	*Ichthyomyzon castaneus*	SINC (KS)	KS
Fishes	Cardinal shiner	*Luxilus cardinalis*	SINC (KS)	KS
Fishes	Striped shiner	*L. chrysocephalus*	SINC (KS)	KS
Fishes	Common shiner	*L. cornutus*	SINC (KS)	KS
Fishes	Sturgeon chub	*Macrhybopsis gelida*	ST (KS), SE (NE)	KS
Fishes	Shoal chub	*M. hyostoma*	ST (KS)	KS
Fishes	Sicklefin chub	*M. meeki*	SE (KS)	KS
Fishes	Silver chub	*M. storeriana*	SE (KS)	KS
Fishes	Arkansas River speckled (peppered) chub	*M. tetranema*	SE (KS)	KS
Fishes	Opossum pipefish	*Microphis brachyurus*	ST (TX)	TX
Fishes	Spotted sucker	*Minytrema melanops*	SINC (KS)	KS
Fishes	River redhorse	*Moxostoma carinatum*	SINC (KS)	KS
Fishes	Black redhorse	*M. duquesnei*	SINC (KS)	KS
Fishes	Redspot chub	*Nocomis asper*	ST (KS)	KS
Fishes	Hornyhead chub	*N. biguttatus*	ST (KS)	KS
Fishes	Tadpole madtom	*Norturus gyrinus*	SINC (KS)	KS
Fishes	River shiner	*Notropis blennius*	SINC (KS)	KS
Fishes	Bigeye shiner	*N. boops*	SINC (KS)	KS
Fishes	Chihuahua shiner	*N. chihuahua*	ST (TX)	TX
Fishes	Ozark minnow	*N. nubilus*	SINC (KS)	KS
Fishes	Silverband shiner	*N. shumardi*	SINC (KS)	KS
Fishes	Bluntnose shiner (extinct)	*N. simus*	ST (TX)	TX
Fishes	Brindled madtom	*Noturus miurus*	SINC (KS)	KS
Fishes	Black-sided darter	*Percina maculata*	ST (OK, KS, TX)	OK, KS, TX
Fishes	Long-nosed darter	*P. nasuta*	SE (OK)	OK

Table 2-20
Special Status Species Occurring in the Planning Area but not Listed on the ESA

Group	Common Name	Scientific Name (Synonym)	Status* (State)	State Where Present
Fishes	River darter	*P. shumardi*	SINC (KS)	KS
Fishes	Flathead chub	*Platygobio gracilis*	ST (KS)	KS
Fishes	Paddlefish	*Polyodon spathula*	ST (TX)	TX
Fishes	Bluehead shiner	*Pteronotropis hubbsi*	ST (TX)	TX
Fishes	Western blacknose dace	*Rhinichthys obtusus*	SINC (KS)	KS
Fishes	Widemouth blindcat	*Satan eurystomus*	ST (TX)	TX
Fishes	Shovelnose sturgeon	*Scaphirhynchus platorynchus*	ST (TX)	TX
Fishes	Toothless blindcat	*Trogloglanis pattersoni*	ST (TX)	TX
Invertebrates	Mucket mussel	*Actinonaias ligamentina*	SE (KS)	KS
Invertebrates	Elktoe mussel	*Alasmidonta marginata*	SE (KS)	KS
Invertebrates	Flat floater mussel	*Anodonta suborbiculata*	SE (KS)	KS
Invertebrates	Cylindrical papershell mussel	*Anodontoides ferussacianus*	SINC (KS)	KS
Invertebrates	Rock pocketbook mussel	*Arcidens confragosus*	ST (KS)	KS
Invertebrates	Oklahoma Cave crayfish	*Cambarus tartarus*	SE (OK)	OK
Invertebrates	Western fanshell mussel	*Cyprogenia aberti*	SE (KS)	KS
Invertebrates	Butterfly mussel	*Ellipsaria lineolata*	ST (KS)	KS
Invertebrates	Spike mussel	*Elliptio dilatata*	SINC (KS)	KS
Invertebrates	Snuffbox mussel	*Epioblasma triquetra*	SINC (KS)	KS
Invertebrates	Texas pigtoe	*Fusconaia askewi*	ST (TX)	TX
Invertebrates	Wabash pigtoe mussel	*F. flava*	SINC (KS)	KS
Invertebrates	Triangle pigtoe	*F. lananensis*	ST (TX)	TX
Invertebrates	Prairie mole cricket	*Gryllotalpa major*	SINC (KS)	KS
Invertebrates	Neosho mucket	*Lampsilis rafinesqueana*	SE (OK, KS)	OK, KS
Invertebrates	Sandbank pocketbook	*L. satura*	ST (TX)	TX
Invertebrates	Fat mucket mussel	*L. siliquoidea*	SINC (KS)	KS
Invertebrates	Yellow sandshell mussel	*L. teres*	SINC (KS), REA	OK, KS, TX
Invertebrates	Fluted-shell mussel	*Lasmigona costata*	ST (KS)	KS
Invertebrates	Washboard mussel	*Megalonaias nervosa*	SINC (KS)	KS
Invertebrates	Southern hickorynut	*Obovaria jacksoniana*	ST (TX)	TX
Invertebrates	Optioservus riffle beetle	*Optioservus phaeus*	SE (KS)	KS
Invertebrates	Neosho midget crayfish	*Orconectes macrus*	SINC (KS)	KS
Invertebrates	Round pigtoe mussel	*Pleurobema coccineum*	SINC (KS)	KS
Invertebrates	Louisiana pigtoe	*P. riddellii*	ST (TX)	TX
Invertebrates	Sharp hornsnail	*Pleurocera acuta*	ST (KS)	KS
Invertebrates	Slender walker snail	*Pomatiopsis lapidaria*	SE (KS)	KS

Table 2-20
Special Status Species Occurring in the Planning Area but not Listed on the ESA

Group	Common Name	Scientific Name (Synonym)	Status* (State)	State Where Present
Invertebrates	Texas heelsplitter	*Potamilus amphichaenus*	ST (TX)	TX
Invertebrates	Salina mucket	*P. metnecktayi*	ST (TX)	TX
Invertebrates	Delta hydrobe	*Probythinella emarginata*	ST (KS)	KS
Invertebrates	Ouachita kidneyshell mussel	*Ptychobranchus occidentalis*	ST (KS)	KS
Invertebrates	Giant floater	*Pyganodon grandis*	REA	OK, KS, TX
Invertebrates	Rabbits-foot mussel	*Quadrula cylindrica*	SE (KS)	KS
Invertebrates	False spike	*Q. mitchelli*	ST (TX)	TX
Invertebrates	Wartyback mussel	*Q. nodulata*	SINC (KS)	KS
Invertebrates	Ozark emerald dragonfly	*Somatochlora ozarkensis*	SINC (KS)	KS
Invertebrates	Creeper mussel	*Strophitus undulatus*	SINC (KS)	KS
Invertebrates	Gray petaltail dragonfly	*Tachopteryx thoreyi*	SINC (KS)	KS
Invertebrates	Mexican fawnsfoot	*Truncilla cognata*	ST (TX)	TX
Invertebrates	Fawnsfoot mussel	*T. donaciformis*	SINC (KS)	KS
Invertebrates	Deertoe mussel	*T. truncata*	SINC (KS)	KS
Invertebrates	Pondhorn	*Uniomerus tetralasmus*	REA	OK, KS, TX
Invertebrates	Ellipse mussel	*Venustaconcha ellipsiformis*	SE (KS)	KS
Mammals	Pallid bat	*Antrozous pallidus*	SINC (KS), REA	OK, KS, TX
Mammals	Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	ST (TX)	TX
Mammals	Townsend's big-eared bat	*C. townsendii*	SINC (KS), REA	OK, KS, TX
Mammals	Black-tailed prairie dog	*Cynomys ludovicianus*	SINC (OK)	OK
Mammals	Texas kangaroo rat	*Dipodomys elator*	ST (TX)	TX
Mammals	Spotted bat	*Euderma maculatum*	ST (TX)	TX
Mammals	Pygmy killer whale	*Feresa attenuata*	ST (TX)	TX
Mammals	Southern flying squirrel	*Glaucomys volans*	SINC (KS), ST (KS)	KS
Mammals	Short-finned pilot whale	*Globicephala macrorhynchus*	ST (TX)	TX
Mammals	Pygmy sperm whale	*Kogia breviceps*	ST (TX)	TX
Mammals	Dwarf sperm whale	*Kogia simus*	ST (TX)	TX

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Group	Common Name	Scientific Name (Synonym)	Status* (State)	State Where Present
Mammals	Eastern red bat	*Lasiurus borealis*	REA	OK, KS, TX
Mammals	Southern yellow bat	*Lasiurus ega*	ST (TX)	TX
Mammals	Margay	*Leopardus wiedii*	ST (TX)	TX
Mammals	River otter	*Lutra canadensis*	ST (NE)	NE
Mammals	Gervais's beaked whale	*Mesoplodon europaeus*	ST (TX)	TX
Mammals	White-nosed coati	*Nasua narica*	ST (TX)	TX
Mammals	Killer whale	*Orcinus orca*	ST (TX)	TX
Mammals	Coues's rice rat	*Oryzomys couesi*	ST (TX)	TX
Mammals	Texas mouse	*Peromyscus attwateri*	SINC (KS)	KS
Mammals	Palo duro mouse	*P. truei comanche*	ST (TX)	TX
Mammals	False killer whale	*Pseudorca crassidens*	ST (TX)	TX
Mammals	Franklin's ground squirrel	*Spermophilus franklinii*	SINC (KS)	KS
Mammals	Eastern spotted skunk	*Spilogale putorius*	ST (KS)	KS
Mammals	Atlantic spotted dolphin	*Stenella frontalis*	ST (TX)	TX
Mammals	Rough-toothed dolphin	*Steno bredanensis*	ST (TX)	TX
Mammals	Southern bog lemming	*Synaptomys cooperi*	SINC (KS)	KS
Mammals	Mexican free-tailed bat	*Tadarida brasiliensis*	REA	OK, KS, TX
Mammals	Black bear	*Ursus americanus*	ST (TX) (due to similarity to Louisiana black bear)	TX
Mammals	Swift fox	*Vulpes velox*	REA, SE (NE)	OK, KS, TX
Mammals	Goose-beaked whale	*Ziphius cavirostris*	ST (TX)	TX
Plants	American ginseng	*Panax quinquefolium*	ST (NE)	NE
Reptiles	Glossy snake	*Arizona elegans*	SINC (KS)	KS
Reptiles	Scarlet snake	*Cemophora coccinea*	ST (TX)	TX
Reptiles	Reticulated gecko	*Coleonyx reticulatus*	ST (TX)	TX
Reptiles	Black-striped snake	*Coniophanes imperialis*	ST (TX)	TX
Reptiles	Timber rattlesnake	*Crotalus horridus*	ST (TX), SINC (KS)	KS, TX
Reptiles	Reticulate collared lizard	*Crotaphytus reticulatus*	ST (TX)	TX
Reptiles	Texas indigo snake	*Drymarchon melanurus erebennus*	ST (TX)	TX
Reptiles	Speckled racer	*Drymobius margaritiferus*	ST (TX)	TX

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Group	Common Name	Scientific Name (Synonym)	Status* (State)	State Where Present
Reptiles	Broadhead skink	*Eumeces laticeps*	ST (KS)	KS
Reptiles	Texas tortoise	*Gopherus berlandieri*	ST (TX)	TX
Reptiles	Cagle's map turtle	*Graptemys caglei*	ST (TX)	TX
Reptiles	Common map turtle	*G. geographica*	ST (KS)	KS
Reptiles	Western hognose snake	*Heterodon nasicus*	SINC (KS)	KS
Reptiles	Eastern hognose snake	*H. platirhinos*	SINC (KS)	KS
Reptiles	Chihuahuan night snake	*Hypsiglena jani*	SINC (KS)	KS
Reptiles	Chihuahuan mud turtle	*Kinosternon hirtipes murrayi*	ST (TX)	TX
Reptiles	Northern cat-eyed snake	*Leptodeira septentrionalis*	ST (TX)	TX
Reptiles	Smooth green snake	*Liochlorophis vernalis*	ST (TX)	TX
Reptiles	Alligator snapping turtle	*Macrochelys temminckii*	ST (TX), SINC (KS)	KS, TX
Reptiles	Brazos water snake	*Nerodia harteri*	ST (TX)	TX
Reptiles	Texas horned lizard	*Phrynosoma cornutum*	ST (TX)	TX
Reptiles	Mountain short-horned lizard	*P. hernandesi*	ST (TX)	TX
Reptiles	Texas blind snake (New Mexico blind snake)	*Rena dissecta*	ST (KS)	KS
Reptiles	Longnose snake	*Rhinocheilus lecontei*	SINC (KS)	KS
Reptiles	Massasauga	*Sistrurus catenatus*	ST (NE)	NE
Reptiles	Redbelly snake	*Storeria occipitomaculata*	SINC (KS)	KS
Reptiles	Checkered garter snake	*Thamnophis marcianus*	ST (KS)	KS
Reptiles	Chihuahuan desert lyre snake	*Trimorphodon vilkinsonii*	ST (TX)	TX
Reptiles	Rough earth snake	*Virginia striatula*	SINC (KS)	KS
Reptiles	Smooth earth snake	*V. valeriae*	SINC (KS)	KS

Sources:[3] USFWS 2008; Nebraska Natural Heritage Program 2013
*Status Codes:
E—Federal-listed Endangered, T—Federal-listed Threatened, C—Federal-listed Candidate, P—Proposed for Listing, BCC—Bird of Conservation Concern, SE—State Endangered, ST—State Threatened
SINC—Species in Need of Conservation, REA—Southern Great Plains Rapid Ecoregional Assessment

[3]Ibid.

Other key special species, including those listed in the Draft Southern Great Plains Rapid Ecoregional Assessment or with known occurrences in the decision area, are discussed in detail below.

Burrowing owl (*Athene cunicularia*) Bird of Conservation Concern, Draft Southern Great Plains Rapid Ecoregional Assessment species

A small ground-dwelling owl, with long legs, white chin stripe, round head, and stubby tail, the burrowing owl may be observed perching on the ground, on fence posts, or on mounds in open spaces. Burrowing owls are not highly territorial and may share a common foraging area with other nesting pairs. Habitat includes open grasslands, prairie, plains, and savanna and sometimes vacant lots near human habitation or airports. This owl spends much time on the ground or on low perches such as fence posts or dirt mounds. It nests in abandoned burrows dug by prairie dogs, ground squirrels, foxes, woodchucks, or badgers. In Oklahoma, burrowing owls are highly associated with prairie dog colonies. Their diet includes large insects, rodents, and sometimes birds and amphibians. Widely distributed through the Great Plains and Rocky Mountains in the US and Canada, the burrowing owl's numbers have been greatly reduced by habitat loss due to intensive agriculture, degradation via human control of prairie dogs and other small burrowing mammals, and fragmentation from conversion to agriculture (NatureServe 2015).

Ferruginous hawk (*Buteo regalis*). Bird of Conservation Concern, Draft Southern Great Plains Rapid Ecoregional Assessment species

With a rusty back and shoulders, pale head, and white tail, the ferruginous hawk winters in Texas and Oklahoma in grassland and desert shrub areas. It prefers open country, primarily prairies, plains, and badlands, sagebrush, saltbush-greasewood shrubland, periphery of pinyon-juniper and other woodland, and desert. It nests in tall trees or willows along streams or on steep slopes, on cliff ledges, hillsides, on power line towers, sometimes on sloped ground on the plains or on mounds in open desert. It avoids agriculture and human activity. Ferruginous hawks may maintain several nests in a territory and alternate their use. Clutch size varies with availability of prey, especially ground squirrels (*Spermophilus* spp.) and jackrabbits (*Lepus* spp.). Home range size varies widely, from 3 to 30 square miles in some areas. Uncommon but widespread in suitable habitat in the western US and Canada, ferruginous hawk numbers have declined in local areas. It is highly sensitive to human disturbance and subject to continuing habitat loss from agricultural development and forest incursion into grasslands (NatureServe 2015).

Long-billed curlew (*Numenius americanus*). Bird of Conservation Concern, Draft Southern Great Plains Rapid Ecoregional Assessment species

The long-billed curlew is a large dusky shorebird, with black barring and a long decurved bill for probing for food in the mud. It is a long-distance migrant that breeds on prairies and grassy meadows, generally near water. It nests on the ground, usually in a flat area with short grass, sometimes on more irregular terrain, often near rocks, in prairies and meadows. In winter, it is often found on beaches and mudflats. It is an opportunistic feeder, ranging from insects such as beetles and grasshoppers, to berries, crabs, small

toads, and snails. It is found widely across the western US and Canada, but its range is diminishing. It occurs in the decision area in northern Texas through southwestern Kansas but is vulnerable or imperiled throughout these areas. Its populations have declined from hunting, and habitat loss from cultivation has led to localized declines (NatureServe 2015).

Mountain plover (*Charadrius montanus*). Bird of Conservation Concern, Draft Southern Great Plains Rapid Ecoregional Assessment species

The mountain plover has a brown back, mainly white undersides, and a dark crown. It is a long-distance migrant, wintering along the Pacific coast and nesting in the Great Plains and Rocky Mountains on the ground in bare or sparsely vegetated areas. It is found in croplands, deserts, and grassland areas and nests in short-grass prairie and sagebrush habitat, sometimes in prairie dog towns. Nests are on the ground in shallow depressions in dry soils. Nest predation is high, mainly from foxes and coyotes, and nests may be lost by being located in fallow fields that subsequently are planted with millet or sunflowers. Mountain plovers feed primarily on insects, including grasshoppers, crickets, beetles, flies, and ants. Preferred winter habitat consists of short-grass plains and fields, plowed fields, and sandy deserts, where they forage and roost in loose flocks that may exceed 1,000 birds on the southern Great Plains.

Mountain plovers' numbers have been greatly reduced by hunting, and habitat has been lost by conversion of short-grass prairie to cropland or tall grasses, orchards, or developments. In the plains, many nests are in prairie dog towns, which have declined greatly from human removal but are now increasing in abundance again. The USFWS recently declined to list the mountain plover under the Endangered Species Act (NatureServe 2015).

Snowy plover (*Charadrius nivosus*). Bird of Conservation Concern, Draft Southern Great Plains Rapid Ecoregional Assessment species

The snowy plover is a small pale plover with a thin dark bill, white underside, and a breast band and dark ear patch. It nests on the ground in loose colonies on shorelines, mud or salt flats, and sandy or sparsely vegetated shores of rivers, lakes, and ponds. Nest predation by gulls, common raven, red fox, skunk, raccoon, and coyote results in a high rate of loss in some areas. Most populations are migratory, and in winter, this species is found on beaches, in salt ponds, and on estuarine sand and mud flats. They eat insects, small crustaceans, and other invertebrates in the mud or near shallow water. They have a large, scattered range, from Texas and Oklahoma west to California. Populations are declining in many areas, due to habitat loss and degradation, especially from development and disturbance by humans in shoreline areas, as well as from predators. On the Great Plains, habitat has been lost to invasion of nonnative tamarisk (NatureServe 2015). The Pacific coast population is listed as threatened under the ESA.

Greater prairie-chicken (*Tympanuchus cupido*). Bird of Conservation Concern

The greater prairie-chicken is a chunky, hen-like bird, barred with dark brown, cinnamon, and pale buff coloring. It is slightly larger, darker, and more barred than the lesser prairie and sharp-tailed grouse. Its preferred habitat is grasslands with herbaceous cover, but it

may also be found in cultivated lands and pastures. As with lesser prairie-chicken, males gather in leks for communal courtship, and females nest in the vicinity, in a scrape on the ground lined with vegetation. Both sexes show site fidelity, and most do not migrate. Ranges vary from 25 to 500 acres. The diet consists primarily of insects, especially grasshoppers in summer. At other times of the year it eats fruit, leaves, flowers, shoots, and grain. Formerly widespread in grasslands of Canada and the western US, the greater prairie-chicken is now found in much reduced numbers in the Great Plains south to Texas. Decline is mainly the result of loss and fragmentation of tall-grass prairie. The largest remaining populations are in Kansas, Nebraska, Oklahoma, and South Dakota. The closely related lesser prairie-chicken is also diminished in range. The subspecies *cupido* (heath hen) of the eastern seaboard has been extinct since the 1930s (NatureServe 2015).

Black-tailed prairie dog (*Cynomys ludovicianus*). Species in Need of Conservation (Oklahoma), Draft Southern Great Plains Rapid Ecoregional Assessment species

Black-tailed prairie dog is a diurnal rodent, approximately 15 inches in length. It lives in colonies or towns, which can cover up to thousands of acres of grassland habitat (Arizona Game and Fish Department 1999). Well-drained and medium-textured soils are required for burrow excavation. Declines in populations in Oklahoma, Kansas, and Texas have been attributed to population control, habitat destruction, fragmentation by agricultural conversion, and plague (Arizona Game and Fish Department 1999). Prairie dogs provide important habitat and feeding grounds for other species, including the endangered black-footed ferret, which uses prairie dog burrows for shelter and depend on prairie dogs for food. Activities that affect black-tailed prairie dog populations or habitat may also affect black-footed ferrets (USFWS 2013).

Swift fox (*Vulpes velox*), Draft Southern Great Plains Rapid Ecoregional Assessment species

This is the smallest fox in North American, found primarily in short-grass and mixed-grass prairies. It relies on dens year-round for shelter, escape from predators, and rearing of young (Meyer 2009). Coyotes are the primary predator, and badgers and raptors are also responsible for some swift fox mortality. Threats include trapping, poisoning, vehicle collision, red fox range expansion, coyotes, and habitat loss and degradation (Meyer 2009). The swift fox is found in northern Texas, the Oklahoma panhandle, and western Kansas.

Trends

Special status species diversity and abundance is directly related to maintaining habitat availability, diversity, and quality. The species described above each has its own specialized habitat requirements. In many instances, these habitat types have been drastically altered or reduced from the historic native ranges.

Continuing threats to native ecosystems and species diversity in the planning area are fragmentation and loss of critical or important habitat due to human activities.

In Kansas, a 2005 reevaluation of the status of fishes found that 54 of the 116 native fish species should be assigned special conservation status due to substantial declines in distribution or abundance or their rarity (Haslouer et al. 2005). Habitat disturbances, including instream flow alteration, water diversions, eutrophication, and exotic species introductions, have resulted in unsuitable conditions for some fish and aquatic invertebrates in the planning area (Anderson et al. 1995).

In Oklahoma, 26 species of breeding land birds have experienced population declines of 45 percent or more between 1968 and 2003 (ODWC 2005). Additionally, channelization and impoundment of rivers has directly eliminated nesting habitat for such species as the least tern. However, listed species, such as the whooping crane and bald eagle, that have benefitted from extensive conservation efforts have been recovering in the region (ODWC 2005; Wasson et al. 2005). Bald eagles have recovered from a low of nine pairs to approximately 150 breeding pairs in Oklahoma today.[4] In eastern Texas, red-cockaded woodpeckers experienced severe population declines in the 1980s. Management activities on federal surface lands, such as thinning projects and translocations, have helped to reverse this trend; nevertheless, loss of forested habitat, inadequate fire regimes to control hardwood midstory, and demographic dysfunction remain as obstacles to recovery, particularly on private and state-owned surface lands (Conner et al. 2006).

Forecast

Fish stocking in reservoirs with BLM subsurface management is expected to continue, as is the spread of aquatic invasive species, which will impact special status fish and amphibian species. Migratory bird populations, including special status birds, will continue to be impacted by habitat fragmentation and climate change. These will reduce the effective habitat availability for nesting, migratory stopovers, and winter habitat for species that are not the focus of extensive conservation efforts. Private landowner conservation incentives and federal and state wildlife regulations will help to preserve special status fish and wildlife habitat.

Key Features

BLM decision area lands provide important habitat for special status species throughout the planning area. Critical habitat for the Arkansas River shiner overlaps BLM mineral estate along the Canadian River. Additionally, the Little River watershed in Oklahoma contains overlapping BLM mineral estate and critical habitat for the leopard darter (USFWS GIS 2014). Reservoirs and other waterways in the decision area also support special status bird populations, such as eagles, whooping crane, and interior least tern. The USFWS manages the 32,000-acre Great Salt Plains National Wildlife Refuge in northern Oklahoma, but it contains BLM subsurface mineral estate. This is a crucial stopover site for whooping cranes during spring and fall migration (USFWS 2007). In Oklahoma, the highest concentrations of American burying beetles are found at Camp Gruber, which contains BLM subsurface lands (USFWS 2008). Numerous caves found

[4]Don Wolfe, Biologist at Sutton Avian Research Center in Bartlesville, Oklahoma. Personal communication with Liza Wozniak, EMPSi Biologist. January 2015.

throughout the planning area (as described under Section 2.2.16) provide habitat for special status invertebrates and bats. The sand sagebrush native rangelands in northwest Oklahoma, western Kansas, and the Texas panhandle provide important habitat for the lesser prairie-chicken.

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2.2.9 Wild Horses and Burros

Indicators

The indicators for the wild horse and burro program relate directly to the requirements of the Wild and Free-Roaming Horses and Burros Act of 1972 and the CFRs because these are the directives for management. Key indicators derived from the act and the CFRs are animal health and habitat health.

Current Condition

The wild horse and burro program is run out of the BLM's Washington, DC, office (WO). WO staff members stationed in the OFO manage large long-term and short-term holding facility contracts in Kansas and Oklahoma. As part of the program, staff members regularly inspect facilities and hold monthly adoptions as well as occasional special adoptions.

The BLM manages 15 long-term holding facility contracts in Oklahoma, a short-term holding facility contract (Paul's Valley) in Oklahoma, and a short-term holding facility contract in Scott City, Kansas. A contract is initially for one year, with an option for up to four years. **Table 2-21** provides details on current long-term holding contracts of the OFO; **Figure 2-18** depicts the locations of these facilities. None of the holding facilities in the planning area house burros.

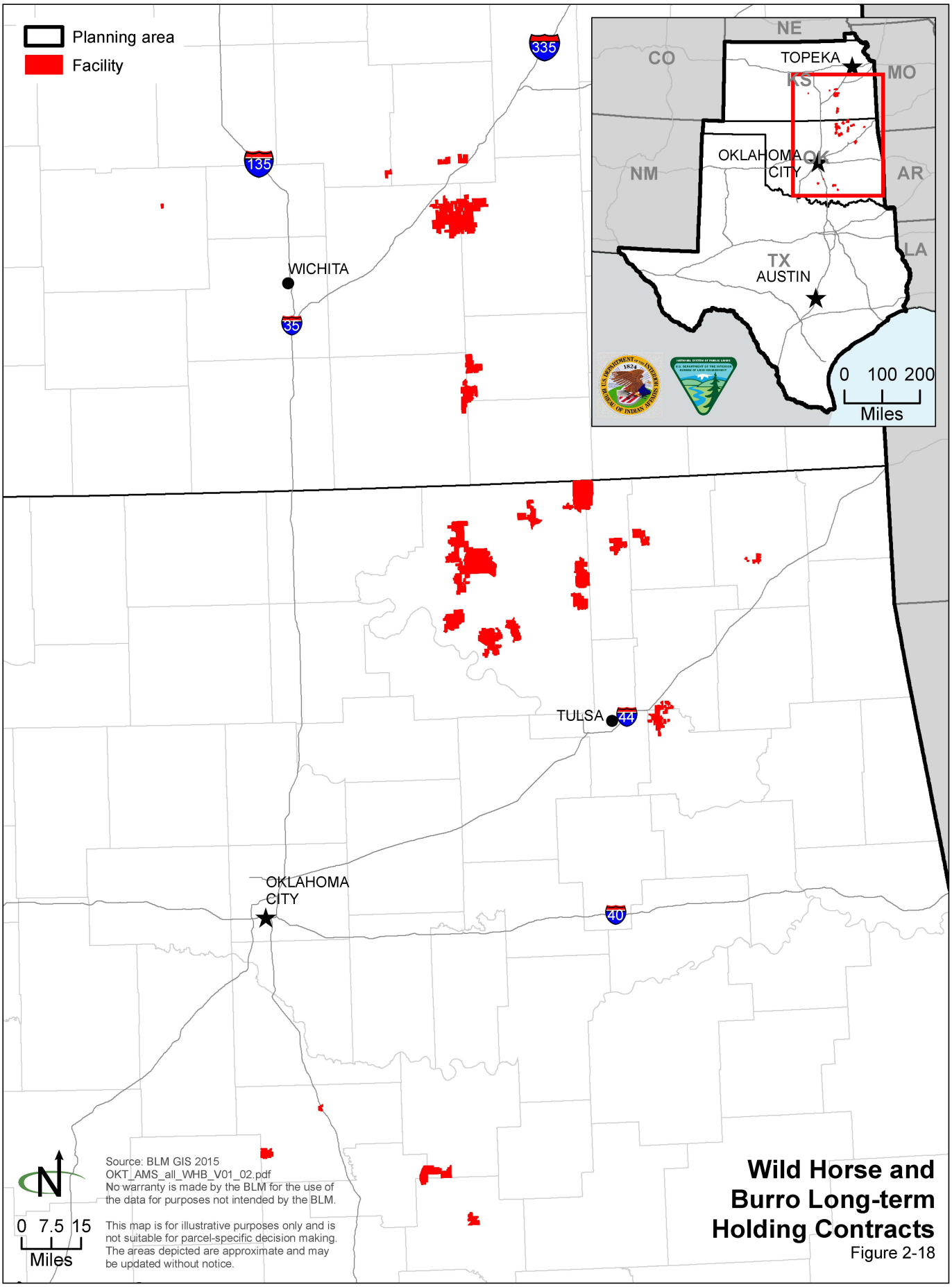
Table 2-21
Wild Horse Long-Term Holding Contracts in the Planning Area

Long-Term Holding Contract	Type of Horse	Acreage
Two Mounds Ranch, LLC	Mares	6,742
Cross Bell Equine Services, LLC	Geldings	20,350
Grand Eagle Summit, LLC	Mares	17,895
20 West, LLC	Both; mostly mares	26,328
Vestring Ranch	Geldings	14,084
Burton Ranch	Mares	4,243
Riddle Ranch	Mares	3,670
Row Ranch	Mares	3,233
Steinhoff, Garry	Geldings	1,234
Hughes Cattle Company, LLC (Catoosa)	Geldings	9,446
Hughes Cattle Company, LLC (Bartlesville)	Geldings	19,155
Moore Ranch	Mares	5,588
Jacobs Ranch, LLC	Mares	9,707
Mustang Holding, LLC (formally part of Shadow 7, LLC)	Both; mostly geldings	16,428
Reed Brothers	Geldings	19,295
Total		**177,398**

Source: BLM 2015a

Hutchinson Correctional Facility

Through a unique partnership with the Kansas Department of Corrections and Kansas Correctional Industries, the BLM offers for adoption wild horses that have been halter or saddle trained by inmates at the Hutchinson Correctional Facility. This arrangement adds value to the horses, while allowing the agency to offer them for adoption for the minimum fee of $125. (Certain special use horses, such as driving teams, may be offered for different fees.)



Wild Horse and Burro Long-term Holding Contracts

Figure 2-18

In addition to benefitting the horses and the adopting public, the training program at Hutchinson also helps prepare inmates for their eventual reintroduction into society by instilling important values, such as discipline, work, and respect. Approximately 14 to 18 minimum security inmates participate in the program at any given time. As they progress through the program, inmates move from providing basic care for the horses (feeding, watering, and cleaning) to actual training, under the supervision and guidance of professional trainers and correction staff.

The Hutchinson facility is designed to hold 350 horses in multiple enclosures and pens. In addition to boarding and training stalls, there are multiple riding rings and a large enclosed building that can be used for training during inclement weather. The entire facility was built by inmates using donated materials, including surplus highway guardrails from the Kansas Department of Transportation.

Untrained adult and yearling horses in holding at Hutchinson are also available for adoption. The BLM will pay a $500 care and feeding allowance to adopters of adult untrained horse four years old and older (BLM 2015).

Trends

Despite overpopulation and drought conditions, wild horse populations generally are able to survive generation to generation. Wild horses have few natural predators, and annual survival rates of horses are very high, exceeding 95 to 98 percent for mature animals and lower for very young. As horse populations exceed set herd management area appropriate management levels, the horses are removed and either adopted out or moved to long-term holding facilities.

Forecast

The BLM will continue to remove wild horses from herd management areas that exceed appropriate management levels and care for excess wild horses that have not been adopted. Future contracts and partnerships will be explored to care for the animals. Because the wild horse and burro program is run out of the WO and there is no land allocation decision associated with wild horses and burros in this BLM RMP, they were not brought forward in the Joint EIS/BLM RMP.

Key Features

No key features for wild horses have been identified in the planning area.

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2.2.10 Cultural Resources

Cultural resources are locations of human activity, occupation, or use. They include expressions of human culture and history in the physical environment, such as archaeological sites, historic buildings and structures, and historic trails. Cultural resources can also be natural features, plants, and animals or places that are considered to be traditionally important or sacred to a culture, subculture, or community. The significance of these places is derived from the role the property plays in a community's cultural identity, as defined by its beliefs, practices, history, and social institutions.

Historic properties are cultural resources that meet specific criteria for eligibility for listing on the National Register of Historic Places. The National Historic Preservation Act Section 106 process outlines the steps for identifying and evaluating historic properties, for assessing the effects of federal actions on historic properties, and for consulting to avoid, reduce, or minimize adverse effects. This process does not require historic properties to be preserved or even nominated for listing, but it does ensure that the decisions of federal agencies concerning the treatment of these places result from meaningful consideration of cultural and historic values and the options available to protect the properties.

Indicators

Impacts on cultural resources occur when there is damage to or loss of the integrity or setting. The integrity of cultural resources is assessed by the ability of the cultural, archaeological, or historic property to convey the important traditional, scientific, and public values for which it is determined to be historically significant.

Important elements for assessing the values conveyed by a site or property are integrity and condition. Integrity of archaeological sites in particular is often related to the condition of the property. It is affected to the extent that important spatial patterning of artifacts, cultural features, or other important elements are lost, mixed, or otherwise compromised by natural or cultural processes. Actions that alter, degrade, or otherwise affect the integrity and condition of a property have a high potential to impact the values that contribute to traditional, cultural, scientific, or historical value of the property. Actions that protect, limit, or otherwise avoid impacts on the integrity or condition of the property would protect and maintain those values.

The physical, visual, and acoustic setting is often integral to the important traditional or cultural values of a site or property. Cultural landscapes, viewsheds, natural or cultural features, and soundscapes are important elements of many traditional cultural and historic properties. Actions that alter or impact these values or traditional practices associated with these places have a high potential to diminish the values that contribute to its

cultural or historical importance. Actions that protect, avoid, or otherwise minimize impacts on the physical, visual, and acoustic setting would maintain or enhance important traditional, cultural, or historical values of the property.

Specific indicators relevant to BLM decisions are the following:

- Extent and relative depth of ground-disturbing activities or removal of structural features permitted and their potential to affect known or unknown intact cultural resources or areas of importance to Native Americans or other traditional communities
- Increased access to or activity in areas where resources are present or anticipated
- Extent that an action changes the potential for erosion or other natural process that could affect cultural resources
- Extent that the action alters the visual, aural, or atmospheric setting of cultural resources and culturally significant landscapes, traditional cultural properties, and National Historic Trails

Current Condition

The decision area for the BLM and BIA in the three states consists of a mix of BLM- and BIA-administered surface lands, split-estate land, federal mineral estate on lands managed by other federal agencies, and surface and mineral estate on tribal lands.

There is no comprehensive overview of the recorded cultural resources in this large and geographically diverse decision area. However, it is known that there is a full range of cultural resources that may date to over 10,000 years ago and continue through multiple eras and cultures to the present day.

Archaeological sites make up most of the recorded cultural resources. They are the most likely cultural resource type to be identified and encountered in federal actions involving mineral estate or land use decisions. Survey coverage overall for the decision area has not been estimated but is expected to be very low. Inventories of cultural resources typically occur in advance of a particular project or permit application. Survey coverage is most complete where blocks of land are surveyed instead of individual drill sites or small parcels. Designated tribal representatives are typically notified at the project or permit application phase. This is to determine the potential presence of traditional cultural properties or traditional use areas.

The condition of cultural resources in the decision area is variable. Where there is federal surface and mineral estate management, there is cultural resource review of all authorized projects and permitted activities. Where surface management is private or the responsibility of other entities, impacts on cultural resources are not necessarily considered, except when there is a federal action, such as an application for permit to drill. In all cases there can be impacts on cultural resources resulting from any activity or

construction that is not subject to review. This can include dispersed recreation, unauthorized collection, vandalism, and natural processes, such as erosion.

Because of increases in oil and gas development, there have been many surveys for cultural resources, and many new sites have been recorded. In most cases if a site is discovered it is avoided, regardless of National Register of Historic Places status. Only a relatively few sites have been formally nominated for listing on the National Register of Historic Places, but many more meet the eligibility criteria or have not been evaluated.

Sites that are not eligible for listing on the National Register of Historic Places and cannot be avoided may be destroyed after the project proponent completes the Section106 process. It is the BLM's policy (as outlined in BLM Manual 8140) and BIA's policy that impacts on historic properties be avoided if possible; if not, adverse effects must be resolved or mitigated. Archaeological site mitigation, when necessary, most often takes the form of data recovery through excavation but can also include alternative forms of off-site mitigation. Site identification, determinations of effect, and resolution of adverse effects are conducted in consultation with the State Historic Preservation Office in the respective states.

Current practices are consistent with cultural resource laws and BLM planning guidance. A Class 1 inventory of BLM-administered surface land is in progress; it will include a broad regional overview of the three-state planning area. The BLM and the BIA have efficient practices and workflow for coordinating Section 106 review of applications for permit to drill. Unlike other states where the BLM operates under a programmatic agreement and state implementation protocols that give it more autonomy in complying with Section 106, a programmatic agreement does not apply to BLM decisions for Oklahoma, Kansas, or Texas but may in the future. In these three states, the BLM and BIA complete Section 106 review on a project-by-project basis.

Trends

The condition of cultural resources has remained stable for those sites identified through compliance activities. The rate of site discoveries has steadily increased due to continued mineral and energy development and the use of block surveys to efficiently inventory the cultural resources. Although sites are generally avoided, additional information valuable to archaeological and historical research is being gained by compiling and synthesizing data from these studies.

More activity, workers, roads, and recreational access near sites can increase the potential for impacts on cultural resources from inadvertent damage, unauthorized collection, vandalism, and erosion, resulting in a potential downward trend in site integrity and scientific potential.

Forecast

If the demand for development and production of the mineral estate continues, there will be an ongoing need to identify and manage cultural resources in the decision area and more intensive pressure on fragile resources. Additional roads, population growth,

general development, and access for recreation may directly and indirectly damage cultural resources. Ground-disturbing activities will continue. Loss of vegetative cover and the ongoing drought will likely lead to soil erosion, which can impact cultural resources. Resources that have been avoided can change over time and will require monitoring and stabilization.

Key Features

Key features include the Cross Bar Ranch Complex, Cherokee Trail, Santa Fe Trail, and Trail of Tears.

2.2.11 Paleontological Resources

Paleontological resources are any fossilized remains or traces of organisms that are preserved in or on the earth's crust, that are of scientific interest, and that provide information about the history of life. Paleontological resources, whether invertebrate, plant, trace, or vertebrate fossils, constitute a fragile and nonrenewable record of the history of life. They are managed for scientific, educational, and recreational values, such as collecting invertebrate fossils and petrified wood for a hobby, and to protect these resources from adverse impacts. The BLM provides expertise to other federal agencies, such as the BIA, for managing paleontological resources and permitting paleontological research.

Indicators

Paleontological resources constitute a fragile and nonrenewable scientific record of the history of life. Resource condition is assessed by field observations, paleontological reports, commercial site reports, and project review. The primary resource indicator is whether there is a loss of those characteristics that make the fossil locality or feature important for scientific use. Natural weathering, decay, erosion, improper collection, and vandalism can remove or damage those characteristics that make the paleontological resource scientifically important.

The BLM considers significant any vertebrate fossils or other noteworthy occurrences of invertebrate and plant fossils. Invertebrate and plant fossils are typically more abundant, and the BLM does not ordinarily consider them to be of significance.

Indicators for the condition of paleontological resources are as follows:

- Type of fossil resource present (vertebrate, invertebrate, or plant)
- Prevalence of the fossil resource in the area
- Geologic formations in the planning area likely to contain fossils
- Physical condition of the fossil
- Scientific, educational, or recreational merit of the resource

Geologic formations are the basic units of geology, indicating a discrete rock type and representing a certain depositional environment or method of development. Paleontological resources are closely tied to the geologic formations containing them;

rocks of different age contain fossils of different types. A basic tenet in paleontology holds that if fossils are found in a formation elsewhere, they could also occur in the same formations in the planning area.

The potential fossil yield classification is a system for categorizing the probability of geologic units to contain scientifically significant paleontological resources or noteworthy fossils. This system has been developed to estimate the potential for discovering significant fossils during any surface-disturbing activity in specific geologic formations.

The potential fossil yield classification has five levels or classes, with Class 1 applied to geologic units that are not likely to contain significant fossils through class 5 for geologic formations that have a high potential to yield scientifically significant fossils (see BLM Instruction Memorandum No. 2008-009). This classification does not reflect rare or isolated occurrences of significant fossils or individual localities; it refers only to the relative occurrence on a formation- or member-wide basis.

Each class is defined briefly as follows:

Class 1, Very Low Potential—Geological units not likely to contain recognizable fossil remains, such as igneous, metamorphic, and Precambrian rocks

Class 2, Low Potential—Sedimentary geological units not likely to contain vertebrate fossils or scientifically significant invertebrate fossils, such as altered formations or Holocene sediments

Class 3, Moderate or Undetermined Potential—Fossiliferous sedimentary geological units where fossil content varies in significance, abundance, and predictable occurrence or sedimentary units of unknown fossil potential

Class 3 is divided into two parts, as follows:

> **Class 3a, Moderate Potential—**Units are known to contain vertebrate fossils or scientifically significant invertebrate fossils, but these occurrences are widely scattered; common invertebrate or plant fossils may be found in the area.
>
> **Class 3b, Undetermined Potential—**Units exhibit geological features that suggest significant fossils could be present, but little information about the paleontological resources of the unit or area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant fossils.

Class 4, High Potential—Geological units that contain a high occurrence of significant fossils; vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented but may vary in occurrence and predictability

Class 5, Very High Potential—Highly fossiliferous geological units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils

Most fossils occur in sedimentary rock formations, where they may be distributed extensively both vertically and horizontally throughout the formations or may occur in discontinuous pockets. Few geologic formations are uniformly rich in fossils throughout, and some are richer in fossils than others. Experienced paleontologists can predict which formations will contain fossils and, in general, what types of fossils will be found based on the age of the formation and its depositional environment. However, predicting the exact location where fossils will be found without field surveys is not possible.

Current Condition

The geologic history of the three-state area manifests a variety of changing environments and life forms preserved in the fossil record. During the early and middle Paleozoic, a shallow sea covered most of the planning area and supported small marine animals, such as Brachiopods, trilobites, mollusks, and crinoids. Late in the Paleozoic (Carboniferous/Pennsylvanian), vast swampy deltas were deposited by rivers supporting amphibians and early reptiles and developing a rich growth of vegetation that would later become coal seams. Periodically, the sea would alternately return and retreat. Other fossils of the late Paleozoic include insects, marine invertebrates, and fishes, such as sharks.

During the Mesozoic, parts of the planning area in the west were generally above sea level, and sands and shales were deposited by large river systems. River and floodplain deposits in the panhandle of Oklahoma include dinosaur footprints and fossils, crocodiles, turtles, and fish. During the Late Mesozoic (Cretaceous), sea levels fluctuated and marine fossils were also deposited. In Kansas the sea deepened, and sharks, mosasaurs, plesiosaurs, turtles, fish, and numerous invertebrates are part of the fossil record.

During the Early Cenozoic (Tertiary), the Rockies were being pushed up to the west, causing a period of broad gentle uplift in Oklahoma, Kansas, and Texas. Rivers draining off the rising mountains carried extensive sand and gravel deposits and filled wide shallow valleys. These sediments and rocks contain a rich vertebrate fossil record, including a large assortment of fossil mammals and petrified wood. During the Late Cenozoic (Quaternary), glaciers covered a portion of Kansas. Quaternary fossils in the planning area are clams, snails, and the teeth and bones of horses, camels, bison, mastodons, saber-tooth cats, and mammoths (The Paleontology Portal 2015).

Potential fossil yield classification maps have not been completed for the decision area. The BLM has not done paleontological investigation in the decision area because of the limited surface management and the types of activities that it typically permits. There is a potential for fossils geologically, especially for Pennsylvanian epoch fossils associated with coal, but there has been relatively little formal investigation.

Trends

Qualitative observation indicates the condition has remained stable for paleontological resources are protected from actions that the BLM permits. The BLM has developed objectives for paleontological resources (BLM Manual H-8270-1, General Procedural Guidance for Paleontological Resource Management) to provide protection of the resources. It is the BLM's policy to manage paleontological resources for these values and to mitigate adverse impacts on them.

In accordance with the 1994 RMP, the BLM paleontological resource management program requires that the BLM be notified if paleontological resources are encountered during approved operations. It also requires that the resources be mitigated through the permitting process and other standard operating procedures (e.g., pre-disturbance clearance) associated with federal management actions. In these cases, the trend is toward conservation and scientific study.

Forecast

The development of potential fossil yield classification maps would provide additional information for permit review and for resource discovery and protection. Continued mineral estate development could lead to more discoveries but also the potential for impacts on the resource. The increase of use or activities in sensitive areas would require additional measures to manage these resources according to BLM policy and laws. The scientific, educational, and recreational value of any discovered or known paleontological resource should be determined by careful examination and evaluation by a paleontological resource specialist.

Key Features

No specific localities were identified.

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2.2.12 Visual Resources

Visual resources are features on a landscape, such as land, water, vegetation, animals, and structures. These features contribute to the landscape's scenic or visual quality and appeal (BLM 1984).

Visual Resource Management System

The BLM Visual Resource Management (VRM) System is a way to identify and evaluate visual resources in order to determine appropriate levels of management. The objective of the VRM System is to manage BLM-administered lands in a manner that will protect the quality of the scenic values of those lands. The VRM System is a tool to identify and map essential landscape settings to meet public preferences and recreational experiences today and in the future. The VRM System helps to ensure that actions taken on BLM-administered lands today will benefit the visual qualities associated with the landscapes, while protecting these visual resources for years to come.

Visual Resource Inventory

The visual resource inventory (VRI) involves identifying the visual resources of an area and assigning them to inventory classes using the BLM's VRI process. The process involves rating the visual appeal of a tract of land (scenic quality), measuring public concern for scenic quality (visual sensitivity), and determining whether the tract of land is visible from travel routes or observation points (distance zone). This process is described in detail in BLM Handbook H-8410-1, Visual Resource Inventory (BLM 1986a). Based on the three inventory components, lands are placed into one of four VRI classes. These class assignments are informational and provide the basis for considering visual values during the RMP process. They do not establish management direction and are not used for constraining or limiting surface-disturbing activities; instead they are considered a baseline for existing conditions.

The results of the VRI become an important component of the RMP. The RMP establishes how BLM-administered lands will be used and allocated for different purposes. It is developed through public participation and collaboration. Visual values are considered throughout the RMP process, and the visual resources of an area are then assigned to the management classes with established objectives.

Management of Visual Resources

The designation of VRM classes is ultimately based on management decisions made during the RMP process, which must take into consideration the value of visual resources. During the process, inventory class boundaries can be adjusted as necessary to reflect these resource allocation decisions. The goal of VRM is to minimize the visual impacts of all surface-disturbing activities, regardless of the class to which an area is assigned.

The objectives for each of the four VRM classes are as follows:

- Class I—To preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
- Class II—To retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- Class III—To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- Class IV—To provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may

dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and basic element repetition.

The VRM objectives are established in conformance with land use allocations made in the plan. The VRM objectives are area specific and provide visual standards for planning, designing, and evaluating proposed development projects. Proper implementation of VRM helps prevent environmental degradation and maintains important resource values.

The visual resource contrast rating process is used to resolve visual impacts. The process of a visual contrast rating compares the project features with the existing landscape features, using basic elements of form, line, color, and texture. It is described in detail in BLM Handbook H-8431-1, Visual Resource Contrast Rating (BLM 1986b).

Indicators

Indicators for visual resources are the components of the VRI: scenic quality, visual sensitivity, and distance zone.

Scenic quality factors are evaluated relative to similar features in the same physiographic province. Physiographic provinces are a subdivision of physiographic regions that divide the continent into distinct regions based on similar landforms and landscapes. The planning area is primarily within three physiographic provinces: western Kansas, the Oklahoma panhandle, and west Texas are in the Great Plains province; north-central Texas, central Oklahoma, and eastern Kansas are in the Central Lowland province; and east/southeast Texas and far southeast Oklahoma are in the Coastal Plain province. A very small portion of eastern Oklahoma is also in the Ouachita and Ozark Plateaus provinces.

Visual sensitivity is a measure of public concern for scenic quality. It can vary with the types of users, level of use, public interest, adjacent land uses, and special areas in the vicinity. Landscapes are assigned to one of three possible sensitivity ratings: high, medium, or low.

Distance zones are a measure of how visible the landscape is from key travel routes or observation points. The closer a landscape is to a viewer the more details are visible. Using GIS, landscapes are assigned to one of three possible distance zones: foreground/middleground (0 to 5 miles), background (5 to 15 miles), or seldom seen (beyond background or not visible).

The BLM will complete a targeted VRI for the planning area according to guidelines in BLM Manual Handbook H-8410-1, Visual Resource Inventory (BLM 1986a). It will include the 31,500 acres, more or less, of BLM-administered land along the Red River. Also included will be BLM-administered land deemed to be of high value for the other 4,000 acres, as well as high value Indian surface lands. High value lands are those near federal- or state-designated parks, scenic rivers, and scenic highways and lands where visual setting may be culturally important to tribal groups. Although the BLM VRM

System is applicable to BLM-administered lands, it will also be used to develop an inventory of visual resources on high-value Indian surface lands. Results of the VRI will be documented in a report and posted on the project website.

Current Condition

BLM-administered lands in the planning area do not currently have VRM objectives assigned. Visual resources are considered on a case-by-case basis during the environmental evaluation of a project.

Trends

In 1978 the BLM evaluated and documented visual resources for a portion of southeast Oklahoma in LeFlore, Haskell, Latimer, Pittsburgh, Coal, and Atoka Counties (BLM 1978) in response to increased demands for coal in that area. At that time, the overlay of scenic quality, sensitivity, and distance zone resulted in a VRM classification, though not a VRI classification as current guidance provides. (Because no planning document carried forward the identified VRM classifications identified in the 1978 report, the term VRI is used here to compare with current BLM guidance for inventorying visual resources.)

Most of the land in the 1978 study area rated as VRI Class II or IV. Lands rated as VRI Class II were identified as such because of the high sensitivity of the area. A few lands were identified as scenic quality A because of the variety of landform and vegetation and scarcity of visual features.

Forecast

There has been additional coal and natural gas development in the planning area since 1978. At the same time, public interest in maintaining high value visual landscapes has also increased. Both are expected to continue into the future.

Key Features

The following areas have been identified as visually important features or viewsheds in the planning area:

- Gloss Mountain State Park
- Salt Plains National Wildlife Refuge
- Cimarron River
- South Canadian River
- Oklahoma designated scenic rivers (Flint Creek, Illinois River, Barren Fork Creek, Upper Mountain Fork River, Big Lee's Creek, and Little Lee's Creek)
- National and State Scenic Byways
- Chickasaw National Recreation Area

BLM-administered land and Indian lands near these areas will be inventoried for visual resources. Also to be identified and inventoried are other lands near federal- and state-

designated parks, scenic rivers, and scenic highways and lands where visual setting may be culturally important to tribal groups.

References

BLM (US Department of the Interior, Bureau of Land Management). 1978. Visual Resource Inventory and Evaluation Southeast Oklahoma Land Use Analysis. Southeast Oklahoma Planning Unit, Oklahoma Project Office.

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2.2.13 Wilderness Characteristics

The BLM's authority to conduct wilderness reviews, including the establishment of new wilderness study areas, expired on October 21, 1993, in accordance with Section 603 of the FLPMA. However, the BLM has retained authority under Section 201 of the FLPMA to inventory BLM-administered lands for wilderness characteristics and to consider such information during land use planning. Policy guidance is provided by BLM Manual 6310, Conducting Wilderness Characteristics Inventory on BLM Lands (BLM 2012a) and Manual 6320, Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process (BLM 2012b). Through this planning process, the BLM has discretion to determine which portions of BLM-administered lands with wilderness characteristics would be protected by special management.

The inventory process entails the identification of wilderness inventory units, an inventory of roads and wilderness characteristics, and a determination of whether the unit as a whole possesses wilderness characteristics. Units found to possess wilderness characteristics are evaluated during the land use planning process to address future management for wilderness characteristics.

Wilderness characteristics considered in this analysis are naturalness, outstanding opportunities for solitude or a primitive and unconfined type of recreation, and supplemental values, as follows:

- Size—An area must be roadless and have 5,000 acres of contiguous BLM-administered lands or, if less, it must be contiguous with lands that have been formally determined to have wilderness or potential wilderness values (e.g., designated wilderness and BLM wilderness study areas).
- Naturalness—Lands and resources exhibit a high degree of naturalness when affected primarily by the forces of nature; the imprint of human activity is substantially unnoticeable. An area's naturalness may be influenced by the

presence of roads and trails, fences, or other developments; the nature and extent of landscape modifications; the presence of native vegetation communities; and the connectivity of habitats. Wildlife populations and habitat are recognized as important aspects of naturalness and would be managed as such.

- Outstanding Opportunities for Solitude or Primitive and Unconfined Types of Recreation—Visitors may have outstanding opportunities for solitude when the sights, sounds, and evidence of other people are rare or infrequent or where visitors can feel isolated, alone, or secluded from others. Visitors may have outstanding opportunities for primitive and unconfined recreation where access to the area is by nonmotorized, nonmechanical means and where no or minimal developed recreation facilities are encountered.
- Supplemental Values—The area may contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Current Condition

In accordance with BLM Manual 6310, the BLM conducted a GIS analysis for 5,000 acres of contiguous BLM-administered lands; it determined that no such lands were present in the planning area. There are also no BLM-administered lands contiguous with lands that have been formally determined to have wilderness or potential wilderness values. Therefore there are no lands with wilderness characteristics in the planning area. This resource will not be carried forward for analysis in the EIS.

References

BLM (US Department of the Interior, Bureau of Land Management). 2012a. BLM Manual 6310—Conducting Wilderness Characteristics Inventory on BLM Lands. Rel. 6-129. Washington, DC. March 15, 2012.

_____. 2012b. BLM Manual 6320—Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process. Rel. 6-130. BLM, Washington, DC. March 15, 2012.

2.2.14 Wildland Fire Management

Federal fire management in the planning area is guided by the Federal Wildland Fire Management Policy established in 1995 and updated in 2001. This policy establishes the guiding principles for fire management: ensuring firefighter and public safety, protecting communities, including property and infrastructure, and protecting natural and cultural resources. Wildland fire management is also guided by land use plans that identify strategies to meet land use goals and objectives related to wildland fire management, including strategies for unplanned ignitions and hazardous fuel treatments. In addition, fire management is also guided by specific fire management plans, which are the overarching activity plans for the fire program. Fire management plans provide the necessary tools for implementing on-the-ground fire-related direction from land use plans. Other fire management direction is provided through other regulatory compliance and statute requirements.

Indicators

Indicators identify factors to describe resource conditions. The indicators used for wildland fire ecology and management use the vegetation condition class (VCC; formerly fire regime condition classification [FRCC]) system to measure the extent to which vegetation departs from historical natural fire regimes (**Table 2-22**, Historical Natural Fire Regimes). Natural fire regimes are based on the frequency of fire, combined with the severity of fire on the dominant overstory vegetation. The historical natural fire regimes for most of the planning area were within Fire Regime II and some in Fire Regime I on the eastern edges of Oklahoma and Texas (Schmidt et al. 2002).

VCCs are qualitative measurements that determine the degree of departure of vegetation from historical fire regimes. This could alter key ecosystem components, such as species composition, structural stage, stand age, canopy closure, and fuel loadings.

Table 2-22
Historical Natural Fire Regimes

Code	Description
I	0-35 year frequency,[1] low severity[2]
II	0-35 year frequency, stand-replacement severity
III	35-100^{+} year frequency, mixed severity
IV	35-100^{+} year frequency, stand-replacement severity
V	200^{+} year frequency, stand-replacement severity

Source: Schmidt et al. 2002
[1]Fire frequency is the average number of years between fires.
[2]Severity is the effect of the fire on the dominant overstory vegetation.

VCCs range from Class 1 to Class 3, as follows (Schmidt et al. 2002 and Santiestevan 2012):

- VCC Class 1—Fire regimes are within a historical range, and the risk of losing key ecosystem components is low.
- VCC Class 2—Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate.
- VCC Class 3—Fire regimes have been significantly altered from historical range. Risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals.

Current Condition

Vegetation in the planning area can be described as the short-grass prairie ecoregion and the mixed-grass prairie ecoregion. Generally short-grass prairie occurs on the western side to the middle of the planning area, with the mixed-grass prairie occurring in the

central to east side of the planning area. The short-grass prairie occurs in the western Kansas and the panhandles and rolling plains of Oklahoma and Texas.

Vegetation communities associated with the short-grass prairie are buffalograss (*Bouteloua dactyloides*) and blue grama (*B. gracilis*). Some herbaceous species are threadleaf sedge (*Carex filifolia*), curlycup gumweed (*Grindelia squarrosa*), and scarlet globemallow (*Sphaeralcea coccinea*). Woody species occur in some areas and include sand sagebrush (*Artemisia filifolia*) and shinnery oak (*Quercus havardii*).

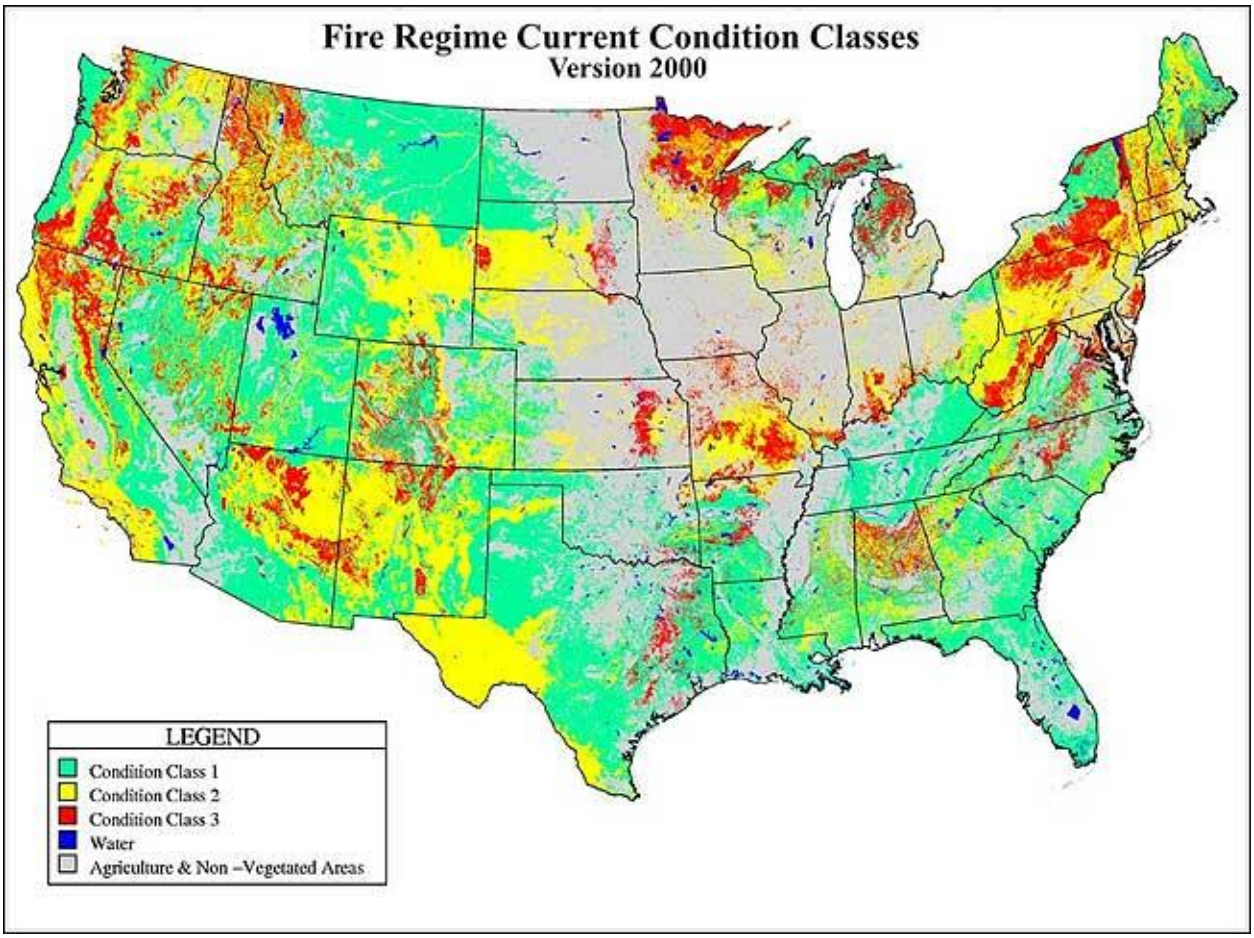
The southern mixed-grass prairie generally includes the central third of Kansas and Oklahoma and small areas of the eastern Texas panhandle and the western half of north-central Texas. Vegetation communities associated with the mixed-grass prairie are bluestem-grama (*Andropogon gerardii*, *Schizachyrium scoparium*, *Bouteloua curtipendula*, and *B. gracilis*), mesquite-buffalograss (*Prosopis* spp., *Bouteloua dactyloides*), buffalograss (*Bouteloua dactyloides*) and blue grama (*B. gracilis*). Common forb species are blanketflowers (*Gaillardia* spp.), evening primroses (*Oenothera* spp.), dozedaisies (*Aphanostephus* spp.), aster (*Symphyotrichum* spp.), penstemons (*Penstemon* spp.), blazing star (*Liatris punctate*), and annual sunflower (*Helianthus annuus*). Common tree and shrub species are redberry juniper (*Juniperus pinchotii*), honey mesquite (*Prosopis glandulosa*), shinnery oak (*Quercus havardii*), and sand sagebrush (*Artemisia filifolia*). Shinnery oak and sand sagebrush are found on sandy soils from western Oklahoma and northern Texas south to central Texas (USGS 2015).

VCCs of vegetation in the planning area are variable across the landscape. Many factors have altered fire regime condition classes from historical regimes to VCC 2 or 3 (see **Figure 2-19**). Examples are wildfire management (aggressive suppression), climate, human disturbances (agriculture, energy development, transportation corridors), and invasive species.

In general, agriculture has altered historical vegetation in large areas of the planning area. The eastern portion of Kansas includes areas where departure from historical ranges have transitioned to VCC 3. Occurrences of VCC 1 are present on the western edges of Kansas and Oklahoma and occur throughout Texas. VCC 2 occurs throughout Kansas and the western edge of central Texas (Schmidt et al. 2002 and Santiestevan 2012).

The availability of fire history data is variable throughout the planning area and differs by agency. In general, fire history is characterized by numerous small fires, most of which are caused by humans. BIA Eastern Oklahoma Region fire history data for the past six years has identified approximately 6,154 human-caused fires, compared to 500 natural fires on BIA-administered or adjacent lands (see **Table 2-23**).

Figure 2-19
Vegetation Current Condition (Formerly Fire Regime Current Condition) Classes (Version 2000)



Source: Schmidt et al. 2002 and Santiestevan 2012

Table 2-23
BIA Eastern Oklahoma Region Fire History 2008-2014

Ignition Source (Cause)	Number of Fires	BIA Acres Burned	Other Acres Burned	Total Acres Burned
Human	6,154	114,844	818,275	933,119
Natural	500	9,644	42,804	52,448
Total	6,654	124,488	861,079	985,567

Source: Brent Gohring, BIA, Eastern Oklahoma Region, personal communication via e-mail with Jeff Johnson, EMPSi, regarding fire history, January 21, 2015

Trends

In general, change agents such as agricultural development, energy development (oil and gas), transportation corridor construction, community expansion and growth, establishment and spread of invasive species, and aggressive fire suppression will continue to alter vegetation communities from historic regimes to VCCs 2 and 3. Change agents remove historical vegetation and disturb soils, which can increase erosion, alter vegetation communities, and make areas vulnerable to invasive species. In general, fire suppression has reduced fire size but has also contributed to fuels buildup, especially of woody vegetation, such as mesquite, creosote, and red cedar. These species now dominate previous grassland areas. The resulting expansion increases the buildup in fuels, causing hotter fires and greater plant mortality (USGS 2015). Human-caused fires should continue to be the primary source of ignition.

Forecast

Changes in VCCs will continue with the establishment and expansion of human-caused disturbances, wildland fire, and noxious weeds. Management actions necessary to slow changes in VCCs from 1 and 2 to 3 would be necessary. It would be necessary to implement management actions to improve vegetative conditions and land health, such as habitat restoration and fuels treatments.

Continued buildup of fuels in areas would increase the need for aggressive fuel treatments such as prescribed fire, mastication of vegetation, and application of chemical treatments to protect communities and resource values. Expansion and growth of communities would increase fire suppression priorities and would increase the need to construct hazardous fuels treatments to provide for public safety and protect communities. Community expansion and increases in population would increase the potential for more public recreation on federal lands and the potential for human-caused fires.

Suppression priorities would increase should additional recreational sites be developed. Identifying areas where fire would be managed for resource benefit would improve fire management efficiencies and improve vegetative ecological conditions. This would be based on interagency coordination needs and would provide more opportunities to manage fire for multiple objectives.

Protecting important resource values, such as sensitive wildlife habitat and cultural areas, would further increase suppression and hazardous fuels priorities to protect these areas and improve habitat conditions.

The potential may increase to implement emergency stabilization and rehabilitation treatments to reduce the wind and water erosion and to deter the establishment of invasive species.

Key Features

Key areas or features that would guide wildland fire ecology and management are as follows:

- Wildland Urban Interface
- Special Management Areas
- Sensitive Wildlife Habitat Areas
- Important Cultural Areas
- Special Designation (e.g., Wild and Scenic Rivers, areas of critical environmental concern [ACECs], and Wilderness)
- Special Recreation Management Areas

References

LANDFIRE GIS. 2015. Published GIS data of Vegetation Condition Class. Internet Website: http://landfire.cr.usgs.gov/viewer/.

Santiestevan, Cristina. 2012. Burning Hot: The Evolution of Eastern and Western Fires. American Forests, Forest File. May 2012. Internet Website: https://www.americanforests.org/our-programs/american-forests-publications/forest-files/forest-files-may-2012/burning-hot-the-evolution-of-eastern-and-western-fires/.

Schmidt, Kirsten M., James P. Menakis, Colin C. Hardy, Wendel J. Hann, and David L. Bunnell. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. Gen. Tech. Rep. RMRS-GTR-87. US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fort Collins, Colorado

USGS (US Geological Survey). 2015. Southern Great Plains Rapid Ecoregional Assessment—Pre-Assessment Report. (Timothy J. Assal, Cynthia P. Melcher, and Natasha B. Carr editors). Open File Report 2015.

2.2.15 Cave and Karst Resources

With the passage of the Federal Cave Resources Protection Act of 1988 (CRPA), Sec.3(1), Congress declared that significant caves on federal lands are an invaluable and irreplaceable part of the nation's natural heritage. It recognized that significant caves may be threatened due to improper use, recreational demand, urban spread, and lack of protection. The purpose of the CRPA is to secure, protect, and preserve significant caves on federal lands for the perpetual use, enjoyment, and benefit of all people. The CRPA's other purpose is to foster increased cooperation and exchange of information between governmental authorities and those who use caves on federal lands for science, education, or recreation. With the CRPA, Congress established policy that federal lands be managed in a manner that protects and maintains, to the extent practical, significant caves.

The CRPA defines a cave as any naturally occurring void, cavity, recess, or system of interconnected passages beneath the surface of the earth or within a cliff or ledge that is large enough to permit an individual to enter, whether the entrance is naturally formed or man-made. A karst is an area of irregular limestone or carbonate in which erosion has produced fissures, sinkholes, underground streams, and caverns. Caves and karst

resources may be considered nonrenewable resources due to the nature of the animal and plant life, paleontological deposits, biological resources, or minerals.

It is the policy of the Secretary of the Interior that federal lands be managed in a manner which, to the extent practical, protects and maintains significant caves and cave resources (43 CFR, Part 37.2). The type and degree of protection is determined through the local agency resource management planning process, with full public participation.

Indicators

Under the CRPA, a cave is considered significant if it meets one or more of the following six criteria:

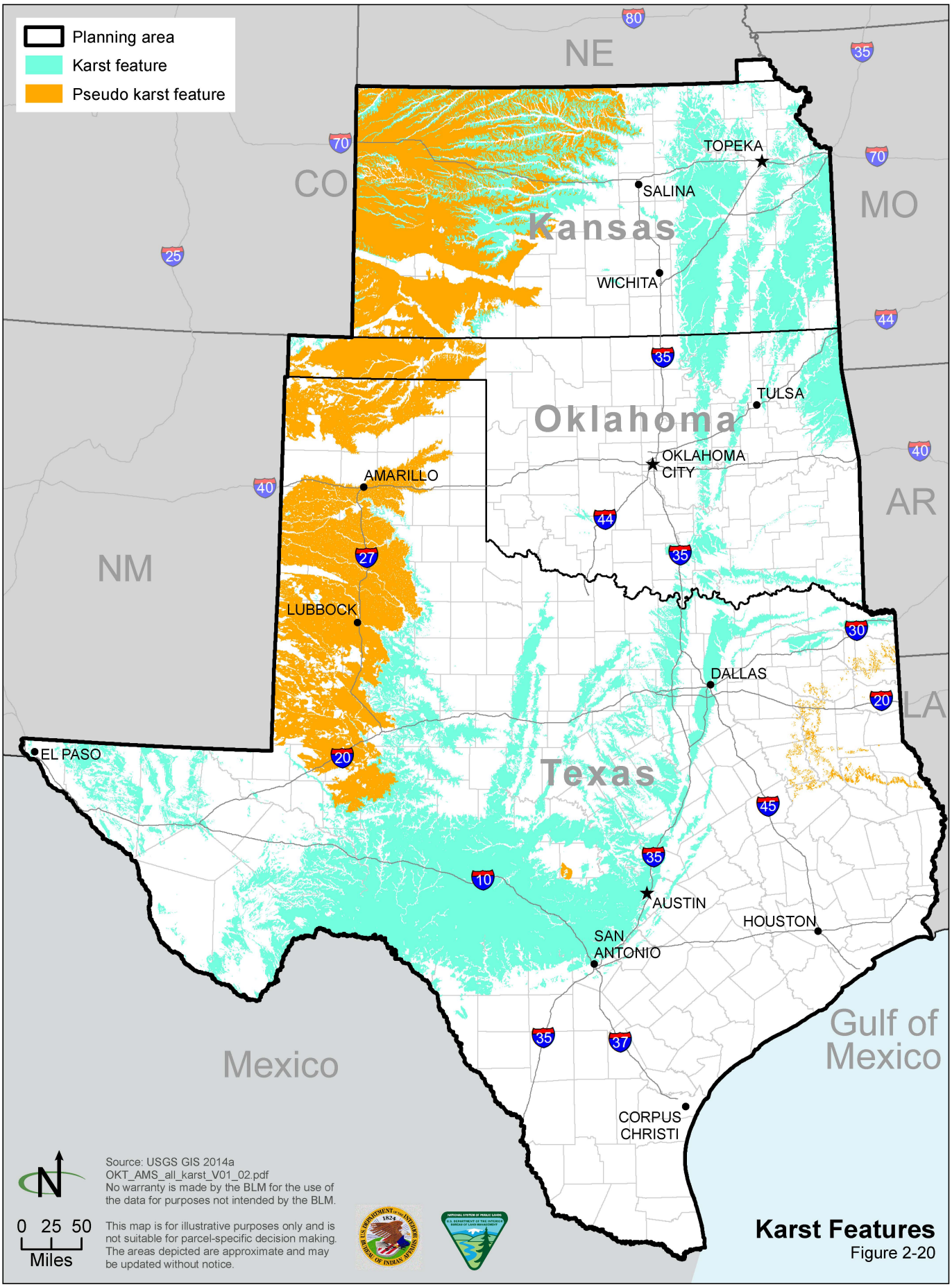
- Biota—The cave serves as seasonal or yearlong habitat for organisms or animals, or contains species or subspecies of flora or fauna native to caves, or is sensitive to disruption, or contains species found on state or federal sensitive, threatened, or endangered species lists.
- Cultural—The cave contains historic or archaeological resources included on or eligible for inclusion on the National Register of Historic Places because of its research importance for history or prehistory, its historical association, or other historical or traditional significance.
- Geological/mineralogical/paleontological—The cave possesses one or more geological or mineralogical features that are fragile or exhibit interesting formations.
- Hydrologic—The cave is part of a hydrologic system or contains water important to humans, biota, or development of cave resources.
- Recreational—The cave provides or could provide recreational opportunities or scenic values.
- Educational or scientific—The resource offers opportunities for educational or scientific use or is in a virtually pristine state, lacking evidence of contemporary human disturbance or impact, or the length, height, volume, total depth, or similar measurements are notable (43 CFR, Part 37).

Current Condition

Currently, cave features or caves of significance have not been identified on BLM-administered surface lands or lands with BLM subsurface mineral estate in the planning area. The USGS has identified karst features and pseudo karst features in the planning area, based on regional geology (see **Figure 2-20**).

Trends

Caves and karst are expected to be discovered more frequently as BLM- and BIA-administered surface and subsurface land is identified and such activities as mineral exploration occur over a larger expanse of federally administered lands. As caves are identified on BLM-administered surface lands, they will be examined for significance or avoided or mitigated where they occur on BLM-administered subsurface mineral estate.



Karst Features
Figure 2-20

Forecast

Under current management, significant caves and karst areas would continue to receive recognition and appropriate protection in the planning area.

Trends indicate a continued increase in interest in cave and karst resources. Educational outreach stressing the importance of these resources would continue. Without proper education, negative impacts on these resources could increase. Caves identified as bat habitat may be closed to reduce the potential of introduction and spread of white nose syndrome, a disease proving detrimental to bat populations.

Increased oil and gas production in the planning area indicates an increased potential for development in sensitive cave and karst areas. Impacts on cave and karst resources will be mitigated as individual project applications are received. However, it is likely that cumulatively these projects will have a negative impact on karst and related resources. Without plans of development, cumulative impacts would affect not only karst but related resources, such as groundwater and biological communities. Older wells with eroding or improperly sealed reserve pits will continue to have impacts on karst resources. These impacts are groundwater contamination and hydrocarbon releases into cave atmospheres, which causes dangerous conditions. The continued leasing of sensitive karst areas will allow potential negative impacts on karst resources and karst groundwater aquifers.

Key Features

In the planning area caves and cave resources of significance have not been documented on BLM-administered surface lands or lands with mineral estate, but they will likely be encountered during oil and gas development. In such as case, they would be documented and protected in a manner that preserves them.

References

USGS GIS. 2014a. GIS data of cave and karst resources. Internet Website: http://pubs.usgs.gov/of/2014/1156/.

2.3 BLM RESOURCE USES

2.3.1 Energy and Minerals

The sections below are discussions of current conditions and forecasts on BLM-administered surface and federal mineral estate. The BLM also has some jurisdiction over leasing Indian minerals (see **Section 2.6.14**, Energy and Minerals).

Coal

Current Condition

Coal resources exist in all three states in the planning area. **Table 2-24**, Coal Resources in the BLM Decision Area, shows the types of economically valuable coal found on BLM-administered federal mineral estate in each of the three states. Approximately 70 acres of BLM-administered surface lands overlay federal coal resources, but the resources are of doubtful value.

Table 2-24
Coal Resources in the BLM Decision Area

Coal Type	Acres of BLM-Administered Federal Mineral Estate
Kansas	
Lignite	0
Low volatile bituminous	0
Medium and high volatile bituminous	49,800
Oklahoma	
Lignite	0
Low volatile bituminous	90,400
Medium and high volatile bituminous	586,700
Texas	
Lignite	414,900
Low volatile bituminous	0
Medium and high volatile bituminous	7,000

Source: BLM GIS 2015

The bulk of coal resources on BLM-administered federal mineral estate in the decision area are in Oklahoma. Most of the valuable coal there is medium and high volatile bituminous. BLM-administered federal mineral estate in Texas contains a large amount of relatively low-value lignite.

Coal mining on BLM-administered federal mineral estate in the planning area is only occurring in Oklahoma; for this reason, coal occurrence and activity are discussed for Oklahoma only.

Oklahoma's coal resources are found in the eastern portion of the state in a coalfield spanning 19 counties. Oklahoma contains the most significant deposits of bituminous coal west of the Mississippi River and east of the Rocky Mountains (Oklahoma Department of Mines 2015). Approximately 0.1 percent of the estimated US recoverable coal reserves are at producing mines in the state.

Oklahoma coal operations produced approximately 1 million tons of coal in 2012, approximately 487,000 tons of which was produced from federal leases (BLM 2015a). Coal was produced from five Oklahoma counties in 2013: LeFlore, Haskell, Craig, Rogers, and Okmulgee (Oklahoma Department of Mines 2013). There are eight federal coal leases in Oklahoma, covering approximately 15,700 acres. Two of the leases, both in LeFlore County, are in production, and six are inactive (BLM GIS 2015). Oklahoma coal is mined by both surface and underground methods (Oklahoma Department of Mines 2015). Approximately 60 percent of the coal mined in Oklahoma is used in lime and cement kilns in Oklahoma and surrounding states. The remainder is used for electricity generation at one power plant in Oklahoma and one plant in Missouri (BLM 2015a).

Forecast

Approximately 1.6 billion tons of economically recoverable coal reserves remain in Oklahoma. While large deposits remain to be produced, extracting these resources will require significant capital investments. Production and market issues affect whether some coal reserves are economical to mine. Regulations concerning mining and reclamation requirements also impact coal activity in the state. Future activity will hinge on development of additional markets for high sulfur coal and the increased use and development of clean coal technology at coal-fired utilities in Oklahoma and surrounding states. These facilities are close enough to Oklahoma's coal reserves to continue to serve as a market for its coal if it can be burned cleanly enough to comply with federal and state air quality standards (Oklahoma Department of Mines 2015).

Key Features

The coalfield in eastern Oklahoma is the key feature for coal resources in the BLM decision area. It contains a commercial coal belt and a noncommercial coal bearing region. Approximately 866,700 acres of the coal field are on BLM-administered federal mineral estate (BLM GIS 2015).

Fluid Minerals

Fluid minerals in the planning area are helium, oil and gas, and geothermal resources. Each of these resources is discussed below.

