

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

**Project: July 2013 Competitive Oil and Gas Lease Sale
EA Log Number: DOI-BLM- NM-F010-2013-0204-EA
Location: Locations in Rio Arriba, & San Juan County, New Mexico.**

Finding of No Significant Impact

Based on the analysis of potential environmental impacts contained in the attached Environmental Assessment (EA), I have determined the Proposed Action Alternative (Alternative B) is not expected to have significant impacts on the environment. The impacts of leasing the fluid mineral estate in the areas described with this EA have been previously analyzed in the 2003 Farmington RMP and the 2002 Biological Assessment; and the lease stipulations that accompany the tracts proposed for leasing would mitigate the impacts of future development on these tracts. Therefore, preparation of an Environmental Impact Statement is not warranted.

Reviewed by:

Date _____
Gary Torres, Farmington Field Office Manager

Approved by:

Date _____
Jesse Juen, New Mexico State Director

**BUREAU OF LAND MANAGEMENT
FARMINGTON FIELD OFFICE**

**ENVIRONMENTAL ASSESSMENT FOR
July 2013 COMPETITIVE OIL AND GAS LEASE SALE
DOI-BLM- NM-F010-2013-0204-EA**

INTRODUCTION

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

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

In the process of preparing a lease sale the NMSO sends a draft parcel list to any Field Offices in which parcel(s) are located. Field office staff then review the legal descriptions of the parcel(s) to determine if they are in areas open to leasing; if new information has become available which might change any analysis conducted during the planning process; if appropriate consultations have been conducted; what appropriate stipulations should be included; and if there are special resource conditions of which potential bidders should be made aware. The parcels nominated for this sale, along with the appropriate stipulations from the 2003 Farmington Resource Management Plan (RMP) and subsequent amendments, are posted online for a two week public scoping period. Comments received are reviewed and incorporated into the Environmental Assessment (EA).

Once the draft parcel review is completed and returned to the NMSO, a list of nominated lease parcel(s) with specific, applicable stipulations is made available online to the public through a NCLS. On rare occasions, additional information obtained after the publication of the NCLS may result in deferral of certain parcel(s) prior to the lease sale.

This EA documents the Farmington Field Office (FFO) review of forty eight (48) parcels nominated for the July 2013 Competitive Oil and Gas Lease Sale that are under the administration of the FFO. It serves to verify conformance with the approved land use plan,

provides the rationale for deferring or dropping parcel(s) from a lease sale, as well as providing rationale for attaching additional notice to specific parcel(s).

The parcels and applicable stipulations were posted online for a two week public scoping period starting on January 28, 2013. Scoping comments were received from Center for Biological Diversity. Scoping comments were also received from the Department of Cultural Affairs Historic Preservation Division, the Hopi Tribe, San Juan Citizens Alliance (SJCA), WildEarth Guardians (WEG), and the Chaco Alliance in regards to the parcels around Chaco Culture National Historic Park. The parcels near the Park have been deferred to allow for Tribal consultation. In addition, this EA was made available for public review and comment for 30 days beginning March 1, 2013. No additional comments were received. Comments provided prior to the lease sale were considered and incorporated into the EA as appropriate.

Purpose and Need

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

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

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

Conformance with Applicable Land Use Plan and Other Environmental Assessments

The applicable land use plan for this action is the 2003 Farmington RMP. The RMP designated approximately 2.59 million acres of federal minerals open for continued oil and gas development and leasing under Standard Terms and Conditions. The RMP, along with the 2002 Biological Assessment, also describe specific stipulations that would be attached to new leases offered in certain areas. Therefore, it is determined that the alternatives considered conform to fluid mineral leasing decisions in the 2003 Farmington RMP and subsequent amendment and are consistent with the goals and objectives for natural and cultural resources.

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this EA is tiered to and incorporates by reference the information and analysis contained in the 2003 Farmington RMP its Final Environmental Impact Statement. While it is unknown precisely when, where, or to what extent well sites or roads would be proposed, the analysis of projected surface disturbance impacts, should a lease be developed, is based on potential well densities listed in the Reasonable Foreseeable Development (RFD) Scenario included in the 2003 Farmington RMP and the 2002 Biological Assessment. While an appropriate level of site-specific analysis of individual wells or

roads would occur when a lease holder submits an Application for Permit to Drill (APD), assumptions based on the RFD scenario may be used in the analysis of impacts in this EA.

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

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

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

Farmington Field Office biologists reviewed the proposed action and determined it would be in compliance with threatened and endangered species management guidelines outlined in Biological Opinions Cons. #2-22-01-I-389. No further consultation with the U.S. Fish and Wildlife Service (USFWS) is required at this stage.

Federal regulations and policies require the BLM to make its public land and resources available on the basis of the principle of multiple-use. At the same time, it is BLM policy to conserve special status species and their habitats, and to 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 Protocol Agreement between New Mexico BLM and New Mexico State Historic Preservation Officer (Protocol Agreement), which is authorized by the National Programmatic Agreement between 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 FFO, cultural resource staff reviews 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 parcel(s) are withheld from the sale while letters requesting information, comments, or concerns are sent to the Native American representative. If the same draft parcel(s) appear in a future sale, a second request for information is sent to the same recipients and the parcel(s) will be held back again. If no response to the second letter is received, the parcel(s) are allowed to be offered in the next sale (third 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 portions of a parcel need

to be withdrawn from the sale, or if stipulations need to be attached as lease stipulations. If the nominated parcels are private surface owners, no Tribal Consultation is necessary.

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 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 five 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 owners of those lands where the Federal Government is not the surface owner, not including lands where another federal agency manages the surface.

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

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

Identification of Issues

An internal review of the Proposed Action was conducted by an interdisciplinary team (ID Team) of the FFO resource specialists in January 2013 to identify and consider potentially affected resources and associated issues. Both USFWS and Forest Service representatives were a part of the ID Team meeting. During the meeting, the ID Team developed the Proposed Action Alternative, presented in the Alternatives section below.

The parcels included in the Proposed Action, along with the appropriate stipulations from the RMP, were posted online at:

http://www.blm.gov/nm/st/en/prog/energy/oil_and_gas/oil_and_gas_lease.html

for a two week public scoping period beginning January 28 through February 11, 2012. Scoping comments were received from the Center for Biological Diversity, the Department of Cultural

Affairs Historic Preservation Division, the Hopi Tribe, San Juan Citizens Alliance (SJCA), WildEarth Guardians (WEG), and the Chaco Alliance. .

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

- *What effects will the proposed action have on the wildlife and special status species?*
- *What effects will the proposed action have on surrounding homes and properties?*
- *What effects will the proposed action have on Air Quality and Climate?*
- *What effects will the proposed action have on Water Quality?*
- *What effects will the proposed action have on soil resources?*
- *What effects will the proposed action have on visual resources?*
- *What effects will the proposed action have on cultural resources?*
- *What effects will the proposed action have on the Chaco Culture National Historical Park?*
- *What effects will the proposed action have on the North Road ACEC?*
- *What effects will the proposed action have on existing coal mines?*

Several issues were considered during project scoping but dismissed from detailed analysis because there would be no potentially significant effects related to the issues resulting from any of the alternatives presented below. The following resources were determined by an ID Team of resource specialists, following their onsite visit and review of the RMP and other data sources to not be present were: Rangeland Resources, Floodplains, Wild and Scenic Rivers, Wetlands/Riparian Zones, and Wild Horses and Burros.

PROPOSED ACTIONS AND ALTERNATIVES

Alternatives Including the Proposed Action

Alternative A - No Action

In the case of a lease sale, an expression of interest to lease (parcel nomination) would be denied or rejected, and the forty-eight (48) parcels would not be offered for lease during the July 2013 Competitive Oil and Gas Lease Sale. Surface management and any ongoing oil and gas development on surrounding federal, private, and state leases would continue under current guidelines and practices. Selection of the no action alternative would not preclude these parcels from being nominated and considered in future lease sale.

Alternative B – Proposed Action Alternative

The Proposed Action is to lease six (6) nominated parcels of federal minerals, covering 3,455.8 acres administered by the FFO and defer two (2) nominated parcels until the Mine Safety and Health Administration determines those parcels are safe to develop for oil and gas. These parcels are located above active coal mining and open mine workings. Standard terms and conditions as well as lease stipulations listed in the RMP and RMPAs would apply.

Once sold, the lease purchaser has the exclusive right to use as much of the leased lands as is necessary to explore and drill oil and gas within the lease boundaries, subject to the stipulations attached to the lease (Title 43 CFR 3101.1-2).

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

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

Six (6) parcels contain a 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. The three (3) parcels located on BLM surface will have the Biological Survey Lease Notice and VRM Class III Lease stipulation attached. Three (3) parcels are located on BIA surface and the BIA-1 stipulation will be attached to the leases. In addition, site specific mitigation measures and Best Management Practices (BMPs) would be attached as Conditions of Approval (COAs) for each proposed exploration and development activity authorized on a lease.

The parcels recommended for leasing under the Proposed Alternative are presented below in Table 1. Maps of these areas are contained in **Appendix A**.

Standard terms and conditions as well as lease stipulations from the RMP and Lease Notices developed through the parcel review and analysis process would apply (as required by Title 43 CFR 3101.3) to address site specific concerns or new information not identified in the land use planning process.

Table 1. Alternative B: Proposed Action

Lease Parcel #	Legal Description	Acres	Lease Stipulations*
NM-201307-075	T.0230N, R.0060W, 23 PM, NM; Sec. 001 LOTS 3-4;001 S2NW, SW Rio Arriba County – Farmington Field Office	320.96	NM-11-LN Special Cultural Resource F-41 LN Biological Survey F-7-VRM VRM Class III
NM-201307-076	T.0230N, R.0060W, 23 PM, NM; Sec. 006 LOTS 1-4;001 S2N2, S2 Rio Arriba County – Farmington Field Office	639.12	NM-11-LN Special Cultural Resource F-41 LN Biological Survey F-7-VRM VRM Class III
NM-201307-077	T.0230N, R.0060W, 23 PM, NM; Sec. 006 E2E2, SWSE; Sec.012 W2W2 Rio Arriba County – Farmington Field Office	360	NM-11-LN Special Cultural Resource F-41 LN Biological Survey F-7-VRM VRM Class III
NM-201307-095	T.0240N, R.0090W, 23 PM, NM; Sec. 003 Lots 3-4, S2NW,SW; Sec. 004 Lots 1-2, S2NE, SE San Juan County – Farmington Field Office	640.12	NM-11-LN Special Cultural Resource BIA-1
NM-201307-107	T.0230N, R.0100W, 23 PM, NM; Sec. 011 NW San Juan County – Farmington Field Office	160	NM-11-LN Special Cultural Resource BIA-1
NM-201307-108	T.0230N, R.0100W, 23 PM, NM; Sec. 024 SE San Juan County – Farmington Field Office	160	NM-11-LN Special Cultural Resource BIA-1
NM-201307-113	T.0300N, R.0150W, 23 PM, NM; Sec. 022 NENE, S2NE, N2S2, SWSW, SESE San Juan County – Farmington Field Office	360	Located over active coal mining and open mine workings. Defer until MSHA releases.
NM-201307-114	T.0300N, R.0150W, 23 PM, NM; Sec. 034 NENE, S2NE, NESE; Sec. 035 Lots 1-4, N2, N2S2 San Juan County – Farmington Field Office	815.6	Located over active coal mining and open mine workings. Defer until MSHA releases.
* See Appendix D for a summary of stipulations			

Design Features:

- 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; co-locate 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 FFO purchased an infrared camera designed to detect natural gas leaks on and around well pad and pipeline facilities. FFO inspection personnel have been trained to operate the camera and FFO is currently developing a strategy to implement the use of

the camera in cooperation with oil and gas operators to detect and eliminate natural gas leaks in well pad and pipeline infrastructure.

- 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 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 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.

- An application for permit to drill (APD) is required for each proposed well to develop a lease. Onshore Oil and Gas Order No. 1 issued under 43 CFR 3160 authorizes BLM to attach Conditions of Approval (COA) to APDs during the permitting process. As a result of recommendations from the Four Corners Air Quality Task Force, the New Mexico Environment Department, Environmental Protection Division requested FFO attach a COA to APDs requiring new and replacement internal combustion gas field engines of between 40 and 300 horsepower to emit no more than two grams of nitrogen oxides per horsepower-hour. FFO has included a COA limiting nitrogen oxides since August of 2005.
- Required archaeological surveys would be conducted upon all subsequent actions that are expected to occur from the lease sale to avoid disturbing cultural resources. No site-specific mitigation measures for cultural resources have been recommended at this time for the proposed parcels recommended to proceed for sale. Specific mitigation measures, including, but not limited to, possible site avoidance or excavation and data recovery would have to be determined when site-specific development proposals are received. BLM will not approve any ground-disturbing activities that may affect any such properties or resources until it completes its obligations (e.g., State Historic Preservation Officer (SHPO) and tribal consultation) under applicable requirements of the NHPA and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or won't approve any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized, or mitigated.

- In the event that lease development practices are found in the future to have an adverse effect on Native American TCPs, the BLM, in consultation with the affected tribe, would take action to mitigate or negate those effects. Measures include, but are not limited to physical barriers to protect resources, relocation of practices responsible for the adverse effects, or other treatments as appropriate.
- To be in conformance with the Native American Graves Protection and Repatriation Act of 1991 (Public Law 101-610), the terms and conditions of the lease should contain the following condition: In the event that the lease holder discovers or becomes aware of the presence of Native American human remains within the lease, they shall immediately notify the Bureau of Land Management in writing.
- The use of a plastic-lined reserve pits or closed systems or steel tanks; casing and cementing requirements; storm water management, silt traps, site recontouring, timely reseeded of disturbed areas and soil stabilization would be implemented.
- The operator would stockpile the topsoil from the surface of well pads which would be used for interim and final reclamation of the well pads. Reserve pits would be recontoured and reseeded as described in attached Conditions of Approval. Upon abandonment of the wells and/or when access roads are no longer in service the Authorized Officer would issue instructions and/or orders for surface reclamation/restoration of the disturbed areas as described in the attached Conditions of Approval. During the life of the development, all disturbed areas not needed for active support of production operations should undergo “interim” reclamation in order to minimize the environmental impacts of development on other resources and uses. Site specific mitigations, determined during the onsite, such as proper project placement, storm water management, silt traps, rounding of corners and soil stabilization, would reduce erosion and sediment migration. Earthwork for interim and final reclamation must be completed within 6 months of well completion or well plugging (weather permitting). The operator shall submit a Sundry Notices and Reports on Wells (Notice of Intent), Form 3160-5, prior to conducting interim reclamation.
- Road constructions requirements and regular maintenance would alleviate potential impacts to access roads from water erosion damage.
- Mitigation would include, as needed to protect impacts to resources, revegetation with native plant species, soil enhancement practices, direct live haul of soil material for seed bank revegetation, reduction of livestock grazing, fencing of reclaimed areas, and the use of seeding strategies consisting of native grasses, forbs, and shrubs.
- In the event noxious weeds are discovered during construction of any access roads and well pads, mitigation would be deferred to the site specific development at the APD stage. Best management practices (BMPs) would be incorporated into the conditions of approval (COAs) of an approved APD.

- A biological survey may be required to determine any impacts on individual project proposals. Any potential impacts to special status species will be determined based on the biological survey report. A preconstruction survey for burrowing owls may also be required for proposed projects scheduled to be constructed within known habitat (i.e. prairie dog towns) during the nesting season of April 1 to July 31. Occupied burrowing owl nests will not be disturbed within a 50 meters radius from April 1 to August 15. After August 15, any project that will cause destruction of the nest burrow can only begin after confirmation that the nest burrow is no longer occupied. Section 7 Consultation under the Endangered Species Act may be required if there would be any impacts to federally-listed species. This determination will be made based on the biological survey.
- All construction activities will be confined to the permitted areas only. Site specific mitigation measures designed to protect migratory birds will be implemented to decrease direct impacts to nesting birds. If an active nest is observed during construction, construction activities that could result in take as defined by the MBTA would halt until practicable or reasonable avoidance alternatives are identified, the birds have fledged, or a migratory bird take permit has been granted from the USFWS. Any proposed action that would result in more than four acres of new surface disturbance; a preconstruction migratory bird nest survey may be required if any construction activities occur between May 15 – July 31 per BLM/FFO Instruction Memorandum No. NM-F00-2010.
- Special painting schemes may be required for all facilities to closely approximate the vegetation within the setting. All facilities, including the meter building, would be painted to blend with the surrounding vegetation. If the proposed project is determined to be in a scenic area, site specific COAs, proper project placement, tree screen, low profile equipment, may be required for the proposed action.
- Proposed wells in the 100-year floodplain would be subject to special management constraints and mitigation. The outline of active floodplain and 100-year floodplain data was entered into BLM's GIS from floodplain maps from the Federal Emergency Management Agency (FEMA).
- Water acquired to construct, produce, and maintain actions authorized by this permit to drill must be acquired from permitted water sources, or water authorized for use by the New Mexico Oil Conservation Division (OCD). Upon request the AO shall be provided with documentation of water sources.

