

**Department of the Interior
Bureau of Land Management**

**Carlsbad Field Office
Carlsbad, New Mexico**

**October 2009 Competitive Oil and Gas Lease Sale
NEPA Log Number DOI-BLM-NM-P020-2009-0842-EA**

Finding of No Significant Impact and Decision Record

Finding of No Significant Impact

Alternative C – Preferred Action has been reviewed and determined to be consistent with these plans (43 CFR 1610.5).

Impact identification and analysis of approving the project proposal and/or alternative(s) has been completed. Environmental analysis has been conducted based on available inventory and monitoring data files. An environmental assessment (EA) has been prepared and revised as necessary. Alternative C – Preferred Alternative conforms with and is within the scope of the land use decisions described and analyzed in the Carlsbad Resource Area Resource Management Plan (RMP) and Final Environmental Impact Statement (BLM February 1986) and the Carlsbad Resource Area Resource Management Plan Amendment (RMPA) and Final Environmental Impact Statement for Oil and Gas Resources (BLM January 1997), which were approved as the Final RMP and RMPA for the BLM-CFO by the Record of Decisions (ROD) signed September 30, 1988 and October 10, 1997 respectively. The Special Status Species RMPA Record of Decision was signed 2 May 2008 and amends the RMP and RMPA in portions of Chaves, Eddy, Lea and Roosevelt Counties, New Mexico, with reference to Planning Areas as described in that document. Implementation of required stipulations and/or mitigating measures, will maintain impacts within those levels analyzed in the RMP and RMPAs.

Environmental impacts associated with Alternative C – Preferred Action have been assessed. Based on the analysis provided in the attached EA, I conclude the approved action is not a major federal action and will result in no significant impacts to the environment under the criteria in Title 40 Code of Federal Regulations 1508.18 and 1508.27. It has been determined that the quality of the human environment will not be significantly impacted as a result of this decision. Therefore, preparation of an Environmental Impact Statement to further analyze possible impacts pursuant to Section 102(2)(c) of the National Environmental Policy Act of 1969 is not required.

Decision:

Eighteen parcels with a total of 7205.08 acres were nominated; seven parcels were deleted from the sale for the following reasons:

Parcel-031: Parcel -031 is located on Bureau of Reclamation (Reclamation) managed surface. Reclamation is in the process of amending their Resource Management Plan. This parcel will be deferred until after the Reclamation Resource Management Plan Amendment has been

completed. Once completed, the parcel if resubmitted will be analyzed again to see if there are any impacts to the resources in the area.

Parcels -110, -111, -112, -113, -114, and -115, contain occupied Lesser Prairie-Chicken (LPC) habitat in the Primary Population Area as described in the Special Status Species RMPA and are to be deferred from leasing for the life of the Special Status Species RMPA and thus have been deleted from the list of available parcels.

Therefore, based upon the analysis, it is my decision to recommend that the New Mexico State Office of the Bureau of Land Management (BLM) offer for oil and gas leasing eleven parcels of federal minerals covering 2609.02 acres administered by the Carlsbad Field Office (CFO) (Alternative C – Preferred Action). Standard terms and conditions as well as the following special stipulations would apply.

All remaining eleven parcels contain a special Cultural Resources Lease Notice stating that all development activities proposed under the authority of these leases are subject to compliances with Section 106 of the NHPA and Executive Order 13007.

The remaining parcels are to be leased with additional stipulations as shown in Appendix 1 of the EA and include the following:

NMLN-11	Special Cultural Resource Lease Notice
SENM-S-21	Caves and Karst
SENM-LN-1	Cave-Karst Occurrence Area
SENM-S-18	Streams, Rivers, and Floodplains-Floodplain
SENM-S-19	Playas and Alkali Lakes-Playas
SENM-S-20	Springs, Seeps and Tanks-Earthen Reservoir
SENM-S-25	Visual Resource Management

No additional mitigation measures are necessary.

Rationale:

The parcels described in Appendix 1 of the EA were reviewed by an interdisciplinary group of specialists at the CFO. The purpose of the review was to determine if the parcels were in areas open to oil and gas leasing; if leasing was in conformance with the existing RMP and Amendments; if new information had been developed which might affect leasing suitability; to ensure that appropriate lease stipulations were attached to each lease parcel; and to verify that appropriate consultations had been conducted.

Approval of this Preferred Alternative will allow the BLM to lease these parcels for oil and gas on lands leased under the Leasing Law of 1920 as amended and the Federal Onshore Oil and Gas Leasing Reform Act of 1987. The attached leasing stipulations will minimize environmental concerns on a lease-wide level. While potential site-specific lease analysis for surface disturbing activities was analyzed in the EA, this does not preclude CFO from conducting site-specific surface moves or adjustments on the ground mainly due to environmental conditions at any given

location. The determining factors weighed by the BLM in reaching a finding of no significant impact are provided below:

- There are no major issues involved.
- There are no unique characteristics within the project area to be affected (e.g., park lands, wetlands, prime farm lands).
- There are no adverse impacts to endangered or threatened plant or animal species or their habitats.
- The project and its potential effects on the quality of the human environment are neither controversial nor do they involve unique or unknown results.
- The proposal is in conformance with all Federal, State, and local planning and laws, imposed for the protection of the environment.

Administrative Review and Appeal:

This protest process for this Decision Record has been instituted to reconcile differences between oil and gas lease sale and NEPA regulations; and improve the opportunities for public input into agency decisions. This Decision Record for the Environmental Assessment must be protested under 43 CFR 3120.1-3. Protests must be received within 30 days of the signed decision record. You may file a protest by mail, in hardcopy form or by telefax. You may not file a protest sent to a fax number other than the fax number identified below. Any protests filed by electronic mail will be dismissed. A protest filed by fax must be sent to (505) 438-7458 or by mail to: BLM New Mexico, 1474 Rodeo Road, PO Box 27115, Santa Fe, NM 87502 Attn: Minerals-Protests.

A protest must state the interest of the protesting party in the matter. The protest must also include any statement of reasons to support the protest. We will dismiss a late-filed protest or a protest filed without a statement of reasons.

If the party signing a protest is doing so on behalf of an association, partnership or corporations, the signing party must reveal the relationship between them. Before including your phone number, e-mail address, or other personal identifying information in your protest, you should be aware that your entire protest – including your personal identifying information – may be made publicly available at any time. While you can ask us in your protest to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Approved by:

/s/ Jim Stovall
Jim Stovall
Field Manager
Carlsbad Field Office

Date: 10 August 2009

**BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE**

**ENVIRONMENTAL ASSESSMENT FOR
October 2009 COMPETITIVE OIL AND GAS LEASE SALE**

DOI-BLM-NM-P020-2009-0842-EA

1.0 Introduction

It is the policy of the Bureau of Land Management (BLM) as derived from various laws, including the Mineral Leasing Act of 1920 and the Federal Land Policy and Management Act of 1976, to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs.

The BLM New Mexico State Office (NMSO) conducts a quarterly competitive lease sale to sell available oil and gas lease parcels in New Mexico, Oklahoma, Texas, and Kansas. A Notice of Competitive Lease Sale, which lists lease parcels to be offered at the auction, is published by the BLM State Office at least 45 days before the auction is held. The decision as to which public lands and minerals are open for leasing and what leasing stipulations may be necessary, based on information available at the time, is made during the land use planning process. Surface management of non-BLM administered lands overlaying federal minerals is determined by BLM in consultation with the appropriate surface management agency or the private surface owner.

In the process of preparing a lease sale the BLM State Office sends a draft parcel list to each field office where the parcels are located. Field Office staff then review the legal descriptions of the parcels to determine if they are in areas open to leasing; if appropriate stipulations have been included; if new information has become available which might change any analysis conducted during the planning process; if appropriate consultations have been conducted, and if there are special resource conditions of which potential bidders should be made aware.

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

The following Environmental Assessment (EA) documents the Carlsbad Field Office (CFO) review of the eighteen parcels offered in the October 2009 Competitive Oil and Gas Lease Sale that are under the administration of the CFO. It serves to verify conformance with the approved land use plan and provides the rationale for deferring or dropping parcels from a lease sale as well as providing rationale for attaching additional lease stipulations to specific parcels.

1.1 Purpose and Need

The purpose of offering parcels for competitive oil and gas leasing is to allow private individuals or companies to explore for and develop oil and gas resources for sale on public markets. The

sale of oil and gas leases is needed to meet the growing energy needs of the United States public. New Mexico is a major source of natural gas for heating and electrical energy production in the lower 48 states, especially California. Continued leasing is necessary to maintain options for production as oil and gas companies seek new areas for production or attempt to develop previously inaccessible or uneconomical reserves.

1.2 Conformance with Applicable Land Use Plans

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this EA tiers to and incorporates by reference the information and analysis contained in the September 1986 Carlsbad Resource Area Proposed Resource Management Plan/Final Environmental Impact Statement (RMP), the January 1997 Carlsbad Proposed Resource Area Proposed Resource Management Plan Amendment/Final Environmental Impact Statement (RMPA) for the management of oil and gas resources, and the November 2007 Pecos District Special Status Species RMPA.

The Final RMP and RMPAs were approved by Record of Decision (ROD) signed 30 September 1988, 10 October 1997 and 2 May 2008, respectively. The 1997 RMPA designated 3.9 million acres of federal minerals open for continued oil and gas development and leasing under Standard Terms and Conditions. The 1997 RMPA described specific stipulations that would be attached to new leases offered in certain areas. All of the parcels to be offered in the October 2009 sale are within areas open to oil and gas leasing.

Site specific analysis as required by the National Environmental Policy Act (NEPA) of 1969, as amended (Public Law 91-90, 42 USC 4321 et seq.) was conducted by CFO resource specialists who relied on personal knowledge of the areas involved or reviewed existing databases and file information to determine if appropriate stipulations had been attached to specific parcels.

At the time of this review, it is not known whether a parcel will be sold, a lease issued or when, where or if future well sites or roads might be proposed. Detailed site specific analysis of individual wells or roads would occur when an Application for Permit to Drill (APD) is submitted.

The Energy Policy Act of 2005 categorically excludes certain oil and gas development activities from further NEPA analysis. However, excluded projects must conform with the applicable RMP including any restrictions to development presented in the Plan.

The proposed project is not in conflict with any local, county, or state plans.

The critical elements subject to requirements specified in statute, regulation, or executive order listed below are either not present or not affected by the proposed action or alternatives:

Hazardous/Solid Wastes
Prime/Unique Farmlands
Wild & Scenic Rivers
Wilderness

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

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

In preparation for the 1997 RMPA, the US Fish and Wildlife Service (USFWS) concurred with CFO biologists with a determination of no effect or not likely to adversely affect T&E species. USFWS response is found in Appendix 4 of the ROD for the RMPA, dated 30 April 1997. No further consultation with the USFWS is needed at this stage for any of the proposed parcels.

