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Environmental Assessment
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EOI #1838, St. Helena Parish, Louisiana
Lease EA

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ACRONYMS AND ABBREVIATIONS

APD	Application for Permit to Drill
AQI	Air Quality Index
BCC	Birds of Conservation Concern
BLM	Bureau of Land Management
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
COA	Condition of Approval
dBA	A weighted decibel
°F	degrees Fahrenheit
DOI	Department of the Interior
EA	Environmental Assessment
EGCP	East Gulf Coastal Plain
EIS	Environmental Impact Statement
EO	Executive Order
EOI	Expression of Interest
ESA	Endangered Species Act
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
FOOGLA	Federal Onshore Oil and Gas Leasing Reform Act
GHG	Greenhouse Gas
GWP	Global Warming Potential
Ha	Hectare
HFC	Hydrofluorocarbon
IPCC	Intergovernmental Panel on Climate Change
Kg	Kilogram
LADNROC	Louisiana Department of Natural Resources, Office of Conservation
LAED	Louisiana Environment Department
LDEQ	Louisiana Department of Environmental Quality
LOC	Level of Concern
MBTA	Migratory Bird Treaty Act
MLA	Mineral Leasing Act
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
PFC	Perfluorocarbon
PSD	Prevention of Significant Determination
RCRA	Resource Conservation Recovery Act
RFD	Reasonably Foreseeable Development
SF	Sulfur Hexafluoride
SHPO	State Historic Preservation Office
SPCC	Spill Prevention Control and Countermeasure
TCP	Traditional Cultural Property
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compound
WQCC	Water Quality Control Commission

EXECUTIVE SUMMARY

Proposed Action. The Proposed Action is to lease 32.21 acres of federal minerals located in St. Helena Parish, Louisiana. The lease parcel evaluated as part of the Proposed Action consists of federal mineral estate underlying privately owned surface estate (i.e., "split estate") and is assigned Expression of Interest (EOI) #1838. The proposed lease would provide the lessee exclusive rights to explore and develop oil and gas reserves on the lease, but does not in itself authorize surface disturbing activities at this stage. Although there would be no surface disturbance from the action of leasing, the Environmental Assessment (EA) analyzes a reasonably foreseeable development (RFD) scenario to address the anticipated environmental effects from potential future oil and gas development that are considered reasonably foreseeable, but unknown in specific detail at this time. Before a lease owner or operator conducts any surface disturbing activities related to the development of these leases to access the federal minerals, the Bureau of Land Management (BLM) must first approve an application for permit to drill (APD) as specified in Title 43 Code of Federal Regulations (CFR) 3162. In an APD, an applicant proposes to drill the well subject to the terms and conditions of the lease. Upon receipt of an APD, the BLM conducts an onsite inspection with the applicant and preferably, the private landowner or surface management agency. The BLM would also conduct additional site-specific analysis in compliance with the National Environmental Policy Act (NEPA) and the appropriate consultations prior to approving the APD.

The RFD scenario projects approximately 16 acres of surface disturbance from potential future oil and gas development associated with the proposed leasing action, all of which is projected to occur on adjacent private lands since the lease parcel is part of a larger production unit and is too small to develop independently. The federal minerals would most likely be accessed from adjacent private lands by lateral drilling at the time of development (see Appendix A).

Purpose and Need. The purpose of the Proposed Action is to support the development of oil and natural gas resources that are essential to meeting the nation's future needs for energy. It is the policy of the BLM as mandated by various laws, including the Mineral Leasing Act of 1920, as amended (30 United States Code [USC] 181 et seq.), the Federal Land Policy and Management Act of 1976 (FLPMA), and the Energy Policy Act of 2005 to make mineral resources available for development to meet national, regional, and local needs. The oil and gas leasing program managed by the BLM encourages the sustainable development of domestic oil and gas reserves which reduces the dependence of the United States on foreign sources of energy as part of its multiple-use and sustainable yield mandate.

The leasing of federal minerals is vital to the United States oil and gas industry as it seeks to maintain adequate domestic production of this strategic resource. The industry uses the BLM EOI process to nominate federal minerals for leasing. The Proposed Action is therefore needed to respond to EOI#1838, consistent with the BLM's mission and requirement to evaluate nominated parcels and hold quarterly competitive lease sales for available oil and gas lease parcels.

Environmental Impacts. The anticipated environmental impacts of the Proposed Action and No Action Alternative are summarized in Table ES-1.

Table ES-1: Summary of Anticipated Environmental Effects

Resource	No Action Alternative	Proposed Action
Land Use	Same as Proposed Action.	No direct impacts from leasing. Minor, short and long term changes to land use from reasonably foreseeable development activities due to conversion of undeveloped areas to areas that support oil and gas development.
Noise/Visual Resources	Same as Proposed Action.	No direct impacts from leasing. Minor, short and long term adverse noise and visual impacts possible from reasonably foreseeable development associated with the lease parcel. Noise levels would lessen during the production phase.
Socioeconomics and Environmental Justice	Same as Proposed Action.	No direct impacts from leasing.
Cultural Resources and Native American Interests	Same as Proposed Action.	No direct impacts from leasing. Future surveys or consultation under the NHPA may be required at the APD stage.
Mineral Resources	Same as Proposed Action.	No direct impacts from leasing. Use and depletion of the resource would occur from reasonably foreseeable development.
Wastes	Same as Proposed Action.	No direct impacts from leasing. Wastes would be generated from reasonably foreseeable development, with a potential for short and long term adverse impacts if wastes are not properly handled, stored, and disposed. SOPs, BMPs, and COAs at the APD stage would minimize risk from spills.
Air Quality	Same as Proposed Action.	No direct impacts from leasing. Short and long term impacts due to emissions from construction equipment and fugitive dust from reasonably foreseeable development.
Climate and Climate Change	Same as Proposed Action.	No direct impacts from leasing. The proposed lease may contribute to the installation and production of new wells, which may consequently lead to an increase in GHG emissions.
Soils	Same as Proposed Action.	No direct impacts from leasing. Potential for minor adverse impacts to soils from future reasonably foreseeable development associated with clearing, filling, and grading activities.
Water Resources – Surface and Groundwater	Same as Proposed Action.	No direct impacts from leasing. SOPs, BMPs, and COAs at the APD stage would minimize risk to groundwater and surface water from spills. No surface water features aside from a few scattered ponds are located near the proposed lease parcel.
Natural Resources (Wildlife	Same as Proposed Action.	No direct impacts from leasing since there would be no surface disturbing

Resource	No Action Alternative	Proposed Action
and Vegetation, Invasives/Exotics, Migratory Birds)		activities. Potential for minor adverse impacts to wildlife and vegetation associated with reasonably foreseeable development associated with clearing for wellpad and road construction due to habitat loss and modification. No adverse impacts to threatened or endangered species, or habitat suitable for these species, are anticipated. Other wildlife species, including migratory birds, would experience loss of habitat and potentially direct disturbance impacts from reasonably foreseeable future development. These impacts are not expected to cause population level impacts to any species, including migratory birds.
Cumulative Impacts	Same as Proposed Action.	Negligible to minimal cumulative impacts are anticipated.

1.0 CHAPTER 1 – PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

The Bureau of Land Management (BLM) has prepared this Environmental Assessment (EA) to evaluate the anticipated environmental impacts of leasing 32.21 acres of federal mineral estate to support potential future oil and gas development in St. Helena Parish, Louisiana. Interested parties such as private individuals or companies may file Expressions of Interest (EOIs) to nominate parcels for competitive bid and leasing by the BLM. BLM Eastern States is required to hold quarterly competitive lease sales to sell available oil and gas lease parcels.

The parcel evaluated as part of the Proposed Action consists of federal mineral estate underlying privately owned surface estate (i.e., "split estate") and is assigned EOI#1838. A federal oil and gas lease is a legal contract that grants exclusive rights to the lessee to develop federally-owned oil and gas resources but does not authorize surface-disturbing activities or obligate the lessee to drill a well on the parcel in the future. Should the parcel be leased and a detailed plan for oil and gas development on the parcel be identified, the BLM would conduct future site-specific environmental analysis prior to any ground disturbing activities. The Proposed Action evaluated in this EA is described in further detail in Chapter 2.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969; the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), the United States Department of the Interior (DOI) NEPA requirements (Department Manual 516, Environmental Quality) and the BLM NEPA Handbook H-1790-1. The information presented within this document serves as the basis for the BLM Authorized Officer to decide whether implementation of the Proposed Action would result in a significant impact to the environment, requiring the preparation of an Environmental Impact Statement (EIS), or that no significant impacts would occur, and therefore a Finding of No Significant Impact (FONSI) would be appropriate.

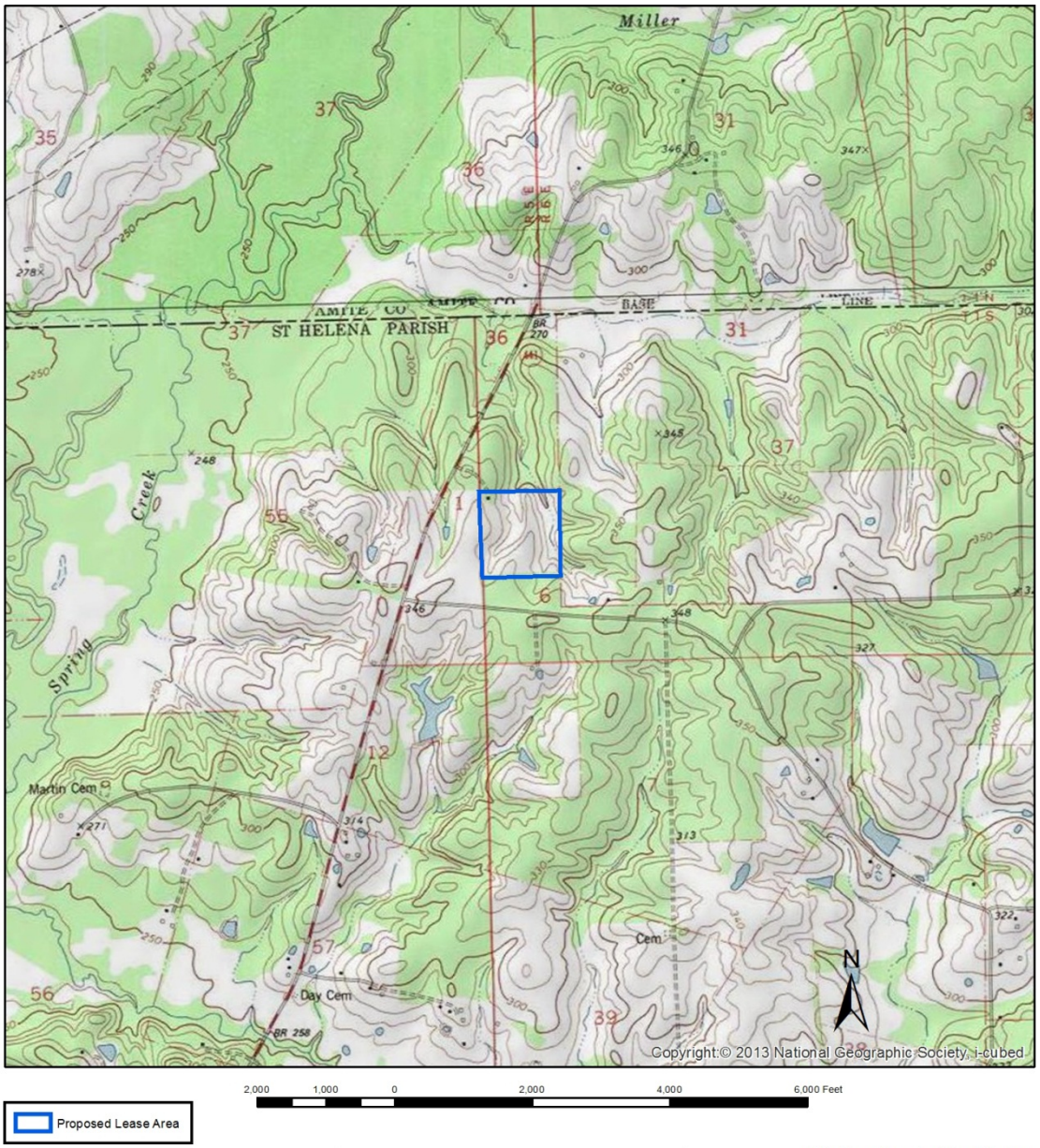
1.2 Location of the Proposed Action

EOI#1838 is located in St. Helena Parish, Louisiana (see Figure 1-1, Figure 1-2, and Figure 1-3). The legal description for the parcel is as follows:

St. Helena Meridian
St. Helena Parish (Gillsburg and Liverpool Quadrangles)
T. 1 S., R. 6 E., Sec. 6, Lot 3 (32.21 acres)

The 32.21-acre parcel is located within the boundary of a larger, approximately 960-acre unit containing privately owned surface estate and privately owned mineral estate. The area is largely rural with minimal development (see Figures 1-4 and 1-5).

Proposed Federal Oil and Gas Lease
EOI 1838



Proposed lease area
St. Halina Parish, Louisiana, St. Helena Meridian
T. 1S., R. 6E.,
Sec.6, Lot 3 - 32.21 acres

U.S. Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States Field Office
Jackson, Mississippi

This map contains portions of the following USGS 1:24,000 Topographic Quadrangles: Gillsburg, Liverpool

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual use or aggregate use with other data.

Map 1 of 1

Figure 1-1: Location Map for EOI #1838

Figures 1-2 and 1-3: Aerial Map of EOI #1838

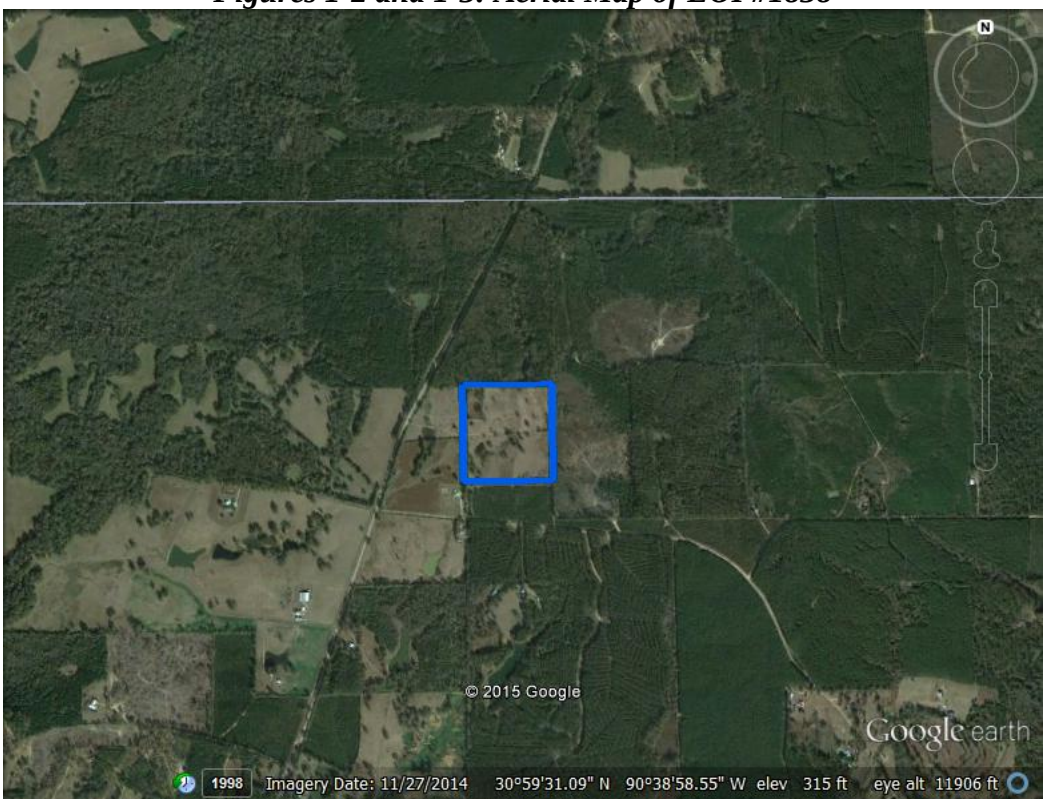


Figure 1-4: West Boundary of EOI #1838 Looking East.

Figure 1-5: South Boundary of EOI #1838 Looking North.

1.3 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to support the development of oil and natural gas resources that are essential to meeting the nation's future needs for energy. It is the policy of the BLM as mandated by various laws, including the Mineral Leasing Act of 1920, as amended [(30 United States Code [USC] 181 et seq.), the Federal Land Policy and Management Act of 1976 (FLPMA), and the Energy Policy Act of 2005 to make mineral resources available for development to meet national, regional, and local needs. The oil and gas leasing program managed by the BLM encourages the sustainable development of domestic oil and gas reserves which reduces the dependence of the United States on foreign sources of energy as part of its multiple-use and sustainable yield mandate.

The leasing of federal minerals is vital to the United States oil and gas industry as it seeks to maintain adequate domestic production of this strategic resource. The industry uses the BLM EOI process to nominate federal minerals for leasing. The Proposed Action is therefore needed to respond to EOI#1838, consistent with the BLM's mission and requirement to evaluate nominated parcels and hold quarterly competitive lease sales for available oil and gas lease parcels.

1.4 Management Objectives of the Action

The management objective of the Proposed Action is to make available for lease 32.21 split estate acres in St. Helena Parish, Louisiana to provide exclusive rights to the lessee to develop federally owned oil and gas resources in an environmentally sound manner.

1.5 Land Use Plan Conformance

The Proposed Action does not conflict with any known state or local planning or zoning law, regulation, policy or ordinance. The proposed lease area in Louisiana is not covered by a BLM Resource Management Plan; however, according to the regulations at 43 CFR 1610.8 (b) (1), this EA will be used as a basis for making a decision on the Proposed Action.

1.6 Relationship to Statutes, Regulations, and Other Plans

In addressing environmental considerations of the Proposed Action, the BLM is guided by relevant statutes (and their implementing regulations) and Executive Orders that establish standards and provide guidance on environmental and natural resources management and planning. These include but are not limited to the following:

- NEPA (1969) and the associated Council on Environmental Quality regulations at 43 CFR Parts 1500-1508
- FLPMA (1976) as amended and the associated regulations at 43 CFR Part 1600
- Mineral Leasing Act (MLA) (1920), as amended and supplemented (30 USC 181),
- National Historic Preservation Act (NHPA) (1966) as amended and the associated regulations at 36 CFR Part 800
- American Indian Religious Freedom Act

- Native American Graves Protection and Repatriation Act
- Endangered Species Act (ESA) (1973) as amended
- Clean Water Act (1977)
- Clean Air Act (1970) as amended
- Federal Onshore Oil and Gas Leasing Reform Act (FOOGLA)
- Migratory Bird Treaty Act (MBTA) (1918)
- Resource Conservation and Recovery Act (RCRA) (1976) as amended
- Executive Order (EO) 11988- Floodplain Management
- EO 119900 – Protection of Wetlands
- EO 12898 – Environmental Justice in Minority Populations and Low-Income Populations
- EO 13007 – Indian Sacred Sites
- Oil and Gas Leasing Reform – Land Use Planning and Lease Parcel Reviews (BLM WO IM 2010-117)

1.7 Decision to be Made

The BLM must decide whether to lease the nominated parcels and if so, under what terms and conditions (see Appendix B, Lease Stipulations and Notices). The BLM's policy is to promote oil and gas development if it meets the guidelines and regulations set forth by NEPA and other subsequent laws and policies of the United States.

1.8 Scoping and Public Involvement

1.8.1 Internal Scoping

A BLM interdisciplinary team consisting of Land Law Examiners, Natural Resource Specialists, NEPA Specialists, Geologists, Fluid Minerals Specialists, GIS Specialists, and Cultural Resources Specialists reviewed the EOI and prepared the EA. The interdisciplinary team used various sources of information to prepare the EA, including existing data inventories, online resources, and information collected onsite. The BLM conducted a site visit on September 30, 2015 to document the physical characteristics of the site and collect information on baseline conditions. No major issues of concern were identified during internal scoping.