Alternatives Considered but Eliminated from Detailed Analysis

The alternatives considered but eliminated from detailed analysis identify those parcels that are not in conformance with the current land use plans or need more time for evaluation. Therefore this alternative will not be carried through the remainder of this environmental assessment. Table 2 below identifies those nominated parcels that are not in conformance with current land use plans, and also describes why these parcels were not carried forward into the proposed action.

Table 2. Alternatives Considered but Eliminated from Detailed Analysis

Lease Parcel #	Alternative	Legal Description	Acres	County	Reason for Elimination
NM-201307-078	Lease	T.0210N, R.0080W, NM PM, NM Sec. 022 E2,NW;	480	San Juan	Tribal Consultation in Progress
NM-201307-079	Lease	T.0220N, R.0090W, NM PM, NM Sec. 004 LOTS 1,2; 004 S2NE,SW;	321.83	San Juan	Tribal Consultation in Progress
NM-201307-080	Lease	T.0220N, R.0090W, NM PM, NM Sec. 005 LOTS 1-4; 005 S2N2,SW; 008 N2,N2SW;	882.87	San Juan	Tribal Consultation in Progress
NM-201307-081	Lease	T.0220N, R.0090W, NM PM, NM Sec. 007 LOTS 1-4; 007 NE,E2W2,N2SE,SWSE;	599.5	San Juan	Tribal Consultation in Progress
NM-201307-082	Lease	T.0220N, R.0090W, NM PM, NM Sec. 009 NE,SW;	320	San Juan	Tribal Consultation in Progress
NM-201307-083	Lease	T.0220N, R.0090W, NM PM, NM Sec. 014 E2,NW;	480	San Juan	Tribal Consultation in Progress
NM-201307-084	Lease	T.0220N, R.0090W, NM PM, NM Sec. 015 ALL;	640	San Juan	Tribal Consultation in Progress
NM-201307-085	Lease	T.0220N, R.0090W, NM PM, NM Sec. 018 LOTS 3,4; 018 W2NE,E2SW,SE;	400.27	San Juan	Tribal Consultation in Progress
NM-201307-086	Lease	T.0220N, R.0090W, NM PM, NM Sec. 020 ALL;	640	San Juan	Tribal Consultation in Progress
NM-201307-087	Lease	T.0220N, R.0090W, NM PM, NM Sec. 021 NE,SW;	320	San Juan	Tribal Consultation in Progress
NM-201307-088	Lease	T.0220N, R.0090W, NM PM, NM Sec. 022 ALL;	640	San Juan	Tribal Consultation in Progress
NM-201307-089	Lease	T.0220N, R.0090W, NM PM, NM Sec. 023 ALL;	640	San Juan	Tribal Consultation in Progress
NM-201307-090	Lease	T.0220N, R.0090W, NM PM, NM Sec. 029 ALL;	640	San Juan	Tribal Consultation in Progress
NM-201307-091	Lease	T.0220N, R.0090W, NM PM, NM Sec. 030 LOTS 1-4; 030 E2,E2W2;	640.48	San Juan	Tribal Consultation in Progress
NM-201307-092	Lease	T.0220N, R.0090W, NM PM, NM Sec. 031 LOTS 1-4; 031 E2,E2W2;	640.15	San Juan	Tribal Consultation in Progress
NM-201307-093	Lease	T.0220N, R.0090W, NM PM, NM Sec. 032 NW,S2;	480	San Juan	Tribal Consultation in Progress
NM-201307-094	Lease	T.0220N, R.0090W, NM PM, NM Sec. 034 N2;	320	San Juan	Tribal Consultation in Progress
NM-201307-096	Lease	T.0220N, R.0100W, NM PM, NM Sec. 001 LOTS 1-4; 001 S2N2,S2;	639.36	San Juan	Tribal Consultation in Progress
NM-	Lease	T.0220N, R.0100W, NM PM,	80	San Juan	Tribal Consultation in

201307-097		NM Sec. 003 E2SE;			Progress
NM-201307-098	Lease	T.0220N, R.0100W, NM PM, NM Sec. 010 SENW,N2SW;	120	San Juan	Tribal Consultation in Progress
NM-201307-099	Lease	T.0220N, R.0100W, NM PM, NM Sec. 011 S2;	320	San Juan	Tribal Consultation in Progress
NM-201307-100	Lease	T.0220N, R.0100W, NM PM, NM Sec. 012 ALL;	640	San Juan	Tribal Consultation in Progress
NM-201307-101	Lease	T.0220N, R.0100W, NM PM, NM Sec. 013 ALL;	640	San Juan	Tribal Consultation in Progress
NM-201307-102	Lease	T.0220N, R.0100W, NM PM, NM Sec. 014 W2SW; 015 S2;	400	San Juan	Tribal Consultation in Progress
NM-201307-103	Lease	T.0220N, R.0100W, NM PM, NM Sec. 020 SE;	160	San Juan	Tribal Consultation in Progress
NM-201307-104	Lease	T.0220N, R.0100W, NM PM, NM Sec. 021 N2; 022 ALL; 023 W2NE,W2;	1360	San Juan	Tribal Consultation in Progress
NM-201307-105	Lease	T.0220N, R.0100W, NM PM, NM Sec. 028 NE,SW;	320	San Juan	Tribal Consultation in Progress
NM-201307-106	Lease	T.0220N, R.0100W, NM PM, NM Sec. 034 N2,SW;	480	San Juan	Tribal Consultation in Progress
NM-201307-109	Lease	T.0230N, R.0100W, NM PM, NM Sec. 024 SW; 025 E2;	480	San Juan	Tribal Consultation in Progress
NM-201307-110	Lease	T.0230N, R.0110W, NM PM, NM Sec. 017 ALL;	640	San Juan	Tribal Consultation in Progress
NM-201307-111	Lease	T.0230N, R.0110W, NM PM, NM Sec. 021 N2;	320	San Juan	Tribal Consultation in Progress
NM-201307-112	Lease	T.0230N, R.0110W, NM PM, NM Sec. 028 NE,N2NW;	240	San Juan	Tribal Consultation in Progress
NM-201307-115	Lease	T.0300N, R.0160W, NM PM, NM Sec. 003 LOTS 1-16; 004 LOTS 1-7; 004 S2NE,SE; 009 LOTS 1-4; 009 E2,E2NW,E2SW; 010 LOTS 1,2; 010 E2NW;	1897.86	San Juan	Tribal Consultation in Progress
NM-201307-145	Lease	T.0220N, R.0060W, TX PM, TX Sec. 004 SE; 009 N2,W2SW; 010 NW;	720	Sandoval	Tribal Consultation in Progress
NM-201307-146	Lease	T.0220N, R.0060W, TX PM, TX Sec. 005 SW; 006 S2; 008 N2;	800	Sandoval	Tribal Consultation in Progress
NM-201307-147	Lease	T.0220N, R.0060W, TX PM, TX Sec. 015 SE; 022 NENE;	200	Sandoval	Tribal Consultation in Progress

NM-201307-148	Lease	T.0220N, R.0060W, TX PM, TX Sec. 023 E2; 024 NW;	480	Sandoval	Tribal Consultation in Progress
NM-201307-149	Lease	T.0220N, R.0060W, TX PM, TX Sec. 026 NW;	160	Sandoval	Tribal Consultation in Progress
NM-201307-150	Lease	T.0220N, R.0060W, TX PM, TX Sec. 030 E2SE;	80	Sandoval	Tribal Consultation in Progress
NM-201307-151	Lease	T.0230N, R.0070W, TX PM, TX Sec. 035 NE;	160	Sandoval	Tribal Consultation in Progress

AFFECTED ENVIRONMENT

Introduction

This section describes the environment that would be affected by implementation of the alternatives described in Section 2. Elements of the affected environment described in this section focus on the relevant resources and issues.

Air Resources

Air quality and climate are components of air resources which may be affected by BLM applications, activities, and resource management. Therefore, the BLM must consider and analyze the potential effects of BLM and BLM-authorized activities on air resources as part of the planning and decision making process. Additional information on air quality in this area is contained in Chapter 3 of the Farmington Field Office (FFO) Resource Management Plan (RMP) and Final Environmental Impact Statement (FEIS; USDI BLM, 2003) which this analysis tiers to and incorporates. Much of the information referenced in this section is incorporated from the Air Resources Technical Report for BLM Oil and Gas Development in New Mexico, Kansas, Oklahoma, and Texas (herein referred to as Air Resources Technical Report, USDI BLM 2013). This document summarizes the technical information related to air resources and climate change associated with oil and gas development and the methodology and assumptions used for analysis.

Air Quality

The Air Resources Technical Report describes the types of data used for description of the existing conditions of criteria pollutants (USDI BLM 2013), how the criteria pollutants are related to the activities involved in oil and gas development (USDI BLM 2013), and provides a table of current National and state standards. EPA's Green Book web page (EPA, 2012) reports that all counties in the Farmington Field Office area are in attainment of all National Ambient Air Quality Standards (NAAQS) as defined by the Clean Air Act. The area is also in attainment of all state air quality standards (NMAQS). The current status of criteria pollutant levels in the Farmington Field Office are described below. Total emissions of criteria pollutants from each source sector were calculated by adding together the emissions from the four counties that are located in FFO: San Juan, McKinley, Rio Arriba, and Sandoval.

“Design Concentrations” are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. The 2011 design concentrations of criteria pollutants are listed below. There is no monitoring for CO and lead in San Juan County, but because the county is relatively rural, it is likely that these pollutants are not elevated. PM10 design concentrations are not available for San Juan County. Table 3 summarizes monitored values for other criteria pollutants in San Juan County.

Navajo Lake	0.069	0.066	0.075
-------------	-------	-------	-------

Table 3. 2011 Design Concentrations of Criteria Pollutants in San Juan County (EPA, 2012)

Pollutant	2011 Design Concentration	Averaging Time	NAAQS	NMAAQS
O ₃	0.063 ppm	8-hour	0.075 ppm ¹	
NO ₂	13 ppb	Annual	53 ppb	50 ppb
NO ₂	39 ppb	1-hour	100 ppb ²	
PM _{2.5}	4.5 µg/m ³	Annual	12 µg/m ^{3,3}	*60 µg/m ³
PM _{2.5}	14 µg/m ³	24 hour	35 µg/m ^{3,2}	150 µg/m ³
SO ₂	20 ppb	1-hour	75 ppb ⁴	
¹ Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years				
² 98th percentile, averaged over 3 years				
³ Annual mean, averaged over 3 years				
⁴ 99 th percentile of 1-hour daily maximum concentrations, averaged over 3 years				

In 2005, the EPA estimates that there was less than 0.01 ton per square mile of lead emitted in FFO counties, which is less than 2 tons total (EPA, 2010b). Lead emissions are not an issue in this area, and will not be discussed further.

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

Mean AQI values for San Juan County were generally in the good range (AQI<50) in 2011 with 78% of the days in that range. The mean AQI in 2011 was 43, which indicates “good” air quality. The maximum AQI in 2011 was 140, which is “unhealthy for sensitive groups”.

Although the AQI in the region has reached the level considered unhealthy for sensitive groups on several days almost every year in the last decade, there are no patterns or trends to the occurrences (Table 3). On 8 days in the past decade, air quality has reached the level of “unhealthy” and on two days, air quality reached the level of “very unhealthy”. In 2009, there were no days that were “unhealthy for sensitive groups” or worse in air quality.

Table 3. Number of Days classified as “unhealthy for sensitive groups” (AQI 101-150) (EPA, 2012a)

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Days	10	6	3	6*	9	18	1	0	12**	9
*in addition, there was 1 day that was “unhealthy” during the year.										
** in addition, there were 5 “unhealthy” days that year and 2 “very unhealthy” days.										

Hazardous Air Pollutants

The Air Resources Technical Report discusses the relevance of hazardous air pollutants (HAPs) to oil and gas development and the particular HAPs that are regulated in relation to these activities (USDI BLM 2013). The EPA conducts a periodic National Air Toxics Assessment (NATA) that quantifies HAP emissions by county in the U.S. The purpose of the NATA is to identify areas where HAP emissions result in high health risks and further emissions reduction strategies are necessary. A review of the results of the 2005 NATA shows that cancer, neurological and respiratory risks in San Juan County are generally lower than statewide and national levels as well as those for Bernalillo County where urban sources are concentrated in the Albuquerque area (EPA, 2011a).

Climate

The planning area is located in a semiarid climate regime typified by dry windy conditions and limited rainfall. Summer maximum temperatures are generally in the 80s or 90s (Fahrenheit) and winter minimum temperatures are generally in the teens to 20s. Temperatures occasionally reach above 100 °F in June and July and have dipped below zero in December and January. Precipitation is divided between summer thunderstorms associated with the Southwest Monsoon and winter snowfall as Pacific weather systems drop south into New Mexico.

The Air Resources Technical Report summarizes information about greenhouse gas emissions from oil and gas development and their effects on national and global climate conditions. While 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.

Heritage Resources

Cultural Resources

When a lessee proposes to explore or develop its lease, an area-specific cultural records review would be done, in accordance with Section 106 of the National Historic Preservation Act (NHPA), to determine if there is a need for a cultural inventory of the areas that could be affected by the proposed surface disturbing activities. Generally, a cultural inventory will be required and all historic and archeological sites that are eligible for listing in the National Register of Historic Places (NRHP: i.e. historic properties) or potentially eligible to be listed would be either avoided by the undertaking or have the information in the sites extracted through data recovery prior to surface disturbance.

The nominated parcels are located within the archaeologically rich San Juan Basin of northwestern New Mexico. In general, the prehistory of the San Juan Basin can be divided into five major periods: PaleoIndian (ca. 10000 B.C. to 5500 B.C.), Archaic (ca. 5500 B.C. to A.D. 400), Basketmaker II-III and Pueblo I-IV periods (A.D. 1-1540), and the historic (A.D. 1540 to present), which includes Native American as well as later Hispanic and Euro-American settlers. Detailed description of these various periods and select phases within each period is provided in the Bureau of Land Management Farmington Field Office Final Environmental Impact Statement and Resource Management Plan (2003) and will not be reiterated here. Additional information is also included in an associated document (SAIC 2002).

To assess the cultural resources of the leases, two avenues of inquiry were considered: literature or file review and Native American consultation. The literature review involved utilizing data sources including computerized data from the Archaeological Records Management Section at the Museum of New Mexico (ARMS; September 2012), BLM site location maps, ethnographic records from previously conducted small and large scale cultural resource surveys, and original General Land Office surveys. Native American consultation involved contacting by mail the Navajo Nation President, Navajo Nation Historic Preservation Office, and affected Navajo chapters for selected parcels.

Previous cultural resource studies and surveys in the lease areas have been generally limited to inspections ahead of oil and gas related activities. From a data review, there are 29 archaeological sites on record in the proposed leases and approximately 841 acres of the proposed leases (24 %) have been inventoried for cultural resources (Table 4). The figures may be likely slightly higher because not all known surveys have been electronically captured in a GIS environment.

Table 4. Archaeological Sites on Record

Parcel	Surface Owner	Parcel Size (ac)	Surveys (ac)	Percent Surveyed	Sites	GLO Records
NM-201307-75	BLM	320.96	1	<1%	1	1882-nothing
NM-201307-76	BLM	639.12	38	6%	2	1882-nothing
NM-201307-77	BLM	360	3	<1%	1	1882-nothing
NM-201307-95	Navajo	640.12	70	11%	7	1882-nothing; 1934-road
NM-201307-107	Navajo	160	15	9%	0	1883-nothing
NM-201307-108	Navajo	160	0	0	0	1883-nothing
NM-201307-113	BLM	360	61	17%	4	1910-nothing
NM-201307-114	BLM	815.6	653	80%	14	1910-nothing
Totals		3455.8	841		29	

The 29 sites represent Anasazi, Navajo, Anglo, and unknown cultural/temporal components. Features identified in site record include but are not limited to historic house remains, rubble mounds, middens/dumps, sweat lodges, hearths, and scatters of artifacts.

General Land Office maps dating from 1882 – 1934 did not yield any significant results within the parcels. There are no sites listed on the National Register of Historic Places in the parcels.

Native American Religious Concerns

Traditional Cultural Prosperities (TCPs) is a term that has emerged in historic preservation management and the consideration of Native American religious concerns. TCPs are places that have cultural values that transcend, for instance, the values of scientific importance that are normally ascribed to cultural resources such as archaeological sites (Parker and King 1998).

Native American communities are most likely to identify TCPs, although TCPs are not restricted to those associations. Some TCPs are well known, while others may only be known to a small group of traditional practitioners, or otherwise only vaguely known.

For the Proposed Action, identification of TCP's were limited to reviewing existing published and unpublished literature (e.g. Van Valkenburgh 1941, 1974; Brugge 1993; Kelly et al 2006). In addition, the BLM's cultural resources program was contacted for information regarding the presence of TCPs identified through ongoing BLM tribal consultation efforts. No TCP's are known to exist in the parcels.

Water Resources

The primary aquifers in the BLM/FFO area are the sandstone based Uinta-Animas and the Mesaverde. Figure 1 shows the geologic time column that relates to aquifers in the San Juan Basin. The Uinta-Animas aquifer is composed primarily of Lower Tertiary rocks consisting of the San Jose Formation, the underlying Animas Formation and its lateral equivalent, the Nacimiento Formation, and the Ojo Alamo Sandstone. The aquifer thickness generally increases toward the central part of the basin.

