

# **BASELINE DATA REPORT**

## **Section 5.0**

### **Wildlife**

JANUARY 2011

Revision 1

Submitted To:

New Mexico Mining and Minerals Division  
&  
U.S. Forest Service (Cibola National Forest)  
&  
New Mexico Environment Department

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## 5.0 Wildlife

### NMAC 19.10.6.602 D.(13) (d)

*Baseline data shall include, as applicable:*

- d. Wildlife information shall be developed for the permit area and, to the extent practicable, the affected area. Where species may be impacted beyond these areas, the information shall include, to the extent practicable, the area of potential impact. Wildlife information shall include the following:*
  - (i) A map showing habitat types. The applicant is encouraged to contact the Director for recommendation on the preferred habitat classification system. Special or unique wildlife habitat features (e.g., cliffs, talus slopes, ponds, springs, known nests, etc.) within the area of potential impact by the mining operation, shall also be mapped.*
  - (ii) A list of species potentially occurring on the permit or affected area and any additional species potentially impacted by the mining operations. The list must also indicate legal status of each species and which species were confirmed present during baseline studies.*
  - (iii) Data gathered shall include: presence/absence, distribution by season and habitat type, and relative abundance. Key habitat areas shall be identified such as calving/fawning, nesting, foraging, wintering areas, etc. The quality and quantity of the data must be suitable for measuring the success of reclamation and the impacts of the mining operation. Survey methods must be suitable for each species.*
  - (iv) Information collected pursuant to this Part shall be summarized in a report which includes a discussion of the faunal characteristics of the habitats in the permit and affected area. The report shall discuss the anticipated direct, indirect, short- and long-term impacts associated with the proposed operation.*

### 5.1 Introduction

PWI conducted wildlife surveys at the site during 2006 and 2007 to support confirmatory drilling and monitor well installation at the Roca Honda permit area. The surveys were set up to determine the presence and absence of species only, with a focus on listed and special status species, as defined by the United States Fish and Wildlife Service (USFWS) and the New Mexico Department of Game and Fish (NMDGF). In 2008, when RHR determined it would submit a uranium mine permit application per 19.10.6 NMAC, formal methodologies for evaluating wildlife populations were developed and implemented.

A combination of survey methods and techniques were utilized to evaluate wildlife communities within the Roca Honda project area and associated access roads from 2006-2010. The surveyed area includes Section 9, 10, 11, 12, 16, and 21. Section 27 was selected as the reference/control site for avian, ungulate, and furbearing mammal monitoring based on its suitable distance from the permit area, and comparable habitat types, elevation, surface geological and habitat features to the permit area.

Data collected to date includes information on pre-mining habitat types and wildlife community use, and species composition, density, distribution and habitat affinity. These data will be used to assess potential impacts to those habitats and communities during the operational phase of the mine.

The results of the presence/absence surveys conducted in 2006 and 2007 and baseline data results for formal surveys conducted in 2008 and 2010 are included at the end of this section as Appendices 5-A, 5-B and 5-C. A general discussion of the Roca Honda permit area by section and wildlife communities present is provided below.

## 5.2 Wildlife Habitat Types

Five general wildlife habitat types, based upon vegetation classifications, were selected for the Roca Honda permit area. The five habitat types are depicted in Figure 5-1. Section 16 consists of juniper-savanna, shrub-grassland, and piñon-juniper woodland. The site has gently to moderately sloped topography interrupted by sheer rock faces, mesas, and arroyos. Elevation across Section 16 ranges from approximately 7,070 to 7,300 ft and contains several drainage areas. There is evidence of year-round livestock grazing as well as several dirt and two-track roads. Portions of the site are undisturbed, largely because of the geological features and rugged terrain. Vegetation throughout the juniper-savanna and shrub-grassland portions is dominated by sand sagebrush (*Artemisia filifolia*), four-wing saltbush (*Atriplex canescens*), rubber rabbitbrush (*Ericameria nauseosa*), ring muhly (*Muhlenbergia torreyi*), and gramma grasses (*Bouteloua spp.*). Piñon-juniper woodland areas are dominated by pinon pine (*Pinus edulis*), one-seed juniper (*Juniper monosperma*), Bigelow sagebrush (*Artemisia bigelovii*), and broom snakeweed (*Gutierrezia sarothrae*).

Section 16 wildlife communities present are typical of piñon-juniper woodlands interfaces along with juniper-savanna and shrub-grassland. Species include birds such as juniper titmouse (*Baeolophus ridgewayi*) and gray flycatcher (*Empidonax wrightii*) and ungulates such as mule deer (*Odocoileus hemionus*) and elk (*Cervus canadensis*).

The landscape and habitat in Section 9 varies from juniper-savanna and shrub-grassland to piñon-juniper (*Pinus sp.* / *Juniperus sp.*) woodland in the lower areas to sheer rock faces in the higher elevations. Elevation ranges from roughly 7,200 to 7,832 ft and changes sharply throughout Section 9. A topographic feature known as Jesus Mesa occupies approximately 50 percent of the section. A large portion of the surface area on and along Jesus Mesa is bedrock with semi-stabilized sand dunes in some areas. Rafael Canyon runs north to south along the section's western boundary.

Section 10 is positioned along the northeastern slope of Jesus Mesa. Terrain and habitat throughout the section is highly variable and ranges from flat mesa top with rock outcroppings to gentle slopes at the base of the mesa. An unnamed canyon is located in the NW1/4 of the section, with sheer cliff faces greater than 50 ft in height along its rim. Elevation in Section 10 ranges from 7,152 to 7,720 ft. Vegetation throughout the section is dominated by piñon-juniper woodland, with desert-scrub and grassland along the southeast corner and along the canyon bottom in the north.



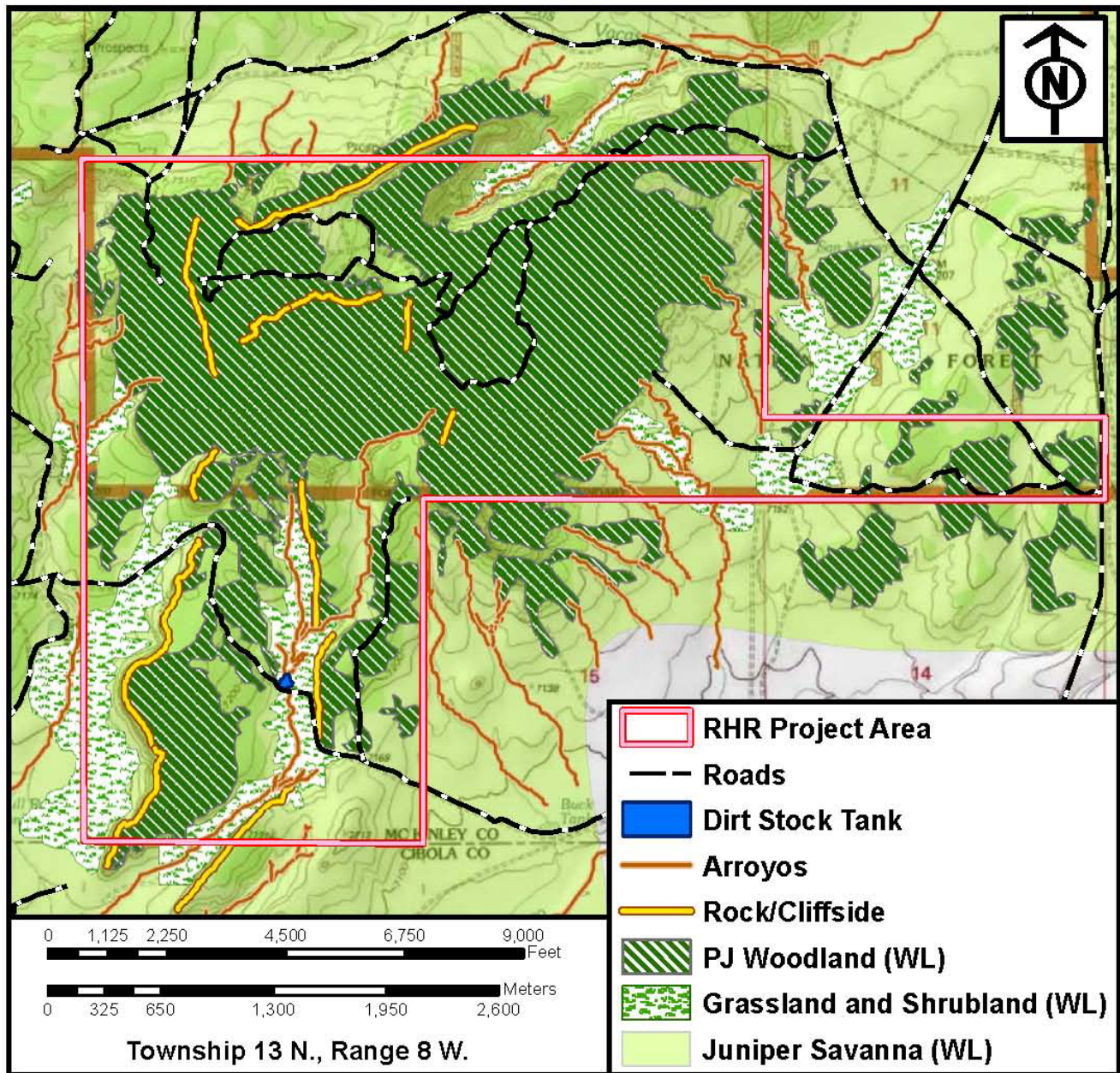


Figure 5-1. Wildlife Habitat Types

Plant communities in Sections 9, 10, and 16 graduate from shrub-grassland, dominated by gramma grasses (*Bouteloua spp.*), ring muhly, and annuals such as rubber rabbitbrush and broom snakeweed to juniper savanna/piñon-juniper woodland ecotone. Juniper savanna and piñon-juniper woodland, a cold-adapted evergreen habitat, tends to occur above shrub-grassland or juniper-savanna vegetation but below pine forest elevations (Peiper 1977). Piñon-juniper woodland areas in all sections are dominated by one-seed juniper and two-needle piñon pine. There are scattered clumps of Ponderosa pine (*Pinus ponderosa*), as well as single mature trees, in the higher elevations in Sections 9 and 10.

Because of the transitional properties of piñon-juniper woodlands, they support important wildlife communities. Wildlife documented at the sites is indicative of juniper-savanna and piñon-juniper interfaces. Avian species detected included obligates and semi-obligates such as western scrub-jay (*Aphelocoma californica*) and juniper titmouse (*Baeolophus griseus*). Typical mammalian species observed included animals such as blacktail jackrabbit (*Lepus californicus*), cliff chipmunk (*Tamias dorsalis*), and mule deer (*Odocoileus hemionus*).

Evidence of grazing by domestic livestock is apparent at lower levels with grazing by native and domestic ungulates at higher elevations. Bladed roads and jeep trails wind throughout the sections. There is evidence of multiple drill pads from historic exploratory drilling. United States Forest Service (USFS) boundary markers and fences are in place at both sections.

#### 5.2.1 Special or Unique Wildlife Habitat Features

Special and unique wildlife features are discussed, mapped, and presented in Appendices 5-A, 5-B and 5-C of this section.

### 5.3 Wildlife Species Potentially Occurring On and Around Permit Area

Prior to implementation of all fieldwork, the current lists of Federal (USFWS 2006–2009) and State of New Mexico (NMDGF 2006–2009) listed and sensitive animal species known to occur in McKinley County, in which the permit area occurs, and Cibola County, which borders Section 16 to the south, were reviewed. In addition, Management Indicator Species, as identified by the USFS, Cibola National Forest (USFS 2005) were also of focus.

#### 5.3.1 Threatened, Endangered, and Special Status Species (Wildlife)

No endangered or threatened species as listed by USFWS or NMDGF were detected during wildlife surveys in 2008 and 2010. However, two state-listed sensitive species, Loggerhead Shrike (*Lanius ludovicianus*) and Gunnison's prairie dog (*Cynomys gunnisoni*), and one state-listed threatened species, Gray Vireo (*Vireo vicinior*) were documented on site during different survey periods. Although the Gunnison's prairie dog was documented, listings for this species only apply to a high altitude subspecies population that does not correlate with the Roca Honda permit area. Additionally, the gray vireo was documented; however, justification for a likely misidentification is provided in Appendix 5-C. All listed or special status species with existing suitable habitat present and the potential to occur at the Roca Honda permit area are addressed in Table 5–1.

Table 5-1. USFWS and NMDGF Endangered, Threatened, Candidate, or Sensitive Species, McKinley and Cibola County, New Mexico

Common Name (scientific name)	Federal Status	State Status	Habitat Associations	Potential to Occur in Permit Area **
<b>Mammals</b>				
Western small-footed myotis bat ( <i>Myotis ciliolabrum melanorhinus</i> )		S	Widespread. Roosts in rock crevices, buildings, caves, mine tunnels, and loose tree bark.	S
Occult little brown myotis bat ( <i>Myotis lucifugus occultus</i> )		S	In the west. Found mainly in mountainous and riparian areas.	NP
Long-legged myotis bat ( <i>Myotis volans interior</i> )		S	Piñon-juniper, oak, and coniferous forests (4,000–9,000 ft).	S
Fringed myotis bat ( <i>Myotis thysanodes thysanodes</i> )		S	Roosts in caves, abandoned buildings, rock crevices, and trees.	S
Long-eared myotis bat ( <i>Myotis evotis evotis</i> )		S	Coniferous forests in northern New Mexico (7,000–8,500 ft).	NP
Townsend's big-eared bat ( <i>Corynorhinus townsendii pallescens</i> )	SOC	S	Found in a variety of desert scrub and relatively open, low- to mid-elevation mixed and coniferous woodlands.	
Spotted bat ( <i>Euderma maculatum</i> )		T	Highly variable habitats from coniferous forest to desert scrub.	S
Cebolleta southern pocket gopher ( <i>Thomomys umbrinus paguatae</i> )	SOC		Limited to higher timbered parts of the Animas Mountains (Hidalgo County, NM).	NP
Gunnison's prairie dog ( <i>Cynomys gunnisoni</i> )		S	Level to gently sloping grasslands, semi-desert and montane shrublands (6,000–12,000 ft).	K
Red fox ( <i>Vulpes vulpes</i> )		S	Diverse habitats including forests, tundra, prairies, and farmland.	K
Black-footed ferret ( <i>Mustela nigripes</i> )	E		Open grasslands with year-round prairie dog colonies. Strongly associated with Black-tailed Prairie Dogs.	NP
Western spotted skunk ( <i>Spilogale gracilis</i> )		S	Variety of habitats including rocky bluffs, cliffs, and brush-bordered canyon streams or stream beds.	K
<b>Birds</b>				
Bald eagle ( <i>Haliaeetus leucocephalus</i> ) *downlisted July 2007	T	T	Mature shoreline forests with scattered openings and little human use, near water with abundant fish and waterfowl.	NP
Northern goshawk ( <i>Accipiter gentilis</i> )	SOC	S	Ponderosa pine, mixed conifer, and spruce-fir forests.	NP
Peregrine falcon ( <i>Falco peregrinus</i> )	SOC	T	Rare breeders (NM) in rocky, steep cliff areas, generally near water or mesic canyons.	S
Mountain plover ( <i>Charadrius montanus</i> )	SOC	S	Dry, disturbed, or intensively grazed open and flat tablelands.	NP

Table 5-1 (Continued)

Common Name (scientific name)	Federal Status	State Status	Habitat Associations	Potential to Occur in Permit Area **
<b>Birds (Continued)</b>				
Least tern ( <i>Sterna antillarum</i> )	E	E	Marine or estuarine shores, or on sandbar islands in large rivers. Prefers areas free from humans and predators.	NP
Black tern ( <i>Chilidonias niger surinamensis</i> )	SOC		Freshwater marshes, wet meadows, lake margins, slow-moving rivers, bogs, shrub-swamps, and along prairie sloughs.	NP
Yellow-billed cuckoo ( <i>Coccyzus americanus</i> )	C	S	Extensive, mature riparian corridors.	NP

(USFWS 2006-2009, NMDGF2006-2009)

**Status**

E Endangered T Threatened C Candidate SOC Species of Concern

S Sensitive Species

**Presence\*\***

K Known, documented observation within permit area.

S Habitat suitable and species suspected to occur within the permit area.

NS Habitat suitable but species is not suspected to occur within the permit area.

NP Habitat not present and species unlikely to occur within the permit area.

### 5.3.2 Management Indicator Species

The Land and Resource Management Plan for the Cibola National Forest and Grasslands, adopted in July 1985 and amended in 2005, identifies 15 Management Indicator Species (USFS 2005). Four Cibola National Forest Management Indicator Species - Rocky Mountain elk (*Cervus elaphus nelsoni*), mule deer (*Odocoileus hemionus*), juniper titmouse (*Baeolophus ridgwayi*), and hairy woodpecker (*Dendrocopos villosus*) - were documented in the permit area during the surveys and are addressed below. The remaining 11 species were not observed in the permit area.

Site use by Rocky Mountain elk (*Cervus elaphus*) was documented during all survey periods. Piñon-juniper and mixed grassland habitats at the permit area appear to support stable elk numbers. This observation is based upon presence and absence surveys only. Species' presence on site was documented by scat, observation of bedding areas, and visual confirmation of harems and cows with young. Suitable grazing, calving, and winter range habitat exists within the permit area.

Mule deer (*Odocoileus hemionus*) use of the permit area was documented during all survey periods by sign and visual confirmation. Does with fawns, juveniles, and sub-adults were also documented. Suitable grazing, fawning, and winter range habitat for mule deer exists within the permit area.

The juniper titmouse (*Baeolophus ridgwayi*) is a species closely tied to piñon–juniper woodland over much of its range with an estimated 39 percent of that habitat within the Cibola National Forest (USFS 2005). Juniper titmice were detected during all surveys, and breeding activity was documented within the permit area.

As primary cavity nesters, hairy woodpeckers (*Dendrocopos villosus*) utilize a wide range of habitats in the southwestern United States. They are a resident nesting species in New Mexico and are highly adaptable. Hairy woodpeckers were documented in and around the permit area during all survey periods, and evidence of nest-site use was documented within the permit area.

Several raptor species and active raptor nests were found during the surveys. No threatened, endangered, or special status species, as listed by state and federal agencies, were documented during the raptor surveys. Golden eagles (two sub-adults and/or juveniles and one adult) were observed during some on-site visits, and one eagle roost was located.

## 5.4 References

NMDGF (New Mexico Department of Game and Fish), 2006–2009. BISON-M/ threatened, endangered, and special status wildlife species in McKinley and Cibola counties, New Mexico, (<http://nmnhp.unm.edu/bisonm/bisonquery.php>).

Peiper, R.D., 1977. “The Southwestern Piñons -Juniper Ecosystem,” In: Aldon, E.F., and T.J. Loring, tech. cords, “Ecology, Uses, and Management of Piñons -Juniper Woodlands,” proceedings of the March 24–25, 1977 workshop, Albuquerque, New Mexico, Gen. Tech. Rep. RM-39, Fort Collins, Colorado, USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, 1–6.

USFS (U.S. Forest Service), 2005 (revised). “Management Indicator Species – Cibola National Forest,” Albuquerque, New Mexico.

USFWS, 2006–2009. *Listed and Sensitive Species in McKinley and Cibola Counties*, New Mexico Ecological Field Services Office, Albuquerque, New Mexico.

## Appendix 5-A

Wildlife Survey Report on State Land  
Section 16, T13N, R8W  
August, 2007

**WILDLIFE SURVEY REPORT FOR STRATHMORE  
RESOURCES U.S. LTD.  
ROCA HONDA PROJECT**

**ON STATE LAND IN  
SECTION 16, T. 13 N., R. 8 W.  
McKINLEY COUNTY, NEW MEXICO**

**PREPARED BY  
PERMITS WEST, INC.  
SANTA FE, NEW MEXICO  
AUGUST 14, 2007**



# **WILDLIFE SURVEY REPORT FOR STRATHMORE RESOURCES U.S. LTD. ROCA HONDA PROJECT**

## **STATE OF NEW MEXICO SECTION 16, T. 13 N, R. 8 W. MCKINLEY COUNTY, NEW MEXICO**

### **1.0 Introduction**

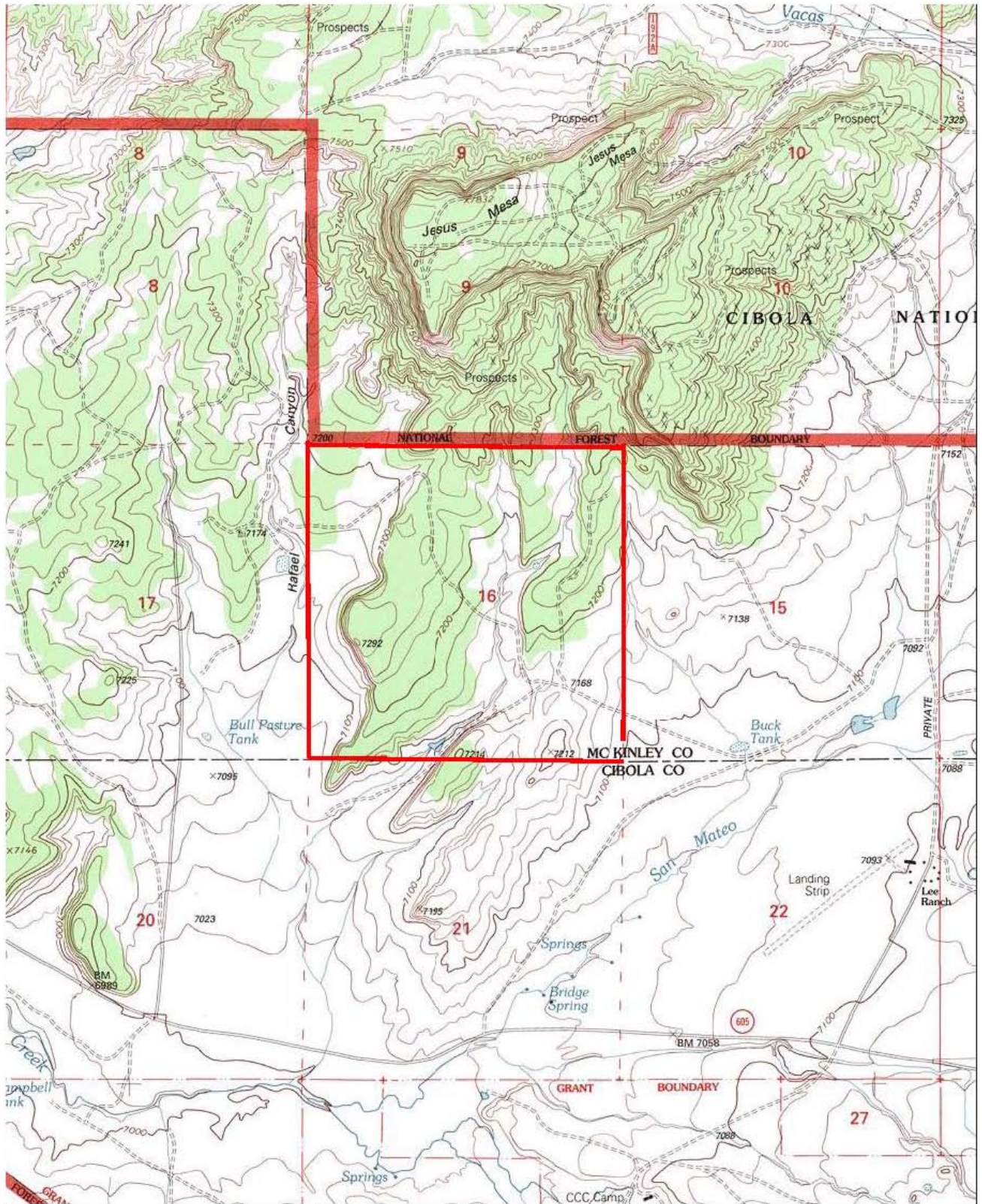
This report addresses the potential for disturbance to endangered, threatened, and special status wildlife species, as listed by Federal and State agencies, that may occur in the project area. The project area is located in McKinley County, New Mexico (Section 16 T. 13 N, R. 8 W), approximately 2 miles northwest of the town of San Mateo (see map on Page 3). Section 16 is currently owned by the State of New Mexico and is administered by the New Mexico State Land Office. Strathmore has General Mining Lease # HG-0036-0001 for all of Section 16.

### **1.1 Existing Habitat**

Section 16 consists of moderately to heavily-grazed desert grassland and open pinon-juniper woodland (see photos at end of section). The site has gently to moderately sloped topography interrupted by sheer rock faces, mesas, and arroyos. Elevation across Section 16 ranges from approximately 7070' – 7300' absl and contains several drainage areas. During the fall survey period, several small areas of inundation existed on-site, including one man-made stock pond. On-site disturbance is distributed throughout the site. There is evidence of year-round livestock grazing, as well as several dirt and two-track roads. Portions of the site are undisturbed due in large part to geological features and rugged terrain. Archeological ruins also exist on-site.

Vegetation throughout the desert grassland portions is dominated by hairy gramma (*Bouteloua hirsuta*), garden purslane (*Portulaca oleracea*), ring muhly (*Muhlenbergia torreyi*), and rubber rabbitbrush (*Ericameria nauseosa*). Open pinon-juniper areas are dominated by Utah juniper (*Juniperus osteosperma*) and two-needle pinon (*Pinus edulis*).

Wildlife communities present are typical of Great Basin Desert / pinon-juniper woodlands interfaces. Species include birds such as juniper titmouse (*Baeolophus ridgewayi*) and gray flycatcher (*Empidonax wrightii*) and ungulates such as mule deer and (*Odocoileus hemionus*) and elk (*Cervus canadensis*).



Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)



## 2.0 Methodology

The current lists of Federal (USFWS, NM Ecological Field Services, 2006-2007) and State of New Mexico (NM Natural Heritage, 2006-2007 and Jankowitz, personal communication, 2007) listed and sensitive animal species known to occur in McKinley County and Cibola County, the border of which lies one mile to the south, were reviewed before fieldwork began. Although all species detected were documented, listed and sensitive species were the focus of the surveys (Appendix I).

Wildlife surveys were conducted at the project site by walking transects along a north-south alignment, approximately 150-200 meters apart. Any discrepancies in transect length and/or distance were due to logistical difficulties caused by changes in topography and elevation. Walked-line transects are commonly utilized to determine avian abundance (Verner, 1985) but also appear to function well for presence/absence surveys for all species in a given area. Survey periods were concentrated during morning hours when most animal species, birds in particular, tend to be more active. Within Section 16, all mesa tops, arroyos, and adjacent habitats were surveyed, including a half-mile buffer zone. During all surveys, cliff faces were scanned for the presence of raptor nests. Potential nest locations and evidence of nest site use from the 2006 season were documented. The surveyors used 8 x 42 and 10 x 40 standard binoculars and a 15-45 x 60 spotting scope for wildlife observation purposes. All vertebrate species detected by sight, sound, and sign were recorded. Weather conditions, altitude, and identifiable plant species were also recorded. Global positioning coordinates were recorded for any prominent features such as den sites or prairie dog colonies. In alignment with standard monitoring protocols, surveys were not performed if precipitation or heavy winds were present.

Prior to starting the raptor surveys, current New Mexico birding reports (NM Ornithological Society, 2007) and associated literature relating to locally occurring birds of prey was reviewed. Due to their federal and state designations, three species were of focus; golden eagle (*Aquila chrysaetos*) – Bald Eagle Protection Act, peregrine falcon (*Falco peregrinus*) – SOC (USFWS) and Threatened (NMDGF), and burrowing owl (*Athene cunicularia*) – SOC (NMDGF). Potential nesting areas were determined by delineating areas on topographical maps and aerial photographs. Habitat associations for specific species were evaluated and timing of nesting surveys was based upon nesting phenology for species expected to occur within the project area.

Raptor surveys were conducted according to standard raptor monitoring methodology (Call, 1978 and Wheeler, 2003). All cliff faces, arroyos, and adjacent habitats were surveyed, including a half-mile buffer zone and a one mile line-of-sight survey for all sections. Suitable nest trees (>8m) were also scanned for the presence of nesting raptors. Potential nest location and evidence of nest site use from the 2006 were documented. Surveyors used 8 x 42 standard binoculars and spotting scopes for observation purposes. Weather, altitude, and global positioning coordinates were recorded for any nests or related sites located during the surveys.

## **3.0 Results**

### **3.1 Survey Periods**

#### **3.1.1 Fall Surveys (2006)**

The project area was surveyed by Wildlife Biologists June M. Galloway and Cindy Lawrence on September 11, 12, and 13, 2006. Weather conditions on-site varied throughout the survey period. Daily conditions ranged from clear and sunny, with winds 1-2 Beaufort (1-6 knots) and 78F, to 67F with overcast skies and no wind.

Since autumn represents a transitional time for almost all animal species and includes events such as migration and rut, survey results during this time period may present only a temporary picture of species regularly utilizing the habitat. Consequently, habitat associations were also assessed.