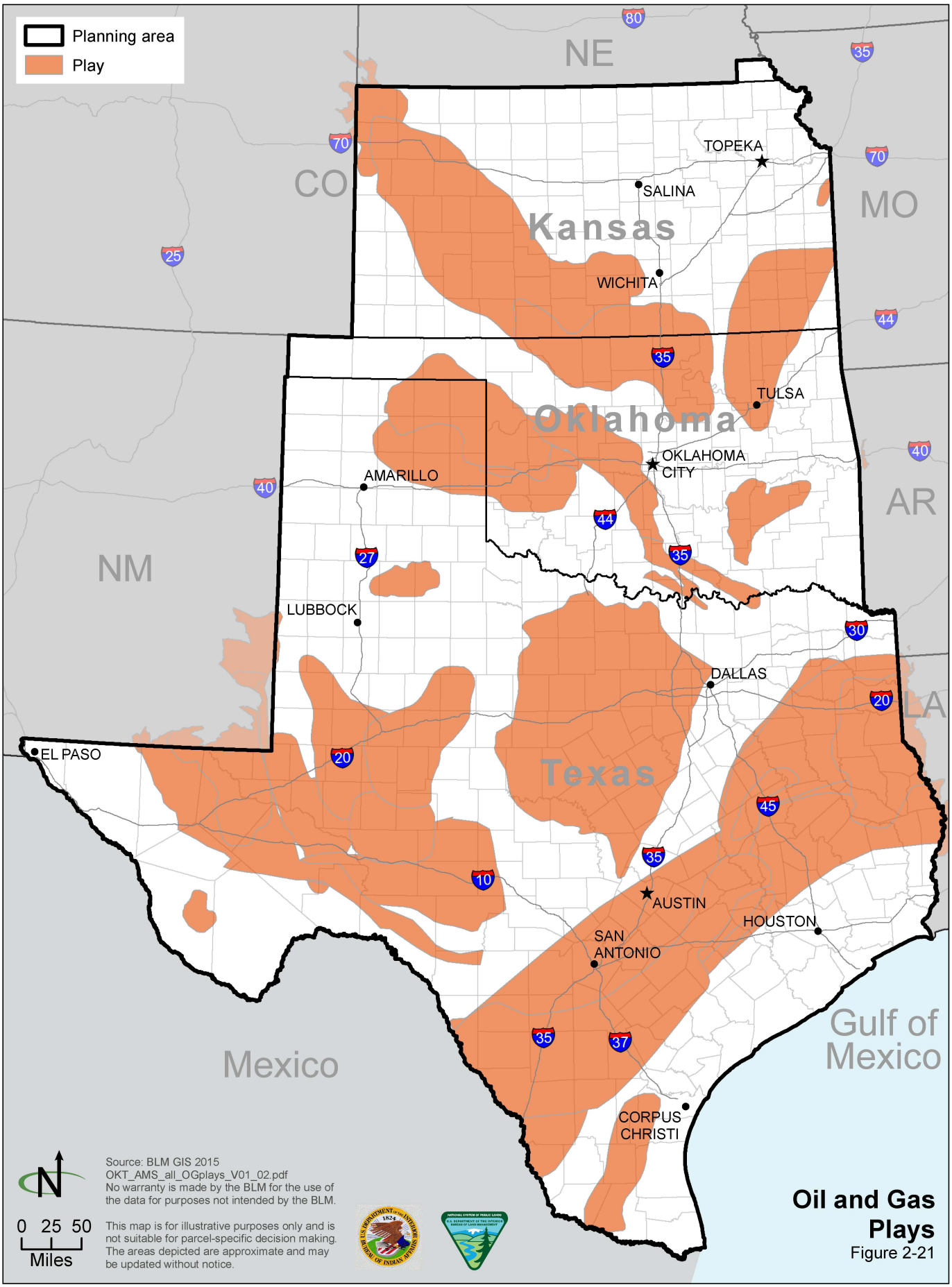
Current Condition

Helium

Natural gas fields in the western portion of the planning area contain unusually high concentrations of helium (from 0.3 to 2.7 percent). These fields constitute the largest source of helium in the US (BLM 2015c). The BLM operates and maintains a helium storage reservoir known as the Cliffside Storage Facility, along with an enrichment plant and pipeline system near Amarillo, Texas. The Cliffside Storage Facility is a natural geologic formation known as the Bush Dome. Helium from this storage facility supplies over 40 percent of domestic helium demand. The BLM supplies crude helium to private helium refining companies, which in turn refine the helium and market it to consumers. A central compression project to produce helium from the storage facility is ongoing.

Oil and Gas

The planning area contains approximately 34 oil and gas plays across all three states (see **Figure 2-21**). Portions of nine plays overlap BLM-administered surface lands, and 24 plays overlap BLM-administered federal mineral estate. BLM-administered surface lands overlap plays almost exclusively in Oklahoma, but some overlapping also occurs in Texas. BLM-administered federal mineral estate overlaps oil and gas plays in all three states in the planning area (BLM GIS 2015).



Oil and Gas Plays
Figure 2-21

For detailed information on production, well completions, and oil and gas development potential, refer to the forthcoming Reasonable Foreseeable Development Scenario (RFD) being prepared by the OFO (BLM 2015b). The current condition discussion below summarizes the information provided in the RFD.

Overall oil production in the planning area declined from 1993 to 2004. Production remained steady from 2004 to 2009 and began to rapidly increase from 2009 to the present. The most significant increases in oil production have been in southern and western Texas. Most of the increase in southern Texas has been from horizontal wells, while the increase in western Texas is largely conventional wells (BLM 2015b).

Despite the overall increase in oil production in the planning area, oil production on BLM-administered federal mineral estate has not surpassed 1993 levels of 1.1 million oil barrels. Production in 2012 approached 1993 levels at 946,000 oil barrels, but 2013 production dropped to 661,000 oil barrels (BLM 2015b).

Allocated oil production (production from wells on private land but for which the BLM shares in production through a unitization agreement) has also declined since 1993. This decline has occurred at a greater rate than the decline in production from wells on BLM-administered federal mineral estate. Most oil production from BLM-administered federal mineral estate has been in Oklahoma, although production on federal mineral estate in Texas spiked in 1997 (BLM 2015b).

Overall gas production in the planning area was relatively stable from 1993 to 2005. Production peaked in 2008 and 2012 at over 10 billion thousand cubic feet (MCF) and remained at nearly 10 billion MCF of gas in 2013. Most of the increase in gas production since 2005 has been in eastern Texas. Gas production in Oklahoma and Kansas has remained relatively stable since 1993. Kansas produced by far the least amount of gas in the planning area over this time, with less than 1 billion MCF per year. Like horizontal oil, horizontal gas production in the planning area has been rapidly increasing since 2003. The increase in horizontal gas production has occurred in Texas and Oklahoma (BLM 2015b).

Gas production from federal and Indian minerals in the planning area accounts for approximately 0.7 percent of total gas production in the planning area. Gas production from BLM-administered federal mineral estate in the planning area peaked in 1996 at approximately 123 million MCF. Production hit a smaller peak in 2012 at approximately 79 million MCF and fell to 64 million MCF in 2013. As is the case with the general planning area, Texas is largely responsible for the peaks in gas production from BLM-administered federal mineral estate in 1996 and 2012. Kansas has had the least gas production from BLM-administered federal mineral estate.

Approximately 2.2 million oil and gas wells have been drilled in the planning area, over 85,000 of which are horizontal or directional; approximately 409,000 wells are currently producing (BLM 2015b). Of the 409,000 producing oil and gas wells in the planning area, 125 (less than 1 percent) are on BLM-administered surface lands and 9,702 (2

percent) are on BLM-administered federal mineral estate (BLM GIS 2015). Most producing wells in the BLM decision area are in Oklahoma.

Injection wells have also been drilled in the decision area. There are five injection wells on BLM-administered surface lands in Texas (plus one in Oklahoma) and 480 injection wells on BLM-administered federal mineral estate across all three states (BLM GIS 2015).

Geothermal Resources

The most favorable portions of the planning area with geothermal energy potential are along its southern border and in the eastern portion of Texas. Northern Oklahoma and central Kansas also have moderately favorable geothermal potential (National Renewable Energy Laboratory GIS 2009). **Table 2-25** shows the acres of BLM-administered surface lands and federal mineral estate with varying levels of enhanced geothermal resource potential (geothermal resources that can be reached by fracturing rock).

Table 2-25
Enhanced Geothermal Potential in the BLM Decision Area

Geothermal Potential Class (1—Most Favorable to 5—Least Favorable)	Acres of BLM-Administered Surface Lands	Acres of BLM-Administered Federal Mineral Estate
1	0	0
2	0	464,000
3	16,100	2,080,200
4	18,100	889,800
5	12,700	985,200

Source: National Renewable Energy Laboratory GIS 2009

While portions of the BLM decision area overlay areas with geothermal resource potential, there has never been any geothermal leasing or activity there.

Forecast

Helium

In recent decades, private sector demand for helium has begun to exceed federal demand for defense purposes. In response, Congress redefined the government's role in helium production by passing the Helium Privatization Act of 1996 (Public Law 104-273, 110 Statute 3315). The BLM was given responsibility for operating the federal helium reserve to provide enriched crude helium to private refiners. The Helium Stewardship Act of 2013 (Public Law 113-40, 127 Statute 534), was passed to allow for a smooth transition to private means of helium production as the federal helium reserve is steadily drawn down. Under this act, all of the federal helium reserve and federally owned facilities associated with the federal helium system must be disposed of by September 30, 2021.

Oil and Gas

The BLM has classified the planning area by oil and gas development potential, ranging from no potential to high potential (see **Figure 2-22**, Oil and Gas Development Potential). **Table 2-26**, Oil and Gas Development Potential in the BLM Decision Area, shows the number of acres with oil and gas development potential on BLM-administered surface lands and subsurface mineral estate in the planning area. As shown in **Table 2-26**, about half of the BLM decision area has moderate or greater oil and gas potential. Most of these areas are on BLM-administered federal mineral estate.

Table 2-26
Oil and Gas Development Potential in the BLM Decision Area

Potential Level	Acres of BLM-Administered Surface Lands	Acres of BLM-Administered Federal Mineral Estate	Total
High	1,500	733,500	**735,000**
Moderate to high	12,900	751,500	**764,400**
Moderate	17,700	942,500	**960,200**
Low to moderate	60	536,300	**536,360**
Low	14,700	1,707,600	**1,722,300**
None	0	75,500	**75,500**

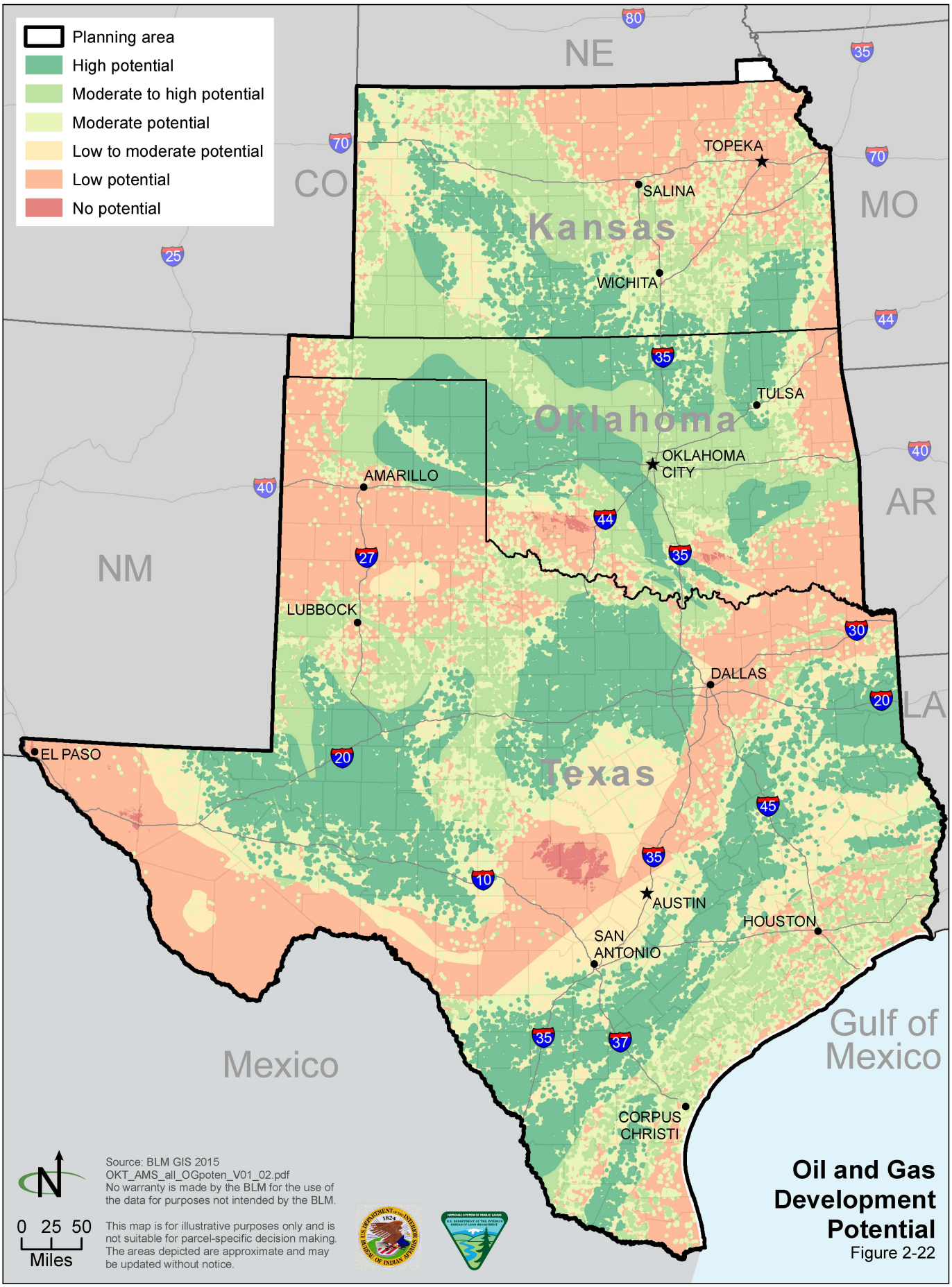
Source: BLM GIS 2015

The Energy Information Administration predicts that nationwide oil prices will rise between 0.8 and 1.4 percent per year between 2012 and 2040 (in 2012 dollars; Energy Information Administration 2014). Natural gas prices are predicted to rise at a rate of 3.7 percent per year between 2012 and 2040 (in 2012 dollars; Energy Information Administration 2014). Based on the oil and gas development potential and predicted nationwide price increases, oil and gas activity in the BLM decision area is expected to increase over the next 20 years.

The RFD prepared by the BLM for the planning area estimates that approximately 1.9 million oil barrels will be produced from federal and Indian minerals in the planning area in 2035; this is a 27 percent increase over 2013 production levels for the BLM and BIA decision areas. The RFD also estimates that 126 million MCF of gas will be produced from federal and Indian minerals in the planning area in 2035; this is a 40 percent increase over 2013 production levels for the BLM and BIA decision areas (BLM 2015b).

Geothermal Resources

Future development of geothermal energy in Texas is expected to include geoexchange systems (heat pumps), direct use activities, and electric power generation. The most likely use of federal geothermal resources would be for electric power generation, which has not yet become commercially established in the state (Texas State Energy Conservation Office 2015). Although portions of the BLM decision area have moderately high geothermal resource potential, geothermal resource development in the decision area is not expected in the next 20 years.



Oil and Gas Development Potential

Figure 2-22

Key Features

Helium

Four helium areas overlap BLM-administered surface lands and federal mineral estate in the western portion of the planning area: Hugoton/Panoma/Panhandle, Greenwood/Keyes, Bradshaw, and Cliffside. These areas contain natural gas fields with high concentrations of helium. The Cliffside area is the storage reservoir for the federal helium reserve. **Table 2-27** shows the number of acres of each helium area that overlaps the BLM decision area.

Table 2-27
Helium Areas

Helium Area Name	State	Acres of BLM-Administered Surface Lands	Acres of BLM-Administered Federal Mineral Estate
Hugoton/Panoma/Panhandle	Kansas, Oklahoma, Texas	70	68,500
Greenwood/Keyes	Kansas, Oklahoma	0	1,400
Bradshaw	Kansas	0	1,500
Cliffside	Texas	10	10,800

Source: BLM GIS 2015

Oil and Gas

Key oil and gas features in the planning area are the plays shown in **Figure 2-21**. These plays contain known oil and gas resources and are considered to have high development potential. For more information on these plays, see the RFD (BLM 2015b).

Geothermal Resources

Key geothermal features in the planning area are areas with the most favorable geothermal potential classes. (See **Table 2-25** for a breakdown of geothermal potential classes on BLM-administered surface lands and federal mineral estate.) The highest potential classes in the planning area and decision area are in eastern Texans and along its southern border. The Texas State Energy Conservation Office estimates there are at least five major regions in Texas that have strong potential for geothermal electrical power production. This is based on the existence of oil and gas wells with temperatures that can get above 212 degrees Fahrenheit. These regions are East Texas, the Gulf Coast, the Delaware-Val Verde Basin region, the Trans-Pecos region, and the Aardvark Basin where it enters the Texas panhandle (Texas State Energy Conservation Office 2015).

Locatable Minerals

Current Condition

Because nearly all BLM-administered federal mineral estate is acquired, hardrock minerals that would otherwise be locatable under the General Mining Law of 1872, as

amended (30 USC, Section 29) are leasable under Reorganization Plan No. 3 of 1946 (5 USC, Appendix). See **Section 2.3.2**, Energy and Minerals, Nonenergy Leasables, for more information on these leasable hardrock minerals.

Public domain federal mineral estate (mineral estate that has always been federal rather than having been acquired by the federal government) does exist along the Red River in the decision area on the Texas/Oklahoma border. Hardrock minerals in this area would be locatable under the General Mining Law of 1872, as amended. Copper and uranium deposits may exist on BLM-administered surface and federal mineral estate in this area (Johnson 2008); however, no locatable mineral activity has occurred on BLM-administered surface or federal mineral estate in this area to date.

Forecast

Due to the small amount of public domain federal mineral estate in the decision area, locatable mineral activity is not expected to occur in the decision area in the next 20 years.

Key Features

The public domain federal mineral estate along the Red River is the key feature for locatable minerals in the decision area. This is because it the only area in which hardrock minerals would be locatable subject to the General Mining Law of 1872, as amended.

Mineral Materials

Current Condition

The planning area contains numerous mineral materials, such as sand and gravel, limestone, granite, chalk, and pumice. However, because most of the BLM-administered federal mineral estate in the decision area is acquired, mineral materials that would normally be disposed of through the Mineral Materials Act of 1947, as amended (30 USC, Section 601 et seq.) are leased under Reorganization Plan No. 3 of 1946 (5 USC, Appendix). See **Section 2.3.2**, Energy and Minerals, Nonenergy Leasables, for more information on these leasable mineral materials.

Public domain federal mineral estate (mineral estate that has always been federal rather than having been acquired by the federal government) does exist along the Red River in the decision area along the Texas/Oklahoma border. Mineral materials in this area would be disposed of under the Mineral Materials Act of 1947, as amended. Sand and gravel are the most common mineral materials in this area (Johnson 2008); however, no mineral material activity has occurred on BLM-administered surface or federal mineral estate in this area to date.

Forecast

Due to the small amount of public domain federal mineral estate in the decision area, mineral material activity is not expected to be significant in the next 20 years. Because mineral materials often provide construction and road building materials, demand is largely driven by proximity to construction projects. Therefore, if projects occurred near

the public domain federal mineral estate along the Red River, the BLM could dispose of mineral materials in the area.

Key Features

The public domain federal mineral estate along the Red River is the key feature for mineral materials in the decision area. This is because it is the only area in which mineral materials would be disposed of subject to the Mineral Materials Act of 1947, as amended.

Nonenergy Leasables

Current Condition

As mentioned under Locatable Minerals and Mineral Materials, hardrock minerals and mineral materials on acquired BLM-administered federal mineral estate in the planning area would be leased under Reorganization Plan No. 3 of 1946 (5 USC, Appendix); however, there has been very little hardrock or mineral material activity in the decision area. In the past, companies showed interest in chromium and palladium deposits on BLM-administered federal mineral estate in the Ouachita Mountains in southeastern Oklahoma, but the minerals did not exist in economic quantities.

The primary nonenergy leasable minerals in the planning area are evaporites, which include salt and gypsum, along with other minerals that are less commercially viable. Large salt deposits lie beneath western Texas, western Oklahoma, and western and central Kansas. Although no salt development is occurring in the decision area, the Kanopolis salt mine outside Salina, Kansas, is mining salt resources close to BLM-administered federal mineral estate. Approximately 1,324,800 acres of BLM-administered federal mineral estate and 14,000 acres of BLM-administered surface lands contain salt resources (BLM GIS 2015).

Forecast

Based on low historical demand and the widespread availability of hardrock minerals and mineral materials on private minerals, the BLM does not expect leasing activity associated with hardrock minerals and mineral materials in the next 20 years.

Development of salt resources in the planning area, particularly in Kansas, is expected to continue. The Hutchinson Salt Member in Kansas contains a higher concentration of salt and fewer impurities than most salt beds (Sawin and Buchanan 2002). Members of the commercial salt industry have identified a tract of BLM-administered federal mineral estate near the Kanopolis mine for future salt mining. This tract is expected to be leased in the next 20 years.

Key Features

Key features in the planning area are the salt resources in the western and northern portions of the planning area, particularly the Hutchinson Salt Member in Kansas.

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2.3.2 Renewable Energy

Renewable energy consists of energy produced from wind, solar, and biomass generation methods.

Current Condition

Wind energy development is a rapidly growing industry throughout the planning area. Reliable wind resources throughout the Great Plains, combined with federal incentives for renewable energy development as part of the American Recovery and Reinvestment Act, led to a proliferation of new and expanded wind energy generation facilities in Kansas, western Oklahoma, northwestern Texas, and the Texas gulf coast. Within the three-state planning area, there are 214 individual wind energy project locations (National Renewable Energy Laboratory 2015). Project locations contain as few as one turbine, but many have 50 or more. Individual turbine sizes and generation capacities vary, but typical commercial-scale turbines are between 200 and 300 feet tall, with +/-100-foot long rotors, and generation capacities between 1.5 and 3 megawatts.

There are currently no wind or solar energy ROWs or biomass facilities on BLM-administered lands or split-estate lands where the BLM manages the subsurface mineral estate.

Forecast

Fewer federal incentives for renewable energy development are expected to lead to a slowing of the expansion of future wind energy development throughout the planning area. However, technological advancements are expected to gradually lower the cost per kilowatt hour, which could promote future development. The comparative cost of fossil fuel-based energy sources is also expected to dictate the amount of future wind energy generation facilities. Higher oil, gas, and coal prices could lead to more rapid and widespread wind energy development as demand for more sustainable energy sources grows. Lower prices for carbon-based energy products could also fuel wind energy development as investors seek higher and more sustainable returns on energy investments.

Key Features

While wind resources in the planning area are generally favorable for utility-scale wind energy development, the scattered nature of BLM and BIA landownership limits the likelihood of future development in the decision area. Legal access to BLM-administered and BIA trust lands further complicates renewable energy development opportunities in the decision area. Within the planning area where wind resources are highest, wind energy development is most likely where energy generation is compatible with the existing land use (e.g., agriculture).

References

National Renewable Energy Laboratory. 2015. Open EI: Map of Wind Farms. Internet website: http://en.openei.org/wiki/Map_of_Wind_Farms. Accessed in January 2015.

2.3.3 Recreation and Visitor Services

Current Condition

There are a multitude of recreation opportunities in the 269-million-acre planning area. Many activities take place on surface lands not managed by the BLM, including state parks, state and federally managed reservoirs, and other destinations.

Recreation is also popular along stretches of the Red River, including near Waurika, Oklahoma. Off-highway vehicle riding, bird watching, fishing, picnicking, hunting, and hiking are common activities on BLM-administered land and private lands along the river. Recreation on BLM-administered lands has increased dramatically in the past 10 years.

Hunting is a popular seasonal activity throughout the planning area and is regulated at the applicable tribal or state government level.

Oklahoma

The Oklahoma Tourism and Recreation Department provides recreation opportunities statewide at 35 state parks. Four of those parks charge day-use fees, but access to the other 31 is free. Common activities are boating and fishing, hunting, camping, hiking, horseback riding, and mountain biking (Oklahoma Tourism and Recreation Department 2015).

A portion of one national forest and two national grasslands occur in Oklahoma. They offer many dispersed and developed recreation opportunities, many of which are centered on Lake Ouachita and Broken Bow Reservoir in Ouachita National Forest in eastern Oklahoma.

Dispersed recreation also occurs on public land throughout Oklahoma. On BLM-administered lands and federal mineral estate, low levels of hiking, hunting, camping, sightseeing, and driving for pleasure are occurring, primarily along the Canadian River corridor and existing roads.

Recreation along the Red River corridor is discussed under Key Features, below.

Texas

Texas Parks and Wildlife administers 103 state parks and historical sites. These properties provide a wide variety of recreation opportunities, from camping and hunting to hiking and mountain biking, and horseback riding. Daily or annual passes are required for entrance to many parks and historical sites.

There are four national forests and four national grasslands in Texas, totaling over one million acres. OHV riding, hunting, hiking, camping, fishing, and other dispersed and developed recreation activities are popular on National Forest System land.

The only BLM-administered surface land in Texas is the 11,800-acre Cross Bar Ranch near Amarillo. It is discussed in more detail under Key Features, below.

Kansas

The Kansas Department of Wildlife, Parks, and Tourism manages 26 state parks. Most offer camping, wildlife viewing, and access to reservoirs for water-based recreation. Daily and seasonal passes are available for purchase. Recreation activities are hunting, fishing, boating, hiking, camping, wildlife viewing, mountain biking, and horseback riding (Kansas Department of Wildlife, Parks, and Tourism 2015).

The Cimarron National Grassland is in the southwest corner of Kansas. Popular activities are hunting, wildlife viewing, camping and picnicking, hiking, and interpretive education (Forest Service 2015).

Tribal Jurisdictional Lands

Recreation on tribal jurisdictional lands is generally restricted for nontribal members. Tribes establish their own policies for public access, including recreation. Recreational activities, such as hunting and fishing, require applicable tribal permits and permission.

Forecast

Recreation is expected to continue to be a popular use for the life of the plan. This is especially true for areas experiencing population growth, including expanding urban areas in the planning area. Developed recreation areas, including state parks, reservoirs, and other locations with recreation facilities, may experience greater increases in visitation than undeveloped areas because of greater certainty of long-term public access.

Key Features

Stretches of the Red River corridor have become popular recreation areas. The area of public land south of Waurika, Oklahoma, next to State Route 79, has extensive recreational use. Other than posting signs, the BLM does not have an active day-to-day management presence in this part of the river. OHV riding is especially popular, and users ride cross-country and on a series of user-created trails; the lack of signs makes it difficult for users to determine land management boundaries and results in frequent trespass onto private land. Some users also camp in this area during multi-day trips.

In addition to OHV use, bird-watching and wildlife viewing are also common activities along portions of the Red River. There are a series of unofficial trails users can follow, but access often requires traversing private land.

The Cross Bar Ranch, an 11,800-acre parcel near Amarillo, Texas, in the Amarillo Field Office, was originally acquired as a strategic helium reserve; today it also serves as a research area. The ranch is surrounded by private land, and public access is limited to hiking in along the Canadian River. As a result, the area receives low recreation use, primarily by archery hunters.

The planning area includes many reservoirs and other parcels where the BLM administers federal mineral estate but does not manage any surface uses, including recreation.

References

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Oklahoma Tourism and Recreation Department. 2015. State Park Frequently Asked Questions. Internet website: http://www.travelok.com/article_page/stateparkfaqs.

2.3.4 Comprehensive Travel and Transportation Management

In the past, comprehensive and proactive transportation planning has not been an emphasis in BLM RMPs. The development of transportation routes, whether planned through projects such as oil and gas developments or created by recreation users, has traditionally been viewed as an acceptable part of the development of BLM lands. Research from the past 20 years on the impacts of roads on resources, wildlife, and other users and actual experience by the BLM on these impacts is increasing the need for well-designed and integrated transportation planning.

Current Condition

Travel and transportation is extensive across the planning area and includes routes ranging from interstate highways to foot trails. Routes are managed by a variety of entities at the federal, state, and local level.

There is no management framework for travel and transportation on BLM-administered land in the planning area; previous RMPs did not analyze this use. While most scattered parcels of BLM-administered land receive little to no travel, land along the Red River has become increasingly popular for OHV use. This has resulted in a need to allocate BLM-administered land as open, limited, or closed to OHV use, in accordance with federal regulations in 43 CFR, Part 8340.

Forecast

Population growth and an increasing awareness of BLM-administered land as a recreation destination are expected to drive the trend toward additional recreational use and accompanying requests for improved access.

Travel is expected to increase throughout the life of the plan, especially as recreation becomes more popular. Areas along the Red River will require specific management for OHV travel to mitigate damage to vegetation and riparian areas.

Key Features

The Red River near Waurika, Oklahoma, is a popular recreation destination; as such, routes near it receive moderate to heavy vehicle use. None of the routes on BLM-administered land have been designated for public use, and the area has not previously been analyzed for OHV use or associated management allocations.

Likewise, there is no current management allocation for OHV use in the Cross Bar Ranch. The ranch is surrounded by private land, though an easement has been acquired that may provide public access in the future. If access is improved, there will likely be an increased demand for creating designated routes for motorized and nonmotorized use on the ranch. There are a total of 32.8 miles of roads and trails at the Cross Bar Ranch, though they are not designated for specific types of vehicles or uses (BLM GIS 2015).

Off-Highway Vehicle Management Areas

Off-highway vehicle is synonymous with off-road vehicle. Off-road vehicle is defined in 43 CFR, Part 8340.0-5(a): Off-road vehicle means any motorized/battery-powered vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding: 1) Any non-amphibious registered motorboat; 2) Any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; 3) Any vehicle whose use is expressly authorized by the authorized officer or otherwise officially approved; 4) Vehicles in official use; and 5) Any combat or combat-support vehicle when used in times of national defense emergencies. Types of OHVs commonly used on public lands include dirt motorcycles, dune buggies, sand rails, jeeps, four-wheel drive vehicles, snowmobiles, and all-terrain vehicles.

The BLM's regulations for OHV management, 43 CFR, Part 8342.1, stipulate "the authorized officer shall designate all BLM lands as either open, limited, or closed to [OHVs]." As such, all BLM lands in the planning area need to be designated in one of three OHV designation categories, as follows:

- Open area designations are used for intensive OHV or other transportation use areas where there are no special restrictions or where there are no compelling resource protection needs, user conflicts, or public safety issues to warrant limiting cross-country travel.
- Limited area designations are used where travel must be restricted to meet specific resource and/or resource use objectives. In accordance with BLM Travel and Transportation Manual 1626, areas classified as limited, the BLM must consider a full range of possibilities, including travel that will be limited to types or modes of travel, such as foot, equestrian, bicycle, and motorized; limited to existing roads and trails; limited to time or season of use; limited to certain types of vehicles (e.g., motorcycles, all terrain, and high clearance); limited to licensed or permitted vehicles or users; limited to BLM administrative use only; or other types of limitations. In addition, the BLM must provide specific guidance about the process for managing motorized vehicle access for authorized, permitted, or otherwise approved vehicles for those specific categories of motorized vehicle uses that are exempt from a limited designation.
- Closed area designations prohibit any and all motorized travel and transportation. Areas or trails are designated closed if closure to all vehicular use is necessary to protect resources, promote visitor safety, or reduce use conflicts. Non-motorized uses are permitted in these areas.

References

BLM GIS (US Department of the Interior, Bureau of Land Management, Geographic Information System). 2015. Base GIS data on file with the BLM's eGIS server used for calculations or figures; includes data prepared for the reasonable foreseeable development scenario and Version 04_02 of the decision area. BLM, Oklahoma Field Office, Tulsa.

2.3.5 Lands and Realty

Land Use Authorizations

Current Condition

On BLM-administered lands, the BLM authorizes certain land use activities, mainly by issuing rights-of-way (ROWs) and leases. Examples of ROWs are roads (e.g., highways), electrical distribution and transmission lines, pipelines, and wind and solar energy generation facilities. The BLM typically issues leases for communication sites.

The following analysis describes these types of land uses generally for the broad planning area and more specifically for BLM-administered lands. For analysis of wind and solar energy ROWs, see **Section 2.3.3**, Renewable Energy.

<u>Kansas and Oklahoma</u>

The State of Kansas has an average population density of 35 people per square mile, while in Oklahoma the population per square mile is 55. The averages for both states are below the national average of 87 people per square mile. The largest population centers in the planning area are Oklahoma City and Tulsa, Oklahoma, and Wichita and Topeka, Kansas. Collectively, these four cities have a population of 1,523,000 and account for nearly a quarter of the two-state population (US Census Bureau 2010). Major land use authorizations, such as highways, electrical transmission lines, pipelines, and communication equipment, are more concentrated near these and other smaller urban centers. In general, rural areas have a lower density of ROWs and other infrastructure. In rural areas, most roads, power lines, and other linear features follow Public Land Surveying System section lines.

Approximately 31,500 acres of BLM-administered surface lands are next to the Red River, along the Oklahoma-Texas border. BLM-administered lands along the Red River consist of scattered parcels and contiguous land holdings, generally ranging in size from less than one acre to approximately 200 acres. In general, these isolated parcels contain few roads, pipelines, transmission lines, or other similar uses.

BLM-administered subsurface estate accounts for approximately 4,754,700 acres in the planning area. These areas are most prevalent in eastern Oklahoma, but are also scattered throughout the two states. On the surface, infrastructure-related land uses consist of a variety of power lines, pipelines, roadways, and communication facilities, as well as typical urban development, agricultural lands, and undeveloped open space.

Texas

Texas has a population density of 96 people per square mile, which is more than the national average of 87 and a total population in 2013 of 26,448,000. Cities such as Houston, Dallas, San Antonio, and Austin are some of the most rapidly growing urban areas in the country. Between 2010 and 2013, for example, the population of Austin grew by 9.2 percent. With a total population of 2,196,000, Houston is the fourth most populous city in the country. Regional road, electrical, gas, oil, and communication infrastructure in place to support these large and expanding urban areas is substantial, with infrastructure systems extending far beyond the cities' geographic centers. In rural areas, infrastructure is a less dominant element of the overall landscape. Infrastructure patterns in Texas are also less predictable because it largely did not use the Public Land Surveying System to allocate landownership. Roads and other linear features tend to cross the landscape in an assortment of directions rather than the grid pattern characteristic throughout the northern portion of the planning area in Oklahoma and Kansas.

There is a cluster of approximately 11,800 acres of BLM-administered surface lands, the Cross Bar Ranch, northwest of Amarillo. There are two large transmission lines that cross through the center of the cluster from north to south (BLM GIS 2015). There are also several unpaved access roads in this area. It is unclear, however, if the BLM issued ROWs for these uses.

The current management direction for lands and realty is considered adequate to ensure continued management of lands in the planning area. Management decisions in the planning area could identify ROW avoidance or exclusion areas to better protect resources. Public utility corridors for power lines, pipelines, communication sites, and communication ROWs could be identified as well.

Throughout the planning area, unauthorized uses on BLM-administered lands are an ongoing management concern. The BLM is aware of approximately 10 pipelines crossing the Red River and potentially affecting BLM-administered lands that have not been formally authorized through the BLM ROW process. Other potential unauthorized uses and trespass cases are thought to be present; however, the BLM is unclear of the nature and extent of these issues.

Due to the isolated and scattered nature of the BLM landownership pattern in the planning area, access to BLM-administered lands is also a management concern. The BLM is aware that people trespass across adjacent private lands to reach federal lands. This is especially prevalent along the Red River.

Forecast

Overall demand for land use authorizations in the planning area is anticipated to increase as a result of continued regional population expansion, future subsurface mineral development, renewable energy development, and demand from other uses such as agricultural and manufacturing.

Key Features

Land use authorizations in the planning area consist of major roadways, high-voltage electrical transmission lines, electrical distribution lines, pipelines, and communication sites. In general, there is a higher concentration of ROWs and communication sites near large urban areas with fewer infrastructure-related uses in the rural areas. The BLM will continue to evaluate applications for land use authorizations for compatibility with valid existing rights and uses.

Possible indicators are as follows:

- Change in the nature and type of ROWs and leases on BLM-administered lands
- Acres designated as ROW avoidance or exclusion on BLM-administered lands
- Acres on BLM-administered lands within designated utility corridors

Land Tenure

Current Condition

The distribution of landownership directly influences the current level and locations of uses influencing BLM management in the planning area. BLM-administered lands are highly scattered and represent less than one percent of the total landownership in the planning area. The most concentrated areas of contiguous ownership are along the Red River in southwestern Oklahoma and northern Texas. Surface land in the planning area is administered by or owned by numerous federal agencies and tribal, state, and private entities (**Table 1-1**).

The BLM administers approximately 4,754,700 acres of subsurface mineral estate within the planning area. Surface uses vary in ownership and types and intensity of uses, which may limit opportunities for developing the underlying mineral resources. In split-estate areas where existing mineral development activity is present on the surface, surface owners have the responsibility to consider compatibility of any surface land uses with the existing mineral development activity. In some areas, incompatible uses (e.g., electrical or transportation infrastructure) could be precluded or required to use an alternative design to avoid conflict with any subsurface mineral development activities.

In the planning area, there are five National Forest System national grasslands and five national forests. In addition, the Big Bend National Park in Texas near the Mexican border and the eastern portion of Guadalupe Mountains National Park in far northwestern Texas are within the planning area. The BLM does not manage Forest Service minerals, just the permits. The BLM is the leasing agent for the Forest Service, but the Forest Service plans and stipulates the restrictions for the leases. However, the BLM does manage the subsurface mineral split-estate within the administrative boundaries of all six national grasslands and five national forests in the planning area.

BLM-administered lands are retained in federal ownership, as mandated by the FLPMA, with the exception of lands identified in a land use plan for disposal. To be eligible for disposal, lands must meet certain FLPMA criteria, such as being isolated or difficult to manage, or they must have the potential to support community expansion, economic development, or other public purposes. Withdrawn BLM-administered lands remain under title with the BLM but are managed by another federal entity and are not available for sale or exchange.

In accordance with the 1987 Planning Analysis for Proposed Disposal of Public Lands in Kansas and 1988 Supplemental Planning Analysis, all BLM-administered lands in Kansas were disposed of through procedures outlined in 43 CFR, Parts 2710 or 2740. At the time of the 1987 and 1988 analyses, the BLM had not identified all public lands in the state. In Oklahoma, similar direction provided by the BLM Director in 1982 initiated a program to dispose of the remaining 8,200 acres of identified lands. Subsequent BLM analyses between 1982 and 1994 identified townsites that had not been patented and remained in public ownership. The BLM also conducted a landownership analysis as part of this RMP Amendment (RMPA), which identified 2,000 acres of BLM-administered surface estate, 4,500 acres of land that had been conveyed out of federal ownership, and 1,700 acres of lands of unknown status, or where discrepancies regarding landownership remain unresolved (BLM GIS 2015).

One of the primary mechanisms the BLM uses to dispose of federal lands in the planning area is the Recreation and Public Purposes Act of 1954 (68 Statute 173; 43 USC, Section 869 et seq.). Through the Recreation and Public Purposes Act, the BLM can sell or lease federal lands to state and local governments or qualified nonprofit organizations for a range of public or recreational purposes, including public parks, campgrounds, schools, and landfills and for other public service facilities, such as police and fire stations. Recipients of lands transferred out of federal ownership via the Recreation and Public Purposes Act maintain a patent and are deeded the title of ownership under the condition that the lands be used for the specified public purpose. In the event that the new owner fails to develop the public facility or use for which the lands were transferred, then the lands revert to federal ownership. Over the past 25 years, the BLM has issued Recreation and Public Purposes Act patents for approximately 2,600 acres in the planning area. Of these, approximately 700 acres have either reverted to federal ownership or have an unknown or unresolved landownership status. Lands reverted to public ownership are identified for disposal.

Forecast

FLPMA states that BLM-administered lands should be retained in federal ownership unless adjustment is in the public interest. Therefore, public surface will remain under BLM administration if resources of national, state, or regional significance are found on them and the possible adverse effects of the adjustment action cannot be mitigated at reasonable cost. Examples of such resources are habitat for threatened or endangered species, riparian areas, wetlands, mining claims, and important cultural resources.

Disposals will continue to be considered if such actions would accomplish any of the following:

- Support the multiple use mandate
- Meet the implementation of special acts and support the growth and development of communities or agriculture
- Dispose of lands with little or no value to the public
- Transfer ownership of lands that have been used as landfills or other lands that may be a liability to the public interest
- Settle trespass

The BLM will continue to evaluate land tenure adjustments on a case-by-case basis. All proposals will be given full consideration of public benefits and land management goals.

Land tenure adjustments are anticipated to continue as the BLM evaluates the practicality and efficiency of managing existing surface estate. Lands determined to be inefficient to manage and having limited to no resource or resource use potential will be considered for disposal.

Additional land tenure actions may be necessary along the Red River as ongoing adjudication and land surveys verify existing landownership. Where public recreation values exist on BLM-administered lands along the Red River, the BLM will evaluate opportunities to support and provide access to those areas. Where lack of access prohibits effective BLM management of federal lands, the BLM will consider those lands for disposal.

Key Features

The noncontiguous land pattern caused by the implementation of previous disposals, special acts, patents, and land grants presents the greatest management challenge and results in overlapping interests on BLM-administered lands.

The one possible indicator is a change in the total acres of BLM-administered lands in the planning area.

Withdrawals

The BLM currently has no land withdrawals, and no future land withdrawals are proposed in the planning area.

Current Condition

There are no withdrawn lands in the planning area.

Forecast

The BLM does not anticipate the need for future land withdrawals.

Key Features
The on possible indicator is a change in the total area of land withdrawals in the planning area.

References
BLM GIS (US Department of the Interior, Bureau of Land Management, Geographic Information System). 2015. Base GIS data on file with the BLM's eGIS server used for calculations or figures; includes data prepared for the reasonable foreseeable development scenario and Version 04_02 of the decision area. BLM, Oklahoma Field Office, Tulsa.

US Census Bureau. 2010. Census of Population, Public Law 94-171 Redistricting Data File. Internet website: http://quickfacts.census.gov/.

2.3.6 Livestock Grazing

Current Condition
There are four active BLM grazing leases being administered in Oklahoma. Three of these lie along the north bank of the Red River (in the Red River Management Area): two in Tillman County and one in Jefferson County. The fourth grazing lease is on the South Canadian River in Blaine County (see **Table 2-28** and **Figure 2-23**).

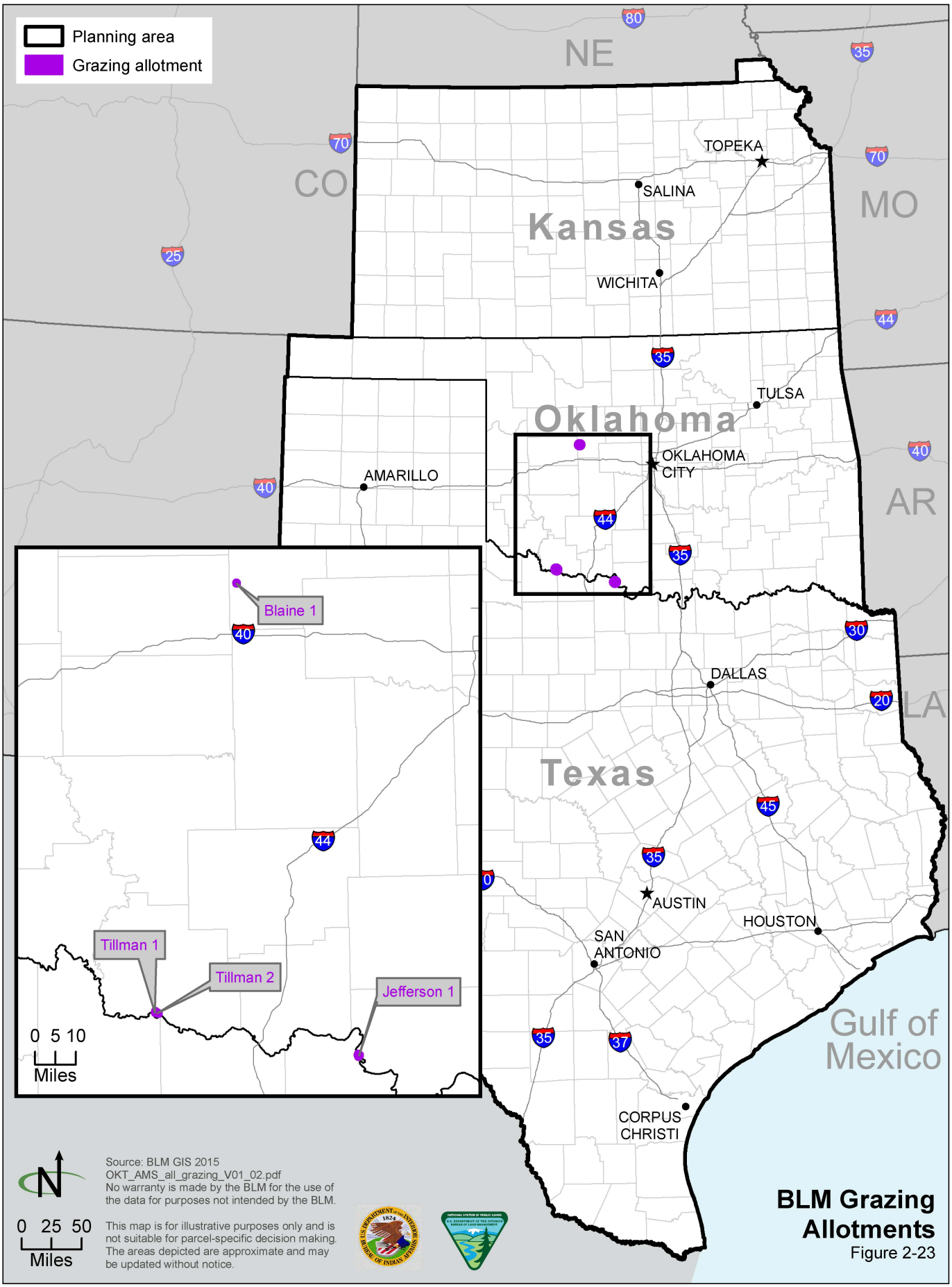
Table 2-28
BLM Grazing Allotments*

Allotment Name	Total Acres	Season of Use	Total Animal Unit Months
Tillman 1	147	March 1 to February 28	51
Tillman 2	92	March 1 to February 28	36
Blaine 1	29	March 1 to February 28	36
Jefferson 1	167	March 1 to February 28	15

Source: BLM 2015[5]
*All grazing allotments are for cattle.

Trends
Grazing has not been a big resource use on BLM-administered surface lands in the planning area. In the absence of a well-defined south bank (state line), the public lands in the Red River Management Area historically have been grazed by livestock generally owned by Texas ranchers on private lands adjacent to the Red River public lands.

[5]Melinda Fisher, BLM, personal communication via e-mail to Holly Prohaska, EMPSi, regarding OKT RMP Livestock Grazing and Wild Horses, January 20, 2015.



BLM Grazing Allotments
Figure 2-23

Forecast

Future trends in grazing depend on such environmental factors as water availability and demand; therefore, at this time it is unknown if grazing on BLM-administered lands will continue or expand.

Key Features

The public lands in the Red River Management Area do not possess value for livestock grazing because they lack consistent water. Mesquite encroachment is significant to the point that forage production is dropping drastically. Combating mesquite would be a huge undertaking, considering the size of the allotments and resources available in the OFO to complete vegetation projects such as these. In addition, there are no fences around the allotments and keeping fences up in the river/sandy soil would be a challenge.

References

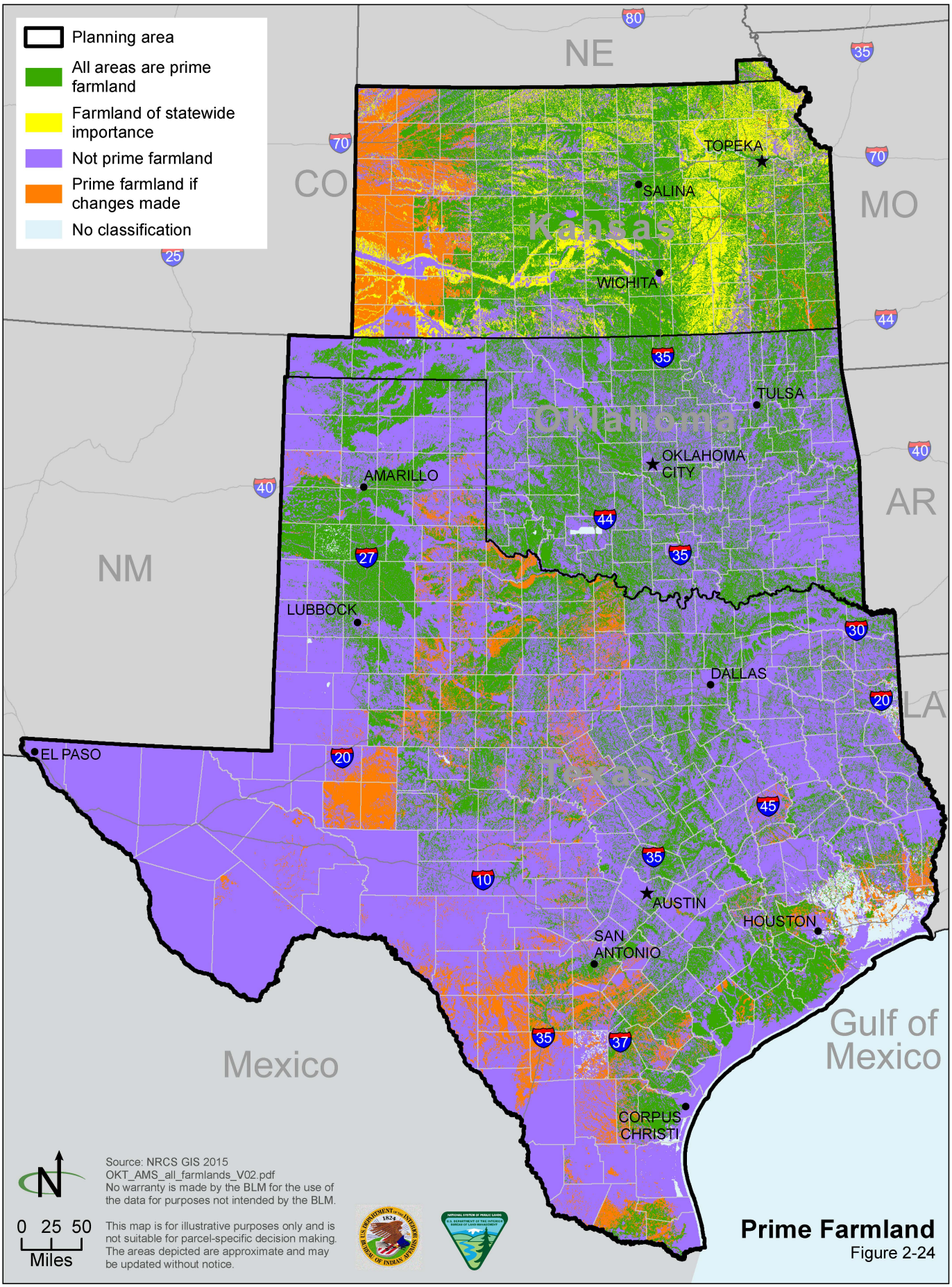
BLM GIS (US Department of the Interior, Bureau of Land Management, Geographic Information System). 2015. Base GIS data on file with the BLM's eGIS server used for calculations or figures; includes data prepared for the reasonable foreseeable development scenario and Version 04_02 of the decision area. BLM, Oklahoma Field Office, Tulsa.

2.3.7 Prime and Unique Farmlands/Agriculture

The planning area contains soils that are considered suitable for farmland applications and are protected by the Farmland Protection Policy Act, under the Agricultural Food Act of 1981. Farmlands are classified as prime, unique, or farmlands of state or local importance. Prime and unique farmlands are those that have the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, or labor. The Farmland Protection Policy Act is intended to minimize impact of federal programs by reducing the unnecessary and irreversible conversion of farmland to nonagricultural uses. If a project has the potential to convert important farmlands to nonagricultural uses, then the project proponent must submit a farmland conversion impact rating form to the NRCS.

Current Condition

According to NRCS data, there are prime farmlands, prime farmlands of statewide importance, prime farmlands if drained or irrigated, and prime farmlands if protected from flooding on BLM-administered lands in the decision area, as shown in **Table 2-29** and **Figure 2-24**, Prime Farmland.



Prime Farmland

Figure 2-24

Table 2-29
Prime Farmlands in the BLM Decision Area

Farmland Type	BLM-Administered Surface Lands	BLM-Administered Federal Mineral Estate	BIA-Administered Tribal and Allotted Lands	BIA-Administered Tribal and Allotted Subsurface Minerals Estate
Kansas				
Prime farmland	0	224,900	7,600	7,600
Farmland of statewide importance	0	114,400	19,700	19,700
Prime farmland if drained	0	1,100	1,000	1,000
Prime farmland if irrigated	0	8,500	0	0
Not prime farmland	0	303,900	1,500	1,500
Nebraska				
Prime farmland	0	0	200	200
Farmland of statewide importance	0	0	200	200
Not prime farmland	0	0	500	500
Oklahoma				
Prime farmland	400	425,000	379,700	956,700
Not prime farmland	34,600	1,385,500	435,400	1,651,400
Texas				
Prime farmland	4,700	348,400	1,600	1,700
Prime farmland if drained	0	15,200	0	0
Prime farmland if irrigated	0	38,200	100	100
Prime farmland if protected from flooding	0	2,500	0	0
Not prime farmland	7,100	1,755,200	2,900	3,000

Source: NRCS GIS 2015

Forecast

The planning area is projected to have high levels of new oil and gas activity. Soils with farmland characteristics are generally avoided when siting oil and gas or other

development features, but farmlands disturbed by topsoil excavation and soils compaction would change these soils. Stockpiling the soil horizons separately and spreading them across the site in their original order during reclamation could prevent this change.

Key Features

If prime or unique farmland is present, then an appropriate level of analysis would be prepared to determine if the proposed action may have an adverse effect. Also appropriate mitigation measures would be identified to minimize any unnecessary and irreversible conversion of farmland to nonagricultural uses.

References

NRCS GIS 2015. Published GIS data of soil attributes from the gSSURGO soil database. Received April 2015.

2.4 BLM SPECIAL DESIGNATIONS

2.4.1 Wilderness and Wilderness Study Areas

Under FLPMA, wilderness preservation is part of the BLM's multiple use mandate. Wilderness is recognized as part of a spectrum of resource values to be considered during land use planning. As set forth in Section 2(c) of the Wilderness Act of 1964, wilderness is defined as having the following characteristics: natural, untrammeled, and undeveloped opportunities for solitude or primitive and unconfined recreation and (optionally) unique, supplemental, or other features. **Table 2-30** lists wildernesses in the planning area (there are no wilderness areas in Kansas).

Table 2-30
Wilderness in Oklahoma and Texas

Wilderness Name	Management Agency
Oklahoma	
Black Fork Mountain Wilderness	Forest Service
Upper Kiamichi River Wilderness	Forest Service
Wichita Mountains Wilderness	USFWS
Texas	
Big Slough Wilderness	Forest Service
Guadalupe Mountains Wilderness	National Park Service
Indian Mounds Wilderness	Forest Service
Little Lake Creek Wilderness	Forest Service
Turkey Hill Wilderness	Forest Service
Upland Island Wilderness	Forest Service
Big Bend Wilderness (proposed)	National Park Service

Source: Wilderness.net 2015a, 2015b

The Black Fork Mountain Wilderness, Upper Kiamichi River Wilderness, and Wichita Mountains Wilderness overlap BLM-administered federal mineral estate (Wilderness.net

GIS 2014). According to the Wilderness Act of 1964, except where there are valid existing rights, the minerals in designated wilderness areas are withdrawn from all forms of appropriation under the mining laws and from disposition under all laws pertaining to mineral leasing (Public Law 88-577). Therefore, the EIS will not result in any decisions that will impact these areas, and this resource topic will not be carried forward in the joint EIS/BLM RMP and BIA Integrated RMP.

Wilderness study areas are lands with wilderness characteristics identified through the wilderness review required by Section 603 of FLPMA, Congressional legislation, or the land use planning process in Section 202 of FLPMA. There are no wilderness study areas in the planning area. Therefore, this resource topic will not be carried forward in the joint EIS/BLM RMP and BIA Integrated RMP.

References

Wilderness.net. 2015a. List of Wilderness Areas by Location—Oklahoma. Internet website: http://www.wilderness.net/NWPS/stateView?state=OK.

_____. 2015b. List of Wilderness Areas by Location—Texas. Internet website: http://www.wilderness.net/NWPS/stateView?state=TX.

Wilderness.net GIS. 2014. GIS data of designated wilderness areas. Internet website: http://www.wilderness.net/NWPS/geography.

2.4.2 Areas of Critical Environmental Concern

An ACEC is defined in FLPMA, Section 103(a). It is an area within BLM-administered lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or to other natural systems or processes or to protect life and safety from natural hazards. BLM regulations for implementing the ACEC provisions of the FLPMA are found in 43 CFR, Part 1610.7-2(b).

To be eligible for consideration as an ACEC, the area must meet criteria of relevance and importance found in 43 CFR, Part 1610-7-2(a)(b). An ACEC possesses significant historic, cultural, or scenic values, fish or wildlife resources (including habitat, communities, or species), natural processes or systems, or natural hazards. In addition, the significance of these values and resources must be substantial in order to satisfy the importance criteria.

There are no ACECs in the planning area, and no nominations for ACECs were received during public scoping. The Cross Bar Ranch has been discussed internally as a possible ACEC nomination. It is yet to be determined whether portions of this area will be brought forward as an ACEC in the joint EIS/BLM RMP and BIA Integrated RMP.

2.4.3 Wild and Scenic Rivers

Wild and scenic rivers are streams or stream segments designated by Congress under the Wild and Scenic Rivers Act of 1968 (16 USC, Sections 1271-1287; Public Law 90-542,

as amended). The purposes of wild and scenic river designation are to preserve the stream or stream section in its free-flowing condition and to preserve water quality. The act's other purpose is to protect outstandingly remarkable values, which are identified on a segment-specific basis. They may include scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values.

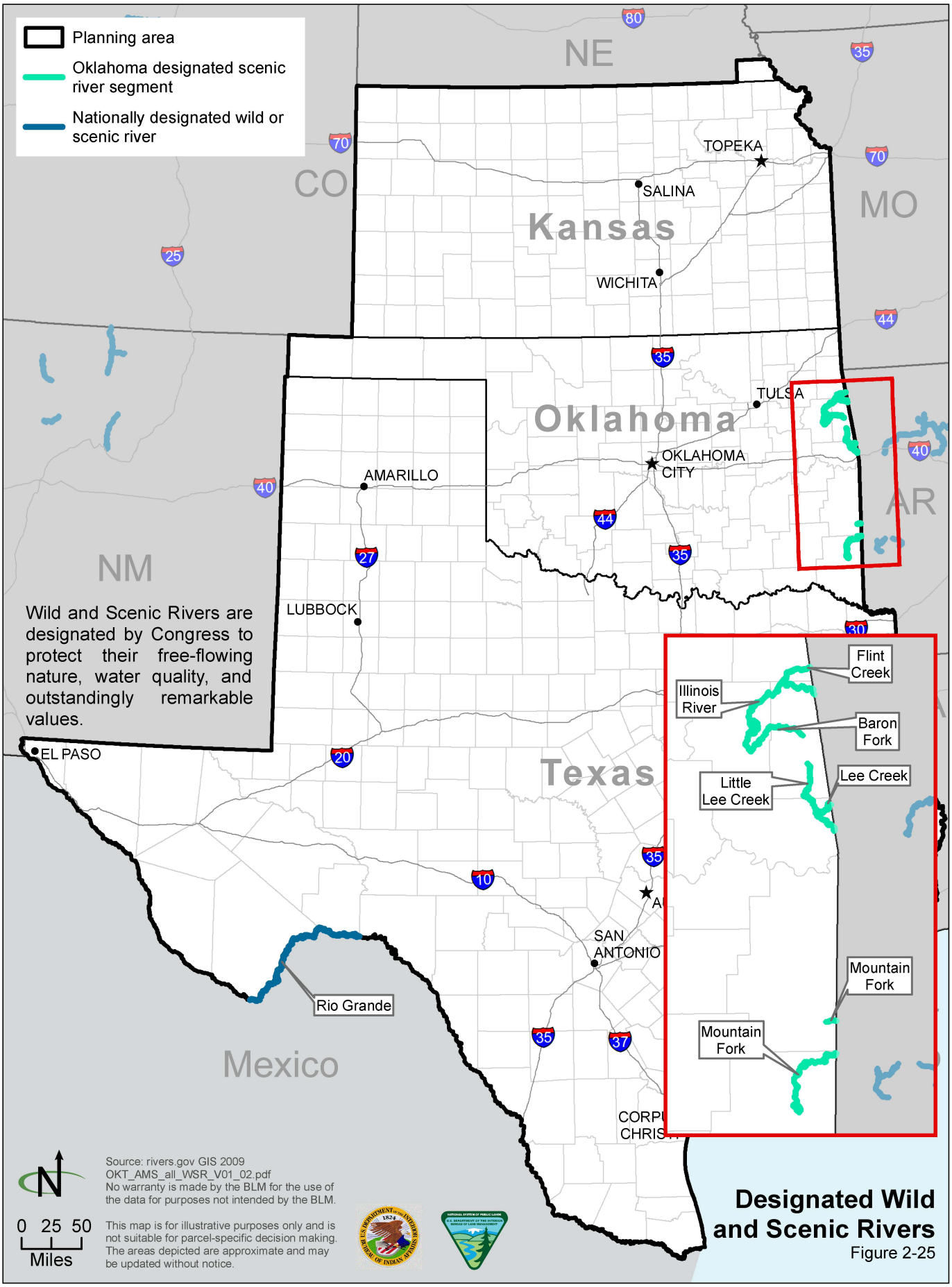
There are no wild and scenic rivers in Oklahoma or Kansas, as designated under the Wild and Scenic Rivers Act of 1968 (Interagency Wild and Scenic Rivers Council 2015). In Texas, 191.2 miles of the Rio Grande are designated; 95.2 miles are classified as wild and 96 miles are classified as scenic (Interagency Wild and Scenic Rivers Council 2015). No portions of this wild and scenic river overlap with BLM-administered federal mineral estate, so this resource topic will not be carried forward in the joint EIS/BLM RMP and BIA Integrated RMP (Rivers.gov GIS 2009).

However, there are state-designated scenic river areas that overlap with BLM-administered federal mineral estate. Designated under Oklahoma's Scenic Rivers Act (Oklahoma Statute Title 82, Sections 1451-1471), six scenic river areas are to be preserved as part of Oklahoma's diminishing resource of free-flowing rivers and streams (Oklahoma Scenic Rivers Act 1983). These rivers were found to possess unique natural scenic beauty, water conservation, fish, wildlife, and outdoor recreational values of present and future benefit. A total of 31.6 miles of Oklahoma's scenic river areas overlap BLM-administered federal mineral estate; none overlap BLM-administered surface lands (see **Table 2-31** and **Figure 2-25** illustrates these rivers).

Table 2-31
Oklahoma Scenic River Areas

River Name	Total Miles	Miles on BLM-Administered Federal Mineral Estate
Flint Creek	13.7	0
Illinois River	62.9	5.2
Baron Fork	29.4	3.8
Mountain Fork	48.5	22.5
Lee Creek	17.9	0
Little Lee Creek	25.9	0.1
Total	**198.3**	**31.6**

Sources: Oklahoma Scenic Rivers Act 1983; National Hydrography Dataset GIS 2013
Note: Miles are rounded to the nearest 1/10th.



Designated Wild and Scenic Rivers

Figure 2-25

References

Interagency Wild and Scenic Rivers Council. 2015. River Mileage Classifications for Components of the National Wild and Scenic Rivers System. January 2015.

National Hydrography Dataset GIS. 2013. GIS data of rivers used to create GIS of the Oklahoma scenic rivers based on textual descriptions and to describe perennial, intermittent, and ephemeral streams. Internet website: http://datagateway.nrcs .usda.gov.

Oklahoma Scenic Rivers Act. 1983. Oklahoma Statute Title 82, Sections 1451-1471. Amended June 29, 1983. Rivers.gov GIS. 2009. GIS data of designated wild and scenic rivers. Data last updated 2009. Internet website: www.rivers.gov.

Rivers.gov GIS. 2009. GIS data of designated wild and scenic rivers. Data last updated 2009. Internet website: rivers.gov.

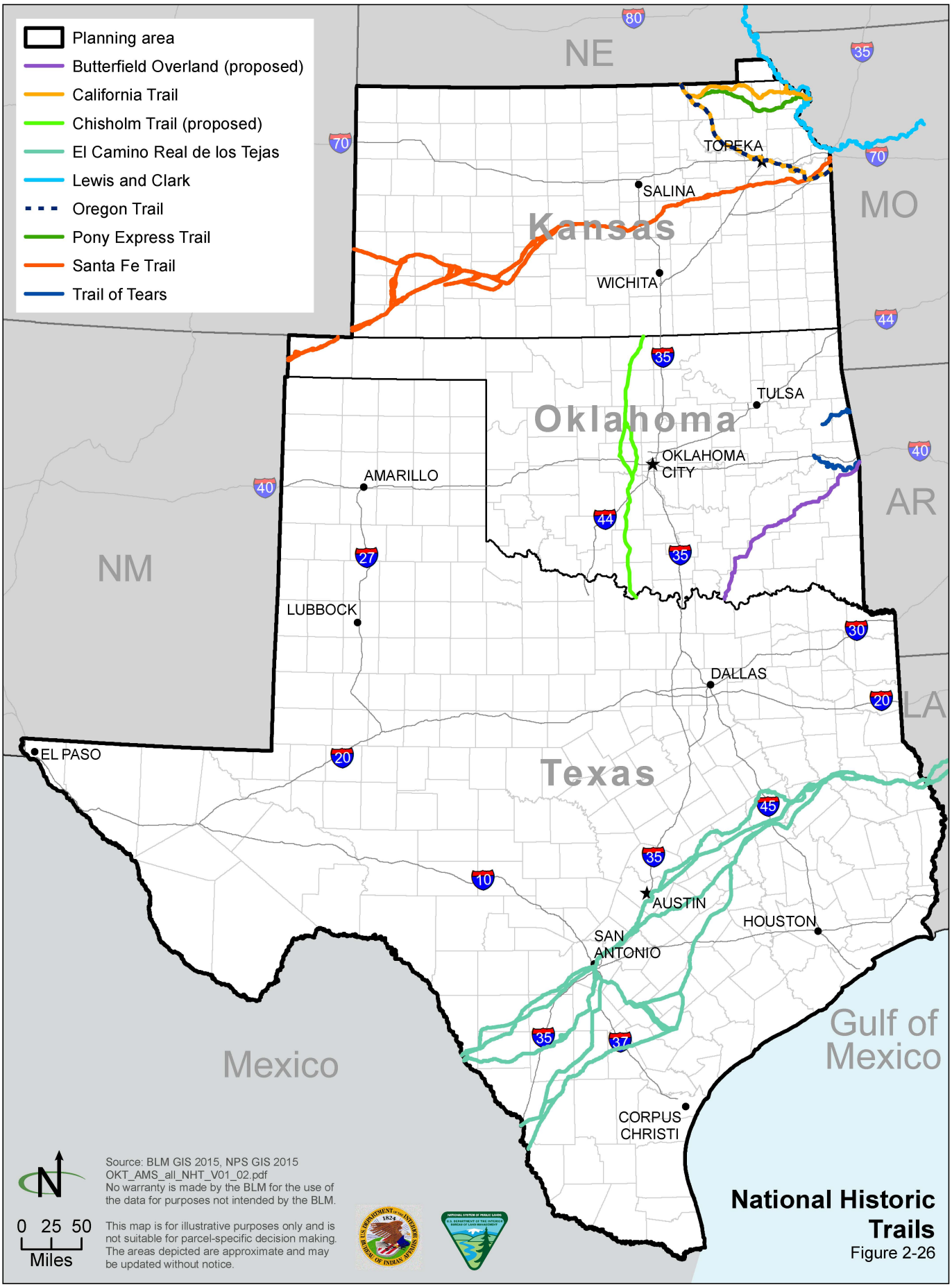
2.4.4 National Historic Trails

Congress designates national historic trails under the National Trails System Act of 1968. BLM Manual 6250, National Scenic and Historic Trail Administration (BLM 2012a), and BLM Manual 6280, Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation (BLM 2012b), contain policy for the management and administration of congressionally designated national historic trails. BLM Manual 6100, National Landscape Conservation System Management (BLM 2012c), also provides guidance on managing the areas as part of the National Landscape Conservation System.

National historic trails are extended trails that closely follow a historic trail or route of travel of national significance. Congress identifies and protects historic routes, historic remnants, and artifacts for public use and enjoyment. They must meet the following criteria listed in Section 5(b)(11) of the National Trails System Act:

- Follow actual documented route of historic use
- Be of national significance
- Possess significant potential for public recreation and interpretation

There are six national historic trails in the planning area, covering 4,761.6 miles (see **Table 2-32**, National Historic Trails, and **Figure 2-26**). Of these, 70.2 miles are on BLM-administered federal mineral estate; none are on BLM-administered surface lands.



National Historic Trails

Figure 2-26

Table 2-32
National Historic Trails

Trail Name	Miles in Planning Area	Miles on BLM-Administered Federal Mineral Estate
Oklahoma		
Butterfield Overland National Historic Trail (proposed)	185.6	7.6
Chisholm National Historic Trail (proposed)	282.9	0
Santa Fe National Historic Trail	76.3	1.3
Trail of Tears National Historic Trail	94.4	25.4
Total	**639.2**	**34.3**
Kansas		
California National Historic Trail	346	1.9
Lewis and Clark National Historic Trail	48.6	0
Oregon National Historic Trail	179.7	1.9
Pony Express National Historic Trail	132.7	0
Santa Fe National Historic Trail	985.6	0.5
Total	**1,692.9**	**4.3**
Texas		
Chisholm National Historic Trail (proposed)	1.4	0
El Camino Real de los Tejas National Historic Trail	2,428.1	31.9
Total	**2,429.5**	**31.9**

Sources: National Park Service 2010, BLM GIS 2015
Note: Miles are rounded to the nearest 1/10th.

References

BLM (US Department of the Interior, Bureau of Land Management). 2012a. BLM Manual 6250—National Scenic and Historic Trail Administration. Rel. 6-133. Washington, DC. July 13, 2012.

_____. 2012b. Manual 6280—Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation. Rel. 6-139. Washington, DC. September 24, 2012.

_____. 2012c. BLM Manual 6100— National Landscape Conservation System Management. Rel. 6-131. Washington, DC. July 13, 2012.

BLM GIS (US Department of the Interior, Bureau of Land Management, Geographic Information System). 2015. Base GIS data on file with the BLM's eGIS server used for calculations or figures; includes data prepared for the reasonable foreseeable development scenario and Version 04_02 of the decision area. BLM, Oklahoma Field Office, Tulsa.

National Park Service. 2010. National Trails System Map. Internet website: http://www.nps.gov/nts/maps.html.

NPS GIS. 2015. GIS data of the Lewis and Clark National Historic Trail. National Park Service. Internet website: http://imgis.nps.gov/DSC/Viewer/?Viewer=LECL.

Scenicbyways.info GIS. 2015. GIS data of scenic byways. Byway routes opened in Furkot.com and exported as a gpx file. Google Earth was used to create a kmz of each byway polyline. Internet website: www.scenicbyways.info.

2.4.5 National, State, and BLM Scenic Byways

National and State Scenic Byways

The National Scenic Byways Program was established under the Intermodal Surface Transportation Efficiency Act of 1991 and was reauthorized in 1998 under the Transportation Equity Act for the 21st Century. The program recognizes certain roads as National Scenic Byways or All-American Roads, based on their archaeological, cultural, historic, natural, recreational, and scenic qualities. All-American Roads must exhibit multiple intrinsic qualities to be considered for inclusion in the program. A highway must provide safe passage for passenger cars year-round, be designated a State Scenic Byway, and have a current corridor management plan in place. Off-site outdoor advertising (such as billboards) is not allowed along scenic byways.

Scenic byways are found throughout the planning area. There are 7 in Oklahoma, 11 in Kansas, and 10 in Texas, covering a total of 8,182 miles. Of these, 0.1 mile is on BLM-administered surface lands, and 146.5 miles are on BLM-administered federal mineral estate (Scenicbyways.info GIS 2015). **Table 2-33** describes byways that cross federal mineral estate (see also **Figure 2-27**).

Table 2-33
Scenic Byways Crossing Federal Mineral Estate

Byway Name	Designation Type	Miles in Planning Area	Miles on BLM-Administered Surface Lands	Miles on BLM-Administered Federal Mineral Estate
Oklahoma				
Cherokee Hills Byway	National Scenic Byway	84.7	0	6.6
Historic Route 66—Oklahoma	All-American Road, National Scenic Byway	22.9	0.1	2.6
Mountain Gateway Scenic Byway	State Byway	23.2	0	3.8
Mountain Pass Scenic Byway	State Byway	65.7	0	0

Table 2-33
Scenic Byways Crossing Federal Mineral Estate

Byway Name	Designation Type	Miles in Planning Area	Miles on BLM-Administered Surface Lands	Miles on BLM-Administered Federal Mineral Estate
Osage Nation Heritage Trail Byway	State Byway	34.7	0	0.5
Talimena Scenic Drive—Oklahoma	National Scenic Byway	105.4	0	0
Wichita Mountains Byway	National Scenic Byway	391.6	0	23.5
	Total (Oklahoma)	**728.2**	**0.1**	**13**
Kansas				
Flint Hills Scenic Byway	National Scenic Byway	43.1	0	0
Frontier Military Historic Byway	State Byway	172.2	0	0
Glacial Hills Scenic Byway	State Byway	63.2	0	0
Gypsum Hills Scenic Byway	State Byway	35.9	0	0
Kansas Historic Route 66 Byway	State Byway	11.3	0	0
Native Stone Scenic Byway	State Byway	49	0	0
Post Rock Scenic Byway	State Byway	14.7	0	2.3
Prairie Trail Scenic Byway	State Byway	55.8	0	2.8
Smoky Valley Scenic Byway	State Byway	60.9	0	3.4
Western Vistas Historic Byway	State Byway	93.3	0	0.3
Wetlands and Wildlife Scenic Byway	National Scenic Byway	75.9	0	4.1
	Total (Kansas)	**673.9**	**0**	**12.9**
Texas				
Texas Brazos Trail	State Byway	471.2	0	16.5
Texas Forest Trail	State Byway	836.4	0	35.9
Texas Forts Trail	State Byway	673.6	0	3.8
Texas Hill Country Trail	State Byway	634.6	0	0.3

Table 2-33
Scenic Byways Crossing Federal Mineral Estate

Byway Name	Designation Type	Miles in Planning Area	Miles on BLM-Administered Surface Lands	Miles on BLM-Administered Federal Mineral Estate
Texas Independence Trail	State Byway	717.9	0	2
Texas Lakes Trail	State Byway	650.3	0	18
Texas Mountain Trail	State Byway	688.7	0	2.3
Texas Pecos Trail	State Byway	696.1	0	5.3
Texas Plains Trail	State Byway	684.1	0	0.4
Texas Tropical Trail	State Byway	673	0	12.6
	Total (Texas)	**6,725.9**	**0**	**97.1**

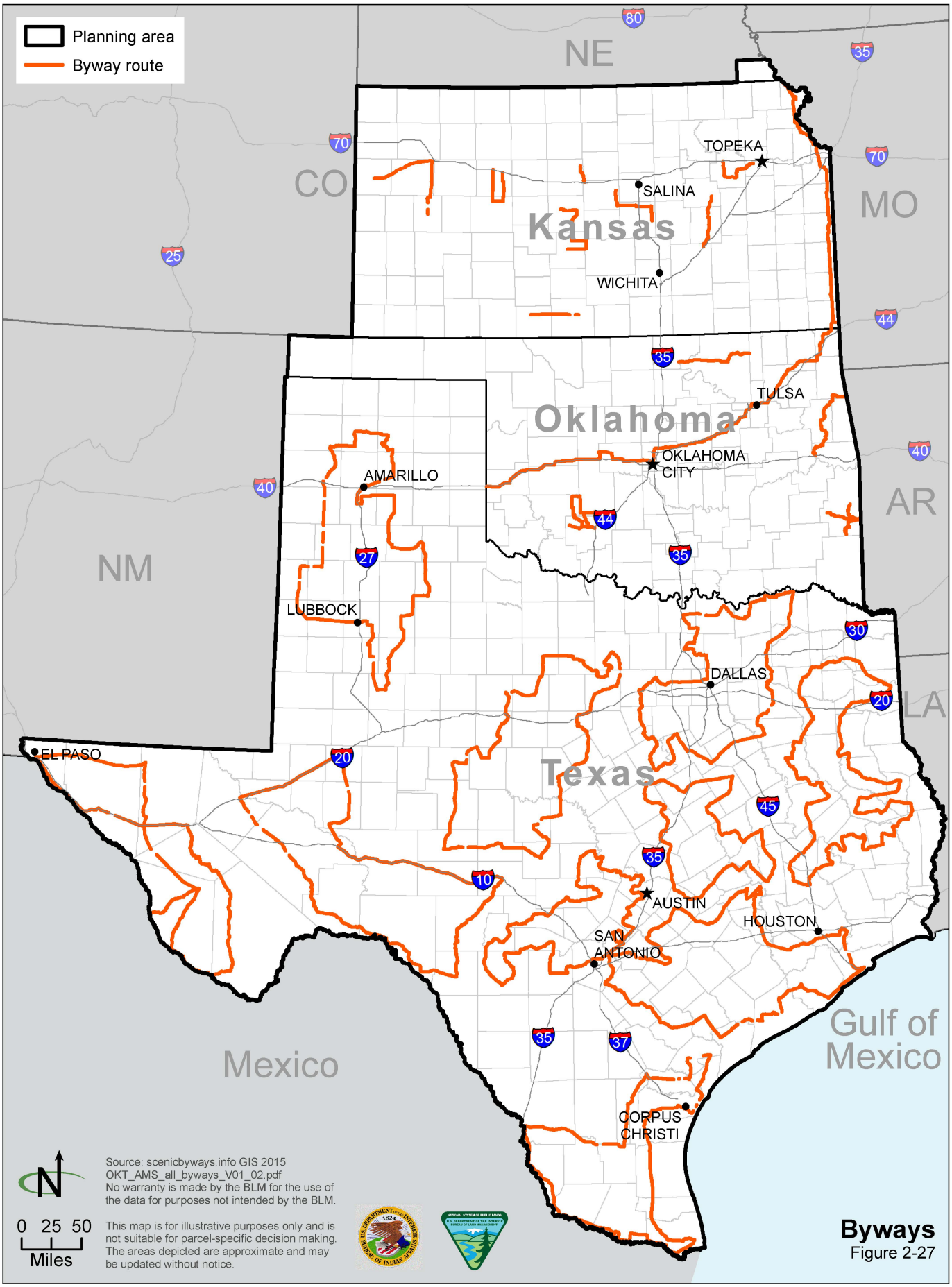
Sources: Scenic Byways 2015, Federal Highway Administration 2015, Scenicbyways.info GIS 2015
Note: Miles are rounded to the nearest 1/10th.

