

**ATTACHMENT F-4**

SENT BY CERTIFIED MAIL

September 18, 2009

Ms. Lesley McWhirter  
NM/TX Branch Chief, Regulatory Division  
Albuquerque District, U.S. Army Corps of Engineers  
4101 Jefferson Plaza NE  
Albuquerque, NM 87109

RE: Concurrence Request for Wetlands Jurisdictional Determination; Property in  
Luna County, New Mexico

Dear Ms. McWhirter:

By this letter, Sapphire Energy Company (Sapphire) requests appropriate persons in the Army Corps of Engineers review the enclosed biological survey report for a property our company is attempting to develop in Luna County, New Mexico and concur with the findings reported on the "Preliminary Jurisdictional Determination Form." This form, along with the "Wetland Determination Data Form," are included in Appendix B of the attached document.

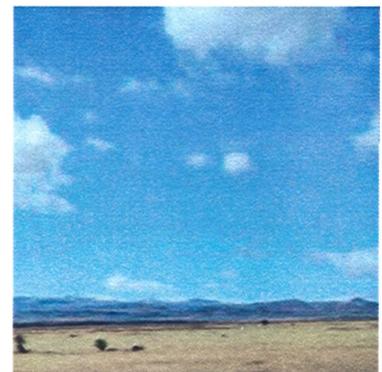
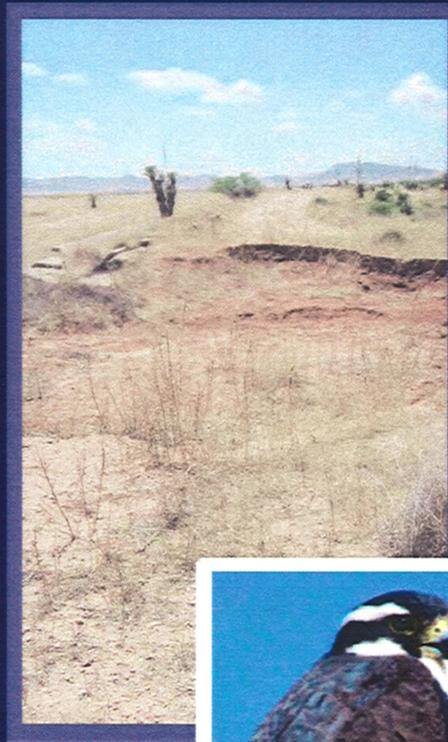
We would appreciate your timely response to this request.

Regards,

Name  
Title  
Sapphire Energy Company

Enc.

**Biological and  
Wetland Field  
Survey Report  
Proposed IABR Project  
Cooper Ranch Property  
Luna County,  
New Mexico**



**s e p t e m b e r 2 0 0 9**

**AMEC Geomatrix**

**BIOLOGICAL AND WETLAND FIELD SURVEY REPORT  
PROPOSED IABR PROJECT  
COOPER RANCH PROPERTY  
LUNA COUNTY, NEW MEXICO**

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**AMEC Geomatrix**

**September 2009**

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- APPENDIX A – Photographs of Project Area
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## 1.0 INTRODUCTION

Sapphire Energy Company (Sapphire) proposes to construct and operate an Integrated Algal Biorefinery Facility (IABR) to produce oil from algae, ultimately refining the oil into various types of transportation fuels. The proposed project is located in Luna County, New Mexico, southwest of the village of Columbus (Sections 8 and 9, Township 29 North, Range 9 West) (**Figure I**). As part of environmental compliance, Sapphire contracted with AMEC Geomatrix Inc (AMEC Geomatrix) to conduct biological field surveys and wetland surveys of the project area. AMEC Geomatrix biologists conducted reconnaissance studies of the proposed project area (the Property) in March, 2009 and field surveys on June 2 through 5 and September 9 through 11, 2009 to:

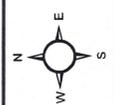
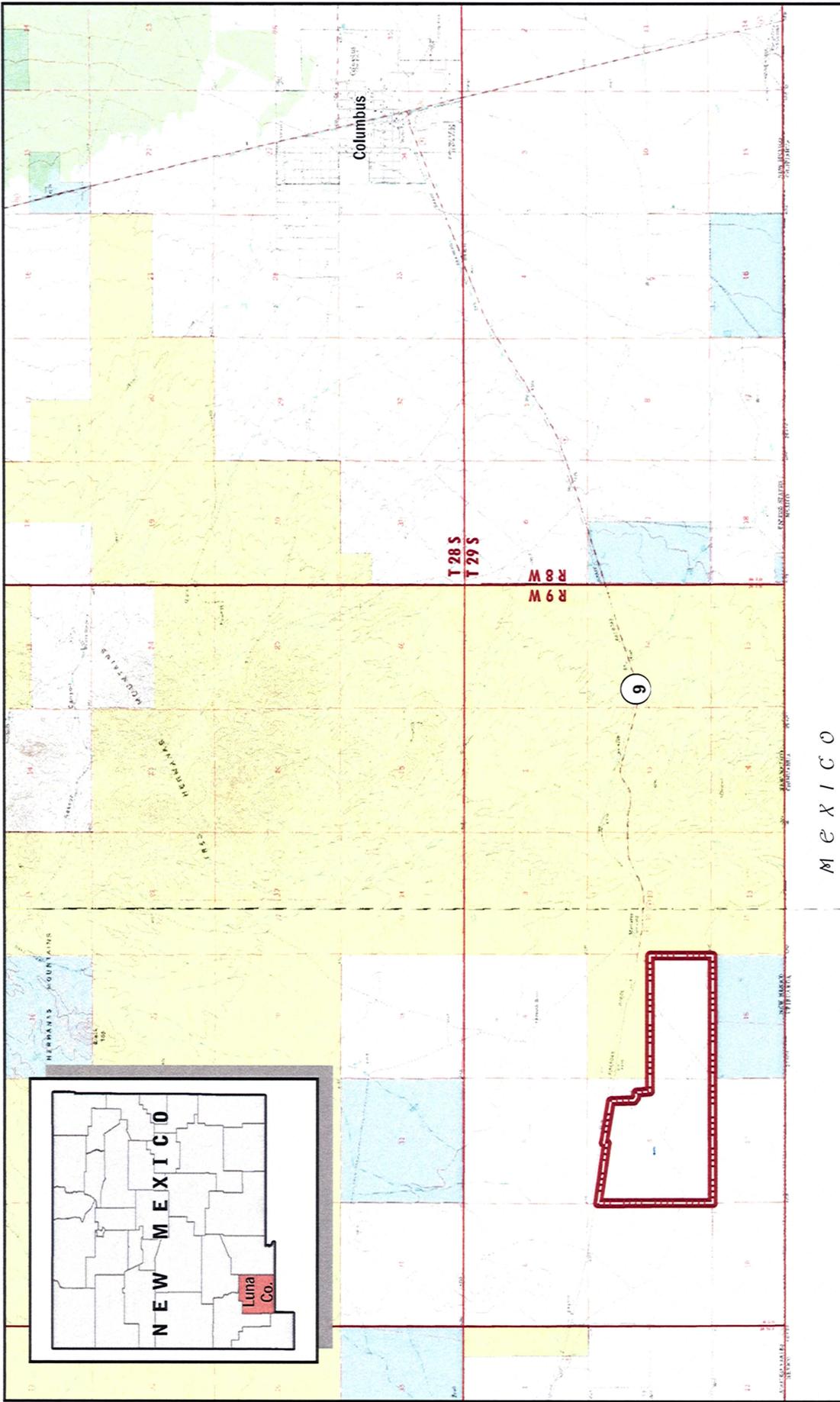
- Assess species of birds and other wildlife on and near the Property;
- Evaluate potential foraging and nesting habitat for the Aplomado falcon and other species protected under the Endangered Species Act of 1973;
- Assess habitat suitability for plant and animal species of conservation concern to the state of New Mexico;
- Conduct a survey for plant species of concern and identify dominant plant species; and,
- Identify and map wetlands and other waters of the United States that may be present on the Property.

This report presents findings from the June and September 2009 field surveys. The data presented herein and information reported in the scientific literature will be used as the basis for preparing portions of permit applications and environmental assessments related to the potential development of the Property as an IABR. Also included in this report are descriptions of agency consultations likely to be needed to fill data gaps to support the needs of various agency requirements for the possible development of the Property.

### 1.1 PROJECT AREA DESCRIPTION

The proposed project area lies within the Basin and Range physiographic province, which is characterized by low parallel mountain ranges separated by flat desert plains. The general terrain exhibits low relief with drainage flowing to the southeast. The site occurs within the Chihuahuan Desert Ecoregion and habitat is ecotonal between Chihuahuan semi-desert grassland and Chihuahuan desertscrub.

Ecological conditions of the part of the Property proposed for development have been altered by past land uses that have removed the original cover of native vegetation from the site. All of the property south of the east-west paved highway was used to produce irrigated crops until 1971, when farming was



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-  Cooper Property
-  Bureau of Land Management
-  State of New Mexico
-  Private

Location Map  
 Sapphire Energy  
 Cooper Property  
 Luna County, New Mexico  
**FIGURE 1**

discontinued and the site was allowed to colonize with invasive plants typical of soil that has been tilled. Much of the property contains dense stands of invasive species with low densities of native plants (**Photographs 1 and 2, Appendix A**). The species composition and canopy structure of vegetation on the property differs from native plant communities on adjacent state and federally managed public land (**Photograph 3 and 4, Appendix A**). Native vegetation on adjacent land is typical of the Semidesert Grassland and Chihuahuan Desertscrub (Brown 1982).

## 1.2 METHODS

### 1.2.1 Wildlife Observations

Observations of wildlife or their sign (e.g., tracks, scats, skeletal remains, and carcasses) including small mammals, and herps (amphibians and reptiles) were made while conducting avian surveys, vegetation surveys, walking transects, driving between sampling points, and during other phases of baseline data collection.

### 1.2.2 Avian Point Counts

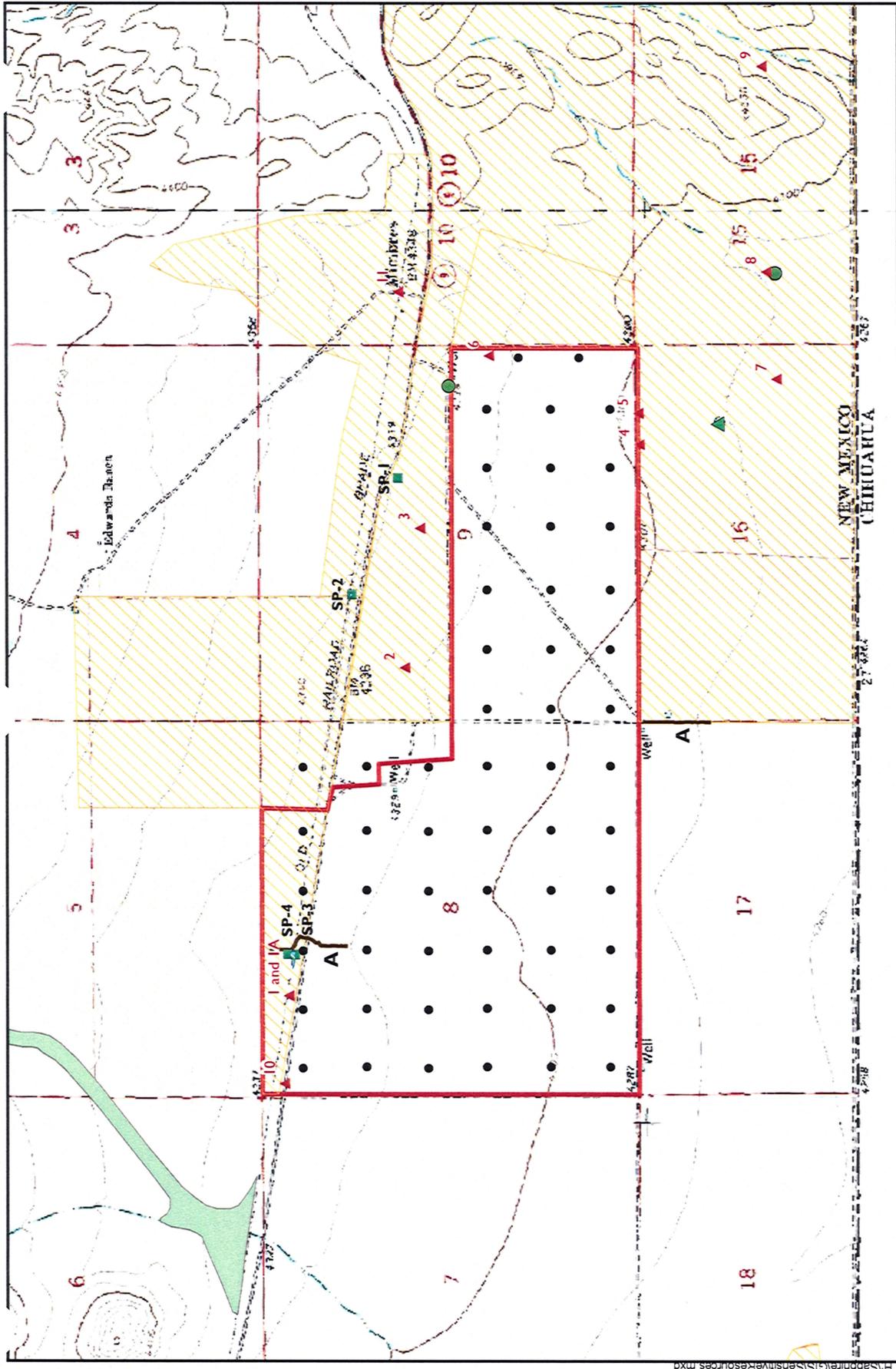
Avian surveys were conducted in June 2009 utilizing standard point-count methods. Sampling locations were spaced 250 meters apart, 125 meters from the Property fence line. All species observed visually or aurally within a 125-meter radius were recorded, along with the bird's distance from the observer and the bird's activity. Surveys were conducted for five minutes at each sampling station following a one minute listening period to allow birds to acclimate to the surveyor's presence. Surveys were conducted within the first three to four hours following sunrise; a total of 56 sampling points were used in completing the survey (**Figure 2**).

### 1.2.3 Vegetation Surveys

Surveys for New Mexico state-listed plant species potentially occurring on the Property were conducted using survey transects spaced at approximately 100 meters. Wetlands, other waters of the U.S., and wildlife habitat were also evaluated during these surveys. Dominant and subdominant vegetation was noted and infrequent plants were identified to determine if plant species of conservation concern are present on the Property. Taxonomic references included the Flora of Arizona (Kearney and Peebles 1960), A Flora of New Mexico (Martin and Hutchens 1980) the Flora of North America ([http://www.efloras.org/flora\\_page.aspx?flora\\_id=1](http://www.efloras.org/flora_page.aspx?flora_id=1)). Taxonomic nomenclature follows USDA Plants (<http://plants.usda.gov/checklist.html>).

### 1.2.4 Wetland Surveys

Potential wetlands and other waters of the U.S. were surveyed along 100-meter transects within the Property boundaries. Special attention was directed towards drainages and low spots on topographic maps or indicated as a National Wetland Inventory (NWI) wetland. Potential wetlands were evaluated by following the methodology for the on-site determination outlined in the U.S. Army Corps of



**Sensitive Resources Map**  
**Sapphire Energy**  
**Cooper Property**  
**Luna County, New Mexico**  
**FIGURE 2**

|  |                                      |  |  |  |                     |
|--|--------------------------------------|--|--|--|---------------------|
|  | Wetland Sample Point (SP-1)          |  | Wetlands (As mapped by National Wetland Inventory) |  | Cooper Property     |
|  | Avian Point-Count Survey Locations   |  | Palustrine Flat Wetland                            |  | Wetlands            |
|  | Potential Aplomado Falcon Nest Sites |  | Palustrine Open Water Wetland                      |  | 100 Year Floodplain |
|  | Erosional Feature                    |  | Aplomado Suitable Falcon Habitat                   |  |                     |

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**AMEC Geomatrix**

Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2) (Environmental Laboratory 2008). These methods require an area to have positive indicators of hydrophytic vegetation, hydric soils, and wetland hydrology to satisfy the criteria for jurisdictional wetlands regulated under the Section 404 of the Clean Water Act.