The Mesaverde aquifer comprises water-yielding units in the Upper Cretaceous Mesaverde Group and some adjacent Tertiary and Upper Cretaceous formations. In the basin, the aquifer consists of sandstone, coal, siltstone, and shale of the Mesaverde Group. The aquifer has a maximum thickness of about 4,500 feet in the southern part of the basin. The quality of the Mesa Verde Aquifer is extremely variable. Sparse data indicate that the total dissolved solids (TDS) concentrations ranges from about 1,000 to 4,000 milligrams per liter (mg/L) in the basin (USDI/BLM 2003a, page 3-29) and also high in chlorides (USGS 1995). The available data in the San Juan Basin indicate recharge in the area of the Zuni Uplift, Chuska Mountains, and in northern Sandoval County, New Mexico. Transmissivity, the rate which groundwater flows horizontally through an aquifer, of the Mesaverde aquifer is less than 50 feet squared per day in large areas of the Colorado Plateaus (USGS 1995).

Figure 1. Geologic Time Column of the San Juan Basin (USDI/BLM 2003a)

Era	System	Formation	Thickness	Production
CENOZOIC	TERTIARY	San Jose Formation	2500 ft.	Gas
		Nacimiento Formation	500-1300 ft.	Gas
		Ojo Alamo Sandstone	250 ft.	Gas
MESOZOIC	CRETACEOUS	Kirtland Shale Farmington Sandstone	1500 ft.	Gas/Oil
		Fruitland Formation	500 ft.	Gas
		Pictured Cliffs Sandstone	250 ft.	Gas
		Lewis Shale Huerfanito Bentonite	500-1900 ft.	Gas
		Mesaverde Group		
		Cliff House Sandstone	0-800 ft.	Gas
		Menefee Formation	350-2200 ft.	Gas
		Point Lookout Formation	100-300 ft.	Gas
		Mancos Shale		
		Upper Mancos Shale/Tocito Sandstone	2300-2500 ft.	Gas/Oil
		Gallup Sandstone/Carlile Shale		Gas/Oil
		Greenhorn Limestone		
		Graneros Shale		
	JURASSIC	Dakota Sandstone	150-200 ft.	Gas/Oil
		Morrison Formation	400-900 ft.	
		Wanakah Formation	50-200 ft.	
		Todilto Limestone		
	TRIASSIC	Entrada Sandstone	100-300 ft.	Oil
		Chinle Formation	500-1600 ft.	
PALEOZOIC	PERMIAN	Cutler Formation	1500-2500 ft.	
	PENNSYLVANIAN	Honaker Trail Formation		
		Paradox Formation	200-3000 ft.	Gas?
		Pinkerton Trail Formation		
		Molas Formation	0-100 ft.	
	MISSISSIPPIAN	Leadville Limestone	0-165 ft.	
	DEVONIAN	Elbert Formation	0-325 ft.	
	CAMBRIAN	Ignacio Quartzite	0-100 ft.	
PRECAMBRIAN				

Groundwater is readily available in most of the FFO planning area and is of fair to poor quality. Generally TDS exceed 1,000 mg/L and ranges from 400 up to 4,000 mg/L. The water is hard to very hard with chemical composition dependent on location of withdrawal and the producing aquifer. Calcium or sodium is usually the predominant cation with bicarbonate or sulfate the predominant anion (USDI/BLM 2003a, page 3-30).

Most onshore produced water is injected deep underground for either enhanced recovery or disposal. With the passage of the Safe Drinking Water Act in 1974, the subsurface injection of fluids came under federal regulation. In 1980, the USEPA promulgated the Underground Injection Control regulations. The program is designed to protect underground sources of drinking water. The NMOCD regulates oil and gas operations in New Mexico. The NMOCD has the responsibility to gather oil and gas production data, permit new wells, establish pool rules and oil and gas allowables, issue discharge permits, enforce rules and regulations of the division, monitor underground injection wells, and ensure that abandoned wells are properly plugged and the land is responsibly restored. The New Mexico Environment Department (NMED) administers the major environmental protection laws. The Water Quality Control Commission

(WQCC), which is administratively attached to the NMED, assigns responsibility for administering its regulations to constituent agencies, including the NMOCD. The NMOCD administers, through delegation by the WQCC, all Water Quality Act regulations pertaining to surface and groundwater (except sewage not present in a combined waste stream). According to the NMOCD, produced water if predictable in salt concentration, can be used for drilling and completion and possibly cementing (Jones, pers. comm. 2012).

Soil

The Soil Conservation Service, now the Natural Resource Conservation Service (NRCS), has surveyed the soils in McKinley, San Juan, and Rio Arriba County. The soil map units represented in the project area are in Table 5.

Table 5. Soil Map Data

Parcels	Soils
<p>76,77 Rio Arriba County, Farmington FO</p>	<p><u>Pinavetes-Florita Complex, 2 to 10 percent slopes (09)</u> - The Pinavetes-Florita complex is found on slopes of 2 to 10 percent on toeslopes of hills and dunes that may be encroaching on hills. The parent material for this soil is alluvium and eolian material derived from sandstone. The typical profile is up to 3 inches of light yellowish brown loamy sand, and then 14 to 26 inches of strong brown loamy sand. This is a deep soil with very pale brown sand from 26 to 60 inches deep. This soil is excessively drained, has a low available water capacity, and is severely susceptible to water erosion. The major use for this soil is livestock grazing with a potential plant community of blue grama, Indian ricegrass, galleta, and western wheatgrass.</p>
<p>76,77 Rio Arriba County, Farmington FO</p>	<p><u>Sparank – San Mateo Silt Loam, 0 to 3 percent slopes (10)</u> - The Sparank soils are found of 0 to 3 percent slopes in broad valleys and flood plains. The typical profile is 2 inches of pale brown silt loam and 2 to 60 inches pale brown clay. The parent material is alluvium derived from sandstone and shale. The available water capacity is moderate and the permeability is very slow with a moderate potential for water erosion. This soil is slightly saline and strongly alkaline. The San Mateo silt loam is found in valley floodplains with slopes from 0 to 3 percent. The parent material is alluvium derived from sandstone and shale. The typical profile is 3 inches of brown sandy loam, 3 to 8 inches of pale brown fine sandy loam, 8 to 15 inches of pale brown sandy loam, 15 to 46 inches of brown clay loam, and 46 to 60 inches of pale brown clay loam. The available water capacity is high and the permeability is moderately slow. Potential for water erosion is slight. The major use of this soil type is livestock grazing with a potential plant community of alkali sacaton, western wheatgrass, galleta, bottlebrush squirreltail and four with saltbush, and black greasewood.</p>
<p>75 Rio Arriba County, Farmington FO</p>	<p><u>Orlie Fine Sandy Loam, 1 to 8 percent slopes (103)</u>- The Orlie fine sandy loam is found on 1 to 8 percent slopes in valley sides and mesa tops. This soil ranges from well drained to somewhat excessively drained valley sides and hillsides. The parent material primarily consists of alluvium and eolian material derived from sandstone and shale. This soil has a deep structure (greater than 60 inches to underlying rock), which is moderately permeable. Available water capacity is very high with a moderate shrink-swell potential. This soil is moderately susceptible to water erosion. The major use of this soil type is livestock grazing. The potential plant community is characterized by western wheatgrass, Indian ricegrass, needleandthread, galleta, and big sagebrush.</p>
<p>75,76,77 Rio Arriba County, Farmington FO</p>	<p><u>Vessilla-Menefee-Orlie Complex, 1 to 45 percent slopes (110)</u> - The Vessilla-Menefee-Orlie Complex, 1 to 30%, slopes is comprised of Vessilla and similar soils, 45%; Menefee and similar soils, 25%; Orlie and similar soils, 20%; and minor components, 10%. Vessilla soils are located on breaks formed from slope alluvium over residuum derived from sandstone. This unit is well drained with a very low water capacity. This unit has moderate permeability and low shrink-swell potential. Menefee soils are located on breaks formed from colluvium over residuum derived from shale, with a 15 to 45% slope. This soil is well drained with a very low water capacity. Runoff for this unit is high and the shrink-swell potential is moderate. Orlie soils, located on summits of plateaus and mesas, formed from slope alluvium derived from sandstone and shale. They have a 1 to 8% slope. This unit is well drained with a high available water capacity. Runoff for this unit is medium and permeability is slow. Minor components consist of</p>

	<p>Rock outcrop, Pinavetes and similar soils, and Gobernador and similar soils. Rock outcrop consists of barren or nearly barren areas of exposed bedrock on ridges, ledges, and escarpments. Pinavetes and similar soils comprise about 3% of the total acreage with a slope of 0 to 3%. Gobernador and similar soils comprise about 3% of the total acreage with a slope of 0 to 3%. Major used of this soil type is grazing and wood products. The major limitation for this soil is water erosion..</p>
<p>75,77 Rio Arriba County, Farmington FO</p>	<p><u>Rock Outcrop-Vessilla-Menefee Complex, 15 to 45 percent slopes (220)</u> – The Rock Outcrop-Vessilla-Menefee Complex is comprised of 15 to 45% slopes. The complex is comprised of 40% Rock Outcrop, 15 to 45% slopes; 30% Vessilla sandy loam, 15 to 45% slopes; 20% Menefee clay loam, 15 to 45% slopes; and 10% minor components. The Rock Outcrop consists of barren or nearly barren areas of exposed bedrock on ridges, ledges, and escarpments. Vessilla soils, found on breaks, is shallow and well drained. Permeability is moderately rapid with a very low available water capacity. Effective rooting depth varies from 6 to 10 inches. Runoff is rapid with the potential for water erosion severe. The hazard of soil blowing is severe. Menefee soil, found on breaks, is shallow and well drained. Permeability is slow with a very low available water capacity. Effective rooting depth is 6 to 10 inches. Runoff tends to be rapid with the potential for water erosion severe. The potential for wind erosion is also severe. The unit has limitations due to lack of soil depth and slopes. Roads can be protected from erosion by construction of water bars and be seeding of cuts and fills. Minor components include badlands, 5% and rubble land, 5%. The major use for this soil type is wood products.</p>
<p>95, 113, 114 San Juan County, Farmington FO</p>	<p><u>Blancot-Notal Association, 0 to 5 percent slopes (BT)</u> The Blancot-Nota Association is found on fans and in valleys with slopes of 0 to 5 percent. This soil unit is about 55 percent Blancot loam, 25 percent Notal silty clay loam, and 20 percent other soil inclusions. This soil unit is deep and well drained, and formed in alluvium derived dominantly from sandstone and shale. The surface is pale brown loam about two to three inches thick. The subsoil is pale brown an light brownish gray clay loam about 13 to 20 inches thick. The substratum to a depth of 60 inches or more is light grayish brown sandy clay loam. The permeability of the Blancot portion is moderate and the water capacity is high. The permeability of the Notal portion is very slow and the water capacity if very high. The runoff potential for this soil unit is medium, and the hazard of water erosion is moderate. The potential plant community of this soil unit is western wheatgrass, galleta, Indian ricegrass, and fourwing saltbush.</p>
<p>95, 108 San Juan County, Farmington FO</p>	<p><u>Fruitland-Persayo-Sheppard Complex, 5 to 30 percent slopes (FX)</u> The Fruitland-Persayo-Sheppard Complex is found hills, mesas, plateaus, fans, and breaks with slopes from 5 to 30 percent. This unit is about 40 percent Fruitland sandy loam, 30 percent Persayo clay loam, 25 percent Sheppard loamy fine sand, and 5 percent other soil inclusions. The Fruitland soil is deep and well drained and was formed from in alluvium derived dominantly from sandstone and shale. Typically, the Fruitland soil has a brown sandy loam surface layer about 4 inches thick; has moderately rapid permeability, moderate available water capacity, medium runoff potential, and has a moderate water erosion hazard. Persayo soil is shallow and well drained and was formed in residuum derived dominantly from shale. Persayo soil has a surface layer of about 2 inches of brownish gray clay loam, has moderately slow permeability, very low water availability, rapid runoff, and has a high hazard of water erosion. Sheppard is deep and somewhat excessively drained and was derived from mixed sources. Sheppard soil has a surface layer of about 4 inches of brown loamy fine sand, has raid permeability, low water capacity, slow runoff, and has a slight potential for water erosion. The potential plant community for the Fruitland and Sheppard soil is Indian ricegrass, blue grama, fourwing saltbush, giant dropseed, and alkali sacaton. The potential plant community for the Persayo soil is juniper, pinyon, antelope bitterbrush, and blue grama.</p>
<p>107 San Juan County, Farmington FO</p>	<p><u>Doak-Sheppard-Shiprock Association, 0 to 15 percent slopes (DS)</u> The Doak-Sheppard-Shiprock Association is found on mesas, plateaus, and terraces with slopes of 0 to 15 percent. This unit is about 40 percent Doak loam, 30 percent Sheppard loamy fine sand, 20 percent Shiprock fine sandy loam, and 10 percent other soil inclusions. This soil unit is deep and from well drained to somewhat excessively drained. This soil formed in alluvium derived dominantly from sandstone and shale. The surface layer is typically brown loam to brown loamy fine sand to about three inches deep. The subsoil ranges from light brown silty clay to yellowish brown fine sand. The Doak portion has a moderately slow permeability with very high water capacity; runoff potential is medium and the hazard of water erosion is moderate. The Sheppard portion has rapid permeability with low available water capacity; runoff is slow and the hazard for water erosion is slight. The Shiprock portion has moderately rapid water permeability with moderate</p>

	available water capacity; runoff is slow and the hazard for water erosion is slight, but potential for soil blowing is severe. The potential plant community on this soil unit is blue grama, western wheatgrass, Indian ricegrass, needleandthread, alkali sacaton, and giant dropseed.
Source: Information obtained at Soils.USDA.gov	

Special Status Species

Threatened or Endangered Species

Under Section 7 of the Endangered Species Act of 1973 (as amended), the BLM is required to consult with the U.S. Fish and Wildlife Service on any proposed action which may affect federal listed threatened or endangered species or species proposed for listing. Based on FFO's field inspection and reviews, it was determined that there are no known threatened or endangered species located within the area of analysis, although habitat may exist within Parcels #113 & #114. The proposed action would be in compliance with the 2002 Biological Assessment for the 2003 BLM/FFO RMP (Cons. #2-22-01-I-389). No further consultation with the U.S. Fish and Wildlife Service (USFWS) is required at this stage. Any proposed project within the proposed leases would require another effects determination on federally-listed species under Section 7 of the Endangered Species Act. Table 6 lists all the federally-listed and Candidate species in Rio Arriba and Sandoval Counties.

Table 6. Habitat Descriptions and Presence of Federally-Listed Threatened, Endangered, and Candidate Species in Rio Arriba and Sandoval Counties.

Species Name	Conservation Status	Habitat Associations	Potential to Occur in the Proposed Action Area
BIRDS			
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	Federal-Endangered	Riparian habitats along rivers, streams, or other wetlands with dense growths of willows or other shrubs and medium sized trees.	There are no riparian habitats suitable for willow flycatchers in the proposed action area.
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	Federal-Endangered	Mature montane forest and in shaded, woody, and steep canyons.	No montane forests are located within the proposed action area.
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Federal-Candidate	Low to mid-elevation riparian woodlands, deciduous woodlands, and abandoned farms and orchards.	There are no large cottonwood galleries in, or near the proposed action area.
Whooping crane (<i>Grus americana</i>)	Experimental, non-essential population; Rocky Mountain population	Nests at shallow diatom ponds that contain bulrush. Migration: wetland mosaics most suitable. Feeding: primarily use shallow, seasonally and semi permanently flooded palustrine wetlands for roosting, and various cropland and emergent wetlands.	No suitable wet areas or cropland occur in or near the analysis area. Rocky Mountain experimental population has been discontinued.
Least tern-interior pop. (<i>Sterna antillarum</i>)	Federal-Endangered	Breeds on sandbars or sandy shorelines along perennial rivers, lakes, and reservoirs east of the Continental Divide and forages over open waters.	There are no perennial water bodies in the proposed action area.
FISH			
Colorado pikeminnow (<i>Ptychocheilus lucius</i>)	Federal-Endangered	Large rivers with strong currents, deep pools, and quiet backwaters.	USFWS designated critical habitat within 2 miles of Parcel #114 and within 3 miles of Parcel # 113.

