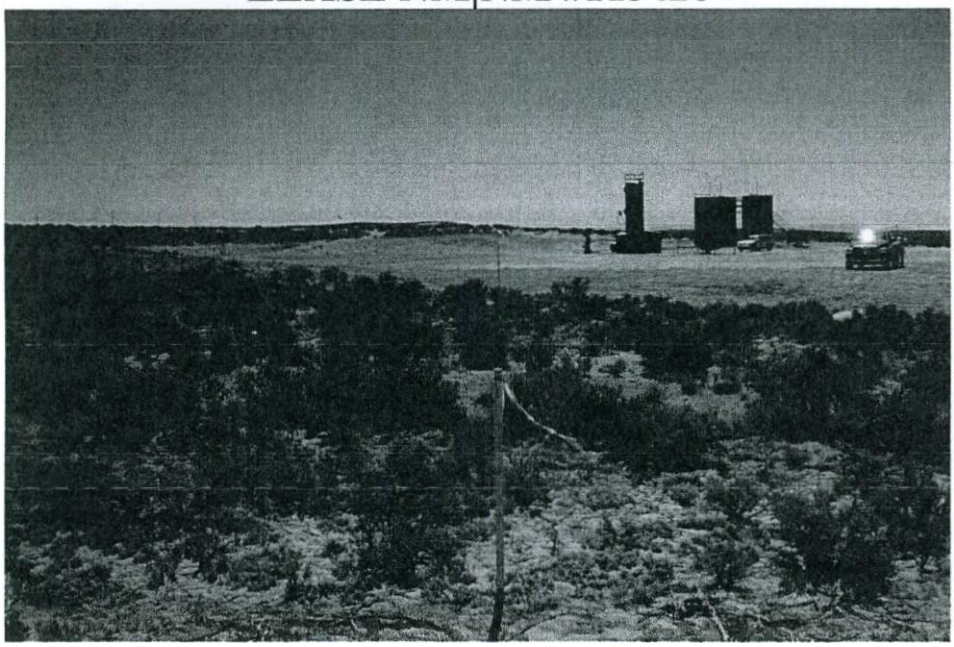
ENVIRONMENTAL ASSESSMENT

EA # NM-FOl0-2011-228
Serial# NM

HIGH PLAINS OPERATING COMPANY, LLC

OJO ENCINO 21 FEDERAL #2 DWS
PROPOSED OIL WELL PROJECT
LEASE NM NM #113426



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July 2011

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1.0 INTRODUCTION

High Plains Operating Company, LLC (HPOC) has proposed vertically drilling an oil well in McKinley County, New Mexico. The legal coordinates for the proposed Ojo Encino 21 Federal #2 DWS oil well project are as follows:

Well Pad Surface Location:
2,621' FSL (from the south line), 2,360' FWL (from the west line)
Section 21, Township 20 North, Range 05 West
New Mexico Principal Meridian (NMPM)

Surface disturbance activities associated with drilling the oil well would include construction of a twinned well pad. The proposed project would be located approximately 63 miles southeast of Bloomfield, New Mexico and 24 miles west-southwest of Cuba, New Mexico (Figure 1). HPOC has filed an Application for Permit to Drill (APD) for the oil well with the Bureau of Land Management Farmington Field Office (BLMIFFO). The proposed project would be located on public land with the federal mineral estate administered by the BLMIFFO.

1.1 Purpose and Need

The purpose of the proposed action is to allow the applicants to produce oil from federal mineral lease number NM NM #113426 issued by the Bureau of Land Management (BLM) in 2005. The BLM's policy is to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs. The Mineral Leasing Act of 1920, as amended (30 USC [United States Code] 181 et seq.), authorizes the BLM to issue oil and gas leases for the exploration of mineral resources and permits the development of those leases. The existing lease is a binding legal contract that allows development of the minerals by HPOC. An approved APD, issued by the BLM, would authorize the applicant to construct and drill the proposed oil well.

1.2 Conformance with Applicable Land Use Plan and Other Environmental Assessments

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this Environmental Assessment (EA) tiers into and incorporates by reference the information and analysis contained in the Farmington Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS) (BLM 2003a), which was approved as the Final Resource Management Plan for the BLM.IFFO by the Record of Decision signed SeptemheL 29, 2003 (BLM 2003b). The PRMP/FEIS and ROD are available for review at the FFO, Farmington, NM or electronically at http://www.nm.blm.gov/ffo/ffo home.html. This project EA addresses site specific resources and/or impacts that are not covered within the PRMP/FEIS, as required by the National Environmental Policy Act of 1969 (NEPA), as amended (Pub. L. 91-90, 42 USC 4321 et seq.). The proposed project would not be in conflict with any local, county, or state plans.

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

Under Section 402 of the Clean Water Act (CWA) (as amended), the U.S. Environmental Protection Agency (USEPA) regulates storm water discharges from industrial and construction activities under the National Pollutant Discharge Elimination System program. Additionally, Sections 404 of the Act, regulated by the U.S. Army Corps of Engineers, and Section 401 of the Act, regulated by the New Mexico Environment Department (NMED) or USEPA (depending upon surface ownership), protect wetlands and waters of the U.S. Operators are required to obtain all necessary permits and approvals for projects requiring CWA permits prior to any disturbance activities.

The New Mexico Energy, Minerals and Natural Resources Department requires oil and gas operators to follow "pit rule" guidelines contained with NMAC 19.15.17 to reduce the potential for ground water contamination from industry related activities.

The Endangered Species Act of 1973 requires all federal departments and agencies to conserve threatened and endangered species and the habitats on which they depend, and to consult with the U.S. Fish and Wildlife Service (USFWS), on all actions authorized, funded, or carried out by the agency to ensure that the action will not likely jeopardize the continued existence of any threatened and endangered species or adversely modify critical habitat.

Compliance with Section 106, responsibilities of the National Historic Preservation Act, are adhered to by following the BLM –New Mexico State Historic Preservation Office protocol agreement, which is authorized by the National Programmatic Agreement between the *BLM,* the *Advisory Council on Historic Preservation*, and the *National Conference of Council of State Historic Preservation Officers.*

Additionally, HPOC would:

- Comply with all applicable federal, state, and local laws and regulations.
- Obtain the necessary permits for the drilling, completion and production of the well, including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
- Certify that a Surface Use Agreement has been reached with the private landowner, where required.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Alternative A - No Action

The BLM NEPA Handbook (H-1790-1) states that for EAs on externally initiated proposed actions, the no action alternative generally means that the proposed activity will not take place. This option is provided in 43 CFR 3162.3-2 (h) (2). This alternative would deny the approval of the APD and the current land and resource uses would continue to occur in the proposed project area. No mitigation measures would be required.

2.2 Alternative B - Proposed Action

Proposed Action Titlefrype: Ojo Encino 21 Federal #2 DWS oil well project/Application for Permit to Drill
County: McKinley, New Mexico
Applicant: High Plains Operating Company, LLC
Surface Owners: BLM
Mineral Estate: BLM

HPOC has filed an APD for the proposed vertical drilling of an oil well to access the federal mineral estate administered by the BLM/FFO. The proposed Ojo Encino 21 Federal #2 DWS well pad would be constructed on federal lands at 2,621' FSL and 2,360' FWL in Section 21 of Township 20 North, Range 05 West, NMPM in McKinley County, New Mexico. The proposed oil well would be directionally drilled to access the Ojo Encino Entrada pool. A project vicinity map is provided as Figure 1. The proposed action is shown on the Ojo Encino Mesa, New Mexico, U.S. Geological Survey (USGS) 7.5-minute quadrangle map as Figure 2.

For a detailed description of design features and construction practices associated with the proposed action, refer to the project plats provided in the APD in Appendix A. Implementation of committed mitigation measures contained in the Conditions of Approval (COAs) are incorporated and analyzed in this alternative. The COAs are provided in Appendix A.

HPOC would comply with all applicable Federal, State and local laws and regulations and obtain the necessary permits for the proposed project. All areas of proposed surface disturbance were inspected in the field to ensure that potential impacts to natural resources would be minimized through the implementation of mitigation measures. These measures are described for all resources potentially impacted in Section 4.0 of this EA.

Drilling of the proposed Ojo Encino 21 Federal #2 DWS oil well project would require construction of a 185-foot by 230-foot well pad with a 50-foot wide construction zone around the pad perimeter, for a total disturbance of approximately 2.16 acres. The proposed project would require a maximum of 6.3 feet of cut between corner 5 and 6 and 5.4 feet of fill in corner 3 to provide a level well pad for drilling (Appendix A). An approximately 40 by 130 foot reserve pit would be used during the initial drilling. After casing is set, a closed loop system would be used to contain the oil-based drilling mud.

The proposed project would be twinned with the existing Ojo Encino 21 Federal #1H oil well; therefore, no new access road would be required. The plugged and abandoned Federal 21 #1 well is located immediately southeast of the proposed well pad and the plugged and abandoned Federal 21 #2 is located immediately northwest. The proposed project would result in approximately 1.16 acre of new disturbance. There would be approximately 1 acre of long-term disturbance associated with the proposed action which would overlap the existing Ojo Encino 21 Federal #1H well.

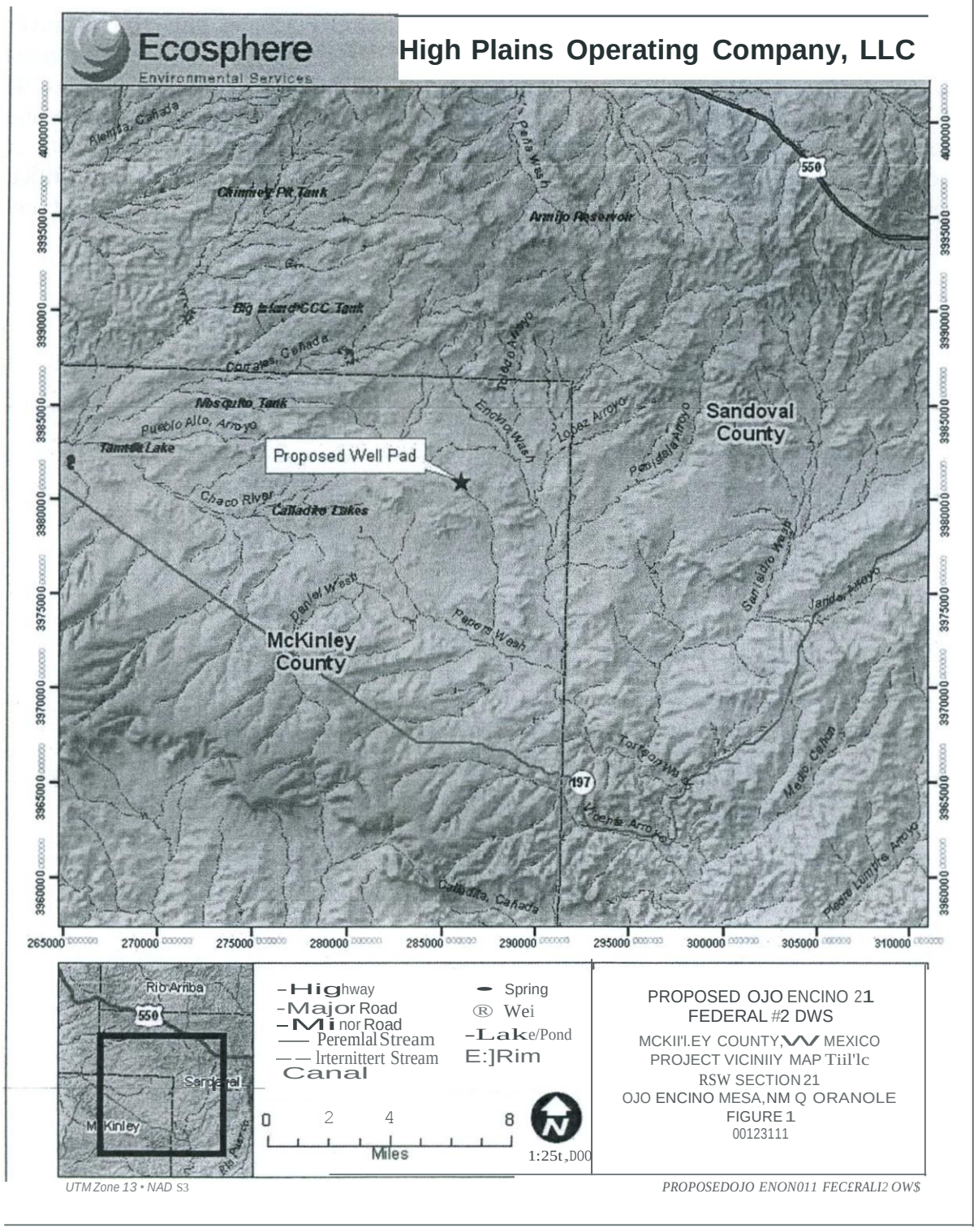
If productive, oil would be stored on site and trucked to a treating facility; therefore, no pipeline is proposed for the project. Surface facilities would include an approximately 50 by 50 foot tank battery with secondary containment. Up to four 400 bbls tanks would store produced water and oil on site. Final tank requirements will not be known until the Ojo Encino 21 Federal #2 DWS well has been drilled and completed.

Construction activities associated with the proposed action would include drilling the proposed oil well and the installation of any surface equipment necessary for production. Construction of the proposed well pad would commence following BLMIFFO approval of HPOC's APD. In general, construction of the well pad project would follow the sequence listed below.

1. Construction crews remove vegetation from the proposed oil well project site. Excavated materials from the cuts would be used on the fill portion of the location to level the pad. Included in the pad construction would be excavation of the reserve pit. Cut material from the reserve pit.
2. Oil well drilling facility assembly would occur on the well pad after site clearing and leveling. Associated facilities and equipment utilized in this phase would include a drilling rig, generators, diesel engines, water tanks, mud tanks, safety stations, equipment and material storage units, blowout preventers, and an accumulator station. Water for the drilling would be obtained from a commercial source and trucked to the site.
3. An approximately 40 by 130 foot lined reserve pit would be used during the initial drilling. After casing is set, a closed loop system would be used to contain the oil based drilling mud. The open reserve pit would be fenced on three sides away from the pad until the closed loop system is installed. The reserve pit free fluids would be removed and trucked to an approved disposal facility. In addition, any production equipment or facility for which fluids are present shall be adequately fenced and properly maintained in order to safeguard both livestock and wildlife.
4. After the well icmpleted, a port on of the pad not required fo!:_production equipment and vehicular access, would be re-contoured and seeded. Approximately 1 acre for facilities on the well pad would remain in use for production and vehicle access. These areas would not be reclaimed until final abandonment of the well. Production equipment that would remain onsite would include the wellhead, production unit separator, and a tank battery. Ancillary equipment such as a Christmas tree, compressor, pump jack, storage tank(s), and dehydrator could also be installed at the well pad site.

2.3 Alternatives Considered But Not Analyzed In Detail

During the planning stages of this project, a representative from HPOC met with representatives from the BLM and discussed possible alternative locations. The proposed location was selected to reach the geological target within drill window and to utilize existing infrastructure to the greatest extent possible, thereby minimizing environmental impacts. Twinned gas wells and associated well pads are generally considered to be an option that creates the least amount of surface disturbance and minimizes impacts to resources. No other alternatives were identified during preliminary analysis and during the onsite meeting that would result in less impact and still fulfill the purpose and need of the proposed action.