### 1.2.5 Wetland Vegetation

The U.S. Fish and Wildlife Service classified vegetation according to its frequency of occurrence in wetlands (Reed 1988). Plant species have been given wetland indicator status of either obligate wetland (OBL), facultative wetlands (FACW), facultative (FAC), facultative upland (FACU), or upland (UPL) based on probabilities of occurring in wetlands. Definitions of wetland indicator status of plants are shown in **Table I**. The Natural Resources Conservation Service (NRCS) has also compiled a list of plants and their wetland indicator status for Region 7. The NRCS list for Region 7 was used to determine wetland indicator status for plants at sites evaluated on the Property for jurisdictional wetlands.

**Table I: Plant Indicator Definitions**

| Indicator Symbol | Indicator Status    | Definition  |
|------------------|---------------------|---|
| OBL              | Obligate            | Species that occur almost always (probability >99 %) in wetlands under natural conditions.              |
| FACW             | Facultative wetland | Species that usually occur in wetlands (probability 67 to 99 %), but occasionally found in non-wetlands |
| FAC              | Facultative         | Species that are equally likely to occur in wetlands and non-wetlands (probability 33 to 66 %).         |
| FACU             | Facultative upland  | Species that usually occur in non-wetlands (probability 67 to 99 %), but occasionally found in wetlands |
| UPL              | Upland              | Species that occur almost always in non-wetlands under normal conditions (probability >99 %).           |
| NI               | No indicator        | Species for which insufficient information was available to determine indicator status                  |

### 1.2.6 Soils

Soils in the project area were evaluated for hydric conditions by digging holes 20-inches deep and recording soil colors based on Munsell Color Chart comparisons and observing soil textural and hydrological features (saturation depth).

### 1.2.7 Hydrology

Criteria for wetland hydrology require that jurisdictional wetlands have permanent or periodic inundation or soil saturation for a significant period of the growing season. Wetland hydrology may be supplied by surface water, groundwater, and direct precipitation

### 1.2.8 Significant Nexus Determinations

Significant nexus determinations were made for drainage features to determine if they have a surface connection to traditionally navigable waters of the United States. Significant nexus determinations were made by examining the topography and spatial extent of erosional features (ephemeral drainages) and plant communities adjacent to the wetlands. Information in the U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Handbook was reviewed to assist in nexus determinations.

## 2.0 WILDLIFE AND VEGETATION

### 2.1 SPECIES OBSERVED IN PROJECT AREA

Species diversity of wildlife within the Property is low, reflecting habitat conditions with limited breeding and foraging capacity for many species. Wildlife or their sign encountered during the site visit includes the striped skunk (*Mephitis mephitis*), deer (unknown species, tracks only), the banner-tailed kangaroo rat (*Dipodomys spectabilis*), roundtail horned lizard (*Phrynosoma modestum*), Texas horned lizard (*Phrynosoma cornutum*), coyote (*Canis latrans*), green cicada (*Sphecius grandis*), tarantula wasp (*Pepsis* sp.), grasshoppers, harvester ants, prairie rattlesnake (*Crotalus viridis*), black-tailed jackrabbit (*Lepus californicus*), northern earless lizard (*Holbrookia maculata maculata*), and tarantulas (*Aphonopelma* sp).

### 2.2 FEDERAL AND STATE SPECIES OF CONSERVATION CONCERN

No plant species protected under the Endangered Species Act are likely to inhabit the Project Area and federally designated critical habitat does not occur on the Property. **Table 2** lists federal and state species of conservation concern known or with the potential to be present in the Mimbres Basin.

According to the New Mexico Rare Plant Technical Council (NMRPTC), five special status species are known to occur within the project vicinity. Three of these species are considered Species of Concern by the USFWS and the State of New Mexico. Species that have been confirmed to be present in the northeast portion of the Mimbres Basin by NMRPTC are the grayish-white giant hyssop (*Agastache cana*), Orcutt pincushion cactus (*Escobaria orcuttii*), Chihuahua scurf pea (*Pediomelum pentaphyllum*), and Griffith's saltbush (*Atriplex griffithsii*). The dune prickly pear (*Opuntia arenaria*) and night-blooming cereus (*Peniocereus greggii* var. *greggii*), have documented occurrences near the Project Area and are considered Species of Concern by the USFWS and Endangered by the State of New Mexico.

**Table 2: Federal and State Species of Concern  
Known or with the Potential to be Present in the Mimbres Basin**

| Species                           | Status* | Habitat  | Possible Occurrence in the Project Area | Reason for yes/no occurrence in Project Area            |
|-----------------------------------|---------|--|---|---|
| <b>Amphibians</b>                 |         |  |   |   |
| Chiricahua leopard frog           | FT      | Permanent aquatic habitats between 2,800 and 7,300 ft. amsl                  | No                                      | No habitat  |
| Great Plains narrowmouth toad     | SE      | Grassland and desert grassland, tobosa grass, requires wet habitat in summer | Yes                                     | Small amounts of suitable upland habitat may be present |
| New Mexico ridge-nose rattlesnake | FW      | Montane woodlands and Madrean evergreen woodlands                            | No                                      | No habitat  |
| <b>Fish</b>                       |         |  |   |   |
| Loach minnow                      | FT      | Streams with riffle habitat  | No                                      | No habitat  |
| Spikedace                         | FT      | Streams with riffle habitat  | No                                      | No habitat  |
| Beautiful shiner                  | FT      | Rivers and streams   | No                                      | No habitat  |
| <b>Birds</b>                      |         |  |   |   |
| Bald eagle                        | BGEPA   | Large trees or cliffs within one mile of foraging habitat.                   | No                                      | No habitat  |

| Species                        | Status*  | Habitat  | Possible Occurrence in the Project Area | Reason for yes/no occurrence in Project Area     |
|--------------------------------|----------|--|---|--|
| Golden eagle                   | BGEPA    | Grassland habitats   | Yes                                     | Foraging habitat present, no nesting habitat     |
| Northern aplomado falcon       | NEXP, SE | Grassy plains interspersed with mesquite, cactus, and yucca                    | Yes                                     | Foraging habitat present limited nesting habitat |
| Common black-hawk              | ST       | Riparian woodlands   | No                                      | No habitat                                       |
| Peregrine falcon               | ST       | Forages in desert, shrubland, chaparral, and woodlands; nests in rocky cliffs. | Yes, resident and summer migrants       | Foraging habitat present, no nesting habitat     |
| Southwestern willow flycatcher | FE, SE   | Riparian woodlands, tamarisk stands  | No                                      | No habitat                                       |
| Broad-billed hummingbird       | ST       | Varied habitat, including riparian woodlands and Chihuahuan desert scrub       | No                                      | Suitable nesting habitat not present             |
| Costa's hummingbird            | ST       | Desertscrub, chaparral, deciduous forests                                      | No                                      | Suitable nesting habitat not present             |
| Lucifer hummingbird            | ST       | Arid deserts with preferred nectaring plants                                   | No                                      | Suitable nesting habitat not present             |

| Species                     | Status* | Habitat  | Possible Occurrence in the Project Area | Reason for yes/no occurrence in Project Area                                     |
|-----------------------------|---------|--|---|--|
| Violet-crowned hummingbird  | ST      | Riparian woodlands, forests, scrub-oak adjacent to xeric habitats                  | No                                      | No habitat; there are no riparian woodlands                                      |
| White-eared hummingbird     | ST      | Montane habitats, woodlands, forests   | No                                      | No habitat   |
| Yellow-eyed junco           | ST      | High-elevation mixed coniferous and Ponderosa pine forests                         | No                                      | No habitat   |
| Thick-billed kingbird       | SE      | Riparian canyons, deciduous forests, thornscrub, woodlands.                        | No                                      | Known to forage in desert scrub adjacent to habitat; however, no nesting habitat |
| Buff-collared nightjar      | SE      | In New Mexico, generally in canyons and washes with mesquite and other small trees | No                                      | Preferred habitat absent, will likely occur only as a transient                  |
| Whiskered screech-owl       | ST      | Dense oak and pine-oak woodlands in canyon bottoms                                 | No                                      | No habitat   |
| Mexican spotted owl         | FE      | Montane forests  | No                                      | No habitat   |
| Arizona grasshopper sparrow | SE      | Typically well-developed grasslands lacking woody vegetation                       | Unlikely                                | Marginal habitat, project area is invaded by shrubs or contains weeds.           |

| Species                | Status* | Habitat   | Possible Occurrence in the Project Area | Reason for yes/no occurrence in Project Area |
|------------------------|---------|---|---|--|
| <b>Mammals</b>         |         |   |   |  |
| Spotted bat            | ST      | Roost in cliffs, found in higher elevation habitats during summer, lower elevations in winter   | No                                      | No habitat                                   |
| Mexican long-nosed bat | FE      | Desert scrub vegetation with century plants, creosotebush, and cacti. Roosts in mines, caves, and old buildings                                     | No                                      | No habitat                                   |
| Lesser long-nosed bat  | FE      | Requires mines and caves for roost sites and saguaro cactus and paniculate agave for foraging   | No                                      | No habitat                                   |
| Western yellow bat     | ST      | Wooded riparian habitats  | No                                      | No habitat                                   |
| Southern pocket gopher | ST      | Typically occur in 5,800 to 8,000 feet in rabbitbrush riparian, oak savanna, oak woodland, pinon-juniper, chapparal, and coniferous forest habitats | No                                      | Site below elevational range; no habitat     |

| Species                      | Status* | Habitat   | Possible Occurrence in the Project Area | Reason for yes/no occurrence in Project Area |
|------------------------------|---------|---|---|--|
| Jaguar                       | FE      | Chihuahuan desert scrub and semi-desert grassland within 10 square miles of water | No                                      | No hiding or escape cover                    |
| Gray wolf                    | NEXP    | Variety of habitats with abundant prey populations                                | No                                      | No hiding cover and prey base very limited   |
| Arizona shrew                | SE      | Mesic wooded habitats   | No                                      | Site is not mesic, no trees                  |
| <b>Molluscs</b>              |         |   |   |  |
| Hacheta Grande Woodlandsnail | ST      | Rock outcrops and talus slopes, typically montane                                 | No                                      | No habitat                                   |

\*FE = federally endangered; FT = federally threatened; NEXP = federally endangered/non-essential experimental; SE = state endangered; ST = state threatened; BGEPA – Bald and Golden Eagle Protection Act  
 Source: USFWS Website <http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ListSpecies.cfm>

2.3 FEDERALLY LISTED SPECIES

There are 56 federally listed species of animals in New Mexico with 12 of these being present in the Mimbres Basin (Dona Ana, Hidalgo, and Luna counties). Of these 12 species, five are endangered, five are threatened, and two are experimental, non-essential populations. Based on an analysis of habitat features in project area, AMEC Geomatrix determined that there is the potential for one of these species, the aplomado falcon, to utilize habitat in the project area.

2.3.1 Northern Aplomado Falcon

The northern aplomado falcon, a federally endangered species (experimental non-essential population), has been re-introduced into New Mexico and may utilize habitat on or near the Property; however field studies in June and September did not detect its presence. One active aplomado falcon nest is known in New Mexico.

AMEC Geomatrix biologists searched the “action area” for suitable northern aplomado falcon habitat. The “action area,” as related to impacts associated with the Endangered Species Act, comprises the Property and adjacent land within visual and aural range of proposed project activities. The action area was estimated to include a one-mile radius from the Property. Suitable habitat includes semi-desert grassland habitat interspersed with large yuccas and/or trees containing raptor and/or corvid nests (aplomado falcons do not build their own nests). Typically, yuccas and trees suitable as nesting substrates are over six-feet tall and have a platform formed by branches or flowering stalks. Potential nesting habitat was assessed by driving roads and conducting pedestrian surveys on the Property with binoculars and a spotting scope.

Potentially suitable nests for the northern aplomado falcon were identified within the Property (**Photograph 5, Appendix A**), north of the paved highway, on Bureau of Land Management (BLM), and state-administered land immediately adjacent to the Property (**Figure 2**). These nests were constructed by raptors and ravens. A small patch of suitable habitat, consisting of large yuccas, also occurs approximately 0.8 miles southwest of the Property boundary on private land.

Removal of yuccas and associated nests may be avoidable due to their location on the periphery of the Property (although noise and visual disturbance would not be avoidable). Three nests (two are on one yucca) occur immediately north of the highway in the northwestern-most portion of the Property between the old railroad grade and Highway 9 (**Figure 1**). The other nest is located in the northeastern-most portion of the east half of the Property, adjacent to the eastern Property fence line.

### 2.3.2 Migratory Birds

Avian diversity was low within the Property boundaries, presumably due to lack of canopy structure. This finding is supported by the relatively greater number of species observed on BLM and state lands which were discovered to contain more heterogeneous habitat than that present at the Property. Most species encountered during point-count surveys were passerines, either nesting on the ground or in the sparsely scattered yucca, or were raptors engaged in soaring/foraging activities. **Table 3** summarizes the results from the June point-count surveys.

The majority of the birds detected were the ground-nesting western meadowlark and the mourning dove, which usually nests in shrubs and trees. Nests were not observed for these species, although several mourning dove pairs were seen and were occasionally flushed during sampling point transitions. Western kingbirds were abundant, and two active nests were identified on the Property; one located in a yucca and one on a power pole.

Burrowing owls were also observed on the Property and on state land immediately south of the Property during the June surveys but were not observed during the September surveys. Potential burrowing owl habitat is present throughout the Property as evidenced by the abundance of burrow systems.

The horned lark was observed on and adjacent to the Property. The long-billed curlews noted on the Property are likely transients in the area, as they were observed flying overhead; suitable habitat for this species does not appear to be present in the vicinity. Swainson's hawks were regularly observed during the surveys and while activities were conducted at the property. One active nest was observed in a yucca adjacent to the Property.

Ground-disturbing construction activities and clearing of yuccas potentially associated with development of the proposed IABR and conducted from March through August would likely result in a "take" of birds nesting on the Property, as defined by the Migratory Bird Treaty Act (MBTA), as a result of egg destruction and bird deaths. Avoidance measures required typically include conducting ground-clearing activities prior to the breeding season. In addition, avian monitoring is often required by the regulatory agencies during construction activities.

**Table 3: Avian Point Count Survey Results**

| Common Name  | Auditory | Visual | Total |
|--|----------|--------|-------|
| Western meadowlark ( <i>Sturnella neglecta</i> )         | 34       | 9      | 43    |
| Mourning dove ( <i>Zenaida macroura</i> )                | 4        | 17     | 21    |
| Western kingbird ( <i>Tyrannus verticalis</i> )          | 4        | 12     | 16    |
| Gambel's quail* ( <i>Callipepla gambelii</i> )           | 5        |        | 5     |
| Swainson's hawk ( <i>Buteo swainsoni</i> )               |          | 3      | 3     |
| Long-billed curlew ( <i>Numenius americanus</i> )        |          | 2      | 2     |
| White-winged dove ( <i>Zenaida asiatica</i> )            |          | 2      | 2     |
| Loggerhead shrike ( <i>Lanius ludovicianus</i> )         |          | 2      | 2     |
| Unknown  |          | 2      | 2     |
| Horned lark ( <i>Eremophila alpestris</i> )              |          | 1      | 1     |
| Cactus wren* ( <i>Campylorhynchus brunneicapillus</i> )  | 1        |        | 1     |
| Ash-throated flycatcher ( <i>Myiarchus cinerascens</i> ) | 1        |        | 1     |
| Burrowing owl ( <i>Athene cunicularia</i> )              |          | 1      | 1     |

The presence of burrowing owls may require additional mitigation measures be employed by Sapphire if the site is to be developed as an IABR, as these owls are also protected under the MBTA. Burrowing owls could occur throughout the property during the breeding and non-breeding seasons and could be

killed during construction activities. The New Mexico Department of Game and Fish (NMDGF), in coordination with the New Mexico Burrowing Owl Working Group, California Burrowing Owl Consortium, and the California Department of Fish and Game, developed “Guidelines and Recommendations for Burrowing Owl Surveys and Mitigation” (July 2007). These guidelines were established to provide direction for conducting burrowing owl surveys and designing mitigation during the preparation of environmental assessment reports and environmental impact statements. When burrowing owls are confirmed on a project site, these guidelines outline three general approaches to mitigation:

- Design and implement project activities to spatially avoid negative impacts and disturbance to burrowing owls and their habitat;
- Design and implement project activities to seasonally avoid negative impacts and disturbances to burrowing owls (although confirmation of unoccupied burrows will still be required); and/or,
- Relocate burrowing owls that will be negatively impacted to protected areas.