Razorback sucker (<i>Xyrauchen texanus</i>)	Federal-Endangered	Habitats include slow areas, backwaters and eddies of medium to large rivers; impoundments.	USFWS designated critical habitat within 2 miles of Parcel #114 and within 3 miles of Parcel # 113.
Rio Grande cutthroat trout (<i>Oncorhynchus clarki virginalis</i>)	Federal-Candidate	Small streams and Lakes at High Elevations 7500-10750 feet in elevation	There are no perennial high elevation streams or lakes within the proposed action area.
Rio Grande silvery minnow (<i>Hybognathus amarus</i>)	Federal-Endangered	River with silty substrates in eddies, and backwaters of the Rio Grande River and its tributaries.	There are no perennial rivers with eddies and backwaters located in the proposed action area.
Roundtail chub (<i>Gila robusta</i>)	Federal-Candidate	Occurs in cool to warm water, mid-elevation streams and rivers with deep pools adjacent to swifter riffles and runs. Cover is usually present (large boulders, tree rootwads, submerged large trees, etc.)	Proposed action area does not contain suitable habitat.
MAMMAL			
Black footed ferret (<i>Mustela nigripes</i>)	Federal-Endangered	Grassland plains where it occurs in association with prairie dogs. At a minimum, the black-footed ferret requires prairie dog towns of at least 80 acres for suitable habitat.	No prairie dog colonies are located within the proposed action area.
New Mexico jumping mouse (<i>Zapus hudsonius luteus</i>)	Federal-Candidate	Riparian zones along permanent waterways with dense and diverse vegetation consisting of grasses, sedges, and forbs	No riparian zones occur within the proposed action area.
Gunnison's prairie dog (<i>Cynomys gunnisoni</i>)	Federal-Candidate	Open, brushy country, oft sagebrush with scattered juniper, typically > 5000ft elev.	Proposed action area contains suitable habitat but no known p-dog colonies.
Canada lynx (<i>Lynx canadensis</i>)	Federal-Candidate	Mature subalpine coniferous forests with uneven-aged stands, boulder outcrops, and downed logs.	No subalpine forests occur within the proposed action area; elevation too low. No riparian corridors suitable for migration occur in or near the proposed action area.
PLANTS			
Knowlton's cactus (<i>Pediocactus knowltonii</i>)	Federal-Endangered	Alluvial deposits that form rolling, gravelly hills in piñon-juniper and sagebrush communities (6,200-6,400 ft.).	Soils in the proposed project area are clay and sandy in texture and do not contain a high content of organic matter
Mancos milkvetch (<i>Astragalus humillimus</i>)	Federal-Endangered	Cracks of Point Lookout Sandstone of the Mesa Verde series (5,000-6,000 ft.).	Point Lookout Sandstone does not occur in the proposed action area.
Mesa Verde cactus (<i>Sclerocactus mesae-verde</i>)	Federal-Threatened	Highly alkaline soils in sparse shale or adobe clay badlands of the Mancos and Fruitland formations (4,000-5,550 ft.)	Parcels #113 & 114 do include Mancos or Fruitland Shale Formations.

Other Special Status Species

In accordance with BLM Manual 6840, the Farmington Field Office of the Bureau of Land Management (FFO) has prepared a list of special management species to focus species management efforts toward maintaining habitats under a multiple use mandate, called FFO Special Management Species (SMS). The BLM manages certain sensitive species not federally listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. Table 7 provides an evaluation of the potential for Special

Management Species to occur in the proposed action area. The FFO has mapped potential habitats for those species which have readily defined habitat characteristics. A review of the GIS data indicates there are currently no concerns with SMS relative to the lease sale parcel and their potential presence determination is based on evaluation of the proposed action area habitat and the known habitat requirements of the SMS.

Table 7. Habitat Descriptions and Presence of BLM FFO Special Status Species

Species Name	Conservation Status		Habitat Associations	Potential to Occur in the Proposed Action Area
	BLM/ FFO	New Mexico		
Birds				
Golden Eagle (<i>Aquila chrysaetos</i>)	SMS		In the West, mostly open habitats in mountainous, canyon terrain. Nests primarily on cliffs and trees.	Likely: Proposed action area does contain habitat for foraging. No known nests have been documented within lease area.
Ferruginous hawk (<i>Buteo regalis</i>)	SMS		Open, arid country or grasslands with piñon-juniper plant associations. Nests on ledges or cliff sites, may use the ground.	Low: Proposed action area may contain habitat for foraging. No known nests have been documented within lease area.
Prairie falcon (<i>Falco mexicanus</i>)	SMS		Arid, open country, grasslands or desert scrub, rangeland; nests on cliff ledges, trees, power structures.	Possible: Proposed action area does contain habitat for nesting or foraging. No known nests have been documented within lease area.
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	SMS		Low to mid-elevation riparian woodlands, deciduous woodlands, and abandoned farms and orchards. Rare in the San Juan River valley.	Unlikely: Proposed action area does not contain suitable riparian area habitat.
American peregrine falcon (<i>Falco peregrinus anatum</i>)	SMS	NM-T	Open country near lakes or rivers with rocky cliffs and canyons. Tall city bridges and buildings also inhabited.	Possible: Proposed action area may contain suitable habitat for foraging, but not nesting.
Bald eagle (<i>Haliaeetus leucocephalus</i>)	SMS	NM-T	Near lakes, rivers and cottonwood galleries. Nests near surface water in large trees. May forage terrestrially in winter	Unlikely: Proposed action area does not contain suitable habitat for nesting and unlikely any winter foraging habitat.
Mountain plover (<i>Charadrius montanus</i>)	SMS		Semi desert, grasslands, open arid areas, bare fields, breeds in open plains or prairie.	Possible: Parcel #112 does contain known suitable nesting habitat. Nesting habitat may occur in other parcels, however, there is no documented habitat within the other parcels.
Burrowing owl (<i>Athene cunicularia</i>)	SMS		Associated with prairie dog towns. In dry, open, short-grass, treeless plains	Possible: Proposed action area does not contain known prairie dog towns for nesting, however, habitat exist within the proposed action area.
Plants				
Brack's hardwall cactus (<i>Sclerocactus cloveriae</i> ssp. <i>brackii</i>)	SMS	NM-E	Sandy clay of the Nacimiento Formation in sparse shadscale scrub (5,000-6,000 ft).	Unlikely: Nacimiento formation does not occur in the project and action area.

Species Name	Conservation Status		Habitat Associations	Potential to Occur in the Proposed Action Area
	BLM/FFO	New Mexico		
Aztec gilia (<i>Aliciella formosa</i>)	SMS	NM-E	Salt desert scrub communities in soils of the Nacimiento Formation (5,000-6,000 ft).	Unlikely: Nacimiento formation does not occur in the project and action area.

Wildlife/Migratory Birds

The Piñon-Juniper plant communities in the northeastern part of the FFO provide habitat for herds of wintering and resident populations of mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus*). Mule deer and elk are found most often on FFO land north of US Highway 550, and are much less common south of the highway due to the lack of suitable habitat. The BLM lands found around Counselor provide yearlong habitat for a variety of wildlife species but most notably, deer and elk. Deer also migrate from the surrounding Apache Reservation into the Counselor area to winter. Their numbers vary depending upon the severity of the winter. Deer and elk population density on FFO land varies by location and time of year.

Several small populations of pronghorn antelope (*Antilocapra americana*) reside in the area north and east of US Highway 550 and are much less common south of the highway due to the lack of suitable habitat. Deer and elk population density on FFO land varies by location and time of year.

Detailed information on other wildlife species and habitats in the FFO is contained on pages 3-39 to 3-42 of the PRMP/FEIS and the background biological resources analysis (SAIC 2002) prepared for the RMP.

Migratory Birds

A Memorandum of Understanding (MOU) between the BLM and USFWS dated April 12, 2010 calls for increased efforts to more fully implement the Migratory Bird Treaty Act of 1918. In keeping with this mandate, the BLM/FFO has issued an interim policy to minimize unintentional take as defined by the MOU and to better optimize migratory bird efforts related to BLM/FFO activities (BLM 2010). In keeping with this policy, a list of priority birds of conservation concern which occur in similar eco-regions as the proposed action area was compiled through a review of existing bird conservation plans including:

- Fish and Wildlife Service (USFWS) Birds of Conservation Concern (BCC)
- New Mexico Partners in Flight (NMPF) New Mexico Bird Conservation Plan
- Comprehensive Wildlife Conservation Strategy for New Mexico (CWCS)
- Gray Vireo Recovery Plan
- The North American Waterbird Conservation Plan
- Recovery plans and conservation plans/strategies prepared for federally-listed candidate species.

The selected species have a known distribution in the FFO area within the piñon-juniper vegetation community and may be affected by the proposed action. These species and a brief assessment of their habitat can be found in Table 8.

Table 8. Migratory Birds with Potential to Occur in the Proposed Action Area

Species Name	Habitat Associations	Potential to Occur in the Proposed Action Area
Montezuma quail (<i>Cyrtonyx montezumae</i>)	Open oak, pine-oak, or piñon-juniper with well-developed grassy understory; prefers 70% or more tall grass cover.	Lack of significant grassy understory within the analysis area limits habitat.
Broad-tailed hummingbird (<i>Selasphorus platycercus</i>)	Piñon-juniper woodlands, montane riparian areas and thickets, and open, mixed conifer forests.	Piñon-juniper woodland in the analysis area could provide suitable habitat for the species.
Cassin's kingbird (<i>Tyrannus vociferans</i>)	Found in open country with scattered trees (savannahs) or open woodlands including piñon-juniper.	Piñon-juniper/sagebrush edge of the analysis area may provide preferred habitat.
Loggerhead shrike (<i>Lanius ludovicianus</i>)	Open country interspersed with improved pastures, grasslands, and hayfields. Nests in sagebrush areas, desert scrub, and woodland edges.	Open country interspersed with grassy areas occurs in or near the project area.
Gray vireo (<i>Vireo vicinior</i>)	In northern NM, stands of piñon pine and Utah juniper 5800 - 7200 ft, open with a shrub component and mostly bare ground; antelope bitterbrush, mountain mahogany, Utah serviceberry and big sagebrush often present. Broad, flat or gently sloped canyons, in areas with rock outcroppings, or near ridge-tops.	Piñon-juniper woodland in the analysis area could provide suitable habitat for the species.
Plumbeous vireo (<i>Vireo plumbeus</i>)	Denser piñon-juniper woodland at higher elevations (and ponderosa forests) with some deciduous understory.	Low elevation sparse woodland not likely to provide habitat.
Western scrub-jay (<i>Aphelocoma californica</i>)	Scrub and open woodland habitats.	Piñon-juniper woodland in the analysis area could provide suitable habitat for the species.
Piñon jay (<i>Gymnorhinus cyanocephalus</i>)	Piñon-juniper habitat, due to the species' tightly co-evolved relationship with piñon pines.	Piñon-juniper woodland in the analysis area could provide suitable habitat for the species.
Juniper titmouse (<i>Baeolophus griseus</i>)	Open, mixed woodland areas at mid-elevations, most common where juniper is dominant; high overstory cover; requires large, mature trees for cavity nesting.	Piñon-juniper woodland in the analysis area could provide suitable habitat for the species.
Western bluebird (<i>Sialia mexicana</i>)	Open piñon-juniper, often burned or moderately logged areas; requires larger trees and snags for cavity nesting.	Piñon-juniper woodland in the analysis area could provide suitable habitat for the species.
Mountain bluebird (<i>Sialia currucoides</i>)	Open piñon-juniper woodlands, mountain meadows, and sagebrush shrublands; requires larger trees and snags for cavity nesting.	Piñon-juniper woodland in the analysis area could provide suitable habitat for the species.
Bendire's thrasher (<i>Toxostoma bendirei</i>)	On the Colorado Plateau, inhabits open sagebrush with scattered junipers; sparse or degraded understory, lower elevations.	Open sagebrush with scattered junipers does occur in the analysis area.
Virginia's warbler (<i>Vermivora virginiae</i>)	Coniferous woodland or forest mixed with deciduous shrubs or trees; dense understory is critical; steep draws or scrubby hillsides especially favored	Lack of significant deciduous component limits preferred habitat.
Black-throated gray warbler (<i>Dendroica nigrescens</i>)	Large stands of mature piñon-juniper woodland often with brushy undergrowth.	Lack of mature woodland limits preferred habitat.
Black-chinned sparrow (<i>Spizella atrogularis</i>)	Moderately dense montane shrubs from 3-7 ft tall mixed with rocky outcroppings; large grass component and openings.	No montane shrub dominated areas exist in or near the project area.
Cassin's finch (<i>Carpodacus cassinii</i>)	Breeds in higher mountains. Fall and winter moves into lower mountains and foothills, especially areas where piñon pine cone crops are excellent.	Piñon-juniper woodland in the analysis area could provide suitable winter habitat for the species.

Visual Resources

The BLM classifies visual resources through a Visual Resource Inventory (VRI). The VRI has three components: scenic quality, sensitivity, and distance zone. Scenic quality is a measure of the visual appeal of a tract of land. In the VRI process, BLM-managed lands are given an A, B, or C rating based on the apparent scenic quality. Scenic quality is determined by using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modification. Areas with the most visual appeal are rated A, while areas with the least visual appeal are rated C.

Sensitivity is a measure of the public concern for scenic quality. During the sensitivity rating, public lands are assigned high, medium, or low sensitivity by analyzing six indicators of public concern: type of user, amount of use, public interest, adjacent land uses, special areas, and other factors.

The distance zone analysis is conducted to determine the relative visibility from travel points or observation points. The distance zone for this area is foreground/middleground meaning the area can be seen from travel routes of observation points within a distance of 3 to 5 miles. This indicates activities and development may be able to be viewed in detail.

VRI Information for the nominated parcels is displayed in Table 9.

Table 9. Visual Resource Inventory for Nominated Parcels

Lease Parcel #	Scenic Quality Rating Unit (SQRU)
NM-201307-075	<p>SQRU 004: Blanco Mesa Complex Scenic Quality: B The area contains prominent mesas. Vegetation includes pinon/juniper, sagebrush, and occasional ponderosa. Colors in the landscape vary from greys, browns and greens. Human activity is readily apparent including oil and gas development, wood cutters, and cattle ranching. Sensitivity: Low VRI Class: III</p>
NM-201307-076	<p>SQRU 004: Blanco Mesa Complex Scenic Quality: B The area contains prominent mesas. Vegetation includes pinon/juniper, sagebrush, and occasional ponderosa. Colors in the landscape vary from greys, browns and greens. Human activity is readily apparent including oil and gas development, wood cutters, and cattle ranching. Sensitivity: Low VRI Class: III</p> <p>SQRU 003: Largo Canyon Scenic Quality: B The area contains large sage brush flats and dry washes. Vegetation includes sagebrush and occasional pinon/juniper. Colors in the landscape vary from greys, browns and greens. Human activity is readily apparent including oil and gas development and cattle ranching. Sensitivity: Low VRI Class: III</p>
NM-201307-076	<p>SQRU 004: Blanco Mesa Complex Scenic Quality: B The area contains prominent mesas. Vegetation includes pinon/juniper, sagebrush, and occasional ponderosa. Colors in the landscape vary from greys, browns and greens. Human activity is readily apparent including oil and gas development, wood cutters, and cattle ranching. Sensitivity: Low</p>

	VRI Class: III
NM-201307-095	SQRU 040: Lindrith Scenic Quality: C The area contains rolling hills and low lying lands. Vegetation includes sporadic pinon/juniper and sagebrush. Colors in the landscape vary from browns to greens. Human activity is readily apparent including oil and gas development, residential housing, and powerlines and HWY 550. Sensitivity: Low VRI Class: III
NM-201307-107	SQRU 029: Tanner Lake Scenic Quality: C This area is characterized by rolling hills and sage brush parks. Vegetation is primarily sage brush mixed with grasses. Colors in the landscape vary from greys, browns and greens. Human activity is readily apparent including oil and gas development . Sensitivity: Low VRI Class: III
NM-201307-108	SQRU 029: Tanner Lake Scenic Quality: C This area is characterized by rolling hills and long erratic dry washes. Vegetation includes pinon/juniper and sagebrush. Colors in the landscape vary from browns to greens. Sensitivity: Low VRI Class: III
NM-201307-113	SQRU 002: Hutch Canyon Scenic Quality: C This area is characterized by a power plant. Vegetation includes shad-scale and sagebrush. Colors in the landscape vary from grey, browns, and greens. Human activity is readily apparent including the power plant, active coal mine, oil and gas development, and powerlines and HWY 550 Sensitivity: Low VRI Class: IV
NM-201307-114	SQRU 002: Hutch Canyon Scenic Quality: C This area is characterized by a power plant. Vegetation includes shad-scale and sagebrush. Colors in the landscape vary from grey, browns, and greens. Human activity is readily apparent including the power plant, active coal mine, oil and gas development, and powerlines and HWY 550 Sensitivity: Low VRI Class: IV
*The 2009 Visual Resource Inventory did not provide ratings in this area.	

The BLM has developed VRM classification system designed to maintain or enhance visual qualities and describe the different degrees of modification to the landscape. There are four VRM classes (Classes I through IV) which identify suggested degrees of allowed human modification in a landscape. Class I allows the least modification and Class IV allows the most (RMP 2003).

The nominated parcels 95, 107, and 108 are located on tribal surface. VRM classes only apply on public lands and are conducted in accordance with BLM Handbook 8410 and BLM Manual 8411.

Socioeconomics and 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 January 2013 Oil and Gas Lease Sale will not be out of conformance with this executive order.

The nominated parcels are located outside any areas which may result in environmental and human health impacts on minority and low-income populations.