In April 2008, the BLM Pecos District Special Status Species RMPA amended the Carlsbad RMP in portions of the CFO with references to the Planning Area, as described in that document, to ensure continued habitat protection of two special status species, the lesser prairie-chicken (*Tympanuchus pallidicinctus*) (LPC) and the sand dune lizard (*Sceloporus arenicolus*) (SDL). This action is in compliance with threatened and endangered species management outlined in the September 2006 (Cons. #22420-2007-TA-0033) Biological Assessments and in accordance with the requirements of the Federal Land Policy and Management Act (FLMPA) of 1976 and the National Environmental Policy Act (NEPA) of 1969.

Federal regulations and policies require the BLM to make its public land and resources available based on the principle of multiple-use. At the same time, it is BLM policy to conserve special status species and their habitats, and ensure that actions authorized by the BLM do not contribute to the need for the species to become listed as threatened or endangered by the USFWS.

Compliance with Section 106 responsibilities of the National Historic Preservation Act (NHPA) are adhered to by following the BLM – New Mexico SHPO protocol agreement, which is authorized by the National Programmatic Agreement between the *BLM*, the *Advisory Council on Historic Preservation*, and the *National Conference of State Historic Preservation Officers*, and other applicable BLM handbooks. When draft parcel locations are received by the CFO, cultural resource staff review the locations to determine if any are within known areas of concern.

Native American consultation is conducted by certified mail regarding each lease sale activity. If Traditional Cultural Properties (TCP) or heritage related issues are identified, such parcels are withheld from the sale while letters requesting information, comments, or concerns are sent to the Native American representative. If the same draft parcels appear in a future sale, a second request for information is sent to the same recipients and the parcels will be held back again. If no response to the second letter is received, the parcels are allowed to be offered in the next sale. If responses are received, BLM cultural resources staff will discuss the information or issues of concern with the Native American representative to determine if all or only portions of a parcel need to be withdrawn from the sale or if special stipulations need to be attached as lease stipulations. Native American consultation letters for the October 2009 Lease Sale were sent 14 July 2009. To date, no responses with concerns from Tribes have been received.

In Section 1835 of the Energy Policy Act of 2005 (43 U.S.C. 15801), Congress directed the Secretary of the Interior to review current policies and practices with respect to management of

Federal subsurface oil and gas development activities and their effects on the privately-owned surface. The Split Estate Report, submitted in December 2006, documents the findings resulting from consultation on the split estate issue with affected private surface owners, the oil and gas industry, and other interested parties.

In 2007, the Legislature of the State of New Mexico passed the Surface Owners Protection Act. This Act requires operators to provide the surface owner at least 5 business days notice prior to initial entry upon the land for activities that do not disturb the surface; and provide at least 30 days notice prior to conducting actual oil and gas operations. At the New Mexico Federal Competitive Oil and Gas Lease Sale conducted on October 17, 2007, the BLM announced the implementation of this policy. Included in this policy is the implementation of a Notice to Lessees (NTL), a requirement of lessees and operators of onshore Federal oil and gas leases within the State of New Mexico to provide the BLM with the names and addresses of the surface owner(s) of those lands where the Federal Government is not the surface owner, not including lands where another Federal agency manages the surface.

The New Mexico State BLM office will then contact the surface owners and notify them of the expression of interest and the date the oil and gas rights will be offered for competitive bidding. The BLM will provide the surface owners with its internet web address so they may obtain additional information related to the oil and gas leasing process, the imposition of any special stipulations on that lease parcel, Federal and State regulations, and Best Management Practices. The surface owner(s) may elect to protest the leasing of the minerals underlying their surface. If the BLM receives a protest, the parcel will remain on the lease sale; however, the BLM will resolve any protest prior to issuing an oil and gas lease for that parcel. If the protest is upheld, the BLM will return the payments received from the successful bidder for that parcel. After the lease sale has occurred, the BLM will post the results on its website. The surface owner may access the BLM's website to learn of the results of the lease sale.

2.0 Alternatives Including the Proposed Action

2.1 Alternative A – No Action

The BLM NEPA Handbook (H-1790-1) states that for EAs on externally initiated proposed actions, the No Action Alternative generally means that the proposed action would not take place. In the case of a lease sale, this would mean that an expression of interest to lease (parcel nomination) would be denied or rejected.

The No Action alternative would withdraw all eighteen lease parcels from the October 2009 lease sale. The parcels would remain available for inclusion in future lease sales. Surface management would remain the same and ongoing oil and gas development would continue on surrounding federal, private and state leases.

No mitigation measures would be required as no new oil and gas development would occur on the un-leased lands. No rental or royalty payments would be made to the federal government.

If the BLM does not lease these Federal minerals, an assumption is that it is not expected that demand would decrease for oil and gas. Demand would likely be addressed through production elsewhere or imports.

2.2 Alternative B – Proposed Action

The Proposed Action would be a recommendation to the State Director that BLM offer for oil and gas leasing eighteen parcels of federal minerals covering 7205.08 acres administered by the CFO. Standard terms and conditions as well as special stipulations listed in the RMPAs would apply. The number of parcels and acres are the same in both Alternatives A and B.

All original eighteen parcels, totaling 7205.08 acres, contain a special Cultural Resources Lease Notice stating that all development activities proposed under the authority of these leases are subject to compliances with Section 106 of the NHPA and Executive Order 13007.

Once sold, the lease purchaser has the right to use so much of the leased lands as is reasonably necessary to explore and drill for all of the oil and gas within the lease boundaries, subject to the stipulations attached to the lease (43 CFR 3101). Oil and gas leases are issued for a 10-year period and continue for as long thereafter as oil or gas is produced in paying quantities. If a lease holder fails to produce oil and gas, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease; ownership of the minerals leased revert back to the federal government and the lease can be resold.

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

The Proposed Action includes parcels that were recommended for deferment or deletion in Alternative C-Preferred Action. These parcels include:

Parcel-031: Parcel -031 is located on Bureau of Reclamation (Reclamation) managed surface. Reclamation is in the process of amending their Resource Management Plan. This parcel will be deferred until after the Reclamation Resource Management Plan Amendment has been completed. Once completed, the parcel if resubmitted will be analyzed again to see if there are any impacts to the resources in the area.

Parcels -110, -111, -112, -113, -114, and -115, contain occupied Lesser Prairie-Chicken (LPC) habitat in the Primary Population Area as described in the Special Status Species RMPA. The prescription for these parcels, as described in the RMPA, is to defer these parcels for the life of the plan and thusly is to be deleted from the list of available parcels.

2.3 Alternative C – Preferred Action

Alternative C would be a recommendation to the State Director that BLM offer for oil and gas leasing eleven parcels of federal minerals covering 2609.02 acres administered by the CFO. Standard terms and conditions as well as special stipulations listed in the RMP and RMPAs would apply. The Preferred Action conforms to the RMP and RMPAs decisions and resource issues.

The Preferred Action does not include the following parcels which were deferred or deleted below:

Parcel-031: Parcel -031 is located on Bureau of Reclamation (Reclamation) managed surface. Reclamation is in the process of amending their Resource Management Plan. This parcel will be deferred until after the Reclamation Resource Management Plan Amendment has been completed. Once completed, the parcel if resubmitted will be analyzed again to see if there are any impacts to the resources in the area.

Parcels -110, -111, -112, -113, -114, and -115, contain occupied Lesser Prairie-Chicken (LPC) habitat in the Primary Population Area as described in the Special Status Species RMPA. The prescription for these parcels, as described in the RMPA, is to defer these parcels for the life of the plan and thus is to be deleted from the list of available parcels.

All eleven parcels contain a special Cultural Resources Lease Notice stating that all development activities proposed under the authority of these leases are subject to compliance with Section 106 of the NHPA and Executive Order 13007. Standard terms and conditions as well as special stipulations listed in the RMP would apply.

Each of the eleven parcels to be leased have one or more of the following stipulations attached to the lease as shown in Appendix 1 of the EA and include the following:

NMLN-11	Special Cultural Resource Lease Notice
SENM-S-21	Caves and Karst
SENM-LN-1	Cave-Karst Occurrence Area
SENM-S-18	Streams, Rivers, and Floodplains-Floodplain
SENM-S-19	Playas and Alkali Lakes-Playas
SENM-S-20	Springs, Seeps and Tanks-Earthen Reservoir
SENM-S-25	Visual Resource Management

No additional mitigation measures are necessary.

3.0 Description of Affected Environment

This section describes the environment that would be affected by implementation of **Alternative C – Preferred Action** in Section 2.3 above. Aspects of the affected environment described in this section focus on the relevant major resources or issues. Certain critical environmental components require analysis under BLM policy. Only those aspects of the affected environment that are potentially impacted are described in detail in this chapter.

The proposed project area is located within Eddy and Lea Counties primarily on lands administered by the BLM.

All of the private surfaces encumbered by this project have mineral estates that are federally owned and administered by the BLM. Use of public land consists mainly of recreation, agriculture, potash mining, and oil and gas exploration and production.

Certain critical environmental components require analysis under BLM policy. Those critical environmental components are analyzed in Chapter 4 of this document. Unless otherwise noted individually, only those parcels offered for lease are described with their accompanying stipulations.

New information about Green House Gases (GHGs) and their effects on national and global climate conditions has emerged since the RMP and Amendments were prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), water vapor, and several trace gasses on global climate. Through complex interactions on a global scale, GHG emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming.

3.1 Air Quality

Regulation of air quality is delegated to some states. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. The area of Alternative C – Preferred Alternative is considered a Class II air quality area. A Class II area allows moderate amounts of air quality degradation. The primary sources of air pollution are dust from blowing wind on disturbed or exposed soil and exhaust emissions from motorized equipment.

Air quality in the areas of the proposed lease tracts is generally good. None of the potential lease tracts are located in any of the areas designated by the Environmental Protection Agency (EPA) as “non-attainment areas” for any listed pollutants regulated by the Clean Air Act.

3.2 Climate Change

In addition to the air quality information in the RMPs cited above, new information about greenhouse gases (GHGs) and their effects on national and global climate conditions has emerged since the RMPs were prepared. Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies, 2007). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Without additional meteorological monitoring and modeling systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions; what is known is that increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2001, the Intergovernmental Panel on Climate Change (IPCC) predicted that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2006) supports these predictions, but has acknowledged that there are uncertainties regarding how climate change may affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum

temperatures is more likely than increases in daily maximum temperatures. It is not, however, possible at this time to predict with any certainty the causal connection of site specific emissions from sources to impacts on the global/regional climate relative to the Alternative C – Preferred Alternative and subsequent actions of oil and gas development.

Mean annual temperatures have risen across New Mexico and the southwestern U.S. since the early 20th century. When compared to baseline information, periods between 1991 and 2005 show temperature increases in over 95% of the geographical area of New Mexico. Warming is greatest in the northwestern, central, and southwestern parts of the state. Recurrent research has indicated that predicting the future effects of climate change and subsequent challenges of managing resources in the Southwest is not feasible at this time (USFS, 2008). However, it has been noted that forests at higher elevations in New Mexico, for example, have been exposed to warmer and drier conditions over a ten year period. Should the trend continue, the habitats and identified drought sensitive species in these forested areas and higher elevations may also be affected by climate change (Enquist and Gori).

This EA incorporates a subsequent analysis of the contributions of Alternative C – Preferred Alternative to GHG emissions and a general discussion of potential impacts to climate.