BLM Backcountry Byways

The National Backcountry Byway Program is the BLM's unique contribution to the larger National Scenic Byways Program. BLM Backcountry Byways fall into one of the following category types (BLM 2014, 2004):

- Type I—Roads are paved or have an all-weather surface and have grades that are negotiable by a normal touring car. These roads are usually narrow, slow speed, secondary roads.
- Type II—Roads require high-clearance vehicles, such as trucks or four-wheel drives. These roads are usually not paved but may have some type of surfacing. Grades, curves, and road surfaces are such that they can be negotiated with a two-wheel drive high-clearance vehicle without undue difficulty.
- Type III—Roads require four-wheel drive or other specialized vehicles, such as dirt bikes or all-terrain vehicles. These roads are usually not surfaced but are managed to provide for safety considerations and resource protection. They have grades, tread surfaces, and other characteristics that require specialized vehicles to negotiate.
- Type IV—Trails that are managed specifically to accommodate dirt bikes, mountain bikes, snowmobiles, or all-terrain vehicles. These are usually single-track trails.

There are no BLM Backcountry Byways in the planning area (BLM 2004).



Byways
Figure 2-27

References

BLM (United States Department of the Interior, Bureau of Land Management). 2004. Table 1, BLM Scenic and/or Back County Byway (BCB) Roster. June 30, 2004.

_____. 2014. BLM Backcountry Byways. Internet website: http://www.blm.gov/wo/st/en/prog/Recreation/recreation_national/byways/blm_back_country_byways.html.

Federal Highway Administration. 2015. Byways by State. Internet website: http://www.fhwa.dot.gov/byways/states/.

Scenic Byways. 2015. America's Scenic Byways. Internet website: http://scenicbyways.info/.

Scenicbyways.info GIS. 2015. GIS data of scenic byways. Byway routes opened in Furkot.com and exported as a gpx file. Google Earth was used to create a kmz of each byway polyline. Internet website: www.scenicbyways.info.

2.5 BLM Social and Economic Conditions

2.5.1 Native American Tribal Uses

Native American tribal uses and interests in the decision area include both the exercise of economic and resource rights and those uses and resources that are tied to traditional cultural practices. Under the federal government's trust responsibilities to tribes, the BLM and the BIA have an obligation to exercise statutory and other legal authorities to protect tribal resources and rights. These agencies also have a duty to carry out the mandates of federal law with respect to American Indians.

Indian trust assets are legal interests held by the federal government for federally recognized Indian tribes or nations or for individual Indians. Native American economic rights and uses include using the mineral resources and Indian trust surface lands in the decision area. The Secretary of the Interior has specific trust responsibilities, including holding land and resources in trust and maintaining monetary accounts for tribes and individual tribal members. Protecting these economic rights and uses are most directly the responsibility of the BIA. It maintains and discharges the trust responsibility of the Secretary of the Interior through public laws, permitting, and restricted requirements concerning tribal and individually owned native allotments and resources.

Development and exploitation of the mineral estate provides the most important source of income among many tribal members. With the emphasis on Indian self-governance and self-determination, many of the tribes have initiated other economic development enterprises, including alternative energy, commercial facilities, gaming, and tourism.

The BLM assesses the effects of its programs, permits, and projects on tribal trust resources but does not administer tribal trust accounts. Both the BLM and BIA engage

federally recognized tribal governments and consult with tribes on a government-to-government level when their actions could affect trust resources.

There are also Native American tribal uses and interests associated with the cultural practices or beliefs. These uses are rooted in the community's history and are important in maintaining cultural identity. Examples can include natural landscape features, ceremonial and worship places, plant gathering locations, ancestral archaeological sites, artisan material locations, landscapes, and rock art.

The boundaries of these resources and impact areas are often difficult to assess. They are usually identified through government-to-government consultation during compliance with NEPA and Section 106 of the National Historic Preservation Act. Cultural resources that meet the criteria for eligibility for listing on the National Register of Historic Places are referred to as traditional cultural properties. For tribes, maintaining confidentiality and customs regarding traditional knowledge may take precedence over identifying and evaluating these resources, unless they are in imminent danger of damage or destruction.

In the decision area, there is extensive geographic, environmental, historic, economic, social, ethnic, and religious diversity that is reflected in the tribal interests and traditional cultural resources that may be valued by Native Americans. There is no comprehensive way to define all of the resources on this broad scale, especially where confidentiality is often required. There is also considerable overlap between what an outsider or another group might define as economic interests and natural resource issues and ones that have religious and traditional cultural meaning to a group.

Section 101(d) of the National Historic Preservation Act requires that federal agencies consult with Native American tribes who historically occupied the area of the undertaking or who may attach significance to resources in the region. Provisions of NEPA also require that agencies consult with Native American tribal leaders. Consultation with Native American tribes typically occurs during an undertaking, such as review of an application for a permit to drill, when the BLM or BIA requests that a tribe identify any areas of interest in the project area. The National Historic Preservation Act applies to federal actions, regardless of who owns the land surface. In split-estates the BLM or the BIA still has the authority and the responsibility to take reasonable measures to avoid or minimize adverse impacts on cultural resources that may result from mineral leasing activities.

Table 2-34 lists the tribes with potential interest in the planning and decision areas of the joint EIS/BLM RMP and BIA Integrated RMP.

Tribes have also been invited to participate in regional tribal socioeconomic workshops to present their concerns.

References

BIA 2014. Compiled from lists supplied by BIA Southern Plains and Eastern Oklahoma Regions. March 2014.

Table 2-34
Tribes with Potential Interest in the Planning and Decision Areas

Absentee Shawnee Tribe	Kickapoo Traditional Tribe of Texas
Alabama-Coushatta Tribe of Texas	Kiowa Tribe
Alabama Quassarte Tribal Town	Miami Tribe of Oklahoma
Apache Tribe of Oklahoma	Modoc Tribe of Oklahoma
Caddo Nation	Muscogee (Creek) Nation
Cherokee Nation	Osage Nation
Cheyenne and Arapaho Tribes	Otoe-Missouria Tribe
Chickasaw Nation	Ottawa Tribe
Choctaw Nation	Pawnee Nation of Oklahoma
Citizen Potawatomi Nation	Peoria Tribe of Indians of Oklahoma
Comanche Nation	Ponca Nation
Delaware Nation	Prairie Band Potawatomi Nation
Delaware Tribe of Indians	Quapaw Tribe of Oklahoma
Eastern Shawnee Tribe	Sac and Fox Nation
Euchee (Yuchi) Tribe (not federally recognized)	Sac and Fox Nation of Missouri in Kansas and Nebraska
Fort Sill Apache Tribe	Seminole Nation
Iowa Tribe of Oklahoma	Seneca-Cayuga Tribe of Oklahoma
Jena Band of the Choctaw	Shawnee Tribe
Iowa Tribe of Kansas and Nebraska	Thlopthlocco Tribal Town
Jicarilla Apache Nation of New Mexico	Tonkawa Tribe of Oklahoma
Kaw Nation of Oklahoma	United Keetoowah Band of Cherokee
Kialegee Tribal Town	Wichita and Affiliated Tribes
Kickapoo Tribe of Oklahoma	Wyandotte Nation
Kickapoo Tribe of Kansas	Wyandotte Nation

Source: BIA 2014

2.5.2 Public Health and Safety

The BLM has a mission to sustain public lands for the use and enjoyment of present and future generations. Its responsibility is to minimize and reduce threats from releases of hazardous substances that could have an impact on the health, diversity, and productivity of the public lands as well as on the health and safety of the individuals who use and work on these lands. In addition, FLPMA require that BLM actions comply with approved standards for public health and safety. Of particular concern to the BLM are the safety impacts related to abandoned mines, unexploded ordnance, solid waste, hazardous materials associated with energy development, hydraulic fracturing, hydrogen sulfide gas, and recreational shooting

The goals of public safety management are as follows:

- Protect public health and safety and environmental resources by minimizing environmental contamination from past and present land uses (such as

abandoned mine lands) on public lands and on BLM-administered and operated facilities

- Comply with federal, state, and local hazardous materials management laws and regulations
- Maintain the health of ecosystems through assessment, cleanup, and restoration of contaminated lands
- Manage the costs, risks, and liabilities associated with hazardous materials so that the responsible parties and not the government bear the brunt of financial liabilities
- Integrate environmental protection and compliance with all environmental statutes into BLM activities

Abandoned Mines

The Abandoned Mine Lands Program is a national and state BLM safety priority. In the planning area, abandoned mine lands issues are focused on lands with private surface ownership, as sites located on BLM surface administered lands either are reclaimed or would be managed appropriately on discovery.

Abandoned mine sites may pose hazards to the environment and to employee and visitor health and safety. Open mines are unstable; openings or tunnels may collapse, internal supports may fail, and mine shafts (vertical openings) may be obstructed or unseen. Oxygen levels can be at lethally low levels or toxic gases could be present at high concentrations. Hazardous wastes, such as containers of explosives and chemicals used in milling or drilling, could be present. Illegal dumping of hazardous wastes in abandoned mines is also a possibility. Changes in the chemical composition or soil loss near abandoned mines can result in alterations or loss of natural habitat for native wildlife.

Environmental problems stemming from abandoned mine land sites are contaminated/acidic surface water and groundwater and stockpiled waste rock and mill tailing piles. Ensuring public safety and protecting watersheds from hazardous materials and mine drainage is emphasized. At the field office level, the purpose of the program is to identify and characterize inactive mine sites. Hazards or potential hazards to human health, safety, and the environment are inventoried, and data are stored in a national or state database. Specific sites may be closed or remediated in order to protect human health or the environment. The presence of a large number of abandoned mine lands that are not being monitored, restored, or reclaimed would indicate a public health and safety risk.

Unexploded Ordnance

The BLM may accept lands from other federal agencies that were formerly used by the Army, Navy, Air Force, or Marine Corps and that have been returned to the public domain. As part of the management of these lands, the BLM collaborates with the Department of Defense and the USACE to address any public lands that may contain munitions or explosives of concern. The presence of unexploded ordnance or of lands in

the planning area that were formerly used by military services would indicate a potential public safety risk. Such areas potentially include Camp Gruber Training Center and the McAlester Army Ammunition Plant, both located in Oklahoma, and Camp Roberts, located in the Rita Blanca National Grasslands in north Texas.

Solid Waste

The term solid waste is defined by the Resource Conservation and Recovery Act (42 USC, Section 6901). It is any solid, liquid, semisolid, or contained gaseous material that is deemed to be a waste. Solid waste is further defined as abandoned piles of household garbage, bags of yard waste, discarded appliances, old barrels, used tires, and demolition debris that can threaten the health of humans, wildlife, and the environment. A few commonly found illegally dumped items, such as vehicles, boats, trailers, and motorhomes, can be characterized as either solid waste or hazardous waste; this would depend on the timeliness of the item being found, reported, and subsequently cleaned up. For example, rubber car tires or an intact fiberglass boat found in the desert does not pose much of a threat as a solid waste, but if the rubber tires or fiberglass are set on fire and burned, it becomes a hazardous waste.

Petroleum Wastes

Petroleum wastes are those substances included in the meaning of the petroleum exclusion to the Comprehensive Environmental Response, Compensation and Liability Act (42 USC, Section 9601). This is petroleum that is not specifically listed or designated as a hazardous substance.

The term hazardous substance is defined by the Comprehensive Environmental Response, Compensation and Liability Act. There are thousands of hazardous substances, but in general they can be categorized as ignitable, corrosive, reactive, or toxic materials. Release, as defined by the Comprehensive Environmental Response, Compensation and Liability Act, means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of (including abandonment) a hazardous substance.

The presence of oil and gas development in the planning area poses the potential for public safety and health risks if the public were to come in contact with any petroleum wastes or other hazardous substances. The BLM requires all oil and gas operators to comply with applicable regulations designed to protect the environment and the public (e.g., the BLM's Onshore Orders 1, 2, and 7). The operators also must comply with additional BLM requirements as part of the drilling permit or lease or ROW grant. Spills of oil and gas wastes and chemicals used in production can contaminate surface water, groundwater, and soil. Active wells can produce hazardous chemical emissions through well control valves (e.g., venting pressurized well gas), leaking equipment (e.g., well heads), water or condensate tanks (e.g., entrained gas can flash or evaporate), and gas compressors. Well work can also result in the release of hazardous chemicals.

Hydraulic Fracturing

New technologies in oil and gas development have led to increased concern about the impacts on public health and safety. Many of the chemicals used in hydraulic fracturing are considered hazardous under 40 CFR, Part 302, Section 302.4.

Hydraulic fracturing has been used for more than 50 years to enhance the recovery of oil and gas hydrocarbons from bedrock by creating small fractures that function as preferential flowpaths of fluids toward the borehole. The fractures are generally more permeable to fluid flow than the interstices (pore spaces) within sedimentary rocks containing the hydrocarbons; this is because the pore spaces are filled with a natural cementing agent (typically calcite or silica).

Recent advances in hydraulic fracture technology have opened to development large reserves of domestic natural gas reserves that previously could not be extracted from the rock. This advance has been realized primarily in "tight" formations, particularly deep marine shales and marlstones that have very low permeability due to very small grain size in addition to the pressure from thousands of feet of overlying strata.

Public concern about the use of hydraulic fracturing has been focused on the potential for it to contaminate freshwater aquifers and to impact domestic and municipal water wells. An associated concern has involved the potential for "mini-earthquakes" caused by creating enough pressure within the formation to cause fractures. If the public were to come in contact with these substances, it could result in health and safety impacts.

Hydrogen Sulfide Gas

Hydrogen sulfide (H_2S) is a colorless gas with the characteristic foul odor of rotten eggs. It is heavier than air, corrosive, flammable, explosive, and very poisonous. At low concentrations it can irritate the eyes and act as a depressant; at high concentrations it can irritate the upper respiratory tract and, during long exposure, lead to pulmonary edema (USGS 2010). A 30-minute exposure to 500 ppm results in headache, dizziness, excitement, staggering gait, and diarrhea, followed sometimes by bronchitis or bronchopneumonia (USGS 2010). Areas with H_2S that are not being monitored would indicate a public health and safety risk.

Recreational Shooting

Recreational shooting is commonplace in the Red River area and can pose significant danger to public health and safety if not managed correctly. Conflicts may arise between shooting and other recreational activities in this area, including camping, OHV use, and fishing. These conflicts include shooting over roads or trails, not having a backstop, or shooting in areas where there are high levels of other recreation. Most shooting areas are littered with garbage and tend to attract illegal dumping. In these areas, it is common to find shot up televisions, appliances, and furniture. There are no BLM policies in place regulating shooting or setting a standard for acceptable responsibility while shooting.

References

USGS (US Geological Survey). 2010. Volcano Hazards Program, Volcano Gases and Their Effects. Internet website: http://volcanoes.usgs.gov/hazards/gas/index.php. Accessed on January 2015.

2.5.3 Socioeconomics

A socioeconomic study area is defined as the area where social and economic conditions may affect or be affected by the BLM's and BIA's land use and mineral leasing decisions. This area is invariably larger than the decision area because decisions can affect conditions on adjacent parcels, communities, and beyond. A socioeconomic study area may differ from the planning area, depending on social and economic relationships across communities, regions, and states. In addition, the geographic basis on which social and economic data are available may affect the determination of a socioeconomic study area's boundaries. For example, while impacts of decisions may be mostly experienced within a few communities, counties are often the smallest geographic units for which important data are available.

Different management decisions will be made for BLM- and BIA-administered lands and minerals; however, due to the widespread and scattered nature of surface land and mineral estate, the socioeconomic study area is the same for BLM and BIA management decisions.

For each state in the joint EIS/BLM RMP and BIA Integrated RMP, the socioeconomic study area was determined by the distribution of surface land and areas for which the BLM or BIA administers the federal mineral leasing program. Because these areas are distributed across major portions of the state, the socioeconomic study area is defined as a statewide area. For some indicators, information is broken down by both metro and non-metro populations to provide insight into the role of BLM-administered lands and BIA-managed minerals.

Indicators

Each state section below provides socioeconomic information in the topical subsections defined. These issues were selected to provide an overview of current demographic and economic conditions and to highlight components of the local economy or social setting that may be impacted by BLM or BIA management decisions.

- Population and migration—This section profiles trends in population. Current and historic population trends and forecasts can indicate the degree of population migration.
- Community indicators—This section includes indicators such as age, education level, language spoken, and place of birth, which can impact the social values of a community.
- Housing—This section includes data on housing availability and cost. These indicators have the potential to impact and be impacted by development and associated temporary or permanent changes in population.

- Income and employment—Income is derived from two major sources: labor earnings (income from the workplace) and nonlabor income. The former is dividends, interest, and rent, collectively often referred to as money earned from investments, and transfer payments, such as those from governments to individuals, including Medicare, disability, and Social Security insurance payments, and retirements. This section includes such indicators as income distribution and proportion of labor and nonlabor income, which provide baselines for the region. This section also examines employment and income by industry sector and unemployment levels. Such indicators demonstrate the relative importance of various industries and the economic stability of the area.
- Public finance—Current management actions may impact revenue from the use of public lands and mineral resources. Its focus is the sources of public revenues from minerals, which are most likely to impact state and local government revenues in the region. In particular, it addresses federal mineral royalties, severance taxes, and ad valorem taxes produced in the state or the socioeconomic study area. Information is also included for payment in lieu of taxes, where appropriate.
- Social and economic activity related to BLM/BIA management actions—This section highlights the current role of BLM and BIA management actions in the state.
- Social conditions and nonmarket values—This section provides a social context for land use planning decisions.

Existing Conditions—Kansas Overview

The Kansas economy was originally based on agriculture. Today industry sectors include bioscience, especially in the animal health area, transportation, advanced manufacturing due to numerous aerospace and automotive products, food processing and distributing, and energy technology, particularly wind energy. Much of the state's economic growth has been based on abundant mineral deposits. During the late 19th and early 20th centuries, coal, oil and natural gas, lead and zinc, salt, and many other natural resources were extracted from the earth. In varying degrees, most of these resources continue to be of importance to the state's economy. The cost of living in Kansas is nearly 8.74 percent below the national average, ranking the state sixth lowest for cost of living in the US. Housing costs are especially low, with the median value of owner-occupied homes below the national average by a factor of over 200 (Kansas Department of Commerce 2015).

Approximately 29,700 acres of BIA-managed surface lands and mineral estate are found in Kansas. In total, Kansas has 669,700 acres of BLM-administered minerals but has no surface lands administered by the BLM.

Population and Migration

The total population in Kansas in 2013 was 2,868,107, up approximately 6.7 percent since 2000. In comparison, the US population as a whole increased 10.7 percent between

2000 and 2013 (Bureau of Economic Analysis, Regional Economic Accounts, Washington, DC, Table CA-30, as reported by Headwater Economics 2015). Overall, population increases in the state have come from births; more people are moving out of the state than into the state, based on average annual net migration data (see **Table 2-35**).

Table 2-35
Components of Population Growth, 2000-2013

	Change 2000-2013
Population growth	201,147
Average annual population change (natural change and net migration)	13,396
Average annual natural change (births and deaths)	15,698
Average annual net migration (international and domestic)	-2,423

Source: US Census Bureau Population Division 2014. as reported by Headwater Economics 2015

Similar trends in population change are anticipated over the next 20 years. The state's population is projected to increase approximately 9.4 percent by 2030, as compared to 29.2 percent for the US as a whole (see **Table 2-36**). Information on ethnicity and race in area populations is addressed in Section 2.5.4, Environmental Justice.

Table 2-36
Population and Population Projections

	Kansas	**Three-State Region**	**United States**
Population (2013)	2,868,107	32,293,222	311,536,594
Population (2000)	2,688,418	26,990,892	281,421,906
Population change (2000-2013)	179,689	5,302,330	30,114,688
Population percent change (2000-2013)	6.7	19.6	10.7
Projected population change (2010-2030)	251,666	N/A	82,162,529
Projected percent change (2010-2030)	9.4	N/A	29.2

Source: US Census Bureau 2000 Census and 2013 American Community Survey data, as reported in Headwater Economics 2015; US Census Bureau 2005
N/A: not available (the source does not provide aggregate area population projections)

Community Indicators

The population of Kansas, with a median age of 36 years in 2013, was slightly younger on average than the US population (median age 37.3). In general, the non-metro population (43.4 median age) was older than the metro population (33.8 median age; US Census Bureau 2013a).

The population in Kansas had a slightly higher level of people who had bachelor's degrees, as compared to the three-state region for the metro area population; this was slightly below that of the three-state region for the non-metro population (see **Table 2-37**).

Table 2-37
Educational Attainment—Kansas

	Kansas Metro	Kansas Non-Metro	Three-State Region	United States
Total Population 25 or older	1,338,759	511,251	20,394,615	206,587,852
No high school degree	142,242	46,030	3,551,747	28,887,721
	10.6%	9.0%	17.4%	14.0%
High school graduate	1,196,517	465,221	16,842,868	177,700,131
	89.4%	91.0%	82.6%	86.0%
Associate's degree	97,737	42,943	1,353,982	16,135,795
	7.3%	8.4%	6.6%	7.8%
Bachelor's degree or higher	443,354	116,461	5,424,267	59,583,138
	33.1%	22.8%	26.6%	28.8%
Bachelor's degree	283,053	80,333	3,601,803	37,286,246
	21.1%	15.7%	17.7%	18.0%
Graduate or professional degree	160,301	36,128	1,822,464	22,296,892
	12.0%	7.1%	8.9%	10.8%

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Most residents in Kansas speak only English, and the percentage of those who speak English less than very well is below that of the three-state average and national average (see **Table 2-38**).

Table 2-38
Language Spoken at Home—Kansas

	Kansas Metro	Kansas Non-Metro	Metro/Non-Metro Region	United States
Population 5 or older	1,967,797	697,549	29,891,329	291,484,482
Speak only English	1,705,827	665,601	21,032,653	231,122,908
	86.7%	95.4%	70.4%	79.3%
Speak a language other than English	261,970	31,948	8,858,676	60,361,574
	13.3%	4.6%	29.6%	20.7%
Speak English less than very well	110,504	9,828	3,633,524	25,148,900
	5.6%	1.4%	12.2%	8.6%

Source: US Census Bureau 2013 as reported in Headwater Economics 2015.

Housing

Housing availability and cost has the potential to be impacted by development and associated population changes. Housing occupancy information in the planning area is displayed in **Table 2-39**. Approximately 8.9 percent of housing in metro areas and 13.3 percent in non-metro areas is vacant. This rate is similar to the three-state region and US national average.

Table 2-39
Housing Occupancy—Kansas

	Kansas Metro	Kansas Non-Metro	Three-State Region	United States
Total Housing Units	901,803	333,682	12,976,016	132,057,804
Occupied	821,161	289,279	11,440,992	115,610,216
	91.1%	86.7%	88.2%	87.5%
Vacant	80,642	44,403	1,535,024	16,447,588
	8.9%	13.3%	11.8%	12.5%
For rent	23,746	3,998	406,597	3,230,123
	2.6%	1.2%	3.1%	2.4%
Rented, not occupied	4,821	825	67,837	599,884
	0.5%	0.2%	0.5%	0.5%
For sale only	11,220	4,249	151,989	1,682,020
	1.2%	1.3%	1.2%	1.3%
Sold, not occupied	2,921	1,229	54,530	608,590
	0.3%	0.4%	0.4%	0.5%
For seasonal, recreational, occasional use	4,603	9,876	290,284	5,122,778
	0.5%	3.0%	2.2%	3.9%
For migrant workers	207	180	3,913	34,233
	0.0%	0.1%	0.0%	0.0%
Other vacant	33,124	24,046	559,874	5,169,960
	3.7%	7.2%	4.3%	3.9%

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Housing costs for rent and mortgage in Kansas are below that of the national average for both metro and non-metro areas (see **Table 2-40**).

Table 2-40
Housing Costs—Kansas

	Kansas Metro	Kansas Non-Metro	Three-State Region	United States
Owner-occupied housing units with a mortgage	346,708	126,857	4,503,350	49,820,840
Monthly cost <15% of household income	77,453	32,247	992,414	9,215,740
	22.3%	25.4%	22.0%	18.5%
Monthly cost >30% of household income	86,584	32,074	1,316,380	17,636,343
	25.0%	25.3%	29.2%	35.4%
Specified renter-occupied units	309,100	51,603	4,098,967	40,534,516
Gross rent <15% of household income	38,892	9,949	505,289	4,355,942
	12.6%	19.3%	12.3%	10.7%

Table 2-40
Housing Costs—Kansas

	Kansas Metro	Kansas Non-Metro	Three-State Region	United States
Gross rent >30% of household income	136,095	14,593	1,824,871	19,581,493
	44.0%	28.3%	44.5%	48.3%
Median monthly mortgage cost	$1,322	$1,204	**N/A**	$1,540
Median gross rent	$750	$607	**N/A**	$904

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Income and Employment

Both total employment and total personal income in Kansas has increased more rapidly than population change from 2000 to 2013 (see **Table 2-41**).

Unemployment in Kansas generally followed national trends, peaking in 2010-2011, but remained below the national average. Unemployment over the past five years is shown in **Table 2-42**.

Table 2-41
Population, Employment, and Income Trends, 2000-2013—Kansas

	2000	2013	Change 2000-2013	Percent Change 2000-2013
Population	2,693,681	2,893,957	200,276	8.9
Employment (full and part-time jobs)	1,759,453	1,864,258	104,805	10.3
Personal income (in thousands of 2013 dollars)	104,833,609	128,540,565	23,706,956	44
Average earnings per Job	$44,202	$49,920	$5,718	12.9
Per capita income	$38,918	$44,417	$5,499	14.1

Source: Headwater Economics 2015

Table 2-42
Average Annual Unemployment—Kansas

	Kansas	United States
2013	5.4%	7.4%
2012	5.8%	8.1%
2011	6.5%	8.9%
2010	7.1%	9.6%
2009	7.1%	9.3%

Table 2-42
Average Annual Unemployment—Kansas

	Kansas	United States
2008	4.4%	5.8%
2007	4.1%	4.6%

Source: Bureau of Labor Statistics 2014

Income distribution for 2009-2013 American Community Survey data is demonstrated in more detail for both metro and non-metro populations in **Table 2-43**, Household Income Distribution—Kansas. Per capita income in Kansas was slightly lower than that of the US average. Median household income was slightly higher than the US average in metro areas and slightly lower in non-metro populations.

When examined by industry, key sectors of the economy can be identified. Based on 2013 data, top economic sectors are trade, transportation, and utilities, government, education and health, and manufacturing. It is worth noting that average annual wages were lower than average levels for trade and government and higher than average for education and manufacturing (see **Table 2-44**, Employment and Wages by Industry—Kansas). In 2013 the three industry sectors with the most jobs were government (296,431), health care, social assistance (194,872), and retail trade (183,224). From 2001 to 2013, the three industry sectors that added the most new jobs were health care, social assistance (29,508), mining (including fossil fuels; 25,309), and finance, insurance (23,811).

Total personal income by industry provides additional information on key economic sectors. In 2013, the three industry sectors with the largest personal income were government ($16,321.3 million), manufacturing (including forest products; $12,975.8 million), and health care, social assistance ($9,667.1 million). From 2001 to 2013, the three industry sectors that added the most new personal income in real terms were government ($3,144.9 million), farm ($2,512.7 million), and health care, social assistance ($2,323.6 million; see **Table 2-45**, Personal Income by Industry 2001-2013 (in Thousands of 2013 Dollars)).

Labor is the main source of income for Kansas, comprising 67.1 percent and 61.8 percent for metro and non-metro populations. Non-labor income is of increasing importance nationally and may provide locally important sources of income. This is particularly the case in non-metro areas, which have a higher dependence on non-labor income than the average or the three-state region and the national average. For more details regarding income source, refer to **Table 2-46**, Study Area Labor and Non-labor Income—Kansas (in Thousands of 2013 Dollars).

Table 2-43
Household Income Distribution—Kansas

	Kansas Metro	Kansas Non-Metro	Three-State Region	United States
Per capita income (in 2013 dollars)	$26,840	$27,182	**N/A**	$28,155
Median household income (in 2013 dollars)	$50,317	$53,847	**N/A**	$53,046
Total Households	821,161	289,279	11,440,992	115,610,216
Less than $10,000	58,060	13,463	847,123	8,380,364
	7.1%	4.7%	7.4%	7.2%
$10,000 to 14,999	43,889	13,692	624,251	6,214,548
	5.3%	4.7%	5.5%	5.4%
$15,000 to 24,999	92,496	29,675	1,280,481	12,468,604
	11.3%	10.3%	11.2%	10.8%
$25,000 to 34,999	91,818	32,045	1,249,592	11,929,761
	11.2%	11.1%	10.9%	10.3%
$35,000 to 49,999	121,977	44,189	1,613,499	15,723,148
	14.9%	15.3%	14.1%	13.6%
$50,000 to 74,999	153,313	61,612	2,069,926	20,744,045
	18.7%	21.3%	18.1%	17.9%
$75,000 to 99,999	99,930	39,878	1,347,052	14,107,031
	12.2%	13.8%	11.8%	12.2%
$100,000 to 149,999	97,678	36,345	1,402,947	14,858,239
	11.9%	12.6%	12.3%	12.9%
$150,000 to 199,999	32,853	10,058	511,090	5,651,848
	4.0%	3.5%	4.5%	4.9%
$200,000 or more	29,147	8,322	495,031	5,532,628
	3.5%	2.9%	4.3%	4.8%

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Table 2-44
Employment and Wages by Industry—Kansas

	Employ ment	Percent of Total Employ-ment	Average Annual Wages (Metro)	Average Annual Wages (Non-Metro)	Average Annual Wages (State)	Percent Above or Below Average
Total	1,337,168		$44,790	$33,403	$41,546	
Private	1,093,116	81.7	$42,442	$31,234	$42,294	1.8
Non-Services-Related	241,371	18.1	$65,945	$51,190	$51,059	22.9
Natural resources/mining	21,512	1.6	$49,381	$39,044	$45,599	9.8
Agriculture, forestry, fishing, and hunting	11,049	0.8	$36,122	$28,325	$36,115	-13.1
Mining (including fossil fuels)	10,463	0.8	$45,153	$34,112	$55,614	33.9
Construction	56,855	4.3	$56,586	$42,635	$47,895	15.3
Manufacturing (including forest products)	163,003	12.2	$48,525	$44,609	$52,883	27.3
Services-related	851,745	63.7	$39,029	$35,762	$39,811	-4.2
Trade, transportation, and utilities	254,212	19.0	$60,267	$54,799	$37,985	-8.6
Information	27,548	2.1	$48,965	$44,538	$68,033	63.8
Financial activities	70,727	5.3	$60,003	$42,199	$58,475	40.7
Professional and business	161,716	12.1	$42,542	$30,218	$51,913	25.0
Education and health	182,646	13.7	$38,800	$33,184	$38,952	-6.2
Leisure and Hospitality	121,337	9.1	$74,662	$39,058	$14,411	-65.3
Other services	33,559	2.5	$62,690	$40,770	$29,324	-29.4
Unclassified	0	0.0	$54,526	$36,384	N/A	N/A
Government	244,053	18.3	$41,964	$31,883	$38,194	-8.1
Federal	25,382	1.9	$15,350	$11,833	$61,452	47.9
State	40,691	3.0	$31,155	$25,661	$47,679	14.8
Local	177,980	13.3	N/A	N/A	$32,709	-21.3

Source: US Department of Labor 2014, Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Washington, DC, as reported in Headwater Economics 2015

Table 2-45
Personal Income by Industry 2001-2013 (in Thousands of 2013 Dollars)

	2001	2013	Change 2001-2013
Labor earnings	79,046,306	93,063,676	14,017,370
Non-services related	20,861,800	24,825,948	3,964,148
Farm	1,530,127	4,042,790	2,512,663
Forestry, fishing, and related activities	247,177	516,653	269,476
Mining (including fossil fuels)	814,874	2,363,628	1,548,754
Construction	4,816,283	4,927,057	110,774
Manufacturing	13,453,339	12,975,820	-477,519
Services related	45,008,139	51,916,458	6,908,319
Utilities	838,148	1,038,267	200,119
Wholesale trade	4,336,473	4,893,810	557,337
Retail trade	5,603,178	5,276,719	-326,459
Transportation and warehousing	3,263,232	3,471,380	208,148
Information	3,981,383	2,442,177	-1,539,206
Finance and insurance	4,129,278	5,362,230	1,232,952
Real estate and rental and leasing	1,218,288	1,244,046	25,758
Professional and technical services	4,637,996	5,966,214	1,328,218
Management of companies and enterprises	1,115,149	1,624,865	509,716
Administrative and waste services	2,529,029	3,939,882	1,410,853
Educational services	581,511	785,353	203,842
Health care and social assistance	7,343,548	9,667,124	2,323,576
Arts, entertainment, and recreation	380,867	461,991	81,124
Accommodation and food services	2,139,585	2,364,565	224,980
Other services, except public administration	2,910,474	3,377,835	467,361
Government	13,176,366	16,321,270	3,144,904

All employment data are reported by place of work. Estimates for data that were not disclosed are indicated with ~.
Source: Bureau of Economic Analysis, Regional Economic Accounts, Washington, DC. Table CA05N, as reported in Headwater Economics 2015

Table 2-46
Study Area Labor and Non-labor Income—Kansas (in Thousands of 2013 Dollars)

	Kansas Metro	Kansas Non-Metro	Three-State Region	United States
Total personal income ($1,000)	88,651,992	39,888,573	1,449,807,346	14,151,427,000
Non-labor income	29,151,871	15,223,571	460,289,630	5,085,220,000
	32.9%	38.2%	31.7%	35.9%
Dividends, interest, and rent	16,873,737	7,896,376	243,340,439	2,670,719,000
	19.0%	19.8%	16.8%	18.9%

Table 2-46
Study Area Labor and Non-labor Income—Kansas (in Thousands of 2013 Dollars)

	Kansas Metro	Kansas Non-Metro	Three-State Region	United States
Transfer payments	12,278,134	7,327,195	216,949,191	2,414,501,000
	13.8%	18.4%	15.0%	17.1%
Labor earnings	59,500,121	24,665,002	989,517,716	9,066,207,000
	67.1%	61.8%	68.3%	64.1%

Source: Bureau of Economic Analysis 2014, as reported in headwater Economics 2015
Note: Non-labor income and labor earnings may not add to total personal income because of adjustments made by the Bureau of Economic Analysis. This was to account for contributions from Social Security, cross-county commuting, and other factors.

Public Finance

Components of public finance related to management of federal lands and mineral resources in the planning area primarily include federal mineral royalty payments and other taxes collected from the extraction and sale of mineral resources. These categories are explained in detail below.

Taxes

The severance tax in Kansas was 8 percent on gross value of oil or gas, with exemptions for low producing oil and gas wells. Money for refunds distributed into the mineral production tax refund fund. Of the remaining revenues, seven percent were deposited in the special county mineral production tax fund; the remaining revenues were deposited in a general state fund with surplus money in special funds if available (National Conference of State Legislatures 2012). In 2011, approximately $128 million was collected in severance taxes (Kansas Independent Oil and Gas Association 2012).

Ad valorem property taxes are charged on oil and gas equipment and on oil and gas produced. The unit of taxation for property taxes is the mil, defined as one-thousandth of a currency unit. To calculate the property tax, the authority multiplies the assessed value of the property by the mil rate and then divides it by 1,000. For example, a property with an assessed value of $50,000 located in a municipality with a rate of 20 mils would have a property tax bill of $1,000 per year. Kansas has an oil and gas conservation fee of 91 mils per barrel for oil and 12.9 mils per MCF for gas (National Conference of State Legislatures 2012). Approximately $225 million dollars in ad valorem taxes were collected in 2011 (Kansas Independent Oil and Gas Association 2012).

Federal Mineral Royalties

Additional revenues from oil, gas, and coal extraction come from rents and royalties paid by producers on public lands. Lease holders competitively bid, pay an initial bonus, and subsequently pay rent for the right to develop the resources on public lands. These funds are collected and subsequently distributed to the federal and state government and are known as lease revenue and, in the case of rents, lease royalties. Lease revenues and royalties to the state and county provide an additional economic benefit of mineral

resource extraction. Federal mineral lease revenues are collected by the Office of Natural Resources Revenue within the Department of the Interior. Approximately 50 percent of the revenues are transferred to the state treasurer for disbursement to the counties of origin.

Royalties collected in Kansas is shown in **Table 2-47**, Rents, Royalties, and Bonus Revenue Collected—Kansas. The US Department of the Interior disburses 100 percent of the revenues received for energy and mineral production on Indian lands directly to the tribes and individual mineral owners through the BIA and the Office of Special Trustee for American Indians. Tribes then distribute the revenues among all members; alternately they apply the revenues to health care, infrastructure, education, and other critical community development programs, such as senior centers, public safety projects, and youth initiatives. Many individual mineral owners use these revenues as a major source of income to support their families and communities. Kansas's state share of federal mineral royalty revenue disbursement for fiscal year 2014 was $1,354,119. A portion of this amount is then disbursed to counties of origin.

Table 2-47
Rents, Royalties, and Bonus Revenue Collected—Kansas (FY 2014)

Gas (mcf*) volume	4,050,842
Gas sales	$13,443,499
Gas royalties	**$1,650,579**
Oil (oil barrels) volume	$193,600
Oil sales	$18,630,063
Oil royalties	**$$2,391,248**
Coal (tons) volume	0
Coal sales	0
Coal royalties	0
Rents	**$$45,014**
Bonuses	**$18,000**
Other Revenue	**$8,348.38**

Source: Office of Natural Resources Revenue 2015
*mcf = thousand cubic feet

Existing Conditions—Oklahoma Overview

Historically, agriculture has been a dominant economic activity in Oklahoma. However, in the 1900s, agriculture's share of employment dropped from 70 percent to 37 percent as employment in other sectors, including oil and gas mining and petroleum refineries, began to grow (Oklahoma Historical Society 2009).

According to the State Chamber of Oklahoma Research Foundation, the oil and gas industry has doubled in size in the past decade and has an outsized influence on overall state economic activity; oil and gas firms account for only 3.2 percent of all business

establishments but hire 5 percent of wage and salary workers. The oil and gas industry produces 10 percent of state gross domestic product and generates 13.5 percent of total earnings statewide (State Chamber of Oklahoma Research Foundation 2014).

Approximately 13,600 acres of BLM-administered surface lands and 816,500 acres of BIA-managed surface lands are found in Oklahoma. in total, Oklahoma has 1,885,000 acres of BLM-administered minerals and 2,609,500 acres of BIA-managed minerals.

Population and Migration

The total population in Oklahoma in 2013 was 3,785,742, an approximately 9.7 percent increase since 2000. This is compared to the increase of 10.7 percent in the US population as a whole over the same time period (US Census Bureau 2014). Population increases in the state have come from both births (62 percent) and migration of people into the area (42 percent; see **Table 2-48**).

Table 2-48
Components of Population Growth, 2000-2013

	Change 2000-2013
Population Growth (2000-2013)	396,625
Average annual population change (natural change and net migration)	26,958
Average annual natural change (births and deaths)	16,903
Average annual net migration (international and domestic)	11,625

Source: US Census Bureau Population Division 2014, as reported by Headwater Economics 2015

The state's population is projected to increase approximately 13.4 percent by 2030, as compared to 29.2 percent for the US as a whole (see **Table 2-49**, Population and Population Projections—Oklahoma). Information on ethnicity and race in area population is addressed in Section 2.5.4, Environmental Justice.

Table 2-49
Population and Population Projections—Oklahoma

	Oklahoma	**Three-State Region**	**United States**
Population (2013)	3,785,742	32,293,222	311,536,594
Population (2000)	3,450,654	26,990,892	281,421,906
Population change (2000-2013)	335,088	5,302,330	30,114,688
Population percent change (2000-2013)	9.7	19.6	10.7
Projected population change (2010-2030)	462,597	N/A	82,162,529
Projected percent change (2010-2030)	13.4	N/A	29.2

Source: US Census Bureau 2000 Census and 2013 American Community Survey data as reported in Headwater Economics 2015, US Census Bureau 2005.

Community Indicators

The population of Oklahoma, with a median age of 36.2 years in 2013, was slightly younger on average than the US population (median age 37.3). In general, the non-metro population (41.2 median age) was older than the metro population (33.9 median age; US Census Bureau 2014).

Oklahoma had a slightly lower percent of people with bachelor's degrees or higher in the metro area compared to the three-state region and the US average. For non-metro populations, the rate was 10 percent below the US average (see **Table 2-50**, Educational Attainment—Oklahoma). Most residents in Oklahoma speak only English, and the percentage of those who speak English less than very well is below that of the three-state and national averages (see **Table 2-51**, Language Spoken at Home—Oklahoma).

Table 2-50
Educational Attainment—Oklahoma

	Oklahoma Metro	Oklahoma Non-Metro	Three-State Region	United States
Total Population 25 or older	1,591,754	872,544	20,394,615	206,587,852
No high school degree	211,482	123,749	3,551,747	28,887,721
	13.3%	14.2%	17.4%	14.0%
High school graduate	1,380,272	748,795	16,842,868	177,700,131
	86.7%	85.8%	82.6%	86.0%
Associate's degree	114,094	57,901	1,353,982	16,135,795
	7.2%	6.6%	6.6%	7.8%
Bachelor's degree or higher	420,173	158,284	5,424,267	59,583,138
	26.4%	18.1%	26.6%	28.8%
Bachelor's degree	279,677	108,208	3,601,803	37,286,246
	17.6%	12.4%	17.7%	18.0%
Graduate or professional degree	140,496	50,076	1,822,464	22,296,892
	8.8%	5.7%	8.9%	10.8%

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Table 2-51
Language Spoken at Home—Oklahoma

	Oklahoma Metro	Oklahoma Non-Metro	Metro/Non-Metro Region	United States
Population 5 or older	2,319,106	1,202,477	29,891,329	291,484,482
Speak only English	2,041,976	1,148,100	21,032,653	231,122,908
	88.1%	95.5%	70.4%	79.3%
Speak a language other than English	277,130	54,377	8,858,676	60,361,574
	11.9%	4.5%	29.6%	20.7%

Table 2-51
Language Spoken at Home—Oklahoma

	Oklahoma Metro	Oklahoma Non-Metro	Metro/Non-Metro Region	United States
Speak English less than very well	123,390	15,251	3,633,524	25,148,900
	5.3%	1.3%	12.2%	8.6%

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Housing

Housing occupancy information in the planning area is displayed in **Table 2-52**, Housing Occupancy—Oklahoma. Approximately 11.6 percent of housing in metro areas and 17.2 percent in non-metro areas is vacant compared to the three-state average of 11.8 percent and the national average of 12.5 percent.

Table 2-52
Housing Occupancy—Oklahoma

	Oklahoma Metro	Oklahoma Non-Metro	Three-State Region	United States
Total Housing Units	1,095,047	574,781	12,976,016	132,057,804
Occupied	968,134	475,947	11,440,992	115,610,216
	88.4%	82.8%	88.2%	87.5%
Vacant	126,913	98,834	1,535,024	16,447,588
	11.6%	17.2%	11.8%	12.5%
For rent	35,700	7,777	406,597	3,230,123
	3.3%	1.4%	3.1%	2.4%
Rented, not occupied	7,567	1,560	67,837	599,884
	0.7%	0.3%	0.5%	0.5%
For sale only	15,753	7,396	151,989	1,682,020
	1.4%	1.3%	1.2%	1.3%
Sold, not occupied	4,709	3,909	54,530	608,590
	0.4%	0.7%	0.4%	0.5%
For seasonal, recreational, occasional use	7,523	31,952	290,284	5,122,778
	0.7%	5.6%	2.2%	3.9%
For migrant workers	424	322	3,913	34,233
	0.0%	0.1%	0.0%	0.0%
Other vacant	55,237	45,918	559,874	5,169,960
	5.0%	8.0%	4.3%	3.9%

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Housing cost for rent and mortgage, which are important indicators of cost of living, are below that of the national average for both metro and non-metro areas (see **Table 2-53**, Housing Costs—Oklahoma).

Table 2-53
Housing Costs—Oklahoma

	Oklahoma Metro	Oklahoma Non-Metro	Three-State Region	United States
Owner-occupied housing units with a mortgage	373,182	196,425	4,503,350	49,820,840
Monthly cost <15% of household income	91,270	53,188	992,414	9,215,740
	24.5%	27.1%	22.0%	18.5%
Monthly cost >30% of household income	97,939	52,330	1,316,380	17,636,343
	26.2%	26.6%	29.2%	35.4%
Specified renter-occupied units	385,134	90,211	4,098,967	40,534,516
Gross rent <15% of household income	50,701	15,078	505,289	4,355,942
	13.2%	16.7%	12.3%	10.7%
Gross rent >30% of household income	171,449	26,890	1,824,871	19,581,493
	44.5%	29.8%	44.5%	48.3%
Median monthly mortgage cost	$1,165	$1,078	**N/A**	$1,540
Median gross rent	$717	$611	**N/A**	$904

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Income and Employment

Both total employment and total personal income in Oklahoma increased more rapidly than population change from 2000 to 2013 (see **Table 2-54**, Population, Employment and Income Trends 2000-2013—Oklahoma).

Income distribution for 2009-2013 data is shown for both metro and non-metro populations in **Table 2-55**, Household Income Distribution—Oklahoma. Both per capita income and median household income were lower in Oklahoma metro and non-metro areas than in the US.

Table 2-54
Population, Employment and Income Trends 2000-2013—Oklahoma

	2000	2013	Change 2000-2013	Percent Change 2000-2013
Population	3,454,365	3,850,568	396,203	11.5
Employment (full and part-time jobs)	1,993,644	2,254,523	260,879	13.1
Personal income (in thousands of 2013 dollars)	115,918,470	161,187,913	45,269,443	39.1
Average earnings per job	$42,053	$50,875	$8,822	21
Per capita income	$33,557	$41,861	$8,304	24.7

Source: Headwater Economics 2015

Table 2-55
Household Income Distribution—Oklahoma

	OK Metro	OK Non-Metro	Three-State Region	United States
Per capita income (in 2013 dollars)	$24,585	$23,468	**N/A**	$28,155
Median household income (in 2013 dollars)	$44,468	$47,143	**N/A**	$53,046
Total households	968,134	475,947	11,440,992	115,610,216
Less than $10,000	84,245	33,829	847,123	8,380,364
	8.7%	7.1%	7.4%	7.2%
$10,000 to 14,999	61,160	30,554	624,251	6,214,548
	6.3%	6.4%	5.5%	5.4%
$15,000 to 24,999	121,576	58,311	1,280,481	12,468,604
	12.6%	12.3%	11.2%	10.8%
$25,000 to 34,999	118,243	55,792	1,249,592	11,929,761
	12.2%	11.7%	10.9%	10.3%
$35,000 to 49,999	146,996	71,337	1,613,499	15,723,148
	15.2%	15.0%	14.1%	13.6%
$50,000 to 74,999	176,266	93,128	2,069,926	20,744,045
	18.2%	19.6%	18.1%	17.9%
$75,000 to 99,999	106,833	57,351	1,347,052	14,107,031
	11.0%	12.0%	11.8%	12.2%
$100,000 to 149,999	95,854	50,608	1,402,947	14,858,239
	9.9%	10.6%	12.3%	12.9%
$150,000 to 199,999	29,136	14,037	511,090	5,651,848
	3.0%	2.9%	4.5%	4.9%
$200,000 or more	27,825	11,000	495,031	5,532,628
	2.9%	2.3%	4.3%	4.8%

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Unemployment in Oklahoma generally followed national trends, peaking in 2010, but it remained below the national average. Since 1990, the annual unemployment rate ranged from a low of 3.1 percent in 2000 to a high of 6.9 percent in 2010. Unemployment over the past five years is shown in **Table 2-56**, Average Annual Unemployment—Oklahoma.

When examined by industry, key sectors of the economy can be identified. Based on 2013 data, top economic sectors in percent of employment were trade, transportation, and utilities, government, education and health, and professional and business services.

Average annual wages were lower than average levels for trade and government and higher than average for education and manufacturing (see **Table 2-57**, Employment and Wages by Industry, 2013 (in 2013 Dollars)).

Table 2-56
Average Annual Unemployment—Oklahoma

	Oklahoma	United States
2013	5.4%	7.4%
2012	5.4%	8.1%
2011	5.9%	8.9%
2010	6.9%	9.6%
2009	6.7%	9.3%
2008	3.7%	5.8%
2007	4.1%	4.6%

Source: Bureau of Labor Statistics 2014

Table 2-57
Employment and Wages by Industry, 2013 (in 2013 Dollars)

	Employ-ment	Percent of Total Employ-ment	Average Annual Wages	Percent Above or Below Average
Total	1,560,843		$42,451	
Private	1,240,974	79.5	$42,733	0.7
Non-services-related	280,403	18.0	$58,627	38.1
Natural resources and mining	69,696	4.5	$85,551	101.5
Agriculture, forestry, fishing, and hunting	10,262	0.7	$33,565	-20.9
Mining (including fossil fuels)	59,434	3.8	$94,527	122.7
Construction	74,477	4.8	$46,045	8.5
Manufacturing (including forest products)	136,230	8.7	$51,731	21.9
Services-related	960,571	61.5	$38,093	-10.3
Trade, Transportation, and utilities	292,881	18.8	$38,810	-8.6
Information	21,807	1.4	$53,313	25.6
Financial activities	77,747	5.0	$50,476	18.9
Professional and business services	180,114	11.5	$47,316	11.5
Education and health services	200,985	12.9	$40,252	-5.2
Leisure and hospitality	151,399	9.	$16,006	-62.3
Other services	35,582	2.3	$30,849	-27.3
Unclassified	55	0.0	$69,854	64.6
Government	319,870	20.5	$41,357	-2.6
Federal government	47,144	3.0	$62,988	48.4
State government	72,101	4.6	$43,493	2.5
Local government	200,625	12.9	$35,506	-16.4

Source: Headwater Economics 2015
Note: This table shows wage data from the Bureau of Labor Statistics, which does not report data for proprietors or the value of benefits and uses slightly different industry categories than those shown on previous pages of this report.

In 2013 the three industry sectors with the largest number of jobs were government (369,501), retail trade (220,147), and health care, social assistance (213,636). From 2001 to 2013, the three industry sectors that added the most new jobs were mining, including fossil fuels (79,420), health care, social assistance (40,111), and government (34,737).

Total personal income by industry provides additional information on key economic sectors. In 2013, the three industry sectors with the largest personal income were government ($21,204.2 million), mining, including fossil fuels ($14,735.5 million), and health care, social assistance ($11,013.0 million). From 2001 to 2013, the three industry sectors that added the most new personal income in real terms were mining, including fossil fuels ($8,426.8 million), government ($4,154.6 million), and health care, social assistance ($3,191.1 million; see **Table 2-58**).

Table 2-58
Personal Income by Industry, 2001-2013 (in Thousands of 2013 Dollars)

	2001	2013	Change 2001-2013
Labor Earnings	88,458,239	114,699,262	26,241,023
Non-services-related	24,554,566	33,990,458	9,435,892
Farm	1,072,055	1,128,307	56,252
Forestry, fishing, and related activities	198,244	267,650	69,406
Mining (including fossil fuels)	6,308,665	14,735,514	8,426,849
Construction	5,196,449	7,295,564	2,099,115
Manufacturing	11,779,153	10,563,423	-1,215,730
Services-related	46,854,088	59,504,620	12,650,532
Utilities	1,200,360	1,573,284	372,924
Wholesale trade	3,784,759	4,558,635	773,876
Retail trade	6,606,891	7,328,920	722,029
Transportation and warehousing	4,002,498	5,738,541	1,736,043
Information	2,310,613	1,756,007	-554,606
Finance and insurance	3,654,657	4,603,017	948,360
Real estate and rental and leasing	1,496,404	2,292,357	795,953
Professional and technical services	4,691,182	6,057,297	1,366,115
Management of companies and enterprises	1,061,810	1,597,976	536,166
Administrative and waste services	3,438,254	4,354,373	916,119
Educational services	614,113	855,034	240,921
Health care and social assistance	7,821,878	11,012,997	3,191,119
Arts, entertainment, and recreation	397,392	682,254	284,862
Accommodation and food services	2,320,715	3,051,769	731,054
Other services, except public administration	3,452,561	4,042,159	589,598
Government	17,049,585	21,204,184	4,154,599

Source: US Department of Commerce, Bureau of Economic Analysis 2014, as reported in Headwater Economics 2015

One important economic sector, particularly for Indian tribes, is gaming. Gaming is typically included in the leisure and hospitality sector. There are two racetrack casinos and 114 tribal casinos in the state. From 2011 to 2012, consumer spending on commercial casino gambling increased 6.4 percent, from $106.23 million to $113.06 million. In 2012, commercial casino tax revenue was $20.38 million, a growth of 11.4 percent from 2011. There were 870 commercial casino jobs in Oklahoma in 2012, a decrease of 3.9 percent from 905 jobs in 2011 (American Gaming Association 2013).

Tribes that operate covered games in accordance with State-Tribal Gaming Compacts pay a monthly exclusivity fee to the State of Oklahoma for the exclusive right to operate compacted gaming. Exclusivity fees paid to the state are calculated as follows:

- 4 percent of the first $10 million of annual adjusted gross revenues (the total, minus prize payouts)
- 5 percent of the next $10 million of annual adjusted gross revenues
- 6 percent of adjusted gross revenues over $20 million

In 2011, approximately $122 million was collected in exclusivity fees, a growth of 3.3 percent from 2011 in which approximately $118 million was collected (Oklahoma Office of State Finance 2015).

Labor is the main source of income for Oklahoma, comprising 67.1 percent and 58.7 percent for metro and non-metro populations. Nonlabor income is of increasing importance nationally and may provide locally important sources of income, particularly in non-metro areas, which have a higher dependence on nonlabor income from transfer payments than the average or the three-state region and the national average. For more details regarding income source, refer to **Table 2-59**.

Table 2-59
Non-Labor Share of Total Personal Income—Oklahoma

	Oklahoma Metro	Oklahoma Non-Metro	Three-State Region	United States
Total personal income (in thousands of 2013 dollars)	111,591,055	49,596,858	1,449,807,346	14,151,427,000
Non-labor income	36,828,448	20,477,538	460,289,630	5,085,220,000
	33.0%	41.3%	31.7%	35.9%
Dividends, interest, and rent	19,184,334	8,945,475	243,340,439	2,670,719,000
	17.2%	18.0%	16.8%	18.9%
Transfer payments	17,644,114	11,532,063	216,949,191	2,414,501,000
	15.8%	23.3%	15.0%	17.1%
Labor earnings	74,762,607	29,119,320	989,517,716	9,066,207,000
	67.0%	58.7%	68.3%	64.1%

Source: Bureau of Economic Analysis 2014, as reported in Headwater Economics 2015
Note: Non-labor income and labor earnings may not add to total personal income because of adjustments made by the Bureau of Economic Analysis to account for contributions from Social Security, cross-county commuting, and other factors.

Public Finance

Components of public finance related to managing federal lands and mineral resources in the planning area primarily include federal mineral royalty payments and other taxes collected from the extraction and sale of mineral resources. These categories are explained in additional detail below.

Taxes

Taxes collected on mineral production in Oklahoma include a gross production tax and petroleum excise tax. No ad valorem production tax is collected in the state on oil and gas production or equipment. The gross production severance tax in Oklahoma is variable, based on an average price of crude oil and natural gas in a calendar month. The severance tax rate in a month is determined by the average production price in the prior three months. For gas, the gross production tax rate is seven percent if the statewide average price of Oklahoma gas equals or exceeds $2.10 per MCF, four percent if greater than $1.75 per MCF but less than $2.10 per MCF, and one percent if less than $1.75 per MCF. For oil, the gross production tax rate is seven percent if the average price of Oklahoma oil equals or exceeds $17 per oil barrel, four percent if the average price is less than $17 per oil barrel but equal to or exceeds $14 per oil barrel, and one percent if the average price is less than $14 per oil barrel (Oklahoma Tax Commission 2012; National Conference of State Legislatures 2012). In fiscal year 2012, the gross production severance tax was constant at seven percent, and approximately $703 million was collected (Oklahoma Tax Commission 2013). All oil and gas products produced in Oklahoma also incur a petroleum excise tax of 0.095 percent of the same taxable value used to compute the gross production severance tax (Oklahoma Tax Commission 2012). In fiscal year 2013, approximately $13 million was collected in petroleum excise taxes (Oklahoma Tax Commission 2013).

Federal Mineral Royalties

Additional revenues from oil, gas, and coal extraction come from rents and royalties paid by producers on public lands. Lease holders competitively bid, pay an initial bonus, and subsequently pay rent for the right to develop the resources on public lands. These funds are collected and are subsequently distributed to the federal and state government; they are known as lease revenue and, in the case of rents, as lease royalties. Lease revenues and royalties to the state and county provide an additional economic benefit of mineral resource extraction. Federal mineral lease revenues are collected by the Office of Natural Resources Revenue within the Department of the Interior. Approximately 50 percent of the revenues are transferred to the state treasurer for disbursement to counties of origin.

Royalties collected in Oklahoma shown in **Table 2-60**, Rents, Royalty, and Bonus Revenue Collected. The Department of the Interior disburses 100 percent of the revenues received for energy and mineral production on Indian lands directly to the tribes and to individual mineral owners through the BIA and the Office of Special Trustee for American Indians. Tribes then distribute the revenues among all members or apply the revenues to health care, infrastructure, education, and other critical community development programs, such as senior centers, public safety projects, and youth

Table 2-60
Rents, Royalty, and Bonus Revenue Collected (Fiscal Year 2014)

	Oklahoma
Gas (mcf) volume	41,207,754
Gas sales	$189,711,741
Gas royalties	**$32,421,925**
Oil (oil barrel) volume	1,775,706
Oil sales	$$170,314,276
Oil royalties	**$25,780,515**
Coal (tons) volume	563,275
Coal sales	$30,286,733
Coal royalties	**$713,196**
Rents	**$619,527**
Bonuses	**$821,220**
Other Revenue	**$2,069,741**

Source: Office of Natural Resources Revenue 2015

initiatives. Many individual mineral owners use these revenues as a major source of income to support their families and communities. Indian royalty disbursement information is not available due to the proprietary nature of the data, but due to the large amount of Indian minerals in the area, the amount has significant importance for some individuals and tribes in the state.

Oklahoma's state share of federal mineral royalty disbursement for fiscal year 2014 was $5,353,242. A portion of this amount is then disbursed to the counties of origin.

Existing Conditions—Texas Overview

Texas industries with the greatest concentrations of employment are biotech and life sciences, information and electronics, professional and financial services, aerospace and aviation, industrial manufacturing, petroleum and chemical products, logistics and transportation, and food and beverage processing (Office of the Governor 2012). Historically, the oil industry has been a significant economic sector in Texas. When the sector gained prominence in the twentieth century, petroleum began to displace agriculture as the principal economic driver of the state (Texas Almanac 2015). Today, Texas is the nation's leading producer of oil and gas, refined products, and chemicals. Texas is the nation's largest chemicals producer, manufacturing 14 percent of the nation's value of chemical output (Office of the Governor 2005). In 2011, Texas had the fourth largest percentage of jobs directly attributable to the oil and natural gas industry's operations, with 13.6 percent of jobs in that sector (American Petroleum Institute 2013).

Texas has approximately 33,290 acres of BLM-administered surface lands and 6,000 acres of BIA-managed surface lands. In total 2,192,000 acres of BLM-administered minerals and 6,300 acres of BIA-managed minerals are in Texas.

Population and Migration

The total population in Texas in 2013 was 25,639,373. The population increased approximately 23 percent over the last decade, double the percent change in population in the US. Population projections for Texas estimate a continued population influx, with approximately 60 percent population change predicted by 2030, compared to a 29 percent increase for the US (see **Table 2-61**).

Table 2-61
Population and Population Projections—Texas

	Texas	Three-State Region	United States
Population (2013)	25,639,373	32,293,222	311,536,594
Population (2000)	20,851,820	26,990,892	281,421,906
Population change (2000-2013)	4,787,553	5,302,330	30,114,688
Population percent change (2000-2013)	23.0	19.6	10.7
Projected population change (2010-2030)	12,465,924	N/A	82,162,529
Projected percent change (2010-2030)	59.8	N/A	29.2

Source: US Census Bureau 2000 Census and 2013 American Community Survey data as reported in Headwater Economics 2015, US Census Bureau 2005.

Population increases in the state have come from both births (54 percent) and migration of people into the area (46 percent; see **Table 2-62**). Ethnicity and race in area population are addressed in Section 2.5.4, Environmental Justice.

Table 2-62
Components of Population Growth, 2000-2013

	Change 2000-2013
Population growth	5,502,230
Average annual population change (natural change and net migration)	419,256
Average annual natural change (births and deaths)	227,287
Average annual net migration (international and domestic)	192,999

Source: US Census Bureau, Population Division 2014, as reported by Headwater Economics 2015

Community Indicators

The population of Texas was overall the youngest in the planning area, with a median age of 33.8 in 2013, younger on average than the US population (median age 37.3). In general, the non-metro population (41.0 median age) was older than the metro population (32.7 median age; US Census Bureau 2014).

Texas had a lower level of those with bachelor's degrees or higher in both metro and non-metro populations, compared to the three-state average and national average (see **Table 2-63**, Educational Attainment—Texas).

Table 2-63
Educational Attainment—Texas

	Texas Metro	Texas Non-Metro	Three-State Region	United States
Total population 25 or older	13,428,682	2,651,625	20,394,615	206,587,852
No high school degree	2,564,817	463,427	3,551,747	28,887,721
	19.1%	17.5%	17.4%	14.0%
High school graduate	10,863,865	2,188,198	16,842,868	177,700,131
	80.9%	85.2%	82.6%	86.0%
Associate's degree	861,623	179,684	1,353,982	16,135,795
	6.4%	6.8%	6.6%	7.8%
Bachelor's degree or higher	3,785,410	500,585	5,424,267	59,583,138
	28.2%	18.9%	26.6%	28.8%
Bachelor's degree	2,501,143	349,389	3,601,803	37,286,246
	18.6%	13.2%	17.7%	18.0%
Graduate or professional degree	1,284,267	151,196	1,822,464	22,296,892
	9.6%	5.7%	8.9%	10.8%

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Texas had a high rate of residents who speak a language other than English, compared to the three-state and national average and based on 2013 data. The percentage of those who speak English less was also above the three-state average and national average (see **Table 2-64**).

Table 2-64
Language Spoken at Home—Texas

	Texas Metro	Texas Non-Metro	Metro/Non-Metro Region	United States
Population 5 or older	20,040,637	3,663,763	29,891,329	291,484,482
Speak only English	12,466,128	3,005,021	21,032,653	231,122,908
	62.2%	82.0%	70.4%	79.3%
Speak a language other than English	7,574,509	658,742	8,858,676	60,361,574
	37.8%	18.0%	29.6%	20.7%
Speak English less than very well	3,140,103	234,448	3,633,524	25,148,900
	15.7%	6.4%	12.2%	8.6%

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Housing

Housing occupancy information in the planning area is displayed in **Table 2-65**, Housing Occupancy—Texas. Approximately 10.2 percent of housing in metro areas and 19.5 percent in non-metro areas is vacant, as compared to the three-state average of 11.8 percent and the national average of 12.5 percent.

Table 2-65
Housing Occupancy—Texas

	Texas Metro	Texas Non-Metro	Three-State Region	United States
Total housing units	8,367,394	1,703,309	12,976,016	132,057,804
Occupied	7,514,794	1,371,677	11,440,992	115,610,216
	89.8%	80.5%	88.2%	87.5%
Vacant	852,600	331,632	1,535,024	16,447,588
	10.2%	19.5%	11.8%	12.5%
For rent	315,669	19,707	406,597	3,230,123
	3.8%	1.2%	3.1%	2.4%
Rented, not occupied	49,195	3,869	67,837	599,884
	0.6%	0.2%	0.5%	0.5%
For sale only	88,251	25,120	151,989	1,682,020
	1.1%	1.5%	1.2%	1.3%
Sold, not occupied	28,569	13,193	54,530	608,590
	0.3%	0.8%	0.4%	0.5%
For seasonal, recreational, occasional use	97,499	138,831	290,284	5,122,778
	1.2%	8.2%	2.2%	3.9%
For migrant workers	1,578	1,202	3,913	34,233
	0.0%	0.1%	0.0%	0.0%
Other vacant	271,839	129,710	559,874	5,169,960
	3.2%	7.6%	4.3%	3.9%

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Housing costs for rent and mortgage are similar to the national average for metro areas and below the national average for non-metro areas (see **Table 2-66**).

Table 2-66
Housing Costs—Texas

	Texas Metro	Texas Non-Metro	Three-State Region	United States
Owner-occupied housing units with a mortgage	2,912,427	547,751	4,503,350	49,820,840
Monthly cost <15% of household income	600,305	137,951	992,414	9,215,740
	20.6%	25.2%	22.0%	18.5%
Monthly cost >30% of household income	892,121	155,332	1,316,380	17,636,343
	30.6%	28.4%	29.2%	35.4%
Specified renter-occupied units	3,013,509	249,410	4,098,967	40,534,516
Gross rent <15% of household income	352,088	38,581	505,289	4,355,942
	11.7%	15.5%	12.3%	10.7%
Gross rent >30% of household income	1,397,662	78,182	1,824,871	19,581,493
	46.4%	31.3%	44.5%	48.3%

Table 2-66
Housing Costs—Texas

	Texas Metro	Texas Non-Metro	Three-State Region	United States
Median monthly mortgage cost	$1,467	$1,290	N/A	$1,540
Median gross rent	$858	$736	N/A	$904

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Income and Employment

Both total employment and total personal income in Texas has increased more rapidly than population change from 2000 to 2013 (see **Table 2-67**).

Table 2-67
Population, Employment and Income Trends, 2000-2013—Texas

	2000	2013	Change 2000-2013	Percent Change 2000-2013
Population	20,944,499	26,448,193	5,503,694	26.2
Employment (full and part-time jobs)	12,139,152	15,505,307	3,366,155	27.7
Personal income (in thousands of 2013 dollars)	803,126,092	1,160,078,868	356,952,776	44.4
Average earnings per job	$53,956	$57,319	$3,363	6.2
Per capita income	$38,345	$43,862	$5,517	14.4

Source: Headwater Economics 2015

In general, average annual unemployment in Texas has remained lower than the national average but has followed similar trends. Since 1990, the annual unemployment rate ranged from a low of 4.4 percent in 2000 to a high of 8.2 percent in 2010. See **Table 2-68** for a comparison of Texas and US average unemployment over the past five years.

Table 2-68
Average Annual Unemployment—Texas

	Texas	United States
2013	6.3%	7.4%
2012	6.8%	8.1%
2011	7.9%	8.9%
2010	8.2%	9.6%
2009	7.5%	9.3%
2008	4.9%	5.8%
2007	4.4%	4.6%

Source: Bureau of Labor Statistics 2014

Income distribution for 2009-2013 is demonstrated in more detail for both metro and non-metro population in **Table 2-69**. Per capita income was lower in Texas metro and non-metro areas compared to the US average. Median household income was similar to the national average for non-metro areas and was lower in metro areas.

Table 2-69
Household Income Distribution—Texas

	Texas Metro	Texas Non-Metro	Three-State Region	United States
Per capita income (in 2013 dollars)	$26,051	$25,841	**N/A**	$28,155
Median household income (in 2013 dollars)	$51,665	$53,191	**N/A**	$53,046
Total households	7,514,794	1,371,677	11,440,992	115,610,216
Less than 10,000	570,070	87,456	847,123	8,380,364
	7.6%	6.4%	7.4%	7.2%
$10,000 to 14,999	403,190	71,766	624,251	6,214,548
	5.4%	5.2%	5.5%	5.4%
$15,000 to 24,999	827,626	150,797	1,280,481	12,468,604
	11.0%	11.0%	11.2%	10.8%
$25,000 to 34,999	806,019	145,675	1,249,592	11,929,761
	10.7%	10.6%	10.9%	10.3%
$35,000 to 49,999	1,038,681	190,319	1,613,499	15,723,148
	13.8%	13.9%	14.1%	13.6%
$50,000 to 74,999	1,330,875	254,732	2,069,926	20,744,045
	17.7%	18.6%	18.1%	17.9%
$75,000 to 99,999	870,094	172,966	1,347,052	14,107,031
	11.6%	12.6%	11.8%	12.2%
$100,000 to 149,999	941,276	181,186	1,402,947	14,858,239
	12.5%	13.2%	12.3%	12.9%
$150,000 to 199,999	362,479	62,527	511,090	5,651,848
	4.8%	4.6%	4.5%	4.9%
$200,000 or more	364,484	54,253	495,031	5,532,628
	4.9%	4.0%	4.3%	4.8%

Source: US Census Bureau 2013 as reported in Headwater Economics 2015

Based on 2013 data, top economic sectors in Texas were government, trade, transportation, and utilities, and professional and business services. It is worth noting that average annual wages were higher than average levels for professional services and lower for trade and government. The mining sector, which includes oil and gas, had a notably higher average annual wage (see **Table 2-70**, Employment and Wages by Industry—Texas (in 2013 Dollars)). In 2013 the three industry sectors with the largest number of jobs were government (1,973,911), retail trade (1,510,502), and health care, social

Table 2-70
Employment and Wages by Industry—Texas (in 2013 Dollars)

	Employment	Percent of Total Employ-ment	Average Annual Wages	Percent Above or Below Average
Total	11,036,121		$51,187	
Private	9,262,091	83.9	$52,146	1.9
Non-services-related	1,833,539	16.6	$71,405	39.5
Natural Resources and Mining	347,411	3.1	$105,413	105.9
Agriculture, forestry, fishing and hunting	57,864	0.5	$30,928	-39.6
Mining (including fossil fuels)	289,547	2.6	$120,299	135.0
Construction	612,682	5.6	$55,738	8.9
Manufacturing (including forest products)	873,446	7.9	$68,869	34.5
Services-related	7,428,552	67.3	$47,392	-7.4
Trade, transportation, and utilities	2,225,210	20.2	$46,849	-8.5
Information	200,822	1.8	$75,536	47.6
Financial activities	670,725	6.1	$69,768	36.3
Professional and business services	1,458,998	13.2	$63,510	24.1
Education and health services	1,423,098	12.9	$42,851	-16.3
Leisure and hospitality	1,138,859	10.3	$18,995	-62.9
Other services	306,725	2.8	$33,857	-33.9
Unclassified	4,116	0.0	$44,008	-14.0
Government	1,774,031	16.1	$46,183	-9.8
Federal government	197,038	1.8	$70,094	36.9
State government	348,938	3.2	$49,676	-3.0
Local government	1,228,055	11.1	$41,353	-19.2

Source: US Bureau of Labor Statistics 2013, as reported in Headwater Economics 2015

assistance (1,500,081). From 2001 to 2013, the three industry sectors that added the most new jobs were health care, social assistance (504,210), finance, insurance (352,378), and accommodation, food services (313,294).

In 2013, the three industry sectors with the largest personal income were government ($125,628.5 million), manufacturing ($82,393.7 million), and professional, scientific, and technical services ($81,184.9 million). From 2001 to 2013, the three industry sectors that added the most new personal income (in real terms) were mining, including fossil fuels ($49,458.3 million), government ($30,484.7 million), and health care, social assistance ($26,691.4 million; see **Table 2-71**, Personal Income by Industry—Texas (in Thousands of 2013 Dollars)).

Table 2-71
Personal Income by Industry—Texas (in Thousands of 2013 Dollars)

	2001	2013	Change 2001-2013
Labor earnings	683,283,413	888,747,947	205,464,534
Non-services-related	172,770,102	234,130,996	61,360,894
Farm	5,242,962	4,368,353	-874,609
Forestry, fishing, and related activities	1,462,602	1,567,377	104,775
Mining (including fossil fuels)	30,940,843	80,399,099	49,458,256
Construction	50,248,044	65,402,439	15,154,395
Manufacturing	84,875,652	82,393,728	-2,481,924
Services-related	415,369,460	528,988,434	113,618,974
Utilities	8,357,805	8,407,367	49,562
Wholesale trade	42,765,377	54,590,626	11,825,249
Retail trade	47,430,397	51,356,632	3,926,235
Transportation and warehousing	38,091,551	43,099,932	5,008,381
Information	24,960,690	19,610,290	-5,350,400
Finance and insurance	43,825,874	51,529,082	7,703,208
Real estate and rental and leasing	17,613,093	18,333,995	720,902
Professional and technical services	57,931,987	81,184,922	23,252,935
Management of companies and enterprises	3,466,252	11,411,928	7,945,676
Administrative and waste services	26,043,190	37,453,164	11,409,974
Educational services	5,029,704	8,288,228	3,258,524
Health care and social assistance	52,323,124	79,014,481	26,691,357
Arts, entertainment, and recreation	4,473,834	5,891,776	1,417,942
Accommodation and food services	19,207,868	25,535,001	6,327,133
Other services, except public administration	23,848,715	33,281,010	9,432,295
Government	95,143,850	125,628,517	30,484,667

Data Sources: US Department of Commerce 2014, Bureau of Economic Analysis, Regional Economic Accounts, Washington, DC., Table CA25N, as reported in Headwater Economics 2015

Labor is the main source of income for Texas, comprising 70.3 percent and 57.9 percent for metro and non-metro populations. Non-labor income is of increasing importance nationally and may provide locally important sources of income. This is particularly the case in non-metro areas, which have a higher dependence on non-labor income than the average for the three-state region and the nation. For more details regarding income source, refer to **Table 2-72**, Non-labor Share of Total Personal Income—Texas.

Public Finance

Components of public finance related to managing federal lands and mineral resources in the planning area are primarily federal mineral royalty payments and other taxes collected from the extraction and sale of mineral resources. These categories are explained in detail below.

Table 2-72
Non-labor Share of Total Personal Income—Texas

	Texas Metro	Texas Non-Metro	Three-State Region	United States
Total personal income (in thousands of 2013 Dollars)	1,044,931,932	115,146,936	1,449,807,346	14,151,427,000
Non-labor income	310,100,137	48,508,065	460,289,630	5,085,220,000
	29.7%	42.1%	31.7%	35.9%
Dividends, interest, and rent	168,779,428	21,661,089	243,340,439	2,670,719,000
	16.2%	18.8%	16.8%	18.9%
Transfer payments	141,320,709	26,846,976	216,949,191	2,414,501,000
	13.5%	23.3%	15.0%	17.1%
Labor earnings	734,831,795	66,638,871	989,517,716	9,066,207,000
	70.3%	57.9%	68.3%	64.1%

Source: US Department of Commerce, Bureau of Economic Analysis 2014, as reported in headwater Economics 2015
Note: Non-labor income and labor earnings may not add to total personal income because of adjustments made by the Bureau of Economic Analysis to account for contributions from Social Security, cross-county commuting, and other factors.

Taxes

The baseline gross production severance tax in Texas on is 7.5 percent of market value of gas produced and saved and 4.6 percent of market value of oil produced. There is a condensate production tax of 4.6 percent of market value (National Conference of State Legislatures 2012). Taxable barrels of oil are subject to a regulatory tax and fee assessment of 0.008125 cents, which consists of 3/16 of a cent ($.001875) per barrel plus 5/8 of a cent ($0.00625) per barrel, totaling 0.008125 cents (Texas Comptroller of Public Accounts 2013). There is an oilfield cleanup regulatory fee of 5/8 of $0.01/barrel and 1/15 of $0.01 per MCF of gas (National Conference of State Legislatures 2012). In 2013, approximately $4.6 billion was collected in severance taxes in Texas (US Census Bureau 2014).

In addition to severance taxes, ad valorem property taxes are levied at the county level. This tax is payable only when minerals are producing. The market value that county ad valorem tax is assessed is the value of the discounted cash flow estimated from future production, which is based on production profile, operating expenses, oil and gas prices, and the discount rate (MineralWise 2011). In Texas, oil and gas mineral interests are also assessed an annual ad valorem tax at the county level based on market value of an individual interest in a given lease. The market value of future lease reserves is based on the appraiser's projection as to how each lease will perform in the future using a state-mandated appraisal methodology. This methodology includes examining factors such as start rate and decline of production, price operating expense, and discount rate to determine the fair market value of the lease in the market place (Pritchard and Abbott, Inc. 2009). Oil and gas equipment are also subject to county ad valorem taxes.

Federal Mineral Royalties

Additional revenues from oil, gas, and coal extraction come from rents and royalties paid by producers on public lands. Lease holders competitively bid, pay an initial bonus, and subsequently pay rent for the right to develop the resources on public lands. These funds are collected and subsequently distributed to the federal and state government. This is known as lease revenue and, in the case of rents, as lease royalties. Lease revenues and royalties to the state and county provide an additional economic benefit of mineral resource extraction. Federal mineral lease revenues are collected by the Office of Natural Resources Revenue within the Department of the Interior. Approximately 50 percent of the revenues are transferred to the state treasurer for disbursement to counties of origin.

Royalties collected from onshore oil and gas development in Texas is provided in **Table 2-73**, Rents, Royalty, and Bonus Revenue Collected (Fiscal Year 2014). The Department of the Interior disburses 100 percent of the revenues received for energy and mineral production on Indian lands directly to the tribes and individual mineral owners through the BIA and the Office of Special Trustee for American Indians. Tribes then distribute the revenues among all members or apply them to health care, infrastructure, education, and other critical community development programs, such as senior centers, public safety projects, and youth initiatives. Many individual mineral owners use these revenues as a major source of income to support their families and communities.

Texas's share of onshore federal minerals royalty revenue disbursement for fiscal year 2014 was $ 10,730,021.. A portion of this amount is then disbursed to the counties of origin.

Table 2-73
Rents, Royalty, and Bonus Revenue Collected (Fiscal Year 2014)

	Texas
Gas (mcf) sales volume	48,092,356
Gas sales	$215,930,532
Gas royalties	**$25,416,705**
Oil (oil barrel) volume	489,691
Oil sales	$ $46,686,490
Oil royalties	**$ $5,465,102**
Coal (tons) volume	0
Coal sales	0
Coal royalties	0
Rents	**$493,651**
Bonuses	**$2,552,315**
Other Revenue	**$78,068**

Source: Office of Natural Resources Revenue 2015

Social and Economic Activity Related to BLM/BIA Management Actions

Energy and Minerals

Energy and mineral development represents a key economic sector for states in the planning area. In Kansas, however, this sector is of lesser economic importance than in Texas and Oklahoma. The percent of private employment in mining is notably higher than the national average in all three states, but particularly in Oklahoma and Texas. Employment in the mining sector is broken out by sector in **Table 2-74**, Employment in Mining, 2012. The BLM-administered and BIA-managed minerals represent only a fraction of total oil and gas production in all three states; over the past 20 years, federal and Indian wells accounted for just for 0.3 percent of the wells drilled in the three-state planning area. **Table 2-75**, Active and Inactive Oil and Gas Wells (2010-2014) , shows active and inactive oil and gas wells in the planning area by state as of December 2014. Based on preliminary estimates from production models, production for both oil and gas is anticipated to increase over the next 20 year time frame.

