



United States  
Department of  
Agriculture

Forest  
Service

Southwestern  
Region



# **Environmental Assessment for Energen Resources Corporation Oil and Gas Production Facility Special Use Authorization**

**Jicarilla Ranger District  
Carson National Forest  
Rio Arriba County, New Mexico**

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# Chapter 1 – Purpose and Need

## Document Structure

The U.S. Department of Agriculture, Forest Service (FS) has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EA discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and considers the best available science. The document is organized into six chapters:

- **Chapter 1: Introduction:** This section includes the purpose of and need for the project and desired conditions for the project area. This section also details how the FS informed the public of the proposal and how the public responded.
- **Chapter 2: Alternatives:** This section provides a detailed description of the agency's proposed action as well as a description of a no action alternative. Alternatives were developed based on issues raised by the public, other agencies, and FS staff. This discussion also includes alternatives considered but eliminated from detailed analysis and project design features which would mitigate effects of proposed actions.
- **Chapter 3: Environmental Consequences:** This section describes the environmental effects of taking no action (not issuing a permit) or implementing the proposed action. The analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the no action alternative and the proposed action alternative.
- **Chapter 4: Agencies and Persons Consulted:** This section provides a list of agencies consulted during the development of the EA.
- **Chapter 5: References:** This section provides a list of references utilized in preparation of the EA.
- **Chapter 6: List of Preparers:** This section provides a list of preparers and reviewers for the EA.

## Introduction

The FS is evaluating a proposal to issue a Special Use Permit (SUP) to Energen Resources Corporation (Energen) for the purpose of occupying National Forest System (NFS) lands to drill four off-lease natural gas wells. The proposed wells would develop Southern Ute Indian Tribe (SUIT) minerals. Development of these minerals is authorized through a non-development minerals agreement (minerals agreement) between the SUIT and the SUIT, d/b/a Red Willow Production Company. This minerals agreement authorizes mineral development, but not surface use or occupancy. Energen, through a joint development agreement with Red Willow Production Company, has the authorization to develop and produce these minerals on SUIT lands located immediately north of the forest boundary in Colorado. However, because the terms of the minerals agreement do not allow surface occupancy upon the lands specified under the agreement, Energen proposes to utilize an existing Energen well pad located on NFS lands to the south of the Colorado-New Mexico border in order to horizontally drill the four new natural gas wells. The project would expand the existing Energen well pad disturbance (approximately 2.5 acres) to approximately 5.9 acres.

This EA was prepared to determine whether effects of the expansion of an existing Energen well pad from approximately 2.5 acres to approximately 5.9 acres to accommodate the drilling of four (4) additional

coalbed methane natural gas wells may be significant, and thus, require the preparation of an Environmental Impact Statement. If there are no significant effects identified through this analysis, the results will be summarized in a Finding of No Significant Impact, public comments will be reviewed, and a signed Decision Notice authorizing the Carson National Forest to implement the activities on the Forest will be released. This EA fulfills FS policy and direction to comply with the NEPA and other relevant federal and state laws and regulations.

## **Regulatory Framework**

In the case of the proposed action, the Bureau of Land Management (BLM) has authority over the Application for Permit to Drill (APD) and Surface Use Plan of Operations (SUPO) because the proposed action involves development of a minerals agreement issued pursuant to the Indian Mineral Development Act of 1982 (25 USC §§ 2101, et seq.). The FS has authority over SUPO's developing federal leases on NFS lands, which are issued pursuant to the Mineral Leasing Act of 1920, as amended (30 U.S.C. § 181, et seq.).

Although the BLM has authority over the APD and SUPO for the proposed action, the FS would still be required to issue a SUP to authorize the proposed action pursuant to 36 CFR 228 subpart E (Oil and Gas Resources); which indicates that surface uses associated with oil and gas prospecting, development, production, and reclamation activities, that are conducted on NFS lands outside a leasehold must receive prior authorization from the FS. A SUP is a special use authorization which provides permission, without conveying an interest in land, to occupy and use NFS land or facilities for specified purposes, and which is both revocable and terminable. The Carson National Forest, Forest Supervisor, has the delegated authority pursuant to law and policy to authorize and issue a SUP for the use and occupancy described in the proposed action.

As the proposed action is associated with a lease located outside of NFS lands, but requires surface disturbance of NFS lands, a SUP is required. The FS would administer all surface activities and disturbance related to the proposed action pursuant to the terms and conditions of the SUP.

## **Location of the Proposed Project Area**

The project area is located in the northwestern portion of the Jicarilla Ranger District (Jicarilla RD) (Figure 1) of the Carson National Forest on Carracas Mesa just south of the Carracas Rim along the northern boundary of the Jicarilla RD (Township 32 North, Range 5 West, Section 10, northwest quarter, New Mexico Principal Meridian [NMPM]). The project area consists of approximately 5.9 acres of land. Of the 5.9 acres, approximately 2.5 acres consists of the existing Energen well pad, and the remaining 3.4 acres would consist of the expansion area for the existing well pad to accommodate the additional wells. The project area is accessed by FS Road (FSR) 218 which bounds the project area on the south. Refer to the Proposed Action Alternative in Chapter 2 for additional details regarding the project area and proposed action.

The existing Energen well pad consists of three wells and associated infrastructure. The existing wells include two producing natural gas wells (Carracas 10A#005 and Carracas 11A #003) and one pressure observation well (Carracas 10A #008). These wells are developing and monitoring the San Juan Basin Fruitland Coal formation within Energen's valid and existing federal mineral lease (NMNM 076832).

## Project Area Setting

The Jicarilla RD encompasses over 153,000 acres and is located in northwestern New Mexico within the San Juan Basin, approximately 50 miles east of the town of Farmington. Surface elevations range from 6,200 to approximately 7,700 feet above sea level (asl). The Jicarilla RD is located in the northeastern part of the San Juan Basin. The San Juan Basin is an asymmetrical syncline that extends from northwestern New Mexico into southwestern Colorado. Roughly circular in shape, the basin is approximately 200 miles long (north to south) and 130 miles wide and covers approximately 25,000 square miles. The basin is composed of layers of sedimentary rocks that range in age from Cambrian to Quaternary, underlain by Precambrian rocks. Oil and gas development is a primary land use within the San Juan Basin and within the Jicarilla RD. The natural gas to be accessed by the proposed action consists of Fruitland Coalbed methane. In addition to the effects of exploration for and production of natural gas which commenced on the Jicarilla RD in the 1950's, the physical landscape of the Jicarilla RD has also been shaped by historic heavy livestock (cattle, sheep, and horses) grazing. Heavy grazing pressures contributed to severe erosion which resulted in deep gullies and other features which remain present across the Jicarilla RD.

The project area is primarily located within Terrestrial Ecosystem Unit (TEU) 162. A portion of the project area is located in TEU 174. TEU 162 is characterized by ponderosa pine (*Pinus ponderosa*), pinyon pine (*Pinus edulis*), junipers (*Juniperus* spp.), Gambel oak (*Quercus gambelii*), and big sagebrush (*Artemisia tridentata*) (USDA 1987). TEU 174 is dominated by ponderosa pine, Gambel oak, and a variety of forbs and grasses. The mean annual temperature for both TEU's is 5 to 6 degrees Celsius, with precipitation varying from 45 to 55 centimeters in TEU 162 and from 50 to 60 centimeters in TEU 174. Over half of the precipitation in each TEU occurs between October 1<sup>st</sup> and March 31<sup>st</sup>. Refer to applicable sections of this EA for additional details regarding the project area and the proposed action.

## Purpose and Need for Action

The purpose and need for the proposed action is to process and review the SUP application in accordance with applicable laws, policies, and regulations. The FS has a regulatory obligation to evaluate the impacts of a SUP application that has been accepted following the administrative initial and second-level screening process. This proposed SUP application has been accepted by the authorized officer. The authorized officer will review the environmental analysis and make a decision whether to approve the proposed use, approve the proposed use with modifications, or deny the proposed use.

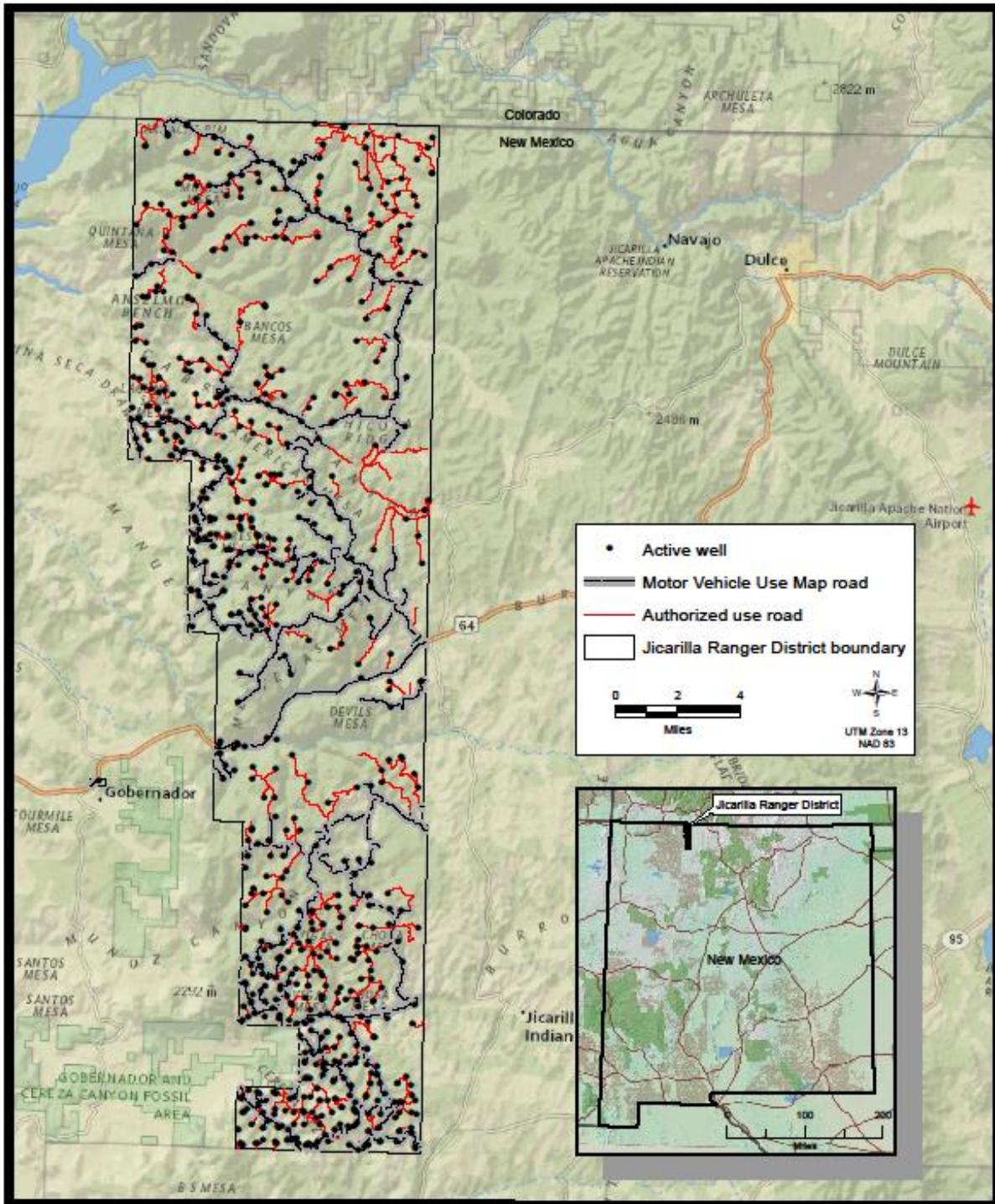


Figure 1. Jicarilla Ranger District Map

## Land and Resource Management Plan

The Carson National Forest has a Land and Resource Management Plan (Forest Plan; USDA 1986, as amended) that provides guidance on long term resource goals and objectives, including desired conditions. Desired conditions are on-the-ground resource conditions which management is working to attain. These conditions are the desired result if management goals are fully achieved. The project area is located in Management Area 4 (Ponderosa Under 40% Slopes). In addition to standards and guidelines for Management Area 4, additional management goals, objectives, and desired conditions outlined in the Forest Plan which are applicable to the project area include the following:

- Mineral Resources
- Cultural Resources
- Wildlife Resources
- Air Quality Resources

Ponderosa Under 40 % Slopes (Management Area 4) - Management Area 4 has two primary Desired Future Conditions, Visual Quality Objective (VQO) and wildlife habitat. The VQO Desired Future Condition states that “activities and uses remain visually subordinate to the characteristic landscape (partial retention VQO) or they may visually dominate the original characteristic of the landscape. However, they must borrow from the form, line, color, and texture of the landscape (modification VQO).” The wildlife habitat Desired Future Condition is the presence of “quality habitat for the hairy woodpecker, turkey, elk, and Abert's squirrel.” Additional management standards and guidelines applicable to Management Area 4 include:

- RECREATION

Lands which have the VQO of foreground retention and are located within the immediate foreground (100 to 300 feet) of a sensitive travel route, use area, or water body will be managed for the following: entry period will equal 20 years; 30-inch diameter pines with yellow, deep fissured bark; stand age at replacement will be 240 years.