3.3 Soils

Based on soil survey manuals, the Carlsbad Resource Management Area can be divided into four general soil types as stated in Soil Survey: Eddy Area, New Mexico. These are shallow, loamy, sandy, and gypsum.

The shallow type is primarily soils of the Ector and Upton series. Several other minor soil mapping units are found in this type. These soils are shallow to very shallow, well-drained, calcareous, stony and rocky loams over limestone and caliche. Topography ranges from nearly level ridgetops to steep side slopes to cliffs and escarpments. Permeability is moderate, water-holding capacity is very low to low, and runoff is rapid after the soils become saturated. They are subject to water erosion, but the stones and rock outcrops help to stabilize the soils on nearly level to gently sloping areas.

Loamy soils are mainly in the Reagan, Reeves, and Anthony series, while other minor soil mapping units also occur within this type. Generally these soils are deep, well-drained, moderately dark colored, calcareous, and loamy, occurring on gently undulating plains and in the broader valleys of the hills and mountains. Permeability is moderate, water-holding capacity is moderate to high, and runoff is likely after prolonged or heavy rains.

The sandy type has predominately soils from the Pyote, Kermit, Berino, Pajarito, and Wink series. Other soil mapping units make up a minor part of this type. Typically, these soils are deep, well-drained to excessively drained, non-calcareous to weakly calcareous sands. They are found on undulating plains and low hills in the “sand country” east of the Pecos River. Permeability is moderate to very rapid, water-holding capacity is low to moderate, and little runoff occurs.

Gypsum soils are primarily in the Cottonwood and Gypsum land series. These soils have a loamy surface layer, with gypsiferous materials starting at a depth of 1 to 10 inches. They are found on gently undulating uplands, with steep, broken gypsum outcrops occurring in places. Permeability varies from very low to moderate, water-holding capacity is very low to low, and runoff rapid to very rapid. Soil fertility and the rooting zone are limited by the underlying gypsiferous material.

All of the aforementioned soil types are susceptible to wind erosion and careful management is needed to maintain a cover of desirable forage plants and to control erosion. Revegetation is difficult once the native plant cover is lost, due to high temperatures and unpredictable rainfall.

Biological soil crusts can be found within the project area. These include cyanobacteria, squamulose and gelatinous lichen. These biological soil crusts, while abundant in some locations, are scattered throughout the project area.

Cyanobacteria are the most common in the project area. These soil crusts are important in binding loose soil particles together to stabilize the soil surface and reduce erosion. They also function in the nutrient cycle by fixing atmospheric nitrogen, contributing to soil organic matter, and maintaining soil moisture. In addition, they can act as living mulch that discourages the establishment of annual or invasive weeds.

Structurally, cyanobacteria form an uneven, rough carpet that reduces raindrop impact and slows surface runoff. Below the surface, lichen, rhizines, and cyanobacterial filaments act to bind the soil surface particles just below and at the surface. Horizontally, they occur in nutrient-poor areas between plant clumps. Because they lack a waxy epidermis, they tend to leak nutrients into the surrounding soil. Vascular plants such as grasses and forbs can then utilize these nutrients. Once disturbed, these crusts, particularly the lichens, take from 10 to 100 years to recover, based on the severity of the disturbance and the type of crust.

While they occur in the top 4 mm of the soil, this type of soil crust is important in binding loose soil particles together to stabilize the soil surface and reduce erosion. The cyanobacteria also function in the nutrient cycle by fixing atmospheric nitrogen, contributing to soil organic matter, and maintaining soil moisture. Cyanobacteria are mobile, and can often move up through disturbed sediments to reach light levels necessary for photosynthesis. Horizontally, they occur in nutrient-poor areas between plant clumps. Because they lack a waxy epidermis, they tend to leak nutrients into the surrounding soil. Vascular plants such as grasses and forbs can then utilize these nutrients.

3.4 Vegetation

In general, the project areas are a grassland site with warm season mid and short grass aspect. There is a fair scattering of shrubs and half-shrubs throughout the landscape, and in places shrubs have invaded to the point of dominating the vegetative component. Forb production fluctuates from season to season and year to year.

The majority of the shallow type is made up of the gravelly, shallow, very shallow, and limestone hills range sites. The potential plant community consists primarily of grasses such as black grama, sideoats grama, hairy grama, muhlys, dropseeds, and tridens. Cresotebush,

mesquite, mariola, and catclaw mimosa also occur on the site. Yucca, sacahuista, mariola, and catclaw mimosa become more prevalent on north and east slopes. In deteriorated condition, this site will show an increase in woody plants and grasses such as threeawns, fluffgrass, and hairy tridens.

Range sites such as loamy, swale, bottomland, and draw make up most of the loamy type. The potential plant community consists of blue grama, black grama, sideoats grama, and tobosa. Fourwing saltbush, tarbush, and yucca are the principal shrubs. Forbs include croton, filaree, globemallow, and desert holly. Invasive species such as three-awns, burrograss, snakeweed, mesquite, creosote, and cholla cactus increase as ecological condition decreases.

The sandy type is dominated by deep sand, sand hills, and sandy range sites. The potential plant community consists of dropseeds (sand, spike, and mesa), bluestems, and black grama. Yucca, fourwing saltbush, and shinnery oak are the principle shrub species. As deterioration occurs, plants such as threeawn grass and mesquite will increase and soil hummocking will occur.

Gypsum hills and gypsum flats are the range sites occurring in gypsum type. The potential plant community consists of gyp grama, gyp dropseed, coldenia, yucca, and ephedra. Black grama, blue grama, alkali sacaton, tobosa, and fourwing saltbush can be found in the loamy pockets included in the gypsum areas. Tarbush, broom snakeweed, and mesquite invade in disturbed areas.

3.5 Visual Resources

The proposed lease parcels fall under one of the four categories of Visual Resource Management Objectives. Each of the different class objectives are described below with the appropriate lease parcels noted.

Class I Objective: The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

The following leases parcels are within Class I Objectives: None

Class II Objective: The objective to this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

The following lease parcel is within Class II Objectives: Parcel -055 has the western half of the parcel within a VRM II as described: T. 26 S., R. 29 E., NMPM
SW¹/₄ NE¹/₄, SE¹/₄NW¹/₄, E¹/₂SW¹/₄

The remainder of Parcel -055 falls within a VRM IV Objective.

Class III Objective: The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

The following lease parcels are within Class III Objectives: Parcels -025, -026, -027, -028, and -029

Class IV Objective: The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

All remaining lease parcels fall within Class IV Objectives.

3.6 Recreation

The proposed lease parcels are all within dispersed recreation areas subject to public use. Dispersed recreation areas are areas that are used by recreationists as they desire. The Carlsbad Field Office is flanked on the west by the Guadalupe Mountains. The Pecos River Valley cuts the resource area roughly in half. The river is favored by the public for fishing, camping, hunting, and other outdoor recreation activities. The sand dunes east of Carlsbad include two Off-Highway Vehicle sites. Every area has a different setting and may be used in a different way. Activities from hunting and four-wheeling to hiking and bird watching occur in dispersed recreation areas.

3.7 Wildlife

Mammals known to occur throughout the field office include, but are not limited to various species of bats, desert cottontail, black-tailed jackrabbit, spotted ground squirrel, rock squirrel, pocket gopher, porcupine, coyote, gray fox, bobcat, raccoon, striped skunk, spotted skunk, mule deer, pronghorn, wood rat, and various other small rodents. Upland game bird species may include, but are not limited to, scaled quail, bobwhite quail, mourning dove, and lesser prairie-chicken. Several raptors inhabit the area, including but not limited to, Harris Hawk, Swainson's hawk, and the western burrowing owl.

Migratory Birds

Executive order #13186 titled "Responsibilities of Federal Agencies to Protect Migratory Birds" signed 1/10/01 requires that the BLM evaluate the effects of federal actions on migratory birds. A migratory bird inventory has not been completed for this area. Common migratory birds which may use the area as habitat include various species of song birds, owls, ravens, hawks, finches, doves, thrashers, and meadow larks.

Water is a limiting factor for many animal species in the desert. There are numerous wildlife water developments scattered throughout the field office that have been installed for water distribution and availability for wildlife during dry times.

For the October 2009 Lease Sale, there are no documented wildlife water units on any offered parcels.

3.8 Special Status Species

Special status species of concern in this area include the lesser prairie-chicken and sand dune lizard which are considered “candidate species” for listing under the Federal Endangered Species Act (ESA) by the USFWS.

Lesser Prairie-Chicken

Parcels -110, -111, -112, -113, -114, and -115 occur in the sand shinnery habitat type. Sand shinnery communities extend across the southern Great Plains occupying sandy soils in portions of north and west Texas, west Oklahoma, and southeast New Mexico. Portions of Eddy, Lea and Chaves counties consist largely of sand shinnery habitat and are intermixed with areas of mesquite to a lesser degree. The characteristic feature of these communities is co-dominance by shinnery oak and various species of grasses. In New Mexico Shinnery oak occurs in sandy soil areas, often including sand dunes.

In New Mexico, the lesser prairie-chicken (LPC) formerly occupied a range that encompassed the easternmost one-third of the state, extending to the Pecos River, and 48 km west of the Pecos near Fort Sumner. This covered about 38,000 km². By the beginning of the 20th Century, populations still existed in nine eastern counties (Union, Harding, Chaves, De Baca, Quay, Curry, Roosevelt, Lea, and Eddy). The last reliable records from Union County are from 1993. Currently, populations exist only in parts of Lea, Eddy, Curry, Chaves, and Roosevelt counties, comprising about 23% of the historical range.

LPC are found throughout dry grasslands that contained shinnery oak or sand sage. Currently, they most commonly are found in sandy-soiled, mixed-grass vegetation, sometimes with short-grass habitats with clayey or loamy soils interspersed. They occasionally are found in farmland and smaller fields, especially in winter. Shinnery oak shoots are used as cover and produce acorns, which are important food for LPC and many other species of birds, such as the scaled quail, northern bobwhite, and mourning dove. Current geographic range of shinnery oak is nearly congruent with that of the lesser prairie-chicken, and these species sometimes are considered ecological partners. Population densities of LPC are greater in shinnery oak habitat than in sand sage habitat.

LPC use a breeding system in which males form display groups. These groups perform mating displays on arenas called leks. During mating displays male vocalizations called booming, attract females to the lek. Leks are often on knolls, ridges, or other raised areas, but in New Mexico leks are just as likely to be on flat areas such as roads, abandoned oil drill pads, dry playa lakes or at the center of wide, shallow depressions. Leks may be completely bare, covered with short grass, or have scattered clumps of grass or short tufts of plants. An important physical requirement for location of leks is visibility of surroundings, but the most important

consideration is proximity of suitable nesting habitat, breeding females and the ability to hear male vocalizations.

In the late 1980's, there were 35 documented active booming grounds known to exist within the CFO. Due to population decreases and unpredictable weather cycles the LPC is currently a candidate for federal listing, and potentially may become extirpated from Eddy and southern Lea counties.