ENVIRONMENTAL IMPACTS

Environmental Consequences

Assumptions for Analysis

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

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

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

The reasonable and foreseeable development scenario developed for the Farmington RMP forecasted 497 wells would be drilled annually on existing and new leases for Federal minerals. Since 2000, an average of 459 wells has been drilled annually

The reasonable and foreseeable potential full development of the proposed lease sale was reviewed by the Farmington BLM minerals staff. The mineral staff determined that all of the proposed leases would most likely be developed for oil using horizontal drilling techniques, and calculated the number of potential horizontal oil wells that could be drilled in each lease. An emission calculator (see Sec. 4.3.2) was used to estimate emissions for the 13 potential wells.

The surface disturbance assumptions shown in the following estimate impacts associated with oil and gas exploration and development drilling activities for the following parcels:

Parcel #75, 320.96 acre tract

Considering spacing requirements and potential formation development, a maximum of two (2) horizontal wells may be required to develop this tract from one (1) well pad. The existing plugged and abandoned well pad, access road, pipeline, and power line would be utilized.

Parcel #76, 639.12 acre tract

Considering spacing requirements and potential formation development, a maximum of four (4) horizontal wells may be required to develop this tract from the maximum of two (2) well pads.

Parcel #77, 360 acre tract

Considering spacing requirements and potential formation development, a maximum of two (2) horizontal wells may be required to develop this tract from the one (1) well pad.

Parcel #95, 640.12 acre tract

Considering spacing requirements and potential formation development, a maximum of four (4) horizontal wells may be required to develop this tract from the maximum of two (2) well pads.

Parcel #107, 160 acre tract

Considering spacing requirements and potential formation development, a maximum of one (1) net horizontal well may be required to develop this tract from the one (1) well pad. Adjacent leases would also be developed with this horizontal well.

Parcel #108, 160 acre tract

Considering spacing requirements and potential formation development, a maximum of one (1) net horizontal well may be required to develop this tract from the one (1) well pad. Adjacent leases would also be developed with this horizontal well.

Parcel #113, 360 acre tract

Considering the active under ground coal mine, this lease would not be developed until the Mine Safety and Health Administration (MSHA) determines it is safe to do so.

Parcel #114, 815.6 acre tract

Considering the active under ground coal mine, this lease would not be developed until the Mine Safety and Health Administration (MSHA) determines it is safe to do so.

One typical horizontal well pad is approximately 3.67 acres of disturbance with 0.65 acres of Total Long Term and 3.02 acres with interim reclamation.

Effects from the No Action Alternative

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

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

Analysis of the Action Alternatives

Air Resources

Methodology and Assumptions for calculating Air pollutant and greenhouse gas emissions are described in the Air Resources Technical Document (USDI BLM, 2013). This document incorporates the sections discussing the modification of calculators developed by the BLM to address emissions for one well. The calculators give an approximation of criteria pollutant, HAP and GHG emissions to be compared to regional and national levels (USDI BLM 2013). Also incorporated into this document are the sections describing the assumptions that the FFO used in developing the inputs for the calculator (USDI BLM 2013).

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

An emission calculator was used to estimate emissions for the 14 potential wells listed in Section 4.1.

There are three phases in the development of a well that result in different levels of emissions. The first phase occurs during the first year of development and may include pad construction, drilling, completion, interim reclamation, and operation of the completed well. The first year results in the highest level of emissions due to the large engines required during the construction and drilling, and the potential release of natural gas to the atmosphere during completion.

The second phase of the well begins after the well is completed and is put on line for production. Emissions during the production phase may include vehicle traffic, engines to pump oil if necessary, compressor engines to move gas through a pipeline, venting from storage tanks, and storage tank heaters. A workover of the well may occasionally be required, but the frequency of workovers is not predictable.

The final phase is to plug and abandon the well and rehab the pad. The life of the well is unknown and emission estimates for this phase are not presented.

FFO estimated the proposed leases could result in 13 horizontal oil wells. However, it is unknown if all the potential wells would be drilled, or how many years may pass during the development of the leases. It is highly improbable that all the wells would be drilled in the same year. The emission estimates for full lease development are presented for the first year, and for annual production for all 13 potential wells (Table 10 and Table 11).

Criteria Pollutants

The criteria pollutant emission estimates for full lease development are presented for the first year, and for annual production for all 13 potential wells (Table 10 and Table 11). For comparison Table 12 shows total human caused emissions for each of the counties in the FFO based on EPA's 2005 emissions inventory (EPA, 2011b).

Table 10. Estimated Emissions for Drilling, Completing, and Operating for First Year

Parcel	Acres	Number of Potential Horizontal Oil Wells	Emissions/ Well Tons NOx	Emissions/ Well Tons CO	Emissions/W ell Tons VOC	Emissions/ Well Tons CO _{2eq}
			5.05	1.40	12.4	655
			Emissions/ well X Number of potential wells	Emissions/ well X Number of potential wells	Emissions/ well X Number of potential wells	Emissions/ well X Number of potential wells
NM-201307-075	320.96	2	10.1	2.8	24.8	1310
NM-201307-076	639.12	4	20.2	5.6	49.6	2620
NM-201307-077	360	2	10.1	2.8	24.8	1310
NM-201307-095	640.12	4	20.2	5.6	49.6	2620
NM-201307-107	160	1	5.05	1.4	12.4	655
NM-201307-108	160	1	5.05	1.4	12.4	655
NM-201307-113	360	0	0	0	0	0
NM-201307-114	815.6	0	0	0	0	0
Totals	3,455.8	14	70.6	19.6	173.6	9,170

Table 11. Estimated Emissions for Annual Operations

Parcel	Acres	Number of Potential Horizontal Oil Wells	Emissions/ Well Tons NOx	Emissions/ Well Tons CO	Emissions/Well Tons VOC	Emissions/ Well Tons CO _{2eq}
			0.0004	0.0002	0.72	1.10
			Emissions/ well X Number of potential wells	Emissions/ well X Number of potential wells	Emissions/ well X Number of potential wells	Emissions/ well X Number of potential wells
NM-201307-075	320.96	2	.0008	.0004	1.44	2.2
NM-201307-076	639.12	4	.0016	.0008	2.88	4.4
NM-201307-077	360	2	.0008	.0004	1.44	2.2
NM-201307-095	640.12	4	.0016	.0008	2.88	4.4
NM-201307-107	160	1	0.0004	0.0002	0.72	1.10
NM-201307-108	160	1	0.0004	0.0002	0.72	1.10
NM-201307-113	360	0	0	0	0	0
NM-201307-114	815.6	0	0	0	0	0
Totals	3,455.8	14	.0056	.0028	10.08	15.4

Table 12. Analysis Area Emissions in Tons/Year, 2008

County	NO _x ⁽¹⁾	CO ⁽²⁾	VOC ⁽³⁾	PM ₁₀ ⁽⁴⁾	PM _{2.5} ⁽⁵⁾	SO ₂ ⁽⁶⁾
McKinley	12,595.0	31,885.2	37,509.0	66,590.7	6,977.5	1,659.8
Rio Arriba	4,276.6	27,352.9	45,841.5	46,321.6	4,746.2	89.1
San Juan	35,651.7	54,549.5	46,994.9	69,655.7	8,108.3	11,471.0
Sandoval	4,780.1	33,290.5	31,733.6	36,232.3	4,056.3	123.4
Total	57,303.4	147,078.1	160,079	218,800.3	23,897.3	13,343.3

Source: EPA 2008 National Emissions Inventory

(<http://www.epa.gov/ttn/chief/net/2008inventory.html>)

⁽¹⁾ NO_x – nitrogen oxides

⁽²⁾ CO – carbon monoxide

⁽³⁾ VOC – volatile organic compounds

⁽⁴⁾ PM₁₀ – particulate matter with an aerodynamic diameter equal to or less than 10 microns

⁽⁵⁾ PM_{2.5} – particulate matter with an aerodynamic diameter equal to or less than 2.5 microns

⁽⁶⁾ SO₂ – sulfur dioxide

While all of San Juan County is in attainment of all NAAQS including ozone, the Navajo Dam monitoring station is the most closely watched due to the current design value of 0.066ppm zone. While 0.066ppm is well below the attainment value of 0.075ppm, it is the highest design value of the three monitoring stations in San Juan County. The potential amounts of ozone precursor

emissions of NO_x and VOCs are not expected to impact the current design value for ozone in San Juan County.

Potential Mitigation:

The BLM encourages industry to incorporate and implement BMPs, which are designed to reduce impacts to air quality by reducing emissions, surface disturbances, and dust from field production and operations. Typical measures include: adherence to BLM's 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; suggest that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; and perform interim reclamation to revegetate areas of the pad not required for production facilities and to reduce the amount of dust from the pads. In addition, the BLM encourages industry to participate in the Gas STAR program that is administered by EPA. The Natural Gas STAR program is a flexible, voluntary partnership that encourages oil and natural gas companies to adopt proven, cost-effective technologies and practices that improve operational efficiency and reduce natural gas emissions.

The FFO purchased an infrared camera designed to detect natural gas leaks on and around well pad and pipeline facilities. FFO inspection personnel have been trained to operate the camera and FFO is currently developing a strategy to implement the use of the camera in cooperation with oil and gas operators to detect and eliminate natural gas leaks in well pad and pipeline infrastructure.

Greenhouse Gases

Information about (GHGs) and their effects on national and global climate is presented in the Air Resources Technical Report (USDI BLM 2013). Analysis of the impacts of the proposed action on GHG emissions will be reported below. Only the GHG emissions associated with exploration and production of oil and gas will be evaluated here because the environmental impacts of GHG emissions from oil and gas consumption, such as refining and emissions from consumer-vehicles, are not effects of the proposed action as defined by the Council on Environmental Quality because they do not occur at the same time and place as the action. Thus, GHG emissions from consumption of oil and gas do not constitute a direct effect that is analyzed under NEPA. Nor is consumption an indirect effect of oil and gas production because production is not a proximate cause of GHG emissions resulting from consumption. However, emissions from consumption and other activities are accounted for in the cumulative effects analysis.

Leasing the subject tracts would have no direct impacts to climate change as a result of GHG emissions. Any potential effects to air quality from sale of a lease parcel would occur at such time that the lease was developed. The potential full development of the proposed lease sale is estimated at 13 horizontal oil wells (see Assumptions for Analysis for more information).

The two primary GHGs associated with the oil and gas industry are carbon dioxide (CO₂) and methane (CH₄). Because methane has a global warming potential that is 21-25 times greater than the warming potential of CO₂, the EPA uses measures of CO₂ equivalent (CO₂e) which takes the difference in warming potential into account for reporting greenhouse gas emissions. Emissions will be expressed in metric tons of CO₂ equivalent in this document.

Oil and Gas production in New Mexico is concentrated in the northwest corner, the San Juan Basin, and the southeast corner, the Permian Basin. Production in the San Juan Basin is mostly natural gas while production in the Permian Basin is mostly oil. Production statistics developed from EPA and New Mexico Oil Conservation Division for 2010 are shown in Table 13 for the US, New Mexico and for wells on federal leases in each basin.

Table 13. 2010 Oil and Gas Production

	Oil Barrels (bbl)	% U.S. Total	Gas (MMcf)	% U.S. Total
United States	1,999,731,000	100	26,836,353	100
New Mexico	65,380,000	3.27	1,341,475	5.00
Federal leases in New Mexico	31,533,000	1.58	824,665	3.07
San Juan Basin	1,468,000	0.07	630,060	2.35
Permian Basin	30,065,000	1.5	194,065	0.73

Table 14 shows an estimate of greenhouse gas emissions for oil and gas field production for the U.S., New Mexico, and Federal leases by basin based on the assumption that greenhouse gas emissions are proportional to production. Because oil and gas leaves the custody and jurisdiction of the BLM after the production phase and before processing or refining, only emissions from the production phases are considered here. It should also be remembered that following EPA protocols, these numbers do not include fossil fuel combustion which would include such things as truck traffic, pumping jack engines, compressor engines and drill rig engines. Nor does it include emissions from power plants that generate the electricity used at well sites and facilities. Note that units of Metric tons CO₂e have been used in Table 14 to avoid very small numbers. For comparison one million metric tons is equal to one teragram.

Table 14. 2010 Oil and Gas Field Production Emissions

	Oil		Gas		Total O&G Production	%U.S. Total GHG emissions
(Metric Tons CO ₂ ^e)	CO ₂	CH ₄	CO ₂	CH ₄		
United States	300,000	30,600,000	10,800,000	126,000,000	167,700,000	2.6
New Mexico	9,810	1,000,620	540,000	6,300,000	7,850,430	0.12
Federal leases in New Mexico	4,740	483,480	331,560	3,868,200	4,687,980	0.07
San Juan Basin	210	21,420	253,800	2,961,000	3,236,430	0.05
Permian Basin	4,500	459,000	78,840	919,800	1,462,140	0.03

Table 14 provides an estimate of direct emissions that occur during exploration and production of oil and gas. This phase of emissions represents a small fraction of overall emissions of GHG from the life cycle of oil and gas. For example, acquisition (drilling and development) for petroleum is responsible for only 8% of the total GHG emissions, whereas transportation of the petroleum to refineries represents about 10% of the emissions, and final consumption as a transportation fuel represents fully 80% of emissions (U.S.DOE, NETL, 2008).

To develop a more detailed estimate of the potential emissions from the proposed lease sale, an estimate of emission per well is useful. Unlike the estimate based on production presented in Table 11, this estimate includes emissions from the burning of fossil fuel in some aspects of construction and production. As described above, the information and assumptions from the Air Resources Technical Document (USDI BLM, 2013) and the calculators were used to estimate these emissions.

The calculator was used to estimate GHG emissions for the first year of operation and annual operations for a potential horizontal oil well. The first year emission estimates includes pad construction, well drilling, completion activities, road traffic, and well operations. The annual operation emission estimate includes fugitive gas, and road traffic. Emissions per well for the first year are estimated at 655 metric tons CO₂e, and annual operations are estimated at 1.1 metric tons CO₂e per year.

Table 12: Comparison of Potential Greenhouse Gas Emissions Resulting from Proposed Lease Sale Referenced to Total U.S. Emissions from all Sources from EPA GHG 2010 Inventory.

Total U.S. GHG Emissions From All Sources	6,372,900,000 metric tons	100.00 %
Total Estimated GHG Emissions From Oil & Gas from initial construction and first year operation (13) wells compared to total U.S. GHG Emissions from all sources	8515 metric tons	.00013%
Total Estimated GHG Emissions From Annual Operations (13) wells compared to total U.S. GHG Emissions from all sources	14.3 metric tons	.0000002%

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 EPA data show that improved practices and technology and changing economics have reduced CO₂ emissions from oil and gas exploration and development (Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2010 (EPA, 2012)). One of the factors in this

improvement is the adoption by industry of the BMPs proposed by the EPA's Natural Gas Energy Star program. The 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. While EPA data shows that methane emissions increased from oil and gas exploration and development from 1990-2010, reductions in methane emissions from oil and gas exploration and development should occur in future years as a result of EPA's recently finalized oil and gas air emissions regulations.

Heritage Resources

Cultural Resources

While the act of leasing a parcel would produce no impacts, subsequent development of the lease could have impacts on archaeological resources.

Potential threats to cultural resources from leasing are variable and dependent upon the nature of the cultural resource and the nature of the proposed development. Effects normally include alterations to the physical integrity of a cultural resource. The greatest potential impact to cultural resources stems from the construction of associated lease related facilities such as pipelines, power lines, roads, and well locations. If a cultural resource is significant for other than its scientific information, effects may also include the introduction of audible, atmospheric, or visual elements that are out of character for the cultural site and diminish the integrity of those criteria that make the site significant.

A potential effect from the proposed action is the increase in human activity or access to the area with the increased potential of unauthorized removal or other alteration to cultural resources in the area. These impacts could include altering or diminishing the elements of a National Register eligible property and diminish an eligible property's National Register eligibility status. Conversely, cultural resource investigations associated with development potentially adds to our understanding of the prehistory/history of the area under investigation and discovery of sites that would otherwise remain undiscovered due to burial or omission during review inventories.

Provided that Class III cultural resource inventories are conducted as lease development takes place and avoidance measures associated with the preservation of cultural resources are proposed and stipulated during development, there does not appear to be any impacts to cultural resources from leasing. The nominated parcels 95, 107, and 108 are located on tribal surface and Navajo Nation cultural resource inventory protocol would be followed.

Native American Religious Concerns

The proposed actions are not known to physically threaten any TCPs, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies and rituals pursuant to AIRFA or EO 13007. Use of lease notice NM-11-LN will help ensure that new information is incorporated into lease development. Additional consultation may be initiated at the APD stage of development if BLM professional staff determines it is necessary.

Water Resources

Hydraulic fracturing is a common process in the San Juan Basin and applied to nearly all wells drilled. There are no verified instances of hydraulic fracturing adversely affecting groundwater in the San Juan Basin (USDI/BLM 2011*a*, page 54). The producing zone targeted by the Proposed Action is well below any underground sources of drinking water. The Mancos Shale formation is also overlain by a continuous confining layer. On average, total depth of each well bore would be 6,700 feet below the ground surface. Fracturing in the Basin Mancos formation is not expected to occur above depths above 5,700 feet below the ground surface. Fracturing could possibly extend into the Mesaverde formation overlying the Basin Mancos; however, the formation has not been identified as an underground source of drinking water based on its depth and relative high levels of TDS.