Minerals - The management vision for minerals on the Carson National Forest development is to encourage responsible mineral development (Forest Plan - Minerals page 1).

Cultural - Special land uses may be allowed which are, or can be, made compatible with emphasized management practices. Surface disturbing undertakings will be managed to comply with 36 CFR 800. All consultation responsibilities to the State Historic Preservation Officer (SHPO) before, during, and after an undertaking will be followed. The area of an undertaking's potential environmental impact will be surveyed for cultural resources and areas of Native American religious use. Inventory standards will be as specified in the FS Handbook, and will be determined in consultation with the SHPO. Native American groups will be consulted as appropriate (Forest Plan - Cultural Resources page 3).

Wildlife - Inventory, evaluate, and prepare implementation plans for proposed, threatened and endangered (T&E), and sensitive plant and animal species in the first decade or as species are proposed. Monitor approved plans and effects of management activities within T&E and sensitive species habitats (Forest Plan - Wildlife and Fish page 2).

Air Quality - Management activities will be planned so that air quality will be equal to or better than that required by the applicable Federal, State, and/or local standards or regulations (Forest Plan - Air page 1).

The Interdisciplinary Team (IDT) has reviewed the proposed project and determined that the proposed action is consistent with goals and objectives outlined in the Forest Plan.

## **Public Involvement and Scoping**

The project was posted to the Carson National Forest Schedule of Proposed Actions on the internet and a scoping letter was mailed to interested stakeholders on July 8, 2014. An error in the July 8, 2014 letter prompted a second scoping letter that was mailed on July 15, 2014. Refer to Chapter 4 of this EA for a list of stakeholders who were contacted during the scoping process.

During the scoping process, one letter was received that was supportive of the project.

The public and agencies were notified of the availability of the preliminary EA for a 30-day comment period which commenced on January 1, 2015 following publication in *The Taos News*. A copy of the preliminary EA was also sent to the range permittee for the grazing allotment on which the project is located. The preliminary EA was available through the Carson National Forest website. During the comment period, one letter was received which was generally supportive of the project. All comments received by the Forest Service with regard to the project are available in the project record.

Comments received from the public and other agencies during scoping and the designated 30-day comment period did not identify significant environmental issues regarding the effects of the proposed action.

## **Tribal Scoping**

Tribal consultation was initiated to 20 individuals of 10 tribes via issuance of tribal consultation letters describing the project on July 1, 2014. Refer to Chapters 3 and 4 of this EA for additional information regarding tribal consultation.

## Chapter 2 - Alternatives

As directed by Council on Environmental Quality (CEQ) regulations, the EA must include a brief introduction of alternatives (40 CFR 1508.9(b)). NEPA requires that the agency study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.

This section describes and compares the two alternatives analyzed in detail: the no action (no SUP issued) alternative, Alternative 1, and the proposed action, Alternative 2. It also covers alternatives that were considered but eliminated from detailed study.

### Alternatives

#### Alternative 1 -- No Action

Under the no action alternative, the FS would not approve the Energen application for a SUP to occupy NFS lands for the purpose of drilling four new natural gas wells. The three existing Energen natural gas wells and associated well pad would remain in place and continue to be in use.

#### Alternative 2 -- Proposed Action

Under the proposed action, the FS would authorize the issuance of an SUP to Energen to construct four wells in the proposed project area as an expansion of Energen's existing well pad location. The proposed action would also amend Energen's existing pipeline SUP for development of the well-tie pipelines and water collection pipelines associated with the new wells. The existing Energen well pad consists of three wells and associated infrastructure located in Township 32 North, Range 5 West, Section 10, northwest quarter, NMPM (Figure 2). The existing wells include two producing natural gas wells (Carracas 10A#005 and Carracas 11A #003) and one pressure observation well (Carracas 10A #008). The proposed wells would consist of horizontal drills heading in a northerly direction across the New Mexico-Colorado state line to access the lease on SUT lands in order to produce coalbed methane from trust minerals.

The anticipated life expectancy of the proposed wells would be approximately 30 years. Although natural gas wells are a year-round operation, drilling and work-over operations are limited by a Jicarilla RD seasonal closure between November 1 and March 31, annually.

The timing of construction would be dependent on factors including, but not limited to, Jicarilla RD seasonal closures, wildlife timing restrictions, permitting, weather, and contractor availability. The applicant has up to four years to complete drilling once an APD is authorized by the BLM. The well pad would be used as the only working area during the project. It is anticipated that construction would require approximately 90 days.

Specific elements of the proposed action include:

- Prior to commencement of construction activities on the well pad, Energen would resurface approximately 2 miles of FSR 218 (Figure 2). The resurfacing would be done in accordance with "The Gold Book" (Surface Operating Standards and Guidelines for Oil and Gas Development, as amended).

- Energen would strip the existing well pad (approximately 2.5 acres) and temporarily shut in the three existing wells. Energen would then expand the existing well pad by an estimated 3.4 acres, resulting in a final well pad with a disturbance footprint of approximately 5.9 acres. The 5.9-acre disturbance footprint includes a 40-foot construction area around the perimeter of the well pad. The proposed well pad would have an irregular shape (see Figure 2) that would be approximately 780 feet by approximately 360 feet and would be oriented in a general northwest to southeast direction. The well pad would be terraced to avoid having a cut slope of greater than 15 feet. The southeastern portion of the well pad (upper pad) would be graded to an elevation of approximately 7,591 feet asl, and the northwestern portion of the well pad (lower pad) would be graded to an elevation of approximately 7,580 feet asl.
- A new access connecting FSR 218 to the upper pad would be created within the disturbance area of the well pad, while access to the lower pad would be via the existing well pad access road.
- An existing silt trap located at the edge of the existing well pad and which controls sediment run-off from the well pad during operations would be relocated to the edge of the expanded well pad and would be within the 5.9-acre total disturbance footprint.
- Top soil would be stored on-site within the 5.9-acre well pad disturbance area and is estimated to occupy a footprint of 0.15 acre.
- Energen is proposing to use a closed loop drilling system that would not require a reserve pit.
- Natural gas developed from the well location would be connected to existing Energen gathering systems currently operated under a SUP. Because of the presence of the existing Energen gathering system, disturbance for construction of gathering lines for the proposed wells would be limited to the 5.9-acre well pad disturbance area.
- Upon completion of construction and drilling activities, areas not required for the safe production of natural gas would be reclaimed by grading and contouring as necessary to provide a stable substrate and seeding with a native grass and forb mix.
- A separate existing silt trap located off of the well pad (refer to Figure 2) would be expanded from 78 feet by 56 feet (0.1 acre) to approximately 180 feet by 160 feet (0.67 acre), resulting in additional ground disturbing acreage beyond the 5.9-acre well pad footprint of 0.57 acre.
- A wildlife guzzler would be installed by the project proponent under the direction of the Jicarilla RD wildlife biologist as off-site mitigation to offset impacts resulting from ground disturbing activities associated with expansion of the well pad. An existing 0.07-mile two-track road will be utilized as an access route for guzzler installation. Additionally, approximately 0.15 miles of fence will be installed as an enclosure surrounding the wildlife guzzler. The fence is intended to prevent use of the wildlife guzzler by livestock. Refer to Figures 3 and 4 for photos depicting a typical wildlife guzzler and fence, similar to what will be installed for the project. Although the guzzler enclosure will occupy a footprint of 1 acre, ground disturbing associated with the installation will be limited to tree and brush clearance. Long-term disturbance is limited to the negligible footprints occupied by the fencing and guzzler. The disturbance footprint of the guzzler and associated enclosure is in addition to the 5.9-acre footprint of the well pad.

- Development and operation of the proposed gas wells will be in general conformance with standard practices and procedures as outlined in the “The Gold Book” and the operating plan to be provided by the Jicarilla RD with SUP issuance.

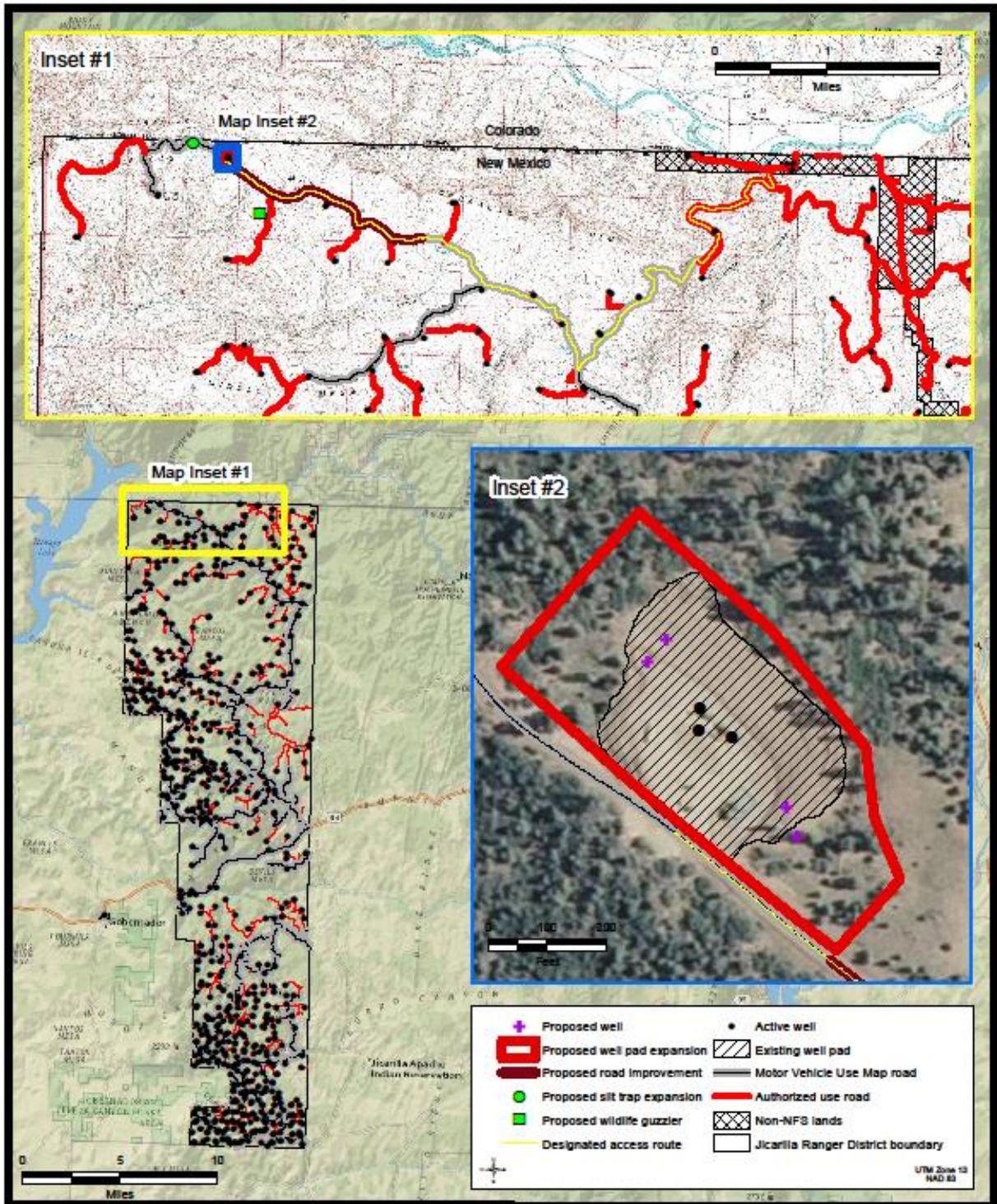


Figure 2. Proposed Project Layout



**Figure 3. Photograph of typical wildlife guzzler**



**Figure 4. Photograph of typical wildlife guzzler enclosure**

## **Alternatives Eliminated from Detailed Analysis**

### **An Alternative That Would Develop Gas Wells on Non-Tribal Lands in Colorado**

The first alternative eliminated from detailed analysis consists of development of the mineral resources from non-tribal surface land located in Colorado. The proposed location was in Township 32 North, Range 5 West, Sections 13 & 14, NMPM. There are two reasons why this location was not suitable to construct a well pad for the development of the minerals in question, namely:

- The length of the horizontal lateral would be at the extreme reach of current technology.
- The surface location is within the jurisdiction of the Bureau of Reclamation and is currently designated as no surface occupancy.

### **An Alternative That Would Develop Gas Wells on SUIT Land**

The second alternative eliminated from detailed analysis consists of constructing a pad and drilling from SUIT land located at Township 32 North, Range 5 West, Section 24, NMPM. This alternative was not considered for analysis for the following reasons:

- The mineral development agreement does not allow for surface occupancy on tribal lands in this area.
- Extensive archaeology in this location prevents the placement of a pad large enough to facilitate the drilling of four horizontal wells.
- Steep terrain contributes to the limitations of locating the well pad in this location.
- There would be an overall increase in the amount of new ground disturbance associated with the construction of a new well pad, road access, and pipeline installation relative to the proposed action, as existing infrastructure in this area is limited.

# Chapter 3 - Environmental Consequences

## Introduction

Chapter 3 summarizes the physical, biological, social, and economic environments of the project area and the potential effects of implementing each alternative on that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in the alternatives chapter. In the development of the environmental analyses that follow, the best available science was considered and documented in the project record. The environmental analysis focuses on issues identified through the scoping process. An environmental effect, impact, or consequence is defined as a modification of or change in the existing environment brought about by the action taken. Effects are direct, indirect, or cumulative and may be temporary (short term) or permanent (long term). Effects can vary in degree, ranging from only a slightly discernible change to a drastic alteration in the environment. This analysis considers short-term effects to be any that would occur during construction and drilling phases. Long-term effects are residual effects that persist during the production phase.

## Cumulative Effects

The Council on Environmental Quality defines cumulative impact as:

“...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7).

Existing activities, projected activities directly associated with a proposed action, and other reasonably foreseeable future actions provide the basis for defining and analyzing cumulative impacts. Reasonably foreseeable future actions include activities, developments, or events that have the potential to change the physical, social, economic, and/or biological nature of a specified area. Courts have interpreted a “reasonably foreseeable future action” as one that has been proposed and is in the planning stages.

## Past, Present, and Future Actions

Past activities are considered part of the existing condition and are discussed within the affected environment sections for each resource. The existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. By looking at current conditions, the residual effects of past human actions and natural events are captured, regardless of which particular action or event contributed to those effects.

The Jicarilla RD currently has 804 active wells located on NFS lands and a total of 829 wells within the boundary. Additionally, there are eight approved APDs that have not yet been drilled on the Jicarilla RD (Miller 2014). The existing wells on the Jicarilla RD are associated with approximately 850 to 1,250 acres (based on an estimate of between 1 and 1.5 acres of long term disturbance per well) of cumulative, long-term disturbance from wells and facilities related to the development of oil and gas resources, including injection wells, roads, corridors for pipelines and

utilities, compressor stations, and ancillary facilities. These wells and facilities would be reclaimed when they cease production in the future.

Primary anticipated future actions on the Jicarilla RD consist principally of natural gas development. Development of natural gas resources on the Jicarilla RD is expected to continue until the resource has been recovered within the limits that technology allows. Projected mineral (natural gas) development within the Jicarilla RD was analyzed in the Final Environmental Impact Statement for Surface Management of Gas Leasing and Development for the Jicarilla RD (FEIS) (USDA 2008). The selected alternative analyzed total projected development within the Jicarilla RD at 1,509 natural gas wells. Refer to the FEIS for additional details regarding alternatives analyzed, anticipated development, and potential impacts.

### **Irreversible and Irretrievable Effects**

An irreversible effect is a change in a natural resource that cannot be reversed. An irreversible commitment of resources refers primarily to the effects of use of non-renewable resources such as minerals or cultural resources, or to those factors such as soil productivity that are renewable only over long periods of time. An irretrievable effect is a loss of production or use of a renewable natural resource for a period of time, but is reversible (FS Handbook 1909.15 Zero Code 05). For example, all or part of a well pad is lost to prior or alternative uses as the pad serves natural gas development for an extended period. Irreversible or irretrievable effects, pertaining to each individual resource, are discussed where relevant throughout this EA.

### **Project Record**

The project record for this project is referenced in an effort to keep this document brief and concise as per 40 CFR 1502.21. The project record contains a variety of documents, including, but not limited to: specialist reports, supporting documents, maps and GIS analysis, literature, and other process-related documents.

### **Specialist Reports**

This EA incorporates by reference the resource specialist reports in the project record (40 CFR 1502.21). Specialist reports contain the detailed data, executive summaries, regulatory framework, assumptions and methodologies, analyses, conclusions, maps, references, and technical documentation that the resource specialists relied upon to reach their conclusions. These reports are summarized in this chapter.

### **Summary of Effects**

This section provides a summary of effects from implementing the proposed action. Information in Table 1 is focused on effects which can be distinguished quantitatively or qualitatively.

A few resource areas, namely, Visual Resources, Social and Economic Resources, and Environmental Justice, are not further analyzed following Table 1, as the proposed action will not result in impacts to these resources and further analysis is not warranted. The rationale for why these resources will not be impacted by the proposed action is provided in Table 1. However, for the remainder of resource areas, it was determined that the proposed action has the potential to adversely impact the resource. Therefore, the potential impacts of the proposed action on those resources are further analyzed in the applicable sub-section following the table.

**Table 1 - Summary of Effects from the Proposed Action**

<b>Resource</b>	<b>Proposed Action</b>
Air Quality	Low Short-term Effects; refer to Air Quality section of EA.
Climate Change	No Significant Effect; refer to Air Quality section of EA.
Heritage Resources	No Adverse Effect; refer to Heritage Resources section of EA.
Vegetation and Range	Low Effect; refer to Vegetation, Range, Fuelwood, Noxious Weeds, and Invasive Plants section of EA.
Timber and Fuelwood	No Effect; refer to Vegetation, Range, Fuelwood, Noxious Weeds, and Invasive Plants section of EA.
Noxious Weeds and Invasive Species	Low Effect; refer to Vegetation, Range, Fuelwood, Noxious Weeds, and Invasive Plants section of EA.
Minerals	No Significant Effect; refer to Minerals, Lands, Special Uses, Recreation, and Specially Designated Areas section of EA.
Lands	No Significant Effect; refer to Minerals, Lands, Special Uses, Recreation, and Specially Designated Areas section of EA.
Transportation	Positive Effect; refer to Minerals, Lands, Special Uses, Recreation, and Specially Designated Areas section of EA.
Special Uses – Land	No Effect; refer to Minerals, Lands, Special Uses, Recreation, and Specially Designated Areas section of EA.
Recreation	No Significant Effect; refer to Minerals, Lands, Special Uses, Recreation, and Specially Designated Areas section of EA.
Specially Designated Areas (e.g. Wild and Scenic Rivers)	No Significant Effect; refer to Minerals, Lands, Special Uses, Recreation, and Specially Designated Areas section of EA.
Visual Resources	No Effect; the proposed action is compliant with applicable standards of the Forest Plan and is not located in the vicinity of Vaqueros Canyon, which is an area of resource concern for visual resources.
Social and Economic Resources	Positive Effect; the proposed action is not anticipated to have social impacts and will provide a positive economic impact through temporary job creation for construction and drilling, long term employment for production, and long term financial benefits to the SUIT from the production of natural gas.
Environmental Justice	No Effect; the proposed action will not have a disproportionate effect on minority and low-income communities.
Soil and Water	No Significant Effect; refer to Soil and Water section of EA.
Federally Listed Species	No Significant Effect; refer to Wildlife section of EA.
FS Sensitive Species	No Significant Effect; refer to Wildlife section of EA.
Migratory Birds	No Significant Effect; refer to Wildlife section of EA.
Management Indicator Species	Positive Effect; refer to Wildlife section of EA.
Big Game Species	Positive Effect; refer to Wildlife section of EA.

## Effects to Air Quality

The Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including seven nationally regulated ambient air pollutants. The pollutants of primary concern in this analysis include volatile organic compounds (VOC), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and particulate matter less than 10 microns in diameter (PM<sub>10</sub>).

Although VOCs and NO<sub>x</sub> have no established standards, they are important as precursors to ozone formation. Regulation of air quality has been delegated by the EPA to the State of New Mexico as administered by the New Mexico Environment Department (NMED). To protect public health, the EPA designates areas where regulated air pollutant levels exceed the standard as “non-attainment areas.” State and Local governments adopt plans to reduce the air pollution.

## Climate Change

Activities related to oil and gas development will involve the production of greenhouse gases, including carbon dioxide, methane, and nitrous oxide, which are understood to contribute to global climate change. However, project level emissions alone are not sufficient to cause climate change. The effects of the proposed action would be minor as there would be a negligible increase in greenhouse gases from the construction and operation of four new natural gas wells. The cumulative effects of emissions from four wells would be negligible compared to greenhouse gas emissions produced by natural gas development on the entire San Juan Basin. At this time there are no regulations to limit such emissions and the current state of the science does not allow for specific analysis of the impacts of greenhouse gas emissions at the local or regional level. Any analysis of quantitative impacts on climate change would be speculative and is, therefore, not addressed further in this EA.

## Affected Environment

The Jicarilla RD sits on the eastern edge of the San Juan Basin, an area rich in energy resources which has been undergoing extensive development of oil and gas during the past several years. Oil and Gas development and operations are primary sources of air pollutants in the region. Gas well production includes well drilling, completion, and testing, along with construction of roads, well pads, pipelines, storage tanks, and compressor stations; all of which may affect air quality. Federal and state regulations regarding oil and gas development and operation activities help to control the potential effects of the industry on air quality.

Emissions also occur from mobile and stationary source equipment, including automobiles and other vehicles used for construction, operations, and maintenance. Emissions of fugitive dust from earth-moving equipment and operation of vehicles are the main sources of particulates in the region. In addition, the air quality of the general project area is impacted by a number of coal burning power plants in the Four Corners Region.

The proposed action is in a Class II air quality area, which allows moderate amounts of air quality degradation (EPA 2012). There are no “non-attainment” areas in the project area for air quality as regulated by the New Mexico Environment Department-Air Quality Bureau.

## Environmental Consequences

### Effects of Alternative 1

#### *Direct, Indirect, and Cumulative effects*

Under the no action alternative, air quality would not be impacted, as the proposed wells would not be constructed.