In June 1998, the US Fish and Wildlife Service (USFWS) issued a statement regarding their status review of the lesser prairie-chicken. It stated, "Protection of the lesser prairie-chicken under the Federal Endangered Species Act (ESA) is warranted but precluded which means that other species in greater need of protection must take priority in the listing process." Given the current Federal Candidate status of this species, the Bureau of Land Management is mandated to carry out management consistent with the principles of multiple use, for the conservation of candidate species and their habitats, and shall ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as Threatened or Endangered (Bureau Manual 6840.06).

These six parcels are located in the Primary Population Area (PPA) as described in the Special Status Species RMPA. The protocol for leasing new parcels in the PPA, which is also described in the Special Status Species RMPA, closes the opportunity to lease parcels in occupied or suitable LPC habitat. Therefore, these parcels will be deferred from leasing for the life of the plan and will not be available for leasing under this preferred action. Due to the deferment, there are no available October lease parcels within potential (suitable or occupied) LPC habitat.

Parcels -119, -120, and -121 occurs in a transition zone from Chihuahuan Desert scrub habitat type to the north and east on the caprock to a sand shinnery habitat type to the south and east. It is primarily dominated by mesquite scrublands intermixed with various grasses. This mesquite scrubland community extends across the southern Great Plains, occupying portions of north and west Texas, western Oklahoma, and southeast New Mexico. Portions of Eddy and Lea counties consist of mesquite scrublands to a lesser degree. The characteristic feature of the mesquite scrubland community is co-dominance by various species of grasses and cacti. Although shinnery oak potentially occurs on these parcels, other vegetation characteristics, such as abundance of mesquite and absence of abundant bunch grasses, limits the suitability of the habitat for lesser prairie-chickens. The closest known lek locations occurred 12 miles west and 10.5 miles southwest though neither have been observed active since 1988. The closest known sighting of an LPC was in 2008 10.5 miles southwest of the parcels. Therefore the leasing of these three parcels would result in no effect for the species.

Sand Dune Lizard

Parcels -112 and -114 occur in suitable habitat for the sand dune lizard. The sand dune lizard (SDL) is a species with a limited geographic range including parts of Chaves, Eddy, Lea and Roosevelt Counties of southeastern New Mexico and 4 counties in Texas. The SDL is a habitat specialist, found exclusively in association with Shinnery oak dune complexes. These complexes are patchworks of shinnery oak and scattered sandsage interspersed with areas of open sand and wind-created sandy blowouts. These complexes create ideal habitat for the SDL.

The SDL may also require specific sand particle size. Research has shown that there are significant differences in the composition of sand between sites that are occupied and unoccupied by SDL. Occupied sites have slightly coarser sand than unoccupied sites. This suggests that SDL may not occur in areas with high percentages of sand particles smaller than 250 micrometers (Fitzgerald et al, 1997).

The U.S. Fish and Wildlife Service (USFWS) was petitioned on May 28, 2002 by The Center for Biological Diversity and Chihuahuan Desert Conservation Alliance to list the SDL as an endangered species under the Endangered Species Act. In May 2005 the USFWS issued a statement regarding their status review of the SDL. It stated, "Protection of the sand dune lizard under the Federal Endangered Species Act (ESA) is warranted but precluded, which means that other species in greater need of protection must take priority in the listing process." Given the current Federal Candidate status of this species, the Bureau of Land Management is mandated to carry out management, consistent with the principles of multiple use, for the conservation of candidate species and their habitats and shall ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as Threatened or Endangered (Bureau Manual 6840.06).

These two parcels are located in the Primary Population Area (PPA) as described in the Special Status Species RMPA. The protocol for leasing new parcels in the PPA, which is also described in the Special Status Species RMPA, closes the opportunity to lease parcels in occupied or suitable LPC habitat. Therefore, these parcels will be deferred from leasing for the life of the plan and will not be available for leasing under Alternative C – Preferred Alternative. Due to the deferment, there are no available October lease parcels within potential (suitable or occupied) SDL habitat.

3.9 Range

The lease sale covers all or parts of 4 grazing allotments. All four are west of the Pecos. These allotments are run as a year long, cow-calf operation. Most of the grazing permittees follow some type of deferred use rotation system, in which one or more pastures within the allotment receive some growing rest. Range improvement projects such as windmills, water delivery systems (pipelines, storage tanks, and water troughs), earthen reservoirs, fences, and brush control projects are located within the project area. In general, an average rating of the range land within this area is six acres/AUM (Animal Unit Months). In order to support one cow, for one year, about 72 acres is needed. This equals about nine cows per section.

3.10 Watershed/Water Resources/Ground Water/Drinking Water Quality

Surface water within the project area is affected by geology, precipitation, and water erosion. Factors that currently affect surface water resources include livestock grazing management, oil and gas development, recreational use, and brush control treatments. Surface water is located in perennial and ephemeral springs, ephemeral playas, and stock tanks. The Pecos River, and its tributaries such as Black River and Delaware River, are water quality impaired streams presently found within the CFO as per the 2006-2008 State of New Mexico Integrated Clean Water Act 303(d) and 305(b) Report. The impaired designated uses are livestock watering, irrigation, and warm water fishery. Listed probable causes of impairment include natural sources (Malaga salt dome), flow regulation or modification, and bank/shoreline modification or destabilization.

Groundwater within the CFO is affected by geology and precipitation. Factors that currently affect groundwater resources include livestock grazing management, oil and gas development, groundwater pumping, and possible impacts from brush control treatments. Groundwater within the CFO can be obtained from groundwater aquifers located within the Rustler, Castile, Tansill, Yates, Seven Rivers, Queen, Grayburg, Artesia, Ogallala, Chinle Formation, Capitan and San Andres Limestones, Glorieta and Santa Rosa Sandstones, and the Dockum Group. Most of the groundwater occurs as unconfined aquifers. Groundwater occurs as confined aquifers in the San Andres Formation under artesian conditions. The depth to shallow unconfined groundwater varies from 1 foot to depths of 400 feet throughout the CFO (New Mexico Office of the State Engineer data). The depth to confined groundwater can occur at depths greater than 400 feet. Most of the groundwater is used for agricultural, industrial, rural, domestic, and livestock purposes.

There are numerous sinks and playas within one or more of the proposed lease boundaries that may hold water after infrequent heavy rains. Numerous intermittent drainages also cut across the project area.

3.11 Wetlands, Riparian Areas and Floodplains

Portions of the offered lease parcels are located in the 100-year floodplain of the Pecos River. Most often ephemeral in desert watersheds, floodplains range in width from less than one-half mile to more than one mile in some areas. On desert watersheds including the CFO, floodplains may appear to be little more than gentle draws. However, they can quickly become dangerous torrents in periods of monsoonal rainstorms. Regardless, they are important water sources for animals and plants of the Chihuahuan Desert. For administrative purposes, the 100-year floodplain serves as the basis for floodplain management on public lands. These are in general relatively narrow areas along natural drainage ways that carry large quantities of runoff following periods of high precipitation.

The following lease parcels have mapped floodplains within their lease parcel boundaries or within 200 meters of their parcel boundaries: Parcels -025, -027, -028, -029, and -055.

Playas are ephemeral, round hollows in the ground located mainly on the Southern High Plains of the United States. The temporal nature of playas allow filling with water only after rainstorms when freshwater collects in the round depressions of the otherwise flat landscape of West Texas, Oklahoma, New Mexico, Colorado, and Kansas. There are also many saltwater-filled playas in the CFO, known as alkali lakes. These are fed by water from underlying aquifers, which brings salt with it as it percolates up through the soil. As the water evaporates, the salt is left behind in the increasingly salty playas. They are important water sources for animals and plants of the Chihuahuan Desert.

The following lease parcels have playas within their lease parcel boundaries or are within 200 meters of their parcel boundaries: Parcel -055

Springs and seeps are fed by groundwater from shallow aquifers. Their emergence is a function of hydrogeological, geological and topographical conditions and interrelation among them. Earthen tanks are drainage catchments normally used for livestock watering, however they also

offer isolated and limited water for plants, wildlife as well as domestic and commercial purposes in the Chihuahuan Desert.

Lease parcel 121 includes an earthen tank or spring within 200 meters of the lease parcel boundary.

Some lease parcels may have unidentified windmills for livestock watering purposes within 200 meters of the lease parcel boundary.

3.12 Cultural Resources

The project area identified in this environmental document is located in southeastern New Mexico. Geographically the area is bounded on the west by the eastern flanks of the Guadalupe Mountains, east by the Llano Estacado or ‘Staked Plain’ and is bisected by the Southern Pecos River Valley. Three archaeological regions (The Guadalupe Mountain, Pecos Valley, and Plains archaeological regions) characterize the cultural resources located within the project area. Lease Parcel -072 is located in the Plains archaeological region. All other parcels are located in the Pecos Valley archaeological region.

Archaeological sites in Southeastern New Mexico are the reflection of human adaptations to changing environmental conditions. As the environmental conditions changed, the distribution and availability of food (plant and animal) also changed. Archaeological sites often reflect these adaptations in their technology (artifact assemblages), geographical location, and the duration of occupation. Rough chronological sequences have been created that reflect these cultural adaptations allowing archaeologists to place a site into a cultural tradition or period. Paleoindian (ca. 12,000-8,000 B.C.), Archaic (ca. 8000 B.C. –A.D. 950), Formative (ca. A.D. 600-1540) Protohistoric (ca. A.D. 1400-1821), and Historic (ca. A.D. 1822 to early 20th century). Sites representing any or all of these periods are known to occur within these archaeological regions (Sebastian & Larralde 1989 and Hogan 2006).

A portion of the proposed lease sale (a portion of parcels -055) falls within the area covered by the Permian Basin Memorandum of Agreement (MOA). The Permian Basin MOA is an optional method of compliance with Section 106 of the National Historic Preservation Act for energy related projects in a 28 quadrangle area of the Carlsbad Field Office. The MOA is a form of off-site mitigation which allows industry to design projects to avoid known NRHP eligible cultural resources and to contribute to a mitigation fund in lieu of paying for additional archaeological inventory in this area that has received adequate previous survey. Funds received from the Permian Basin MOA will be utilized to conduct archaeological research and outreach in Southeastern New Mexico. Research will include archaeological excavation of significant sites, predictive modeling, targeted research activities, as well as professional and public presentations on the results of the investigations.

Paleontological Resources

Paleontological resources preserved in marine and terrestrial sediments may be found in rocks formed during the late Paleozoic, Mesozoic, and Cenozoic Ages. Detailed data concerning Pennsylvanian and Permian Age fossils is available because of the intense oil and gas exploration in southeastern New Mexico where such data is necessary for stratigraphic

correlation (age dating) of producing formations. Such information is lacking in non-producing areas.

Paleontological remains found in isolated Cenozoic terrestrial sediments are perhaps the best known vertebrate fossils found in the Pecos District. These Pleistocene-Holocene fossils are usually associated with lake deposits, caves, or early man's hunting sites. The extent of known paleontological resources in the area is minimal when compared to the amount of sedimentary rocks which may contain fossil remains.

There are no parcels located in the vicinity of known paleontological resources.

3.13 Cave/Karst

Portions of this project are located in gypsum karst terrain, a landform that is characterized by underground drainage through solutionally enlarged conduits. Gypsum karst terrain may contain sinkholes, sinking streams, caves, and springs. Sinkholes leading to underground drainages and voids are common. These karst features, as well as occasional fissures and discontinuities in the bedrock, provide the primary sources for rapid recharge of the groundwater aquifers of the region.