To allow greater flexibility with the project schedule, implementing the third option may be in Sapphire’s best interest. This would involve either trapping and relocating, or utilizing one-way doors in burrow entrances to exclude burrowing owls. One-way doors must be inserted 48-hours prior to construction so that burrows remain unoccupied. This method (trapping or utilizing one-way doors) must be initiated prior to March 1 in the year of construction to avoid an MBTA take (nesting activities begin after March 1). Construction must be phased so that ground-clearing would occur immediately after trapping or excluding to ensure burrow destruction and disallow re-occupation by owls. A video probe should be used to determine if burrow is providing burrowing owl nesting habitat. If there is a lag between initial ground clearing/burrow destruction and other construction activities, surveys may need to be conducted to ensure that further burrows have not been constructed and subsequently occupied by owls.

Two natural or artificial burrows should be constructed to compensate for each active burrow rendered unsuitable, and a minimum of 6.5 acres of foraging habitat should be maintained in an undisturbed habitat condition for each pair or unpaired resident bird. Permits must be obtained by USFWS and NMDGF to handle burrowing owls.

### 2.3.3 Bald and Golden Eagle Protection Act

Golden eagles are protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Under these statutes, it is illegal to implement activities that would result in “take” of bald eagles or golden eagles. The BGEPA defines “take” as “pursue, shoot, shoot at, poison, wound, kill capture, trap, collect, molest or disturb”. Disturb means to agitate or bother eagles to a

degree that causes or is likely to cause, based on the best scientific data available, injury to an eagle; decrease in productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or, nest abandonment by substantially interfering with normal breeding, feeding or sheltering behavior.

Golden eagles occur throughout western North America and hunt by soaring over open prairie, sagebrush-grassland and woodland habitats. Golden eagles eat primarily jackrabbits, ground squirrels, and carrion and occasionally prey on deer and antelope fawns, other small mammals, and waterfowl. Golden eagles generally nest on cliffs, in large trees, or occasionally on artificial structures such as power poles. Golden eagles have not been observed on the Property, but have been regularly observed along Highway 9 east of the Property. They may periodically utilize the Property for foraging.

#### 2.4 NEW MEXICO STATE-LISTED WILDLIFE

The primary species of potential concern relative to New Mexico State-Listed wildlife in and near the Property is the Great Plains narrowmouth toad (*Gastrophryne olivacea*). Habitat for this species was assessed along 100-meter survey transects during with the wetland and plant surveys. General habitat was characterized and mapped, as shown on **Figure 3**.

Habitat for the Great Plains narrowmouth toad is limited within the Property. Suitable habitat includes grassland and desert grassland habitats, principally those containing tobosa grass and aquatic habitat in summer for reproduction. Aquatic habitat for reproduction may consist of swales and/or roadside ditches. Tobosa grass was sparse on the Property, although other grasses that occur on site may provide the same type of refuge, such as blue panic grass. Tobosa grass and other suitable grasses occur north of Highway 9 within the Property boundaries. Rodent burrows which may also be used as refuges by this toad are extensive throughout the Property. Aquatic habitat was not observed during the site suveys, but several swales and roadside ditches may be suitable for breeding. It is unlikely that this species would occur in the project area due to the limited amount of suitable habitat.

#### 2.5 VEGETATION SURVEY RESULTS

Ecological conditions within the Property have been altered by past land uses that have removed the original cover of native vegetation from the site. Nearly all of the Property was used to produce irrigated crops until 1971, when farming was discontinued and the site was allowed to colonize with invasive plants typical of disturbed soils. Much of the Property has dense stands dominated by invasive species with low densities of native plants.

The species composition and canopy structure of vegetation on the Property differs substantially from native plant communities on adjacent state and federally managed land. Native vegetation on adjacent land is typical of the Semidesert Grassland and Chihuahuan Desertscrub. Dominant native species



include soaptree yucca, creosote bush (*Larrea tridentata*), honey mesquite (*Prosopis glandulosa*), tarbush (*Flourenzia cernua*), Mormon tea (*Ephedra trifurca*), tobosa (*Hilaria mutica*), vine mesquite (*Panicum obtusum*), and a diversity of other forbs grasses, and cacti. The canopy structure of the native plant communities, with an upper tier of shrubs and a lower tier of herbaceous species supports much higher levels of biodiversity than the Property, which is dominated by herbaceous invasive species interspersed with patches of bare ground.

## 2.6 NEW MEXICO STATE-LISTED PLANTS

The majority of the vegetation on the Property consists of grasses with occasional yucca and cacti. **Table 4** summarizes the dominant grass species encountered during the June and September 2009 site visit. At the time of the site surveys in June, there had been limited rainfall and much of the vegetation was dry. During the surveys in September, the monsoon rains had begun and vegetation, especially warm-season grasses, were initiating new growth.

**Table 4: Dominant Grasses in Project Area**

| Scientific Name              | Common Name          | Growth Form/ Habitat   |
|------------------------------|----------------------|--|
| <i>Aristida adscensionis</i> | Six weeks three awn  | Annual, occurs on sites where native grasses have been depleted.         |
| <i>Aristida divaricata</i>   | Poverty three-awn    | Perennial bunch grass.   |
| <i>Chloris virgata</i>       | Feather finger grass | Annual, invasive species which occurs on disturbed soils.                |
| <i>Eragrostis lehmannii</i>  | Lehman's lovegrass   | Introduced, perennial bunch grass.                                       |
| <i>Hilaria mutica</i>        | Tobosa               | Perennial bunch grass, fine-textured soils, often occurs in swales.      |
| <i>Panicum antidotale</i>    | Blue panic grass     | Introduced, perennial bunch grass, often associated with irrigation.     |
| <i>Panicum obtusum</i>       | Vine mesquite        | Perennial, often found in swales with fine-textured soils.               |
| <i>Tridens pulchellus</i>    | Fluff grass          | Perennial bunch grass, indicator of low potential productivity of soils. |

Dominant forbs present at the site included cocklebur (*Xanthium strumarium*), unicorn plant (*Proboscidea louisianica*), Russian thistle (*Salsola iberica*), silver-leaf nightshade (*Solanum eleagnifolium*), and Powell amaranth (*Amaranthus powellii*). Sub-dominant forbs included scarlet gaura (*Gaura coccinea*), velvety gaura (*Gaura parviflora*), milkweed (*Asclepias brachstephana* and *engelmannii*), bladderpod (*Lesquerella gordonii*), bindweed (*Convolvulus incanus*), desert marigold (*Baileya multiradiata*), *Verbena goodingii*, hogpotato (*Hoffmanseggia densiflora*), lobed ground-cherry (*Physalis lobata*), cholla (*Opuntia imbricata*), scarlet globemallow (*Sphaeralcea coccinea*), narrowleaf globemallow (*Sphaeralcea angustifolia*), soaptree yucca (*Yucca elata*), broom snakeweed (*Gutierrezia sarothrae*), yellow star thistle (*Centuarea solstitialis*), kochia

(*Kochia scoparia*), thistle (*Cirsium* sp.), puncture vine (*Tribulus terrestris*) and prickly-pear (*Opuntia polycantha*). No rare or special status species were identified on the Property during the June and September surveys.

## 2.7 WETLAND AND OTHER WATERS OF THE U.S.

### 2.7.1 Overview of Wetland Regulations

The COE is responsible for regulation of wetlands as specified under the Clean Water Act and has defined wetlands in the 1987 Wetland Delineation Manual based on features of soils, vegetation, and hydrology. The 1987 Wetland Delineation Manual describes the process that is used to determine whether a site meets the requirements to be defined as a wetland in accordance with federal regulation as follows:

“Wetlands are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes bogs and similar areas.”

Wetlands generally have the following characteristics:

- Water on or near the surface, all or part of the year.
- Distinctive poorly drained soils that develop certain physical characteristics due to the presence of water (referred to as hydric soils).
- A predominance of vegetation composed of species (referred to as hydrophytes) adapted to life in wet soils.

Wetlands can be present in riparian areas, flood plains, and upland forested areas. Some wetlands hold fresh water, some are saline, and others are created by underground water that discharges at or is very close to the surface. They are wet long enough and often enough to provide natural ecological functions, though they can be dry part of the year. Wetlands form part of a continuous gradient between uplands and open water. They may be bordered by both wetter areas (deepwater habitats) and by drier uplands (non-wetlands).

Wetlands and riparian areas are also protected by Executive Order 11990 (wetland protection) and 11988 (floodplain management), which regulate federal activities in wetlands or riparian areas.

Legal decisions (*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*) indicate that jurisdictional wetlands must have a direct connection (nexus) to interstate commerce. Generally, wetlands associated with streams and intermittent drainages are considered by the COE to have a connection to interstate commerce, but isolated depressional wetlands (e.g., ponds, lakes, and potholes) often do not and, therefore, are not regulated under Section 404 of the Clean Water Act.

Recent Supreme Court rulings (*Rapanos v. United States* and *Carabell v. United States*.) direct the COE to make case-by-case analyses to determine if wetlands have a “significant nexus” to navigable waters. A significant nexus exists when it is demonstrated that a tributary or wetland has “more than a speculative or insubstantial effect on the chemical, physical, and biological integrity of a traditional navigable water”. Determinations for the presence of a significant nexus must be made for the following waters:

- Non-navigable tributaries that do not typically flow year-round or have continuous flow for at least three months of the year.
- Wetlands that are adjacent to such tributaries
- Wetlands that are adjacent to but that do not directly abut a relatively permanent non-navigable tributary.

### 2.7.2 Wetlands and Non-wetland Waters of the United States

Natural drainage patterns within the Property have been extensively modified by construction of concrete irrigation ditches, a paved highway, access roads, irrigated crop fields, and a railroad right-of-way (abandoned). Topographically, the land slopes gently to the south and overland flow paths are largely determined by openings in the railroad embankment or under the concrete irrigation ditches and in roadside ditches. Incised, eroded drainages are present where overland flows are concentrated by the railroad embankment, highway, and concrete irrigation ditches. These eroded, incised drainages are most prominent at the northern part of the Property, becoming barely un-discernable at the southern edge of the Project Area.

One palustrine open water (POW) wetland was indicated on NWI maps depicted for the area (**Figure 2**). This wetland was assessed for Clean Water Act applicability. The POW was determined to be a man-made pond associated with a historical windmill and stock tank, and is located immediately north and outside of the Property boundaries. Neither the windmill or stock tank is currently functional, nor did the POW contain water. A Routine Wetland Determination form was not completed because the POW was determined to be outside of the Property. Observations indicate that this is not a wetland applicable to the Clean Water Act due to the lack of hydrophytic vegetation and appropriate hydrologic conditions.

Two potential wetlands were identified on the Property, north of Highway 9, abutting the north side of the Property (**Figure 2**). These vegetated swales (SP- 2 and SP-3, **Figure 2**) are present where surface water seasonally collects as a result of the old railroad grade intercepting surface runoff from rangeland and irrigated crop fields (**Photographs 6 and 7, Appendix A**). Wetland Determination Data Forms for these sites are included as **Appendix B**. These sites have hydrophytic vegetation but the soils do not exhibit hydric features. Plant species present on these sites include the species listed in **Table 5**.

**Table 5: Plant Species Present at Wetland Evaluation Sites**

| Scientific Name                | Common Name            | Wetland Indicator Status |
|--------------------------------|------------------------|--------------------------|
| <i>Amaranthus powellii</i>     | Powell's amaranth      | UPL                      |
| <i>Aristida adscensionis</i>   | Six-weeks three awn    | UPL                      |
| <i>Asclepias engelmannii</i>   | Milkweed               | UPL                      |
| <i>Chloris virgata</i>         | Feather finger-grass   | UPL                      |
| <i>Chrysothamnus nauseosus</i> | Rubber rabbitbrush     | UPL                      |
| <i>Echinochloa colona</i>      | Jungle-rice            | FACW                     |
| <i>Eriochloa acuminata</i>     | Taper-tip cup grass    | FACW                     |
| <i>Hilaria mutica</i>          | Tobosa                 | UPL                      |
| <i>Opuntia imbricate</i>       | Cholla                 | UPL                      |
| <i>Opuntia polycantha</i>      | Prickly pear cactus    | UPL                      |
| <i>Panicum obtusum</i>         | Vine mesquite          | FAC                      |
| <i>Setaria macrostachya</i>    | Plains bristlegrass    | UPL                      |
| <i>Solanum eleagnifolium</i>   | Silver-leaf nightshade | UPL                      |
| <i>Sorghum halapense</i>       | Johnson grass          | FACU                     |
| <i>Xanthium strumarium</i>     | Cocklebur              | FACU                     |
| <i>Yucca elata</i>             | Soaptree yucca         | UPL                      |

Wetland hydrology is present at sites SP-2 and SP-3 during the monsoon season when runoff collects on the upslope side of the railroad embankment. It is likely that the soils at these sites have been altered by construction of the railroad and by erosional deposition from irrigated cropland that is immediately adjacent and upslope from the railroad grade. The soils at the SP- 3 have no horizon development to 20 inches, exhibit no redox features, and do not have a chroma that is typically associated with hydric soils. The soils at SP-3 have the same color and chroma (7.5 YR 3/3) as soils at SP-4, an adjacent upland site (Figure 2).

Site SP-2 has hydrophytic vegetation and wetland hydrology during the monsoon season but like site SP-3; the soils do not exhibit hydric features. The upper 2 inches of the soil horizon has a color and chroma of 7.5 YR 3/3 and from 2-18 inches the soil color and chroma are 5YR 4/4. The soil exhibits no redox features associated with anaerobic conditions. Evaluation of site SP-1 (Figure 2), in a broad swale down slope from a gap in the railroad embankment, indicated that the vegetation was not hydrophytic

and the soils had a brighter chroma (7.5 YR 3/4). It appears that in depressions formed by railroad embankment soils have slightly lower chromas than soils that do not support hydrophytic vegetation (7.5 YR 3/3 versus 7.5 YR 3/4). According to the Arid West Region Supplement, the soils of the Property may be “problem soils” based on Indicator TF2: Red Parent material described in the Arid West Regional Supplement to the Wetland Delineation Manual.

Because sites SP-2 and SP-3 have hydrophytic vegetation and wetland hydrology and the soils have been extensively altered and are derived from red parent material (“problem soils”), these sites were determined to be wetlands and were evaluated for a nexus with traditionally navigable waters of the United States. SP-2 is 0.042 acres and SP-3 is 0.245 acres.

Wetland SP-3 has a hydrologic connection to areas down-slope through a wash (Erosional Feature A, **Figure 2**). This erosional feature begins at an irrigated crop field and collects water in a constructed ditch (**Photograph 8, Appendix A**) that extends through a gap in the railroad grade (**Photograph 9, Appendix A**) and continues south (**Photograph 10, Appendix A**), for approximately 817 feet before becoming undetectable because the bank and bed become undefined. Flow from this wash seeps into the soil without connecting to other drainage features.

Erosional Feature B begins at the south boundary of the Project Area and extends south in a roadside ditch for 966 feet before being intercepted by a berm associated with an irrigation pipe (**Photograph 11, Appendix A**). This ditch exhibits features of regular flows and supports several hydrophytic plant species. This erosional feature originates at an outflow pipe from an irrigation pumping station (**Photograph 12, Appendix A**) that discharges water to the road-side ditch as part of flushing associated with maintenance. Water discharged to this ditch does not flow to a series of road-side ditches that extend along the road on the Mexican border; rather, water is confined by berms and slightly higher topographic relief before the ditch reaches the road-side border ditch. Road maintenance, agricultural management, and activities by the Border Patrol to create unvegetated strips along roads continually alter the configuration and microtopography of road-side ditches in and around the Project Area.

There are other erosional features on the Property where overland flows have been channeled through breaks in the abandoned concrete irrigation ditch, resulting in head cutting above the ditch (**Photograph 13, Appendix A**) and a drainage channel extending several hundred feet downslope from the ditch. None of these erosional features has a nexus with other drainages, ditches, or water ways. These drainages all become undefined by a bank and bed and water seeps into the broad, relatively flat upland. The vegetation associated with these erosional features is dominated by upland plant species (e.g., Powell’s amaranth, feather finger-grass, and six-weeks three awn).