#### **3.1.2 Winter Surveys (2006)**

During the winter survey period, the project area was surveyed by Wildlife Biologist June M. Galloway on November 30 and December 01, 2006. Days were consistently clear, cold (20-30F), and sunny throughout the survey period. During this season, after many avian species have migrated south to winter roosting grounds, many mammalian species are either in periods of sporadic or continual hibernation while others are less active. A snow storm passed through the area on November 29, resulting in a 3-4" layer of fresh snow. The new snow aided greatly in species identification by providing clear tracks and sign.

#### **3.1.3 Raptor Surveys (2007)**

Due to the existence of available nesting and foraging habitat at the project site and the detection of several raptor species during site visits, focal surveys for raptors were deemed appropriate for Section 16. The project area was surveyed by Wildlife Biologist June M. Galloway on March 23, 26, 27, 2007. One comprehensive one-mile 'line of sight' survey was conducted on April 4, 2007.

#### **3.1.4 Breeding Season Surveys (2007)**

Breeding season surveys were carried out at Section 16 on May 25, 31, and June 01, 2007 by Wildlife Biologists June M. Galloway and Charles Black. Weather conditions were consistently clear, sunny, and still with an average temperature of 73F throughout the survey period. Surveys conducted during this time period should present the most comprehensive picture of animal species utilizing the area during their most critical periods (i.e. breeding, rearing of young).

## **3.2 DISCUSSION**

### **Threatened, Endangered, and Special Status Species (Wildlife)**

Although one species protected by the Bald Eagle Protection Act (1978), golden eagle (*Aquila chrysaetoe*), was observed during fall and winter surveys, no threatened, endangered, or special status species as listed by the USFWS (NM Ecological Field

Services, 2007) and BLM (2007) were documented . Two state listed sensitive species; white-tailed (Gunnison's) prairie dog (*Cynomys gunnisoni*) and loggerhead shrike (*Lanius ludovicianus*) and one state threatened species, gray vireo (*Vireo vicinior*) were documented on site during the fall and summer surveys (Appendix I). State species range mapping also supports the potential for Gunnison's Prairie Dog to occur in the project area. All listed species with existing suitable habitat present and the potential to occur at the project site are addressed below (Table 1). All vertebrate species detected during surveys are listed in taxonomic order in Appendix I. For birds, species names and the order in which they appear follows the most current American Ornithologists' Union list (American Ornithologists' Union 2007). For mammals, species names and order follows Jones et al. (1992). For reptiles and amphibians, species names and order follows Baxter and Stone (1980).

Table 1. Wildlife species listed by the USFWS and BLM as Endangered, Threatened, Candidate, or Special Status (SOC) with potential to occur in McKinley and Cibola Counties, NM (2007).

Common Name (scientific name)	Federal Status	Habitat Associations	Potential to occur in project area **
<b>Mammals</b>			
Black-footed ferret ( <i>Mustela nigripes</i> )	E	Open grasslands with year-round prairie dog colonies. Strongly associated with black-tailed prairie dogs.	NP
<b>Birds</b>			
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	T	Mature shoreline forests with scattered openings and little human use, near water with abundant fish and waterfowl.	NP
Northern goshawk ( <i>Accipiter gentilis</i> )	SOC	Ponderosa pine, mixed conifer, and spruce-fir forests.	NP
Peregrine falcon ( <i>Falco peregrinus</i> )	SOC	Rare breeders (NM) in rocky, steep cliff areas, generally near water or mesic canyons.	NS
Mountain plover ( <i>Charadrius montanus</i> )	SOC	Dry, disturbed, or intensively grazed, open and flat tablelands.	NP
Least tern ( <i>Sterna antillarum</i> )	E	Marine or estuarine shores, or on sand bar islands in large rivers. Prefers areas free from humans and predators.	NP
Black tern ( <i>Chlidonias niger surinamensis</i> )	SOC	Freshwater marshes, wet meadows, lake margins, slow-moving rivers, bogs, shrub-swamps, and along prairie sloughs.	NP

Yellow-billed cuckoo ( <i>Coccyzus americanus</i> )	C	Extensive, mature riparian corridors.	NP
Western burrowing Owl ( <i>Athene cunicularia</i> )	SOC	Grasslands and prairies, associated with prairie dog towns.	NS
Mexican spotted owl ( <i>Strix occidentalis lucida</i> ) Designated Critical Habitat	T	Rocky canyons in mature montane forests below 9500 feet in elevation.	NP
Southwestern willow flycatcher ( <i>Empidonax trillii extimus</i> )	E	Dense, riparian vegetation near surface water or saturated soil, monotypic or mixed stands of native and/or exotic species.	NP
Fish			
Zuni bluehead sucker ( <i>Catostomus discobolous yarrowi</i> )	C	Often inhabits swift water areas in mountain streams and smaller tributaries to large rivers (nursery habitat).	NP

**Status**

E Endangered    T Threatened    C Candidate    SOC Species of Concern

**Presence\*\***

K Known, documented observation within project area.

S Habitat suitable and species suspected to occur within the project area.

NS Habitat suitable but species is not suspected to occur within the project area.

NP Habitat not present and species unlikely to occur within the project area.

Table 2. Wildlife species listed by the USFWS and NMDGF as Endangered, Threatened, Candidate, or Sensitive with potential to occur in McKinley and Cibola Counties, NM (2007).

Common Name (scientific name)	Federal Status	State Status	Habitat Associations	Potential to occur in project area **
Mammals				
Western Small-footed Myotis Bat ( <i>Myotis ciliolabrum melanorhinus</i> )		S	Widespread. Roosts in rock crevices, buildings, caves, mine tunnels, and loose tree bark.	S
Occult Little Brown Myotis Bat ( <i>Myotis lucifugus occultus</i> )		S	In the west, found mainly in mountainous and riparian areas.	NP
Long-legged Myotis Bat ( <i>Myotis volans interior</i> )		S	Pinyon-juniper, oak, and coniferous forests (4000-9000 ft.).	S
Fringed Myotis Bat ( <i>Myotis thysanodes thysanodes</i> )		S	Roosts in caves, abandoned buildings, rock crevices, and trees.	S

Long-eared Myotis Bat ( <i>Myotis evotis evotis</i> )		S	Coniferous forests in northern New Mexico (7000-8500 ft.).	NP
Gunnison's Prairie Dog ( <i>Cynomys gunnisoni</i> )		S	Level to gently sloping grasslands, semi-desert and montane shrublands (6000-12,000 ft.)	K
Red Fox ( <i>Vulpes vulpes</i> )		S	Diverse habitats including forests, tundra, prairies, and farmland.	S
Black-footed Ferret ( <i>Mustela nigripes</i> )	E		Open grasslands with year-round prairie dog colonies. Strongly associated with Black-tailed Prairie Dogs.	NP
Western Spotted Skunk ( <i>Spilogale gracilis</i> )		S	Variety of habitats including rocky bluffs, cliffs, and brush-bordered canyon streams or stream beds.	S
<b>Birds</b>				
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	T	T	Mature shoreline forests with scattered openings and little human use, near water with abundant fish and waterfowl.	NP
Northern Goshawk ( <i>Accipiter gentilis</i> )	SOC	S	Ponderosa pine, mixed conifer, and spruce-fir forests.	NP
Peregrine Falcon ( <i>Falco peregrinus</i> )	SOC	T	Rare breeders (NM) in rocky, steep cliff areas, generally near water or mesic canyons.	NS
Mountain Plover ( <i>Charadrius montanus</i> )	SOC	S	Dry, disturbed, or intensively grazed, open and flat tablelands.	NP
Least Tern ( <i>Sterna antillarum</i> )	E	E	Marine or estuarine shores, or on sand bar islands in large rivers. Prefers areas free from humans and predators.	NP
Black Tern ( <i>Chilidonias niger surinamensis</i> )	SOC		Freshwater marshes, wet meadows, lake margins, slow-moving rivers, bogs, shrub-swamps, and prairie sloughs.	NP
Yellow-billed Cuckoo ( <i>Coccyzus americanus</i> )	C	S	Extensive, mature riparian corridors.	NP
Western Burrowing Owl ( <i>Athene cunicularia</i> )	SOC		Grasslands and prairies, associated with prairie dog towns.	NS
Mexican Spotted Owl ( <i>Strix occidentalis lucida</i> )	T	S	Rocky canyons in mature montane forests below 9500 feet in elevation.	NP

Costa's Hummingbird ( <i>Calypte costae</i> )		T	Desert scrub, chaparral, thorn-scrub, tropical deciduous forest, and suburban areas.	NP
Southwestern Willow Flycatcher ( <i>Empidonax trillii extimus</i> )	E	E	Dense, riparian vegetation near surface water or saturated soil, monotypic or mixed stands of native and/or exotic species.	NP
Loggerhead Shrike ( <i>Lanius ludovicianus</i> )		S	Open countryside – shortgrass prairies, weedy fields, grasslands, agricultural areas, swampy thickets, orchards, and right-of-way corridors.	K
Gray Vireo ( <i>Vireo vicinior</i> )		T	Thorn scrub, oak-juniper woodland, pinon-juniper, dry chaparral, mesquite and riparian willow habitats.	K – detected during migration
<b>Fish</b>				
Zuni Bluehead Sucker ( <i>Catostomus discobolous yarrowi</i> )	C	E	Often inhabits swift water areas in mountain streams and smaller tributaries to large rivers (nursery habitat).	NP

#### Status

E Endangered    T Threatened    C Candidate    SOC Species of Concern

S Sensitive Species

#### Presence\*\*

K Known, documented observation within project area.

S Habitat suitable and species suspected to occur within the project area.

NS Habitat suitable but species is not suspected to occur within the project area.

NP Habitat not present and species unlikely to occur within the project area.

### Species of Concern (Federal)

#### American Peregrine Falcon (*Falco peregrinus*)

Due to extensive reintroduction efforts, peregrine falcons have recovered in the United States to the point where the US Fish and Wildlife Service removed the species from the Endangered Species list in 1999 (USGS, 2006). Although peregrine numbers are healthier than they have been in decades, the falcons are still uncommon in a large portion of their historical range (Johnsgard, P. A.). Peregrine falcons will utilize almost any habitat type that provides hunting opportunities. For nesting purposes, however, cliffs are preferred. Although no peregrine falcons were observed during survey periods there does appear to be marginally suitable habitat for hunting and nesting within and adjacent to Section 16.



### **Western Burrowing Owl (*Athene cunicularia hypugaea*)**

The fragmentation of native grasslands and elimination of prairie dog colonies through out North America appears to be contributing to precipitous declines of burrowing owl populations in several western states, including New Mexico. Burrowing owls nest in grasslands across the western plains and are normally associated with prairie dog colonies. Although burrowing owls are most often associated with black-tailed prairie dogs (*Cynomys ludovicianus*) and Richardson's ground squirrels (*Spermophilus richardsonii*) (Dechant, 2002), marginally suitable habitat exists in the project area. Prairie dog colonies within and adjacent to Section 16 were surveyed for burrowing owls. No individuals or sign were documented.

### **Raptors**

Two raptor species, red-tailed hawk (*Buteo jamaicensis*) and great horned owl (*Bubo virginianus*), were documented during the 2007 raptor surveys. One active great horned owl nest was documented at Section 16, within 500 feet of potential drill hole S3-Jmw-CH-07 and within 50 feet of an existing road, and juvenile owls were seen within ¼ mile of the nest site during the breeding season surveys. No threatened, endangered, or special status species, as listed by state and federal agencies, were detected. Although three golden eagles (2 subadults /juveniles and 1 adult) were observed during on-site visits on February 7 and 8, 2007 and one eagle roost was located, no golden eagles were observed during the focal surveys. Since two of the individuals observed were not of breeding age, it is likely that the eagles were utilizing the area as wintering habitat.

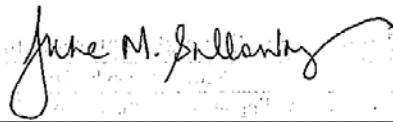
### **3.3 Recommendations**

No construction or drilling activities should be conducted between:

November 1 and March 31 if wintering eagles are present.

March 1 to June 30 if there are active raptor nests.

**Signature of Author:**



June M. Galloway

**Date: August 14, 2007**

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<b>Appendix I. Animal Species Documented At Section 16, T13N, R8W (McKinley County, NM).</b>			
<b>Taxa</b>	<b>Survey Period</b>		
<b>Common Name (scientific name)</b>	<b>Fall (2006)</b>	<b>Winter (2006)</b>	<b>Breeding Season (2007)</b>
<b>Mammals</b>			
Mountain (Nuttall's) cottontail* ( <i>Sylvilagus nuttalli</i> )	X	X	X
Desert cottontail ( <i>Sylvilagus aububoni</i> )	X	X	X
Blacktail jackrabbit* ( <i>Lepus californicus</i> )	X	X	X
Cliff chipmunk ( <i>Tamias dorsalis</i> )	X		X
White-tailed antelope squirrel* ( <i>Amnospermophilus leucurus</i> )	X	X	X
Rock squirrel ( <i>Citellus variegates</i> )	X	X	X
<b>Gunnison's (white-tailed) prairie dog*</b> ( <i>Cynomys gunnisoni</i> )	X		X
Kangaroo rat ( <i>Dipodomys sp.</i> )	X		
White-footed mouse ( <i>Peromyscus spp.</i> - <i>poss. truei</i> and <i>leucopus</i> )	X	X	X
White-throated woodrat* ( <i>Neotoma albigula</i> )	X	X	X
Bushy-tailed woodrat* ( <i>Neotoma albigua</i> )	X	X	X
Porcupine ( <i>Erthizon dorsatum</i> )	X	X	X
Coyote* ( <i>Canis latrans</i> )	X	X	X
Gray fox* ( <i>Urocyon cineroargenteus</i> )	X	X	X
Weasel ( <i>Mustela sp.</i> - <i>poss. frenata</i> )	X	X	X
Badger ( <i>Taxidea taxus</i> )	X		
Bobcat ( <i>Lynx rufus</i> )		X	
Rocky mountain elk* ( <i>Cervus canadensis</i> )	X	X	X

Mule deer* ( <i>Odocoileus hemionus</i> )	X	X	X
<b>Birds</b>			
Turkey vulture ( <i>Cathartes aura</i> )	X		X
Northern harrier ( <i>Circus cyaneus</i> )		X	
Sharp-shinned hawk ( <i>Accipiter striatus</i> )	X		
Red-tailed hawk* / ** ( <i>Buteo jamicensis</i> )	X	X	X
<b>Golden eagle</b> ( <i>Aguila chrysaetos</i> )	X	X	
Mourning dove* ( <i>Zenaida macroura</i> )	X		X
Great-horned owl* / ** ( <i>Bubo virginianus</i> )	X	X	X
Common poorwill ( <i>Phalaenoptilus nuttallii</i> )			X
White-throated swift* ( <i>Aeronautes saxatalis</i> )			X
Black-chinned hummingbird* ( <i>Archilochus alexandri</i> )			X
Broad-tailed hummingbird* ( <i>Selasphorus platycercus</i> )			X
Hairy woodpecker* ( <i>Picoides villosus</i> )	X	X	X
Northern flicker (Red-shafted)* ( <i>Colaptes auratus</i> )	X	X	X
Western wood-peewee* ( <i>Contopus sordidulus</i> )			X
Gray flycatcher* ( <i>Empidonax wrightii</i> )			X
Say's phoebe ( <i>Sayornis saya</i> )	X		X
Ash-throated flycatcher ( <i>Myiarchus tuberculifer</i> )	X		X
Loggerhead shrike ( <i>Lanius ludovicianus</i> )	X		
Cassin's kingbird* ( <i>Tyrannus cassinii</i> )	X		X
<b>Gray vireo</b> ( <i>Vireo vicinior</i> )	X		
Plumbeous vireo* ( <i>Vireo plumbeous</i> )			X

Warbling vireo ( <i>Vireo gilvus</i> )			X
Western scrub jay* ( <i>Aphelocoma californica</i> )	X	X	X
Pinyon jay* ( <i>Gymnorhinus cyanocephalus</i> )	X	X	X
Common raven* ( <i>Corvus corax</i> )	X	X	X
Cliff swallow* ( <i>Petrochelidon pyrrhonata</i> )	X		X
Barn swallow ( <i>Hirundo rustica</i> )			X
Violet-green swallow* ( <i>Tachycineta thalassina</i> )	X		X
Black-capped chickadee* ( <i>Poecile atricapillus</i> )		X	X
Mountain chickadee* ( <i>Poecile gambeli</i> )	X	X	X
Juniper titmouse* ( <i>Baeolophus ridgewayi</i> )	X		X
Bushtit* ( <i>Psatriparus minimus</i> )	X	X	X
White-breasted nuthatch* ( <i>Sitta carolinensis</i> )		X	X
Rock wren* ( <i>Sappinctes obseletus</i> )	X		X
Canyon wren* ( <i>Catherpes mexicanus</i> )	X	X	X
Bewick's wren* ( <i>Thryomanes bewickii</i> )	X		X
Blue-gray gnatcatcher* ( <i>Poliophtila caerulea</i> )	X		X
Western bluebird* ( <i>Sialia mexicana</i> )	X		X
Mountain bluebird* ( <i>Sialia currucoides</i> )			X
American robin* ( <i>Turdus migratorius</i> )	X		X
Northern mockingbird ( <i>Mimus polyglottus</i> )			X
Orange-crowned warbler ( <i>Vermivora celata</i> )	X		
Virginia's warbler ( <i>Vermivora virginiae</i> )	X		
Magnolia warbler ( <i>Dendroica magnolia</i> )	X		

Hooded warbler ( <i>Wilsonia citrine</i> )	X		
Wilson's warbler ( <i>Wilsonia pusilla</i> )	X		
Hepatic tanager ( <i>Piranga flava</i> )			X
Black-headed grosbeak* ( <i>Pheucticus melanocephalus</i> )			X
Green-tailed towhee ( <i>Pipilo chlorurus</i> )	X		
Spotted towhee* ( <i>Pipilo fuscus</i> )			X
Canyon towhee* ( <i>Pipilo fuscus</i> )	X		X
Chipping sparrow* ( <i>Spizella passerina</i> )	X		X
Lark sparrow* ( <i>Chonestes grammacus</i> )			X
Vesper sparrow* ( <i>Pooecetes gramineus</i> )			X
Black-throated sparrow ( <i>Amphispiza bilineata</i> )	X		
Dark-eyed junco – Oregon and Gray-headed ( <i>Junco hyemalis</i> )		X	
Brown-headed cowbird* ( <i>Molothrus ater</i> )			X
Scott's oriole* ( <i>Icterus parisorum</i> )			X
Cassin's finch ( <i>Carpodacus cassinii</i> )		X	
House finch* ( <i>Carpodacus mexicanus</i> )	X		X
Lesser goldfinch ( <i>Carduelis psaltria</i> )	X		
<b>Herpetiles</b>			
Collared lizard ( <i>Crotaphytus collaris</i> )			X
Eastern fence lizard ( <i>Sceloporus undulates</i> )	X		X
Sagebrush lizard ( <i>Sceloporus graciosis</i> )	X		X
Side-blotched lizard ( <i>Uta stansburiana</i> )			X
Western whiptail ( <i>Cnemidophorus velox</i> )	X		X

Plateau striped whiptail ( <i>Cnemidophorus velox</i> )			X
Bullsnake ( <i>Pituophis melanoleucus</i> )			X

\*breeding activity documented (males singing, nesting activity, young observed)

\*\*species documented during raptor surveys





Section 16. View south from NW quarter (September 2006)



Section 16. View south from NW boundary (December 2006)



Section 16. View from NE boundary – looking south (September 2006)



Section 16. View to the south, mid-section (December 2006)

## Appendix 5-B

Wildlife Survey Report on Cibola National Forest  
Sections 9 and 10, T13N, R8W  
August, 2007

**WILDLIFE SURVEY REPORT FOR  
STRATHMORE RESOURCES U.S. LTD.  
ROCA HONDA PROJECT**

**ON THE CIBOLA NATIONAL FOREST  
MOUNT TAYLOR RANGER DISTRICT  
SECTIONS 9 & 10, T. 13 N., R. 8 W.  
McKINLEY COUNTY, NEW MEXICO**

**PREPARED BY  
PERMITS WEST, INC.  
SANTA FE, NEW MEXICO  
AUGUST 11, 2007**

## **WILDLIFE SURVEY REPORT FOR STRATHMORE RESOURCES U. S. LTD. ROCA HONDA PROJECT**

### **CIBOLA NATIONAL FOREST - MOUNT TAYLOR RANGER DISTRICT SECTIONS 9 & 10, T13N R8W. McKINLEY COUNTY, NEW MEXICO**

#### **1.0 Introduction**

This report addresses the potential for disturbance to endangered, threatened, and special status wildlife species, as listed by State and Federal agencies, which may occur in the project area. The project area is located in Sections 9 and 10, T13N R8W, McKinley County, New Mexico, approximately 3 miles northwest of the town of San Mateo (see maps on next three pages). Sections 9 and 10 are federally owned and administered by the Cibola National Forest's Mount Taylor Ranger District.

#### **1.1 Existing Habitat**

Plant communities in the two sections graduate from desert grassland, dominated by hairy gramma (*Bouteloua hirsuta*), garden purslane (*Portulaca oleracea*), ring muhly (*Muhlenbergia torreyi*), and annuals such as Colorado rubberweed (*Hymenoxys richardsonii* var. *floribunda*) to juniper savanna / pinon-juniper woodland ecotone. Juniper savanna and pinon-juniper woodland, a cold-adapted evergreen habitat, tends to occur above grassland or desert vegetation, but below pine forest elevations (Peiper, 1977). Open pinon-juniper areas in Sections 9 and 10 are dominated by Utah juniper (*Juniperus osteosperma*) and two-needle pinyon (*Pinus edulis*).

Because of the transitional properties of pinon-juniper woodlands, they support critically important wildlife communities. Wildlife documented at the sites is indicative of desert grassland and pinon-juniper interfaces. Avian species detected included obligates/ semi-obligates such as western Scrub-Jay (*Aphlecoma californica*) and juniper titmouse (*Baeolophus griseus*). Typical mammalian species observed included animals such as blacktail jackrabbit (*Lepus californicus*), cliff chipmunk (*Tamias dorsalis*), and mule deer (*Odocoileus hemionus*).

Evidence of moderate grazing by domestic livestock is apparent at lower levels with light evidence of grazing by native and domestic ungulates at higher elevations. Bladed roads and jeep trails wind throughout the two sections. There are multiple drill pads. Several cow trails are also evident at the lower elevations. Forest Service boundary markers and fences are in place at both sections.

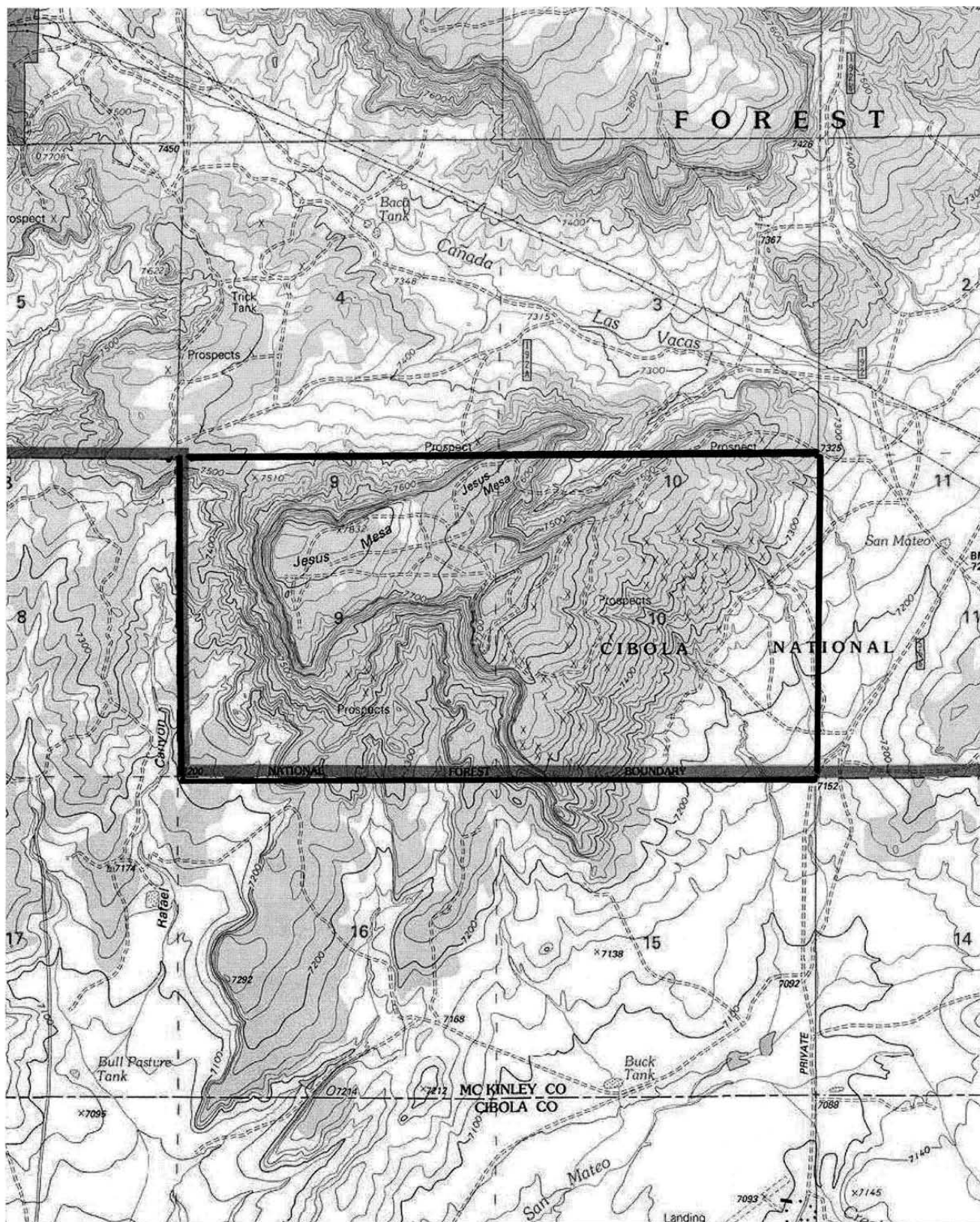












Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)



### 1.1.1 Topography

The landscape in Section 9 varies from desert grassland and open pinon-juniper (*Pinus spp.* / *Juniperus spp.*) woodland in the lower areas to sheer rock faces in the higher elevations. Altitude ranges from roughly 7,200 feet to 7,832 feet and changes sharply throughout Section 9. Much of the surface is bare bedrock and there are sand dunes in some areas. Jesus Mesa occupies approximately fifty-percent of the section. Rafael Canyon runs north to south along the section's western boundary.

Terrain in Section 10 is highly variable and ranges from flat mesa top with rock outcroppings to gentle slopes at the base of the mesa. A nameless canyon is located in the northwest quarter of the section, with sheer cliff faces >15 meters in height along its rim. Elevation in Section 10 ranges from 7,152 feet to 7,720 feet above sea level.

## 2.0 Methodology

The current lists of Federal (USFWS, NM Ecological Field Services Office, 2006 -2007) and State of New Mexico (NM Natural Heritage, 2006-2007 and Jankowitz, personal communication, 2007) listed and sensitive animal species known to occur in McKinley County and Cibola County, the border of which is one mile to the south, were reviewed before fieldwork began. Cibola National Forest Management Indicator Species (March 2005) were also assessed and are addressed in the results section of this report. All species which were detected were documented. However, listed and sensitive species were the focus of the surveys.

Wildlife surveys were conducted at the project site by walking transects along a north-south alignment, approximately 150-200 meters apart. Any discrepancies in transect length and/or distances were due to logistical difficulties caused by rough topography. Walked-line transects are commonly utilized to determine avian abundance (Verner, 1985) but also appear to function well for presence/absence surveys for all species in a given area. Survey periods were concentrated during morning hours. Most animal species, and birds in particular, tend to be more active in the morning. All mesa tops, arroyos, and adjacent habitats were surveyed, including a half-mile buffer around Sections 9 and 10. During all surveys, cliff faces were scanned for the presence of raptor nests.

The wildlife biologists used 8 x 42 and 10 x 40 standard binoculars and a 15-45 x 60 spotting scope for wildlife observation purposes. All vertebrate species detected by sight, sound, and sign were recorded. Weather conditions, altitude, and identifiable plant species were also recorded. Global positioning coordinates were recorded for any prominent features such as den sites or prairie dog colonies. In alignment with standard monitoring protocols, surveys were not performed if precipitation or sustained heavy winds were present.

Prior to starting the raptor fieldwork, current New Mexico birding reports (NM Ornithological Society, 2007) and associated literature relating to locally occurring birds of prey was reviewed. Due to their federal and state designations, three species were of focus; Golden Eagle (*Aquila chrysaetos*) – Bald Eagle Protection Act, Peregrine Falcon (*Falco peregrinus*) – SOC (USFWS) and Threatened (NMDGF), and Burrowing Owl (*Athene cunicularia*) – SOC (NMDGF). Potential nesting areas were determined by delineating areas on topographical maps and aerial photographs. Habitat associations for specific species were evaluated and timing of

nesting surveys was based upon nesting phenology for species expected to occur within the project area.