Hydraulic fracturing fluid is roughly 99 percent water but also contains numerous chemical additives as well as propping agents, such as sands. Chemicals added to stimulation fluids include friction reducers, surfactants, gelling agents, scale inhibitors, acids, corrosion inhibitors, antibacterial agents, and clay stabilizers. Stimulation techniques have been used in the United States since 1949 and in the San Juan Basin since the 1950s. Over the last 10 years, advances in multi-stage and multi-zone hydraulic fracturing has allowed development of gas fields that previously were uneconomic, including the San Juan Basin.

Contamination of groundwater could occur without adequate cementing and casing of the proposed well bore. Casing specifications are designed and submitted to the BLM. The BLM independently verifies the casing program, and the installation of the casing and cementing operations are witnessed by certified Petroleum Engineering Technicians. Surface casing setting depth is determined by regulation. Adherence to APD COAs and other design measures would minimize potential effects to groundwater quality. The potential for impacts to groundwater from the well bores would be long term for the life of the wells.

There would be the potential for accidental spills or releases of these materials, which could impact local water quality. The potential for surface water quality impacts from accidental spills or releases of hazardous materials on the well pads would be long term for the life of the wells.

Soil

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

Contamination of soil from drilling and production wastes mixed into soil or spilled on the soil surfaces could cause a long-term reduction in site productivity. Some of these impacts can be

reduced or avoided through proper design, construction and maintenance and implementation of best management practices.

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

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

Special Status Species

Threatened or Endangered Species

The FFO reviewed and determined that Parcels #113 and #114 are within Mesa Verde cactus potential habitat and within three miles of USFWS Designated Critical Habitat for the razorback sucker and Colorado pikeminnow. These parcels are located just outside of the Hogback ACEC. This ACEC has been designated, in part, to protect the Mesa Verde cactus. Any vegetation disturbing project could have direct adverse impacts on the Mesa Verde cactus or the two fish species or their habitat. A biological survey will be required for any proposed projects within these parcels to determine if there are any impacts on federally-listed species. Section 7 consultations with the USFWS under the Endangered Species Act will likely be required to reduce any impacts to federally-listed species caused by any proposed projects within Parcels 113 and 114. A biological survey may also be required for the other parcels to determine if there are any impacts to any federally-listed species. Any biological survey will be conducted by a BLM/FFO approved biologist.

Other Special Status Species

There may be nesting burrowing owls within the proposed lease area. The BLM/FFO has specific management measures to ensure that nesting burrowing owls are protected during the breeding season. Mountain plover nesting habitat exists within Parcels 111 and 112. A mountain plover protocol survey will be required before any vegetation disturbing activities are conducted during the breeding season. Special status raptor species, such as golden eagles, peregrine and prairie falcons, ferruginous hawks occur within the action area. There can be adverse impacts to these species from oil and gas related activities, especially during the breeding season due to noise, visual, traffic, and general human activity close to nesting areas. Specific management measures, as written within the BLM/FFO Special Management Policy will be enforced to protect these species from any impacts during the nesting season.

Wildlife/Migratory Birds

The types and extent of impacts expected from oil and gas development to wildlife species and habitats from development are similar to those described in the 4.9 Special Status Species Section. Although reclamation and restoration efforts for surface disturbance could provide for the integrity of other resources, these efforts may not always provide the same habitat values (e.g. structure, composition, cover, etc.) in the short or in some instance, the long-term in complex vegetative community types (e.g., shrub oak communities). The short-term negative impact to wildlife would occur during the construction phase of the operation due to noise and habitat destruction.

In general, most wildlife species would become habituated to the new facilities. For other wildlife species with a low tolerance to activities, the operations on the well pad would continue to displace wildlife from the area due to ongoing disturbances such as vehicle traffic, noise and equipment maintenance. The conditions of approval would alleviate most losses of wildlife species, such as; fencing the reserve pits, netting storage tanks, installation or other modifications of cones on separator stacks, and timing stipulations. The magnitude of above effects would be dependent on the rate and location of the oil and gas development, but populations could likely not recover to pre-disturbance levels until the activity was completed and the vegetative community restored.

Migratory Birds

Potential effects on birds in the action area are difficult to predict. Ongoing studies have shown mixed effects of oil and gas development, including compressor noise on nesting migratory birds. Frances and Ortega (2006 unpublished report to BLM/FFO) found no significant difference in nest density or nest success between sites with or without wellhead compressors. Some species, such as black-chinned hummingbird (*Archilocus alexandri*) and house finch (*Carpodacus erythrinus*), were more common on sites with compressors while others, such as mourning dove (*Zenaida macroura*) and spotted towhee (*Pipilo erythrophthalmus*), appeared to either avoid or nest further from compressors. Holmes *et al.* (2003) found that sage sparrow had lower nest survival in an area with ongoing gas development, while Brewer's sparrow (*Spizella breweri*) had higher survival rates when compared with populations in an undeveloped control area.

Due to the limited scope of the proposed action, the relatively small area of disturbance, and the availability of adjacent suitable habitat, the anticipated effects on migratory bird populations and species as a whole would be low in the short term and long term. Site specific analysis will be conducted to determine the impacts on migratory birds. Measures to protect birds during the nesting season will be taken.

Visual Resources

The construction of an access road, well pad and other ancillary facilities, other than facilities greater in height than eight feet, would modify the existing area visual resources. Facilities, such as condensate and produced water or oil storage tanks that rise above eight feet, would provide a

geometrically strong vertical and horizontal visual contrast in form and line to the characteristic landscape and vegetation, which have flat, horizontal to slightly rolling form and line.

Depending on the production nature of the well site, multiple tanks such as condensate, oil or produced water tanks would be necessary to accommodate the project. Visual impacts can be mitigated by color manipulation, by painting well facilities to blend with the surrounding vegetation and/or landform setting, the view is expected to favorably blend with the form, line, color and texture of the existing landscape. A site specific color will be chosen during the onsite and all facilities, including the meter building, would be painted this color. Low profile equipment, tree screens, and proper project placement, can also reduce the visual impacts.

Socio-economics and Environmental Justice

No minority or low income populations would be directly affected in the vicinity of the proposed actions from subsequent proposed oil or gas projects. Indirect impacts could include a small increase in activity and noise disturbance in areas used for wildlife, grazing, and wood gathering. However, these impacts would apply to all public land users in the project area.

Cumulative Impacts

The NMSO manages approximately 41 million acres of Federal mineral estate. Of the 41 million acres, 35 million acres are available for oil and gas leasing. Approximately 17% of the 35 million acres is currently leased (73% of the leases are in production and 63% of the lease acres are in production). The NMSO received 151 parcel nominations (92,147.63 acres) for consideration in the July 2013 Oil & Gas Lease Sale, and is proposing to lease 68 (30,820.16 acres) of the 151 parcels. If these 68 parcels were leased, the percentage of Federal minerals leased would not change. The Carlsbad, Roswell, Las Cruces, and Oklahoma Field Office (Oklahoma and Texas) parcels are analyzed under separate EAs.

Table 15. Actual - Acres of Federal Minerals/Acres Available/Acres Leased:

State	Federal O&G Mineral Ownership	Acres Available	Acres Leased	Percent Leased
KS	744,000	614,586	127,414	21%
NM	34,774,457	29,751,242	5,023,215	17%
OK	1,998,932	1,668,132	330,800	20%
TX	3,404,298	3,013,207	391,091	13%
Totals/Average	40,921,687	35,058,167	5,862,520	17%

Table 16. Parcels Nominated & Offered in the July 2013 Oil & Gas Lease Sale:

Field Office	No. of Nominated Parcels	Acres of Nominated Parcels	No. of Parcels to be Offered	Acres of Parcels to be Offered
Carlsbad	39	17,148.76	25	9,172.14
Farmington	48	23,878.12	6	2280.20
Las Cruces	35	43,160.58	10	11,417.65

Texas	13	3,761.31	13	3,761.31
Oklahoma	16	4,468.855	14	4,188.855
Totals	151	92,417.63	66	30,820.16

Table 17. Foreseeable - Acres of Federal Minerals/Acres Available/Acres Leased:

State	Federal O&G Mineral Ownership	Acres Available	Acres Leased	Percent Leased
KS	744,000	614,586	127,654	21%
NM	34,774,457	29,751,242	5,046,084.99	17%
OK	1,998,932	1,668,132	334,988.85	20%
TX	3,404,298	3,013,207	394,852.31	13%
Totals/Average	40,921,687	35,058,167	5,903,260	17%

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

Effects on Air Resources

The following analysis of cumulative impacts of the proposed action on air quality will be limited to the Four Corners area of New Mexico. The cumulative impacts of GHG emissions and their relationship to climate change are evaluated at the national and global levels in the Air Resources Technical Report (USDI BLM 2013).

Effects of Other Past, Present, and Reasonably Foreseeable Actions on Air Resources

The primary activities that contribute to levels of air pollutant and GHG emissions in the Four Corners area are electricity generation stations, fossil fuel industries and vehicle travel. The Air Quality Technical Report includes a description of the varied sources of national and regional emissions that are incorporated here to represent the past, present and reasonably foreseeable impacts to air resources (USDI BLM 2011). It includes a summary of emissions on the national and regional scale by industry source. Sources that are considered to have notable contributions to air quality impacts and GHG emissions include electrical generating units, fossil fuel production (nationally and regionally) and transportation.

Cumulative Effects of the Proposed Action on Air Resources

The emissions calculator estimated that there could be an increase of approximately 20 tons of criteria pollutants per year due to annual production of the 27 potential wells (Table 4.2). The 2005 emissions for the same pollutants from (Table 4.4) for San Juan, Rio Arriba, Sandoval, and McKinley counties were approximately 207,447 tons.

The RFDS developed for the 2003 Farmington RMP forecasted 497 wells would be drilled annually on existing and new leases for Federal minerals. Since 2000, an average of 459 wells has been drilled annually and in recent years, many fewer wells have been drilled.

Cumulative Effects of the Proposed Action on Air Quality

The very small increase in emissions that could result from approval of the proposed action would not result in any county in the FFO area exceeding the NAAQS for any criteria pollutants. The applicable regulatory threshold for HAPs is the oil and gas industry National Emissions Standards for Hazardous Air Pollutants, which are currently under review by the EPA. The emissions from the proposed well are not expected to impact the 8-hour average ozone concentrations, or any other criteria pollutants in the Southern San Juan Basin.

Cumulative Effects of the Proposed Action on Climate Change

The very small increase in GHG emissions that could result from approval of the proposed action would not produce climate change impacts that differ from the No Action Alternative. This is because climate change is a global process that is impacted by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from the proposed action cannot be translated into effects on climate change globally or in the area of this site-specific action. It is currently not feasible to predict with certainty the net impacts from the proposed action on global or regional climate.

The Air Resources Technical Report (USDI BLM, 2013) discusses the relationship of past, present and future predicted emissions to climate change and the limitations in predicting local and regional impacts related to emissions. It is currently not feasible to know with certainty the net impacts from particular emissions associated with activities on public lands.

Consultation/Coordination

This section includes individuals or organizations from the public, external agencies, the interdisciplinary (ID) team that was contacted during the development of this document.

Table 18. List of Preparers

ID Team Member	Title	Organization
Jim Copeland	Archaeologist	BLM
John Kendall	T & E Biologist	BLM
Sarah Scott	Natural Resource Specialist	BLM
Dave Mankiewicz	Assistant Field Manager, Minerals	BLM
Jeff Tafoya	Range Management Specialist	BLM
Lindsey Eoff	Project Manager	BLM
Janelle Alleman	Outdoor Planner	BLM
John Hansen	Wildlife Biologist	BLM
Amanda Nisula	Planning & Environmental Coordinator	BLM
Barney Wegener	Natural Resource Specialist	BLM
Dale Wirth	Range & Multiple Resource-Branch Chief	BLM
Stan Dykes	Weeds	BLM
Sherrie Landon	Paleontologist	BLM

Agencies, Persons and Organizations Consulted

Agencies

Thetis Gamberg, USFWS Biologist
Micheal Davis, US Forest Service
Matt Wunder, NM Dept. of Game & Fish Chief Conservation Services Division

New Mexico State Office

Rebecca Hunt, State Office Natural Resource Specialist
Melanie Barnes, State Office NEPA Coordinator
Dave Goodman, State Office NEPA Coordinator
Mary Uhl, State Office Air Resources Specialist

On February 13, 2013 a briefing for the BLM NM State Director was held at the New Mexico State Office to review Field Office recommendations for nominated parcels.

Public Involvement

The nominated parcels for this sale, along with the appropriate stipulations from the RMP were posted online for a two week scoping period January 28 – February 11, 2013. Scoping comments were also received from the Department of Cultural Affairs Historic Preservation Division, the Hopi Tribe, San Juan Citizens Alliance (SJCA), WildEarth Guardians (WEG), and the Chaco Alliance in regards to the parcels around Chaco Culture National Historic Park. The parcels near the Park have been deferred to allow for Tribal consultation. This EA was made available for public review and comment for 30 days between March 1 and April 1, 2013. No additional comments were received. Comments provided prior to the lease sale will be considered and incorporated into the EA as appropriate.

References

Brugge, David M. 1993. An Investigation of AIRFA Concerns Relating to the Fruitland Coal Gas Development Area. Office of Contract Archaeology, University of New Mexico. Ms. on file, Bureau of Land Management, Farmington, New Mexico.

CCSP, 2008: *Climate Models: An Assessment of Strengths and Limitations*. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research [Bader D.C., C. Covey, W.J. Gutowski Jr., I.M. Held, K.E. Kunkel, R.L. Miller, R.T. Tokmakian and M.H. Zhang (Authors)]. Department of Energy, Office of Biological and Environmental Research, Washington, D.C., USA, 124 pp.

Environmental Protection Agency. 2011. Technology Transfer Network: Clearinghouse for Inventories and Emissions Factors. <http://www.epa.gov/ttn/chief/eiinformation.html>.

EPA (2010). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008. EPA 430-R-10-006, <http://www.epa.gov/climatechange/emissions/usinventoryreport.html>.

EPA. (2010). FACT SHEET--PROPOSAL TO REVISE THE NATIONAL AMBIENT AIR QUALITY STANDARDS. Retrieved August 9, 2010, from <http://www.epa.gov/air/ozonepollution/pdfs/fs20100106std.pdf>

Environmental Protection Agency. 2010a. The Green Book Non Attainment Areas for Criteria Pollutants. <http://www.epa.gov/airquality/greenbk/> (Accessed 3/03/2011).

Environmental Protection Agency, 2010b. Air Trends. <http://www.epa.gov/airtrends/> (Accessed 3/14/11).

Environmental Protection Agency. 2011a. 2005 National-Scale Air Toxics Assessment. Summary of Results. <http://www.epa.gov/ttn/atw/nata2005>.

EPA. 2011b. 2008 National Emissions Inventory. <http://www.epa.gov/ttn/chief/net/2008inventory.html>.

EPA Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006. Environmental Protection Agency, Washington, D.C.

EPA, Natural Gas Star Program (2006 data) at: <http://www.epa.gov/gasstar/accomplish.htm>. Environmental Protection Agency, Washington, D.C.

Enquist, Carolyn and Gori, Dave. Implications of Recent Climate Change on Conservation Priorities in New Mexico. April 2008.

Goddard Institute for Space Studies. 2007. Annual Mean Temperature Change for Three Latitude Bands. Datasets and Images. GISS Surface Temperature Analysis, Analysis Graphs and Plots. New York, New York. (Available on the Internet: <http://data.giss.nasa.gov/gistemp/graphs/Fig.B.lrg.gif>.)

Holmes, A.L., D.C. Barton, and A. King. 2003. Sagebrush Bird Monitoring Handbook, Version 2.0. Point Reyes Conservation Science: Stinson Beach, CA.

Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: The Physical Basis (Summary for Policymakers). Cambridge University Press. Cambridge, England and New York, New York. Available on the Internet: <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf>

Intergovernmental Panel on Climate Change (IPCC). Climate Change 2007, Synthesis Report. A Report of the Intergovernmental Panel on Climate Change.

Karl, Thomas L., Jerry M. Melillo, and Thomas C. Peterson, (eds.). Global Climate Change Impacts in the United States, Cambridge University Press, 2009.

Kelly, Klara, Rena Martin, Richard Begay, Ted Neff, and Clifford Werito. 2006. "We Will Help You With What We Know": Diné Traditional Cultural Places In Dinétah. Museum of Northern Arizona Environmental Solutions, Inc, Flagstaff. Ms. on file, Bureau of Land Management, Farmington, New Mexico.

National Academy of Sciences. 2006. Understanding and Responding to Climate Change: Highlights of National Academies Reports. Division on Earth and Life Studies. National Academy of Sciences. Washington, D.C. (Available on the Internet: <http://dels.nas.edu/basc/Climate-HIGH.pdf>.)

Parker, Patricia L. and Thomas F. King. 1998. Guidelines for Evaluating and Documenting Traditional Cultural Properties. National Park Service, National Register Bulletin 38. Washington

Science Applications International Corporation (SAIC). 2002 *Cultural Resources Technical Report: Background Information on Cultural resources for the Farmington Draft RMP/EIS*. Ms. on file, Bureau of Land Management, Farmington New Mexico.