1.8.2 External Scoping

The BLM conducted and completed the required consultation with the Louisiana State Historic Preservation Office (SHPO) and tribes. Since there are no threatened or endangered species located in St. Helena Parish, BLM is not required to consult with the United States Fish and Wildlife Service (USFWS) under the ESA. Consultation with the SHPO occurred on March 3, 2015 and a concurrence letter was received on April 13, 2015. Letters were sent to various tribes on March 6, 2015 notifying them of the Proposed Action and requesting comments or concerns. Comments were received from two tribes and they did not indicate any concerns about known historical sites on the project sites. The tribes did, however, request that a survey be performed once development plans are known and requested a copy of the survey. The following tribes were contacted to notify them of the Proposed Action and to request comments or concerns:

- Tunica-Biloxi Tribe of Louisiana
- Coushatta Tribe
- Jena Band of Choctaw
- Mississippi Band of Choctaw
- Choctaw Nation of Oklahoma
- Alabama Coushatta Tribe of Texas
- Thlopthlocco Tribal Town
- Kialagee Tribal Town

All agency and tribal correspondence is included in Appendix C of this EA.

1.8.3 Public Involvement

The BLM invites public participation in the NEPA process. Consideration of the views and information of all interested persons promotes open communication and enables more informed decision making. All agencies, organizations, and members of the public having a potential interest in the Proposed Action, including minority, low-income, disadvantaged, and Native American groups, are encouraged to participate in the decision making process.

The BLM published a newspaper notice soliciting input on the EA (Appendix D) and the EA was also made available for a 30-day review period. The lease sale notice is posted on the BLM Eastern States webpage at least 90 days prior to the sale.

2.0 CHAPTER 2 – DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The CEQ's *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* establish a number of policies for federal agencies, including "using the NEPA process to identify and assess reasonable alternatives to the Proposed Action that would avoid or minimize adverse effects of these actions on the quality of the human environment" (40 CFR 1500.2 (e)). This chapter provides a detailed description of the Proposed Action and alternatives carried forward for analysis in the EA.

2.1 Proposed Action

The Proposed Action is to lease 32.21 acres of federal minerals located in St. Helena Parish, Louisiana. The proposed lease would provide the lessee exclusive rights to explore and develop oil and gas reserves on the lease, but does not in itself authorize surface disturbing activities. Before a lease owner or operator conducts any surface disturbing activities related to the development of these leases to access the federal minerals, the BLM must first approve an application for permit to drill (APD) as specified in Title 43 CFR 3162. In an APD, an applicant proposes to drill the well subject to the terms and conditions of the lease. Upon receipt of an APD, the BLM conducts an onsite inspection with the applicant and preferably, the private landowner or surface management agency. The BLM would also conduct additional site-specific NEPA analysis and the appropriate consultations under the ESA and NHPA prior to approving the APD. Although there would be no surface disturbance from the action of leasing, the EA analyzes a reasonably foreseeable development (RFD) scenario to address the potential environmental effects from potential future oil and gas development that are considered reasonably foreseeable, but unknown in specific detail at this point in time. For example, estimates can be made on the most likely number of wells that could be constructed, but the locations may change at the APD stage.

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

2.1.1 RFD Scenario for Potential Oil and Gas Development for EOI #1838

The 32.21-acre parcel consists of privately owned surface estate and federal mineral estate. It is located within the boundary of a larger production unit consisting of privately owned surface estate and privately owned mineral estate (referred to as "fee-fee" lands). In Louisiana, production units are typically approximately 1,920 acres but because of the proximity of the parcel to the Mississippi/Louisiana state border the larger unit is only approximately 960 acres. The 32.21 acre unit cannot be developed independently because the small size does not meet the Louisiana requirements for size of production units.

The total surface disturbance predicted under the RFD scenario is approximately 16 acres, which includes projected surface disturbance associated with well pads (approximately 14 acres) and construction of an access road (approximately 2 acres) (see Appendix A). Because the parcel is

located within the boundary of a larger production unit, the federal minerals would most likely be accessed from outside of the lease parcel boundary on the adjacent private lands. The RFD scenario projects two well pads with up to 14 total lateral lines, only one of which would likely be used by the operator to access the federal minerals associated with the lease parcel. There is a high probability that no lateral would access federal minerals and that any revenues associated with the lease would be obtained through a communitization agreement between the BLM and lessee. While the RFD scenario does not project any disturbance on federal lands as a result of future oil and gas development, this EA analysis covers the potential impacts of future oil and gas development on both the parcel itself and on adjacent lands to allow for maximum NEPA flexibility and coverage in case conditions should change in the future.

Reasonably foreseeable activities that could occur as a result of future oil and gas development associated with leasing the parcel include surface disturbance associated with preparation for drilling including construction of a road, drilling pad, and reserve pit. Constructed access roads normally have a running surface width of approximately 30 feet; the length is dependent upon the well site location in relation to existing roads or highways. The average length of road construction is approximately 0.5 miles. Therefore, approximately two acres would likely be affected by road construction. Typically seven acres are cleared and graded level for the construction of the drilling pad. Each drilling pad could have up to seven lateral lines. If the well produces natural gas, and the flowline is in the road, another 0.5 acres may be affected by flowline construction. These disturbances are typical for private or federal ownership well pad locations. The excavation reserve pit is typically about five feet deep and is lined with bentonite clay to retain drilling fluids, circulated mud, and cuttings. Plastic or butyl liners (or its equivalent), that meet state standards for thickness and quality, are used on occasions when soils are determined incapable of holding pit fluids.

Drilling typically continues around the clock. Once drilling is completed, excess fluids are pumped out of the pit and disposed of in a state authorized disposal site and the cuttings are buried. The RFD scenario assumes that wells would be drilled by rotary drilling using mud as the circulating medium. Mud pumps would be used to force mud down the drillpipe, thereby forcing the rock cuttings out the wellbore. Water would normally be obtained from a well drilled on the site, however, water could be pumped to the site from a local pond, stream or lake through a pipe laid on the surface. Approximately 1,500 barrels of drilling mud would be typically kept on the location. If a tract is adjacent to a producing field and water production is expected during the life of the field, separation, dehydration and other production processing may be necessary. Construction of facilities off the federal lease may be needed to handle this processing. Some processing or temporary storage may be necessary on site.

During well pad construction, the topsoil would likely be stockpiled for use during restoration activities. If the well is successful, the drill pad would be reduced to about 100 feet x 100 feet with the remaining surface area, including the reserve pit, re-graded and restored as per the surface owner requirements. A lease notice for the proposed lease encourages the use of non-invasive cover plants during all restoration and stabilization activities. Final seed mixtures and plantings are determined with recommendations from BLM with approval of the land owner. The remaining 100 feet x 100 feet pad would be maintained for the life of the well. The life of a

productive well may be 25 years. Following abandonment, the pad is subject to the same restoration parameters.

Appendix B contains the lease stipulations and lease notices for the parcel. These recommended lease stipulations and notices have been developed to provide general habitat protection and setbacks. Additional surveys or consultations may be required after site-specific proposals have been received by BLM during the development phase.

2.1 No Action Alternative

Under the No Action Alternative, the BLM would not offer for competitive bid or lease the proposed 32.21 acres of federal mineral estate for potential future oil and gas development. Ongoing oil and gas development would, however, likely continue on surrounding areas and it is likely that the same or nearly the same amount of development as described under the Proposed Action would occur on the adjacent private lands whether or not the federal minerals are accessed. This is because the parcel is part of a larger production unit. The difference between the Proposed Action and No Action Alternative is that without the lease (No Action Alternative), the operator would not be authorized to access the federal minerals at the time of development but could continue to develop the privately owned minerals adjacent to the 32.21-acre parcel. Not leasing the parcel would not meet the purpose of and need for the Proposed Action. CEQ guidelines (40 CFR 1502the 15) stipulate that the No Action Alternative should be analyzed to assess any environmental consequences that may occur if the Proposed Action is not implemented and to serve as a baseline for comparing impacts of the Proposed Action. Therefore, the No Action Alternative has been retained for analysis in this EA.

2.2 Alternatives Considered but Dismissed

Since EOI#1838 contains only 32.21 acres and consists of one parcel, BLM did not consider any other alternatives aside from the Proposed Action and the No Action Alternative.

3.0 CHAPTER 3 – DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter describes the environment that would potentially be affected by implementation of the Proposed Action, as required by CEQ regulations for implementing NEPA (40 CFR Parts 1500-1508). The discussion in this chapter focuses on the relevant resources and issues and only those elements of the affected environment that have the potential to be affected are described in detail.

Based on a review of the context and scale of the Proposed Action, the following resources are discussed in detail in this EA: Land Use, Visual/Noise Resources, Socioeconomics and Environmental Justice, Cultural Resources and Native American Concerns, Minerals and Mineral Development, Wastes, Soils, Air Resources, Surface Water and Groundwater, and Natural Resources including Invasive/Exotic Species, Vegetation and Wildlife, and Migratory Birds of Concern.

The following resources have been eliminated from further discussion from the EA, because either the resource is not present or there are no anticipated effects to the resource. A brief summary explaining why the resource was eliminated is also provided below.

- Special Status Species. There are no federally listed, proposed, or candidate species documented by the USFWS to occur in St. Helena Parish. As a result, BLM has determined there would be no effect on federally listed species. BLM is therefore not required to informally consult with USFWS for the proposed project and this resource has been eliminated from further consideration. As shown in Appendix B, the lease would include a general stipulation for special status species protection in case habitat conditions change in the future.
- Wetlands/Riparian Areas/Floodplains. EO 11990 on the Protection of Wetlands provides an opportunity for early review of federal agency plans regarding new construction in wetland areas. Under EO 11990, each agency shall provide leadership and shall take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating and licensing activities. Based on results of the site visit to the parcel and a desktop review of the surrounding area, there are no wetlands, riparian areas or floodplains located on EOI#1838 or the immediate vicinity and these resources have therefore been eliminated from further consideration.
- Lands with Wilderness Characteristics, Areas of Critical Environmental Concern, Wilderness Study Areas, Wild and Scenic Rivers. None of these resources are present on or near the proposed lease parcel.

3.1 Land Use

EOI #1838 is located in St. Helena Parish, Louisiana in the East Gulf Coastal Plain (EGCP). The EGCP contains many natural community types including: eastern upland longleaf pine forest, eastern hillside seepage bogs, and slash pine-pondcypress-hardwood forest. Cypress swamps,

small stream forest, and bayhead swamps also occur throughout the ecoregion. The EGCP is the fastest growing area in the state and these natural communities will continue to receive pressures from urban expansion.

The nearest town to the parcel with a population over 500 people is Greensburg which is located 5 miles southwest. The parcel is located less than 0.25 mile east of Louisiana State Highway 441 and less than one mile south of the Mississippi state line. The parcel is 90% cleared and contains a dirt road running east/west through the center of the tract. Some trees are scattered throughout the tract and are the following species: water oak (*Quercus nigra*), laurel oak (*Q. laurifolia*), southern red oak (*Q. falcata*), loblolly pine (*Pinus taeda*), and sweetgum (*Liquidambar styraciflua*). The surrounding area contains some cleared areas for agriculture and timber (particularly to the southwest and southeast) as well as some forested areas (particularly to the northwest and northeast).

3.2 Visual/Noise Resources

3.2.1 Visual Environment

The visual environment of the parcel and adjacent areas is rural and minimally developed with generally flat topography. The proposed lease parcel itself is primarily cleared, with pockets of trees. The surrounding area also contains cleared and forested areas, with minimal development except for agricultural and timber harvest activities. There are a few scattered buildings/residences around the vicinity of the parcel.

3.2.2 Noise Environment

The extent to which individuals are affected by noise is controlled by several factors, including the duration and frequency of sound; the distance between the source and the receptor; the intervening natural or man-made barriers or structures; and the ambient environment. Typically, levels of noise are measured in units called decibels. The “A-weighted” decibel (dBA) is a unit of measure used to express the relative loudness of sounds in the air as perceived by the human ear. The dBA scale de-emphasizes the very low and the very high frequencies and emphasizes the middle frequencies, thereby closely approximating the frequency response of the human ear.

Human ability to perceive chance in noise levels varies widely from person to person, as do responses to perceived changes. Generally, a 3 dBA change in noise level would be barely perceptible to most listeners, whereas a 10 dBA change is normally perceived as doubling (or halving) of noise levels and is considered a substantial change. These thresholds permit direct estimation of an individual’s probable perception of changes in noise levels.

The St. Helena Parish Code of Ordinance states (Sec. 15-53. - Noise and sound prohibitions):

> *Maximum permissible sound levels by emanating land use.* Except as may be otherwise herein regulated, provided or specifically exempted elsewhere in this section, no person or legal entity shall create or cause to be created on his/her/their/its property or

leased property any source of sound or noise so as to create a sound level at the property line of this said property which exceeds 90 dBA.

3.3 Socioeconomics and Environmental Justice

3.3.1 Socioeconomics

St. Helena Parish is approximately 408 square miles, with a population density of 27.4 persons per square mile (U.S. Census Bureau: State and County Quick Facts, 2010). The 2014 estimated population is 10,619, a 5.2% decrease from the 2010 census despite the general pattern of population growth in Louisiana, which increased by 2.6% from 2010 to 2014 (U.S. Census Bureau: State and County Quick Facts, 2010). The county seat and the nearest town to the proposed lease sale parcel is Greensburg, which is located five miles southwest.

Employment in St. Helena Parish is increasing with 7.1% growth in annual average employment between 2014 and 2013 (Louisiana Workforce Commission, Regional Labor Market Area 2, data accessed December 2015). Although St. Helena Parish is one of the most rural parishes, the U.S. Census Bureau estimated that 4.2% of total employment in St. Helena Parish is in the agriculture, forestry, fishing, hunting, and mining industries between 2009 and 2013 (U.S. Census Bureau: 2009-2013 American Community Survey 5-Year Estimates). This employment estimate is similar to the Louisiana statewide figure of 4.6% in the same sectors (U.S. Census Bureau: 2009-2013 American Community Survey 5-Year Estimates). The total civilian preliminary labor force (not seasonally adjusted) for St. Helena Parish, Louisiana in September, 2015 was 4,727, of which 4,333 were employed and 394 were unemployed. The unemployment rate in St. Helena Parish was 8.3% and higher than the statewide unemployment rate of 6.4% in October, 2015, not seasonally adjusted (Louisiana Workforce Commission data accessed December 2015).

Assessing the economic dependence upon oil and gas development in St. Helena Parish is difficult to estimate because of the relatively recent activity in the Tuscaloosa Marine Shale play. Louisiana employment in the oil and gas industry was estimated in 2012 to be 9,818 jobs with long term industry projections to increase by 9.0% over the next ten years (Louisiana Workforce Commission, Industry Projections Program, data accessed December 2015). However, in 2014 the average annual employment in the oil and gas sectors decreased by 8.8% compared to 2013 estimates, and a 29.2% decrease compared to 2012 (Louisiana Workforce Commission, Average Annual Employment and NAICS Units, data accessed December 2015). Annual average employment and wages in the mining industry for St. Helena Parish was not available in 2014. Regional Labor Market Area 2, which includes St. Helena Parish, estimated there were 190 jobs in the oil and gas sector with a projected annual 0.8% decrease in employment through 2022 (Louisiana Workforce Commission, Industry Projections Program, data accessed December 2015). Over the same long-term projection period, it was estimated that industries supporting the mining sector, including oil and gas, would experience the second highest amount of growth in Regional Labor Market Area 2 (Louisiana Workforce Commission, Industry Projections Program). The annual percent change in employment would increase by 3.8% per year and add approximately 356 new jobs (Louisiana Workforce Commission, Industry Projections Program).
In 2014, the Mid-Continent Oil and Gas Association published an updated study "The Energy Sector – Still a giant economic engine for the Louisiana economy", which reviewed the impact

of the oil and gas industries on the state's economy. Statewide, Louisiana is the number two producer of crude oil and gas in the United States and ranks second in petroleum refining capacity (Scott 2014). These three industries generated over $20.5 billion in household earnings for Louisianans in 2011 (Scott 2014). The $20.5 billion in earnings represented 11.6 percent of total earnings in Louisiana in that year (Scott 2014). The average annual wages in the oil and gas industry, based on first quarter 2015 figures, was over $181,000 per year (Labor Market Statistics, Quarterly Census of Employment and Wages Program).

Federal oil and gas leases generate a one-time lease bonus bid as well as annual rents. The minimum competitive lease bid is $2.00 per acre. If parcels do not receive the minimum bid, they may be leased later as noncompetitive leases that don't generate bonus bids. Lease rental is $1.50 per acre per year for the first five years and $2.00 per acre per year thereafter. Typically, oil and gas leases expire after 10 years unless held by production. During the lease period annual lease rents continue until one or more wells are drilled that result in production and associated royalties. The average bonus bid per acre estimate for oil and gas leases within BLM Eastern States received in the region without stipulations was estimated to be $278 per acre between the years 2005 and 2009, and approximately $153.39 per acre with no surface occupancy stipulations (BLM internal documentation).

For the state of Louisiana in October 2015, average wellhead prices were $52.92 per barrel (bbl.) for Light Louisiana Sweet crude oil (Louisiana Department of Natural Resources, Average Crude Oil Prices). The trend of decreasing average spot crude oil price was $55.30 per barrel in 2015, $96.83 per barrel in 2014, and $107.35 per barrel in 2013 (Department of Natural Resources, Louisiana Energy Facts Annual 2014). Federal revenues collected from onshore oil and gas production in 2015 was $3,485,707 in Louisiana (Office of Natural Resource Revenues, FY-2015 Statistical Information). From this amount, revenues are disbursed to each local county of production. These revenues help fund traditional county functions such as enforcing laws, administering justice, collecting and disbursing tax funds, providing for orderly elections, maintaining roads and highways, providing fire protection, and/or keeping records. Other county functions that may be funded include administering primary and secondary education and operating clinics/hospitals, county libraries, county airports, local landfills, and county health systems. Additionally, a severance tax is levied by the state of Louisiana on each barrel of crude oil or each thousand cubic feet of natural gas produced. In 2014, Louisiana received over $574 million in severance taxes from all oil and gas produced in the state (Department of Natural Resources, Louisiana Energy Facts Annual 2014).

3.3.2 Environmental Justice

EO 12898 (1994) formally requires Federal agencies to incorporate environmental justice as part of their missions. Specifically, it directs agencies to address, as appropriate, any disproportionately high and adverse human health or environmental effects of their actions, programs, or policies on minority or low-income populations.

Minority populations as defined by the Council on Environmental Quality (CEQ) under the 1997 Environmental Justice guidance under NEPA include individuals in the following population groups: African American, American Indian or Alaskan Native, Asian or Pacific Islander, and

Hispanic. A minority population is identified where "(a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater…" (CEQ 1997). Additionally, "[a] minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 1997). Low-income populations are determined by the U.S. Census Bureau based on poverty thresholds developed every year.

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

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

The proposed lease parcel is located in St. Helena Parish, in a predominately rural area along the Mississippi border. Based on 2014 U.S. Census data, St. Helena Parish has an estimated 56.2% composition of minority populations, including more than one race. The percentage of minority populations in St. Helena parish is 14.7% higher than the Louisiana state-wide average of 41.5% (U.S. Census Bureau, 2010 Census – Demographic Profile Data).

Data for the identification of low-income populations is from the U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program. In 2013, 25.8% of St. Helena Parish's population of all ages had an income level below the annual poverty line. The percentage of all people whose income is below the poverty line for St. Helena Parish is 5.8% greater than the Louisiana state-wide average of 20%.

3.4 Cultural Resources and Native American Concerns

3.4.1 Cultural Resources

A cultural resource is a broad term that refers to areas of traditional significance, use and the remains of past and current human activity. These resources may be the physical remains of a prehistoric or historic archeological site or a place of traditional cultural significance or use. A Traditional Cultural Property (TCP) refers to the connection between places on the landscape and a group's traditional beliefs, religion, or cultural practice. Because cultural resources are nonrenewable and easily damaged, laws and regulations exist to help protect them.

The NHPA, as amended, and its implementing regulations require that federal agencies consider the effects of their undertakings on "historic properties." The term "historic properties" refers to cultural properties, both prehistoric and historic, that are eligible for listing in the National Register of Historic Places (NRHP). Traditional sacred places and traditional use areas of tribes are also considered cultural historic properties that may be eligible for the NRHP, because of their association with cultural practices and beliefs rooted in history and their importance in maintaining the cultural identity of ongoing American Indian communities. Consultations about these uses and places are governed and/or mandated by the NHPA, as amended in 1992 (USC 470 et seq.), the American Indian Religious Freedom Act of 1978 (42 USC 1996), the Native

American Graves Protection and Repatriation Act of 1990 (25 USC 3001 et seq.) and EOs 13007, 13175, 13084, and 13647. Federal agencies consider the effects of their management activities on historic properties by first determining the area of potential effect, then conducting literature searches and field surveys to locate cultural properties. Additionally, they consult with American Indian Tribes and other interested parties to determine whether TCPs are within the area of potential effect.

EOI #1838 is located on private land and has not been surveyed for cultural resources. Based on a review of the literature there are no recorded sites within one mile of the lease area, but there may be undiscovered sites that may qualify as historic properties (36 CFR 61) (Louisiana Division of Archeology 2013).