Ecosphere
Environmental Services
High Plains Operating Company, LLC
Chimney Pit Tank
Arroyo Reservoir
Big Island CCC Tank
Corrales Cañada
Mosquito Tank
Pueblo Alto, Arroyo
Tanque Lake
Proposed Well Pad
Chaco River
Cañadito Lakes
Sandoval County
McKinley County
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Rio Arriba
Sandoval
McKinley
Highway
Major Road
Minor Road
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Spring
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PROPOSED OJO ENCINO 21
FEDERAL #2 DWS
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RSW SECTION 21
OJO ENCINO MESA, NM Q ORANOLE
FIGURE 1
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UTM Zone 13 • NAD 83
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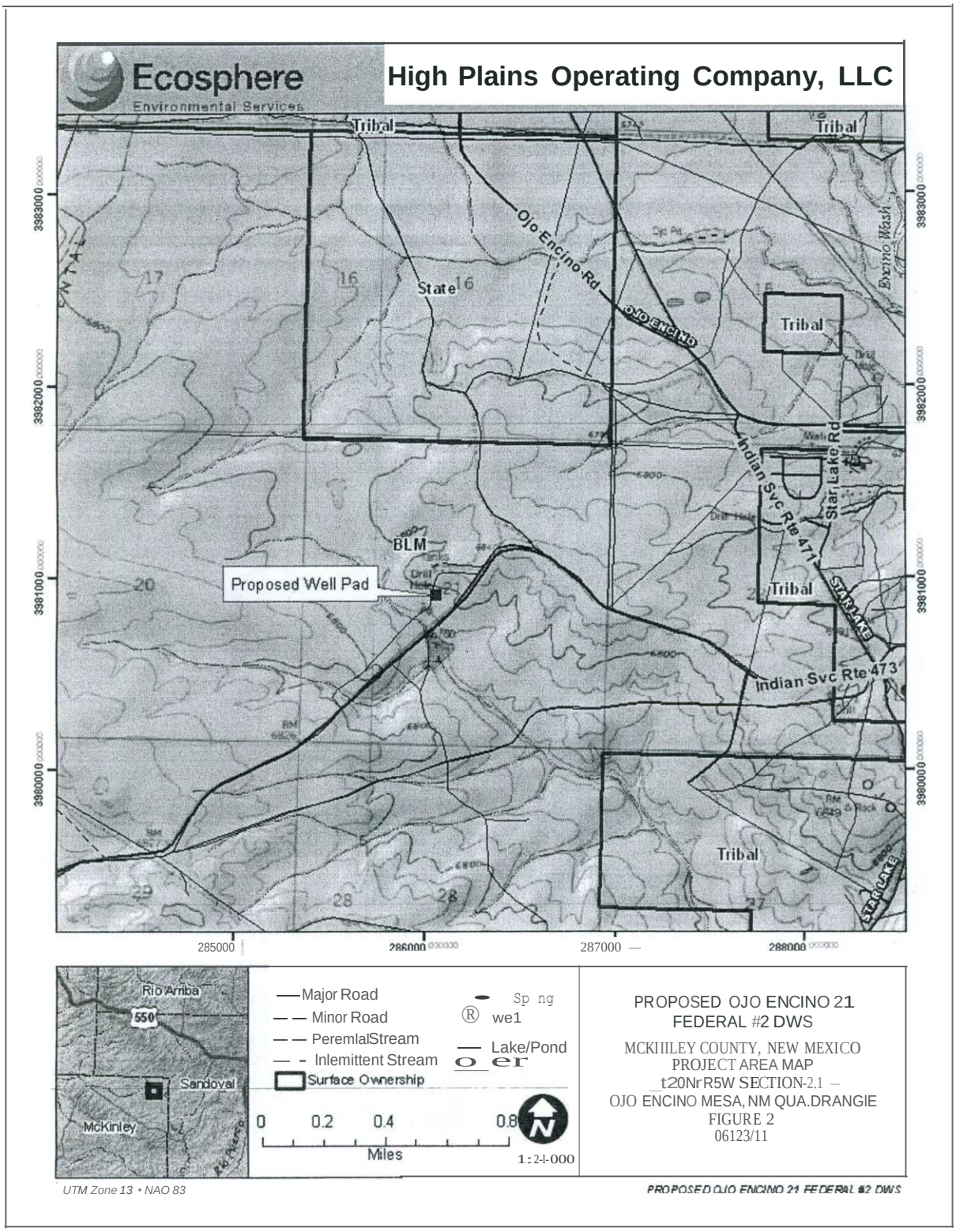
Ecosphere
Environmental Services
High Plains Operating Company, LLC
Tribal
Tribal
Ojo Encino Rd
State
Tribal
Indian Svc Rte 471
Star Lake Rd
BLM
Proposed Well Pad
Tribal
Indian Svc Rte 473
Tribal
3983000
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3981000
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285000
286000
287000
288000
Rio Arriba
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Sandoval
McKinley
Major Road
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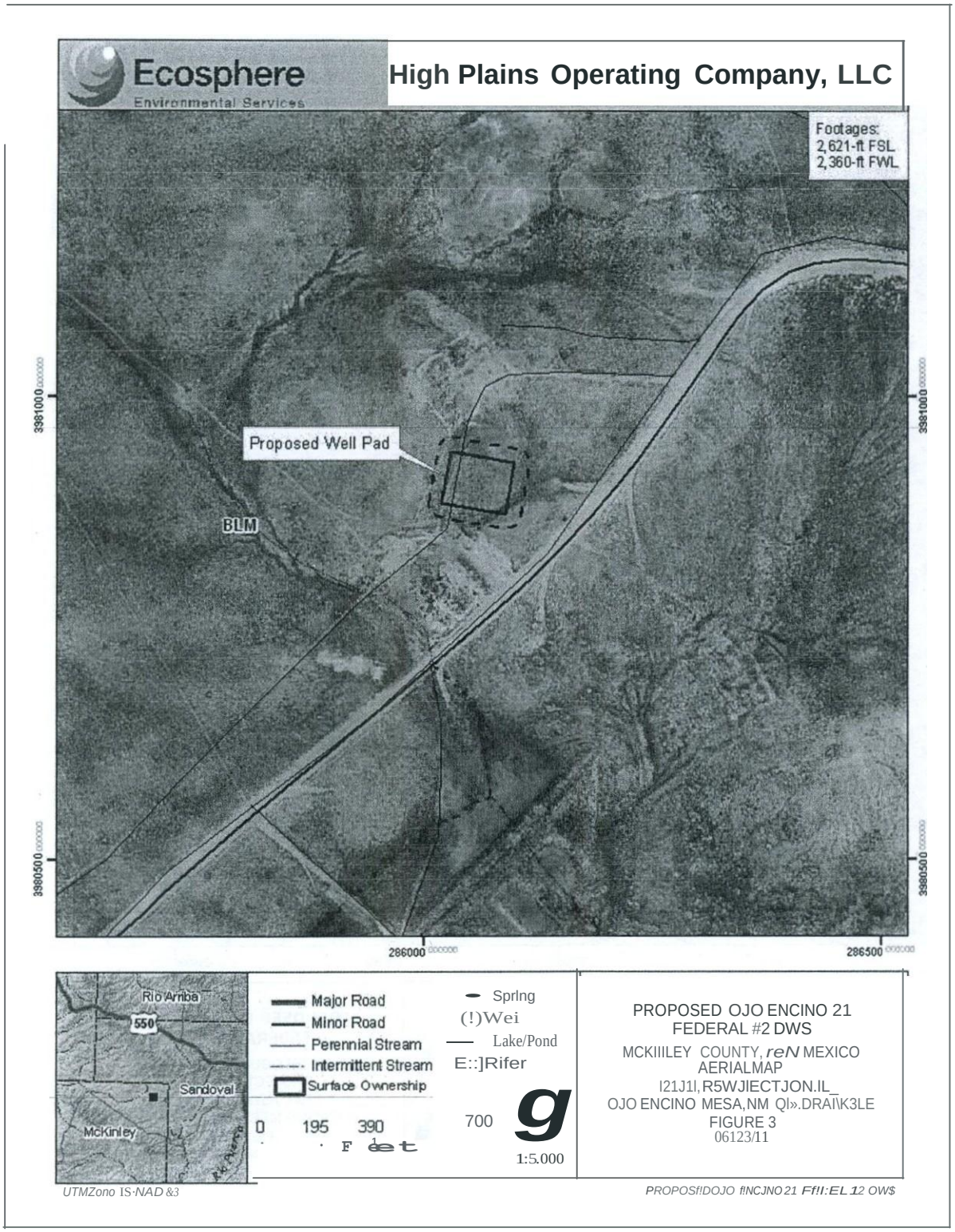
Perennial Stream
Intermittent Stream
Surface Ownership
Spring
Well
Lake/Pond
0 0.2 0.4 0.8
Miles
1:24,000
PROPOSED OJO ENCINO 21
FEDERAL #2 DWS
MCKINLEY COUNTY, NEW MEXICO
PROJECT AREA MAP
T20N R5W SECTION 21
OJO ENCINO MESA, NM QUAD.
FIGURE 2
06/23/11
UTM Zone 13 • NAD 83
PROPOSED OJO ENCINO 21 FEDERAL #2 DWS


Ecosphere
Environmental Services
High Plains Operating Company, LLC
Footages:
2,621-ft FSL
2,360-ft FWL
Proposed Well Pad
BLM
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Rio Arriba
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Sandoval
McKinley
Major Road
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Perennial Stream
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PROPOSED OJO ENCINO 21
FEDERAL #2 DWS
MCKIIILEY COUNTY, reN MEXICO
AERIALMAP
FIGURE 3
06123/11
UTMZono 1S·NAD &3

3.0 DESCRIPTION OF AFFECTED ENVIRONMENT

This section describes the environment that would be affected by implementing the proposed alternative described in Section 2.0. Aspects of the affected environment described in this section focus on the relevant major resources or issues. Only the aspects of the affected environment that are potentially impacted are described.

Field resource investigations of the proposed project area were conducted on June 14,2011 by a biologist from Ecosphere Environmental Services (Ecosphere). Cultural resources surveys were conducted by Division of Conservation Archaeology (DCA) on June 5, 2011.

3.1 Critical Elements

Certain critical environmental components require analysis under BLM policy (see Appendix *5* of H-1790-1, NEPA Handbook). These requirements, listed in Table 1, are specified by statute, regulations, or executive order. Elements that do not exist in the project area or that do not have potential to be impacted are eliminated from further analysis as indicated in the table. Those elements potentially impacted by the proposed action or alternatives are described in the following sections.

Table 1. Affected Environment and Basis for Determination of No Further Analysis of Critical Elements.

CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT				
Resources	**Located in Project Area**	**Not Located in Project Area**	**Further Analysis Presented in Text**	**Basis for Determination**
Air Quality	X		X	
Areas of Critical Environmental Concern (ACECsl		X		The proposed project is not located within an ACEC.
Cultural Resources	X		X	No traditional cultural properties known to occur in the proposed project area (Jim Copeland, pers. comm. 7/6/2011).
Native American Religious Concerns		X	X	
Environmental Justice	X		X	
Farmlands, Prime or Unique		X		No prime or unique farmlands located in project area or vicmity.
Floodplains		X		No floodplains located in project area or vicinity.
Threatened or Endangered Species		X	X	

CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT				
Resources	**Located in Project Area**	**Not Located in Project Area**	**Further Analysis Presented in Text**	**Basis for Determination**
Wastes, Hazardous or Solid		X	X	Due to the handling and storage of minor volumes of fuels and lubricants during construction, and due to the presence of existing oil and gas facilities in the project area, further analysis is warranted.
Water Quality, Surface/Ground	X		X	
Wetlands/Riparian Zones		X		No wetlands/riparian areas are located in the project area.
Wild and Scenic Rivers		X		There are no wild and scenic rivers in the FFO.
Wilderness		X		There are no designated Wilderness areas within a 25 mile radius of the proposed project.

3.1.1 Air Resources

The proposed well is located in McKinley County, New Mexico. Additional general information on air quality in the area is contained in Chapter 3 of the Farmington PRMP/FEIS. In addition to the air quality information in the PRMP cited above, new information about greenhouse gases (GHGs), and their effects on national and global climate conditions has emerged since this RMP was prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (C02) methane (CH4); nitrous oxide (N2O); water vapor; and several trace gases on global climate. Through complex interactions on a global scale, GHG emissions may cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming.

The 2003 PRMP discussed ozone in the Baseline Air Quality and Impact Assessment sections. The National Ambient Air Quality Standard (NAAQS) at the time was 0.084 ppm. In March of 2U08, the USEYA announcea a new primary 8-nourstandard of0.075 ppm.

Increased development in the Four Comers area including a proposed new coal fired power plant, increased oil and gas development, and population growth are all contributing to air quality concerns. Many residents are concerned with potential health impacts from other pollutants. An overall haze and plume of nitrogen oxides can often been seen in the skies, which impact visibility, and there are concerns for the ecosystem due to deposition of mercury and

nitrogen.

In addition, the USEPA, on October 17, 2006, issued a final ruling on the lowering of the NAAQS for particulate matter ranging from 2.5 micron or smaller particle size. This ruling became effective on December 18, 2006, stating that the 24-hour standard for $PM_{2.5}$, was lowered to 35 ug/m³ from the previous standard of 65 ug/m³. This revised $PM_{2.5}$ daily NAAQS was promulgated to better protect the public from short-term particle exposure.

This EA incorporates an analysis of the contributions of the proposed action to GHG emissions, and a general discussion of potential impacts to climate.

Air quality and climate are the components of air resources, which include applications, activities, and management of the air resource. Therefore, the BLM must consider and analyze the potential effects of BLM and ELM-authorized activities on air resources as part of the planning and decision making process.

The USEPA has the primary responsibility for regulating air quality, including seven nationally regulated ambient air pollutants. Regulation of air quality is also delegated to some states of which New Mexico is one. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. Greenhouse gases and the potential effects of GHG emissions on climate are not regulated by the USEPA, however climate has the potential to influence renewable and non-renewable resource management.

3.1.1.1 Air Quality

The area of the proposed action is considered a Class II air quality area. A Class II area allows moderate amounts of air quality degradation. The primary sources of air pollution are dust from blowing wind on disturbed or exposed soil and exhaust emissions from motorized equipment. Air quality in the area near the proposed project is generally good and is not located in any of the areas designated by the USEPA as "non-attainment areas" for any listed pollutants regulated by the Clean Air Act. During the summers of 2000 through 2002, ozone levels in San Juan County were approaching non-attainment. Additional modeling and monitoring was conducted by Alpine Geophysics, LLC, and Environ International Corporations, Inc., in 2003 and 2004. Results of the modeling suggest the episodes recorded in 2000 through 2002 were attributable to regional transport and high natural biogenic source emissions. The model also predicted that the region will not violate the ozone NAAQS through 2007 and that the trends in the 8-hour ozone values in the region will be declining in the future. At the present time, the San Juan County is classified as in attainment with the revised federal ozone stan ard of 0.075 ppm.

Greenhouse gases, including CO_2 and $C_,$ and the potential effects of GHG emissions on climate, are not regulated by the USEPA under the Clean Air Act. However, climate has the potential to influence renewable and non-renewable resource management. The USEPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks found that total U.S. GHG emissions were over 7 billion metric tons in 2007 and that total U.S. GHG emissions have increased by 17 percent from 1990 to 2007. Emissions increased from 2006 to 2007 by 1.4 percent (99.0

teragrams of carbon dioxide equivalents [Tg $C0_2$eq]). The following factors were primary contributors to this increase: (1) cooler winter and warmer summer conditions in 2007 than in 2006 increased the demand for heating fuels and contributed to the increase in the demand for electricity, (2) increased consumption of fossil fuels to generate electricity, and (3) a significant decrease (14.2 percent) in hydropower generation used to meet this demand (USEPA 2008).

The levels of these GHGs are expected to continue increasing. The rate of increase is expected to slow as greater awareness of the potential environmental and economic costs associated with increased levels of GHGs result in behavioral and industrial adaptations.

3.1.1.2 Climate

Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies 2007). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

In 2007, the Intergovernmental Panel on Climate Change (IPCC) predicted a warming of about 0.2°C per decade for the next two decades, and then a further warming of about 0.1°C per decade (IPCC 2007). The National Academy of Sciences (2006) supports these predictions, but has acknowledged that there are uncertainties regarding how climate change may affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures are more likely than increases in daily maximum temperatures.