Raptor surveys were conducted according to standard raptor monitoring methodology (Call, 1978 and Wheeler, 2003). All cliff faces, arroyos, and adjacent habitats were surveyed, including a half-mile buffer zone and a one mile line-of-sight survey for all sections. Tall trees (> 8m) were also scanned for presence of nesting raptors. Potential nest locations and evidence of nest site use from the 2006 season were documented. The surveyors used 8 x 42 standard binoculars and spotting scopes for observation purposes. Weather, altitude, and global positioning coordinates were recorded for any nests or related sites located during the survey.

### **3.0 Results**

#### **3.1 Survey Periods**

##### **3.1.1 Fall Surveys (2006)**

The two sections were surveyed by Wildlife Biologists June M. Galloway, Charles Black, and Cindy Lawrence on September 13, 14, 19, 20, 22, 23, and 25, 2006. Surveys were carried out from roughly 1-2 hours after sunrise to mid-afternoon, depending upon weather conditions. Field conditions were variable over the course of the survey period with weather ranging from sunny and clear (76°F) to high winds and hail (59°F) (conditions which effectively ended that survey period).

Autumn represents a transitional time for almost all animal species and includes events such as migration and rut. Survey results during this time period may present only a temporary picture of species regularly utilizing the habitat. Consequently, habitat associations were also assessed.

##### **3.1.2 Winter Surveys (2006)**

Sections 9 and 10 were surveyed again by Wildlife Biologists June M. Galloway and Charles Black on December 6, 7, 8, and 9, 2006. Days were consistently clear and sunny with winds varying from 1-4 Beaufort (1-16 knots). Temperatures were close to freezing for most surveys (22 – 45°F). Snow cover was still in place (2-5 inches) during the survey period from storms that occurred during late November. During this season, after many avian species have migrated south to winter roosting grounds, many mammalian species are in sporadic or continual hibernation, while others are less active during the winter. The new snow aided greatly in species identification by providing clear tracks and sign.

##### **3.1.3 Raptor Surveys (2007)**

Wildlife Biologists Cindy Lawrence and June M. Galloway conducted focal surveys for raptors on March 23 – 30 and April 4, 2007. These surveys included Sections 9, 10, and 16. Weather conditions varied greatly with temperatures ranging from 26-58°F, and periods of hail, snow, and sunshine. Winds ranged from 1-6 Beaufort (1-22 knots).

##### **3.1.4 Breeding Season Surveys (2007)**

Breeding season surveys were carried out at Sections 9 and 10 on May 13-16, 18, and May 23-25 by Wildlife Biologists June M. Galloway and Charles Black. Over the course of the

surveys, weather conditions ranged from overcast with sporadic rain to sunny and clear. Temperatures averaged 55°F, with winds ranging from 1-4 Beaufort (1-16 knots). Surveys conducted during this time period should present the most comprehensive picture of animal species utilizing the area during their most critical periods (i.e. breeding, rearing of young).

## 3.2 DISCUSSION

### Threatened, Endangered, and Special Status Species (Wildlife)

No threatened, endangered, or special status as listed by the USFWS (NM Ecological Field Service Office, 2007) and BLM (2007) were documented during project surveys at Strathmore Resources' Roca Honda project. All listed species with existing suitable habitat present and the potential to occur at the project site are addressed in Table 1. All vertebrate species detected during surveys are listed in taxonomic order in Appendix I. Avian species names and the order in which they appear follows the most current American Ornithologists' Union list (American Ornithologists' Union 2007). Mammal species names and order follows Findley et al. (1975). Reptile and amphibian species names and order follows Stebbins (2003).

Table 1. Wildlife species listed by the USFWS and the BLM as Endangered, Threatened, or Special Status Species with potential to occur in McKinley and Cibola Counties, NM (2007)

Common Name (scientific name)	Federal Status	Habitat Associations	Potential to occur in project area **
<b>Mammals</b>			
Black-footed ferret ( <i>Mustela nigripes</i> )	E	Open grasslands with year-round prairie dog colonies. Strongly associated with black-tailed prairie dogs.	NP
<b>Birds</b>			
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	T	Mature shoreline forests with scattered openings and little human use, near water with abundant fish and waterfowl.	NP
Northern goshawk ( <i>Accipiter gentilis</i> )	SOC	Ponderosa pine, mixed conifer, and spruce-fir forests.	NP
Peregrine falcon ( <i>Falco peregrinus</i> )	SOC	Rare breeders (NM) in rocky, steep cliff areas, generally near water or mesic canyons.	NS
Mountain plover ( <i>Charadrius montanus</i> )	SOC	Dry, disturbed, or intensively grazed, open and flat tablelands.	NP
Least tern ( <i>Sterna antillarum</i> )	E	Marine or estuarine shores, or on sand bar islands in large rivers. Prefers areas free from humans and predators.	NP
Black tern ( <i>Chilidonias niger surinamensis</i> )	SOC	Freshwater marshes, wet meadows, lake margins, slow-moving rivers, bogs, shrub-swamps, and along prairie sloughs.	NP
Yellow-billed cuckoo	C	Extensive, mature riparian corridors.	NP

( <i>Coccyzus americanus</i> )			
Western burrowing Owl ( <i>Athene cunicularia</i> )	SOC	Grasslands and prairies, associated with prairie dog towns.	NS
Mexican spotted owl ( <i>Strix occidentalis lucida</i> ) Designated Critical Habitat	T	Rocky canyons in mature montane forests below 9500 feet in elevation.	NP
Southwestern willow flycatcher ( <i>Empidonax trillii extimus</i> )	E	Dense, riparian vegetation near surface water or saturated soil, monotypic or mixed stands of native and/or exotic species.	NP
Fish			
Zuni bluehead sucker ( <i>Catostomus discobolous yarrowi</i> )	C	Often inhabits swift water areas in mountain streams and smaller tributaries to large rivers (nursery habitat).	NP

#### Status

E Endangered    T Threatened    C Candidate    SOC Species of Concern

#### Presence\*\*

K Known, documented observation within project area.

S Habitat suitable and species suspected to occur within the project area.

NS Habitat suitable but species is not suspected to occur within the project area.

NP Habitat not present and species unlikely to occur within the project area.

Table 2. Wildlife species listed by the USFWS and NMDGF as Endangered, Threatened, Candidate, or Sensitive with potential to occur in McKinley and Cibola Counties, NM (2006).

Common Name (scientific name)	Federal Status	State Status	Habitat Associations	Potential to occur in project area **
Mammals				
Western Small-footed Myotis Bat ( <i>Myotis ciliolabrum melanorhinus</i> )		S	Widespread. Roosts in rock crevices, buildings, caves, mine tunnels, and loose tree bark.	S
Occult Little Brown Myotis Bat ( <i>Myotis lucifugus occultus</i> )		S	In the west, found mainly in mountainous and riparian areas.	NP
Long-legged Myotis Bat ( <i>Myotis volans interior</i> )		S	Pinyon-juniper, oak, and coniferous forests (4000-9000 ft.).	S
Fringed Myotis Bat ( <i>Myotis thysanodes thysanodes</i> )		S	Roosts in caves, abandoned buildings, rock crevices, and trees.	S
Long-eared Myotis Bat ( <i>Myotis evotis evotis</i> )		S	Coniferous forests in northern New Mexico (7000-8500 ft.).	NP
Gunnison's Prairie Dog ( <i>Cynomys gunnisoni</i> )		S	Level to gently sloping grasslands, semi-desert and montane shrublands	K

			(6000- 12,000 ft.)	
Red Fox ( <i>Vulpes vulpes</i> )		S	Diverse habitats including forests, tundra, prairies, and farmland.	S
Black-footed Ferret ( <i>Mustela nigripes</i> )	E		Open grasslands with year-round prairie dog colonies. Strongly associated with Black-tailed Prairie Dogs.	NP
Western Spotted Skunk ( <i>Spilogale gracilis</i> )		S	Variety of habitats including rocky bluffs, cliffs, and brush- bordered canyon streams or stream beds.	S
<b>Birds</b>				
Bald Eagle ( <i>Haliaeetus leucocephalus</i> )	T	T	Mature shoreline forests with scattered openings and little human use, near water with abundant fish and waterfowl.	NP
Northern Goshawk ( <i>Accipiter gentilis</i> )	SOC	S	Ponderosa pine, mixed conifer, and spruce-fir forests.	NP
Peregrine Falcon ( <i>Falco peregrinus</i> )	SOC	T	Rare breeders (NM) in rocky, steep cliff areas, generally near water or mesic canyons.	NS
Mountain Plover ( <i>Charadrius montanus</i> )	SOC	S	Dry, disturbed, or intensively grazed, open and flat tablelands.	NP
Least Tern ( <i>Sterna antillarum</i> )	E	E	Marine or estuarine shores, or on sand bar islands in large rivers. Prefers areas free from humans and predators.	NP
Black Tern ( <i>Chilidonias niger surinamensis</i> )	SOC		Freshwater marshes, wet meadows, lake margins, slow-moving rivers, bogs, shrub-swamps, and prairie sloughs.	NP
Yellow-billed Cuckoo ( <i>Coccyzus americanus</i> )	C	S	Extensive, mature riparian corridors.	NP
Western Burrowing Owl ( <i>Athene cunicularia</i> )	SOC		Grasslands and prairies, associated with prairie dog towns.	NS
Mexican Spotted Owl ( <i>Strix occidentalis lucida</i> )	T	S	Rocky canyons in mature montane forests below 9500 feet in elevation.	NP
Costa's Hummingbird ( <i>Calypte costae</i> )		T	Desert scrub, chaparral, thorn-scrub, tropical deciduous forest, and suburban areas.	NP
Southwestern Willow Flycatcher ( <i>Empidonax trillii extimus</i> )	E	E	Dense, riparian vegetation near surface water or saturated soil, monotypic or mixed stands of native and/or exotic species.	NP
Loggerhead Shrike ( <i>Lanius ludovicianus</i> )		S	Open countryside – shortgrass prairies, weedy fields, grasslands,	K

			agricultural areas, swampy thickets, orchards, and right-of-way corridors.	
Gray Vireo ( <i>Vireo vicinior</i> )		T	Thorn scrub, oak-juniper woodland, pinon-juniper, dry chapparal, mesquite and riparian willow habitats.	K
Fish				
Zuni Bluehead Sucker ( <i>Catostomus discobolous yarrowi</i> )	C	E	Often inhabits swift water areas in mountain streams and smaller tributaries to large rivers (nursery habitat).	NP

#### Status

E Endangered    T Threatened    C Candidate    SOC Species of Concern  
S Sensitive Species

#### Presence\*\*

K Known, documented observation within project area.

S Habitat suitable and species suspected to occur within the project area.

NS Habitat suitable but species is not suspected to occur within the project area.

NP Habitat not present and species unlikely to occur within the project area.

### Species of Concern (Federal)

#### American Peregrine Falcon (*Falco peregrinus*)

Due to extensive reintroduction efforts, peregrine falcons have recovered to the point where the U. S. Fish and Wildlife Service removed the species from the Endangered Species list in 1999 (USGS, 2006). Although peregrine numbers are healthier than they have been in decades, the falcons are still uncommon in a large portion of their historical range (Johnsgard, P. A.). Peregrine falcons will utilize almost any habitat type that provides hunting opportunities. For nesting purposes, however, cliffs are preferred. Although no peregrine falcons were observed during survey periods there does appear to be marginally suitable habitat for hunting and nesting within and adjacent to the site.

#### Western Burrowing Owl (*Athene cunicularia hypugaea*)

The fragmentation of native grasslands and elimination of prairie dog colonies throughout North America appears to be contributing to precipitous declines of burrowing owl populations in several western states, including New Mexico. Burrowing owls nest in grasslands across the western plains and are normally associated with prairie dog colonies. Although burrowing owls are most often associated with black-tailed prairie dogs (*Cynomys ludovicianus*) and Richardson's ground squirrels (*Spermophilus richardsonii*), several Gunnison's prairie dog towns exist either within or adjacent to Sections 9 and 10. Although no burrowing owls were documented during focal raptor surveys within the project area, suitable habitat is present in the lower-lying areas of Sections 9 and 10.



## **Management Indicator Species (MIS) – Cibola National Forest (2005)**

### **Game Species**

#### **Rocky Mountain Elk (*Cervus elaphus*)**

(Habitat type – Mountain grassland / mixed-conifer)

Site use by elk was documented during all survey periods. Pinon- juniper and mixed grassland habitats at the project area appear to support stable elk numbers (based upon presence/absence surveys only). Species' presence on-site was documented by sign such as scat and observation of bedding areas and visual confirmation of harems and cows with young. Suitable grazing, calving, and winter range habitat exists within the project area.

#### **Mule Deer (*Odocoileus hemionus*)**

(Habitat type – Mountain shrub / pinon-juniper)

It is believed that mule deer numbers across the western United States have decreased over the past decade due, in some part, to the mule deer's need for early and mid-successional habitats (USDA FS, 2005). Site use by mule deer at the project area was documented during all survey periods by sign and visual confirmation. Does with fawns and juveniles/sub-adults were also documented. Suitable grazing, fawning, and winter range habitat for mule deer exists within the project area.

### **Non-game Species**

#### **Juniper titmouse (*Baeolophus ridgwayi*)**

(Habitat type – Pinon-juniper)

The juniper titmouse is a species closely tied to pinons and junipers over much of its range. An estimated 39% of that habitat is within the Cibola National Forest (2005). Juniper titmice were detected during all surveys and breeding activity was documented within the project area.

#### **Hairy woodpecker (*Dendrocopos villosus*)**

(Habitat type – Mixed conifer)

As primary cavity nesters, hairy woodpeckers utilize a wide range of habitats in the southwestern United States. They are a resident nesting species in New Mexico and are highly adaptable. Hairy woodpeckers were documented at Sections 9 and 10 during all survey periods and evidence of nest-site use was documented within the project area.

### **Raptors**

Five raptor species and three active raptor nests were found (see following list) during the 8 days of raptor surveys. No threatened, endangered, or special status species, as listed by state and federal agencies, were documented during the raptor surveys. Although three Golden Eagles (2 subadults / juveniles and 1 adult) were observed during on-site visits on February 7 and 8,

2007 and one eagle roost was located, no Golden Eagles were observed at or near the project sites in March and April. The eagles were, most likely, using the area as wintering habitat.

#### Section 9

Sharp-shinned Hawk (*Accipiter striatus*)  
Red-tailed Hawk (*Buteo jamaicensis*)\*  
Rough-legged Hawk (*Buteo lagopus*)  
American Kestrel (*Falco sparverius*)  
Great Horned Owl (*Bubo virginianus*)\*

#### Section 10

American Kestrel (*Falco sparverius*)

#### Section 16

Red-tailed Hawk (*Buteo jamaicensis*)  
Great Horned Owl (*Bubo virginianus*)\*

\*Active nest documented (March & April 2007)

### **3.3 Recommendations**

No construction or drilling activities should be conducted between:

November 1 and March 31 if wintering eagles are present  
March 1 to June 30 if raptors are nesting

Signature of Author: \_\_\_\_\_



Brian Wood

**Date: August 11, 2007**



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Appendix I. Animal Species Documented At Sections 9 and 10, T13N, R8W (Cibola NF – McKinley County, NM).			
Taxa	Survey Period		
Common Name (scientific name)	Fall (2006)	Winter (2006)	Breeding Season (2007)
Mammals			
F. Vespertilionidae ( <i>Myotis sp.</i> )			X
Mountain (Nuttall's) cottontail* ( <i>Sylvilagus nuttalli</i> )	X	X	X
Desert cottontail ( <i>Sylvilagus aububoni</i> )	X	X	X
Blacktail jackrabbit* ( <i>Lepus californicus</i> )	X	X	X
Cliff chipmunk ( <i>Tamias dorsalis</i> )	X		X
White-tailed antelope squirrel* ( <i>Amnospermophilus leucurus</i> )	X	X	X
Rock squirrel ( <i>Citellus variegates</i> )	X	X	X
Gunnison's (white-tailed) prairie dog* ( <i>Cynomys gunnisoni</i> )	X		X
Kangaroo rat ( <i>Dipodomys sp.</i> )	X		X
White-footed mouse ( <i>Peromyscus spp.</i> )	X		X
White-throated woodrat* ( <i>Neotoma albigula</i> )	X	X	X
Bushy-tailed woodrat* ( <i>Neotoma albigua</i> )	X	X	X
Porcupine ( <i>Erthizon dorsatum</i> )	X		X
Coyote* ( <i>Canis latrans</i> )	X	X	X
Red fox ( <i>Vulpes fulvus</i> )		X	
Gray fox* ( <i>Urocyon cineroargenteus</i> )	X	X	X
Weasel ( <i>Mustela sp. - poss. frenata</i> )		X	
Rocky mountain elk* ( <i>Cervus canadensis</i> )	X	X	X
Mule deer* ( <i>Odocloieus hemionus</i> )	X	X	X

Birds			
Gambel's quail ( <i>Callipepla gambelii</i> )			X
Turkey vulture ( <i>Cathartes aura</i> )	X		X
Sharp-shinned hawk ( <i>Accipiter striatus</i> )	X		
Red-tailed hawk* ( <i>Buteo jamaicensis</i> )	X	X	X
American kestrel* ( <i>Falco sparverius</i> )	X		
Mourning dove* ( <i>Zenaida macroura</i> )	X		X
Western screech owl ( <i>Megascops kennicottii</i> )			X
Great-horned owl* ( <i>Bubo virginianus</i> )	X	X	X
Common poorwill ( <i>Phalaenoptilus nuttallii</i> )			X
White-throated swift ( <i>Aeronautes saxatalis</i> )			X
Black-chinned hummingbird* ( <i>Archilochus alexandri</i> )			X
Broad-tailed hummingbird* ( <i>Selasphorus platycercus</i> )			X
Ladder-backed woodpecker ( <i>Picoides scalaris</i> )		X	
Hairy woodpecker* ( <i>Picoides villosus</i> )	X	X	X
Northern flicker (Red-shafted)* ( <i>Colaptes auratus</i> )	X	X	X
Western wood-peewee* ( <i>Contopus sordidulus</i> )			X
Gray flycatcher* ( <i>Empidonax wrightii</i> )			X
Say's phoebe ( <i>Sayornis saya</i> )			X
Ash-throated flycatcher ( <i>Myiarchus tuberculifer</i> )			X
Cassin's kingbird* ( <i>Tyrannus cassinii</i> )			X
Plumbeous vireo* ( <i>Vireo plumbeus</i> )			X
Western scrub jay* ( <i>Aphelocoma californica</i> )	X	X	X
Clark's nutcracker			X

( <i>Nucifraga columbiana</i> )			
Pinyon jay* ( <i>Gymnorhinus cyanocephalus</i> )	X		X
American crow ( <i>Corvus brachyrhynchos</i> )			X
Common raven* ( <i>Corvus corax</i> )	X	X	X
Cliff swallow* ( <i>Petrochelidon pyrrhonata</i> )			X
Barn swallow ( <i>Hirundo rustica</i> )			X
Violet-green swallow* ( <i>Tachycineta thalassina</i> )	X		X
Black-capped chickadee* ( <i>Poecile atricapillus</i> )		X	X
Mountain chickadee* ( <i>Poecile gambeli</i> )	X	X	X
Juniper titmouse* ( <i>Baeolophus ridgewayi</i> )	X	X	X
Bushtit* ( <i>Psatrisparus minimus</i> )	X	X	X
White-breasted nuthatch* ( <i>Sitta carolinensis</i> )		X	X
Rock wren* ( <i>Sappinectes obseletus</i> )	X		X
Canyon wren* ( <i>Catherpes mexicanus</i> )	X	X	X
Bewick's wren* ( <i>Thryomanes bewickii</i> )	X		X
Blue-gray gnatcatcher* ( <i>Polioptila caerulea</i> )			X
Western bluebird* ( <i>Sialia mexicana</i> )	X	X	X
Mountain bluebird ( <i>Sialia currucoides</i> )			X
Townsend's solitaire ( <i>Myadestes townsendi</i> )	X	X	
American robin* ( <i>Turdus migratorius</i> )		X	X
Northern mockingbird ( <i>Mimus polyglottus</i> )			X
Virginia's warbler* ( <i>vermivora virginiae</i> )			X
Yellow-rumped warbler ( <i>Dendroica coronata</i> )			X
Black-throated gray warbler*			X

<i>(Dendroica nigrescens)</i>			
Chipping sparrow* <i>(Spizella passerina)</i>	X		X
Lark sparrow* <i>(Chonestes grammacus)</i>			X
Vesper sparrow* <i>(Pooecetes gramineus)</i>			X
Green-tailed towhee <i>(Pipilo chlorurus)</i>	X		
Spotted towhee* <i>(Pipilo maculates)</i>			X
Canyon towhee* <i>(Pipilo fuscus)</i>	X		X
Black—headed grosbeak* <i>(Pheucticus melanocephalus)</i>			X
Dark-eyed junco – Oregon and Gray-head <i>(Junco hyemalis)</i>		X	
Brown-headed cowbird* <i>(Molothrus ater)</i>			X
House finch* <i>(Carpodacus mexicanus)</i>	X		X
<b>Herpetiles</b>			
Collared lizard <i>(Crotaphytus collaris)</i>			X
Eastern fence lizard <i>(Sceloporus undulates)</i>			X
Sagebrush lizard <i>(Sceloporus graciosis)</i>	X		X
Side-blotched lizard <i>(Uta stansburiana)</i>			X
Short-horned lizard <i>(Phrynosoma douglasii)</i>			X
Western whiptail <i>(Cnemidophorus velox)</i>	X		X
Plateau striped whiptail <i>(Cnemidophorus velox)</i>			X
Bullsnake <i>(Pituophis melanoleucus)</i>	X		X

\*breeding activity documented (males singing, nesting activity, young observed).



**Figure 1. West side of Jesus Mesa – Section 9 (December 2006).**



**Figure 2. View of southern boundary of Section 10 from SE quarter of Section 16 (December 2006).**





**Figure 3. Jesus Mesa (Section 9) – view from NW quarter of Section 16 (December 2006).**



**Figure 4. View of Section 9 from NW/NW quarter of Section 10 – Rafael Canyon (December 2006).**



## Appendix 5-C

Wildlife Survey Report,

Roca Honda Project 2008 and 2010 Field Seasons

**WILDLIFE SURVEY REPORT (BASELINE DATA)  
ROCA HONDA RESOURCES, LLC  
ROCA HONDA PROJECT  
2008 & 2010 FIELD SEASONS**

**ON STATE, PRIVATE, AND FEDERAL LANDS  
(CIBOLA NATIONAL FOREST)  
SECTIONS 9, 10, 11, 12, 16, T. 13 N., R. 8 W.  
SECTION 27, T. 14 N., R. 8 W.  
MCKINLEY AND CIBOLA COUNTIES  
NEW MEXICO**

**JANUARY 17, 2011**

**PREPARED FOR:**



**ROCA HONDA RESOURCES, LLC**

**PREPARED BY:**



**PERMITS WEST, INC.  
SANTA FE, NM**

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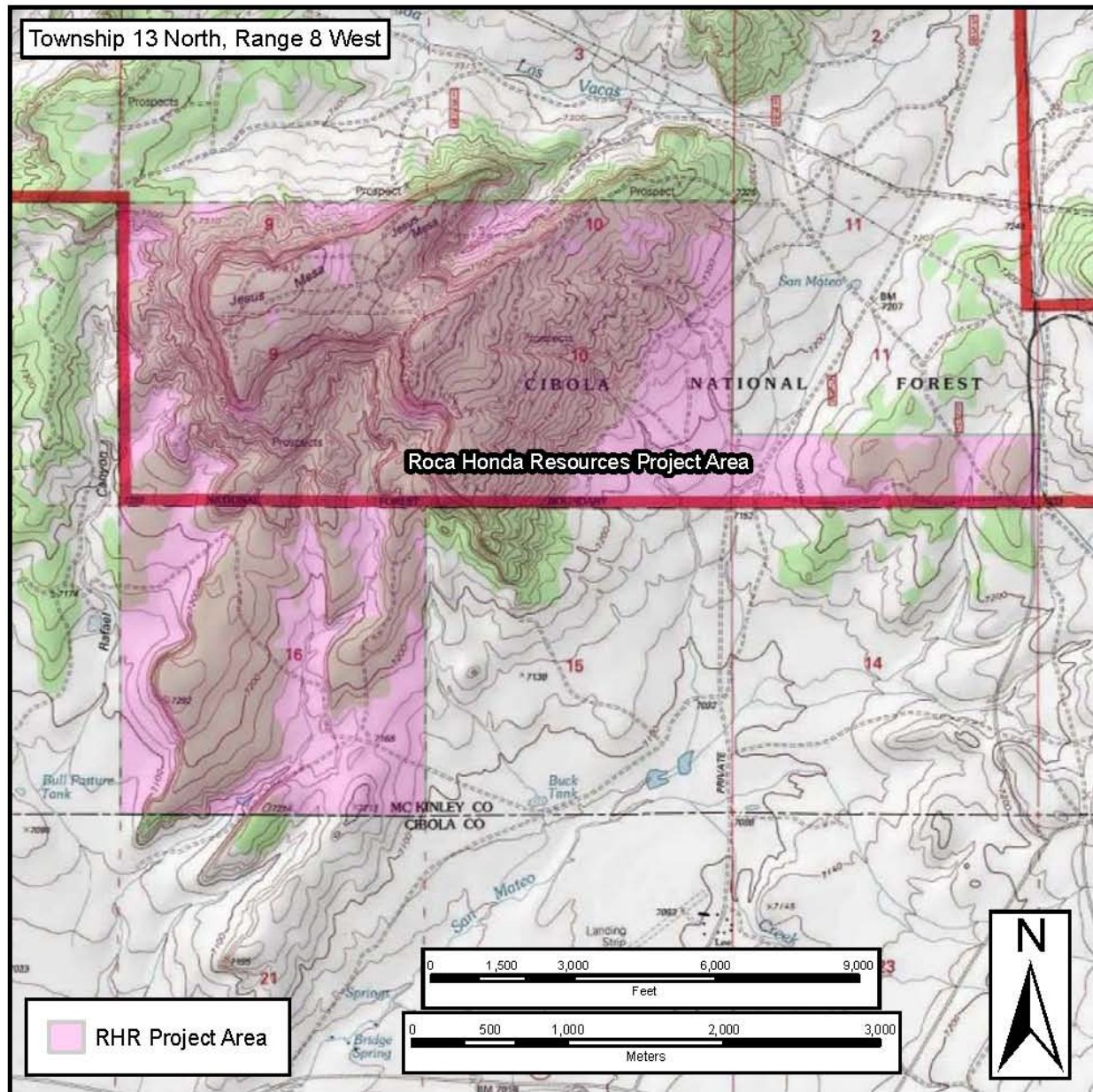
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## 1.0 INTRODUCTION

Roca Honda Resources, LLC, is applying for a new mine permit for Sections 9, 10, and 16 of Township 13 North, Range 8 West, in McKinley County, New Mexico. Section 16 is located on property owned by the state of New Mexico, while Sections 9 and 10 are on USDA Forest Service (Cibola National Forest) land. Figure 1 below identifies the Roca Honda Project Area. A State of New Mexico mining permit is required for activities that will occur on all three sections, while USFS approval is required for activities on Sections 9 and 10. In order to provide the most comprehensive overview of existing wildlife communities, additional sections where impacts are expected to be evident were also included in the wildlife study design.



**Figure 1. Roca Honda Resources Project Area.**



Both the State of New Mexico (NMAC 19.10.6) and USFS (36 CFR 228) regulations require an environmental analysis in support of mining applications. This analysis provides a baseline for evaluating the potential effects of mining and identifies appropriate measures for mitigating the impacts from construction and mine operation. The baseline analysis is also used for development of plans for eventual mine reclamation.

Specific requirements for the State of New Mexico baseline analysis are identified in NMAC 19.10.6.602D.(13). Requirements for the USFS analysis are identified in Forest Service Handbook 1909.15, Chapter 61. USFS requirements encompass all state requirements and identify additional factors requiring analysis in accordance with the National Environmental Policy Act (NEPA).

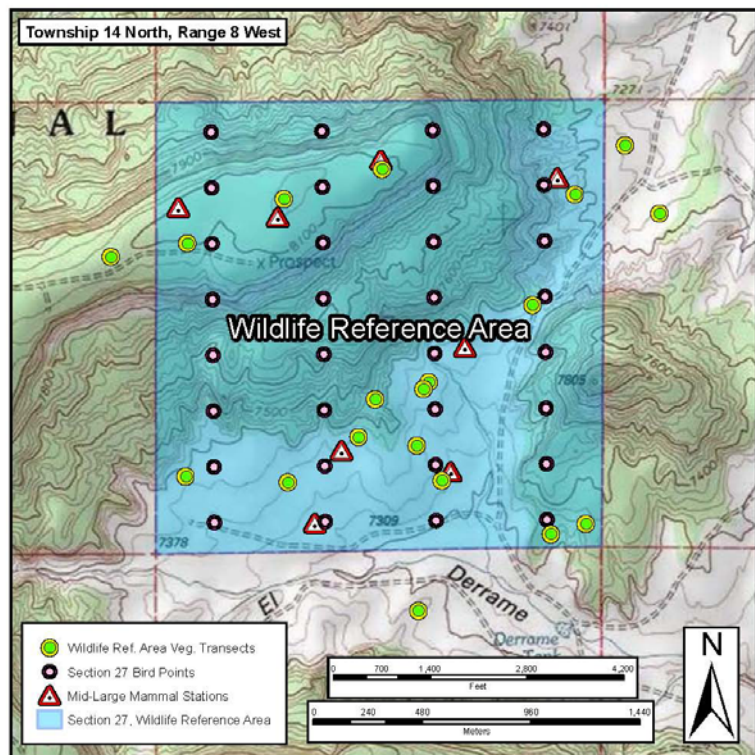
## 1.1 WILDLIFE INVENTORY OBJECTIVES

The purpose of the wildlife survey effort conducted in 2008 by Permits West, Inc. for the proposed Roca Honda mine project was to address short and long-term impacts to existing wildlife communities associated with uranium mining operations.