The BLM categorizes all areas within the Carlsbad Field Office as having either low, medium, high or critical cave potential based on geology, occurrence of known caves, density of karst features, and potential impacts to fresh water aquifers. This project occurs within a high karst zone. A high karst zone is defined as an area occurring in known soluble rock types and containing a high frequency of significant caves and karst features such as sinkholes, bedrock fractures that provide rapid recharge of karst aquifers, and springs that provide riparian habitat.

Sinkholes and cave entrances collect water and can accumulate rich organic materials and soils. This, in conjunction with the stable microclimate near cave entrances, support a greater diversity and density of plant life which provides habitat for a greater diversity and density of wildlife such as raptors, rodents, mammals, and reptiles.

The interior of the caves support a large variety of troglobitic, or cave environment-dependent species. The troglobitic species have adapted specifically to the cave environment due to constant temperatures, constant high humidity, and total darkness. Many of the caves in this area contain fragile cave formations known as speleothems.

All or portions of the following parcels containing Cave/Karst concerns: Parcels -025, -026, -027, -028, and -029

3.14 Noxious Weeds

The presence of those species described in the Noxious Weed List for the State of New Mexico (NMDA, 1999) is detected via continual inventory being carried on by all field going personnel. The inventory process is on-going to detect invasive populations when they are small. Once a population is found, the Bureau coordinates with various agencies, lease operators, and the land user to implement some kind of treatment to remove or control the population.

Noxious weeds, primarily African rue and Malta star thistle, were determined to exist and are scattered within the area. Small infestations of noxious weeds are located within or immediately adjacent to the project area. Project activities, even with preventative management actions, could result in the establishment and spread of noxious weeds on disturbed sites throughout portions of the project area. Most of the noxious weeds exist mainly along the shoulders of County roads, lease and private roads, and on production pads within the project area.

3.15 Environmental Justice

Executive Order 12898, issued on 11 February 1994, addresses concerns over disproportionate environmental and human health impacts on minority and low-income populations. The impetus behind environmental justice is to ensure that all communities, including minority, low-income, or federally recognized tribes, live in a safe and healthful environment and the October 2009 Oil and Gas Lease Sale will not be out of conformance with this executive order.

Portions of the City of Carlsbad and the City of Hobbs consist of minorities with some low-income populations. However, none of the leases nominated fall within the city limits of either city. Most of the populations that lie near these leases are with the agricultural or mining sector and do not fall under the coverage of this executive order.

4.0 Environmental Consequences and Proposed Mitigation Measures

Alternative A – No Action

Under the No Action Alternative, the proposed parcels would not be leased. There would be no new impacts from oil and gas production on the parcel lands. Oil and gas development of federal, state, and private minerals would continue on the lands surrounding the parcels. No additional natural gas or crude oil would enter the public markets and no royalties would accrue to the federal or state treasuries. The No Action Alternative would result in the continuation of the current land and resource uses on the proposed parcels and is used as the baseline for comparison of alternatives. No further analysis of the No Action alternative is presented in the following sections.

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

Alternative B – Proposed Action

Alternative B – Proposed Action contained seven parcels (-031, -110, -111, -112, -113, -114, -115) which were either deferred or deleted, therefore this alternative will not be analyzed further.

Alternative C – Preferred Action

The act of leasing the eleven proposed parcels (Alternative C – Preferred Action) would, by itself, have no impact on any resources in the CFO. All impacts would be linked to as yet undetermined future levels of lease development. If lease parcels were developed, short-term impacts would be stabilized or mitigated rapidly (within 5 years) and long-term impacts are those that would substantially remain for more than 5 years. Potential impacts, lease stipulations and mitigation measures are described below.

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

4.1 Air Quality

4.1.1 Direct and Indirect Impacts

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

Potential impacts of development would include increased air borne soil particles blown from new well pads or roads, exhaust emissions from drilling equipment, compressor engines, vehicles, flares, and dehydration and separation facilities, and volatile organic compounds during drilling or production activities.

It is unknown whether the petroleum resources specific to these leases in the Preferred Action are gas or oil or a combination thereof, as well as the actual potential for those resources. Oil wells are on a tighter spacing than gas wells, therefore the specific number of wells that would be drilled as a result of issuing the leases is unknown.

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

What can be said is that exploration and production would contribute to incremental increases in overall air quality emissions associated with oil and gas exploration and production into the atmosphere.

Coalbed methane does not exist within the field office and, therefore, there are no emissions from this source.

4.1.2 Potential Mitigation

The EPA's inventory data describes "Natural Gas Systems" and "Petroleum Systems" as the two major categories of total US sources of GHG gas emissions. The inventory identifies the contributions of natural gas and petroleum systems to total CO₂ and CH₄ emissions (natural gas and petroleum systems do not produce noteworthy amounts of any of the other greenhouse gases). Within the larger category of "Natural Gas Systems", the EPA identifies emissions occurring during distinct stages of operation, including field production, processing, transmission and storage, and distribution. "Petroleum Systems" sub-activities include production field operations, crude oil transportation and crude oil refining. Within the two categories, the BLM has authority to regulate only those field production operations that are related to oil and gas measurement, and prevention of waste (via leaks, spills and unauthorized flaring and venting).

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

The EPA data show that improved practices and technology and changing economics have reduced emissions from oil and gas exploration and development (Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006). One of the factors in this improvement is the adoption by industry of the BMPs proposed by the EPA's Natural Gas Energy Star program. The Carlsbad Field Office will work with industry to facilitate the use of the relevant BMPs for operations proposed on Federal mineral leases where such mitigation is consistent with agency policy.

Consumption of oil and gas from the nominated parcels are expected to produce GHGs. Consumption is driven by a variety of complex interacting factors including energy costs, energy efficiency, availability of other energy sources, economics, demography, and weather or climate.

4.2 Climate Change

4.2.1 Direct, Indirect, and Cumulative Effects

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 Alternative C – Preferred Alternative on climate—that is, while BLM actions may contribute to the climate change phenomenon, the specific effects of those actions on the global climate are somewhat speculative given the current state of the science. The BLM does not have the ability to associate a BLM action’s contribution to climate change with impacts in any particular area. The technology to be able to do so is not yet available. The inconsistency in results of scientific models used to predict climate change at the global scale coupled with the lack of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future impacts of decisions made at this level and determining the significance of GHG emissions is beyond the limits of science. When further information on the impacts to climate change is known, such information would be incorporated into the BLM’s planning and NEPA documents as appropriate.

Leasing the subject tracts would have no direct impacts on climate as a result of GHG emissions. Similar to impacts on air quality as a result of Alternative C – Preferred Alternative, it is unknown whether the petroleum resources specific to these leases are gas or oil or a combination thereof. Since this type of data is unavailable at this time, it is unreasonable to quantify GHG emissions at this time.

Regulatory requirements to measure and report GHG emissions for oil and gas production facilities is in the drafting stage by the US EPA. If and when any such regulations become law, all BLM authorized users will be subject to compliance with applicable laws, as with all current laws and regulations. Because of the variability of oil and gas activities on federal mineral estates, it is not possible at this time to accurately quantify potential GHG emissions in the affected areas as a result of making the proposed tracts available for leasing. Some general assumptions, however, can be made: leasing the proposed tracts may contribute to drilling new wells (Refer to limitations of projecting actual number of wells as a result of the proposed action under direct/indirect effects); drilling new wells and oil and gas production from those wells will result in emissions of air pollution, including greenhouse gases.

The New Mexico Greenhouse Gas Inventory and Reference Case Projection 1990-2020 (Inventory) estimates that approximately 17.3 million metric tons of GHGs from the natural gas industry and 2.3 million metric tons of GHGs from the oil industry are projected in 2010 as a result of oil and natural gas production, processing, transmission and distribution. As of 2008, there were 23,196 oil wells and 27, 778 gas wells in New Mexico (NM well statistics).¹

1 In 2000, approximately 17 million metric tons and 2.3 million metric tons were respectively attributed to natural gas and oil activities. As of 2002, the Inventory indicates that there approximately 21,771 oil wells and 23,261 gas wells in the State. Uncertainties remain with respect to: the quality of historical field data, processing, and pipeline use of natural gas, does not factor in reclaimed wells and total number of new wells drilled per year; CO2 emissions from enhanced oil recovery, which have not been estimated; and refinery fuel use-EIA indicates less than half the refinery fuel use as indicated by refinery permit data. In addition, it is not feasible to estimate the actual number of wells that would be drilled as a result of the lease.

As oil and gas and natural gas production technology continues to improve in the future, and if greenhouse gases will perhaps be regulated or legislated upon in the future, one assumption is that reductions in the rate or total quantity of GHG emissions associated with oil and gas production are likely.

In addition, regarding the linkage between climate change related warming and associated impacts, an assessment of the IPCC states that difficulties remain in attributing observed temperature changes at smaller than continental scales. It is currently beyond the scope of existing science to predict climate change on regional or local scales resulting from specific sources of GHG emissions.

What can be said is that exploration and production would contribute to increases in GHGs associated with oil and gas exploration and production. There are qualitative projections regarding potential impacts to natural resources and plant and animal species due to climate change from GHG emissions over time; these effects are likely to be varied, including those in the southwestern United States. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils. Cool season plant species' spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened/endangered plants may be accelerated. Due to loss of habitat or competition from other species whose ranges may shift northward, the population of some animal species may be reduced or increased. Less snow at lower elevations would likely impact the timing and quantity of snowmelt, which, in turn, could impact water resources and species dependant on historic water conditions (USFS, March 2008) . Forests at higher elevations in New Mexico, for example, have been exposed to warmer and drier conditions over a ten year period. Should the trend continue, the habitats and identified drought sensitive species in these forested areas and higher elevations may also be more affected by climate change (Enquist and Gori).

4.2.2 Potential Mitigation

Refer to the related mitigation section for air quality, which also addresses the mitigation of some GHGs.

4.3 Soils

4.3.1 Direct, Indirect and Cumulative Effects

Impacts to soils would occur during the construction, operation, and rehabilitation phases of lease development. Off-road travel, excavation of caliche for road and pad construction, road and pad construction, and associated rights of way construction cause soil particles to become unconsolidated and removes vegetative cover. This increases susceptibility of the soil to both wind and water erosion. Soil horizons directly below caliche capped roads and pads will be protected from erosion, but will not receive any infiltration. Nearby soils would be more susceptible to water erosion due to increased runoff from these caliche covered surfaces.

Additional wells will reduce the acreage available for grazing purposes and increase erosion and decrease available vegetation for all proposed parcels. There will be the increased risk of hydrocarbon spills within the lease as well. Increased surface disturbance will also increase the risk of noxious weed invasion and spread.

4.3.2 Potential Mitigation

Mitigation measures will be deferred to the site specific APD stage of development. Best management practices (BMPs) would be incorporated into Conditions of Approval (COAs).

None of the parcels are within fragile soil locations containing gypsiferous soils, active dunes or steep slopes.