None of the drainages (erosional features) has a nexus with traditionally navigable waters of the United States. The Property and surrounding land slopes toward the Mexican border, which is one-half mile from the boundary of the Property; consequently, ephemeral, non-wetland drainages that exit the

United States in the vicinity of the Project Area would have the potential to flow into the waters of Mexico.

### 3.0 LITERATURE CITED

- Brown, D. 1982. Biotic communities of the American Southwest-United States and Mexico. Desert Plants Vol. 4, No. 1-4. University of Arizona and Boyce Thompson Southwestern Arboretum.
- Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Army Corps of Engineers. Vicksburg, Mississippi.
- Environmental Laboratory. 2008. Regional supplement to the Corps of Engineers wetland delineation manual: Arid West Region (Version 2). Army Corps of Engineers. Vicksburg, Mississippi.
- Kearney, T. and R. Peebles. 1960. Arizona flora. University of California Press.
- Martin, W. and C. Hutchens. 1980. A flora of New Mexico. A.R. Gantner Verlag K.G. Germany.
- Reed, P. 1988. National List of Plant Species that Occur in Wetlands: Idaho USDI. U.S. Fish and Wildlife Service.

**PHOTOGRAPHS OF  
PROJECT AREA**



**A P P E N D I X A**



Photograph 1 – Abandoned irrigation ditch on Property and typical sparse vegetation (June)



Photograph 2 – Typical view of Property (June)



Photograph 3 – Raptor or raven nests in yucca on Property north of railroad grade



Photograph 4 – Creosote bush community on land adjacent to Property (June)



Photograph 5 – Yucca/grassland community on land adjacent to Property (June)



Photograph 6 – Wetland at SP-3, north of railroad grade (September)



Photograph 7 – Wetland at SP-2 north of railroad grade (September)



Photograph 8 – Beginning of Erosional Feature A, upslope from railroad grade (September)



Photograph 9 – Erosional Feature A, downslope from Highway 9 and railroad (September)



Photograph 10 – Point at which flow is not detectable in Erosion Feature A (September)



Photograph 11 – Beginning of Erosional Feature B and irrigation pump station (September)



Photograph 12 – Erosional Feature B at berm with irrigation pipe (September)



Photograph 13 – Eroded drainage feature at break in irrigation ditch (September)  
Note eroded head cut from overland flow, upslope from break in ditch.

**WETLAND DETERMINATION  
DATA FORMS**



**A P P E N D I X B**

## PRELIMINARY JURISDICTIONAL DETERMINATION FORM

**This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:**

|  |             |  |
|--|-------------|--|
| District Office  | File/ORM #  | PJD Date:  |
| State  | City/County | Name/<br>Address of<br>Person<br>Requesting<br>PJD<br>Jaime Moreno<br>Sapphire Energy Company<br>3115 Merryfield Row<br>San Diego, CA 92121                    |
| Nearest Waterbody:   |             |  |
| Location: TRS.<br>Lat/Long or UTM:   |             |  |
| Identify (Estimate) Amount of Waters in the Review Area:                         |             | Name of Any Water Bodies Tidal:  |
| <u>Non-Wetland Waters:</u><br>linear ft    width    acres    Stream Flow:    N/A |             | on the Site Identified as<br>Section 10 Waters:    Non-Tidal:  |
| <u>Wetlands:</u> acre(s)    Cowardin Class:    Palustrine, emergent              |             | <input type="checkbox"/> Office (Desk) Determination<br><input checked="" type="checkbox"/> Field Determination:    Date of Field Trip: <u>June, Sept 2009</u> |

**SUPPORTING DATA: Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):**

- Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - Office concurs with data sheets/delineation report.
  - Office does not concur with data sheets/delineation report.
- Data sheets prepared by the Corps
- Corps navigable waters' study:
- U.S. Geological Survey Hydrologic Atlas:
  - USGS NHD data.
  - USGS 8 and 12 digit HUC maps.
- U.S. Geological Survey map(s). Cite quad name: \_\_\_\_\_
- USDA Natural Resources Conservation Service Soil Survey. Citation: \_\_\_\_\_
- National wetlands inventory map(s). Cite name: \_\_\_\_\_
- State/Local wetland inventory map(s): \_\_\_\_\_
- FEMA/FIRM maps: \_\_\_\_\_
- 100-year Floodplain Elevation is: \_\_\_\_\_
- Photographs:  Aerial (Name & Date): \_\_\_\_\_
  - Other (Name & Date): See attached biological resources and wetlands report
- Previous determination(s). File no. and date of response letter: \_\_\_\_\_
- Other information (please specify): See attached report

**IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.**

|  |   |
|--|---|
| Signature and Date of Regulatory Project Manager<br>(REQUIRED) | Signature and Date of Person Requesting Preliminary JD<br>(REQUIRED, unless obtaining the signature is impracticable) |
|--|---|

**EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:**

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 CFR Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 CFR 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

**PRELIMINARY JURISDICTIONAL DETERMINATION FORM**

This preliminary JD finds that there "may be" waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

Appendix A - Sites

District Office  File/ORM #  PJD Date:   
State  City/County  Person Requesting PJD

| Site Number | Latitude | Longitude | Cowardin Class       | Est. Amount of Aquatic Resource in Review Area | Class of Aquatic Resource  |
|-------------|----------|-----------|----------------------|--|----------------------------|
|             |          |           | n.a                  |  | Non-Section 10 non-wetland |
| SP- 2       |          |           | Palustrine, emergent |  | Non-Section 10 non-wetland |
| SP-3        |          |           | Palustrine, emergent |  | Non-Section 10 non-wetland |
|             |          |           |                      |  |                            |
|             |          |           |                      |  |                            |
|             |          |           |                      |  |                            |

Notes:

see attached Biological Resources and Wetlands Report

**WETLAND DETERMINATION DATA FORM – Arid West Region**

Project/Site: LABR - COOPER RANCH City/County: LUNA Sampling Date: 9/19/09  
 Applicant/Owner: \_\_\_\_\_ State: NM Sampling Point: SP-1  
 Investigator(s): J ELLIOTT Section, Township, Range: 3E09 T29N R9W  
 Landform (hillslope, terrace, etc.): SWALE Local relief (concave, convex, none): CONCAVE Slope (%): 2  
 Subregion (LRR): \_\_\_\_\_ Lat: \_\_\_\_\_ Long: \_\_\_\_\_ Datum: \_\_\_\_\_  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation NO, Soil NO, or Hydrology NO significantly disturbed? Are "Normal Circumstances" present? Yes  No \_\_\_\_\_  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

|   |           |  |  |
|---|-----------|--|--|
| Hydrophytic Vegetation Present?   | Yes _____ | No <input checked="" type="checkbox"/> | Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/> |
| Hydric Soil Present?  | Yes _____ | No <input checked="" type="checkbox"/> |  |
| Wetland Hydrology Present?  | Yes _____ | No <input checked="" type="checkbox"/> |  |
| Remarks: <u>SITE IS IN BROAD SWALE DOWNSLOPE FROM A DRAINAGE GAP IN THE ABANDONED RAILROAD EMBANKMENT DURING PERIODS OF HIGH FLOOD, WATER SPREADS OUT ACROSS THIS BROAD SWALE</u> |           |  |  |

**VEGETATION – Use scientific names of plants.** THERE ARE NO DEFINED CHANNELS

| Tree Stratum (Plot size: _____)                     | Absolute % Cover | Dominant Species?                | Indicator Status | Dominance Test worksheet:  |
|---|------------------|----------------------------------|------------------|--|
| 1. <u>NONE</u>                                      |                  |                                  |                  | Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)                                       |
| 2. _____  |                  |                                  |                  | Total Number of Dominant Species Across All Strata: _____ (B)  |
| 3. _____  |                  |                                  |                  | Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)                                    |
| 4. _____  |                  |                                  |                  |  |
| _____ = Total Cover                                 |                  |                                  |                  |  |
| Sapling/Shrub Stratum (Plot size: <u>0-1 ACRE</u> ) |                  |                                  |                  | Prevalence Index worksheet:  |
| 1. <u>YUCCA ELATA</u>                               | <u>1</u>         | <u>NO</u>                        | <u>UPL</u>       | Total % Cover of: _____ Multiply by: _____   |
| 2. <u>CHONDA CHRYSOTHAMNUS MAU</u>                  | <u>1</u>         | <u>NO</u>                        | <u>UPL</u>       | OBL species _____ x 1 = _____  |
| 3. <u>OPUNTIA IMBRICATA</u>                         | <u>1</u>         | <u>NO</u>                        | <u>UPL</u>       | FACW species _____ x 2 = _____   |
| 4. <u>OPUNTIA POLYCANtha</u>                        | <u>1</u>         | <u>NO</u>                        | <u>UPL</u>       | FAC species _____ x 3 = _____  |
| 5. _____  |                  |                                  |                  | FACU species _____ x 4 = _____   |
| <u>4</u> = Total Cover                              |                  |                                  |                  | UPL species _____ x 5 = _____  |
|   |                  |                                  |                  | Column Totals: _____ (A) _____ (B)   |
|   |                  |                                  |                  | Prevalence Index = B/A = _____   |
| Herb Stratum (Plot size: _____)                     |                  |                                  |                  | Hydrophytic Vegetation Indicators:   |
| 1. <u>HILARIA MUTICA</u>                            | <u>80</u>        | <u>YES</u>                       | <u>UPL</u>       | ___ Dominance Test is >50%   |
| 2. <u>ASCLERIAS ENGELMANNI</u>                      | <u>1</u>         | <u>NO</u>                        | <u>UPL</u>       | ___ Prevalence Index is ≤3.0 <sup>1</sup>  |
| 3. _____  |                  |                                  |                  | ___ Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) |
| 4. _____  |                  |                                  |                  | ___ Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  |
| 5. _____  |                  |                                  |                  |  |
| 6. _____  |                  |                                  |                  |  |
| 7. _____  |                  |                                  |                  |  |
| 8. _____  |                  |                                  |                  |  |
| <u>85</u> = Total Cover                             |                  |                                  |                  |  |
| Woody Vine Stratum (Plot size: _____)               |                  |                                  |                  | Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>                       |
| 1. <u>NONE</u>                                      |                  |                                  |                  |  |
| 2. _____  |                  |                                  |                  |  |
| _____ = Total Cover                                 |                  |                                  |                  |  |
| % Bare Ground in Herb Stratum <u>15</u>             |                  | % Cover of Biotic Crust <u>0</u> |                  |  |

Remarks: THIS IS NATIVE, UNDISTURBED VEGETATION

**SOIL**

Sampling Point: SP-1

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix        |   | Redox Features |   |                   |                  | Texture   | Remarks |
|----------------|---------------|---|----------------|---|-------------------|------------------|-----------|---------|
|                | Color (moist) | % | Color (moist)  | % | Type <sup>1</sup> | Loc <sup>2</sup> |           |         |
| 0-20+          | 7.5YR 3/4     |   |                |   |                   |                  | CLAY LOAM |         |
|                |               |   |                |   |                   |                  |           |         |
|                |               |   |                |   |                   |                  |           |         |
|                |               |   |                |   |                   |                  |           |         |
|                |               |   |                |   |                   |                  |           |         |
|                |               |   |                |   |                   |                  |           |         |
|                |               |   |                |   |                   |                  |           |         |
|                |               |   |                |   |                   |                  |           |         |
|                |               |   |                |   |                   |                  |           |         |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

|  |   |   |
|--|---|---|
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Sandy Redox (S5)           | <input type="checkbox"/> 1 cm Muck (A9) (LRR C)     |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Stripped Matrix (S6)       | <input type="checkbox"/> 2 cm Muck (A10) (LRR B)    |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Mucky Mineral (F1)   | <input type="checkbox"/> Reduced Vertic (F18)       |
| <input type="checkbox"/> Stratified Layers (A5) (LRR C)    | <input type="checkbox"/> Loamy Gleyed Matrix (F2)   | <input type="checkbox"/> Red Parent Material (TF2)  |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR D)            | <input type="checkbox"/> Depleted Matrix (F3)       | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6)    |   |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Depleted Dark Surface (F7) |   |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Redox Depressions (F8)     |   |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Vernal Pools (F9)          |   |

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_

Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No

Remarks:

**HYDROLOGY**

**Wetland Hydrology Indicators:**

|   |  |  |
|---|--|--|
| <u>Primary Indicators (minimum of one required; check all that apply)</u> |  | <u>Secondary Indicators (2 or more required)</u>                   |
| <input type="checkbox"/> Surface Water (A1)                               | <input type="checkbox"/> Salt Crust (B11)                              | <input type="checkbox"/> Water Marks (B1) (Riverine)               |
| <input type="checkbox"/> High Water Table (A2)                            | <input type="checkbox"/> Biotic Crust (B12)                            | <input type="checkbox"/> Sediment Deposits (B2) (Riverine)         |
| <input type="checkbox"/> Saturation (A3)                                  | <input type="checkbox"/> Aquatic Invertebrates (B13)                   | <input type="checkbox"/> Drift Deposits (B3) (Riverine)            |
| <input type="checkbox"/> Water Marks (B1) (Nonriverine)                   | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                    | <input type="checkbox"/> Drainage Patterns (B10)                   |
| <input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)             | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) | <input type="checkbox"/> Dry-Season Water Table (C2)               |
| <input type="checkbox"/> Drift Deposits (B3) (Nonriverine)                | <input type="checkbox"/> Presence of Reduced Iron (C4)                 | <input type="checkbox"/> Crayfish Burrows (C8)                     |
| <input type="checkbox"/> Surface Soil Cracks (B6)                         | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)    | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)        | <input type="checkbox"/> Thin Muck Surface (C7)                        | <input type="checkbox"/> Shallow Aquitard (D3)                     |
| <input type="checkbox"/> Water-Stained Leaves (B9)                        | <input type="checkbox"/> Other (Explain in Remarks)                    | <input type="checkbox"/> FAC-Neutral Test (D5)                     |

**Field Observations:**

|  |  |                       |   |
|--|--|-----------------------|---|
| Surface Water Present?                             | Yes _____ No <input checked="" type="checkbox"/> | Depth (inches): _____ | Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/> |
| Water Table Present?                               | Yes _____ No <input checked="" type="checkbox"/> | Depth (inches): _____ |   |
| Saturation Present?<br>(includes capillary fringe) | Yes _____ No <input checked="" type="checkbox"/> | Depth (inches): _____ |   |

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**WETLAND DETERMINATION DATA FORM – Arid West Region**

Project/Site: IABR - COOPER RANCH City/County: LUNA Sampling Date: 9/9/09  
 Applicant/Owner: \_\_\_\_\_ State: NM Sampling Point: SP-2  
 Investigator(s): J. ELLIOTT Section, Township, Range: SEC 9 T29N R9W  
 Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0  
 Subregion (LRR): \_\_\_\_\_ Lat: \_\_\_\_\_ Long: \_\_\_\_\_ Datum: \_\_\_\_\_  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation YES Soil YES or Hydrology YES significantly disturbed? Are "Normal Circumstances" present? Yes \_\_\_\_\_ No   
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

|  |  |
|--|--|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____<br>Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/><br>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____ | Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ |
| Remarks: <u>SITE IS IN DEPRESSION WITH NO OUTLET UP SLOPE FROM RAILROAD EMBANKMENT. SOILS ARE "PROBLEM SOILS" BECAUSE OF PAST DISTURBANCE AND RED PARENT MATERIAL AND LOW CHROMA (3/3) 7.5YR 3.3</u>                                     |  |