3.4.2 Native American Concerns

Federally recognized Native American tribes have been contacted about this proposed undertaking (see Section 1.8.2). Currently there are no known sites for religious purposes, Sacred Sites or TCPs identified by Native Americans on the proposed lease parcel.

3.5 Minerals and Mineral Development

The objective horizon is Tuscaloosa Marine Shale and the commodity is both oil and natural gas for EOI #1838.

The proposed lease parcel does not contain any existing features related to energy development, production, supply or distribution including plugged or unplugged oil and gas wells. Two pre-production wells are located approximately three miles away, and seven wells in production are located approximately eight miles away. To access the federal minerals, wells would most likely be drilled vertically to a certain depth referred to as the kick-off point. From there the wells would be steered from the vertical to the horizontal using a short, medium, or long radius curve. A horizontal lateral would then be drilled in the objective horizon for a distance of between 4,000 and 9,000 feet. These wells may require high volume hydraulic stimulation/fracturing in order to establish commercial production. Hydraulic stimulation occurs after a well has been drilled to a particular depth vertically and possibly drilled a certain distance horizontally through the targeted geologic zone (Figure 3-1). Steel pipe (casing) would be inserted in the well bore and perforated within the target zone(s) that contain oil or gas, enabling production out of the targeted zone(s) when the fracturing fluid is injected at high pressure into the well flowing through the perforations. Eventually, the targeted formation cannot absorb the fluid as quickly as it is being injected and at this point, the pressure created causes the formation to crack or fracture. Once the fractures have been created, injection ceases and some quantity of the fracturing fluids begins to flow back to the surface. Materials called proppants (e.g., usually sand or ceramic beads), which were injected as part of the fracturing fluid mixture, remain in the target formation to hold open the fractures.

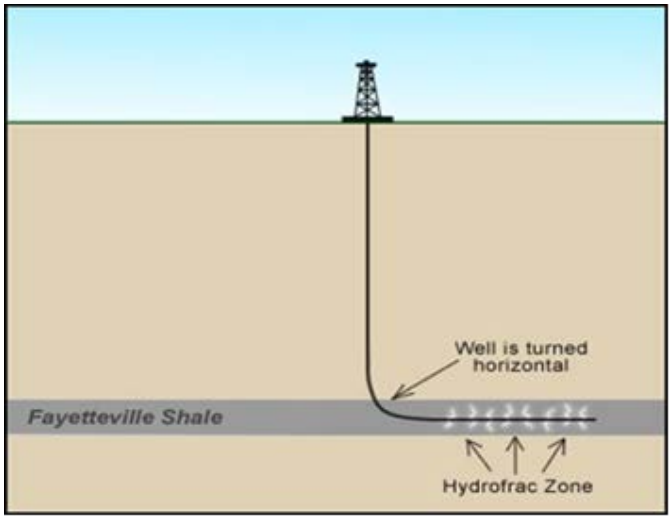


Figure 3-1. Diagram of Hydraulically Fracturing a Well.

Some studies have shown that anywhere from 20-85% of fracturing fluids may remain underground. Used fracturing fluids that return to the surface are often referred to as flowback, and these wastes are typically stored in open pits or tanks at the well site prior to proper disposal or can be reused in developing other wells.

3.6 Wastes

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

During the site visit, no hazardous or solid waste disposal sites were found on the proposed lease parcel. Should the parcel be leased and the federal minerals developed, generation and temporary storage of waste materials (solid and liquid) would likely occur on or near the lease parcel.

3.7 Soils

There are two primary soil types found on EOI #1838 and on the adjacent lands; Ruston-Smithdale association, 3-12% slopes (comprises 65% of the parcel) and Tangi silt loam, 1-3% slopes (comprises 35% of the parcel). Ruston-Smithdale association, 3-12% is found on hillslopes and fluviomarine terraces and has a parent material of loamy fluviomarine deposits derived from sedimentary rock. It is well drained and contains a high available water storage in

profile (9.8/9.9 inches). This type of soil is not considered prime farmland. Tangi silt loam, 1-3% slopes is found on ridges and has a parent material of loess over pleistocene fluviomarine depositis. It is moderately well drained and contains a low available water storage in profile (about 5.5 inches). This type of soil is considered prime farmland.

3.8 Air Resources

3.8.1 Air Quality

In the general area of the parcel, the primary sources of air pollution are dust from blowing wind on disturbed or exposed soil, exhaust emissions from motorized equipment, oil and gas development, agriculture, and industrial sources. The USEPA was given the authority for air quality protection with the provision to delegate this authority to the state as appropriate under U.S. law. The Louisiana Department of Environmental Quality (LDEQ) has been delegated most of the authority for air quality protection in Louisiana. The Clean Air Act of 1970, as amended, requires the establishment of National Ambient Air Quality Standards (NAAQS). NAAQS pollutants include carbon monoxide (CO), nitrogen dioxide ($N0_2$), ozone (03), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide ($S0_2$), and lead (Pb). The NAAQS pollutants are monitored in Louisiana by the LDEQ. The Clean Air Act identifies two types of NAAQS. Primary standards define levels of air quality that the USEPA judges to be necessary, with an adequate margin of safety, to protect the public health. Secondary standards define levels of air quality that the USEPA judges to be necessary to protect the public from any known or anticipated adverse effects of a pollutant. Both primary and secondary standards are currently in effect (Table 3-1).

Table 3-1. National Ambient Air Quality Standards.

	Primary Standards		Secondary Standards	
Pollutant	**Level**	**Averaging Time**	**Level**	**Averaging Time**
Carbon Monoxide	9 ppm (10 mg/m^3)	8-hour (1)	None	
	35 ppm (40 mg/m^3)	1-hour (1)		
Lead	0.15 µg/m^3 (2)	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m^3	Quarterly Average	Same as Primary	
Nitrogen Dioxide	53 ppb (3)	Annual (Arithmetic Average)	Same as Primary	
	100 ppb	1-hour (4)	None	
Particulate Matter (PM_{10})	150 µg/m^3	24-hour (5)	Same as Primary	
Particulate Matter ($PM_{2.5}$)	15.0 µg/m^3	Annual (6) (Arithmetic Average)	Same as Primary	
	35 µg/m^3	24-hour (7)	Same as Primary	
Ozone	0.075 ppm (2008 std)	8-hour (8)	Same as Primary	
	0.08 ppm (1997 std)	8-hour (9)	Same as Primary	
	0.12 ppm	1-hour (10)	Same as Primary	
Sulfur	0.03 ppm	Annual		

	Primary Standards		Secondary Standards	
Pollutant	**Level**	**Averaging Time**	**Level**	**Averaging Time**
Dioxide		(Arithmetic Average)		
	0.14 ppm	24-hour (1)		

Note:

(1) Not to be exceeded more than once per year.

(2) Final rule signed October 15, 2008.

(3) The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

(4) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).

(5) Not to be exceeded more than once per year on average over 3 years.

(6) To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.

(7) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3 (effective December 17, 2006).

(8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008).

(9) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as USEPA undertakes
rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
(c) USEPA is in the process of reconsidering these standards (set in March 2008).

(10) USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.

Air quality in a given region can be measured by its Air Quality Index (AQI) value. The AQI is reported according to a 500-point scale for each of the major criteria air pollutants, with the worst denominator determining the ranking. The AQI is a national index and the air quality rating is an important indicator for populations sensitive to air quality changes. Louisiana has air monitoring stations in seven cities, with the closest one to the parcel located in Baton Rouge. On November 18, 2015, the AQI in Baton Rouge was good (42) overall and good for particulate matter ($PM_{2.5}$) (42) and ozone (35) (AirNow 2015).

3.8.1.1 Visibility

Visibility, also referred to as visual range, is a subjective measure of the distance that light or an object can clearly be seen by an observer. Light extinction is used as a measure of visibility and is calculated from the monitored components of fine particle mass (aerosols) and relative humidity. It is estimated that the average natural background visibility range for the eastern United States varies from 65 to 121 miles. Visibility range information is not available for southeast Louisiana.

There are three classifications of areas that attain NAAQS: Class I, Class II, and Class III. Congress established certain national parks and wilderness areas as mandatory Class I areas where only a small amount of air quality degradation is allowed. Since 1980, the Interagency Monitoring of Protected Visual Environments network has measured visibility in Class I areas. These are managed as high visual quality under the federal visual resource management

program. The Clean Air Act 1997 amendment declared "as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I federal areas…from manmade air pollution" 42 USC Section 7491(a)(1).25. All other areas of the United States are designated as Class II, which allow a moderate amount of air quality degradation. No areas of the United States have been designated Class III, which would allow more air quality degradation. The Clean Air Act gives federal managers the affirmative responsibility, but no regulatory authority, to protect air quality-related values, including visibility, from degradation.

Breton Wilderness Area is the only Class I area in Louisiana. This 5,000 acre National Wildlife Refuge is an island located in the Gulf of Mexico near Venice, Louisiana. The National Wildlife Refuge is located approximately 140 miles southeast of the proposed project site.

Prevention of Significant Deterioration (PSD) increments limit air quality degradation and ensure that areas with clean air continue to meet NAAQS, even during economic development. The PSD program goal is to maintain pristine air quality required to protect public health and welfare from air pollution effects and "to preserve, protect and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreation, scenic or historic value."

PSD increments have been established for NO_2, SO_2, and PM_{10}. Comparisons of potential PM_{10}, NO_2, and SO_2 concentrations with PSD increments are intended only to evaluate a threshold of concern. The allowable PSD increment depends on an area's classification. Class I areas have lower increments, due to their protected status as pristine areas. PSD increment data is currently unavailable for Louisiana.

3.8.1.2 Atmospheric Deposition

Atmospheric deposition refers to processes in which air pollutants are removed from the atmosphere and deposited into terrestrial and aquatic ecosystems. Air pollutants can be deposited by precipitation (rain and snow) or the gravitational settling of gaseous pollutants on soil, water, and vegetation. Much of the concern about deposition is due to secondary formation of acids and other compounds from emitted nitrogen and sulfur species, such as oxides of nitrogen (NOx) and SO_2, which can contribute to acidification of lakes, streams, and soils and affect other ecosystem characteristics, including nutrient cycling and biological diversity.

The accurate measurement of atmospheric deposition is complicated by contributions to deposition by several components including but not limited to rain, snow, cloud water, particle settling, and gaseous pollutants. Deposition varies with precipitation and other meteorological variables (e.g., temperature, humidity, winds, and atmospheric stability), which in turn, vary with elevation and time.

The United States Forest Service has established guidelines or Levels of Concern (LOC) for total deposition of nitrogen and sulfur compounds in Class I Wilderness Areas. Total nitrogen deposition of 1.5 kilograms (kg) per hectare (ha) per year or less is considered to be unlikely to harm terrestrial or aquatic ecosystems. For total sulfur deposition, the LOC is 5 kg per ha per

year. The United States Forest Service is considering a sulfur LOC of 1.5 kg per ha per year. Breton Wilderness Area is the only Class I area in Louisiana and LOC data is not available for this area.

3.8.2 Climate and Climate Change

3.8.2.1 Climate

The climate of the project area is considered subtropical. Summer temperatures range from 85 degrees Fahrenheit (°F) to 95 °F during the afternoon and 65 °F to 75 °F in the early morning. The winters are generally mild, and only rarely are there days when the temperature fails to rise above freezing. Average winter temperatures range from 55 °F to 65 °F in the afternoon and from 40 °F to 50 °F in the early morning hours.

The annual rainfall within the area averages about 59 inches. Hurricane season is from June through November. Rainfall amounts vary with the storms, ranging from a trace to a record 22 inches for a 3-day period in 1922. Moderate to severe flooding is sometimes associated with these storms (USDA 1999).

Tornadoes can develop any time of the year, but the primary season is from March to May. Their occurrence is most common in April. A second tornado season takes place from November to January. Intense, localized rainfall is often associated with these storms (USDA 1999).

3.8.2.2 Climate Change

Climate change refers to any significant change in measures of climate (e.g., temperature or precipitation) lasting for an extended period (decades or longer). Climate change may result from natural processes, such as changes in the sun's intensity, natural processes within the climate system (such as changes in ocean circulation), and human activities that change the atmosphere's composition (such as burning fossil fuels) and the land surface (such as urbanization) (Intergovernmental Panel on Climate Change [IPCC] 2013).

Greenhouse gases (GHGs) are gases in the atmosphere composed of molecules that absorb and reradiate infrared electromagnetic radiation. When present in the atmosphere the gas contributes to the greenhouse effect. The greenhouse effect is a process by which thermal radiation from a planetary surface is absorbed by atmospheric GHGs and is re-radiated in all directions. Since part of this re-radiation is back towards the surface and the lower atmosphere, it results in an elevation of the average surface temperature above what it would be in the absence of the gases. Some GHGs such as CO_2 occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHGs (e.g., fluorinated gases) are created and emitted solely through human activities. The primary GHGs that enter the atmosphere as a result of anthropogenic activities include CO_2, CH_4, N_2O, and fluorinated gases such as hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF). Fluorinated gases are powerful GHGs that are emitted from a variety of industrial processes including production of refrigeration/cooling systems, foams and aerosols. Fluorinated gases are not primary to the activities authorized by the BLM and will not be discussed further in this document.

Ongoing scientific research has identified the potential impacts of anthropogenic GHG emissions and changes in biological sequestration due to land management activities on the global climate. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused CO_2 equivalent (CO_2e) concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. CO_2e is the metric measurement used to compare the emissions for various GHGs based upon their global warming potential (GWP). The CO_2e for a gas is derived by multiplying the tons of the gas by the GWP. The IPCC recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations" (IPCC 2013).

It is important to note that GHGs will have a sustained climatic impact over different temporal scales. For example, recent emissions of CO_2 can influence climate for 100 years. In contrast, black carbon is a relatively short-lived pollutant, as it remains in the atmosphere for only about a week. It is estimated that black carbon is the second greatest contributor to global climate change behind CO_2 (Ramanathan and Carmichael 2008). Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies 2007). In 2001, the IPCC indicated that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2006) has confirmed these findings, but also indicated that there are uncertainties regarding how climate change may affect different regions. Observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Data indicates that northern latitudes (above 24° N) have exhibited temperature increases of nearly 1.2°C (2.1°F) since 1900, with nearly a 1.0°C (1.8°F) increase since 1970 alone. It also shows temperature and precipitation trends for the conterminous United States. For both parameters we see varying rates of change, but overall increases in both temperature and precipitation.

The lack of scientific tools designed to predict climate change at regional or local scales limits the ability to quantify potential future impacts. However, potential impacts to air quality due to climate change are likely to be varied. Oil and gas development activities can generate CO_2 and CH_4. CO_2 emissions result from the use of combustion engines, while CH_4 can be released during processing and development/production of oil and gas resources. Wild land fires also are a source of other GHG emissions, while livestock grazing is a source of CH_4. Currently, the LDEQ does not have regulations regarding GHG emissions, although these emissions are regulated indirectly by various other regulations.

Because GHGs circulate freely throughout Earth's atmosphere, the region of influence for this resource is the entire globe. The largest component of global anthropogenic GHG emissions is

CO_2. Global anthropogenic carbon emissions reached about 7,000,000,000 metric tons per year in 2000 and about 9,000,000,000 metric tons per year in 2008 (Boden et al 2010). Oil and gas production is a major contributor of GHGs. In 2006, natural gas production accounted for 8% of global CH_4 emissions, and oil production accounted for 0.5% of global CH_4 emissions (URS Corporation 2010).

3.9 Water Resources - Surface/Ground Water

The Louisiana Department of Natural Resources, Office of Conservation (LADNROC) regulates oil and gas operations in Louisiana. The LADNROC has the responsibility to gather oil and gas production data, permit new wells, establish pool rules and oil and gas allowables, issue discharge permits, enforce rules and regulations of the division, monitor underground injection wells, and ensure that abandoned wells are properly plugged and the land is responsibly restored. The Louisiana Environment Department (LAED) administers the major environmental protection laws. The Water Quality Control Commission (WQCC), which is administratively attached to the LAED, assigns responsibility for administering its regulations to constituent agencies, including the LADNROC. The LADNROC administers, through delegation by the WQCC, all Water Quality Act regulations pertaining to surface and groundwater (except sewage not present in a combined waste stream). According to the LADNROC, produced water if predictable in salt concentration, can be used for drilling and completion and possibly cementing.

3.9.1 Surface Water

Surface water hydrology within the area is typically influenced by geology, soil characteristics, precipitation and vegetation. There are no surface water features located on EOI #1838. Based on a desktop review, there are a few small ponds located on the private lands surrounding the parcel but no other major surface water features are present.

3.9.2 Ground Water Resources

The proposed lease parcel is located within the Coastal lowlands aquifer system which consists of a gulf-ward-thickening, heterogeneous, unconsolidated to poorly consolidated wedge of discontinuous beds of sand, silt, and clay that range in age from Oligocene to Holcene. Major rivers that flow across this system include the Mississippi, the Pearl, and the Red Rivers. The coastal lowlands aquifer system yields large quantities of water for agricultural, public supply, domestic and commercial, and industrial uses (USGS 2014).

The results of the LDEQ Baseline Monitoring Program indicate that water quality is good in Louisiana aquifers. Although the overall quality of the state's ground water is good, there are more than 200 sites where active investigation or remediation of contaminated ground water is taking place, not including underground storage tank or Superfund sites. There also were 14 public water supply systems impacted by volatile organic compound (VOC) contamination of ground water between 1989 and 2002 (GWPC 2009).

Groundwater hydrology within the area is influenced by geology and recharge rates. Groundwater quality and quantity can be influenced by precipitation, water supply wells, and various disposal activities. Most onshore produced water is injected deep underground for either enhanced recovery or disposal. With the passage of the Safe Drinking Water Act in 1974, the subsurface injection of fluids came under federal regulation. In 1980, the USEPA promulgated the Underground Injection Control regulations. The program is designed to protect underground sources of drinking water.

3.10 Invasive/Exotic Species

Noxious weeds can have a disastrous impact on biodiversity and natural ecosystems. Noxious weeds affect native plant species by out-competing native vegetation for light, water and soil nutrients. There are a number of non-native species that are considered invasive in Louisiana and are monitored by the Louisiana State University Agriculture Center. Table 3-2 provides a list of some of the invasive species that can be found in Louisiana. No invasive species were documented on the proposed lease parcel during the site visit.

Table 3-2: Invasive Species in Louisiana

Common Name	**Scientific Name**
Alligator weed	*Alternanthera philoxeroides*
Japanese climbing fern	*Lygodium japonicum*
Chinaberry	*Melia azedarach*
Johnson grass	*Sorghum halepense*
Chinese privet	*Ligustrum sinense*
Japanese honeysuckle	*Lonicera japonica*
Brazilian verain	*Verbena brasiliensis*
Cogon grass	*lmperata cylindrica*
Chinese tallow tree	*y:,iadica sebifera*
Common salvinia	*Salvinia minima*
Hydrilla	*Hydrilla verticillata*
Mimosa	*Albizia julibrissin*
Water hyacinth	*Eichhorinia crassipes*

3.11 Vegetation and Wildlife

3.11.1 Vegetation

EOI #1838 and the surrounding area are located within the EGCP ecoregion of Louisiana. Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. The EGCP contains many natural community types including: eastern upland longleaf pine forest, eastern hillside seepage bogs, and slash pine-pond cypress-hardwood forest. Cypress swamps, small stream forest, and bayhead swamps also occur throughout the ecoregion. The EGCP is the fastest growing area in the state and these natural communities will continue to receive pressures from urban expansion.

Based on field reconnaissance during the site visit in September 2015, the parcel is 90% cleared and contains a dirt road running east/west through the center. Some trees are scattered throughout the tract and consist of the following species: water oak (*Quercus nigra*), laurel oak (*Q. laurifolia*), southern red oak (*Q. falcata*), loblolly pine (*Pinus taeda*), and sweetgum (*Liquidambar styraciflua*). The surrounding area within a two mile radius contains some cleared areas for agriculture and timber (particularly to the southwest and southeast) and some forested areas (particularly to the northwest and northeast).

3.11.2 Wildlife

Wildlife diversity and abundance is likely limited on the proposed lease parcel since it is nearly entirely cleared, with a dirt road running through the middle portion of the parcel. Surrounding areas contain a mix of development from agriculture and timber harvest, along with undeveloped forested areas. In general, the species inhabiting the parcel and surrounding area are likely to be typical of those found in southeast Louisiana. The species that inhabited the southeast Louisiana area prior to European settlement are still present in non-developed areas today. Notable exceptions include the bison, elk, red wolf, and ivory-billed woodpecker. Some species, such as the house sparrow, European starling, and nutria have been introduced, while others such as the coyote and armadillo have expanded their ranges and are now common inhabitants (USDA 1999). Most species may occur commonly in one particular habitat but are also likely to frequent adjacent habitats.