4.4 Vegetation

4.4.1 Direct, Indirect and Cumulative Effects

Vegetation will be lost within the construction areas of pads, roads, and rights of ways. Those areas covered in caliche, such as pads and roads, would have no vegetation for the life of the well. Rights-of-ways could revegetate in one to two years with proper reclamation and adequate precipitation. Poor reclamation practices followed by inadequate precipitation over several growing seasons could result in loss of vegetative cover, leading to weed invasion and deterioration of native vegetation.

Impacts to vegetation depend on development. These acres will produce no vegetation, due to caliche covered surfaces with each well in production. These acres should be in adequate vegetative cover in three to five growing seasons, if proper reclamation procedures are followed, and adequate precipitation is received, after the well is plugged.

4.4.2 Potential Mitigation

Specific mitigation measures will be determined when site specific development proposals are received and will be incorporated as COAs.

4.5 Visual Resources

4.5.1 Direct, Indirect and Cumulative Effects

Oil and gas development (wells, pads, storage tanks, pipelines, transfer stations, powerlines, roads, and truck traffic) can create many visual scars on the landscape. Development can create contrast to the landscape's natural form, line, color, and texture. Pads, tanks, roads, powerlines, and pipelines introduce unnatural forms into the landscape. Clearing for pads, roads, and pipelines create unnatural color, line and texture changes. Tanks and poles add vertical trends to the general flat landscapes. The more prominent these visual contrasts, the more the project will stand out and distract from the natural view of the landscape. The more unnatural distractions added to the landscape the more unpleasing the landscape will look.

Each surface development visually impacts the landscape. Each project may meet or exceed the area's Visual Resource Management (VRM) objectives; however, as an entire oil field is developed, the small visual impacts will accumulate to create harsh scars on the landscape. The cumulative effects will degrade the visual esthetics and public's appreciation for their surrounding environment. To avoid this result, all projects (regardless of VRM class) should be hidden, masked, and reclaimed as best as possible with BMPs.

4.5.2 Potential Mitigation

Mitigation measures to reduce impacts of development and maintain Visual Resource Class Objectives may include landform considerations such as moving locations to areas with less

slope, changing road width and grade, changing alignment to follow existing grades, and prohibiting dumping of excess material on downhill slopes. Earthwork COAs may include rounding or warping slopes, retaining rocks, trees and drainage, adding mulch, hydromulch, or topsoil, shaping cuts and fills to appear as natural forms, cutting rock areas so forms are irregular, designing to take advantage of natural screens (i.e., vegetation, land forms), and grass seeding of cuts and fills.

Topography considerations may require locating projects away from prominent topographic features and designing projects to blend with topographic forms in shape and placement. Additional COAs for retaining vegetation may include using retaining walls on fill slopes, reducing surface disturbance, protecting roots from damage during excavations, mulching cleared areas, controlling planting times, furrowing slopes, planting holes on cut/fill slopes, choosing native plant species, stockpiling and reusing topsoil, fertilizing, mulching, and watering vegetation, utilizing existing roads, limiting work within construction area, selecting type of equipment to be used and minimizing clearing size. Permanent structures are impacts for the life of the project. To minimize the number of visible structures, COAs will be applied, requiring use of earth-tone paints and stains and natural stone surfaces, burying all or part of the structure, selecting paint finishes with low levels of reflectivity (i.e., flat), redesign structures to blend with surroundings, and relocating structures. Interim reclamation measures for the working life of the pad may be implemented to reduce visual impacts, such as partial re-vegetation of the pad after initial drilling is complete to allow only necessary surface use and access requirements. COAs will be added to the site specific APD stage of development.

COAs may require utilities and right-of-ways related to the development of the proposed lease parcels may be stipulated to make crossings at right angles of corridors, setting structures a maximum distance from the crossing, leaving vegetation along the roadside, minimizing viewing time, and utilizing natural screening.

Visual Resource Management SENM-S-25 stipulations will apply to lease parcels offered in the October 2009 sale as follows: Parcels -025, -026, -027, -028, -029, and -055.

4.6 Recreation

4.6.1. Direct, Indirect and Cumulative Effects

Potential effects could occur on dispersed recreation activities such as big game hunting in certain pastures of individual parcels, but these effects cannot be determined until site specific development proposals are received at the APD stage.

Additional wells will reduce the acreage available for recreation in open space on public land. Dispersed recreation activities, such as off-road driving, hunting, and hiking will be impacted by increased traffic, visual intrusions, noise, trash, and other related results of oil and gas development. Increased above ground facilities fragment open space and reduce the natural setting of areas. Some recreation pursuits will be limited by additional hazards created by facilities and infrastructure related to development.

4.6.2 Potential Mitigation

Mitigations for impacts to recreation will be determined when specific sites for development are determined. Mitigations may include moving locations, increased safety precautions during construction, relocating existing trails, reducing visual impacts, implementing noise control devices on facilities, and co-locating facilities and the use of corridors to reduce surface disturbance.

4.7 Wildlife

4.7.1 Direct, Indirect and Cumulative Effects

The severity of effects depends on the sensitivity of the species affected. The species present in these areas tend to vacate traditional habitats under continued and increasing pressure from petroleum activities. Additional wells would increase the risk to wildlife in the developing area due to noise and visual impacts (for example, compressor stations, increased number of operating pumpjacks, powerlines (line hum in wind), drilling rigs, and increased vehicular traffic). This could potentially cause wildlife to avoid these areas, including wildlife watering units, and relocate to other areas that have a lesser degree of development. Disturbance to the surface itself could potentially degrade or fragment habitat to such a degree that it may become unusable for certain species at a localized level.

There also could potentially be other forms of surface disturbance on developing leases such as the installation of caliche pits, the addition of oil and gas field infrastructure such as powerlines, pipelines, and tank batteries or other storage facilities, and the construction of new roads that potentially fragment habitat and increase the risk of collision between vehicles and wildlife. Effects on raptor nests or heronries could result in a reduction of nesting habitat for raptors or herons thus reducing the likelihood of sustaining the local population.

Cumulative adverse effects could potentially result in a decrease in wildlife populations in all proposed lease parcels if full infield development of oil and gas were to occur. These operations could potentially reduce and possibly eliminate habitat for some species.

4.7.2 Potential Mitigation

The BLM will continue to require oil and gas lessees to conduct operations in a manner that will minimize adverse impacts to wildlife. To that end, the BLM will continue to apply reasonable measures to all oil and gas activities.

In the event that a wildlife water development is in fact within a parcel, the SENM-S-15 stipulation will be attached as a condition-of-approval at the APD stage. This will afford some protection to the habitat around the wildlife water. Therefore, no adverse effects to water developments are expected.

Site-specific COAs or BMPs may be developed at the APD stage to further mitigate direct and indirect effects.

4.8 Special Status Species

4.8.1 Direct, Indirect and Cumulative Effects

Lesser Prairie-Chicken

The only parcels that occur in habitat for lesser prairie-chicken have been deleted from the list of available parcels for this sale. Therefore, no impacts from the preferred action to the species are expected.

Sand Dune Lizard

The only parcels that occur in habitat for sand dune lizard have been deleted from the list of available parcels for this sale. Therefore, no impacts from the preferred action to the species are expected.

4.8.2 Potential Mitigation

Due to the deferment, no further mitigation measures are necessary.

4.9 Range

4.9.1 Direct, Indirect and Cumulative Effects

The construction of pads, pits, roads, and rights of way would cause forage to be lost on portions of four allotments. On average, it takes approximately 6 acres of vegetation per Animal Unit Month (AUM), which is the amount of forage needed to support one cow for one month. Using this figure a likely range from less than 1 to as many as 15 AUMs would be lost per allotment. These numbers would not cause the 10 year permit or lease to be adjusted.

There are occasional livestock injuries or deaths due to accidents such as collisions with vehicles, falling into mud pits or other excavations, and ingesting plastic or other materials present at the work site. Construction activities can damage range improvements such as fences and pipelines. These impacts make the day to day livestock management actions more difficult.

Adverse cumulative effects would include reduced acreages for grazing purposes. Other detriments such as increased risk of weed encroachment onto rangelands caused by increased road traffic (seed dispersion) thereby reducing desirable vegetation species and therefore reducing stocking rates.

4.9.2 Potential Mitigation

Mitigation will be deferred to the site specific APD stage of development. BLM currently consults with grazing permittees on a site by site basis as part of the Approved Plan to Drill process. BMPs would be incorporated into COAs.

4.10 Watershed/Water Resources/Ground Water/Drinking Water Quality

4.10.1 Direct, Indirect and Cumulative Effects

Potential impacts of drilling operations to water resources could include the loss of drilling fluids, which sometimes contain heavy metals and other chemicals, and cement. This may cause the pollution of the ground water recharge areas and adversely impact water quality.

Additionally, cementing operations could plug some of the underground drainages and restrict ground water flow, thereby reducing the recharge quality and quantity of springs, resurgences, and water tables and reducing the discharge (water availability) from seeps, springs, and water wells. Potential impacts of well production include the introduction of hydrocarbons and other chemicals into underground drainages and recharge areas as a result of leaks or spills from casings in the well, storage tanks, mud pits, pipelines, or other production facilities. This may

also degrade water quality. In addition, drilling an oil or gas well may require large quantities of water, especially if porous and permeable formations are encountered. If fresh water is used, this could reduce natural flow from seeps, springs, and water wells.

With any surface disturbance there will be decreased infiltration rates which may lead to more rapid runoff responses to precipitation events. The cumulative impacts of surface disturbance could lead to: 1) increased occurrence and magnitude of flood events, 2) increased erosion, 3) higher sediment loads in downstream surface waters, and 4) decreased groundwater recharge.

4.10.2 Potential Mitigation

Mitigation will be deferred to the site specific APD stage of development. BMPs would be incorporated into COAs.

4.11 Wetland, Riparian Areas and Floodplains

4.11.1 Direct, Indirect and Cumulative Effects

No adverse impacts are expected for wetland, floodplains or riparian areas, as stipulations for a minimum 200-meter buffer from the edge of the floodplain or wetland is applied to these parcels. By moving pads, roads, and rights of ways at least 200 meters away from the edge of the wetland or riparian areas, the values these areas provide are protected.

The risk of hydrocarbon spills would threaten these water resources as well as seepage from any pits containing hydrocarbons or brines. Poor cement jobs or corroded or bad casing or tubing downhole during production operations can enter potentially viable aquifers. There is always the unfortunate possibility of a well blowout which can release thousands of barrels of crude hydrocarbon either on or under the surface. These events can propagate downstream and either damage or destroy these fragile environments which contain lush grasses, aquatic birds and their nesting environment and aquatic life such as fishes and crustaceans.

4.11.2 Potential Mitigation

The mitigative measures addressed below are meant to protect wetlands and riparian areas of concern.

The following proposed parcels contain SENM S-18 stipulations for streams, rivers and floodplains:

Parcels -025, -027, -028, -029, and -055

The following parcels contain SENM-19 stipulations for Playas: Parcel -055.

The following lease parcels have earthen tanks or springs within their lease parcel boundaries and carry the SENM-S-20 stipulation: Parcel -121. Some lease parcels may have unidentified windmills for livestock watering purposes and would require a 200-meter buffer at the APD stage.