**VEGETATION – Use scientific names of plants.**

| Tree Stratum (Plot size: _____)                                       | Absolute % Cover | Dominant Species? | Indicator Status | Dominance Test worksheet:   |
|---|------------------|-------------------|------------------|---|
| 1. <u>NONE</u>  |                  |                   |                  | Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)   |
| 2. _____  |                  |                   |                  | Total Number of Dominant Species Across All Strata: <u>3</u> (B)  |
| 3. _____  |                  |                   |                  | Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66.6</u> (A/B)   |
| 4. _____  |                  |                   |                  |   |
| = Total Cover   |                  |                   |                  |   |
| Sapling/Shrub Stratum (Plot size: _____)                              | Absolute % Cover | Dominant Species? | Indicator Status | Prevalence Index worksheet:   |
| 1. <u>NONE</u>  |                  |                   |                  | Total % Cover of: _____ Multiply by: _____  |
| 2. _____  |                  |                   |                  | OBL species _____ x 1 = _____   |
| 3. _____  |                  |                   |                  | FACW species _____ x 2 = _____  |
| 4. _____  |                  |                   |                  | FAC species _____ x 3 = _____   |
| 5. _____  |                  |                   |                  | FACU species _____ x 4 = _____  |
| = Total Cover   |                  |                   |                  | UPL species _____ x 5 = _____   |
|   |                  |                   |                  | Column Totals: _____ (A) _____ (B);   |
|   |                  |                   |                  | Prevalence Index = B/A = _____  |
| Herb Stratum (Plot size: <u>0.1 ACRES</u> )                           | Absolute % Cover | Dominant Species? | Indicator Status | Hydrophytic Vegetation Indicators:  |
| 1. <u>PANICUM OBTUSUM</u>   | <u>30</u>        | <u>YES</u>        | <u>FAC</u>       | <input checked="" type="checkbox"/> Dominance Test is >50%  |
| 2. <u>ARISTIDA ADSCENIONIS</u>  | <u>15</u>        | <u>YES</u>        | <u>UPL</u>       | <input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup>  |
| 3. <u>SOLANUM ELEAGNIFOLIUM</u>                                       | <u>10</u>        | <u>NO</u>         | <u>UPL</u>       | <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) |
| 4. <u>AMARANTHUS POWELLII</u>   | <u>5</u>         | <u>NO</u>         | <u>UPL</u>       | <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  |
| 5. <u>ASCLEPIAS ENGELMANNII</u>                                       | <u>2</u>         | <u>NO</u>         | <u>UPL</u>       |   |
| 6. <u>ERIOCHLOA ACUMINATA</u>   | <u>15</u>        | <u>YES</u>        | <u>FACW</u>      |   |
| 7. _____  |                  |                   |                  |   |
| 8. _____  |                  |                   |                  |   |
| <u>77</u> = Total Cover   |                  |                   |                  |   |
| Woody Vine Stratum (Plot size: _____)                                 | Absolute % Cover | Dominant Species? | Indicator Status | Hydrophytic Vegetation Present?   |
| 1. <u>NONE</u>  |                  |                   |                  | Yes <input checked="" type="checkbox"/> No _____  |
| 2. _____  |                  |                   |                  |   |
| <u>77</u> = Total Cover   |                  |                   |                  |   |
| % Bare Ground in Herb Stratum <u>23</u> % Cover of Biotic Crust _____ |                  |                   |                  |   |
| Remarks:  |                  |                   |                  |   |



## WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: IA BR - COOPER RANCH City/County: LUNA Sampling Date: 9/9/09  
 Applicant/Owner: \_\_\_\_\_ State: NM Sampling Point: SP-3  
 Investigator(s): J. ELLIOTT Section, Township, Range: Sec. 8 T29N R9W  
 Landform (hillslope, terrace, etc.): ALLUVIAL Local relief (concave, convex, none): CONCAVE Slope (%): 0  
 Subregion (LRR): \_\_\_\_\_ Lat: \_\_\_\_\_ Long: \_\_\_\_\_ Datum: \_\_\_\_\_  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes  No \_\_\_\_\_ (If no, explain in Remarks.)  
 Are Vegetation YES, Soil YES, or Hydrology YES significantly disturbed? Are "Normal Circumstances" present? Yes \_\_\_\_\_ No   
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

|   |  |
|---|--|
| Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____<br>Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/><br>Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____  | Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ |
| Remarks: <u>SITE IS IN SWALE DOWNSLOPE FROM IRRIGATED FIELD AND UPSLOPE FROM ABANDONED RAILROAD EMBANKMENT. RR GRADE BLOCKS SURFACE RUNOFF. SOILS ARE "PROBLEM SOILS" AND DISTURBED BY RR CONSTRUCTION AND DEPOSITION OF SEDIMENT FROM UPSLOPE SOURCES (CROP FIELD AND RANGELAND)</u> |  |

**VEGETATION – Use scientific names of plants.**

| Stratum (Plot size: _____)                        | Absolute % Cover              | Dominant Species? | Indicator Status | Dominance Test worksheet:  |
|---|-------------------------------|-------------------|------------------|--|
| <b>Tree Stratum</b> (Plot size: _____)            |                               |                   |                  | Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)<br><br>Total Number of Dominant Species Across All Strata: <u>3</u> (B)<br><br>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66.6</u> (A/B)   |
| 1. <u>NONE</u>                                    |                               |                   |                  |  |
| 2. _____  |                               |                   |                  |  |
| 3. _____  |                               |                   |                  |  |
| 4. _____  |                               |                   |                  |  |
| _____ = Total Cover                               |                               |                   |                  | <b>Prevalence Index worksheet:</b><br>Total % Cover of: _____ Multiply by: _____<br>OBL species _____ x 1 = _____<br>FACW species _____ x 2 = _____<br>FAC species _____ x 3 = _____<br>FACU species _____ x 4 = _____<br>UPL species _____ x 5 = _____<br>Column Totals: _____ (A) _____ (B)<br><br>Prevalence Index = B/A = _____  |
| <b>Sapling/Shrub Stratum</b> (Plot size: _____)   |                               |                   |                  |  |
| 1. <u>NONE</u>                                    |                               |                   |                  |  |
| 2. _____  |                               |                   |                  |  |
| 3. _____  |                               |                   |                  |  |
| _____ = Total Cover                               |                               |                   |                  |  |
| <b>Herb Stratum</b> (Plot size: <u>0.1 ACRE</u> ) |                               |                   |                  | <b>Hydrophytic Vegetation Indicators:</b><br><input checked="" type="checkbox"/> Dominance Test is >50%<br><input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup><br><input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)<br><input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)<br><br><sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. |
| 1. <u>PANICUM OBTUSUM</u>                         | <u>30</u>                     | <u>YES</u>        | <u>FAC</u>       |  |
| 2. <u>SOLANUM ELEAGNIFOLIUM</u>                   | <u>10</u>                     | <u>NO</u>         | <u>UPL</u>       |  |
| 3. <u>SORGHUM HALPENSIS</u>                       | <u>20</u>                     | <u>YES</u>        | <u>FACU</u>      |  |
| 4. <u>ECHINOCHLOA COLONA</u>                      | <u>20</u>                     | <u>YES</u>        | <u>FACW</u>      |  |
| 5. <u>XANTHIUM STRUMARIUM</u>                     | <u>2</u>                      | <u>NO</u>         | <u>FACU</u>      |  |
| 6. <u>AMARANTHUS POWELLII</u>                     | <u>5</u>                      | <u>NO</u>         | <u>UPL</u>       |  |
| 7. <u>HILARIA MUTICA</u>                          | <u>2</u>                      | <u>NO</u>         | <u>UPL</u>       |  |
| 8. <u>ASCLEPIAS ENGELMANNII</u>                   | <u>10</u>                     | <u>NO</u>         | <u>UPL</u>       |  |
| _____ = Total Cover                               |                               |                   |                  |  |
| <b>Woody Vine Stratum</b> (Plot size: _____)      |                               |                   |                  | <b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="checkbox"/> No _____  |
| 1. <u>NONE</u>                                    |                               |                   |                  |  |
| 2. _____  |                               |                   |                  |  |
| _____ = Total Cover                               |                               |                   |                  |  |
| % Bare Ground in Herb Stratum _____               | % Cover of Biotic Crust _____ |                   |                  |  |
| Remarks: _____                                    |                               |                   |                  |  |

SOIL

Sampling Point: SP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

| Depth (inches) | Matrix        |     | Redox Features |   |                   |                  | Texture   | Remarks |
|----------------|---------------|-----|----------------|---|-------------------|------------------|-----------|---------|
|                | Color (moist) | %   | Color (moist)  | % | Type <sup>1</sup> | Loc <sup>2</sup> |           |         |
| 0-20"          | 7.5YR 3/3     | 100 |                |   |                   |                  | CLAY LOAM |         |
|                |               |     |                |   |                   |                  |           |         |
|                |               |     |                |   |                   |                  |           |         |
|                |               |     |                |   |                   |                  |           |         |
|                |               |     |                |   |                   |                  |           |         |
|                |               |     |                |   |                   |                  |           |         |
|                |               |     |                |   |                   |                  |           |         |
|                |               |     |                |   |                   |                  |           |         |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

- Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)
- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Sandy Redox (S5)           | <input type="checkbox"/> Indicators for Problematic Hydric Soils <sup>3</sup> : |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Stripped Matrix (S6)       | <input type="checkbox"/> 1 cm Muck (A9) (LRR C)                                 |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Mucky Mineral (F1)   | <input type="checkbox"/> 2 cm Muck (A10) (LRR B)                                |
| <input type="checkbox"/> Stratified Layers (A5) (LRR C)    | <input type="checkbox"/> Loamy Gleyed Matrix (F2)   | <input type="checkbox"/> Reduced Vertic (F18)                                   |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR D)            | <input type="checkbox"/> Depleted Matrix (F3)       | <input type="checkbox"/> Red Parent Material (TF2)                              |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Redox Dark Surface (F6)    | <input type="checkbox"/> Other (Explain in Remarks)                             |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Depleted Dark Surface (F7) |   |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Redox Depressions (F8)     |   |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          | <input type="checkbox"/> Vernal Pools (F9)          |   |

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):  
 Type: \_\_\_\_\_  
 Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No

Remarks: NO HORIZON DEVELOPMENT OR REDOX FEATURES. SOIL COLOR AND CHROMA THE SAME AS ADJACENT UPLANDS. THIS IS A "PROBLEM SOIL".

HYDROLOGY

- Wetland Hydrology Indicators:
- Primary Indicators (minimum of one required; check all that apply)
- |  |  |   |
|--|--|---|
| <input checked="" type="checkbox"/> Surface Water (A1)             | <input type="checkbox"/> Salt Crust (B11)                              | Secondary Indicators (2 or more required)                             |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Biotic Crust (B12)                            | <input type="checkbox"/> Water Marks (B1) (Riverine)                  |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                   | <input checked="" type="checkbox"/> Sediment Deposits (B2) (Riverine) |
| <input type="checkbox"/> Water Marks (B1) (Nonriverine)            | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                    | <input type="checkbox"/> Drift Deposits (B3) (Riverine)               |
| <input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)      | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) | <input type="checkbox"/> Drainage Patterns (B10)                      |
| <input type="checkbox"/> Drift Deposits (B3) (Nonriverine)         | <input type="checkbox"/> Presence of Reduced Iron (C4)                 | <input type="checkbox"/> Dry-Season Water Table (C2)                  |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)    | <input type="checkbox"/> Crayfish Burrows (C8)                        |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Thin Muck Surface (C7)                        | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)    |
| <input type="checkbox"/> Water-Stained Leaves (B9)                 | <input type="checkbox"/> Other (Explain in Remarks)                    | <input type="checkbox"/> Shallow Aquitard (D3)                        |
|  |  | <input type="checkbox"/> FAC-Neutral Test (D5)                        |

Field Observations:

Surface Water Present? Yes  No \_\_\_\_\_ Depth (inches): 2"

Water Table Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_

Saturation Present? Yes \_\_\_\_\_ No \_\_\_\_\_ Depth (inches): \_\_\_\_\_  
 (includes capillary fringe)

Wetland Hydrology Present? Yes  No \_\_\_\_\_

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: THIS SITE EVALUATED IN SPRING-JUNE AND FOLLOWING RAINSTORM IN SEPTEMBER. APPEARS TO ONLY RETAIN WATER AFTER SIGNIFICANT STORM EVENTS

**WETLAND DETERMINATION DATA FORM – Arid West Region**

Project/Site: IABR - COOPER RANCH City/County: LUNA Sampling Date: 9/9/09  
 Applicant/Owner: \_\_\_\_\_ State: NM Sampling Point: SP-4  
 Investigator(s): J ELLIOTT Section, Township, Range: SEC 8 T29 N R9 W  
 Landform (hillslope, terrace, etc.): TERRACE Local relief (concave, convex, none): NONE Slope (%): 0  
 Subregion (LRR): \_\_\_\_\_ Lat: \_\_\_\_\_ Long: \_\_\_\_\_ Datum: \_\_\_\_\_  
 Soil Map Unit Name: \_\_\_\_\_ NWI classification: \_\_\_\_\_

Are climatic / hydrologic conditions on the site typical for this time of year? Yes \_\_\_\_\_ No  (If no, explain in Remarks.)  
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ significantly disturbed? Are "Normal Circumstances" present? Yes \_\_\_\_\_ No   
 Are Vegetation \_\_\_\_\_, Soil \_\_\_\_\_, or Hydrology \_\_\_\_\_ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.**

|  |  |
|--|--|
| Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/><br>Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/><br>Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/> | Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/> |
| Remarks: <u>SITE IS DOWNSLOPE FROM ADJACENT IRRIGATED CROPLAND AND UPSLOPE FROM ABANDONED RAILROAD GRADE THAT BLOCKS OVERLAND WATER FLOW</u>   |  |

**VEGETATION – Use scientific names of plants.**

| Tree Stratum (Plot size: _____)                                   | Absolute % Cover | Dominant Species?  | Indicator Status | Dominance Test worksheet:   |
|---|------------------|--|------------------|---|
| 1. <u>NONE</u>  |                  |  |                  | Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)   |
| 2. _____  |                  |  |                  | Total Number of Dominant Species Across All Strata: <u>1</u> (B)  |
| 3. _____  |                  |  |                  | Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A/B)  |
| 4. _____  |                  |  |                  |   |
| _____ = Total Cover   |                  |  |                  |   |
| Sapling/Shrub Stratum (Plot size: _____)                          | Absolute % Cover | Dominant Species?  | Indicator Status | Prevalence Index worksheet:   |
| 1. <u>NONE</u>  |                  |  |                  | Total % Cover of: _____ Multiply by: _____  |
| 2. _____  |                  |  |                  | OBL species _____ x 1 = _____   |
| 3. _____  |                  |  |                  | FACW species _____ x 2 = _____  |
| 4. _____  |                  |  |                  | FAC species _____ x 3 = _____   |
| 5. _____  |                  |  |                  | FACU species _____ x 4 = _____  |
| _____ = Total Cover   |                  |  |                  | UPL species _____ x 5 = _____   |
|   |                  |  |                  | Column Totals: _____ (A) _____ (B)  |
|   |                  |  |                  | Prevalence Index = B/A = _____  |
| Herb Stratum (Plot size: <u>0.1 ACRE</u> )                        | Absolute % Cover | Dominant Species?  | Indicator Status | Hydrophytic Vegetation Indicators:  |
| 1. <u>AMARANTHUS POLYGLYCH</u>                                    | <u>85</u>        | <u>YES</u>   | <u>UPL</u>       | <input type="checkbox"/> Dominance Test is >50%   |
| 2. <u>SCIRPUS HALEDENSE</u>                                       | <u>5</u>         | <u>NO</u>  | <u>UPL</u>       | <input type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup>  |
| 3. <u>HILARIA MUTICA</u>  | <u>2</u>         | <u>NO</u>  | <u>UPL</u>       | <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) |
| 4. _____  |                  |  |                  | <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  |
| 5. _____  |                  |  |                  |   |
| 6. _____  |                  |  |                  |   |
| 7. _____  |                  |  |                  |   |
| 8. _____  |                  |  |                  |   |
| <u>92</u> = Total Cover   |                  |  |                  |   |
| Woody Vine Stratum (Plot size: _____)                             | Absolute % Cover | Dominant Species?  | Indicator Status | Footnote:   |
| 1. <u>NONE</u>  |                  |  |                  | <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.              |
| 2. _____  |                  |  |                  |   |
| <u>0</u> = Total Cover  |                  |  |                  |   |
| % Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____ |                  | Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> |                  |   |
| Remarks: _____  |                  |  |                  |   |

SOIL

Sampling Point: SP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

| Depth<br>(inches) | Matrix        |   | Redox Features |   |                   |                  | Texture   | Remarks |
|-------------------|---------------|---|----------------|---|-------------------|------------------|-----------|---------|
|                   | Color (moist) | % | Color (moist)  | % | Type <sup>1</sup> | Loc <sup>2</sup> |           |         |
| 0-20+             | 7.5YR 3/3     |   |                |   |                   |                  | CLAY LOAM |         |
|                   |               |   |                |   |                   |                  |           |         |
|                   |               |   |                |   |                   |                  |           |         |
|                   |               |   |                |   |                   |                  |           |         |
|                   |               |   |                |   |                   |                  |           |         |
|                   |               |   |                |   |                   |                  |           |         |
|                   |               |   |                |   |                   |                  |           |         |
|                   |               |   |                |   |                   |                  |           |         |