Table 2-74
Employment in Mining, 2012

	Oklahoma Metro	Oklahoma Non-Metro	Texas Metro	Texas Non-Metro	Kansas Metro	Kansas Non-Metro	United States
Total private employ-ment	909,682	372,334	8,304,745	732,385	792,031	327,076	115,938,468
Mining	2.80%	5.30%	1.60%	6.60%	0.30%	2.00%	0.60%
Oil and gas extraction	2.80%	5.00%	1.50%	6.20%	0.20%	1.80%	0.40%
Oil and gas extraction	1.40%	1.10%	0.40%	1.00%	0.10%	0.40%	0.10%
Drilling oil and gas wells	0.50%	1.00%	0.30%	1.30%	0.10%	0.50%	0.10%
Support for oil and gas opera-tions	0.90%	2.90%	0.80%	4.00%	0.10%	0.90%	0.20%
Coal mining	0.00%	0.10%	0.00%	0.20%	0.00%	0.00%	0.10%
Metal ore mining	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 2-74
Employment in Mining, 2012

	Oklahoma Metro	Oklahoma Non-Metro	Texas Metro	Texas Non-Metro	Kansas Metro	Kansas Non-Metro	United States
Non-metallic minerals mining	0.10%	0.30%	0.00%	0.20%	0.10%	0.10%	0.10%
Mining-related	0.50%	0.80%	0.70%	1.50%	0.10%	0.90%	0.20%
Oil and gas pipeline and related construc-tion	0.40%	0.50%	0.50%	1.10%	0.00%	0.30%	0.10%
Pipeline trans-portation	0.10%	0.20%	0.20%	0.40%	0.10%	0.60%	0.00%
Non-mining	96.70%	93.90%	97.70%	91.90%	99.60%	97.10%	99.20%

Source: Headwater Economics 2015

Table 2-75
Active and Inactive Oil and Gas Wells (2010-2014)

	Kansas Federal	Oklahoma Federal	Texas Federal	Oklahoma Indian Trust	Texas Indian Trust
Actual Active Wells	**394**	**387**	**490**	**1,760**	**9**
Actual Inactive Shut-in Wells	21	66	49	261	0
Allocated Active Wells	553	2,053	200	4,267	0
Allocated Inactive Shut-in Wells	36	203	61	571	2

Source: BLM 2014b . Data current as of December 2014

Current coal production in the planning area is limited to nine authorized federal leases and two active mines in Oklahoma, covering 16,700 acres. Coal development in the state is focused in Haskell, Latimer, and Le Flore Counties. In 2012 total production was 1,075,100 tons, and federal leases production was 487,000 tons.

The BLM has provided estimates for economic contributions from oil and gas in the three states in the planning area (see **Table 2-76**, BLM Economic Contributions (Fiscal Year 2013); note that contributions from BIA-managed mineral development are not included in this analysis). Contributions to state and local economies are jobs, income, taxes, and royalty revenue disbursement, as discussed in detail in state summary sections.

Table 2-76
BLM Economic Contributions (Fiscal Year 2013)

	Kansas (in Millions of Dollars)	Oklahoma (in Millions of Dollars)	Texas (in Millions of Dollars)
Oil and gas			
Direct	$40.6	$140.0	$249.0
Total	$67.6	$205.7	$388.8
Coal			
Direct	$0	$35.7	$0
Total	$0	$56.8	$0

Source: BLM 2014b

Additional mineral development includes mineral materials. BIA managed minerals included 1,917,300 tons of sand and $60,700 tons of gravel with total sales value of $433,500 from 2009-2014. Mineral materials may also have additional economic importance for local communities as the materials are important for road construction and other construction activities.

The BLM Helium reserve near Amarillo, Texas, houses the national helium reserves. As dictated by the Helium Stewardship Act of 2013, the helium program is being privatized, with all helium resources and dispose of all facilities, equipment, and other real and personal property, held by the US in the Federal Helium System. In order to achieve this agenda, helium in the reserve is being auctioned off. The first auction in June 2014 resulted in $14,972,568 in revenue which will contribute to nearly $185 million the program contributed to the U.S. Treasury in fiscal year 2014.

Potential for other mineral development is present in the planning area including but not limited to salt.

Agriculture

Agriculture and livestock grazing played a traditional role in the study area economy and continue to be important in some areas today, particularly in non-metro areas. There were 390,800 farms, totaling 164,556,000 acres, in the study area in 2012 (USDA, National Agricultural Statistical Service 2012). Agricultural data are presented in **Table 2-77**, Summary of Socioeconomic Study Area Agriculture (2012). Due to the limited BLM surface lands in the planning area, BLM management actions have had only a minor role

Table 2-77
Summary of Socioeconomic Study Area Agriculture (2012)

State	Number of Farms	Acres in Farms	Market Value (Crop Sales)	Market Value (Livestock Sales)
Kansas	61,773	46,137,295	6,983,993,000	11,476,571,000
Texas	248,809	130,153,438	7,366,993,000	18,008,588,000
Oklahoma	80,245	34,356,110	1,875,569,000	5,254,015,000

Source: USDA, National Agricultural Statistical Service 2012

in livestock grazing to this point. There are four allotments with a total of 138 animal unit months, in the planning area on BLM lands, all in Oklahoma. Economic contributions from grazing on BLM lands are negligible for the planning area as a whole because of the low level of grazing. Additional grazing occurs on BIA-administered lands in the area, and there is potential for grazing to increase on both public and BIA-managed lands in the future.

Recreation

Recreation plays an important role in some areas in the three-state region. Estimated economic impacts from area recreation are shown in **Table 2-78**, Summary of Planning Area Outdoor Recreation Economic Impacts. Due to the scattered nature of surface lands in the area and legal access issues, recreation has not historically been a major land use in the area on public lands; its use has not been closely tracked or managed. There is potential for management of recreation, including OHVs in the planning area.

Table 2-78
Summary of Planning Area Outdoor Recreation Economic Impacts

State	Consumer Spending for Outdoor Recreation	Direct Jobs Generated from Outdoor Recreation	Wages and Salaries Related to Outdoor Reaction	State and Local Tax Revenue from Outdoor Recreation
Kansas	$7.1 billion	85,000	$2 billion	$477,000,000
Texas	28.7 billion	277,000	8.9 billion	1.9 billion
Oklahoma	8.4 billion	95,000	2.5 billion	584,000,000

Source: Outdoor Industry Association 2014

Wild Horse and Burros

The Wild horse and burro program in the three state region consists of a regional holding facility at Paul's Valley Oklahoma, the adoption team based in Moore, Oklahoma and long and short term holding at private ranches through contracts with the BLM.

Of the 77.2 million appropriated for the national wild horse and burro program in fiscal year 2014, holding costs accounted for $43.235 million (64 percent). Contracts for

private ranchers to use their properties as holding facilities for 4 year periods are available for bid for properties meeting specific criteria. Payment in contracts is generally around $1.35 per head/per day and can provide an important source of income for some area ranchers.

Visitation opportunities are available at the BLM's regional holding facility in Paul's Valley, Oklahoma. A drive-up interpretation center situated near the pastures allows visitors to view the animals as they leisurely roam and graze on the land.

Through a joint partnership with the Kansas Department of Corrections, Kansas Correctional Industries, and the Mustang Heritage Foundation, horse are trained for adoption and sold for the minimum price of $125.

Social Conditions and Non-Market Values

Social Setting

Much of the planning area was historically based on a rural agricultural economy. In certain local communities and regional centers such as Dallas, Houston, and Oklahoma City, oil and gas development have an important economic role. Cycles in oil and gas prices and level of development and employment can result in swings in population. This may strain public services and introduce large influxes of people from outside the region, potentially straining the social setting in smaller communities and rural areas. Large population changes may alter perceptions of the friendliness, neighborliness, and trustworthiness of other residents. It also could change the perception of security, safety, and risk of victimization by crime and the satisfaction level of community life in general (Smith et al. 2001).

Changes to the social setting are more likely to occur when development and associated population change is introduced to communities that do not have a long history of natural resource development. With changes in technology, different portions of the planning area may be impacted by development.

Changes to the social setting can also impact the ability of different groups to adopt historic land uses. In addition, the planning area contains traditional cultural properties (TCPs), places that have cultural values and that have potential to be impacted by development. The National Park Service has defined TCPs as follows:

> A traditional cultural property can be defined generally as one [a property] that is eligible for the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community (*National Register Bulletin* 38).

TCPs typically include prehistoric and historic Native American archaeological sites but may also include culturally important sites with limited archaeological significance. In addition there are good reasons to expect that non-Native American communities may have TCPs in the planning area.

At community assessment meetings held in February 2015, representatives from local communities and interest groups provided input on important community social and economic values. Participants had various views on important factors for their communities for the next 20 years. Key issues of concern varied by state and among participants and are summarized below. Additional details are provided in the Socioeconomic Workshop Summary Report.

Kansas

- Maintaining a viable oil industry
- Growth and expansion of the local tax base
- Potential impacts of regulation on the tax base
- Slow but steady growth in population and finances
- Protection of water quality and quantity for both surface water and groundwater
- Air quality and nonattainment areas
- Work force, including level of training and turnover rates
- Impacts on private land, including changes to traditional land uses (e.g., family ranches are not being passed down to families that ranch, and wind turbines are popping up on old ranch lands)
- Disproportionate impacts on small communities as a result of lack of re-permitting for current activities
- Helium pipeline and the fate of the current easements for the helium pipeline.

Oklahoma

- Recreation, including trespass and enforcement issues and a need for more infrastructure to facilitate more and better recreation opportunities
- Jobs, including how to create a skilled labor force through minerals development
- Water quality and quantity issues, including water use for mineral development and renewable energy
- Health issues, including poverty and food scarcity
- Continued leasing and permitting of mineral development, and streamlining the process for developers
- Education of workforce and turnover; Oklahoma needs trained people to improve socioeconomic conditions; turnover is an issue in particular business sectors, such as the packing plant and casinos
- Quality of life balance
- Potential for economic diversity

- Tribal casinos, particularly for some Texas/Oklahoma border counties such as Cotton County; potential impacts on local economy
- Slow steady growth, while meeting the needs of citizens was cited as key for some communities

Texas

- Sustainable economy and economic diversification, including smaller companies and opportunities for entrepreneur development
- Management of motorized recreation and creation of rules for users; provide recreation on public lands for people from metro areas to use OHVs for recreation; legal and safe places for recreationists to go (i.e., places that are managed and maintained and that have rules and provide a safe environment); in particular for the Red River area, impacts of recreation, including trespass issues and burdens on public health and safety resources
- Water quality and quantity issues, including groundwater and water use, water availability, water disposal, brine spills from salt water flow lines, and sediment runoff
- Special status species, including impacts from recreation (i.e., all-terrain vehicle [ATV] use affecting interior least terns)
- Carbon sequestration
- Impacts of BLM management actions on other agencies (i.e., impacts on the Army's mission from development)
- Population growth and increase in housing costs
- Equestrian trails are a major recreation use in some areas, such as Wise County
- Balance of less regulation-government assistance vs. government management
- Drilling in north Texas runs the gamut from being done in very rural areas to highly urbanized areas, such as Fort Worth, so the impacts will vary considerably across the region
- Concerns about land disputes in the Red River area

Many of the quality of life components brought forward in meetings can be discussed in terms of non-market values. Non-market values are the benefits derived by society from the uses or experiences that are not dispensed through markets and do not require payment. Non-market values can be broken down into two categories, use and non-use. The use value of a non-market good is the value to society from the direct use of the asset through recreation, such as hiking, bird watching, and OHV use. The use of non-market goods often requires consumption of associated market goods, such as lodging and gas. Non-use, or passive use, values of a non-market good reflect the value of an asset beyond its current use, due to willingness to preserve a resource for potential future use and for the benefit of preserving an asset for future generations to enjoy. This can include values

such as scenic views and preservation of plant and animal habitat that are not currently providing economic benefits.

Affected Groups and Individuals

The socioeconomic study area is a diverse setting with portions having suburban or urban character and experiencing rapid development in the past decades. It includes other areas that retain rural character and traditional land uses, including ranching and mineral development.

Groups and individuals who have similar values but may not represent a physical community or region, but rather a specific group for whom management of public or BIA-managed land or minerals is of particular interest. These groups are discussed below.

Oil and Gas Leaseholders—Development of mineral resources is of primary importance in the planning area economy. Details of the contributions of these resources are discussed above, under *Regional Demographics and Economic Context*. Leaseholders are particularly interested in keeping restrictions on leasing minimal in order to keep the costs and delays of production low.

Local Residents and Private Landowners—Landowners next to public lands and BIA-managed lands are an important group to consider in the planning process. All landowner groups are concerned about how management decisions may impact the quality or quantity of local natural resources. Some common concerns are quality and quantity of water and the protection of adjacent lands from wildland fire. Additional planning issues of importance are impacts of development on adjacent lands, rural lifestyle preservation, and public land recreation opportunities.

Ranchers—Ranching and agriculture are a part of the planning area's history, culture, and economy. Due to the limited BLM-administered surface lands, ranching has not traditionally been impacted by BLM land management decisions. Livestock graze on BIA-managed lands to a greater extent and may represent a locally important source of income. Ranchers face such challenges as fluctuating livestock prices, increasing equipment and operating costs, fluctuating water availability, and changing federal regulations. Additional income sources are often necessary to continue ranching, and ranchers or their family members may also work in other sectors of the economy.

Recreational Users—Recreational use of public lands in the planning area has been limited in the past due to the scatted nature of parcels and the lack of public access. One exception is within the Red River area bordering Oklahoma and Texas. Recreational users in the area have the potential to be impacted by BLM management decisions.

Potential Renewable Energy Leaseholders—Renewable energy, particularly wind energy, is of increasing importance in certain portions of the planning area, notably Kansas. While wind energy is not a traditional land use, management decisions on BLM-

administered or BIA-managed lands may impact the ability of this industry to grow in those lands in the planning area.

Individuals and Groups Who Prioritize Resource Protection—Various individuals and groups at the local, regional, and national levels are interested in how the BLM manages public lands. Many of their concerns are in regard to oil and gas development and impacts on water and air quality and visual quality. They value public lands for open space, wildlife, recreation, and scenic qualities, among other aspects.

Individuals and Groups Who Prioritize Resource Use—Due to the long history of fossil fuel development in the planning area, the local, state, and regional economy is tied to fossil fuels development. Interested parties include local, regional, and national energy development companies, as well as local retailers who directly support construction, drilling, and operations for the industry. In addition, local retailers that offer lodging, food, and other services to oil and gas employees have an interest in management decisions impacting the level of permitted development. Fossil fuel development on public lands and minerals and BIA-managed minerals represents only a small fraction of total fossil fuels development but may have local or regional impacts.

Native Americans—Land held in trust for Native Americans and land held by individual Indian allottees has an important role in the planning area. Native Americans have a unique relationship with lands based on traditional uses and cultural values. The value they place on public lands includes extractive resource use and also may have religious, spiritual, and traditional aspects, all of which may be affected by BLM or BIA resource management decisions. These values are defined solely by the concerned tribes and are integral to tribal history, sense of place, and community identity. Development of oil and gas resources can impact Native Americans by affecting development potential on all landownership in the area (due to changes in infrastructure and supply), by affecting employment opportunities, and by potentially impacting traditional important or sacred places and land uses.

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2.5.4 Environmental Justice

Environmental justice refers to 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. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences of industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

Guidance on environmental justice terminology developed by the President's Council on Environmental Quality (1997) is discussed below.

- **Low-income population—**A low-income population is determined based on annual statistical poverty thresholds developed by the US Census Bureau. In 2013, the poverty level was based on total income of $11,888 for an individual and $23,624 for a family of four (US Census Bureau 2013). A low-income community may include either a group of individuals living in geographic proximity to one another or dispersed individuals, such as migrant workers or Native Americans.
- **Minority—**Minorities are individuals who are members of the following population groups: American Indian, Alaskan Native, Asian, Pacific Islander, Black, or Hispanic.
- **Minority population area—**A minority population area is so defined if either the aggregate population of all minority groups combined exceeds 50 percent of the total population in the area or if the percentage of the population in the area comprising all minority groups is meaningfully greater than the minority population percentage in the broader region. Like a low-income population, a minority population may include either individuals living in geographic proximity to one another or those who are dispersed.
- **Comparison population—**For the purpose of identifying a minority population or a low-income population concentration, state populations are compared to the US population. For counties, populations are compared to the respective state population average.

Low-Income Populations

Summary state-level poverty data is displayed in **Table 2-79**, Study Area County Population in Poverty in 2013, **Table 2-80**, Percent of Individuals below the Poverty Level in Counties of Oklahoma, **Table 2-81**, Percent of Individuals below the Poverty Level in Counties of Texas, and **Table 2-82**, Percent of Individuals below the Poverty Level in Counties of Kansas. The percent of individuals in poverty was lowest for the Kansas non-metro area population (9.5 percent) and highest for the Texas metro population (18.3 percent). In general, metro areas in all three states had higher percentage of people in poverty than non-metro populations.

Table 2-79
Study Area County Population in Poverty in 2013

	Oklahoma Metro	Oklahoma Non-Metro	Texas Metro	Texas Non-Metro	Kansas Metro	Kansas Non-Metro	United States
Percent of individuals in poverty	18	14.6	18.3	13.9	15.2	9.5	15.4
Percent of families in poverty	13.6	10.8	14.4	10.1	10.4	6.5	11.3

Source: US Census Bureau 2013 as reported in Headwater Economics 2015.

Table 2-80, **Table 2-81**, and **Table 2-82** show the percent of individuals below the poverty level for each county in Oklahoma, Kansas, and Texas, respectively. Counties with levels above the state average are shaded. These would be areas of focus for ensuring that residents of these counties do not have disproportionately negative economic and social impacts from decisions in the joint EIS/BLM RMP and BIA Integrated RMP. **Figure 2-28**, Percent of Individuals below the Poverty Level, shows a map of each states' counties and comparative poverty levels.

The average percent of individuals below the poverty level in Oklahoma is 16.9 percent (US Census Bureau 2010b). **Table 2-80** shows the percent of individuals below the poverty level for each county in Oklahoma. 35 counties in Oklahoma have a percentage of individuals living below the poverty line that is higher than the state average.

Table 2-80
Percent of Individuals below the Poverty Level in Counties of Oklahoma

County	Percent of Individuals Below the Poverty Level
Kay	18.3
Okfuskee	23.7
Wagoner	12.1
Tulsa	15.1
Cotton	13.8
Harper	11.6
Canadian	7.8
Coal	23.5
Oklahoma	17.3
Jackson	18.9
Washington	13.3
Blaine	15.6
Delaware	20.7

Table 2-80
Percent of Individuals below the Poverty Level in Counties of Oklahoma

County	Percent of Individuals Below the Poverty Level
Grady	14.3
Cimarron	23.7
Le Flore	20.9
Comanche	16.9
Custer	17.7
Cleveland	12.1
Okmulgee	19.4
Adair	24.8
Caddo	20.9
Garvin	15.0
Choctaw	25.5
Pottawatomie	17.6
McCurtain	27.6
Logan	14.9
Beaver	13.2
Beckham	15.8
McIntosh	22.2
Ottawa	18.8
Tillman	21.7
Cherokee	25.8
Atoka	22.6
Creek	14.2
Payne	23.2
Pittsburg	17.4
Noble	13.7
Murray	15.7
Nowata	16.3
Roger Mills	14.1
Washita	15.4
Texas	14.6
Muskogee	21.1
Pawnee	17.7
Grant	11.6
Kiowa	21.2
Sequoyah	19.0
Rogers	9.9
Carter	16.2
Mayes	17.9
Harmon	30.6
Seminole	22.4

Table 2-80
Percent of Individuals below the Poverty Level in Counties of Oklahoma

County	Percent of Individuals Below the Poverty Level
Hughes	23.3
Greer	11.0
Woods	15.8
Pushmataha	27.2
Love	16.0
Osage	13.6
Dewey	12.9
Major	10.4
Bryan	20.0
Johnston	22.6
Craig	15.0
Woodward	12.4
Latimer	14.2
Garfield	16.3
Stephens	13.0
Marshall	14.3
Pontotoc	17.5
Alfalfa	11.2
Kingfisher	10.4
Jefferson	18.4
McClain	11.6
Ellis	15.3
Haskell	12.7
Lincoln	14.8

Source: US Census Bureau American Community Survey GIS 2015, US Census Bureau 2010b

The average percent of individuals below the poverty level in Texas is 17.9 percent (US Census Bureau 2010b). **Table 2-81** shows the percent of individuals below the poverty level for each county in Texas. 102 counties in Texas have a percentage of individuals living below the poverty line that is higher than the state average.

Table 2-81
Percent of Individuals below the Poverty Level in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Andrews	17.0
Crane	19.3
Liberty	16.2

Table 2-81
Percent of Individuals below the Poverty Level in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Yoakum	22.4
Bee	20.6
Foard	21.7
Glasscock	5.1
Gregg	16.6
Orange	13.6
Sabine	21.8
Crosby	27.4
Angelina	18.4
Kaufman	11.8
Camp	18.6
Haskell	17.0
Matagorda	21.2
Hamilton	12.5
Aransas	17.6
Uvalde	27.7
Lynn	18.5
Eastland	19.5
DeWitt	14.7
Presidio	22.9
Brazos	29.7
Borden	0.0
Fisher	13.6
Mason	13.2
Hall	25.9
Castro	24.6
Bell	14.8
Reeves	28.4
Hale	20.0
Rusk	13.5
Bexar	17.1
Stephens	14.9
Lavaca	10.1
Archer	13.1
Brewster	13.9
Briscoe	22.9
San Patricio	17.3
Childress	12.5
Dimmit	33.0
Dallam	12.3

Table 2-81
Percent of Individuals below the Poverty Level in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Kleberg	24.8
Bastrop	14.2
Blanco	8.1
Grimes	15.6
Jones	13.0
Carson	6.5
Bowie	18.4
Rains	11.8
Webb	30.6
Gillespie	9.1
Brooks	39.6
Coke	13.6
Edwards	20.8
Marion	22.6
Runnels	20.0
Zapata	36.7
Clay	10.4
Gaines	19.0
Llano	13.1
Jack	16.6
Trinity	16.6
Hutchinson	14.9
Lee	12.5
Floyd	21.8
Freestone	14.0
Coryell	14.1
Howard	19.7
Grayson	14.4
Refugio	16.8
Morris	17.4
Callahan	12.7
Schleicher	22.4
Nacogdoches	24.1
Terrell	14.0
Dallas	18.3
Karnes	22.7
Limestone	19.1
Wood	14.8
Colorado	15.7
Collingsworth	26.8

Table 2-81
Percent of Individuals below the Poverty Level in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Hunt	18.3
Hood	11.3
Cochran	16.2
Harrison	14.5
Armstrong	11.1
Galveston	13.1
Franklin	13.4
Pecos	17.0
Kinney	27.9
Newton	17.4
Reagan	10.8
San Augustine	27.2
Gray	14.6
Terry	16.7
Parmer	19.7
Winkler	15.6
Burnet	14.0
Hardeman	22.2
Fayette	12.8
Montgomery	11.5
La Salle	24.3
Dickens	20.5
Shackelford	13.0
Nueces	18.8
Wharton	17.5
Young	16.6
Van Zandt	15.9
Hudspeth	44.7
McLennan	21.7
Lampasas	15.3
Gonzales	22.3
Burleson	13.3
McCulloch	20.8
Mitchell	13.3
Zavala	39.0
Kent	7.0
Martin	11.5
Waller	18.3
Real	25.1
Navarro	20.0

Table 2-81
Percent of Individuals below the Poverty Level in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Tarrant	14.2
Sutton	11.7
Erath	19.5
Hidalgo	35.3
Ector	16.2
Houston	20.7
McMullen	15.2
Donley	12.5
Hopkins	18.2
Comanche	23.4
Potter	22.7
Hartley	8.0
Hemphill	16.5
Lubbock	19.1
Washington	14.3
Midland	11.5
Panola	12.8
Madison	22.7
Williamson	6.3
Crockett	18.0
Cameron	34.9
Ellis	11.4
Maverick	31.5
Throckmorton	13.3
Victoria	17.1
Sterling	14.7
Falls	23.6
Wise	10.0
Swisher	17.2
Menard	19.3
Titus	18.3
Jeff Davis	9.7
El Paso	25.0
San Saba	22.0
Wichita	13.9
Upton	13.7
Jasper	17.5
Dawson	20.6
Travis	16.6
Hardin	11.5

Table 2-81
Percent of Individuals below the Poverty Level in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Ward	14.2
Garza	22.5
Montague	13.1
Moore	15.1
Henderson	16.0
Johnson	10.8
Hill	16.3
San Jacinto	17.7
Delta	20.2
Caldwell	20.7
Fort Bend	8.3
Lipscomb	14.7
Hansford	13.3
Loving	16.1
Chambers	8.3
Guadalupe	9.7
Kerr	14.1
Collin	7.3
Hockley	16.0
Wilson	10.1
Nolan	18.9
Stonewall	18.9
Live Oak	14.6
Denton	7.9
Bosque	15.2
Baylor	15.8
Culberson	32.3
Mills	16.8
Lamb	21.1
Ochiltree	21.6
Cass	18.9
Upshur	13.0
Bandera	17.4
Jim Wells	22.9
Austin	9.3
Jefferson	18.9
Fannin	15.3
Jim Hogg	9.9
Roberts	10.2
Goliad	13.8

Table 2-81
Percent of Individuals below the Poverty Level in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Concho	21.7
Frio	22.1
Palo Pinto	15.8
Robertson	22.1
Knox	18.9
Tom Green	15.9
Cottle	13.3
Atascosa	17.7
Irion	3.4
Lamar	17.0
Coleman	30.8
Rockwall	5.5
Wilbarger	20.6
Calhoun	16.7
Leon	17.5
Bailey	19.2
Kimble	17.4
Polk	19.9
Val Verde	23.0
Duval	22.8
Starr	36.3
Wheeler	12.3
Oldham	20.0
Comal	9.5
Medina	16.6
King	5.5
Somervell	9.0
Tyler	19.2
Jackson	12.5
Milam	17.0
Red River	16.8
Motley	21.6
Kendall	8.9
Hays	16.4
Deaf Smith	16.8
Shelby	24.5
Harris	17.3
Kenedy	19.1
Cooke	13.6
Scurry	18.5

Table 2-81
Percent of Individuals below the Poverty Level in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Randall	9.4
Sherman	14.0
Taylor	16.5
Willacy	42.3
Parker	10.9
Brazoria	10.7
Cherokee	22.3
Anderson	18.8
Brown	17.1
Walker	23.4
Smith	15.5

Source: US Census Bureau American Community Survey GIS 2015, US Census Bureau 2010b

The average percent of individuals below the poverty level in Kansas is 13.6 percent (US Census Bureau 2010b). **Table 2-82** shows the percent of individuals below the poverty level for each county in Kansas. 35 counties in Kansas have a percentage of individuals living below the poverty line that is higher than the state average.

Table 2-82
Percent of Individuals below the Poverty Level in Counties of Kansas

County	Percent of Individuals Below the Poverty Level
Elk	19.3
Edwards	15.4
Harper	13.9
Brown	20.2
Sheridan	13.4
Clark	12.2
Pottawatomie	6.8
Lyon	21.2
Phillips	12.7
Cowley	16.8
Grant	13.2
Marion	10.2
Greenwood	18.1
Dickinson	10.3
Gove	9.4

Table 2-82
Percent of Individuals below the Poverty Level in Counties of Kansas

County	Percent of Individuals Below the Poverty Level
Kingman	11.4
Shawnee	14.7
Seward	16.2
Bourbon	15.9
Rice	14.7
Greeley	6.2
Thomas	7.8
Washington	12.3
Jefferson	6.3
Osage	10.8
Crawford	19.1
Anderson	12.8
Pawnee	6.5
Linn	10.9
Lane	15.8
Saline	13.9
Doniphan	12.5
Wilson	13.3
Comanche	6.3
Republic	12.4
Scott	7.2
Leavenworth	8.8
Gray	7.6
Mitchell	8.3
Montgomery	15.3
Cheyenne	10.3
Wyandotte	21.9
Ness	7.4
Franklin	10.2
Barton	12.7
McPherson	8.6
Chautauqua	14.7
Johnson	5.9
Stevens	12.8
Miami	8.4
Riley	23.6
Morris	7.8
Sherman	19.9
Sedgwick	14.0

Table 2-82
Percent of Individuals below the Poverty Level in Counties of Kansas

County	Percent of Individuals Below the Poverty Level
Graham	10.5
Hodgeman	5.2
Ottawa	9.9
Stanton	4.6
Cherokee	15.4
Osborne	14.2
Wabaunsee	6.7
Marshall	11.8
Atchison	13.0
Stafford	11.2
Douglas	19.0
Kiowa	13.2
Lincoln	11.5
Chase	13.3
Woodson	18.6
Nemaha	11.2
Geary	12.5
Haskell	11.8
Smith	13.8
Russell	13.9
Butler	7.6
Morton	5.3
Meade	10.0
Logan	11.3
Decatur	9.6
Ford	15.5
Labette	16.1
Ellis	15.4
Jackson	9.5
Neosho	16.8
Pratt	7.6
Rooks	15.5
Jewell	10.6
Finney	15.1
Trego	9.4
Sumner	12.6
Rush	13.5
Hamilton	8.8
Reno	13.0

Table 2-82
Percent of Individuals below the Poverty Level in Counties of Kansas

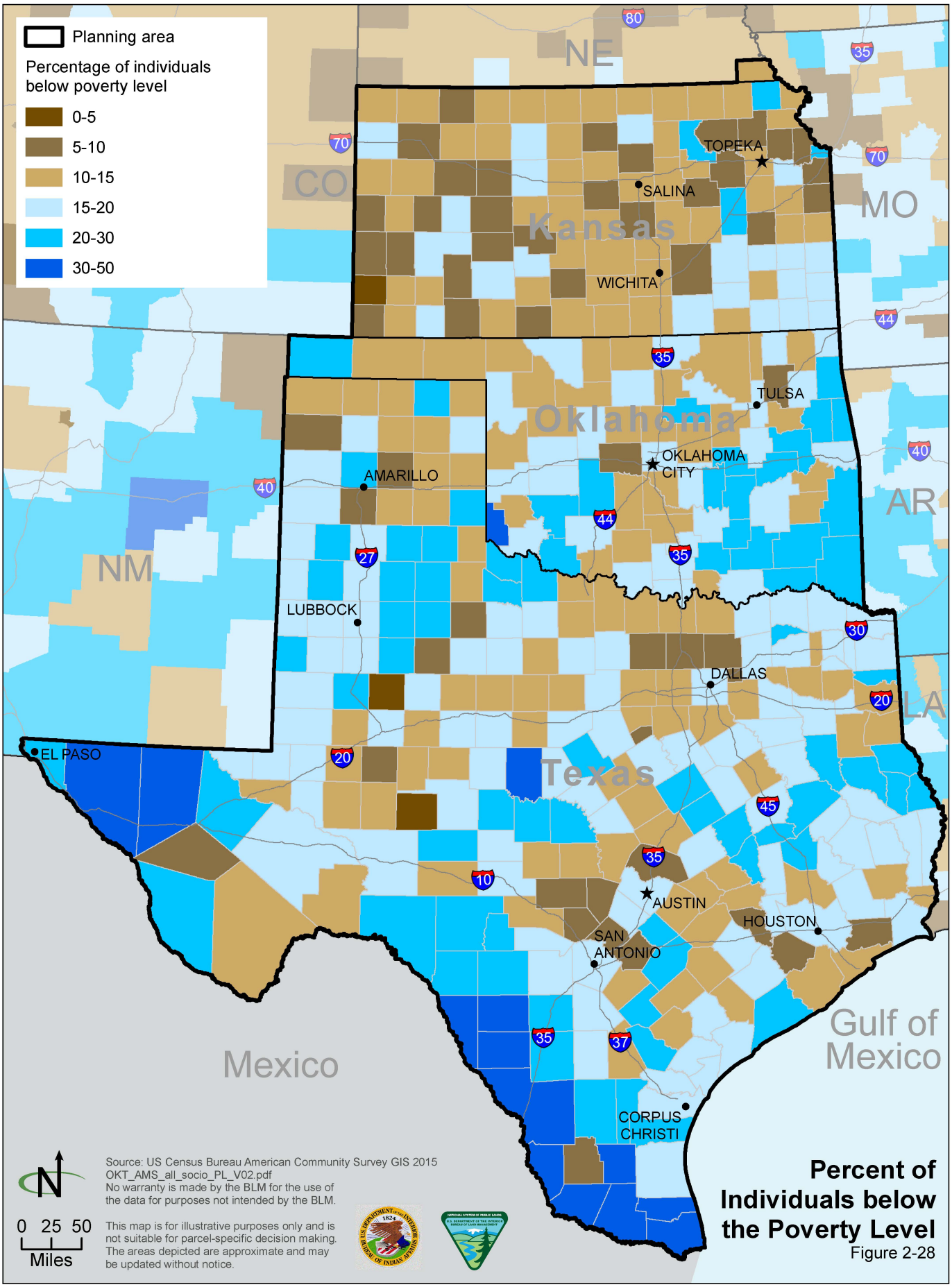
County	Percent of Individuals Below the Poverty Level
Norton	12.7
Barber	11.0
Allen	15.4
Wichita	13.0
Cloud	16.2
Clay	11.6
Rawlins	13.5
Kearny	9.5
Harvey	11.1
Wallace	14.1
Coffey	9.9
Ellsworth	6.2

Source: US Census Bureau American Community Survey GIS 2015, US Census Bureau 2010b

Minority Populations

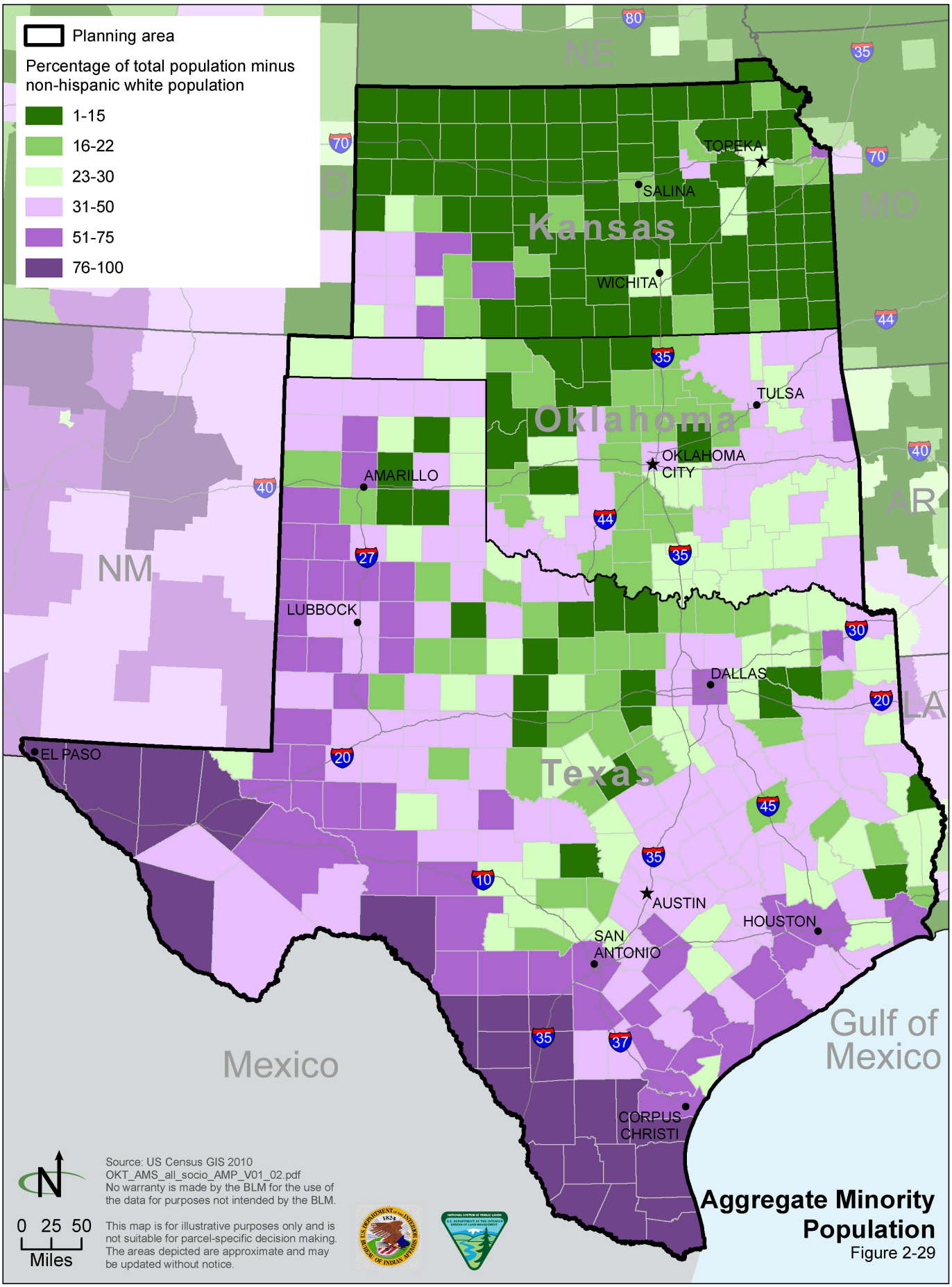
Based on 2013 data, the population of Kansas had minority populations below that of the national average; Oklahoma populations were similar to the national average, while Texas had minority populations above that of the national average (see **Table 2-87**). Native Americans are a significant minority in Oklahoma. **Table 2-34** lists tribes within the planning area. The largest minority groups outside of tribal groups were Hispanics/Latinos, particularly of note in Texas.

Table 2-83, Percent of Aggregate Minority Population in Counties of Oklahoma, **Table 2-**, Percent of Aggregate Minority Population in Counties of Kansas, and **Table 2-86**, Percent of Aggregate Minority Population in Counties of Texas**,** show the aggregate minority population percentage, or the percentage of the population identifying as one or more racial or ethnic minorities (non-white) for each county in Oklahoma, Kansas, and Texas, respectively. This is found by taking the total population minus the non-Hispanic white population. Counties with levels above the state average are shaded. These would be areas of focus for ensuring that residents of these counties do not have disproportionately negative economic and social impacts from decisions in the joint EIS/BLM RMP and BIA Integrated RMP. **Figure 2-29**, Aggregate Minority Population, shows a map of each states' counties and comparative aggregate minority population percentages.



Percent of Individuals below the Poverty Level

Figure 2-28



Source: US Census GIS 2010
OKT_AMS_all_socio_AMP_V01_02.pdf
No warranty is made by the BLM for the use of the data for purposes not intended by the BLM.

This map is for illustrative purposes only and is not suitable for parcel-specific decision making. The areas depicted are approximate and may be updated without notice.

Aggregate Minority Population

Figure 2-29

The average percent of aggregate minority population in Oklahoma is 31.3 percent (US Census Bureau 2010a). **Table 2-83** shows the percent of aggregate minority population for each county in Oklahoma. 25 counties in Oklahoma have a percentage of aggregate minority population that is higher than the state average. As previously stated, people of Native American descent make up a significant minority group in Oklahoma. In 2010 data, 12.9 percent of people identified themselves as Native American in the state overall. In total, 37 counties (48 percent) had a percentage of Native American population that is higher than the state average (see **Table 2-84**).

Table 2-83
Percent of Aggregate Minority Population in Counties of Oklahoma

County	Percent of Aggregate Minority Population
Adair County	57.9
Alfalfa County	12.7
Atoka County	27.2
Beaver County	23.5
Beckham County	21.1
Blaine County	37.1
Bryan County	26.2
Caddo County	40.5
Canadian County	20.3
Carter County	27.5
Cherokee County	49.8
Choctaw County	36.3
Cimarron County	23.5
Cleveland County	24.3
Coal County	26.9
Comanche County	41.1
Cotton County	20.8
Craig County	34.4
Creek County	21.6
Custer County	26.6
Delaware County	34.1
Dewey County	14.0
Ellis County	9.4
Garfield County	19.5
Garvin County	21.0
Grady County	16.4
Grant County	8.5
Greer County	21.6
Harmon County	37.1
Harper County	19.8

Table 2-83
Percent of Aggregate Minority Population in Counties of Oklahoma

County	Percent of Aggregate Minority Population
Haskell County	26.7
Hughes County	33.2
Jackson County	34.2
Jefferson County	19.4
Johnston County	28.3
Kay County	22.4
Kingfisher County	20.0
Kiowa County	22.7
Latimer County	30.8
Le Flore County	26.9
Lincoln County	15.4
Logan County	21.5
Love County	23.7
Major County	11.9
Marshall County	30.2
Mayes County	33.1
McClain County	19.0
McCurtain County	34.2
McIntosh County	30.6
Murray County	24.1
Muskogee County	41.7
Noble County	16.7
Nowata County	32.2
Okfuskee County	36.8
Oklahoma County	40.7
Okmulgee County	35.6
Osage County	35.3
Ottawa County	32.6
Pawnee County	20.3
Payne County	20.3
Pittsburg County	28.1
Pontotoc County	30.7
Pottawatomie County	25.6
Pushmataha County	26.1
Roger Mills County	12.7
Rogers County	26.3
Seminole County	32.8
Sequoyah County	34.8
Stephens County	17.5

Table 2-83
Percent of Aggregate Minority Population in Counties of Oklahoma

County	Percent of Aggregate Minority Population
Texas County	47.2
Tillman County	35.4
Tulsa County	34.8
Wagoner County	26.6
Washington County	24.1
Washita County	14.1
Woods County	13.4
Woodward County	17.2

Source: US Census Bureau GIS 2010, US Census Bureau 2010a

Table 2-84
Percent of Native American Population in Oklahoma

County	Percent of Population Native American or Alaskan Native (Including People of One or More Races)
Adair County	53.4
Alfalfa County	4.4
Atoka County	20.3
Beaver County	2.4
Beckham County	4.3
Blaine County	10.5
Bryan County	19.3
Caddo County	29.7
Canadian County	7.5
Carter County	14.1
Cherokee County	42.6
Choctaw County	21.8
Cimarron County	1.7
Cleveland County	8.2
Coal County	24.1
Comanche County	8.5
Cotton County	13.5
Craig County	28.2
Creek County	15.8
Custer County	8.8
Delaware County	29.8
Dewey County	8.2

Table 2-84
Percent of Native American Population in Oklahoma

County	Percent of Population Native American or Alaskan Native (Including People of One or More Races)
Ellis County	2.4
Garfield County	4.1
Garvin County	11.6
Grady County	8.8
Grant County	3.6
Greer County	4.7
Harmon County	3
Harper County	1.8
Haskell County	22.4
Hughes County	24.2
Jackson County	3.7
Jefferson County	9.9
Johnston County	22.5
Kay County	13.6
Kingfisher County	5.2
Kiowa County	9.1
Latimer County	27.8
Le Flore County	17.3
Lincoln County	10.6
Logan County	6
Love County	9.7
Major County	10.8
Marshall County	20.4
Mayes County	24.9
McClain County	3.4
McCurtain County	14.5
McIntosh County	29.9
Murray County	17.8
Muskogee County	24.6
Noble County	11.7
Nowata County	27.6
Okfuskee County	25.4
Oklahoma County	6.4
Okmulgee County	23.2
Osage County	20.9
Ottawa County	25.6
Pawnee County	16.9
Payne County	8.3

Table 2-84
Percent of Native American Population in Oklahoma

County	Percent of Population Native American or Alaskan Native (Including People of One or More Races)
Pittsburg County	20.4
Pontotoc County	23.7
Pottawatomie County	18
Pushmataha County	22.8
Roger Mills County	7.6
Rogers County	20.4
Seminole County	24.2
Sequoyah County	29.3
Stephens County	8.6
Texas County	2.3
Tillman County	5.4
Tulsa County	10.1
Wagoner County	16.2
Washington County	15.2
Washita County	5.2
Woods County	4.2
Woodward County	4.4

Source: US Census Bureau 2010a

The average percent of aggregate minority population in Kansas is 21.8 percent (US Census Bureau 2010a). **Table 2-85** shows the percent of aggregate minority population for each county in Kansas. 16 counties in Kansas have a percentage of aggregate minority population that is higher than the state average.

Table 2-85
Percent of Aggregate Minority Population in Counties of Kansas

County	Percent of Aggregate Minority Population
Allen County	8.1
Anderson County	4.0
Atchison County	10.5
Barber County	5.2
Barton County	16.6
Bourbon County	8.0
Brown County	16.0
Butler County	9.0

Table 2-85
Percent of Aggregate Minority Population in Counties of Kansas

County	Percent of Aggregate Minority Population
Chase County	6.9
Chautauqua County	10.3
Cherokee County	10.8
Cheyenne County	6.7
Clark County	11.2
Clay County	4.1
Cloud County	5.2
Coffey County	4.9
Comanche County	5.7
Cowley County	17.8
Crawford County	11.0
Decatur County	3.1
Dickinson County	7.3
Doniphan County	8.3
Douglas County	18.3
Edwards County	19.5
Elk County	6.5
Ellis County	8.3
Ellsworth County	11.8
Finney County	53.6
Ford County	56.0
Franklin County	8.1
Geary County	40.1
Gove County	2.9
Graham County	9.2
Grant County	45.8
Gray County	15.9
Greeley County	15.3
Greenwood County	6.5
Hamilton County	33.0
Harper County	7.5
Harvey County	15.4
Haskell County	28.7
Hodgeman County	8.8
Jackson County	14.1
Jefferson County	5.0
Jewell County	3.8
Johnson County	18.0
Kearny County	31.5

Table 2-85
Percent of Aggregate Minority Population in Counties of Kansas

County	Percent of Aggregate Minority Population
Kingman County	4.7
Kiowa County	6.9
Labette County	14.5
Lane County	7.0
Leavenworth County	19.7
Lincoln County	3.9
Linn County	4.9
Logan County	5.3
Lyon County	26.7
Marion County	5.3
Marshall County	3.9
McPherson County	6.9
Meade County	17.8
Miami County	6.3
Mitchell County	2.8
Montgomery County	19.1
Morris County	5.9
Morton County	23.7
Nemaha County	3.3
Neosho County	8.3
Ness County	9.0
Norton County	8.9
Osage County	4.5
Osborne County	3.0
Ottawa County	4.3
Pawnee County	13.7
Phillips County	4.4
Pottawatomie County	8.9
Pratt County	8.7
Rawlins County	4.7
Reno County	13.9
Republic County	2.6
Rice County	13.9
Riley County	20.5
Rooks County	3.9
Rush County	4.3
Russell County	4.7
Saline County	17.9
Scott County	17.0

Table 2-85
Percent of Aggregate Minority Population in Counties of Kansas

County	Percent of Aggregate Minority Population
Sedgwick County	30.1
Seward County	64.0
Shawnee County	24.4
Sheridan County	4.7
Sherman County	13.2
Smith County	3.7
Stafford County	14.2
Stanton County	39.6
Stevens County	34.6
Sumner County	8.7
Thomas County	7.1
Trego County	3.3
Wabaunsee County	5.5
Wallace County	8.8
Washington County	4.2
Wichita County	26.3
Wilson County	5.8
Woodson County	5.1
Wyandotte County	56.7

Source: US Census Bureau GIS 2010, US Census Bureau 2010a

The average percent of aggregate minority population in Texas is 54.7 percent (US Census Bureau 2010a). **Table 2-86** shows the percent of aggregate minority population for each county in Texas. 59 counties in Texas have a percentage of aggregate minority population that is higher than the state average.

Table 2-86
Percent of Aggregate Minority Population in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Anderson County	38.8
Andrews County	52.1
Angelina County	36.7
Aransas County	29.4
Archer County	9.6
Armstrong County	9.3
Atascosa County	63.7

Table 2-86
Percent of Aggregate Minority Population in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Austin County	34.3
Bailey County	61.7
Bandera County	19.1
Bastrop County	42.8
Baylor County	15.5
Bee County	65.6
Bell County	49.3
Bexar County	69.7
Blanco County	20.6
Borden County	15.9
Bosque County	19.3
Bowie County	33.7
Brazoria County	46.8
Brazos County	40.9
Brewster County	45.7
Briscoe County	29.0
Brooks County	92.1
Brown County	25.3
Burleson County	31.9
Burnet County	23.9
Caldwell County	55.8
Calhoun County	54.2
Callahan County	10.9
Cameron County	89.3
Camp County	41.1
Carson County	11.5
Cass County	22.8
Castro County	62.7
Chambers County	29.4
Cherokee County	37.3
Childress County	38.5
Clay County	7.5
Cochran County	57.5
Coke County	20.2
Coleman County	19.9
Collin County	36.9
Collingsworth County	36.6
Colorado County	40.1
Comal County	28.7

Table 2-86
Percent of Aggregate Minority Population in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Comanche County	27.4
Concho County	55.7
Cooke County	21.3
Coryell County	38.0
Cottle County	30.7
Crane County	59.7
Crockett County	64.7
Crosby County	56.7
Culberson County	79.0
Dallam County	44.4
Dallas County	66.9
Dawson County	60.9
Deaf Smith County	69.3
Delta County	16.8
Denton County	35.6
DeWitt County	42.9
Dickens County	34.9
Dimmit County	87.8
Donley County	14.7
Duval County	89.8
Eastland County	17.8
Ector County	58.9
Edwards County	52.7
El Paso County	86.9
Ellis County	34.5
Erath County	22.5
Falls County	47.5
Fannin County	19.1
Fayette County	26.5
Fisher County	29.6
Floyd County	56.9
Foard County	18.6
Fort Bend County	63.8
Franklin County	18.9
Freestone County	31.1
Frio County	83.8
Gaines County	39.4
Galveston County	40.7
Garza County	54.2

Table 2-86
Percent of Aggregate Minority Population in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Gillespie County	21.6
Glasscock County	32.7
Goliad County	39.8
Gonzales County	55.4
Gray County	30.9
Grayson County	21.3
Gregg County	39.2
Grimes County	39.4
Guadalupe County	45.2
Hale County	62.4
Hall County	40.4
Hamilton County	12.0
Hansford County	45.0
Hardeman County	29.0
Hardin County	12.0
Harris County	67.0
Harrison County	35.0
Hartley County	32.2
Haskell County	29.7
Hays County	41.4
Hemphill County	30.2
Henderson County	19.1
Hidalgo County	92.2
Hill County	26.4
Hockley County	48.6
Hood County	12.9
Hopkins County	24.6
Houston County	37.6
Howard County	46.3
Hudspeth County	81.9
Hunt County	25.2
Hutchinson County	25.6
Irion County	27.9
Jack County	19.4
Jackson County	37.1
Jasper County	24.6
Jeff Davis County	36.4
Jefferson County	55.4
Jim Hogg County	93.7

Table 2-86
Percent of Aggregate Minority Population in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Jim Wells County	80.3
Johnson County	23.4
Jones County	37.9
Karnes County	59.8
Kaufman County	30.0
Kendall County	22.9
Kenedy County	79.3
Kent County	17.2
Kerr County	27.8
Kimble County	25.1
King County	15.4
Kinney County	58.4
Kleberg County	76.7
Knox County	36.9
La Salle County	87.0
Lamar County	23.9
Lamb County	56.9
Lampasas County	24.6
Lavaca County	23.8
Lee County	35.0
Leon County	22.2
Liberty County	30.8
Limestone County	38.3
Lipscomb County	33.0
Live Oak County	41.0
Llano County	10.4
Loving County	26.8
Lubbock County	42.7
Lynn County	49.6
Madison County	41.2
Marion County	28.3
Martin County	46.3
Mason County	22.9
Matagorda County	52.6
Maverick County	97.1
McCulloch County	32.8
McLennan County	41.1
McMullen County	38.9
Medina County	53.5

Table 2-86
Percent of Aggregate Minority Population in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Menard County	36.4
Midland County	46.8
Milam County	34.5
Mills County	18.5
Mitchell County	49.5
Montague County	12.0
Montgomery County	28.8
Moore County	61.8
Morris County	33.2
Motley County	16.3
Nacogdoches County	38.5
Navarro County	40.1
Newton County	25.1
Nolan County	39.6
Nueces County	67.1
Ochiltree County	50.5
Oldham County	17.2
Orange County	17.0
Palo Pinto County	21.9
Panola County	26.4
Parker County	14.7
Parmer County	61.6
Pecos County	72.1
Polk County	27.7
Potter County	51.0
Presidio County	85.5
Rains County	12.5
Randall County	21.8
Reagan County	63.8
Real County	27.5
Red River County	26.1
Reeves County	80.5
Refugio County	54.8
Roberts County	9.5
Robertson County	40.9
Rockwall County	25.9
Runnels County	34.9
Rusk County	33.9
Sabine County	12.5

Table 2-86
Percent of Aggregate Minority Population in Counties of Texas

County	Percent of Individuals Below the Poverty Level
San Augustine County	30.3
San Jacinto County	23.4
San Patricio County	57.8
San Saba County	32.6
Schleicher County	45.9
Scurry County	42.2
Shackelford County	12.3
Shelby County	35.0
Sherman County	41.9
Smith County	37.9
Somervell County	22.3
Starr County	96.0
Stephens County	24.3
Sterling County	35.9
Stonewall County	19.1
Sutton County	60.3
Swisher County	48.8
Tarrant County	48.2
Taylor County	33.0
Terrell County	49.7
Terry County	54.6
Throckmorton County	11.5
Titus County	50.8
Tom Green County	42.1
Travis County	49.5
Trinity County	19.0
Tyler County	19.6
Upshur County	17.9
Upton County	52.0
Uvalde County	71.0
Val Verde County	82.5
Van Zandt County	14.2
Victoria County	52.1
Walker County	41.5
Waller County	55.4
Ward County	53.8
Washington County	33.6
Webb County	96.7
Wharton County	52.3

Table 2-86
Percent of Aggregate Minority Population in Counties of Texas

County	Percent of Individuals Below the Poverty Level
Wheeler County	28.9
Wichita County	31.6
Wilbarger County	36.6
Willacy County	89.9
Williamson County	36.2
Wilson County	41.3
Winkler County	57.5
Wise County	20.3
Wood County	15.1
Yoakum County	60.8
Young County	19.4
Zapata County	93.9
Zavala County	94.5

Source: US Census Bureau GIS 2010, US Census Bureau 2010a

Table 2-87
Study Area Population by Race/Ethnicity (2012)

Population	Oklahoma Metro	Oklahoma Non-Metro	Texas Metro	Texas Non-Metro	Kansas Metro	Kansas Non-Metro	United States
Total							
Hispanic or Latino ethnicity of any race	11.5%	4.5%	40.6%	22.6%	12.9%	4.4%	16.6%
White alone	71.6%	77.3%	71.9%	88.1%	82.2%	94.6%	74.0%
Black or African American alone	9.7%	2.4%	13.0%	5.4%	7.4%	0.9%	12.6%
American Indian or Alaskan Native alone	5.6%	10.0%	0.5%	0.6%	0.8%	1.0%	0.8%
Asian alone	2.5%	0.5%	4.6%	0.7%	3.2%	0.4%	4.9%

Table 2-87
Study Area Population by Race/Ethnicity (2012)

Population	Oklahoma Metro	Oklahoma Non-Metro	Texas Metro	Texas Non-Metro	Kansas Metro	Kansas Non-Metro	United States
Native Hawaiian and Other Pacific Islander alone	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%	0.2%
Some other race	3.1%	1.4%	7.5%	3.5%	2.8%	0.9%	4.7%
Two or more races	7.4%	8.5%	2.4%	1.7%	3.6%	2.2%	2.8%
Aggregate minority population	35.2%	25.1%	59.7%	30.2%	27%	8.5%	36.7%

Source: Headwater Economics. 2015

References

Council on Environmental Quality. 1997. Environmental Justice Guidance under the National Environmental Policy Act. December 10, 1997.

Headwater Economics. 2015. Socioeconomic profiles for states of Nebraska, Kansas, Texas, and Oklahoma. Economic Profile System-Human Dimensions Toolkit. Internet website: http://headwaterseconomics.org/tools/eps-hdt. Accessed on January 6, 2015 and February 26, 2015.

US Census Bureau. 2010a. 2010 Census Demographic Profile Data. Profile of General Population and Housing Characteristics (DP-1). Internet website: http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t. Accessed on March 3, 2015.

_____. 2010b. 2010 1 year American Community Survey Data. DP03 Selected Economic Characteristics. Internet website: http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t. Accessed on March 3, 2015

_____. 2013. Poverty Thresholds for 2013 by Size of Family and Number of Related Children Under 18 Years. Internet website: https://www.census.gov/hhes/www/poverty/data/threshld/. Accessed on January 21, 2015.

US Census Bureau American Community Survey GIS (Geographic Information Systems). 2015. GIS data of percentage of individuals below poverty level, 2007 to 2011. Internet website: https://www.census.gov/geo/maps-data/data/tiger-data.html. Accessed on January 12, 2015.

US Census Bureau GIS (Geographic Information Systems). 2010. GIS data of aggregate minority population-derived. Internet website: https://www.census.gov/geo/maps-data/data/tiger-data.html. Accessed on January 12, 2015.

2.6 BIA DECISION AREA

2.6.1 Air

Air resources in the BIA decision area are primarily described above under Section 2.2, BLM Resources, which discusses air quality on both BLM and BIA land in Oklahoma, Texas, and Kansas. The BIA decision area in Richardson County, Nebraska, is not included in Section 2.2 and is discussed here.

There are no Class I areas within Richardson County, nor are there any tribal Class I areas in the Nebraska BIA decision area (National Park Service 2011). All of Richardson County is classified as a Class II area.

Nebraska has adopted the national standards for all criteria pollutants. These standards are listed in **Table 2-2**. There are no nonattainment areas in Richardson County (EPA 2014b). There are no air quality monitoring data from Richardson County to compare with the data in Table 2-2, Air Quality Monitoring Values in the Planning Area by State (EPA 2014c). The Nebraska State Implementation Plan has been approved by the EPA.

Trends and Forecast for air resources are discussed under Section 2.2, BLM Resources.

References

References are provided under Section 2.2, BLM Resources.

2.6.2 Climate

Climate resources are described above under Section 2.2, BLM Resources.

2.6.3 Geology

The geology of the planning area and associated geologic hazards are described above under Section 2.2, BLM Resources.

2.6.4 Soil Resources

Soil resources are described above under Section 2.2, BLM Resources.

2.6.5 Water Resources

To qualify to administer the water quality standards program, a tribe needs to develop and submit an application to the appropriate regional EPA office. The basic requirements for applying to administer the water quality standards program are described in 40 CFR, Part 131.8, of the water quality standards regulation. Briefly, these requirements are that the Tribe must conform to the following:

- Be recognized by the federal government

- Have a governing body carrying out substantial governmental duties and powers over a federal Indian reservation
- Have appropriate authority to regulate the quality of reservation waters
- Be capable of carrying out the functions of an effective water quality standards program

For this last bullet item, a tribe must have either the technical capability for administering the program or must provide a plan showing how it will get such capability.

If a tribe has submitted information to apply for authorization to administer other Clean Water Act programs, it need only supply additional materials relevant to the water quality standards program that were not previously submitted (EPA 2015f).

Indicators

Indicators of water resources are state and federal (or tribal) water quality standards and Water supply.

Current Condition

Water resources (such as hydrologic units, streams, and aquifers) cross various managed lands, which does not necessarily result in changes to water resources. Therefore, water resources descriptions provided under Section 2.2.5 are also applicable to the BIA decision area. Information is provided below where water resources information is different for the BIA decision area.

Surface Water

Due to the large number of watersheds in Kansas, Oklahoma, and Texas, accounting units are provided in in **Table 2-88**, Accounting Units in the Decision Area for the BIA.

The number of miles of perennial, intermittent, and ephemeral stream types is in **Table 2-89**, Streams in the Decision Area for BIA.

The number of miles of streams on the 303(d) list is shown in **Table 2-90**, Stream Segments on the 303(d) List of Impaired Waters in the Decision Area for BIA.

For the Southern Plains, Native American tribes have no water management plans or established water rights. Acquisition of water rights either has not been successful or is in progress.[6]

For eastern Oklahoma, the Chickasaw, Choctaw, and Cherokee tribes have water rights to the Arkansas River riverbed.[7]

[6]David Anderson, Regional Environmental Scientist, Southern Plains Region, BIA, personal communication with Derek Holmgren, EMPSi, February 12, 2015.

[7]Mosby Halterman, Environmental Protection Specialist and Regional Water Coordinator, Eastern Oklahoma Region, BIA, personal communication with Derek Holmgren, EMPSi, February 18, 2015.

Table 2-88
Accounting Units in the Decision Area for the BIA

Accounting Unit Name	BIA Trust Surface Land (Acres)	BIA Trust Subsurface (Acres)
Kansas		
Arkansas-Keystone	0	0
Big Blue	0	0
Kansas	27,800	27,800
Lower Cimarron	0	0
Middle Arkansas	0	0
Missouri-Nishnabotna	1,900	1,900
Neosho	0	0
Osage	0	0
Republican	0	0
Smoky Hill	0	0
Upper Beaver	0	0
Upper Cimarron	0	0
Verdigris	10	0
Oklahoma		
Arkansas-Keystone	110,900	569,700
Lower Beaver	0	0
Lower Canadian	61,000	114,700
Lower Cimarron	25,300	35,800
Lower North Canadian	97,500	150,000
Middle Canadian	0	0
Neosho	47,900	48,400
North Fork Red	8,200	12,900
Prairie Dog Town Fork Red	0	0
Red-Lake Texoma	124,600	219,900
Red-Little	51,000	114,000
Red-Pease	14,800	24,600
Robert S. Kerr Reservoir	61,600	117,300
Salt Fork Red	0	0
Upper Beaver	0	0
Upper Cimarron	0	0
Verdigris	66,000	956,900
Washita	147,700	245,300
Texas		
Big Cypress-Sulphur	0	0
Brazos Headwaters	0	0
Central Texas Coastal	0	0
Devils	0	0
Galveston Bay-Sabine Lake	0	0
Guadalupe	0	0

Table 2-88
Accounting Units in the Decision Area for the BIA

Accounting Unit Name	BIA Trust Surface Land (Acres)	BIA Trust Subsurface (Acres)
Lavaca	0	0
Little	0	0
Lower Beaver	0	0
Lower Brazos	0	0
Lower Canadian	0	0
Lower Colorado	0	0
Lower Pecos	0	0
Lower Rio Grande	0	0
Lower Trinity	0	0
Middle Brazos-Bosque	0	0
Middle Brazos-Clear Fork	0	0
Middle Canadian	0	0
Middle Colorado-Concho	0	0
Middle Colorado-Llano	0	0
Neches	4,600	4,700
North Fork Red	0	0
Nueces	0	0
Prairie Dog Town Fork Red	0	0
Red-Lake Texoma	500	700
Red-Little	600	600
Red-Pease	200	200
Rio Grande Closed Basins	0	0
Rio Grande-Amistad	0	0
Rio Grande-Falcon	100	100
Rio Grande-Fort Quitman	0	0
Sabine	0	0
Salt Fork Red	0	0
San Antonio	0	0
San Bernard Coastal	0	0
San Jacinto	0	0
Southwestern Texas Coastal	0	0
Upper Beaver	0	0
Upper Trinity	0	0
Washita	0	0
Nebraska		
Missouri-Nishnabotna	918	918

Source: USGS GIS 2015

Table 2-89
Streams in the Decision Area for BIA

State	BIA-Administered Tribal and Allotted Lands			BIA-Administered Tribal and Allotted Subsurface Minerals Estate		
	Perennial (Miles)	Intermittent (Miles)	Ephemeral (Miles)	Perennial (Miles)	Intermittent (Miles)	Ephemeral (Miles)
Kansas	44.6	84	0	44.6	83.9	0
Oklahoma	802.4	2,291.3	0.1	1,917.6	8,004.4	0.2
Texas	10.3	6.2	0	10.4	6.2	0
Nebraska	0.8	2.6	0	0.8	2.6	0

Source: National Hydrography Dataset GIS 2013

Table 2-90
Stream Segments on the 303(d) List of Impaired Waters in the Decision Area for BIA

State	BIA Trust Surface (Miles)	BIA Trust Subsurface (Miles)
Kansas	3.2	3.2
Oklahoma	215.0	521.1
Texas	3.6	3.6

Source: EPA GIS 2015

Groundwater
Aquifers are listed in **Table 2-91**, Aquifers in the Decision Area for BIA.

For the Southern Plains, some residents are served by water wells for domestic and livestock use.[8]

Floodplains
The number of acres in 100-year floodplains is in **Table 2-92**, 100-Year Floodplains in the Decision Area.

For Southern Plains, flood control structures and farm ponds are sources of water for livestock use.[9]

Trends
For the Southern Plains, the trends for water resources are described under Section 2.2.5, excluding coal trends (Anderson 2015). For the Eastern Oklahoma Region, the trends for water resources are described under Section 2.2.5 (Halterman 2015).

[8]Anderson.
[9]Ibid.

Table 2-91
Aquifers in the Decision Area for BIA

Aquifer Name	BIA-Administered Tribal and Allotted Lands (Acres)	BIA-Administered Tribal and Allotted Subsurface Mineral Estate (Acres)
Texas coastal uplands aquifer system	0	0
Seymour	0	0
Rush Springs	76,600	108,100
Rio Grande	0	0
Ozark Plateaus	52,700	54,600
Mississippi embayment aquifer system	0	0
Lower Cretaceous	0	0
High Plains (Ogallalla)	0	0
Edwards-Trinity aquifer system	12,500	36,400
Coastal lowlands aquifer system	4,600	4,700
Central Oklahoma	24,400	32,700
Blaine	0	0
Arbuckle-Simpson	2,400	8,500
Ada-Vamoosa	82,200	600,100

Source: USGS GIS 2003

Table 2-92
100-Year Floodplains in the Decision Area

State	BIA-Administered Tribal and Allotted Lands (Acres)	BIA-Administered Tribal and Allotted Subsurface Minerals Estate (Acres)
Kansas	2,400	2,400
Oklahoma	108,000	306,800
Texas	4,000	4,500

Source: Federal Emergency Management Agency GIS 2013

For eastern Oklahoma, tribes value water conservation. There is concern for the Tar Creek Superfund site in Ottawa County. Chat piles from previous mining operations are contaminating the soil, groundwater, surface water, and drinking water aquifer with lead, zinc, and other metals. Other concerns for eastern Oklahoma are runoff from chicken farms into the Illinois River and into the water supply for Sardis Lake. The Choctaw and Chickasaw Tribes are seeking water rights to Sardis Lake for domestic water use and to preserve water levels for recreation.[10]

[10]Halterman.

Forecast

For the Southern Plains Region, the forecast for water resources is described under Section 2.2.5, excluding the forecast for coal.[11]

For the Eastern Oklahoma Region, the forecast for water resources is described under Section 2.2.5. Also, the Tar River, Illinois River, and Sardis Lake trends will continue to be a concern.[12]

Key Features

Key features for water resources are described under Section 2.2.5. Also, for the Southern Plains Region, some tribes have lands on shores of rivers and lakes.[13]

For the Southern Plains Region, water from the Delaware River is treated by the Kickapoo Tribe in Kansas at a water treatment plant. The treated water is used for domestic use.[14]

For the Southern Plains Region, key features for water resources are described under Section 2.2.5[15]. Also, Grand Lake and Sardis Lake are key water features. The impoundment of the Neosho River created Grand Lake. The impoundment of Jackfork Creek created Sardis Lake. Other key water features are the Illinois, Arkansas, and Canadian rivers[16].

References

References are provided under Section 2.2, BLM Resources. The following additional references are also cited:

EPA (US Environmental Protection Agency). 2015f. Authorization for Tribes to Administer Water Quality Standards Program. Internet website: http://water.epa.gov/scitech/swguidance/standards/wqslibrary/auth.cfm. Accessed on February 18, 2015.

2.6.6 Vegetation

Vegetation is described above under Section 2.2, BLM Resources. Where vegetation information is different for the BIA decision area, that information is provided below.

Current Condition

Upland Vegetation

The planning area is in portions of 19 EPA Level III ecoregions (Woods et al. 2005; Chapman et al. 2001; Griffith et al. 2004; USEPA 2013). The acres of each ecoregion in

[11]Anderson.
[12]Halterman.
[13]Anderson.
[14]Ibid.
[15]Halterman.
[16]Ibid.

the planning area and the BIA decision area are summarized in **Table 2-93**, Ecoregions within the Planning and BIA Decision Areas; ecoregions in the planning area are shown in **Figure 2-1**.

Table 2-93
Ecoregions within the Planning and BIA Decision Areas

Ecoregion (Ecoregion Number)	Planning Area	BIA-Administered Tribal and Allotted Lands	BIA-Administered Tribal and Allotted Subsurface Mineral Estate
Arizona/New Mexico Mountains (23)	52,400	0	0
Chihuahuan Deserts (24)	22,632,200	0	0
High Plains (25)	33,675,300	0	0
Southwestern Tablelands (26)	19,458,200	0	0
Central Great Plains (27)	53,137,200	381,200	653,600
Flint Hills (28)	6,902,200	53,200	522,900
Cross Timbers (29)	21,791,800	217,200	1,130,700
Edwards Plateau (30)	18,524,000	0	0
Southern Texas Plains (31)	13,201,000	130	100
Texas Blackland Prairies (32)	10,719,900	0	0
East Central Texas Plains (33)	13,776,800	600	3,300
Western Gulf Coastal Plain (34)	14,769,400	0	0
South Central Plains (35)	17,423,100	27,000	49,000
Ouachita Mountains (36)	2,589,300	21,100	35,600
Arkansas Valley (37)	3,077,300	42,600	91,700
Boston Mountains (38)	530,500	16,900	20,600
Ozark Highlands (39)	1,548,200	55,400	59,300
Central Irregular Plains (40)	10,722,600	15,700	57,500
Western Corn Belt Plains (47)	2,635,000	22,000	22,000

Source: EPA GIS 2013

The BIA supports tribes through forestry management planning. According to the national Indian forestry database, Eastern Oklahoma Region contains approximately 123,800 acres of forested lands (Nix 2015) and the Southern Plains Region contains approximately 99,230 acres of forested land (Sahmaunt 2015).

Noxious Weeds and Nonnative Invasive Plants
In addition to the noxious weeds and nonnative plants described under Section 2.2.6, some species are designated as noxious in the state of Nebraska, but not in Oklahoma, Kansas, or Texas. These species include plumeless thistle (*Carduus acanthoides*), spotted knapweed (*Centaurea biebersteinii*), and diffuse knapweed (*Centaurea diffusa*) (NRCS 2014),

Special Status Plant Species
In addition to the special status plant species described under Section 2.2.6, American ginseng (*Panax quinquefolium*) is known to occur in Richardson County, Nebraska, and is a state threatened species (Nebraska Natural Heritage Program 2013). American ginseng was previously listed as a candidate species under the federal ESA but was subsequently removed from candidacy, as the USFWS determined it was more abundant or widespread than previously thought (50 FR 39526. Special status plant species are also those species considered culturally significant by the BIA or tribes in the planning area. This information is considered sensitive and is therefore not published in this document.

Trends

Upland Vegetation
Tallgrass prairie has declined greatly in acreage due to agricultural conversion throughout the region; however, large expanses of this vegetation type still occur in Osage County and adjacent counties in Oklahoma (Hoagland 2008). The Osage grasslands were historically used largely for pasture (Duck and Fletcher 1943). This practice led to the conversion to exotic pasture grasses (yellow bluestem, Bermuda grass [*Cynodon dactylon*], and weeping lovegrass [*Eragrostis curvula*]; Hoagland 2000) and is an ongoing threat in tall-grass prairie and other vegetation types in the region.

The BIA will continue to support forest management planning in the Eastern Oklahoma and Southern Plains Regions.

Special Status Plant Species
Trends for special status plant species are described under Section 2.2.6.

References
References are provided under Section 2.2, BLM Resources. The following additional references are also cited:

Duck, L. G., and J. B. Fletcher. 1943. The Game Types of Oklahoma. A Report to the Oklahoma Game and Fish Commission. Adapted by the Oklahoma Biological Survey. Internet website: http://www.biosurvey.ou.edu/duckflt/dfhome.html. Internet website. Accessed on November 11, 2014.

Nix 2015. Email from Robert Nix to Holly Prohaska (EMPSi) containing information on forested lands in the Eastern Oklahoma Region from the National Indian Forestry Database. May 29, 2015.

Sahmaunt 2015. Email from Mark Sahmaunt to Holly Prohaska (EMPSi) containing information on forested lands in the Southern Plains Region from the National Indian Forestry Database. May 29, 2015.

EPA GIS (US Environmental Protection Agency, Geographic Information System). 2013. GIS data of ecoregions. Internet website: www.epa.gov/wed/pages/ecoregions/level_iii_iv.htm. Accessed on November 15, 2013.

Hoagland, B. W. 2000. The Vegetation of Oklahoma: A Classification for Landscape Mapping and Conservation Planning. Oklahoma Natural Heritage Inventory and Department of Geography, University of Oklahoma, Norman. December, 2000.

_____. 2008. "Vegetation of Oklahoma." [poster] Oklahoma Biological Survey.

Nebraska Natural Heritage Program. 2013. Range Maps for Nebraska's Threatened and Endangered Species. Nebraska Game and Parks Commission—White Papers, Conference Presentations and Manuscripts. Paper 30.

NRCS (US Department of Agriculture, National Resources Conservation Service). 2014. Nebraska State-listed Noxious Weeds. Internet website: http://plants.usda.gov/java/noxious?rptType=State&statefips=48. Accessed on December 26, 2014.

2.6.7 Fish and Wildlife

Fish and wildlife are described above under Section 2.2, BLM Resources. Where information is different for the BIA decision area, that information is provided below.

Key Features

BIA surface and subsurface trust lands provide habitat for fish and wildlife throughout the planning area. Lands in Caddo and Osage Counties in Oklahoma are of particular importance, as they contain more acres of BIA subsurface and surface trust lands than any other counties in the decision area.

2.6.8 Special Status Species

Special status species are described above under Section 2.2, BLM Resources. Where information is different for the BIA decision area, that information is provided below.

Current Condition

Designated critical habitat for federal-listed species in the BIA decision area are the Arkansas River shiner (*Notropis giradi*) and the leopard darter (*Percina pantherina*; USFWS GIS 2014). Additionally special status species which occur in Richardson County, Nebraska, and not within the BLM decision area include: massasauga (*Sistrurus catenatus*), and river otter (*Lutra canadensis*). Both species are Nebraska state threatened (Nebraska Natural Heritage Program 2013). Special status species also are those species considered culturally significant by the BIA or tribes in the planning area. This information is considered sensitive, and is therefore not published in this document.

Key Features

BIA surface and subsurface trust lands provide habitat for special status species throughout the planning area. Lands in Caddo and Osage Counties in Oklahoma are of particular importance, as they contain more acres of BIA subsurface and surface trust lands than any other counties in the decision area. Additionally, the following Oklahoma counties contain critical habitat for federal-listed fish species on BIA surface and subsurface trust lands: Canadian, Cleveland, Grady, Hughes, McClain, McCurtain, McIntosh, Pittsburg, Pontotoc, and Seminole (USFWS GIS 2014).

References

References are provided under Section 2.2, BLM Resources. The following additional reference is also cited:

Nebraska Natural Heritage Program. 2013. Range Maps for Nebraska's Threatened and Endangered Species. Nebraska Game and Parks Commission—White Papers, Conference Presentations, and Manuscripts. Paper 30. DigitalCommons at University of Nebraska, Lincoln, Nebraska.

2.6.9 Cultural Resources

Cultural resources are described above under Section 2.2, BLM Resources.

2.6.10 Paleontological Resources

Paleontological resources are described above under Section 2.2, BLM Resources.

2.6.11 Visual Resources

Visual resources refer to the visible features on a landscape, such as land, water, vegetation, animals, and structures. These features contribute to the scenic or visual quality and appeal of the landscape (BLM 1984).

The inventory consists of three components: scenic quality evaluation, sensitivity level analysis, and delineation of distance zones.

Indicators

Indicators for visual resources are scenic quality, visual sensitivity, and distance zone.

Scenic quality factors are evaluated relative to similar features in the same physiographic province. Physiographic provinces are a subdivision of physiographic regions that divide the continent, based on similar landforms and landscapes. The planning area is primarily in the following physiographic provinces:

- Western Kansas, the Oklahoma panhandle, and west Texas are in the Great Plains province
- North-central Texas, central Oklahoma, and eastern Kansas and Nebraska are in the Central Lowland province
- East/southeast Texas and far southeast Oklahoma are in the Coastal Plain province

A very small portion of eastern Oklahoma is also in the Ouachita and Ozark Plateaus provinces.

Visual sensitivity is a measure of public concern for scenic quality. It can vary with the types of users, level of use, public interest, adjacent land uses, and special areas present. Landscapes are assigned to one of three possible sensitivity ratings: high, medium, or low.

Distance zones are a measure of how visible the landscape is from key travel routes or observation points. The closer a landscape is to a viewer the more details are visible. Using GIS, landscapes are assigned to one of three possible distance zones: foreground/middleground (0 to 5 miles), background (5 to 15 miles), or seldom seen (beyond background or not visible).

A targeted VRI of scenic quality, sensitivity, and distance zone for the planning area will be completed according to guidelines in BLM Manual Handbook H-8410-1, Visual Resource Inventory (BLM 1986a). It will include high value Indian surface lands. These are lands near federal- or state-designated parks, scenic rivers, and scenic highways or lands where visual setting may be culturally important to tribal groups. Although the BLM's VRM System is applicable to BLM-administered lands, it also will be used to develop an inventory of visual resources on high-value Indian surface lands.

Based on the three inventory components, lands will be placed into one of four VRI classes. These class assignments are informational and provide the basis for considering visual values during the EIS process. They do not establish management direction and are not used as a basis for constraining or limiting surface-disturbing activities; instead they are considered a baseline for existing conditions. Results of the VRI will be documented in a report and posted on the project website.

Current Condition

The BIA does not maintain a visual resources inventory. Visual resources would likely vary from tribe to tribe. Areas with sensitive visual resources might be impacted by proposed renewable energy projects and transportation projects in areas with low relief and sparse vegetation.

Key Features

The following areas have been identified as visually important features or viewsheds in the planning area:

- Gloss Mountain State Park
- Salt Plains National Wildlife Refuge
- Cimarron River
- South Canadian River
- Oklahoma-designated scenic rivers (Flint Creek, Illinois River, Barren Fork Creek, Upper Mountain Fork River, Big Lee's Creek, and Little Lee's Creek)

- National and State Scenic Byways
- Chickasaw National Recreation Area

BLM and Indian lands near these areas will be inventoried for visual resources. Other lands near federal- or state-designated parks, scenic rivers, and scenic highways or lands where visual setting may be culturally important to tribal groups will also be identified and inventoried.

References

BLM (US Department of the Interior, Bureau of Land Management). 1984. Manual 8400—Visual Resource Management. Rel. 8-24. Washington, DC. April 5, 1984.

_____. 1986a. Handbook H-8410-1—Visual Resource Inventory. Rel. 8-28. Washington, DC. January 17, 1986.

2.6.12 Wildland Fire Management

Wildland fire management resources on federal lands are described above under Section 2.2, BLM Resources.

2.6.13 Cave and Karst Resources

Cave and karst resources are described above under Section 2.2, BLM Resources. Where cave and karst resources information is different for the BIA decision area that information is provided below.

Current Condition

The BIA has made a recent cave discovery within its administered lands. Further exploration and information on this discovery will need to be gathered.

Trends

As caves are identified, they will be examined for significance and will be documented.

2.6.14 Energy and Minerals

Coal

Current Condition

Coal resources exist in all three states in the planning area. **Table 2-94**, Coal Resources in the BIA Decision Area, shows the types of economically valuable coal found on BIA-administered tribal and allotted surface and mineral estate in Kansas, Oklahoma, and Nebraska. No coal resources exist beneath BIA-administered tribal and allotted surface or mineral estate in Texas.

The bulk of coal resources in the BIA decision area are in Oklahoma on both BIA-administered tribal and allotted surface and subsurface mineral estate. Most of the valuable coal in the Oklahoma portion of the BIA decision area is medium and high volatile bituminous.

Table 2-94
Coal Resources in the BIA Decision Area

Coal Type	Acres of BIA-Administered Tribal and Allotted Lands	Acres of BIA-Administered Tribal and Allotted Subsurface Mineral Estate
Kansas		
Lignite	0	0
Low volatile bituminous	0	0
Medium and high volatile bituminous	1,900	1,900
Oklahoma		
Lignite	0	0
Low volatile bituminous	14,500	15,600
Medium and high volatile bituminous	32,900	173,900
Nebraska		
Medium and high volatile bituminous	800	800

Source: BLM GIS 2015

Because most coal resources in the BIA decision area are in Oklahoma, coal occurrence and activity in Oklahoma only is discussed below.