U.S. Department of Energy/National Energy Technology Laboratory. 2008. Development of Baseline Data and Analysis of Life Cycle Greenhouse Gas Emissions of Petroleum Based Fuels. <http://www.netl.doe.gov/energy-analyses/pubs/NETL%20LCA%20Petroleum-Based%20Fuels%20Nov%202008.pdf>

U.S. Department of the Interior, Bureau of Land Management. 2008. Manual 6840: Special Status Species Management.

U.S. Department of the Interior, Bureau of Land Management. September 2003a. Farmington Proposed Resource Management Plan and Final Environmental Impact Statement. Farmington, New Mexico.

U.S. Department of the Interior, Bureau of Land Management. September 2003. Farmington Approved Resource Management and Plan Record of Decision. Farmington, New Mexico.

USDI. BLM. 2013. Air Quality Technical Report. New Mexico State Office. http://www.blm.gov/nm/st/en/prog/more/air_resources/air_resources_technical.html.

Van Valkenburgh, Richard F. 1941. Diné Bikeyah. Department of the Interior, Office of Indian Affairs, Navajo Services, Window Rock. Ms. on file, Bureau of Land Management, Farmington, New Mexico.

Van Valkenburgh, Richard F. 1974. Navajo Sacred Places. Edited by Clyde Kluckhohn. Garland American Indian Ethnohistory Series, Navajo Indians, 3 Vols. Garland Publishing. New York.

Authorities

Code of Federal Regulations (CFR) 3100

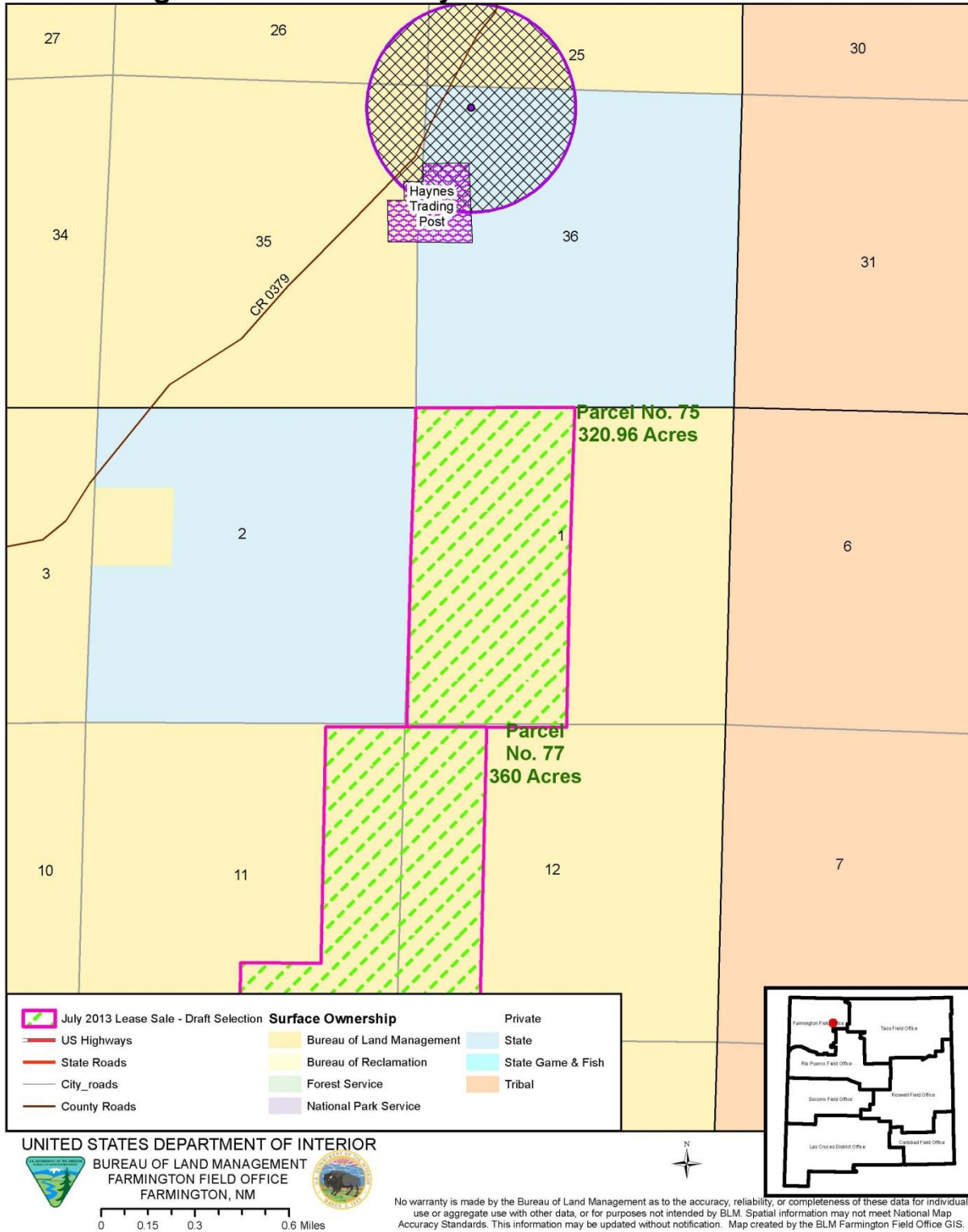
40 CFR All Parts and Sections inclusive Protection of Environment, Revised as of October 1, 2001.

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

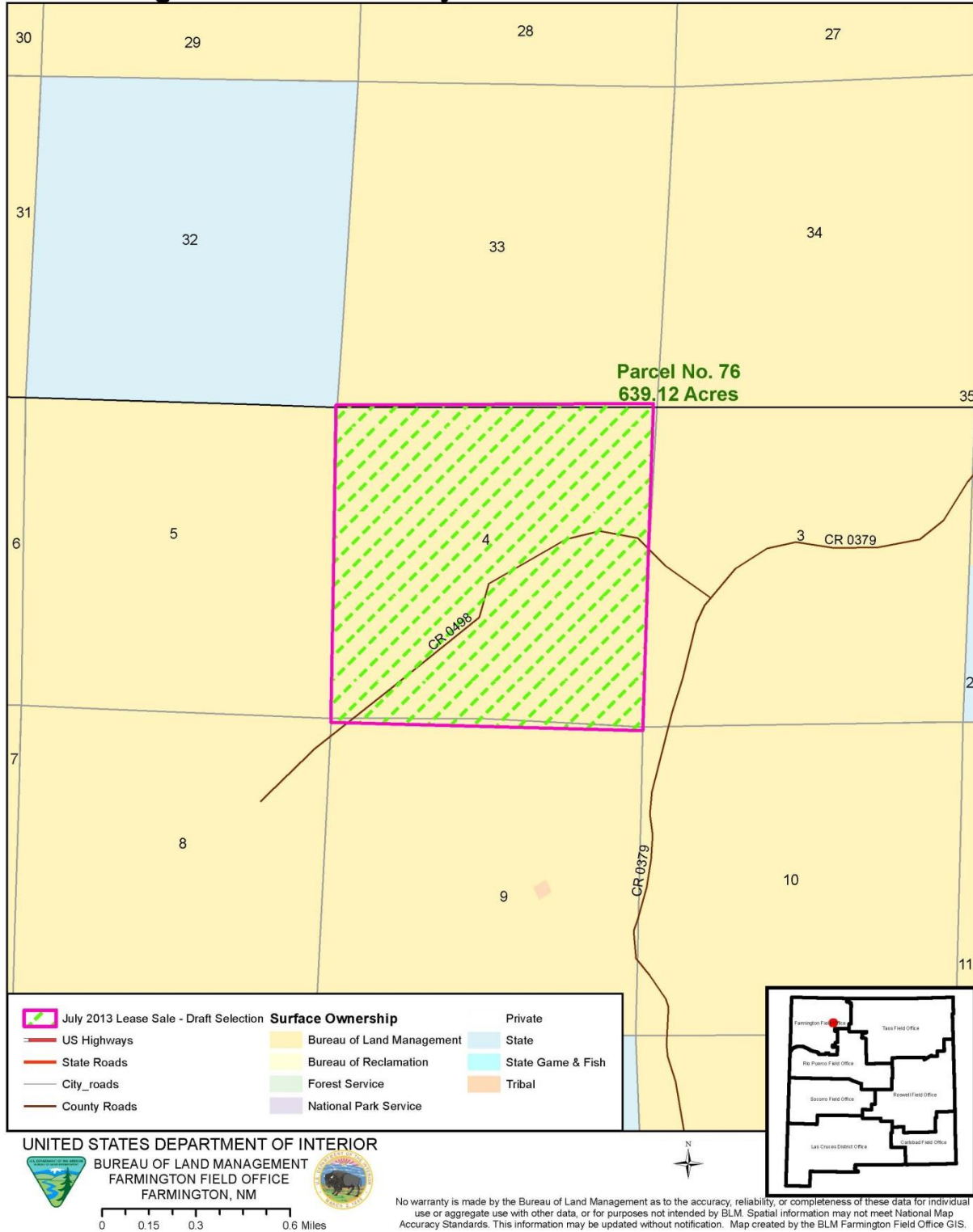
U.S. Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors). 2001. The Federal Land Policy and Management Act, as amended. Public Law 94-579.

Appendix A Parcel Maps

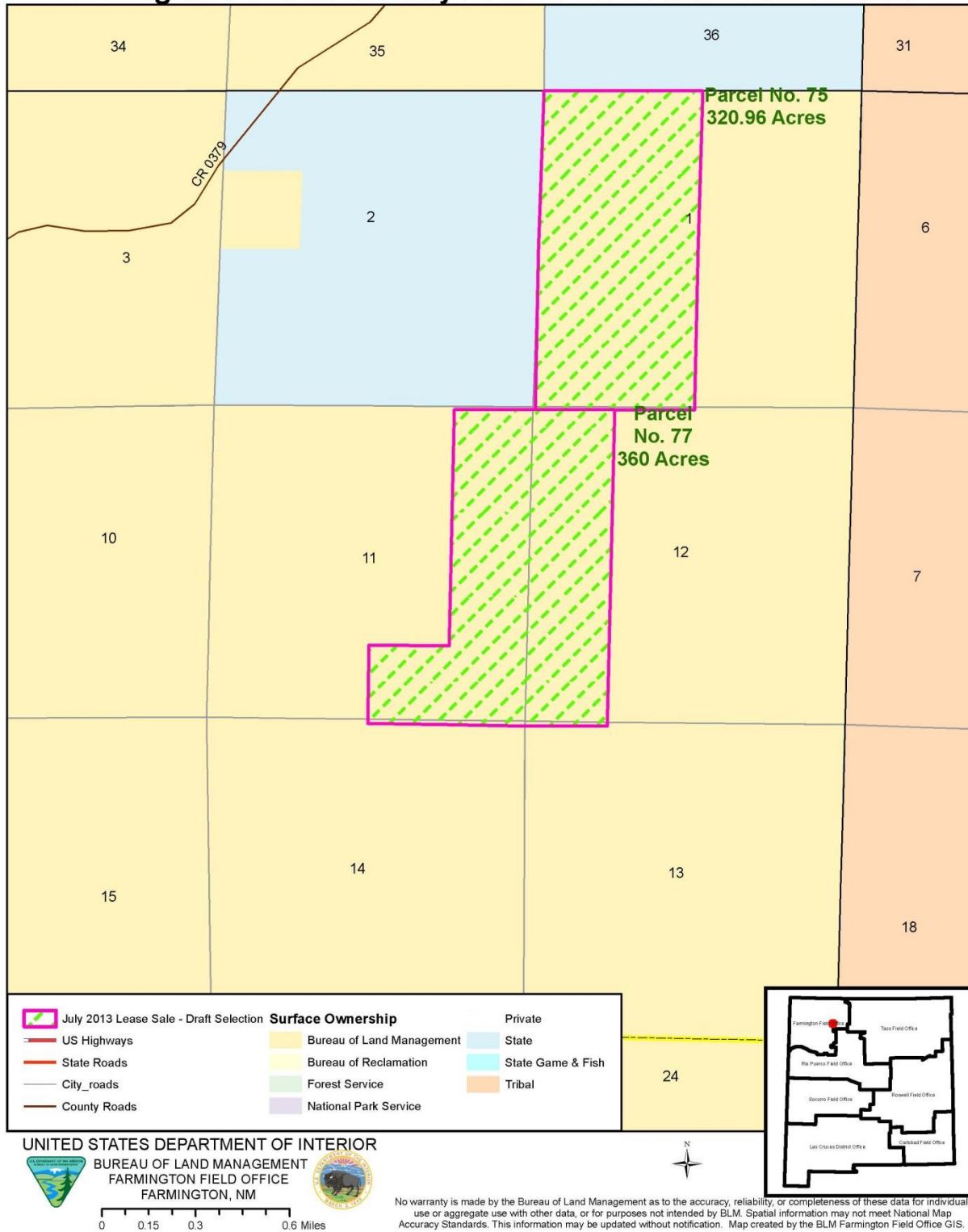
Farmington Field Office July 2013 DRAFT Lease Sale Parcels



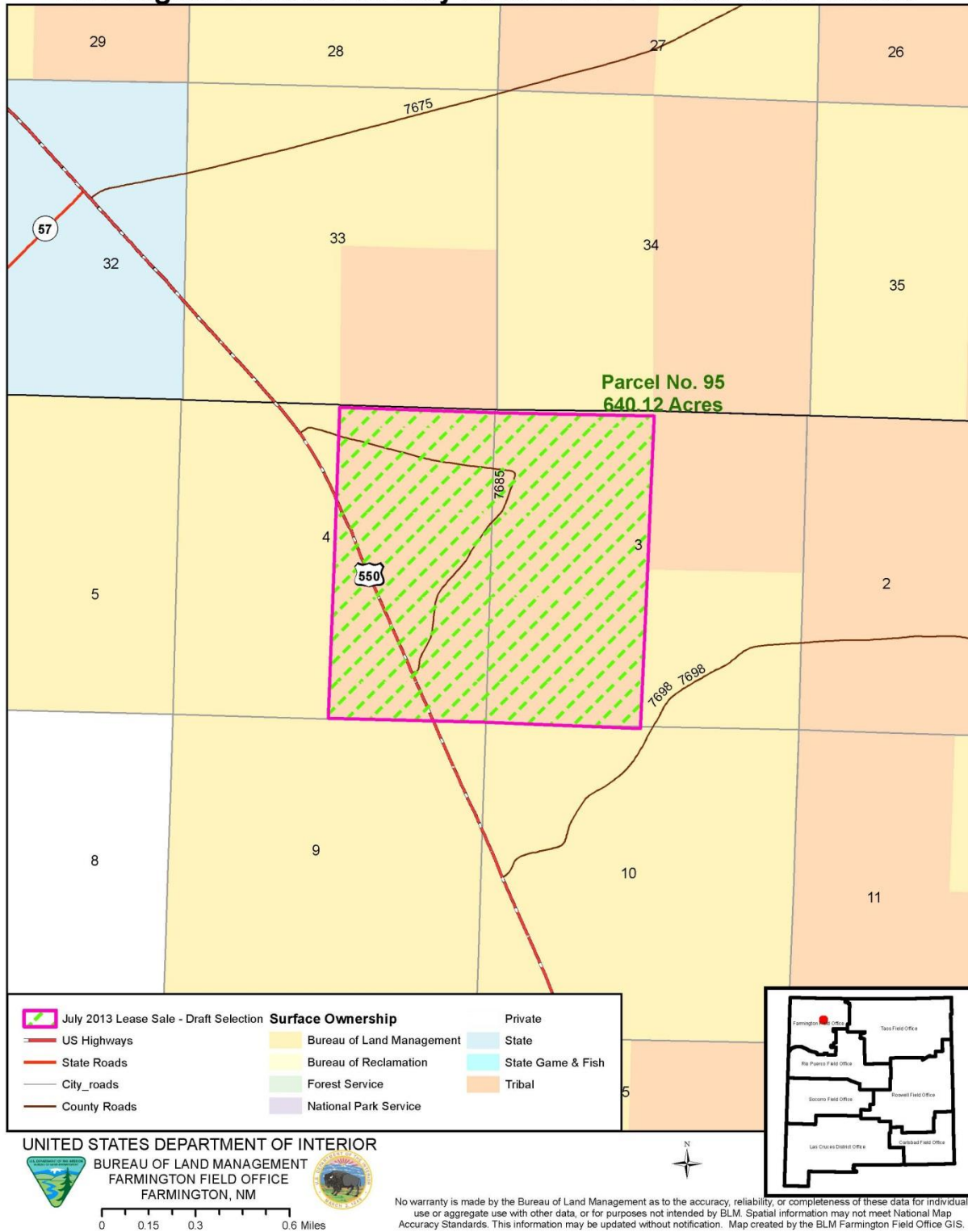
Farmington Field Office July 2013 DRAFT Lease Sale Parcels