Monitoring objectives were to: 1) describe vertebrate fauna in the project area by conducting (pre-mine) inventories to determine species composition, density, distribution and habitat affinity prior to mining activities, 2) provide data to enable determination of the relationship between projected impacts on wildlife related to the proposed mine and anticipated cumulative impacts, 3) provide a basis for determining the effectiveness of mitigation activities and reclamation plans, and 4) plan post-mine inventories to address overall project impact.

## 2.0 DATA COLLECTION, ANALYSES, AND FIELD METHODOLOGY

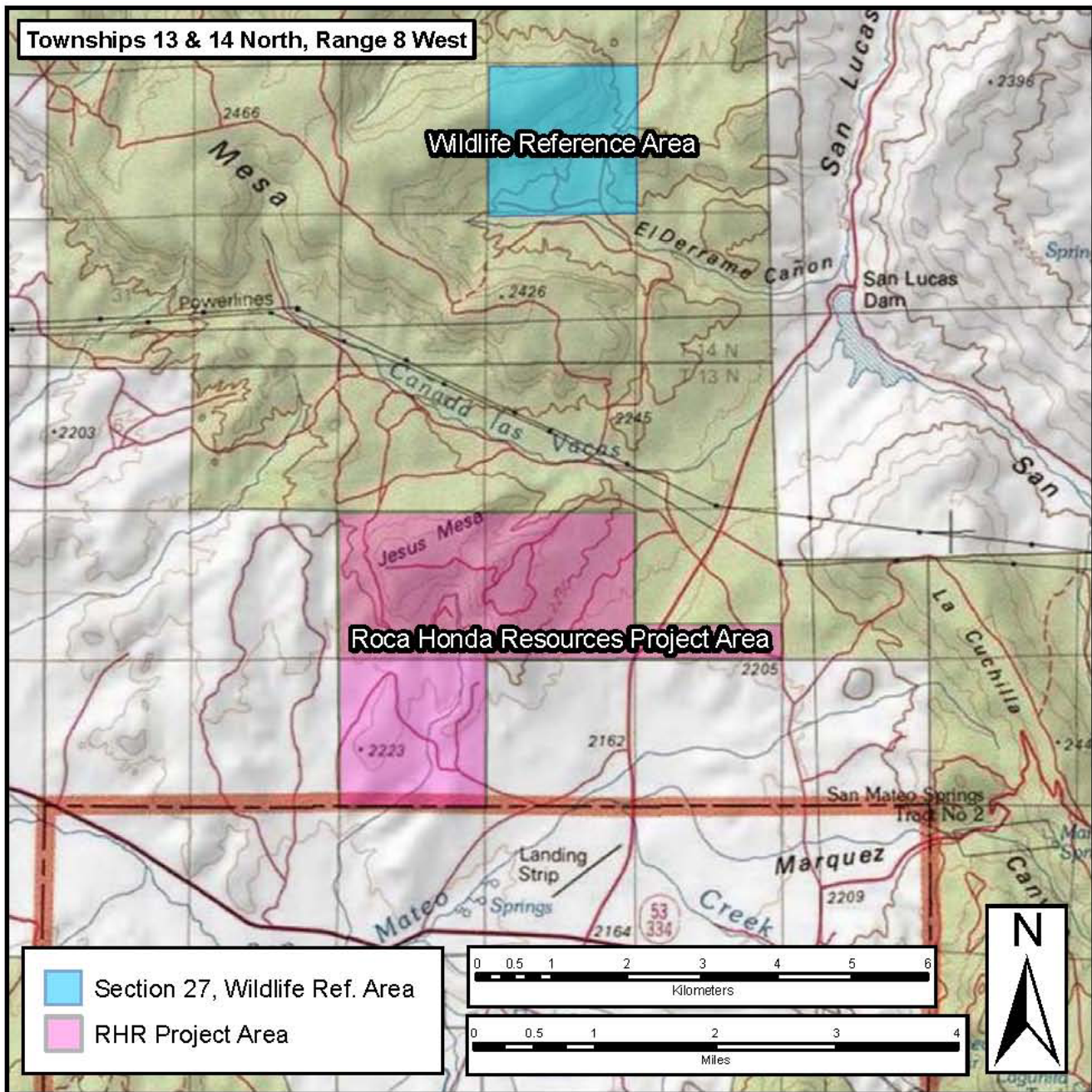
In order to assess the relationships among projected impacts related to the proposed mine and anticipated cumulative impacts (mine-related plus other outside activities), data collection focused on wildlife community use of existing habitat types. The resulting information helped to provide a basis for determining effectiveness of mitigation activities and reclamation plans and practices. A combination of survey methods and techniques were utilized to evaluate wildlife communities within the RHR Project Area. Section 27, T. 14 N., R. 8 W. (Figure 2 at right and Figure 3 on page 3) was selected as the wildlife reference area (control) for avian, ungulate, and furbearing mammal monitoring



**Figure 2. Section 27, RHR Wildlife Reference Area.**



based upon the following criteria; suitable distance from impact site, comparable habitat types and elevation, and comparable surface geological and habitat features.



**Figure 3. Roca Honda Resources Project Area and Wildlife Reference Area.**

Post-mining inventory data will provide critical information for the analysis of overall project impacts. Field survey requirements and methodologies are based upon current research techniques (i.e. Holthausen et al., 2005, Williams et al., 2002) and standard methodologies utilized by the USFS, USFWS, and NMDGF. The survey timing sequences were as follows:

- Herpetofauna—Reptile focus based upon area topography. Species occurrence and relative abundance (May through September).
- Small mammals and furbearing mammals —Distribution and relative abundance: fall (August through October) and spring (March through May).
- Birds—Breeding densities (May through mid-July), migratory presence (late August – September) and winter occurrence and abundance, including raptors (December through February).
- Ungulate—Assessment for population size, distribution, and habitat use: winter (January through February) and reproductive season (September-October).

## **2.1 HERPETOFAUNA (REPTILES AND AMPHIBIANS)**

Herpetofauna (herps) sampling ran concurrently with small mammal sampling. During the survey period, a processing station for small mammals and herps was established in the southeast quarter of Section 10, which allowed for easy access to sampling arrays and grids for early morning and late evening operations.

Pitfall trap arrays were widely used to obtain data on a variety of arthropods, amphibians, reptiles, and small mammals. For the monitoring, each array was composed of four (4) five-gallon (19-liter) buckets buried in the ground. One bucket served as the center of the array. The other three buckets were set 10 m (32.8 ft) away from the center on three 120° rays of silt fencing to form a Y-array. The herpetofauna sampling array is shown in Figure 4 below. Buckets were outfitted with 40.5 cm x 40.5 cm (16 in x 16 in) coverboards. Centered on each of the rays was a 63.5-cm x 17.8-cm (25-in long x 7-in round) funnel trap constructed of hardware cloth with funnels on each end, through which herps could enter and become trapped. Each set/array consisted of four pitfalls (buckets) and three funnel traps. During sampling periods, coverboards were elevated approximately 25 mm (1 in) with rocks, sticks or soils, allowing herps to fall into the buckets after running into and being directed along the fence. Between sampling periods traps were shut down; coverboards were tightly closed onto the tops of the buckets and covered with soil and rocks, and funnels were sealed with small cardboard drinking cups.

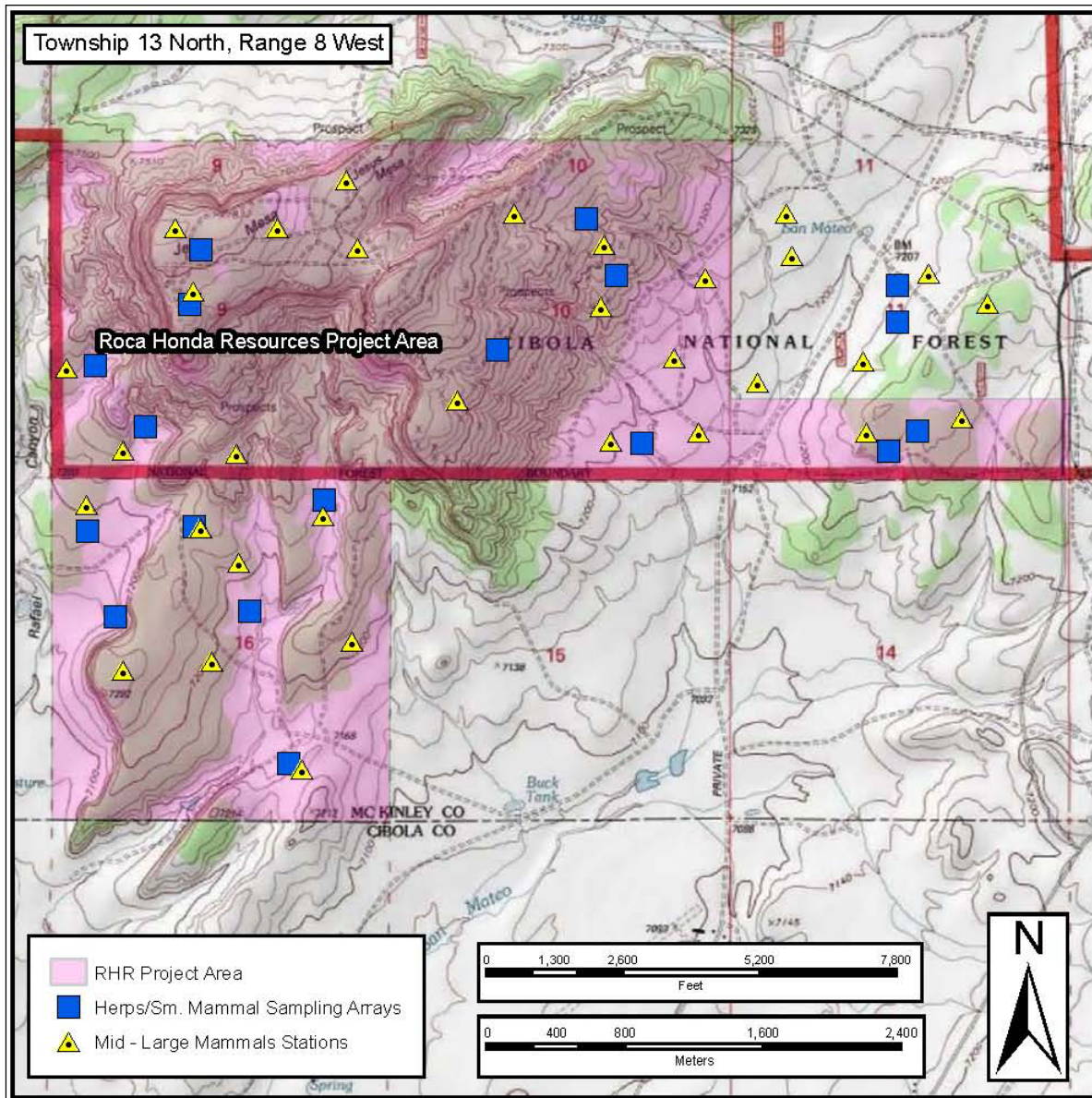


**Figure 4. Herpetofauna sampling array at Roca Honda (2008).**

Four (4) arrays were set up in Section 9, four (4) arrays in Section 10, four (4) arrays in Section 11, and six (6) arrays in



Section 16 for a total of 20 arrays. The herpetofauna and small mammal sampling areas are shown in Figure 5 below.



**Figure 5. Herpetofauna and small mammal sampling locations at RHR Project Area (2008).**

Evening surveys were also performed at the project site. Roads on-site and nearby were driven at dusk and were searched after dark for crossing herpetofauna and for herpetofauna using the road as a substrate for thigmothermic warming (absorbing heat from contact with a warm surface). Herpetofauna encountered opportunistically were recorded. High grade, pedestrian surveys were conducted as time allowed during field sampling periods. The focal areas of these searches were areas that were not in close proximity to any of the arrays. The purpose was to find and record species not captured at or near the arrays. A sample herpetofauna data collection form is shown in Figure 6 on page 6.

SBI--Permits West/Strathmore-Proposed Uranium Mine-- Herpetofaunal Sampling PITFALL ARRAY Data Sheet

**Figure 6. Sample herpetofauna data collection form.**

## 2.2 SMALL MAMMALS

The small mammal component of biological inventory and monitoring for the Roca Honda project encompasses a variety of different life histories that requires variable sampling techniques. Small mammals have thus been categorized into five groups: terrestrial small mammals, colonial small mammals (prairie dogs), lagomorphs (rabbits and hares), fossorial small mammals (gophers), and volant mammals (bats). The sections below outline details for sampling of these groups. Prairie dog sampling was not conducted.

### 2.2.1 Terrestrial Small Mammals

This group contains both nocturnal and diurnal small mammals, all of which can readily be caught in standard Sherman live traps. A Sherman live trap can be seen in Figure 7 on page 7. These traps were set, baited with a mixture of peanut butter and rolled oats, in trapping arrays (square grids) of 25 traps each (5 x 5) spaced at 10 m (33 ft) apart. The small mammal and herpetofauna sampling stations were chosen in proximity to ease integration of data among various taxonomic groups. Sampling sites were chosen to best represent all available habitats within the Roca Honda survey area, taking into account substrate, slope, aspect, and vegetation variability. Generally, four sampling arrays are located in each mile square section within the survey area as seen in Figure 5 on page 5. For consistency of orientation, each small mammal array was rooted with a south corner trap placed 10 m (33 ft) north of the



northernmost edge of the herpetofauna pitfall array. The remainder of the array was set in a square grid with corners located at north, south, east and west. For each sampling night, traps were opened and baited during the late afternoon and closed each morning before 10:00 am to reduce risk of overheated specimens but allowing for sampling of diurnal small mammals. Each morning traps with captures were collected and replaced with spare empty traps. Data collected for each specimen included species information, gender, age, standard external measurements, mass, tag number (either ear tag or toe clip), and capture status as either new individual, seasonal recapture, or current recapture. A sample small mammal data collection form is shown in Figure 8 on page 8. Processed animals were released onto the same arrays where they were collected as soon as possible following processing.



**Figure 7. Checking small Sherman mammal traps at Roca Honda (2008).**



<p><i>Roca Honda Biological Assessment - Small Mammal Capture Data</i></p> <p><i>Grants, NM</i></p> <p>Inclusive Dates at Site: (Date Set: _____; Date Removed: _____)</p> <p>Notes: _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Moon phase per night: _____</p> <p>Cloud cover per night: _____</p> <p>Temperature per night: _____</p> <p>Other weather: _____</p> <p>_____</p>	<p>Array #</p>	<p>Trap nights (SBE included)</p>	<p>GPS coordinates on S corner</p>
	_____	_____ = _____	
	_____	_____ = _____	
	_____	_____ = _____	
	_____	_____ = _____	
	_____	_____ = _____	
	_____	_____ = _____	
	_____	_____ = _____	
	_____	_____ = _____	
	_____	_____ = _____	

\* Disposition includes New Individual (N), Current Recapture (R), Seasonal Recapture (S), Dead In Trap (DIT), Voucher Specimen (V), etc...

	Array/trap	Sex	Measurements (mm)									Disposition *	NK Number	Comments
#	Date	Number	Tag #	Species	(♀/♂)	Total	Tail	Foot	Ear	Mass (g)				(Age: A/SA/J; ♂: S/NS; ♀: C/O, S/E, N/L)
1														

\* Disposition includes New Individual (N), Current Recapture (R), Seasonal Recapture (S), Dead In Trap (DIT), Voucher Specimen (V), etc...

	Array/trap	Sex	Measurements (mm)									Disposition *	NK Number	Comments
#	Date	Number	Tag #	Species	(♀/♂)	Total	Tail	Foot	Ear	Mass (g)				(Age: A/SA/J; ♂: S/NS; ♀: C/O, S/E, N/L)

**Figure 8. Sample small mammal data collection form.**

### 2.2.2 Lagomorphs

To gain knowledge of diversity and distribution of lagomorphs within the survey area, spotlight surveys were conducted. Surveys began at dusk and continued for up to two hours. Eye shine, as well as movement, was used to detect for the presence of rabbits and hares. Upon detection, time, GPS coordinates at vehicle, rough distance estimate of animal from vehicle, species, and numbers were recorded. Species within the genus *Sylvilagus* are cryptic and morphological differences are slight. In addition to spotlight surveys, road-kill specimens were collected to confirm presence of potential species.

### 2.2.3 Fossorial Small Mammals

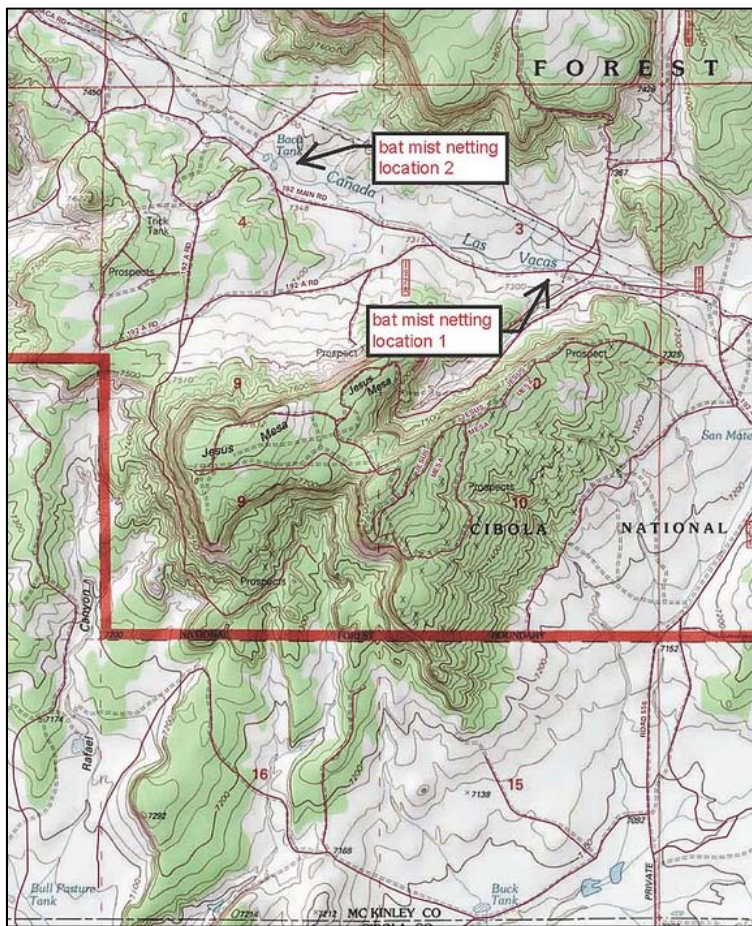
Pocket gophers are only readily captured using standard gopher traps set in subterranean runways maintained by these species. Traps were set on or near sites with gopher sign evident for opportunistic sampling. Traps were checked twice daily and removed if a capture was made or after three days.

## 2.2.4 Volant Mammals

Bats in arid regions are most efficiently collected using standard mist nets set up in arrays over limited standing water sources such as ponds and livestock tanks. However, the available water sources at Roca Honda are ephemeral and were not available to use on a repeatable basis. Surveys consisted of opportunistic mist netting to determine diversity within this group. Nets were set before dusk over available standing water sources and



**Figure 9. Mist-netting bats at Roca Honda (July 2008).**



**Figure 10. Bat mist-netting locations.**

remained open until 23:00 pm and were checked at least every 30 minutes. Mist-netting of bats is shown in Figure 9 above. Data collected for each specimen included species information, gender, age, standard external measurements, and mass.

Mist-netting surveys were conducted on July 8 and July 10, 2008, and September 24, 2008 at two locations. These locations held water and were on public lands but not within the RHR Permit Area. Other locations may have held water; however, these locations were either seasonally void of water, or on private land where permission for survey access was not granted. The 2 mist-netting survey locations on public lands are displayed in Figure 10 at left.

Location 1 was characterized by a roughly 82-foot diameter, 5-foot deep earthen berm livestock tank



with low surrounding vegetation consisting mostly of sparse *Salsola kali*, no riparian vegetation, and water semi-choked with algae. Location 2 was characterized by a larger approximate 40 m (131 ft) diameter, 1.8-2.4 m (6-8 ft) deep livestock tank consisting of sparse vegetation, no riparian vegetation, and water semi choked with algae.

### **2.3 AVES (BIRDS)**

At each land section where access was authorized by appropriate land managers and the potential for direct and indirect impacts from the proposed mine existed, point count stations were established. An example of a point count sampling station can be seen in Figure 11 below. Count stations were located based on global positioning system (GPS) coordinates and were aligned north to south. All stations were positioned approximately 150 meters (492 feet) apart, north to south, and roughly 400 m (1312 ft) apart, east to west.

Thirty-two (32) point count stations were established per square mile in Sections 9, 10, 11, 16, and 27. Figure 12 on page 11 shows a map of all stations in and around the RHR Project Area. Section 27 bird point count stations can be seen in Figure 2 on page 2.



**Figure 11. Bird point count sampling station at Roca Honda (2008).**





In order to provide appropriate data for comparison between before and after site conditions, a reference site was established. The Wildlife Reference Area, Section 27 (control), was selected based upon the following criteria; suitable distance from impact site, comparable habitat types and elevation, and comparable geological and habitat features. Figures 2 and 3 on pages 2 and 3 show the Wildlife Reference Area, Section 27. Sampling design was based on methods created by Ralph et al. (1993) and Noon et al. (1981).

Breeding season point counts were conducted by experienced surveyors. Counts generally started within a half-hour of sunrise and were completed before 11:00 am each survey day. Counts were not conducted during heavy precipitation or high winds. For each ten-minute point count, the following variables were recorded; site number, temperature, start and end time, cloud cover, wind speed, general habitat type, species name and alpha code for species heard or seen, number of individuals detected, detection method (seen or heard), distance to species (meters), and age/sex, if discernible. Additional anecdotal information was also recorded (i.e. foraging, family groups). A sample avian point count form is provided in Figure 13 below.

Roca Honda Project – Avian Point Count Data Form						
Permits West, Inc., 37 Verano Loop, Santa Fe, NM 87508						
Tel: (505) 466-8120						
Site # _____		Section _____		Line _____		Point _____
Date: _____ - _____ - _____				Temp (°F): <30   30-50   50-70   70-90   90-110   >110		
Month _____		Day _____		Year _____		
Start Time: _____		Cloud Cover Code _____				
End Time: _____		Wind Code _____		Habitat Type _____		
Species Code	Species Name	Distance (m)	#	Mode of Detect. (S / H)	Age / Sex	Comments

Distance (m) = 0-50m   50-100m   >100m   Flyover

**Figure 13. Sample avian point count form.**

Avian habitat was evaluated at all point count stations by establishing a 25-m (82-ft) radius plot and measuring for both non-vegetative and vegetative habitat variables. These variables included; aspect, slope, canopy cover (25% increments), and abundance of snags. Station number, date, time, and weather were also recorded on the avian habitat data evaluation form seen in Figure 14 on page 13.

The entire project area was searched for active bird nests throughout the breeding season. Nest search effort was relatively even across sites, with higher effort placed on proposed direct impact areas (Sections 9, 10, S2S2 11, and 16). Although active nests were not routinely monitored, raptor nests were rechecked when possible.



Roca Honda Project - Avian Habitat Evaluation Sheet Permits West, Inc., 37 Verano Loop Santa Fe, NM 87508 Tel: (505) 466-8120				
Section/Line # _____		Surveyor (s) _____		
Date _____		Time _____		Weather _____
Point Count Station (measure w/in 25 m)	Aspect (0-360°)	Slope (0-99%)	*Canopy Cover (0-25%, 25-50%, 50-75%, >75%) <i>List species, predominant sp. first</i>	Estimated number of snags (≥ 4 foot dbh, ≥ 2-meter height)
A				
B				
C				
General Comments:				

\*trees > 4 foot dbh w/in 25-meter radius of center.

**Figure 14. Avian habitat data evaluation form.**

## 2.4 UNGULATES AND FURBEARING MAMMALS

Sampling stations were established in primary habitat types to estimate presence of ungulate and furbearing mammalian species.

### 2.4.1 Ungulates

Fecal pellet group counts are the most widely used indices for monitoring ungulate abundance. The technique is often used to monitor habitat use and distribution. It is also used for determining indices of relative ungulate abundance to monitor population fluctuations (Fuller, 1991). The monitoring program used the most traditional sampling scheme which involves counting pellet groups within bounded circular plots. Because the Roca Honda site will require long-term monitoring, permanent sampling plots were established. In order to ensure that pellets will not be recounted during subsequent survey periods, all pellet groups are removed or destroyed in the survey area once counted. Sampling station center points were randomly selected using GIS (Global Information Systems) in areas that best represented existing habitat types. Roughly eight mammal sampling stations were placed per land section (Sections 9, 10, 11, 16, and 27). Each sampling station was established with one stationary central point, with three 50-m (164-ft) ‘arms’ placed approximately 120 degrees apart. The ‘arms’ represent 5-m (16-ft) wide, 50-m (164-ft) long belt transects with pellet count station centers situated at the end of each arm, including the center starting point. A picture of an ungulate and furbearer sampling station can be seen in Figure 15 on page 14. Pellet count stations were set up to measure a 0.004 ha (0.01 ac) area per count station.

Data was recorded on the large mammal (ungulate) pellet count and habitat evaluation forms in Figure 16 on page 14. Ungulate surveys were set up to take place during critical time periods such as fall (rut) and late winter (winter range and over-winter survival). Sampling design was based, on research conducted by Allison et al. (2006) and Shult et al. (1999).



**Figure 15. Ungulate and furbearer sampling station at Roca Honda (2008).**

Roca Honda Project - Big Game/Furbearer Habitat Evaluation Sheet			
Permits West, Inc. 37 Verano Loop Santa Fe, NM 87508 Tel: (505) 466-8120			
Sampling Station <u>16M4</u>		Surveyor(s) <u>SA, MD, JW</u>	
Date <u>9/9/08</u>		Time <u>12:05 pm</u>	
Pellet Count Station (w/in 25 m)	Aspect (0-360°)	Slope (0-99%)	*Canopy Cover (0-25%, 25-50%, 50-75%, >75%) <i>List species, predominant sp. first</i>
A	148°	8%	Juniper mon 0-25%
B	140°	7%	Juniper mon 0-25%
C	120°	6%	Juniper mon 0-25%
D	144°	7%	Juniper mon 0-25%
General comments: (A) Small arroyo ≈ 12' East of T Bar (B) small arroyo crossed transect @ ≈ midpoint Juniper mon next to lathe (C) Small arroyo ≈ 15' West of point B + crosses transect line			
*trees > 4" dbh w/in 25 m radius of center.			

Roca Honda - Large Mammal (Big Game) Survey Form			
Permits West, Inc. 37 Verano Loop Santa Fe, NM 87508 Tel: (505) 466-8120			
Sampling Station _____		Observer(s) _____	
Date _____		Time _____ Gen Habitat Type _____	
Pellet Group	Elk - # of pellet groups	Mule deer - # of pellet groups	Other
A			
B			
C			
D			
General comments:			

**Figure 16. Ungulate and furbearer habitat evaluation and survey sample forms.**



### **3.0 EXISTING HABITAT**

#### **3.1 SECTIONS 9, 10, S2S2 11, AND 16 (DIRECT IMPACT AREAS)**

##### **3.1.1 Section 9**

Topography in Section 9 varies from desert grassland and open piñon-juniper (*Pinyon sp* / *Juniperus sp.*) woodland in the low-lying areas to sheer rock faces in the higher elevations. Altitude ranges from roughly 2164 to 2390 m (7100 to 7840 ft) and changes sharply throughout the site. Large rock outcroppings exist on-site. Jesus Mesa, and its' gradations, occupies approximately fifty-percent of the site, which can be seen on the map in Figure 1 on page 1. Evidence of moderate grazing by domestic livestock is apparent at lower levels with light evidence of grazing by native ungulates (i.e. elk and mule deer) at higher elevations along the mesa's top.

There are historic exploratory drill sites in both Section 9 and 10. Roads built to access the drill sites still exist on-site and include one narrow two-track which winds along the top of Jesus Mesa, west from Section 10, and one two-track which runs through the section at the base of Jesus Mesa. Several small dirt roads and cow trails are also evident in the lower elevations. Forest Service boundary markers and fencing are in place along the southern edge of Section 9.