A 2007 U.S. Government Accountability Office (GAO) Report on Climate Change found that, "federal land and water resources are vulnerable to a wide range of effects from climate change, some of which are already occurring. These effects include, am ng others: 1) physical effects such as droughts, floods, glacial melting, and sea level rise; 2) biological effects, such as increases in insect and disease infestations, shifts in species distribution, and changes in the timing of natural events; and 3) economic and social effects, such as adverse impacts on tourism, infrastructure, fishing, and other resource uses." It is not, however, possible to predict with any certainty regional or site-specific effects on climate relative to the proposed action and subsequent actions.

In New Mexico, a recent study indicated that the mean annual temperatures have exceeded the global averages by nearly 50 percent since the 1970s (Enquist and Gori 2008). Similar to trends -in nat-ional data, increases-in mean winter-tempemtYFes in--thesouthwest have Gontr:ibuted tO-this rise. When compared to baseline information, periods between 1991 and 2005 show temperature increases in over 95 percent of the geographical area ofNew Mexico. Warming is greatest in the northwestern, central, and southwestern parts of the state (Enquist and Gori 2008).

3.1.2 Cultural Resources

The project is 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: Paleolndian (ca. l0000 B.C. to 5500 B.C.), Archaic (ca. 5500 BC 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. A detailed description of these various periods and select phases within each period is provided in the Farmington PRMP/FEIS (BLM 2003a).

The proposed Ojo Encino 21 Federal #2 DWS oil well would be located within the Arroyo Chico sub-watershed. Based on the Farmington PRMP/FEIS (BLM 2003a), a total of 1,733 sites representing Paleo, Archaic Period, Basketmaker II, Basketmaker III, Unknown Anasazi, Pueblo I, Pueblo II, Pueblo III, Pueblo IV, Unknown Navajo, Dinetah/Gobemador Phase, Cabezon Phase, Reservation Phase, Pueblo, Hispanic, and Euro-Anglo temporal/cultural components have been documented within the watershed. Of the 18 categories of sites defined based on temporal/cultural affiliation, 16 are represented. Lacking in the watershed are sites attributed to Apache and Ute occupations. The most frequently occurring cultural affiliations recorded are Reservation (24 percent) and Archaic (10 percent). Sites density is high with any apparent gaps most likely a factor of inventory lacking, not a lack of sites.

DCA conducted a Class III cultural resource inventory of the proposed project under the BLM Cultural Resources Use Permit #7-2920-08-RRR. In conjunction with the field surveys of the project area, the investigation included a literature review of known resources within the project area. DCA conducted the literature review using available Geographic Information Systems (GIS) data from the Laboratory of Anthropology Archaeological Record Management Section (ARMS), the BLM/FFO, the New Mexico Cultural Resource Information System data base, and VanValkenburgh (1974). DCA surveyed a total of3.42 acres on June 5, 2011.

No cultural resources were identified within the proposed well pad area or immediate vicinity. The cultural resources report has been submitted to the BLM under separate report cover (DCA Technical Report Number 11-DCA-036).

3.1.3 Native American Religious Concerns

Traditional Cultural Properties (TCPs) are a separate class of cultural resources which may occur in the EA analysis area, may or may not coincide with archaeological sites and artifact loci, and may fall under the purview of one or more of the cited legislation. The National Park Service has defined TCPs asfollows (Parker-and K-ing-199-8).

> A traditional cultural property can be defined generally as one (a property) that is eligible for the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community (Parker and King 1998).

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

There are several pieces of legislation or Executive Orders that should be considered when evaluating Native American religious concerns. These govern access and use of scared sites, possession of sacred items, protection and treatment of human remains, and the protection of archaeological resources ascribed with religious or historic importance. These include the following:

- The American Indian Religious Freedom Act of 1978 (AIRFA; 42 USC 1996, P.L. 95-431 Stat. 469).
  - ../ Possession of sacred items, performance of ceremonies, access to sites.
- Executive Order 13007 (24 May 1996).
  - ../ Access and use of sacred sites, integrity of sacred sites.
- The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA; 25 USC 3001, P.L. 101-601).
  - ../ Protection, ownership, and disposition of human remains, associated funerary objects, unassociated funerary objects, sacred objects, or objects of ultural patrimony.
- The Archaeological Resources Protection Act of 1979 (ARPA; 16 USC 470, Public Law 96-95).
  - ../ Protection or archaeological resources on Federal and Indian lands.

For the proposed action, identification efforts for Native American Religious Concerns were limited to reviewing existing published and unpublished literature and personal communications with Jim Copeland, BLM/FFO archaeologist. The proposed project area is not located within or near any TCPs (Jim Copeland, BLMIFFO, pers. comm., July 6, 2011).

3.1.4 Environmental Justice

Executive Order 12898 requires federal agencies to assess projects to ensure there is no disproportionately high or adverse environmental, health, or safety effects on minority and low income populations. Minorities comprise a large proportion of the population residing inside the boundaries of the BLM/FFO (see pages 3-106 to 3-107 ofthe PRMP/FEIS for more details on ethnicity and poverty rates).

3.1.5 USFWS Threatened and Endangered Species

Dnder section 7 ofThe ESA of 1973 (as amenaea),tlie 'BIJV11.s requirea f0 consult with the USFWS on any proposed action which may affect federally listed threatened or endangered species or species proposed for listing. The project Biological Survey Report (BSR) is provided in Appendix C and addresses the potential for federally listed and other special status species (Section 3.2.8) to occur in the project area. Table 2 summarizes the potential for federally listed species to occur in the project area.

Table 2. Habitat Descriptions and Presence of USFWS listed Threatened (T), Endangered (E), or Candidate (C) species with potential to occur in McKinley County, New Mexico.

SPECIES	STATUS	HABITAT ASSOCIATIONS	PRESENCE*
MAMMALS			
Black-footed ferret *(Mustela nigripes)*	E	Open grasslands with year-round prairie dog colonies of 200 acres or greater.	NP
BIRDS			
Mexican spotted owl *(Strix occidentalis lucida)*	T	Nests in caves, cliffs, or trees in steep-walled canyons of mixed conifer forests.	NP
Southwestern willow flycatcher *(Empidonax traillii extimus)*	E	Breeds in dense, shrubby riparian habitats, usually in close proximity to surface water or saturated soil.	NP
Yellow-billed cuckoo *(Coccyzus americanus ssp. occidentalis)*	C	Breeds in riparian woodlands with dense, understory vegetation.	NP
FISH			
Zuni bluehead sucker *(Catostomus discobolus yarrowi)*	C	Inhabits largely shaded, pool and riffle habitats with coarse substrates.	NP
PLANTS			
Zuni fleabane *(Erigeron rhizomatus)*	E	Nearly barren detrital clay hillsides with soils derived from shales of the Chinle or Baca formations.	NP

* K- Known, documented observation Withm project area; S -Habitat suitable and species suspected to occur withm the project area; NS -Habitat suitable but species is not suspected to occur within the project area; NP- Habitat not present and species unlikely to occur within the project area.

No federally listed threatened, endangered, or candidate spectes, or potential habitats, were identified within the proposed project area.

3.1.6 Wastes, Hazardous or Solid

The Resource Conservation and Recovery Act (RCRA) passed in 1976, establishes a comprehensive program for managing hazardous wastes from the time they are produced until their disposal. The USEPA regulations defme solid wastes as any "discarded materials" subject to a number of exclusions. A "hazardouswaste" is a solid waste that (1) 1sltsteaoy the USEPA as a hazardous waste, (2) exhibits any of the characteristics of hazardous wastes (ignitability, corrosiveness, reactivity, or toxicity), or (3) is a mixture of solid and hazardous waste. A 1980, amendment to RCRA conditionally exempted from regulation as hazardous wastes "drilling fluids, production waters, and other wastes associated with the exploration, development, or production of crude oil or natural gas". On July 6, 1988, USEPA determined that oil and gas exploration, development and production (EDP) wastes would not be regulated as hazardous wastes under RCRA. A simple rule of thumb was developed for determining if an EDP waste is

likely to be considered exempt or non-exempt from RCRA regulations: If (1) the waste came from down-hole, or (2) the waste was generated by contact with the oil and gas production stream during removal of produced water or other contaminants, the waste is most likely to be considered exempt by USEPA. The Comprehensive Environmental Response Compensation and Liability Act (CERCLA), passed in 1980, deals with the release (spillage, leaking, dumping, accumulation, etc.) or threat of a release of hazardous substances into the environment. Despite many oil and gas constituent wastes being exempt from hazardous waste regulations, certain RCRA exempt contaminants could be subject to regulations as hazardous substances under CERCLA. The New Mexico Oil Conservation Division (OCD) administers hazardous waste regulations for oil and gas activities in New Mexico.

3.1.7 Water Quality, Surface and Groundwater

The project area is located in the Upper Colorado River Hydrologic Region and is part of the San Juan River sub-region. The project area is located within the Arroyo Chico sub-watershed. There are no perennial water sources within a 25 mile radius of the proposed project. The proposed project area would not be located within a floodplain. The proposed project area contains no well defmed ephemeral drainages.

A diversion ditch, less than 1 foot deep by 2 feet wide, originates along the southern and western perimeter of the existing well pad. This drainage spreads into a shallow sheet outside the southern construction zone of the proposed project. A shallow ephemeral drainage is located approximately 470 feet southwest from the proposed well pad. This drainage is characterized by a shallow flat sandy bottom with no defined ordinary high water mark. Moderate vegetation occurs within the drainage charmel. An unnamed seasonal impoundment is located approximately 700 feet southeast of the project area.

The primary aquifers in the BLM/FFO area are the Uinta-Animas and the Mesaverde, which are sandstone based. Groundwater is readily available in most of the BLM/FFO area and is of fair to poor quality. A search of the New Mexico State Engineers Office - Water Administration and Technical Engineering Resource System (WATERS) database for the proposed project area and vicinity (1-mile radius) was performed. The database has no records of known water wells located with the proposed project area or a 1-mile radius (NMOSE 2011).

3.2 Non-Critical Elements

Non-critical elements are resources that may be affected by the proposed action or alternatives, but are not necessarily required to be analyzed by statute, regulation, or Executive Order (EO). The--11on-crit-ica-elements listeEl in Table 3 af{}--€ itheF €liminat€d-fr-om furthet:,analysis in the-table- or are brought forward in this EA for analysis because they pertain to management objectives outlined in the BLM/FFO PRMP/FEIS (BLM 2003a).

Table 3. Affected Environment and Basis for Determination of No Further Analysis of Non-Critical Elements

NON-CRITICAL ELEMENTS				
Resources	**Located in Project Area**	**Not Located in Project Area**	**Further Analysis Presented in Text**	**Basis for Determination**
Topography/Surface Geology	X		X	
Mineral Resources	X		X	
Paleontology		X	X	The project area is located within a PFYC designated Class 5 area.
Soils	X		X	
Vegetation, Forestry	X		X	
Invasive, Non-native Species		X	X	
Livestock Grazing	X		X	
Special Status Species	X		X	
Wildlife	X		X	
Migr_atoryBirds	X		X	
Wild Horses and Burros		X		There are no wild horse or burro populations in or near the project area.
Recreation		X	X	
Visual Resources	X		X	
Public Health and Safety	X		X	

3.2.1 General Topography/Surface Geology

The proposed project *would* be located in an area among Ceja De Raton to the west and Ojo Encino Mesa to the east. The topography of the general area is characterized by open, mildly rolling terrain bisected by shallow drainages. . The east portion of the proposed project would be located within a highly disturbed landscaped .associated with the existing Ojo Encino 21 Federal #lH well pad, access road, and power line. The west portion of the proposed project is situated on a mid backslope of a mild rolling ridge rising about I0 feet above the existing well location. Slope within the proposed project area ranges from about 0-4 degrees with southwest aspects. Elevation of the proposed project area is 6,790 feet.

Surface geology in the proposed project area is described as the Fruitland and Kirtland Formations (Green and Jones 2001). Shale fragments are scattered throughout the northwestern portion of proposed project area.

3.2.2 Paleontological Resources

The BLM uses the Potential Fossil Yield Classification (PFYC) system to identify areas with a high potential to produce significant fossil resources (IM 2008-009). This system has ranked all lands within the FFO management area as a Class 5 designation. Class 5 designations are described as being Very High Potential paleontological resource areas, thus requiring an

assessment at the project level (IM 2008-011). The proposed project area is located within the paleontological rich area ofthe San Juan Basin of northern New Mexico.

3.2.3 Mineral Resources

New Mexico ranks second in natural gas production and fifth in oil production for all states. In the state 95 percent of oil is produced from the Permian Basin and 5 percent of oil is produced from the San Juan Basin. The proposed oil well would produce from a valid existing federal lease for the minerals associated with the proposed development formation. There are no coal mines or salable mineral extraction projects operating in the vicinity of the proposed project.

3.2.4 Soils

Soils in the San Juan Basin were formed primarily in two kinds of parent material: alluvial sediment and sedimentary rock. Alluvial sediment is material that was deposited in river valleys and on mesas, plateaus, and ancient river terraces. The material has been mixed and sorted in transport and is widely ranging in mineralogy and particle size. Sedimentary parent material consists mainly of sandstone and shale bedrock. These shale and resistant sandstone beds form prominent structural benches, buttes, and mesas bounded by cliffs.

One major soil mapping unit occurs within the proposed project area; Doakum-Betonnie complex, 1 to 8 percent slopes. The unit is composed of 60 percent Doakum and similar soils, 25 percent Betonnie and similar soils, and 15 percent minor components. These soils are found on sideslopes on ridges and hills, fan remnants on valley sides, dipslopes on cuestas and summits on mesas. Doakum soils are well drained with a moderate penpeability and available water capacity. Doakum soils have a low shrink swell potential. Wind and water erosion potentials are moderate. Betonnie soils are somewhat excessively drained with a moderately rapid permeability and a low available water capacity. Betonnie soils also exhibit a low shrink swell potential. Wind and water erosion potentials are moderate (USDAINRCS 2001).

3.2.5 Vegetation, Forestry

The natural vegetation type in the project area vicinity is classified as Great Basin desert scrub (Dick-Peddie 1993). The southeast portion of the proposed project supports reseeded herbaceous plants associated with the reclamation of the existing well pad. The current vegetation within the seeded area is dominated by sparsely distributed tiny shoots of grass species such as crested wheatgrass *(Agropyron cristatum).* Other herbaceous species include annual, exotic weedy species such as prickly Russian thistle *(Sa/sola tragus)* and burning bush *(Basia scoparia).* The undisturbed-portion consists of woru::ly and herbaceQus_species_sum as big sagebrush.*(.Artemisia tridentata),* standing about 1-2 feet in height and blue grarna *(Bouteloua gracilis)* forming a dense matted cover. Overall, vegetative cover was visually estimated from 1-30 percent; however the existing well location is essentially devoid of vegetation. A list of plants found during the field survey is included in the BSR in Appendix C.

3.2.6 Invasive; Non-native Species

The BLMIFFO maintains a list of invasive and non-native plant species of concern (BLM 2003a). None of the species listed by the BLM were observed in the project area.

3.2.7 Livestock Grazing

The BLM/FFO manages 167 grazing allotments with 351 grazing authorizations that permit cattle, sheep and horse grazing within the resource area. Ofthe 351 grazing authorizations, 317 are permitted under Section 3 of the Taylor Grazing Act. Of the 167 grazing allotments, there are four authorizations issued under Section 15 of the Taylor Grazing Act to the Navajo Tribe that authorizes grazing on 35 allotments. An additional Section 15 authorizations permit grazing on 30 allotments in the Lindrith, New Mexico area.