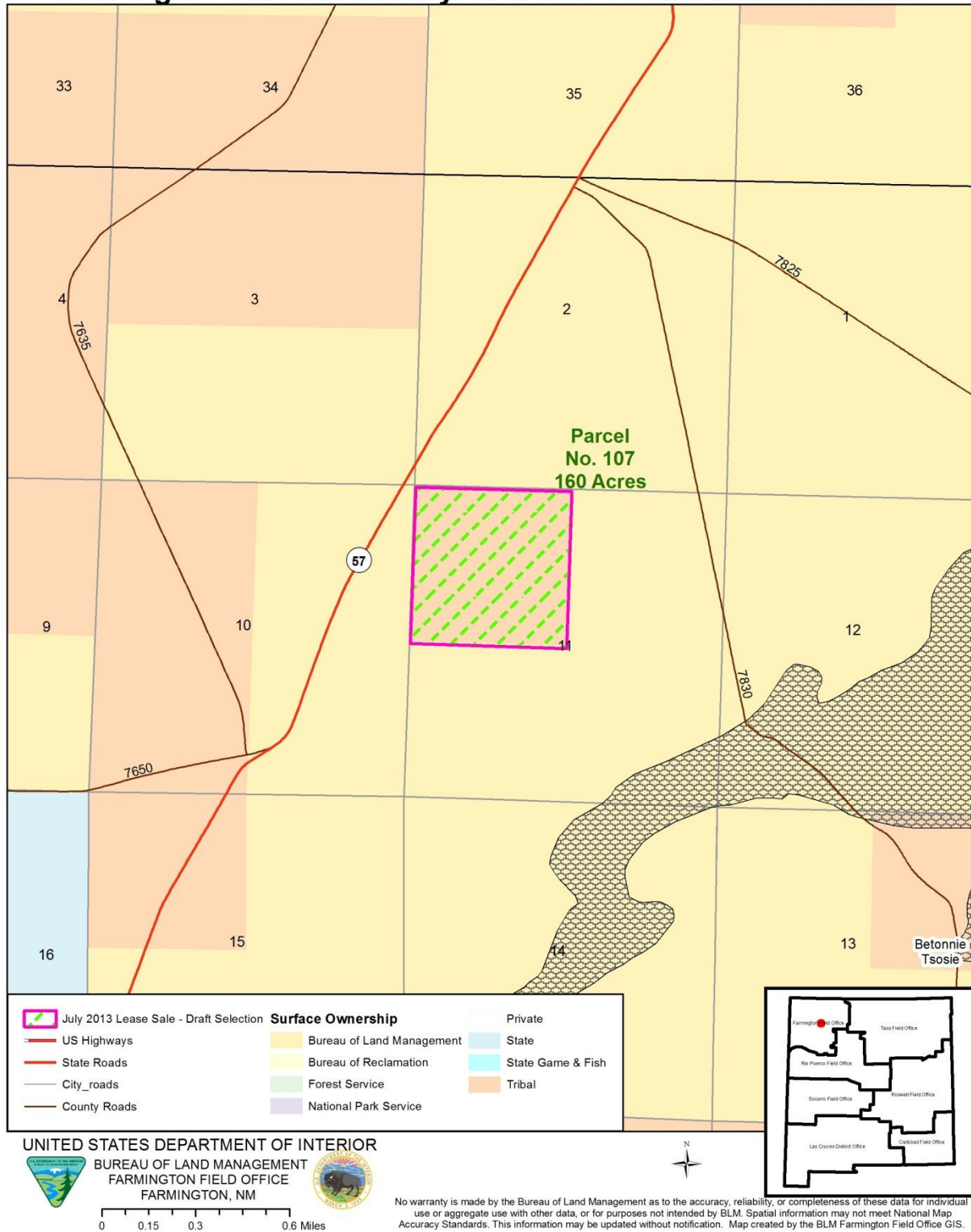
Farmington Field Office July 2013 DRAFT Lease Sale Parcels



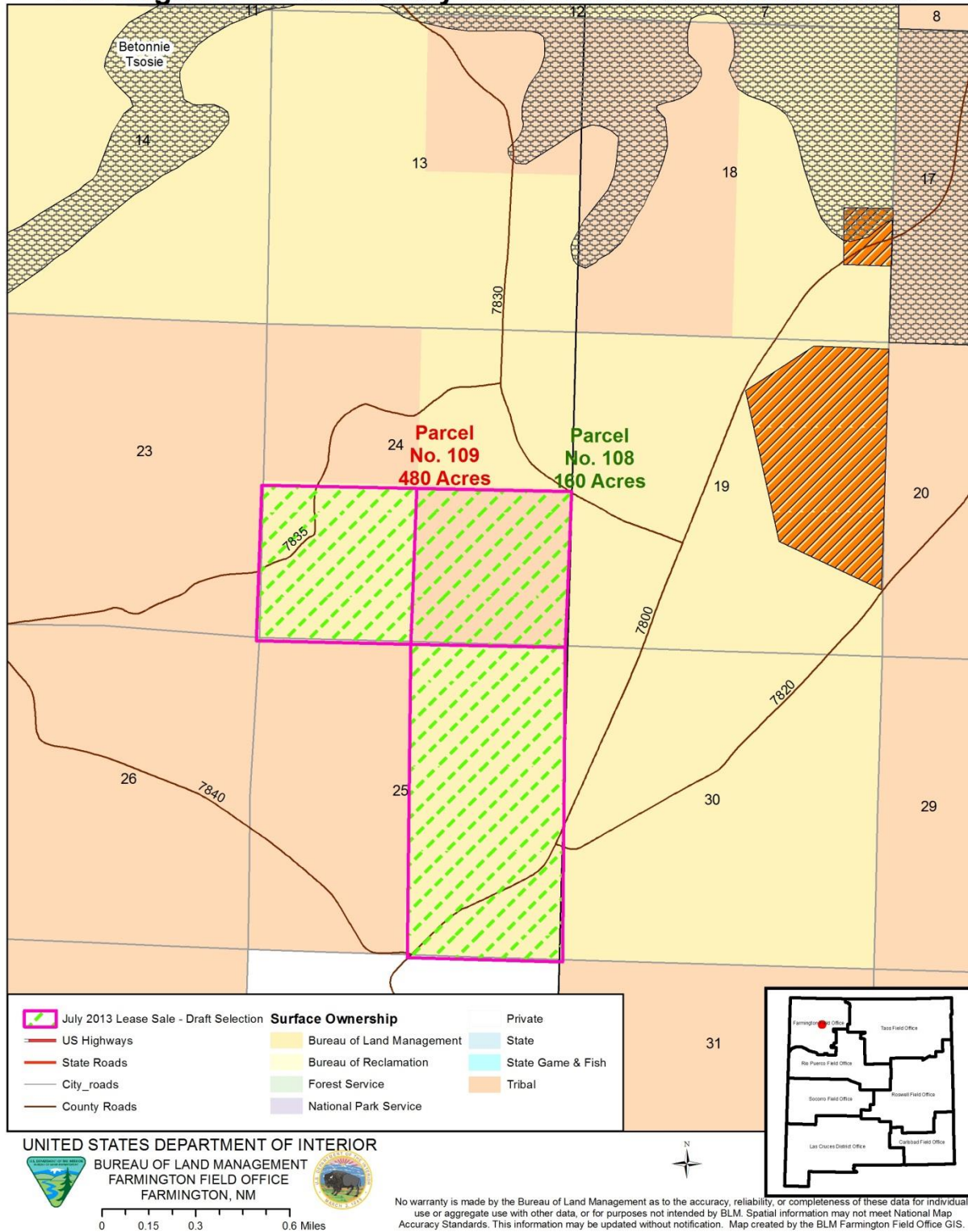
Farmington Field Office July 2013 DRAFT Lease Sale Parcels



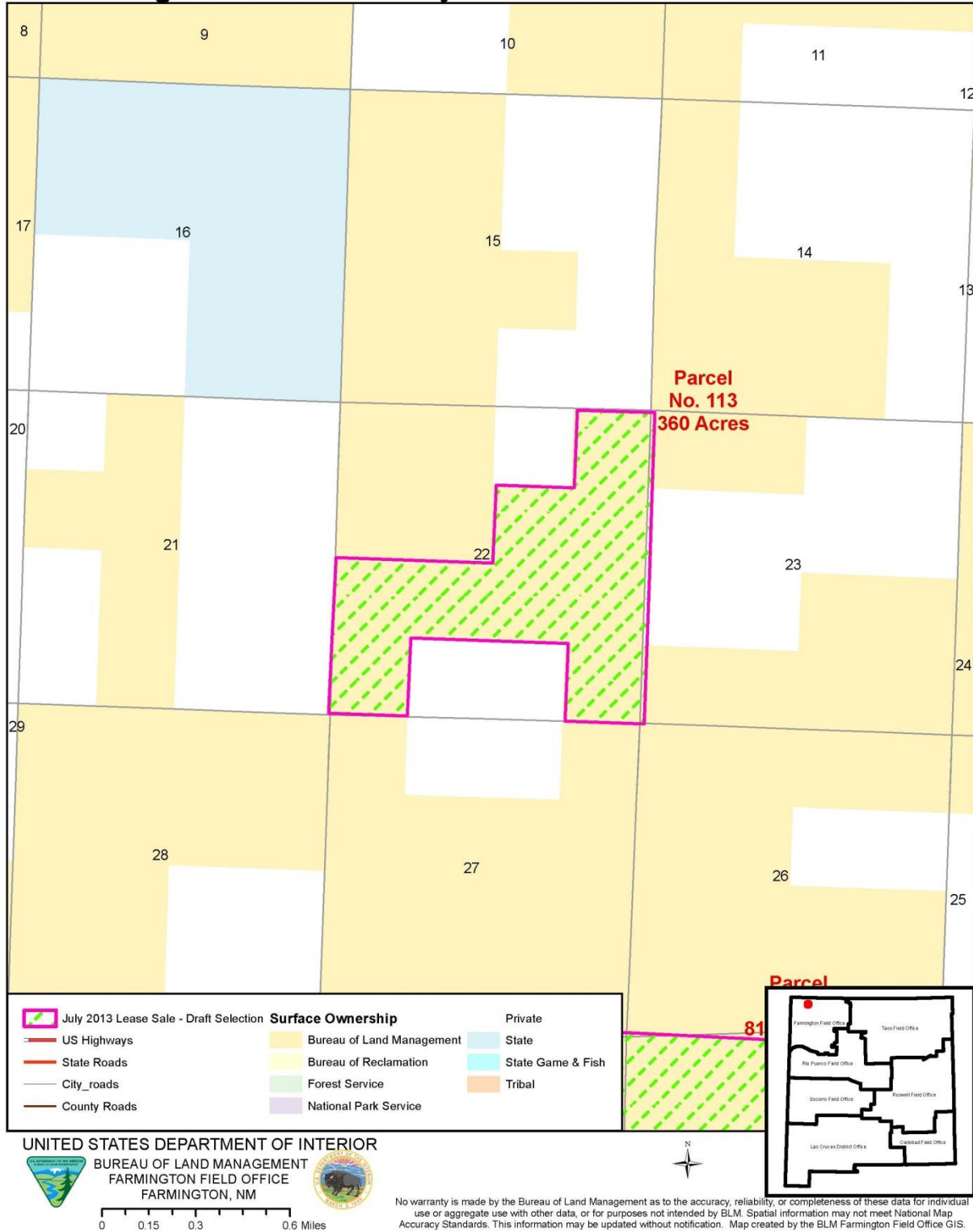
Farmington Field Office July 2013 DRAFT Lease Sale Parcels



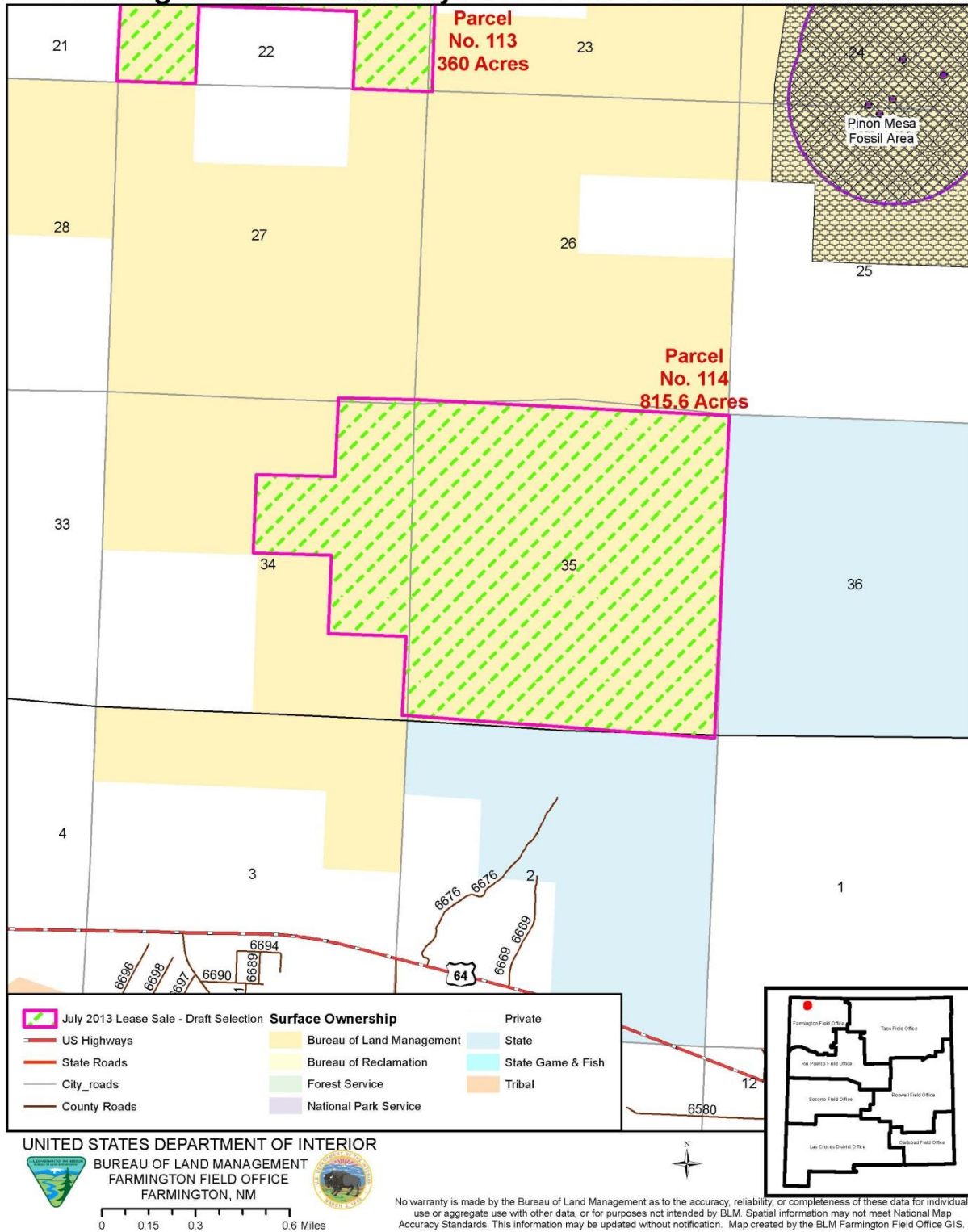
Farmington Field Office July 2013 DRAFT Lease Sale Parcels



Farmington Field Office July 2013 DRAFT Lease Sale Parcels



Farmington Field Office July 2013 DRAFT Lease Sale Parcels





Appendix D

FARMINGTON FIELD OFFICE LEASE STIPULATION SUMMARY

<u>Stipulation</u>	<u>Description/Purpose</u>
NM-11- LN	LEASE NOTICE – CULTURAL RESOURCES All development activities proposed under the authority of this lease are subject to compliance with Section 106 of the National Historic Preservation Act and Executive Order 13007. Compliance could require intensive cultural resource inventories, Native American consultation and mitigation measures to avoid adverse effects
F-7-VRM	VISUAL RESOURCE MANAGEMENT CLASS IV OBJECTIVES SPECIAL STIPULATION Surface activities are subject to Visual Resource Management (VRM) Class III restrictions. Activities that may attract attention but should not dominate the view. This may require additional mitigation methods such as special painting stipulations, site placement, and/or any other measures necessary to meet VRM Class III objectives.
F-41-LN	LEASE NOTICE - BIOLOGICAL SURVEY A biological survey may be required prior to any surface disturbing activity on BLM managed lands. Proposed activities may be subject to seasonal closures within sensitive species habitat. Federal land management agencies are mandated to manage special status species so they should not need to be listed under Endangered Species Act (ESA) in the future.
BIA-1	NAVAJO AREA, BUREAU OF INDIAN AFFAIRS, SURFACE MANAGEMENT AGENCY LEASE STIPULATION FOR FEDERAL OIL AND GAS LEASE OFFERING Lessees shall abide by and conform to appropriate provisions of Titles 25, 36, and 43, Code of Federal Regulations, and any and all other applicable regulations and manuals of the Secretary now or hereafter in force relative to surface leasing rights-of-way and as amended, and National Area Environmental Protection guidelines; the National Historic Preservation Act of 1966, as amended, Archaeological Resources Protection Act, and American Indian Religious Freedom Act and other applicable laws, 30 BIA, 36 CFR 800 and 43 CFR 7.