##### **3.1.2 Section 10**

Section 10 is positioned along the northeastern slope of Jesus Mesa, which can be seen on the map in Figure 1 on page 1. Topography throughout the site is highly variable and ranges from flat mesa top with rock outcroppings to gently-sloping habitat at the base of the mesa. A 61-m (200-ft) deep canyon is in the northwest corner of Section 10. Elevation throughout the site ranges from 2194.6 to 2316.5 m (7200 to 7600 ft) above sea level.

Analogous to Section 9, vegetation throughout the majority of the project area is dominated by piñon-juniper woodland. Desert /shrub grassland is present along the southeast corner of the site and the canyon bottom. Disturbance at the site is moderate and there are signs of moderate grazing by both native and domestic ungulates. One main two track road, which enters from the north, loops within Section 10 and continues into Section 9.

Evidence of moderate grazing by domestic livestock is apparent at lower levels with light evidence of grazing by native and domestic ungulates at higher elevations. Historic exploratory disturbance such as roads and jeep trails wind throughout the section. Cow trails are also more apparent at the lower elevations.

##### **3.1.3 S2S2 Section 11**

The S2S2 of Section 11 consists of moderately to heavily-grazed desert grassland and open piñon-juniper woodland which can be seen on the map in Figure 1 on page 1. The site has gently sloped topography which drains to the south. Elevation across the S2S2 of Section 11 ranges from approximately 2179-2219 m (7150–7280 ft) and contains 2 dry drainages. There is evidence of year-round livestock grazing, as well as several dirt and two-track roads.

### **3.1.4 Section 16**

Section 16 consists of moderately to heavily-grazed desert grassland and open piñon-juniper woodland which can be seen on the map in Figure 1 on page 1. The site has gently to moderately sloped topography interrupted by sheer rock faces, mesas, and arroyos. Elevation across Section 16 ranges from approximately 2155-2225 m (7070–7300 ft) and contains several drainages. Historic exploratory drilling disturbance is present throughout the site, as well as four recent monitoring wells. There is evidence of year-round livestock grazing, as well as several dirt and two-track roads. Portions of the site are less undisturbed due in large part to geological features and rugged terrain.

## **3.2 SECTIONS 11 (NORTH 3/4) AND 27 (INDIRECT IMPACT AND WILDLIFE REFERENCE AREA)**

Areas immediately surrounding the project area, where indirect and cumulative impacts could occur, were also surveyed. Federal lands (Cibola NF) include Sections 11 and 27. Section 27, as seen in the maps in Figures 2 and 3 on pages 2 and 3, was selected as the Wildlife Reference Area (control) based upon the following criteria; suitable distance from impact site, comparable habitat types and elevation, and comparable geological and habitat features.

## **3.3 HABITAT MAPPING**

Plant communities in the Sections 9, 10, and 16 graduate from desert grassland, dominated by gramma grasses (*Bouteloua spp.*), ring muhly (*Muhlenbergia torreyi*), and annuals such as rubber rabbitbrush (*Ericameria nauseosa*) and broom snakeweed (*Gutierrezia sarothrae*), to juniper savanna / piñon-juniper woodland ecotone. Juniper savanna and piñon-juniper woodland, a cold-adapted evergreen habitat, tends to occur above grassland or desert vegetation but below pine forest elevations (Peiper, 1977). Open piñon-juniper areas in all sections are dominated by one-seed juniper (*Juniperus monosperma*) and two-needle piñon pine (*Pinus edulis*). There are some scattered clumps of Ponderosa pine, as well as single trees, in the higher elevations in Sections 9 and 10.

Because of the transitional properties of piñon-juniper woodlands, they support critically important wildlife communities. Wildlife documented at the sites is indicative of desert grassland and piñon-juniper interfaces. Avian species detected included obligates/ semi-obligates such as western scrub-jay (*Aphelocoma californica*) and juniper titmouse (*Baeolophus griseus*). Typical mammalian species observed included animals such as blacktail jackrabbit (*Lepus californicus*), cliff chipmunk (*Tamias dorsalis*), and mule deer (*Odocoileus hemionus*).

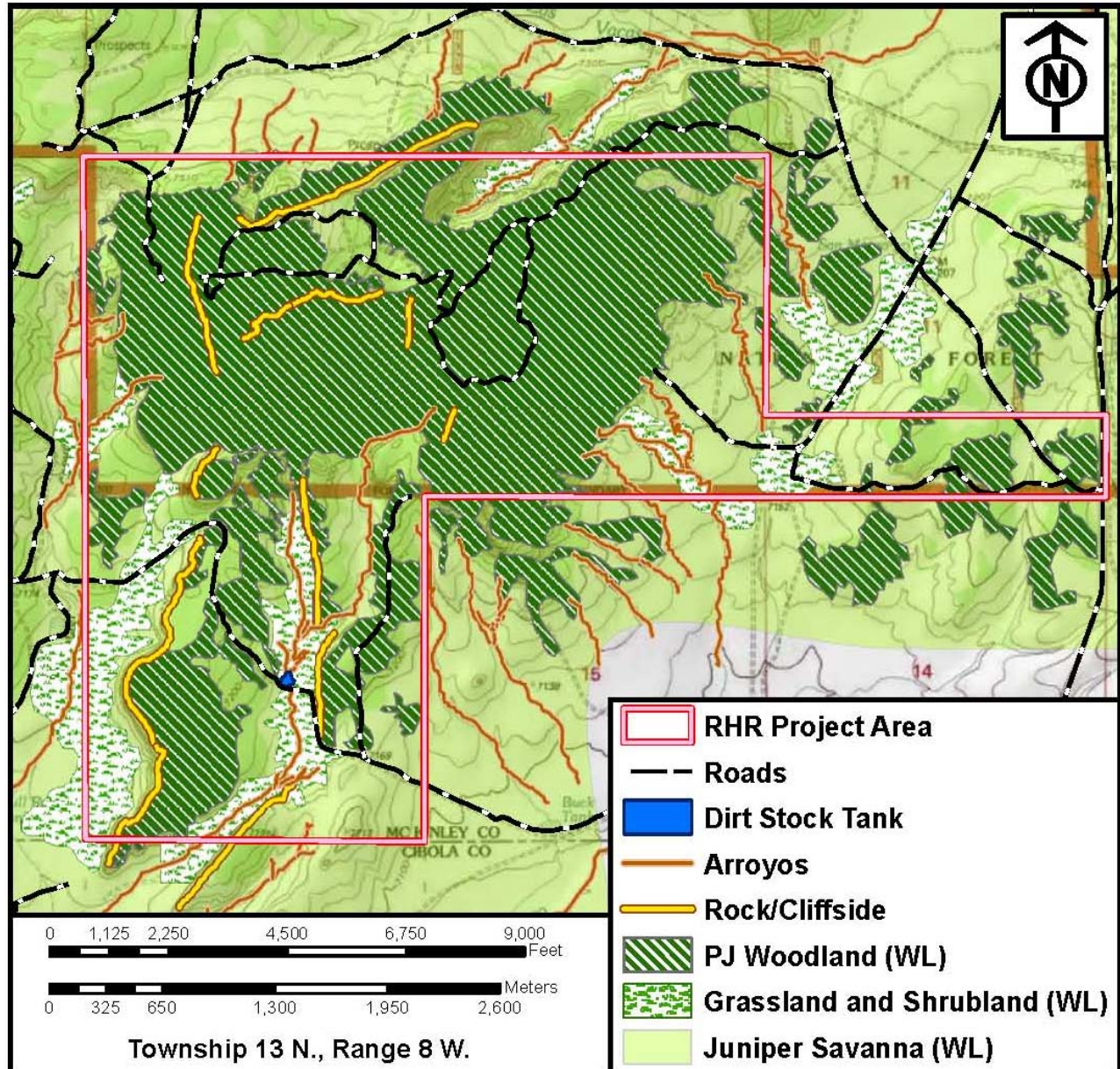
Five general wildlife habitat types were selected for the Roca Honda project area, including the Wildlife Reference Area; piñon-juniper woodland, juniper savannah, grassland and shrubland, rock/cliffside, and arroyo. The 3 primary habitat types (piñon-juniper woodland, juniper savannah, desert grassland) are depicted in the project's habitat map in Figure 18 on page 18. Examples of rock/cliffside and arroyo are also identified.

Three (cliffs, talus slopes, and nests) of the five special or unique habitat features cited in NMAC 19.10.6.602 D. (13) (d) (i) were found in the project area. Two (cliffs, talus slopes) of the habitat features are depicted on the USGS map (Figure 1 on Page 1). Thirty-one nests were



mapped in 2008 in the project area. UTM coordinates for each nest were recorded (as well as other data). RHR has elected to keep the locations confidential to avoid any harassment. The other two cited features (ponds, springs) are not present within the project area. However, there is a manmade dirt stock tank in Section 16 and water pockets eroded in sandstone outcrops. The tank and pockets periodically hold water.

Predominant plant species documented in each habitat type and topographic area are displayed in Table 1 on page 19.



**Figure 18. Habitat map of 3 primary habitat types.**

**Table 1. Predominant plant species documented.**

Habitat Type	Predominant Plant Species Documented
Piñon-juniper woodland (including uplands)	Piñon pine ( <i>Pinus edulis</i> ) Ponderosa pine ( <i>Pinus ponderosa</i> ) –some, isolated Gambel’s, Rocky Mountain white, and scrub oak ( <i>Quercus sp.</i> ) - some One-seed juniper ( <i>Juniper monosperma</i> ) Bigelow sagebrush ( <i>Artemisia bigelovii</i> ) Four-wing saltbush ( <i>Atriplex canescens</i> ) Broom snakeweed ( <i>Gutierrezia sarothrae</i> )
Juniper savanna	One-seed juniper ( <i>Juniper monosperma</i> ) Four-wing saltbush ( <i>Atriplex canescens</i> ) Broom snakeweed ( <i>Gutierrezia sarothrae</i> ) Gramma grasses ( <i>Bouteloua spp.</i> )
Desert Grassland/shrubland	Sand sagebrush ( <i>Artemisia filifolia</i> ) Four-wing saltbush ( <i>Atriplex canescens</i> ) Rubber rabbitbrush ( <i>Ericameria nauseosa</i> ) Broom snakeweed ( <i>Gutierrezia sarothrae</i> ) Pale wolfberry ( <i>Lycium pallidum</i> ) Gramma grasses ( <i>Bouteloua spp.</i> ) Ring muhly ( <i>Muhlenbergia torreyi</i> )
Rock/cliffside	Piñon pine ( <i>Pinus edulis</i> ) - some Ponderosa pine ( <i>Pinus ponderosa</i> ) – some One-seed juniper ( <i>Juniper monosperma</i> ) – some Woodland beargrass ( <i>Nolina greenieei</i> ) Littleleaf mock orange ( <i>Philadelphus microphyllus</i> )
Arroyo	Four-wing saltbush ( <i>Atriplex canescens</i> ) Broom snakeweed ( <i>Gutierrezia sarothrae</i> ) Rubber rabbitbrush ( <i>Ericameria nauseosa</i> ) Gramma grasses ( <i>Bouteloua spp.</i> ) Wheatgrasses ( <i>Agropyron spp.</i> )

## 4.0 SURVEY RESULTS

Results for the field seasons focus on the proposed direct impact sections (Sections 9, 10, S2S2 Section 11, and 16). The report focuses on data collected in Sections 9, 10, 11, and 16; however, data from other sections are also occasionally included for context.

### 4.1 HERPETOFAUNA

Sampling periods for reptiles and amphibians were from July 6-12 and from September 21-28, 2008. All herpetofaunal arrays were run for five days during each sampling period. All of the arrays were run during the July sampling period. Three of the Section 9 arrays and two of the Section 10 arrays were located on Jesus Mesa.

Pitfall arrays and opportunistic surveys (high grade) yielded fifty-six (56) recorded herps specimens during July and another 56 recorded herps specimens during September. These

data are summarized in Tables 2, 3, and 4 below and on page 21. Twelve different species of herpetofauna were recorded during field surveys in 2008. Another two species were observed by a Permits West field biologist, but were not observed during the summer or fall sampling. Table 3 below displays habitat usage and status for all herpetofaunal species recorded.

**Table 2. Herpetofauna collected at Roca Honda (McKinley & Cibola Co. NM).**

Herpetofauna collected in pitfall arrays and incidentally at Roca Honda Proposed Uranium Mine site during July and September sampling periods, 2008. The 112th capture was a Plateau Striped Whiptail, and is not included in this table due to ambiguous metadata.																					
Site	9-1	9-2	9-3	9-4	9-5	10-1	10-2	10-3	10-4	11-1	11-2	11-3	11-4	12-2	16-1	16-2	16-3	16-4	16-5	16-6	Total
Species																					
Plateau Striped Whiptail		4		4			1	1							1	3	3	3			20
Eastern Collared Lizard							1														1
Prairie Rattlesnake				2					1			2		1							5
Lesser Earless Lizard																	1				1
Greater Short-horned Lizard									1	2	1				4		1				10
Gopher Snake															1					1	2
Sagebrush Lizard	4	2	1	1	1			2		1	1	2	2			2	9		2	4	34
Plateau Lizard				6		1		3		2	1	4	5	2	3		4	7			38
Total	4	6	1	13	1	1	2	6	2	5	3	8	7	3	9	5	18	10	2	5	111

**Table 3. Herpetofauna habitat usage and status for all species recorded at Roca Honda (2006-2010).**

Species	Status	Habitat	Comments
Plateau Striped Whiptail ( <i>Aspidoscelis velox</i> )	C	DG	Commonly captured and observed in grassland sites
Eastern Collared Lizard ( <i>Crotaphytus collaris</i> )	U	RK	Single individual captured in Section 10, however, this species prefers rocky areas
Prairie Rattlesnake ( <i>Crotalus viridis</i> )	U	All	Several individuals were captured during 2008
Lesser Earless Lizard ( <i>Holbrookia maculata</i> )	R	DG	Single individual captured in Section 16, however, this species prefers grassland areas
Greater Short-horned Lizard ( <i>Phrynosoma hernandesi</i> )	C	DG	Ten individuals of this cryptic species were captured or observed
Gopher Snake ( <i>Pituophis catenifer</i> )	U	All	Two individuals were reported during the study period
Sagebrush Lizard ( <i>Sceoporus graciosus</i> )	C	All	One of the two most abundant lizards along with the plateau lizard
Plateau Lizard ( <i>Sceloporus tristichus</i> )	C	All	One of the two most abundant lizards along with the sagebrush lizard
Canyon treefrog ( <i>Hyla arenicolor</i> )	U	RK	Found in standing water pools in sandstone up side canyons
New Mexico Spadefoot ( <i>Spea multiplicata</i> )	U	DG	Single individual observed, but likely common after rains
Bullfrog ( <i>Rana catesbeiana</i> )	U	SP	Single individual recorded from farm pond
Western Terrestrial Garter Snake ( <i>Thamnophis elegans</i> )	U	SP	Single individual captured while mist-netting at point for bats at farm pond

**Status**

C-Common, easily found in appropriate habitat and season

U-Uncommon, present in low numbers in appropriate habitat and season

R-Rare, < 3 records

**Habitat**

PJ-Pinyon – Juniper Woodland

JS-Juniper Savannah

DG-Desert Grassland, includes arroyos

RK-Areas dominated by rocky outcropping, broken terrain or cliff faces

SP-Stock Pond



**Table 4. Herpetofauna potentially present at Roca Honda (McKinley & Cibola counties, NM).**

Family	Common Name	Species	Likelihood of Occurrence	Verified 2008
Ambystomidae	Tiger Salamander	<i>Ambystoma tigrinum</i>	High	
Pelobatidae	Plains Spadefoots	<i>Spea bombifrons</i>	High	
Pelobatidae	New Mexico Spadefoot	<i>Spea multiplicata</i>	High	X
Bufonidae	Red-spotted toad	<i>Bufo punctatus</i>	possible	
Bufonidae	Woodhouse's Toad	<i>Bufo woodhousii</i>	possible	
Ranidae	Bullfrog	<i>Rana catesbienna</i>	present	X
Hylidae	Canyon Treefrog	<i>Hyla arenicolor</i>	unlikely	X
Crotaphytidae	Eastern Collared Lizard	<i>Crotaphytus collaris</i>	present	X
Crotaphytidae	Lepoard Lizard	<i>Gambelia wislizenii</i>	possible	
Phrynosomatidae	Lesser Earless Lizard	<i>Holbrookia maculata</i>	present	X
Phrynosomatidae	Greater Short-horned Lizard	<i>Phrynosoma hernandesi</i>	present	X
Phrynosomatidae	Roundtail Horned Lizard	<i>Phrynosoma modestum</i>	unlikely	
Phrynosomatidae	Sagebrush Lizard	<i>Sceloporus graciosus</i>	present	X
Phrynosomatidae	Prairie Lizard	<i>Sceloporus tristichus</i>	present	X
Phrynosomatidae	Tree Lizard	<i>Urosaurus ornatus</i>	high	
Phrynosomatidae	Side-blotched Lizard	<i>Uta stansburiana</i>	present	X
Teiidae	Western Whiptail	<i>Aspidoscelis tigris</i>	present	X
Teiidae	Plateau Striped Whiptail	<i>Aspidoscelis velox</i>	present	X
Teiidae	Little Striped Whiptail	<i>Aspidoscelis inornatus</i>	unlikely	
Scincidae	Many-lined skink	<i>Eumeces multivirgatus</i>	high	
Scincidae	Great Plains Skink	<i>Eumeces obsoletus</i>	possible	
Colubridae	Glossy Snake	<i>Arizona elegans</i>	unlikely	
Colubridae	Ringneck Snake	<i>Diadophis punctatus</i>	possible	
Colubridae	Corn Snake	<i>Elaphe guttata</i>	possible	
Colubridae	Night Snake	<i>Hypsiglena torquata</i>	possible	
Colubridae	Coachwhip	<i>Masticophis flagellum</i>	high	
Colubridae	Striped Whipsnake	<i>Masticophis taeniatus</i>	high	
Colubridae	Gopher Snake	<i>Pituophis melanoleucus</i>	present	X
Colubridae	Mountain Patchnose Snake	<i>Salvadora grahamiae</i>	possible	
Colubridae	Western Terrestrial Garter Snake	<i>Thamnophis elegans</i>	high	X
Colubridae	Western Diamondback Rattlesnake	<i>Crotalus atrox</i>	high	
Colubridae	Blacktail Rattlesnake	<i>Crotalus molossus</i>	possible	
Viperidae	Prairie Rattlesnake	<i>Crotalus viridis</i>	high	X

Herp captures were dominated by four lizard species; Plateau striped whiptail (*Aspidoscelis velox*; 21 specimens), sagebrush lizard (*Sceloporus graciosus*; 34 specimens) plateau lizard (*Sceloporus tristichus*; 38 specimens), and the greater short horned lizard (*Phrynosoma hernandesi*; 10 specimens). These four species accounted for 92% (103 out of 112 total) of captures. Two examples of captured specimens can be seen in Figures 19 and 20 below.



**Figure 19. Prairie rattlesnake (*Crotalus viridis*) at Roca Honda (2008).**



**Figure 20. Greater short-horned lizard (*Phrynosoma hernandesi*) at Roca Honda (2008).**



Plateau striped whiptails were more abundant in July than in September, with 17 specimens captured in July and 4 specimens captured in September. 81% of the 21 total captures occurring during July. Sagebrush lizard abundance was very similar for July and September, with 15 specimens captured in July and 19 specimens captured in September. Plateau lizards were more abundant in September than in July, with 26 specimens captured in September and 12 specimens captured in July. 68% of captures occurred during the later sampling period. Greater short-horned lizard abundance was similar during July and September, with 6 specimens captured in July and 4 specimens captured in September. Herpetofauna captures per array, per section, are summarized in Table 5 below.

**Table 5. Summary of herpetofauna captures.**

Section	10	11	12	16	9
Captures per Array	2.75	5.75	1.5	8.2	6.25

Herpetofaunal pitfall arrays are quite effective at capturing small mammals and yielded a dozen incidental mammal captures. These data were provided in Table 2 on page 20.

## 4.2 SMALL MAMMALS

### 4.2.1 Terrestrial Small Mammals

For each small mammal array, sampling occurred for three consecutive nights in the summer (between July 9-15, 2008) and in the fall (between September 22-28, 2008). Capture results and summary statistics for the small mammals have been recorded separately for each monitoring period, shown in Tables 6 and 7 on pages 24 and 25, and cumulatively to represent patterns over multiple seasons, shown in Table 8 on page 26. Only results for sites in Sections 9, 10, and 16 are discussed, although results for sites in Sections 11 and 12 are also reported in tables.

A total of fourteen (14) species were recorded. Diversity per site ranged from 2-7 species in both summer, with an average of 4 species, and fall, with an average of 3.3 species. Cumulative diversity ranged from 3-10 species per site, with an overall average of 5 species. Species composition was largely uniform throughout the study area. The most abundant species over two seasons, as shown in Table 8 on page 26, was pinon mouse (*Peromyscus truei*; 90 specimens) that occurred commonly at all sites except 10-3, 16-1, and 16-3, which were predominantly grassland habitats with arid shrubs. This species is recognized as being affiliated most often with piñon-juniper habitats. Silky pocket mouse (*Perognathus flavus*; 65 specimens) was the second most abundant species that also occurred at all sites from pure grassland to pinon/juniper woodland. This was followed in total abundance by deer mouse (*Peromyscus maniculatus*; 45 specimens), white-throated woodrat (*Neotoma albigula*; 33 specimens), and Ord's kangaroo rat (*Dipodomys ordii*; 20 specimens). The other species were at significantly lower densities but nevertheless are common throughout the Roca Honda study area. These included two species of squirrel, cliff chipmunk (*Tamias dorsalis*) and white-tailed antelope ground squirrel (*Ammospermophilus leucurus*), that are common especially in rocky areas, and a desert shrew (*Notiosorex crawfordi*), that is common in the arid southwest although not normally caught.

**Table 6. Small mammal captures July 9-15, 2008 with summary statistics.**

	Site/	9-1	9-2	9-3	9-4	10-1	10-2	10-3	10-4	11-1	11-2	11-3	11-4	12-1	12-2	16-1	16-2	16-3	16-4	16-5	16-6	Totals
Species																						
In Mammal Traps																						
Tamias dorsalis				1		3															1	5
Ammospermophilus leucurus																					1	1
Perognathus flavus		1	1			1	1	1	2	1	1	4	2	6	1	3	3	2	1	1	4	36
Perognathus flavescens									1													1
Dipodomys ordii		2	2					1			1	1	1			1		1			3	13
Dipodomys spectabilis										1											2	3
Reithrodontomys megalotis										1		1		1								3
Peromyscus maniculatus		2	1		3	1	5		1	3	2	1	3	3	2	1		4			2	34
Peromyscus boylii									1													1
Peromyscus truei		4	1	2	5	9	6		5		8	4	5	1			5		4	1	7	67
Onychomys leucogaster								1														1
Neotoma albigula								2	1		2	1	4		3				1			14
Other																						
Notiosorex crawfordi			1									1										2
Thomomys bottae													1									1
Diversity (# of species)		4	5	2	2	4	3	4	6	4	5	7	6	4	3	3	2	3	3	2	7	14
Trapping intensity (trap nights)		74	73	72	72	72	71	73	72	72	71	64	71	69	72	72	75	68	72	65	72	1422
Total # captures		14	7	4	13	15	12	6	15	6	14	13	18	11	8	5	8	8	10	2	23	212
Total # unique individuals		9	5	3	8	14	12	5	11	6	14	12	15	11	6	5	8	7	6	2	20	179
Capture success (%)		18.9	9.6	5.6	18.1	20.8	16.9	8.2	20.8	8.3	19.7	20.3	25.4	15.9	11.1	6.9	10.7	11.8	13.9	3.1	31.9	14.9
% recapture		35.7	28.6	25.0	38.5	6.7	0.0	16.7	26.7	0.0	0.0	7.7	16.7	0.0	25.0	0.0	0.0	12.5	40.0	0.0	13.0	15.6

**Table 7. Small mammal captures September 22-28, 2008 with summary statistics.**

Site/	9-1	9-2	9-3	9-4	10-1	10-2	10-3	10-4	11-1	11-2	11-3	11-4	16-1	16-2	16-3	16-4	16-5	16-6	Totals
<b>Species</b>																			
<b>In Mammal Traps</b>																			
<i>Tamias dorsalis</i>					1														1
<i>Ammospermophilus leucurus</i>								1									1		2
<i>Perognathus flavus</i>			1	2			1	1	1	2	1			3	7	3	4	3	29
<i>Perognathus flavescens</i>																			0
<i>Dipodomys ordii</i>	1						2	1		1							1	1	7
<i>Dipodomys spectabilis</i>							1						1					2	4
<i>Reithrodontomys megalotis</i>						1			1										2
<i>Peromyscus maniculatus</i>				1			1	1	4		1	2		1					11
<i>Peromyscus boylii</i>											1								1
<i>Peromyscus truei</i>		1	2	1	1			3		2	3	3		1		2		4	23
<i>Onychomys leucogaster</i>																		1	1
<i>Neotoma albigula</i>		1			2		1			1	4	2			1	4		3	19
<b>Other</b>																			
<i>Notiosorex crawfordi</i>							1												1
<i>Thomomys bottae</i>							1								1			1	3
<b>Diversity (# of species)</b>																			
<b>Trapping intensity (trap nights)</b>	72	75	72	74	70	74	72	73	73	72	72	71	74	71	74	72	70	69	1300
<b>Total # captures</b>	2	2	3	4	5	1	7	8	6	6	11	10	1	5	10	10	6	24	121
<b>Total # unique individuals</b>	1	2	3	4	4	1	6	7	6	6	10	7	1	5	8	9	6	14	100
<b>Capture success (%)</b>	3	3	4	5	7	1	10	11	8	8	15	14	1	7	14	14	9	35	9
<b>% recapture</b>	50	0	0	0	20	0	14	13	0	0	9	30	0	0	20	10	0	42	17
<b># seasonal recapture</b>	1	0	0	1	0	0	1	2	0	0	0	1	0	2	1	3	0	7	19
<b>% seasonal recaptures</b>	100	0	0	25	0	0	17	29	0	0	0	14	0	40	13	33	0	50	19

**Table 8. Small mammal captures for all 2008 with summary statistics.**

Site/	9-1	9-2	9-3	9-4	10-1	10-2	10-3	10-4	11-1	11-2	11-3	11-4	12-1	12-2	16-1	16-2	16-3	16-4	16-5	16-6	Totals
<b>Species</b>																					
<b>In Mammal Traps</b>																					
<i>Tamias dorsalis</i>			1		4														1		<b>6</b>
<i>Ammospermophilus leucurus</i>								1											1	1	<b>3</b>
<i>Perognathus flavus</i>	1	1	1	2	1	1	2	3	2	3	5	2	6	1	3	6	9	4	5	7	<b>65</b>
<i>Perognathus flavescens</i>								1													<b>1</b>
<i>Dipodomys ordii</i>	3	2					3	1		2	1	1			1		1		1	4	<b>20</b>
<i>Dipodomys spectabilis</i>							1		1						1					4	<b>7</b>
<i>Reithrodontomys megalotis</i>						1			2		1		1								<b>5</b>
<i>Peromyscus maniculatus</i>	2	1		4	1	5	1	2	7	2	2	5	3	2	1	1	4			2	<b>45</b>
<i>Peromyscus boylii</i>								1			1										<b>2</b>
<i>Peromyscus truei</i>	4	2	4	6	10	6		8		10	7	8	1			6		6	1	11	<b>90</b>
<i>Onychomys leucogaster</i>							1													1	<b>2</b>
<i>Neotoma albigula</i>		1			2		3	1		3	5	6		3			1	5		3	<b>33</b>
<b>Other</b>																					
<i>Notiosorex crawfordi</i>		1					1				1										<b>3</b>
<i>Thomomys bottae</i>							1					1				1				1	<b>4</b>
<b>Diversity (# of species)</b>																					
<b>Trapping intensity (trap nights)</b>	146	148	144	146	142	145	145	145	145	143	136	142	69	72	146	146	142	144	135	141	<b>2722</b>
<b>Total # captures</b>	16	9	7	17	20	13	13	23	12	20	24	28	11	8	6	13	18	20	8	47	<b>333</b>
<b>Total # unique individuals</b>	10	7	6	12	18	13	11	18	12	20	22	22	11	6	6	13	15	15	8	34	<b>279</b>
<b>Capture success (%)</b>	11.0	6.1	4.9	11.6	14.1	9.0	9.0	15.9	8.3	14.0	17.6	19.7	15.9	11.1	4.1	8.9	12.7	13.9	5.9	33.3	<b>12.2</b>
<b>% recapture</b>	37.5	22.2	14.3	29.4	10.0	0.0	15.4	21.7	0.0	0.0	8.3	21.4	0.0	25.0	0.0	0.0	16.7	25.0	0.0	27.7	<b>16.2</b>



All shrews in this survey were recovered from herpetofauna pitfalls. Rock squirrels (*Spermophilus variegates*) were abundant throughout the Roca Honda study area and on all sites. Table 9 below provides habitat usage and status for small mammals at Roca Honda.