Site specific COAs will be incorporated at the APD stage of development.

4.12 Cultural Resources

4.12.1 Direct, Indirect and Cumulative Effects

Cultural/Paleontological Resources

There will be no immediate consequence to the environment as a result of the leasing of any of these parcels with regard to cultural or paleontological resources. This document deals only with lease sale actions; any subsequent realty or oil and gas projects or development will be subject to a separate NEPA document and compliance with Section 106 of the NHPA. Native American consultation was conducted by certified mail regarding lease sale activities and no traditional cultural properties were identified. No specific heritage related issues have been identified during the consultation process. The BLM does acknowledge that the potential exists for the Native American community to identify heritage related issues in the future as specific actions are proposed.

As oil and gas development actions or associated realty actions are proposed, the areas of potential effect (APE) will be defined and assessments of the impacts upon cultural and paleontological resources will be undertaken. NEPA and Sec. 106 compliance will be completed on all undertakings. In the event that cultural or paleontological resources are identified within a project area, an evaluation of significance will occur and steps will be taken to mitigate impacts to that resource. Mitigation most frequently involves site avoidance, but may rarely include data recovery or compensation. It should be noted that BLM has discretionary control over mitigation stipulations or avoidance measures imposed on a project.

BLM may require development activities to be moved if necessary to protect cultural resources. This should allow nearly all sites to be avoided. Sites that cannot be avoided will be evaluated for listing on the National Register and mitigation measures will be instituted if the site is found eligible. Should development uncover subsurface sites, the lessee is required to halt all work until the site can be evaluated and proper mitigation and avoidance measures identified.

A portion of Parcel -055 is located within the area covered by the Permian Basin Memorandum of Agreement (MOA). Prior to development of leases the project proponent may choose to participate in the Permian Basin MOA by planning to avoid all known NRHP eligible and potentially eligible cultural resources, the proponent will contribute funds commensurate to the undertaking into an account for offsite mitigation. Participation in the MOA serves as mitigation for the effects of this project on cultural resources. If any skeletal remains or funerary objects are discovered by any activities, the project proponent will cease activities in the area of discovery and notify the BLM within 24 hours as required by the Permian Basin MOA. Work shall not resume until a Notice to Proceed is issued by the BLM.

Cumulative Impact Analysis for Cultural Resources

Cultural resources on public lands, including archaeological sites and historic properties, are protected by federal law and regulations. Current operations must comply with these protective regulations, and BLM requires the completion of cultural resource inventories prior to surface disturbing activities. These inventories have been used to identify sites potentially eligible for inclusion on the National Register of Historic Places and to identify sites which BLM has required past exploration and development activities to avoid. Because Class III cultural resource inventories must be completed, the potential for increased impacts on cultural artifacts would be

minimized. By avoiding known cultural and historical sites during the layout of drill sites, access roads, pipeline corridors, and other realty actions, the potential for incremental increases in cumulative impacts would be avoided.

Completion of cultural resource inventories would have a beneficial, cumulative impact on the level of cultural information about the project area. Some unintentional damage to subsurface resources could occur during grading or excavation activities. Newly built roads can open previously inaccessible areas to illegal collecting and destruction of archaeological resources by vandalism, however, implementation of resource protection and mitigation would protect such resources upon discovery.

Cumulative Impact Analysis for Paleontological Resources

Foreseeable and unforeseen projects, including mining of surface mineral resources and construction materials may have cumulative impacts on paleontological resources. Construction can directly impact fossil resources and newly built roads can open previously inaccessible areas to illegal collecting and destruction of fossil resources by vandalism. Scientifically noteworthy fossils and fossil localities containing them are rare and not uniformly distributed throughout the geologic deposits. Loss of fossil resources from rare and scientifically important localities and the loss of the localities themselves by destruction may have an unforeseen cumulative effect. Development could, however increase the potential for discovering scientifically noteworthy fossil resources, if the nature and significance of the paleontological material is recognized; adequate measures would be applied to ensure proper treatment and recovery of the resource.

These areas can be identified by referring to detailed geologic maps on a case-by-case basis. Should construction activities reveal any new paleontological sites, construction would be delayed until salvage efforts are undertaken. Construction could also be relocated, if the site were judged to have enough significance as to warrant moving the activity.

4.12.2 Potential Mitigation

All parcels within the Carlsbad Field Office are leased with the Special Cultural Resource Lease Notice Stipulation (NM-LN-11). Depending on the nature of the lease developments being proposed and the cultural resources potentially affected, compliance with Section 106 of the NHPA and Executive Order 13007 could require intensive cultural resource inventories, Native American consultation, and other mitigation measures to avoid adverse effects - the costs for which will be borne by the lessee. In addition, the BLM may require modifications to or disapprove proposed activities that are likely to affect traditional cultural places or sacred sites for which no mitigation measures are possible.

4.13 Cave/Karst

4.13.1 Direct, Indirect and Cumulative Effects

Cave and karst features provide direct conduits leading to groundwater. These conduits can quickly transport surface and subsurface contaminants directly into underground water systems and freshwater aquifers without filtration or biodegradation as a result of the development of oil and gas leases. In addition, contaminants spilled or leaked into or onto cave/karst zone surfaces and subsurfaces may lead directly to the disruption, displacement, or extermination of cave species and critical biological processes. In extreme or rare cases, a buildup of hydrocarbons in

cave systems due to surface leaks or spills could potentially cause underground ignitions or asphyxiation of wildlife or humans within the cave.

In cave and karst terrains, rainfall and surface runoff is directly channeled into natural underground water systems and aquifers. Changes in geologic formation integrity, runoff quantity/quality, drainage course, rainfall percolation factors, vegetation, surface contour, and other surface factors can negatively impact cave ecosystems and aquifer recharge processes. Blasting, heavy vibrations, and focusing of surface drainages can lead to slow subsidence, sudden collapse of subsurface voids, and/or cave ecosystem damage.

The construction of roads, pipelines, well pads and utilities can impact bedrock integrity and reroute, impede, focus, or erode natural surface drainage systems. Increased silting and sedimentation from construction can plug downstream sinkholes, caves, springs, and other components of aquifer recharge systems and result in adverse impacts to aquifer quality and cave environments. Any contaminants released into the environment during or after construction can impact aquifers and cave systems. A possibility exists for slow subsidence or sudden surface collapse during construction operations due to collapse of underlying cave passages and voids. This would cause associated safety hazards to the operator and the potential for increased environmental impact. Subsidence processes can be triggered by blasting, intense vibrations, rerouting of surface drainages, focusing of surface drainage, and general surface disturbance.

Blasting fractures in bedrock can serve as direct conduits for transfer of contaminants into cave and groundwater systems. Blasting also creates an expanded volume of rock rubble that cannot be reclaimed to natural contours, soil condition, or native vegetative condition. As such, surface and subsurface disruptions from blasting procedures can lead to permanent changes in vegetation, rainfall percolation, silting/erosion factors, aquifer recharge, and freshwater quality and can increase the risk of contaminant migration from drilling/production facilities built atop the blast area.

During drilling, previously unknown cave and karst features could be encountered. If a void is encountered while drilling and a loss of circulation occurs, lost drilling fluids can directly contaminate groundwater recharge areas, aquifers, and groundwater quality. Drilling operations can also lead to sudden collapse of underground voids. Cementing operations may plug or alter groundwater flow, potentially reducing the water quantity at springs and water wells. Inadequate subsurface cementing, casing, and cave/aquifer protection measures can lead to the migration of oil, gas, drilling fluids, and produced saltwater into cave systems and freshwater aquifers.

4.13.2 Potential Mitigation

In order to mitigate potential impacts to Cave/Karst Resources, lease stipulations S-21 Caves and Karst Stipulation and LN-1 Potential Cave or Karst Occurrence Lease Notice would be attached to lease parcels as follows: Parcels -025, -026, -027, -028, and -029. Potential mitigations that could be developed during the APD and lease development stages may include: changes in drilling operations, special casing and cementing programs, modification in surface activities, cave/karst avoidance or other reasonable measures.

4.14 Noxious Weeds

4.14.1 Direct, Indirect and Cumulative Effects

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

Cumulative adverse effects to resource values because of noxious weeds would include increased surface disturbance, increasing the risk of noxious weed invasion and spread.

4.14.2 Potential Mitigation

New infestations of noxious weeds would be prevented or kept to small localized areas on drill pads if stipulations for proper control methods are followed. However, since current populations of noxious weeds do exist, surface disturbance associated with lease development could allow the populations to increase in size where they currently exist, or spread to other sites. Weed seeds may be picked up on the tires of vehicles and then spread across the landscape. If noxious weeds are detected, abatement measures would be implemented. These include weed inventory surveys, weed monitoring programs, and a spraying program.

The spraying program would reduce or eliminate existing populations, control the spread of current populations, or prevent the establishment of new populations. Measures to ensure the prevention of the spread of noxious weeds will be in place such as the washing of vehicles before leaving infested areas. The CFO works closely with the surrounding communities and the oil and gas industry to monitor and treat heavily infested areas with chemical before habitat areas are invaded.

4.15 Environmental Justice

4.15.1 Direct, Indirect and Cumulative Effects

Issuing any or all of these leases may result in a major hydrocarbon discovery. Increased employment in Hobbs or Carlsbad would aid the minority and low income populations. Otherwise the lease sale does not have potential to disproportionately affect minority or low-income populations. If a major discovery of hydrocarbons results from the October 2009 Oil and Gas Lease Sale, this has the potential to increase the population of the Cities of Hobbs and Carlsbad and the aforementioned communities placing stress on housing, schools, commerce and emergency services in Chaves, Eddy, and Lea Counties.

4.15.2 Potential Mitigation

No mitigation would be required as a result of this project.

5.0 CONSULTATION AND COORDINATION

This section lists individual resource specialists located within the CFO as well as other individuals and agencies who were contacted during the development of this document.

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

ID Team Member/ Contact Name	Title	Organization
Steve Daly	Soil Conservationist	BLM-CFO
Marcos Molinar	GIS Specialist	BLM-CFO
Jim Rutley	Solid Minerals Geologist	BLM-CFO
Jim Goodbar	Senior Cave Specialist	BLM-CFO
Aaron Stockton	Natural Resource Specialist	BLM-CFO
Owen Lofton	Realty Specialist	BLM-CFO
Dario Lunardi	Cartographer, Acting Recreation Specialist	BLM-CFO
Donald Peterson	Assistant Field Manager Lands & Minerals	BLM-CFO
James B. Smith	Planning & Environmental Coordinator	BLM-CFO
George H. MacDonell	Archaeologist	BLM-CFO
Cody Layton	Natural Resources Specialist	BLM-CFO
Rebecca Hunt	Planning & Environmental Coordinator	BLM-CFO
Steve Bird	Wildlife Biologist	BLM CFO
Ty Allen	Wildlife Biologist	BLM CFO
James Rutley	Geologist	BLM-CF)
Natalie Rhoads	Cartographer	BLM-CFO
Howard Parman	Planning & Environmental Coordinator	BLM-RFO
George Farmer	Habitat Officer	NM Dept of Game & Fish
Timothy Breen	Biologist	USFWS
Tony Herrell	Deputy State Director – Minerals	BLM NM State Office
Gloria Baca	Land Law Examiner	BLM NM State Office
Bernadine Martinez	Land Law Examiner	BLM NM State Office
Rebecca Olivas	Land Law Examiner	BLM NM State Office
Margie Dupre	Land Law Examiner	BLM NM State Office
Robert Benavides	Governor	Pueblo of Isleta
Mark Chino	President	Mescalero Apache Tribe
Holly Houghton	THPO	Mescalero Apache Tribe
Wallace Bitsedy	Tribal Administrator	Apache Tribe of Oklahoma

Wallace Coffey	Chairman	Comanche Indian Tribe
Billy Evans Horse	Chairman	Kiowa Tribe of Oklahoma
Benjamin H. Nuvamsa	Chairman	Hopi Tribal Council
Arturo Senclair	Governor	Ysleta del Sur Pueblo
Anthony Vigil	Planning & Environmental Coordinator	Bureau of Reclamation

Summary of Public Comments Received

No public comments were received in response to the two week public comment period of the nominated lease parcels.