The proposed project would be located on public lands within the BLM Star Lake Community grazing allotment #6023. The grazing allotment is permitted for a total of 8,597 animal unit months (AUMs). The allotment is permitted for 3,582 sheep between March 1, 2011 and February 28, 2012. No permanent livestock water sources are located within the project or action area.

3.2.8 Special Status Species

In accordance with BLM Manual 6840, 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. Special status species and their potential to occur in the proposed project area are listed in Table 4. The BSR in Appendix C provides the basis for the findings listed in the table.

The project and action area provide potential foraging habitat for golden eagle *(Aquila chrysaetos)*, ferruginous hawk *(Buteo regalis)*, or prairie falcon *(Falco mexicanus)*. During the field survey, no raptor nesting activities were detected within the project area or surroundings. Suitable nesting features preferred by these three raptor species are not found in the project or action area. The presence of desert cottontail and black-tailed jackrabbits detected in the proposed project area provide prey for golden eagle, ferruginous hawk, and prairie falcon. No golden eagles, ferruginous hawks, prairie falcons or sign of consistent raptor use (e.g., whitewash or nests) were observed in the project area or surrounding vicinity during the biological survey. According to the BLMIFFO raptor nest data (i.e., historic or currently active nests), there is one historic or currently active golden eagle nest within six miles of the proposed project area (BLM 2009, unpublished data). The occurrence- of golden eagles,- ferruginous hawks, and prairie falcons in the project area is likely limited to individuals flying over the site for adjacent nesting, foraging, or perching sites.

Table 4. Habitat descriptions and presence of BLMIFFO special status species (SSS) and USFWS candidate species (C).

SPECIES	HABITAT ASSOCIATIONS	PRESENCE
Aztec gilia *(Aliciella formosa)*	Salt desert scrub communities in soils of the Nacimiento Formation (5,000-6,000 ft).	NP
Brack's hardwall cactus *(Sclerocactus c/overiae* ssp. *brackii)*	Sandy clay of the Nacimiento Formation in sparse shadscale scrub (5,000-6,000 ft).	NP
Golden eagle *(Aquila chrysaetos)*	In the west, mostly open habitats in mountainous, canyon terrain. Nests primarily on cliffs and trees.	S
Burrowing owl *(Athene cunicularia)*	Rarely dig their own burrows and are typically associated with prairie dog colonies.	NP
Ferruginous hawk *(Buteo regalis)*	Flat or rolling terrain in grasslands, shrub-steppes, and deserts; may occur in the periphery of pinon-juniper or other forests. Badlands. Prefers elevated nest sites (e.g., buttes, utility poles, trees) but also nests on the ground.	S
Mountain plover *(Charadrius montanus)*	Breeds in flat, open grasslands; often associated with prairie dog towns and intensive grazing.	NP
Yellow-billed cuckoo *(Coccyzus americanus occidenta/is)*	Breeds in riparian woodlands with dense, understory vegetation.	NP
Prairie falcon *(Falco mexicanus)*	Found in arid, open grasslands and shrub-steppe habitats. Prairie falcons require cliffs for nesting.	S
American peregrine falcon *(Falco peregrinus anatum)*	Rugged terrain with rocky cliffs and canyons (30-1,000+ ft high), adjacent to rivers, lakes, or streams. Urban areas with towers and buildings are also inhabited.	NP
Bald eagle *(Haliaeetus /eucocephalus)*	Nests in forested areas adjacent to large bodies of water.	NP

K - Known, documented observation withm prOJeCt area; S - Habitat suitable and species suspected to occur withm the project area; NS - Habitat suitable but species is not suspected to occur within the project area; NP - Habitat not present and species unlikely to occw:..within the-project area.

3.2.9 Wildlife

Big-game, small and medium-sized mammals commonly found in sagebrush grassland communities may include, mule deer, elk *(Cervus elaphus)*, black-tailed jackrabbit *(Lepus californicus)*, desert cottontail *(Sylvilagus audubonii)*, ground squirrel *(Spermophilus variegates)*, deer mouse *(Peromyscus maniculatus)*, coyote *(Canis latrans)*, and badger *(Taxidea taxus)*.

During the June 14, 2011 biological survey, wildlife signs in the project area were limited to desert cottontail *(Sylvilagus audubonii)* and black-tailed jackrabbit *(Lepus californicus).*

3.2.10 Migratory Birds

Under the Migratory Bird Treaty Act (MBTA) (16 USC §703-712) and EO 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds," federal agencies are required to consider management impacts to migratory non-game birds. While all migratory songbirds are protected by law, certain species have been determined to be at greater risk than others. More than 350 avian species occur in San Juan County and the surrounding area administered by the BLM/FFO. A total of 136 species have been confirmed as breeding in San Juan County with likely additional species if one considers the adjacent counties within the BLM/FFO area. Data collected through breeding bird surveys coordinated by the USFWS as well as other private sector efforts have provided the basis for the New Mexico Partners in Flight (NMPIF) organization to develop bird "Watch Lists" and the USFWS's "Birds of Conservation Concern List." The NMPIF organization has identified priority species of birds for the state of New Mexico by habitat type. The BLM/FFO area lies within the Colorado Plateau physiographic region as identified by the NMPIF. The proposed project area contains one of the habitat types addressed in these documents: Great Basin desert shrub (sage-grass). Some of the birds listed as "Highest Priority" by the NMPIF group as well as USFWS "Birds of Conservation Concern" includes the ferruginous hawk, gray vireo *(Vireo vicinior),* pinon jay *(Gymnorhinus cyanocephalus),* and juniper titmouse *(Baeolophus ridgwayi).*

The Bird Conservation Plan developed for the State of New Mexico by NMPIF lists the sage thrasher (*Oreoscoptes montanus)* and sage sparrow *(Amphispiza belli)* within the Great Basin desert shrub habitat type as "highest priority" species for conservation. The ferruginous hawk, mountain plover *(Charadrius montanus),* and long-billed curlew *(Numenius americanus)* are listed as a "highest priority" species under the Plains and Mesa grassland habitat type. Most of the priority bird species identified by the NMPIF also occur on the USFWS Division of Migratory Bird Management "Birds of Conservation Concern 2008" within Bird Conservation Region 16 – Southern Rockies/Colorado Plateau. Birds included on this list are those "species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973" (USFWS 2008).

The open scrub habitat in and surrounding the proposed project area provides foraging habitat for large raptors. Black-throated sparrows *(Amphispiza bilineata),* Brewer's sparrows *(Spizella breweri),* and mountain bluebirds *(&alia currucatdes)* can also occur in this-community (NMPJF 2007).

3.2.11 Recreation

Recreation in the area consists of dispersed activities such as hiking and hunting. There are no designated special recreation areas in proximity to the proposed action.

3.2.12 Visual Resources

The proposed project area is within the San Juan Basin, an area visually characterized by steep colorful escarpments, narrow vistas and rugged canyons. The BLM has developed a Visual Resource Management (VRM) classification system designed to maintain or enhance visual qualities and describe the different degrees of modification to the landscape (USDI, BLM 2003). Visual Resource Management (VRM) on public lands is conducted in accordance with BLM Handbook 8410 and BLM Manual 8411. Further details of the FFO VRM Program are contained on pages 2-9 to 2-10 and 3-61 to 3-63 of the Farmington PRMP/FEIS. Modifications to the visual resource must follow the guidelines for the types of change suitable for each class. The proposed project area is located within a designated Class IV VRM area. This classification provides for activities that require major modification of the landscape and the level of change to the landscape can be high.

3.2.13 Public Health and Safety

The proposed well pad would be twinned with an operational well and located in the general vicinity of other existing oil and gas facilities and other developments. The project area is in an area connected by a network of dirt surface access roads. Public risk associated with the development includes increased traffic on public roads, wildfire, pipeline leakage, rupture, fire and explosion. Additional public health and safety risks include spills of wastes, chemicals, or hazardous materials. Roads in the area are generally unimproved dirt surface and are used to access mineral development facilities and private residences. These roads may become hazardous or impassable during periods of inclement weather.

4.0 ENVIRONMENTAL CONSEQUENCES

Environmental resources can be affected in many ways during implementation of the proposed action. The effect, or impact, is defined as any change or alteration in the pre-existing condition of the environment produced by the proposed action, either directly or indirectly. This chapter analyzes the environmental consequences of the proposed action.

Impacts can be either long-term (permanent, residual) or short-term (incidental, temporary). Short-term impacts affect the environment for only a limited time period and the environment usually reverts rapidly to the pre-construction condition. Short-term impacts are often disruptive and obvious. Long-term impacts are substantial and permanent alterations to the pre-project environment. The BLM defmes long-term impacts as those impacts whose results endure more than five years. Impacts may be irreversible or residual and affected resources irretrievable.

For the purpose of this EA, potential impacts have been divided into three categories:

> **High** - as defmed in CEQ guidelines (40 CFR 1500-1508), impacts which are substantial in severity and therefore should receive the greatest attention in decision making.
>
> **Moderate** - impacts which cause a degree of change that is easy to detect, but do not meet the criteria for significant impacts.
>
> **Low** - impacts which cannot be easily detected and cause little change in the existing environment.

No Action Alternative

Under the no action alternative, the proposed well pad would not be constructed and the well would not be drilled. There would be no new impacts from oil production to resources in the project area. The no action alternative would result in the continuation of the current land and resource uses in the project area. This alternative will not be evaluated further in Chapter 4.

Action Alternative- Proposed Action

Under the proposed action, the Ojo Encino 21 Federal #2 DWS well pad would be constructed and the oil well would be vertically drilled as proposed, with mitigation measures to reduce potential impact to the environmental resources. Total proposed surface disturbance would be 2.16 acres. There would be approximately 1.16 acres of new cfisturoance associated with the proposed action. Approximately 1 acre would be subject to long-term disturbance associated with the well production facilities. The potential environmental consequences and proposed mitigation measures for this alternative are described for both critical and non-critical elements in the following sections.

4.1 Air Resources

4.1.1 Direct and Indirect Effects

Air quality would temporarily be directly impacted with pollution from exhaust emissions, chemical odors, and dust that would be caused by the motorized equipment used to construct the well pad and by the drilling rig that will be used to drill the well. Dust dissemination would discontinue upon completion of the construction phase of the well pad. Air pollution from the motorized equipment would discontinue at the completion of the drilling phase of the operations. The winds that frequent the northwestern part of New Mexico generally disperse the odors and emissions. The impacts to air quality would be greatly reduced as the construction and drilling phases are completed. Other factors that currently affect air quality in the area include dust from livestock herding activities, dust from recreational use, and dust from use of roads for vehicular traffic.

Over the last 10 years, the leasing of federal oil and gas mineral estate in the FFO has resulted in an average total of approximately 450 to 500 wells drilled on federal leases annually. These wells would contribute an incremental increase to the total emissions (including GHGs) from oil and gas activities in New Mexico.

Potential impacts of development could include increased air borne soil particles blown from new well pads or roads, exhaust emissions from drilling equipment, compressors, vehicles, arid dehydration and separation facilities, as well as potential releases of GHG, NOx and VOCs during drilling or production activities. The amount of increased emissions cannot be quantified at this time since it is unknown how many wells might be drilled, the types of equipment needed if a well were to be completed successfully (e.g., compressor, separator, dehydrator), or what technologies may be employed by a given company for drilling any new wells. The degree of impact will also vary according to the characteristics of the geologic formations from which production occurs.

The reasonable and foreseeable development scenario developed for the FFO PRMP/FEIS demonstrated 522 wells would be drilled annually for federal minerals. Current APD permitting trends within the field office confirm that these assumptions are still accurate. This level of exploration and production would contribute a small incremental increase in overall hydrocarbon emissions, including GHGs, NOx, and VOCs released into the planet's atmosphere. When compared to total national or global emissions, the amount released as a result of potential production from the proposed well would not have a measurable effect on climate change due to uncertainty and incomplete and unavailable information; therefore is not possible to determine the effecrs-on ctima:te lrange on a regional, national, or global---scate:-

Consumption of oil and gas developed from the proposed well is expected to produce GHGs, NOx and VOCs. 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. Regional and global transportation, metropolitan traffic, fires (including wildfires, controlled bums and use of domestic fire places), and power plant emissions from the west are all parts of the equation. Regional air quality modeling conducted for the Northern San

Juan Basin Coal Bed Methane FEIS Project in August 2006 determined that potential cumulative visibility impacts to federal PSD Class I Areas (Mesa Verde National Park and the Weminuche Wilderness) could occur at some unspecified time in the future

The NAAQS are set for the most common and widespread pollutants. The standards are concentrations of air pollution above which the USEPA has determined that serious health and welfare consequences could occur. If the concentrations are below the NAAQS, there are no expected adverse effects to humans and the environment.

Climate

The assessment of GHG emissions and climate change is in its formative phase. It is currently not feasible to know with certainty the net impacts from the proposed action on climate. The inconsistency in results of scientific models used to predict climate change at the global scale coupled with the lack of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future impacts of decisions made at this level. When further information on the impacts to climate change is known, such information would be incorporated into the BLM's planning and NEPA documents as appropriate.

4.1.2 Mitigation

The BLM/FFO has been a participant of the Four Corners Air Quality Task Force (FCAQTF) since its inception in 2002 when it was known as the Four Comers Ozone Task Force. Because of the unanswered questions raised by these modeling efforts, the FCAQTF has continued to look at air quality issues in the Four Corners region. The FCAQTF is comprised of a broad base of representatives including federal, state, Indian, and local governments, as well as industry, interest groups, and concerned community members. The FCAQTF has several groups that worked on the development of a mitigation options report (completed December 2007) to serve as a resource and guide to the regulatory agencies. The responsible agencies may use the report as the basis for developing air quality management plans for the region. This may include developing new and revising existing regulations, supporting new legislation, developing new outreach and information programs, and developing and/or expanding voluntary programs for emission reductions.

Additional air quality modeling conducted since completion of the 2003 FEIS/PRMP and provisions in the ROD for the PRMP/FEIS provide for applications of additional emission controls if requested by the New Mexico Air Quality Bureau (NMAQB). Based on this modeling, the NMAQB issued an interim directive that all newly issued APDs limit compressor emissions to no more than 2 grams per horsepowet hour of 1"12O for engines of300 horsepower or less. The BLM/FFO has complied with this directive through a condition of approval (COA) that has been in effect since August 1, 2005. To date, NMAQB has made no other such requests. Currently, development on federal minerals in New Mexico's San Juan Basin is at a lower level than forecast in the Reasonable Foreseeable Development (RFD) Scenario prepared in 2001 for the BLMIFFO PRMP/FEIS (BLM *2003a).* The impacts forecast by the RFD are still valid. At the time the 2003 PRMP/FEIS was written, ozone readings did not represent a violation of the NAAQS for this pollutant. The NMED Air Quality Bureau has determined that the 2007 - 2009

ozone design value for San Juan County is 0.070 ppm. The design value for the county must be greater than the revised 8-hour ozone standard of 0.075 ppm for a nonattainment designation.

The USEPA's inventory data describes "Natural Gas Systems" and "Petroleum Systems" as the two major categories of total U.S. sources of GHG gas emissions. The inventory identifies the contributions of natural gas and petroleum systems to total CO_2 and C 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 USEPA identifies emissions occurring during distinct stages of operation, including field production, processing, transmission and storage, and distribution. "Petroleum Systems" subactivities include produqtion field operations, crude oil transportation, and crude oil refining. Within the two categories, the BLM has authority to regulate only those field production operations that are related to oil and gas measurement, and prevention of waste (via leaks, spills and unauthorized flaring and venting).