**Table 9. Small mammal habitat usage, status, and comments for Roca Honda area.**

Species	Status	Habitat	Comments
Cliff Chipmunk ( <i>Tamias dorsalis</i> )	C	RK	Commonly found throughout the area, but most common in rocky areas
White-tailed Antelope Ground Squirrel ( <i>Ammospermophilus leucurus</i> )	C	RK	Commonly found throughout the area, but most common in rocky areas
Silky Pocket Mouse ( <i>Perognathus flavus</i> )	A	All	Captured at sites across all habitat types
Plains Pocket Mouse ( <i>Perognathus flavescens</i> )	R	U	Single individual captured at site at base of mesa in Section 10
Ord's Kangaroo Rat ( <i>Dipodomys ordii</i> )	C	DG	Captured in areas with sandy soils
Banner-tailed Kangaroo Rat ( <i>Dipodomys spectabilis</i> )	U	DG	Only seven individuals were captured
Western Harvest Mouse ( <i>Reithrodontomys megalotis</i> )	U	U	Only five individuals were captured
Deer Mouse ( <i>Peromyscus maniculatus</i> )	C	All	Common across all habitat types
Brush Mouse ( <i>Peromyscus boylii</i> )	R	U	Only two individuals were captured
Pinyon Mouse ( <i>Peromyscus truei</i> )	A	PJ, JS	The most common small mammal captured
Northern Grasshopper Mouse ( <i>Onychomys leucogaster</i> )	R	U	Only two individuals were captured
Rock Squirrel ( <i>Spermophilus variegates</i> )	C	All	Abundant throughout the Roca Honda study area and on all sites
White-throated Woodrat ( <i>Neotoma albigula</i> )	C	DG, PJ	Fairly common across sites and numerous middens were observed
Desert Shrew ( <i>Notiosorex crawfordi</i> )	U	DG	All shrews recorded were captured in herpetofaunal pitfall arrays
Botta's Pocket Gopher ( <i>Thomomys bottae</i> )	C	DG	While gopher traps were only set at four locations, most sites seem suitable for gopher occupation with old sign present in the form of old dirt mounds
Black-tailed Jackrabbit ( <i>Lepus californicus</i> )	A	All	Observed in abundance while spotlighting
Desert Cottontail ( <i>Sylvilagus auduboni</i> )	A	All	Observed in abundance while spotlighting
Big Brown Bat ( <i>Eptesicus fuscus</i> )	?	U	Minimal mist-netting was conducted so knowledge of bat species composition and abundance in inadequate and incomplete
Little Brown Bat ( <i>Myotis occultis</i> )	?	U	Minimal mist-netting was conducted so knowledge of bat species composition and abundance in inadequate and incomplete
Fringed Myotis ( <i>Myotis thysanodes</i> )	?	U	Minimal mist-netting was conducted so knowledge of bat species composition and abundance in inadequate and incomplete
Gunnison's Prairie Dog ( <i>Cynomys gunnisoni</i> )	A	DG	At least four small to large prairie dog towns are present within the study site

**Status**

A-Abundant, present in large numbers

C-Common, easily found in appropriate habitat and season

U-Uncommon, present in low numbers in appropriate habitat and season

R-Rare, < 3 records

**Habitat**

PJ-Pinon – Juniper Woodland

JS-Juniper Savannah

DG-Desert Grassland, includes arroyos

RK-Areas dominated by rocky outcropping, broken terrain or cliff faces

U-Not enough records to determine habitat preference

The three highest diversity sites for small mammals were Section 16 site 6, Section 10 site 4, and Section 10 site 3, as shown in Table 8 on page 26. The three sites with the most individuals caught were Section 16 site 6, Section 10 site 4, and Section 10 site 1. Average capture success over all seasons was about 12% which is relatively high for small mammals.

There is seasonal and inter-annual variation inherent in small mammal population structure due to changing seasons and natural population cycles. Summer sampling was more productive than fall sampling for most sites. Seasonal recaptures were noted to record relative turnover at each site over multiple seasons. This can depend on relative survivorship of individuals and species as well as longevity but can loosely be considered a measure of stability of a given site. The percentage of seasonal recaptures was generally highest in Section 16 as well as Section 10 sites 4 and 3, as shown in Table 7 on page 25.

#### **4.2.2 Lagomorphs**

Both black-tailed jackrabbit (*Lepus californicus*) and desert cottontail (*Sylvilagus auduboni*) were common throughout the study area. The desert cottontail (*Sylvilagus auduboni*) can be seen in Figure 21 at right.



**Figure 21. Desert cottontail (*Sylvilagus auduboni*) at Roca Honda Project Area (July 2008).**

#### **4.2.3 Fossorial Small Mammals**

Two gopher traps were set at site 9-4, six traps at site 10-3, three traps at site 16-3, and two traps at site 16-6 where signs of recent gopher activity were evident. In addition, most other sites appeared suitable for gopher occupation, often with old sign present in the form of old dirt mounds. Four Botta's pocket gopher (*Thomomys bottae*) were captured and collected as voucher specimens for sub-species designation. The Roca Honda site is a potential contact zone between two recognized sub-species of *T. bottae*, and these specimens will be valuable vouchers for determining occurrence of each sub-species.

#### **4.2.4 Volant Mammals**

Water sources at the Roca Honda site were few and ephemeral. Mist nets were set up on three occasions at two localities, located along the northern boundary of Sections 9 and 10, over the two monitoring seasons. Weather and size of water body also determine the relative success of this opportunistic sampling method. Windy conditions on two out of the three nights, as well as relatively large ponds (poor coverage with nets) resulted in no captures. One sampling session in July 2008, however, produced the following data: big brown bat (*Eptesicus fuscus*; 3 specimens); little brown bat (*Myotis occultis*; 1 specimen); fringed myotis (*Myotis thysanodes*; 1 specimen).

#### 4.2.5 Other Small Mammals

One road-kill Gunnison's prairie dog (*Cynomys gunnisoni*) was collected within the project area. There are at least four small to large prairie dog towns within the study site. Activity and densities appear to be healthy.

### 4.3 AVES (BIRDS)

In 2008, birds were sampled twice (replicate) during the breeding season at all established point count stations (240 stations in 7 ½ land sections). Surveys were conducted during the main breeding season for most resident species, from May 26 through June 24, 2008.

A total of 1,781 individuals, of fifty-nine (59) species, were recorded during breeding bird surveys at Sections 9, 10, 11, and 16 as shown in Table 10 below.

**Table 10. Avian species diversity and total number of species (Roca Honda 2008).**

Table 10. Avian species diversity and numbers (2008)				
Common Name (scientific name)	Section 9	Section 10	Section 16	S2S2 Section 11
<b>Birds</b>				
Scaled quail ( <i>Callipela squamata</i> )		X		
Turkey vulture ( <i>Cathartes aura</i> )	X	X	X	X
Red-tailed hawk ( <i>Buteo jamaicensis</i> )	X	X	X	X
American kestrel ( <i>Falco sparverius</i> )	X	X	X	X
Prairie falcon ( <i>Falco mexicanus</i> )		X		
Mourning dove* ( <i>Zenaida macroura</i> )	X	X	X	X
White-winged dove ( <i>Zenaida asiatica</i> )		X	X	
Common nighthawk ( <i>Chordeiles minor</i> )		X		X
Common poorwill ( <i>Phalaenoptilus nuttallii</i> )	X			
White-throated swift ( <i>Aeronautes saxatalis</i> )	X	X	X	
Black-chinned hummingbird ( <i>Archilochus alexandri</i> )	X	X	X	
Broad-tailed hummingbird ( <i>Selasphorus platycercus</i> )	X	X	X	
Hairy woodpecker ( <i>Picoides villosus</i> )	X	X		
Northern flicker (Red-shafted)* ( <i>Colaptes auratus</i> )	X	X	X	
Olive-sided flycatcher ( <i>Contopus cooperi</i> )	X	X	X	
Western wood-peewee ( <i>Contopus sordidulus</i> )	X		X	
Gray flycatcher ( <i>Empidonax wrightii</i> )	X	X	X	X
Say's phoebe* ( <i>Sayornis saya</i> )	X	X	X	X

**Table 10. Avian species diversity and numbers (2008)**

Common Name (scientific name)	Section 9	Section 10	Section 16	S2S2 Section 11
<b>Birds</b>				
Ash-throated flycatcher* ( <i>Myiarchus cinerascens</i> )	X	X	X	X
Cassin's kingbird* ( <i>Tyrannus cassinii</i> )	X	X	X	X
Loggerhead shrike ( <i>Lanius ludovicianus</i> )	X			X
Plumbeous vireo ( <i>Vireo plumbeous</i> )	X	X	X	
Warbling vireo ( <i>Vireo gilvus</i> )	X		X	
Western scrub jay ( <i>Aphelocoma californica</i> )	X	X	X	X
Pinyon jay* ( <i>Gymnorhinus cyanocephalus</i> )	X	X	X	X
Common raven* ( <i>Corvus corax</i> )	X	X	X	X
Cliff swallow ( <i>Petrochelidon pyrrhonata</i> )	X	X	X	X
Violet-green swallow* ( <i>Tachycineta thalassina</i> )	X	X	X	X
Mountain chickadee ( <i>Poecile gambeli</i> )		X	X	
Juniper titmouse ( <i>Baeolophus ridgewayi</i> )	X	X	X	X
Bushtit ( <i>Psatriparus minimus</i> )	X		X	X
White-breasted nuthatch* ( <i>Sitta carolinensis</i> )	X	X		
Rock wren ( <i>Sappinctes obseletus</i> )	X	X	X	
Canyon wren* ( <i>Catherpes mexicanus</i> )	X	X	X	
Bewick's wren ( <i>Thryomanes bewickii</i> )	X	X	X	X
Blue-gray gnatcatcher ( <i>Poliopitila caerulea</i> )	X	X	X	
Western bluebird* ( <i>Sialia mexicana</i> )	X	X	X	X
Mountain bluebird* ( <i>Sialia currucoides</i> )	X	X	X	
American robin ( <i>Turdus migratorius</i> )	X	X	X	
Northern mockingbird ( <i>Mimus polyglottus</i> )	X	X	X	X
Virginia's warbler ( <i>vermivora virginiae</i> )		X		
Yellow-rumped warbler ( <i>Dendroica coronata</i> )	X	X	X	
Black-throated gray warbler ( <i>Dendroica nigrescens</i> )	X	X		
Western tanager ( <i>Piranga ludoviciana</i> )	X	X	X	



Table 10. Avian species diversity and numbers (2008)				
Common Name (scientific name)	Section 9	Section 10	Section 16	S2S2 Section 11
<b>Birds</b>				
Chipping sparrow* ( <i>Spizella passerina</i> )	X	X	X	
Brewer's sparrow ( <i>Spizella breweri</i> )		X		
Vesper sparrow ( <i>Pooecetes gramineus</i> )		X		
Lark sparrow ( <i>Chonestes grammacus</i> )	X	X	X	X
White-crowned sparrow ( <i>Zonotrichia leucophrys</i> )			X	
Dark-eyed junco–Oregon & Gray-head ( <i>Junco hyemalis</i> )	X	X		
Spotted towhee ( <i>Pipilo maculatus</i> )	X	X		
Canyon towhee ( <i>Pipilo fuscus</i> )	X	X	X	X
Black-headed grosbeak ( <i>Pheucticus melanocephalus</i> )	X	X	X	
Red-winged blackbird ( <i>Agelaius phoeniceus</i> )			X	
Western meadowlark ( <i>Sturnella neglecta</i> )		X	X	X
Brown-headed cowbird ( <i>Molothrus ater</i> )	X	X	X	X
House finch ( <i>Carpodacus mexicanus</i> )	X	X	X	X
Pine siskin ( <i>Carduelis pinus</i> )			X	
Lesser goldfinch ( <i>Carduelis psaltria</i> )	X	X	X	
<b>Species diversity (# of species)</b>	47	53	47	27
<b>Total number of individuals detected</b>	663	432	686	
<b>Total (sp. diversity/ total individuals)</b>	59 / 1,781			

\*verified nesting activity (species listed in phylogenetic order- AOU, 2007)

Of the species documented in the three sections, the most common appear to be ash-throated flycatcher (*Myiarchus cinerascens*), juniper titmouse (*Baeolophus ridgewayi*), rock wren (*Sappinctes obsoletus*), bewick's wren (*Thryomanes bewickii*), and chipping sparrow (*Spizella passerina*). All five species were detected in all sections, with ash-throated flycatcher, a widely distributed species, and juniper titmouse, a species with fairly specific habitat requirements which includes a strong association with piñon-juniper woodlands, the most prevalent. Some of the prevalence may be due to highly conspicuous behavior, such as displaying and pair vocalizations, by both species during the breeding season. None of the protected or special status species listed in 2009 by the USFWS or NMDGF as having the

potential to occur in the project area was documented during sampling, as shown in Table 10 on pages 29-31.

In addition to the point count surveys of the breeding season of 2008, another series of point count surveys was conducted during the fall migration of 2008 (September 4, 5, 6, 12, 13, and 14) and once during the winter of 2010 (February 3, 4, 5, 7, 9). The winter survey was conducted in 2010 rather than 2009. To supplement the point count surveys, additional bird observations were recorded in a variety of ways; surveys conducted in 2006 and 2007 focused on walking all areas of the site to determine presence/absence, abundance and habitat usage of avifauna during different seasons. The survey dates in 2006 were August 16, September 13, 14, 19, 20, 22, 23, and 25, and December 6, 7, 8, and 9. The survey dates in 2007 were May 13-16, 18 and 23-25. A series of raptor nest surveys were conducted in areas of rocky outcrops and cliffs in late March and early April of 2007 (March 23-30 and April 4). Five raptor species and three active raptor nests were found during these surveys. Four nights of nocturnal bird surveys were conducted from May 13-16 of 2007. During the breeding season of 2008, afternoon nest searches were conducted throughout the project site (May 27-30, June 1-3, and June 9-15). In addition, unique bird observations were made while conducting other wildlife related tasks at Roca Honda.

Table 11 on pages 33-38 summarizes the abundance, seasonal presence, breeding status, and habitat usage of all avian species detected at Roca Honda. A total of 87 bird species were recorded, and 43 of those species were confirmed or highly suspected to be nesting in the project area. Species listed in Table 11 on pages 33-38 follow the taxonomic order and nomenclature of the 7th American Ornithological Union Checklist (and the 44th Supplement to that Checklist). Additionally, all species listed were observed in all four sections (unless otherwise indicated) of the proposed mine site (Sections 9, 10, S2S2 11, and 16) as the habitats through the area are fairly monotypic and continuous.

The following discussion provides a detailed description of abbreviations used in Table 11 on pages 33-38 which includes status, nesting status, seasonal presence, and habitat usage. Status is broken into four (4) categories (A, C, U, and R), whereby A = Abundant, present in large numbers; C = Common, easily found in appropriate habitat and season; U = Uncommon, present in low numbers in appropriate habitat and season; and R = Rare, < 3 records. Nesting Status is broken into three (3) categories (I, C, and U), whereby I = Inferred: territorial behavior in suitable nesting habitat during breeding season; C = Confirmed: an active nest found, adults feeding young, or fledglings observed; and U = Unknown. Seasonal Presence is broken into four (4) categories (R, SR, WR, and M), whereby R = Year-round resident; SR = Summer resident, generally infers breeding; WR = Winter resident; and M = Migrant. Habitat is broken into five (5) categories (PJ, JS, DG, RK, and U), whereby PJ = Piñon-Juniper woodland; JS = Juniper savannah; DG = Desert grassland, including arroyos; RK = Areas dominated by rocky outcropping, broken terrain, or cliff faces; and U = Not enough records to determine habitat preference.

The preceding abbreviations can also be referenced at the end of Table 11 on page 38.

**Table 11. Avian abundance, seasonal presence, breeding status, and habitat usage for all avian species recorded at Roca Honda (2006-2010).**

<b>Table 11. Avian abundance, seasonal presence, breeding status, and habitat usage (2006-2010)</b>					
<b>Species</b>	<b>Status</b>	<b>Nesting Status</b>	<b>Seasonal Presence</b>	<b>Habitat</b>	<b>Comments</b>
Scaled quail ( <i>Callipepla squamata</i> )	R	U	R	DG	A few birds were heard calling in the distance in lower areas of the site (SW/4 of Section 9) on 5/16/07. The species was not recorded during point count surveys. Overall, the site is too high in elevation for this species
Turkey Vulture ( <i>Cathartes aura</i> )	C	U	SR, M	FO	No nest sites were found within the project area
Northern Harrier ( <i>Circus cyaneus</i> )	R		M	FO	Three birds were seen in migration and winter in the project area. 2 in Section 10 on 4/17/08, and 1 in Section 16 on 2/7/10
Sharp-shinned Hawk ( <i>Accipiter striatus</i> )	R		M	PJ	One male bird was seen on 9/2/2008 atop Jesus Mesa in Section 9
Cooper's Hawk ( <i>Accipiter cooperii</i> )	U		M	PJ, JS	Roughly 15 individuals were observed during migration. The lack of breeding season records indicates this species is not nesting at the site
Red-tailed Hawk ( <i>Buteo jamaicensis</i> )	U	C	SR, M, and WR	All	An active nest was found near the southern boundary of Sections 9 and 10. The nest fledged at least one young in 2008. Otherwise, this species can be present at the site in all seasons
Golden Eagle ( <i>Aquila chrysaetos</i> )	R		R	FO	A single adult was seen several times near the south half of Section 16. No nests are present within the site
American Kestrel ( <i>Falco sparverius</i> )	R	I	R	DG	The presence of this species in low numbers during the breeding season indicates breeding on or near the site
Prairie Falcon ( <i>Falco mexicanus</i> )	R		R	FO	One bird seen on 6/15/2008 in Section 10
Mourning Dove ( <i>Zenaidura macroura</i> )	C	C	SR, M	DG, FO	Nests in desert grasslands, common in flocks of 5+ birds during migration. 1 active nest found 6/17/2008 in Section 9
Great-horned Owl ( <i>Bubo virginianus</i> )	U	C	R	JS	One active nest found in the center of Section 16, in April 2007. Another active nest was found slightly north of the project area in Section 11. Not observed in Sections 9 or 10
Common Nighthawk ( <i>Chordeiles minor</i> )	R	I	SR	DG, JS	A total of 7 individuals were seen during the summer of 2008, all were in Sections 16 and 10
Common Poorwill ( <i>Nyctidromus albicollis</i> )	U	I	SR	JS, PJ	A total of 8 calling birds were heard during night surveys in 2007, and 2 were heard near dawn in 2008. Not observed in Section 11
White-throated Swift ( <i>Aeronautes saxatalis</i> )	U	I	SR	RK, FO	Two active nest cavities were located in Section 9 in 2008, otherwise an uncommon aerial forager near sheer cliffs throughout the site
Black-chinned Hummingbird ( <i>Archilochus alexandri</i> )	U	I	SR	PJ, JS	This species breeds in lower wooded areas of the site and generally vacates the area by early August

**Table 11. Avian abundance, seasonal presence, breeding status, and habitat usage (2006-2010)**

Species	Status	Nesting Status	Seasonal Presence	Habitat	Comments
Broad-tailed Hummingbird ( <i>Selasphorus platycercus</i> )	U	I	SR, M	PJ	Found nesting primarily in the highest portions of Jesus Mesa, also an uncommon fall migrant throughout.
Rufous Hummingbird ( <i>Selaphorus rufus</i> )	U		M	All	Late summer to early fall migrant, at times can be very numerous where banks of wild flowers are blossoming during the rainy season.
Williamson's Sapsucker ( <i>Sphrapicus thyroideus</i> )	R		WR	PJ	<10 birds were observed during winter point count surveys in 2/10, not observed in Section 11
Hairy Woodpecker ( <i>Picoides villosus</i> )	U	I	R	PJ	Most common atop Jesus Mesa where dead pinyons are present. Not observed in Section 11
Northern Flicker ( <i>Colaptes auratus</i> )	U	C	R	PJ, JS	Recorded throughout. One nest found in Section 16 on 5/29/2008
Olive-sided Flycatcher ( <i>Contopus cooperi</i> )	U		M	PJ, JS	A late spring migrant persisting into early June of 2008
Western Wood-Pewee ( <i>Contopus sordidulus</i> )	U	I	SR, M	PJ	Most common in denser, more mature stands of PJ woodland
Hammond's Flycatcher ( <i>Empidonax hammondi</i> )	R		M	DG, JS	Two migrants observed 5/16/07, and 9/3/08, only in Section 9
Dusky Flycatcher ( <i>Empidonax olberholseri</i> )	R		M	JS, PJ	Five migrants observed 9/3-10/08, not observed in Section 11
Gray Flycatcher ( <i>Empidonax wrightii</i> )	C	I	SR, M	PJ, JS	This species was a particularly common breeder in the project area
Say's Phoebe ( <i>Savornis saya</i> )	U	C	SR, M	JS, DG	This species was absent during the winter of 2010, probably due to the abnormally cold, snowy winter of 2009-2010. 2 nests found in Section 16 on 5/29/2008, and 6/3/2008
Ash-throated Flycatcher ( <i>Myiarchus cinerascens</i> )	C	C	SR	PJ, JS	This common nesting bird seems to completely vacate the area by mid July. One nest found in Section 10 on 5/27/2008.
Cassin's Kingbird ( <i>Tyrannus vociferans</i> )	U	C	SR, M	JS	This loud, conspicuous species is most commonly found where large decadent pinyons are present, as it requires sizable cavities for nesting. One nest found in Section 16 on 5/15/2008
Loggerhead Shrike ( <i>Lanius ludovicianus</i> )	R	I	SR, M	PJ, JS, DG	Present in low numbers throughout the site
Plumbeous Vireo ( <i>Vireo plumbeus</i> )	U	I	SR, M	PJ	A summer resident Pinyon-Juniper Community breeding bird, and an uncommon migrant throughout
Cassin's Vireo ( <i>Vireo cassinii</i> )	R		M	JS	One observed in Section 16 on 9/3/08
Warbling Vireo ( <i>Vireo gilvus</i> )	U	U	SR?, M	PJ	The breeding status of this species is unknown, singing birds were recorded high in Section 9 in possible breeding habitat (Gambel's oak thickets) during May of 2007 and early June of 2008. None were recorded during the second round of breeding season surveys in 2008. This may indicate that earlier birds were late spring migrants. Otherwise, this bird is an



**Table 11. Avian abundance, seasonal presence, breeding status, and habitat usage (2006-2010)**

Species	Status	Nesting Status	Seasonal Presence	Habitat	Comments
					uncommon migrant throughout the site
Clark's Nutcracker ( <i>Nucifraga columbiana</i> )	R		M	PJ	A record of a small flock in the Fall of 2007 in Section 16
Western Scrub Jay ( <i>Aphelocoma californica</i> )	U	I	R	PJ, JS	A resident Piñon-Juniper Community breeding bird
Pinon Jay ( <i>Gymnorhinus cyanocephalus</i> )	A	C	R	All	This species is abundant throughout the site in all seasons (although winter counts were slightly lower) often forming into flocks of 20+ birds. One nest found in Section 9 on 6/28/2008
Common Raven ( <i>Corvus corax</i> )	C	C	R	All	Common and conspicuous in all seasons. One nest found in a cliff ledge in Section 10 on 5/16/2007. The nest was active again in 2008
Horned Lark ( <i>Eremophila alpestris</i> )	U	I	SR, M, WR	DG	This species is present in low numbers at all seasons, although these almost certainly represent different populations of this highly migratory species, i.e. birds that nest at the site probably migrate south in winter, and horned larks present at the site in winter likely nested far to the north.
Tree Swallow ( <i>Tachycineta bicolor</i> )	U		M	All	Often in low numbers in mixed swallow flocks in migration
Violet-green Swallow ( <i>Tachycineta thalassina</i> )	A	C	SR, M	Nests in RK, PJ seen All	This species is a very common nester in cavities in trees and rocky outcropping and is at times an abundant migrant. Several nest sites were present in cavities along cliff faces in Sections 9 and 10, and eroded embankments in Section 16 in 2007 and 2008.
Cliff Swallow ( <i>Petrochelidon pyrrhonata</i> )	U		M	All	May nest in the area, as a few single birds were observed in nesting season, not believed to nest on the project site. Often in mixed swallow flocks in migration
Barn Swallow ( <i>Hirundo rustica</i> )	U		M	All	May nest in the area, as a few single birds were observed in nesting season, not believed to nest on the project site. Often in mixed swallow flocks in migration
Mountain Chickadee ( <i>Poecile gambeli</i> )	U		WR	PJ, JS	An uncommon widespread wintering species in wooded areas throughout the site
Juniper Titmouse ( <i>Baeolophus ridgwayi</i> )	C	C	R	PJ, JS	A resident Pinyon-Juniper Community breeding bird
Bushtit ( <i>Psaltirparus minimus</i> )	U	I	R	PJ, JS	A resident Pinyon-Juniper Community breeding bird
White-breasted Nuthatch ( <i>Sitta carolinensis</i> )	U	C	R	PJ, JS	A resident Pinyon-Juniper Community breeding bird. 1 nest found in Section 10 on 6/15/2008
Rock Wren ( <i>Salpinctus obsoletus</i> )	A	C	R	RK	This extremely vocal species was often detected at distances of > 100 meters and is an abundant species near any rocky out cropping or steep rocky area. Several adults feeding young in rocky areas of Sections 9 and 10 in

**Table 11. Avian abundance, seasonal presence, breeding status, and habitat usage (2006-2010)**

Species	Status	Nesting Status	Seasonal Presence	Habitat	Comments
					2007 and 2008.
Canyon Wren ( <i>Catherpes mexicanus</i> )	U	C	R	RK	Surprisingly uncommon, only found in low numbers near the steepest cliff faces. One nest found in Section 9 on 6/17/2008
Bewick's Wren ( <i>Thryomanes bewickii</i> )	C	I	R	PJ, JS	A resident Pinyon-Juniper Community breeding bird.
House Wren ( <i>Troglodytes aedon</i> )	R		M	PJ, JS	Six were observed in Sections 9 and 10, 9/3-12/08)
Ruby-crowned Kinglet ( <i>Regulus calendula</i> )	R		M	JS	Four records, 1 5/14/07, Section 16, 1 5/15/07, Section 9, 2 seen on 9/4/08, Section 10. This species is surprisingly sparse as a migrant at the site
Blue-gray Gnatcatcher ( <i>Poliophtila carulea</i> )	U	I	SR, M	PJ, JS	A summer resident Pinyon-Juniper Community breeding bird
Western Bluebird ( <i>Sialia mexicana</i> )	A	C	SR, M, WR	All	This species is common to abundant in all seasons, although these occurrences almost certainly represent different populations of this migratory species, i.e. birds that nest at the site probably migrate south in winter, and bluebirds present at the site in winter likely nested far to the north. Five nests found in cavities in decadent pinyons and junipers in Sections, 9, 10 and 16 in 2007 and 2008
Mountain Bluebird ( <i>Sialia currucoides</i> )	U	C	SR, M, WR	All	This species is uncommon in nesting season but common at all other seasons, although these occurrences almost certainly represent different populations of this migratory species, i.e. birds that nest at the site probably migrate south in winter, and bluebirds present at the site in winter likely nested far to the north. Many nests found in cavities in eroded embankments in Section 16 in 2007 and 2008
Townsend's Solitaire ( <i>Myadestes townsendii</i> )	U		M, WR	PJ, JS	An uncommon, widespread winter resident throughout the site
American Robin ( <i>Turdus migratorius</i> )	C	U	M, WR	All	Breeding status unknown, singing migrants persisted in early June 2008, but were not present on the second round of breeding bird surveys. Often forms flocks of 20 + birds during winter
Hermit Thrush ( <i>Cartarus guttatus</i> )	R		M	JS	One observed on 9/5/08 in Section 10
Northern Mockingbird ( <i>Mimus polyglottus</i> )	C	I	SR	DG	This common nesting bird seems to completely vacate the area by late July
Cedar Waxwing ( <i>Bombicilla cedrorum</i> )	R		M	JS	One flock of 6 birds was observed on 4/18/08 in Section 10
Orange-crowned Warbler ( <i>Vermivora celata</i> )	U		M	All	An uncommon migrant throughout
Virginia's Warbler ( <i>Vermivora virginiae</i> )	U	U	SR?/M	PJ, JS	Breeding status unknown, singing migrants persisted in late May of 2007 and early June 2008 in small pockets of suitable breeding