Hunting is a popular pastime in Louisiana and game species populations are high enough to support this activity. Major game on non-developed areas of northwest Louisiana includes white-tailed deer, wild turkey, fox, gray squirrel, bobwhite quail, woodcock, waterfowl, and the mourning dove.

3.12 Migratory Bird Species of Concern

EO 13188, 66 *Federal Register* 3853, (January 17, 2001) identifies the responsibility of federal agencies to protect migratory birds and their habitats, and directs executive departments and agencies to undertake actions that will further implement the Migratory Bird Treaty Act (MBTA). Under the MBTA, incidental, unintentional, and accidental take, killing, or possession of a migratory bird or its parts, nests, eggs or products, manufactured or not, without a permit is unlawful. EO 13186 includes a directive for federal agencies to develop a Memorandum of Understanding with the USFWS to promote the conservation of migratory bird populations, including their habitats, when their actions have, or are likely to have, a measureable negative effect on migratory bird populations.

For the purpose of this analysis, the term “migratory birds” applies generally to native bird species protected by the MBTA. This includes native passerines (flycatchers and songbirds) as well as birds of prey, migratory waterbirds (waterfowl, wading birds, and shorebirds), and other species such as doves, hummingbirds, swifts, and woodpeckers. Among the wide variety of species protected by the MBTA, special concern is usually given to the following groups:

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

Because of the many species that fall within one or more of these groups, BLM focuses on species identified by USFWS as Birds of Conservation Concern (BCC) (USDI 2002). Table 3-3 lists the BCC found in the Southeastern Coastal Plain Bird Conservation Region where EOI #1838 is located. There is suitable habitat on the proposed lease parcel and surrounding area for several BCC on these lists.

Table 3-3. List of BCC found in the Southeastern Coastal Plain Bird Conservation Region

Common Name	**Scientific Name**
Kentucky Warbler	*Oporonis formosus*
American Bittern (nb)	*Botaurus lentifinosus*
American Kestrel (*paulus* ssp.)	*Falco sparverius paulus*
American Oystercatcher	*Haematoput palliatus palliatus*
Audubon's Shearwater (nb)	*Puffinus nativitatis*
Bachman's Sparrow	*Aimophila aesivalis*
Bald Eagle (b)	*Haliaeetus leucocephalus*
Bewick's Wren (*bewickii* ssp.)	*Thryomanes bewickii bewickkii*
Black Rail	*Laterallus jamaicensis*
Black Skimmer	*Rynchops miger*
Black-capped Petrel (nb)	*Pterodorma hasitata*
Black-throated Green Warbler	*Dendroica virens*
Blue-winged Warbler	*Vermivora pinus*
Brown-headed Nuthatch	*Sitta pusilla*
Buff-breasted Sandpiper (nb)	*Tryngites subruficollis*
Cerulean Warbler	*Dendroica cerulea*
Chuck-will's-widow	*Caprimulgus carolinensis*
Common Ground-Dove	*Colmbina passerina*
Gull-billed Tern	*Gelochelidon nilotica*
Henslow's Sparrow	*Ammodramus henslowii*
Least Bittern	*Ixobrychus exilis*
Least Tern (c)	*Sternula antillarum*
LeConte's Sparrow (nb)	*Ammodramus leconteii*
Limpkin	*Aramus guarauna*

Common Name	**Scientific Name**
Loggerhead Shrike	*Lanius ludovicianus*
Long-billed Curlew (nb)	*Numenius americanus*
Marbled Godwit (nb)	*Limosa fedoa*
Nelson's Sharp-tailed Sparrow (nb)	*Ammodramus nelsoni*
Painted Bunting	*Passerina ciris*
Peregrine Falcon (b)	*Falco peregrinus*
Prairie Warbler	*Dendroica discolor*
Prothonotary Warbler	*Protonotaria citrea*
Red Knot (*rufa* ssp.) (a) (nb)	*Caladris canutus rufa*
red-headed Woodpecker	*Melanerpes eryhrocephalus*
Red-throated Loon	*Gavia stellata*
Roseate Spoonbill (nb)	*Platalea ajaja*
Rusty Blackbird (nb)	*Euphagus carolinus*
Saltmarsh Sharp-tailed Sparrow (nb)	*Ammodramuscaudacutus*
Sandwich Tern	*Thalasseus sandvicensis*
Seaside Sparrow (c)	*Ammodramus maritimus*
Sedge Wren (nb)	*Cistothorus platensis*
Semipalmated Sandpiper (Eastern) (nb)	*Calidris pusilla*
Short-billed Dowitcher (nb)	*Limnodromus griseus*
Snowy Plover (c)	*Charadrius alexandrinus nivosus/tenuirostis*
Solitary Sandpiper (nb)	*Tringa solitaria*
Swainson's Warbler	*Limnothlypis swainsonii*
Swallow-tailed Kite	*Elanoides forficatus*
Upland Sandpiper (nb)	*Bartramia longicauda*
Whimbrel (nb)	*Numenius phaeopus*
Whip-poor-will	*Caprimulgus vociferus*
Wilson's Plover	*Charadrius wilsoniha wilsonia*
Wood Thrush	*Hylocichla mustelina*
Yellow Rail (nb)	*Coturnicops noveboracensis*

4.0 CHAPTER 4 - ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

This chapter assesses the anticipated environmental consequences associated with direct, indirect, and cumulative effects of the Proposed Action and No Action Alternative. The Proposed Action of leasing parcels would, by itself, have no direct impact on any resources in the lease area since there would be no surface disturbing activities. All anticipated resource impacts would be associated with potential future oil and gas development. For the purpose of this EA, a RFD scenario is used to assess the potential impacts from reasonably foreseeable, but yet uncertain, future oil and gas development as a result of leasing the parcel. If these parcels were developed, short-term impacts from potential development are considered those that would be stabilized or mitigated within five years and long-term impacts are those that would substantially remain for more than five years. Cumulative impacts include the combined effect of past projects, specific planned projects and other reasonably foreseeable future actions such as other infield wells being located within the nearby area. Cumulative impacts are addressed at the end of this Chapter.

4.1 Land Use

4.1.1 Proposed Action

There would be no direct impacts to land use as a result of leasing as there would be no surface disturbing activities at this stage. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance could occur on adjacent lands and that no surface disturbance is predicted on EOI #1838. There would likely be short and long term changes to land use as a result of reasonably foreseeable oil and gas development on lands adjacent to EOI #1838, where development is projected to occur in the future in order to access the federal minerals. The federal minerals are a small percentage, approximately 0.2%, of the 960 acre unit. Undeveloped lands would be converted to developed areas containing wellpads and roads to support oil and gas activities, although specific locations for development are unknown at this time. Reclamation activities on adjacent lands would result in some of the land being reverted to natural conditions over time. Since the area surrounding EOI #1838 is part of a larger unit, oil and gas development is generally consistent with surrounding land uses.

4.1.2 No Action Alternative

There would be no changes to land use on EOI #1838 under the No Action Alternative; however, there would likely be short and long term changes to land use as a result of reasonably foreseeable oil and gas development on adjacent lands. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed. Impacts to land use under the No Action Alternative would therefore be the same as those described under the Proposed Action.

4.2 Visual/Noise Resources

4.2.1 Proposed Action

Under the Proposed Action, the RFD scenario projects approximately 16 acres of surface disturbance on lands adjacent to EOI #1838 as a result of reasonably foreseeable oil and gas development. Visual impacts may be short or long term, depending on when oil and gas activities commence and are completed. While the act of leasing federal minerals would produce no impacts to visual resources since there is no surface disturbing activities at this time, subsequent exploration/development could affect visual quality on adjacent lands through: increased visibility of constructed features such as roads, well pads, pipelines, and tank batteries; road degeneration from heavy trucks and vehicles following rain; dust and exhaust from construction, drilling, and production vehicles and equipment; vegetation removal; unreclaimed sites; and discarded equipment. Well pads, power lines, access roads, and associated production facilities and storage tanks have the greatest potential to alter visual conditions for the life of the well. Vegetation removal would present an obvious contrast in color with the surrounding vegetation and affect foreground and middleground distance zones for more than a decade. These impacts would be most obvious immediately after construction. Impacts would decrease as the disturbed surface began to blend in color, form, and texture, when interim or final reclamation occurs. Long-term visual impacts could persist as long as the well is producing, which could be a couple of years to more than 50 years. Long-term impacts may include vegetation removal, alteration of the landscape, and installation of equipment and facilities. Reclamation activities would result in some of the land being reverted to natural conditions over time.

Noise generation from well operations would be associated with vehicle movements and the operation of production equipment. There could be short term noise impacts associated with construction, drilling, and/or completion of reasonably foreseeable oil and gas development activities on lands adjacent to EOI #1838, but the intensity of the impacts would likely be minimal. Noise generating activities would lessen over time as production commences, when the site would be visited periodically and/or to haul produced fluids. There is currently no development on the lease parcel and minimal development surrounding the parcel, so it is unlikely that any residences would be disturbed from noise associated with potential future oil and gas development from leasing EOI #1838.

4.2.2 No Action Alternative

Under the No Action Alternative, impacts to the visual environment and from noise would be the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed.

4.3 Socioeconomics and Environmental Justice

4.3.1 Proposed Action

4.3.1.1 Socioeconomics

The direct effect of the Proposed Action would be the payments received, if any, from the leasing of 32.21 acres of federal mineral estate. If the lease is sold and it leads to actual well drilling and economic production in the future, it would likely bring modest revenues in the form of royalty payments, severance taxes, and rent monies to the state and county. Economic production would provide wages and salaries to employees, maintenance staff, and contractors employed in drilling wells, and sales to area hotels, restaurants, and other businesses that serve drillers for the duration of drilling and similar construction-related benefits later as wells are abandoned and sites restored. Other effects could include the potential for increases in traffic congestion, noise and visual impacts associated with fluid mineral production.

It is speculative to predict the exact effects of this action since there is no guarantee that the lease will receive bids, and that the parcel will be developed and produce fluid minerals. Any APD received would require additional site-specific NEPA analysis which would further examine socioeconomic impacts to the local economy. It is unknown how oil and gas surface disturbances associated with exploration and development, such as construction of roads, well pads, and other infrastructure would affect the oil and gas sector or the associated services economy in St. Helena Parish. At this time it is not possible to determine the magnitude and duration of potential impacts either in terms of payments received or changes in employment patterns in St. Helena Parish, but any effects would be anticipated to be beneficial.

4.3.1.2 Environmental Justice

No minority or low income populations would be disproportionately affected in the vicinity of the lease parcel from the proposed lease or subsequent development. The proposed lease would not create an unsafe or unhealthy environment for any population, including minority and low-income populations and therefore would not be out of conformance with EO 12898. The direct effect of the Proposed Action would be the payments received, if any, from the leasing of the 32.21 acres of federal mineral estate. Indirect positive environmental justice effects could include potential future employment opportunities related to oil and gas and service support industries that might result, should the lease be sold and whether exploration and development of the lease occurs. It is speculative to predict the exact effects of the leasing action to human health and the environment, as site-specific development proposals and analysis would be examined in future NEPA. The total surface disturbance estimated for this lease sale parcel based on the RFD scenario of two well pads on adjacent land is approximately 16 acres. Potential adverse human health or environmental effects related to oil and gas production at either this scale or across the anticipated 960 acre production unit are not quantifiable at this stage but are limited in extent as to not likely to disproportionately affect low-income or minority populations. Specific impacts to public health, such as the potential for contamination of surface waters and aquifers due to subsurface hydraulic fracturing operations are considered extremely unlikely based on the thousands of feet of rock separating target formations from underground

reservoirs. Additional discussion of the effects of oil and gas operations to water quality can be found in Section 4.9. Potential impacts to water use on low income or minority populations would be analyzed in more detail at the APD stage.

4.3.2 No Action Alternative

Under the No Action Alternative, impacts to socioeconomics and environmental justice would be the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed.

4.4 Cultural Resources and Native American Concerns

4.4.1 Proposed Action

There would be no direct impacts to cultural resources or Native American interests as a result of leasing as there would be no surface disturbance at this stage. Although literature reviews indicate there are no historic resources on or within a mile of the parcel, cultural resource surveys have not been conducted on EOI #1838 and therefore there may be undiscovered cultural resources present on or around the parcel. Direct and indirect impacts from reasonably foreseeable future oil and gas development may occur to cultural resources or to a potentially sacred Native American religious site if there is ground disturbance. Direct impacts are those such as completely destroying a site by bulldozing the area and workers picking up artifacts. Indirect impacts are those such as erosion or compaction of the soil on the site. If sites are located and recorded before ground disturbance begins, these impacts can be avoided or mitigated.

BLM consulted with the SHPO on March 3, 2015 and received concurrence on April 13, 2015 (Appendix C) on the proposed leasing action. Letters were sent to various tribes on March 6, 2015 notifying them of the Proposed Action and requesting comments or concerns. SHPO and the two tribes that responded requested that cultural surveys be conducted if/when development is proposed and submitted to their office for comment.

4.4.2 No Action Alternative

Under the No Action Alternative, impacts to cultural resources and Native American concerns would be the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed. The operator would need to comply with all required laws and regulations with regard to protection of cultural resources.

4.4.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

If federal minerals are proposed for development in the future, an APD would be required and the BLM would conduct additional site-specific analysis of cultural resources. In order to protect cultural resources, a cultural resources survey is needed before ground disturbance begins. A report of the survey would be approved by the BLM and the SHPO before the APD is approved. If a known recorded site is located within the lease area, it would be avoided up to 200 meters in order to protect these resources. If avoidance is not possible, then the appropriate mitigation measures would be identified in coordination with the SHPO. Additional consultation with the SHPO and the appropriate federally recognized Native Americans would occur before APD approval is given.

In order to protect any currently used religious sites, if present, consultation with the appropriate Native American tribe/group is also necessary at the APD stage. If currently unknown burial sites are discovered during development activities associated with this lease, these activities must cease immediately, Louisiana state law on unknown burials would be followed and, if necessary, consultation with the appropriate tribe/group of federally recognized Native Americans would take place. The Authorized Officer may require relocation or modification of the proposed development to minimize impacts to sites or burials.

A BLM stipulation regarding cultural resources and Native American religious concerns applies to the lease parcel (Appendix B). The stipulation states that the BLM would not approve any ground disturbing activities that may affect historic properties and/or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. If currently unknown burials are discovered during development activities associated with this lease, these activities must cease immediately, applicable law on unknown burials will be followed and, if necessary, consultation with the appropriate Tribe/group of federally recognized Native Americans would take place. Although the RFD scenario projects that approximately 16 acres of surface disturbance would occur on lands adjacent to EOI #1838 and there would be no surface disturbance on federal lands, the stipulation is included for the lease parcel in case future conditions change and future development occurs on the parcel itself.

4.5 Minerals and Mineral Development

4.5.1 Proposed Action

There would be no direct impacts to minerals from the Proposed Action, since there would be no surface disturbing activities at this stage; however, subsequent exploration and oil and gas development could impact the production horizons and reservoir pressures. If production wells are established, the resources allotted to the wells would eventually be depleted. There could also be impacts to other mineral resources as a result of exploration/development through the loss of available surface or subsurface area needed to develop or access the other mineral resource overlapping the subject lease parcel. The extent of the impacts to mineral resources, if any, would be further determined once site-specific development information is available at the APD stage.

4.5.2 No Action Alternative

Under the No Action Alternative, impacts to mineral resources would be nearly the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed. Under the No Action Alternative, however, the federal minerals would not be accessed. Therefore, impacts to federal minerals would be less than what is described under the Proposed Action but impacts to minerals overall would be nearly the same, since development would still likely occur on adjacent private lands and private minerals would be developed.

4.6 Wastes

4.6.1 Proposed Action

There would be no direct impacts due to waste generation from the Proposed Action, since there would be no surface disturbing activities at this stage; however, subsequent exploration/oil and gas development could result in the introduction of hazardous and non-hazardous substances to the area. Oil and gas development activities typically generate the following wastes: (1) discharge of drilling fluids and cuttings into the reserve pits, (2) wastes generated from used lubrication oils, hydraulic fluids, and other fluids used during production of oil and gas, some of which may be characteristic or listed hazardous waste, and (3) service company wastes from exploration and production activities as well as containment of some general trash. Certain wastes unique to the exploration, development, and production of crude oil and natural gas have been exempted from Federal Regulations as hazardous waste under Subtitle C of the RCRA of 1976. The exempt waste must be intrinsic to exploration, development or production activities and cannot be generated as part of a transportation or manufacturing operation. The drilling fluids, drill cuttings, and produced waters are classified as a RCRA exempt waste, and potential drilling that could occur would not introduce hazardous substances into the environment if they are managed and disposed of properly under federal, state, and local waste management regulations and guidelines. Properly used, stored, and disposed of hazardous and non-hazardous substances greatly decreases the potential for any impact on any environmental resources. One way operators and the BLM ensure hazardous and non-hazardous substances are properly managed is through the preparation of a Spill Prevention, Control, and Countermeasure (SPCC) plan.

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

standing industry practices. In addition, many of these additives are common chemicals which people regularly encounter in everyday life (GWPC 2009).

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

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

4.6.2 No Action Alternative

Under the No Action Alternative, impacts associated with wastes would be essentially the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed. Operators would be required to conform to the appropriate laws and regulations with regard to safe handling, storage, and disposal of wastes.

4.6.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

If federal minerals are proposed for development in the future, an APD would be required and the BLM would conduct additional site-specific analysis of potential impacts from wastes. The following measures to reduce adverse impacts from wastes are common to most projects: all trash would be placed in a portable trash cage and hauled to an approved landfill, with no burial or burning of trash permitted, chemical toilets would be provided for human waste, fresh water

zones encountered during drilling operations would be isolated by using casing and cementing procedures, a berm or dike would enclose all production facilities if a well is productive, and all waste from all waste streams on site would be removed to an approved disposal site. Future development activities would be regulated under the RCRA, Subtitle C regulations. Additionally, waste management requirements are included in the 12 point surface use plan and the 9 point drilling plan required for all APDs. Leaseholders proposing development would be required to have approved SPCCPs, if the applicable requirements of 40 CFR 112 are met, and comply with all requirements for reporting of undesirable events. Lease bonds would not be released until all facilities have been removed, wells are plugged, and satisfactory reclamation has occurred.

There are five standard BLM COAs that would apply at the APD stage regarding handling and disposing of wastes, should federal minerals be accessed. These COAs include: storing wastes properly to minimize the potential for spills, providing secondary containment for all stored containers, draining the reserve pit before closure and trucked to a disposal site, use of preventative measures to avoid drainage of fluids, sediments, and other contaminants from the pad into water bodies, and keeping the project area clear of trash.

Further, if shallow groundwater is expected or encountered at the project specific site, open reserve pits would not be authorized and all waste products would be hauled from the site to state-approved disposal facilities.

4.7 Soils

4.7.1 Proposed Action

While the act of leasing federal minerals would not affect soils, subsequent exploration/development may produce short and long term impacts by physically disturbing the topsoil and exposing the substratum soil on subsequent project areas. Direct impacts from reasonably foreseeable oil and gas construction of well pads, access roads, and reserve pits include: removal of vegetation, exposure of the soil, mixing of horizons, compaction, loss of topsoil productivity and susceptibility to wind and water erosion. Wind erosion would be expected to be a minor contributor to soil erosion with the possible exception of dust from vehicle traffic during all phases of development. Vehicle traffic would be limited to approved travel routes in which the surface has not been paved or dressed in a material to prevent soil movement. The extent of wind erosion related to vehicle traffic would depend on a number of factors including: length of well bore, whether hydraulic fracturing is used during completion, whether telemetry is used during production, and whether the well is gas, oil, condensate, or a combination thereof. These impacts could result in increased indirect impacts such as runoff, erosion and off-site sedimentation. Activities that could cause these types of indirect impacts include construction and operation on well sites, access roads, gas pipelines and facilities.

Additional soil impacts associated with future development can occur when heavy precipitation causes water erosion damage. When water saturated segment(s) on the access road become impassable, vehicles may still be driven over the road. Consequently, deep tire ruts may develop.

Where impassable segments are created from deep rutting, unauthorized driving may occur outside the designated route of access roads.