The BLM's regulatory jurisdiction over field production operations has resulted in the development of "Best Management Practices" (BMPs) designed to reduce impacts to air quality by reducing all emissions from field production and operations. Typical measures may include: flare hydrocarbon and gases at high temperatures in order to reduce emissions of incomplete combustion; require that vapor recovery systems be maintained and furi.ctional in areas where petroleum liquids are stored; placement of compressors engines 300 horsepower or less must have NOx emissions limited to 2 grams per horsepower hour; revegetate areas of the pad not required for production facilities to reduce the amount of dust from the pads; and water dirt roads during periods of high use in order to reduce fugitive dust emission. The significant threshold for particulate matter of 35 $\mu g/m^3$ daily $PM_{2.5}$ NAAQS is not expected to be exceeded under the proposed action alternative.

The USEPA data show that improved practices and technology and changing economics have reduced emissions from oil and gas exploration and development (USEPA 2008). One of the factors in this improvement is the adoption by industry of the BMPs proposed by the USEPA's Natural Gas Energy Star program. The BLMIFFO will work with industry and NMAQB to help facilitate the use of the relevant BMPs for operations proposed on federal mineral leases where such mitigation is consistent with agency policy.

4.2 Cultural Resources

No cultural resources were recorded within the proposed project area or within a 1/4 mile of the proposed project. The proposed action is located on both undisturbed and disturbed terrain.

4.2.1 Direct and Indirect Effects

The proposed action would have no direct effects to cultural resources. A potential indirect effect from the proposed action is the increase in human activity in the area with the increased possibility of unauthorized removal or other alteration to cultural resources in the area. A cultural resources determination of effect for the proposed action would be issued by BLMIFFO archaeologists. This determination would be included in the BLM/FFO cultural resources stipulations attached to the APD.

4.2.2 Mitigation Measures

No special protective measures have been recommended for the proposed construction activities. Final project clearance and stipulations will be issued by the BLM/FFO. If previously undocumented cultural sites are encountered during construction, all activities will stop in the vicinity of the discovery and the BLM will be immediately notified. The site would then be evaluated. Mitigation measures such as data recovery may be required by the BLM to prevent impacts to newly identified cultural resources.

4.3 Native American Religious Concerns

4.3.1 Direct and Indirect Effects

The proposed action is not known to physically threaten any TCP's, 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 the American Indian Religious Freedom Act or E013007. Currently, no known remains fall within the purview ofthe NAGPRA or ARPA.

4.3.2 Mitigation Measures

No site specific mitigation measures for Native American Religious Concerns have been recommended. In the event of any discoveries during project implementation, the BLM will be notified.

4.4 Environmental Justice

4.4.1 Direct and Indirect Effects

Development of the proposed action would not result in negative impacts to minority or low income populations. No minority or low income populations would be directly affected in the vicinity of the proposed action. Indirect effects could include positive effects due to overall employment opportunities related to the oil and gas and service support industry in the region as well as the economic benefits to state and county governments related to royalty payments and severance taxes. A more detailed description of potential impacts is contained in the PRMP/FEIS p.4-120 and 4-129.

4.4.2 Mitigation Measures

No mitigation measures for Environmental Justice are recommended.

4.5 USFWS Threatened and Endangered Species

No USFWS listed species, or potential habitats, were found in the project area.

4.5.1 Direct and Indirect Effects

Under section 7 of the ESA, the BLM is required to consult with the USFWS on any proposed action which may affect federally listed threatened or endangered species or species proposed for

listing. The BLM/FFO staff reviewed the proposed action and determined that it is in compliance with listed species management guidelines outlined in the September 2002 Biological Assessment (Cons. #2-22-01-1-389). No further consultation with the USFWS is required.

4.5.2 Mitigation Measures

No mitigation measures for USFWS threatened and endangered species are needed.

4.6 Wastes, Hazardous or Solid

Typical wastes associated with the proposed action include trash, sewage, produced water, and produced hydrocarbons. No chemicals subject to the Superfund Amendments and Reauthorization Act (SARA) Title III in amounts greater than 10,000 lbs. will be used during project activities. No extremely hazardous substances as defmed in 40 CFR 355 in threshold planning quantities will be used.

4.6.1 Direct and Indirect Effects

The potential for littering and hazardous leaks exists during co"nstruction and operation of the proposed project. The impacts from hazardous or solid waste would be minimal to non-existent in both the short and long-term with adherence to the following mitigation measures.

4.6.2 Mitigation Measures

During drilling and completion, a trash receptacle and a chemically treated portable toilet will be on location for trash and sewer disposal. All produced hydrocarbons will be put in tanks on location during completion work. Produced water will be put in onsite tanks or within lined reserve pit during completion work. All wastes will be disposed of ▮ a proper manner as required by federal and state law and as described in the COAs

When significant amounts of chemicals are stored on-site, governmental agencies will be notified as required under the Emergency Planning and Community Right to Know Act (1986). The notification of releases such as natural gas, natural gas liquids, and petroleum outside the facility .site is required under the CERCLA and under BLM NTL-3A. The well location will have an informational sign (43 CFR 3160).

4.7 Water Quality: Surface and Groundwater

Key-fa-ctors that influence"Lhe surfae -water quality in the– San Juan basin-drainage system include some or all of the following: sparse vegetative cover, highly erosive and saline soils, rapid runoff during storm events, livestock grazing, and mineral resource development.

There are no perennial or intermittent streams, springs, or other water sources in the project area. The project area contains no wetlands or riparian areas. No waters wells are located within a 1-mile radius of the proposed project.

4.7.1 Direct and Indirect Effects

The proposed action would temporarily expose (worst case) 2.16 acres of soils as a sediment source entering local drainage ways. Exposure of soils, particularly near washes and on slopes, would lead to an increase in an undetermined amount of sediment transport, particularly during and following storm events, due to moderate water erosion potentials.

Slight alterations in project area drainage patterns may lead to an increase in sediment transport. These increases in sediment transport would persist for several years until the disturbed areas are stabilized. The impacts to surface water quality due to short-term increases in sediment transport would be low as the surface water present of the project area is ephemeral. The potential for surface water quality impacts from accidental spills or releases of hazardous materials would be low and long-term. The impact of the proposed action on area water quality would be low in both the short and long-term. The proposed project is not known to impact any groundwater resources.

Minimal amounts of hazardous materials (i.e., gas, diesel, etc.) would be used and stored on location. There would be the potential for accidental spills or releases of these materials which could impact local water.

4.7.2 Mitigation Measures

The potential for sediment transport into the drainages will be minimized through the implementation of stipulated mitigation measures; these will include BMPs and other preventive measures, such as reestablishment of vegetation and proper site hydrological diversions.

The construction zone will be recontoured and reclaimed following well completion. HPOC will implement aggressive revegetation following completion or at the direction of the BLM. A diversion ditch will be constructed above the cut slope between Comers 5 and 3 to divert surface flows to the south and to prevent surface water from entering the proposed project area. One silt trap will be constructed near stake 4 in the construction zone, to reduce surface runoff velocities and minimize sediment transport.

HPOC will maintain a hazardous material response contingency plan to cover eventualities, which could arise from an accidental release of hazardous materials. Adequate casing, cementing, mud weights, blow out preventer and reserve pit volume will be stipulated in the COAs to mitigate any potential down-hole impacts to groundwater resources. A closed-loop system to contain oil based drilling mud will be utilized after casing has been set. A liner will be installed under the closed loop system as a secondary containment; Adherence to APD COAs and other mitigation measures will minimize impacts to water quality.

4.8 General Topography/Geology

The proposed action would be twinned with the Ojo Encino 21 Federal #l H well location that has been leveled and contoured. Further, the undisturbed area is located on a mild backslope of a ridge with slopes ranging from 0-4 degrees with a west aspect.

4.8.1 Direct and Indirect Effects

A total of approximately 2.16 acre of disturbed and undisturbed land would be impacted from construction of the proposed project. The construction of the proposed well pad would require a maximum of 6.3 feet cut and 5.4 feet of fill to provide a level pad for drilling. Alterations to topography from the removal of soils and rock within the proposed well pad would be low during the construction phase and after recontouring the periphery of the well pad. Changes in topographic relief would vary in extent and would not likely be noticeable after interim reclamation. Impacts to project area topography as a result of the proposed action would be low and short-term during construction and low and long-term during operation.

Cross contamination between geological zones could occur without adequate cementing and casing of the proposed well bore. With implementation of FFO standard drilling and completion requirements, short and long-term effect to mineral resources and geology are anticipated to be low.

4.8.2 Mitigation Measures

Following well completion, area,s not needed for operation will be recontoured and reseeded. Once the proposed well is abandoned, HPOC will recontour and reseed the remaining portions of the well pad in accordance with the COAs and stipulations issued by the BLM. Adequate casing, cementing, mud weight, blow out preventer and reserve pit volume will be issued by the BLM with the COAs to mitigate any potential down-hole impacts.

4.9 Paleontological Resources

The proposed project would be assessed individually based on BLM's PFYC system, GIS/Remote Sensing based locality data, known paleontological locality information, existing reports, and data for the area. If preliminary analysis indicates that the proposed project area has a high probability to fall within an appropriately designated class area, additional surveys, reporting, and stipulations would be required.

The Fruitland and Kirtland Formations found within the proposed project area are not known to contain any paleontological resources. No fossils are known to occur within or proximate to the proposed project area.

4.9.1 Direct and Indirect Effects

Although no paleontological resources are known to occur within the proposed project area, impacts to paleontological resources from the proposed project implementation could possibly occur. Direct impacts of the proposed project to fossil localities could result from the ground disturbing activities or the disturbance of the stratigraphic context in which they are located. This project could also create indirect impacts to areas by changing erosion patterns. An increase in human activity in the area could increase the possibility of unauthorized removal or other alterations to paleontological resources in the area. Potential impacts to paleontological resources as a result of the proposed action would be low and long-term.

4.9.2 Mitigation Measures

All BLM/FFO paleontological resources stipulations will be followed as indicated in the COAs, attached to the APD. These stipulations may include, but are not limited to, temporary or permanent fencing or other physical barriers, monitoring of earth disturbing construction, project area reduction and/or specific construction avoidance zones, and employee education. Upon review, a determination for final project clearance and stipulations shall be issued by the BLM/FFO.

If previously undocumented paleontological sites are encountered during construction, all activities shall stop in the vicinity of the discovery and the BLM will be immediately notified. The site will then be evaluated. Mitigation measures such as data recovery may be required by the BLM to prevent impacts to newly identified paleontological resources.

4.10 Soils

The soil mapping unit in the proposed project is the Doakum-Betonnie complex.

4.10.1 D.irect and Indirect Effects

A total of approximately 2.16 acres of soil material would be exposed during construction activities, resulting in temporary displacement, compaction, and mixing of soils. Surface runoff rates for this soil mapping unit are very low and the erosion potentials are moderate. The well pad, approximately 1 acre, would remain as bare, compacted soil for the life of the project, approximately 30 years, and would be subject to an undetermined amount of wind and water erosion until the well is completely reclaimed.

The impact to project area soils as a result of the proposed action would be would be moderate and short-term during construction and low and long-term during operation. Compaction of the soils during construction and operation of the proposed project, coupled with the implementation of mitigation measures described below, would limit soil impacts from erosion. The most susceptible period for soil erosion impacts is during construction when strong winds or precipitation events during soil disturbing activities could mobilize soils. The impact on soils would be localized and low for the short and long-term.

4.10.2 Mitigation Measures

Industry related vehicle and pedestrian traffic will be restricted to proposed disturbance area and existing roads. Following construction activities, unused areas will be reseeded with a BLM approved seed mix to stabilize soils and prevent erosion. Following construction, vehicle traffic will be restricted to existing bladed roads to prevent erosion, soil mixing, and compaction in adjacent areas.

HPOC will construct a diversion ditch above the cut slope between Corners 5 and 3 to divert surface flows to the south and to prevent surface water from entering the proposed project area.

A silt trap will be constructed near stake 4 in the construction zone, to reduce surface runoff velocities and minimize sediment transport.

The top 6-inches of soil will be stockpiled during well pad construction and drilling and then respread during interim reclamation. Implementation of proper soil salvage, storage, and reclamation will retain adequate infiltration and permeability rates that will allow for maintenance of soil moisture, which is necessary for plant growth and vigor, and minimize surface runoff.

4.11 Vegetation, Forestry

The vegetation communities in the proposed project area include a reclaimed scrub and Great Basin desert scrub.

4.11.1 Direct and Indirect Effects

Construction of the proposed action would result in the disturbance of approximately 1-acre of previously disturbed vegetation. Approximately 1.16 acres of undisturbed vegetation would be removed by the proposed action.

The degree of impact would depend on the type and amount of vegetation impacted, the duration of the disturbance, and the rate at which the vegetation would regenerate after reclamation. The impact of the proposed action on area vegetation would be low and short to long-term. Direct effects would include the short-term loss of vegetation and the long-term modification of species composition and density. Indirect effects may include the long-term increased potential for introducing invasive, non-native species into the area, exposure of soil and increased soil erosion, a shift in species composition and change in plant density, and a reduction in the quality of wildlife habitat.

4.11.2 Mitigation Measures

During construction, HPOC and their contractors' vehicles will only operate on areas identified in this EA as work areas and on existing roadways. Revegetation of the construction zone will be initiated immediately following completion or at the direction of the BLM. The area will be reseeded with a BLM approved seed mixture as shown in Table 5. All rates shown are for pure live seed (PLS). The amount of seed is for drilled rate, for broadcast applications the rate will be doubled. Approximately 1.16 acres will be revegetated following well completion. Monitoring for invasive plants and appropriate control/eradication measures will be done in conjunction with the BLM and other re uired permits/agencies. Shrubs will Qe mQ wc! and incorp orated into drainage for erosion control process.

Table 5. Farmington Field Office Seed Mtx.

Common Name	Variety	Percent for Mix	PLS lbs/Acre
Western Wheatgrass	Arriba	23%	3.0
Indian Ricegrass	Paloma or Rimrock	23%	3.0
Slender Wheatgrass	San Luis	15%	2.0
Crested Wheatgrass	Hy-Crest	22%	3.0
Bottlebrush Squirreltail		15%	2.0
Four-wing Saltbush		2%	2.0

Source: BLM 2006

Alternative Species for Consideration:

Grass: Alkali sacaton (for clayey and salty bottoms)
Needle and thread
Pubescent wheatgrass
Intermediate wheatgrass
Smooth brome (for higher elevations)

4.12 Invasive, Non-native Species

No BLM listed invasive, non-native species of concern were identified in the project area.

4.12.1 Direct and Indirect Effects

Surface disturbance activities associated with the proposed project create potential for the establishment and spread of noxious weeds and invasive, non-native species. The proposed project would have low and long-term impact from the potential introduction of invasive, non-native species into the area.

4.12.2 Mitigation Measures

Appropriate washing of vehicles entering the project area will reduce the potential for invasive and non-native plant species infestations. Proper seeding and monitoring of the disturbed areas will reduce the potential for invasive species to establish. Adherence to BLM reclamation measures will minimize impacts from invasive, non-native species. Monitoring for invasive plants and appropriate control/eradication measures will be done in accordance with standard and project specific BLM stipulations.

4.13 Livestock Grazing

The proposea action ts ocatea witrun grazing allo ment #6023, Wliich allows a total of 8,597 AUMs armually.

4.13.1 Direct and Indirect Effects

Surface-disturbing activities associated with construction of the proposed action would initially remove a limited amount of forage. Approximately 2.16 acres of surface disturbance would occur in the current grazing allotment. Sheep grazing would continue proximate to the proposed

action during development and operation. The reclaimed areas associated with the proposed action would typically recover to the level before disturbance in about one to two years. Reseeded sites often produce more livestock forage then native habitat. Limited forage species would be absent during construction and in limited quantities one to two years after revegetation.

A total of approximately 1.16 acres of undisturbed vegetation would be directly impacted by the proposed action, resulting in a minor reduction in forage and a change in the herbaceous species composition. The direct short-term loss would be approximately 0.14 federal AUMs (at an estimated 15 acres per AUM). This impact would last until successful reclamation of the disturbed area has occurred. There would be a long-term loss of an estimated 1-acre of potential forage resources (0.07 AUMs) for areas needed for operation and maintenance.