### Effects of Alternative 2

#### *Direct and Indirect effects*

Under the proposed action, air quality would be directly impacted during the construction phase of the project by pollution from exhaust emissions and dust caused by motorized equipment used to resurface the access road, construct the well pad, and to drill the wells. After construction and drilling, dust and exhaust emissions would still occur from daily traffic associated with operations and maintenance for the well pad, but it is not anticipated that operations and maintenance for the new wells would result in a significant increase of vehicle traffic relative to existing vehicle traffic associated with operation and maintenance of the existing wells.

Based on information provided in Energen's SUP application package, emissions during production will be produced from four pumping units and two separator heaters. During production, the proposed action is estimated to emit 0.0231 tons/yr of VOC, 3.8964 tons/yr of CO, 8.9338 tons/yr of NO<sub>x</sub>, 0.0041 tons/yr of sulfur dioxide (SO<sub>2</sub>), and 0.0488 tons/yr of PM<sub>10</sub> cumulatively from the four pumping units and two separator heaters. Under the proposed action, short and long-term effects to air quality would be limited, and would not result in exceedance of applicable federal or state air quality regulations. The proposed wells and associated infrastructure would comply with federal, state, and local regulations and permit conditions.

#### *Cumulative effects*

Although gas extraction equipment associated with the proposed action will result in limited emissions and particulates added to the atmosphere, the effects of the proposed action added to the cumulative effects of anticipated past, present, and future oil and gas development within the Jicarilla RD would be negligible, and are not anticipated to result in exceedance of applicable air quality standards.

## Effects to Heritage Resources (Archeological and Historic)

The FS Inventory Standards and Accounting Forms (IS & A) in the project record are hereby incorporated by reference (Briggs 2010, R. Miller 2014). The IS & A forms contain an abstract/summary of the project and findings and contain the archaeological clearance and SHPO concurrence for the project.

## Tribal Consultation

On July 1, 2014, a consultation letter was mailed to 20 representatives of 10 Native American Tribes and Pueblos (refer to Chapter 4 for a list of Tribes and Pueblos consulted) to begin the consultation process for the proposed action. The consultation letter detailed the legal location and provided the results of heritage resource inventories for the proposed action. Responses were received from the Pueblo of Santa Clara and the Navajo Nation, and they did not identify

concerns for development of the project area. No Traditional Cultural Properties or sacred sites were identified within the proposed project area.

## New Mexico State Historic Preservation Officer Consultation

Consultation with the SHPO is not required for the proposed action. In accordance with the Programmatic Agreement Among the United States Department of Agriculture, FS, Carson National Forest, and the New Mexico State Historic Preservation Officer Regarding the Environmental Impact Statement for Surface Management of Gas Leasing and Development on the Jicarilla RD, New Mexico (Jicarilla Oil & Gas PA; USDA and New Mexico SHPO 2008), SHPO concurrence is not required prior to approving the heritage resource report for the proposed project. The heritage resource report for the proposed action was sent to the SHPO for information only.

## Affected Environment

Current knowledge of the cultural history of the project area is tied to early research conducted in the San Juan Basin of northwestern New Mexico. Recent studies related to natural gas development also contribute to the understanding of the cultural history of the Jicarilla RD. The prehistory of the Jicarilla RD can be divided into four major periods. The earliest period of human occupation is termed Paleoindian, followed by the Archaic period, when agriculture was first evidenced. Subsequent developments are referred to as the Anasazi Basketmaker and Pueblo periods during which agriculture and population aggregation appear throughout the San Juan Basin. The historic period follows, with continued Native American developments and Hispanic and Euro-American settlers.

**Table 2 - Archeological Periods and Cultural Phases of Northwest New Mexico**

Archeological Period		Cultural Phase	Date Range
Archaic			5500 BC – AD 100
Basketmaker II		Los Pinos	AD 100- 400
Basketmaker III		Sambrito	AD 400 - 700
Early Pueblo I		Rosa	AD 700 - 850
Late Pueblo I		Piedra	AD 850 - 950
Pueblo II		Arboles	AD 950 - 1050
Pueblo III		Largo-Gallina	AD 1050 - 1300
Pueblo IV			AD 1300 - 1600
Historic	Spanish Contact/Colonial	Dinetah	AD 1550 - 1620
		Early Gobernador	AD 1620 - 1680
	Post Pueblo Revolt (AD 1693 - )	Late Gobernador	AD 1680 - 1750
	Spanish Colonial & Mexican Period		AD 1750-1846
	US Territorial		AD 1846 - 1912
	US Statehood-WWII		AD 1912 - 1945

Chronology adapted from the Pecos Classification and Eddy (1966)

Archeological surveys conducted on the Jicarilla RD are generally project oriented, and are not designed to inventory areas for research purposes. At present, approximately 20% of the Jicarilla RD has been inventoried for heritage resources, resulting in the recording of almost 2,500

archeological sites. Across the Jicarilla RD almost 70% of the sites are culturally affiliated with the Anasazi and date to the Pueblo I period (59%), with the remainder of the sites dating to the Archaic (less than 1%), Basketmaker II (less than 1%), Basketmaker III (10%), Pueblo II (6%), Pueblo III (less than 1%), Navajo Dinetah and Gobernador (17%), Apache (less than 1%), and Historic Anglo/Hispanic (2%) time periods (FS 2008).

The location of the proposed action was inventoried for heritage resources by archeologists from the Division of Conservation Archeology at Salmon Ruins and FS archeologists. Prior to the field investigations, record searches for previously recorded sites and surveys were conducted for the proposed project area. The Jicarilla RD archeological files and the New Mexico Cultural Resource Information System (NMCRIS) database were accessed for previous site and survey information.

## Environmental Consequences

### Effects of Alternative 1

#### *Direct, Indirect, and Cumulative Effects*

Under the no action alternative, additional well construction would not occur and there would be no effect on heritage resources.

### Effects of Alternative 2

#### *Direct, Indirect, and Cumulative Effects*

The proposed project area was inventoried for heritage resources and no resources were identified within the immediate project area. A finding of “no adverse effect” to heritage resources was made for the proposed project. Standard site protection measures will be utilized to prevent direct effects to heritage resources. Expansion of the existing well pad and installation of additional well equipment associated with the proposed action will create changes to the visual setting of nearby archeological sites, but will not affect the characteristics of sites (information potential) that make them eligible for the National Register of Historic Places. The proposed action will not result in an adverse effect to heritage resources and therefore will not have a cumulative effect on heritage resources.

## Effects to Vegetation, Range, Fuelwood, Noxious Weeds, and Invasive Plants

As defined in Executive Order 13112, an “invasive species” (including plants) means alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” Invasive plants are nonnative plant species that can grow and spread rapidly, thereby replacing native plant species. Invasive plants generally have some of the following characteristics; aggressiveness, difficult to manage, poisonous, toxic, parasitic, potential carrier or host for serious disease and are new or uncommon to the United States or parts thereof (Executive Order 13112). Invasive plant is a general term that includes noxious weeds, which are invasive by definition, and also includes common weeds that are invasive.

The Plant Protection Act of 2000 (P. L. 106-224) defined noxious weeds as any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the

natural resources of the United States, the public health, or the environment. Noxious weeds are designated by individual states.

The New Mexico Department of Agriculture updated their Noxious Weed List in 2009 (Ashigh et al. 2010). The following noxious weed classifications help prioritize land managers efforts and standardize a level of concern.

- Class A noxious weeds are defined as those that have limited distribution in New Mexico. Preventing new infestations of these species and eradicating infestations is the highest priority.
- Class B noxious weeds are defined as those that are limited to portions of the state. In areas with severe infestations, management should be designated to contain the infestation and stop any further spread.
- Class C noxious weeds are those that are widespread in the state. Management decisions for these species should be determined at the local level, based on feasibility of control and level of infestation.

## Affected Environment

### *Vegetation and Range*

The project area is located within the Carracas Range Allotment (Carracas Allotment). Because the range condition of the Carracas Allotment has been significantly degraded by recent drought conditions and overuse by the wild horse population, livestock has not been stocked on the Carracas Allotment since 2002. Additionally, the Carracas Mesa portion of the Carracas Allotment is somewhat poorly suited to livestock grazing because of extensive use by wildlife and wild horses as well as the presence of a natural barrier which generally limits access to Carracas Mesa by livestock. Livestock grazing on Carracas Mesa has not been documented since 1980, as grazing on the Carracas Allotment has historically been limited to the Carracas Canyon portion of the Carracas Allotment where livestock grazing conditions have historically been more favorable.

As indicated in Chapter 1, the majority of the project area is located within TEU 162, which is characterized by ponderosa pine, pinyon pine, Gambel oak, and big sagebrush (USDA 1987). A portion of FSR 218 to be re-surfaced is located within TEU 174; however, because the portion of the project area located in TEU 174 does not require new ground disturbance, this TEU is not addressed in this section.

A field visit by the Jicarilla RD Range Specialist confirmed that the 3.4-acre portion of the project area is composed of Ponderosa Pine and Grassland vegetation types as mapped in the FS Carson National Forest Vegetation Types dataset. More specifically, it was observed that the Grassland habitat type was composed principally of black sage (*Artemisia nova*), forbs, and grasses with scattered ponderosa pine, pinyon pine, and juniper trees while the Ponderosa Pine vegetation type consisted of dense Gambel oak with ponderosa pine, pinyon pine, and juniper scattered throughout. For a complete list of plant species inventoried in the project area during the July 21, 2014 site visit by the Jicarilla RD Range Specialist, refer to the Range Specialist Report in the Project Record. Refer to Figure 5 for a photograph depicting vegetation observed at a portion of the well pad expansion portion of the project area.

Based on data for TEU 162, the total annual herbaceous and woody vegetative production from the 3.4-acre portion of the project area with natural vegetation is estimated to be 2,720 pounds from the ground level up to 4.5 feet. Of the total 2,720 pounds of annual herbaceous and woody vegetative production, 595 pounds is expected to provide food for grazing animals. If the undeveloped 3.4 acres of the project area were to be modified to maximize forage production through removal of undesirable species, the maximum total annual herbaceous and woody vegetative production that may be expected to provide food for grazing animals is estimated to be 6,800 pounds.

#### *Timber and Fuelwood*

For TEU 162, the site index, which is a metric of the average height that dominant and co-dominant trees would be expected to attain in a given number of years for timber, is 55 feet. Currently, the majority of the trees occupying the project area are unmarketable and the project area is not fully stocked or evenly aged. The project area, and the Jicarilla RD overall, have not recently been utilized for timber production.

The potential productivity of fuelwood from the 3.4-acre undeveloped portion of the project area is estimated to be four cords per acre. As such, there could potentially be 13.6 cords of fuelwood in the project area. This is not an annual production and would theoretically be renewable over several decades.

#### *Noxious Weeds and Invasive Species*

Three species of New Mexico designated noxious weeds were observed within or adjacent to the project area during the July 21, 2014 field visit. The observed noxious weeds include Cheatgrass (*Bromus tectorum*; Class C noxious weed), Musk thistle (*Cardus nutans*; Class B noxious weed), and Canada thistle (*Cirsium arvense*; Class A noxious weed). The observed noxious weeds consisted predominantly of isolated individual plants, except for Canada thistle. It appears probable that the observed noxious weeds may have spread from the existing Energen well pad and have been missed during weed treatments.



**Figure 5. Photograph of proposed well pad expansion area. Black sage and grasses with Gambel oak, ponderosa pine, and juniper.**

### Effects of Alternative 1

#### *Direct, Indirect, and Cumulative Effects*

The currently undeveloped 3.4 acres would be anticipated to continue to produce vegetation similar to what exists presently. Vegetation would continue to be available for forage and fuelwood and trees would continue to mature, improving their suitability for timber. The presence of the existing well pad would contribute to the potential continued presence of noxious weeds. However, now that the FS is aware of the presence of noxious weeds, the weeds will be treated. Treatment of the noxious weeds within the existing well pad would continue to be the responsibility of the operator. No significant cumulative effects would be anticipated.