**Table 11. Avian abundance, seasonal presence, breeding status, and habitat usage (2006-2010)**

Species	Status	Nesting Status	Seasonal Presence	Habitat	Comments
					habitat at the north rim of Jesus Mesa in Section 9, but were not present on the second round of breeding bird surveys. Otherwise an uncommon migrant throughout the site
Nashville Warbler ( <i>Vermivora ruficapilla</i> )	R		M	JS	One seen on 9/6/08 in Section 10
Yellow-rumped warbler ( <i>Dendroica coronata</i> )	U	U	SR?, M	PJ	Breeding status unknown, singing migrants persisted in late May of 2007 and early June 2008 on the highest parts of Jesus Mesa in Section 9, but were not present on the second round of breeding bird surveys. Otherwise an uncommon migrant throughout the site
Black-throated Gray Warbler ( <i>Dendroica nigriscens</i> )	C	I	SR, M	PJ, JS	Most common in denser, more mature stands of PJ woodland
Townsend's Warbler ( <i>Dendroica townsendii</i> )	U		M	PJ, JS	Twelve records from 9/3-12/08, not seen in Section 11
MacGillivray's Warbler ( <i>Oporornis tolmiei</i> )	U		M	PJ, JS	Fairly common migrant throughout the site
Western Tanager ( <i>Piranga ludoviciana</i> )	C		SR?, M	All	Breeding status unknown, singing migrants persisted in late May of 2007 and early June 2008 on the highest parts of Jesus Mesa in Section 9, but were not present on the second round of breeding bird surveys. Otherwise a common migrant throughout the site
Hepatic Tanager ( <i>Piranga flava</i> )	R		M	JS	One female observed on 5/23/07 in Section 16
Green-tailed Towhee ( <i>Pipilo chlorurus</i> )	U		M	PJ, JS	Uncommon migrant throughout the site
Spotted towhee ( <i>Pipilo maculatus</i> )	U	I	SR, M	PJ, JS	Nests in low numbers where Gambel's oak thickets are present on and around Jesus Mesa, otherwise an uncommon migrant throughout the site
Canyon Towhee ( <i>Pipilo fuscus</i> )	U	I	R	JS, DG	This species is present throughout the site year round, although winter numbers are down significantly
Chipping Sparrow ( <i>Spizella passerina</i> )	C	I	SR, M	All	A fairly common nesting species in all wooded areas, a common migrant throughout the site
Brewer's sparrow ( <i>Spizella brewerii</i> )	U		M	All	Uncommon migrant throughout the site
Vesper sparrow ( <i>Poocetes gramineus</i> )	R		M	DG	The site contains areas of suitable breeding habitat for this species, mostly in the S2 of Section 16 and the west side of Section 9. Despite this, the species was found to completely absent during the nesting season. The site is probably too arid for this species to breed. Otherwise, the species is a rare migrant, observed on 8/16/06 in Section 16, and 5 were recorded between 9/3-12/08 in Sections 10 and 16

**Table 11. Avian abundance, seasonal presence, breeding status, and habitat usage (2006-2010)**

Species	Status	Nesting Status	Seasonal Presence	Habitat	Comments
Lark Sparrow ( <i>Chondestes grammacus</i> )	A	C	SR, M	JS, DG	This species breeds high numbers in desert grasslands and juniper savannah throughout the site. The species is also a common migrant throughout the site. Two nests were found in low shrubs in the S2S2 of Section 11 in on 6/24/2008 and 7/11/2008
Lincoln's Sparrow ( <i>Melospiza lincolni</i> )	R		M	PJ	Two records: 9/3/08-Section 9, 9/6/08-Section 10
White-crowned Sparrow ( <i>Zonotrichia leucophrys</i> )	R		M	JS	A flock 6 -8 birds were seen in Section 10 on 4/17/08
Dark-eyed Junco ( <i>Junco hyemalis</i> )	C		M, WR	All	Common, widespread winter resident throughout the site
Black-headed grosbeak ( <i>Pheucticus melanocephalus</i> )	U	I	SR, M		Most common in denser, more mature stands of PJ woodland
Western Meadowlark ( <i>Sturnella neglecta</i> )	U	I	SR, M	DG	Likely nests in low densities in open desert grassland throughout the site
Brewer's blackbird ( <i>Euphagus cyanocephalus</i> )	R		M	DG	Two small flocks of 4 birds were seen in Section 10 on 9/6/08 and on 9/12/08
Brown-headed cowbird ( <i>Molothrus ater</i> )	U	I	SR, M	All	This nest parasite appeared to be active throughout the site in the breeding seasons of 2007 and 2008.
Scott's Oriole ( <i>Icterus parisorum</i> )	R	U	SR?, M	DG	1 male was seen and heard singing on 5/16/07 in the SW/4 of Section 9. The bird may have been nesting in the area, but the site is likely too high in elevation for this species to breed
Cassin's finch ( <i>Carpodacus cassinii</i> )	U		WR	PJ, JS	Winters in moderate numbers throughout the site
House Finch ( <i>Carpodacus mexicanus</i> )	C	I	R	All	This species is common throughout the site year round, although winter numbers are down significantly
Pine Siskin ( <i>Carduelis pinus</i> )	U		M	All	This species shows up sporadically throughout the site in small flocks in all seasons (Fewer in winter). Breeding is not suspected.
Lesser Goldfinch ( <i>Carduelis psaltria</i> )	U	I	SR, M	PJ, JS	A summer resident Pinyon-Juniper Community breeding bird
Evening Grosbeak ( <i>Coccothraustes vespertinus</i> )	U		WR, M	All	Winters in moderate numbers throughout the site, although one large flock (25-30 birds) was seen on 2/12/10 in Section 16

Status

A-Abundant, present in large numbers

C-Common, easily found in appropriate habitat and season

U-Uncommon, present in low numbers in appropriate habitat and season

R-Rare, < 3 records

Seasonal Presence

R-Year-round resident

SR-Summer Resident, generally infers breeding

WR-Winter Resident

M-Migrant

Nesting Status

I-Inferred: territorial behavior in suitable nesting habitat during breeding season

C-Confirmed: an active nest found, adults feeding young, or fledglings observed

U-Unknown

Habitat

PJ-Pinon – Juniper Woodland

JS-Juniper Savannah

DG-Desert Grassland, includes arroyos

RK-Areas dominated by rocky outcropping, broken terrain or cliff faces

U-Not enough records to determine habitat preference



#### **4.3.1 Doubtful Sightings or Calls**

Short of capturing birds, brief views and calls from birds inherently led to a small number of doubtful identifications. The author of this section has considerable expertise (roughly 25 years) with status, field identification, and distribution of birds of the pinon-juniper community in New Mexico and conducted the vast majority of field work at Roca Honda. The following records from Roca Honda (2006-2010) are considered dubious by the author, and are therefore omitted from Table 11 on pages 33-38.

***Rough-legged Hawk* (*Buteo lagopus*)** - There is a record of this species from April of 2007 from Section 16. This is an extremely late spring report for this raptor which breeds above the Arctic Circle. This species winters in Northern New Mexico but is generally present only during the winter months (November-early March). The common and widespread Red-tailed Hawk can show an extremely wide variation in plumage and is often mistaken for Rough-legged hawks. This is likely the source of this misidentification.

***Gambel's Quail* (*Callipepla gambelli*)** - There is a report of Gambel's Quail from Section 16 from 2007. In its native range, this quail is confined to deserts and riparian areas in southwestern and south central New Mexico, north to Espanola. Gambel's quail were introduced as a game bird into desert habitats north of Grants, Cibola County. These introduced populations rarely thrive outside their native environment, thus it is very unlikely that these populations could have spread all the way to the north side of Mount Taylor. In addition, even introduced populations of this species are generally found at significantly lower elevations than the Roca Honda site. The project area is beyond the native range of the species and too high in elevation for introduced populations. For these reasons, this report is likely a misidentification.

***White-winged Dove* (*Zenaida asiatica*)** - This species appeared about 10 times on one observer's data sheets from point count surveys. The species was not observed by any other surveyors between 2006 and 2010. White-winged doves have increased their range significantly in New Mexico in the past 20 years, and are now present almost statewide. In northern New Mexico, including Cibola and McKinley Counties, they are confined to suburban neighborhoods in larger towns like Grants and Gallup, where they are a popular "backyard" feeder bird. This species is highly unlikely to be present in upland areas, away from urban areas, above 7000 feet in northwest New Mexico. It's probable the observer saw mourning doves in poor lighting or at long distances in flight. This is likely the source of this misidentification.

***Ladder-backed Woodpecker* (*Picoides scalaris*)** - A record of this species from Jesus Mesa (Section 9) from the summer of 2007 is highly doubtful. This is a lowland species found in deserts and lowland riparian corridors generally below 6000 feet. The fact that this species was never recorded during point count surveys casts further doubt on the record. The observer likely saw a Hairy Woodpecker. Hairy Woodpeckers are roughly the same size as Ladder-backed Woodpeckers and give somewhat similar vocalizations and are a resident species on Jesus Mesa.

**Gray Vireo** (*Vireo vicinior*) - A Gray Vireo was reported on September 9, 2006, in Section 16. This is an extremely late record for this species, perhaps the latest record for northern New Mexico by three weeks. The fact that this species was never recorded during point count surveys casts further doubt on the record. The Roca Honda project area is probably too high in elevation for Gray Vireo breeding. In central New Mexico, this highly localized species is found at the base and lower slopes of foothills areas with juniper savanna and a healthy grassland component, generally from 5700 feet up to 6400 feet. The lowest portions of the Roca Honda site are above 7000 feet. Gray Vireos bear a close resemblance to Plumbeous Vireos (a widespread migrant at Roca Honda well into September). This is likely the source of this misidentification.

**Black-capped Chickadee** (*Poecile atricapilla*) - Multiple Black-capped Chickadees were reported in December of 2006 in Section 9. This species is strictly confined to lowland riparian corridors in Northern New Mexico, and has never been reliably found outside these areas. Mountain Chickadees in their late fall molt often lose their distinctive small white eye-line, making them look like Black-capped Chickadees. This is undoubtedly the source of this misidentification.

**Magnolia Warbler** (*Dendroica magnolia*) - A Magnolia Warbler was reported from the Spring/Summer of 2007 in Section 16. This species is a rare eastern vagrant in New Mexico. Therefore this record is omitted from the above list. This species could possibly be confused with a male Yellow-rumped Warbler, a species which is a widespread migrant at Roca Honda. Therefore this record is omitted from the above list.

**Hooded Warbler** (*Wilsonia citrina*) - A Hooded Warbler was reported from the Spring/Summer of 2007 in Section 16. This species is a rare eastern vagrant in New Mexico. This species could possibly be confused with a male Wilson's Warbler, a species which is a widespread migrant at Roca Honda. Therefore this record is omitted from the above list.

**Black-throated Sparrow** (*Amphispiza bilineata*) - An un-cited record from Section 16 is present in the database. While the record is possible, the site is almost certainly too high in elevation for this sedentary desert sparrow. The fact that this species was never recorded during point count surveys casts further doubt on the record. If seen well, this species is unmistakable. Lark Sparrows give similar vocalizations to Black-throated Sparrows and are very common at Roca Honda. It is likely this is the source of the misidentification.

#### **4.3.2 Quality Control**

For quality control purposes, this report and list were reviewed and edited by Dr. Sartor O. Williams, Chairman of the New Mexico Rare Bird Committee, and former New Mexico Department of Game and Fish Ornithologist. His reply was received on April 26, 2010.

Migratory bird surveys were conducted in Sections 9, 10, 11, 16, and 27 in their entirety (160 stations). Thirty-two stations were evenly distributed within all surveyed sections irrespective of terrain features and habitat types.

Every effort was made to keep nest search effort even across the project site, with a more intense effort placed on direct potential impact areas, as mentioned above. A total of twenty-five (25) active nests, of fifteen (15) different species, were documented in Sections 9, 10, and 16, as shown in Table 10 on pages 29-31. Piñon and ponderosa pine snags in the area provide suitable nest site habitat for many primary and secondary cavity nesting species, such as mountain bluebird shown in Figure 22 at right. These two tree species are clearly an important nest site habitat component for local birds as fifteen of the twenty nests documented in trees were in either piñon or ponderosa pine. The highest numbers of nests documented in the 2008 season were those of western bluebird (*Sialia mexicana*). Western bluebirds are secondary cavity nesters with a preference in New Mexico for piñon-juniper and open woodland habitats. Although western bluebirds breed throughout much of the western United States, populations have shown sharp declines in New Mexico since 1980 (NMPIF, 2009). Some of the apparent prevalence at the site may be correlated with the high visibility of the species and the presence of highly suitable nesting habitat within and around the project area, as seen in the habitat map in Figure 18 on page 18.



**Figure 22. Mountain bluebird feeding nestlings at Roca Honda (June 2008).**

## **4.4 UNGULATE AND FURBEARERS (MID-LARGE MAMMALS)**

### **4.4.1 Ungulates**

Information about ungulate populations, elk and mule deer in particular, in New Mexico has great value with regard to current natural resource management on both public and private lands. Ungulate surveys were timed to take place during the main reproductive season (rut). Surveys were conducted at Roca Honda from August 25 to September 11, 2008, as per NMDGF guidelines.

Of the native ungulate species expected to occur within the area, two (2) were documented; Rocky Mountain elk (*Cervus elaphus nelsoni*) and mule deer - Rocky Mountain subspecies (*Odocoileus hemionus*). While Rocky Mountain elk range from New Mexico to north-central British Columbia and have been successfully reintroduced in many places, it is widely believed that mule deer populations are currently in decline throughout the west. Both elk and mule deer have been documented at the Roca Honda project site in previous years, as well as mountain lion sign. Recent survey results confirm site use by all three. The highest number of pellet groups for both elk and mule deer were recorded in Section 16, with the highest apparent habitat use at piñon-juniper interfaces with juniper savannah and desert grassland, as shown in Figure 23 on page 42. Table 12 on page 43 provides ungulate abundance, reproductive status, and habitat usage at Roca Honda.



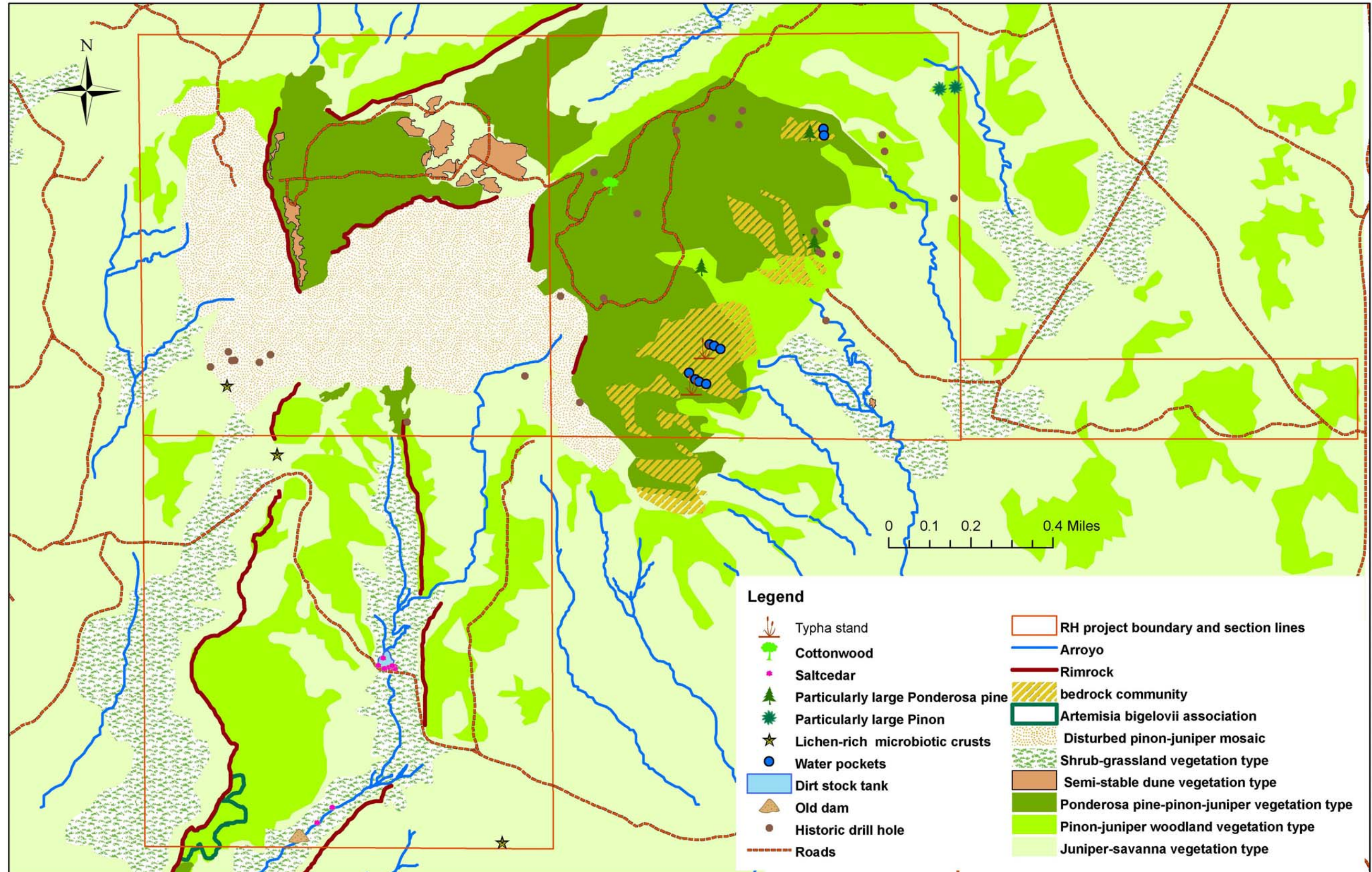


Figure 23. Vegetation Map of RHR Project Area.



**Table 12. Ungulate status, reproductive status, and habitat usage at Roca Honda.**

Species	Status	Reproductive Status	Habitat Usage during Rut Surveys	Habitat Usage during Winter Surveys	Comments
Elk	U	U	PJ, JS	DG, JS	During “rut” surveys, Elk were primarily found in more densely wooded areas, although they occurred in very low numbers indicating little to no reproductive activity in the project area. In winter, they were only found in lower, more open areas of the project area.
Mule Deer	R	U	PJ, JS	PJ, JS	Mule deer were found to be sparse in the project area.

**Status**

*U-Uncommon-present in low numbers in appropriate habitat and season*

*R-Rare - < 3records*

**Reproductive Status**

*U-Unknown*

**Habitat**

*PJ-Pinon - Juniper Woodland*

*JS-Juniper Savannah*

*DG-Desert Grassland, includes arroyos*

#### **4.4.1.1 Ungulate Survey Results**

Table 13 below provides the results of ungulate surveys conducted in the fall (rut) (September 8-12) of 2008, and winter of 2010 (February 16-18) on 842 ha (2,080 ac) in all of Sections 9, 10, S2S2 11, and 16. Because each of the 8 ungulate sampling stations per section covered 0.004 ha (0.01 ac), the total coverage was 0.03 ha (0.08 ac) per section.

**Table 13. Ungulate rut survey results for fall (2008) and winter (2010).**

Section	# of Elk Pellet Sets		# of Mule Deer Pellet Sets		Estimated Elk sign per Acre		Estimated Mule Deer sign per Acre	
	2008	2010	2008	2010	2008	2010	2008	2010
9	7	3	5	5	87.5	37.5	62.5	62.5
10	1	22	1	1	12.5	275	12.5	12.5
S2S2, 11	0	0	2	3	0	0	25	37.5
16	11	20	6	5	137.5	250	75	62.5

Based on survey data, it can be concluded that native ungulate presence at the proposed Roca Honda Mine Site is very low. This is primarily due to historic and current over-grazing in Sections 9, 10, and 11, and severe erosion and degraded range in Section 16. Superior grazing areas are available on the agricultural fields of the Lee Ranch (located south of the site).

**Elk** - Elk sign was very low during the rut of 2008 indicating very little if any reproductive activity at the site. The Mount Taylor elk herd typically ruts and calves at higher elevations on Mount Taylor where better range and cover are available. Elk wintering numbers were somewhat higher in Sections 10 and 16, but were lower in Section 9 and elk sign was almost non-existent atop Jesus Mesa. It should be noted that periodic heavy rains in the area probably contributed to lower pellet counts and other mammal sign.

**Mule Deer** - Mule Deer sign was consistently very low in all sampling sessions. This is likely due to degraded range. Mule Deer are probably more numerous in less disturbed areas or further upslope on Mount Taylor where better range and cover are available.

#### 4.4.2 Furbearers

Mountain lion activity was previously documented at Roca Honda. The area provides suitable habitat and prey base (elk, mule deer, and porcupine) for mountain lion. One skeleton of what appeared to be a juvenile (yearling) mountain lion was found in Section 9, near mammal sampling station # 6. Ancillary sign was also recorded by other survey crews in Sections 10 and 16. Table 14 below provides status, reproductive status, and habitat usage of furbearers at the Roca Honda site.

**Table 14. Furbearer abundance, reproductive status, and habitat usage at Roca Honda.**

Species	Status	Reproductive Status	Habitat Usage during Rut Surveys	Habitat Usage during Winter Surveys	Comments
Porcupine ( <i>Erethizon dorsatum</i> )	U	U	PJ, JS	PJ, JS	This arboreal species is likely confined to more heavily wooded areas of the project area
Coyote ( <i>Canis latrans</i> )	C	U	DG, JS	DG, JS	This species occurs in more open areas of the project area
Gray fox ( <i>Urocyon cinereoargenteus</i> )	R	U	U	U	Occurs in very low numbers in the project area
Skunk species (Genus unknown)	R	U	U	U	Occurs in very low numbers in the project area
Mountain lion ( <i>Felis concolor</i> )	R	U	PJ, RK, JS	PJ, RK, JS	Occurs in very low numbers in the project area
Bobcat ( <i>Lynx rufus</i> )	C	U	PJ	PJ	This species is common in higher, more wooded portions of the project area
Red Fox ( <i>Vulpes vulpes</i> )	R	U	U	U	This species was not recorded during Belt Transect surveys
Long-tailed weasel ( <i>Mustela frenata</i> )	R	U	U	U	This species was not recorded during Belt Transect surveys
Badger ( <i>Taxidea taxus</i> )	U	C	DG, JS	DG, JS	This species was not recorded during Belt Transect surveys, although 5 were sighted from 2006-2010 and 2 active burrows were observed in Section 16

Status

C-Common-easily found in appropriate habitat and season  
U-Uncommon-present in low numbers in appropriate habitat and season  
R-Rare - < 3 records

Reproductive Status

C-Confirmed: adults observed with young, active mammal burrows  
U-Unknown

Habitat

PJ-Pinon - Juniper Woodland  
JS-Juniper Savannah  
DG-Desert Grassland, includes arroyos  
RK-Areas dominated by rocky outcropping, broken terrain or cliff faces  
U-Not enough records to determine habitat preference

Mid-sized furbearing mammals documented in Sections 9, 10, S2S2 11, and 16 included six native species; porcupine (*Erethizon dorsatum*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), badger (*Taxidea taxus*), striped skunk (*Mephitis mephitis*), and bobcat (*Lynx rufus*). Mid-sized furbearing mammal species documented can be found in Table 15 on page 45.

**Table 15. List of potential furbearing mammals with potential to occur at the Roca Honda project site (Cibola and McKinley Counties) (2008).**

Family	Common Name	Species	Likelihood of Occurrence	Verified
Erethizontidae	Porcupine	<i>Erethizon dorsatum</i>	Probable	X
Canidae	Coyote	<i>Canis latrans</i>	Definite	X
Canidae	Kit fox	<i>Vulpes macrotis</i>	Unknown	
Canidae	Gray fox	<i>Urocyon cinereoargenteus</i>	Probable	X
Procyonidae	Ringtail	<i>Bassariscus astutus</i>	Unknown	
Procyonidae	Raccoon	<i>Procyon lotor</i>	Unknown	
Mustelidae	Long-tailed weasel	<i>Mustela frenata</i>	Unknown	X
Mustelidae	Badger	<i>Taxidea taxus</i>	Definite	X
Mephitidae	Spotted skunk	<i>Spilogale gracilis</i>	Probable	
Mephitidae	Striped skunk	<i>Mephitis mephitis</i>	Probable	X
Mephitidae	Hog-nosed skunk	<i>Conepatus mesoleucus</i>	Unknown	
Felidae	Mountain lion (puma)	<i>Felis concolor</i>	Definite	X
Felidae	Bobcat	<i>Lynx rufus</i>	Probable	X
Tayassuidae	Collared peccary	<i>Peccary tajacu</i>	Unknown	
Cervidae	Rocky Mountain elk	<i>Cervus elaphus nelsoni</i>	Definite	X
Cervidae	Mule deer – Rocky Mtn	<i>Odocoileus hemionus</i>	Probable	X
Antilocapridae	Pronghorn	<i>Antilocapra americana</i>	Unknown	

*Taxonomy based on Wilson and Reeder (2005).*

Species identification was based upon sightings, scat, and other ancillary sign, a sample of which can be seen in Figure 24 at right. Porcupine and coyote were the most common species identified along belt transects across all sites. Species verification is understandably harder for some species than others. Porcupines are primarily nocturnal and presence was often verified by sign such as tree blazes (debarking) and tree girdling. Coyotes were typically identified by tracks and scat.



**Figure 24. Bobcat track at Roca Honda (2008).**

The highest species diversity, five species, was recorded at Section 16. The highest total number of individuals, twelve specimens, was also recorded at Section 16, likely due to the existence of a wider variety of high quality habitat. Some sampling transects may have exhibited lower numbers of detectable species due to site restrictions such as rock surfaces and trees within the survey area of a transect. Since the sampling stations were randomly selected,

they were not modified. Incidental observations which took place either outside of survey periods or away from sampling stations included long-tailed weasel (*Mustela frenata*), badger (*Taxidea taxus*), gray fox (*Urocyon cinereoargenteus*), and porcupine (*Erethizon dorsatum*) at a number of locations throughout Roca Honda, including one porcupine kill site.

#### 4.4.2.1 Furbearer Survey Results

Table 16 below displays the results of furbearing mammal belt transect surveys conducted in the fall of 2008 (September 8-12) and the winter of 2010 (February 16-18) on 842 ha (2,080 ac) in all of Sections 9, 10, S2S2 11, and 16. Because each of the 8 furbearer belt transect sampling stations per section covered 0.07 ha (0.18 ac), the total coverage was 0.58 ha (1.44 ac) per section.

**Table 16. Furbearer surveys results for fall (2008) and winter (2010).**

Species	# of Sign in Section 9		# of Sign in Section 10		# of Sign in S2S2 of Section 11		# of Sign in Section 16	
	2008	2010	2008	2010	2008	2010	2008	2010
Porcupine ( <i>Erethizon dorsatum</i> )	6	0	2	0	1	0	1	2
Coyote ( <i>Canis latrans</i> )	4	4	1	2	0	1	5	12
Gray fox ( <i>Urocyon cinereoargenteus</i> )	0	0	2	0	0	0	1	1
Spotted Skunk ( <i>Mephitis mephitis</i> )	0	0	0	0	0	0	1	0
Mountain lion ( <i>Felis concolor</i> )	0	1	0	0	0	0	1	1
Bobcat ( <i>Lynx rufus</i> )	1	10	0	3	0	0	2	1

In addition to furbearers detected during formal surveys, the following species were detected by diagnostic tracks during pedestrian wildlife surveys in 2006 and 2007.

**Red Fox** (*Vulpes vulpes*) - One set of tracks was recorded in Section 16 in the winter of 2006.

**Long-tailed Weasel** (*Mustela frenata*) - One set of tracks was recorded in Section 16 in the winter of 2006.

**Badger** (*Taxidea taxus*) - Roughly five badgers were sighted between 2006 and 2010 at Roca Honda during pedestrian wildlife surveys. Active burrows were found in the central part of Section 16 and in the southeast corner of Section 10. Most sightings were in close vicinity to these burrows.

## 4.5 USFWS & NMDGF THREATENED, ENDANGERED, & SPECIAL STATUS SPECIES

Prior to implementation of fieldwork, the current lists of Federal (USFWS, NM Ecological Field Services Office, 2008-2009) and State of New Mexico (NM Natural Heritage, 2008-



2009) listed and sensitive animal species known to occur in McKinley and Cibola Counties were reviewed. No listed or special status species were documented during wildlife surveys in 2008. Table 17 below presents currently listed USFWS and NMDGF endangered, threatened, and candidate species and associated habitat suitability in McKinley and Cibola Counties.