Impacts of the proposed action would include increased human activity and industry related vehicles, which would affect livestock distribution as livestock would stay away from construction and operation due to noise and activity. Drilling and production activities are not expected to conflict with grazing use of the area.

4.13.2 Mitigation Measures

Control of invasive weeds during construction and operation of the proposed project will be important for controlling further habitat degradation to the affected allotment. HPOC will fence around the reserve pit during drilling, precluding livestock and big game from utilizing these water sources.

4.14 Special Status Species

In accordance with BLM Manual 6840, 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. The BSR in Appendix C provides the basis for the fmdings listed in .the table. Three BLM special management status species have the potential to occur in the project area: golden eagle, ferruginous hawk, and prairie falcon. The occurrence of golden eagles, ferruginous hawks, and prairie falcons in the project area is likely limited to individuals flying over the site for adjacent nesting, foraging, or perching sites.

4.14.1 Direct and Indirect Effects

Direct impacts to golden eagles, ferruginous hawks, and prame falcons as a result of the proposed project would include the removal and modification of approximately 1-acre of preYiously_disiurbecLand undisturbed potentiaLfuraging habitat. Approximately 1acre of the total 2.16 permitted acres would be reclaimed following construction of the proposed project. The proposed action would not result in any disturbance or modification of potential nesting habitat. Additional impacts may include avoidance of the project area by raptors during construction, drilling, and operation due to disturbance and activity from human and vehicle presence and associated noise. Impacts from loss or modification of habitat and avoidance would be low and long-term. Indirect impacts may include a change in vegetation species composition and density due to surface disturbance and reclamation, which could affect the prey

base for golden eagles, ferruginous hawks, and prairie falcons. Indirect impacts would be low and long-term.

4.14.2 Mitigation Measures

Adherence to COAs and stipulations provided by the BLM will minimize effects to all raptors that may utilize the project and action areas for foraging. Should any nesting raptors be identified before or during construction activities, the BLM biologist will be immediately contacted in order to evaluate whether additional resource protection measures are warranted

4.15 Wildlife

The proposed action would be located within Great Basin desert scrub that are used year-round by big-game and small- and medium-sized mammals.

4.15.1 Direct and Indirect Effects

Construction of the proposed action would result in the removal of approximately 2.16 acres of vegetation. Since the vegetation removed would not necessarily be replaced with the same species and in the same percentage, habitat modification is anticipated.

During construction activities there would be impacts to area wildlife (big-game, small and medium-sized mammals) in the proposed project and adjacent areas would temporarily displaced and would vacate the area during construction activities due to human and vehicular activity and the associated noise. Wildlife in adjacent areas would vacate the area during construction and drilling, but would likely return to the area and the well is completed. At that time, wildlife would continue to pass through the proposed project area, and yet are also likely to modify movement patterns around the proposed project to avoid human activities and traffic. Transporting product and produced water during well operation would result in increased truck traffic on project area roads. Increased traffic could result in wildlife/vehicle collisions particularly for smaller, less mobile species such as desert cottontail or black-tailed jackrabbit.

A silt trap would be constructed to reduce impacts short-term impacts to water quality from increases in sediment transfer. This trap would retain water for short periods following storm events providing an additional water source for area wildlife.

Impacts to wildlife would be low to moderate in the short-term during construction and drilling. Impacts during operation would be low and long-term. These impacts are minimized by development of the proposed action on existing disturbance.

4.15.2 Mitigation Measures

Construction activities will be confined to the permitted area to avoid further disruption to wildlife. Adherence to BLM reclamation and sanitation measures will also minimize potential impacts to wildlife. The area will be reseeded with the FFO seed mix.

4.16 Migratory Birds

Executive Order 13186 dated January 17, 2001 calls for increased efforts to more fully implement the MBTA. In keeping with this mandate, the BLM/FFO has consulted the PIF Bird Conservation Plan for the State of New Mexico and the USFWS list of Birds of Conservation Concern. A review of these documents, specifically as they pertain to the Colorado Plateau physiographic area, indicates there are three "priority" avian species (with a known range of distribution in the FFO area) that utilize the sagebrush/grass within the Great Basin Desert Shrub habitat type that occur on the NMPIF "Highest Priority" and USFWS "Birds of Conservation Concern 2008" lists. Various types of perturbations and or anthropogenic activity may affect these species. These species and a brief assessment of the effects of the proposed action on their habitat are provided in Table 6.

Table 6. Migratory Bird Species of Concern Occurring within the BLM/FFO and Potential Impacts.

Species	Habitat Type	Effects	Impact Rating None/Low/Moderate/High
Grasshopper sparrow *(Ammodramus savannarum)*	Sage-grass	May be positively affected due to conversion to grassland.	Low
Sage sparrow[1] *(Amphispiza belli)*	Sage-grass	Minor loss of nesting and brood rearing habitat	Low
Burrowing owl *(Athene cunicularia)*	Sage-grass	Little effect, nests in abandoned prairie dog burrows.	None
Long-billed curlew *(Numenius americanus)*	Sage-grass	May be positively affected due to conversion to grassland.	Low
Sage thrasher[1] *(Oreoscoptes montanus)*	Sage-grass	May be some loss of sage/nesting habitat	Low
Bendire's thrasher *(Toxostoma bendirei)*	Sage-grass	Little effect anticipated some loss of nesting habitat; increase in prey (i.e., arthropods) likely.	Low

1 = "Htgh Pnonty" *bud* spectes that are hsted on the NMPIF "Htghest Pnonty" brrds of conservatiOn concern list but not on the USFWS "Birds of Conservation Concern 2008" list.

4.16.1 Direct and Indirect Effects

Direct and indirect impacts to migratory birds of concern would be low and short to long-term. Impacts to migratory birds would generally be low giy JLthe level of disturbance :proposed for the project area. Impacts to those species associated with sagebrush grasslands would be through the removal of 2.16 acres of vegetation. Impacts to migratory birds would be greater should construction occur during the breeding season of April 15 through July 15. Construction activities may cause some nest abandonment in adjacent areas. Impacts to migratory birds would be minimized by the development of the proposed action on existing disturbance.

4.16.2 Mitigation Measures

Construction activities will be confined to the proposed project area to avoid further disruption to migratory birds. Adherence to BLM reclamation and sanitation measures will minimize potential impacts. Following construction activities, disturbed areas will be reseeded with the appropriate BLM seed mix. Any spills will be promptly cleaned up and HPOC will prepare a hazardous material response contingency plan to cover eventualities, which could arise from an accidental release of hazardous materials. Reserve pits will be fenced and any open cavities will be covered. Any bird nests found within the proposed project area must be reported to a BLM/FFO biologist for appropriate mitigation prior to construction activities.

4.17 Recreation

There are no designated recreational areas within the proposed project area or immediate surroundings. The proposed project area does offer minimal opportunities for dispersed recreational activities.

4.17.1 Direct and Indirect Effects

During construction and drilling recreationists may experience an increase in traffic, fugitive dust, and sound levels, as well as night time lighting. During operation impacts to recreationists would be limited to periodic traffic and associated fugitive dust. The proposed action would have low and short-term impacts to recreation opportunities during construction and operation of the well. Impacts would be low for the long-term.

4.17.2 Mitigation Measures

Suspended dust during construction activities will be reduced through the application of fresh water to disturbed areas and heavy vehicle traffic areas. Construction activities will be confined to the proposed project area. Adherence to BLM reclamation and sanitation measures will minimize potential impacts. Following construction activities, disturbed areas will be reseeded with the appropriate BLM seed mix. Any spills will be promptly cleaned up and HPOC will prepare a hazardous material response contingency plan to cover eventualities, which could arise from an accidental release of hazardous materials.

4.18 Visual Resources

The proposed project is located within the boundary of an area designated as Class IV VRM.

4.18.1 Direct-and Indirect Effects-

During construction and drilling operations, the effect of disturbed ground, machinery emissions, and the presence of the drill rig and construction equipment would result in low to moderate short-term visual impacts. After construction, the presence of above ground equipment associated with well operation and oil production would result in residual visual impacts. Operation of the proposed action would result in low long-term visual impacts that would be

minimized after implementation of reclamation. Impacts to visual resources are minimized by the development of the proposed action on existing disturbance.

4.18.2 Mitigation Measures

A rapid construction schedule will minimize impacts to visual resources that result from construction activities. Mitigation measures that will minimize the visual impact of the project include revegetation and above-ground facility paint color requirements established by the BLM. The equipment will be low profile and painted to minimize long-term visual effects.

4.19 Public Health and Safety

The proposed project may impact public health and safety in a number of ways. The primary activities associated with public health and safety include traffic and transportation to/from the site, and handling, storage, and operation of equipment associated with construction activities. Health and safety issues for construction workers include operation of heavy equipment, welding activities, and working in the vicinity of other utilities (primarily other oil and gas gathering pipelines).

4.19.1 Direct and Indirect Effects

Direct and indirect impacts on public health and safety would be low to moderate and short-term during construction and drilling. Impacts during operation would be low and long-term.

4.19.2 Mitigation Measures

Adherence to company safety policies and BLM COAs will provide mitigation for public health and safety. In addition, hauling equipment and materials for the project on public roads would comply with all Department of Transportation regulations. All drilling and equipment operation would be performed in compliance with appropriate Occupation Health and Safety Administration (OSHA) regulations.

4.20 Cumulative Effects

The leased area of the proposed action has been industrialized with oil and gas well development. The surface disturbance for each project that has been permitted has created a spreading out of land use fragmentation. The cumulative impacts fluctuate with the gradual reclamation of abandoned wells and the creation of new surface disturbances in the construction of new access roads and well pads. The on-going process of restoration of abandonments and creattrrg-new disturb3n-ces-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.

Due to the absence of regulatory requirements to measure GHG emissions and the variability of oil and gas activities on federal minerals, it is not possible to accurately quantify potential GHG emissions in the affected areas as a result of approving this application for permit to drill. A general assumption, however, can be made: drilling this well may contribute to GHG emissions.

The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. However, potential impacts to natural resources and plant and animal species due to climate change are likely to be varied, including those in the southwestern United States. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased windblown dust from drier and less stable soils. Cool season plant species' spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened/endangered plants may be accelerated.

Due to loss of habitat or competition from other species whose ranges may shift northward, the population of some animal species may be reduced or increased. Less snow at lower elevations would likely impact the timing and quantity of snowmelt, which, in tum, could impact water resources and species dependant on historic water conditions. Forests at higher elevations in NM, for example, have been exposed to warmer and drier conditions over a ten year period. Should the trend continue, the habitats and identified drought sensitive species in these forested areas and higher elevations may also be more affected by climate change.

5.0 CONSULTATION/COORDINATION

This section includes individuals or organizations from the public, public land users, the interdisciplinary team, and permittees that were contacted during the development of this document.

Table 7. Summary of Public and Interdisciplinary Team Contacts Made During Preparation of the document.

Public Contact	Title	Organization	Present at Onsite?
Butch Butler	Manager	High Plains Operating Company	Yes
Steven Craig Willems	Environmental Protection Specialist	Bureau of Land Management Farmington Field Office	Yes
Robert Switzer	Environmental Protection Specialist	Bureau of Land Management Farmington Field Office	Yes
Jim Copeland	Archaeologist	Bureau of Land Management Farmington Field Office	No
John Kendall	Threatened and Endangered Species Specialist	Bureau of Land Management Farmington Field Office	No
Glen Russell	Surveyor	Russell Surveying	Yes
Dustin Bridge	Construction Supervisor	B&B Vac Services, Inc.	Yes
John Dodge	Biologist	Ecosphere Environmental Services	Yes

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APPENDIX A

APPLICATION FOR PERMIT TO DRILL (APD)

APPENDIXB

CONDITIONS OF APPROVAL

APPENDIXC

BIOLOGICAL SURVEY REPORT

BIOLOGICAL SURVEY REPORT
HIGH PLAINS OPERATING COMPANY, LLC
PROPOSED OJO ENCINO 21 FEDERAL #2 DWS OIL WELL PROJECT

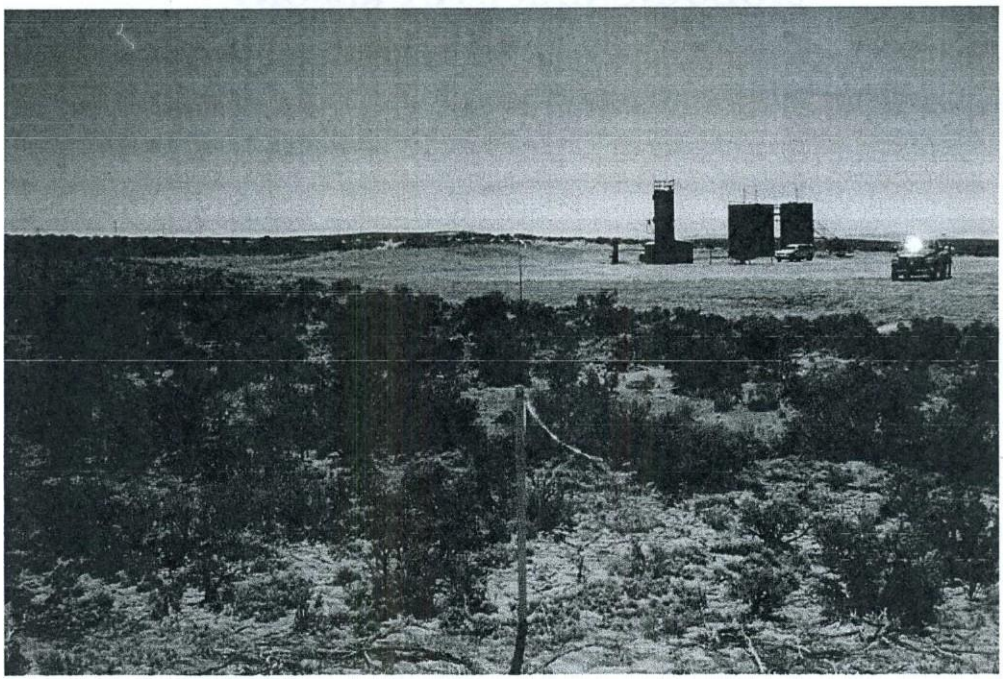

Photo 1. Proposed Ojo Encino 21 Federal #2DWS oil well pad site looking southeast toward proposed wellhead from #4 rear of the proposed project (June 14, 2011).

This report describes the potential for U.S. Fish and Wildlife Service (USFWS) and Bureau ofLand Management (BLM) threatened, endangered, candidate, and other designated sensitive flora and fauna to occur in the project and action areas. The BLM defmes the action area as any area that may be directly or indirectly impacted by the proposed action. This report is prepared in accordance with the BLM's biological survey guidelines and is intended to provide the agency with information to make determinations of effect on species with special conservation status.

PROJECT DESCRIPTION

Location: High Plains Operating Company, LLC (HPOC) proposes to vertically drill the Ojo Encino 21 Federal #2 DWS oil well located on BLM lands with the mineral resources administered by the BLM Farmington Field Office (FFO). The proposed project would be located about 63 miles southeast ofBloomfield, New Mexico and 1.4 miles southwest ofOjo Encino Chapter House. The proposed welLhead.would he-1ocated...at 2,62lfeetESL(..fromJ:he south line) an..d2,l6Qieet..EWL (from the west line) of Section 21, Township 20 North, Range 5 West, New Mexico Principal Meridian (NMPM) in McKinley County, New Mexico. Project plats for the proposed oil well are provided as Attachment A. A project area map showing the location of the proposed action on the Ojo Encino Mesa, New Mexico U.S. Geological Survey 7.5-minute topographic map is provided as Attachment B.