Oklahoma's coal resources are found in the eastern portion of the state, in a coalfield spanning 19 counties. Oklahoma contains the most significant deposits of bituminous coal west of the Mississippi River and east of the Rocky Mountains (Oklahoma Department of Mines 2015). Approximately 0.1 percent of the estimated US recoverable coal reserves are located at producing mines in the state.

Oklahoma coal operations produced approximately 1 million tons of coal in 2012 (BLM 2015a). Coal was produced from five Oklahoma counties in 2013: LeFlore, Haskell, Craig, Rogers, and Okmulgee (Oklahoma Department of Mines 2013). Oklahoma coal is mined by both surface and underground methods (Oklahoma Department of Mines 2015). Approximately 60 percent of the coal mined in Oklahoma is used in lime and cement kilns in Oklahoma and surrounding states. The remainder is used for electricity generation at one power plant in Oklahoma and one plant in Missouri (BLM 2015a). There are no active coal leases in the BIA decision area.

Forecast

Approximately 1.6 billion tons of economically recoverable coal reserves remain in Oklahoma. While large deposits remain to be produced, extracting these resources will require significant capital investments. Production and market issues affect whether some coal reserves are economical to mine. Regulations concerning mining and reclamation requirements also impact coal activity in the state. Future activity will hinge on

development of additional markets for high sulfur coal and the increased use and development of clean coal technology at coal-fired utilities in Oklahoma and surrounding states. These facilities are close enough to Oklahoma's coal reserves to continue to serve as a market for Oklahoma coal if the coal can be burned cleanly enough to comply with federal and state air quality standards (Oklahoma Department of Mines 2015).

Key Features

The coalfield in eastern Oklahoma is the key feature for coal resources in the BIA decision area. It contains a commercial coal belt and a noncommercial coal-bearing region. Approximately 217,000 acres of the coalfield are on BIA-administered tribal and allotted surface, and 1,347,200 acres are on BIA-administered tribal and allotted subsurface mineral estate (BLM GIS 2015).

Fluid Minerals

Fluid minerals in the BIA decision area are oil and gas and geothermal resources. Each is discussed below.

Current Condition

Oil and Gas

The planning area contains approximately 34 oil and gas plays across all three states (see **Figure 2-21**). Portions of 11 plays overlap BIA-administered tribal and allotted surface and subsurface mineral estate. BIA-administered tribal and allotted surface and subsurface mineral estate overlaps plays almost exclusively in Oklahoma, but some overlapping also occurs in Texas. No BIA-administered tribal or allotted surface or subsurface mineral estate overlaps oil and gas plays in Kansas (BLM GIS 2015).

For detailed information on production, well completions, and oil and gas development potential, refer to the forthcoming RFD being prepared by the OFO (BLM 2015b). The current condition discussion below presents a summary of the information provided in the RFD.

Overall oil production in the planning area declined from 1993 to 2004. Production remained steady from 2004 to 2009 and began to rapidly increase from 2009 to the present. The most significant increases in oil production have been in southern and western Texas. Most of the increase in production in southern Texas has been from horizontal wells, while the increase in western Texas is largely from conventional wells (BLM 2015b).

Despite the overall increase in oil production in the planning area, oil production on BIA-administered tribal and allotted subsurface mineral estate spiked in 1997 at 2.3 million oil barrels; it has been gradually declining since then to a 2013 level of 790,000 oil barrels (BLM 2015b). Most oil production from federal and Indian minerals has been in Oklahoma, although production of federal and Indian minerals in Texas spiked in 1997 (BLM 2015b).

Overall gas production in the planning area was relatively stable from 1993 to 2005. Production peaked in 2008 and 2012 at over 10 billion MCF and remained at nearly the same amount in 2013. Most of the increase in gas production since 2005 has been in eastern Texas. Gas production in Oklahoma has remained relatively stable since 1993. Like horizontal oil, horizontal gas production in the planning area has been rapidly increasing since 2003 in Texas and Oklahoma (BLM 2015b).

Gas production from federal and Indian minerals in the planning area accounts for approximately 0.7 percent of total gas produced in the planning area. Gas production from BIA-administered tribal and allotted subsurface mineral estate peaked around 1989, 1997, and 2011 at between 41 and 32 million MCF per year. Gas production in 2013 from BIA-administered tribal and allotted subsurface mineral estate was approximately 26 million MCF. As is the case with the general planning area, Texas is largely responsible for the peaks in gas production from BIA-administered tribal and allotted subsurface mineral estate in 1996 and 2012.

Approximately 2.2 million oil and gas wells have been drilled in the planning area, over 85,000 of which are horizontal or directional wells. Approximately 409,000 wells are currently producing (BLM 2015b). Of these, 7,390 (2 percent) are on BIA-administered tribal and allotted lands, and 39,117 (10 percent) are on BIA-administered tribal and allotted subsurface mineral estate. However, note that, of the producing wells on BIA-administered tribal and allotted subsurface mineral estate, 29,688 (76 percent) are in Osage County. Almost all producing wells in the BIA decision area are in Oklahoma. Only 13 producing wells are in the Texas portion of the BIA decision area (BLM GIS 2015).

Injection wells have also been drilled in the decision area: 311 on BIA-administered tribal and allotted lands and 2,133 on BIA-administered tribal and allotted subsurface mineral estate in the BIA decision area. All injection wells in the BIA decision area are in Oklahoma. Of injection wells on BIA-administered tribal and allotted subsurface mineral estate, 1,696 (80 percent) are in Osage County.

Geothermal Resources

The most favorable portions of the planning area with geothermal energy potential are along the southern border of Texas and in the state's eastern portion Northern Oklahoma and central Kansas also have moderately favorable geothermal potential (National Renewable Energy Laboratory GIS 2009). **Table 2-95**, Enhanced Geothermal Potential in the BIA Decision Area, shows the acres of BIA-administered tribal and allotted lands and mineral estate with varying levels of enhanced geothermal resource potential (geothermal resources that can be reached by fracturing rock).

While portions of the BIA decision area overlay areas with geothermal resource potential, there has never been any geothermal leasing or activity in the decision area.

Table 2-95
Enhanced Geothermal Potential in the BIA Decision Area

Geothermal Potential Class (1: Most Favorable to 5: Least Favorable)	Acres of BIA-Administered Tribal and Allotted Lands	Acres of BIA-Administered Tribal and Allotted Subsurface Minerals
1	0	0
2	400	400
3	365,500	1,817,600
4	202,300	352,700
5	173,500	309,400

Source: National Renewable Energy Laboratory GIS 2009

Forecast

Oil and Gas

The BLM has classified the planning area by oil and gas development potential, ranging from no potential to high potential. **Table 2-96**, Oil and Gas Development Potential in the BIA Decision Area, shows the number of acres with oil and gas development potential on BIA-administered tribal and allotted lands and subsurface mineral estate.

Table 2-96
Oil and Gas Development Potential in the BIA Decision Area

Potential Level	Acres of BIA-Administered Tribal and Allotted Lands	Acres of BIA-Administered Tribal and Allotted Subsurface Mineral Estate (Acres in Osage County)
High	223,000	1,239,300 (973,400)
Moderate to high	272,600	657,600 (268,200)
Moderate	141,600	443,200 (231,500)
Low to moderate	4,200	15,000 (1,300)
Low	209,300	289,100 (200)
None	1,400	2,500 (0)

Source: BLM GIS 2015

As shown in **Table 2-96**, most of the BIA decision area has moderate or greater oil and gas potential. However, approximately 63 percent of the areas with moderate or greater oil and gas potential in the BIA decision area are in Osage County. Oil and gas resources in Osage County would not be subject to the decisions made in this planning effort.

The Energy Information Administration predicts that nationwide oil prices will rise between 0.8 and 1.4 percent per year between 2012 and 2040 (in 2012 dollars; Energy Information Administration 2014). Natural gas prices are predicted to rise at a rate of 3.7 percent per year between 2012 and 2040 (in 2012 dollars; Energy Information

Administration 2014). Based on the oil and gas development potential and predicted nationwide price increases, oil and gas activity in the BIA decision area is expected to increase over the next 20 years.

In its RFD prepared for the planning area, the BLM estimates that approximately 1.9 million oil barrels will be produced from federal and Indian minerals in the planning area in 2035; this is a 27 percent increase over 2013 production levels for the BIA and BLM decision areas. In its RFD, the BLM also estimates that 126 million MCF of gas will be produced from federal and Indian minerals in the planning area in 2035; this is a 40 percent increase over 2013 production levels for the BIA and BLM decision areas (BLM 2015b).

Geothermal Resources

Future development of geothermal energy in Texas is expected to include geoexchange systems (heat pumps), direct use activities, and electric power generation. The most likely use of federal geothermal resources is for electric power generation, which has not yet become commercially established in the state (Texas State Energy Conservation Office 2015). Although portions of the BIA decision area have moderately high geothermal resource potential, geothermal resources in the decision area are not expected to be developed during the next 20 years.

Key Features

Oil and Gas

Key oil and gas features in the planning area are the plays shown in **Figure 2-21**. These plays contain known oil and gas resources and are considered to have high development potential. For more information on these plays, see the RFD (BLM 2015b).

Geothermal Resources

Key geothermal features in the planning area are those with the most favorable geothermal potential classes. See **Table 2-95** for a breakdown of geothermal potential classes on BIA-administered tribal and allotted lands and subsurface mineral estate. The highest potential classes in the planning area and decision area are along the southern border of Texas and in eastern Texas. The Texas State Energy Conservation Office estimates there are at least five major regions in Texas that have strong potential for geothermal electrical power production, based on the existence of oil and gas wells with temperatures that can get above 212 degrees Fahrenheit. These regions are east Texas, the Gulf Coast, the Delaware-Val Verde Basin region, the Trans-Pecos region, and the Aardvark Basin where it enters the Texas panhandle (Texas State Energy Conservation Office 2015).

Nonenergy Solid Minerals

Current Condition

Limestone/dolomite operations use blasting and crushing techniques to produce crushed gravel from limestone formations at or near the surface. There are five

limestone/dolomite leases in Osage County totaling 570 acres. There is one sand and gravel lease in Cotton County, Oklahoma, totaling 160 acres and another sand and gravel lease in Tulsa County, Oklahoma, totaling 100 acres.

Sandy soil operations are similar to sand and gravel pits where unconsolidated material at or near the surface is removed and hauled away. In Osage County much of the sand is mixed with top soil or sub-soil and therefore cannot be called a sand lease. This typically includes road fill material as well, even though such material might contain either sandstone, limestone, or both. There are four sandy soil leases in Osage County totaling almost 200 acres.

Sandstone operations are informal operations where a lessee will select and remove only certain sandstone pieces based on appearance and demand. There is little or no surface disturbance and even after an area is mined there may be many pieces of rock that were not removed. There are three sandstone leases in Osage County totaling 225 acres.

There is a business lease on the Arkansas Riverbed in Leflore and Sequoyah counties, Oklahoma. The lease allows a third party the right to purchase and transfer dredged materials from the Arkansas River.

Large salt deposits lie beneath western Texas, western Oklahoma, and western and central Kansas. Approximately 103,800 acres of BIA-administered tribal and allotted lands and 150,700 acres of BIA-administered tribal and allotted subsurface mineral estate contain salt resources.

Forecast
Levels and locations of nonenergy solid mineral activity in the BIA decision area are expected to remain the same throughout the life of the RMP.

Key Features
Key features for nonenergy solid mineral activity in the BIA decision area are riverbeds, which contain sand and gravel and other nonenergy solid mineral resources.

References
References are provided in Section 2.2, BLM Resources.

2.6.15 Renewable Energy
Renewable energy is described above under Section 2.2, BLM Resources. Where information is different for the BIA decision area, that information is provided below.

Current Condition
There are currently no wind or solar energy ROWs or biomass facilities on tribal trust lands. Plans are underway for a wind energy project on tribal trust lands surrounding the Chilocco Indian School campus, but construction has not begun.

2.6.16 Recreation and Visitor Services
The BIA does not manage trust land for recreation.

2.6.17 Lands and Realty

Land Use Authorizations

Current Condition

On BIA-managed lands, land use authorizations for certain activities are issued mainly as ROWs. Examples of ROWs are roads, electrical distribution and transmission lines, pipelines, and wind and solar energy generation facilities. In accordance with 23 CFR, Part 169, ROWs can be issued on tribal trust lands only when there is written consent of the landowners and the Secretary of the Interior. The types of land uses found throughout the broad planning area and on tribal trust lands are discussed below. For analysis of wind and solar energy ROWs, see Section 2.6.15, Renewable Energy.

In the broader planning area, major land use authorizations, such as highways, electrical transmission lines, pipelines, and communication equipment, are more concentrated near urban centers, such as Oklahoma City and Tulsa. In general, rural areas have a lower density of ROWs and other infrastructure. In rural areas, most roads, power lines, and other linear features follow Public Land Surveying System section lines.

Of the 269,650,000 total acres in the planning area, 853,000 are BIA-managed lands, with 394,200 acres in eastern Oklahoma and 457,500 acres in the Southern Plains region of Oklahoma and Kansas. Tribal trust lands generally consist of scattered lands in northeastern Oklahoma, with two small but contiguous groups of land in Kansas, north of Topeka. In general, tribal trust lands contain few roads, pipelines, communication sites, transmission lines, and other authorizations.

Forecast

Overall demand for land use authorizations in the planning area is anticipated to increase as a result of continued regional population expansion, future subsurface mineral development, renewable energy (e.g., wind) development, and demand from other uses, such as agricultural and manufacturing.

There is a US Department of the Interior working group evaluating a proposed ROW rule that would streamline the review process for ROWs proposed on tribal trust lands. Implementation of the proposed rule could incentivize ROW development on tribal trust lands, thereby increasing the number of authorizations in the future.

Key Features

Land use authorizations in the planning area consist of major roadways, high-voltage electrical transmission lines, electrical distribution lines, pipelines, and communication sites. In general, there is a higher concentration of ROWs and communication sites near large urban areas with fewer infrastructure-related uses in the rural areas.

Possible Indicators are as follows:

- Change in the nature and type of ROWs and leases on BLM-administered lands
- Acres designated as ROW avoidance or exclusion on BLM-administered lands
- Acres on BLM-administered lands in designated utility corridors

Land Tenure

Current Condition
The distribution and types of landownership directly influence the current level and locations of uses influencing tribal trust lands in the planning area. Tribal trust lands represent less than one percent of the total landownership in the planning area. The most concentrated areas of contiguous tribal trust lands are in northeastern Oklahoma and northeastern Kansas. In addition to tribal trust lands, surface ownership in the planning area consists of BLM, US Bureau of Reclamation, USACE, Forest Service, National Park Service, Department of Defense, and state and private entities (see **Table 1-1**). *The Standards for Indian Trust Lands Boundary Evidence Handbook* provides a standardized system of identifying and documenting tribal trust lands, as well as differentiating those lands from individual trust lands and restricted lands.

Forecast
The BIA will continue to facilitate landownership actions on a case-by-case basis and in accordance with current policy.

Key Features
The noncontiguous land pattern caused by the implementation of previous disposals, special acts, patents and land grants presents the greatest management challenge and results in overlapping interests on BLM-administered lands.

Possible Indicator is change in the total acres of tribal trust lands in the planning area.

Withdrawals
Tribal trust lands are by default withdrawn from the public domain. Conversion of allotted trust lands to fee simple status (i.e., where an individual holds title to the land outside of trust) is the primary means by which land is conveyed out of the tribal trust.

2.6.18 Livestock Grazing
Livestock grazing is described in Section 2.2, BLM Resources. Where information is different for the BIA decision area, that information is provided below.

Current Condition
Both the BIA eastern Oklahoma and Southern Plains regions process grazing leases for restricted and trust lands. Grazing leases vary in size from as little as 5 to 10 acres and up. The leases are normally executed for three to five years. At this time, the total number of leases that are administered in the two regions is unknown.

Forecast

The BIA will continue to process permits for agricultural and livestock grazing leases on restricted and trust lands.

2.6.19 Prime and Unique Farmlands/Agriculture

Prime and unique farmlands and agricultural resources are described in Section 2.2, BLM Resources. Where information is different for the BIA decision area, it is provided below.

The BIA staff provide technical assistance to Indian landowners, tribal governments, and land users. They help develop, update, and amend land use plans under the principal of sustainable yield managements to ensure adequate resources in the future (BIA 2015).

Current Condition

According to NRCS data, on BLM- and BIA-administered lands in the decision area, there are prime farmlands, prime farmlands of statewide importance, prime farmlands if drained or irrigated, and prime farmlands if protected from flooding(see **Table 2-97**).

Table 2-97
Farmlands in the BIA Decision Area

Farmland Type	BIA-Administered Tribal and Allotted Lands	BIA-Administered Tribal and Allotted Subsurface Minerals Estate
Kansas		
Prime farmland	7,600	7,600
Farmland of statewide importance	19,700	19,700
Prime farmland if drained	1,000	1,000
Prime farmland if irrigated	0	0
Not prime farmland	1,500	1,500
Nebraska		
Prime farmland	200	200
Farmland of statewide importance	200	200
Not prime farmland	500	500
Oklahoma		
Prime farmland	379,700	956,700
Not prime farmland	435,400	1,651,400
Texas		
Prime farmland	1,600	1,700
Prime farmland if drained	0	0
Prime farmland if irrigated	100	100
Prime farmland if protected from flooding	0	0
Not prime farmland	2,900	3,000

Source: NRCS GIS 2015

References

BIA (US Department of the Interior, Bureau of Indian Affairs). 2015. Division of Natural Resources, Branch of Agriculture and Rangeland Development. Internet website: http://www.bia.gov/WhoWeAre/BIA/OTS/NaturalResources/AgrRngeDev/index.htm.

2.6.20 National Historic Trails

National historic trails are described in Section 2.2, BLM Resources. Where information is different for the BIA decision area, it is provided below.

Of the six national historic trails in the planning area, 18.5 miles are on BIA-administered tribal and allotted lands; 23.6 miles are on BIA-administered tribal and allotted subsurface minerals estate (see **Table 2-98**, National Historic Trails on BIA-Administered Tribal and Allotted Lands or Subsurface Mineral Estate; Scenicbyways.info GIS 2015).

Table 2-98
National Historic Trails on BIA-Administered Tribal and Allotted Lands or Subsurface Mineral Estate

Trail Name	Miles in Planning Area	Miles on BIA-Administered Tribal and Allotted Lands	Miles on BIA-Administered Tribal and Allotted Subsurface Minerals Estate
Oklahoma			
Butterfield Overland National Historic Trail (proposed)	185.6	0.2	9
Chisholm National Historic Trail (proposed)	282.9	2.6	3.6
Santa Fe National Historic Trail	76.3	0	0
Trail of Tears National Historic	94.4	15.5	0
Total (Oklahoma)	**639.2**	**18.3**	**12.6**
Kansas			
California National Historic Trail	346	0	0
Lewis and Clark National Historic Trail	48.6	0	0
Oregon National Historic Trail	179.7	0	0
Pony Express National Historic Trail	132.7	0.2	0
Santa Fe National Historic Trail	985.6	0	0
Total (Kansas)	**1,692.9**	**0.2**	**0**
Texas			
Chisholm National Historic Trail (proposed)	1.4	0	0
El Camino Real de los Tejas National Historic Trail	2,428.1	0	0
Total (Texas)	**2,429.5**	**0**	**0**

Table 2-98
National Historic Trails on BIA-Administered Tribal and Allotted Lands or Subsurface Mineral Estate

Trail Name	Miles in Planning Area	Miles on BIA-Administered Tribal and Allotted Lands	Miles on BIA-Administered Tribal and Allotted Subsurface Minerals Estate
Nebraska			
Lewis and Clark Trail	9.8	0	0
Total (Nebraska)	**9.8**	**0**	**0**

Sources: National Park Service 2010; BLM GIS 2015
Note: Miles are rounded to the nearest 1/10th.

References
References are provided in Section 2.2, BLM Resources.

2.6.21 National and State Byways
National and state byways are described in Section 2.2, BLM Resources. Where information is different for the BIA decision area, it is provided below.

Of the scenic byways in the planning area, 22 miles are on BIA-administered tribal and allotted lands and 95.4 miles are on BIA-administered tribal and allotted subsurface minerals estate (see **Table 2-99**, Scenic Byways Crossing BIA-Administered Tribal and Allotted Lands or Subsurface Mineral Estate; Scenicbyways.info GIS 2015).

References
References are provided in Section 2.2, BLM Resources.

2.6.22 Native American Tribal Uses
Native American tribal uses are described above in Section 2.2, BLM Resources.

2.6.23 Public Health and Safety
Public health and safety concerns on BIA lands are the same as those described in Section 2.2, BLM Resources.

2.6.24 Socioeconomics
The socioeconomic conditions and trends for Oklahoma, Kansas, and Texas are described in **Section 2.2**, BLM Resources. The following describes socioeconomic conditions for Richardson County, Nebraska, which is part of the planning area. This county only includes BIA surface and subsurface minerals. The same indicators as used in the socioeconomics sections for Oklahoma, Kansas, and Texas (**Section 2.2**, BLM Resources) are used to describe conditions in Richardson County, Nebraska.

Table 2-99
Scenic Byways Crossing BIA-Administered Tribal and Allotted Lands or Subsurface Mineral Estate

Byway Name	Designation Type	Miles in Planning Area	Miles on BIA-Administered Tribal And Allotted Lands	Miles on BIA-Administered Tribal and Allotted Subsurface Minerals Estate
Oklahoma				
Cherokee Hills Byway	National Scenic Byway	84.7	1.3	0
Historic Route 66—Oklahoma	All-American Road, National Scenic Byway	22.9	3.8	4.4
Mountain Gateway Scenic Byway	State Byway	23.2	0	0
Mountain Pass Scenic Byway	State Byway	65.7	0.5	0.5
Osage Nation Heritage Trail Byway	State Byway	34.7	1.2	0.1
Talimena Scenic Drive—Oklahoma	National Scenic Byway	105.4	0	0
Wichita Mountains Byway	National Scenic Byway	391.6	13.8	18.9
	Total	**728.2**	**20.6**	**23.9**
Kansas				
Flint Hills Scenic Byway	National Scenic Byway	43.1	0	0
Frontier Military Historic Byway	State Byway	172.2	0	0
Glacial Hills Scenic Byway	State Byway	63.2	0	0
Gypsum Hills Scenic Byway	State Byway	35.9	0	0
Kansas Historic Route 66 Byway	State Byway	11.3	0	0
Native Stone Scenic Byway	State Byway	49	0	0
Post Rock Scenic Byway	State Byway	14.7	0	0
Prairie Trail Scenic Byway	State Byway	55.8	0	0

Table 2-99
Scenic Byways Crossing BIA-Administered Tribal and Allotted Lands or Subsurface Mineral Estate

Byway Name	Designation Type	Miles in Planning Area	Miles on BIA-Administered Tribal And Allotted Lands	Miles on BIA-Administered Tribal and Allotted Subsurface Minerals Estate
Smoky Valley Scenic Byway	State Byway	60.9	0	0
Western Vistas Historic Byway	State Byway	93.3	0	0
Wetlands and Wildlife Scenic Byway	National Scenic Byway	75.9	0	0
	Total	**673.9**	**0**	**0**
Texas				
Texas Brazos Trail	State Byway	471.2	0	0
Texas Forest Trail	State Byway	836.4	1.4	1.4
Texas Forts Trail	State Byway	673.6	0	0
Texas Hill Country Trail	State Byway	634.6	0	0
Texas Independence Trail	State Byway	717.9	0	0
Texas Lakes Trail	State Byway	650.3	0	0
Texas Mountain Trail	State Byway	688.7	0	0
Texas Pecos Trail	State Byway	696.1	0	0
Texas Plains Trail	State Byway	684.1	0	0
Texas Tropical Trail	State Byway	673	0	0
	Total	**6,725.9**	**1.4**	**1.4**

Sources: Scenic Byways 2015; Federal Highway Administration 2015; Scenicbyways.info GIS 2015
Note: Miles are rounded to the nearest 1/10th.

Existing Conditions—Nebraska Overview

Agriculture was a historically important sector for Nebraska, with commercial apple orchards being a popular crop in the 1900s (Save America's Heritage 1993). In the 1930s, abandonment of railroad lines and drought resulted in economic and population decline in the county. Richardson County's first oil boom was from 1938 to 1942; the first oil strike in Nebraska was in Falls City, within Richardson County (Schottenhamel 1979; Nebraska Energy Quarterly 2015). Production in Richardson County peaked in 1941 with 1.88 million barrels just 2 years after this first strike (Nebraska Energy Quarterly 2015). However, today the state's leaders in oil production are Red Willow and Hitchcock counties (Nebraska Energy Quarterly 2015). Today, trade, transportation, and utilities are important economic sectors in Richardson County.

Community Indicators

The population of Richardson County, with a median age of 46.7 years in 2013, was older on average than the US population (median age 37.3) (US Census Bureau 2013, American Community Survey Office, as reported by Headwater Economics 2015). Richardson County had fewer people who held a bachelor's degree as compared to the US, but more high school graduates and people who held an associate's degree (see **Table 2-100**).

Table 2-100
Education Attainment

	Richardson County, NE	United States
Total Population 25 or older	6,038	206,587,852
No high school degree	459	28,887,721
	7.6%	14.0%
High school graduate	5,579	177,700,131
	92.4%	86.0%
Associate's degree	564	16,135,795
	9.3%	7.8%
Bachelor's degree	820	37,286,246
	13.6%	18.0%
Bachelor's degree or higher	1,137	59,583,138
	18.8%	28.8%
Graduate or professional degree	317	22,296,892
	5.3%	10.8%

Source: US Census Bureau 2013, American Community Survey Office, as reported by Headwater Economics 2015

Most residents in Richardson County speak only English, and the percentage of those who speak English less than very well is below that of the national average (see **Table 2-101**).

Table 2-101
Language Spoken at Home

	Richardson County, NE	United States
Population 5 or older	7,896	291,484,482
Speak only English	7,777	231,122,908
	98.5%	79.3%
Speak a language other than English	119	60,361,574
	1.5%	20.7%
Speak English less than very well	17	25,148,900
	0.2%	8.6%

Source: US Census Bureau 2013, American Community Survey Office, as reported by Headwater Economics 2015

Housing

Housing availability and cost can be impacted by development and associated population changes. Housing occupancy information is displayed in **Table 2-102**, Housing Occupancy. Approximately 13.9 percent of housing in Richardson County is vacant. This rate is similar to the US national average (12.5 percent). Housing costs for rent and mortgage in Richardson County are almost half of the US national average costs (see **Table 2-103**, Housing Costs).

Table 2-102
Housing Occupancy

	Richardson County, NE	United States
Total Housing Units	4,387	132,057,804
Occupied	3,779	115,610,216
	86.1%	87.5%
Vacant	608	16,447,588
	13.9%	12.5%
For rent	53	3,230,123
	1.2%	2.4%
Rented, not occupied	0	599,884
	0.0%	0.5%
For sale only	129	1,682,020
	2.9%	1.3%
Sold, not occupied	0	608,590
	0.0%	0.5%
For seasonal, recreational, occasional use	93	5,122,778
	2.1%	3.9%
For migrant workers	0	34,233
	0.0%	0.0%
Other vacant	333	5,169,960
	7.6%	3.9%

Source: US Census Bureau 2013, American Community Survey Office, as reported by Headwater Economics 2015

Table 2-103
Housing Costs

	Richardson County, NE	United States
Owner-occupied housing units with a mortgage	**1,290**	**49,820,840**
Monthly cost <15% of household income	443	9,215,740
	34.3%	18.5%
Monthly cost >30% of household income	294	17,636,343
	22.8%	35.4%
Specified renter-occupied units	871	40,534,516
Gross rent <15% of household income	277	4,355,942
	31.8%	10.7%

Table 2-103
Housing Costs

	Richardson County, NE	United States
Gross rent >30% of household income	243	19,581,493
	27.9%	48.3%
Median monthly mortgage cost	$773	$1,540
Median gross rent	$490	$904

Source: US Census Bureau 2013, American Community Survey Office, as reported by Headwater Economics 2015

Population and Migration

The total population in Richardson County in 2013 was 8,125, down approximately 17 percent since 2000. In comparison, the US population as a whole increased 10.7 percent between 2000 and 2013 (Bureau of Economic Analysis, Regional Economic Accounts, Washington, DC, Table CA-30, as reported by Headwater Economics 2015). Population decline in the county is due to more deaths than births and more people moving out of the county than into the county, based on average annual net migration data (see **Table 2-104**, Components of Population Growth, 2000-2013).

Table 2-104
Components of Population Growth, 2000-2013

	Change 2000-2013
Population decline	-1,378
Average annual population change (natural change and net migration)	-134
Average annual natural change (births and deaths)	-52
Average annual net migration (international and domestic)	-76

Source: US Census Bureau Population Division 2014, as reported by Headwater Economics 2015

Population decline is projected to slow in the next 20 years in Richardson County. The county's population is expected to decrease approximately 3.3 percent by 2030, while the population in the Unites States as a whole is expected increase by 29.2 percent (see **Table 2-105**, Population and Population Projections). Information on ethnicity and race in area populations is addressed in **Section 2.6.25**, Environmental Justice.

Income and Employment

Total employment in Richardson County has decreased at almost the same rate as population change between 2000 and 2013, while total personal income has increased more rapidly than population change during the same timeframe (see **Table 2-106**).

Unemployment in Richardson County has generally followed national trends, peaking in 2010-2011, but remained below the national average. Unemployment over the past five years is shown in **Table 2-107**.

Table 2-105
Population and Population Projections

	Richardson County, NE	United States
Population (2013)	8,125	311,536,594
Population (2000)	9,507	281,421,906
Population change (2000-2013)	-1,382	30,114,688
Population percent change (2000-2013)	-17.0	10.7
Projected population change (2010-2030)	7,398	82,162,529
Projected percent change (2010-2030)	-3.3	29.2

Source: US Department of Commerce 2014, Bureau of Economic Analysis, Regional Economic Accounts, Washington, DC, Table CA-30, as reported by Headwater Economics 2015; Prochaska and Associates 2013

Table 2-106
Population, Employment, and Income Trends, 2000-2013

	2000	2013	Change 2000-2013	Percent Change 2000-2013
Population	9,507	8,125	-1,382	-14.5
Employment (full and part-time jobs)	4,947	4,247	-700	-14.1
Personal income (in thousands of 2013 dollars)	314,245	377,691	63,446	20.2
Average earnings per Job	$31,545	$47,551	$16,006	50.7
Per capita income	$33,054	$46,485	$13,431	40.6

Source: Bureau of Economic Analysis, Regional Economic Accounts, as reported by Headwater Economics 2015

Table 2-107
Average Annual Unemployment

	Richardson County, NE	United States
2013	5.3%	7.4%
2012	5.3%	8.1%
2011	6.4%	8.9%
2010	6.6%	9.6%
2009	6.1%	9.3%
2008	4.3%	5.8%
2007	4.1%	4.6%

Source: Bureau of Labor Statistics 2015

Income distribution for 2009-2013 American Community Survey data is demonstrated in more detail in **Table 2-108**, Household Income Distribution. Per capita income in Richardson County was slightly lower than that of the US average. Median household income was much lower than the US average.

Table 2-108
Household Income Distribution

	Richardson County, NE	United States
Per capita income (in 2013 dollars)	$23,566	$28,155
Median household income (in 2013 dollars)	$38,582	$53,046
Total Households	3,779	115,610,216
Less than $10,000	275	8,380,364
	7.3%	7.2%
$10,000 to 14,999	277	6,214,548
	7.3%	5.4%
$15,000 to 24,999	522	12,468,604
	13.8%	10.8%
$25,000 to 34,999	703	11,929,761
	18.6%	10.3%
$35,000 to 49,999	685	15,723,148
	18.1%	13.6%
$50,000 to 74,999	542	20,744,045
	14.3%	17.9%
$75,000 to 99,999	432	14,107,031
	11.4%	12.2%
$100,000 to 149,999	240	14,858,239
	6.4%	12.9%
$150,000 to 199,999	62	5,651,848
	1.6%	4.9%
$200,000 or more	41	5,532,628
	1.1%	4.8%

Source: US Census Bureau 2013, American Community Survey Office, as reported by as reported by Headwater Economics 2015

Based on 2013 data, top economic sectors in Richardson County are trade, transportation, and utilities, local government, education and health, and manufacturing. It is worth noting that average annual wages were much higher than average levels for information services and much lower than average for leisure and hospitality services (see **Table 2-109**, Employment and Wages by Industry, 2013). In 2013 the three industry sectors with the most jobs were trade, transportation, and utilities (526); government (590); and education and health (466).

Table 2-109
Employment and Wages by Industry, 2013

	Employment	Percent of Total Employment	Average Annual Wages	Percent Above or Below Average
Total	2,434		$28,495	
Private	1,844	75.8	$28,045	-1.6
Non-Services-Related	360	14.8	$36,223	27.1
Natural resources/mining	39	1.6	$23,126	-18.8
Agriculture, forestry, fishing, and hunting	33	1.4	$23,642	-17.0
Mining (including fossil fuels)	5	0.2	$24,342	-14.6
Construction	81	3.3	$31,530	10.7
Manufacturing (including forest products)	240	9.9	$39,935	40.1
Services-related	1,484	61.0	$26,061	-8.5
Trade, transportation, and utilities	526	21.6	$27,020	-5.2
Information	22	0.9	$72,845	155.6
Financial activities	103	4.2	$36,027	26.4
Professional and business	99	4.1	$28,393	-0.4
Education and health	460	18.9	$29,168	2.4
Leisure and Hospitality	220	9.0	$10,019	-68.8
Other services	54	2.2	$13,267	-53.4
Unclassified	0	0.0	N/A	N/A
Government	590	24.2	$29,901	4.9
Federal	36	1.5	$40,215	41.1
State	33	1.4	$30,861	8.3
Local	521	21.4	$29,127	2.2

Source: Bureau of Labor Statistics 2014, Quarterly Census of Employment and Wages, as reported by Headwaters Economics 2015

Total personal income by industry provides additional information on key economic sectors. In 2013, the three industry sectors with the largest personal income were farm ($73.4 million), government ($27.3 million), and health care and social assistance ($17.8 million). From 2001 to 2013, the three industry sectors that added the most new personal income in real terms were farm ($41.8 million), health care and social assistance ($2.7 million), and construction ($1.6 million; see **Table 2-110**, Personal Income by Industry 2001-2013 (in Thousands of 2013 Dollars)).

Table 2-110
Personal Income by Industry 2001-2013 (in Thousands of 2013 Dollars)

	2001	2013	Change 2001-2013
Labor earnings	152,965	201,948	48,983
Non-services related	52,103	93,785	41,682
Farm	31,656	73,403	41,747
Forestry, fishing, and related activities	N/A	N/A	N/A
Mining (including fossil fuels)	249	240	-9
Construction	5,737	7,297	1,560
Manufacturing	14,461	12,845	-1,616
Services related	59,665	61,394	1,729
Utilities	N/A	N/A	N/A
Wholesale trade	6,710	8,234	1,524
Retail trade	13,011	11,184	-1,827
Transportation and warehousing	N/A	N/A	N/A
Information	3,291	2,150	-1,141
Finance and insurance	5,578	4,461	-1,117
Real estate and rental and leasing	692	1,088	396
Professional and technical services	3,307	3,521	214
Management of companies and enterprises	N/A	N/A	N/A
Administrative and waste services	N/A	N/A	N/A
Educational services	1,144	1,144	0
Health care and social assistance	15,115	17,844	2,729
Arts, entertainment, and recreation	203	391	188
Accommodation and food services	3,189	3,015	-174
Other services, except public administration	7,426	8,362	936
Government	26,873	27,343	470

Source: US Department of Commerce. 2014. Bureau of Economic Analysis, Regional Economic Accounts, Washington, DC. Table CA05N, as reported in Headwater Economics 2015
Note: All employment data are reported by place of work.

Labor is the main source of income for Richardson County, comprising 62.1 percent of total personal income. Non-labor income is of increasing importance nationally and may provide locally important sources of income. Non-labor income in Richardson County makes up about the same percentage of total personal income as the national average. For more details regarding income source, refer to **Table 2-111**, Labor and Non-labor Income (in Thousands of 2013 Dollars).

Public Finance

Components of public finance related to management of federal lands and mineral resources in the planning area primarily include federal mineral royalty payments and other taxes collected from the extraction and sale of mineral resources. These categories are explained in detail below.

Table 2-111
Labor and Non-labor Income (in Thousands of 2013 Dollars)

	Richardson County, NE	United States
Total personal income ($1,000)	377,691	14,151,427,000
Non-labor income	143,157	5,085,220,000
	37.9%	35.9%
Dividends, interest, and rent	66,617	2,670,719,000
	17.6%	18.9%
Transfer payments	76,540	2,414,501,000
	20.3%	17.1%
Labor earnings	234,534	9,066,207,000
	62.1%	64.1%

Bureau of Economic Analysis 2014, Regional Economic Accounts, as reported by Headwater Economics 2015

Taxes

The severance tax in Nebraska is 3 percent on value for natural gas and non-stripper oil severed and 2 percent on value for stripper oil severed (National Conference of State Legislatures 2012). In 2006, approximately $2.8 million was collected in severance taxes in Nebraska (Nebraska Department of Revenue 2006). In addition to severance tax, oil and gas is subject to conservation tax, which is based on the value at the well of all oil and gas produced, saved, and sold or transported from Nebraska. The conservation tax rate is 0.40 percent and is deposited in the Oil and Gas Conservation Fund. In 2006, approximately $484,000 was collected in conservation tax (Nebraska Department of Revenue 2006).

Federal Mineral Royalties

As discussed in **Section 2.2**, BLM Resources, additional revenues from oil, gas, and coal extraction come from rents and royalties paid by producers for development of federal or Indian minerals. Mineral lease revenues are collected by the Office of Natural Resources Revenue within the Department of the Interior. Royalties collected in Nebraska are shown in **Table 2-112**, Rents, Royalties, and Bonus Revenue Collected. The Department of the Interior disburses 100 percent of the revenues received for energy and mineral production on Indian lands directly to the tribes and individual mineral owners through the BIA and the Office of Special Trustee for American Indians. Tribes then distribute the revenues among all members. Alternately, they apply the revenues to health care, infrastructure, education, and other critical community development programs, such as senior centers, public safety projects, and youth initiatives. Many individual mineral owners use these revenues as a major source of income to support their families and communities.

Table 2-112
Rents, Royalties, and Bonus Revenue Collected (FY 2014)

Gas (mcf[1]) volume	1,330
Gas sales	$5,330
Gas royalties	**$5,064**
Oil (oil barrels) volume	24,681
Oil sales	$ 2,190,827
Oil royalties	**$ 274,123**
Coal (tons) volume	0
Coal sales	0
Coal royalties	0
Rents	**$ 7,605**
Bonuses	**$ 48,544**
Other Revenue	**$46,214**

Source: Office of Natural Resources Revenue 2015
[1]mcf = thousand cubic feet

Nebraska's state share of federal mineral royalty revenue disbursement for fiscal year 2014 was $38,770. A portion of this amount is then disbursed to counties of origin (Office of Natural Resources Revenue 2015).

Social and Economic Activity Related to BIA Management Actions

Energy and Minerals
Employment in the mining sector in Nebraska represented only 0.6 percent (1,811) of the total private employment in 2012, less than that in Oklahoma, Kansas, or Texas. BIA-administered minerals represent only a fraction of total oil and gas production Nebraska.

Agriculture
Agriculture and livestock grazing played a traditional role in the study area economy and continue to be important in some areas today, particularly in non-metro areas. There were 736 farms, totaling 318,179 acres, in the Richardson County in 2012 (USDA, National Agricultural Statistical Service 2012). Agricultural data are presented in **Table 2-113**, Summary of Socioeconomic Study Area Agriculture (2012). Additional grazing occurs on BIA-administered lands in the area and there is potential for grazing to increase on both public and BIA-administered lands in the future.

Table 2-113
Summary of Socioeconomic Study Area Agriculture (2012)

Area	Number of Farms	Acres in Farms	Market Value (Crop Sales)	Market Value (Livestock Sales)
Richardson County	736	319,179	$114,978,000	$47,045,000

Source: USDA, National Agricultural Statistical Service 2012

Recreation

Recreation plays an important role in some local areas. Estimated economic impacts from area recreation are included below in **Table 2-114**.

Table 2-114
Summary of Planning Area Outdoor Recreation Economic Impacts

State	Consumer Spending for Outdoor Recreation	Direct Jobs Generated from Outdoor Recreation	Wages and Salaries Related to Outdoor Reaction	State and Local Tax Revenue from Outdoor Recreation
Nebraska	$5.7 billion	74,000	$1.7 billion	$396,000,000

Source: Outdoor Industry Association 2014

Social Conditions and Non-Market Values

An overview of social conditions and non-market values is provided in Section 2.5.3.

Tribal socioeconomic workshops were held in January 2015 to collect input from tribal groups on social and economic considerations important to tribes in the planning area. A summary of key concerns from participants at the tribal socioeconomic workshops is included below; full details are provided in the Socioeconomic Workshop Summary Report (BLM and BIA 2015). Details for general socioeconomic workshops conducted in February 2015, which also included some tribal member participation, are included in Section 2.5.3 and in the Workshop Summary Report (BLM and BIA 2015).

- Tribal gaming was cited as a big economic driver for many tribes.
- Tourism is becoming more important to some tribes, such as the Choctaw Nation and Absentee Shawnee.
- Participants noted that there is interest in wind development. There are at least three tribes that have proposed over 90 turbine wind farms. There will be five to seven wind farm developments in the next five years.
- Social concerns were getting people working and addressing domestic violence.
- Many of the 24 tribes in the Southern Plains rely on their oil and gas royalties. Eastern Oklahoma (which has mainly gas) has been in a slower growth rate as the price of gas has been low, and now with oil prices going down, western Oklahoma (mainly oil) will likely slow down too.
- Employment in tribal government and business ventures represents a major employer in some areas.
- Livestock graze on tribal lands and can be locally important for some tribes.

References

References are provided under Section 2.2, BLM Resources. The following additional references are also cited:

BLM and BIA 2015. BLM Oklahoma Field Office and BIA Southern Plains Region and Eastern Oklahoma Region. Joint Environmental Impact Statement and BLM Resource Management Plan and BIA Integrated Resource Management Plan Socioeconomics Workshops Summary Report. ul April 2015.

BLM GIS (US Department of the Interior, Bureau of Land Management, Geographic Information System). 2015. Base GIS data on file with the BLM's eGIS server used for calculations or figures; includes data prepared for the reasonable foreseeable development scenario and Version 04_02 of the decision area. BLM, Oklahoma Field Office, Tulsa.

Bureau of Labor Statistics. 2015. Unemployment Rate for Richardson County. Internet website: http://data.bls.gov/map/MapToolServlet.

Nebraska Department of Revenue. 2006. Nebraska Department of Revenue Annual Report. Internet website: http://nlcs1.nlc.state.ne.us/epubs/R5000/A001-2006.pdf.

Nebraska Energy Quarterly. 2015. The Birth of Oil Production in Nebraska. Internet website: http://www.neo.ne.gov/neqsum97/sum9705.htm.

Office of Natural Resources Revenue. 2015. Reported Revenues for All Land Categories in Nebraska for Fiscal Year 2014 by Accounting Year. Internet website: http://statistics.onrr.gov/ReportTool.aspx.

Outdoor Industry Association. 2014. The Outdoor Recreation Economy. State profiles for Nebraska, Oklahoma, Kansas, and Texas. Internet website: outdoorindustry.org/ recreationeconomy.

Prochaska and Associates. 2013. Richardson County Law Enforcement Center Needs Assessment Study. August 13, 2013. Falls City, Nebraska. Internet website: http://www.co.richardson.ne.us/pdfs/jail_project/Needs_Assessment_for_Law_Enforcement_Center.pdf.

Save America's Heritage. 1993. Nebraska Historic Buildings Survey, Reconnaissance Survey Final Report of Richardson County, Nebraska. August 1, 1993. Available online: http://www.nebraskahistory.org/histpres/reports/richardson_county.pdf.

Schottenhamel, George C. 1979. The Richardson County Oil Boom, 1938-1942. Nebraska History 60 (1979): 357-370. Internet website: http://www.nebraska history.org/publish/publicat/history/full-text/NH1979RichardsonOil.pdf.

2.6.25 Environmental Justice

The environmental justice conditions and trends for Oklahoma, Kansas, and Texas are described in **Section 2.2**, BLM Resources. The following describes environmental justice conditions for Richardson County, Nebraska, which is part of the planning area. This county only includes BIA surface and subsurface minerals. The same indicators as used in the environmental justice sections for Oklahoma, Kansas, and Texas (**Section 2.2**, BLM Resources) are used to describe conditions in Richardson County, Nebraska.

Low-Income Populations

A summary of poverty data for Richardson County is displayed in **Table 2-115**. The percent of individuals in poverty in Richardson County is slightly higher than the national average. The percent of families in poverty in Richardson County is about the same as the national average.

Table 2-115
Richardson County Population in Poverty in 2013

	Richardson County, NE	United States
Percent of individuals in poverty	17.2	15.4
Percent of families in poverty	11.2	11.3

Source: US Census Bureau 2013, American Community Survey Office, as reported by Headwater Economics 2015

The average percent of individuals below the poverty level in Nebraska is 12.9 percent (US Census Bureau 2010b). Individual poverty in Richardson County is therefore higher than the state average. This would be an area of focus for ensuring that residents of this county do not have disproportionately negative economic and social impacts from decisions in the joint EIS/BLM RMP and BIA Integrated RMP. **Figure 2-28**, Percent of Individuals below the Poverty Level, shows a map of Nebraska counties and comparative poverty levels.

Minority Populations

Based on 2013 data, the population of Richardson County had mostly minority populations below that of the national average (see **Table 2-116**, Richardson County Population by Race/Ethnicity (2012)). The exceptions are American Indian and individuals with two or more races, both of which were higher than the national average.

The average percent of aggregate minority population in Nebraska is 17.9 percent (US Census Bureau 2010a). Richardson County is therefore much lower than the state average. **Figure 2-29**, Aggregate Minority Population, shows a map of Nebraska counties and comparative aggregate minority populations.

References

References are provided under Section 2.2, BLM Resources.

Table 2-116
Richardson County Population by Race/Ethnicity (2012)

Population	Richardson County, NE	United States
Hispanic or Latino ethnicity of any race	5.7%	16.6%
White alone	88.9%	74.0%
Black or African American alone	0.0%	12.6%
American Indian alone	7.0%	0.8%
Asian alone	0.0%	4.9%
Native Hawaiian and Other Pacific Islander alone	0.0%	0.2%
Some other race	0.0%	4.7%
Two or more races	4.0%	2.8%
Aggregate minority population	6%	36.7%

Source: US Census Bureau 2013, American Community Survey Office, as reported by Headwater Economics 2015

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CHAPTER 3
CURRENT MANAGEMENT DIRECTION

3.1 RELEVANT PLANS AND AMENDMENTS

Management decisions are currently based on the Kansas RMP (BLM 1991), the Oklahoma RMP (BLM 1994a), and the Texas RMP (BLM 1996a), as amended (see **Table 3-1**).

Table 3-1
Current Resource Management Plans and Amendments within the Planning Area

Document Title	Month and Year
Kansas Resource Management Plan and Record of Decision (BLM 1991)	September 1991
Oklahoma Resource Management Plan and Record of Decision (BLM 1994a)	January 1994
Environmental Assessment and Finding of No Significant Impact and Decision Record: Six Coal Lease Applications and One Coal Lease Modification in Southeastern Oklahoma (BLM 1994b)	August 1994
Oklahoma Resource Management Plan Amendment and Record of Decision(BLM 1996b)	September 1996
Oklahoma Resource Management Plan Amendment and Finding of No Significant Impact for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (BLM 2004)	September 2004
Resource Management Plan Amendment and Decision Record for Federal Coal Leases in Haskell and LeFlore Counties, Oklahoma (BLM 2014)	March 2014
Texas Resource Management Plan and Record of Decision (BLM 1996a)	May 1996
Texas Resource Management Plan Amendment and Finding of No Significant Impact for the Cross Bar Cooperative Management Area (BLM 2000)	April 2000

3.2 BLM CURRENT MANAGEMENT OF RESOURCES

While the BLM manages according to federal and state laws and Department of the Interior policies and guidelines, no planning-level decisions have been identified in the existing Oklahoma, Kansas, or Texas RMPs for the following resources: air, soil, water, vegetation, wild horses and burros, visual resources, wildland fire, lands with wilderness characteristics, caves and karsts, forests, comprehensive trails and travel management, ACECs, backcountry byways, national trails, wild and scenic rivers, wilderness study areas, outstanding natural areas, social and economic conditions, treaty rights and tribal interests, environmental justice, and public safety. While the RMPs do not contain specific management decisions for the above-listed resources, specific fluid mineral leasing stipulations (see Federal Mineral Lease Stipulations) provide protection of some of these resources.

3.2.1 Soils

Decision Source	Current Management Decision/Policy	Status
RMP Amendment and Decision Record for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.	Highly erodible soils should be managed to maintain or reduce erosion and to improve vegetative ground cover. Where necessary, roads should be upgraded, maintained, and properly surfaced in accordance with the appropriate standards. Areas where the soils are highly erodible or difficult to reclaim should receive increased attention and are avoidance areas for surface-disturbing activities.	

3.2.2 Fish and Wildlife and Special Status Species

Decision Source	Current Management Decision/Policy	Status
Kansas RMP (Continuing Management Guidance)	Special status species and other fish, wildlife and wetland/riparian resource concerns are addressed through site-specific agency coordination in Kansas.	

Decision Source	Current Management Decision/Policy	Status
	Agency coordination is initiated with the USFWS, Kansas Department of Wildlife, Parks, and Tourism, and the Kansas Natural Heritage Program regarding each site specific BLM project in Kansas. Every application for permit to drill will continue to result in site specific agency coordination and application and discussion of any existing lease stipulations and notices.	
Texas Proposed RMPA and Environmental Assessment, 2000 (Continuing Management Guidance) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo.	Wildlife program coordination, such as that needed to conduct special status species evaluations, has been, and will continue to be, conducted with the Texas Parks and Wildlife Department and USFWS.	
Texas Proposed RMPA and Environmental Assessment, 2000 (Continuing Management Guidance) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and	The Texas Parks and Wildlife Department recommended that deer hunting on the lands be restricted to archery hunting only. The Department of the Interior adopted this recommendation. Shotgun-only small game hunting is largely regulated by the absence of legal access, both pedestrian and vehicular.	

Decision Source	Current Management Decision/Policy	Status
38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo.		
Texas Proposed RMPA and Environmental Assessment, 2000 (Continuing Management Guidance) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo.	Since the transfer of responsibilities to the BLM the Texas Panhandle Chapter of Quail Unlimited has expressed interest in challenge cost share projects to benefit the bobwhite and scaled (blue) quail populations on the Cross Bar property. These projects have been put on hold until the BLM finalizes a decision regarding the management of these lands.	

3.2.3 Cultural Resources

Decision Source	Current Management Decision/Policy	Status
Oklahoma RMP (Continuing Management Guidance)	Sacred tribal grounds or ceremonial sites considered important by federally recognized tribes are managed in accordance with the American Indian Religious Freedom Act, Public Law 95-341. At present, the American Indian Religious Freedom Act has no implementing regulations, and BLM consults with Native Americans under Archaeological Resources Protection Act of 1979 regulations and 43 CFR, Part 7. The Native American Graves Protection and Repatriation Act requires consultations with a tribe that has cultural affiliation when human remains, associated and unassociated funerary	

Decision Source	Current Management Decision/Policy	Status
	objects, sacred objects, and objects of cultural patrimony are found during testing, excavations, or unexpected discoveries.	
Oklahoma RMP (Continuing Management Guidance)	A key tool used by the BLM to manage the cultural resources is a varied intensity of inventory divided into three classes: Class I—Previously conducted inventory and literature search; Class II—Sampling field inventory (all sample units inventoried to a Class III level); and Class III—Intensive field inventory covers 100 percent of the area on foot. With only specifically defined exceptions in the BLM Cultural Resource Manual, the Class III inventory is required before any surface disturbance is allowed.	
Kansas RMP (Continuing Management Guidance)	Sacred tribal grounds or ceremonial sites considered important by federally recognized tribes are managed in accordance with American Indian Religious Freedom Act using 43 CFR, Part 7. This consultation will take into account the concerns of the tribes involving sites or locations of religious significance and can result in restrictions of oil and gas development or even no surface occupancy (NSO).	
Oklahoma RMP (Continuing Management Guidance) Kansas RMP (Continuing Management Guidance)	Cultural resource program involvement in split-estate minerals activities in Kansas consists of development of environmental analyses reports, site specific evaluations or inventories in support of oil and gas leasing, development of stipulations for impact mitigation or impact avoidance, and consultations with state agencies. Program involvement associated with mineral leasing under other federal surface management agencies properties is limited to coordination and consultation with the other federal agencies and with state agencies.	
Texas RMP (Continuing Management Guidance)	The cultural resource program activities in Texas consist of development of environmental analysis reports; site specific evaluations or inventories of cultural resources in support of mineral leasing and development, development of terms and conditions of impact mitigation or impact avoidance, and consultations with state agencies and Indian tribes. Program involvement associated with mineral leasing under the federal surface management agency (SMA) properties is limited to coordination and consultation with other federal and state agencies and federally recognized Indian tribes. Consultation directly with federally recognized Indian tribes is regularly performed to comply with the	

Decision Source	Current Management Decision/Policy	Status
	American Indian Religious Freedom Act. These consultations do not depend on tribal ownership of mineral rights in a development area, but result from tribal history, sacred or ceremonial areas or unmarked graves possible in an area of development. Negotiations with specific Indian tribes will also be conducted when any newly discovered Indian graves are claimed for repatriation in accordance with the Native American Graves Protection and Repatriation Act.	
Texas Proposed RMPA and Environmental Assessment, 2000 (Continuing Management Guidance) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo.	The management of cultural resources at the Cross Bar property is very similar to that described in the original Texas RMP. Preparation of environmental assessments required by proposed surface disturbance of any development is a regular function. Review continues of any contracted cultural inventories and close consultation with the Texas Historical Commission, other federal or state agencies, and federally recognized Indian tribes. Negotiation and preparation of the terms and conditions of any impact on cultural resources would be a second option after avoidance of any impact on cultural resources was first considered.	
Texas Proposed RMPA and Environmental Assessment, 2000 (Continuing Management Guidance) The planning area this RMPA applies to is 11,833.80 acres of federal surface	Consultation directly with a federally recognized Indian tribe would be the policy to comply with the American Indian Religious Freedom Act. These consultations do not depend on an Indian tribe owning mineral rights, but result from past tribal occupation, sacred or ceremonial areas and unmarked graves in a proposed project area. Negotiations with specific Indian tribes will be conducted when any newly discovered Indian grave is claimed for repatriation in accordance with the Native American Graves Protection and Repatriation Act.	

Decision Source	Current Management Decision/Policy	Status
estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo. (This is the same as the Texas RMP)		
Texas Proposed RMPA and Environmental Assessment, 2000 (Alternative B.—Retention and Management of Public Lands in Potter County, Texas (Preferred Alternative)) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo. *Note—The decision detailed here is an action of the preferred alternative, which*	Proposed Action (treated as decisions) Develop a cooperative resource management plan for the Management of the Cross Bar property. This cooperative resource management plan will include the following management principles and objectives: Natural and cultural resources protection will be a priority.	

Decision Source	Current Management Decision/Policy	Status
is assumed to be the selected alternatives (no ROD provided for this proposed RMPA).		
WO- NHPA	Lease stipulation. A lease may be found to contain historic properties 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.	

3.2.4 Paleontological Resources

Decision Source	Current Management Decision/Policy	Status
Oklahoma RMP (Continuing Management Guidance)	The BLM paleontological resource management program within Oklahoma includes the requirement that the BLM be notified should paleontological resources be encountered during the conduct of BLM approved operations.	
Texas RMP (Continuing Management Guidance)	The paleontological resource program activities in Texas consists of development or review of environmental analysis reports; site specific evaluations or inventories of paleontological resources in support of mineral leasing and development, and application of terms and conditions for impact mitigation or to avoid impacts.	
Kansas RMP (Continuing Management Guidance)	The BLM paleontological resource management program within Kansas includes the requirement that the BLM be notified should paleontological resources be encountered during the conduct of operations.	

3.3 BLM CURRENT MANAGEMENT OF RESOURCE USES

3.3.1 Energy and Minerals

General—All Energy and Minerals

Decision Source	Current Management Decision/Policy	Status
Kansas RMP (Continuing Management Guidance)	Federal minerals under private surface or federal surface managed by another federal agency or licensed by another federal agency to a state or local agency for surface management purposes are the most common situations encountered in BLM's wildlife management program in Kansas. In these situations BLM's wildlife responsibilities in Kansas do not begin until a BLM mineral action is proposed.	
Kansas RMP (Continuing Management Guidance)	All federal oil and gas leasing and lease operations in Kansas are conducted following procedures established and presented in 43 CFR, Part 3100. Lease development activities in Kansas involve on-site inspections before application for permit to drill approval, drilling plan review and lease operations inspection and enforcement.	
Kansas RMP (Continuing Management Guidance)	Lease operations are regulated by lease terms, regulations, and stipulations that may be attached to the lease to protect specific resource values identified in an Environmental Assessment or EIS. Before operations, a site-specific environmental analysis of the proposed well site may result in additional considerations before approval of the drilling permit.	
Kansas RMP (RMP Actions)	Under the RMP, new leases and expired leases that are reissued would be leased with standard lease terms. Mandatory stipulations would be incorporated into each lease where those stipulations apply. In addition, this will include optional stipulations where resource values exist that warrant special protection.	
Kansas RMP (RMP Actions)	All new leases and expired leases that are reissued would be leased with stipulations currently identified by the SMA. Additional stipulations may be applied to these SMA lands where the BLM determines that additional stipulations may be necessary to protect resource values warranting greater protection than provided by the SMA stipulations.	
Texas RMP (Continuing Management Guidance)	The uncertainty concerning the location of split-estate minerals in Texas makes some preleasing/post RMP wildlife agency coordination necessary. Every post-leasing action which would result in surface disturbing activities would be analyzed in a BLM Environmental	

Decision Source	Current Management Decision/Policy	Status
	Assessment and an "evaluation of special status species, wetlands and riparian zones." Agency Coordination letters would be mailed to the Texas Parks and Wildlife Department and the appropriate USFWS office on all post-leasing oil and gas actions which would result in surface-disturbing activities. Such surface disturbing actions would include applications for permit to drill or sundry notices submitted for actions on Indian or federal oil and gas leases. Site-specific agency coordination would include a discussion of lease stipulations and notices.	
Texas RMP (Continuing Management Guidance)	Federal minerals occurring in commercial quantities in Texas include oil and gas and coal or lignite. Federal lignite leasing in Texas was addressed in the Draft and Final Camp Swift Lignite Leasing EIS of 1980 and is included as continuing management guidance. Procedures for reviewing oil and gas lease applications vary depending on the category of surface ownership. Proposals to lease split-estate minerals require the BLM to prepare a site-specific Environmental Assessment and assure that necessary surface protection stipulations are attached to the lease. Procedures for leasing on other SMA minerals are similar to split-estate procedures except that the SMA is contacted for approval to lease and also for identification of specific agency surface protection stipulations. The BLM is responsible for NEPA compliance documentation, which could include preparing a site-specific Environmental Assessment that addresses the proposal. All federal oil and gas leasing and lease operations in Texas are conducted following procedures established and presented in 43 CFR, Part 3100. Before operations begin, a site-specific environmental analysis of the proposed well site may result in additional considerations before approval of an application for permit to drill. Lease activities in Texas involve on-site inspections before approving an application for permit to drill, drilling plan review and lease operations inspection and enforcement. Lease operations are regulated by lease terms, regulations and stipulations that may be attached to the lease to protect specific resource values identified	

Decision Source	Current Management Decision/Policy	Status
	in an Environmental Assessment or EIS. Geophysical operations within Texas are not controlled or authorized by the BLM. Each SMA and surface owner negotiates and controls surface uses which includes access for geophysical exploration activities.	
Texas RMP (The RMP for Oil and Gas Leasing and Development)	Split-Estate Lands 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 protection.	
Texas RMP (The RMP for Oil and Gas Leasing and Development)	SMA Lands All new leases and all expired leases that are reissued would be leased with stipulations currently identified by the SMA. Additional stipulations may be applied to these SMA lands where the BLM determines additional stipulations may be necessary to protect resource values warranting protection greater than that provided by the SMA stipulations.	
Texas Proposed RMPA and Environmental Assessment, 2000 (Alternative B—Retention and Management of Public Lands in Potter County, Texas (Preferred Alternative) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over	Proposed action (treated as decisions): Designate an electrical transmission line ROW corridor across federal surface estate adjacent to the existing power line (as required by Section 503 of FLPMA)	

Decision Source	Current Management Decision/Policy	Status
federal minerals) in Potter County, north of Amarillo.		
Texas Proposed RMPA and Environmental Assessment, 2000 (affected environment: portions from this section that describe management direction as they now exist on the Amarillo Field Office unit boundaries) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo.	Gas rights for 6,806.3 acres were leased by the BM to Sunlight Exploration, Inc. This lease includes the following lands: Sections 2, 3, 4 Block 4 G&M Survey Sections 45, 48, 50 Block 5 G&M Survey Section 14 Block 21-W EL&RR Survey Section 19 Block 21-W Pointevant Survey Sections 22, 27 Block 21-W GC&SFRR Survey Gas right for 1920 acres was leased to J.W. Resources by the BM. This lease includes the following lands: Sections 211, 212, 213 Block 2 AB&M Survey. When these leases expire, the gas rights will not be offered for lease again (43CFR3100.3-3[b][2][v]).	
Resource Management Plan Amendment and Decision Record for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties,	The RMPA will allow the three lease applications areas (LAA) to be leased and subsequently developed. These LAAs are in Haskell, Latimer, and LeFlore Counties in southeastern Oklahoma and total 6,883.17 acres of previously unleased coal. The sizes and locations of the three LAAs are as follows: LAA: Liberty West Acres: 640 County: Haskell	

Decision Source	Current Management Decision/Policy	Status
Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.	Cadastral Location: Sections 1 and 12, T10N, R21E LAA: McCurtain Acres: 2,380 County: Haskell Cadastral Location: Sections 8-11, 14-17, T8N, R22E LAA: Bull Hill Acres: 3,863.17 County: Latimer, LeFlore Cadastral Location: Sections 4-6, T5N, R23E; Sections 31-34, T6N, R24E; Sections 33-36, T6N, R23E; Section 1-3, T5N, R22E	
Amendment and Decision Record for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.	Liberty West LAA Coal from the Stigler seam would be recovered by surface mining methods. The Stigler seam averages 26 inches in thickness, and dips toward the northwest and southwest at a rate of approximately 2 to 4 percent, with 135 tons per acre-inch of recoverable coal. The Stigler seam in this area lies from approximately 60 feet below the surface to as deep as 150 feet below the surface within the mining area. Mining would be a continuation of the adjacent permit, Oklahoma Department of Mines Permit #4268. Mining would progress in a series of long narrow pits away from the crop line of the Stigler horizon. The pits would be up to 150 feet wide at the bottom and may range from 60 to 120 feet deep. The length would vary but would range from 2,000 to 4,000 feet.	
Amendment and Decision Record for Three Competitive Coal Lease Sales in	McCurtain LAA Coal from the Hartshorne seam would be recovered by underground mining methods. The Hartshorne seam averages 47 inches in thickness and a maximum recovery	

Decision Source	Current Management Decision/Policy	Status
Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.	depth of 1,000 feet. The existing high wall remaining from previous mining operations would be stripped back to a solid wall, and then the underground mining operation would begin.	
Amendment and Decision Record for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.	Bull Hill LAA Coal from the Lower and Upper Hartshorne coal seams would be recovered to a depth of 100 feet of overburden. The coal seam would be recovered with a combination of conventional surface mining and auger mining. Surface mining operations would remove coal from two steeply dipping coal seams. One pit of coal would be stripped using conventional surface mining methods. The stripping would advance the existing highwall down-dip to a depth of approximately 100 feet to provide additional pit area for the auger mining operations and would recover coal 300 to 500 feet into the seam from the highwall.	
Amendment and Decision Record	The three LAAs will be offered for lease, allowing development of all lands in the leased areas, except those	

Decision Source	Current Management Decision/Policy	Status
for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.	considered to be unsuitable for development (1) in accordance with the unsuitability criteria and (2) considering the results of the multiple use screen, which includes wetland and riparian areas, the Wister Wildlife Management Area, cultural resources, and priority streams. With stipulations, approximately 1.62 acres, or less than 1 percent of the originally proposed leases, would be unsuitable for consideration.	
Oklahoma RMPA and Decision Record for Federal Coal Leases in Haskell and Leflore Counties, Oklahoma (2014) The planning area this RMPA applies to is the McCurtain Area (1,300.62 acres), the Milton Area (290.00 acres), the Spiro Area (790 acres), and the Liberty Area (1,620 acres). The planning area is outside of areas designated as	The planning area would be made available for leasing, allowing for potential development of all lands in the leased areas, except those considered to be unsuitable for development (1) in accordance with the unsuitability criteria and (2) considering the results of the multiple-use screen. This screen identified wetlands, stream, and riparian zones and potential archaeological and historical sites, potential habitat for special status wildlife species, and potential conflict with existing land uses. The estimated total number of acres in the planning area considered at this time as unsuitable for development, after stipulations and the multiple-use screen, is approximately 323 acres. This is about 8.1 percent of the total 4,000.62 acres.	

Decision Source	Current Management Decision/Policy	Status
available for coal leasing in the RMP (1994) or its amendments.		
Oklahoma RMPA and Decision Record for Federal Coal Leases in Haskell and Leflore Counties, Oklahoma (2014) The planning area this RMPA applies to is the McCurtain Area (1,300.62 acres), the Milton Area (290.00 acres), the Spiro Area (790 acres), and the Liberty Area (1,620 acres). The planning area is outside of areas designated as available for coal leasing in the RMP (1994) or its amendments.	Area: Milton Total Acres: 290.00 Area Considered Unsuitable (acres): 26.3 Percent of Total Considered Unsuitable: 9 Area Considered Suitable (acres) 263.7	
Oklahoma RMPA and Decision Record for Federal Coal Leases in Haskell and Leflore Counties, Oklahoma (2014) The planning	Area: Spiro Total Acres: 790.00 Area Considered Unsuitable (acres): 0.0 Percent of Total Considered Unsuitable: 0.0 Area Considered Suitable (acres): 790	

Decision Source	Current Management Decision/Policy	Status
area this RMPA applies to is the McCurtain Area (1,300.62 acres), the Milton Area (290.00 acres), the Spiro Area (790 acres), and the Liberty Area (1,620 acres). The planning area is outside of areas designated as available for coal leasing in the RMP (1994) or its amendments.		
Oklahoma RMPA and Decision Record for Federal Coal Leases in Haskell and Leflore Counties, Oklahoma (2014) The planning area this RMPA applies to is the McCurtain Area (1,300.62 acres), the Milton Area (290.00 acres), the Spiro Area (790 acres), and the Liberty Area (1,620 acres). The planning area is outside of areas designated as available for	Area: Liberty Total Acres: 1,620.00 Area Considered Unsuitable (acres): 297.1 Percent of Total Considered Unsuitable: 18.3 Area Considered Suitable (acres): 1,322.9	

Decision Source	Current Management Decision/Policy	Status
coal leasing in the RMP (1994) or its amendments.		
Oklahoma RMPA and Decision Record for Federal Coal Leases in Haskell and Leflore Counties, Oklahoma (2014) The planning area this RMPA applies to is the McCurtain Area (1,300.62 acres), the Milton Area (290.00 acres), the Spiro Area (790 acres), and the Liberty Area (1,620 acres). The planning area is outside of areas designated as available for coal leasing in the RMP (1994) or its amendments.	Area: McCurtain Total Acres: 1,300.62 Area Considered Unsuitable (acres): 0.0 Percent of Total Considered Unsuitable: 8.1 Area Considered Suitable (acres):1,300.62	

Federal Mineral Lease Notices

Decision Source	Current Management Decision/Policy	Status
Kansas RMP (Lease Stipulations)	Lease Stipulation WO-ESA-7: Consultation Stipulation The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened or endangered or other special status species. The BLM may recommend modifications to exploration and	

Decision Source	Current Management Decision/Policy	Status
	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 its habitat. The BLM may require modifications to or may disapprove proposed activity that is likely to jeopardize the continued existence of a proposed or listed threatened or endangered species or to result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 USC, Section 1531 et seq., including completion of any required procedure for conference or consultation. This lease stipulation applies to the following: • Allen County Split-Estate Tract • Barber County Split-Estate Tract 2 • Clark County Split-Estate Tracts 14 • Comanche County Split-Estate Tract 3 • Cowley County Split-Estate • Douglas County Split-Estate Tracts 1 and 3 • Finney County Split-Estate Tracts 1 and 3 • Franklin County Split-Estate Tracts 1 • Hamilton County Split-Estate Tracts 1, 2, 4, 5, and 7 • Jefferson County Split-Estate Tract 2 • Johnson County Split-Estate Tract • Leavenworth County Split-Estate Tracts 4 and 5 • Linn County Split-Estate Tracts • Logan County Split-Estate Tract 3 • Meade County Split-Estate Tracts • Scott County Split-Estate Tract 2 • Seward County Split-Estate Tracts 1, 3, and 4 • Wabaunsee County Split-Estate Tract • Wallace County Split-Estate Tract 1	
Kansas RMP (Lease Notices)	Lease Notice LN-2, Black-Footed Ferrets In Kansas “If black-footed ferrets occur anywhere in the wild in Kansas, they are presumed to be associated with prairie dogs. All or portions of this lease area lie within a county of Kansas where prairie dog towns have occurred in the past. Therefore, if a prairie dog town of	

Decision Source	Current Management Decision/Policy	Status
	eighty acres or more is found to occur on or near this lease, a black-footed ferret survey may be required before permitting surface-disturbing activity which may impact the prairie dog town." Lease Notice LN-2 will be applied to leases issued in the counties that last reported the presence of prairie dog towns, as follows: Barber, Barton, Cheyenne, Clark, Clay, Comanche, Decatur, Edwards, Ellis, Ellsworth, Finney, Ford, Gove, Graham, Grant, Gray, Greeley, Hamilton, Harper, Harvey, Haskell, Hodgeman, Jewell, Kearny, Kingman, Kiowa, Lane, Lincoln, Logan, McPherson, Meade, Mitchell, Morton, Ness, Norton, Osborne, Ottawa, Pawnee, Phillips, Pratt, Rawlins, Reno, Rice, Rooks, Rush, Russell, Saline, Scott, Seward, Sheridan, Sherman, Smith, Stafford, Stanton, Stevens, Sumner, Thomas, Trego, Wallace, and Wichita.	
Texas RMP (Lease Stipulations) Oklahoma RMP (Lease Stipulations)	Lease Stipulation WO-ESA-7, Consultation Stipulation "The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development 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." This lease stipulation applies to the following in Oklahoma: • Alfalfa County Split-Estate Tracts 35 • Beaver County Split-Estate Tracts 19, 20- 22, 30, 27, 28, 29, 34, and 38 • Blaine County Split-Estate Tracts 2-9, 12-20, and	

Decision Source	Current Management Decision/Policy	Status
	27 • Bryan County Split-Estate Tracts • Caddo County Split-Estate tracts • Canadian County Split-Estate 16, 9, and 11-l3 • Cherokee County Split-Estate Tracts • Cleveland County Split-Estate Tracts • Cotton County Split-Estate Tracts 15 • Custer County Split-Estate Tracts 10 and 15-19 • Dewey County Split-Estate Tracts 1 through 28 • Ellis County Split-Estate Tracts 17, 22 through 31, and 50 through 61 • Grant County Split-Estate Tracts 14 • Harper County Split-Estate Tracts 1, 10, I3, and I5-22 • Haskell County Split-Estate Tracts • Jackson County Split-Estate Tracts 14, 15, and 21-39 • Kingfisher County Split-Estate Tracts 2, 3, 4, 5, and 10-17 • Latimer County Split-Estate Tracts • Le Flore County Split-Estate Tracts • Major County Split-Estate Tracts 1-8, 10-12, 14-20, 26-29, and 97-99 • Muskogee County Split-Estate Tracts • Payne County Split-Estate Tracts 4, 7, and 8 • Pittsburg County Split-Estate Tracts • Pottawatomie County Split-Estate Tracts 4, 7, and 8 • Pushmataha County Split-Estate Tracts 60, 64, 69, and 84 • Rogers County Split-Estate Tracts • Sequoyah County Split-Estate Tracts • Tillman County Split-Estate Tracts 4 and 7-12 • Tulsa County Split-Estate Tracts • Woods County Split-Estate Tracts 1 through 6, 63-67, 70-72, 74-105, and 122-127 • Woodward County Split-Estate Tracts 1, 19, 38, and 42-50	
Oklahoma RMP (Lease Notices)	Lease Notice LN-2, ODWC-owned and –managed Lands The ODWC owns and manages the surface above all or a portion of this federal lease. The lessee needs to be	

Decision Source	Current Management Decision/Policy	Status
	aware of the surface use requirements as presented in ODWC documents G-12-82 and A-12 which address regulations and a surface damage agreement to govern oil, gas, and other mineral exploration and production on ODWC-owned and -managed lands. Applies to: • Beaver County Split-Estate Tracts 27, 30, 31, 32, and 33 • Cimarron County Split-Estate Tracts 4, 11, 12, 39, and 40. • Major County Split-Estate Tracts 4, 86, and 90	

Federal Mineral Conditions of Approval

Decision Source	Current Management Decision/Policy	Status
Oklahoma RMP (Conditions of Approval)	"All open pits and tanks being used in conjunction with the development of this lease will be covered until they are removed and/or filled and reclaimed. The recommended coverings include hard covers or a screen material of small enough mesh size so as to prevent the entry and death of migratory birds. The USFWS, Division of Law Enforcement has prepared materials which provide more detailed guidelines for covering oil field pits and tanks."	

Federal Mineral Lease Stipulations

All stipulations are relevant to Energy and Minerals; additional resources/programs of relevance for each stipulation are also noted.