Contamination of soil from future drilling, hydraulic fracturing, and production wastes mixed into soil or spilled on the soil surface could cause a long-term reduction in site productivity. Contaminants spilled on soil would have the potential to pollute and/or change the soil chemistry (see also Section 4.6, Wastes). These impacts can be reduced or avoided through proper design, construction, maintenance and implementation of Best Management Practices (BMPs) and COAs.

4.7.2 No Action Alternative

Under the No Action Alternative, impacts to soils would be the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed. Operators would be required to conform to the appropriate laws and regulations with regard to soil erosion and minimizing risk from contamination.

4.7.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

If federal minerals are proposed for development in the future, an APD would be required and the BLM would conduct additional site-specific analysis of potential impacts to soils. The operator would stockpile the topsoil from the surface of well pads which would be used for surface reclamation of the well pads. During the life of the development, all disturbed areas not needed for active support of production operations should undergo “interim” reclamation in order to minimize the environmental impacts of development on other resources and used. Upon abandonment of wells and/or when access roads are no longer in service, final reclamation would be implemented.

The impact to the soil would be remedied upon reclamation of well pads when the stockpiled soil that was specifically conserved to establish a seed bed is spread over well pads and vegetation re-establishes. A permanent vegetation cover would be established on all disturbed areas. Road construction requirements and regular maintenance would alleviate potential impacts to access roads from water erosion damage.

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

A standard BLM COA would apply at the APD stage, should federal minerals be accessed, which would require the operator to take necessary measures to ensure that the final graded slopes are stabilized to prevent the movement of soil from the pad area for the life of the project.

Stabilization techniques could include: natural, organic matting, silt fences, and or additional mulching.

4.8 Air Resources

4.8.1 Air Quality

4.8.1.1 Proposed Action

The administrative act of offering the proposed lease parcels would have no direct impacts on air quality. Any potential effects to air quality would occur if and when the leases were developed. Any proposed development project would be subject to additional analysis of possible air effects before approval and the analysis may include air quality modeling. A Memorandum of Understanding between the Departments of the Interior and Agriculture and USEPA directs that air quality modeling be conducted for actions that meet certain emissions or geographic criteria:

- Creation of a substantial increase in emissions
- Material contribution to potential adverse cumulative air quality impacts
- Class I or sensitive Class II Areas
- Non-attainment or maintenance area
- Area expected to exceed NAAQS or PSD increment

The project area includes no Class I, sensitive Class II, or non-attainment areas. Due to the small number of wells projected to follow a lease on the lease tracts in relation to the current volume of hydrocarbon, development of the lease is not likely to exceed the emissions criteria, NAAQS or PSD increment.

The following source of emissions are anticipated during any oil and gas exploration or development: combustion engines (i.e. fossil fuel fired internal combustion engines used to supply electrical or hydraulic power for hydraulic fracturing to drive the pumps and rigs used to drill the well, drill out the hydraulic stage plugs and run the production tubing in the well; generators to power drill rigs, pumps, and other equipment; compressors used to increase the pressure of the oil or gas for transport and use; and tailpipe emissions from vehicles transporting equipment to the site), venting (i.e. fuel storage tanks vents and pressure control equipment), mobile emissions (i.e. vehicles bringing equipment, personnel, or supplies to the location) and fugitive sources (i.e. pneumatic valves, tank leaks, and dust). A number of pollutants associated with combustion of fossil fuels are anticipated to be released during drilling including: CO, NOx, SO_2, Pb, PM, CO_2, CH_4, and N_2O. Venting may release VOC/HAP, H_2S, and CH_4. Mobile source emissions are likely to include fugitive particulate matter from dust or inordinate idling.

The actual emissions of each pollutant will be entirely dependent on the factors described in the previous paragraph. During the completion phase, the most significant emissions of criteria pollutants emitted by oil and gas operations in general are VOCs, particulate matter and NO_2. VOCs and NOx contribute to the formation of O_3. The USEPA's Natural Gas STAR Program is a voluntary program that identifies sources of fugitive CH_4 and seeks to minimize fugitive CH_4 through careful tuning of existing equipment and technology upgrades. Data provided by STAR

show that some of the largest air emissions in the natural gas industry occur as natural gas wells that have been fractured and are being prepared for production. During well completion, flowback, fracturing fluids, water, and reservoir gas come to the surface at high velocity and volume. This mixture includes a high volume of VOCs and CH_4, along with air toxins such as benzene, ethylbenzene, and n-hexane. The typical flowback process lasts from 3 to 10 days. Pollution also is emitted from other processes and equipment during production and transportation of the oil and gas from the well to a processing facility.

To reasonably quantify emissions associated with well exploration and production activities, certain types of information are needed. Such information includes a combination of activity data such as:

- The number, type, and duration of equipment needed to construct/reclaim, drill and complete (e.g. belly scrapers, rig, completions, supply trucks, compressor, and production facilities)
- The technologies which may be employed by a given company for drilling any new wells to reduce emissions (e.g. urea towers on diesel powered drill rigs, green completions, and multi-stage flares)
- Area of disturbance for each type of activity (e.g. roads, pads, pipelines, electrical lines, and compressor station)
- Compression per well (sales and field booster), or average horsepower for each type of compressor
- The number and type of facilities utilized for production

The degree of impact will also vary according to the characteristics of the geological formations from which production occurs. Currently, it is not feasible to directly quantify emissions. What can be said is that emissions associated with oil and gas exploration and production would incrementally contribute to increases in air quality emissions into the atmosphere.

Air pollution can affect public health in many ways. Numerous scientific studies have linked air pollution to a variety of health problems including: (1) aggravation of respiratory and cardiovascular disease, (2) decreased lung function, (3) increased frequency and severity of respiratory symptoms such as difficulty breathing and coughing, (4) increased susceptibility to respiratory infections, (5) effects on the nervous system, including the brain, such as IQ loss and impacts on learning, memory, and behavior, (6) cancer, and (7) premature death. Some sensitive individuals appear to be at greater risk for air pollution-related health effects, for example, those with pre-existing heart and lung diseases (e.g., heart failure/ischemic heart disease, asthma, emphysema, and chronic bronchitis), diabetics, older adults, and children.

Degradation of air quality may also contribute damage to ecosystem resources. For example, ozone can damage vegetation, adversely impacting the growth of plants and trees. These impacts can reduce the ability of plants to uptake CO_2 from the atmosphere and can then indirectly affect the larger ecosystems.

4.8.1.2 No Action Alternative

Under the No Action Alternative, impacts to air quality would be the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed.

4.8.1.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

The BLM encourages industry to incorporate and implement BMPs, which are designed to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. Typical measures include:

- Flared hydrocarbon gases at high temperatures in order to reduce emissions of incomplete combustion
- Watering dirt roads during periods of high use to reduce fugitive dust emissions
- Co-location wells and production facilities to reduce new surface disturbance
- Implementation of directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores
- Requiring that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored
- Performing interim reclamation to reclaim areas of the pad not required for production facilities and to reduce the amount of dust from the pads

Additionally, the BLM encourages oil and natural gas companies to adopt proven, cost-effective technologies and practices that improve operational efficiency and reduce natural gas emissions.

In October 2012, USEPA promulgated air quality regulations for completion of hydraulically fractured gas wells. These rules require air pollution mitigation measures that reduce the emissions of VOCs during gas well completions. Mitigation includes a process known as "Green Completion" in which natural gas brought up during flowback must be recaptured and rerouted into the gathering line. In addition, at the APD stage, the BLM would encourage operators to participate in the voluntary STAR program.

4.8.2 Climate and Climate Change

4.8.2.1 Proposed Action

The administrative act of leasing the proposed federal minerals would not result in any direct GHG emissions. However, in regard to future development, the assessment of GHG emissions and climate change is in its formative phase. While it is not possible to accurately quantify potential GHG emissions in the affected area of the proposed leases, some general assumptions can be made: the proposed leases may contribute to the installation and production of new wells, which may consequently lead to an increase in GHG emissions.

Emissions from fossil fuel production grew 101% from 1990 to 2005 and are projected to increase by a further 10% between 2005 and 2020. The natural gas industry is the major contributor to both GHG emissions and emissions growth, with CH_4 emissions from coal mining second. That said, it is worth noting that a significant portion of the emissions attributed to the natural gas industry are due to vented gas from processing plants, many of which are used for injection in enhanced oil recovery operations. Additionally, many technological advances in emission control technology have been implemented by the oil and gas industry to reduce emission levels.

Many aspects of oil and gas production emit GHGs. The primary aspects include the following:

- Fossil fuel combustion for construction and operation of oil and gas facilities which include vehicles driving to and from production sites, engines that drive drill rigs, etc. These produce CO_2 in quantities that vary depending on the age, types, and conditions of the equipment as well as the targeted formation, locations of wells with respect to processing facilities and pipelines, and other site-specific factors.

- Fugitive CH_4 is CH_4 that escapes from wells (both gas and oil), oil storage, and various types of processing equipment. This is a major source of global CH_4 emissions. These emissions have been estimated for various aspects of the energy sector, and starting in 2011, producers are required under 40 CFR 98, to estimate and report their CH_4 emissions to the USEPA.

- It is expected that drilling will produce marketable quantities of oil and/or gas. Most of these products will be used for energy, and the combustion of the oil and/or gas would release CO_2 into the atmosphere. Fossil fuel combustion is the largest source of global CO_2.

The assessment of GHG emissions, their relationship to global climatic patterns, and the resulting impacts is an ongoing scientific process. It is currently not feasible to know with certainty the net impacts from the Proposed Action on climate – that is, while BLM actions may contribute to the climate change phenomenon, the specific effects of those actions on global climate are speculative given the current state of the science. The BLM does not have the ability to associate a BLM action's contribution to climate change with impacts in any particular area. The science to be able to do so is not yet available. The inconsistency in results of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future impacts of decisions made at this level and determining the significance of any discrete amount of GHG emissions is beyond the limits of existing science. When further information on the impact to climate change is known, such information would be incorporated in the BLM's planning and NEPA documents as appropriate.

In recent years, many states and other organizations have initiated GHG inventories, tallying GHG emissions by economic sector. The USEPA provides links to statewide GHG emissions inventories (USEPA 2014), however this inventory information is not available for Louisiana. Guidelines for estimating project-specific GHG emissions are available (URS Corporation 2010), but some necessary data, including the volume of oil produced and the number of wells,

are not available for the Proposed Action. The uncertainties regarding numbers of wells and other factors make it very impractical to attempt to project amounts of GHG that the Proposed Action would emit. At the APD stage, more site-specific information on GHG impacts and mitigation measures would be described in detail.

Recent IPCC publications (2013) indicate that due to increasing temperatures, faster evaporation rates, and more sustained droughts brought on by climate change, increasing levels of GHGs contributing to climate change may bring about the following impacts in the southeastern U.S., including LA:

- A shift towards a warmer climate with an increase in extreme high temperatures and a reduction in extreme low temperatures. These changes have been especially apparent in the western half of North America
- Abnormally hot days and nights and heat waves are very likely to become more frequent. Cold days and cold nights are very likely to become much less frequent
- Increasing stress due to heat waves. This may lead to more illness and death, particularly among the young, elderly and frail
- Respiratory disorder may be exacerbated by warming-induced deterioration in air quality
- The growing season length is expected to increase. However, as temperature rises, crops grown in the southwestern U.S. will increasingly experience temperatures above their optimum, and animal production of meat or dairy products will be impacted by temperature extremes
- Weeds and other invasive plants will continue to migrate northward
- Arid areas are very likely to experience increases in erosion and fire risk
- An increase in the length of the forest fire season and the area subject to forest fires
- Additional stress to ground water and surface water sources that are already overtaxed in many areas
- Changes in the abundance and spatial distribution of species and expanded ranges of tree killing insects, vector-borne and tick-borne diseases
- Precipitation is likely to be less frequent but more intense and precipitation extremes are very likely to increase
- Increased weather related losses of property
- Rising sea level in and around the Gulf Coast area
- It is likely that hurricane intensity will increase in response to human-caused warming, but this requires further study

4.8.2.2 No Action Alternative

Under the No Action Alternative, potential climate change effects would be the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed.

4.9 Water Resources, Surface/Ground

While the act of leasing federal minerals would produce no impacts to water resources, subsequent exploration and development of the lease parcel have the potential to produce impacts. The physical effects of mineral extraction include erosion, compaction, sedimentation, and potential groundwater contamination. Sedimentation and pollution of streams or wetlands can occur down-gradient from such activity sites (USDA 1999). Surface disturbance from the construction of well pads, access roads, pipelines, and utility corridors can result in degradation of surface water and groundwater quality from non-point source pollution, increased soil losses, and increased erosion.

4.9.1 Surface Water Resources

4.9.1.1 Proposed Action

Potential impacts to surface water that may occur from construction of well pads, access roads, fracturing ponds, pipelines, utility lines and production include:

- Increased surface runoff and off-site sedimentation brought about by soil disturbance
- Increased salt loading and water quality impairment of surface waters
- Channel morphology changes due to road and pipeline crossings and possible contamination of surface waters by spills

The magnitude of these impacts to water resources would depend on the proximity of the disturbance to the drainage channel, slope aspect and gradient, degree and area of soil disturbance, amount of local precipitation, soil character, and duration and time before implementation mitigation or clean up measures can be put into place. As discussed in Chapter 3, there are no surface water features on the proposed lease parcel and based on desktop research there are a few scattered ponds (but no other major surface water features) on the adjacent lands, therefore, potential impacts to existing surface water would likely be minimal.

Minor long-term direct and indirect impacts to the watershed could occur from water discharge from roads, road ditches, and well pads, but would decrease once all well pads and road surfacing material has been removed and reclamation of well pads, access roads, pipelines, and powerlines have taken place. Interim reclamation of the portion of the well pad not needed for production operation, re-vegetating the portion of the pad that is needed for production operations, and re-vegetating road ditches would reduce this long-term impact. Short-term direct and indirect impacts to the watershed from future access roads that are not surfaced with impervious materials would occur and would likely decrease in time due to reclamation efforts.

4.9.1.2 No Action Alternative

Under the No Action Alternative, potential impacts to surface water would be the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed. The operator

would be required to comply with all required laws and regulations with regard to protection of surface water.

4.9.2 Ground Water Resources

4.9.2.2 Proposed Action

Groundwater can be affected by multiple factors, including industrial, domestic, or agricultural activities through withdrawal, injection (including chemical injection), or mixing of materials from different geologic layers or the surface. Withdrawal of groundwater could affect local groundwater flow patterns and create changes in the quality or quantity of the remaining groundwater. Loss of a permitted source of groundwater supply due to drawdown would be considered a significant impact if it were to occur and any potential for this to occur would be assessed at the development stage should development be proposed. The drilling of horizontal wells, versus directional and vertical wells may initially appear to require a greater volume of water for drilling/completion purposes. However, a horizontal well develops a much larger area of the reservoir than a directional and/or vertical well and actually results in a lesser volume of fluids being required. Vertical and directional wells can easily require one well per 10 acres resulting in 64 wells per section. This is in contrast to one horizontal well per 640 acres or one per 320 acres which results in a net decrease in total fluid volumes needed and in surface disturbance acreages. Impacts to the quality of groundwater from future development, should they occur, would likely be limited to near a well bore location due to inferred groundwater flow conditions in the area of the parcel.

Oil and gas contained in geologic formations is often not under sufficient hydraulic pressure to flow freely to a production well. The formation may have low permeability or the area immediately surrounding the well may become packed with cuttings. A number of techniques are used to increase or enhance the flow. They include hydraulic fracturing and acid introduction to dissolve the formation matrix and create larger void space(s). The use of these flow enhancement techniques and secondary recovery methods result in physical changes to the geologic formation that will affect the hydraulic properties of the formation. Typically, the effects of these techniques and methods are localized to the area immediately surrounding the individual well, are limited to the specific oil and gas reservoir, and do not impact adjacent aquifers.

In recent years there has been an elevated public concern about the possibility of subsurface hydraulic fracturing operations creating fractures that extend well beyond the target formation to water aquifers, allowing CH_4, contaminants naturally occurring in formation water, and fracturing fluids to migrate from the target formation into drinking water supplies (Zoback et al 2010). Typically, thousands of feet of rock, including some impermeable, separate most major formations in the U.S. from the base of aquifers that contain drinkable water (U.S. Department of Energy, 2009). The direct contamination of underground sources of drinking water from fractures created by hydraulic fracturing would require hydrofractures to propagate several thousand feet beyond the upward boundary of the target formations through many layers of rock. It is extremely unlikely that the fractures would ever reach fresh water zones and contaminate freshwater aquifers (Zoback et al 2010). During the APD review, the exact difference between

the base of treatable water and the top of the target formation for the specific site would be reviewed to determine the potential for direct contamination of underground sources.

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

Casing specifications are designed and submitted to the BLM. The BLM independently verifies the casing program, and the installation of the casing and cementing operations are witnessed by a Petroleum Engineer. Petroleum products and other chemicals used in the drilling and/or completion process could result in groundwater contamination through a variety of operational sources including but not limited to pipeline and well casing failure, well (gas and water) construction, and spills. Similarly, improper construction and management of reserve and evaporation pits could degrade ground water quality through leakage and leaching.

The potential for negative impacts to groundwater caused from completion activities such as hydraulic fracturing have not been confirmed but based on its history of use are not likely. A recent study completed on the Pinedale Anticline did not find a direct link to known detections of petroleum hydrocarbons to the hydraulic fracturing process. Authorization of the proposed project would require full compliance with local, state, and federal directives and stipulations that relate to surface and groundwater protection and the BLM would deny any APD who proposed drilling and/or completion process was deemed to not be protective of usable water zones as required by 43 CFR 3162.5-2(d).

A high risk of fluid migration exists along the vertical pathways created by inadequately constructed wells and unplugged inactive wells. Brine or hydrocarbons can migrate to overlying or underlying aquifers in such wells. Since the 1930s, most States have required that multiple barriers be included in well construction and abandonment to prevent migration of injected water, formation fluids, and produced fluids. These barriers include (1) setting surface casing below all known aquifers and cementing the casing to the surface, and (2) extending the casing from the surface to the production or injection interval and cementing the interval. Barriers that can be used to prevent fluid migration in abandoned wells include cement or mechanical plugs. They should be installed (1) at points where the casing has been cut, (2) at the base of the lowermost aquifer, (3) across the surface casing shoe, and (4) at the surface. Individual states, and the BLM have casing programs for oil and gas wells to limit cross contamination of aquifers.

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

Typically when groundwater is used as a source of drilling/completion water, impacts to the aquifer would be minimal due to the size of the aquifers impacted and recharge potential across the entire aquifer. However, localized aquifer effects could be expected depending upon the rate of drawdrown and the density and/or intensity of the drilling activity. A cone of depression may occur in the immediate vicinity of the existing water well used to supply the drilling/completion water. With each rain event, the aquifer is expected to recharge to some degree, but it is unknown if or when it would recharge to baseline conditions after pumping ceases which is dependent upon surface conditions (whether impervious surface or not). The time it takes depends greatly on rainfall events, surface soil materials, drought conditions, and frequency of pumping that has already occurred and will continue to occur into the future. The amount of water actually used for drilling/completion activities is highly dependent on a number of factors including: length of well bore, closed-loop or reserve pit drilling system, type of mud, whether hydraulic fracturing would be used during stimulation, whether recycled water would be used, dust abatement needs, and type and extent of construction, to name a few. The impacts of water use on water quality and quantity would be analyzed in more detail during the APD review.

Any proposed drilling/completion activities would need to comply with Onshore Order #2, 43 CFR 3160 regulations, and not result in a violation of a federal and/or state law. If these conditions were not met, the proposal would be denied.

4.9.2.3 No Action Alternative

Under the No Action Alternative, potential impacts to ground water would be the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed. The operators would be required to comply with all required laws and regulations with regard to protection of groundwater resources.

4.9.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

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

The BLM will closely analyze areas proposed for drilling in APDs during the onsite inspection, since regional wetland inventories often do not capture small wetlands. USEPA requires that Storm Water Pollution Prevention Plans and SPCCP be in place to prevent any spill from reaching surface water due to rain events or accidental release of fluids related to production operations.

4.10 Invasive/Exotic Species

4.10.1 Proposed Action

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

4.10.2 No Action Alternative

Under the No Action Alternative, potential impacts from non-native species would be the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed.

4.10.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

Specific mitigation measures would be identified at the APD stage once site-specific development plans are determined. BMPs require that all federal actions involving surface disturbance or reclamation take reasonable steps to prevent the introduction or spread of noxious weeds, including requirements to use weed-free hay, mulch and straw. A BLM COA applies to all APDs, should federal minerals be accessed, which recommends that native cover plants in seeding mixtures be used during reclamation activities. Post-construction monitoring for cogon grass and other invasive plant species should be conducted to ensure early detection and control. If invasive species are found, the proper control techniques should be used to either eradicate the species from the area or minimize its spread to other areas. If cogon grass is found on site, equipment should be washed before exiting the site to prevent the spread of this highly invasive species to other locations.