Disturbance: Drilling of the proposed Ojo Encino 21 Federal #2 DWS oil well project would require construction of a 185-foot by 230-foot well pad with a 50-foot wide construction zone around the perimeter of the pad that would disturb approximately 2.16 acres. The proposed project

would require a maximum of 6.3 feet of cut between comer 5 and 6 and 5.4 feet of fill in comer 3 to provide a level well pad for drilling. The proposed project would be twinned with the existing Ojo Encino 21 Federal #1H; therefore, no new access road would be required. If productive, oil would be stored on site and trucked to a treating facility; therefore, no pipeline is proposed for the project. Total permitted surface disturbance for the proposed project would be 2.16 acres.

Noise and vehicle traffic would increase in this area during construction and may continue afterward during operation and maintenance of the well.

Previous Disturbance: Approximately 46 percent, or 1-acres=, ofthe proposed project would be twinned with the existing Ojo Encino 21 Federal #1H well pad. Other disturbance is associated with an existing access road and over head power line (Attachment A). Total new disturbance of 1.16 acres would occur in the western half of the proposed well pad.

METHODOLOGY

Off-site Methods: Prior to conducting fieldwork, Ecosphere Environmental Services (Ecosphere) biologists compiled a list ofUSFWS and BLM species with special conservation status that occur or have the potential to occur in McKinley County, New Mexico. USFWS listed species (Table 1) were obtained from the USFWS Southwest Region Endangered Species List (USFWS 2011). BLM special status species (Table 2) were compiled from the BLM/FFO Instruction Memorandum (IM) No. IM-NM-200-2008-01 (BLM 2008) and the Farmington Resource Management Plan (BLM 2003).

On-site Methods: An on-site meeting and pedestrian survey of the proposed Ojo Encino 21 Federal #2 DWS oil well project was conducted with representatives from HPOC, the BLMIFFO, and Ecosphere on June 14, 2011. The weather was sunny and clear with ambient temperatures near 80°F. Parallel transects spaced approximately 20-feet apart were surveyed over the entire project area. All plant and wildlife species and signs of wildlife observed in the project area were recorded and digital photos of the project area were taken. Binoculars were used to survey for raptors and potential nest habitat. The habitat was evaluated for all USFWS threatened and endangered species and BLM species with special conservation status that have the potential to occur in the project area or action area (Tables 1 and 2).

ACTION AREA

Action Area: The action area consists of the proposed project area (well pad and construction zone) and surrounding terrain within a 1/3-mile radius of the project area.

Physical Description: The proposed project would be located in an area with Ceja De Raton to the west and Ojo Encino Mesa to the east. The topography of the general area is characterized by open, mildly rolling terrain bisected by shallow drainages. The east portion of the proposed project would be located within a highly disturbed landscaped associated with the existing Ojo Encino 21 Federal #1H well pad, access road, and power line. The west portion of the proposed project is situated on a mid backslope of a mild rolling ridge rising about 10 feet above the existing well location. Slope within the proposed project area ranges from about 0-4 degrees with southwest aspects. Elevation of the proposed project area is 6,790 feet.

Surface geology in the proposed project area is described as the Fruitland and Kirtland Formations (Green and Jones 2001). Shale fragments are scattered along the ridge located in the northwestern portion of proposed project area. Soils in the proposed project area have a tan fme sandy loam to sandy loam textures with portions previously extensively mixed and constructed during the construction and operation of existing well pad. No biological soil crusts were observed in the project area.

A diversion ditch, less than 1 foot deep by 2 feet wide, originates along the southern and western perimeter of the existing well pad. This drainage spreads into a shallow sheet outside the southern construction zone of the proposed project. A shallow ephemeral drainage is located approximately 470 feet southwest from the proposed well pad. This drainage is characterized by a shallow flat sandy bottom with no defmed ordinary high water mark. Moderate vegetation occurs within the drainage channel. An unnamed seasonal impoundment is located approximately 700 feet southeast of the project area. There are no perennial surface water resources in the form of rivers, lakes, ponds or streams, nor any wetlands, springs, or riparian habitats within the proposed project area.

Biological Description: The natural vegetation type in the project area vicinity is classified as Great Basin desert scrub (Dick-Peddie 1993). The southeast portion of the proposed project supports reseeded herbaceous plants associated with the reclamation of the existing well pad. The current vegetation within the seeded area is dominated by sparsely distributed tiny shoots of grass species such as crested wheatgrass *(Agropyron cristatum).* Other herbaceous species include annual, exotic weedy species such as prickly Russian thistle *(Sa/sola tragus)* and burning bush *(Basia scoparia).* The undisturbed portion consists of woody and herbaceous species such as big sagebrush *(Artemisia tridentata),* standing about 1-2 feet in height and blue grama *(Boutelouagracilis)* forming a dense matted cover. Overall, vegetative cover was visually estimated from 1-30%; however the existing well location is essentially devoid of vegetation. No BLM listed invasive, non-native plant species of concern were identified during the field survey.

The action area is located within the Great Basin desert scrub vegetation community that could support a diversity of wildlife and wildlife habitats. Signs of wildlife observed within the proposed project area indicated the presence of desert cottontail *(Sylvilagus audubonii)* and black-tailed jackrabbit *(Lepus californicus)*. According to the BLM (2006, unpublished data), and confirmed during the field survey, no prairie dog *(Cynomys* sp.) colonies were located in the project area. According to the BLM/FFO raptor nest data (i.e., historic or currently active nests), there is one historic or currently active golden eagle *(Aquila chrysaetos)* nest within six miles of the proposed project area (BLM 2009, unpublished data). According to the BLM (2005, unpublished data), there are nine mountain plover *(Charadrius montanus)* designated potential habitat polygons within five miles of the proposed project area. None of these areas are located within the proposed area of disturbance. A complete list of Qlants and wildlife observed during the field survey is included as Attachment C.

Specially Designated Areas: The proposed project site is not located within any BLMIFFO specially designated area (SDA).

SURVEY RESULTS

USFWS T&E Species: According to the USFWS, there are six federally listed threatened, endangered, or candidate species with potential to occur in McKinley County, New Mexico. Table 1 lists these species, their conservation status, habitat associations, and potential to occur in the project or action area. No federally listed species were identified during the field survey.

Table 1. Species listed by the USFWS under the authority of the Endangered Species Act of 1973 for McKinley County, New Mexico. (E = endangered; T = threatened; or C = candidate).

SPECIES	CONSERVATION STATUS	HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR IN THE PROJECT OR ACTION AREA
MAMMALS			
Black-footed ferret *(Mustela nigripes)*	E	Open grasslands with year-round prairie dog colonies of 200 acres or greater.	No prairie dog colonies occur within the project or action area.
BIRDS			
Southwestern willow flycatcher *(Empidonax traillii extimus)*	E	Breeds ill dense, shrubby riparian habitats, usually in close proximity to surface water or saturated soil.	No riparian habitat exists in the project or action area.
Mexican spotted owl *(Strix occidentalis Iucida)*	T	Nests in caves, cliffs, or trees in steep-walled canyons of mixed conifer forests.	No steep-walled canyons with mixed conjfer forest or designated critical habitat occur in the project or action area.
Yellow-billed cuckoo *(Coccyzus americanus* ssp. *occidentalis)*	C	Breeds in riparian woodlands with dense, understory vegetation.	No riparian habitat exists in the project or action area.
FISH			
Zuni bluehead sucker *(Catostomus discobolus yarrowi)*	C	Current distribution limited mainly to the Rio Nutria draillage upstream of the mouth of the Nutria Box Canyon. Inhabits largely shaded, pool and riffle habitats with coarse substrates.	No perennial water sources occur in the project or action area.
PLANTS			
Zuni fleabane *Erigeron rhi=omatus*	T	Nearly barren detrital clay hillsides with soils derived tromshale oftfie Cfimle or Baca Formation (7,200-7,900 feet).	Project and action area do not contain appropriate geologic substrate for this species.

Source: USFWS 20I I

BLM Special Management Species: Of the 10 species warranted for special management consideration by the BLMIFFO (BLM 2008), three have the potential to occur in the project or action area: golden eagle, ferruginous hawk *(Buteo regalis)*, and prairie falcon *(Falco mexicanus)*. Those species with special management status designated by the BLM are summarized in Table 2. None of these special management species was observed on the site and their potential to occur is based on evaluation of the project and action area habitats and the known habitat associations of the listed species.

Table 2. BLM/FFO species with special management status and their potential to occur in the project and actwn areas based upon habitat associations.

SPECIES	HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR IN PROJECT OR ACTION AREA
BIRDS		
American peregrine falcon *(Falco peregrinus anatum)*	Rugged terrain with rocky cliffs and canyons (30-1,000+ ft high), adjacent to rivers, lakes, or streams. Urban areas with towers and buildings also inhabited.	Project and action area do not contain any shoreline or riparian habitat. No cliffs in the action area.
Bald eagle *(Haliaeetus leucocepha/us)*	Nest in forested areas adjacent to large bodies ofwater.	Project and action area do not contain any large bodies of water.
Burrowing owl *(Athene cunicularia)*	Rarely dig their own burrows and are typically associated with prairie dog colonies. Found in dry, open, short-grass, treeless plains. Use areas that include shrubs such as four-wing saltbush and rabbit-brush. Also inhabit human-modified landscapes, such as golf courses and parking lots	No burrows were observed within the project area. No prairie dog colonies or short grassland occur within the action area.
Ferruginous hawk *(Buteo regalis)*	Flat or rolling terrain in grasslands, shrub-steppes, and deserts; badlands. Prefers elevated nest sites (e.g., buttes, utility poles, trees) or on the ground.	Project and action area provide potential foraging habitat.
Golden eagle *(Aquila clzrysaetos)*	In the West, mostly open habitats in mountainous, canyon terrain. Nests primarily on cliffs and trees.	Project and action area provide potential foraging habitat.
Mountain plover *(Charadrius montanus)*	Breeds in flat, open grasslands. Often associated with prairie dog towns and L-intensive grazing.	No flat open grasslands occur in the project or action areas.
Prairie falcon *(Falco mexicanus)*	Arid, open regions of grassland or scrub vegetation with cliff formations that are at least 30 ft high. Breeding cliffs are sometimes in semi-open regions with scattered conifer trees and occasionally dense woodlands.	Project and action area provide potential foraging habitat.
Yellow-billed cuckoo *(Coccyzus americanus occidentalis)*	Breeds in riparian woodlands with dense, understory vegetation.	No riparian habitat exists in the project or action area.
PLANTS		

SPECIES	HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR IN PROJECT OR ACTION AREA
Aztec gilia *(Aiiciella formosa)*	Salt desert scrub communities in soils of the Nacimiento Formation (5,000-6,000 ft).	Project and action areas do not contain appropriate geologic substrate for this species.
Brack's hardwall cactus *(Sc/erocactus cloveriae* ssp. *brackii)*	Sandy clay of the Nacimiento Formation in sparse shadscale scrub (5,000-6,000 ft).	Project and action areas do not contain appropriate geologic substrate for this species.

Source: BLM 2008

DISCUSSION

The project and action area provide potential foraging habitat for golden eagles, ferruginous hawks, and prairie falcons. During the field survey, no golden eagles, ferruginous hawks, or prairie falcons nesting activities were detected in the action area. Specific nesting features preferred by these three raptor species are not found in the project or action area. The presence of desert cottontail and black-tailed jackrabbits provide prey for golden eagle, ferruginous hawk, and prairie falcon. No golden eagles, ferruginous hawks, prairie falcons or sign of consistent raptor use (e.g., whitewash or nests) were observed in the project area or surrounding vicinity during the biological survey. According to the BLMIFFO raptor nest data (i.e., historic or currently active nests), there is one historic or currently active golden eagle nest within six miles of the proposed project area (BLM 2009, unpublished data). Golden eagles may utilize the action and project area for foraging since the home ranges for golden eagle averages 12 to 19 square miles in the western U.S. (Kochert et al. 2002). Prairie falcons forage over large areas during the breeding season and are often elongate and orient in one direction, usually north, from the nest (Steenhof 1998). The exact size of area used by prairie falcon varies by geographic area, and ranges from 36-195 square miles (Steenhof 1998). Little research has studied the ferruginous hawk home range. However, in Utah an average home range was estimated at about 3.6 square miles (Smith and Murphy 1973; Wakeley 1978). The occurrence of golden eagles, ferruginous hawks, and prairie falcons in the project area is likely limited to individuals flying over the site for adjacent nesting, foraging, or perching sites.

Direct impacts to golden eagles, ferruginous hawks, and prairie falcons as a result of the proposed project would include the removal and modification of approximately 2.16 acres of previously disturbed and undisturbed potential foraging habitat. Approximately 1 acre of the total 2.16 permitted acres would be reclaimed following construction of the proposed project. The proposed action would not result in any disturbance or modification of potential nesting habitat. Additional impacts may include avoidance of the project area by raptors during construction, drilling, and operation due to disturbance-and activity from human-and vehicle presence and associated noise. Impacts from loss or modification of habitat and avoidance would be low and long-term. Indirect impacts may include a change in vegetation species composition and density due to surface disturbance and reclamation, which could affect the prey base for golden eagles, ferruginous hawks, and prairie falcons. Indirect impacts would be low and long-term.

Impacts to migratory birds would generally be low. Impacts would include the modification of approximately 2.16 acres of disturbed and undisturbed habitat. Impacts to migratory birds would be greater should construction occur during the breeding season of April 15 through July 15 when construction activities may cause some nest abandonment in adjacent areas.

CERTIFICATION

Conclusions are based on actual field examinations and are correct to the best of my knowledge.