Decision Source	Current Management Decision/Policy	Status
Kansas RMP (BLM Stipulations)Texas RMP (BLM Mandatory Stipulations) Oklahoma RMP (BLM Mandatory Stipulations)	Oklahoma Resource Area ORA-1, Floodplain Protection Stipulation "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." This stipulation applies to the following areas in Kansas: • Fort Riley Military Reservation (1,800 acres)	

Decision Source	Current Management Decision/Policy	Status
	• Allen County Split-Estate Tracts • Bourbon County Split-Estate Tracts • Cheyenne County Split-Estate Tracts 1 and 15 • Clark County Split-Estate Tract 1 • Comanche County Split-Estate Tract 3 • Cowley County Split-Estate Tract • Decatur County Split-Estate Tract 1 • Geary County Split-Estate Tract • Greeley County Split-Estate Tract 1 • Hamilton County Split-Estate Tracts 1, 2, and 4 • Jefferson County Split-Estate Tract 2 • Leavenworth County Split-Estate Tract 2 • Linn County Split-Estate Tracts 1 and 2 • Logan County Split-Estate Tract 1 • Marshall County Split-Estate Tract 1 • Morris County Split-Estate Tract • Osage Split-Estate Tract • Republic County Split-Estate Tract • Riley County Split-Estate Tracts 1 and 2 • Scott County Split-Estate Tract 1 • Seward County Split-Estate Tracts 3, 4, and 5 • Wabaunsee County Split-Estate Tract This stipulation applies to the following areas in Oklahoma: • Alfalfa County Split-Estate Tracts 35 • Atoka County Split-Estate Tract 1 • Beaver County Split-Estate Tracts 4, 20-22, 27-30, 34, 37, 38, and 47 • Beckham County Split-Estate Tracts • Blaine County Split-Estate Tracts 19, 11-17, 18-20, and 27 • Bryan County Split-Estate Tracts • Caddo County Split-Estate Tracts • Canadian County Split-Estate Tracts 16, 9, and 11-l3 • Carter County Split-Estate Tracts 14 • Cherokee County Split-Estate Tracts • Cimarron County Split-Estate Tracts 13, 16, 19, 74, 75, 92-96, 141, 156, 162, and 165 • Cleveland County Split-Estate Tracts • Cotton County Split-Estate Tracts 15 • Craig County Split-Estate Tract 2	

Decision Source	Current Management Decision/Policy	Status
	• Custer County Split-Estate Tracts 10 and 14-l9 • Dewey County Split-Estate Tracts 1 through 28 • Ellis County Split-Estate Tracts 17, 22-31, and 50- 61 • Gavin County Split-Estate Tracts 1 and 2 • Grant County Split-Estate Tracts 1-4 • Greer County Split-Estate Tracts 7-12 and 17 • Harmon County Split-Estate Tracts 19, 20-28, and 37-40 • Harper County Split-Estate Tracts 1, 8, 10-13, and 15-22 • Haskell County Split-Estate tracts 5,9, and 10 • Jackson County Split-Estate Tracts 1-15 and 21-39 • Jefferson County Split-Estate Tract 4 • Kingfisher County Split-Estate Tracts 2, 3, 4, 6, and 11-17 • Kiowa County Split-Estate Tracts 15-17 • Latimer County Split-Estate Tracts 5 and 6 • Le Flore County Split-Estate Tracts • Lincoln County Split-Estate Tracts 1-8 • Logan County Split-Estate Tracts • Major County Split-Estate Tracts 1-8, 10-12, 14, 20, 26-29, 60-64, and 97-99 • Muskogee County Split-Estate Tract 23 • Murray County Split-Estate Tract 1 • Noble County Split-Estate Tract 8 • Oklahoma County Split-Estate Tracts • Payne County Split-Estate Tracts 4, 7, and 8 • Pottawatomie County Split-Estate Tracts 1-10 • Pushmataha County Split-Estate Tracts 60-64 and 69-84 • Texas County Split-Estate Tract 18 • Tillman County Split-Estate Tracts 4 and 7-12 • Washita County Split-Estate Tract 7 • Woods County Split-Estate Tracts 16, 63-67, 70-72, 74-105, and 122-127 • Woodward County Split-Estate Tracts 1-19, 38, and 42-50	
Kansas RMP (BLM Stipulations) Texas RMP (BLM	Oklahoma Resource Area ORA-2, Wetland/Riparian Stipulation “All or portions of the lands under this lease contain	

Decision Source	Current Management Decision/Policy	Status
Mandatory Stipulations) Oklahoma RMP (BLM Mandatory Stipulations)	wetland and/or riparian areas. 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, minimized or compensated. The mitigation goal will be no net loss of in-kind wetlands. Such mitigation will be developed during the application for permit to drill process in cooperation with appropriate state and Federal agencies." This stipulation applies to the following areas in Kansas: • Fort Riley, 1800 acres • Allen County Split-Estate Tract • Barber County Split-Estate Tract 1 • Bourbon County Split-Estate Tract • Brown County Split-Estate Tract • Cheyenne County Split-Estate Tracts 1 through 14 and 16 • Clark County Split-Estate Tracts • Clay County Split-Estate Tract • Comanche County Split-Estate Tract 13 • Cowley County Split-Estate Tract • Decatur County Split-Estate Tract 1 • Doniphan County Split-Estate Tract • Douglas County Split-Estate Tract 3 • Ellis County Split-Estate Tract • Finney County Split-Estate Tracts 1 and 4 • Greeley County Split-Estate Tracts • Hamilton County Split-Estate Tracts 1, 2, 3, 6, and 8 • Haskell County Split-Estate Tracts • Jackson County Split-Estate Tracts • Jefferson County Split-Estate Tracts 1 and 2 • Jewell County Split-Estate Tracts • Johnson County Split-Estate Tract • Kearny County Split-Estate Tracts • Kingman County Split-Estate Tracts • Lane County Split-Estate Tract 15 • Leavenworth County Split-Estate Tracts 1 and 2 • Linn County Split-Estate Tracts • Logan County Split-Estate Tract 2 • Marshall County Split-Estate Tract 2	

Decision Source	Current Management Decision/Policy	Status
	• Meade County Split-Estate Tract 15 • Mitchell County Split-Estate Tract • Morris County Split-Estate Tract • Norton County Split-Estate Tract • Osage County Split-Estate Tract • Phillips County Split-Estate Tract • Riley County Split-Estate Tracts • Saline County Split-Estate Tracts • Scott County Split-Estate Tract 1 • Seward County Split-Estate Tract 25 • Smith County Split-Estate Tract • Stanton County Split-Estate Tract • Wabaunsee County Split-Estate Tract • Wallace County Split-Estate Tracts 1 and 3 • Washington County Split-Estate Tract • Wichita County Split-Estate Tract This stipulation applies to the following areas in Oklahoma: • Alfalfa County Split-Estate Tract 35 • Atoka County Split-Estate Tract 24 • Beaver County Split-Estate Tracts 6, 8, 19-22, 27-30, 34, 36-38, 44, 47, 76, 82, 86-89, and 92 • Beckham County Split-Estate Tracts 4-34 • Blaine County Split-Estate Tracts 1-20, 25, and 27 • Bryan County Split-Estate Tract l • Caddo County Split-Estate Tracts 3 and 6 • Canadian County Split-Estate Tracts 1-6, 9, and 11-l3 • Carter County Split-Estate Tracts 1-4 • Cherokee County Split-Estate Tracts • Cimarron County Split-Estate Tracts 11, 13, 16, 19, 29, 35, 53, 54, 60, 74, 75, 90-96, 141, 156, 162, and 165 • Cleveland County Split-Estate Tracts • Coal County Split-Estate Tracts 1 and 5 • Cotton County Split-Estate Tract 1-5 • Craig County Split-Estate Tract 2 • Custer County Split-Estate Tracts 3, 6, 8, 10-11, and 14-l9 • Dewey County Split-Estate Tracts 1, 28, 36, and 40	

Decision Source	Current Management Decision/Policy	Status
	• Ellis County Split-Estate Tracts 13, 17, 22-31, 34, 39, and 50-61 • Gavin County Split-Estate Tracts 1, 2, and 9 • Grant County Split-Estate Tract 14 • Greer County Split-Estate Tracts 6-12 and 17 • Harmon County Split-Estate Tracts 19, 17-19, 20-28 and 37-40 • Harper County Split-Estate Tracts 1-6, 9, 10, 13, 15-22 and 28 • Haskell County Split-Estate Tracts 4, 5, 8-13, and 15-17 • Jackson County Split-Estate Tracts 1-15 and 21-39 • Jefferson County Split-Estate Tract 4 • Kingfisher County Split-Estate Tracts 2, 3, 4, 6, and 10-17, and 20 • Kiowa County Split-Estate Tracts 15, 16, and 17 • Latimer County Split-Estate Tracts 3, 5, and 6 • Le Flore County Split-Estate Tracts • Lincoln County Split-Estate Tracts I9 • Logan County Split-Estate Tracts • Major County Split-Estate Tracts 1-8, 10-12, 14, 20, 26-29, 48, 51, 59, 60-64, and 97-99 • McCurtain County Split-Estate Tract 1 • McIntosh County Split-Estate Tract 3 • Murray County Split-Estate Tracts 1, 4, and 6 • Muskogee County Split-Estate Tracts 2, 8, and 10 • Noble County Split-Estate Tracts 2, 7, and 8 • Oklahoma County Split-Estate Tracts • Pawnee County Split-Estate Tract 1 • Payne County Split-Estate Tracts 2, 4, 7, 8, 11, 13-16, 18-23, 27, 30, and 47 • Pittsburg County Split-Estate Tracts 3, 7, 8, and 9 • Pottawatomie County Split-Estate Tract 1-10 • Pushmataha County Split-Estate Tracts 5, 47, 55, 60-64, and 69-84 • Sequoyah County Split-Estate Tract 1 • Stephens County Split-Estate Tract • Texas County Split-Estate Tract 18 • Tillman County Split-Estate Tracts 3-4, 7-12, 16, and 17	

Decision Source	Current Management Decision/Policy	Status
	• Tulsa County Split-Estate Tracts • Wagoner County Split-Estate Tract 4 • Washita County Split-Estate Tracts 1 and 7 • Woods County Split-Estate Tracts 16, 19, 61, 63-67, 70-72, 74-105, and 122-127 • Woodward County Split-Estate Tracts 1-19, 29-32, 35-39, and 42-51	
Kansas RMP (BLM Stipulations) Texas RMP (BLM Optional Stipulations) Oklahoma RMP (BLM Mandatory Stipulations)	Oklahoma Resource Area ORA-3, Season of Use Stipulation (Optional) "Surface occupancy of this lease will not be allowed from (date) through (date) without the specific approval in writing, from the Authorized Officer of the BLM." This stipulation restricts the time that the lessee can be on the lease for a period of more than 60 days. Most season of use restrictions involve wildlife seasonal use requirements or recreation use conflicts with drilling activities. Applies to the following in Kansas: • Council Grove Lake SMA from September 1 through March 31, on approximately 2,638 acres • Elk City Lake SMA from September 1 through March 31, on 10,219 acres • Fall River Lake SMA from September 1 through March 31, on 11,407 acres • John Redmond Dam and Reservoir from September 1 through March 31, on approximately 2,067 acres • Marion Lake SMA from September 1 through March 31, on approximately 3,002 acres • Pearson-Skubitz Big Hill Lake SMA from September 1 through March 31, on approximately 800 acres • Toronto Lake SMA from September 1 through March 31, on approximately 5,576 acres • Kaw, Hulah, and Capon Lakes SMA from September 1 through March 31 • Finney County Tract 2 from November 1 through March 1 • Scott County Tract 1 from October 15 through March 1	

Decision Source	Current Management Decision/Policy	Status
	Oklahoma Resource Area ORA-3, Season of Use Stipulation "Surface occupancy of this lease will not be allowed from DATE through DATE without the specific approval in writing, from the Authorized Officer of the BLM." This stipulation restricts the time that the lessee can be on the lease. This is usually necessary only when the restriction would result in more than a 60-day delay before operations begin (by regulation, the BLM can specify up to a 60-day delay as a result of the application for permit to drill analysis). Most season of use restrictions involve wildlife seasonal use requirements or recreation use conflicts with drilling activities. Applies to the following in Oklahoma: • Pat Mayes Lake SMA from September 1 through March 31, on 8,925 acres • Texoma Lake SMA from September 1 through March 31, on 11,429 acres • Belton Lake SMA Oklahoma Resource Area ORA-3 from September 1 through March 31, on the approximately 5,000 acres • B. A. Steinhagen Lake SMA from September 1 through March 31, on approximately 13 ,450 acres • Granger Lake SMA from September 1 through March 31, on approximately 10,800 acres • Beaver County Tracts during all applicable hunting seasons and from February 15 through May 15 • Beckham County Tracts from February 15 through May I5 • Ellis County Tracts 39-49 and 62-64 during all applicable hunting seasons it applies to these and all other Ellis County tracts from February I5 to May 15 • Greer County Tracts 43 and 53-56 in the Sandy Sanders Public Hunting Area managed by ODWC, from September 1 to June 1	

Decision Source	Current Management Decision/Policy	Status
	• Harper County Split-Estate Tracts February I5 through May I5 • Jefferson County Split-Estate Tract 2 • Major County Split-Estate Tract 84 from September 1 to May 3 • McIntosh County Split-Estate Tracts 1 and 2 • Payne County from February 15 through May 15 • Roger Mills County Split-Estate Tracts from February 15 to May 15 • Rogers County Split-Estate Tracts from February 1 to May 15 • Tulsa County Split-Estate Tracts from February 15 to May 15 • Wagoner County Split-Estate Tracts from February 15 to May 15 • Woodward County Split-Estate Tracts from February 15 to May 15	
Kansas RMP (BLM Stipulations) Texas RMP (BLM Optional Stipulations) Oklahoma RMP (BLM Mandatory Stipulations)	Oklahoma Resource Area ORA-4, NSO (Optional) "Surface occupancy of this lease will not be allowed." This stipulation prohibits surface use to protect a resource or use that is not compatible with oil and gas development. The tract could be leased for inclusion in a drilling unit and may be drilled directionally from an offsite location where occupancy is allowed. The stipulation applies to the following Kansas areas: • Barber County Split-Estate Tract 1 • Clark County Split-Estate Tract 4 • Comanche County Split-Estate Tracts 1 and 2 • Cowley County Split-Estate Tract • Decatur County Split-Estate Tract 2 • Doniphan County Split-Estate Tract • Edwards County Split-Estate Tract • Geary County Split-Estate Tract • Gove County Split-Estate Tract 20 and 21 • Hamilton County Split-Estate Tracts 1, 2, and 4 • Kearney County Split-Estate Tracts 5 and 6 • Logan County Split-Estate lands in Sections 30 and 31 of Tract 3 and all of Tract 4 • Meade County Split-Estate Tracts 7 and 8 • Riley County Split-Estate Tract 2	

Decision Source	Current Management Decision/Policy	Status
	• Seward County Split-Estate Tract 6 The stipulation applies to the following Oklahoma areas: • Beaver County Split-Estate Tract 68 • Cimarron County Split-Estate Tracts 38, 39, 40, 41, 43, 61, and 62 to protect Black Mesa State Park • Oklahoma County Split-Estate Tracts • Pushmataha County Split-Estate Tracts 35, 40, and 41 • Red River Management Area Split-Estate Tracts	
Oklahoma RMP (Site-specific Descriptions, US Bureau of Reclamation Projects)	The following areas are subject to NSO stipulations: • Altus Dam and Reservoir • Fort Cobb Dam and Reservoir • Floss Reservoir • McGee Creek Reservoir • Mountain Park Dam/Tom Steed Reservoir	
Oklahoma RMP (Site-specific Descriptions, US Army, USACE Tulsa District Projects)	The following areas are subject to NSO/ND (no disturbance) stipulations: • Broken Bow Lake • Canton Lake • Chouteau Lock and Dam • Copan Lake • Eufaula Dam and Lake • Fort Gibson Lake • Fort Supply Lake • Great Salt Plains Lake • Heyburn Lake • Hugo Lake • Kaw Lake • Keystone Dam and Lake • Newt Graham Lock and Dam • Oologah Lake • Optima Lake • Pine Creek Lake • Robert S. Kerr Lock and Dam and Lake • Sardis Lake • Tenkiller Ferry Dam • Texoma Lake and Denison Dam • W. D. Mayo Lock and Dam • Waurika Lake • Webbers Falls Lock and Dam	

Decision Source	Current Management Decision/Policy	Status
	• Wister Lake	
Oklahoma RMP (Site-specific Descriptions, US Department of Defense Military Lands)	The following areas are subject to NSO stipulations: • Fort Sill Military Reservation • Camp Gruber • McAlester US Army Ammunition Depot	
Oklahoma RMP (Site-Specific Descriptions, USDA, Agriculture Research Service)	The following area is subject to NSO stipulations: Agricultural Research Service (ARS) lands in Harper and Woodward Counties not in city limits.	
Kansas RMP (Specific Site Descriptions) US Bureau of Reclamation GP (Great Plains Region)-135 stipulations; also described in Appendix 2	GP-135 stipulations protect US Bureau of Reclamation projects with buffer zones, which prohibit occupancy and drilling for a specific distance. Maximum project protection is provided by the NSO/ND to within 1,000 feet under the maximum water surface by elevation, as defined in standing operating procedures of the US Bureau of Reclamation, or to within 2,000 feet under dam embankments and appurtenance structures, outlet works, and spillways or to within half a mile (2,640 feet) of the centerline of any tunnel. Should the US Bureau of Reclamation waive the maximum project protection stipulation, additional restrictions protect recreational developments, wildlife habitats, project facilities, and water supplies by creating a No Surface Occupancy/Open to Directional Drilling (NSO/DD) buffer, ranging from 200 to 500 feet around these areas. Stipulations protecting special wildlife habitats or significant surface resources have been identified by project site. The overlapping buffer zones identified for each surface resource result in stipulation acreage greater than the project's total. In all cases, GP-135 requires a site-specific surface use plan approved by the US Bureau of Reclamation Regional Director before any lease development. Whenever a conflict occurs concerning the applicability of a US Bureau of Reclamation stipulation, the more restrictive stipulation will apply. This stipulation applies to: • Glen Elder Dam/Waconda Lake SMA	

Decision Source	Current Management Decision/Policy	Status
	• Norton/Keith Sebelius Lake SMA • Lovewell Reservoir SMA • Cheney Reservoir SMA • Webster Reservoir SMA • Cedar Bluff Reservoir SMA	
Kansas RMP (Specific Site Descriptions) Tulsa District USACE Special Stipulations 1-A; also described in Appendix 2	1-A stipulations protect surface resources through the use of surface occupancy restrictions, drilling restrictions, or consultation requirements with authorized surface lessees (Kansas Department of Wildlife, Parks, and Tourism). Generally, 1-A requires NSO or directional drilling within 2,000 feet under restricted areas. Restricted areas are major structures, such as the dam, spillways, and embankments. All existing or proposed public use areas, recreation areas, wildlife and waterfowl refuges, historical sites, and hiking or horseback trails are designated NSO. The 1-A stipulations are standardized and apply to the following: • All Tulsa District projects • Council Grove Lake SMA • El Dorado Lake SMA • Elk City Lake SMA • Fall River Lake SMA • John Redmond Dam and Reservoir SMA • Marion Lake SMA • Pearson-Skubitz Big Hill Lake SMA • Toronto Lake SMA • Kaw, Hulah, and Capon Lakes SMA	
Kansas RMP (Specific Site Descriptions) Kansas City District USACE Special Stipulations—Also described in Appendix 2	Kansas City District USACE requires NSO or directional drilling within 2,000 feet under restricted areas, which are major structures, such as the dam, spillways, and embankments. A NSO restriction applies to all areas below the lake's flood elevation level and to existing or proposed public use areas, recreation areas, wildlife and waterfowl refuges, unique ecological areas, historical sites, and hiking or horseback trails. The special stipulations are standardized and apply to all Kansas City District USACE projects. Additionally, the Kansas City District USACE uses a wildlife habitat protection stipulation (Appendix 2) that essentially provides a season of use restriction and a surface avoidance restriction on all identified wildlife lands. This stipulation applies to the following:	

Decision Source	Current Management Decision/Policy	Status
	• Clinton Lake SMA • Hillsdale Lake SMA • Kanopolis Lake SMA • Melvern Lake SMA • Milford Lake SMA • Perry Lake SMA • Pomona Lake SMA • Tuttle Creek Lake SMA • Wilson Lake SMA	
Kansas RMP (Specific Site Descriptions) US Department of Defense Military Lands—US Department of Defense Leasing Stipulations	US Department of Defense lands acquired or withdrawn for military purposes are available for oil and gas leasing subject to US Department of Defense leasing stipulations and the particular uses of a specific base or facility. There are two active Army Military Reservations (forts), two working Army ammunition plants, and two active Air Force facilities in Kansas. Two of the military facilities, Fort Leavenworth and the Kansas Army Ammunition Plant are closed to oil and gas leasing.	
Kansas RMP (Specific Site Descriptions) US Department of Defense lands	Fort Riley Military Reservation SMA Lease Stipulations are as follows: • Closed to leasing 30,700 • NSO 68,173 • Open W/STC 1,800	
Kansas RMP (Specific Site Descriptions) US Department of Defense lands	Sunflower Army Ammunition Plant SMA Lease Stipulations: Standard US Department of Defense stipulations require NSO within 2,000 feet of structures and developments. This effectively places the entire 10,000 acres in this category. All oil and gas operations would be subject to approval of the base commander.	
Kansas RMP (Specific Site Descriptions) US Department of Defense lands	McConnell Air Force Base SMA Lease Stipulations: NSO with directional drilling possible, with the approval of the base commander.	
Kansas RMP (Specific Site Descriptions) US Department of Defense lands	Smoky Hill Air National Guard Range SMA Lease Stipulations: Standard US Department of Defense and US Air Force stipulations would apply. NSO would apply on approximately 11,326 acres associated with the target area, as well as an appropriate buffer surrounding facilities and structures. Leased, stipulations as described would apply.	
Lease Stipulations—US	If required by the lessor during the period of this lease, including any extension thereof, the lessee agrees to	

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Bureau of Reclamation Source: Kansas RMP (Appendix 2) and Texas RMP (Appendix) Lease Stipulations, US Bureau of Reclamation Source: Oklahoma RMP (Appendix 3, Oklahoma Oil and Gas Lease Stipulations)	maintain an additional bond with qualified sureties in such sum as the lessor, if it considers that the bond required under Section 2(a) is insufficient, may at any time require the following: • Pay for damages sustained by any reclamation homestead entryman to crops or improvements that are caused by drilling or other operations of the lessee; such damages would include the lessee reimbursing the entryman when the lessee uses or occupies the land of any homestead entryman, for all construction and operation and maintenance charges becoming due during such use or occupation on any portion of the land so used and occupied • Pay for any damage caused to any reclamation project or water supply thereof by the lessee's failure to comply fully with the requirements of the lease • Recompense any nonmineral applicant, entryman, purchaser under the Act of May 16, 1930 (46 Statute 367), or patentee for all damages to crops or to tangible improvements caused by drilling or other prospecting operations, where any of the lands covered by this lease are embraced in any nonmineral application, entry, or patent under rights initiated before the date of the lease, with a reservation of the oil deposits, to the United States, in accordance with the act of July 17, 1914 (38 Statute 509). As to any lands covered by this lease in the area of any federal government reclamation project, or in proximity thereto, the lessee shall take such precautions as required by the Secretary of the Interior to prevent any injury to the lands susceptible to irrigation under such project or to the water supply thereof; provided that drilling is prohibited on any constructed works or ROW of the US Bureau of Reclamation, and provided, further, that there is reserved to the lessor, its successors and assigns, the superior and prior right at all times to construct, operate, and maintain dams, dikes, reservoirs, canals, wasteways, laterals, ditches, telephone and telegraph lines, electric transmission lines, roadways, appurtenant irrigation structures, and reclamation	

Decision Source	Current Management Decision/Policy	Status
	works, in which construction, operation, and maintenance, the lessor, its successors and assigns, shall have the right to use any or all of the lands herein described without making compensation therefor, and shall not be responsible for any damage from the presence of water thereon or on account of ordinary, extraordinary, unexpected, or unprecedented floods. That nothing shall be done under this lease to increase the cost of, or interfere in any manner with, the construction, operation, and maintenance of such works. It is agreed by the lessee that, if the construction of any or all of said dams, dikes, reservoirs, canals, wasteways, laterals, ditches, telephone or telegraph lines, electric transmission lines, roadways, appurtenant irrigation structures or reclamation works across, over, or on said lands should be made more expensive by reason of the existence of the improvements and workings of the lessee thereon, said additional expense is to be estimated by the Secretary of the Interior, whose estimate is to be final and binding on the parties hereto, and that within thirty (30) days after demand is made on the lessee for payment of any such sums, the lessee will make payment thereof to the United States, or its successors, constructing such dams, dikes, reservoirs, canals, wasteways, laterals, ditches, telephone and telegraph lines, electric transmission lines, roadways, appurtenant irrigation structures, or reclamation works, across, over, or on said lands; provided, however, that subject to advance written approval by the United States, the location and course of any improvements or works and appurtenances may be changed by the lessee; provided, further, that the reservations, agreements, and conditions contained in the within lease shall be and remain applicable notwithstanding any change in the location or course of said improvements or works of lessee. The lessee further agrees that the United States, its officers, agents, and employees, and its successors and assigns shall not be held liable for any damage to the improvements or workings of the lessee resulting from the construction, operation, and maintenance of any of the works hereinabove enumerated. Nothing in this paragraph shall be construed as in any manner limiting other reservations in favor of the United States contained in this lease.	

Decision Source	Current Management Decision/Policy	Status
	The lessee Further Agrees That there is reserved to the lessor, its successors and assigns, the prior right to use any of the lands herein leased, to construct, operate, and maintain dams, dikes, reservoirs, canals, wasteways, laterals; ditches, telephone and telegraph lines, electric transmission lines, roadways, or appurtenant irrigation structures, and also the right to remove construction materials therefrom, without any payment made by the lessor or its successors for such right, with the agreement on the part of the lessee that if the construction of any or all of such dams, dikes, reservoirs, canals, wasteways, laterals, ditches, telephone and telegraph lines, electric transmission lines, roadways, or appurtenant irrigation structures across, over, or on said lands or the removal of construction materials therefrom, should be made more expensive by reason of the existence of improvements or workings of the lessee thereon, such additional expense is to be estimated by the Secretary of the Interior, whose estimate is to be final and binding on the parties hereto, and that within thirty (30) days after demand is made on the lessee for payment of any such sums, the lessee will make payment thereof to the United States or its successors constructing such dams, dikes, reservoirs, canals, wasteways, laterals, ditches, telephone and telegraph lines, electric transmission lines, roadways, or appurtenant irrigation structures across, over, or on said lands or removing construction materials therefrom. The lessee further agrees that the lessor, its officers, agents, and employees and its successors and assigns shall not be held liable for any damage to the improvements or workings of the lessee resulting from the construction, operation, and maintenance of any of the works herein above enumerated. Nothing contained in this paragraph shall be construed as in any manner limiting other reservations in favor of the lessor contained in this lease.	
Oklahoma RMP (Appendix 3, Oklahoma Oil and Gas Lease Stipulations, Oklahoma State University OSU-1)	Oklahoma State University OSU-1 No occupancy or other activity on the surface of the following described lands: This NSO stipulation is to protect Lake Carl Blackwell and associated facilities owned by Oklahoma State University.	

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	-Payne County Split Estate Tracts 9-48 would also be covered under this stipulation.	
Oklahoma RMP (Appendix 3, Oklahoma Oil and Gas Lease Stipulations, OSU-2)	Oklahoma State University OSU-2 Before operations are conducted on these lands, the Tulsa District Office of the BLM must approve a plan of operations. Any drilling, construction, or other operations on the leased lands are subject to site-specific stipulations as may be necessary to ensure reasonable protection of Lake Carl Blackwell and associated facilities owned by Oklahoma State University. A plan would not be approved if it would result in unacceptable impacts on any land use or the environment. Payne County Split-Estate Tracts 9 through 48 would also be covered under this stipulation.	
Kansas RMP (Appendix 2) US Bureau of Reclamation Special Stipulations Texas RMP (Appendix) US Bureau of Reclamation Special Stipulations, GP-135 Oklahoma RMP (Appendix 3, Oklahoma Oil and Gas Lease Stipulations, Special Stipulation, US Bureau of Reclamation)	The lessee agrees that the conditions below shall apply to all exploration and development and other operation of the works thereafter on lands covered by this lease. This is to avoid interfering with recreation development or having impacts on fish and wildlife habitat and to help prevent damage to any US Bureau of Reclamation dams, reservoirs, canals, ditches, laterals, tunnels, and related facilities, and contamination of the water supply therein. Note: 1. Before commencement of any surface-disturbing work including drilling, access road work, and well location construction, a surface use and operations plan will be filed with the appropriate officials. A copy of this plan will be furnished to the Regional Director. Great Plains Region. US Bureau of Reclamation, P.O. Box 36900, Billings, MT 59107-6900, for review and consent before approval of the plan. Such approval will be conditioned on reasonable requirements needed to prevent soil erosion, water pollution, and unnecessary damages to the surface vegetation and other resources, including cultural resources, of the United States, its lessees, permittees, or licensees, and to provide for the restoration of the land surface and vegetation. The plan shall contain provisions as the US Bureau of Reclamation may deem necessary to maintain proper management of the water, recreation, lands,	

Decision Source	Current Management Decision/Policy	Status
	structures, and resources, including cultural resources, within the prospecting, drilling, or construction area. Drilling sites for all wells and associated investigations such as seismograph work shall be included in the abovementioned surface use and operation plan. If later explorations require departure from or additions to the approved plan, these revisions or amendments, together with a justification statement for proposed revisions, will be submitted for approval to the Regional Director, Great Plains Region, US Bureau of Reclamation, or the Director's authorized representative. Any operations conducted in advance of approval of an original, revised, or amended prospecting plan, or which are not in accordance with an approved plan constitute a violation of the terms of this lease. The US Bureau of Reclamation reserves the right to close down operations until such corrective action, as is deemed necessary, is taken by the lessee. 2. No occupancy of the surface of the following excluded areas is authorized by this lease. It is understood and agreed that the use of these areas for US Bureau of Reclamation purposes is superior to any other use. The excluded areas are: a. Within 500 feet on either side of the centerline of any and all roads or highways within the leased area. b. Within 200 feet on either side of the centerline of any and all trails within the leased area. c. Within 500 feet of the normal high-water line of any and all live streams in the leased area. d. Within 400 feet of any and all recreation developments within the leased area. e. Within 400 feet of any improvements either owned, permitted, leased, or otherwise	

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	authorized by the US Bureau of Reclamation within the leased area. f. Within 200 feet of established crop fields, food plots, and tree/shrub plantings within the leased area. g. Within 200 feet of slopes steeper than a 2:1 gradient within the leased area. h. Within established rights-of-way of canals, laterals, and drainage ditches within the leased area i. Within a minimum of 500 feet horizontal from the centerline of the facility or 50 feet from the outside toe of the canal, lateral, or drain embankment, whichever distance is greater, for irrigation facilities without clearly marked rights-of-way within the leased area. Texas RMP (not in Kansas RMP or Oklahoma RMP) j. Providing that appropriate environmental measures can be ensured, and providing further that Reclamation project works and other public interests can be protected, Reclamation may consider, on a case-by-case basis, waiving the requirements specified in Section 2 hereof. However, lessees are advised that obtaining such a waiver can be a difficult, time consuming, and costly process, with no guarantee that the US Bureau of Reclamation will grant the requested waiver. 3. No occupancy of the surface or surface drilling will be allowed in the following areas. In addition, no directional drilling will be allowed that would intersect the subsurface zones, delineated by a vertical plane in these areas. The following restrictions apply only to mineral tracts located within the boundary of a US Bureau of Reclamation project where the United States owns 100 percent of the fee mineral interest. a. Within 1,000 feet of the maximum water	

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	surface, as defined in the Standard Operating Procedures, of any reservoirs and related facilities located within the leased area. b. Within 2,000 feet of dam embankments and appurtenance structures such as spillway structures, outlet works, etc. c. Within one-half mile horizontal from the centerline of any tunnel within the leased area. d. Providing that appropriate environmental compliance measures can be ensured, and providing further that Reclamation project works and other public interests can be protected, Reclamation may consider, on a case-by-case basis, waiving the requirements specified in Section 3 hereof. However, lessees are advised that obtaining such a waiver can be a difficult, time consuming, and costly process with no guarantee that Reclamation will grant the requested waiver. 4. The distances stated in items 2 and 3 above are intended to be general indicators only. The US Bureau of Reclamation reserves the right to revise these distances as needed to protect US Bureau of Reclamation facilities. 5. The use of explosives in any manner shall be so controlled that the works and facilities of the United States, its successors and assigns will in no way be endangered or damaged. In this connection, an explosives use plan shall be submitted to and approved by the Regional Director, Great Plains Region, US Bureau of Reclamation, or authorized representative. 6. The lessee shall be liable for all damage to the property of the United States, its successors and assigns, resulting from the exploration, development, or operation of the works contemplated by this lease, and shall further hold the United States, its successors and assigns, and its officers, agents, and employees, harmless from all claims of third parties for injury or damage sustained or in any way resulting from the exercise	

Decision Source	Current Management Decision/Policy	Status
	of the rights and privileges conferred by this lease. 7. The lessee shall be liable for all damage to crops or improvements of any entryman, nonmineral applicant, or patentee, their successors and assigns, caused by or resulting from the drilling or other operations of the lessee, including reimbursement of any entryman or patentee, their successors and assigns, for all construction, operation, and maintenance charges becoming due on any portion of their said lands damaged as a result of the drilling or other operations of the lessee. 8. In addition to any other bond required under the provisions of this lease, the lessee shall provide such bond as the United States may at any lime require for damages which may arise under the liability provisions of sections 6 and 7 above.	
Kansas RMP (Appendix 2) Special Stipulations 1-A Texas RMP (Appendix) US Army USACE Special Stipulations 1-A Oklahoma RMP (Appendix 3, Oklahoma Oil and Gas Lease Stipulations, US Army USACE Special Stipulations 1-A)	1. All oil and gas drilling and production operations shall be under the supervision of the District Manager, BLM, in accordance with 43 CFR, Part 3160. 2. The Secretary of the Army or designee reserves the right to require cessation of operations if a national emergency arises of if the Army needs the leased property for a mission incompatible with lease operations. On approval from higher authority, the District Engineer will give notice of the required suspension. The lessee agrees to this condition and waives compensation for its exercise. 3. If the District Engineer or authorized representative discovers an imminent danger to safety or security which allows no time to consult BLM, that person may order such activities stopped immediately. The District Manager, BLM, will be notified immediately, will review the order, and will determine the need for further remedial action. 4. lessee liability for damage to improvements shall include improvements of the Department of Defense. lessee shall be liable for pollution and other damages, as a result of their operations, to Government-owned land and property and to the property of the Government's authorized surface user. 5. Before beginning to drill, the lessee must consult with third parties authorized to use real estate in the lease area and must consider programs for which	

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	third parties have contractual responsibility. 6. A license to conduct geophysical test on the leased area must be obtained separately from the District Engineer. 7. That all rights under this lease are subordinate to the rights of the United States to flood and submerge the lands, permanently or intermittently, in connection with the operation and maintenance of the above-named project. 8. That the United States shall not be responsible for damages to property or injuries to persons which may arise from or be incident to the use and occupation of the said premises, or for damages to the property of the lessee, or for injuries to the person of the lessee's officers, agents, servants, or employees, or others who may be on said premises at their invitation or the invitation of any one of them arising from or incident to the flooding of the said premises by the Government or flooding from any other cause, or arising from or incident to any other governmental activities; and the lessee shall hold the United States harmless from any and all such claims. 9. That the work performed by the lessee on the lands shall be under the general supervision of the District Engineer, Corps of Engineers in direct charge of the project and subject to such conditions and regulations as the District Engineer may be prescribed, and the plans and locations for all structures, appurtenances thereto, and work on said lands shall be submitted to the said District Engineer for approval in advance of commencement of any work on said lands. The District Engineer shall have the right to enter on the premises, at any time, to inspect both the installation and operational activities of the lessee. 10. That no structure or appurtenance thereto shall be of a material or construction determined to create floatable debris. 11. That the construction and operation of said structures and appurtenances thereto shall be of such a nature as not to cause pollution of the soils and the waters of the project. 12. That the United States reserves the right to use the land jointly with the lessee in connection with the	

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	construction, operation, and maintenance of the Government project and to place improvements thereon or to remove materials therefrom, including sand and gravel and other construction material, as may be necessary in connection with such work, and the lessee shall not interfere in any manner with such work or do any act that may increase the cost of performing such work. If the cost of the work performed on land outside the property included in the lease is made more expensive by reason of improvements constructed on the leased property by the lessee, the lessee shall pay to the United States money in the amount, as estimated by the Chief of Engineers, sufficient to compensate for the additional expense involved. 13. All areas within 2,000 feet of any major structure, including but not limited to the dam, spillway, or embankment, are restricted areas. The lessee, operators, agents, or employees shall not utilize the surface of restricted areas for any purpose. 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. The restricted areas are included in the lease for the sole purpose of becoming part of a drilling unit so that the United States will share in the royalty of the unit. 14. All existing or proposed public use areas, recreation areas, wildlife and waterfowl refuges, historical sites, and hiking and horseback trail areas may be leased for the sole purpose of becoming a part of a drilling unit. The lessee, the lessee's operators, agents, or employees will not use or enter on the surface for any purpose. Directional drilling from non-public areas is permitted if not otherwise restricted. 15. No drilling will be permitted from Government-owned surface where alternate surface use is available within the same drilling unit. 16. All storage tanks and slush pits will be protected by dikes of sufficient capacity to protect the reservoir from pollution to flood pool elevation _____ feet, National Geodetic Vertical Datum. 17. It is the responsibility of the lessee to identify and be aware of areas where entry is prohibited. There	

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	will be no surface or subsurface entry within 2,000 feet of the dam structure. A portion of the lease includes the ____ Public Use Area; therefore, stipulation ____ is applicable. Stipulation _____ also applies to portions of the lease area. 18. The operator will immediately stop work and advise the District Engineer or authorized representative if contamination is found in the operating area.	
Kansas RMP (Appendix 2) Stipulations for Oil and Gas Leases—Lands Under Jurisdiction of the USACE (Water Resource Projects)	The lands embraced in this lease, in accordance with the Mineral Leasing Act of 1920 (30 USC, Section 181 et seq.) or the Mineral Leasing Act for Acquired Lands of 1947 (30 USC, Section 351 et seq.) are under the jurisdiction of the USACE, as the SMA, and are subject to further controls established by the Engle Act (43 USC, Section 155 et seq.). The lands described are a part of a water resource multipurpose project, authorized by Congress for flood control, water supply, navigation, recreation, wildlife, and other purposes. Rights under this lease are subordinate to the rights of the United States for the management, operation, and maintenance of the project, including public use and the right to flood and submerge the lands intermittently and to remove materials therefrom. 1. That all rights under this lease are subordinate to the rights of the United States to flood and submerge the lands, permanently or intermittently, in connection with the operation and maintenance of the above-named project. 2. That the United States shall not be responsible for damages to property or injuries to persons which may arise from or be incident to the use and occupation of the said premises, or for damages to the property of the lessee, or for injuries to the person of the lessee (if an individual), or for damages to the property or injuries to the person of the lessee's officers, agents, servants, or employees, or other who may be on said premises at their invitation or the invitation of any one of them arising from or incident to the flooding of the said premises by the Government or flooding from any other cause, or arising from or incident to any other governmental activities; and the lessee shall hold the United States harmless from any and all such claims.	

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	3. That the work performed by the lessee on the lands shall be under the general supervision of the District Commander, Corps of Engineers, in direct charge of the project and subject to such conditions and regulations as the District Commander may prescribe. Before lessee developing plan of operation involving any surface-disturbing activity, including routes to be used for vehicular access and plans and locations for all structures and appurtenances thereto, the lessee shall contact the SMA for information to develop such surface use program. There shall be no surface disturbance before compliance by lessee with applicable BLM Onshore Oil and Gas Operation Procedures (43 CFR, Part 3160), including Oil and Gas Orders and Notice to lessees. The lessee must obtain permission (through the BLM) of the SMA and subordinate holders of interest (or third parties having contractual responsibility) and approval of the plan of operation from the SMA before any surface-disturbing activity. The District Commander shall have the right to enter on the premises at any time to inspect both the installation and operational activities of the lessee. 4. That no structure or appurtenance thereto shall be of a material or construction determined to create floatable debris. 5. That the construction and operation of said structures and appurtenances thereto shall be of such a nature as not to cause pollution of the soils and the waters of the project. 6. That the United States reserves the right to use the land jointly with the lessee in connection with the construction, operation, and maintenance of the Government project and to place improvements thereon or to remove materials therefrom, including sand and gravel and other construction material, as may be necessary in connection with such work, and the lessee increase the cost of performing such work. If the cost of the work performed by the Government at and in connection with the project, including work performed on lands outside the property included in the lease, is made more expensive by reason of improvements constructed	

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	on the leased property by the lessee, the lessee shall pay to the United States money in an amount, as estimated by the Chief of Engineers, sufficient to compensate for the additional expense involved. 7. No drill related structures (rigs, collector lines, reserve pits, access roads, and storage tanks) will be allowed for placement in the following restricted areas: a. Within 2,000 feet of any structure, including, but not limited to the dam, spillway or embankment areas. The lessee, operators, agents, or employees shall not utilize the surface of such areas for any purpose. Drilling operations in, on, or under these areas, including drilling outside of such areas which would cause a bore hole to be under these areas, will not be permitted. These areas are included in the lease for the sole purpose of becoming a part of a drilling unit so that the United States will share in the royalty of the unit. The lessee shall be fully responsible for any damaging subsidence from extraction thereunder. b. within the boundaries of designated USACE- or state-operated public use areas, and special recreation areas, such as hiking and horseback trails). c. within areas leased to cities, townships, or quasi-public groups for park and recreational purposes, d. below elevations, _____feet mean sea level e. within incorporated town, villages, or city limits, f. within unique ecological areas, g. historical sites, h. wildlife and waterfowl refuges, i. within 100 feet of public roadways or 300 feet of occupied buildings. j. The lessee, operators, agents, or employees will be prohibited from use or entry on the surface of restricted areas for any purpose. With the exception of lands covered in paragraph 7a. above, directional drilling from nonrestricted areas is prohibited. 8. The Secretary of the Army or designee reserves the	

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	right to require cessation of operations in a national emergency of if the Army needs the premises for a use incompatible with lease operations. On approval by higher authority, the Commander will notify the lessee in writing or, if time permits, requests the BLM to notify the lessee. The lessee understands that rights granted by this lease do not include the period of any such cessation, and the United States has no obligation to compensate the lessee for damages or contractual losses resulting from exercise of this stipulation. The lessee shall include this stipulation in contracts with third parties to supply oil and gas. This stipulation shall not affect the lessee's right to seek suspension of the lease term from BLM. 9. If the Commander or the Commander's authorized representative discovers an imminent danger to safety or security that allows no time to consult the BLM, that person may order such activities stopped immediately. The state BLM director will be notified immediately, will review the order, and will determine the need for further remedial action. 10. If contamination is found in the operating area, either from mineral lessee's operations or existing conditions, the operator will immediately stop work and consult with the District Commander, or his authorized representative in analyzing the problem and developing a remedial plan. 11. In furtherance of Section 9 of the lease, lessee liability for damage to improvements and all natural resources and waters of the project shall include improvements of the Department of Defense and any surface users authorized by the Department of Defense. 12. Before beginning to drill, the lessee must consult with third parties authorized to use real estate in the leased area and must take into consideration programs for which third parties have contractual responsibility. 13. A license to conduct geophysical tests on the leased area must be obtained separately from the Commander or authorized representative. 14. Before beginning operations, the lessee will appoint and retain a local agent who may be served notice concerning matters in these stipulations and who	

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	will notify the SMA instantly in the event of pollution, potential spills or other hazards encountered. 15. The lessee will be liable for pollution or other damages, as a result of their operations, to Government-owned lands and property and to the property of the Government's authorized surface user. 16. That it is understood that this instrument is effective only insofar as the rights of the United States in the said property are concerned; and that the lessee shall obtain such permission as may be necessary on account of any other existing rights whether or not granted by the Government. It is further understood that the Government does not warrant title or the accuracy of the descriptions provided in the lease. 17. Land and water areas included under a fish and wildlife management license agreement with a State agency, or allocated in the Master Plan for Fish and Wildlife Management, will be subject to the special Kansas City District Corps of Engineers Lease Stipulations for Wildlife Lands.	
Kansas RMP (Appendix 2) Kansas City District USACE Stipulation for Lands Designated for the Management of Wildlife	Lands and water areas of the project are managed for multiple purposes and may be included under a fish and wildlife management license with a State agency, permitted to the USFWS, or allocated in the Master Plan for Fish and Wildlife Management, and will be subject to special stipulations to insure the mitigation, protection and/or enhancement of wildlife and wildlife habitat. Surface disturbance will be restricted to those areas with insignificant impact to wildlife resources, and will be prohibited in areas providing habitat for threatened or endangered species, refuges, critical habitat of the key management species, and/or unique breeding grounds. The time period or location where construction, drilling, production or restoration activity can occur (or is required to be accomplished) may be specified to avoid impact to seasonal hunting, breeding, migration or fire hazard, to include seasonal occupancy, controlled access, limits on noise generation, lighting and use of explosives. Vegetation must be preserved, sludge or flare pits covered, erosion repaired, and scars revegetated. Access roads must be maintained for collateral use with the public	

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	where hunting or fishing is authorized, and when no longer required by the lessee shall be brought to useable standards for continued public access, or obliterated and revegetated, at the option of the lessor. Ancillary equipment will be removed immediately when no longer needed for production.	
Texas RMP (Federal Oil and Gas Lease Stipulations)	Exceptions to a lease stipulation, waiver of a lease stipulation, or modification of a lease stipulation (as explained in 43 CFR, Part 3101.1-4) can only be granted by the Authorized Officer. If the proposed exception, waiver, or modification is inconsistent with the land use plan, the plan will be amended or changed or the exception, waiver, or modification will be disallowed. Exceptions are considered on a case-by-case basis and are subject to an environmental analysis. Exception to a leasing stipulation will be granted by the Authorized Officer if the reason for the exception is consistent with that analysis. No public notice is required for exceptions to lease stipulations which conform to the plan. Exceptions which do not conform to the plan may be granted only on plan amendment and public notification. A stipulation waiver is the complete elimination of a stipulation from a particular lease contract. A stipulation is waived by the Authorized Officer after preparation of an Environmental Assessment and a decision is made that the stipulation in question is no longer required for a particular lease. The decision to waive a substantial stipulation requires a plan amendment and a 30-day public notice period before waiver. Modifications to a lease stipulation are made if and when resource management determines the stipulation is no longer effective as written. This situation could occur when new information, obtained by inventory or monitoring, indicates that the protective measure is unnecessarily restrictive. Modification of a stipulation requires the preparation of an Environmental Assessment to determine the potential impacts and/or plan amendment or maintenance needs. If the modification is determined to be substantial by the	

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	Authorized Officer, a 30-day public notice period before modifying the lease stipulation is required. Stipulations attached to a tease as a condition of consent by a SMA are not subject to exception, waiver or modification by the BLM.	
Texas RMP (BLM Optional Stipulations)	NM-8, Coal Protection This stipulation requires that any federal oil and gas operator must coordinate development with the federal coal lessee. This stipulation is used to protect the value of the federal coal resource.	
Kansas RMP (BLM Optional Stipulations) Oklahoma RMP (BLM Optional Stipulations)	NM-10, Coal Protection This stipulation requires that any federal oil and gas operator must coordinate development with the federal coal lessee. This stipulation is used to protect the value of the federal coal resource and is applicable to the following areas in Oklahoma: • Atoka County Split-Estate Tracts 2-4 • Haskell County Split-Estate Tracts 15-17 • Latimer County Split-Estate Tracts 3-6 • Le Flore County Split-Estate Tracts 15-17 • Pittsburg County Split-Estate Tracts 8 and 9	
Texas RMP (BLM Optional Stipulations) Oklahoma RMP (BLM Optional Stipulations)	NM-9, NSO, Pooling Purposes Only This stipulation prohibits surface use and directional drilling into federal minerals. It protects a resource or use that is not compatible with oil and gas development. The tract could be leased for inclusion in a drilling unit to meet an operator's spacing requirements. This stipulation is applicable to the following areas in Oklahoma: • Beaver County Split-Estate Tract 93 • Carter County Split-Estate Tract 5	
Texas RMP (Specific Site Descriptions) US Army, USACE, Tulsa District Projects	I-A stipulations provide for the protection of surface resources through the use of surface occupancy restrictions, drilling restrictions or consultation requirements with authorized surface lessees. Generally, I-A requires NSO or directional drilling within 2,000 feet under restricted areas. Restricted areas include the major structures such as the dam, spillways, and embankments. All existing or proposed public use areas, recreation areas, wildlife and	1-A/NSO

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	waterfowl refuges, historical sites and hiking or horseback trails are designated NSO. The I-A stipulations are standardized and apply to all Tulsa District projects.	
Texas RMP (Specific Site Descriptions) US Army, USACE, Tulsa District Projects	Pat Mayse Lake SMA Lease Stipulations: NSO/ND on approximately 1,200 acres associated with the dam and spillway and a 2,000-foot buffer. NSO on approximately 10,000 acres as buffers to recreational facilities, roads, trails and other developments and within the identified flood pool. Should USACE project lands at Pat Mayse Lake be available for lease the stipulations described above would apply and	
Texas RMP (Specific Site Descriptions) US Army, USACE, Tulsa District Projects	Texoma Lake SMA Lease Stipulations: NSO/ND on approximately 4,250 acres associated with the dam and spillway and a 2,000-foot buffer. NSO on approximately 85,500 acres as buffers to recreational facilities, roads, trails, and other developments and within the identified flood pool. Should USACE project lands at Lake Texoma be available for lease the stipulations described above would apply and Oklahoma Resource Area ORA-3 Season of Use restrictions would apply from September 1 through March 31, on the 11,429 acres of wildlife management lands within Texas.	
Texas RMP (Specific Site Descriptions) US Army, USACE, Fort Worth District Projects	These stipulations provide for the protection of surface resources through the use of surface occupancy restrictions, drilling restrictions or consultation requirements with authorized surface lessees. Generally, the Fort Worth District USACE requires NSO/ND within 3,000 feet under restricted areas. Restricted areas include the major structures such as the dam, spillways, embankments. A NSO restriction applies to all areas below the lakes flood elevation level an existing or proposed public use areas, recreation areas, wildlife and waterfowl refuges, unique ecological areas, historical sites and hiking or horseback trails. The special stipulations are standardized and apply to specific areas within all Fort Worth District projects: • Aquilla Lake SMA • Bardwell Lake SMA • Belton Lake SMA	

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	• Benbrook Lake SMA • B. A. Steinhagen Lake SMA • Canyon Lake SMA • Cooper Lake SMA • Georgetown Lake SMA • Granger Lake SMA • Grapevine Lake SMA • Hords Creek Lake SMA • Joe Pool Lake SMA • Lake O' The Pines SMA • Lavon Lake SMA • Lewisville Lake SMA • Navarro Mills Lake SMA • O. C. Fisher Lake SMA • Proctor Lake SMA • Ray Roberts Lake SMA • Sam Rayburn Lake SMA • Somerville Lake SMA • Stillhouse Hollow Lake • Waco Lake SMA • Whitney Lake SMA • Wright Patman Lake SMA	
Texas RMP (Specific Site Descriptions) US Bureau of Reclamation Projects. US Bureau of Reclamation GP-135 Special Stipulations.	US Bureau of Reclamation GP-135 Special Stipulations provide for protection of US Bureau of Reclamation projects by use of buffer zones which prohibit occupancy and/or drilling for specific distance. Maximum project protection is provided by the use of NSO/ND to within 1,000 feet under the maximum water surface by elevation as defined in Standing Operating Procedures of US Bureau of Reclamation or to within 2,000 feet under dam embankments and appurtenance structures, outlet works, spillways, or to within one-half mile (2,640 feet) of the centerline of any tunnel. Should the maximum project protection stipulation be waived by the BR, additional restrictions protect recreational developments, wildlife habitats, project facilities and water supplies by creating a NSO/DD buffer ranging from 200 to 500 feet around these areas.]Stipulations protecting special wildlife habitats or significant surface resources have been identified by project site. The overlapping buffer zones	

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	identified for each surface resource results in special stipulations covering acreage greater than the project total. This stipulation applies to specific areas in the following projects: • Choke Canyon Dam and Reservoir—Neuces River Project SMA • Palmetto Bend Dam and Lake Texana SMA • Sanford Dam and Lake Meredith Canadian River Project SMA • Twin Buttes Dam and Reservoir San Angelo Project SMA	
Texas RMP (Specific Site Descriptions) US Department of Defense Military Lands	US Department of Defense lands acquired for military purposes are available for oil and gas leasing subject to US Department of Defense leasing stipulations, the approval of the base commander as well as the inclusion of base specific lease stipulations. Generally, US Department of Defense military lands are leased with the NSO/DD stipulation, however, the NSO/ND stipulation has been used to keep drilling rigs from impacting mission required air space. US Army: Forts Bliss, Hood and Wolters, Camps Bowie, Bullis and Swift, Lone Star and Longhorn Army Ammunition Plants and Red River Army Depot. US Air Force: Bergstrom, Dyess, Laughlin, Randolph, Reese and Sheppard Air Force Bases, as well as Laughlin No. 1 and Seguin Abandoned Air Field. US Navy: Corpus Christi and Kingsville Naval Air Station, Cabaniss and Waldon Navy Landing Airfield and the McGregor Naval Industrial Reserve Ordnance Plants.	
Texas RMP (Specific Site Descriptions) USDA	Pecan Genetics and Improvement Research Laboratory SMA Lease Stipulations: NSO on approximately 84 acres. Should federal minerals at this facility be available for lease the stipulations described above would apply.	
Texas RMP (Specific Site Descriptions) USDA	Conservation and Production Research Laboratory SMA Lease Stipulations: NSO on approximately 1,531 acres.	

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	Should federal minerals at this facility be available for lease the stipulations described above would apply.	
Texas RMP (Specific Site Descriptions) USDA	The US Livestock Insects Laboratory SMA Lease Stipulations: NSO on approximately 35 acres. Should federal minerals at this facility be available for lease the stipulations described above would apply.	
Texas RMP (Specific Site Descriptions) USDA	Grassland, Soil, and Water Research Laboratory SMA Lease Stipulations: NSO on approximately 1,272 acres. Should federal minerals at this facility be available for lease the stipulations described above would apply.	
Texas RMP (Specific Site Descriptions) US Department of State	Amistad Reservoir SMA Lease Stipulations: NSO below the 1144.3 foot elevation traverse (USIDWC Stip. No. I). Should federal minerals at this facility be available for lease the stipulations described above would apply.	
Texas RMP (Specific Site Descriptions) US Department of State	Falcon Reservoir SMA Lease Stipulations: NSO/ND within 2,300 feet of the centerline of the dam embankment. NSO below the 307-foot elevation traverse (US Section of the International Boundary and Water Commission Stip. No. I). Should federal minerals at this facility be available for lease the stipulations described above would apply.	
Texas RMP (Specific Site Descriptions) US Department of Energy	Pantex SMA Stipulations: NSO/ND on the approximately 16,000 acres controlled by the Pantex facility. Should federal minerals at this facility be available for lease, the stipulations described above would apply.	
Texas RMP (Appendix) US Bureau of Reclamation General Stipulations	I. All rights under this lease are subordinate to the right of the United States to flood and submerge the lands, permanently or intermittently, in connection with the construction and operation and maintenance of the _____ Dam and Reservoir, _____Project, _____. 2. All surface work performed by the lessee on the lands shall be under the general supervision of the Area Manager, US Bureau of Reclamation (Reclamation) in direct charge of the project, and shall be subject to such conditions and regulations as he may prescribe. Detailed	

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	plans and location for all structures, appurtenances thereto, and surface disturbance work on the leased lands shall be submitted to the said Area Manager for approval in advance of commencement of any surface work 011 the said leased lands. At least 60 days or more lead time is preferred. All oil or gas drilling and producing operations shall be under the supervision of the District Manager, BLM, in accordance with 43 CFR, Part 3160. The authorized representatives of Reclamation and the BLM shall have the right to enter on the leased premises at any time to inspect both the installation and operational activities of the lessee. A. Predrilling Conditions I. No exploratory drilling, pit construction, or site clearing will occur until approval is granted by the appropriate Reclamation representatives in consultation with the local managing agencies. 2. No well shall be drilled for oil or gas below the surface elevation of feet. (This elevation restriction does not apply to areas downstream of the dam.) No drilling will be allowed within feet of any developed recreation area. 3. All storage tanks shall be constructed outside the Hood plain above elevation feet (maximum water surface). This elevation restriction does not apply to areas downstream of the dam. Berms shall be constructed around storage batteries, tanks, and separators to contain their entire volume should an accidental spill or rupture occur. 4. Drilling a well for oil and gas is prohibited within feet of any dam, dike, or other major structures, unless otherwise approved by the Area Manager in consultation with the local managing agencies. 5. No well shall be drilled within 1/8 mile (660 feet) of a river, channel, permanent stream, tributary, or marsh site unless otherwise approved by the Area Manager in consultation with the local managing agencies. To protect watersheds, slopes in excess of 40 percent (2.5: I) should be avoided where possible.	

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	6. All drilling operations shall be conducted in accordance with the applicable State laws relative to municipal water supplies. 7. No surface disturbance shall occur until completion of an environmental analysis of the proposed drilling activity by Reclamation and all coordination matters are completed. This analysis will involve review of federally listed threatened and endangered plant and animal species, protection of wetlands, cultural resources, and water quality associated concerns. Certain data needs may be requested from the applicant proposing a surface disturbance action. 8. Where surface operations and facilities could reasonably be expected to discharge petroleum products into navigable waters and should oil or petroleum products be stored onsite and facilities have an aggregate storage of 1,320 gallons or more or single containers with capacity of 660 gallons or more, a spill prevention control and counter measure plan shall be prepared and must be maintained and kept available for inspection onsite (if staffed) or at the nearest field office if unmanned. In the event of a spill or leakage, the lessee assumes all responsibility for cleanup and damages. 9. At the lessee's expense, a cultural resource survey of lands that may be disturbed must be completed before any surface disturbance. If during operations the lessee or any person working on the lessee's behalf discovers any historic or prehistoric ruin, monument, or site or any object of antiquity subject to the Archaeological Resource Protection Act of 1979 or the National Historic Preservation Act of 1966, as amended, and Reclamation Instructions 376.11, then work shall be suspended and the discovery promptly reported to Reclamation. When directed by Reclamation's authorized representative, the lessee shall obtain at the lessee's expense a qualified archaeologist to examine and, if necessary, excavate or gather such ruins or objects. 10. No mud pits shall be constructed below elevation __	

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	feet. (This elevation restriction does not apply to areas downstream of the dam.) Pits shall be well constructed in such a manner to prevent leaching of chemicals into the water table and under no circumstances shall they be allowed to leak or be cut to drain. Lining mud pits with plastic may be required. They shall not be located on natural drainages. In some situations, such as drilling in a floodplain, a closed mud system may be required with containerization of drill cuttings. Waste or discharge of any kind shall not be allowed to enter any drainage. Any plastic material used to line pits or sumps shall be cut off below ground level, as far down as possible, and disposed of before the pits are covered. All unattended pits containing liquids shall be fenced, and the liquid portion shall be allowed to evaporate before the pits are broken. 11. The derrick shall not be closer than one-and-a-half times its height from any electrical power transmission line unless prior approval is obtained from the owner of the power company. Signs shall be posted warning the public to prevent entry to the jobsite. Also, adequate blowout preventers shall be properly maintained. 12. All aboveground structures, not subject to applicable safety requirements, shall be painted to blend with the natural surroundings. The paint used shall be lusterless, nonreflective, flat, or semigloss color that blends with the area. B. Roads 1. The lessee shall observe the following restrictions during exploration: a. Wherever possible, existing roads and trails are to be used as access to the drilling site. New road construction will be kept to a minimum, and new construction will not begin until the location is approved by the local managing agency. b. Each existing fence to be crossed by the lessee shall be braced and tied off before cutting so as to prevent slacking of the wire. The opening shall be protected as necessary during construction and well operation to prevent the	

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	escape of livestock. On completion of construction, the fence shall be repaired to the original standard of the existing fence. c. Cleared trees and shrubs will be removed and/or piled as brush piles for wildlife shelter as designated by the local managing agency. Available topsoil will be removed from the road right of-way and stored in a topsoil stockpile. d. New access roads shall normally be a maximum of 30 feet wide, including drainage ditches and culverts. Road surface shall be graveled to a thickness identified as suitable for the safe operation of the vehicles and equipment at speeds proposed. The road shall be posted with curve signs and maximum speed limits. Speeds shall be limited on curves and posted to speeds that win permit a vehicle to be stopped within one-half the minimum sight distance. The road shall be maintained in safe condition. e. At the request of the local managing agency, on new access roads the lessee shall construct cattle guards or install gates with locks which will be maintained by the lessee during drilling operations and all such times thereafter as production continues. Fencing of roads may be required. f. Roads shall be maintained in suitable condition for vehicle passage during the duration of drilling activities with special consideration given to erosion control during wet and muddy periods. g. Existing roads shall be returned to original or equivalent condition after drilling equipment has been removed. h. All roads shall be adequately drained to control runoff and soil erosion. Drainage facilities may include ditches, water bars, culverts, or any other measures deemed necessary by Reclamation representatives. The following is a general guide for the spacing of water bars: Present Slope • less than 2 percent—200 feet • 2 to 4 percent—100 feet • 4 to 5 percent—75 feet	

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	• more than 5 percent—50 feet i. In the event of a dry hole, any new road construction sites will be revegetated by the drilling company, with native or adapted grasses, forbs, and shrubs as requested by Reclamation, unless the local managing agency indicates in writing that the road is to remain. Revegetation is to be accomplished by seeding and fertilizing the area within one year of completion at recommended seeding rates and dates. 2. The lessee shall observe the following stipulations should oil or gas be found and production activities occur: a. Production company shall maintain road in suitable condition or vehicle passage. Public will be permitted to use road where existing road was originally open to such use. New road construction, if needed, can be exempt from public use. b. Should the local managing agency deem it necessary to control vehicle traffic into the area during any season of the year, the production company will provide a metal gate and lock. C. Drilling Pad and Reserve Pit I. Area cleared for the drilling pad site and reserve pit shall be the absolute minimum required for operations. 2. All trees and shrubs removed from the pad site shall be piled near the site at places designated by the local managing agency for use as wildlife shelters. 3. Available topsoil shall be removed from the drilling pad and pit site and stored in a topsoil stockpile. 4. Diesel fuel tanks and other potential pollution sources will be surrounded by an earthen berm of sufficient height to contain their entire volume in the event of an accidental leak or rupture. 5. The area will be kept well policed and free of trash	

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	and litter at all times, including access roads used solely by the lessee. Litter blown out of the work area must be picked up. All waste associated with the drilling operations shall be removed and deposited in an approved sanitary landfill within 1month after removal of the drilling rig. The lessee shall comply with all state laws and regulations pertaining to the disposal of human waste. 6. For the protection of livestock and wildlife, all pits containing toxic liquids shall be fenced and covered with a fine mesh netting (i.e., hardware cloth) with openings being of one-half inch or less. 7. The lessee will remove fluids and trash from all pits. The sludge pit will be pumped after drilling activities are completed and, following adequate drying, reshaped to original contours and covered with topsoil. This restoration must be accomplished within 90 days of completion of drilling. The area must then be revegetated as requested by Reclamation. D. Actions with a Producing Well 1. A minimum service area will be developed around the well head. No permanent material storage will be allowed on the lease. The remainder of the drilling pad will be covered with topsoil from the stockpile and restored to vegetation by tilling, fertilizing, and seeding. Specific seed types will be determined on a case-by-case basis by Reclamation in consultation with the local managing agency. 2. The lessee may be required to utilize electric or submersible pumps, where feasible, rather than fuel-powered pumps (or other machinery). All electric lines must be buried to a depth of 15 to 18 inches. 3. All transfer lines from well site to tank: battery, saltwater disposal well, or the like, must be buried 3 feet below the surface and a minimum depth of 4 feet at stream, creek, and river channel crossings. 4. When possible, a common point of collection shall be established to minimize the number of tank batteries.	

Decision Source	Current Management Decision/Policy	Status
	E. Actions with a Nonproducing Well 1. All disturbed areas will be recontoured, covered with topsoil, and revegetated. All trash will be removed from the lease site. 2. Gates and cattle guards shall be removed where requested by the local managing agency. Any openings in fences will be restored to original condition. F. General I. The lessee shall limit access to well and storage locations on the leased property to authorized personnel. 2. The lessee agrees to cease all operations and make all necessary corrections to the satisfaction of the representative of Reclamation in consultation with tl1e local managing agency before resuming any operations should any violations of tl1e terms of this lease occur. 3. The lessee shall not permit any nuisance to be maintained on the premises and shall not use said premises for any purposes other than those authorized in the lease. Before abandoning any well, the lessee shall securely plug the same so as to effectually shut off water from the oil-bearing stratum. 4. The lessee shall carry on the development or operation of the leased premises in a workmanlike manner and shall not commit or suffer to be committed waste on the lands in the lessee's occupancy and use. In drilling operations, the lessee shall only use so much of the land as is necessary; shall safeguard the lakes and streams from any pollution; and shall not permit oil, saltwater, drilling mud, or other deleterious substances to escape onto the land, but the same shall be retained in proper tanks, receptacles, or in pits prepared for such purpose; and after the termination of drilling operations, any such pits shall be filled and land properly restored to its original condition, and only so much thereof shall be used in the production of the leased premises as is reasonably necessary to operate any well or wells thereon.	

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	5. The lessee shall provide all subcontractors and assigns, especially the dirt contractor, with a copy of the above stipulations before construction of the road, pad, or associated developments. Area Manager Oklahoma-Texas Area Office US Bureau of Reclamation 420 West Main, Suite 630 Oklahoma City, Oklahoma 73102	
Texas RMP (Appendix) Lone Star Army Ammunition Plan Mineral Leasing Stipulations (US Department of Defense Military Lands, US Army)	It is understood by all parties that the following fifteen mineral leasing stipulations are a part of subject lease and may be waived or modified only on the written concurrence of the installation commander, Lone Star Army Ammunition Plant, Texas (LSAAP, hereinafter Commander) and the written approval of the Department of the Interior's BLM, or authorized representatives. Compliance with these stipulations will be at no cost to the United States: 1. The lessee understands that its activity on LSAAP requires prior approval of the BLM, and that BLM approval requires the concurrence of the Commander, where necessary. Requirements which may be imposed include but are not limited to prohibitions or specifications on: a. access (e.g., time of year, gates, roads, construction, maintenance, pipelines, vegetation disposal) b. exploration activities c. location, design, and timing of construction of drilling, collection, and storage facilities (e.g., burial of wellhead and equipment in underground bunkers, depth of burial of flow lines) d. use and protection of LSAAP water supply (e.g., water quality testing) e. protection of the environment (e.g., hazardous waste areas, endangered species, erosion control, pollution prevention) and protection of objects of historic and scientific significance f. safety and fire protection measures (e.g., use of explosives, safe working distances from ammunition and explosives, construction and maintenance of firebreaks, development of contingency plans in the event of danger to persons or property, posting of signs)	

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	g. use of communication and transportation systems h. LSAAP security (e.g., authorized operation hours, worker identification) i. management of production area (e.g., size, fencing, gates, cattle guards, interim revegetation) j. reclamation measures k. attendance at meetings (e.g., pre-operations conference, post-operations conference) 2. The lessee may occupy only the surface of the lands that are cross-hatched, identified on the attached map, Exhibit A; the remaining areas identified on Exhibit A are available only for directional drilling. 3. The lessee will make every effort to locate pipeline and access routes in existing utility and road corridors. The lessee will furnish as-built drawings of completed pipelines at a scale and detail specified by the Commander. 4. The lessee in accepting this lease understands that the leased lands are part of LSAAP, a military installation. Mineral exploration and development in any restricted impact areas or areas involving ammunition or explosives is prohibited; however, these lands may be explored and produced by directional drilling at a safe distance from outside the areas as prescribed by US Department of Defense or Department of the Army regulations. Furthermore, the lessee understands that future increased production, testing or storage of ammunition or explosives may further restrict the surface area available for lease operations. Safe distances from ammunition and explosive facilities are based on the quantity and type of explosive present or authorized and the proposed use (e.g., aboveground or below ground, continuous or temporary presence of personnel). The lessee may obtain pertinent information on this subject from the LSAAP safety office. 5. Before beginning any approved operations on LSAAP the lessee must consult with third parties authorized to use real estate in the leased area and must document in any proposals for development the manner in which consideration is being given to programs for which third parties have contractual rights or	

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	responsibility. The lessee may consult the records of the District Engineer, Fort Worth, Texas to determine what real estate interests have been granted to third parties on LSAAP. On request of the BLM, the Commander may seek to resolve disputes between the lessee and third parties if they cannot reach agreement. Resolutions will be coordinated with contracting officers or representatives of all parties involved. The lessee shall hold the United States harmless for claims by such third parties arising from the lessee's activities, including damage to pasture and cropland capabilities. 6. Merchantable timber cleared from roads, pipeline rights-of-way, or drill sites will be disposed of in accordance with the Commander's instructions. 7. The lessee shall bear all costs of the following: a. Increased Army costs for its projects which are incurred by reason of the lessee's activity on LSAAP. Such costs will be paid when demanded on a one time basis as a condition of approval of proposed operations. b. Any Army costs to administer and ensure lease compliance not otherwise funded by Congress. c. The lessee's share of road and bridge maintenance costs for use of LSAAP roads and bridges in accordance with a maintenance agreement. In calculating such costs, the drilling and production area, pipeline ROW, lengths of roads and bridges, and so forth will be considered. Payments shall be made in advance as a result of negotiations between LSAAP and the lessee. d. Repair or restoration for damage or degradation of land or facilities, including that caused by subsidence and pollutant spills, resulting from the lessee's activities. Where conditions of urgency exist as determined by the Commander and time is of the essence, the lessee shall repair damages or degradation in a timely fashion in the manner specified by the Commander without awaiting confirmation from the BLM. The Commander shall subsequently confirm oral orders to the lessee in writing, with a copy furnished to the BLM and the District Engineer. If the lessee cannot or will not immediately comply, the Commander may immediately act, and the lessee shall be liable for reimbursement to the Army for all damages and costs of	

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	such action, including administrative costs and any surcharges that may be deemed appropriate. 8. The lessee shall not pollute the air, ground, or water (including groundwater) or create a public nuisance. a. Before beginning operations, the lessee shall retain a local agent who may be served notice on these matters and who shall notify the Commander immediately of spills or other unexpected threats or hazards to the environment. b. The lessee shall hold the United States harmless for any claim, including equitable claims, court or legal expenses incurred by the United States, and fines or penalties imposed on the United States which are related to unlawful pollution arising from the lessee's use of the property. 9. The United States reserves the option to purchase up to a hundred percent of the natural gas or oil refined, at the price defined below, under a utility service contract to be negotiated before the exercise of this right in accordance with present or future US Department of Defense or Army regulations. Any product purchased by the government shall be for the sole use of Army or US Department of Defense installation tenants located within a one-hundred fifty (150) mile radius of headquarters, LSAAP, and not for resale to the public. The lessee shall include this paragraph in any contract or sale of natural gas or oil to other parties. a. The lessee shall, in its sole discretion, determine whether oil or gas reserves are present on LSAAP in sufficient quantities to permit commercial development. After the lessee has determined and declared that commercial production is possible, the Government and lessee will have four months in which to negotiate the specific terms of any sale and begin delivery of production. Except during mobilization or surge periods, the Commander shall have the right to change its election under this option, but in no case more often than once every 12 months. b. The price paid to the lessee by the United States shall be the average of the three lowest publicly posted or spot prices for the delivered refined product as	

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	announced monthly by the three largest purchasers in Texas Railroad Commission District-6. Specific details of the price and actual quantity of product shall be negotiated during sales contract procedures. The sale price may be adjusted to reflect any unusual unanticipated capital investment and transportation costs incurred by the lessee. Such costs should be negotiated in paragraph 9a. In all cases, the lessee shall bear all costs on a nonreimbursable basis associated with maintaining the well site (including meters) during the producing life of the well and salvaging such facilities when production is ended. c. The lessee shall routinely inspect and calibrate equipment involved with the exercise of this option with the BLM. The BLM may require the lessee at least annually to engage an independent party acceptable to BLM to test meters for accuracy and to furnish written findings to BLM. 10. Notwithstanding any other stipulation, or condition of the lease, the United States and its officers, agents, servants and employees (the released parties) shall not be responsible for damages to property, injury to persons, or any other cause of action (released actions) which may arise from or be incident to this lease or the lessee's use and occupation of the leased premises. Released actions include, without limitations, damages to the lessee's property, injury to the lessee's person, or other cause of action of the lessee, or such damage, injury or other cause of action of the lessee's officers, agents, servant employees, invitees of any of these, or anyone else otherwise on or off said premises incident to the lease. Released actions include any actions arising from flooding of the lease premises. The lessee shall hold harmless and indemnify the released parties for released actions which may arise from or be incident to this lease or the lessee's use or occupation of the leased premises. 11. The lessor's rights described in the printed BLM lease form include the rights of the Army. 12. The Secretary of the Army or designee reserves the right to require cessation of operation if a national emergency arises or if the Army needs the leased	

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	premises for a mission incompatible with lease operations. On approval from higher authority, the Commander will give the lessee written notice or, if time permits, request, the BLM to give notice of the required cessation. The lessee understands the lease rights granted by this instrument do not include the period of any such cessation and the United States has no obligation to compensate the lessee for damages (including contractual losses) resulting from the exercise of this stipulation. The lessee shall include this stipulation in contracts with third parties to supply oil and gas. This stipulation shall not affect the lessee's right to seek suspension of the lease term from the BLM. Whether or not a suspension is granted will have no effect on cessation of operations as stipulated herein. 13. If the Commander or the authorized representative discovers an imminent danger to safety or security which allows no time to consult BLM, that person may order such activities stopped immediately. The authorized officer of BLM shall review the order and determine the need for further remedial action. 14. If military or explosive contamination is found in the operating area, the operator shall immediately stop work, leave the area, notify the Commander and not return until the Commander advises that it is safe to return. 15. It is in the best interest of LSAAP to determine if commercial deposits of oil or gas exist within LSAAP boundaries. The Authorized Officer (AO) of the BLM may specify rates of development and production pursuant to Section 4 of the Lease Terms and the Oil and Gas Operations Regulations at 43 CFR, Part 3162.2(c). Accordingly, the operator will commence drilling within thirty-six (36) months of the effective date of this lease on acreage available for occupancy on this lease, or within an approved exploratory unit which includes this lease. Drilling operations shall be diligently prosecuted until a well capable of adequately testing, at a minimum, Paluxy, Moorings Port, and the Smackover Formations has been drilled. The operator shall not in any event be required to drill said well to a depth in excess of 8,500 feet. With the approval of the	

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	AO, a completion to a lesser depth than the Smackover may be made. However, not later than twelve (12) months after said completion to a lesser depth, the operator shall commence drilling a well to test, at a minimum, the Formations mentioned above. Additional wells may be drilled as deemed necessary by the AO, after consultation with the lessee, based on test results and well spacing rules. Failure to comply with this stipulation will result in an assessment, civil penalty, or lease cancellation pursuant to 43 CFR, Part 3162. The lessee has the option to voluntarily cancel the lease in lieu of the assessment or civil penalty.	
Texas RMP (Appendix) Lone Start Army Ammunition Plant Installation Conditions for Site Approval (US Department of Defense Military Lands, US Army)	It is understood by all parties that the following sixteen (16) installation conditions for site approval (the "Conditions") are a part of subject lease and may be waived or modified only upon the written concurrence of the installation commander, Lone Star Army Ammunition Plant, Texas (LSAAP), (hereinafter "Commander") and the written approval of the Department of the Interior's BLM, or authorized representatives. The Lessee's compliance with these Conditions will be at no cost to the United States: 1. The routing of all supply pipelines, as well as material workmanship specifications shall be approved in advance by LSAAP. Pipeline access routes have yet to be determined by LSAAP. 2. The Lessee's access to LSAAP shall be through existing gates and roads as approved in advance by the Commander. No temporary gates shall be installed in LSAAP's perimeter fence. 3. New road routes, if any, will be approved by LSAAP before the start of construction. Such roads shall be properly drained, terraced to prevent erosion, compacted and surfaced to provide for all weather access to wells and equipment. The Lessee will maintain these roads for the duration of the underlying lease. Roads to drilling sites of wells with no production capability shall be restored to original condition immediately after the site is abandoned unless LSAAP Commander accepts the road and the maintenance	

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	responsibility for it. 4. Proposed activities have been reviewed and approved by the appropriate safety offices to include site approval by the Department of Defense Explosive Safety Board. Any and all changes to activities must have prior approval by the appropriate Safety Office. 5. Producing wells shall be enclosed with a permanent fence which shall enclose an area not to exceed the minimum required for operation and maintenance of the well as mutually determined by LSAAP and the Lessee. The fencing shall be 72” chain link utilizing steel posts. Fence gates shall be kept locked and the Lessee shall furnish LSAAP Commander with keys to all locks. 6. Lessee is required to comply with security regulations as stipulated in DARCOM-R 190-3 as well as any and all LSAAP security regulations and the LSAAP Protection Plan. 7. Lessee is required to comply with fire and safety regulations in accordance with AMC-R 385-100, Safety Manual as well as any and all plant safety and fire regulations. Firebreaks (50' minimum clear zone) are required around drilling sites, fences, pipelines, and as required by the Commander. 8. The LSAAP underground water table must not be contaminated nor disturbed or disrupted. The Lessee shall not contaminate any surface water, soil, air, or groundwater. 9. Hazardous and non-hazardous waste material will be disposed of in accordance with LSAAP, State of Texas, and Federal regulations; disposal of hazardous materials will be off LSAAP. 10. Charges for any administrative assistance, monitoring, or relocation of explosives will be assessed by LSAAP at a man-hour plant rate determined by the activity involved (guards, production, engineering, etc.). These charges will be reviewed annually and will be changed when necessary to reflect the Government's cost for providing these services. A separate negotiated	

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	agreement will be required for these services. Advance payment, at the discretion of the Commander, may be required as part of the contract. 11. Drilling on or under any lease, license, permit or easement stated in the report of Availability is permitted so long as the use granted thereunder is not disturbed. Known easements on LSAAP consist of, but are not limited to: a. Access to families of individuals buried on the 5.5 acres of cemeteries maintained by LSAAP. b. Approximately 13 SF in the telephone communications building (1-4) for General Telephone (GTE) to supply switch gear. c. Lake Texarkana Water Supply Corporation for a 30” line along the northern border. d. Southwestern Electric Power Company for a transmission line along the southwestern border. 12. The Lessee shall provide completely installed, maintained, and operable supply systems from the wellhead to existing LSAAP distribution lines if and when the Government exercises its option to purchase up to One-Hundred Percent (100%) of the well's natural gas or oil production. The supply systems shall meet the following requirements, or current industry standards: a. Materials -All piping shall be schedule 40 steel. Welded joints are required for underground piping and for piping 2-1/2” diameter or more if above ground. Above ground piping of 2” diameter or less may be screw joints. All piping, valves and fittings shall meet existing EPA requirements for high pressure gas distribution systems, as well as American National Standards Institute Specification B31.8 (latest edition) for Gas Transmission and Distribution Piping Systems. b. Coating -All underground piping shall be coated with coal tar enamel and glass fiber reinforced felt or suitable factory applied polyethylene or plastic coating (tape rapped at joints) to fully meet all EPA recommendations/requirements for gas distribution lines. Cathodic protection shall be provided by magnesium anodes or rectifier/ground-bed systems. The Government shall review and approve proposed systems and shall perform quality control testing and inspection of piping, coating and cathodic protection systems.	