4.11 Vegetation and Wildlife

4.11.1 Proposed Action

There would be no direct impacts to vegetation and wildlife from leasing, since there is no surface disturbance at this stage; however, reasonably foreseeable oil and gas development could result in short and long term impacts to vegetation and wildlife on lands adjacent to EOI #1838. Short term impacts to vegetation from future development would primarily result from removal of vegetation for construction of wellpads and associated infrastructure. Long-term vegetation loss could include those portions of the wellpad needed for production operations for the life of the well and access road.

Impacts to wildlife could result from increased habitat fragmentation, noise, or other disturbance during development. Although reclamation and restoration efforts for surface disturbance could provide for the integrity of other resources, these efforts may not always provide the same habitat values (e.g. structure, composition, cover, etc.). Short-term negative impacts to wildlife would occur during the construction and production phase of the operation (drilling, fracturing, production, etc.) due to noise and habitat destruction. In general, most wildlife species would become habituated to the new facilities. For other wildlife species with a low tolerance to activities, the operations on the well pad would continue to displace wildlife from the area due to ongoing disturbances such as vehicle traffic, noise and equipment maintenance. The magnitude of above effects would be dependent on the rate and location of the oil and gas development, but populations could likely not recover to pre-disturbance levels until the activity was completed and vegetative community restored.

Many of the common species expected to occur on the lease parcels have broad habitat requirements and would continue to be found in a variety of habitats in the surrounding areas. Wildlife use of the site after the well is put into production would vary depending on vegetation and succession stage. Once put into production, the well pad would be reduced in size and the reserve pit would be graded and seeded. The producing well site would be subject to regular maintenance and inspection. Wildlife use of the site is dependent on the adequacy of restoration. However, over the life of the well, some of the acreage would be excluded from utilization by most wildlife species.

4.11.2 No Action Alternative

Under the No Action Alternative, potential impacts to vegetation and wildlife would be the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed.

4.11.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

Measures would be taken to prevent, minimize, or mitigate impacts to fish and wildlife animal species from exploration and development activities. Prior to authorization, activities would be

evaluated on a case-by-case basis, and the project would be subject to mitigation measures. Mitigation could potentially include rapid re-vegetation, noise restrictions, project relocation, or pre-disturbance wildlife species surveying.

A standard BLM COA would apply at the APD stage that is designed to prevent bat and bird mortality, should federal minerals be accessed. The COA states that all open vent stack equipment, such as heater-treaters, separators, and dehydrator units, will be designed and constructed to prevent birds and bats from entering or nesting in or on such units, and to the extent practical, to discourage birds from perching on the stacks. Installing cone-shaped mesh covers on all open vents is one suggested method. Flat mesh covers are not expected to discourage perching and will not be acceptable.

4.12 Migratory Bird Species of Concern

4.12.1 Proposed Action

While the act of leasing would not affect migratory birds, subsequent exploration/development of the subject parcel may produce impacts. Surface disturbance from the development of well pads, access roads, pipelines, and utility lines can result in an impact to migratory birds and their habitat.

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

4.12.2 No Action Alternative

Under the No Action Alternative, potential impacts to migratory birds would be the same as those described under the Proposed Action. The RFD scenario developed for this EA predicts that approximately 16 acres of surface disturbance would occur on adjacent lands whether or not the proposed leasing action occurs and whether or not federal minerals are accessed.

4.12.3 Possible Future Best Management Practices, Standard Operating Procedures and/or Mitigation Measures

Per the Memorandum of Understanding between BLM and USFWS, entitled, “To Promote the Conservation of Migratory Birds,” the following temporal and spatial conservation measures must be implemented as part of the COAs with an APD:

1. Avoid any take of migratory birds and/or minimize the loss, destruction, or degradation of migratory bird habitat while completing the proposed project or action.

2. If the proposed project or action includes a reasonable likelihood that take of migratory birds will occur, then complete actions that could take migratory birds outside of their nesting season. This includes clearing or cutting of vegetation, grubbing, etc. The primary nesting season for migratory birds varies greatly between species and geographic location, but generally extends from early April to mid-July. However, the maximum time period for the migratory bird nesting season can extend from early February through late August. Strive to complete all disruptive activities outside the peak of migratory bird nesting season to the greatest extent possible.

3. If no migratory birds are found nesting in the proposed project or action areas immediately prior to the time when construction and associated activities are to occur, then the project activity may proceed as planned.

To protect perch and roosting sites and terrestrial habitats for and to avoid potential impacts to migratory birds, the following standard BLM COAs would apply at the APD stage, should federal minerals be accessed:

- Any reserve pit that is not closed within 10 days after a well is completed and that contains water must be netted or covered with floating balls, or another method must be used to exclude migratory birds

- All powerlines must be built to protect raptors and other migratory birds, including bald eagles, from accidental electrocution, using methods detailed by the Avian Power Line Interaction Committee

4.13 Cumulative Effects

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from 'the incremental impacts of the action when added to past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Recent CEQ guidance in considering cumulative effects involves defining the scope of the other actions and their interrelationship with the Proposed Action. The scope must consider geographical and temporal overlaps among the Proposed Actions and other actions. It must also evaluate the nature of interactions among these actions.

Cumulative effects are most likely to arise when a relationship or synergism exists between the Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in proximity to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated.

To identify cumulative effects, three fundamental questions need to be addressed:

- Does a relationship exist such that affected resource areas of the Proposed Action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?

- If one or more of the affected resource areas of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by impacts of the other action?

- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this EA, the affected area includes the proposed lease area and surrounding vicinity.

4.13.1 Context for Cumulative Effects Analysis

Offering the subject parcel for lease, and the subsequent issuance of the lease, in and of itself, would not result in any cumulative impacts; however, the Proposed Action does include an analysis of the potential reasonably foreseeable oil and gas development that could occur in the future associated with the lease parcel, which serves as the basis for assessing whether there could be any cumulative effects associated with the possible future development of the lease parcel.

Current oil and gas development in St. Helena Parish includes two pre-production wells within 2.8 miles of the proposed lease parcel and seven producing wells approximately 8 miles to the west (see Figure 4-1). The proposed lease parcel is adjacent to the proposed Day-Branch Field, which is over 1,000 acres in extent for drilling and production of Tuscaloosa Marine Shale (State of Louisiana Office of Conservation, Order No. 1578). The 32.21 acres of federal mineral estate could potentially add two additional surface wells on adjacent lands if the parcel is leased and developed. Additionally there are 23 Tuscaloosa Marine Shale units in varying phases of proposal in development in northern St, Helena Parish, and encompassing 24,329 acres (Louisiana Department of Natural Resources, Sonris GIS, accessed December 2015). If the proposed EOI were approved, it could contribute less than one percent of surface disturbance within the Tuscaloosa Marine Shale units.

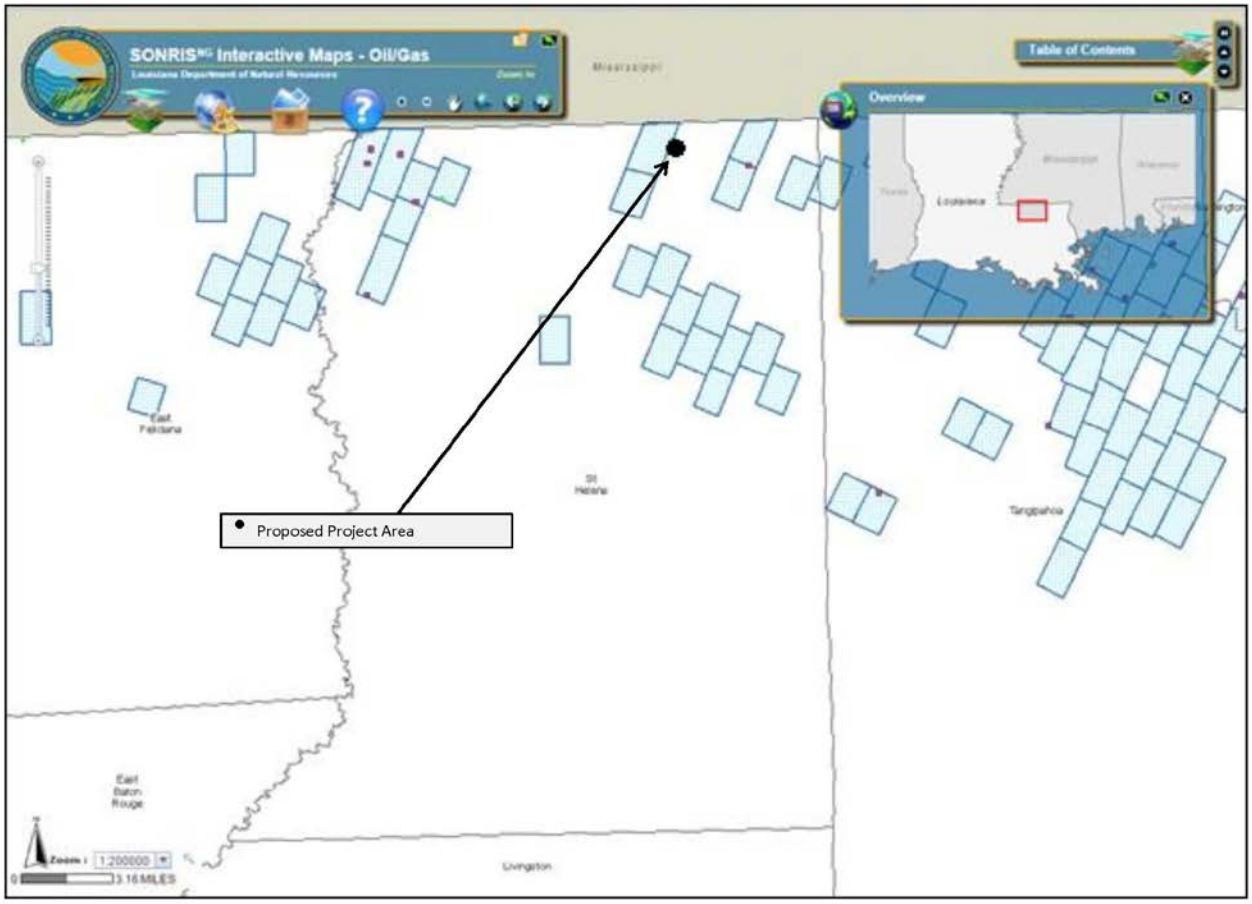


Figure 4-1: Mineral Development Activity near EOI #1838

4.13.2 Cumulative Effects Analysis

Because of the small size of EOI #1838 and the small amount of foreseeable development projected under the RFD scenario, the incremental effect of the Proposed Action and No Action Alternative in combination with other past, present, or reasonably foreseeable actions on resources including land use, visual/noise resources, vegetation and wildlife (including invasives and migratory birds), soil resources, cultural resources, water resources, soils, and wastes is negligible to minor. Further site-specific NEPA analysis will be conducted at the APD stage, along with additional consultations and surveys as required. Further NEPA analysis at the APD stage will address cumulative impacts of any proposed development at the site-specific level; however, this EA does discuss cumulative impacts from leasing on a general level. Following is a discussion of potential cumulative effects associated with the Proposed Action and No Action Alternative. As discussed in previous sections of this Chapter, the Proposed Action and No Action Alternative would result in nearly identical environmental impacts.

Land Use

There would be no cumulative impacts to land use as a result of leasing EOI #1838; however, the RFD scenario projects approximately 16 acres of surface disturbance associated with reasonably

foreseeable development from potential future oil and gas activities. The area surrounding EOI #1838 is rural with minimal development. Other activities occurring in the area include agriculture and timber, which over time may contribute to changes in existing land uses if these activities are changed or expanded. As shown in Figure 4-1, other mineral activity in the area is ongoing. Potential future development associated with the leasing of EOI #1838 would contribute minimally to land use conversion in the area and is consistent with ongoing uses of the land. Therefore, there would be no perceptible cumulative impacts to land use from implementing the Proposed Action and No Action Alternative.

Visual/Noise Resources

There would be no cumulative impacts to visual and noise resources as a result of leasing EOI #1838; however, the RFD scenario projects approximately 16 acres of surface disturbance associated with reasonably foreseeable development from potential future oil and gas activities. Because the area surrounding EOI #1838 is largely rural with minimal development, there are few noise-generating activities in the area above and beyond those typical of a rural, agricultural area. Other mineral development activities are located nearly three miles away. Timber and agriculture activities typically do not produce noise levels that would result in noise ordinance violations. Timber management activities would result in some changes to the visual environment at the site-specific level, but the Proposed Action would not interact with these activities in a manner to result in changes to the larger scale visual environment. Because the other activities in the area are spatially separated, the Proposed Action and No Action Alternative would not result in a cumulative impact to the noise or visual environment.

Cultural Resources and Native American Concerns

There would be no cumulative impacts to cultural resources as a result of leasing EOI #1838; however, potential cumulative effects to cultural resources could occur if future development activities on or near the parcel are conducted without proper surveys and consultations under the NHPA or state requirements. Cumulative effects from repetitious illegal activity, primarily archeological vandalism, may occur on certain sites or site types unless perpetrators are apprehended and prosecuted. The degree of cumulative effects to known properties from BLM activities, however, should be slight as inventory, assessment, protection, and mitigation measures would be implemented at the APD stage if federal minerals are accessed. Under the No Action Alternative, operators in the vicinity would be required to comply with all required laws and regulations with regard to protection of cultural resources and Native American Concerns.

Socioeconomics and Environmental Justice

Cumulative effects to socioeconomics from reasonably foreseeable future development would likely be positive, but minor. At this time it is not possible to determine with certainty the magnitude and duration of potential impacts either in terms of payments received or changes in employment patterns in St. Helena Parish. Additional analysis will be conducted at the APD stage where socioeconomic impacts will be further assessed. Many of the cumulative socioeconomic effects and impacts associated with oil and gas development are already occurring in the region and would be perpetuated in the future. For instance, oil and gas activity

is generating employment opportunities and labor earnings for communities that support these types of activities.

The Proposed Action and No Action Alternative would not disproportionately affect low income or minority populations; therefore, there would be no cumulative effects to these groups.

Soils

Increases in mineral development, construction activities, and the conversion of land to developed landscapes collectively result in the removal of vegetation, long-term reduction in vegetation cover, and disturbance of soils. This would expose soils to the erosive forces of wind and water, destabilize soils, and increase overland flow, which in turn could result in accelerated erosion. Accelerated erosion could mobilize soils and remove nutrient-rich topsoil, and thereby reduce soil productivity and vegetation growth rates. Because the proposed lease parcel is small and reasonably foreseeable future development under the RFD scenario is only 16 acres, the incremental effect of the Proposed Action and No Action Alternative with other activities on soils in the vicinity would be small. Cumulative impacts to soil resources would therefore be negligible.

Mineral Resources

There would be no cumulative impacts to minerals from the administrative action of leasing EOI #1838, but the potential reasonably foreseeable development projected under the RFD scenario in combination with other mineral development activities in the area would result in a minor incremental effect from development on BLM federal mineral estate. At this stage it is uncertain how productive the wells accessing the federal mineral estate would be, should development occur in the future. If developed, the mineral resources would be drained and depleted over time, but given the small size of the lease parcel the incremental cumulative effect would be minor compared to other mineral development activities occurring in the vicinity (see Figure 4-1).

Wastes

As noted in the Proposed Action description, impacts from waste storage, handling, and disposal would be minimized through the use of BMPs, SOPs, and COAs at the APD stage, should federal minerals be proposed for development. Other mineral development, agriculture, and timber management activities in the area would need to comply with all required laws and regulations with regard to wastes. Therefore, cumulative effects from wastes are not anticipated.

Natural Resources (Vegetation and Wildlife, Invasives, Migratory Birds)

The Proposed Action and No Action Alternative would contribute a minor amount of potential vegetation loss from reasonably foreseeable development. Under the RFD scenario, approximately 16 acres of surface disturbance could occur from future oil and gas activities adjacent to EOI #1838. The loss of vegetation would also affect wildlife using that habitat, although many species would likely relocate during construction from future development activities. Reclamation activities would help restore vegetation conditions. At this stage, it does

not appear that there are sensitive species or habitats present on or adjacent to the parcel, and future site-specific analysis would be conducted at the APD stage. Given the small size of the parcel and projected surface disturbance, cumulative effects to vegetation, wildlife, and migratory birds would be minor and cumulative effects to the population level of species are not expected. The Proposed Action would not be expected to significantly compound current patterns of habitat fragmentation, degradation, or wildlife patterns. If BLM weed control strategies are implemented, cumulative effects due to invasive species are not anticipated. Since federally listed special status species were not documented within St. Helena Parish, there would be no cumulative effects to these species.

Water Resources (Surface Water and Ground Water)

There would be no cumulative impacts to water resources from the administrative action of leasing EOI #1838, however, energy and mineral development, construction activities, agriculture, and the conversion of land to developed landscapes, collectively results in the removal of vegetation, long-term reduction in overall vegetation cover, and disturbance of soils. This would increase overland flow, result in accelerated soil erosion, and decrease the ability of watersheds to buffer high flows and filter water, sediment, and nutrients. Soil mobilized by wind and water erosion would be transported downslope and to nearby water bodies, which would increase sediment and nutrient loads to streams, rivers, lakes, and reservoirs and thereby degrade water quality. Increases in overland flow also would directly increase the amount of water transported to streams and rivers, which could lead to increased downcutting, widening, and overall degradation of stream channels. Because of the small size of the parcel and only 16 acres of surface disturbance are projected under the RFD scenario, the incremental effect of the Proposed Action and No Action Alternative would result in negligible cumulative effects to surface water.

Oil and gas wells have the potential to affect groundwater quality and quantity through withdrawal, injection, and unintentional leakage and spills. Proper well design, construction, drilling, and completion methods would reduce the likelihood of these impacts but would not entirely eliminate them. Hydraulic fracturing is used to enhance recovery by enlarging fractures through which oil and gas can be drawn to a wellbore and brought to the surface. After fluids are injected at high pressures to expand fractures, injected fracture fluids and some formation water flows back to the surface and is removed to allow gas and/or oil to flow into the wellbore. In recent years there has been an elevated public concern about the possibility of subsurface hydraulic fracturing operations creating fractures that extend well beyond the target formation to water aquifers, allowing methane, contaminants naturally occurring in formation water, and fracturing fluids to migrate from the target formation into drinking water supplies (Zoback et al 2010). Contamination of groundwater could occur without adequate cementing and casing of the proposed well bore. For completion or formation fluids to escape the wellbore and affect the usable quality water or contaminate or cross contaminate acquifers, the fluid would have to breech several layers of steel casing and cement. Failure of the cement or casing surrounding the wellbore is a possible risk to water supplies. If the annulus is improperly sealed, natural gas, fracturing fluids, and formation water containing high concentrations of dissolved solids may be transferred directly along the outside of the wellbore among the target formation, drinking water aquifers, and layers of rock in between. Complying with BLM and state regulations regarding

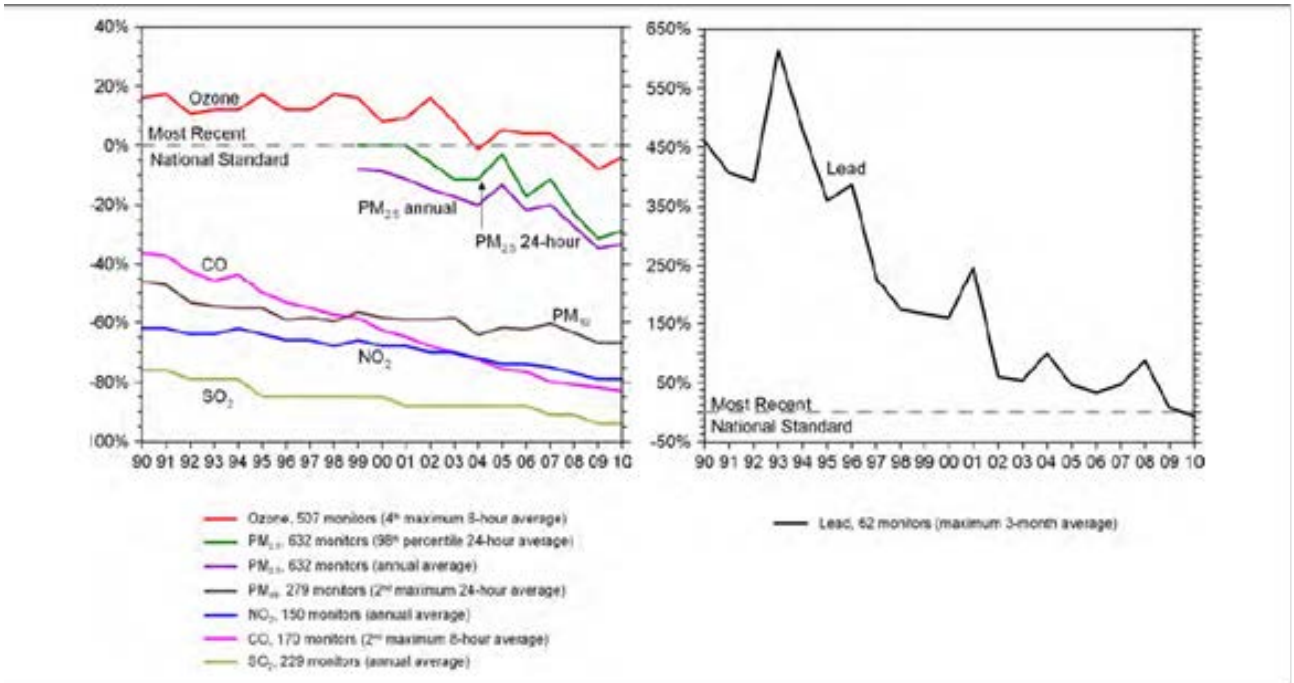
casing and cementing, implementing BMPs, testing casings and cement prior to continuing to drill or introducing additional fluids and continual monitoring during drilling and hydraulic fracturing, allow producers and regulators to check the integrity of casing and cement jobs and greatly reduce the chance of aquifer contamination. Cumulative effects to ground water are not anticipated if SOPs, BMPs, and COAs as described in this EA and identified during the APD process are followed, should federal minerals be proposed for development.