### Effects of Alternative 2

#### *Direct and Indirect Effects*

##### *Vegetation and Range*

Under the proposed action, 3.4 acres of TEU 162 would be developed and eliminated from forage production. Removal of this area would result in a loss of approximately 595 pounds of suitable forage annually, relative to existing conditions. 3.4 acres of range and associated forage would be irretrievable for the life of the project. However, a portion of that impact footprint would be reclaimed following construction, by seeding with a native grass and forb mix, thereby returning that portion of the impact footprint to potentially suitable forage condition. The existing well pad

experienced successful interim reclamation, and similar interim reclamation success may be anticipated for the new disturbance footprint. Additionally, following decommissioning of the wells, reclamation of the complete 5.9-acre project area would be required, and this area would return to potentially suitable forage, and would likely result in an increase in available forage because of the removal of trees and other woody vegetation during construction which would be replaced with grasses and forbs following reclamation.

Furthermore, as the project area has not been utilized for livestock grazing since 1980, and the Carracas Allotment permittee is not currently stocking the Carracas Allotment, the proposed action is not anticipated to result in significant impacts to range condition and forage availability. Similarly, the proposed action is not anticipated to have a significant contribution to cumulative effects, as the loss of forage is limited.

#### *Timber and Fuelwood*

The proposed action would result in the loss of vegetation, including trees, for an area of 3.4 acres. Potential timber and fuelwood production would be lost and be irretrievable for the life of the project. However, interim reclamation could be anticipated to reestablish vegetation, but reclamation does not include re-establishment of trees or woody species. Therefore, timber and fuelwood availability would likely be reduced following final reclamation. Nevertheless, because of the limited area of disturbance and the lack of significant timber or fuelwood extraction in the project area, the proposed action is not anticipated to significantly affect timber and fuelwood resources.

#### *Noxious Weeds and Invasive Species*

There is a potential for invasive species and noxious weeds to get established in the project area, but noxious weeds would be treated in accordance with the operating plan to be developed for the SUP. Final reclamation would require that no infestations of New Mexico listed noxious weeds exist; however, invasive species or common weeds not designated as noxious by the state of New Mexico could persist. Noxious weeds may also be able to establish in adjacent areas outside of the project area where the operator is not responsible for weed control.

The vegetation in the wildlife guzzler enclosure would remain the same, as vegetation disturbance required for guzzler installation is limited. The sediment trap would need regular maintenance and would be a disturbed area where the vegetation change is unpredictable. Noxious weeds associated with the sediment trap would be treated along with the rest of the project area.

Nevertheless, as operators are required to manage noxious weeds, the proposed action is not anticipated to result in significant adverse effects to noxious weeds or invasive species.

#### *Cumulative Effects*

The proposed action is not anticipated to have a significant effect that would result in significant cumulative effects to vegetation, range, timber or fuelwood. Additionally, although the proposed action may facilitate limited establishment of noxious weeds, this is not anticipated to result in a cumulative effect because of required and ongoing treatments of noxious weeds in the project area and across the Jicarilla RD by permitted oil and gas operators.

## **Effects to Minerals, Lands, Transportation, Special Uses, Recreation, and Specially Designated Areas**

### **Affected Environment**

#### **Minerals**

The exploration for and production of natural gas are the primary mineral activities in the Jicarilla RD. Mineral lease development and production has been taking place on the Jicarilla RD for approximately 60 years. Currently, all NFS lands within the Jicarilla RD that are available for mineral leasing have been leased. As of January 2014, there were 714 pad locations with 829 active wells (804 on NFS lands) and 204 plugged and abandoned wells located within the Jicarilla RD administrative boundary (complete existing well location list is on file at the Jicarilla RD office). There are eight approved APDs that have not been drilled on the Jicarilla RD. The Jicarilla RD has recently experienced a down turn in lease development with only three wells drilled since 2012 while sixteen wells have been plugged during the same time (Miller 2014). Gas wells in the Jicarilla RD produce primarily from the Pictured Cliffs, Mesaverde Group, Fruitland Coal, and Dakota Formations. The life of a well in the San Juan Basin can extend for more than 50 years.

There are no known locatable minerals (i.e. minerals that may be located with a mining claim under the General Mining Law of 1872; e.g. gold, silver, platinum, precious gems, bentonite, etc. in the Jicarilla RD) (BLM 2011). The Jicarilla RD has approximately 21 borrow pits, averaging 3 acres in size, to supply sandstone for the surfacing and stabilization of roads and well pads across the Jicarilla RD. Sandstone is used to surface roads that are highly erodible and to help provide support during wet weather conditions.

#### **Lands**

Within the administrative boundary of the Jicarilla RD there are NFS, state, and private lands. There are approximately 153,305 acres of NFS, 3,870 acres of private, and 543 acres of state land within the Jicarilla RD boundary (Miller 2014). Surface activities are intended to develop SUIT minerals located just north of the project area.

#### **Transportation**

The road system within the Jicarilla RD primarily supports lease development. The road system consists of public motorized vehicle roads, authorized per the Motor Vehicle Use Map (MVUM), and lease operations roads. Motor vehicle use on lease operations roads is restricted to authorized lease activities only. There are approximately 217 miles of lease operations roads and 189 miles of MVUM roads.

As part of the SUP, FSR 218 and FSR 218A will be designated for access. All construction, drilling, and production equipment and vehicles would be authorized to use these roads. Energen is currently responsible for all maintenance of FSR 218A as part of their lease operations, and maintenance responsibilities would continue under the SUP. FSR 218 is maintained through the Jicarilla Road Committee, of which Energen is a participating member. Under the SUP, Energen would be responsible for re-surfacing two miles of FSR 218 and would also be responsible for repair of any damage associated with the proposed action. If warranted, during times of heavy use, Energen would also be responsible for dust abatement.

## Special Uses - Land

As indicated previously, a SUP is issued to a qualified applicant to conduct an authorized use and occupancy of NFS lands. The Jicarilla RD currently has twenty SUPs issued for a variety of lands related uses such as fences, pipelines, power lines and roads, among others. Existing SUPs are not located in the immediate proximity of the project area, with the exception of an Energen natural gas pipeline SUP. The proposed action will tie into Energen's natural gas pipeline system permitted under said SUP.

## Recreation

The major recreational use on the Jicarilla RD is big game hunting. Deer and elk are the most popular species and account for the majority of hunting. Cougar, bear, and turkey provide additional hunting opportunities. The Jicarilla RD provides opportunities for both adult and youth hunters seeking individual or guided hunts. Private individual hunters do not require a permit from the FS on the Jicarilla RD, but outfitters/guides are required to obtain a SUP from the FS to lead hunts on the Jicarilla RD. In 1996, the Forest Plan was amended (Amendment 10) to establish upper limits of service days authorized per species and the total number of outfitters/guides granted SUPs per species allowed to operate on the Jicarilla RD. The Jicarilla RD has had to deny new SUP applications because of these capacity limits, indicating that demand is high. Outfitter/guide SUPs represent the only current recreation based SUPs issued on the Jicarilla RD (Miller 2014).

The project area is located in game management unit (GMU) 2B for deer, GMU 2 for elk and turkey, cougar management zone A, and bear management zone 2. The entire Jicarilla RD makes up a relatively small portion of these management units and zones. Licensed hunters have opportunities to hunt both on and off NFS lands within these GMUs.

Typically, small game hunting, camping, horseback riding, non-commercial firewood and Christmas tree cutting, and wild horse viewing constitute the remaining recreational land uses. These recreational activities would be considered minor uses.

The Forest Plan identifies three recreation sites on the Jicarilla RD; two primitive camping areas (Buzzard Park and Cedar Springs) and one interpretive site (Gasbuggy). These facilities are not located in the vicinity of the project area.

## Specially Designated Areas

Specially designated areas located within the Jicarilla RD or nearby areas include Areas of Resource Concern (ARC) and Noise Sensitive Areas (NSAs). There are five ARCs identified within the Jicarilla RD, namely Bancos Canyon, La Jara Canyon, Valencia Canyon, Fierro Mesa and Canyon, and Vaqueros Canyon. These ARCs are not located in close proximity to the project area. Refer to Figure 6 for a map of the locations of designated Areas of Resource Concern relative to the project area.

Seven NSAs have been designated within the Jicarilla RD, namely Buzzard Park and Cedar Springs Campgrounds, Gasbuggy Interpretive Site, Carracas Mesa Administrative Site, and Middle Mesa, Ullbarri, and Munoz Canyon Raptor Areas. A portion of the project area, the access route at the intersection of FSR 218 and FSR 218A, falls within the Carracas Mesa Administrative Site NSA. Refer to Figure 6 for a map of the locations of NSAs relative to the project area.

The Jicarilla RD does not contain wilderness, wilderness study areas, research natural areas, proposed research natural areas, or inventoried roadless areas. Additionally, there are no waterways classified as wild and/or scenic under the National Wild and Scenic Rivers Act on the Jicarilla RD; however, an inventory of waterways within the Jicarilla RD classified five stream segments as potentially eligible for designation under the National Wild and Scenic Rivers Act. Eligible stream segments consist of Bancos, Cabresto, Carracas, La Jara, and Vaquero Canyons, but these stream segments are not located in close proximity to the project area.

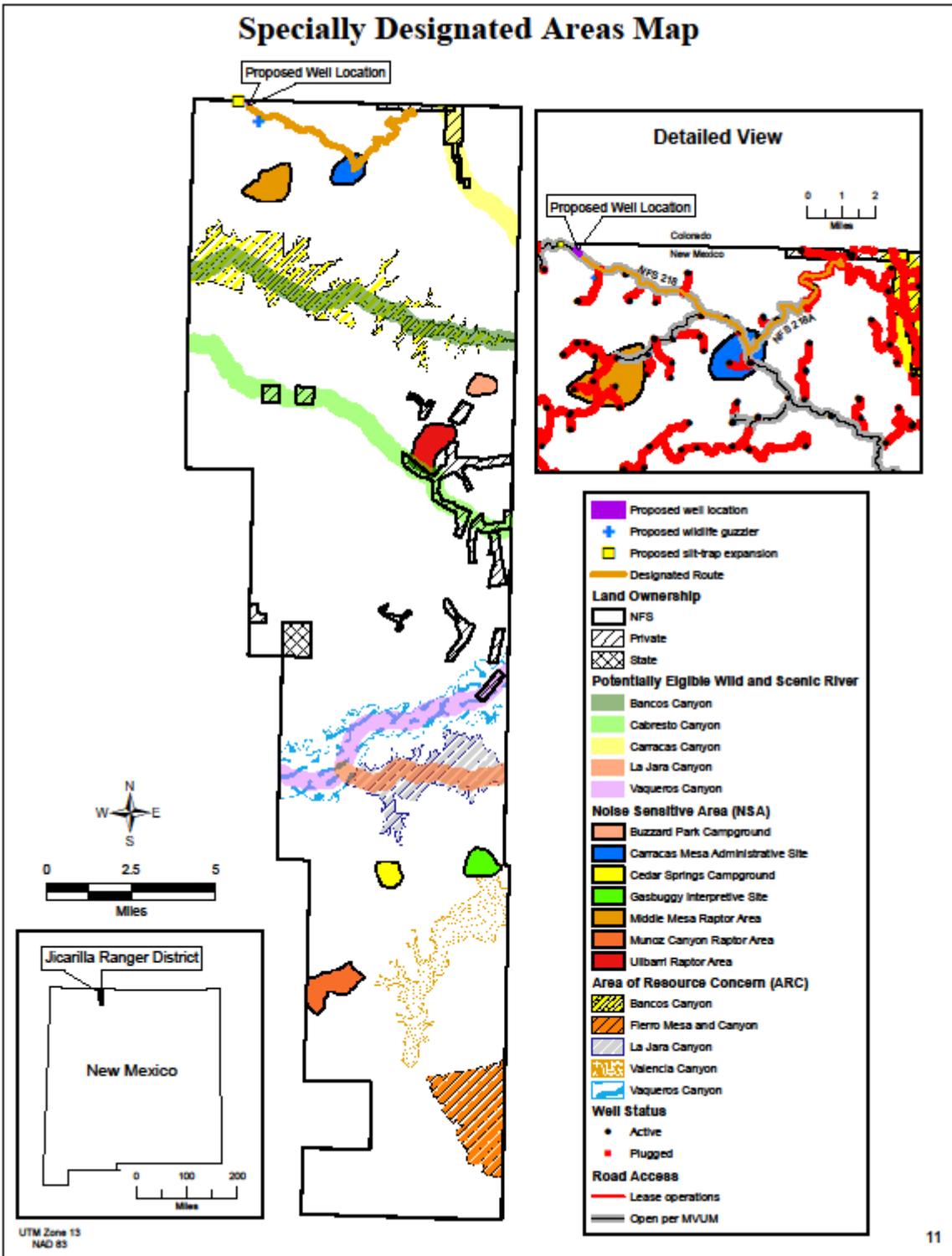


Figure 6. Specially Designated Areas Map

## Environmental Consequences

### Effects of Alternative 1

#### *Direct, Indirect, and Cumulative Effects*

The no action alternative would not adversely affect minerals, lands, special uses, recreation, or specially designated areas, as the proposed development would not occur. FSR 218 would not be re-surfaced under this alternative, and it would remain in its current condition. The no action alternative would not result in cumulative effects to these resources.