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	c. Welding and General Workmanship -Welding and general workmanship shall be in accordance with all EPA and American National Standards Institute requirements for high pressure gas distribution systems. d. Size of Piping -Size of piping shall be sufficient to convey 50 percent of the well's production capacity, to the specified delivery point with a minimum delivery pressure of 50 pounds per square inch gauge and a maximum line pressure of 15 pounds per square inch gauge. Sizing shall be approved in advance by the Government. e. Meters -Meters shall be provided, installed, maintained, and calibrated by the Lessee, and shall be of type and quality equivalent to those used by the alternative non-Government gas purchaser. Meters shall be installed at the point of entry into the Government gas distribution system. f. Pressure Regulators and Accessories -Pressure regulators and accessories shall be provided and maintained by the Lessee to automatically pass gas into LSAAP distribution system as required to maintain a system pressure of 50 pounds per square inch gauge at the delivery point. 13. The Lessee is required to provide all necessary data to LSAAP to permit development of a Safety Site Plan which must be approved at all necessary Army command levels prior to the Army concurring with either a Notice of Staking or an Application for Permit to Drill. 14. Herbicides may be used by the Lessee to maintain clear zones. Any herbicides proposed for use must be coordinated with LSAAP pest management coordinated through AMCCOM prior to use. Only those herbicides approved by the EPA are acceptable. The Lessee will report to LSAAP pest management coordinator monthly herbicide usage not later than the third working day after the end of the month of use. Negative reports are not required. 15. The Lessee shall not establish any drill site, pipeline, or any other facilities within 200 feet of any cemetery or other potential historical site (see Exhibit F) within LSAAP. Explosive or seismic methods will not	

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	be employed within 500 feet of any cemetery or other historic site unless otherwise approved by the Commander. The Lessee will be responsible for any damages to headstones, markers, fences, or other property in area of the historic site, or access roads to same, that result from its operations. Exploration or exploitation actions proposed in the vicinity of historic sites will require coordination with, and approval by, the State Historic Preservation Office. 16. Leasing is permitted for oil and natural gas only.	
Texas RMP (Appendix) United States Section, International Boundary and Water Commission, United States and Mexico Special Stipulations for Falcon Dam and Reservoir	1. The lessee understands and agrees that a negative easement is imposed in and on said land to prohibit the drilling or deepening of any well for the purpose of producing oil or gas and other minerals provided, however, that exploration and development of oil or gas and other minerals under said land will be permitted by directional drilling from locations off the said land and above the 307-foot elevation traverse. 2. No drilling operations are permitted which will cause contamination of the Falcon Reservoir, or the Rio Grande. Before drilling operations commence, works, including a reserve pit, satisfactory to and as required by the United States Commissioner, United States Section, International Boundary and Water Commission, United States and Mexico, shall be constructed of sufficient size and maintained so as to hold all contaminants, well cuttings, trash, debris, and refuse, and to prevent them from getting into Falcon Reservoir or into the Rio Grande; and further, the lessee shall be liable for all damages due to any contamination of the Falcon Reservoir, or the Rio Grande, resulting from the lessee's operations. 3. The lessee agrees that all drilling, exploration, development and producing operations will be in conformance with the requirements of the Texas Railroad Commission and agencies of the State of Texas responsible for environmental concerns. 4. The lessee agrees not to subdivide or assign this lease without the prior written approval of the said United States Commissioner, 4171 North Mesa, Suite C-310, EI Paso, Texas 79902, first had and obtained	

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	before submission for approval to the Department of the Interior. Texas RMP (Appendix) United States Section, International Boundary and Water Commission, United States and Mexico Special Stipulations for Amistad Dam and Reservoir 1. The lessee understands and agrees that a negative easement is imposed in and on said land to prohibit the drilling or deepening of any well for the purpose of producing oil and/or gas and other mineral provided, however, that exploration and development of oil and/or gas and other minerals under said land will be permitted by directional drilling from locations off the said land and above the 1,144.3-foot elevation contour. 2. No drilling operations are permitted which will cause contamination of the Amistad Reservoir, or the Rio Grande, Pecos or Devils Rivers. Before drilling operations commence, works, including a reserve pit, satisfactory to and as required by the United States Commissioner, United States Section, International Boundary and Water Commission, United States and Mexico, shall be constructed of sufficient size and maintained so as to hold all contaminants, well cuttings, trash, debris, and refuse and to prevent them from getting into Amistad Reservoir or into the Rio Grande, Devils, or Pecos Rivers; and further, the lessee shall be liable for all damages due to any contamination of the Amistad Reservoir, or the Rio Grande, Pecos, or Devils Rivers resulting from the lessee's operations. 3. On completion of the well, any pits—after settling or drying—shall be filled and the location area shall be graded so as to resemble, as nearly as practicable, the land conditions before drilling. 4. The lessee agrees not to subdivide or assign this lease without the prior written approval of the said United States Commissioner, 4171 North Mesa, Suite C-310, EI Paso, Texas 79902, first had and obtained before submission for approval to the Department of	

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	the Interior.	
Texas RMP (Appendix) Lease Stipulations, Oil and Gas Leasing, Randolph Air Force Base, Texas	NSO permitted. Pooling of minerals or extraction of minerals via slant drilling or other methods is permitted provided that such activity does not detrimentally impact the flying training mission at Randolph Air Force Base, Texas. The 12th Civil Engineer Squadron, Randolph Air Force Base, Texas 78150-4513 must approve all drilling locations before the BLM approves any applications for permits to drill.	
Texas RMP (Appendix) Lease Stipulations, Oil and Gas Leasing, Seguin Air Force Auxiliary Airfield, Texas	NSO permitted. Pooling of minerals or extraction of minerals via slant drilling or other methods is permitted provided that such activity does not detrimentally impact the flying training mission at Seguin Air Force Auxiliary Field. The 12th Civil Engineer Squadron, Randolph Air Force Base, Texas 78150-4513 must approve all drilling locations before the BLM approves any applications for permits to drill.	
Oklahoma Resource Management Plan Amendment and Record of Decision (1996b) The RMP amendment will incorporate the Lease Application Area (LAA) of 90 acres of previously unleased federal coal and an existing adjacent lease area which covers 100 acres into the land-use plan.	Appendix A, Lease Stipulations 1. The lands described below may be mined using surface or subsurface mining techniques. The plan area consists of 190 acres in LeFlore County, Oklahoma, and is described as follows: IM, T.9 N., R.24 E., Section 3, NE¼ NE¼, NW¼SE¼NE¼, SW¼NE¼, NW¼NW¼SE¼, NE¼SW¼, NW¼SE¼SW¼, SW¼SW¼. 5. If it is impractical to relocate any ROW, mining will be prohibited within the ROW and within a 100-foot buffer zone outside the ROW (100 feet on either side of the ROW boundaries). Relocation approval of both the holder and issuing parties involved in the ROW is required to be filed with the District Manager unless included with the mining permit application package. 6. The coal lessee will consult with the owners of occupied dwellings and maintain or, with the owner's written consent, adjust a designated 300-foot buffer zone. Consent to mine is required to be filed with the District Manager unless included with the mining permit application package. 7. Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall conduct a cultural resource intensive field inventory in a manner	

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	specified by the authorized officer of the BLM on portions of the mine plan area that may be adversely affected by lease related activities, and that were not previously approved by the authorized officer of the surface managing agency (or the BLM if the surface is privately owned). Lessee shall submit the results of such surveys to the Tulsa District, BLM. 8. The lessee shall protect all cultural resource properties within the lease area from lease-related activities until the cultural resource mitigation measures can be implemented as part of an approved mining and reclamation plan or exploration plan. The cost of conducting the inventory, preparing reports, and carrying out mitigation measures shall be borne by the lessee. If cultural resource are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the Regional Director (or the District Manager if activities are associated with coal exploration outside an approved mining permit area), or the authorized officer of the surface managing agency if the Regional Director, or District Manager, as appropriate, is not available. The lessee shall not disturb such resources except as may be subsequently authorized by the Regional Director (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area). With two working days of notification, the Regional Director (or the District Manager, if activities are associated with coal exploration outside an approved mining permit area) will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface managing agency unless otherwise specified by the authorized officer of the BLM. All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law. 9. The lessee shall not knowingly disturb, alter, destroy, or take any larger and more conspicuous fossils or significant scientific interest, and shall protect all such fossils in conformance with the measures included in the approval of the mining and reclamation plan or exploration plan. The lessee shall immediately bring	

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	any such fossils that might be altered or destroyed by the lessee's operation to the attention of the Regional Director or the District Manager, as appropriate. Operations may continue as long as the fossil specimen or specimens would not be seriously damaged or destroyed by the activity. The Regional Director or the District Manager, as appropriate, shall evaluate or have evaluated such discoveries brought to the Director or Manager's attention and, within five working days, shall notify the lessee what action shall be taken with respect to such discoveries. All such fossils of significant scientific interest shall remain under the jurisdiction of the United States until ownership is determined under applicable law. Copies of all paleontological resource data generated as a result of the lease term requirements will be provided to the Regional Director or the District Manager, as appropriate. The cost of any required salvage of such fossils shall be borne by the United States. These conditions apply to all such fossils of significant scientific interest discovered within the lease area whether discovered in the overburden, interburden, or coal seam or seams.	
Oklahoma RMP (Federal Coal Tracts in Oklahoma Acceptable for Further Consideration for Leasing—Exceptions, Stipulation Application and Mitigation)	COAL LEASE STIPULATION I (CLS-I). ROW: If it is impractical to relocate the ROW, mining will be prohibited in the ROW and to within a 100-foot buffer zone from the outside of the ROW. Relocation approval of both the holder and issuing parties involved in the ROW would be required. Applies to the following areas in Oklahoma: • Bache Area • Blocker Area • Buck Creek Mountain Area • Cavanal West Area • Coalgate Area • Heavener Area • Howe Area • Lehigh Area • McCurtain Area • Morgan Mountain Area • Rock Island Area • Spiro-Bokoshe Area • Wilbueron-Red Oak Area • Wister Area	

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Amendment and Decision Record for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.	<u>Existing Stipulations</u> Coal Lease Stipulation 1 (CLS-1) ROW: If it is impractical to relocate the ROW, mining will be prohibited within the ROW and to within a 100-foot buffer zone from the outside of the ROW. Relocation approval of both the holder and issuing parties involved in the ROW would be required.	
Oklahoma RMP (Federal Coal Tracts in Oklahoma Acceptable for Further Consideration for Leasing—Exceptions, Stipulation Application and Mitigation)	COAL LEASE STIPULATION 2 (CLS-2). DWELLINGS: The coal lessee will consult with the owners of occupied dwellings and maintain or, with the owner's written consent, adjust the designated 300-foot buffer zone. Applies to the following areas in Oklahoma: • Bache Area • Blocker Area • Buck Creek Mountain Area • Coalgate Area • Heavener Area • Howe Area • Lehigh Area • Morgan Mountain Area • Rock Island Area • Spiro-Bokoshe Area • Wilbueron-Red Oak Area • Wister Area	
Amendment and Decision Record for Three Competitive	<u>Existing Stipulations</u> Coal Lease Stipulation 2 (CLS-2) Dwellings: The coal	

Decision Source	Current Management Decision/Policy	Status
Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.	lessee will consult with the owners of occupied dwellings and will maintain or, with the owner's written consent, adjust the designated 300-foot buffer zone.	
Oklahoma RMP (Federal Coal Tracts in Oklahoma Acceptable for Further Consideration for Leasing—Exceptions, Stipulation Application and Mitigation)	COAL LEASE STIPULATION 3 (CLS-3). WETLAND PROTECTION: All or portions of the lands under this lease contain wetland and/or riparian areas. The lessee will not conduct surface-disturbing activities on these areas without the specific approval, in writing, of the authorized officer. Impacts or disturbance to wetlands and riparian habitats which occur on this lease, must be avoided, minimized or compensated. The mitigation goal will be no net loss of in-kind habitats. The mitigation shall be developed in cooperation with appropriate state and federal agencies. The wetland/riparian stipulation is mandated by Executive Order 11990, Protection of Wetlands, of May 24, 1977. Applies to the following areas in Oklahoma: • Bache Area • Blocker Area • Buck Creek Mountain Area • Cavanal West Area • Coalgate Area • Heavener Area • Howe Area • Lehigh Area	

Decision Source	Current Management Decision/Policy	Status
	• McCurtain Area • Morgan Mountain Area • Rock Island Area • Spiro-Bokoshe Area • Wilbueron-Red Oak Area • Wister Area	
Oklahoma Resource Management Plan Amendment and Record of Decision (1996b) The RMP amendment will incorporate the Lease Application Area (LAA) of 90 acres of previously unleased federal coal and an existing adjacent lease area which covers 100 acres into the land-use plan.	CLS-3 (Wetland Protection) will be modified to read as follows: All or portions of the lands under this lease contain wetland and/or riparian areas. The lessee will not conduct surface-disturbing activities on these areas without the specific approval, in writing, of the authorized officer. Impacts or disturbance to wetlands and riparian habitat which occur on this lease, must be avoided, minimized or compensated. The mitigation goal will be no net loss of in-kind habitats. The mitigation shall be developed in cooperation with appropriate state and federal agencies. All proposals to divert stream channels must receive specific concurrence from the BLM.	
Amendment and Decision Record for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as	<u>Existing Stipulations</u> Coal Lease Stipulation 3 (CLS-3) Wetland Protection: All or portions of the lands under this lease contain wetland and/or riparian areas. The lessee will not conduct surface-disturbing activities on these areas without the specific approval, in writing, of the authorized officer. Impacts on or disturbance of wetlands and riparian habitats, which occur on this lease, must be avoided, minimized, or compensated. The mitigation goal will be no net loss of in-kind habitats. The mitigation shall be developed in cooperation with appropriate State and federal agencies. The wetland/riparian stipulation is mandated by Executive Order 11990, Protection of Wetlands, of May 24, 1977.	

Decision Source	Current Management Decision/Policy	Status
amended in 1996, are not addressed.		
Oklahoma RMPA and Decision Record for Federal Coal Leases in Haskell and Leflore Counties, Oklahoma (2014) The planning area this RMPA applies to is the McCurtain Area (1,300.62 acres), the Milton Area (290.00 acres), the Spiro Area (790 acres), and the Liberty Area (1,620 acres). The planning areas are outside of areas designated as available for coal leasing in the RMP (1994) or its amendments.	Forested, emergent, or riverine wetlands deemed important by the BLM and USFWS have been identified during the Unsuitability Analysis. The BLM would attach the CLS for wetlands, USGS mapped streams, and riparian zones (CLS-3) to new coal leases as stated in Section 2.4.4. Riparian zones have been incorporated as a 100-foot buffer applied to mapped wetlands and streams.	
Oklahoma RMP (Federal Coal Tracts in Oklahoma Acceptable for Further Consideration for Leasing—Exceptions, Stipulation Application and Mitigation)	CLS-4, American burying beetle protection: The lessee will not conduct surface-disturbing lease activities which will result in unacceptable impacts to the American burying beetle, a federally listed endangered species. The lessee may be required to arrange for a qualified biologist to conduct field surveys which could result in beetle removal and transplant efforts. Such transplant efforts must be accomplished no more than one year before surface-disturbing activities are to begin. Survey requirements, transplant efforts and Endangered Species Act coordination/consultation will be cooperatively accomplished with the USFWS. This stipulation would be attached to federal coal leases that occur in Bryan, Cherokee, Haskell, Latimer, LeFlore, Muskogee, Pittsburg, Sequoyah, and Tulsa counties. Applies to the following areas in Oklahoma:	

Decision Source	Current Management Decision/Policy	Status
	• Bache Area • Blocker Area • Buck Creek Mountain Area • Cavanal West Area • Heavener Area • Howe Area • McCurtain Area • Morgan Mountain Area • Rock Island Area • Spiro-Bokoshe Area • Wilbueron-Red Oak Area • Wister Area	
Oklahoma Resource Management Plan Amendment and Record of Decision (1996b) The RMP amendment will incorporate the Lease Application Area (LAA) of 90 acres of previously unleased federal coal and an existing adjacent lease area which covers 100 acres into the land-use plan.	CLS-4 (American Burying Beetle Protection) will be modified to read as follows: The lessee may be required to arrange for a qualified biologist to conduct field surveys for the federally endangered American burying beetles. Without a survey, no determination can be made about the effects of the action on this species. If American burying beetles are found during the survey, further consultation with the Oklahoma Ecological Services Field Office of the USFWS under Section 7 of the Endangered Species Act may be necessary.	
Resource Management Plan Amendment and Decision Record for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment	The 1994 RMP includes one Coal Lease Stipulation (CLS-4) for protection of the American burying beetle (*Nicrophorus americanus*), a federally listed endangered species. The stipulation prohibits surface-disturbing activities that would result in unacceptable impacts on the American burying beetle. The stipulation is specifically attached to leases in Bryan, Cherokee, Haskell, Latimer, LeFlore, Muskogee, Pittsburg, Sequoyah, and Tulsa Counties. As such, this stipulation would apply to the three current LAAs.	

Decision Source	Current Management Decision/Policy	Status
prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.		
Amendment and Decision Record for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.	<u>Existing Stipulations</u> CLS-4, American Burying Beetle Protection: The lessee will not conduct surface-disturbing lease activities that will result in unacceptable impacts on the American burying beetle, a federally listed endangered species. The lessee may be required to arrange for a qualified biologist to conduct field surveys that could result in beetle removal and transplant efforts. Such transplant efforts must be accomplished no more than one year before surface-disturbing activities are to begin. Survey requirements, transplant efforts, and Endangered Species Act coordination/consultation will be accomplished cooperatively with the USFWS. This stipulation would be attached to federal coal leases, which occur in Bryan, Cherokee, Haskell, Latimer, LeFlore, Muskogee, Pittsburg, Sequoyah, and Tulsa Counties.	
Oklahoma RMPA and Decision Record for Federal Coal Leases in Haskell and Leflore Counties, Oklahoma (2014) The planning area this RMPA applies to is the McCurtain Area (1,300.62 acres), the Milton	CLS–5—Cultural Resources: Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall conduct a cultural resource intensive field inventory in a manner specified by the Authorized Officer of the BLM or of the surface-managing agency, if different, on portions of the mine-plan area and adjacent areas, or exploration area, that may be adversely affected by lease-related activities and that were not previously inventoried at such a level of intensity. The inventory shall be conducted by a qualified archaeologist, historian, or historical architect, as appropriate, approved by the Authorized Officer of the surface-managing agency, or by the	

Decision Source	Current Management Decision/Policy	Status
Area (290.00 acres), the Spiro Area (790 acres), and the Liberty Area (1,620 acres). The planning area are outside of areas designated as available for coal leasing in the RMP (1994) or its amendments.	BLM, if the surface is privately owned, and a report of the inventory and recommendations for protecting any cultural resources identified shall be submitted to the Assistant Director of the Midcontinent Region of the OSM, the Authorized Officer of the BLM if activities are associated with coal exploration outside an approved mining permit area, and the Authorized Officer of the surface-managing agency, if different. The lessee shall undertake measures, in accordance with instructions from the Assistant Director, or Authorized Officer, to protect cultural resources on the leased lands. The lessee shall not commence the surface-disturbing activities until permission to proceed is given by the Assistant Director or Authorized Officer. The lessee shall protect all cultural resource properties within the lease area from lease-related activities until the cultural resource mitigation measures can be implemented as part of the approved mining and reclamation or exploration plan. The cost of conducting the inventory, preparing reports, and carrying out mitigation measures shall be borne by the lessee. If cultural resources are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the Assistant Director or Authorized Officer, or the Authorized Officer of the surface-managing agency, if the Assistant Director is not available. The lessee shall not disturb such resources except as may be subsequently authorized by the Assistant Director or Authorized Officer. Within two working days of notification, the Assistant Director or Authorized Officer will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface-managing agency unless otherwise specified by the Authorized Officer of the BLM or of the surface-managing agency, if different. All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.	
Amendment and Decision Record for Three Competitive	<u>Standard Stipulation for Cultural Resources</u> The BLM employs a standard overall stipulation for	

Decision Source	Current Management Decision/Policy	Status
Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.	cultural resources that is not stated specifically in the 1994 RMP. The standard stipulation for cultural resources states the following. CLS–5, Cultural Resources: Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall conduct a cultural resource intensive field inventory in a manner specified by the authorized officer of the BLM or of the surface managing agency, if different, on portions of the mine plan area and adjacent areas, or exploration area, that may be adversely affected by lease-related activities and that were not previously inventoried at such a level of intensity. The inventory shall be conducted by a qualified archaeologist, historian, or historical architect, as appropriate, approved by the authorized officer of the surface-managing agency (or by the BLM, if the surface is privately owned), and a report of the inventory and recommendations for protecting any cultural resources identified shall be submitted to the Manager, Program Support Division, Mid-Continent Coordinating Center (PSD manager) of the OSM, the authorized officer of the BLM, if activities are associated with coal exploration outside an approved mining permit area (hereinafter called authorized officer), and the authorized officer of the surface managing agency, if different. The lessee shall undertake measures, in accordance with instructions from the PSD manager, or authorized officer, to protect cultural resources on the leased lands. The lessee shall not commence the surface-disturbing activities until permission to proceed is given by the PSD manager or authorized officer. The lessee shall protect all cultural resource properties within the lease area from lease-related activities until the cultural resource mitigation measures can be implemented as part of approved mining and reclamation or exploration plan. The cost of conducting the inventory, preparing reports, and carrying out mitigation measures shall be borne by the lessee. If cultural resources are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the PSD manager or authorized	

Decision Source	Current Management Decision/Policy	Status
	officer, or the authorized officer of the surface managing agency, if the PSD manager is not available. The lessee shall not disturb such resources except as may be subsequently authorized by the PSD manager or authorized officer. Within two working days of notification, the PSD manager or authorized officer will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface-managing agency unless otherwise specified by the authorized officer of the BLM or of the surface managing agency, if different. All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.	
Oklahoma RMPA and Decision Record for Federal Coal Leases in Haskell and Leflore Counties, Oklahoma (2014) The planning area this RMPA applies to is the McCurtain Area (1,300.62 acres), the Milton Area (290.00 acres), the Spiro Area (790 acres), and the Liberty Area (1,620 acres). The planning area is outside of areas designated as available for coal leasing in the RMP (1994) or its amendments.	CLS–6—Migratory Bird Habitat: If surface-disturbing activities occur between March 1 and July 30, surveys for ground- and tree-nesting birds will be conducted by an entity approved by the BLM field office staff. If active nests are encountered, surfacing disturbing activities will be delayed until the nesting activities are complete. Concurrence by the USFWS Oklahoma Ecological Services Office will be required for compliance.	

Decision Source	Current Management Decision/Policy	Status
Amendment and Decision Record for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.	<u>Stipulation Identified Through the Coal Screen</u> CLS-6, Floodplains: Floodplains (100-year recurrence interval) have been mapped by the Federal Emergency Management Agency for the Bull Hill LAA. The leaseholder must receive a floodplain permit from the county floodplain administrator. The leaseholder must correspond with both the floodplain administrator and the ODM to make any necessary modification to achieve the floodplain permit. The Liberty West and McCurtain LAAs lie within areas that are unmapped by the Federal Emergency Management Agency for floodplains. As such, within the Liberty West LAA a 100-foot buffer zone (200-foot total) would be applied to perennial and intermittent streams. Mining would not be allowed within this buffer zone unless approval is obtained from the county floodplain administrator. Mining within the McCurtain LAA would be conducted in accordance with SMCRA and 30 CFR, Part 817.57 (hydrologic balance: stream buffer zones). As such, no land within 100 feet of a perennial stream or an intermittent stream shall be disturbed by underground mining activities, unless the regulatory authority specifically authorizes underground mining activities closer to, or through, such a stream.	
Amendment and Decision Record for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma	<u>Stipulation Identified Through the Coal Screen</u> CLS-7, Municipal Watersheds: The Bull Hill LAA lies within the municipal watershed for the city of Poteau. Leasing must be coordinated with the Poteau Valley Improvement Authority, which provides water to Poteau, and agreements must be made with the authorized officer to allow surface mining to occur in this watershed.	

Decision Source	Current Management Decision/Policy	Status
RMP, and as amended in 1996, are not addressed.		
Amendment and Decision Record for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the 1994 Oklahoma RMP, and as amended in 1996, are not addressed.	<u>Stipulation Identified Through the Coal Screen</u> CLS-8, Wister Wildlife Management Area: Leasing within the Wister Wildlife Management Area must be coordinated with the USACE and ODWC or authorized officer. If leasing agreements cannot be reached, no surface mining would be allowed in the Wister Wildlife Management Area.	
Resource Management Plan Amendment and Decision Record for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma (2004) Neither the 1994 RMP nor the amendment prepared in 1996 addressed the areas that are the subject of this RMPA. Lands already considered in the	The Wister Wildlife Management Area covers a total of 35,500 acres of central LeFlore and eastern Latimer Counties in southeastern Oklahoma. It is located around the 7,000-acre Wister Lake, along and on either side of Highway 59 and 271 South, and south of the towns of Wister and Heavener. Provisions for development around the Wister Wildlife Management Area are defined by the 1994 RMP. NSO is allowed in approximately 23,070 acres around the lake as buffers for recreational facilities, roads, trails, and other developments and within the identified flood pool. Leasing within the Wister Wildlife Management Area must be coordinated with the USACE and ODWC.	

Decision Source	Current Management Decision/Policy	Status
1994 Oklahoma RMP, and as amended in 1996, are not addressed.		
Oklahoma Resource Management Plan Amendment and Record of Decision (1996b) The RMP amendment will incorporate into the land use plan the LAA of 90 acres of previously unleased federal coal and an existing adjacent lease area that covers 100 acres.	<u>Action</u> The Decision (Preferred Alternative) is to amend the Oklahoma RMP to include a 190-acre area described as IM, T.9 N., R.24 E., Section 3 I.M., NE¼NE/¼, NW¼SE¼NE¼, SW¼NE¼, NW¼NW¼SE¼, NE¼SW¼, NW¼SE¼SW¼, SW¼SW¼.	
Oklahoma Resource Management Plan Amendment and Record of Decision (1996b) The RMP amendment will incorporate into the land use plan the LAA of 90 acres of previously unleased federal coal and an existing adjacent lease area which covers 100 acres.	<u>Non-Suitable Areas</u> A 50-foot ROW for a 161 kV power line, 100-foot buffers on each side of Cache Creek, and buffer east of the highway on the west side of the tract have been designated unsuitable for surface mining.	
Oklahoma Resource Management Plan Amendment and Record of Decision (1996b) The RMP amendment will incorporate into the	<u>Multiple Use Decision</u> The Oklahoma RMP designated areas acceptable for further consideration for leasing. Implementing the action would then include this LAA into the previous decisions, making the LAA available for further consideration for leasing.	

Decision Source	Current Management Decision/Policy	Status
land use plan the LAA of 90 acres of previously unleased federal coal and an existing adjacent lease area which covers 100 acres.		
Oklahoma Resource Management Plan Amendment and Record of Decision (1996b) incorporate into the land use plan the LAA of 90 acres of previously unleased federal coal and an existing adjacent lease area which covers 100 acres.	<u>Surface Owner Consultation and Consent</u> The surface of the LAA is entirely under private ownership. Any surface owned by a qualified surface owner could not be included in a lease sale without written consent.	
	The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened or endangered or other special status species. The BLM may recommend modifying 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 its habitat. The BLM may require modifications to or disapprove a proposed activity that is likely to jeopardize the continued existence of a proposed or listed threatened or endangered species or to result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 USC, Section 1531 et seq., including completion of any required procedure for conference or consultation.	
WO-NHPA	A lease may be found to contain historic properties or resources protected under the NHPA, the American Indian Religious Freedom Act, the Native American Graves Protection and Repatriation Act, Executive Order 13007, or other statutes and executive orders. The	

Decision Source	Current Management Decision/Policy	Status
	BLM will not approve any ground-disturbing activities that may affect any such properties or resources until it completes its obligations (e.g., 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 it may disapprove any activity that is likely to result in adverse effects that could not be successfully avoided, minimized, or mitigated.	

3.3.2 Locatable Minerals

Decision Source	Current Management Decision/Policy	Status
Texas Proposed RMPA and Environmental Assessment, 2000 (Affected Environment—portions from this section that describe management direction as they now exist on the Amarillo Field Office unit boundaries) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo.	According to 30 USC, Section 22 (1982), lands acquired by the United States are not, by mere force of acquisition, open to disposal under the public land laws. In absence of specific statutory authority to the contrary, acquired land is not subject to location under the mining law. Acquired lands, according to 43 USC, Section 1571 (1982) administered by the BLM are not subject to appropriation unless and until opening orders are duly noted on the land records.	

3.3.3 Recreation and Visitor Services

Decision Source	Current Management Decision/Policy	Status
Oklahoma Proposed RMP/Final EIS Continuing Management Guidance	The Red River Management Area would be classified as an extensive recreation management area. As public land is identified it becomes available for dispersed recreation activities, including hunting, fishing, sightseeing, horseback riding, hiking, and rafting, consistent with limitations necessary to meet other resource management objectives. Provision for opportunities accessible by car and close to population centers are emphasized.	
Texas Proposed RMPA and Environmental Assessment, 2000 (Continuing Management Guidance) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo.	The FLPMA provides for management of outdoor recreation on public lands. Section 202(c)(9) calls for land use planning consistent with statewide outdoor recreation plans. Recreation use is managed in order to protect the health and safety of visitors and to protect natural, cultural, and other resource values to facilitate public enjoyment of public lands and to resolve user conflicts. Providing opportunities for unconfined recreation close to major urban areas is stressed.	
Texas Proposed RMPA and Environmental Assessment, 2000 (Continuing Management Guidance) The planning area this RMPA applies to is 11,833.80 acres of federal surface	The outdoor recreation program uses the Recreation Opportunity Spectrum as a basic tool for inventory and management to ensure the general public the continued variety of quality recreational opportunities.	

Decision Source	Current Management Decision/Policy	Status
estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo.		
Texas Proposed RMPA and Environmental Assessment, 2000 (Continuing Management Guidance) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo.	Recreation resources are also evaluated on a case-by-case basis as a part of project level planning. Such evaluation considers the significance of the proposed project and the sensitivity of recreation resources in the affected area. Stipulations are attached as appropriate to ensure compatibility of projects with recreation management objectives.	
Texas Proposed RMPA and Environmental Assessment, 2000 (Continuing Management Guidance) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar	The use of off-road vehicles on BLM-administered land is regulated in accordance with the authority and requirements of Executive Orders 11644 and 11989 and regulations contained in 43 CFR, Part 8340. These regulations and Executive Orders require that off-road vehicle use not cause significant adverse impacts to resource values, that conflicts between visitors be minimized, and that public hazards are identified and public safety is promoted.	

Decision Source	Current Management Decision/Policy	Status
property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo.		
Texas Proposed RMPA and Environmental Assessment, 2000 (Alternative B.—Retention and Management of Public Lands in Potter County, Texas (Preferred Alternative)) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo. *Note—The decision detailed here is an action of the preferred alternative, which is assumed to be the selected alternatives (no ROD provided for this Proposed RMPA).*	Proposed Action (treated as decisions) Develop a cooperative resource management plan for the Management of the Cross Bar property. Under this cooperative resource management plan, public use of the public lands will be a priority.	

Decision Source	Current Management Decision/Policy	Status
Texas Proposed RMPA and Environmental Assessment, 2000 (Affected Environment—portions from this section that describe management direction as they now exist on the Amarillo Field Office unit boundaries) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo.	There exists a memorandum of understanding between the National Park Service and the BLM. It gives the National Park Service management and supervisory authority over all surface uses, including recreational uses, on 6,975 acres of the subject BLM-administered lands. The memorandum of understanding was renewed on January 28, 1999, for a term of five years with either agency having the right of termination on 60 days written notice to the local management of the other agency.	

3.3.4 Lands and Realty

Decision Source	Current Management Decision/Policy	Status
Kansas RMP Planning Analysis for Proposed Disposal of Public Lands in Kansas, prepared in 1987, and the Supplemental Planning Analysis	Decision to transfer title of the isolated tracts of BLM-managed federal surface estate to other than federal ownership. There may also be additional tracts of public land situated within the state that are presently unidentified due to deficiencies in existing land status records. Any unidentified tracts detected will be disposed of through procedures outlined in 43 CFR, Part 2710, Sales, or 43 CFR, Part 2740. If at some future date, abandoned rail road corridors revert to federal ownership, the	

Decision Source	Current Management Decision/Policy	Status
for Proposed Disposal of Public Lands in Kansas, completed in 1988.	corridors in question would be evaluated for potential rails to trails projects with full public participation as required by law.	
Oklahoma Proposed RMP/Final EIS Continuing Management Guidance	Red River Management Area —The precise limit of the boundary of the Red River Management Area has yet to be determined.	
Oklahoma RMP (The RMP for Issues 3. Townsite Disposal)	Under the RMP, the BLM would pursue disposal of all townsite reserves. Townsite reserves in incorporated towns or cities would be transferred to those towns or cities that desire such a transfer. The remaining parcels would then be offered based on the "needs of Federal, state, and local governments, adjoining landowners, historical uses, and competitive interests." This would result in first making these parcels available to other federal agencies, followed respectively by offerings to the State of Oklahoma, and then local government entities that are in vicinity of the lands for augmentation or implementation of their specific missions. The lands would next be offered to adjoining landowners, and finally to individuals and the general public. Disposal would be through sales, the Recreation and Public Purposes Act of 1976, and the Color-of-Title Act.	
Texas Proposed RMPA and Environmental Assessment, 2000 (Alternative B—Retention and Management of Public Lands in Potter County, Texas (Preferred Alternative) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar	Proposed Action (treated as decisions) Develop a cooperative resource management plan for the management of the Cross Bar property. This cooperative resource management plan will include the following management principles and objectives: A. No actions which conflict with the BLMs mission of storage and production of helium will be allowed. B. Management of the public lands as one unit. (1) The special use permit to the Department of the Navy will be canceled (a) All structures, signs and Navy property will be removed and the lands returned to native condition (b) Any future Marine Reserve use of public lands will be considered through the	

Decision Source	Current Management Decision/Policy	Status
property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of Amarillo. *Note—The decision detailed here is an action of the preferred alternative, which is assumed to be the selected alternative (no ROD was provided for this proposed RMPA).*	use of applications and temporary use permits (2) The memorandum of understanding between the BLM and National Park Service concerning current management of the Cross Bar property will be canceled.	
Texas Proposed RMPA and Environmental Assessment, 2000 (Alternative B—Retention and Management of Public Lands in Potter County, Texas (Preferred Alternative) The planning area this RMPA applies to is 11,833.80 acres of federal surface estate (Cross Bar property) and 38,256.18 acres of split-estate (private surface over federal minerals) in Potter County, north of	Proposed Action (treated as decisions) Develop a cooperative resource management plan for the management of the Cross Bar property. Adjacent landowners will be encouraged to participate in its development and implementation.	

Decision Source	Current Management Decision/Policy	Status
Amarillo. *Note—The decision detailed here is an action of the preferred alternative, which is assumed to be the selected alternative (no ROD was provided for this Proposed RMPA).*		

3.3.5 Livestock Grazing

Decision Source	Current Management Decision/Policy	Status
Oklahoma RMP Guidance	There are four active grazing leases being administered in Oklahoma. Three of these grazing leases lie along the north fork of the Red River: two in Tillman County and one in Jefferson County. The fourth grazing lease is on the South Canadian River in Blaine County.	

3.4 BIA CURRENT MANAGEMENT OF RESOURCES

While the BIA manages according to federal and state laws and US Department of the Interior policies and guidelines, no planning level decisions have been identified for the BIA Eastern Oklahoma and Southern Plains Regional Offices. All of the management described in the table below comes from policy.

3.4.1 Air

Decision Source (if applicable)	Current Management Decision/Policy	Status
Indian Affairs Manual: Part 59, Chapter 1; 1.3, B. Environmental and Cultural Resources Management, Environmental Management	It is the policy of Indian Affairs to comply with all applicable federal, state, local and tribal environmental laws and regulations.	
Indian Affairs Manual: Part 59,	Implement sustainable practices for energy efficiency, greenhouse gas emission reduction, renewable energy,	

Decision Source (if applicable)	Current Management Decision/Policy	Status
Chapter 1; 1.3, C. Environmental and Cultural Resources Management, Environmental Management	water conservation, pollution and waste minimization, recycling, reduction or elimination of use of toxic or hazardous chemicals, petroleum products use reduction, and green purchasing, among others.	

3.4.2 Climate

Decision Source (if applicable)	Current Management Decision/Policy	Status
Indian Affairs Manual: Part 59, Chapter 1; 1.3, B. Environmental and Cultural Resources Management, Environmental Management	It is the policy of the BIA to comply with all applicable federal, state, local and tribal environmental laws and regulations.	
Indian Affairs Manual: Part 59, Chapter 1; 1.3, C. Environmental and Cultural Resources Management, Environmental Management	Implement sustainable practices for energy efficiency, greenhouse gas emission reduction, renewable energy, water conservation, pollution and waste minimization, recycling, reduction or elimination of use of toxic or hazardous chemicals, petroleum products use reduction, and green purchasing, among others.	

3.4.3 Water Resources

There are minimal management decisions or policy guiding water resources management for BIA.

Decision Source (if applicable)	Current Management Decision/Policy	Status
Title 25—Indians, Chapter 1—BIA, Department of the Interior (Parts 1-293), Subchapter H—Land and Water (Parts 150-183)	Regulation of with water leases, water runoff, livestock water developments, and irrigation water.	

3.4.4 Vegetation

Decision Source (if applicable)	Current Management Decision/Policy	Status
Indian Affairs Manual: 53 Indian Affairs Manual 10—Woodland Management (BIA 2006)	All woodlands on Indian forest lands shall be afforded the opportunity for effective management and protection through the application of sound silvicultural principles. Woodlands are a component of the overall forest resource, and are subject to all policies and standards relating to forest management on Indian lands. Woodland cover types include pinyon-juniper, non-timber oak, riparian, and others.	
Indian Affairs Manual: 54 Indian Affairs Manual 7—Management of Noxious Weeds on Indian Lands (BIA 2014)	It is the policy of BIA to implement BIA programs with the goal of preventing the introduction and spread of noxious weeds, to monitor for and rapidly respond to the presence of noxious weeds, and to promote the restoration of native species and habitat conditions in ecosystems that have been impaired by noxious weed infestation. Noxious weed means a plant species that has been officially declared by a federal, state, tribal or county government entity to be injurious to native ecosystems and wildlife habitats, cropland and rangeland agriculture, and/or humans, livestock, and wildlife, and to be the target of recommended or mandatory management efforts.	
25 CFR, Part 162—Leases and Permits	A Restoration and Reclamation Plan is a required component of some leases of tribal land, including wind energy evaluation leases and wind and solar resource leases, and others. *Restoration and reclamation plan* means a plan that defines the reclamation, revegetation, restoration, and soil stabilization requirements for the project area, and requires the expeditious reclamation of construction areas and revegetation of disturbed areas to reduce invasive plant infestation and erosion.	
n/a	BIA indicated that they regularly conduct prescribed burning operations for fuels reduction/weed management/range improvement purposes. These treatments generally target Easter red cedar in the wildland/urban interface. Trees are cut, piled, and burned, followed by a broadcast burn the following season to target resprouts.[1]	

[1]David Anderson, Regional Environmental Scientist, BIA, Southern Plains Regional Office, personal communication with Kevin Rice and Morgan Trieger, EMPSi, February 25, 2015.

Decision Source (if applicable)	Current Management Decision/Policy	Status
10-Year Regional Fire Management Plan 2010-2020	The BIA's Eastern Oklahoma Region and the tribes regularly conduct hazardous fuel reduction treatments, as directed by the 10-year Regional Fire Management Plan 2010-2020. The Eastern Oklahoma Region has fire management plans for specific tribes as well.	
Forest Management Plans (multiple plans)	The BIA Eastern Oklahoma Region and the tribes have prepared several forest management plans and NEPA documents to establish timber resource management goals and objectives and to define management practices and methods to achieve goals and objectives. Tribes that have prepared forest management plans in the planning area are the Peoria Tribe of Indians of Oklahoma, the Seminole Nation of Oklahoma, the Eastern Shawnee Tribe of Oklahoma, the Modoc Tribe of Oklahoma, and the Cherokee Nation (BIA 2009a, 2009b, 2009c, 2009d, 2009e). Additionally, the BIA Southern Plains Region Anadarko Agency has prepared a draft forest management plan for the Wichita/Caddo/Delaware Reservation, the Kiowa/Commence/Apache Reservation, and the Fort Sill Apache Reservation (BIA 2009f).	

3.4.5 Fish and Wildlife

Decision Source (if applicable)	Current Management Decision/Policy	Status
Indian Affairs Manual: Part 56, Chapter 3. Fish, Wildlife, and Recreation Policies	The BIA will actively protect Indian fish, wildlife and outdoor recreation resources as trust assets, and assure that tribal input is obtained for all agency actions and decisions that may affect these assets. The BIA will protect against the loss, infringement and abrogation of hunting, fishing, gathering, and related rights guaranteed to federally-recognized tribes by the United States through treaty, statute or Executive Order and support fulfilling tribal co-management responsibilities associated with the exercise of such rights. It will also provide for the conservation, prudent management, enhancement, orderly development and wise use of fish, wildlife and outdoor recreation resources on which the meaningful exercise of hunting, fishing, gathering, and related rights depend and the implementation of associated resource management programs require.	

Decision Source (if applicable)	Current Management Decision/Policy	Status
Indian Affairs Manual: Part 56, Chapter 3. Fish, Wildlife, and Recreation Policies	All Indian lands administered by the BIA which contain fish, wildlife, outdoor recreation, and tourism-related values suitable for management and development will have, with the consent and participation of the tribes, an active program for managing associated resources consistent with other land uses. To the maximum extent possible, this will be accomplished through direct tribal participation and capability development in the establishment and implementation of integrated resource management plans, codes, ordinances, regulations, harvest management programs, population and habitat management strategies, and other activities required for effective management.	

3.4.6 Special Status Species

Decision Source (if applicable)	Current Management Decision/Policy	Status
Indian Affairs Manual: 59 Indian Affairs Manual 1—Environmental and Cultural Resources Management—Policy, Requirements, and Responsibilities	Section 1.3 B: It is the policy of Indian Affairs to comply with all applicable federal, State, local and Tribal environmental laws and regulations.	

3.4.7 Cultural Resources

Decision Source (if applicable)	Current Management Decision/Policy	Status
Indian Affairs Manual: Part 59, Chapter 8—Protection of Historical and Archaeological Resources. The manual is a basis reference source for BIA's cultural	It is the policy of BIA to ensure that, before approving or expending funds on a proposed federal undertaking, BIA: takes into account the effect the undertaking may have on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places; manages the historic resources it owns; protects the archaeological resources on Trust lands; and enforces the prohibition against excavating, removing, or damaging archaeological resources on Indian trust lands without a	

Decision Source (if applicable)	Current Management Decision/Policy	Status
resource management program.	permit issued by BIA.	
Indian Affairs Manual: Part 59, Chapter 9—Native American Graves Protection and Repatriation. General Native American Graves Protection and Repatriation Act compliance procedures.	A. Follow legal requirements and appropriate protocols when Native American human remains and funerary objects are intentionally excavated or inadvertently discovered on Indian lands, as defined in Section 3 of the Native American Graves Protection and Repatriation Act, 25 USC, Section 3002. B. Ensure federal and non-federal repositories complete summaries, inventories, consultations, notices, and repatriations for cultural items in BIA's possession or control, consistent with Sections 5-7 of the Native American Graves Protection and Repatriation Act, 25 USC, Sections 3003-3005. C. Take action for the successful repatriation of all Native American Graves Protection and Repatriation Act cultural items within BIA's possession or control.	
25 CFR, Part 211: Leasing of Tribal Lands for Mineral Development	(211.7(b]): The Secretary shall ensure that all necessary surveys are performed and clearances obtained in accordance with 36 CFR, Parts 60, 63, and 800 and with the requirements of the Archaeological and Historic Preservation Act (16 USC, Section 469 et seq.), the National Historic Preservation Act (16 USC, Section 470 et seq.), The American Indian Religious Freedom Act (42 USC, Section 1996), and Executive Order 11593, Protection and Enhancement of the Cultural Environment (3 CFR, Parts 1971 through 1975 Comp., p. 559).	
Application for Permit to Drill Process	Application for permit to drill process for oil and gas development, is integrated with Section 106 and tribal consultation process, requiring surveys for cultural resources. In most cases if a site is discovered it is avoided.	

3.4.8 Paleontological Resources

Decision Source (if applicable)	Current Management Decision/Policy	Status
Indian Affairs Manual: Part 59, Chapter 7—Paleontological Resources	Describes BIA Policies for protecting fossils and permitting paleontological research on Indian lands. Before any person excavates or removes any imbedded fossil from Indian lands, BIA issue a permit under the authority of the Secretary of the Interior. No permit is required for exploration or surface collecting of non-imbedded fossils; however, these exempted activities are subject to tribal jurisdiction and/or landowner consent.	

3.4.9 Visual Resources

There are no management decisions or policy guiding visual resource management. Visual resources are encountered on a site-specific basis.

3.4.10 Wildland and Fire Management

Decision Source (if applicable)	Current Management Decision/Policy	Status
National Fire Plan and Federal Wildland Fire Management Policy (1995) and the Federal Fire Policy Implementation Strategy (2003)	Manage fire for one or more objectives as they are affected by changes in fuels, weather, topography, social understanding and tolerance, and involvement of other governmental jurisdictions. The fire management priorities are 1) life and safety (firefighter and public), 2) property protection, 3) fire management and ecosystem sustainability	
BIA Manual: Part 90, Chapter 1—Wildland Fire Management Policies and Responsibilities	The BIA will adhere to the following wildland policies: Safety—Firefighter and public safety is the first priority. Protection Priorities—Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Fire Management and Ecosystem Sustainability—The full range of fire management activities will be used to achieve ecosystem sustainability, including	

Decision Source (if applicable)	Current Management Decision/Policy	Status
	interrelated ecological, economic, and social components. The appropriate management response is any specific action suitable to meet fire management unit objectives. Typically, the appropriate management response ranges across a spectrum of tactical options, from monitoring to intensive management actions. The appropriate management response is developed by using fire management unit strategies and objectives identified in the fire management plan. The wildland fire situation analysis process is used to determine and document the suppression strategy from the full range of responses available for suppression operations. Suppression strategies are designed to meet the policy objectives of suppression. Wildland fire use is the result of a natural event. The land/resource management plan or the fire management plan will identify areas where the strategy of wildland fire use is suitable. The wildland fire implementation plan is the tool that examines the available response strategies to determine if a fire is being considered for wildland fire use.	
Federal Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide BIA Fuels Management Program Supplement to the Interagency Prescribed Fire Planning and Implementations Procedures—Reference Guide 2008	Hazardous fuels reduction treatments will be designed and implemented to reduce the risk and consequences of wildfire to communities and ecosystems. Hazardous fuels treatments may be used to restore and maintain healthy ecosystems. Hazardous fuels reduction should be planned and implemented in an interdisciplinary and collaborative manner with tribes and other federal, state and local partners. Herbicide use will adhere to EPA label requirements and Occupational Safety and Health Administration Hazard Communication Standards. Prevents deterioration of air quality and NAAQS violations and addresses visibility impacts to class 1 federal areas, in accordance with regional air rules.	
10-Year Regional Fire Management	The BIA Eastern Oklahoma Region and the tribes regularly conduct hazardous fuel reduction treatments,	

Decision Source (if applicable)	Current Management Decision/Policy	Status
Plan 2010-2020	as directed by the 10-Year Regional Fire Management Plan 2010-2020. There are also fire management plans in the Eastern Oklahoma Region for specific tribes.	

3.4.11 Energy and Minerals

Decision Source (if applicable)	Current Management Decision/Policy	Status
25 USC, Section 415 (1955), Leases of Restricted Lands for Public, Religious, Educational, Recreational, Residential, Business, and Other Purposes	Any restricted Indian lands, whether tribally or individually owned, may be leased by the Indian owners, with the approval of the Secretary of the Interior, for public, religious, educational, recreational, residential, or business purposes, including the development or use of natural resources in connection with operations under such leases, for grazing purposes, and for those farming purposes that require the making of a substantial investment in the improvement of the land for the production of specialized crops as determined by said Secretary. All leases so granted shall be for a primary term not to exceed 25 years and a single renewal period of up to 25 years, except leases of land located in specifically delineated reservations.	
25 CFR, Part 200	Terms and Conditions: Coal Leases	
25 CFR, Part 211	Leasing of Tribal Lands for Mineral Development	
25 CFR, Part 212	Leasing of Allotted Lands for Mineral Development	
25 CFR, Part 213	Leasing of Restricted Lands of Members of Five Civilized Tribes, Oklahoma, for Mining	
25 CFR, Part 214	Leasing of Osage Reservation Lands, Oklahoma, for Mining, Except Oil and Gas	
25 CFR, Part 216	Surface Exploration, Mining, and Reclamation of Lands	
25 CFR, Part 225	Oil and Gas, Geothermal, and Solid Minerals Agreements	
25 CFR, Part 226	Leasing of Osage Reservation Lands for Oil and Gas Mining	
BIA Fluid Mineral Estate Procedural Handbook (52 Indian Affairs Manual X-H)	Details step-by-step procedures for each action necessary to accomplish management of the fluid mineral estate	

3.4.12 Recreation and Visitor Services

Decision Source (if applicable)	Current Management Decision/Policy	Status
BIA Manual, Part 56, Chapter 1, Fish, Wildlife, and Recreation Authority and Responsibilities	The scope of BIA and tribal fish and wildlife management authority, jurisdiction, and responsibility varies by reservation and off-reservation case area, depending on land status and the language contained in individual treaties, Executive Orders, court rulings, resource-specific statutes, and other legal instruments. The BIA supports tribal needs and efforts in the areas of fisheries management, wildlife management, outdoor recreation management, and related fields. Tribes determine the specific scope of program activity for their respective reservations and programs (http://www.bia.gov/cs/groups/public/ documents/text/idc-000453.pdf).	
BIA Fish, Wildlife, and Recreation Program	The BIA Fish, Wildlife, and Recreation Program enables tribes the meaningful exercise of their treaty fishing, hunting, and gathering rights. Two of the five program elements directly relate to recreation. First, the Wildlife and Parks Program, distributes funding that is sub-allotted to tribes through a local priority setting process determined by the tribe and the BIA to fund tribal activities in the areas of fisheries, wildlife, outdoor recreation, and public use management, conservation enforcement, and related fields. Activities conducted are determined by tribes and cover a broad array of diverse fisheries, wildlife, conservation enforcement, public use, habitat management, and related programs. Tribes conduct program planning, implementation and evaluation, with BIA functions being primarily inherently federal. Second, the Tribal Management/Development Program assists with the management of tribal fish and game programs on Indian reservations. Tribal management activities are resource management and provision and enforcement of hunting and fishing activities on trust lands. Contracts are executed with tribal fish and wildlife organizations and individual fish and wildlife resource tribes throughout the country to accomplish various resource management objectives set by tribal governments. Individual tribes have jurisdiction over hunting and fishing activities on trust lands (http://www.bia.gov/WhoWeAre/BIA/OTS/Natural Resources/FishWildlifeRec/index.htm).	

3.4.13 Lands and Realty

Decision Source (if applicable)	Current Management Decision/Policy	Status
25 CFR Subchapter H Land and Water Parts 150-183	Land and Water Regulations	
Indian Affairs Manual: Part 50	Irrigation and Power	
Indian Affairs Manual: Part 51	Land Titles and Records	
Indian Affairs Manual: Part 52	Real Estate Services	

3.4.14 Livestock Grazing

Decision Source (if applicable)	Current Management Decision/Policy	Status
25 CFR Part 166	Grazing Permits	
Indian Affairs Manual (IAM): 54 IAM 2, 54 IAM 3, 54 IAM 4, 54 IAM 5, 54 IAM 6, and 54 IAM 7-Agricultural Resources	Following is the policy of BIA: • To protect, conserve, use, and maintain the highest productive potential on Indian grazing lands through the application of sound multiple-resource conservation planning and practices to the development, inventory, classification, management, and administration of grazing resources • To assist trust and restricted Indian landowners in permitting their grazing lands for a reasonable annual return, consistent with prudent management and conservation practices, as well as community goals, as expressed by landowners and in applicable tribal management plans and ordinances • To monitor permittee adherence to the provisions of their grazing permits, including compliance with requirements described in conservation plans • To monitor the results of management and administrative decisions against projected outcomes in order to strengthen future decisions	

3.4.15 Prime and Unique Farmlands/Agriculture

Decision Source (if applicable)	Current Management Decision/Policy	Status
25 CFR Part 162	Leases and Permits	
Indian Affairs Manual (IAM): 54 IAM 1, 3 and 5.	It is the policy of the BIA to take part in managing Indian agricultural lands and related resources, with participation of the beneficial owners of the land in a manner consistent with the trust responsibility of the federal government; to protect and conserve Indian agricultural resources; and to promote the sustained yield use of Indian agricultural resources. It is BIA policy • To protect, conserve, use, and maintain the highest productive potential on Indian agricultural lands by applying sound conservation practices and techniques • To increase production and expand the diversity and availability of agricultural products for subsistence, income, and employment of Indians and Alaska Natives, through the development of agricultural resources on Indian lands • To develop Indian agricultural resources in a manner consistent with applicable tribal programmatic resource management plans • To coordinate and plan with the USDA Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA) to significantly increase the participation of Indian landowners and land users in applicable USDA farm programs.	

3.4.16 National Trails

There is no BIA policy guiding management of national trails. National and State Byways

There is no BIA policy guiding management of national and state byways.

3.4.17 Native American Tribal Uses

Decision Source (if applicable)	Current Management Decision/Policy	Status
Government-to-Government Relations with Native American Tribal Governments (memorandum signed by President Clinton, April 29, 1994), *Federal Register*, Vol. 59, No. 85	Directs federal agencies to consult, to the greatest extent practicable and to the extent permitted by law, with tribal governments before taking actions that affect federally recognized tribal governments. Federal agencies must assess the impact of federal government plans, projects, programs, and activities on tribal trust resources and ensure that tribal government rights and concerns are considered during such development.	
Secretarial Order No. 3175, Departmental Responsibilities for Indian Trust Resources	Requires Department of the Interior bureaus and offices to consult with the recognized tribal government with jurisdiction over the trust property that a proposal may affect	
Secretarial Order No. 3206, American Indian Tribal Rights, Federal Tribal Trust Responsibilities, and the ESA	Clarifies the responsibilities of the Department of the Interior agencies with regard to how Endangered Species Act compliance actions affect, or may affect, Indian lands, tribal trust resources, or the exercise of American Indian tribal rights. Department of the Interior agencies will carry out its responsibilities in a manner that complements the federal trust responsibility to tribes, tribal sovereignty, and statutory missions of the departments. Also, it must strive to ensure that Indian tribes do not bear a disproportionate burden for the conservation of listed species.	
Secretarial Order No. 3215, Principles for the Discharge of the Secretary's Trust Responsibility	Provides guidance to the employees of the Department of the Interior who are responsible for carrying out the Secretary's trust responsibility as it pertains to Indian trust assets.	
Departmental Manual 512 Chapter 2, Departmental Responsibilities for Indian Trust Resources	Establishes the policies, responsibilities, and procedures for operating on a government-to-government basis with federally recognized Indian tribes to identify, conserve, and protect American Indian and Alaska Native trust resources to fulfill the federal Indian trust responsibility.	
Executive Order 13175, Government-to- Government Basis	Directs federal agencies to continue to work with Indian tribes on a government-to-government basis to address issues concerning Indian tribal self-government, tribal trust resources, and Indian tribal treaty and other rights and to establish regular and	

Decision Source (if applicable)	Current Management Decision/Policy	Status
	meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates on Indian tribes.	
BIA Manual: Part 59, Chapter 8—Protection of Historical and Archaeological Resources. The manual is a basis reference source for the BIA's cultural resource management program.	It is the policy of the BIA to ensure that, before approving or expending funds on a proposed federal undertaking, it takes into account the effect the undertaking may have on any district, site, building, structure, or object that is on or is eligible for inclusion on the National Register of Historic Places; manages the historic resources it owns; protects the archaeological resources on trust lands; and enforces the prohibition against excavating, removing, or damaging archaeological resources on Indian trust lands without a permit issued by the BIA.	
Indian Affairs Manual: Part 59, Chapter 9—Native American Graves Protection and Repatriation. General Native American Graves Protection and Repatriation Act compliance procedures	Follow legal requirements and appropriate protocols when Native American human remains and funerary objects are intentionally excavated or inadvertently discovered on Indian lands, as defined in Section 3 of the Native American Graves Protection and Repatriation Act, 25 USC, Section 3002. Ensure federal and nonfederal repositories complete summaries, inventories, consultations, notices, and repatriations for cultural items in the BIA's possession or control, consistent with Sections 5-7 of the Native American Graves Protection and Repatriation Act, 25 USC, Sections 3003-3005. Take action for the successful repatriation of all Native American Graves Protection and Repatriation Act cultural items within the BIA's possession or control.	
25 CFR, Part 211: Leasing of Tribal Lands for Mineral Development	(211.7[b]): The Secretary shall ensure that all necessary surveys are performed and clearances obtained, in accordance with 36 CFR, Parts 60, 63, and 800, and with the requirements of the Archaeological and Historic Preservation Act (16 USC, Section 469 et seq.), the National Historic Preservation Act (16 USC, Section 470 et seq.), the American Indian Religious Freedom Act (42 USC, Section 1996), and Executive Order 11593, Protection and Enhancement of the Cultural Environment (3 CFR, Parts 1971 through	

Decision Source (if applicable)	Current Management Decision/Policy	Status
	1975 Comp., p. 559).	
Application for Permit to Drill Process	The application for permit to drill process for oil and gas development is integrated with Section 106 and tribal consultation process, requiring surveys for cultural resources. In most cases if a site is discovered, it is avoided.	

3.4.18 Socioeconomics

There is no BIA policy guiding socioeconomics.

3.4.19 Environmental Justice

There is no BIA policy guiding environmental justice.

3.5 REFERENCES

BIA (US Department of the Interior, Bureau of Indian Affairs). 2009a. Final Environmental Assessment for the Proposed Peoria Tribe of Indians of Oklahoma Forest Management Plan. BIA Eastern Oklahoma Regional Office, Division of Environmental, Safety and Cultural Resources Management, Muskogee, Oklahoma. September 28, 2009.

_____. 2009b. Final Environmental Assessment for the Proposed Seminole Nation of Oklahoma Forest Management Plan. BIA Eastern Oklahoma Regional Office, Division of Environmental, Safety and Cultural Resources Management, Muskogee, Oklahoma. September 28, 2009.

_____. 2009c. Final Environmental Assessment for the Proposed Eastern Shawnee Tribe of Oklahoma Forest Management Plan. BIA Eastern Oklahoma Regional Office, Division of Environmental, Safety and Cultural Resources Management, Muskogee, Oklahoma. September 28, 2009.

_____. 2009d. Final Environmental Assessment for the Proposed Modoc Tribe of Oklahoma Forest Management Plan. BIA Eastern Oklahoma Regional Office, Division of Environmental, Safety and Cultural Resources Management, Muskogee, Oklahoma. September 28, 2009.

_____. 2009e. Final Environmental Assessment for the Proposed Cherokee Modoc Tribe of Oklahoma Forest Management Plan. BIA Eastern Oklahoma Regional Office, Division of Environmental, Safety and Cultural Resources Management, Muskogee, Oklahoma. September 28, 2009.

_____. 2009f. Forest Management Plan for Wichita/Caddo/Delaware Reservation, Kiowa/Commence/Apache Reservation, and Fort Sill Apache Reservation Tribal and Allotted Lands. BIA Southern Plains Region Anadarko Agency.

BLM (US Department of the Interior, Bureau of Land Management).1991. Kansas Resource Management Plan. BLM, Tulsa District Office, Moore, Oklahoma. September 1991.

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_____. 1994b. Environmental Assessment and Finding of No Significant Impact and Decision Record: Six Coal Lease Applications and One Coal Lease Modification in Southeastern Oklahoma. BLM, New Mexico State Office, Tulsa District Office, and Oklahoma Resource Area Office. August 1994.

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_____. 2000. Texas Resource Management Plan Amendment and Finding of No Significant Impact for the Cross Bar Cooperative Management Area. BLM, Amarillo Field Office, Amarillo, Texas. April 2000.

_____. 2004. Oklahoma Resource Management Plan Amendment and Finding of No Significant Impact for Three Competitive Coal Lease Sales in Haskell, Latimer, and LeFlore Counties, Oklahoma. BLM, Oklahoma Field Office, Tulsa. September 2004.

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CHAPTER 4
MANAGEMENT OPPORTUNITIES

This chapter analyzes the ability of the BLM and BIA to achieve desired resource conditions through its management direction. It also addresses demands on each resource use. It describes current resource management activities that are not, or are only partially, meeting the goals specified in the RMPs and other BLM and BIA management guidance covering the decision area. This chapter serves as a starting point for alternative formulation by identifying management opportunities for consideration while developing alternatives.

The following tables reference management decisions from the RMPs for Kansas, Oklahoma, and Texas, the RMP amendments, and other sources, if applicable. Opportunities for updated management decisions are offered to meet current resource demands. Each decision is analyzed for responsiveness to current needs and opportunities for management changes. The tables also offer new opportunities for desired resource conditions management that are not currently guided by planning or policy. For these, the *Planning Decision* column is noted as none, and the *Remarks* explain that management of that resource is not discussed in current management documents.

4.1 RESOURCES

4.1.1 Air

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Several counties in the planning area are not in attainment for the NAAQS. Several other counties are close to losing	Establish best management practices to limit air pollutants. Conditions of Approval in all applications for permits

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
		attainment status.	to drill. Oil and gas operator must install engines rated for low emissions of nitrogen oxides and must limit emissions that contribute to ozone formation. Partner with agencies, organizations, and industries to conduct additional air quality monitoring in areas with oil and gas development and in areas that are in danger of losing attainment status.
Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development (Gold Book, BLM 2007)—Road maintenance includes dust abatement and design and construction to limit vehicle speeds and resulting dust entrainment.	Yes	Can contribute to the control of particulate matter	Expand dust abatement measures to other surface-disturbing activities not related to oil and gas exploration and development.

4.1.2 Climate

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Climate change trends indicate climate change will continue into the	Conditions of Approval in all applications for permits to drill. Oil and gas operator must take the

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
		future. The effects of climate change are already being felt. The oil and gas industry contributes to greenhouse gas emissions. Some of these emissions can be reduced greatly through proven cost-effective technologies and practices. These improve operational efficiency and reduce emissions of methane, a potent greenhouse gas (EPA Natural Gas STAR Program).	following actions: • Monitor well compressors, drill rigs, pumps, storage tanks, and valves for fugitive methane leaks • Install new equipment and fix old equipment as needed to prevent leaks • Take precautions to prevent fugitive methane emissions during delivery to power plants • Take steps to prevent venting methane emissions Oil and gas operators could reduce methane emissions through the use of the technologies and practices recommended in the EPA Natural Gas STAR Program. Best management practices focus on reduction and sequestration of greenhouse gases

4.1.3 Geology

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Management of this resource is not	Identify areas of geologic hazards and incorporate

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
		identified in current plans.	mitigation of the hazards, such as county-level building codes or buffers from the hazard as necessary
None	No	Management of this resource is not identified in current plans.	Identify areas of unique geology and manage for the protection of these resources; alternatively, structure management to identify and subsequently manage unique geological features.

4.1.4 Soils

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Management of this resource is not identified in current plans.	Integrate the Rangeland Health Standards (BLM 2001) and Rangeland Interagency Ecological Site Handbook for Rangelands (BLM 2013) in site monitoring procedures to manage soil resources.

4.1.5 Water Resources

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No		Coal, oil, and gas development and locations have changed dramatically over the past 20 years. Decisions should address

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
			new forms of development and locations in order to prevent contamination and loss of water supply and to identify practices for managing requirements for cleaning up contaminants.
None	No		Unsettled or unclear water rights exist. Decisions should address interim management of water resources.
None	No		Inventory water developments on livestock allotments.

4.1.6 Vegetation

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
Oklahoma RMP—BLM Stipulations—Oklahoma Resource Area ORA-2, Wetland/Riparian Stipulation (page 12) Kansas RMP—BLM Stipulations—Oklahoma Resource Area Oklahoma Resource Area ORA-2, Wetland/Riparian Stipulation (page11) Kansas City District USACE Stipulation for Lands Designated for the Management of Wildlife (Kansas RMP,	Partially	Current BLM wetland/riparian lease stipulations allow surface occupancy within these resources and call for mitigation when resources are impacted (no net loss of in-kind wetlands). USACE stipulation applies to wetland/riparian/other vegetated areas (as habitat for wildlife species).	Opportunity to strengthen existing or add to standard BLM lease stipulations, specifically relating to wetlands and riparian areas. Specific opportunities are to add or modify surface occupancy restrictions, avoidance buffers, and revegetation requirements for abandoned leases.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
appendices 2-13) Texas RMP—BLM Stipulations—Oklahoma Resource Area ORA-2, Wetland/Riparian Stipulation (page 10)			
Oklahoma RMP—Issue 4. Red River Management scenarios. (pages 101-111)	Partially	Due to the extensive occurrence of wetlands, riparian areas, and sensitive species' habitats along the Red River, robust management guidelines should be developed once land administration and ownership issues are resolved.	Opportunity for detailed resource inventory on BLM-administered lands, including wetlands, riparian, and other sensitive vegetation inventories. Opportunities for improved grazing management in areas with sensitive riparian vegetation. Opportunities for riparian vegetation to be brought up to proper functioning condition, in accordance with BLM regulations. Opportunities for vegetation restoration on lands impacted by such activities as grazing and OHV use.
None	No	Management of the Cross Bar Ranch is not identified in current plans.	Cross Bar Ranch, Texas. Opportunities exist to formalize vegetation management, including restoring native short-grass prairie, treating noxious weeds, and restoring riparian areas.
None	No	Management of this resource is not	Tribal sensitive and culturally significant

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
		identified in current plans.	plants. Though the revised plan should not disclose species and locations, there is opportunity to formalize the consultation procedure with the BIA and tribes on a project level.

4.1.7 Fish and Wildlife

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
Texas Proposed RMPA and Environmental Assessment, 2000	Partially	Lack of formalized management of fish and wildlife at Crossbar Ranch.	Provide opportunity for Challenge Cost Share projects and other projects with the potential to benefit wildlife species at the Crossbar Ranch.

4.1.8 Special Status Species

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
Kansas, Oklahoma, and Texas RMPs (lease stipulations)	Partially	Lease Stipulation WO-ESA-7: Applies to only a select few counties and tracts, based on preliminary information on the presence of federal- and state-listed species. Based on new survey data, these ranges may	Expand the application of Lease Stipulation WO-ESA-7 to all counties where special status species are known to occur, or include a general consultation requirement.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
		have changed. Additionally, some species, such as the bald eagle, are no longer listed by the federal government.	
Kansas RMP (lease notices)	Partially	Lease Notice LN-2 applies to counties that last reported the presence of prairie dog towns.	Update with current list of counties containing prairie dog towns for the entire planning area, or include general consultation requirement.
Oklahoma RMP (lease notices)	Partially	Lease Notice LN-2 refers to ODWC documents G-12-82 and A-12, which are both regulations that appear to be outdated.	Update Lease Notice LN-2 with current ODWC regulations (see Title 800:30-3), or include general stipulation that the surface land manager adhere to surface use requirements.
None	No	Federal government listed the lesser prairie-chicken as a threatened species in 2012; therefore, existing management lacks protective measures for the species.	Implement recommendations from the LPC range-wide conservation plan. Such measures may include the following: • For oil and gas development, reduce impacts through the use of directional drilling and clustering where feasible or by locating facilities to reduce habitat loss and fragmentation of habitat • For oil and gas development, use horizontal drilling, pad drilling

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
			(multiple wells per pad), and common tank batteries where feasible with regulatory approval to minimize new surface disturbance within CHAT categories 1 to 3. • Avoid conducting seismic activities and similar activities that require off-road travel in rangeland or planted grass cover during the lekking, nesting, and brooding season (March 1 to July 15) within 1.25 miles of leks recorded as active within the previous five years; lek surveys will be required in CHAT categories 1 to 3 before any breeding season seismic activities.

4.1.9 Wild Horse and Burros *(BLM only)*

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
National policy and guidance only			Contract more "eco-sanctuaries."

4.1.10 Cultural Resources

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Class I overview in progress for BLM-administered lands. Provides a synthesis of previous work to understand the resource base for better management of the resource.	Define and evaluate the nature and distribution of property types, the historic and prehistoric contexts of properties of special significance, the uses to which property types may be assigned, the threats to site integrity, and the strategies for resource management and protection.

4.1.11 Paleontological Resources

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
Existing RMPs require permitting for scientific research and reporting of discoveries.	Partially	Instruction Memorandum 2008-009, Potential Fossil Yield Classification System for Paleontological Resources on Public Lands has not been completed. Updates needed for addressing Paleontological Resources Preservation Act of 2009.	Potential Fossil Yield Classification is in progress and could be used to determine high priority areas for proactive inventory, stipulations for ground-disturbing activities, and developing research priorities and educational/interpretive programs.

4.1.12 Visual Resources

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Management of this resource is not identified in current plans.	Assign VRM classes to all BLM-administered land. Develop stipulations and design features or other mitigation measures to reduce impacts on the characteristic landscape.

4.1.13 Wilderness Characteristics (BLM only)

In accordance with BLM Manual 6310, the BLM conducted a GIS analysis to determine presence of 5,000 acres of contiguous BLM-administered lands in the planning area; no such lands are present. There are also no BLM-administered lands contiguous with lands that have been formally determined to have wilderness or potential wilderness values. Therefore, there are no lands with wilderness characteristics in the planning area and no management opportunities to be offered for this resource. This resource will not be carried forward for analysis in the EIS.

4.1.14 Wildland and Fire Management

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
Source: Guidance for Implementation of the Federal Wildland Fire Management Policy 2009 Protection Priorities—Protecting human communities, community infrastructure, other property and improvements, and natural and cultural resources will be prioritized, based on the values to be protected, human health and safety, and the costs of protection.	Partially	Any community risk assessment data?	If wildland urban interface areas have been identified, consider prioritizing them for fire suppression.
Source: Guidance for Implementation of the Federal Wildland Fire Management Policy 2009 Fire Management and Ecosystem Sustainability—The full range of fire management activities will be used to	Yes	Limited fire prevention management	Opportunities for adding public fire prevention strategies, public education, and fire restrictions.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
achieve ecosystem sustainability; these include interrelated ecological, economic, and social components.			
Source: Guidance for Implementation of the Federal Wildland Fire Management Policy 2009—Managers will use a decision support process to guide and document wildfire management decisions. The process will provide situational assessment, will analyze hazards and risk, will define implementation actions, and will document decisions and rationale for those decisions.	Partially	Wildland fire situation analysis has changed to wildland fire decision support system	Consider revising to "Use a decision support process to guide and document wildland fire management decisions.
Guidance for Implementation of the Federal Wildland Fire Management Policy 2009—Wildland fire will be used to protect, maintain, and enhance resources and, as nearly as possible, be allowed to function in its natural ecological role. Use of fire will be based on L/RMP and associated fire management plans and will follow specific prescriptions contained in operational plans.	No	Management states fire use areas will be identified in land use plans or fire management plans. The term fire use is no longer applicable. In accordance with BLM Planning Handbook H01601, identify old fire use as an allowable use and identify the geographic areas where fire use is	Consider including RMP objective, such as "Manage natural wildfire to allow the full spectrum of management responses and achieve multiple objectives, including to achieve resource benefits." Consider Management Action; "Manage XXXX acres as conditional suppression areas where natural fire may be used to improve or provide habitat or other resource benefits." Delineate these areas on maps or consider the entire BIA planning area as suitable for fire use.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
		appropriate.	
Source: Guidance for Implementation of the Federal Wildland Fire Management Policy 2009—Agencies and bureaus will review, update, and develop agreements that clarify the jurisdictional interrelationships and define the roles and responsibilities among local, state, tribal and federal fire protection entities. Agreements will be developed to clarify jurisdictional interrelationships and define roles and responsibilities among local, state, tribal, and federal fire protection entities, based on each organization's enabling protection authorities and assistance/mutual aid responsibilities.	Yes		Create cooperative agreements with federal, state, local, and tribal agencies to report, identify, manage, and rehabilitate fires on BLM-administered lands.
Hazardous fuels treatments may be used to restore and maintain healthy ecosystems.	Partially	Hazardous fuels reduction treatments are not identified. This ensures treatment methods comply with applicable LUPs.	Consider identifying treatment methods; example, "Use fuel treatment management tools, such as prescribed fire and vegetation manipulation (mechanical mastication, biological, prescriptive grazing, and chemical treatments) to construct fuel breaks or improve ecological conditions." There are opportunities to define fuels management in, for example, Special Recreation Management Areas, ACECs, and sensitive cultural areas.
Prevent deterioration of air quality and NAAQS violations and addresses visibility impacts on class 1 federal	Partially	No mention of smoke modeling,	Consider management actions. "Continue smoke modeling for

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
areas, in accordance with regional air rules.		prescribed fire prescription plans, dust or ash abatement treatments, or mitigation measures following fire to reduce impacts on air quality.	prescribed burns to achieve multiple objectives. Ensure smoke management complies with prescribed fire prescription plans. Implement dust and ash abatement treatments and other mitigating measures to reduce impacts on air quality.”
Emergency Stabilization and Rehabilitation			
Source: Guidance for Implementation of Federal Wildland Fire Management Policy 2009—Burned areas will be assessed to determine suitable and effective emergency stabilization and rehabilitation needs to meet current and anticipated environmental conditions. Rehabilitation and restoration will be evaluated to assess effectiveness of treatments.	No	ES&R strategies are not implemented on BLM-administered lands due to scattered surface ownership.	Consider adding objectives and management actions consistent with the National Fire Rehabilitation Plan and emergency stabilization and response guidance
Healthy Forest Restoration Act (2003)			
None	No	Management of this resource is not identified in current plans.	Consider fire management strategies (suppression prioritization and fuel treatments) to protect any old growth forests.

4.1.15 Cave and Karst Resources

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
No	None	Management of this resource is not identified in current plans.	Document how the BLM would react to cave discoveries. On BLM-administered lands, cave location and significant features would be documented and management would protect the cave resources. On private lands, disturbance of the cave would be avoided by moving the disturbing activity.

4.2 RESOURCE USES

4.2.1 Energy and Minerals

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Fluid mineral leasing allocations are not mapped.	Consider mapping portions of the decision area that are open to fluid mineral leasing, subject to standard terms and conditions, closed to fluid mineral leasing, open subject to major constraints (NSO stipulations), or open subject to minor constraints (controlled surface use/timing limitation stipulations).
Texas RMP (Optional Stipulations) NM-8, Kansas RMP and Oklahoma RMP	Partially	No identification of where in Texas the stipulation applies. Need to reevaluate	Consider revising and mapping the list of areas where the stipulation applies.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
()optional Stipulations) NM-10 "This stipulation requires that any federal oil and gas operator must coordinate development with the federal coal lessee. This stipulation is used to protect the value of the federal coal resource and is applicable to the following areas in Oklahoma: • Atoka County Split-Estate Tracts 2-4 • Haskell County Split-Estate Tracts 15-17 • Latimer County Split-Estate Tracts 3-6 • Le Flore County Split-Estate Tracts 15-17 • Pittsburg County Split-Estate Tracts 8 and 9"		where the stipulation is applied, based on current resource conditions.	
Kansas RMP, Lease Notice LN-2: Black-Footed Ferrets In Kansas "If black-footed ferrets occur anywhere in the wild in Kansas, they are presumed to be associated with prairie	Partially	No identification of where in Kansas the stipulation applies. Need to reevaluate where the stipulation is applied, based on current resource conditions.	Consider revising and mapping the list of areas where the stipulation applies.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
dogs. All or portions of this lease area lie within a county of Kansas where prairie dog towns have occurred in the past. Therefore, if a prairie dog town of eighty acres or more is found to occur on or near this lease, a black-footed ferret survey may be required before permitting surface disturbing activity which may impact the prairie dog town." Lease Notice LN-2 will be applied to leases issued in the counties that last reported the presence of prairie dog towns.			
Texas RMP, Oklahoma RMP, Lease Stipulation WO-ESA-7: Consultation Stipulation "The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its	Partially	Need to reevaluate where the stipulation is applied, based on current resource conditions.	Consider revising and mapping the list of areas where the stipulation applies.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
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."			
Oklahoma RMP, Lease Notice LN-2: ODWC Owned and Managed Lands The ODWC owns and manages the surface	Partially	Need to reevaluate where the stipulation is applied, based on current landownership.	Consider revising and mapping the list of areas where the stipulation applies.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
above all or a portion of this federal lease. The lessee needs to be aware of the surface use requirements, as presented in ODWC documents G-12-82 and A-12 (appendix 3). These address regulations and a surface damage agreement to govern oil, gas, and other mineral exploration and production on ODWC owned and managed lands.			
Kansas RMP, Texas RMP, Oklahoma RMP, Oklahoma Resource Area ORA-1: Floodplain Protection Stipulation "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."	Partially	No identification of where the stipulation applies. Need to reevaluate where the stipulation is applied, based on current resource conditions.	Consider revising and mapping the list of areas where the stipulation applies.
Kansas RMP, Texas RMP, Oklahoma RMP, Oklahoma Resource Area ORA-2: Wetland/Riparian Stipulation "All or portions of the lands under this lease	Partially	No identification of where the stipulation applies. Need to reevaluate where the stipulation is applied, based on current resource conditions.	Consider revising and mapping the list of areas where the stipulation applies.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
contain wetland and/or riparian areas. 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, minimized or compensated. The mitigation goal will be no net loss of in-kind wetlands. Such mitigation will be developed during the application for permit to drill process in cooperation with appropriate state and federal agencies."			
Kansas RMP, Texas RMP, Oklahoma RMP, Oklahoma Resource Area ORA-3: Season of Use Stipulation (Optional) "Surface occupancy of this lease will not be allowed from (date) through (date) without the specific approval in writing, from the Authorized Officer of the BLM." This stipulation restricts the time that the lessee can be on the	Partially	No identification of where the stipulation applies. Need to reevaluate where the stipulation is applied, based on current resource conditions.	Consider revising and mapping the list of areas where the stipulation applies.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
lease for a period of more than 60 days. Most season of use restrictions involve wildlife seasonal use requirements or recreation use conflicts with drilling activities.			
Kansas RMP, Texas RMP, Oklahoma RMP, Oklahoma Resource Area ORA-4: NSO (Optional) "Surface occupancy of this lease will not be allowed." This stipulation prohibits surface use to protect a resource or use that is not compatible with oil and gas development. The tract could be leased for inclusion in a drilling unit and may be drilled directionally from an off-site location where occupancy is allowed.	Partially	No identification of where the stipulation applies. Need to reevaluate where the stipulation is applied, based on current resource conditions.	Consider revising and mapping the list of areas where the stipulation applies.
Kansas RMP, GP-135 stipulations provide for protection of US Bureau of Reclamation projects by using buffer zones, which prohibit occupancy and drilling for a specific distance. Maximum project protection is provided by the use of NSO/ND to within 1,000 feet	Partially	This stipulation does not identify specific areas where it applies.	Consider mapping the specific areas subject to this stipulation.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
under the maximum water surface by elevation, as defined in Standing Operating Procedures of US Bureau of Reclamation; to within 2,000 feet under dam embankments and appurtenance structures, outlet works, and spillways; or to within one-half mile (2,640 feet) of the center line of any tunnel. Should the US Bureau of Reclamation waive the maximum project protection stipulation, additional restrictions protect recreational developments, wildlife habitats, project facilities, and water supplies by creating a NSO/DD buffer around these areas, ranging from 200 to 500 feet. Stipulations protecting special wildlife habitats or significant surface resources have been identified by project site. The overlapping buffer zones identified for each surface resource results in stipulation acreage greater than the project's total.			

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
In all cases, GP-135 requires a site-specific surface use plan approved by the US Bureau of Reclamation's regional director before any lease is developed. Whenever a conflict occurs concerning the applicability of a US Bureau of Reclamation stipulation, the more restrictive stipulation will apply.			
Kansas RMP, Split-Estate Tracts Stipulations: Summarized in Table 3 of the Kansas RMP.	Partially	Need to reevaluate where the stipulations are applied, based on current resource conditions.	Consider revising and mapping the list of areas where the stipulations apply.
For a complete list of fluid mineral stipulations, refer to **Chapter 3**, Current Management Direction, **Section 3.3**, BLM Current Management of Resource Uses , Federal Mineral Lease Stipulations.	Partially	All stipulations applicable to specific named locations that are managed by other special management areas are assumed to be adequate.	All stipulations applied based on the presence of a sensitive resource to be protected are assumed to be partially adequate and need to be updated based on an updated evaluation of current conditions.
None	No	Many federal coal tracts in the planning area do not have management decisions and cannot be leased until they do.	For all federal coal resources in the planning area, consider identifying in a coal report those areas unacceptable for further consideration for coal leasing, those areas unsuitable for all or certain stipulated methods of coal mining, and those areas

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
			acceptable for further consideration for leasing and suitable for all methods of coal mining.
None	No	There are no decisions applicable to salable minerals in the current RMPs.	Consider identifying areas open and closed to salable mineral disposal throughout the decision area.
None	No	There are no decisions applicable to locatable minerals in the current RMPs.	Consider identifying areas open to locatable mineral entry and areas that would be petitioned for withdrawal from locatable mineral entry in the decision area.

4.2.2 Renewable Energy

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	In current management plans, there are no decisions applicable to renewable energy sources: wind, solar, and biomass.	Consider designating areas as open, avoidance, or exclusion for new utility scale (>20 megawatts) renewable energy ROWs.

4.2.3 Recreation and Visitor Services

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Management of this resource is not identified in current plans.	Consider a recreation management area designation for such high use areas as the Red River.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
			Designation would provide management focus on recreation and associated activities, opportunities, and experiences.
None	No	Management of this resource is not identified in current plans.	Consider action to manage camping and overnight use, especially for popular areas such as the Red River.
None	No	Management of this resource is not identified in current plans.	Consider recreation management area designation for Cross Bar Ranch to accommodate planned future recreation use during the life of the plan.
None	No	Management of this resource is not identified in current plans.	Consider action outlining strategy for and placement of such facilities as trailheads, kiosks, and parking to support current and anticipated recreation demand. This is an implementation level action but can be included in the RMP if it is analyzed specifically.
None	No	Management of this resource is not identified in current plans.	Analyze the types, activities, and locations where special recreation permits would be issued or not issued.
None	No	Management of this resource is not identified in current plans.	Consider leasing and land use authorization stipulations to protect recreation facilities, activities, and opportunities on BLM-administered surface land and split-estate.
None	No	Management of this resource is not identified in current plans.	Consider actions to connect recreation facilities, such as trails, and activities on BLM-administered lands

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
			with similar facilities and activities on adjoining lands managed by other entities.
None	No	Management of this resource is not identified in current plans.	Consider establishing areas open and closed to recreational target shooting.

4.2.4 Comprehensive Travel and Transportation Management

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Management of this resource is not identified in current plans.	Designate all public lands as open, limited, or closed for OHV use, as required in 43 CFR, Part 8340.
None	No	Management of this resource is not identified in current plans.	Consider designating land as open, limited, or closed for nonmotorized uses, such as hiking, horseback riding, and mountain biking.
None	No	Management of this resource is not identified in current plans.	Identify travel management areas and publish current route inventory map, in accordance with BLM Manual 1626. This will begin the process of future route designations as needed to facilitate access and protect sensitive resources.
None	No	Management of this resource is not identified in current plans.	Identify priority areas for access, in accordance with BLM Manual 1626. This would include such parcels as the Cross Bar Ranch, where public and

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
			permitted access will be important over the life of the plan.
None	No	Management of this resource is not identified in current plans.	Establish route designation criteria, in accordance with BLM Manual 1626 (this should be done even if route designations are being deferred).