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils<sup>3</sup>:

- |  |   |   |
|--|---|---|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)           | <input type="checkbox"/> 1 cm Muck (A9) (LRR C)     |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)       | <input type="checkbox"/> 2 cm Muck (A10) (LRR B)    |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1)   | <input type="checkbox"/> Reduced Vertic (F18)       |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)   | <input type="checkbox"/> Red Parent Material (TF2)  |
| <input type="checkbox"/> Stratified Layers (A5) (LRR C)    | <input type="checkbox"/> Depleted Matrix (F3)       | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR D)            | <input type="checkbox"/> Redox Dark Surface (F6)    |   |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Dark Surface (F7) |   |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Depressions (F8)     |   |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Vernal Pools (F9)          |   |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          |   |   |

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: \_\_\_\_\_  
Depth (inches): \_\_\_\_\_

Hydric Soil Present? Yes \_\_\_\_\_ No \_\_\_\_\_

Remarks: NO HORIZON DEVELOPMENT NO REDOX FEATURES  
COLOR AND CHROMA THE SAME AS SP-3

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Salt Crust (B11)                              | <input type="checkbox"/> Water Marks (B1) (Riverine)               |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Biotic Crust (B12)                            | <input type="checkbox"/> Sediment Deposits (B2) (Riverine)         |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                   | <input type="checkbox"/> Drift Deposits (B3) (Riverine)            |
| <input type="checkbox"/> Water Marks (B1) (Nonriverine)            | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                    | <input type="checkbox"/> Drainage Patterns (B10)                   |
| <input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)      | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) | <input type="checkbox"/> Dry-Season Water Table (C2)               |
| <input type="checkbox"/> Drift Deposits (B3) (Nonriverine)         | <input type="checkbox"/> Presence of Reduced Iron (C4)                 | <input type="checkbox"/> Crayfish Burrows (C8)                     |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)    | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Thin Muck Surface (C7)                        | <input type="checkbox"/> Shallow Aquitard (D3)                     |
| <input type="checkbox"/> Water-Stained Leaves (B9)                 | <input type="checkbox"/> Other (Explain in Remarks)                    | <input type="checkbox"/> FAC-Neutral Test (D5)                     |

Field Observations:

Surface Water Present? Yes \_\_\_\_\_ No  Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes \_\_\_\_\_ No  Depth (inches): \_\_\_\_\_  
 Saturation Present? Yes \_\_\_\_\_ No  Depth (inches): \_\_\_\_\_  
 (includes capillary fringe)

Wetland Hydrology Present? Yes \_\_\_\_\_ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

**Photo Log  
For Sapphire Energy  
Field Visit**

**March 5, 2009**



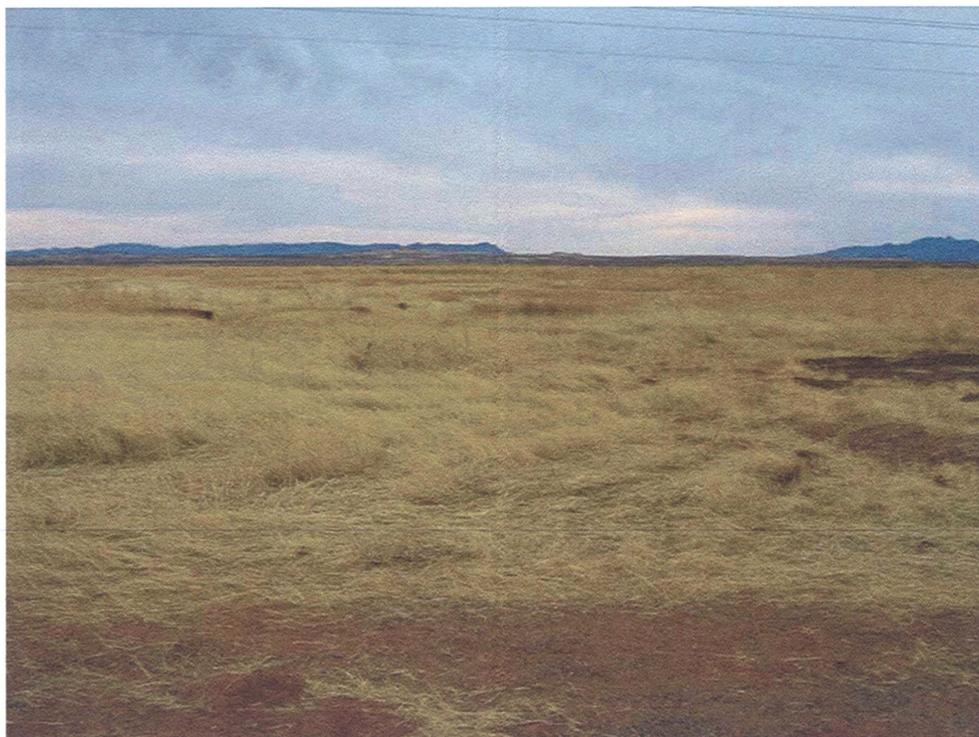
View NE from SW corner Section 8



View E along canal from mid-west edge of Section 8



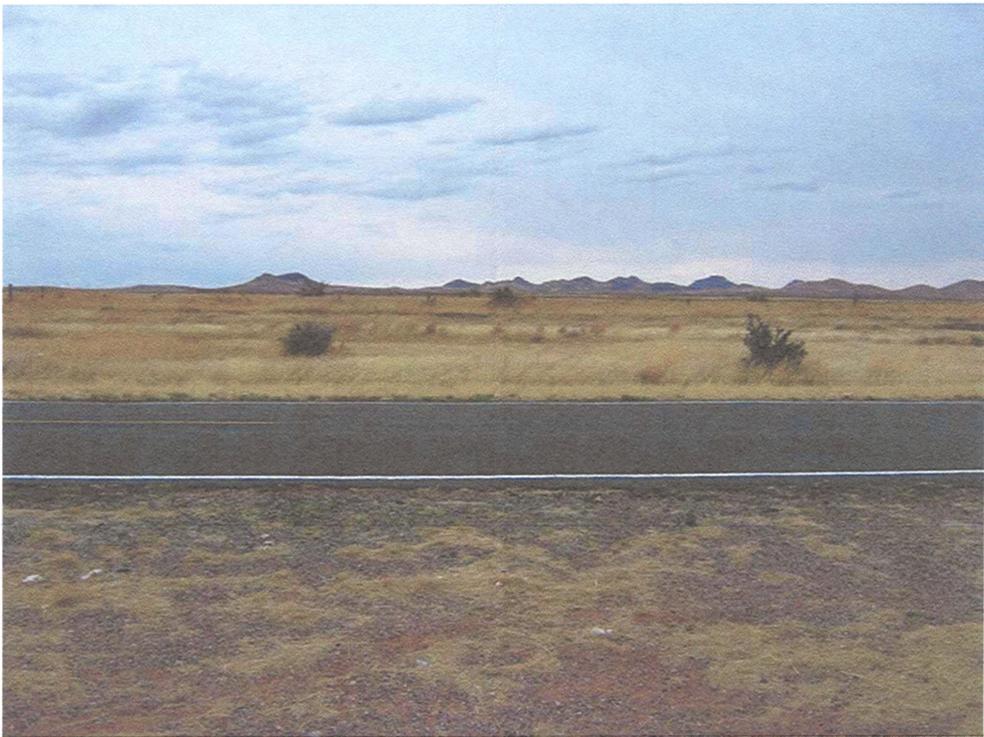
View SE from NW corner Section 8



View S from north central point of Section 8



View S from NW portion of Section 8



View N from NW portion of Section 8 (the small piece of property across highway)



View N from S-mid point of Section 8



View NW from SE corner Section 8



View NE from SE corner Section 8



View SW from E-mid point of Section 9



View NW from SE corner Section 9



View N from S-mid point of Section 9



View S from middle of Section 8

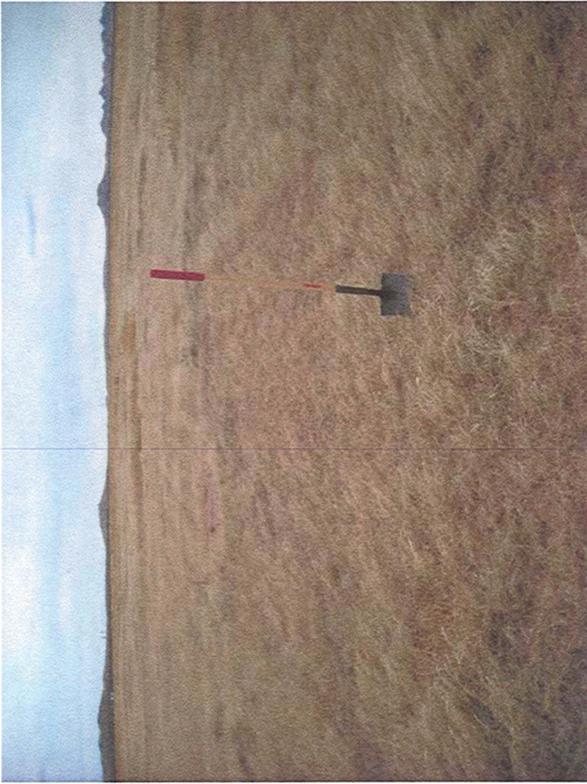


Photo 1: Plowmarks in abandoned field of the proposed project (photograph taken facing north in southwestern portion of project area).

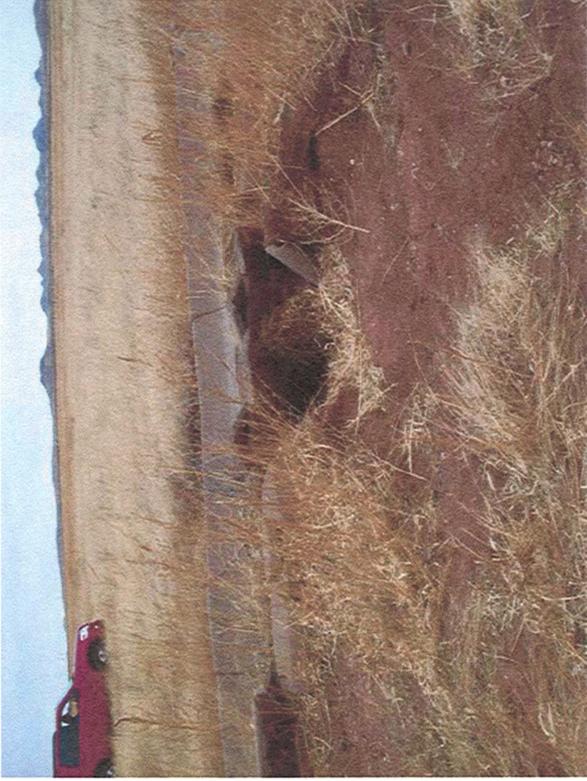


Photo 2: Concrete canal (photograph taken facing north in center of proposed project area).



Photo 3: Well head east of proposed project (photograph taken facing west toward project area). Wells on the property have been inventoried for potential future use in the project.



Photo 4: Powerline and abandoned field in northern portion of proposed project area (photograph taken facing north to northern edge of project area).



Photo 5: Southern boundary of proposed project (photograph taken facing north across project area).



Photo 6: Abandoned field in project area (facing north in southwestern portion of project area).

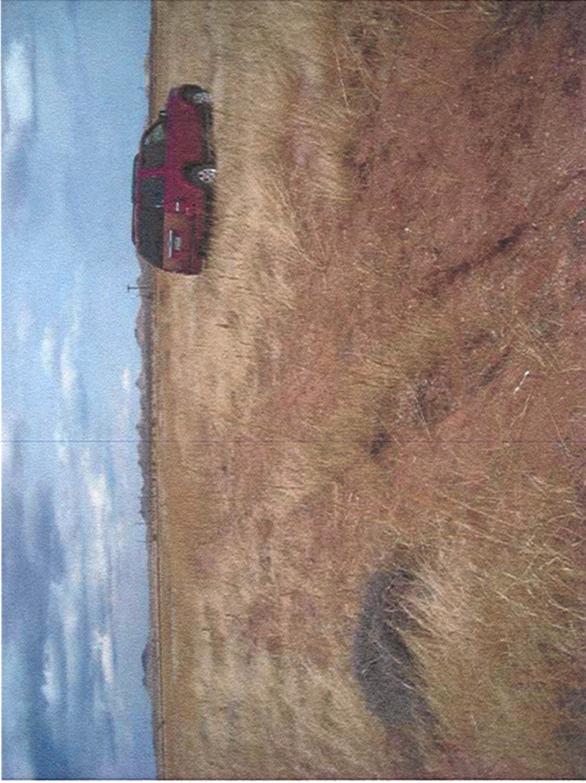


Photo 7: Small eroded area in eastern portion of proposed project (photograph taken facing north).

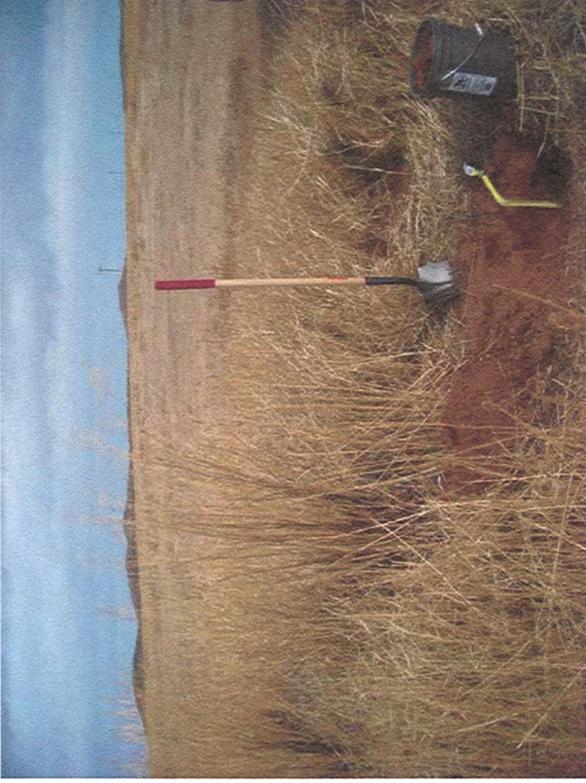


Photo 8: Powerline and abandoned field in southeastern portion of proposed project area (photograph taken facing northwest toward center of project area).

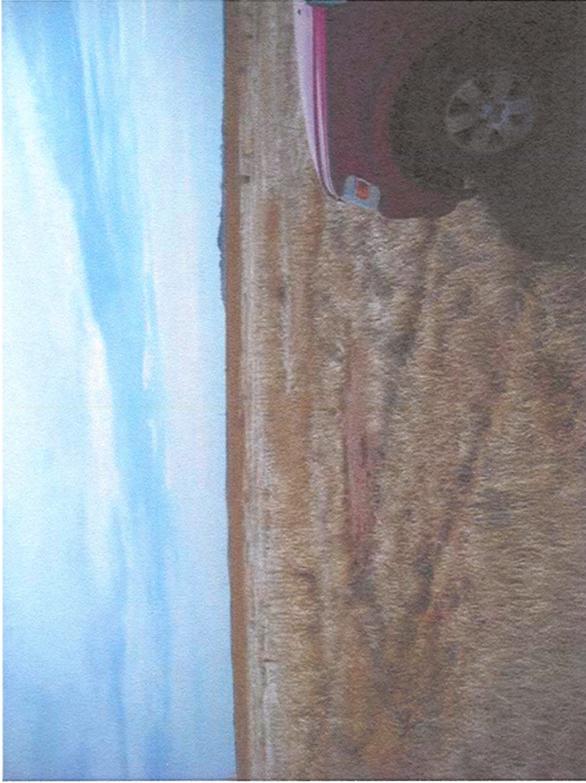


Photo 9: Eastern edge of proposed project (photograph taken facing east past the project boundary).