### Effects of Alternative 2

#### *Direct, Indirect, and Cumulative Effects*

#### Minerals

Implementation of this alternative would not result in significant adverse effects to minerals. Although extraction of natural gas results in irreversible use of this resource, extraction is in accordance with applicable regulations and development plans. As extraction activities are removing gas from SUIT lands, leases on the Jicarilla RD would not be impacted. There will be an impact to lease operations by disturbing the interim reclamation on the existing Energen well pad. However, Energen would be responsible for reclaiming all disturbed areas to an acceptable level. Therefore, this impact would be minimal and temporary.

#### Lands

Implementation of the proposed action would not result in significant impact to lands as the proposed action is in compliance with applicable regulations and oil and gas development in the Forest Plan.

#### Transportation

The proposed action will effect transportation through increased use of FSR 218 and FSR 218A. There will be a temporary, but heavy, increase in traffic associated with construction, drilling, and well completion. Additionally, there would be a minimal increase in long term traffic associated with operation and maintenance for the life of the wells. However, the proposed action is consistent with the existing use of the road system and Energen would be required to mitigate the effects to transportation through re-surfacing and other long-term road maintenance. As such, impacts to transportation would be minimal, and with the road re-surfacing, a net positive impact is anticipated from the proposed action.

#### Special Uses - Lands

The proposed action is not anticipated to result in adverse impacts to issued SUPs. Issuance of an SUP does not impact current SUPs or the potential for future SUPs. The use of the proposed SUP and the current SUPs on the Jicarilla RD are not exclusive. The FS reserves the right to allow others to use the permit area in any way that is not inconsistent with the holder's rights and privileges under their respective SUP. Also, unless specified, the areas authorized by an SUP remain open to the public for all lawful purposes; as such, the proposed action would not restrict public access. Additionally, a SUP is subject to all valid outstanding rights including those derived under mining and mineral laws of the United States. Accordingly, the proposed action will not result in impacts to lands related SUPs.

## Recreation

The proposed action is not anticipated to result in significant impacts to recreational opportunities. As the Jicarilla RD has limited recreational use outside of hunting, the primary concern is for impacts to hunting opportunities resulting from implementation of the proposed action. However, the proposed action will result in minimal loss of habitat for big game. As such, it is unlikely that issuing the SUP would impact issuance of hunting licenses for this region. Furthermore, construction of a guzzler and silt trap as mitigation measures has the potential to improve wildlife habitat, and result in an improvement in hunting opportunities because of improved habitat conditions with additional water sources.

## Specially Designated Areas

Because wildernesses, wilderness study areas, research natural areas, proposed research natural areas or inventoried roadless areas are not located within the Jicarilla RD, these areas would not be impacted by the proposed action. Additionally the proposed action would not result in impacts to designated ARCs or streams classified as eligible for listing under the National Wild and Scenic Rivers Act, as these features are not located within the vicinity of the project area.

Although a portion of the project area is located within the Carracas Mesa Administrative Site NSA, the only action which will occur in this area is vehicle use on existing NFS roads. As such, the actions are transient in nature and are not subject to the noise standards established in NTL04-02 FFO. As such, the proposed action would not result in significant impacts to NSAs.

## Cumulative Effects

There would be no cumulative effects to mineral development, lands, special uses, or specially designated areas. Although, the project would add cumulatively to traffic there would be a long-term beneficial effect to roads because of the road re-surfacing. Additionally, there would be a long-term beneficial effect to recreation because of the silt-trap expansion and the installation of a wildlife guzzler which would improve big game habitat.

## Effects to Soils and Water

### Affected Environment

#### Water Resources

The project area is located within the Canyon Bancos – Navajo Reservoir Watershed (Hydrologic Unit Code [HUC] 140801011502), which is part of the larger Upper San Juan River Watershed. Approximately 28 percent of the Canyon Bancos-Navajo Reservoir watershed is located on the Jicarilla RD. Watercourses are not located within the project area. The closest watercourse to the project area is an unnamed intermittent stream located approximately 0.25 mile west of the project area, and the closest perennial watercourse is the San Juan River located approximately 1.6 miles north of the project area.

Water quality data are not specific enough to characterize surface water quality within the Jicarilla RD, but the New Mexico Environment Department (NMED) State of New Mexico Clean Water Act Section 303(d)/Section 305(b) Integrated Report for 2012-2014 identifies stream reaches that are impaired by pollutants and the likely causes and sources of impairment. The water quality of these streams is strongly influenced by the condition of the upstream watersheds

contributing surface water runoff to the stream and by the flow conditions in the channels. Three downstream reaches (and one sub-reach) of the San Juan River which receive hydrologic input from the project area are identified on the State Section 303(d)/Section 305(b) list, with three of the four reaches identified as not supporting designated uses. One downstream reach classified as not supporting designated uses (Animas River to Cañon Largo) identifies petroleum/natural gas production activities as a probable cause of impairment. However, this reach is located a significant distance downstream from the project area and would be subject to hydrologic inputs from numerous watercourses traversing areas heavily impacted by oil and gas development. The other impaired reaches do not identify petroleum/natural gas activities as probable causes of impairment.

Riparian resources are not located in the immediate vicinity of the project area, but significant riparian habitats are associated with the San Juan River.

### Soil Resources

As indicated previously, based on the Terrestrial Ecosystem Survey of the Carson National Forest, the project area is principally located within TEU 162. A portion of the FSR 218 to be re-surfaced is located within TEU 174. TEU 162 is identified as being composed of Typic Eutroboralfs (95%) and Udic Ustochrepts (5%) with residual parent material consisting of alluvium derived from various sources. Soils are generally fine loams. TEU 174 is identified as being composed of Mollic Eutroboralfs (85%) and Typic Eutroboralfs (15%) with parent material derived from various sources. Soils are generally fine loams. Each TEU in the project area was described as having satisfactory soil stability, as the current soil loss was less than the tolerance level (USDA 1987).

## Environmental Consequences

### Effects of Alternative 1

#### *Direct, Indirect, and Cumulative Effects*

Under the no action alternative, the well pad would not be expanded and new wells would not be drilled. Accordingly, there would be no direct impacts to watercourses and surface water runoff would continue as it does currently. Downstream water quality would be maintained. Additionally, the no action alternative would not result in additional soil loss above the current level. As this alternative would not result in impacts to soil and water resources, this alternative would not result in cumulative impacts to these resources.

### Effects of Alternative 2

#### *Direct and Indirect Effects*

### Water Resources

As watercourses are not located in the project area, direct impacts to watercourses would not occur under the proposed action. However, water quality in downstream waters of the watershed could be affected. Natural gas activities are currently identified as a probable source of downstream water quality impairment. However, impacts would likely be minimal as improved technologies and best management practices would reduce the potential for harmful runoff from the project area into downstream waters. Additionally, construction of a sediment trap could aid downstream water quality by trapping pollutants in the sediment trap and reducing their travel into downstream waters.

## Soil Resources

As the soils within the project area are identified as having suitable stability and appropriate best management measures will be implemented to minimize erosion (e.g. seeding of reclaimed areas and installation of erosion and sediment control devices as appropriate), the proposed action is not anticipated to result in significant impacts to soil resources.

### *Cumulative Effects*

Implementation of the proposed action is not anticipated to have a cumulative effect on soil and water resources as standard procedures and measures would minimize the impact of the proposed action on these resources and would continue to be implemented for future projects in the Jicarilla RD.

## Effects to Wildlife

### Affected Environment

#### Federally Listed Species

A listing of threatened, endangered, candidate, and proposed species was obtained on July 01, 2014, and again on November 3, 2014, from the USFWS New Mexico Ecological Services website: (<http://ecos.fws.gov/ipac/>). This list, displayed in Table 3, represents the federally threatened, endangered, candidate, and proposed species that potentially could occur within Rio Arriba County in the vicinity of the project area. Table 3 presents an analysis regarding the presence of suitable habitat for each species. Species with the potential to have habitat impacted by the proposed action are discussed further following the table.

**Table 3 - Federally Listed Threatened, Endangered, Candidate and Proposed Species in Rio Arriba County, New Mexico**

Species	Legal Status	Habitat Present within Project Area	Habitat not Present within Project Area	Habitat Present within Project Area but not Affected	Does not occur within Project Area	Comments
Canada lynx ( <i>Lynx canadensis</i> )	Proposed Threatened		X			Habitat is generally moist boreal forests with cold, snowy winters and high density of snowshoe hare prey base. No moist boreal forests with cold, snowy winters or snowshoe hares in analysis area. <b>No further analysis required.</b>
Jemez mountain salamander ( <i>Plethodon neomexicanus</i> )	Endangered		X			Jemez mountain salamander is found only in the moist microclimates of the Jemez Mountain Range in New Mexico. The Jemez Mountain Range of New Mexico is not in the analysis area. <b>No further analysis required.</b>
Interior least tern ( <i>Sterna antillarum</i> )	Endangered		X			Habitat is barren to sparsely vegetated sandbars along rivers, sand and gravel pits, or lake and reservoir shorelines. No barren to sparsely vegetated sandbars along rivers, sand or gravel pits, or lake and reservoir shorelines in the analysis area. <b>No further analysis required.</b>
Mexican spotted owl ( <i>Strix occidentalis lucida</i> )	Threatened	X				<b>Analysis required.</b>
Rio Grande cutthroat trout ( <i>Oncorhynchus clarki virginalis</i> )	Candidate		X		X	Rio Grande cutthroat trout habitats include cool water streams with abundant aquatic invertebrates and other prey, deep pools that do not freeze in winter or dry in summer, clean gravel for spawning, and nursery habitat at the stream margins. No cool water streams, deep pools, clean gravel, or nursery habitat in analysis area. Analysis area is also outside of Rio Grande Drainage. <b>No further analysis required.</b>

Species	Legal Status	Habitat Present within Project Area	Habitat not Present within Project Area	Habitat Present within Project Area but not Affected	Does not occur within Project Area	Comments
Southwestern willow flycatcher ( <i>Empidonax traillii extimus</i> )	Endangered		X			Habitat characterized by riparian habitation with intermittent flows or wet meadows. No riparian habitat occurs within the analysis area. <b>No further analysis required.</b>
Yellow-billed Cuckoo ( <i>Coccyzus americanus occidentalis</i> )	Proposed Threatened		X			Habitat characterized by lowland deciduous woodlands, willow, and alder. No lowland deciduous woodlands, willow, or alder in analysis area. <b>No further analysis required.</b>
New Mexico meadow jumping mouse ( <i>Zapus hudsonius luteus</i> )	Endangered		X			The jumping mouse nests in dry soils, but uses moist, streamside, dense riparian/wetland vegetation up to an elevation of about 8,000 ft. It appears to only utilize two riparian community types: 1) persistent emergent herbaceous wetlands (i.e., beaked sedge and reed canary grass alliances); and 2) scrub-shrub wetlands (i.e., riparian areas along perennial streams that are composed of willows and alders). It especially uses microhabitats of patches or stringers of tall dense sedges on moist soil along the edge of permanent water. No riparian habitat occurs within the analysis area. <b>No further analysis required.</b>

The Mexican spotted owl (MSO) is the only federally listed species with the potential to be impacted by the proposed action. The MSO occurs in forested mountains and canyonlands throughout the southwestern U.S. and Mexico (Gutiérrez et al. 1995, Ward et al. 1995a). It ranges from Utah, Colorado, Arizona, New Mexico, and the western portions of Texas south into several States of Mexico. Whereas this owl occupies a broad geographic area, it does not occur uniformly throughout its range. Instead, the owl occurs in disjointed areas that correspond with isolated mountain ranges and canyon systems. In the U.S., the majority of owls are found on NFS lands; however, in some areas of the Colorado Plateau Ecological Management Unit, owls are found only in rocky-canyon habitats, which primarily occur on National Park System and BLM-administered public lands (USFWS 2012).