6.0 AUTHORITIES

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US Government Accountability Office Report "Climate Change, Agencies Should Develop Guidance for Addressing the Effects on Federal Land and Water Resources" GAO-07-863, August 2007 (1st paragraph, 1st page, GAO Highlights) at:

<http://www.gao.gov/news.items/d07863.pdf>

8.0 APPENDICES

Appendix 1. Parcel List and Stipulations

APPENDIX 1:
Carlsbad Field Office October 2009 Lease Sale Parcels

Carlsbad FO

NM-200910-025 160.000 Acres

 T.0210S, R.0250E, NM PM, NM

 Sec. 005 SW;

Eddy County

Carlsbad FO

NMNM 101572

Formerly Lease No.

Stipulations:

NMLN-11 - Special Cultural Resource Lease Notice

SENM-S-18 Streams, Rivers, and Floodplains

Floodplains

SENM-S-25 VRM-Visual Resource Management

SENM-LN-1 Cave-Karst Occurrence Area

SENM-S-21 Caves and Karst

NM-200910-026 299.090 Acres

 T.0210S, R.0250E, NM PM, NM

 Sec. 005 LOTS 3-6,11-14;

Eddy County

Carlsbad FO

NMNM 101572

Formerly Lease No.

Stipulations:

NMLN-11 - Special Cultural Resource Lease Notice

SENM-S-25 VRM-Visual Resource Management

SENM-LN-1 Cave-Karst Occurrence Area

SENM-S-21 Caves and Karst

NM-200910-027 278.910 Acres

 T.0210S, R.0250E, NM PM, NM

 Sec. 006 LOTS 1-8;

Eddy County

Carlsbad FO

NMNM 101573

Formerly Lease No.

Stipulations:

NMLN-11 - Special Cultural Resource Lease Notice

SENM-S-18 Streams, Rivers, and Floodplains

Floodplains

SENM-S-25 VRM-Visual Resource Management

SENM-LN-1 Cave-Karst Occurrence Area

SENM-S-21 Caves and Karst

NM-200910-028 639.360 Acres

 T.0210S, R.0250E, NM PM, NM

 Sec. 006 LOTS 9-18;

 006 E2SW,SE;

Eddy County

Carlsbad FO

NMNM 101573

Formerly Lease No.

Stipulations:

NMLN-11 - Special Cultural Resource Lease Notice

SENM-S-18 Streams, Rivers, and Floodplains

Floodplains

Windmill/water well
SENM-S-25 VRM-Visual Resource Management
SENM-LN-1 Cave-Karst Occurrence Area
SENM-S-21 Caves and Karst

NM-200910-029 319.960 Acres
T.0200S, R.0260E, NM PM, NM
Sec. 031 LOTS 3,4;
 031 E2SW,SE;

Eddy County
Carlsbad FO
NMNM 96202

Formerly Lease No.

Stipulations:

NMLN-11 - Special Cultural Resource Lease Notice
SENM-S-18 Streams, Rivers, and Floodplains
Floodplains
SENM-S-25 VRM-Visual Resource Management
SENM-LN-1 Cave-Karst Occurrence Area
SENM-S-21 Caves and Karst

NM-200910-031 40.000 Acres
T.0190S, R.0270E, NM PM, NM
Sec. 006 SESE;

Eddy County
Carlsbad FO
NMNM 14206

Formerly Lease No.

Stipulations:

NMLN-11 - Special Cultural Resource Lease Notice
SENM-S-18 Streams, Rivers, and Floodplains
Floodplains - Entire parcel is within floodplain, no drillable
locations. Lease as NSO only.

Defer parcel until Bureau Of Reclamation (Reclamation) RMPA is completed.

Justification: Parcel is located within Reclamation lands. This parcel will be deferred until after the BOR Resource Management Plan Amendment has been completed. Once completed, the parcel if resubmitted will be analyzed again to see if there are any impacts to the resources in the area.

NM-200910-055 240.000 Acres
T.0260S, R.0290E, NM PM, NM
Sec. 008 NENE,S2NE,SENW,E2SW;

Eddy County
Carlsbad FO
NMNM 101108

Formerly Lease No.

Stipulations:

NMLN-11 - Special Cultural Resource Lease Notice
SENM-S-18 Streams, Rivers, and Floodplains Floodplains
SENM-S-19 Playas and Alkali Lakes
SENM-S-25 VRM-Visual Resource Management

****STATE DIRECTOR REVIEW****

There are wells on Lease parcel that have not been reclaimed. Need adequate bond coverage prior to lease issuance.

NM-200910-110 80.000 Acres
T.0090S, R.0320E, NM PM, NM
Sec. 014 N2NE;

Lea County
Carlsbad FO
NMNM 93211
Formerly Lease No.

Stipulations:

SENM-S-22 Prairie Chickens
NMLN-11 - Special Cultural Resource Lease Notice

DEFER FOR LIFE OF Special Status Species -RMPA

Justification: Parcel is located in the LPC Primary Population Area as described in the Special Status Species -RMPA. The prescription, as described in the RMPA, is to defer for the life.

NM-200910-111 637.750 Acres
T.0090S, R.0320E, NM PM, NM
Sec. 019 LOTS 1-4;
 019 E2,E2W2;

Lea County
Carlsbad FO
NMNM 57532
Formerly Lease No.

Stipulations:

SENM-S-22 Prairie Chickens
NMLN-11 - Special Cultural Resource Lease Notice
SENM-S-17 Slopes or Fragile Soils Fragile soils - active dunes

DEFER FOR LIFE OF Special Status Species -RMPA

Justification: Parcel is located in the LPC Primary Population Area as described in the Special Status Species -RMPA. The prescription, as described in the RMPA, is to defer for the life.

NM-200910-112 360.000 Acres
T.0090S, R.0320E, NM PM, NM
Sec. 022 E2W2,SWSW,SE;

Lea County
Carlsbad FO
NMNM 90898, NMNM 92769

Formerly Lease No.

Stipulations:

SENM-LN-2 Protection of the Sand Dune Lizard
SENM-S-22 Prairie Chickens
SENM-S-23 Sand Dune Lizard
NMLN-11 - Special Cultural Resource Lease Notice
SENM-S-17 Slopes or Fragile Soils Fragile soils - active dunes

DEFER FOR LIFE OF Special Status Species -RMPA

Justification: Parcel is located in the LPC Primary Population Area as described in the Special Status Species -RMPA. The prescription, as described in the RMPA, is to defer for the life.

NM-200910-113 1280.000 Acres
T.0090S, R.0320E, NM PM, NM
Sec. 026 ALL;
 035 ALL;

Lea County
Carlsbad FO
NMNM 90899, NMNM 92185, NMNM 92769,
NMNM 94092

Formerly Lease No.

Stipulations:

SENM-S-22 Prairie Chickens
NMLN-11 - Special Cultural Resource Lease Notice
SENM-S-20 Springs, Seeps and Tanks Earthen reservoir
DEFER FOR LIFE OF Special Status Species -RMPA

Justification: Parcel is located in the LPC Primary Population Area as described in the Special Status Species -RMPA. The prescription, as described in the RMPA, is to defer for the life.

NM-200910-114 920.000 Acres

T.0090S, R.0320E, NM PM, NM

Sec. 028 ALL;

033 NE,NENW,S2NW;

Lea County

Carlsbad FO

NMNM 54304, NMNM 57532, NMNM 77050

Formerly Lease No.

Stipulations:

SENM-LN-2 Protection of the Sand Dune Lizard

SENM-S-23 Sand Dune Lizard

SENM-S-22 Prairie Chickens

NMLN-11 - Special Cultural Resource Lease Notice

Windmill/water well

DEFER FOR LIFE OF Special Status Species -RMPA

Justification: Parcel is located in the LPC Primary Population Area as described in the Special Status Species -RMPA. The prescription, as described in the RMPA, is to defer for the life.

NM-200910-115 1278.310 Acres

T.0090S, R.0320E, NM PM, NM

Sec. 029 ALL;

030 LOTS 1-4;

030 E2,E2W2;

Lea County

Carlsbad FO

NMNM 54304, NMNM 55950, NMNM 57532

Formerly Lease No.

Stipulations:

SENM-S-22 Prairie Chickens

NMLN-11 - Special Cultural Resource Lease Notice

SENM-S-19 Playas and Alkali Lakes

Playa

DEFER FOR LIFE OF Special Status Species -RMPA

Justification: Parcel is located in the LPC Primary Population Area as described in the Special Status Species -RMPA. The prescription, as described in the RMPA, is to defer for the life.

NM-200910-116 320.000 Acres

T.0110S, R.0320E, NM PM, NM

Sec. 007 E2;

Lea County

Carlsbad FO

NMNM 56744, NMNM 59391, NMNM 61359,

NMNM 64967, NMNM 81957

Formerly Lease No.

Stipulations:

NMLN-11 - Special Cultural Resource Lease Notice

NM-200910-119 80.000 Acres

T.0190S, R.0350E, NM PM, NM

Sec. 013 E2NE;

Lea County

Carlsbad FO

NMNM 64972

Formerly Lease No.

Stipulations:

NMLN-11 - Special Cultural Resource Lease Notice

NM-200910-120 77.130 Acres

T.0190S, R.0360E, NM PM, NM

Sec. 007 LOTS 3;

007 NESW;

Lea County

Carlsbad FO

NMNM 56764

Formerly Lease No.

Stipulations:

NMLN-11 - Special Cultural Resource Lease Notice

NM-200910-121 154.570 Acres

T.0190S, R.0360E, NM PM, NM

Sec. 018 LOTS 3,4;

018 E2SW;

Lea County

Carlsbad FO

NMNM 77117

Formerly Lease No.

Stipulations:

NMLN-11 - Special Cultural Resource Lease Notice

SENM-S-20 Springs, Seeps and Tanks

Earthen reservoir

NM-200910-122 40.000 Acres

T.0170S, R.0390E, NM PM, NM

Sec. 005 SWNW;

Lea County

Carlsbad FO

NMNM 94136

Formerly Lease No.

Stipulations:

NMLN-11 - Special Cultural Resource Lease Notice