Air Quality

Cumulative effects from potential oil and gas development from the proposed leases and possible future development could be an overall increase in CO, NOx, SO_2, Pb, PM, CO_2, CH_4, and N_2O. However, according to USEPA's Air Trends report for 2011 (USEPA 2011), since 1990, nationwide air quality has improved significantly for the six common air pollutants (Figure 4). These six pollutants are ground-level O_3, $PM_{2.5}$, PM_{10}, Pb, NO_2, CO, and SO_2. Nationally, air pollution was lower in 2010 than in 1990 for:

- 8-hour O_3, by 17%
- 24-hour PM_{10} , by 38%
- 3-month average Pb, by 83%
- annual NO_2 , by 45%
- 8-hour CO, by 73%
- annual SO_2 , by 75%

Nationally, annual $PM_{2.5}$ concentrations were 24% lower in 2010 compared to 2001 and 24-hour $PM_{2.5}$ concentrations were 28% lower in 2010 compared to 2001. O_3 levels did not improve in much of the East until 2002, after which there was a significant decline. Eight-hour O_3 concentrations were 13% lower in 2010 than in 2001. This decline is largely due to reductions in NOx required by USEPA rules including the NOx State Implementation Plan (SIP) Call, preliminary implementation of the Clean Air Interstate Rule (CAIR), and Tier 2 Light Duty Vehicle Emissions Standards.



Comparison of national levels of the six common pollutants to the most recent NAAQS, 1990-2010. National levels are averages across all monitor stations with complete data for the time period. Note: Air quality data for $PM_{2.5}$ starts in 1999 (USEPA, 2011).

USEPA concludes that total emissions of toxic air pollutants have decreased by approximately 42% between 1990 and 2005. Control programs for mobile sources and facilities such as chemical plants, dry cleaners, coke ovens, and incinerators are primarily responsible for these reductions. They also found that monitored concentrations of toxic pollutants such as benzene, 1,3-butadiene, ethylbenzene, and toluene decreased by 5% or more per year between 2003 and 2010 at more than half of ambient monitoring sites. Other toxic air pollutants of concern to public health such as carbon tetrachloride, formaldehyde, and several metals, declined at most sites.

Climate Change

In February 2014, the BLM completed a documented titled, "The Air Resources Technical Report." The purpose of the document is to summarize the technical information on air quality and climate change relative to all EAs for APDs and lease sales. It includes a description of the varied sources of national and regional emissions that are incorporated here to represent the past, present, and reasonably foreseeable impacts to air resources (USDI 2014). It includes a summary of emissions on the national and regional scale by an industry source. Sources that are considered to have notable contributions to air quality impacts and GHG emissions include electrical generating units, fossil fuel production (nationally and regionally) and transportation.

The very small increase in emissions that could result from approval of the Proposed Action would not result in the area violating the NAAQS for any criteria pollutant. In October 2012, USEPA regulations that require control of VOC emissions from oil and gas development became effective. These regulations will reduce VOC emissions from oil and gas exploration and

production emissions that contribute to the formation of O_3. Emissions from any lease development are not expected to impact the 8-hour average O_3 concentrations, or any other criteria pollutants in the area of the proposed lease.

Visitors to national parks and wilderness areas list the ability to view unobscured scenic vistas as a significant part of a satisfying experience. Unfortunately, visibility impairment has been documented in all Class I areas with visibility monitoring. Most visibility impairment is in the form of regional haze. The greatest visibility impairment due to regional haze occurs in the eastern U.S. and in southern California, while the least impairment occurs in the Colorado Plateau, Nevada Great Basin areas, and in Alaska. Ammonium sulfate contributes at least 50% to visibility impairment at most Class I areas in the eastern U.S. The contribution to visibility impairment from ammonium nitrate is highest in central and southern California and in the Midwest. The largest region of high rural organic carbon visibility impairment is in the southeastern U.S. Impairment in this range is also present in the Sierra Nevada region of California and in the northern Rockies of Montana. The highest contribution to visibility impairment from fine soil is found in the arid Southwest. The highest coarse particle contribution to impairment is also in the arid Southwest and southern California (IPCC 2013). Visibility impairment on federal lands can also result from plume intrusion and has been documented in Mount Zirkel Wilderness, Moosehorn National Wildlife Refuge, and Grand Canyon National Park.

The USEPA develops an annual report called the Inventory of U.S. Greenhouse Gas Emissions and Sink (Inventory). According to the Inventory report, in 2012, total GHG emissions in the U.S. were 6,525.6 million metric tons (Tg) CO_{2e}. Total U.S. emissions have increased by 4.7% from 1990 to 2012, and emissions decreased from 2011 to 2012 by 3.4% (227.4 Tg CO_{2e}). The decrease from 2011 to 2012 was due to a decrease in the carbon intensity of fuels consumed by power producers to generate electricity due to a decrease in the price of natural gas, a decrease in transportation sector emissions attributed to a small increase in fuel efficiency across different transportation modes and limited new demand for passenger transportation, and much warmer winter conditions resulting in a decreased demand for heating fuel in the residential and commercial sectors. Since 1990, U.S. emissions have increased at an average annual rate of 0.2%.

The primary GHG emitted by human activities in the U.S. was CO_2 representing approximately 82.5% of total GHG emissions. The largest source of CO_2 and of overall GHG emissions was fossil fuel combustion. CH_4 emissions, which have decreased by 10.8% since 1990, resulted primarily from enteric fermentation associated with domestic livestock, natural gas systems, and decomposition of wastes in landfills. Agricultural soil management, manure management, mobile source fuel combustion and stationary fuel combustion were the major sources of NO_2 emissions.

HFCs and PFCs are families of synthetic chemicals that are used as alternatives to O_3 Depleting Substances, which are being phased out under the Montreal Protocol and Clean Air Act Amendments of 1990. HFCs and PFCs do not deplete the stratospheric O_3 layer, and are therefore acceptable alternatives under the Montreal Protocol. These compounds, however, along with SF_6, are potent GHGs. In addition to having high global warming potentials, SF_6 and PFCs

have extremely long atmospheric lifetimes, resulting in their essentially irreversible accumulation in the atmosphere once emitted. SF_6 is the most potent GHG the IPCC has evaluated (IPCC 2013). Other emissive sources of these gases include HCFC-22 production, electrical transmission and distribution systems, semiconductor manufacturing, aluminum production, and magnesium production and processing.

ODS substitute emissions and emissions of J-fluorocarbon (JFC)-23 during the production of JCFS-22 were the primary contributors to aggregate HFC emissions. PFC emissions resulted as a by-product of primary aluminum production and from semiconductor manufacturing, while electrical transmission and distribution systems accounted for most SF_5 emissions.

Overall, from 1990 to 2012, total emissions of CO_2 increased by 274.5 Tg CO_{2e} (5.4%), while total emissions of CH_4 decreased by 68.4 Tg CO_{2e} (10.8%), and N_2O increased by 11.5 Tg CO_{2e} (2.9%). During the same period, aggregate weighted emissions of HFCs PFCs, and SF_6 rose by 74.8 Tg CO_{2e} (83%). From 1990 to 2012, HFCs increased by 114.3 Tg CO_{2e} (309.6%), PFCs decreased by 15.2 Tg CO_{2e} (732.8%), and SF_6 decreased by 24.2 Tg CO_{2e} (74.3%). Despite being emitted in smaller quantities relative to the other principal GHGs, emissions of JFCs, PFCs, and SF_6 are significant because many of these gases have extremely high global warming potentials and, in the cases of PFCs and SF_6, long atmospheric lifetimes. Conversely, U.S. GHG emissions were partly offset by carbon sequestration in forests, trees in urban areas, agricultural soils, and landfilled yard trimmings and food scraps, which, in aggregate, offset 15% of total emissions in 2012.

Within the U.S., fossil fuel combustion accounted for 94.2% of CO_2 emissions in 2012. Globally, approximately 32,579 Tg of CO_2 were added to the atmosphere through the combustion of fossil fuels in 2011, of which the U.S. accounted for about 17%. Changes in land use and forestry practices can also emit CO_2 (e.g. through conversion of forest land to agricultural or urban use) or can act as a sink for CO_2 (e.g. through net additions to forest biomass). In addition to fossil fuel combustion, several other sources emit significant quantities of CO_2. These sources include, but are not limited to non-energy use of fuels, iron and steel production and cement production.

The five major fuel consuming sectors contributing to CO_2 emissions from fossil fuel combustion are electricity generation, transportation, industrial, residential, and commercial. CO_2 emissions are produced by the electricity generation sector as they consume fossil fuel to provide electricity to one of the other four sectors, or "end-use" sectors. For the discussion below, electricity generation emissions have been distributed to each end-use sector on the basis of each sector's share of aggregate electricity consumption. This method of distributing emissions assumes that each end-use sector consumes electricity that is generated from the national average mix of fuels according to their carbon intensity.

Transportation End-Use Sector. When electricity-related emissions are distributed to economic end-use sectors, transportation activities accounted for 34.4% of U.S. CO_2 emissions from fossil fuel combustion in 2012. The largest sources of transportation GHGs in 2012 were passenger cars (43.1%), light duty trucks, which include sport utility vehicles, pickup trucks, and minivans (18.4%), freight trucks (21.9%), commercial aircraft (6.2%), rail (2.5%), and ships and boats (2.2%). These figures include direct emissions from fossil fuel combustion used in transportation

and emissions from non-energy use (i.e. lubricants) used in transportation, as well as HFC emissions from mobile air conditioners and refrigerated transport allocated to these vehicle types.

In terms of the overall trend, from 1990 to 2012, total transportation emissions rose by 18% due, in large part, to increased demand for travel with limited gains in fuel efficiency over the same time period. The number of vehicle miles traveled by light-duty motor vehicles (passenger cars and light-duty trucks) increased 35% from 1990 to 2012, as a result of a confluence of factors including population growth, economic growth, urban sprawl, and low fuel prices during the beginning of this period. Almost all of the energy consumed for transportation was supplied by petroleum-based products, with more than half being related to gasoline consumption in automobiles and other highway vehicles. Other fuel uses, especially diesel fuel for freight trucks and jet fuel for aircraft, accounted for the remainder. The primary driver of transportation-related emissions was CO_2 from fossil fuel combustion, which increased by 16% from 1990 to 2012. This rise in CO_2 emissions, combined with an increase in HFCs from close to zero emissions in 1990 to 72.9 Tg CO_{2e} in 2012, led to an increase in overall emissions from transportation activities of 18%.

Industrial End-Use Sector. Industrial CO_2 emissions, resulting both directly from the combustion of fossil fuels and indirectly from the generation of electricity that is consumed by industry, accounted for 27% of CO_2 from fossil fuel combustion in 2012. Approximately 57% of these emissions resulted from direct fossil fuel combustion to produce steam and/or heat for industrial processes. The remaining emissions resulted from consuming electricity for motors, electric furnaces, ovens, lighting, and other applications. In contrast to the other end-use sectors, emissions from industry have steadily declined since 1990. This decline is due to structural changes in the U.S. economy (i.e., shifts from a manufacturing-based to a service-based economy), fuel switching, and efficiency improvements.

In 2012, CH_4 emissions from coal mining were 55.8 Tg CO_{2e}, which is a 4.0 Tg CO_{2e} (6.7%) decrease below 2011 emission levels. The overall decline of 25.2 Tg CO_{2e} (31.1%) from 1990 results from the mining of less gassy coal from underground mines and the increased use of CH_4 collected from degasification systems.

N_2O is produced by biological processes that occur in soil and water and by a variety of anthropogenic activities in the agricultural, energy-related, industrial, and waste management fields. While total N_2O emissions are much lower than CO_2 emissions, N_2O is approximately 300 times more powerful than CO_2 at trapping heat in the atmosphere (IPCC 2013). Since 1750, the global atmospheric concentration of N_2O has risen by approximately 20% (IPCC 2013). The main anthropogenic activities producing N_2O in the U.S. are agricultural soil management, stationary fuel combustion, fuel combustion in motor vehicles, manure management and nitric acid production.

Emissions resulting from the substitution of ODS (e.g., CFCs) have been consistently increasing, from small amounts in 1990 to 146.8 Tg CO_{2e} in 2012. Emissions from ODS substitutes are both the largest and the fastest growing source of HFC, PFC, and SF_6 emissions. These emissions have been increasing as phase-out of ozone depleting substances required under the Montreal

Protocol came into effect, especially after 1994, when full market penetration was made for the first generation of new technologies featuring ozone depleting substance substitutes.

GWP-weighted PFC, HFC, and SF_6 emissions from semiconductor manufacture have increased by 28% from 1990 to 2012 due to the rapid growth of this industry and the increasing complexity of semiconductor products (more complex devices have a larger number of layers that require additional F-GHG using process steps). Within that time span, emissions peaked in 1999, the initial year of the USEPA's PFC Reduction/Climate Partnership for the Semiconductor Industry, but have since declined to 3.7 Tg CO_{2e} in 2012 (a 48% decrease relative to 1999).

The National Climate Assessment is a document that summarizes the impacts of climate on the U.S. now and in the future. Over 300 experts working with a 60 member Federal Advisory Committee created the report. Major consequences of a warming climate, as discussed in the National Climate Assessment include significant increases in the number of hot days (95°F or above) and decreases in freezing events. Higher temperatures contribute to the formation of harmful air pollutants and allergens. Higher temperatures are also projected to reduce livestock and crop productivity. Climate change is expected to increase harmful blooms of algae and several disease-causing agents in inland and coastal waters. The number of Category 4 and 5 hurricanes in the North Atlantic and the amount of rain falling in very heavy precipitation events have increased over recent decades, and further increases are projected.

Global sea level rose about eight inches in the last century and is projected to rise another 1 to 4 feet in this century. Large numbers of southeastern cities, roads, railways, ports, airports, oil and gas facilities, and water supplies are vulnerable to the impacts of sea level rise. Major cities like New Orleans, with roughly half of its population below sea level, Miami, Tampa, Charleston, and Virginia Beach are among those most at risk. As a result of current sea level rise, the coastline of Puerto Rico around Rincòn is being eroded at a rate of 3.3 feet per year. Puerto Rico has one of the highest population densities in the world, with 56% of the population living in coastal municipalities.

Sea level rise and storm surge can have impacts far beyond the area directly affected. Sea level rise combines with other climate-related impacts and existing pressures such as land subsidence, causing significant economic and ecological implications. According to a recent study co-sponsored by a regional utility, coastal areas in Alabama, Mississippi, Louisiana, and Texas already face losses that annually average $14 billion from hurricane winds, land subsidence, and sea level rise. Losses for the 2030 timeframe could reach $23 billion assuming a nearly 3% increase in hurricane wind speed and just under 6 in of sea level rise. About 50% of the increase in losses is related to climate change. LA State Highway 1, heavily used for delivering critical oil and gas resources from Port Fourchon, is sinking, at the same time sea level is rising, resulting in more frequent and more severe flooding during high tides and storms. A 90-day shutdown of this road would cost the nation an estimated $7.8 billion.

Freshwater supplies from rivers, streams, and groundwater sources near the coast are at risk from accelerated saltwater intrusion due to higher sea levels. Porous aquifers in some areas make them particularly vulnerable to saltwater intrusion. For example, officials in the city of Hallandale Beach, Florida, have already abandoned six of their eight drinking water wells. Continued urban

development and increases in irrigated agriculture will increase water demand while higher temperatures will increase evaporative losses. All of these factors will combine to reduce the availability of water in the Southeast. Severe water stress is projected for many small Caribbean islands.

While recognizing that many factors besides climate change affect energy demand (including population changes, economic conditions, energy prices, consumer behavior, conservation programs, and changes in energy-using equipment), increases in temperature will result in increased energy use for cooling and decreased energy use for heating. These impacts differ among regions of the country and indicate a shift from predominantly heating to predominantly cooling in some regions with moderate climates. For example, in the Northwest, energy demand for cooling is projected to increase over the next century due to population growth, increased cooling degree days, and increased use of air conditioners as people adapt to higher temperatures. Population growth is also expected to increase energy demand for heating. However, the projected increase in energy demand for heating is about half as much when the effects of a warming climate are considered along with population growth.

In sum, the cumulative impacts may result in a very small increase in GHG emissions but are not expected to create climate change impacts because climate change is a global process that is impacted by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from the Proposed Action cannot be translated into effects on climate change globally or in the area of this site-specific action. It is currently not feasible to predict with certainty the net impacts from particular emissions associated with a federal action; however, USEPA's recently finalized oil and gas air quality regulations have a co-benefit of CH_4 reduction that will reduce GHG emissions from any oil and gas development that would occur on this lease.

4.14 Irreversible and Irretrievable Commitments of Resources

NEPA Section 102(2)C requires a discussion of any irreversible or irretrievable commitments of resources that would be involved in the proposal should it be implemented. An irreversible commitment of a resource is one that cannot be reversed (e.g., the extinction of a species or disturbance to protected cultural resources). An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time (e.g., extraction of any solid mineral ore or fluid mineral).

Reasonably foreseeable oil and gas development associated with the Proposed Action would result in a minor amount of surface disturbing activities that would result in irreversible or irretrievable commitments of resources. These surface disturbing activities would result in alterations to soil, removal of vegetation cover and wildlife habitat, and possible damage to cultural resources if proper surveys and consultations are not conducted under the NHPA. Increases in sediment and nonpoint source pollution that result from these activities could result in degradation of water quality within the watershed and habitat for aquatic-dependent species, although no major surface waters are located adjacent to the parcel. Use of BMPs, SOPs, COAs and stipulations as described in the EA are designed to reduce the magnitude of these impacts by preventing habitat degradation.

Development of oil and gas wells would represent an irretrievable commitment of nonrenewable fossil fuels.

4.15 Relationship between Local Short-term Uses and Long-term Productivity

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and of the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing one development option reduces future flexibility in pursuing other options, or that giving over a parcel of land or other resource to a certain use eliminates the possibility of other uses being performed at the site.

The Proposed Action would take place within a relatively rural area with minimal development. No unique habitat or ecosystems would be lost due to this action. Implementation of the Proposed Action or No Action Alternative may result in future oil and gas development, which results in surface disturbing and other disruptive activities that remove vegetation, increase soil erosion and compaction, create visual intrusions and landscape alterations, increase noise, and degrade wildlife habitat. Although management actions, BMPs, surface use restrictions, and lease stipulations are intended to minimize the effect of short-term uses, some impact on long-term productivity of resources would occur. Because of the small size of the parcel and projected development under the RFD scenario, however, the level of impact would be minor.