Critical habitats for this species are not located within the project area, and the closest critical habitat to the project area is located approximately 9.5 miles south/southwest of the project area. Additionally, the 2012 MSO Recovery Plan also outlines additional categories relative to land management, namely Protected Activity Centers (PACs), Recovery Habitat, and Other Forest and Woodland Types. PACs are established around owl sites and are intended to protect and maintain occupied owl habitat. Recovery Habitat occurs in forest types and in rocky canyons used by owls for roosting, foraging, dispersal, and other life history needs, but outside of PACs. Other Forest and Woodland Types are those potentially suitable habitat areas that are not identified as PACs or Recovery Habitat and do not warrant special habitat management. The closest PAC to the project area is located approximately 9.5 miles south/southwest of the project area in conjunction with designated critical habitat. There are 21.38 acres of recovery habitat within 0.5 miles of the project area. Protected and restricted (recovery) habitat will be managed consistent with the 2012 Mexican Spotted Owl Recovery Plan, First Revision, and the Carson National Forest Plan, as amended.

Mexican Spotted Owl (MSO) surveys on the Jicarilla RD began in 1990. These surveys documented a nesting pair, which continued to nest through 1994. This nest established a PAC in 1991 (now within Critical Habitat area SRM-NM-11). In 1991 and 1992, a single individual and a pair of MSO sub-adult males were located, establishing the second PAC (now within Critical Habitat area SRM-NM-12). Nesting in the second PAC area was never confirmed.

Single night surveys were conducted as part of monitoring efforts for new proposed gas wells from 1995 through 2002. No owls were detected. Protocol surveys were completed for MSO covering 2,700 acres of mixed conifer/canyon habitat on the Jicarilla RD in 2003 (partial), 2004 and 2005, and again in 2009 and 2010. A single night survey was conducted for the northern PAC (SRM-NM-12) in 2014 with no owls detected.

It is possible that due to the lack of owl presence in recent years, the Jicarilla RD is on the fringe of the species distribution, with the recent drought being a contributing factor.

### FS Sensitive Species

The FS Sensitive Species list for Region 3 (Southwestern Region) and the Carson National Forest was consulted on July 1, 2014. Species listed on the Sensitive Species List were assessed relative to their potential to occur within or in the vicinity of the project area. For the majority of Sensitive Species, it was determined that they did not occur within the Jicarilla RD or that suitable habitats were not present within or in the immediate vicinity of the project area. Accordingly, these species were not assessed further. Refer to Table 4 for a list of the Sensitive Species that would not occur within or in the vicinity of the project area, and for a rationale why the species would not occur.

Table 4 - FS Region 3 Sensitive Species Not Analyzed in Detail

Species	Jicarilla RD Limiting Factor
<b>TUFTED SAND VERBENA</b> ( <i>Abronia bigelovii</i> )	Lack of gypsum outcrops on Jicarilla RD.
<b>ARIZONA LEATHERFLOWER, CLUSTERED LEATHERFLOWER</b> ( <i>Clematis hirsutissima</i> var <i>hirsutissima</i> )	Sensitive only for AZ forests.
<b>YELLOW LADY'S-SLIPPER</b> ( <i>Cypripedium parviflorum</i> var. <i>pubescens</i> ) (= <i>C. calceolus</i> var. <i>pubescens</i> , <i>C. pubescens</i> )	Lack of mossy steep slopes on Jicarilla RD.
<b>ALPINE LARKSPUR</b> ( <i>Delphinium alpestre</i> )	Elevation too high for Jicarilla RD.
<b>ROBUST LARKSPUR</b> ( <i>Delphinium robustum</i> )	Jicarilla RD is outside of known species range.
<b>SMALL-HEADED GOLDENWEED</b> ( <i>Ericameria microcephala</i> ) ( <i>Haplopappus m.</i> )	Lack of granitic rock on Jicarilla RD.
<b>PECOS FLEABANE</b> ( <i>Erigeron subglaber</i> )	Elevation too high for the Jicarilla RD.
<b>CHAMA BLAZING STAR</b> ( <i>Mentzelia conspicua</i> )	Lack of red shales and clays of the Mancos and Chinle formations on Jicarilla RD.
<b>BLUMER'S DOCK</b> ( <i>Rumex orthoneurus</i> )	Lack of high-elevation wetlands with moist, organic soil adjacent to perennial springs or streams on Jicarilla RD.
<b>ARIZONA WILLOW</b> ( <i>Salix arizonica</i> )	Lack of volcanic soils on Jicarilla RD.
<b>WESTERN BOREAL TOAD</b> ( <i>Bufo boreas boreas</i> )	Lack of spruce fir and alpine habitat on Jicarilla RD.
<b>BOREAL OWL</b> ( <i>Aegolius funereus</i> )	Elevation on Jicarilla RD too low.
<b>WESTERN YELLOW-BILLED CUCKOO</b> ( <i>Coccyzus americanus occidentalis</i> )	Lack of adequate riparian habitat on the Jicarilla RD.
<b>WHITE-TAILED PTARMIGAN</b> ( <i>Lagopus leucurus altipetens</i> )	Elevation on Jicarilla RD too low.
<b>AMERICAN PEREGRINE FALCON</b> ( <i>Falco peregrinus anatum</i> )	Lack of cliffs/breeding areas in project area.
<b>GRAY VIREO</b> ( <i>Vireo vicinior</i> )	No pinyon/juniper will be modified within project area.
<b>WESTERN BURROWING OWL</b> ( <i>Athene cucularia hypugaea</i> )	No ground squirrels or prairie dogs in the project area. No habitat present.
<b>SANGRE DE CRISTO PEA-CLAM</b> ( <i>Pisidium sanguinichristi</i> )	No high elevation glacial cirques on Jicarilla RD.
<b>RIO GRANDE SUCKER</b> ( <i>Catostomus plebeius</i> )	Jicarilla RD is outside the Rio Grande River Basin.
<b>RIO GRANDE CHUB</b> ( <i>Gila pandora</i> )	Jicarilla RD is outside the Rio Grande river basin.
<b>ROUNDTAIL CHUB</b> ( <i>Gila robusta</i> )	No permanent water on the Jicarilla RD.
<b>RIO GRANDE CUTTHROAT TROUT</b> ( <i>Oncorhynchus clarki virginialis</i> )	Jicarilla RD is outside the Rio Grande river basin.
<b>GUNNISON'S PRAIRIE DOG (montane population)</b> ( <i>Cynomys gunnisoni</i> pop. 1)	Jicarilla RD is out of the subspecies range; but is within the prairie population range.
<b>CANADA LYNX</b> ( <i>Lynx canadensis</i> )	Lack of high elevation coniferous forest or alpine habitat on Jicarilla RD.
<b>PALE TOWNSEND'S BIG-EARED BAT</b> ( <i>Corynorhinus townsendii pallascens</i> )	Lack of caves and mines in the project area.

Species	Jicarilla RD Limiting Factor
<b>SPOTTED BAT</b> ( <i>Euderma maculatum</i> )	Lack of caves, and cracks and crevices in cliffs and canyons in project area.
<b>AMERICAN MARTEN</b> ( <i>Martes americana origenes</i> )	Lack of suitable high forest zone habitat on the Jicarilla RD.
<b>AMERICAN PIKA</b> ( <i>Ochotona princeps saxatilis</i> )	Lack of suitable alpine or subalpine habitats on the Jicarilla RD.
<b>CINEREUS (MASKED) SHREW</b> ( <i>Sorex cinereus</i> )	Lack of suitable meadow/marsh habitats on the Jicarilla RD.
<b>AMERICAN WATER SHREW</b> ( <i>Sorex palustris</i> )	Lack of suitable mesic forest or meadow habitats on the Jicarilla RD.
<b>NEW MEXICAN JUMPING MOUSE</b> ( <i>Zapus hudsonius luteus</i> )	No perennial streams on Jicarilla RD.
<b>NOKOMIS FRITILLARY (GREAT BASIN SILVERSPOT BUTTERFLY)</b> ( <i>Speyeria nokomis nokomis</i> )	No streamside meadows or open seepage areas with an abundance of violets in project area.

Six FS Sensitive Species were identified which have the potential to occur within or in the vicinity of the project area, as identified in Table 5. The proposed action was assessed with regard to its potential to impact each of the six species identified in Table 5.

**Table 5 - Summary of Effects Determination for FS Region 3 Sensitive Species Which May Occur in Vicinity of Project Area**

Species	Common Name	Species Legal Status	Determination
<b>Flora</b>			
<i>Astragalus missouriensis</i> <i>var. humistratus</i>	Pagosa/Missouri Milkvetch	US FWS SoC <sup>1</sup> FS Sensitive NM SoC <sup>2</sup>	No Impact
<i>Astragalus ripleyi</i>	Ripley’s Milkvetch	US FWS SoC FS Sensitive NM SoC	No Impact
<b>Fauna – Birds</b>			
<i>Haliaeetus leucocephalus</i>	Bald Eagle	FS Sensitive	No Impact
<i>Accipiter gentilis</i>	Northern Goshawk	NM PIF <sup>3</sup> FS Sensitive	No Impact
<b>Fauna – Mammals</b>			
<i>Cynomys gunnisoni</i>	Gunnison’s Prairie Dog (Prairie Population)	NM SoC FS Sensitive	No Adverse Impact
<b>Fauna – Amphibians</b>			
<i>Lithobates pipiens</i>	Northern Leopard Frog	NM SoC FS Sensitive	No Impact

<sup>1</sup> US Fish and Wildlife Service Species of Concern Southwest Region November 16, 2013.

<sup>2</sup> New Mexico State Species of Concern

<sup>3</sup> New Mexico Partners in Flight priority list of species of concern.

There are ten documented occurrences of the Pagosa/Missouri milkvetch within the Jicarilla RD. This species occurs in open dry meadows or sparsely vegetated soils within ponderosa pine woodland, Gambel oak-mixed montane shrubland, and upper pinyon-juniper woodland (Decker 2006).

Ripley's milkvetch has not been documented within the Jicarilla RD, but potentially suitable habitat is present within the Jicarilla RD. This species occurs in open savannahs and shrublands, open canopy ponderosa pine forest, and along the edges of closed canopy forests and woodlands; it rarely occurs in recently disturbed sites (Naumann 1990).

The bald eagle is not known to nest within the Jicarilla RD, but has been documented in nearby areas to the north and west along the San Juan and Animas Rivers. This species generally utilizes habitats in close proximity to open water such as rivers, lakes, bays, or coastal areas, but wintering birds in particular are known to utilize habitats lacking open water where significant upland food sources are readily available (GBBO 2010).