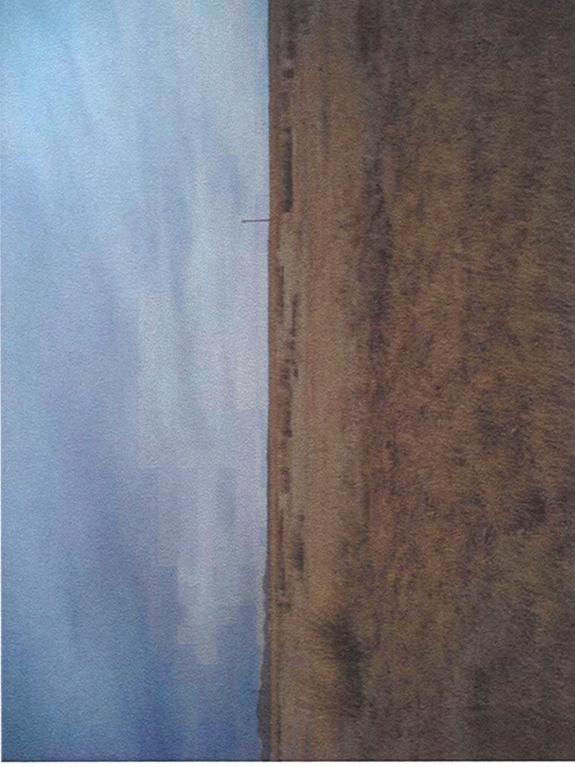


Photo 10: Powerline and abandoned field in southwestern portion of proposed project area (photograph taken facing northeast toward center of project area).

# Mimbres Basin, NM

| Common Name                     | Scientific Name   | County                      | Status                                   |
|---------------------------------|---|-----------------------------|--|
| <i>Fish</i>                     |   |                             |  |
| Chub, Roundtail                 | Gila robusta  | Hidalgo                     | State: Endangered                        |
| Minnow, Loach                   | Tiaroga cobitis   | Hidalgo                     | Federal: Threatened<br>State: Threatened |
| Spikedace                       | Meda fulgida  | Hidalgo                     | Federal: Threatened<br>State: Endangered |
| <i>Amphibians</i>               |   |                             |  |
| Frog, Leopard, Chiricahua       | Rana chiricahuensis                                       | Hidalgo<br>Luna             | Federal: Threatened                      |
| Frog, Leopard, Lowland          | Rana yavapaiensis   | Hidalgo                     | State: Endangered                        |
| Toad, Desert, Sonoran           | Bufo alvarius   | Hidalgo                     | State: Threatened                        |
| Toad, Narrowmouth, Great Plains | Gastrophryne olivacea                                     | Luna                        | State: Endangered                        |
| <i>Reptiles</i>                 |   |                             |  |
| Lizard, Bunchgrass, Slevin's    | Sceloporus slevini  | Hidalgo                     | State: Threatened                        |
| Monster, Gila, Reticulate       | Heloderma suspectum suspectum (NM,AZ)                     | Hidalgo<br>Luna             | State: Endangered                        |
| Rattlesnake, Ridgenose, NM      | Crotalus willardi obscurus (NM)                           | Hidalgo                     | Federal: Threatened<br>State: Endangered |
| Rattlesnake, Rock, Mottled      | Crotalus lepidus lepidus (NM)                             | Hidalgo                     | State: Threatened                        |
| Skink, Mountain                 | Eumeces callicephalus                                     | Hidalgo                     | State NM: Threatened                     |
| Snake, Garter, Mexican          | Thamnophis eques megalops (NM)                            | Hidalgo                     | State: Endangered                        |
| Snake, Garter, Narrowhead       | Thamnophis rufipunctatus rufipunctatus (NM)               | Hidalgo                     | State: Threatened                        |
| Snake, Rat, Green               | Senticolis triaspis intermedia (NM,AZ)                    | Hidalgo                     | State: Threatened                        |
| Whiptail, Gray-checked          | Aspidoscelis dixonii                                      | Hidalgo                     | State: Endangered                        |
| Whiptail, Spotted, Canyon       | Aspidoscelis burti stictogrammus (NM,AZ);xanthonotus (AZ) | Hidalgo                     | State: Threatened                        |
| <i>Birds</i>                    |   |                             |  |
| Tyrannulet, Beardless, N.       | Camptostoma imberbe ridgwayi (NM)                         | Hidalgo                     | State: Endangered                        |
| Black-Hawk, Common              | Buteogallus anthracinus anthracinus (NM)                  | Dona Ana<br>Hidalgo<br>Luna | State: Threatened                        |
| Bunting, Varied                 | Passerina versicolor versicolor (NM);dickeyae (NM)        | Dona Ana<br>Hidalgo<br>Luna | State: Threatened                        |
| Cormorant, Neotropic            | Phalacrocorax brasilianus                                 | Dona Ana<br>Hidalgo<br>Luna | State: Threatened                        |
| Eagle, Bald                     | Haliaeetus leucocephalus alascanus (NM)                   | Dona Ana<br>Hidalgo<br>Luna | State: Threatened                        |
| Falcon, Aplomado                | Falco femoralis septentrionalis (NM)                      | Dona Ana<br>Hidalgo<br>Luna | Federal: Endangered<br>State: Endangered |
| Falcon, Peregrine               | Falco peregrinus anatum                                   | Dona Ana<br>Hidalgo<br>Luna | State: Threatened                        |
| Falcon, Peregrine, Arctic       | Falco peregrinus tundrius                                 | Dona Ana<br>Hidalgo<br>Luna | State: Threatened                        |
| Flycatcher, Willow, SW.         | Empidonax traillii extimus                                | Dona Ana<br>Hidalgo<br>Luna | Federal: Endangered<br>State: Endangered |
| Ground-dove, Common             | Columbina passerina pallescens (NM)                       | Dona Ana<br>Hidalgo<br>Luna | State: Endangered                        |

|                                 |  |                       |   |
|---------------------------------|--|-----------------------|---|
| Hummingbird, Broad-billed       | <i>Cynanthus latirostris magicus</i> (NM)                | Dona Ana Hidalgo      | State: Threatened                           |
| Hummingbird, Costa's            | <i>Calypte costae</i>                                    | Dona Ana Hidalgo      | State: Threatened                           |
| Hummingbird, Lucifer            | <i>Calothorax lucifer</i>                                | Hidalgo Luna          | State NM: Threatened                        |
| Hummingbird, Violet-crowned     | <i>Amazilia violiceps ellioti</i> (NM)                   | Dona Ana Hidalgo Luna | State NM: Threatened                        |
| Hummingbird, White-eared        | <i>Hylocharis leucotis borealis</i> (NM)                 | Hidalgo               | State NM: Threatened                        |
| Junco, Yellow-eyed              | <i>Junco phaeonotus palliatus</i> (NM)                   | Hidalgo               | State NM: Threatened                        |
| Kingbird, Thick-billed          | <i>Tyrannus crassirostris</i>                            | Hidalgo               | State NM: Endangered                        |
| Nightjar, Buff-collared         | <i>Caprimulgus ridgwayi ridgwayi</i> (NM)                | Dona Ana Hidalgo      | State NM: Endangered                        |
| Screech-Owl, Whiskered          | <i>Megascops trichopsis asperus</i> (NM)                 | Hidalgo               | State NM: Threatened                        |
| Owl, Spotted, Mexican           | <i>Strix occidentalis lucida</i> (NM,AZ)                 | Dona Ana Hidalgo Luna | Federal: Threatened                         |
| Pelican, Brown                  | <i>Pelecanus occidentalis carolinensis</i> (NM)          | Dona Ana Luna         | State NM: Endangered                        |
| Sparrow, Baird's                | <i>Ammodramus bairdii</i>                                | Dona Ana Hidalgo Luna | State NM: Threatened                        |
| Sparrow, Grasshopper, AZ        | <i>Ammodramus savannarum ammoregus</i> (NM,AZ)           | Hidalgo               | State NM: Endangered                        |
| Tern, Least                     | <i>Sterna antillarum athalassos</i> (NM)                 | Dona Ana              | Federal: Endangered<br>State NM: Endangered |
| Towhee, Abert's                 | <i>Pipilo aberti aberti</i> (NM)                         | Hidalgo               | State NM: Threatened                        |
| Trogon, Elegant                 | <i>Trogon elegans canescens</i> (NM)                     | Hidalgo               | State NM: Endangered                        |
| Turkey, Wild, Gould's           | <i>Meleagris gallopavo mexicana</i> (NM,AZ)              | Hidalgo               | State NM: Threatened                        |
| Vireo, Bell's                   | <i>Vireo bellii arizonae</i> (NM,AZ); <i>medius</i> (NM) | Dona Ana Hidalgo Luna | State NM: Threatened                        |
| Vireo, Gray                     | <i>Vireo vicinior</i>                                    | Dona Ana Hidalgo Luna | State NM: Threatened                        |
| Woodpecker, Gila                | <i>Melanerpes uropygialis uropygialis</i> (NM)           | Hidalgo               | State NM: Threatened                        |
| <i>Mammals</i>                  |  |                       |   |
| Bat, Long-nosed, Mexican        | <i>Leptonycteris nivalis</i>                             | Hidalgo               | Federal: Endangered<br>State NM: Endangered |
| Bat, Long-nosed, Southern       | <i>Leptonycteris curasoae yerbabuenae</i> (NM,AZ)        | Hidalgo               | Federal: Endangered<br>State NM: Threatened |
| Bat, Spotted                    | <i>Euderma maculatum</i>                                 | Dona Ana              | State NM: Threatened                        |
| Bat, Yellow, Western            | <i>Lasiurus xanthinus</i>                                | Hidalgo               | State NM: Threatened                        |
| Chipmunk, Colorado, Organ Mtns. | <i>Neotamias quadrivittatus australis</i> (NM)           | Dona Ana              | State NM: Threatened                        |
| Gopher, Pocket, Southern        | <i>Thomomys umbrinus emotus</i> (NM)                     | Hidalgo               | State NM: Threatened                        |
| Jaguar                          | <i>Panthera onca arizonensis</i> (NM,AZ)                 | Hidalgo               | Federal: Endangered                         |
| Rabbit, Jack, White-sided       | <i>Lepus callotis gaillardi</i> (NM)                     | Hidalgo               | State NM: Threatened                        |
| Sheep, Bighorn, Desert          | <i>Ovis canadensis mexicana</i> (endangered pops)        | Dona Ana Hidalgo      | State NM: Endangered                        |
| Shrew, Arizona                  | <i>Sorex arizonae</i>                                    | Hidalgo               | State NM: Endangered                        |
| Wolf, Gray, Mexican             | <i>Canis lupus baileyi</i> (NM,AZ)                       | Hidalgo               | Federal: Endangered<br>State NM: Endangered |
| <i>Molluscs</i>                 |  |                       |   |
| Woodlandsnail, Hacheta Grande   | <i>Ashmunella hebardi</i>                                | Hidalgo               | State NM: Threatened                        |
| Woodlandsnail, Cooke's Peak     | <i>Ashmunella macromphala</i>                            | Luna                  | State NM: Threatened                        |
| Snail, Snaggletooth, Shortneck  | <i>Gastrocopta dalliana dalliana</i> (NM)                | Hidalgo               | State NM: Threatened                        |
| Talussnail, Dona Ana            | <i>Sonorella todseni</i>                                 | Dona Ana              | State NM: Threatened                        |

## Mimbres Basin, NM

| Common Name                     | Scientific Name  | County                      | Status                                   |
|---------------------------------|--|-----------------------------|--|
| <i>Fish</i>                     |  |                             |  |
| Chub, Roundtail                 | <i>Gila robusta</i>  | Hidalgo                     | State: Endangered                        |
| Minnow, Loach                   | <i>Tiaroga cobitis</i>   | Hidalgo                     | Federal: Threatened<br>State: Threatened |
| Spikedace                       | <i>Meda fulgida</i>  | Hidalgo                     | Federal: Threatened<br>State: Endangered |
| <i>Amphibians</i>               |  |                             |  |
| Frog, Leopard, Chiricahua       | <i>Rana chiricahuensis</i>   | Hidalgo<br>Luna             | Federal: Threatened                      |
| Frog, Leopard, Lowland          | <i>Rana yavapaiensis</i>   | Hidalgo                     | State: Endangered                        |
| Toad, Desert, Sonoran           | <i>Bufo alvarius</i>   | Hidalgo                     | State: Threatened                        |
| Toad, Narrowmouth, Great Plains | <i>Gastrophryne olivacea</i>   | Luna                        | State: Endangered                        |
| <i>Reptiles</i>                 |  |                             |  |
| Lizard, Bunchgrass, Slevin's    | <i>Sceloporus slevini</i>  | Hidalgo                     | State: Threatened                        |
| Monster, Gila, Reticulate       | <i>Heloderma suspectum suspectum</i> (NM,AZ)                             | Hidalgo<br>Luna             | State: Endangered                        |
| Rattlesnake, Ridgenose, NM      | <i>Crotalus willardi obscurus</i> (NM)                                   | Hidalgo                     | Federal: Threatened<br>State: Endangered |
| Rattlesnake, Rock, Mottled      | <i>Crotalus lepidus lepidus</i> (NM)                                     | Hidalgo                     | State: Threatened                        |
| Skink, Mountain                 | <i>Eumeces callicephalus</i>   | Hidalgo                     | State NM: Threatened                     |
| Snake, Garter, Mexican          | <i>Thamnophis eques megalops</i> (NM)                                    | Hidalgo                     | State: Endangered                        |
| Snake, Garter, Narrowhead       | <i>Thamnophis rufipunctatus rufipunctatus</i> (NM)                       | Hidalgo                     | State: Threatened                        |
| Snake, Rat, Green               | <i>Senticolis triaspis intermedia</i> (NM,AZ)                            | Hidalgo                     | State: Threatened                        |
| Whiptail, Gray-checked          | <i>Aspidoscelis dixonii</i>  | Hidalgo                     | State: Endangered                        |
| Whiptail, Spotted, Canyon       | <i>Aspidoscelis burti stictogrammus</i> (NM,AZ); <i>xanthonotus</i> (AZ) | Hidalgo                     | State: Threatened                        |
| <i>Birds</i>                    |  |                             |  |
| Tyrannulet, Beardless, N.       | <i>Camptostoma imberbe ridgwayi</i> (NM)                                 | Hidalgo                     | State: Endangered                        |
| Black-Hawk, Common              | <i>Buteogallus anthracinus anthracinus</i> (NM)                          | Dona Ana<br>Hidalgo<br>Luna | State: Threatened                        |
| Bunting, Varied                 | <i>Passerina versicolor versicolor</i> (NM); <i>dickeyae</i> (NM)        | Dona Ana<br>Hidalgo<br>Luna | State: Threatened                        |
| Cormorant, Neotropic            | <i>Phalacrocorax brasilianus</i>   | Dona Ana<br>Hidalgo<br>Luna | State: Threatened                        |
| Eagle, Bald                     | <i>Haliaeetus leucocephalus alascanus</i> (NM)                           | Dona Ana<br>Hidalgo<br>Luna | State: Threatened                        |
| Falcon, Aplomado                | <i>Falco femoralis septentrionalis</i> (NM)                              | Dona Ana<br>Hidalgo<br>Luna | Federal: Endangered<br>State: Endangered |
| Falcon, Peregrine               | <i>Falco peregrinus anatum</i>   | Dona Ana<br>Hidalgo<br>Luna | State: Threatened                        |
| Falcon, Peregrine, Arctic       | <i>Falco peregrinus tundrius</i>   | Dona Ana<br>Hidalgo<br>Luna | State: Threatened                        |
| Flycatcher, Willow, SW.         | <i>Empidonax traillii extimus</i>  | Dona Ana<br>Hidalgo<br>Luna | Federal: Endangered<br>State: Endangered |
| Ground-dove, Common             | <i>Columbina passerina pallescens</i> (NM)                               | Dona Ana<br>Hidalgo<br>Luna | State: Endangered                        |