5.0 CHAPTER 5 – LIST OF PREPARERS

Key Personnel included:

Sean MacDougall, Biological Sciences Program Lead, BLM Eastern States, State Office

George Matzke, Fluid Minerals Lead, BLM Eastern States, State Office

Alison McCartney, Planning and Environmental Coordinator, BLM Eastern States, Southeastern States District Office

Carol Zurawski, Planning and Environmental Coordinator, BLM Eastern States, State Office

6.0 CHAPTER 5 – REFERENCES

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APPENDIX A: RFD SCENARIO FOR EOI 1838

Case File Number: EOI 1838

Acres: 32.21

Location: Louisiana, St. Helena Meridian, T1S, R6E, Sec. 6, Lot 3

I. Reasonably Foreseeable Development

A. RFD Baseline Scenario Assumptions and Discussion

Objective horizon is Tuscaloosa Marine Shale. Commodity is oil and natural gas.

Federal acreage with be incorporated into a state determined drilling unit. Drilling and production units are 1920 acres. Both a north and south trending lateral will be drilled initially. 14 other laterals are projected over time to be drilled from 2 pads

A 30’ wide well access road will be constructed consisting of a 16’ wide travel surface with a 7’ buffer on each side.

If productive, multiple wells may be drilled from the existing pad.

If productive, oil and gas handling and production facilities will be constructed on the existing pad.

If productive, the reserve pit and part of the drill pad will be reclaimed when all drilling and completion activities are concluded.

All disturbed acreage will be reclaimed when final production ceases.

Each lateral will be fracked. Each lateral well will require 10-12 million gallons of water and 6,000,000 pounds of sand for drilling and completion

B. Surface Disturbance Due to Oil and Gas Activity of Federal Lands

There will be no surface disturbance on Federal lands.

APPENDIX B: LEASE STIPULATIONS AND NOTICES FOR EOI # 1838

STIPULATIONS

Cultural Resources and Tribal Consultation

Stipulation: This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. These obligations may include a requirement that you provide a cultural resources survey conducted by a professional archaeologist approved by the State Historic Preservation Office (SHPO). If currently unknown burial sites are discovered during development activities associated with this lease, these activities must cease immediately, applicable law on unknown burials will be followed and, if necessary, consultation with the appropriate tribe/group of federally recognized Native Americans will take place. 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.

Endangered Species

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.

Exception: None

Modification: None

Waiver: None

Sensitive Plant Species

Stipulation (CSU): All suitable special status plant species habitat will be identified during environmental review of any proposed surface use activity. If field examination indicates that habitat of one or more of these species is present, the BLM will require a survey by a qualified

botanist for special status plants during periods appropriate to each species. Operations will not be allowed in areas where sensitive plants would be affected.

Objective: To protect threatened, endangered, candidate, proposed, and BLM sensitive plant species.

Exception: An exception may be granted if the operator agrees to implement measures developed in consultation with USFWS and in coordination with State agencies.
Modification: The stipulation may be modified if it is determined that a portion of the lease area does not contain sensitive plant species habitat.

Waiver: The stipulation may be waived if, based on field surveys, it is determined that the lease area does not contain sensitive plant species habitat.

LEASE NOTICES/BEST MANAGEMENT PRACTICES

Migratory Birds and Federally Listed Wildlife

Objective: To protect perch and roosting sites and terrestrial habitats for and to avoid potential impacts to migratory birds and federally listed wildlife.

Any reserve pit that is not closed within 10 days after a well is completed and that contains water must be netted or covered with floating balls, or another method must be used to exclude migratory birds.

All powerlines must be built to protect raptors and other migratory birds, including bald eagles, from accidental electrocution, using methods detailed by the Avian Power Line Interaction Committee (APLIC 2006)

Perching and Nesting Birds and Bats

Objective: To prevent birds and bats from entering or nesting in or on open vent stack equipment.

Open vent stack equipment, such as heater-treaters, separators, and dehydrator units, will be designed and constructed to prevent birds and bats from entering or nesting in or on such units and, to the extent practical, to discourage birds from perching on the stacks. Installing cone-shaped mesh covers on all open vents is one suggested method. Flat mesh covers are not expected to discourage perching and will not be acceptable.

Invasive and Non-Native Species

Objective: To discourage the spread of invasive, non-native plants.

Use of native or non-invasive plants in seeding mixtures will be encouraged to stabilize disturbed areas and during restoration activities. Construction sites will be surveyed for invasive species prior to ground disturbance. If invasive species are found, the proper control measures will be used to either eradicate the species from the area or minimize its spread to other areas. If cogongrass is found on site, equipment will be washed before exiting the site to prevent the spread of this highly invasive species to other locations. Post-construction monitoring for cogongrass and other invasive plant species should be conducted to ensure early detection control. In the case of split-estate lands, final seed mixtures will be formulated in consultation with the private landowner.

Pesticide Application

Objective: To protect the water quality of watersheds and natural stream substrate and morphology supporting special status species and their host species.

Any ground application of herbicides or other pesticides, sterilants, or adjuvants within 150 feet of listed species or habitat will require site-specific control measures developed in coordination or formal consultation with USFWS. No aerial application of herbicides or pesticides will be permitted.

APPENDIX C: AGENCY AND TRIBAL CORRESPONDENCE

United States Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States District Office
411 Briarwood Drive, Suite 404
Jackson, Mississippi 39206
http://www.es.blm.gov

IN REPLY REFER TO: 8100 (020)
JMS EOI 1838, St. Helena Parish

March 03, 2015

Ms Pam Breaux,
State Historic Preservation Officer
Department of Culture, Recreation & Tourism
P.O. Box 44247
Baton Rouge, LA 70804

Dear Ms. Breaux:

The Bureau of Land Management (BLM) has received an Expression of Interest (EOI 1838) to lease federal minerals under privately owned surface, i.e. split-estate minerals. The Bureau's Reasonably Foreseeable Development scenario (RFD) for this proposed lease is multiple wells, up to 14 over time, from two pads on private surface with no more than 15.84 acres total, including access road, gathering line and reserve pit, to be disturbed accessing federal minerals. The legal locations of the approximately 32.21 acres of federal mineral tracts are as follows (map enclosed):

St. Helena Meridian
St. Helena Parish (Gillsburg and Liverpool Quadrangles)
T. 1 S., R. 6 E., Sec. 6, Lot 3 (32.21 acres).

A review of the Louisiana Division of Archaeology site files shows sites within one mile of the proposed lease sale. Development locations have not been determined on a site-specific basis. Specific locations proposed for development are determined by the developer and surface owners. The BLM's surface responsibilities rest only within the boundaries of any proposed development.

The lease document will state that before the BLM approves any development proposal, a cultural resources survey that meets current professional standards and a report that meets Louisiana Division of Archaeology requirements will be required on a site-specific basis. The report must be approved by both the Louisiana Division of Archaeology and the BLM before any ground disturbing activities take place. Any needed consultation will be concluded before ground-disturbing activities begin.

Your concurrence of these procedures for Section 106 compliance is requested in 30 days. If you have any questions or concerns, please contact John M. Sullivan, Archeologist, at (601) 977-5439 or email at John_M_Sullivan@BLM.Gov.

Sincerely,

Duane Winters, Assistant Field Manager
Division of Lands and Renewable Resources

Enclosure
1 Map

Proposed Federal Oil and Gas Lease
EOI 1838

2,000 1,000 0 2,000 4,000 6,000 8,000 Feet

Proposed Lease Area

Proposed lease area
St. Halina Parish, Louisiana, St. Helena Meridian
T. 1S., R. 6E.,
Sec.6, Lot 3 - 32.21 acres

U.S. Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States Field Office
Jackson, Mississippi

This map contains portions of the following USGS 1:24,000 Topographic Quadrangles: Gillsburg, Liverpool

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual use or aggregate use with other data.

JAY DARDENNE
LIEUTENANT GOVERNOR

State of Louisiana

OFFICE OF THE LIEUTENANT GOVERNOR
DEPARTMENT OF CULTURE, RECREATION & TOURISM
OFFICE OF CULTURAL DEVELOPMENT
DIVISION OF ARCHAEOLOGY

CHARLES R. DAVIS
DEPUTY SECRETARY

PAM BREAUX
ASSISTANT SECRETARY

April 13, 2015

Mr. Duane Winters
United States Department of the Interior
Bureau of Land Management
Southeastern States Field Office
411 Briarwood Drive, Suite 404
Jackson, Mississippi 39206

Re: EOI 1838
St Helena Parish, LA

Dear Mr. Winters:

This is in response to your letter dated March 3, 2015, concerning the above referenced project. We concur with your recommendation that a survey should take place prior to any ground disturbing activities.

If you have any questions, please contact Rachel Watson in the Division of Archaeology at (225) 342-8165 or rwatson@crt.la.gov.

Sincerely,

Pam Breaux

Pam Breaux
State Historic Preservation Officer

PB:RW:s

P.O. BOX 44247 • BATON ROUGE, LOUISIANA 70804-4247
PHONE (225) 342-8170 • FAX (225) 342-4480 • WWW.CRT.LA.GOV/ARCHAEOLOGY

United States Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States District Office
411 Briarwood Drive, Suite 404
Jackson, Mississippi 39206
http://www.es.blm.gov

IN REPLY REFER TO: 8100 (020)
JMS EOI 1838, St. Helena Parish

March 03, 2015

Joey A. Barbry, Chairman
Tunica-Biloxi Tribe of Louisiana
P.O. Box 331
Marksville, Louisiana 70523

Dear Chairman Barbry:

The Bureau of Land Management (BLM) has received an Expression of Interest (EOI 1838) to lease federal minerals under privately owned surface, i.e. split-estate minerals. The Bureau's Reasonably Foreseeable Development scenario (RFD) for this proposed lease is multiple wells, up to 14 over time, from two pads on private surface with no more than 15.84 acres total, including access road, gathering line and reserve pit, to be disturbed accessing federal minerals. The legal locations of the approximately 32.21 acres of federal mineral tracts are as follows (map enclosed):

St. Helena Meridian
St. Helena Parish (Gillsburg and Liverpool Quadrangles)
T. 1 S., R. 6 E., Sec. 6, Lot 3 (32.21 acres).

A review of the Louisiana Division of Archaeology site files shows sites within one mile of the proposed lease sale. Development locations have not been determined on a site-specific basis. Specific locations proposed for development are determined by the developer and surface owners. The BLM's surface responsibilities rest only within the boundaries of any proposed development.

A section of the lease document will state that before the BLM approves any development proposal, a survey that meets current professional standards and a report that meets Louisiana Division of Archaeology requirements. The report must be approved by the Louisiana Division

of Archaeology, the BLM and any determinations your office may have before any ground disturbing activities take place. Any needed consultation will be concluded before ground-disturbing activities begin.

In addition, a stipulation will be included in the lease document which covers accidental discovery and requires additional consultation with you and the Louisiana Division of Archaeology. This stipulation will also be included in the permitting documents when, or if, a development proposal is submitted.

If you are aware of any sites within this proposed exploration area which is currently being used for religious purposes, or are recognized as sacred sites or traditional cultural properties (TCP's) on these privately owned lands, please let us know so that additional consultation can be conducted to avoid collateral impacts. As provided by law, any specific location information will be held in confidence. Your information is requested within 30 days.

If you have any questions or comments, please contact John M. Sullivan, Archeologist, at (601) 977-5439 or John_M_Sullivan@BLM.Gov.

Sincerely,

Bruce Dawson

Bruce Dawson
Field Manager

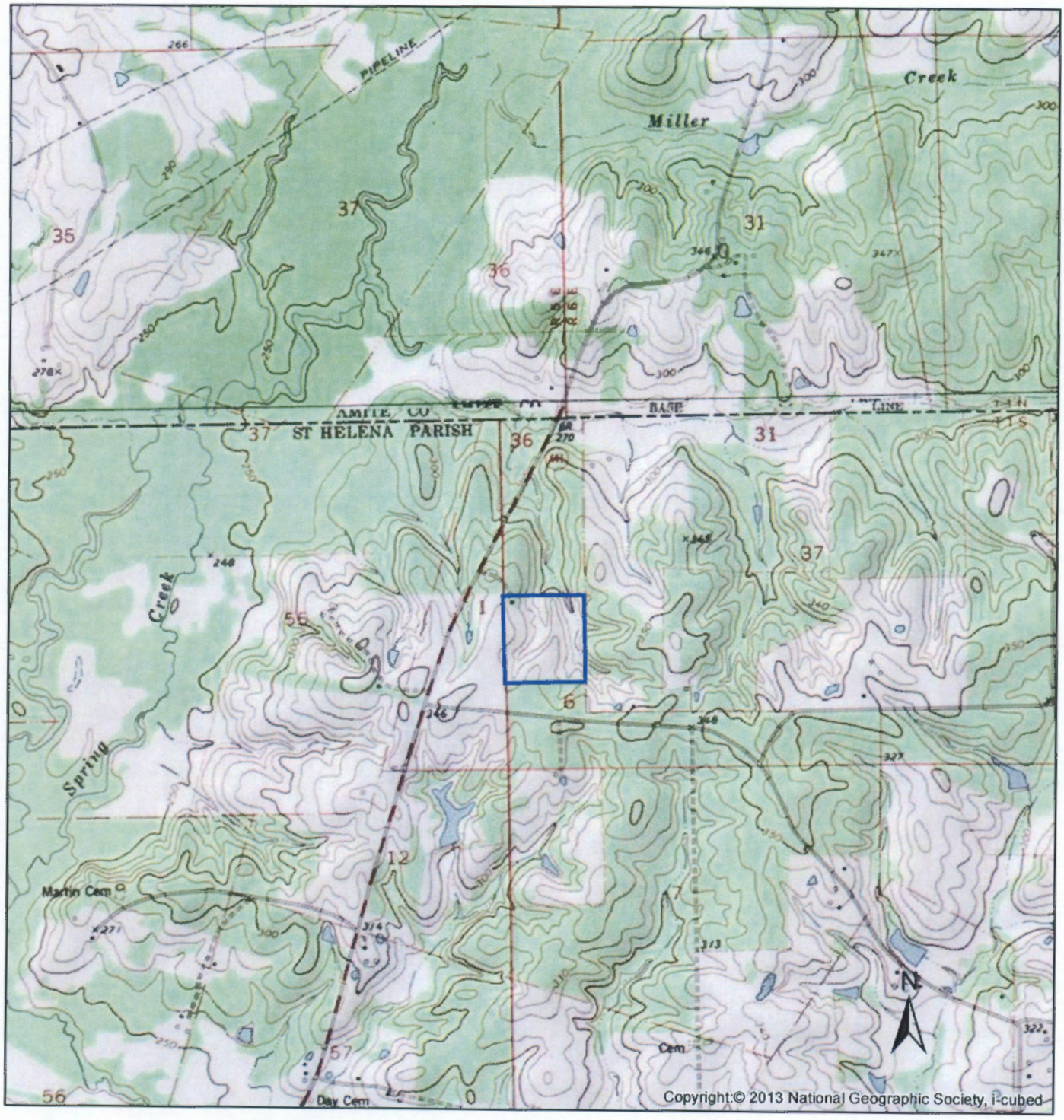
Enclosures
1 - Map

cc via email: Mr. Earl Barbry, Jr., THPO

Original to:	**cc: to these:**
Joey A. Barbry, Chairman Tunica-Biloxi Tribe of Louisiana P.O. Box 331 Marksville, Louisiana 70523	Mr. Earl Barbry, Jr., THPO Tunica - Biloxi Tribe 151 Melacon Dr. Marksville, LA 71351 earlii@tunica.org
Lovelin Poncho, Chairman Coushatta Indian Tribe P.O. Box 818 Elton, LA 70532	Send Hard Copy to Mike Tarpley Linda Langley, THPO Mike Tarpley, Deputy THPO P.O. Box 818 Elton, LA 70532 llangley@mcneese.edu; kokua.aina57@gmail.com
B. Cheryl Smith, Chief Jena Band of Choctaw P.O. Box 2717 Jena LA 71342	Alina J. Shively, Deputy THPO P.O. Box 14 Jena, LA 71342 (318) 992-1205 ashively@jenachoctaw.org
Phyliss J. Anderson, Chief Mississippi Band of Choctaw Indians P.O. Box 6010 Philadelphia, MS 39350	Mr. Ken Carleton, Tribal Historic Preservation Officer Mississippi Band of Choctaw Indians P.O. Box 6257 Philadelphia, MS 39350 kcarleton@choctaw.org
Only send email to Preservation Officer Gary Batton, Chief Choctaw Nation of Oklahoma Drawer 1210 Durant, Oklahoma 74702-1210	Ian Thompson PhD, RPA, THPO, Tribal Archaeologist, Director Historic Preservation Dept. Lindsey Bilyeu, Section 106 580-775-0914, 580-920-3181 (Fax) 1-800-522-6170 ext. 2216 P.O. Drawer 1210 Durant, OK 74702 ithompson@choctawnation.com; lbilyeu@choctawnation.com
Only send email to Preservation Officer Colabe III Clem Sylestine, Principal Chief Alabama-Coushatta Tribe of Texas 571 State Park Road 56 Livingston, TX 77351	Bryant J. Celestine, Historic Preservation Office Alabama-Coushatta Tribe of Texas 571 State Park Road 56 Livingston, TX 77351 celestine.bryant@actribe.org
George Scott, Mekko Thlopthlocco Tribal Town P.O. Box 188 Okemah, Oklahoma 74859 918-560-6198	Charles Coleman, THPO P.O. Box 188 Okemah, Oklahoma 74859 chascoleman75@yahoo.com 405-220-2185 (cell) 405-786-2579 (office/home)

Original to:	**cc: to these**:
Mekko Jeremiah Hobia Kialagee Tribal Town P.O. Box 332 Wetumka, OK 74883 Tel# (405) 452-3263, Fax# 452-3413 jeremiah.hobia@kialegeetribe.net	

Proposed Federal Oil and Gas Lease
EOI 1838



2,000 1,000 0 2,000 4,000 6,000 8,000 Feet

Proposed Lease Area

Proposed lease area
St. Halina Parish, Louisiana, St. Helena Meridian
T. 1S., R. 6E.,
Sec.6, Lot 3 - 32.21 acres

U.S. Department of the Interior
Bureau of Land Management
Eastern States
Southeastern States Field Office
Jackson, Mississippi

This map contains portions of the following USGS 1:24,000 Topographic Quadrangles: Gillsburg, Liverpool

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual use or aggregate use with other data.

APPENDIX D: PUBLIC NOTICE

STATE OF MISSISSIPPI,
COUNTY OF PIKE

PERSONALLY CAME before me, the undersigned, a notary public in and for PIKE County, Mississippi, the CLERK of the McCOMB ENTERPRISE-JOURNAL, a newspaper published in the City of McComb, Pike County, in said state who being duly sworn, deposes and says that the McCOMB ENTERPRISE-JOURNAL is a newspaper as defined and prescribed in Senate Bill No. 203 enacted at the regular session of the Mississippi Legislature of 1948, amending Section 1858, of the Mississippi Code of 1942, and that the publication of a notice, of which the annexed is a copy in the matter of Wilkinson Co. 39.83 acres
St. Helena Parish 32.21 acres

LEGAL NOTICE

The Bureau of Land Management, Southeastern States District Office will prepare an environmental assessment document to consider leasing federally owned mineral estate under two parcels for oil and gas exploration and development. The locations of the parcels are: T2N, R1E, Sec. 19, SWNW, Washington Meridian, Wilkinson County, Mississippi (39.83 acres) and T1S, R6E, Sec.6, Lot 3, St. Helena Meridian, St. Helena Parish, Louisiana (32.21 acres).

The analysis will be prepared by an interdisciplinary team. An issue to be addressed by the team is to identify environmental impacts, and what restrictions may be necessary to avoid or mitigate identified impacts. The public is invited to participate by submitting comments on environmental issues with land use or by submitting other issues for consideration with the land use. Comments will be accepted through December 23, 2015. Send comments to Bureau of Land Management, Southeastern States District Office, 411 Briarwood Drive, Suite 404, Jackson, MS 39206.

For further information contact Alison McCartney with the Southeastern States District Office at (601) 977-5431.

Bruce E. Dawson
Field Manager

has been made in said paper 1 times consecutively, to wit:

On the 24 day of Nov., 20 15

On the _____ day of _____, 20 _____

On the _____ day of _____, 20 _____

On the _____ day of _____, 20 _____

On the _____ day of _____, 20 _____

On the _____ day of _____, 20 _____

On the _____ day of _____, 20 _____

SWORN TO and subscribed before me, this

9 day of Nov., 2015

Kim Golden
Notary Public

Clerk

My Commission Expires: June 19, 2017

STATE OF MISSISSIPPI NOTARY PUBLIC ID # 105833 KIM GOLDEN Commission Expires June 19, 2017 PIKE COUNTY

McComb, Miss. _____, 20 _____

To McComb Enterprise-Journal

TO PUBLISHING _____

case of _____

_____ words space _____

_____ times and making proof, $ 24.24.

RECEIVED OF _____

payment in full of the above account.

_____, 20 _____

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