Signature of Field Biologist: _____ **Date:** 06/24/2011

John Dodge, Project Biologist
Ecosphere Environmental Services
4801 N. Butler Avenue, Suite 15101
Farmington, N.M. 87401
(505) 327-3088

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ATTACHMENT A- PROJECT PLATS

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DISTRICT II
1301 W. Grand Avenue, Artesia, N.M. 88210

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1000 Ilio – 114.. A:U¢. IIJI 87410

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
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OIL CONSERVATION DMSION
1220 Soulh St.. I'rancill Dr.
Selllte Fe.NW 6750f>

Form C-102
Re\l'ised July 10, 2010

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District Office

O AVENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

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'OCR!D Jlo. 246238	'Openltor IIAJDe HPOC, U.C	'-Ilo| 6790'

10 Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	JtuVWoat l!ao	County
K	21	20N	5W		2621'	SOUTH	2360'	WEST	McKINLEY

11 Bottom Hole

Ul. w lol ao. Tcnraa!Up	Ilana• Lot LID	F<'tl ll'om l.he liOit!./soul.b liDo	F..,I !rem l.bo Ilut/Ileol liDo leo-ty
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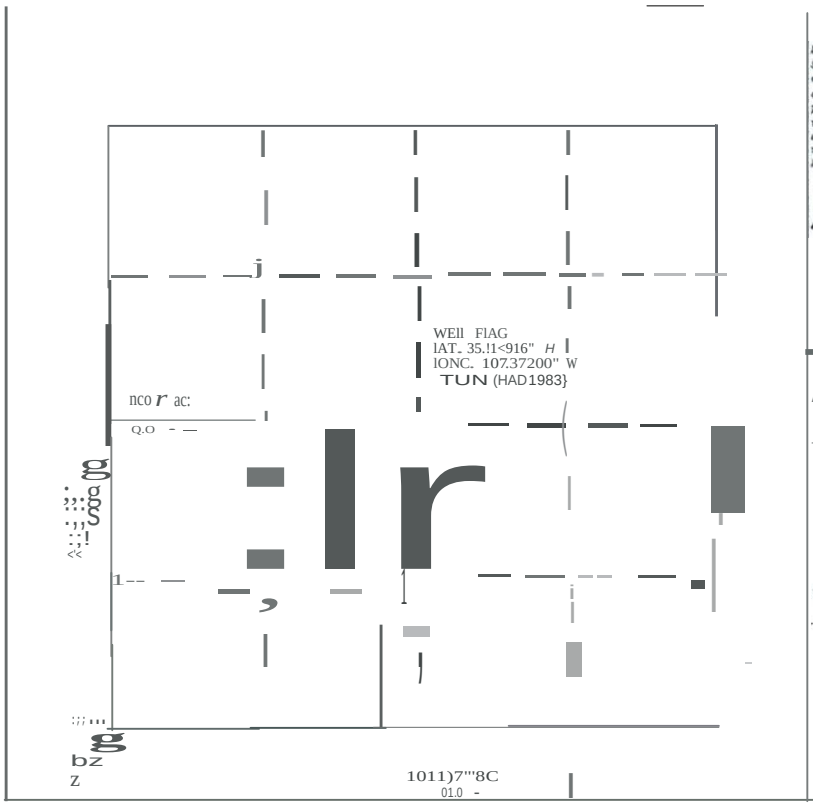
NO AU..O\fABLE *WilL* BE ASSIGNED TO TRtS COYPLET!ON UNTIL ALL INTERESTS RAVE BEEN CONSOUDATED



'7 OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature — Date 6/17/11

ARTHUR W. 8I1TI.ER Ill
Printed Name

bbutlerOhlaholoInsoo.com
E-mail Address

te SURVEYOR CERTIFICATION

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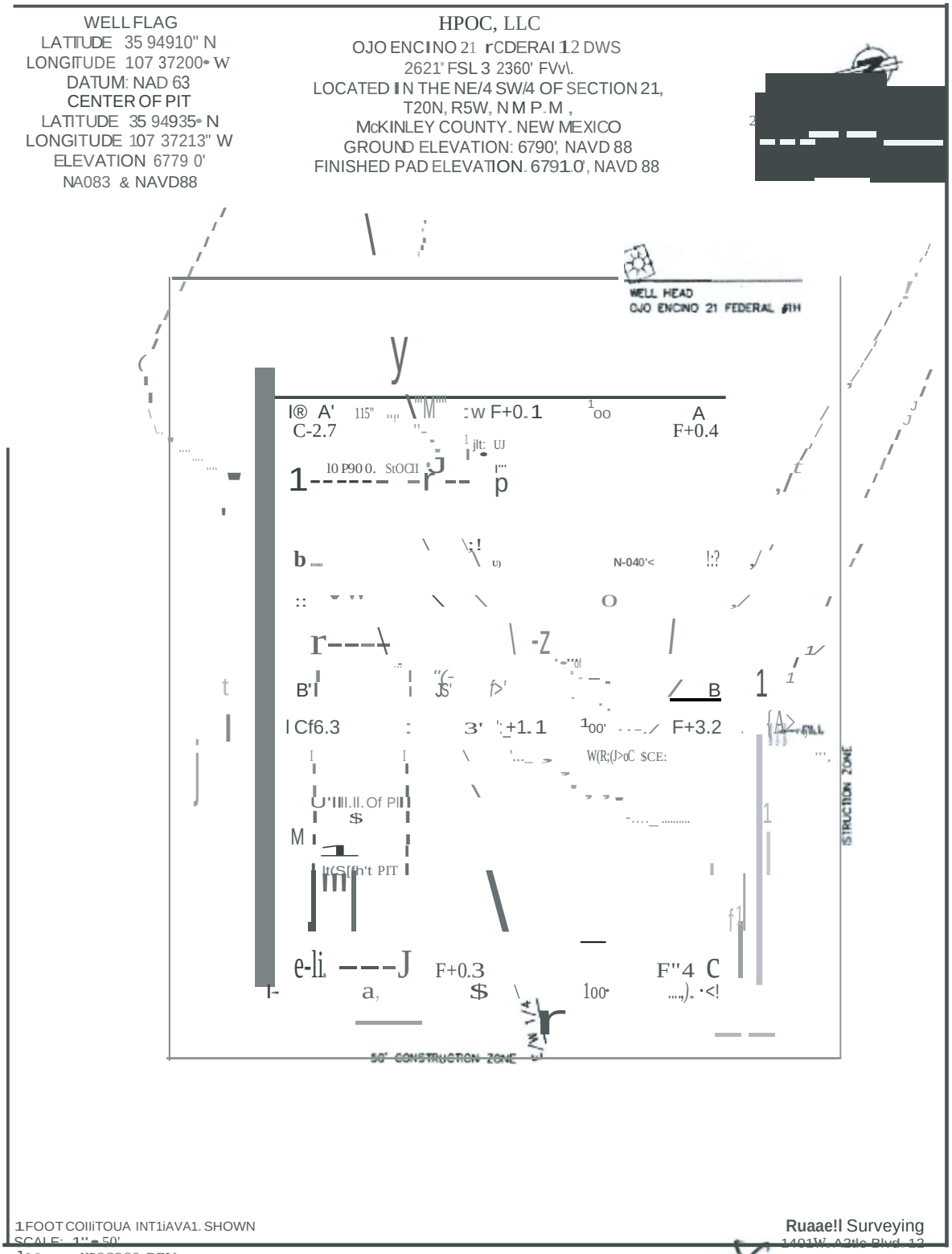
JUNE 14, 2011
Date of Survey

Signature and Seal of Professional Surveyor:

DAVID j
t'crUlloolo ''–''– 10201

WELL FLAG
LATITUDE 35 94910" N
LONGITUDE 107 37200• W
DATUM: NAD 63
CENTER OF PIT
LATITUDE 35 94935• N
LONGITUDE 107 37213" W
ELEVATION 6779 0'
NA083 & NAVD88

HPOC, LLC
OJO ENCINO 21 rCDERAI 12 DWS
2621" FSL 3 2360' FVv\.
LOCATED IN THE NE/4 SW/4 OF SECTION 21,
T20N, R5W, N M P.M ,
McKINLEY COUNTY. NEW MEXICO
GROUND ELEVATION: 6790', NAVD 88
FINISHED PAD ELEVATION. 6791.0', NAVD 88

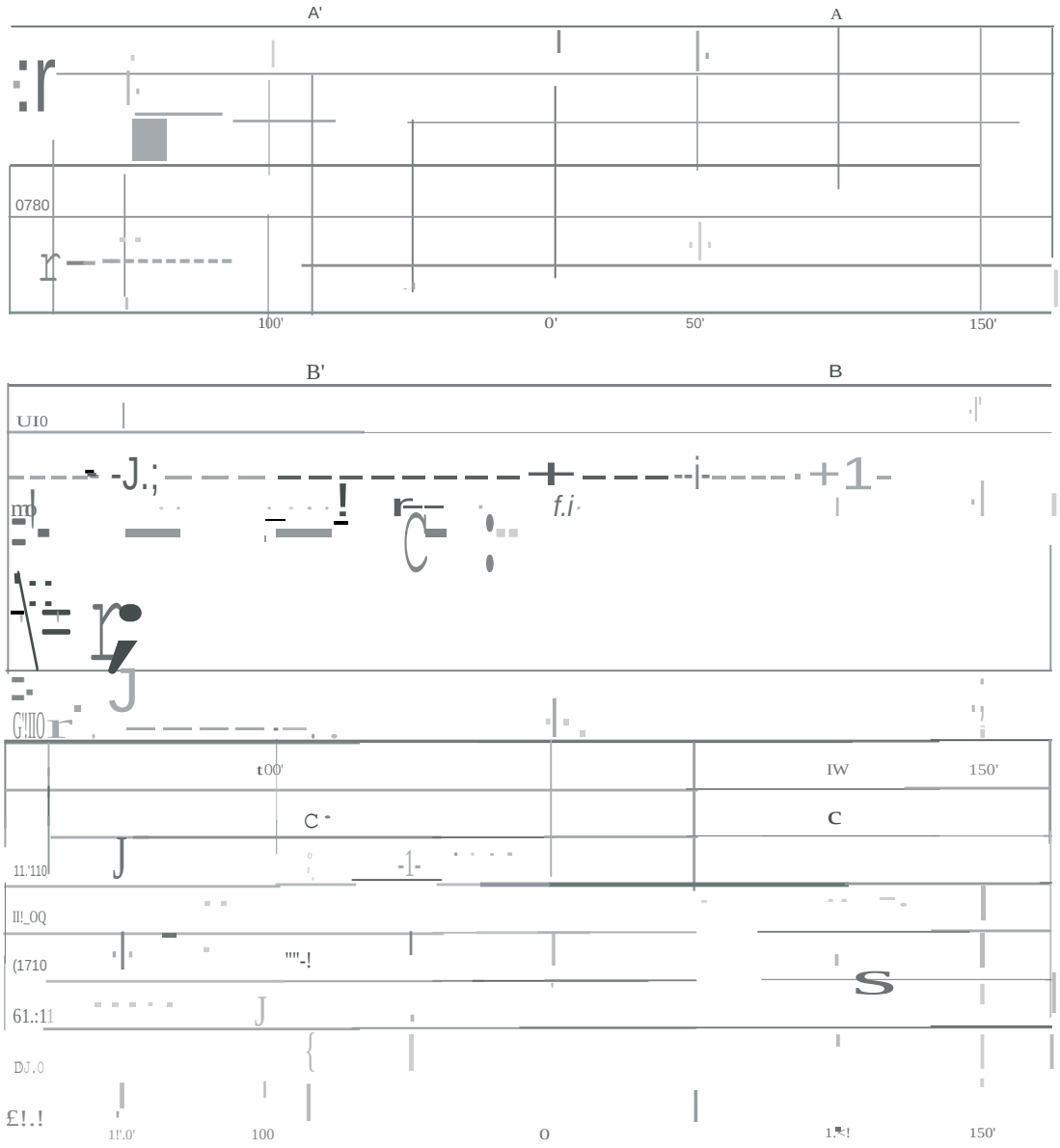


1 FOOT COIIiTOUA INT1iAVA1. SHOWN
SCALE: 1"=50'
Joe Mo: HPOCOOS REVt
DATE: 06115111 –
DRAWN BY: GRA

Ruaae!I Surveying
1401W. A3tle Blvd. 13
Ante. New ▬ tCO 87oCtO
(505)

HPOC, LLC

OJO ENC IIIO 21 FEDERAL #2 DWS
2621' FSL & 2360' FWI
LOCATED IN THE NE/4 SW/4 OF SECTI ON 21.
T20N, R5W, N.M P. M., McKINLEY
COUNTY, NEW MEXICO GROUND
ELEVATION: 0790', NAVD 88
FINISHED PAD ELEVATION 6791 0', NAVD 88

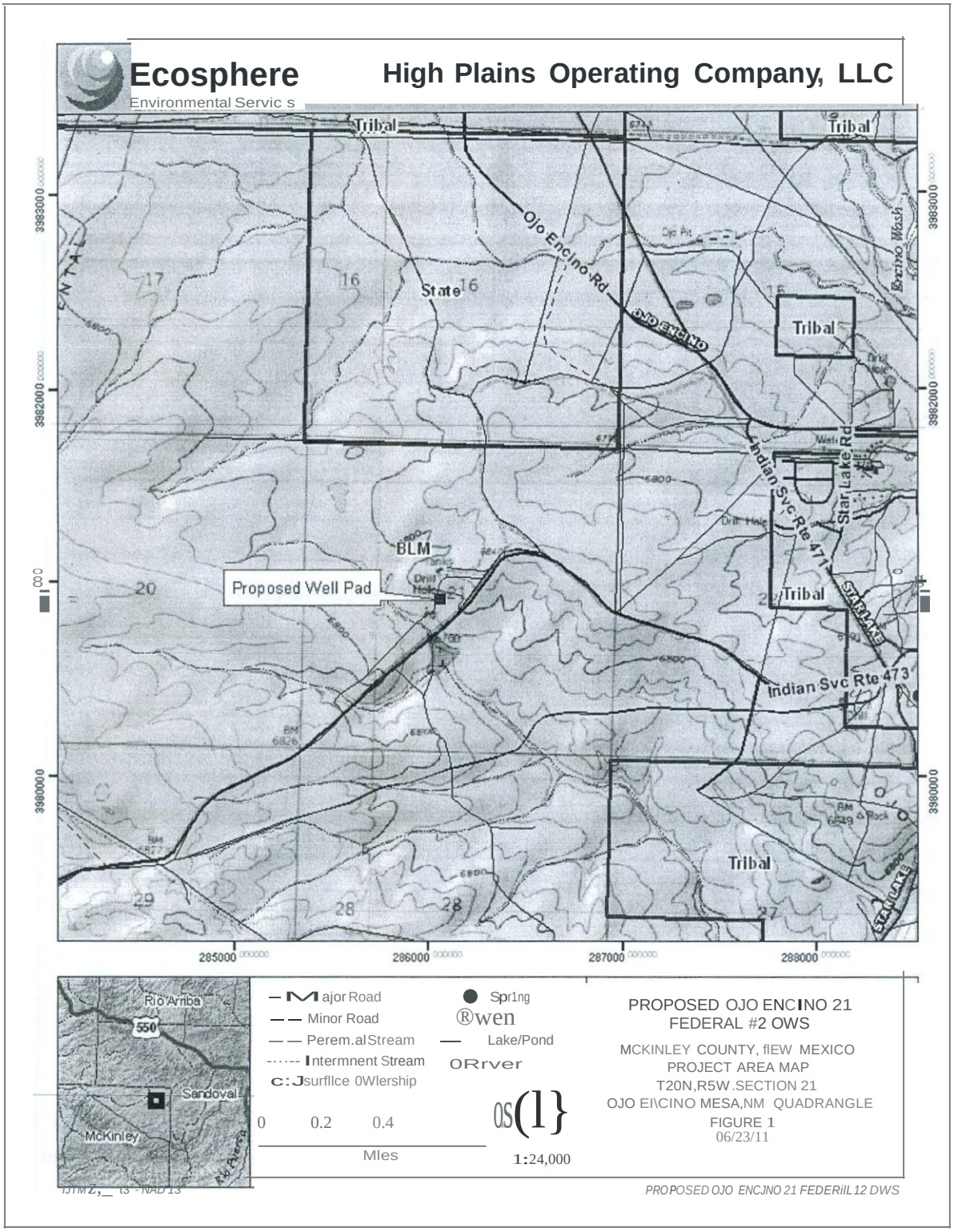


VERT. SCALE: 1" = 30'
HORZ. SCALE: 1" = 50'
JOB No.: IfPOCOOl_REV1
OATE. 06115111

CUT
FILL

RwSefiSurveying
1-40i W. Azt•e Blvd. 12
Aztec;, N.wMttxico 87410
(5051 334-8637

ATTACHMENT B - PROJECT AREA MAP



ATTACHMENT C- PLANTS AND WILDLIFE FOUNDINTHEPROJECTAREA

GRASSES

Agropyron cristatum	crested wheat
Aristida purpurea	purple threeawn
Bouteloua gracilis	blue grama
Elymus elymoides	squirreltail
Pleuraphis jamesii	galleta grass

HERBACEOUS FORBS

Ambrosia acanthicarpa	flatspine burr ragweed
Bassia scoparia	burning bush
Chaetopappa ericoides	rose heath
Cordylanthus wrightii	Wright's bird beak
Plantago patagonica	wooly plantain
Sa/sola tragus	prickly Russian thistle
Sisymbrium altissimum	tall tumble mustard

SHRUBS

Artemisia tridentata	big sagebrush
Atriplex canescens	four-winged saltbush
Gutierrezia sarothrae	broom snakeweed
Eriogonum leptocladon	sand buckwheat

CACTUS/YUCCA

Opuntia polyacantha	plains prickly pear

TREES

none

MAMMALS *Lepus*

californicus	black-tailed jackrabbit
Sylvilagus audubonii	desert cottontail

BIRDS *Corvus*

corax Eremophila	common raven
alpestris	horned lark