4.2.5 Lands and Realty

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	There are no decisions applicable to land use authorizations in current management plans.	Consider designating areas as open, avoidance, or exclusion for ROWs, leases, and other applicable land use authorizations.
Public land disposal, Oklahoma and Kansas RMPs	No	The Oklahoma and Kansas RMPs indicate the BLM policies to dispose of federal lands in those states. GIS analysis is being done to clarify current ownership.	Identify lands for retention, exchange, or sale. Indicate any areas where land acquisition would be considered (e.g., through purchase, exchange, or donation).
None	No	There are no decisions applicable to land withdrawals.	Specify any areas (if applicable) that would be considered for withdrawal. Identify any current withdrawals (if any) that would continue to be managed as withdrawn.

4.2.6 Livestock Grazing

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
There are four active grazing leases being administered in Oklahoma. Three lie along the north fork of the Red River, two are in Tillman County, and one is in Jefferson County. The fourth grazing lease is on the South Canadian River in Blaine County. Oklahoma RMP Guidance	Yes	Identifies allocation	Alternative 1: Increase grazing (e.g., open up grazing in Texas or along the gas pipeline easement). Alternative 2: Decrease grazing and close permits that are not actually viable.

4.2.7 Prime and Unique Farmlands/Agriculture

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Management of this resource is not identified in current plans.	Document how the BLM would manage privately owned subsurface mineral estate with farmlands by including them in the stipulations for mineral leasing. Currently the BLM is managing for farmland conversion on a case-by-case basis, including conservation, conditions of approval, mitigation, and restoration, rather than blanket "avoidance."

4.3 SPECIAL DESIGNATIONS

4.3.1 Wilderness and Wilderness Study Areas

Federal mineral estate in designated wilderness areas is not part of the decision area. The planning area includes wildernesses that are managed by the Forest Service, USFWS, and National Park Service (see Section 2.4.1, **Table 2-27**). Only the Wichita Mountains Wilderness overlaps BLM-administered federal mineral estate (Wilderness.net GIS 2014). According to the Wilderness Act of 1964, except where there are valid existing rights, the minerals in designated wilderness areas are withdrawn from all forms of appropriation under the mining laws and from disposition under all laws pertaining to mineral leasing (Public Law 88-577). Therefore, there are no management opportunities to be offered for this resource, which is fully protected under current mandates. No decisions will be made in the EIS that will impact these areas, and this resource topic will not be carried forward in the joint EIS/BLM RMP and BIA Integrated RMP.

4.3.2 Areas of Critical Environmental Concern (BLM only)

There are no ACECs in the planning area, and no nominations for ACECs were received during internal or public scoping. Therefore, there are no management opportunities that can be offered for this resource, and it will not be carried forward in the joint EIS/BLM RMP and BIA Integrated RMP.

4.3.3 Wild and Scenic Rivers

There are no wild and scenic rivers in Oklahoma or Kansas, as designated under the Wild and Scenic Rivers Act of 1968 (Interagency Wild and Scenic Rivers Council 2015). In Texas, 191.2 miles of the Rio Grande are designated: 95.2 miles are classified as wild and 96 miles are classified as scenic (Interagency Wild and Scenic Rivers Council 2015). No portions of this wild and scenic river overlap with BLM-administered federal mineral estate; therefore, there are no management opportunities that can be offered for this resource, and it will not be carried forward in the joint EIS/BLM RMP and BIA Integrated RMP (Rivers.gov GIS 2009).

However, there are state-designated scenic river areas that overlap with BLM-administered federal mineral estate designated under Oklahoma's Scenic Rivers Act (Oklahoma Statute Title 82, Sections 1451-1471; see Section 2.4.3). Management opportunities for these state-designated scenic river areas are described below.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Management of state-designated scenic river areas is not identified in current plans.	Oklahoma's Scenic Rivers Act (Oklahoma Statute Title 82, Sections 1451-1471) mandates preserving state-designated scenic river areas in their free-

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
			flowing condition and prohibits impoundment by any large dam or structure in these areas. To comply with this, develop stipulations preventing impoundment of state scenic river areas and design features or other mitigation measures to preserve the free-flowing condition of these scenic river areas.

4.3.4 National Historic Trails

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
RMPs stipulate (NSO) buffers around hiking and horseback trails in certain areas. Oklahoma RMP (Appendix 3, Oklahoma Oil and Gas Lease Stipulations, USACE Special Stipulations 1-A) Oklahoma RMP (Appendix 3, Oklahoma Oil and Gas Lease Stipulations, Special Stipulation—US Bureau of Reclamation); Kansas RMP, Tulsa District USACE Special Stipulations 1-A	Partially	These stipulations apply to specific sites within districts managed by the USACE-administered lands or to US Bureau of Reclamation-administered lands. Buffers vary in size and are specified as acres rather than in length and width.	In accordance with BLM Manual 6280, establish national trail management corridors and identify management goals, objectives, and actions for each designated national trail. Develop a national trail management corridor of sufficient width, in accordance with the requirements of this manual, and, to the extent possible, follow the management guidance by resource program offered by this manual.

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
Kansas RMP, Kansas City District USACE Special Stipulations Kansas RMP (Appendix 2) Stipulations for Oil and Gas Leases—Lands Under Jurisdiction of Department of the USACE (Water Resource Projects) Kansas RMP (Appendix 2) US Bureau of Reclamation Special Stipulations Texas RMP, USACE Special Stipulations 1-A Texas RMP, USACE, Fort Worth District Projects Texas RMP (Appendix) US Bureau of Reclamation Special Stipulations, GP-135			Establish an NSO buffer of consistent size around national historic trails to be applied to all trails crossing BIA- or BLM-administered minerals to protect such trails across the decision area, despite landownership.

4.3.5 National, State, and BLM Byways

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Management of national, state, and BLM-administered byways is not	Develop stipulations or mitigation measures to protect the scenic quality of national and state

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
		identified in current plans.	byways. There are no BLM-administered backcountry byways in the planning area, so no management opportunities exist for this resource.

4.4 SOCIAL AND ECONOMIC CONDITIONS

4.4.1 Native American Tribal Uses

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
Existing RMP cultural resource continuing management guidance, government-to-government consultation and United States Department of the Interior requirements address Indian Trust and Native American use issues.	Partially	Focus is on compliance when there is an undertaking.	Incorporate proactive measures to identify and protect areas of cultural importance and consider Indian Trust Assets in early planning on an allocations basis and through standard stipulations.

4.4.2 Public Health and Safety

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Management of this resource is not identified in current plans.	Designate specific recreation areas in the Red River area to separate conflicting recreation (such as OHV use,

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
			recreational shooting, and camping). Develop a warning system to alert recreationists in the event of a flood.

4.4.3 Socioeconomics

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Management of this resource is not identified in current plans.	Management actions on public lands can have a profound impact on social conditions. Consider impacts.

4.4.4 Environmental Justice

Planning Decision, Source	Is Decision Responsive to Current Issues?	Remarks (Rationale)	Options for Change
None	No	Management of this resource is not identified in current plans.	Create EIS/BLM RMP and BIA Integrated RMP objectives for fair treatment and meaningful involvement of all people, regardless of race, color, sex, national origin, or income.

4.5 REFERENCES

BLM (US Department of the Interior, Bureau of Land Management). 2001. Handbook H-4180-1—Rangeland Health Standards. BLM, Washington, DC. Internet website: http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.61484.File.dat/h4180-1.pdf. Accessed on March 5, 2015.

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_____. 2013. Handbook H-1734-1—Rangeland Interagency Ecological Site Handbook for Rangelands. BLM, Washington, DC. Internet website: http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=33943.wba. Accessed on March 5, 2015.

CHAPTER 5
CONSISTENCY/COORDINATION WITH OTHER PLANS

Section 202 of the FLPMA requires the BLM to coordinate land use planning activities with other federal agencies and with state, local, and tribal governments (FLPMA Section 202[c][9]). The FLPMA states the following:

> [T]he Secretary shall, to the extent he finds practical, keep apprised of State, local, and tribal land use plans; assure that consideration is given to those State, local, and tribal land use plans that are germane in the development of land use plans for public lands; assist in resolving, to the extent practical, inconsistencies between Federal and non-Federal Government plans, and shall provide for meaningful public involvement of State and local government officials… (FLPMA Section 202[c][9]).

The FLPMA also states "Land use plans of the Secretary under this section [202] shall be consistent with State and local plans to the maximum extent he finds consistent with Federal law and the purposes of this Act (FLPMA Section 202[c][9])." The BLM planning regulations further clarify the following:

> Guidance and resource management plans and amendments to management framework plans shall be consistent with officially approved or adopted resource related plans, and the policies and programs contained therein, of other Federal agencies, State and local governments and Indian tribes, so long as the guidance and resource management plans are also consistent with the purposes, policies and programs of Federal laws and regulations applicable to public lands, including Federal and State pollution control laws as implemented by applicable Federal and State air, water, noise, and other pollution standards or implementation plans (43 CFR 1610.3-2[a]).

Before the RMP decisions are approved, the BLM authorized officer, in this case the BLM New Mexico State Director, will submit to the governors of Oklahoma, Kansas,

and Texas the proposed plan. The authorized officer will identify any known inconsistencies with the state or local plans, policies, or programs. The governors will have 60 days to identify inconsistencies and provide recommendations in writing to the state director. If the governors do not respond within the 60-day period, the proposed plan is presumed to be consistent.

If the governors recommend changes in the proposed plan that were not raised during the public participation process, the state director will provide the public with an opportunity to comment on the changes. If the state director does not accept the governors' recommendations, the state director will notify the governors, who will have 30 days to submit a written appeal to the state director. The state director will accept the governors' recommendations if the he or she determines that they provide a reasonable balance between the national interest and the states' interests.

The state director will communicate to the governors in writing and will publish in the *Federal Register* the reasons for the decision to accept or reject the governors' recommendations (43 CFR, Part 1610.3-2[e]).

Plans formulated by federal, state, local, and tribal governments for managing lands and resources will be considered as the joint EIS/BLM RMP and BIA Integrated RMP is developed. The plans identified include those below.

5.1 LOCAL GOVERNMENT PLANS

The BLM and BIA will continuously work with local governments as cooperating agencies to identify and, where practicable, resolve consistency issues throughout the EIS process.

5.2 STATE AGENCY PLANS

A number of planning documents, strategies, or policies that guide management activities affect public lands. Many of the plans directly impact or otherwise affect BLM-administered lands, agreements, or other partnership involvement opportunities. In addition to the BLM's cooperating agency relationship with several state agencies (see Cooperating Agencies below), ongoing coordination and communication will ensure consistency.

The state plans most pertinent to the planning area are listed below.

5.2.1 Oklahoma

- Oklahoma's Great Outdoors: The Place, The People, The Providers, The Plan (2012 Statewide Comprehensive Outdoor Recreation Plan; Oklahoma Tourism and Recreation Department 2012)
- Oklahoma Comprehensive Wildlife Conservation Strategy (ODWC 2005)
- Oklahoma's Biodiversity Plan: A Shared Vision for Conserving Our Natural Heritage (ODWC 1993)
- Oklahoma Lesser Prairie Chicken Conservation Plan (Haufler et al. 2012)

- State of Oklahoma Implementation Plan for Air Quality (Internet website: http://www.deq.state.ok.us/AQDnew/rulesandplanning/index.htm)
- Oklahoma Comprehensive Water Plan (Oklahoma Water Resources Board 2015)
- Oklahoma Department of Transportation Long Range Transportation Plan 2010-2035 (Oklahoma Department of Transportation 2010)

5.2.2 Kansas

- Kansas Outdoor Recreation Plan (Kansas Department of Wildlife, Parks, and Tourism 2009)
- State of Kansas Implementation Plan for Air Quality (Internet website: http://www.kdheks.gov/bar/sip.html)
- Kansas Water Plan (Kansas Water Office 2015)
- Natural Resource Coordination Plan (Kansas Natural Resource Coalition 2013)
- Kansas Department of Transportation Long Range Transportation Plan 2008 (Kansas Department of Transportation 2008)
- Kansas's Comprehensive Wildlife Conservation Plan (Wasson et al. 2005)
- Kansas Recovery Plan for the Snowy Plover, *Charadrius alexandrines* (Busby 2003)
- Kansas Recovery Plan for Three Big River Fish Species: Sicklefin Chub, Sturgeon Chub, and Western Silvery Minnow (Layher 2003a)
- Recovery Plan for Four Salamander Species of Cherokee County, Kansas (Layher 2002a)
- Recovery Plan for the Arkansas Darter, *Etheostoma cragini* Gilbert, in Kansas (Layher 2002b)
- Recovery Plan for Four Freshwater Mussels in Southeast Kansas (Obermeyer 2000)
- Recovery Plan for Freshwater Mussels in the Upper Osage River System, Kansas (Obermeyer 2003)
- Recovery Plan for the Henslow's Sparrow, *Ammodramus henslowii*, in Kansas (Layher et al. 2005a)
- Recovery Plan for the Peppered Chub, *Macrhybopsis tetranema* Gilbert, in Kansas (Layher and Brinkman 2005)
- Recovery Plan for the Prairie Mole Cricket *Gryllotalpa major* Saussure in Kansas (Layher et al. 2005b)
- Recovery Plan for the Scott Riffle Beetle, *Optioservus phaeus* Gilbert, in Kansas (Layher 2002c)

- Recovery Plan for the Slender Walker Snail, *Pomatiopsis lapidaria* (Say) in Kansas (Layher 2003b)
- Recovery Plan for the Topeka Shiner (*Notropis topeka*) in Kansas (Mammoliti 2004)

5.2.3 Texas

- Texas Outdoor Recreation Plan (Texas Parks and Wildlife Department 2012a)
- Texas Conservation Action Plan 2012-2016 (Texas Parks and Wildlife Department 2012b)
- Texas Department of Transportation Long Range Transportation Plan 2040 (Texas Department of Transportation 2014)
- State of Texas Implementation Plan for Air Quality (Internet website: https://www.tceq.texas.gov/airquality/sip)
- 2012 Texas State Water Plan (Texas Water Development Board 2015)

5.3 FEDERAL AGENCY PLANS

5.3.1 US Fish and Wildlife Service

Oil and Gas Industry Conservation Plan Associated with Issuance of Endangered Species Act Section 10(a)(1)(B) Permits for the American Burying Beetle in Oklahoma (USFWS 2014)

5.3.2 Forest Service

- National Forests and Grasslands in Texas Revised Land and Resource Management Plan (Forest Service 1996)
- Ouachita National Forest in Arkansas and Oklahoma Revised Land and Resource Management Plan (Forest Service 2005)
- Pike and San Isabel National Forests and Comanche and Cimarron National Grasslands Land and Resource Management Plan (Forest Service 1984).
- Cibola National Forest Land and Resource Management Plan (Forest Service 1985)

5.3.3 Other

- Lesser Prairie-Chicken Range-Wide Conservation Plan (Van Pelt et al. 2013)
- 2008-2012 National Invasive Species Management Plan (National Invasive Species Council 2008)
- Chickasaw National Recreation Area General Management Plan (National Park Service 2008)

5.4 COOPERATING AGENCIES

A cooperating agency is any federal, state, or local government agency or Indian tribe that enters into a formal agreement with the lead federal agency to help develop an environmental analysis. More specifically, cooperating agencies "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM Land Use Planning Handbook, H-1601-1).

The benefits of enhanced collaboration among agencies in preparing NEPA analyses are as follows:

- Disclosing relevant information early in the analytical process
- Applying available technical expertise and staff support
- Avoiding duplication with other federal, state, tribal, and local procedures
- Establishing a mechanism for addressing intergovernmental issues

In March 2014, the BLM invited all affected local, state, federal, and tribal representatives to participate as cooperating agencies for the joint EIS/BLM RMP and BIA Integrated RMP. As of November 20, 2014, 57 agencies have agreed to participate as cooperating agencies for the RMP and 48 have signed a memorandum of understanding with the BLM. These agencies are as follow:

- Federal
  - Office of Surface Mining Reclamation and Enforcement
  - US Bureau of Reclamation, Nebraska-Kansas Area Office
  - USACE, Fort Worth District
  - Forest Service, National Forests and Grasslands in Texas
  - USFWS Region 2 Refuges
- State
  - Kansas Corporation Commission
  - Kansas Water Office
  - Oklahoma Climatological Survey
  - Oklahoma Department of Mines
  - ODWC
  - Oklahoma Department of Environmental Quality
  - Oklahoma Geological Survey
  - Brazos River Authority (Texas)
  - Red River Authority of Texas

  - Texas General Land Office
  - Texas Railroad Commission
  - Texas State Soil and Water Conservation Board
- Local
  - Kansas
    - Barton County
    - Cherokee County
    - Douglas County
    - Hamilton County
    - Jackson County
    - Johnson County
    - Sumner County
  - Oklahoma
    - Adair County
    - Caddo County
    - Choctaw County
    - Cleveland County
    - Coal County
    - Cotton County
    - Creek County
    - Hughes County
    - Latimer County
    - Lincoln County
    - Love County
    - McIntosh County
    - Murray County
    - Okfuskee County
    - Payne County
    - Pontotoc County
    - Pushmataha County
    - Sequoyah County
    - Tulsa County

    - Washington County
  - Texas
    - Clay County
    - Cooke County
    - Denton County
    - Marion County
    - Montague County
    - Scurry County
    - Wichita County
    - Wilbarger County
    - Young County Texas
- Tribes
  - Cherokee Nation
  - Citizen Potawatomie Nation
  - Muskogee Creek Nation
  - Tonkawa Tribe of Oklahoma

The BLM and BIA encourage cooperating agencies and entities to attend meetings and provide scoping comments, to assist the BLM and BIA in developing alternatives, and to review the draft joint EIS/BLM RMP and BIA Integrated RMP materials. They will seek additional cooperation opportunities with other agencies and entities throughout the development process. Project phases involving state and local governments, other federal agencies, and tribal governments will help provide consistency with other federal, state, and local plans.

5.5 TRIBAL CONSULTATION

Treaties, statutes, executive orders, judicial decisions, and agreements define the unique political relationship between the US government and the Native American tribes that it recognizes. This relationship has created a special federal trust responsibility, involving the legal commitments and obligations of the US toward Native American tribes and their lands and tribal trust resources and the exercise of tribal rights.

Consultation with Native American tribes is required by the National Historic Preservation Act and the American Indian Religious Freedom Act. Government-to-government consultation began in September 2013 with the BLM and BIA sending requests for consultation letters to all area tribes. The following lists the tribes contacted for consultation and interest in the project:

- Absentee Shawnee Tribe
- Alabama-Coushatta Tribe of Texas
- Alabama Quassarte Tribal Town
- Apache Tribe of Oklahoma
- Caddo Nation
- Cherokee Nation
- Cheyenne and Arapaho Tribes
- Chickasaw Nation
- Choctaw Nation
- Citizen Potawatomi Nation
- Comanche Nation
- Delaware Nation
- Delaware Tribe of Indians
- Eastern Shawnee Tribe
- Euchee (Yuchi) Tribe
- Fort Sill Apache Tribe
- Iowa Tribe of Kansas and Nebraska
- Iowa Tribe of Oklahoma
- Kaw Nation of Oklahoma
- Kialegee Tribal Town
- Kickapoo Traditional Tribe of Texas
- Kickapoo Tribe of Kansas
- Kickapoo Tribe of Oklahoma
- Kiowa Tribe
- Miami Tribe of Oklahoma
- Modoc Tribe of Oklahoma
- Muscogee (Creek) Nation
- Osage Minerals Council
- Osage Nation
- Otoe-Missouria Tribe
- Ottawa Tribe
- Pawnee Nation of Oklahoma
- Peoria Tribe of Indians of Oklahoma
- Ponca Nation
- Prairie Band Potawatomi Nation
- Quapaw Tribe of Oklahoma
- Sac and Fox Nation
- Sac and Fox Nation of Missouri in Kansas and Nebraska
- Seminole Nation
- Seneca-Cayuga Tribe of Oklahoma
- Shawnee Tribe
- Thlopthlocco Tribal Town
- Tonkawa Tribe of Oklahoma
- United Keetoowah Band of Cherokee
- Wichita and Affiliated Tribes
- Wyandotte Nation

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CHAPTER 6
SPECIFIC MANDATES AND AUTHORITY

6.1 BLM RESOURCES

6.1.1 Air

The following statutes, regulations, handbooks, and other policies govern air quality:

- BLM-M-7300, Air Resource Management
- Clean Air Act of 1970, as amended in 1977 and 1990
- Executive Order 11738, providing for administration of the Clean Air Act and Federal Water Pollution Control Act with respect to federal contracts, grants, and loans
- FLPMA

In 2011 the BLM, USFWS, National Park Service, EPA, and Forest Service signed an interagency memorandum of understanding to address air quality issues associated with oil and gas development on federal lands. The memorandum of understanding establishes common procedures for the agencies to follow in analyzing and mitigating the potential air quality impacts of proposed oil and gas activities on federally managed public lands through the NEPA process, as follows:

- Consultation among the five participating agencies throughout the NEPA process
- Common procedures for determining what type of air quality analyses are appropriate and when air modeling is necessary
- Specific provisions for analyzing and discussing impacts on air quality-related values and for mitigating impacts on air quality and air quality-related values
- A dispute resolution process to facilitate timely resolution of differences among agencies

Additionally, air quality in the planning area is regulated and monitored by the Kansas Department of Health and Environment, the Office of Air in the Texas Commission on Environmental Quality, and the Air Quality Division of the Oklahoma Department of Environmental Quality.

6.1.2 Climate

There are no NAAQS for greenhouse gases. The Final Greenhouse Gas Tailoring Rule and the Greenhouse Gas Mandatory Reporting Rule govern climate and climate change.

6.1.3 Geology

There are no specific regulations and guidelines for geology critical for NEPA compliance. There are specific construction requirements specified in federal building codes, and mandates and authority on mineral development. These are as follows:

- 43 CFR, Part 3160, Order 6, Hydrogen Sulfide Operations
- Indian Mineral Leasing Act, 25 USC, Section 396a et seq.
- 25 USC, Section 396, and the Indian Mineral Development Act, 25 USC, Section 2101 et seq.
- Mineral Leasing Act of 1920, as amended (30 USC, Section 181 et seq.)
- Mining and Mineral Policy Act of 1970 (30 USC, Section 21a)
- General Mining Law of 1872, as amended (30 USC, Section 21 et seq.)
- Onshore Oil and Gas Leasing Reform Act of 1987 (30 USC, Section 181 et seq.)
- Mining Leasing Act for Acquired Lands of 1947
- Surface Mining Control and Reclamation Act of 1977 (30 USC, Section 1201 et seq.)
- Mineral Sites ROWs are granted to State Departments' of Transportation (23 USC, Section 317)
- 43 CFR, Part 3100, Oil and Gas Leasing

6.1.4 Soil Resources

The following statutes, regulations, handbooks, and other policies govern soil resources:

- 43 CFR, Part 3809, Surface Management Regulations
- 43 CFR, Parts 3715 and 3800, Mining Regulations
- 43 CFR, Part 3600, Mineral Material Regulations
- 43 CFR, Part 3802, Exploration and Mining, Wilderness Review Program
- 43 CFR, Part 3715, Use and Occupancy under the Mining Laws
- 43 CFR, Parts 6300 and 8560, Wilderness Management

- BLM Manual 7150 (provides guidance in the conduct and maintenance of water utilization and development, water quality, water yield and timing, and water rights)
- BLM Manual 7100 (defines the BLM's Soil Resource Management Program)
- BLM Manual 7160 (provides general guidance for preventing water and wind erosion)
- BLM Manual 7180 (relates the restoration of disturbed areas directly to the policy on erosion control, protection, maintenance of environmental quality, rehabilitation of mined lands [BLM 3509 and 3605] and prevention of erosion in road construction)
- BLM Manual 7210 (provides the basic framework for soil and watershed activities)
- BLM Technical Notes 371: Determining Hydrologic Properties of Soil
- BLM Technical Reference 1737-19: Riparian Wetland Soils (2003)
- Desert Land Entry Act of 1877, as amended
- Soil Conservation and Domestic Allotment Act of 1935, as amended
- Soil Information Assistance for Community Planning and Resource Development Act of 1996
- Soil and Water Resources Conservation Act of 1977
- The American Indian Agricultural Resource Management Act, Public Law 103-177
- Indian Self Determination Act, Public Law 93-638.

6.1.5 Water Resources

Federal laws, statutes, mandates and authorities on water resources are as follows:

- Appropriations Act of 1952, McCarran Amendment
- Federal Water Pollution Control Act (commonly referred to as the Clean Water Act), as amended (33 USC, Sections 1251-1387)
- Safe Drinking Water Act of 1974 (42 USC, Section 201)
- Economy Act of 1932, as amended
- Watershed Protection and Flood Prevention Act of 1954, as amended
- Water Resources Development Act of 1974
- Water Resources Planning Act of 1965, as amended
- Water Resources Research Act of 1954, as amended
- Soil and Water Resources Conservation Act of 1977 (Public Law 95-87, 91 Statute 1407, November 8, 1977; 16 USC, Section 2000 et seq.)

- Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management, October 18, 2000
- Executive Order 11288, Prevention, Control and Abatement of Water Pollution by Federal Activities, July 2, 1966
- Executive Order 11507, Prevention, Control, and Abatement of Air and Water Pollution at Federal Facilities, February 4, 1970
- Executive Order 11514, as amended by Executive Order 11991, Protection and Enhancement of Environmental Quality, March 5, 1970
- Executive Order 11988, as amended by Executive Order 12148, Floodplain Management, May 24, 1977
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- Executive Order 12322, Water resources projects, September, 17, 1981
- President's letter of May 26, 1974 (creates the Interagency Committee on Water Resources and establishes interagency participation in river basin planning)
- The Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management (*Federal Register*, October 18, 2000)

Regulations are as follows:

- 43 CFR, Part 3809, Surface Management Regulations
- 43 CFR, Parts 6300 and 8560, Wilderness Management
- 43 CFR, Part 4100, Subpart 4180, Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration

Instruction memoranda, information bulletins, manual sections, handbooks, and technical notes are as follows:

- Instruction Memorandum 2000-179—Funding of Water-Related Restoration and Cleanup Projects on Private and Other Non-BLM Lands
- Instruction Memorandum 99-085—Federal Multi-Agency Source Water Agreement
- Information Bulletin 98-116—Clean Water Action
- Instruction Memorandum 87-261—Implementation of the Riparian Area Management Policy
- Instruction Memorandum 78-410—Protection of Wetlands and Riparian Areas

- BLM Manual 6740—Policy and procedures for identifying, protecting, maintaining, and managing fresh, brackish, and saline waters and wetland areas
- BLM Manual 7120—Guidelines for maintaining BLM watershed improvements on public lands
- BLM Manual 7200—BLM direction in surface water resources
- BLM Manual 7221—Policies, responsibilities, and procedures used to incorporate floodplain management into BLM activities
- BLM Manual 7240—BLM policy to protect, maintain, restore, and enhance the quality of water on public lands so that its utility for other dependent ecosystems will be maintained equal to or above legal water quality criteria
- BLM Manual 7250—Policy and guidance to acquire, perfect, and protect water rights necessary for multiple use management
- BLM Manual 7315-7317—Procedures for inventorying and analyzing groundwater and surface water inventories and for erosion and sediment reduction
- BLM Manual 7322—Procedures for analyzing watershed problems and developing plans for improving watershed conditions
- BLM Handbook 85501—Interim Management Policy and Guidelines for Lands under Wilderness Review
- BLM Handbook 8560-1—Management of Designated Wilderness Areas
- BLM Technical Notes 372—Stream discharge measurement using a modified technique
- BLM Technical Notes 405—A framework for analyzing the hydrologic conditions of watersheds

6.1.6 Vegetation

Upland Vegetation

The following statutes, regulations, handbooks, and other policies govern upland vegetation:

- The Public Rangelands Improvement Act (43 USC, Section 869 et seq.)
- Riparian Area Management—Process for Assessing Proper Functioning Condition (Prichard et al. 1998)
- BLM Handbook H-4180—Rangeland Health Standards
- BLM Handbook H-1740-2—Integrated Vegetation Management (BLM 2008)
- BLM Instruction Manual 2012-124, Land Health Standards (BLM 2012)

- Final Vegetation Treatments using Herbicides on BLM Lands in 17 Western States Programmatic EIS (BLM 2007).

The Oklahoma RMP (BLM 1994) does not provide management directly related to upland vegetation management. Relevant management is discussed in the wildlife section as it relates to habitat management for special status species, including lease stipulations and notices, and conditions of approval attached to drilling permits.

The Kansas RMP (BLM 1991) does not provide management directly related to upland vegetation management. Relevant management is discussed in the wildlife section as it relates to habitat management for special status species, including lease stipulations and notices, and conditions of approval attached to drilling permits.

The Texas RMP (BLM 1996) does not provide management directly related to upland vegetation management. Relevant management is discussed in the wildlife section as it relates to habitat management for special status species, including lease stipulations and conditions of approval attached permits.

Wetlands and Riparian Areas

The following statutes, regulations, handbooks, and other policies govern riparian areas and wetlands:

- The Public Rangelands Improvement Act (43 USC 869 et seq.)
- Riparian Area Management—Process for Assessing Proper Functioning Condition (Prichard et al. 1998)
- BLM Handbook H-4180—Rangeland Health Standards
- BLM Handbook H-1740-2—Integrated Vegetation Management
- BLM Instruction Manual 2012-124, Land Health Standards
- Final Vegetation Treatments using Herbicides on BLM Lands in 17 Western States Programmatic EIS (BLM 2007).
- Executive Order 11988—Floodplain Management
- Executive Order 11990—Protection of Wetlands

The Oklahoma RMP (BLM 1994) provides for wetland and riparian management direction. Wetland and riparian resource protection stipulations have been developed, and are an integral part of the oil, gas, and coal resource programs in the state. Wetland and riparian resource concerns are addressed through site specific agency coordination with the Oklahoma Natural Heritage Inventory, and the ODWC as necessary regarding each BLM project in the state.

The Kansas RMP (BLM 1991) also provides for wetland and riparian management direction. Wetland and riparian resource protection stipulations have been developed, and are an integral part of the oil, gas, and coal resource programs in the state. Wetland and

riparian resource concerns are addressed through site specific agency coordination with the Kansas Natural Heritage Inventory as necessary regarding each BLM project in the state.

The Texas RMP (BLM 1996) also provides for wetland and riparian management direction. Wetland and riparian leasing stipulations and conditions of approval have been developed. Wetland and riparian resource concerns are addressed through preparation of environmental analyses and wetland and riparian evaluations in coordination with the Texas Wildlife and Parks Department.

Noxious Weeds and Invasive, Nonnative Species

The following statutes, regulations, handbooks, and other policies govern noxious weeds and nonnative, invasive species:

- The Public Rangelands Improvement Act (43 USC, Section 869 et seq.)
- Executive Order 13112—Invasive Species
- Federal Noxious Weed Act of 1974, as amended
- Riparian Area Management—Process for Assessing Proper Functioning Condition (Prichard et al. 1998)
- BLM Handbook H-4180—Rangeland Health Standards
- BLM Handbook H-1740-2—Integrated Vegetation Management (BLM 2008)
- BLM Instruction Manual 2012-124, Land Health Standards (BLM 2012)
- Final Vegetation Treatments using Herbicides on BLM Lands in 17 Western States Programmatic EIS (BLM 2007)

Indian Affairs Manual Part 54, Chapter 7-Management of Noxious Weeds on Indian Lands.

The Oklahoma RMP (BLM 1994), Kansas RMP (BLM 1991), and Texas RMP (BLM 1996) do not provide management directly related to noxious weeds and invasive nonnative species. Relevant management is discussed in the wildlife section as it relates to habitat management for special status species.

Special Status Plant Species

The following statutes, regulations, handbooks, and other policies govern special status species:

- Endangered Species Act of 1973, as amended
- BLM Manual 6840, Special Status Species Management

The Oklahoma RMP (BLM 1994) provides for special status species management. It is discussed in the wildlife section as it relates to habitat management for special status species, including lease stipulations and notices, and conditions of approval attached to

drilling permits. Special status species resource concerns are addressed through site-specific agency coordination with the Oklahoma Natural Heritage Inventory and the ODWC regarding each BLM project in the state.

The Kansas RMP (BLM 1991) provides for special status species management. It is discussed in the wildlife section as it relates to habitat management for special status species, including lease stipulations and notices, and conditions of approval attached to drilling permits. Special status species resource concerns are addressed through site-specific agency coordination with the Kansas Natural Heritage Inventory regarding each BLM project in the state.

The Texas RMP (BLM 1996) provides for special status species management direction. Special status species leasing stipulations and conditions of approval have been developed. Species concerns are addressed by environmental analyses and special status species evaluations, in coordination with the Texas Parks and Wildlife Department.

6.1.7 Fish and Wildlife

Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act implements a series of international treaties that provide for migratory bird protection. It authorizes the Secretary of the Interior to regulate the taking of migratory birds. The Migratory Bird Treaty Act makes it unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird" (16 USC, Section 703), but it does not regulate habitat. The list of species protected by the Migratory Bird Treaty Act was revised in March 2010 and includes almost all 1,007 bird species that are native to the US.

Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

Signed on January 11, 2001, this Executive Order directs each federal agency taking actions that are likely to have a measureable effect on migratory bird populations to develop and implement a memorandum of understanding with USFWS that promotes the conservation of migratory bird populations.

Texas Parks and Wildlife Code Section 12.0011

The Texas Parks and Wildlife Department is charged with providing recommendations that will protect fish and wildlife resources to local, state, and federal agencies that approve, permit, license, or construct developmental projects. It provides information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources.

6.1.8 Special Status Species

Specific mandates and authorities are as follows:

- Endangered Species Act. The Endangered Species Act (16 USC, Section 1531 et seq.), as amended, provides for the conservation of federal-listed plant and

animal species and their habitats. The Endangered Species Act directs federal agencies to conserve listed species and imposes an affirmative duty on them to ensure that their actions are not likely to jeopardize the continued existence of a listed species or adversely modify its designated critical habitat.

- BLM Manual 6840—Special Status Species Management. This provides management policy for federal-listed species and BLM-designated sensitive species. There are no BLM-designated sensitive species in the planning area.

6.1.9 Wild Horses and Burros

The BLM is responsible for protecting, managing, and controlling wild horses and burros, in accordance with the Wild Free-Roaming Horses and Burros Act of 1971 (Public Law 92-195, as amended). Its purpose is to "manage wild horses and burros within herd management areas designated for their long-term maintenance, in a manner designed to achieve and maintain a thriving natural ecological balance and multiple use relationships." The FLPMA directs the BLM to manage wild horses and burros as one of numerous multiple uses: mining, recreation, domestic grazing, and fish and wildlife. Additional guidance is found in 43 CFR, Part 4700, Protection, Management, and Control of Wild Free-Roaming Horses and Burros.

The Public Rangeland Improvement Act of 1978, as amended, defined excess wild horses and burros, reaffirmed the need to remove excess animals to protect animal and rangeland health, mandated research, and provided guidance for titles to adopted horses and the adoption process.

6.1.10 Cultural Resources

The following statutes, regulations, handbooks, and other policies govern cultural resources:

- American Indian Religious Freedom Act of 1978
- Archaeological Resources Protection Act of 1979, as amended
- BLM Manual 8100, Cultural Resource Management
- Executive Order 13007, Indian Sacred Sites
- Executive Order 13084, Consultation and Coordination with Indian Tribal Governments
- Historic Sites Act of 1935
- Information Bulletin 2002-101, Cultural Resource Information
- National Historic Preservation Act of 1966, as amended
- Native American Graves Protection and Repatriation Act of 1990, as amended
- Procedures for Performing Cultural Resource Fieldwork in the Areas of Oklahoma, Texas, and Kansas BLM Responsibilities

- Indian Affairs Manual Part 59, Chapter 8- Protection of Historical and Archaeological Resources

- Memorandum of Understanding Among the US Department of Defense, US Department of the Interior, US Department of Agriculture, US Department of Energy, and the Advisory Council on Historic Preservation Regarding Interagency Coordination and Collaboration for the Protection of Indian Sacred Sites

6.1.11 Paleontological Resources

The Antiquities Act of 1906 and the Paleontological Resource Preservation Act; Sections 6301-6312 of the Omnibus Public Lands Act of 2009, 16 USC, Section 470aaa) serve as the primary federal legislation to protect and conserve paleontological resources on lands administered by the federal government. The Antiquities Act of 1906 (16 USC, Sections 431-433) protects both historic and prehistoric resources on federal lands.

The Paleontological Resource Preservation Act codified specific protection for paleontological resources that provide information about the history of life on earth. It mandates the management and preservation of those resources on public lands, using scientific principles and expertise. Furthermore, the Paleontological Resource Preservation Act created criteria for issuing paleontological collection permits and directed the Secretaries of the Interior and Agriculture to ensure paleontological resources discovered on federal lands are curated properly into the collections of approved repository institutions.

In addition, the FLPMA (Public Law 94-579) requires that public lands be managed in a manner that protects the “quality of scientific” and other values. NEPA (Public Law 91-190) requires that “important historic, cultural and natural aspects of our national heritage” be protected. The Paleontological Resource Preservation Act applies to federal lands only and does not affect private lands. It provides the authority to protect paleontological resources on federal lands and includes criminal and civil penalties for fossil theft and vandalism.

The following statutes, regulations, handbooks, and other policies govern paleontological resources:

- BLM Manual 8270 on Paleontological Resource Management
- Handbook H8270 on Paleontological Resource Management
- Instruction Memorandum 2008-009 on Potential Fossil Yield Classification System for Paleontological Resources on Public Lands
- Instruction Memorandum 2009-011 on Assessment and Mitigation of Potential Impacts [on] Paleontological Resources

- Instruction Memorandum 2009-113 on Casual Collecting of Common Invertebrate and Plant Paleontological Resources under the Paleontological Resources Preservation Act of 2009
- Instruction Memorandum 2012-140 on Collecting Paleontological Resources under the Paleontological Resources Preservation Act of 2009
- Instruction Memorandum 2012-141 on Confidentiality of Paleontological Locality Information under the Omnibus Public Lands Act of 2009, Title VI, Subtitle D on Paleontological Resources Preservation
- Indian Affairs Manual Part 59, Chapter 7, Paleontological Resources.

6.1.12 Visual Resources

The following statutes, regulations, handbooks, and other policies govern visual resources:

- BLM Manual 8400—Visual Resource Management describes the overall BLM policy direction for visual resource management.
- BLM Handbook H-8410-1—Visual Resource Inventory outlines the BLM's process to identify visual values. The inventory consists of an evaluation of scenic quality and sensitivity and a delineation of distance zones. Based on these three factors, lands are placed into one of four VRI classes, which represent the relative value of the visual resources. Classes I and II are the most valued, class III represents a moderate value, and class IV is the least valued. The inventory classes provide the basis for considering visual values in the planning process.
- BLM Handbook H-8431-1—Visual Resource Contrast Rating outlines the BLM's process to analyze potential visual impacts of proposed projects and activities. The degree to which a proposed project affects the visual quality of the landscape depends on the visual contrast created between the proposed project and the existing landscape. The contrast can be measured by comparing the proposed project features with the major features in the existing landscape. The basic design elements of form, line, color, and texture are used to make this comparison and to describe the visual contrast created by the proposed project. This assessment process provides a means for determining visual impacts and for identifying measures to mitigate these impacts.

6.1.13 Wilderness Characteristics

The following statutes, regulations, handbooks, and other policies govern lands with wilderness characteristics outside wilderness study areas:

- BLM Manual 6310, Conducting Wilderness Characteristics Inventory on BLM Lands (BLM 2012b)

- BLM Manual 6320, Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process (BLM 2012c)

6.1.14 Wildland Fire Management

The following statutes, regulations, handbooks, and other policies govern wildland fire management:

- FLPMA
- NEPA
- Federal Wildland Fire Management Policy, established in 1995 and updated in 2001
- Interagency Guidance—Interagency Standards for Fire and Fire Aviation Operations, Interagency Burned Areas Emergency Response and Interagency Burned Area Rehabilitation, Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- Land Use Planning—BLM Planning Handbook H-1601
- District and Field Office—Fire Management Plans
- BLM Fire Management Policy and Integrated Vegetation Management—BLM Handbook H-1740-2, Integrated Vegetation Management; BLM Manual 9211, Fire Planning; BLM Handbook 9211-1, Fire Planning; BLM Manual 9212, Fire Protection; BLM Handbook H-9238, Fire Trespass
- Indian Affairs Manual Part 90, Chapters 1-4, Wildland Fire Management

6.1.15 Cave and Karst Resources

The following statutes, regulations, handbooks, and other policies govern cave and karst resources:

- Federal Cave Resources Protection Act of 1988, 16 USC Section 4301
- National Cave and Karst Research Institute Act of 1988
- 43 CFR, Part 37, Cave Management
- Instruction Memorandum 2008-105 (cave safety standards)
- BLM Memorandum of Understanding WO-250-2007-01—Facilitates cooperation and enhances management of cave and karst resources on BLM-administered lands
- Interagency Cave and Karst Management Agreement 2003

6.2 BLM RESOURCE USES

6.2.1 Energy and Minerals

Coal

- Mineral Leasing Act of 1920, as amended—Under this federal law, the BLM issues leases for developing deposits of coal, phosphates, potassium, sodium, uranium, petroleum, natural gas, and other hydrocarbons on public domain lands and lands having general reserved minerals.
- Mineral Leasing Act for Acquired Lands of 1947 as amended—This federal law states that all deposits of coal, phosphate, oil, oil shale, gas, sodium, potassium, and sulfur on lands legally acquired by the US may be leased under the same conditions as the leasing provisions of the federal mineral leasing system.
- BLM Coal Regulations (43 CFR, Parts 3400-3580)—These regulations govern the BLM's management of federal coal resources, including leasing, suitability determinations, exploration, and mining operations.

Fluid Minerals

- Helium Privatization Act of 1996—This federal law gives the BLM responsibility for operating the federal helium reserve to provide enriched crude helium to private refiners.
- Helium Stewardship Act of 2013—This federal law directs the Secretary of the Interior to sell the helium resources in the federal helium reserve in a competitive market and to credit the proceeds to the Helium Production Fund to support research, development, commercial application, and conservation programs related to helium resources.
- Mineral Leasing Act of 1920, as amended—Under this federal law, the BLM issues leases for developing deposits of coal, phosphates, potassium, sodium, uranium, petroleum, natural gas, and other hydrocarbons on public domain lands and lands having general reserved minerals.
- Mineral Leasing Act for Acquired Lands of 1947, as amended—This federal law states that the leasing of all deposits of coal, phosphate, oil, oil shale, gas, sodium, potassium, and sulfur on lands legally acquired by the US may be leased under the same conditions as the leasing provisions of the federal mineral leasing system.
- Geothermal Steam Act of 1970—This law authorizes the Department of the Interior to lease public lands for geothermal development. The Department of the Interior has delegated leasing authority to the BLM.
- BLM Fluid Mineral Regulations (43 CFR, Parts 3100-3280)—These regulations govern the BLM's management of federal fluid mineral resources, including leasing, exploration, and operations.

- Onshore Oil and Gas Order No. 1—This policy contains the requirements necessary for the approval of all proposed oil and gas exploratory, development, or service wells on all federal and Indian onshore oil and gas leases (other than those of the Osage Tribe)..

Locatable Minerals

- General Mining Law of 1872, as amended—This law authorizes and governs prospecting and mining for hardrock minerals on federal public lands.
- BLM Locatable Mineral Regulations (43 CFR, Parts 3800 to 3870)—These regulations govern the BLM's management of mining and mining claims under the general mining laws.

Mineral Materials

- Mineral Materials Act of 1947—This law authorizes the BLM to sell mineral materials at fair market value and to grant free-use permits to government agencies and nonprofit organizations.
- BLM Mineral Materials Regulations (43 CFR, Part 3600)—These regulations govern the BLM's administration of mineral materials on public domain lands.

Nonenergy Leasables

- Mineral Leasing Act of 1920, as amended—Under this federal law, the BLM issues leases for developing deposits of coal, phosphates, potassium, sodium, uranium, petroleum, natural gas, and other hydrocarbons on public domain lands and lands having general reserved minerals.
- Mineral Leasing Act for Acquired Lands of 1947, as amended—This federal law states that all deposits of coal, phosphate, oil, oil shale, gas, sodium, potassium, and sulfur on lands legally acquired by the US may be leased under the same conditions as the leasing provisions of the federal mineral leasing system.
- Reorganization Plan No. 3 of 1946—This plan, prepared by the President and approved by Congress pursuant to the Reorganization Act of 1945, transferred the functions of the Secretary of Agriculture for leasing or disposing of minerals (including hardrock minerals) to the Secretary of the Interior for acquired lands.
- BLM Nonenergy Leasable Mineral Regulations (43 CFR, Part 3500)—These regulations govern the BLM's administration of nonenergy leasable minerals, including issuing prospecting permits and leases.

6.2.2 Renewable Energy

The following statutes, regulations, handbooks, and other policies govern renewable energy:

- FLPMA

- Energy Policy Act of 2005 (Public Law 109-58, Title II)

6.2.3 Recreation and Visitor Services

BLM Manual 8320, Planning for Recreation and Visitor Services, provides general policy, direction, and guidance for recreation and visitor services planning on the public lands and associated waters under the BLM's administration. This manual provides definitions and criteria for designating special recreation management areas and extensive recreation management areas. (Neither of these two types of recreation areas have been designated in the planning area.)

BLM Handbook H-2930-1, Recreation Permit and Fee Administration, provides agency policy, direction, and guidance for establishing, modifying, and managing recreation fees and for issuing and administering the various permits for recreation on public lands and related waters. As authorized by 43 CFR, Part 2932, the following four types of uses require Special Recreation Permits: commercial use, competitive events, organized groups, and recreation use in special areas. The BLM can issue Special Recreation Permits for noncommercial use in certain special areas, including rivers, backcountry, and camping areas.

6.2.4 Comprehensive Travel and Transportation Management

Transportation is an integral part of virtually every activity that occurs on public lands. Comprehensive travel and transportation management is meant for the BLM's proactive interdisciplinary planning, on-the-ground management, and administration of roads and trails for both motorized and nonmotorized travel. Its purpose is to ensure that public access, natural and cultural resources, and regulatory needs are considered. The comprehensive travel and transportation management process must address variability among landscapes, users' interests, equipment options, and cultural and biological resource constraints. The primary goal of the comprehensive travel and transportation management process is to develop a systematic network of routes with appropriately designated uses that provide opportunities for a diverse set of activities on public lands, such as recreation, energy development, grazing, and wildlife management.

Traditionally, the BLM's travel management program focused primarily on motor vehicle use. However, the introduction of comprehensive travel and transportation management significantly expanded the planning scope to include all forms of travel, including travel on foot, on horseback and other livestock, via mechanized vehicles (e.g., bicycles), motorized vehicles (e.g., motorcycles, all-terrain vehicles, cars, and trucks), and travel by motorized and nonmotorized boats.

There is considerable overlap between travel management and all other uses on BLM lands. For example, many people visit public lands for recreation. For these visitors, a route system may serve as either a means to reach a destination where the activity occurs (e.g., a road to a trailhead or parking area) or as the focus of the recreation itself (e.g., trails for four-wheel driving, hiking, and horseback riding).

To reduce the duplication of narrative between travel management and the other sections of this document, this section addresses only public travel and access: management area designations, route designations, types of travel, and seasonal area limitations.

6.2.5 Lands and Realty

The following statutes, regulations, handbooks, and other policies govern land tenure:

- 43 CFR, Parts 2100, 2200, 2300, 2700, 2800, 2900, 3100, 3200, 3400, 3500, 3600, and 3800
- 25 CFR, Parts 150, 151, 152
- FLPMA
- Recreation and Public Purposes Act of 1954, as amended
- Recreation and Public Purposes Act Amendment Act of 1988
- BLM Handbook 2100-1, Acquisitions
- BLM Handbook 2200, Land Exchanges
- BLM Manual 2200, Land Exchanges
- BIA Fee-to-Trust Handbook, Version II
- OIG Handbook for Gaming Acquisition
- Indian Affairs Manual Part 51, Land Titles and Records
- Indian Affairs Manual Part 52, Real Estate Services.

The following statutes, regulations, handbooks, and other policies govern use authorizations:

- 43 CFR, Part 2920, Leases, Permits, and Easements
- FLPMA

6.2.6 Livestock Grazing

Federal laws, statutes, mandates, and authorities on livestock grazing are as follows:

- Taylor Grazing Act of 1934 (43 USC, Section 315)
- General Allotment Act of 1887
- The Public Rangelands Improvement Act of 1978
- Executive Order 10175, Amending Executive Order 7908 of June 9, 1938, and Executive Order 10046 of March 24, 1949
- Executive Order 12548, Grazing Fee, February 14, 1986

- Indian Affairs Manual Part 54, Chapter 7, Grazing Permit Issuance, Administration, and Monitoring

The regulation on livestock grazing is 43 CFR, Part 4100, Grazing Regulations.

6.2.7 Prime and Unique Farmlands/Agriculture

- Farmland Protection Policy Act of 1984 (7 USC, Sections 4201-4209)
- The American Indian Agricultural Resource Management Act, Public Law 103-177
- Indian Self Determination Act Public Law 93-638

6.3 BLM SPECIAL DESIGNATIONS

6.3.1 Wilderness and Wilderness Study Areas

- Wilderness Act of 1964—The Wilderness Act 1964 established the National Wilderness Preservation System. It directs each agency administering any designated wilderness to preserve the wilderness character of the area.

6.3.2 Areas of Critical Environmental Concern

- FLPMA Section 202 (43 USC, Section 1712[c][3])
- 43 CFR, Part 1610.7-2
- FLPMA and BLM Manual Section 1613 (BLM 1988)—Requires the BLM to prioritize designating and protecting ACECs during the land use planning process
- This analysis and the resultant findings for ACEC relevance and importance criteria has been performed in accordance with FLPMA Section 202 (43 USC, Section 1712[c][3]), 43 CFR, Part 1610.7-2, and BLM Manual 1613 [BLM 1988])

6.3.3 Wild and Scenic Rivers

- Oklahoma's Scenic Rivers Act, Oklahoma Statute Title 82, Sections 1451-1471—Preserves some of the free-flowing streams and rivers of Oklahoma for the benefit of its people. These rivers are preserved because the Oklahoma legislatures find that they possess unique natural scenic beauty, water conservation, fish, wildlife, and outdoor recreational values of present and future benefit to the people of the state.

6.3.4 National Trails

- National Trails System Act of 1968—Created the National Trails System and defined four categories of national trails: national scenic trails, national historic trails, national recreation trails, and connecting or side trails.
- BLM Manual 6250, National Scenic and Historic Trail Administration—Addresses specific functions delegated to the BLM from the Secretary of the Interior, in accordance with the National Trails System Act. The manual

describes how to conduct national scenic or historic trail feasibility studies, how to administer a national scenic or historic trail after its designation by Congress, and the responsibilities of national scenic or historic trail administrators.

- BLM Manual 6280, Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation—Provides the policies for managing national scenic and historic trails. It identifies requirements for managing trails undergoing a national trail feasibility study, trails that are recommended as suitable for the National Trail System, designation through the national trail feasibility study, and inventorying, planning, managing, and monitoring designated national scenic and historic trails.
- BLM Manual 6100, National Landscape Conservation System Management—Provides general policy for all units of the BLM's National Landscape Conservation System.

6.3.5 National, State, and BLM Byways

- Intermodal Surface Transportation Efficiency Act of 1991—Developed a national intermodal surface transportation system and authorized funds for construction of highways, highway safety programs, and mass transit programs.
- Transportation Equity Act of 1998—Authorized the federal surface transportation programs for highways, highway safety, and transit for from 1998 to 2003. It required that certain planning factors be included in regional transportation plans.

6.4 BLM Social and Economic Conditions

6.4.1 Native American Tribal Uses

Consideration of Indian trust assets is based on the following selected Executive Orders, secretarial orders, and regulations:

- Government-to-Government Relations with Native American Tribal Governments (Memorandum signed by President Clinton, April 29, 1994), *Federal Register*, Vol. 59, No. 85—Directs federal agencies to consult, to the greatest extent practicable and permitted by law, with tribal governments before taking actions that affect tribal governments recognized by the federal government. Federal agencies must assess the impact of federal government plans, projects, programs, and activities on tribal trust resources and ensure that tribal government rights and concerns are considered during such development.
- Executive Order 13751, Consultation and Coordination with Indian Tribal Governments, 63 *Federal Register* 96—Issued to establish regular and meaningful consultation and collaboration with tribal officials in developing

federal policies that have tribal implications. When implementing such policies, agencies must consult with tribal officials as to the need for federal standards and any alternatives that limit their scope or otherwise preserve the prerogatives and authority of Indian tribes.

- Secretarial Order No. 3175, Departmental Responsibilities for Indian Trust Resources—Requires Department of the Interior bureaus and offices to consult with the recognized tribal government with jurisdiction over the trust property that a proposal may affect.
- Secretarial Order No. 3206, American Indian Tribal Rights, Federal Tribal Trust Responsibilities, and the Endangered Species Act—Clarify the responsibilities of the Department of the Interior agencies on how Endangered Species Act compliance actions affect, or may affect, Indian lands, tribal trust resources, or the exercise of American Indian tribal rights. Department of the Interior agencies will carry out their responsibilities in a manner that complements the federal trust responsibility to tribes, tribal sovereignty, and statutory missions of the departments. Also, agencies must strive to ensure that Indian tribes do not bear a disproportionate burden for the conservation of listed species.
- Secretarial Order No. 3215, Principles for the Discharge of the Secretary's Trust Responsibility—Provides guidance to Department of the Interior employees who are responsible for carrying out the Secretary's trust responsibility as it pertains to Indian trust assets.
- Departmental Manual 512 Chapter 2, Departmental Responsibilities for Indian Trust Resources—Establishes the policies, responsibilities, and procedures for operating on a government-to-government basis with Indian tribes recognized by the federal government to identify, conserve, and protect American Indian and Alaska Native trust resources to fulfill the Federal Indian Trust Responsibility.

Consideration of traditional cultural uses, locations, and sacred site tribal Indian trust assets is based on the following selected laws, executive orders, secretarial orders, and regulations:

- National Historic Preservation Act of 1966, as amended, 16 USC, Section 470—Directs federal agencies to take into account the effect of any undertaking (a federally funded or assisted project) on historic properties.
- The American Indian Religious Freedom Act of 1978, 42 USC, Section 1996—Establishes a national policy to protect and preserve the right of American Indians to exercise traditional Indian religious beliefs or practices.
- The Native American Graves Protection and Repatriation Act of 1990—Requires consultation with appropriate Native American tribes and Native Alaskan and Native Hawaiian organizations on the identification and

affiliation of cultural items and those resulting from subsequent intentional excavations and inadvertent discoveries.

- Executive Order 13007—Directs federal agencies, when possible, to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and to avoid adversely affecting the physical integrity of such sacred sites.
- Executive Order 13175—Directs federal agencies to continue to work with Indian tribes on a government-to-government basis to address issues concerning Indian tribal self-government, tribal trust resources, and Indian tribal treaty and other rights; to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications; to strengthen the US government-to-government relationships with Indian tribes; and to reduce the imposition of unfunded mandates on Indian tribes.
- Interagency Coordination and Collaboration for the Protection of Indian Sacred Sites—Memorandum of Understanding among the Departments of the Interior, Agriculture, Energy, and Defense and the Advisory Council on Historic Preservation; states that federal land management agencies "hold in public trust a great diversity of landscapes and sites, including many culturally important sites held sacred by Indian Tribes," and acknowledges that "all Federal agencies are responsible for assessing the potential effects of undertakings they carry out, fund, or permit on historic properties of traditional cultural and religious importance to tribes."

BLM Policy, Direction, and Guidance:

- BLM 8100 series manuals on cultural resources management—A reference source that provides basic information and general summary guidance for the BLM's cultural resource management program.
- 8110, Identifying Cultural Resources—Provides general direction for identifying cultural resources; designed to ensure that BLM field office managers locate and record cultural resources on lands they administer or are affected by undertakings they authorize; evaluate the resources' significance and their scientific, cultural, public, traditional, and conservation importance as the basis for managing the resources and the surrounding land area; and maintain records that can be used for education, research, and other learning purposes.
- 8120, Protecting Cultural Resources—Provides general guidance for protecting cultural resources from deterioration; for making decisions about recovering significant cultural resource data when it is impossible or impractical to maintain cultural resources; for protecting cultural resources from inadvertent adverse effects; and for controlling unauthorized uses of cultural resources.

- 8130, Utilizing Cultural Resources for Public Benefit—Provides specific procedural direction on authorizing the use of cultural resources on public land and general guidance on ensuring public benefits from their use.
- 8160, Native American Consultation and Coordination, and Handbook H-8160-1, Tribal Consultation under Cultural Resource Authorities—Provide policy and guidance on coordinating and consulting with Native Americans. The goal is to ensure that tribal governments, Native American communities, and individuals whose interests might be affected have a sufficient opportunity to participate in BLM planning and resource management decision-making.

6.4.2 Public Health and Safety

- NAAQS (40 CFR, Parts 50.4-50.12)
- National Emission Standards for Hazardous Air Pollutants (40 CFR, Part 61)
- The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 USC, Section 9601 et seq.)
- Occupational and Safety and Health Act of 1970, as amended
- Lead-Based Paint Poisoning Prevention Act, as amended
- Federal Insecticide, Fungicide, and Rodenticide Act of 1947, as amended in 1972
- 43 CFR, Part 300, National Oil and Hazardous Substances Pollution Contingency Plan
- 43 CFR, Part 3809, Surface Management
- Department Manual Part 602 Chapter 2 (land acquisitions, exchanges, and disposals of hazardous substance determination procedures)
- Department Manual Part 910 (national oil and hazardous substances contingency plan procedures)
- BLM Manual 1703 (objectives, policies, responsibilities, and authorities for hazardous material management)
- BLM Manual 9113, Roads
- BLM Handbook H-1703-1 (Comprehensive Environmental Response, Compensation and Liability Act Response Actions Handbook)
- Instruction Memorandum 2003-008 (policy for BLM personnel to enter sites with potential of known hazardous substance releases)
- Instruction Memorandum 2002-138 (hazardous substance discovery policy for BLM personnel)
- Information Bulletin 2001-071 (BLM safety and health policy)

- Information Bulletin 2004-209 (deployment and population of the site cleanup system)

6.4.3 Socioeconomics

Appendix D of the BLM Land Use Planning Handbook (H-1601-1), Social Science Considerations in Land Use Planning Decisions, provides guidance on analyzing social and economic information in the BLM planning process. The purpose of such analysis is to contribute to informed, sustainable land use planning decisions.

6.4.4 Environmental Justice

The following statutes, regulations, handbooks, and other policies govern social and economic features:

- BLM-H-1601-1, Land Use Planning Handbook
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

6.5 BIA DECISION AREA

6.5.1 Air

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.2 Climate

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.3 Geology

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.4 Soil Resources

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.5 Water Resources

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.6 Vegetation

Mandates and authorities are described under Section 6.1, BLM Resources.

Special Status Plant Species

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.7 Fish and Wildlife

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.8 Special Status Species

The Endangered Species Act of 1973 (16 USC, Section 1531 et seq.), as amended, provides for the conservation of federal-listed plant and animal species and their habitats. The Endangered Species Act directs federal agencies to conserve listed species and

imposes an affirmative duty on these agencies to ensure that their actions are not likely to jeopardize the continued existence of a listed species or adversely modify its designated critical habitat.

6.5.9 Cultural Resources

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.10 Paleontological Resources

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.11 Visual Resources

The BIA does not maintain a visual resource inventory.

6.5.12 Wildland Fire Management

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.13 Cave and Karst Resources

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.14 Energy and Minerals

- Indian Mineral Leasing Act of 1938—Provides for the competitive leasing of lands owned by a tribe, group, or a band of Indians with the approval of the Secretary of the Interior.
- Indian Mineral Development Act of 1982—Allows tribes to enter into certain agreements for the exploration, extraction, processing, or other development of oil, gas, uranium, coal, geothermal, or other energy or nonenergy mineral resources.
- Osage Allotment Act of 1906—Provides for the competitive leasing of lands on any Indian reservation or lands owned by the Osage Nation.
- BIA Mineral Leasing Regulations (25 CFR, Parts 211-225)—Govern the BIA's management of Indian mineral resources, including resources other than oil and gas on Osage Reservation Lands and leasing, exploration, and operations.
- BIA Regulations on Leasing of Osage Reservation Lands for Oil and Gas Mining (25 CFR, Part 226)—Govern the BIA's administration of fluid mineral development on the Osage Nation.
- Onshore Oil and Gas Order No. 1—Contains the requirements necessary for the approval of all proposed oil and gas exploratory, development, or service wells on all federal and Indian onshore oil and gas leases (other than those of the Osage Tribe).
- BIA Fluid Mineral Estate Procedural Handbook—Establishes procedures for each action necessary to manage Indian fluid mineral estate, including leasing, operations, and reclamation.

6.5.15 Renewable Energy

Mandates and authorities are described under Section 6.1, BLM Resources. The addditional statutes, regulations, handbooks, or other policies also govern renewable energy:

- 23 CFR, Part 169

6.5.16 Recreation and Visitor Services

The BIA Southern Plains and Eastern Oklahoma Regions do not provide recreation and visitor services.

6.5.17 Lands and Realty

Mandates and authorities are described under Section 6.1, BLM Resources. The addditional statutes, regulations, handbooks, or other policies also govern use authorizations:

- 23 CFR, Part 169, which specifies that a ROW can be granted across tribal lands only when the proponent has landowner consent
- 25 CFR, Subchapter H, Land and Water, Parts 150-183
- Standards for Indian Trust Lands Boundary Evidence Handbook
- Indian Affairs Manual: Part 50
- Indian Affairs Manual: Part 51
- Indian Affairs Manual: Part 52

6.5.18 Livestock Grazing

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.19 Prime and Unique Farmlands/Agriculture

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.20 National Trails

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.21 National and State Byways

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.22 Native American Tribal Uses

Mandates and authorities are described under Section 6.1, BLM Resources. In addition, the following summarizes BIA policy, direction, and guidance:

- Indian Affairs Manual: Part 59, Chapter 8, Protection of Historical and Archaeological Resources—A basis reference source for the BIA's cultural resource management program.

- Indian Affairs Manual: Part 59, Chapter 9, Native American Graves Protection and Repatriation—General Native American Graves Protection and Repatriation Act compliance procedures.

6.5.23 Public Health and Safety

Mandates and authorities are described under Section 6.1, BLM Resources. In addition, the following summarizes BIA policy, direction, and guidance: Indian Affairs Manual: Part 25, Chapter 1-9, Safety and Occupational Health.

6.5.24 Socioeconomics

Mandates and authorities are described under Section 6.1, BLM Resources.

6.5.25 Environmental Justice

Mandates and authorities are described under Section 6.1, BLM Resources.

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CHAPTER 7
PREPARERS

Name	Role/Responsibility	Education
	BLM	
Steve Tryon	Field Manager Oklahoma Field Office	
Laurence Levesque	Project Manager, reviewed all sections	MS, Wildlife Ecology BA, Biology BS, Wildlife Conservation
Ryan Howell	Cultural Resources, Paleontological Resources, Native American Tribal Uses	MA, Anthropology with emphasis in Archaeology, ABD BA, Anthropology BA, Classical Studies Minor, Latin
David J. Money	GIS Specialist	BS, Geoscience with an emphasis in Geography Minors, History, Recreation
Janine Book	Assessment, Inventory, and Monitoring Project Manager	MA, Education BS, Biology Minor, Outdoor Recreation
Jackie Badley	Livestock grazing	N/A
William George	Air Quality, Climate	MS, Meteorology BS, Petroleum Engineering
Richard Wymer	Air Quality, Climate, Geology, Soil Resources, Water Resources, Paleontological Resources, Energy Minerals, Renewable Energy	MS, Geology BS, Geology

Name	Role/Responsibility	Education
Melinda Fisher	Air Quality, Climate, Special Designations, Wild Horse and Burro, Livestock Grazing, Cave and Karst Resources, Wildland Fire Management	BS, Natural Resources
David Anderson	Reviewed all resource sections	BS, Environmental Science
Gabe Morgan	Visual Resources, Recreation and Visitor Services, Lands and Realty	BS, Forestry
George Thomas	Senior Wildlife Biologist	MS, Wildlife Biology
Allen Holubec	Solid Minerals	N/A
BIA		
David Anderson	Regional Environmental Scientist	N/A
Sierra Mandelko	Regional Archeologist, National Environmental Policy Act, Climate	MA, Anthropology
EMPSi, Environmental Management and Planning Solutions, Inc. (Contractor)		
Jordan Adams	Geology, Soils, Cave and Karst Resources, Prime and Unique Farmlands/Agriculture	BS, Environmental Sciences Minor, Geology
Amy Cordle	Air Quality and Climate (Reviewer)	BS, Civil Engineering
Annie Daly	Air Quality and Climate (Author)	BA, Environmental Studies
Kevin T. Doyle	Cultural Resources, Paleontological Resources, Native American Tribal Uses	BA, Sociology
Zoe Ghali	Socioeconomics and Environmental Justice	MS, Environmental Physiology Graduate Certificate, Environmental Policy
Peter Gower	Lands and Realty, Renewable Energy	MS, Land Use Planning
Derek Holmgren	Water Resources, Visual Resources	MS, Environmental Science MPA, Environmental Policy and Natural Resources Management BS, Environmental Science BA, International Studies Minor, Spanish
Jeff Johnson	Wildland Fire Management	BS, Conservation of Natural Resources

Name	Role/Responsibility	Education
Kate Krebs	Visual Resources; Lands with Wilderness Characteristics; BLM Special Designations	BA, Environmental Studies, Spanish Minor, Political Science
Molly McCarter	Special Designations (Wilderness and Wilderness Study Areas, ACECs, Wild and Scenic Rivers, National Trails, and National, State, and BLM Byways)	BA, Environmental Studies Minor, Geography
Katie Patterson	Nonrenewable Resources Lead	BA, Environmental Policy JD, Environmental Law
Holly Prohaska	Wild Horse and Burros, Livestock Grazing (Author)	MS, Environmental Education
Kevin Rice	Fish and Wildlife, Special Status Species (Author)	BS, Environment Science
Morgan Trieger	Vegetation (Author)	BS, Conservation and Resource Studies
Drew Vankat	Recreation and Visitor Services, Comprehensive Travel and Transportation Management (Author)	BPhil, Urban and Environmental Planning MS, Environmental Planning and Policy
Liza Wozniak	Fish and Wildlife, Special Status Species (Author)	MS, Ecology
Meredith Zaccherio	Biology (QA/QC)	MA, Biology

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CHAPTER 8
GLOSSARY

Allotment (BLM). An area of land in which one or more livestock operators graze their livestock. Allotments generally consist of BLM-administered lands but may also include other federally managed, state-owned, and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

Allotted land/Allotment (BIA). Land held in trust by the US government for the benefit of individual Indian allottees (or their heirs).

All-terrain vehicle. A wheeled vehicle, other than a snowmobile, which has a wheelbase and chassis of 50 inches in width or less, is steered with handlebars, generally has a dry weight of 800 pounds or less, travels on three or more low-pressure tires, and has a seat designed to be straddled by the operator.

Animal unit month. The amount of forage needed by an "animal unit" grazing for one month. The animal unit in turn is defined as one mature 1,000-pound cow and her suckling calf; one horse; five goats; or five sheep.

Appropriate management level. The optimum number of wild horses that provide a thriving natural ecological balance on the public range.

Area of critical environmental concern (ACEC). An area within BLM-administered lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes or to protect life and safety from natural hazards.

Brachiopods. Marine animals (phylum Brachiopoda) that have hard valves (shells) on the upper and lower surfaces.

Carboniferous Period. A geologic period that lasted from about 359.2 to 299 million years ago during the late Paleozoic Era; it is associated with coal deposits.

Cenozoic Era. The most recent of subdivisions of animal history and spans about 65 million years, from the extinction of nonavian dinosaurs to the present.

Class 1 inventory. A literature and site record search of previously conducted cultural resource surveys that also provides a historic overview, research issues, and management recommendations.

Comprehensive travel management. The proactive interdisciplinary planning, on-the-ground management, and administration of motorized and nonmotorized travel networks to ensure public access, natural resources, and regulatory needs are considered. It consists of inventorying, planning, designating, implementing, educating, enforcing, monitoring, acquiring easements, mapping and signing, and other measures necessary to provide access to public lands for a wide variety of uses, for example, recreational, traditional, casual, agricultural, commercial, educational, and other purposes.

Cretaceous Period. The last and longest segment of the Mesozoic Era. It lasted from the minor extinction event that closed the Jurassic Period about 145.5 million years ago to the Cretaceous-Paleogene extinction event, dated at 65.5 million years ago.

Crinoids. Aquatic invertebrates that are related to sea stars and are often flower shaped. They have a body plan based on a five-fold radial symmetry, meaning they generally have a body that can be divided into five (or a multiple of 5) roughly equal parts, which are laid out around a central axis.

Designated roads and trails. Specific roads and trails identified by the BLM (or other agencies) where some type of motorized vehicle use is appropriate and allowed either seasonally or year-long (H-1601-1, BLM Land Use Planning Handbook).

Distance zone. In the visual resource inventory process, landscapes are subdivided into three distance zones based on relative visibility from travel routes or observation points. The three zones are foreground-middleground, background, and seldom seen. The foreground-middle ground zone is areas seen from highways, rivers, or other viewing locations that are less than 3-5 miles away. Seen areas beyond the foreground-middleground zone but usually less than 15 miles away and in the background zone. Areas not seen as foreground-middleground or background are in the seldom seen zone; that is, they are hidden from view.

Existing routes. The roads, trails, or ways that are used by operators of motorized vehicle (for example jeeps, all-terrain vehicles, and motorized dirt bikes), mechanized uses (for example mountain bikes, wheelbarrows, and game carts), hikers, and horseback riders and are, to the best of the BLM's knowledge, in existence at the time of RMP/EIS publication.

Fee simple. Landownership status in which an individual or group holds title to and control of the property. The owners may make decisions about land use or may sell the land.

Herd management area. A geographic area identified in a management framework plan or resource management plan for the long-term management of a wild horse herd.

Historic properties. Cultural resources that meet specific eligibility criteria for listing on the National Register of Historic Places.

Indian trust assets. Legal interests in assets held in trust by the federal government for federally recognized Indian tribes or nations or for individual Indians.

Individual trust land. Land held in trust by the United States for an individual Indian.

Invertebrates. Animal species that neither possess nor develop a backbone.

Long-term holding facility. A private ranch that is under contract with the BLM to care for wild horses and that allows the horses to roam freely, protected under the 1971 Wild Free-Roaming Horses and Burros Act.

Mesozoic Era. An interval of geological time from about 252 to 66 million years ago; also called the age of reptiles.

Mollusks. A very large phylum of soft-bodied invertebrates with bilateral symmetry and usually one or two shells. Their organs are in a fluid-filled cavity. Most mollusks live in water, but some live on land.

Mosasaurs. A family of marine reptiles during the Late Cretaceous, from approximately 98 to 65 million years ago. They were large and vicious predators with a long streamlined body, flippers, and a skull with a long, double-hinged jaw.

Motorized vehicles or uses. Any vehicle that is self-propelled, including jeeps, all-terrain vehicles (such as four-wheelers and three-wheelers), trail motorcycles and dirt bikes, and airplanes.

National historic trail. A congressionally designated, extended, long-distance trail, not necessarily managed as continuous. National historic trails follow as closely as possible and practicable the original trails or routes of travel of national historic significance. Its purpose is to identify and protect the historic route, remnants, and artifacts for public use and enjoyment. A national historic trail is managed to protect the nationally significant resources, qualities, values, and associated settings of the areas it passes through, including the primary use or uses of the trail.

National Register of Historic Places. The official list of the nation's historic places worthy of preservation. The National Register of Historic Places is part of a national

program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archaeological resources.

Off-highway vehicle (OHV). Any motorized vehicle capable of, or designed for, travel on or over land, water, or other natural terrain. The term excludes any nonamphibious registered motorboat; any military, fire, emergency, or law enforcement vehicle while being used for emergencies; any vehicle whose use is expressly authorized by the authorized officer or otherwise officially approved; vehicles in official use; and any combat or combat support vehicle when used for national defense (H-1601-1, BLM Land Use Planning Handbook).

Off-highway vehicle (OHV) area designations. BLM-administered lands are designated as open, limited, or closed for OHV use, as follows:

- **Open—**Designated areas where all types of motorized vehicles (e.g., jeeps, all-terrain vehicles, and motorized dirt bikes) are permitted at all times, anywhere in the area, on roads or cross country, subject to the operating regulations and vehicle standards set forth in 43 CFR, Subparts 8341 and 8342.
- **Limited—**Designated areas where motorized vehicles are restricted to designated routes. Off-road, cross-country travel is prohibited in such an area, unless it is specifically identified as one where cross-country over-snow travel is allowed. Some existing routes may be closed in areas designated as limited.
- **Closed—**Designated areas where off-road motorized vehicle travel is prohibited yearlong. Emergency use of vehicles is allowed yearlong.

Open area. Designated areas and trails where off-road vehicles may be operated, subject to operating regulations and vehicle standards set forth in BLM Manuals 8341 and 8343; or an area where all types of vehicle use is permitted at all times, subject to the standards in BLM Manuals 8341 and 8343 (BLM National Management Strategy for OHV Use on Public Lands).

Paleozoic Era. A major interval of geologic time that began 542 million years ago with the Cambrian explosion, an extraordinary diversification of marine animals, and ended 251 million years ago with the end-Permian extinction, the greatest extinction event in history.

Pennsylvanian. Used in the US to coincide with the late Carboniferous Period; it is associated with coal-bearing geological stratigraphy.

Plesiosaurs. Flippered marine reptiles from the Mesozoic Era.

Programmatic agreement. A legally binding document for an agency to establish an alternate process for consulting, reviewing, and complying with federal laws concerning historic preservation.

Quaternary Period. The current and most recent of the three periods of the Cenozoic Era in the geologic time scale. It spans from 2 million years ago to the present.

Restricted lands. Lands owned by the individual Indian that are subject to restrictions.

Right-of-way (ROW). BLM-administered lands authorized to be used or occupied for specific purposes pursuant to a ROW grant, which are in the public interest and that require ROWs over, on, under, or through such lands.

Right-of-way (ROW) avoidance area. An area identified through resource management planning to be avoided but may be available for ROW location with special stipulations.

Right-of-way (ROW) exclusion area. An area identified through resource management planning that is not available for ROW location under any conditions.

Scenic byway. Highway route with a roadside or corridor of special aesthetic, cultural, or historic value. An essential part of the highway is its scenic corridor which may contain outstanding scenic vistas, unusual geologic features, or other natural elements.

Scenic quality. A measure of the visual appeal of a tract of land. In the visual resource inventory process, public lands are given an A, B, or C rating based on the apparent scenic quality This is determined by seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications.

Scenic river area. As used in Oklahoma's Scenic Rivers Act (Oklahoma Statute Title 82, Sections 1451-1471), this is defined as the stream or river and the public use and access areas in the area designated.

Section 106. A cultural resource compliance process under the National Historic Preservation Act that outlines the steps for identifying and evaluating historic properties, for assessing the effects of federal actions on historic properties, and for consulting to avoid, reduce, or minimize adverse effects.

Tertiary Period. The geologic period from 66 million to 2.58 million years ago.

Thermoelectric generators/generation (also called **Seebeck generators**) are devices that convert heat (temperature differences) directly into electrical energy, using a phenomenon called the Seebeck effect (a form of thermoelectric effect).

Traditional cultural properties. A cultural property that is eligible for inclusion on the National Register of Historic Places because of its association with a living community's cultural practices or beliefs that (a) are rooted in that community's history and that (b) are important in maintaining the community's continuing cultural identity.

Tribal trust. Land owned either by an individual tribal member, small group, or a tribe, the title to which is held in trust by the federal government. Most trust land is within reservation boundaries but can also be outside the reservation boundaries.

Trilobites. A fossil group of extinct marine arthropods among the early arthropods; a phylum of hard-shelled creatures with multiple body segments and jointed legs.

Utility type (or terrain) vehicle. Any recreational motor vehicle other than an ATV, motorbike, or snowmobile, designed for and capable of traveling over designated unpaved roads, traveling on four or more low-pressure tires, maximum width less than 74 inches, usually a maximum weight less than 2,000 pounds, or having a wheelbase of 94 inches or less. It does not include vehicles specially designed to carry a person with disabilities.

Vertebrates. Animal species that have a backbone.

Visual resource inventory (VRI). A process used by the BLM to identify visual values. The inventory consists of an evaluation of scenic quality and sensitivity and a delineation of distance zones. Based on these three factors, lands are placed into one of four visual resource inventory classes, which represent the relative value of the visual resources. Classes I and II are the most valued, class III is a moderate value, and class IV is the least valued. The inventory classes provide the basis for considering visual values in the planning process.

Visual resource inventory (VRI) classes. Assigned through the inventory process. Class I is assigned to those areas where a management decision has been made previously to maintain a natural landscape. This includes such areas as designated wilderness, designated wild and scenic rivers classified as wild, and other congressionally and administratively designated areas where decisions have been made to preserve a natural landscape. Classes II, III, and IV are assigned based on a combination of scenic quality, sensitivity level, and distance zones. Inventory classes are informational and provide the basis for considering visual values in the planning process. They do not establish management direction and should not be used as a basis for constraining or limiting surface-disturbing activities.

Visual resource management (VRM) system. The inventory and planning actions taken to identify visual resource values and to establish objectives for managing those values and the management actions taken to achieve the visual resource management objectives.

Visual resource management (VRM) class. Defines the degree of acceptable visual change in a characteristic landscape. A class is based on the physical and sociological characteristics of any given homogeneous area and serves as a management objective. Each class has an objective that prescribes the amount of change allowed in the characteristic landscape (from H-1601-1, BLM Land Use Planning Handbook).

The four classes are as follows:

- **Class I** provides for natural ecological changes only. It includes primitive areas, some natural areas, some wild and scenic rivers, and other similar areas where landscape modification should be restricted.

- **Class II** areas are those where changes in any of the basic elements (form, line, color, or texture) caused by a management activity should not be evident in the characteristic landscape.
- **Class III** is used for areas where changes in the basic elements (form, line, color, or texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
- **Class IV** applies to areas where changes may subordinate the original composition and character; however, they should reflect what could be a natural occurrence in the characteristic landscape.

Visual resources. The visible physical features on a landscape, (topography, water, vegetation, animals, structures, and other features) that comprise the scenery of the area.

Visual sensitivity. Visual sensitivity levels are a measure of public concern for scenic quality. Lands are assigned high, medium, or low sensitivity levels by analyzing various indicators of public concern, including type of users, amount of use, public interest, adjacent land uses, and special areas.

Wild horses. Unbranded and unclaimed horses that use public land as all or part of their habitat or that have been removed from such land by an authorized officer but have not lost their status under section 3 of the Wild Free-Roaming Horse and Burro Act.

Wilderness area. An area formally designated by Congress as part of the National Wilderness Preservation System.

Wilderness characteristics. Wilderness characteristics attributes include the area's size, its apparent naturalness, and outstanding opportunities for solitude or a primitive and unconfined type of recreation. They may also include supplemental values. Lands with wilderness characteristics are those lands that have been inventoried and determined by the BLM to contain wilderness characteristics as defined in Section 2(c) of the Wilderness Act.

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