|                                 |  |                             |   |
|---------------------------------|--|-----------------------------|---|
| Hummingbird, Broad-billed       | <i>Cynanthus latirostris magicus</i> (NM)                | Dona Ana<br>Hidalgo         | State: Threatened                           |
| Hummingbird, Costa's            | <i>Calypte costae</i>                                    | Dona Ana<br>Hidalgo         | State: Threatened                           |
| Hummingbird, Lucifer            | <i>Calothorax lucifer</i>                                | Hidalgo<br>Luna             | State NM: Threatened                        |
| Hummingbird, Violet-crowned     | <i>Amazilia violiceps ellioti</i> (NM)                   | Dona Ana<br>Hidalgo<br>Luna | State NM: Threatened                        |
| Hummingbird, White-eared        | <i>Hylocharis leucotis borealis</i> (NM)                 | Hidalgo                     | State NM: Threatened                        |
| Junco, Yellow-eyed              | <i>Junco phaeonotus palliatus</i> (NM)                   | Hidalgo                     | State NM: Threatened                        |
| Kingbird, Thick-billed          | <i>Tyrannus crassirostris</i>                            | Hidalgo                     | State NM: Endangered                        |
| Nighthawk, Buff-collared        | <i>Caprimulgus ridgwayi ridgwayi</i> (NM)                | Dona Ana<br>Hidalgo         | State NM: Endangered                        |
| Screech-Owl, Whiskered          | <i>Megascops trichopsis asperus</i> (NM)                 | Hidalgo                     | State NM: Threatened                        |
| Owl, Spotted, Mexican           | <i>Strix occidentalis lucida</i> (NM,AZ)                 | Dona Ana<br>Hidalgo<br>Luna | Federal: Threatened                         |
| Pelican, Brown                  | <i>Pelecanus occidentalis carolinensis</i> (NM)          | Dona Ana<br>Luna            | State NM: Endangered                        |
| Sparrow, Baird's                | <i>Ammodramus bairdii</i>                                | Dona Ana<br>Hidalgo<br>Luna | State NM: Threatened                        |
| Sparrow, Grasshopper, AZ        | <i>Ammodramus savannarum ammolegus</i><br>(NM,AZ)        | Hidalgo                     | State NM: Endangered                        |
| Tern, Least                     | <i>Sterna antillarum athalassos</i> (NM)                 | Dona Ana                    | Federal: Endangered<br>State NM: Endangered |
| Towhee, Abert's                 | <i>Pipilo aberti aberti</i> (NM)                         | Hidalgo                     | State NM: Threatened                        |
| Trogon, Elegant                 | <i>Trogon elegans canescens</i> (NM)                     | Hidalgo                     | State NM: Endangered                        |
| Turkey, Wild, Gould's           | <i>Meleagris gallopavo mexicana</i> (NM,AZ)              | Hidalgo                     | State NM: Threatened                        |
| Vireo, Bell's                   | <i>Vireo bellii arizonae</i> (NM,AZ); <i>medius</i> (NM) | Dona Ana<br>Hidalgo<br>Luna | State NM: Threatened                        |
| Vireo, Gray                     | <i>Vireo vicinior</i>                                    | Dona Ana<br>Hidalgo<br>Luna | State NM: Threatened                        |
| Woodpecker, Gila                | <i>Melanerpes uropygialis uropygialis</i> (NM)           | Hidalgo                     | State NM: Threatened                        |
| <b>Mammals</b>                  |  |                             |   |
| Bat, Long-nosed, Mexican        | <i>Leptonycteris nivalis</i>                             | Hidalgo                     | Federal: Endangered<br>State NM: Endangered |
| Bat, Long-nosed, Southern       | <i>Leptonycteris curasoae yerbabuenae</i><br>(NM,AZ)     | Hidalgo                     | Federal: Endangered<br>State NM: Threatened |
| Bat, Spotted                    | <i>Euderma maculatum</i>                                 | Dona Ana                    | State NM: Threatened                        |
| Bat, Yellow, Western            | <i>Lasiurus xanthinus</i>                                | Hidalgo                     | State NM: Threatened                        |
| Chipmunk, Colorado, Organ Mtns. | <i>Neotamias quadrivittatus australis</i> (NM)           | Dona Ana                    | State NM: Threatened                        |
| Gopher, Pocket, Southern        | <i>Thomomys umbrinus emotus</i> (NM)                     | Hidalgo                     | State NM: Threatened                        |
| Jaguar                          | <i>Panthera onca arizonensis</i> (NM,AZ)                 | Hidalgo                     | Federal: Endangered                         |
| Rabbit, Jack, White-sided       | <i>Lepus callotis gaillardi</i> (NM)                     | Hidalgo                     | State NM: Threatened                        |
| Sheep, Bighorn, Desert          | <i>Ovis canadensis mexicana</i> (endangered<br>pops)     | Dona Ana<br>Hidalgo         | State NM: Endangered                        |
| Shrew, Arizona                  | <i>Sorex arizonae</i>                                    | Hidalgo                     | State NM: Endangered                        |
| Wolf, Gray, Mexican             | <i>Canis lupus baileyi</i> (NM,AZ)                       | Hidalgo                     | Federal: Endangered<br>State NM: Endangered |
| <b>Molluscs</b>                 |  |                             |   |
| Woodlandsnail, Hacheta Grande   | <i>Ashmunella hebardi</i>                                | Hidalgo                     | State NM: Threatened                        |
| Woodlandsnail, Cooke's Peak     | <i>Ashmunella macromphala</i>                            | Luna                        | State NM: Threatened                        |
| Snail, Snaggletooth, Shortneck  | <i>Gastrocopta dalliana dalliana</i> (NM)                | Hidalgo                     | State NM: Threatened                        |
| Talusssnail, Dona Ana           | <i>Sonorella todseni</i>                                 | Dona Ana                    | State NM: Threatened                        |



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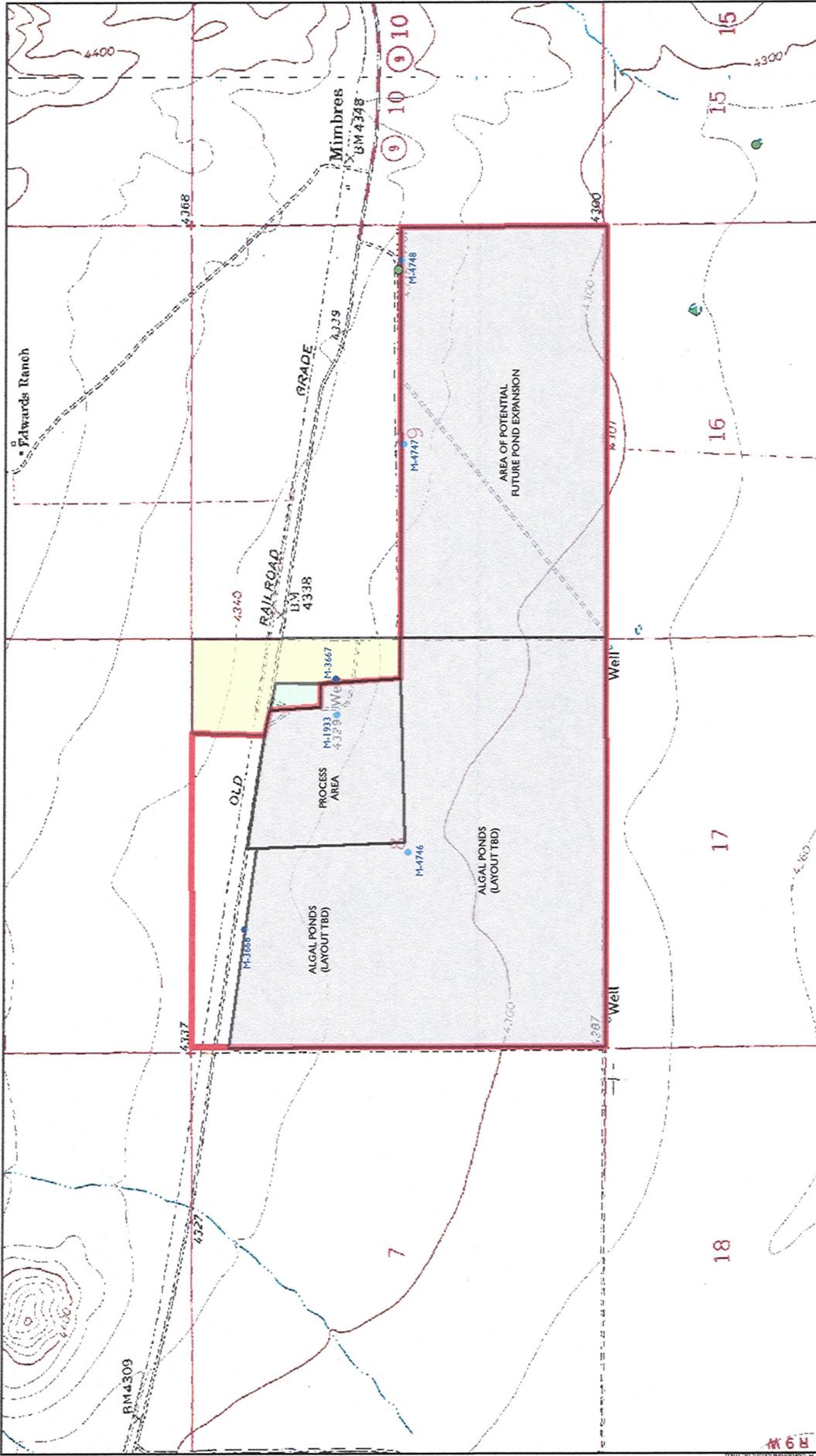
## Results of County Search

| <b>DONA ANA</b>                                       |   |
|---|---|
| Scientific name                                       | County-NM   |
| <i>Agastache cana</i>                                 | Dona Ana, Grant, Luna, Sierra                             |
| <i>Agastache pringlei</i> var. <i>verticillata</i>    | Dona Ana  |
| <i>Astragalus castetteri</i>                          | Dona Ana, Sierra  |
| <i>Castilleja organorum</i>                           | Dona Ana  |
| <i>Draba standleyi</i>                                | Dona Ana, Otero, Sierra, Socorro                          |
| <i>Escobaria organensis</i>                           | Dona Ana  |
| <i>Escobaria sandbergii</i>                           | Dona Ana, Sierra  |
| <i>Escobaria sneedii</i> var. <i>sneedii</i>          | Dona Ana  |
| <i>Escobaria villardii</i>                            | Dona Ana, Otero   |
| <i>Hexalectris spicata</i> var. <i>arizonica</i>      | Dona Ana, Hidalgo, Otero, Sierra                          |
| <i>Hymenoxys vaseyi</i>                               | Dona Ana, Sierra  |
| <i>Oenothera organensis</i>                           | Dona Ana  |
| <i>Opuntia arenaria</i>                               | Dona Ana, Luna, Socorro                                   |
| <i>Peniocereus greggii</i> var. <i>greggii</i>        | Dona Ana, Grant, Hidalgo, Luna                            |
| <i>Penstemon alamosensis</i>                          | Dona Ana, Lincoln, Otero                                  |
| <i>Perityle cernua</i>                                | Dona Ana  |
| <i>Perityle staurophylla</i> var. <i>staurophylla</i> | Dona Ana, Otero, Sierra                                   |
| <i>Polygala rimulicola</i> var. <i>mescalerorum</i>   | Dona Ana  |
| <i>Salvia summa</i>                                   | Chaves, Dona Ana, Eddy                                    |
| <i>Scrophularia laevis</i>                            | Dona Ana  |
| <i>Silene plankii</i>                                 | Bernalillo, Dona Ana, Sandoval, Sierra, Socorro, Torrance |
| <b>GRANT</b>  |   |
| Scientific name                                       | County-NM   |
| <i>Agastache cana</i>                                 | Dona Ana, Grant, Luna, Sierra                             |
| <i>Brickellia chenopodina</i>                         | Grant   |

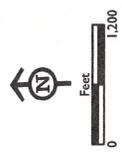
|  |  |
|--|--|
| <i>Cleome multicaulis</i>                          | Grant  |
| <i>Crataegus wootoniana</i>                        | Catron, Grant, Lincoln                                       |
| <i>Cymopterus davidsonii</i>                       | Catron, Grant  |
| <i>Desmodium metcalfei</i>                         | Grant, Sierra  |
| <i>Draba mogollonica</i>                           | Catron, Grant, Sierra, Socorro                               |
| <i>Grindelia arizonica</i> var. <i>neomexicana</i> | Grant, Sierra  |
| <i>Peniocereus greggii</i> var. <i>greggii</i>     | Dona Ana, Grant, Hidalgo, Luna                               |
| <i>Penstemon linarioides</i> ssp. <i>maguirei</i>  | Grant  |
| <i>Phemeranthus humilis</i>                        | Grant, Hidalgo   |
| <i>Puccinellia parishii</i>                        | Catron, Cibola, Grant, Hidalgo, Mckinley, San Juan, Sandoval |
| <i>Scrophularia macrantha</i>                      | Grant, Luna  |
| <i>Silene thurberi</i>                             | Grant, Hidalgo, Sierra                                       |
| <i>Silene wrightii</i>                             | Catron, Grant, Luna, Sierra, Socorro                         |
| <i>Stellaria porsildii</i>                         | Grant  |
| <b>LUNA</b>  |  |
| Scientific name                                    | County-NM  |
| <i>Agastache cana</i>                              | Dona Ana, Grant, Luna, Sierra                                |
| <i>Atriplex griffithsii</i>                        | Hidalgo, Luna  |
| <i>Escobaria orcuttii</i>                          | Hidalgo, Luna  |
| <i>Opuntia arenaria</i>                            | Dona Ana, Luna, Socorro                                      |
| <i>Peniocereus greggii</i> var. <i>greggii</i>     | Dona Ana, Grant, Hidalgo, Luna                               |
| <i>Scrophularia macrantha</i>                      | Grant, Luna  |
| <i>Silene wrightii</i>                             | Catron, Grant, Luna, Sierra, Socorro                         |
| <i>Sphaeralcea procera</i>                         | Luna   |
| <i>Sphaeralcea wrightii</i>                        | Luna   |
| <b>SIERRA</b>                                      |  |
| Scientific name                                    | County-NM  |
| <i>Agastache cana</i>                              | Dona Ana, Grant, Luna, Sierra                                |
| <i>Astragalus castetteri</i>                       | Dona Ana, Sierra   |
| <i>Cirsium wrightii</i>                            | Chaves, Guadalupe, Otero, Sierra, Socorro                    |
| <i>Cuscuta warneri</i>                             | Roosevelt, Sierra  |
| <i>Desmodium metcalfei</i>                         | Grant, Sierra  |
| <i>Draba mogollonica</i>                           | Catron, Grant, Sierra, Socorro                               |
| <i>Draba standleyi</i>                             | Dona Ana, Otero, Sierra, Socorro                             |
| <i>Erigeron scopulinus</i>                         | Catron, Sierra, Socorro                                      |
| <i>Escobaria duncanii</i>                          | Sierra   |

|   |   |
|---|---|
| <i>Escobaria sandbergii</i>                           | Dona Ana, Sierra  |
| <i>Grindelia arizonica</i> var. <i>neomexicana</i>    | Grant, Sierra   |
| <i>Hedeoma todsenii</i>                               | Otero, Sierra   |
| <i>Hexalectris spicata</i> var. <i>arizonica</i>      | Dona Ana, Hidalgo, Otero, Sierra                          |
| <i>Hymenoxys vaseyi</i>                               | Dona Ana, Sierra  |
| <i>Penstemon metcalfei</i>                            | Sierra  |
| <i>Perityle staurophylla</i> var. <i>homoflora</i>    | Sierra, Socorro   |
| <i>Perityle staurophylla</i> var. <i>staurophylla</i> | Dona Ana, Otero, Sierra                                   |
| <i>Physaria gooddingii</i>                            | Catron, Sierra  |
| <i>Silene plankii</i>                                 | Bernalillo, Dona Ana, Sandoval, Sierra, Socorro, Torrance |
| <i>Silene thurberi</i>                                | Grant, Hidalgo, Sierra                                    |
| <i>Silene wrightii</i>                                | Catron, Grant, Luna, Sierra, Socorro                      |

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*Lepidospartum burgessii* © M. Howard, *Argemone pleiacantha* ssp. *pinnatisecta* © R. Sivinski  
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Source: New Mexico, RGIS



- Irrigation Well
- Property Boundary
- Total Acres - 819.8 ac.
- Irrigated Property
- Cook Property
- My Property
- Wetlands (As mapped by National Wetland Inventory)
- ▲ Palustrine Flu-Wetland
- Palustrine Open Water Wetland

Site Plan  
Proposed IABR Facility  
Columbus, New Mexico  
FIGURE 1