The northern goshawk has been documented from the Jicarilla RD. This species utilized conifer forests, hardwood forests, and mixed woodlands (NatureServe 2014).

The prairie population of Gunnison's prairie dog is known to occur in small, scattered colonies within the Jicarilla RD, particularly in the central and southern portions. This species utilizes grasslands and semi-desert and montane shrublands (NatureServe 2014).

The northern leopard frog has been documented from two ponds in the northern portion of the Jicarilla RD. This species is found in association with aquatic habitats such as springs, slow streams, marshes, bogs, ponds, lakes, and similar habitats (NatureServe 2014).

## Migratory Birds

The New Mexico Partners In Flight (PIF) highest priority list of species of concern by vegetation type and the Birds of Conservation Concern Report for the Southern Rockies/Colorado Plateau Bird Conservation Region (BCR) #16 were used to identify migratory bird species to be assessed for impacts from the proposed action. This information was obtained from the Carson National Forest Migratory Birds Assessment (USDA 2001). The project area includes three habitat types utilized by PIF, namely Pinyon-Juniper Woodland, Ponderosa Pine Forest, and Plains and Mesa Grasslands; however, the portion of the project area located in pinyon-juniper habitat consists only of the road resurfacing which will not result in new ground disturbing activities. Therefore, assessment was limited to species associated with Ponderosa Pine Forest and Plains and Mesa Grasslands habitats.

PIF highest priority species for Ponderosa Pine Forest include northern goshawk, Mexican spotted owl, flammulated owl, greater pewee, olive warbler, Virginia's warbler, and Grace's warbler (USDA 2001). Additionally, the BCR identifies the Cassin's Finch as a species of conservation concern which occurs in this habitat type. The Mexican spotted owl is not found in ponderosa pine habitat on the Carson National Forest, and the greater pewee and the olive warbler are not found on the Carson National Forest.

PIF highest priority species for Plains and Mesa Grasslands include the ferruginous hawk, prairie falcon, mountain plover, long-billed curlew, scissor-tailed flycatcher, lark bunting, dickcissel, and cave swallow (USDA 2001). The BCR list also includes the golden eagle, burrowing owl, and chestnut-collared longspur as species of concern for this habitat. The forest is outside of the range for the scissor-tailed flycatcher, lark bunting, long-billed curlew, dickcissel, and chestnut-collared longspur. There is not suitable habitat for the ferruginous hawk, prairie falcon, mountain plover, cave swallow, and golden eagle in the analysis area. As such, the only PIF or BCR listed species for this habitat type with the potential to occur in the project area is the burrowing owl. However, this species is also identified as a FS Sensitive Species; therefore, refer to Table 4 for a

determination of the likelihood of this species occurring within the project area.

### Management Indicator Species

The Forest Plan designates specific Management Indicator Species (MIS) with habitats that could best be used to analyze effects of site-specific proposals on the Carson National Forest. The September 2011, Carson National Forest MIS Assessment (USDA FS 2011) updated the revised 2007 MIS Assessment for the Carson National Forest. It included additional national, regional, local, or forest-wide information for each species and updated both population and habitat trends for each species. Eleven species are identified as MIS for different forest features.

Of the eleven MIS, one species, the Rocky Mountain elk, is considered here based on the presence of and potential for impact to habitat for which this species is an indicator within the project area. The Rocky Mountain elk is identified as an indicator of general forest habitat type. Taking into account the condition and trend of the elk's habitat on the Caron National Forest, existing data and continued increase in the number of hunting permits issued by the New Mexico Department of Game and Fish, the Carson National Forest is sustaining stable populations of Rocky Mountain elk.

### Big Game Species

The project area is located outside of designated primary big game (deer and elk) winter habitat and conventional big game winter habitat. Primary big game winter habitat is located within the canyon bottoms of the Jicarilla RD. The project area is located within Big Game Management Units 2 (for elk) and 2B (for deer).

## Environmental Consequences

### Effects of Alternative 1

#### *Direct, Indirect, and Cumulative Effects*

The no action alternative is not anticipated to result in significant impacts to wildlife resources, including threatened and endangered species, FS Sensitive Species, migratory birds, MIS, and big game species, as new ground disturbing activities and habitat loss would not occur under this alternative. Existing habitat would remain intact. Accordingly, cumulative effects would also not be anticipated.

### Effects of Alternative 2

#### *Direct and Indirect Effects*

### Federally Listed Species

The proposed action would not result in modification to protected or restricted/recovery habitat. However, noise resulting from drilling and well pad construction activities could disturb MSOs. To mitigate potential noise disturbances to the MSO, drilling and construction activities would be conducted outside of the breeding season (March 1 to August 31), or protocol surveys would be conducted prior to implementation to ensure that individuals were not present. Accordingly, implementation of the proposed action will have no effect on federally listed, candidate, or proposed species or their critical habitats.

## FS Sensitive Species

As the Pagosa/Missouri milkvetch and Ripley’s milkvetch were not observed within the analysis area, implementation of the proposed action would not result in direct impacts to these species. There is a slight potential for the proposed action to result in indirect effects through the loss of limited or marginal habitat, and increased sedimentation and soil erosion. However, such impacts would be minimal such that the proposed action is not anticipated to result in significant impacts to Pagosa/Missouri milkvetch or Ripley’s milkvetch.

As aquatic habitats are not located within the project area, the proposed action would not result in significant impacts to the northern leopard frog. Further, the expansion of a silt trap will reduce the amount of silt movement and reduce siltation impacts to potential downstream habitats.

The proposed action has a slight potential to result in indirect effects to the northern goshawk through noise disturbance associated with drilling and well pad construction activities and human disturbance. Heavy truck traffic passing within 78 meters (~257 feet) from nesting northern goshawks in northern Arizona resulted in either ignoring the sound, or looking towards the noise. No nesting goshawks flushed during the noise associated with heavy truck traffic, and all nestling’s successfully fledged (Grubb et. al 2013). It is anticipated that the noise associated with the road resurfacing portion of the proposed action will not affect the northern goshawk. Although suitable habitat for this species occurs in and around the project area, northern goshawks have not been detected in or within ½ mile of the project area. To mitigate limited potential indirect impacts resulting from noise disturbance, drilling and well pad construction activities would not be undertaken during the breeding season (March 1 to September 30), or a goshawk inventory would be conducted to determine if goshawks are present prior to construction activities.

Although suitable habitat for the bald eagle occurs near the project area, neither winter roost or nest trees have been found in the project area. Implementation projects similar to the proposed action have been occurring in the general vicinity of the project area for decades without known disturbance to the bald eagle. Therefore, the proposed action is not anticipated to result in impacts to the bald eagle.

Gunnison’s prairie dog may indirectly be affected due to loss of potential habitat from construction of well pads. However, there are no known prairie dogs in the project area; therefore, the proposed action would not result in direct effects to this species. Additionally, reclamation efforts would create favorable habitat for Gunnison’s prairie dog through clearance of some wooded area. As such, although the proposed action would remove potentially suitable habitat in the short term, required reclamation efforts would result in benefits to this species in the long term.

## Migratory Birds

The proposed action has the potential to result in impacts to migratory birds associated with Ponderosa Pine Forest and Plains and Mesa Grasslands habitats. As described in the affected environment section, the proposed action would not result in impacts to the majority of the PIF highest priority and the BCR listed migratory birds because of a lack of suitable habitat or because the species does not occur within the Jicarilla RD. Species with the potential to be impacted include the northern goshawk, flammulated owl, Virginia’s warbler, Grace’s warbler, Cassin’s finch, and the burrowing owl. For details regarding potential impacts to the northern

goshawk, refer to the FS Sensitive Species section above, and for details regarding the burrowing owl, refer to the FS Sensitive Species section of the affected environment section.

The proposed action is not anticipated to result in significant impacts to the flammulated owl, Virginia's warbler, Grace's warbler, or Cassin's finch because the proposed action will result in minimal loss of ponderosa pine habitat.

### **Management Indicator Species**

The proposed action is not anticipated to result in significant impacts to Rocky Mountain elk or its habitats, as general habitat loss is limited. Additionally, the proposed action is anticipated to have a net positive impact on elk, as construction of a guzzler as a mitigation measure will provide an additional water source to support elk populations.

### **Big Game**

The proposed action is not anticipated to result in significant impacts to big game or their habitats, as primary winter range will not be impacted and general habitat loss is limited. Additionally, the proposed action is anticipated to have a net positive impact on big game, as construction of a guzzler as a mitigation measure will provide an additional water source to support big game populations.

### ***Cumulative Effects***

The proposed action is not anticipated to result in significant cumulative effects to wildlife, including threatened and endangered species, FS Sensitive Species, migratory birds, MIS, or big game as the proposed action is not anticipated to result in significant direct or indirect impacts. Additionally, cumulative impacts to the MSO are not anticipated, as the species has not been documented on the Jicarilla RD in several years, and appropriate conditions (e.g. timing of development, locations of development, etc.) are placed on development activities to minimize potential impacts to this species. Proposed vegetation treatments in the general vicinity of the project area (e.g. prescribed fire and installation of erosion control structures) are anticipated to improve range condition, which would subsequently benefit potential prey species of the MSO. The proposed action is anticipated to have a net positive effect on MIS and big game species.

## Chapter 4 - Consultation and Coordination

The FS consulted the following individuals, tribes, and federal, state and local agencies during the development of this EA. A complete list of people and organizations consulted with throughout the analysis process is in the project record.

<b>Federal, State and Local Agencies</b>			
City of Aztec		New Mexico Department of Game and Fish	
City of Bloomfield		New Mexico Energy, Minerals and Natural Resources Department	
City of Farmington		Rio Arriba County	
Jemez Mountains Electric		San Juan County	
<b>Tribal Consultation</b>			
Jicarilla Apache Nation	President	Ty	Vicente
Jicarilla Apache Nation	Mr.	Clyde	Vicente
Navajo Nation	Mr.	Tony	Joe
Pueblo of Ohkay Owingeh	Mr.	John	Cruz
Pueblo of Ohkay Owingeh	Mr.	Larry	Phillips
Pueblo of Ohkay Owingeh	Governor	Marcelino	Aquinio
Pueblo of Jemez	Governor	Joshua	Madelena
Pueblo of Jemez	Mr.	Greg	Kaufman
Pueblo of San Ildefonso	Governor	Terry	Aguilar
Pueblo of San Ildefonso	Mr.	Bryan	Montoya
Pueblo of Santa Clara	Governor	Michael	Chavarria
Pueblo of Santa Clara	Mr.	Gilbert	Tafoya
Pueblo of Tesuque	Governor	Robert	Mora
Pueblo of Tesuque	Mr.	Charlie	Dorame
Pueblo of Zuni	Governor	Arlen	Quetawki
Pueblo of Zuni	Mr.	Kurt	Dongoski
Southern Ute Indian Tribe	Chairman	Clement	Frost
Southern Ute Indian Tribe	Mr.	Alden	Naranjo
Ute Mountain Ute Tribe	Chairman	Manuel	Heart
Ute Mountain Ute Tribe	Mr.	Terry	Knight
<b>Individuals</b>			
Mr. Pat Montoya Sr.	Mr. Pat Montoya	Mr. Lenny Candelaria	Jesus and Amy Moreno
Mr. Paul Velasquez			

<b>Organizations</b>	
Center for Biological Diversity	Arapahoe Drilling Co
Black Hills Gas Resources	ConocoPhillips Company
Energen Resources Corporation	Enterprise Field Services
Jemez Mountains Electric Cooperative	La Plata Electric Association, Inc.
Noble Energy	Synergy Operating, LLC
Thompson Engineering and Production Corp	Williams Four Corners, LLC
WPX Energy Production, LLC	XTO Energy Inc.

## Chapter 5 - References

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