**Table 17. Wildlife species listed by the USFWS and NMDGF as Endangered, Threatened, or Candidate with potential to occur in McKinley and Cibola Counties, NM (2009).**

Common Name (scientific name)	Federal Status*	State Status*	Habitat Associations	Potential to occur in project area **	Documented at Roca Honda
<b>Mammals</b>					
Spotted bat ( <i>Euderma maculatum</i> )		T	Highly variable habitats from coniferous forests to desert scrub.	S	No
Cebolleta southern pocket gopher ( <i>Thomomys umbrinus paguatae</i> )	SOC		Limited to the higher timbered parts of the Animas Mountains (Hidalgo County).	NP	No
Black-footed ferret ( <i>Mustela nigripes</i> )	E		Open grasslands with year-round prairie dog colonies. Strongly associated with black-tailed prairie dogs.	NP	No
Townsend's big-eared bat ( <i>Corynorhinus townsendii pallescens</i> )	SOC	S	Found in a variety of desert scrub and relatively open, low- to mid-elevation mixed and coniferous woodlands.	S	No
<b>Birds</b>					
Bald eagle ( <i>Haliaeetus leucocephalus</i> )		T	Mature shoreline forests with scattered openings and little human use, near water with abundant fish and waterfowl.	NP	No
Northern goshawk ( <i>Accipiter gentilis</i> )	SOC		Ponderosa pine, mixed conifer, and spruce-fir forests.	NP	No
American peregrine falcon ( <i>Falco peregrinus</i> )	SOC	T	Rare breeders (NM) in rocky, steep cliff areas, generally near water or mesic canyons.	NS (marginal habitat)	No
Arctic peregrine falcon ( <i>Falco peregrinus tundrius</i> )	SOC	T	Nest in treeless tundra of Alaska, Canada, and Greenland. Occasional winter migrant. Rare.	NP	No
Mountain plover ( <i>Charadrius montanus</i> )	SOC		Dry, disturbed, or intensively grazed, open and flat tablelands.	NP	No
Least tern ( <i>Sterna antillarum</i> )	E	E	Marine or estuarine shores, or on sand bar islands in large rivers. Prefers areas free from humans and predators.	NP	No
Black tern ( <i>Chilidonias niger surinamensis</i> )	SOC		Freshwater marshes, wet meadows, lake margins, slow-moving rivers, bogs, shrub-swamps, and along prairie sloughs.	NP	No
Yellow-billed cuckoo ( <i>Coccyzus americanus</i> )	C		Extensive, mature riparian corridors.	NP	No
Western burrowing owl ( <i>Athene cucularia</i> )	SOC		Grasslands and prairies, associated with prairie dog towns.	NS (marginal habitat)	No
Mexican spotted owl ( <i>Strix occidentalis lucida</i> )	T		Rocky canyons in mature montane forests below 9500 feet in elevation.	NP	No
Costa's hummingbird ( <i>Calypte costae</i> )		T	Desert scrub, chaparral, thornscrub, tropical deciduous forest, and suburban areas.	NS	No
Southwestern willow flycatcher ( <i>Empidonax trillii extimus</i> )	E	E	Dense, riparian vegetation near surface water or saturated soil, monotypic or mixed stands of native and/or exotic species.	NP	No
Gray vireo ( <i>Vireo vicinior</i> )		T	Thorn scrub, oak-juniper woodland, piñon-juniper, dry chaparral, mesquite and riparian willow habitats.	NS	Potential/ Unlikely
<b>Fish</b>					
Rio Grande sucker ( <i>Catostomus plebeius</i> )	SOC		Currently inhabits the northern portion of the Rio Grande and its tributaries	NP	No
Zuni Bluehead Sucker ( <i>Catostomus discobolus yarrowi</i> )	C	E	Often inhabits swift water areas in mountain streams and smaller tributaries to large rivers (nursery habitat).	NP	No

**Status**

E-Endangered

T-Threatened

C-Candidate

SOC-Species of Concern

S-Sensitive Species

**\*\*Presence**

K-Known, documented observation within project area.

S-Habitat suitable and species suspected to occur within the project area.

NS-Habitat suitable but species is not suspected to occur within the project area.

NP-Habitat not present and species unlikely to occur within the project area.

## 4.6 MANAGEMENT INDICATOR SPECIES (CIBOLA NATIONAL FOREST)

The Land and Resource Management Plan for the Cibola National Forest and Grasslands, adopted in July 1985, amended in 2005, identifies 15 Management Indicator Species (MIS) (Cibola LRMP page 68-3, 102 and 108). Some, such as elk (*Cervus elaphus*), are listed as MIS for more than one habitat type (i.e., mountain grassland and mixed conifer). In addition some habitat types, such as ponderosa pine may have two or more MIS pygmy nuthatch (*Sitta pygmaea*) and Merriam's wild turkey (*Meleagris gallopavo merriami*), representing different structural stages of that particular vegetation type.

Management Indicator Species are wildlife species selected as indicators to possible changes to plant communities and associated seral habitats. These species are selected for their association with plant communities or seral stages, which management activities are expected to affect. Other factors considered in selection are monitoring feasibility, migratory habits, and habitat versatility.

Four Cibola National Forest MIS; Rocky Mountain elk (*Cervus elaphus nelsoni*), mule deer (*Odocoileus hemionus*), juniper titmouse (*Baeolophus ridgwayi*), and hairy woodpecker (*Dendrocopos villosus*), were documented during the surveys and are addressed below.

### 4.6.1 Game Species

#### Rocky Mountain Elk (*Cervus elaphus*)

(Habitat type – Mountain grassland / mixed-conifer)

Site use by elk was verified during fall sampling. Piñon-juniper and mixed grassland habitats at the project area appear to provide suitable habitat during rut. Species' presence on-site was documented by sign such as scat and observation of bedding areas as well as visual confirmation of harems and cows with young. Suitable grazing, calving, and winter range habitat exists within the project area.

#### Mule Deer (*Odocoileus hemionus*)

(Habitat type – Mountain shrub / piñon-juniper)

It is believed that mule deer numbers across the western United States have decreased over the past decade due, in some part, to the mule deer's need for early and mid-successional habitats (USDA FS, 2005). Site use by mule deer at the project area was documented during fall sampling using sign and visual confirmation. Does with fawns and juveniles/sub-adults were also documented. Suitable grazing, fawning, and winter range habitat for mule deer exists within the project area.

### 4.6.2 Non-game Species

#### Juniper titmouse (*Baeolophus ridgwayi*)

(Habitat type – Piñon-juniper)

The juniper titmouse is a species closely associated with piñon-juniper woodland habitat over much of its range. In New Mexico, an estimated 39% of that habitat is within the

Cibola National Forest (2005). Juniper titmice were detected during all surveys and breeding activity was documented within the project area.

Hairy woodpecker (*Dendrocopos villosus*)

(Habitat type – Mixed conifer)

As primary cavity nesters, hairy woodpeckers utilize a wide range of habitats in the southwestern United States. They are a resident nesting species in New Mexico and are highly adaptable. Hairy woodpeckers were documented during the breeding bird surveys and evidence of nest-site use was documented within the project area.

#### 4.7 MT. TAYLOR DISTRICT - FOREST SERVICE SENSITIVE SPECIES

Table 18 below provides a list of the Regional Forester's Sensitive Species which are likely to occur on the Cibola National Forest/Grasslands (CNF/G). All CNF/G Sensitive Species are listed; however, status (documented or suspected) is only provided for the Mt. Taylor Ranger District.

**Table 18. Cibola National Forest Regional Forester's Sensitive Species List.**

Table 18. Regional Forester’s Sensitive Species – CNF/G, Mt. Taylor District			
Common Name	Taxon	Forest Status	Documented at Roca Honda
		Mt. Taylor Dist.	
AMPHIBIANS			
Plains leopard frog	<i>Rana blairi</i>		No
Northern leopard frog	<i>Rana pipiens</i>	S	No
Great plains narrow- mouthed toad	<i>Gastrophryne olivacea</i>		No
FISH			
Rio Grande chub	<i>Gila pandora</i>		No
Rio Grande sucker	<i>Catostomus plebeius</i>	D	No
Suckermouth minnow	<i>Phenacobius mirabilis</i>		No
Zuni bluehead sucker	<i>Catostomus discobolus yarrowi</i>	D	No
BIRDS			
Bald eagle	<i>Haliaeetus leucocephalus</i>	D	No
White-faced ibis	<i>Plegadis chihi</i>		No
Zone-tailed hawk	<i>Buteo albonotatus</i>		No
Northern goshawk	<i>Accipiter gentilis</i>	D	No
Swainson’s hawk	<i>Buteo swainsoni</i>		No
Ferruginous hawk	<i>Buteo regalis</i>		No
American peregrine falcon	<i>Falco peregrinus (anatum)</i>	D	No
Lesser prairie-chicken	<i>Tympanuchus pallidicinctus</i>		No
Mountain plover	<i>Charadrius montanus</i>		No
Burrowing owl	<i>Athene cunicularia (hypugaea)</i>		No
Common ground dove	<i>Columbina passerina</i>	N/A	No
Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	S	No
White-eared hummingbird	<i>Hylocharis leucotis</i>	N/A	No
Loggerhead shrike	<i>Lanius ludovicianus</i>		No
Gray vireo	<i>Vireo vicinior</i>		No
Bell’s vireo	<i>Vireo bellii arizonae</i>		No
Baird’s sparrow	<i>Ammodramus bairdii</i>	N/A	No
MAMMALS			



**Table 18. Regional Forester's Sensitive Species – CNF/G, Mt. Taylor District**

Common Name	Taxon	Forest Status	Documented at Roca Honda
		Mt. Taylor Dist.	
Merriam's shrew	<i>Sorex merriami leucogenys</i>	D	No
Dwarf shrew	<i>Sorex nanus</i>	D	No
New Mexico shrew	<i>Sorex neomexicanus</i>		No
Spotted bat	<i>Euderma maculatum</i>	D	No
Allen's lappet browed bat	<i>Idionycteris phyllotis</i>		No
Pale Townsend's big-eared bat	<i>Corynorhinus townsendii (pallascens)</i>		No
Gray-footed chipmunk	<i>Neotamias canipes</i>		No
White mountains ground squirrel	<i>Spermophilus tridecemlineatus monticola</i>		No
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>		No
Gunnison's prairie dog	<i>Cynomys gunnisoni</i>	D	Yes
Botta's pocket gopher	<i>Thomomys bottae aureus</i>		Potential, unconfirmed
Botta's pocket gopher	<i>Thomomys bottae morulus</i>		No
Botta's pocket gopher	<i>Thomomys bottae planorum</i>		Potential, unconfirmed
Ceboletta southern pocket gopher	<i>Thomomys bottae paguatae</i>	D	No
Mt. Taylor Northern pocket gopher	<i>Thomomys talpoides taylori</i>	D	No
New Mexico banner-tailed kangaroo rat	<i>Dipodomys spectabilis clarenci [baileyi]</i>		Yes
Southern red-backed vole	<i>Clethrionomys gapperi</i>		No
Long-tailed vole	<i>Microtus longicaudus</i>		No
Sandhills white-tailed deer	<i>Odocoileus virginianus texana</i>		No
Rocky Mountain bighorn sheep	<i>Ovis canadensis (canadensis)</i>		No
<b>REPTILES</b>			
Arid land ribbon snake	<i>Thamnophis proximus diabolicus</i>		No
<b>SNAILS</b>			
Magdalena mountain snail	<i>Oreohelix magdalanae</i>		No
Subalpine mountain snail	<i>Oreohelix subrudis</i>		No
<b>INSECTS</b>			
Bleached skimmer dragonfly	<i>Libellula composita</i>		No
Nitocris fritillary	<i>Speyeria nokomis nitocris</i>		No
<b>CRUSTACEANS</b>			
Clam shrimp	<i>Eulimnadia foliisimilis</i>	D	No
Fairy shrimp (new spp.)	<i>Streptocephalus n. sp.1</i>	D	No
<b>PLANTS</b>			
Green milkweed	<i>Asclepias uncialis ssp. uncialis</i>		Potential
Zuni milkvetch	<i>Astragalus accumbens</i>	S	No
Villous groundcover milkvetch	<i>Astragalus humistratus var. crispulus</i>	S	No
Chaco milkvetch	<i>Astragalus micromerius</i>	D	No
One flowered milkvetch	<i>Astragalus wittmannii</i>		No
Arizona leatherflower Clustered leatherflower	<i>Clematis hirsutissima var. hirsutissima</i>	D	No
Sivinski's fleabane	<i>Erigeron sivinskii</i>	D	No
Sandia alumroot	<i>Heuchera pulchella</i>		No
Tall bitterweed	<i>Hymenoxys brachyactis</i>		No
Spellingberg's groundsel	<i>Packera spellenbergii (=Senecio s.)</i>		No
San Mateo penstemon	<i>Penstemon pseudoparvus</i>		No

D = Documented, reliable, recorded observation, in appropriate habitat within the Cibola National Forest/Grassland boundary.

S = Suspected, likely to occur based on habitat availability to support individuals/breeding pairs/groups within the CNF/G boundary.

X = Documented

Yes = Documented

Potential, unconfirmed = Four (4) *Thomomys bottae* sp. were collected as voucher specimens for sub-species designation. The RHR site is a potential contact zone between two recognized sub-species of *T. bottae*. Specimen designation has not been conducted.

Potential = Although numerous records of *Asclepias macrocarpa* were documented across Sections 9, 10, and 16, it was not determined whether a documented *Asclepias* sp. in Section 16 is of the species *Asclepias uncialis ssp. uncialis*

## **5.0 LABORATORY AND FIELD QUALITY ASSURANCE**

Following the most currently accepted survey protocols, as determined by federal and state agencies, ensures that utilized methods are standardized. Customary regulations require that surveys and data collection be conducted by a qualified person. The field operations leader should have a combination of education and field experience which meets the standards for certification as a fish and wildlife biologist as established by the Wildlife Society. Members of the field crew will have at least a Bachelor of Science degree in a relevant field or be enrolled in a program where there has been sufficient course work to qualify as field experience.

Program parameters must remain relatively constant over time in order to avoid bias and encourage continuity. Maintaining program integrity will create a more accurate overview and analysis of wildlife communities present and a more thorough representation of project impacts.

To evaluate the Roca Honda sampling plan for sources of error, the sampling design and monitoring protocols were reviewed by an experienced independent party prior to implementation (personal communication, Buskirk, 2008). In 2008, Permits West, Inc. hired Dr. Steve Buskirk, Professor of Zoology at the University of Wyoming, to serve as a consulting biologist for the Roca Honda project. Dr. Buskirk provides assistance with technical and statistical methodology and serves as a professional reviewer for project activities.

## 6.0 STATEMENT OF QUALIFICATIONS & PROJECT RESUMES

### 6.1 ROCA HONDA PROJECT – WILDLIFE LEADS AND SUPPORT STAFF

**Ms. June Galloway** - Lead Wildlife Biologist

Ms. Galloway has twelve years experience as a professional wildlife biologist with expertise in carnivores and ornithology. June came to Permits West from a four-year research position with the Rocky Mountain Research Station (USDA, FS) in Albuquerque, NM, where she performed research on wildlife communities in the Bosque ecosystem. She served as a supervisor with the FS and often supervises a crew of 4-10 contract biologists for larger projects with PWI. Over the course of her professional career, June has served as a wildlife biologist for the U.S. Forest Service in New Mexico and Minnesota, an assistant museum curator for Tulane University's Museum of Natural History, a zookeeper for the Audubon Institute, a wildlife rehabilitator, and originally as a wetlands biologist for a consulting firm in Pennsylvania. June performed her thesis research on captive wolves.

MS, Zoology & Wildlife Biology, University of New Orleans  
BS, Zoology, University of Southern Mississippi

**Dr. Geoff Carpenter** - Contract Biologist (Herpetologist)

Dr. Carpenter is a Herpetologist with broad experience working across the Rocky Mountains and southwest. He brings expertise in working with reptile and mammals and complements our existing staff for more general biological field work, T&E surveys, and monitoring. Geoff also assists Permits West as field manager for larger crews and as a technical editor for biological assessments and NEPA documents.

Ph.D., Biology, New Mexico State University  
MS, Zoology and Physiology, University of Wyoming  
BS, Zoology, University of Oklahoma

**Mr. Andrew Hope** - Contract Biologist (Mammalogist)

Mr. Hope is currently a doctoral candidate at the University of New Mexico's (UNM) and expects to graduate in the near future. Andrew is a small mammal specialist with special expertise with *Sorex* (shrews). He has authored and coauthored several peer-reviewed research papers and works in UNM's Museum of Southwestern Biology.

Ph.D., Biology, University of New Mexico (in progress)  
M.S., Biology, Eastern New Mexico University  
B.Sc, Zoology, University of Glasgow, Scotland

**Dr. Steve Buskirk** - Consulting Biologist

Dr. Buskirk is a full professor in the Department of Zoology and Physiology at the University of Wyoming with over 25 years experience in academics. Steve provides Permits West with assistance in technical and statistical methodology, serves as a reviewer and editor for biological assessments, sampling designs, and monitoring plans prepared by Permits West. His expertise is invaluable to Permits West and allows us to perform our tasks using the best of current research and statistical methodologies.

Ph.D., Wildlife Biology, University of Alaska Fairbanks  
MS, Zoology, University of Arizona  
BS, Biology, University of Redlands

**Mr. Charlie Black** - Wildlife Biologist

Mr. Black has been with Permits West, Inc. since 1997. Prior to that, Charlie worked as an assistant zoologist at the New Mexico Natural Heritage Program. Charlie handles surface negotiations, on-site inspections, and writes biological assessments for Permits West, Inc. He specializes in field ornithology.

BS, Arts & Sciences, University of New Mexico.

**Mr. Ben Yanda** - Natural Resources & GIS

Mr. Yanda provides geospatial expertise and is involved in a wide variety of tasks including project management, Storm Water Management, NEPA writing, and interfacing with government agencies. Ben has a background in construction and timber as well as training in the natural sciences. Ben has an extensive educational background in NEPA and Public lands management. Past employment experiences include research positions at Cornell University and the NYS Agricultural Experimental Station, the Star Lake Center for the Study of Environment and Culture, and as a Graduate Assistant in geography at the University of Wyoming.

MA, Geography, University of Wyoming,  
MA, Environment and Natural Resources, University of Wyoming,  
BA, Biology with Environmental Emphasis, Houghton College

**Dr. Juanita Ladyman** - Lead Botanist

Dr. Ladyman has worked with Permits West for eighteen years. She has supervised a wide variety of projects from T&E clearances, to reclamation projects and detailed vegetation maps on areas of several thousand acres. She supervises our larger projects and is responsible for the work of 6-10 botanists at any time. Juanita brings over twenty years leadership experience in applied and basic research on plants utilizing skills in botany, physiological ecology, agronomy, chemistry, and molecular biology from a broad botanical and ecological background. She has extensive experience in a wide range of botanical and ecological field studies and back-country surveys. Researched plant species status and prepared recommendations for management plans.

Ph.D., Botany, Michigan State University



## **7.0 PROTOCOLS**

### **7.1 ROCA HONDA UNGULATE AND FURBEARING MAMMAL FORMAL PROTOCOL**

#### ***7.1.1 Introduction***

In order to account for species not assessed using other survey methodologies at the Roca Honda project site, sampling stations were established in order to estimate presence of ungulate and furbearing mammal species. Sampling station center points were randomly selected using GIS (Global Information Systems) in areas that best represented existing habitat types. Roughly eight mammal sampling stations were placed per square mile (land section). Each sampling station consisted of one stationary central point, with three 50-m (164-ft) ‘arms’ placed approximately 120 degrees apart. The ‘arms’ represented 5-m (16.4 ft) wide, 50-m (164-ft) long belt transects with pellet count station centers situated at the end of each arm, including the center starting point. Since furbearing mammals were surveyed at the Roca Honda project site in association with ungulate surveys, each sampling station was set up to assess on-site presence of both wildlife groups. Sampling was conducted during critical time periods such as fall (rut) and winter (winter range). Counts started mid-morning in order to count any individuals passing through the area the morning of the count. Sampling design and methodologies were created for this specific project based upon Alison et al, 2006, Manley et al., 2004, and others.

#### ***7.1.2 Methodology***

##### ***TERRESTRIAL FURBEARING MAMMALS***

This grouping included mid-sized terrestrial mammals that are both nocturnal and diurnal and have a variety of habitat and food preferences (i.e. porcupine, badger). On-site presence of furbearing mammals was assessed by surveying three (3) 50-m (164-ft) long, 5-m (16.4-ft) wide (2.5 m [8.2 ft]) on each side of center line) transect belts at each sampling station. Presence was determined by visual observation, tracks, and ancillary sign (i.e. hair, scat, tree scarring/rubs). Although these surveys focused primarily on medium-sized, typically furbearing mammals, sampling also included species easily identified by track and sign (mountain lion and black bear) as well as smaller furbearing species such as weasels.

##### ***UNGULATES***

Ungulate surveys focused on native ungulate species, elk and mule deer. At each station 4 ‘points’, including the central point, served as pellet count stations. These ‘stations’ were marked with a labeled wooden stake which served as the center of a circular plot. Plot boundaries were determined by attaching a 3.58-m (11.75-ft) chain to the stake and creating a 360° diameter. Using a chain of this length allowed for sampling of an 0.004 ha (0.01 ac) area. Once the plot was established, the number of ‘fresh’ pellet groups within each circle for each species (elk or mule deer, in almost all cases) was estimated. For the purposes of this study, pellet groups were defined as an association of 10 or more fecal pellets of the same size. For the first round of surveys, ‘fresh’ pellets were those that appeared to have been deposited

within the last several weeks. After the initial survey, all pellets from the plot were removed or destroyed to ensure that pellets were not recounted during subsequent survey periods.

### 7.1.3 Habitat Variables

Since ungulate foraging patterns and habitat use can be greatly influenced by cover type and site conditions, habitat variables were also measured. Habitat was evaluated at all sampling stations by establishing a 25-m (82-ft) radius plot at each pellet count station, with the count station center point as the center. Both non-vegetative and vegetative habitat variables were measured. These variables included; aspect (0-360°), slope (0-99%), and canopy cover (25% increments). Station number, date, time, surveyors, and weather were also recorded.

#### List of Ungulate and Furbearing Mammals with potential to occur at the Roca Honda Project site (2008).

Order Rodentia	
Family Erethizontidae	
<i>Erethizon dorsatum</i> – porcupine .....	Definite
Order Carnivora	
Family Canidae	
<i>Canis latrans</i> – coyote .....	Definite
<i>Vulpes macrotis</i> – kit fox .....	Probable
<i>Vulpes vulpes</i> – red fox .....	Definite
<i>Urocyon cinereoargenteus</i> – gray fox .....	Definite
Family Procyonidae	
<i>Bassariscus astutus</i> – ringtail.....	Unknown
<i>Procyon lotor</i> – raccoon.....	Unknown
Family Mustelidae	
<i>Mustela frenata</i> – long-tailed weasel.....	Definite
<i>Taxidea taxus</i> – badger .....	Definite
Family Mephitidae	
<i>Spilogale gracilis</i> – spotted skunk .....	Probable
<i>Mephitis mephitis</i> – striped skunk.....	Probable
<i>Conepatus mesoleucus</i> – hog-nosed skunk.....	Unknown
Family Felidae	
<i>Felis concolor</i> – mountain lion .....	Definite
<i>Lynx rufus</i> – bobcat .....	Definite
Order Artiodactyla	
Family Tayassuidae	
<i>Peccary tajacu</i> – collared peccary .....	Unknown
Family Cervidae	
<i>Cervus elaphus</i> – elk.....	Definite
<i>Odocoileus hemionus</i> – mule deer .....	Definite
Family Antilocapridae	
<i>Antilocapra americana</i> – pronghorn.....	Unknown

## **7.2 ROCA HONDA AVIAN MONITORING FORMAL PROTOCOL**

### **7.2.1 Introduction**

At each land section where there was the potential for direct and indirect impacts from the proposed mine, eight point count stations per mile were established along a north to south alignment based on global positioning system (GPS) coordinates to assess bird populations. All stations were positioned approximately 150 m (492 ft) apart north to south and roughly 400 m (1284 ft) apart east to west. Thirty-two (32) point count stations were established per square mile.

Thirty-two (32) point count stations were established per square mile in Sections 9, 10, 11, 16, and 27 (T. 13 N., R. 8 W. and T. 14 N., R. 8 W.). In order to provide appropriate data for comparison between before and after site conditions, a reference site was established. The reference site (control) in Section 27 (T14N, R8W) was selected based upon the following criteria; suitable distance from impact site, comparable habitat types and elevation, and comparable geological and habitat features. Sampling design was based partly on methods created by Ralph et al. (1993) and Noon et al. (1981).

### **7.2.2 Methodology**

#### ***BIRDS***

Generally, point count methods follow Bibby and others (1992). Ideally, all points will be sampled an average of four times a year; twice during the breeding season, once during migration, and once during the winter. During breeding season surveys, each transect was surveyed in a north-south direction, alternating direction each session. A round of counts for all sites was completed before beginning a new session. During each point count survey, the observer at each point recorded all birds seen or heard for 10 minutes. Detection mode (heard, seen), sex, relative age of bird, and distance from point (m) was also recorded. Common and scientific names are based on the A.O.U Check List of North American Birds (American Ornithologists' Union, 2006) and its supplements.

Species identification and distance estimations were checked across observers by informal testing prior to the Roca Honda sampling season. Each observer was trained to estimate and record distances to each bird. Each transect was surveyed by at least 2 different individuals over the course of each 2008 survey to aid in standardizing observer bias (Verner, 1985). Surveys were typically conducted within the first four hours after sunrise, with the first count beginning within half an hour of sunrise. Nest surveys were also conducted at each land section, as time permitted. Every effort was made to maintain an even sampling effort across sites.

The entire project area was searched for active bird nests throughout the breeding season. Every effort was made to keep nest search efforts relatively even across sites, with higher effort placed on proposed direct impact areas (Section 9, 10, and 16). Although active nests were not routinely monitored, raptor nests were rechecked when possible.

### **7.2.3 Habitat Variables**

Avian habitat was evaluated at all point count stations by establishing a 25-m (82-ft) radius plot and measuring for both non-vegetative and vegetative habitat variables. These variables include; aspect, slope, canopy cover (25% increments), and abundance of snags. Station number, date, time, and weather were also recorded.

## **7.3 ROCA HONDA SMALL MAMMAL SAMPLING PROTOCOL**

### **7.3.1 Introduction**

The small mammal component of biological inventory and monitoring for the Roca Honda project encompassed a variety of different life histories that required variable sampling techniques. The small mammals were categorized into five groups: terrestrial small mammals, colonial small mammals (prairie dogs), lagomorphs, fossorial small mammals (gophers), and volant mammals (bats). Separate sections below outline details for sampling of each of these groups in turn. The only wildlife taken as part of the baseline data collection effort was small mammals. A wildlife take authorization permit was obtained from the NMDGF whereby Andrew Hope is listed as a subpermittee (Figure 25 on page 58). The permit is specifically named “Authorization for Taking Protected Wildlife for Scientific and/or Education Purposes.” The period of authorization was from February 26, 2007 to December 31, 2009 and provides specific conditions of authorization.

### **7.3.2 Methodology**

#### ***TERRESTRIAL SMALL MAMMALS***

**Trapping Design** - This group contained both nocturnal and diurnal small mammals, all of which were readily be caught in standard Sherman live traps. These traps were set, baited with a mixture of peanut butter and rolled oats, in trapping arrays (square grids) of 25 traps each (5x5) spaced at 10 m (32.8 ft) apart. The small mammal and herpetofauna sampling stations were chosen in proximity to ease integration of data among various taxonomic groups. Sampling sites were chosen to best represent all available habitats within the Roca Honda survey area, taking into account substrate, slope, aspect, and vegetation variability. Generally, four sampling arrays were located in each mile square section within the survey area. For consistency of orientation, each small mammal array was rooted with a south corner trap placed 10 m (32.8 ft) north of the northernmost edge of the herpetofauna pitfall array. The remainder of the array was set in a square grid with corners located at north, south, east and west. For each small mammal array, sampling occurred for three consecutive nights at each of three sampling periods through the year: spring (March through April to capture data concerning the pre-breeding annual population relative abundance and diversity and reflecting the impact of the previous winter season on populations), summer (June through July to capture data concerning early breeding season productivity before the southwestern monsoon season commences), and autumn (September through October to capture data concerning populations and diversity after a full breeding season).





**NEW MEXICO DEPARTMENT OF GAME AND FISH AUTHORIZATION  
FOR TAKING PROTECTED WILDLIFE FOR SCIENTIFIC AND/OR EDUCATION PURPOSES**  
Amended July 9, 2007, Amended July 13, 2007

**Name of Permittee:** Joe Cook

**Address:** Museum of Southwestern Biology, CERIA Building, MSC 03 2020, 1 University of New Mexico, Albuquerque, NM 87131-0001; 505/277-1358

**Name(s) of Subpermittee(s):**

Adamson, Tierney	Dunnum, Jonathan L.	Hope, Andrew	Patrick, Liz	Thomas, Jason
Barker, Brittany	Ediger, Ben	Johnson, Andy	Polechla, Paul J.	Tinnin, David S.
Bennett, Jewels	Escobedo, Yadech	Kochler, Anson	Racz, Gabor R.	Weise, Christa
Best, Troy L.	Findley, James S.	Lessa, Enrique	Rearick, Jolene	Witt, Chris
Campbell, Mariel	Frances, Jose	MacDonald, Steve	Runck, Amy	Yates, Terry L.
Dawson, Natalie	Gannon, William L.	Malaney, Jason	Schaff, Ben	
Dickerman, Robert W.	Goade, Diane	Nofchissey, Robert	Song, Elisha	
Dragoo, Jerry W.	Harding, Larisa E.	Parmenter, Robert R.	Swanson, Scarlett	

**Authorization No.:** 3300 (State employee; no fee required for permit)

**Period of Authorization:** Feb. 26, 2007 to Dec. 31, 2009

**Means of Taking Wildlife:** Firearms, mist-netting, live-capture methods including Sherman live traps, Tomahawk live traps, pitfall traps, snaptraps and salvage.

**Disposition of Wildlife:** Museum of Southwestern Biology, University of New Mexico, Albuquerque.

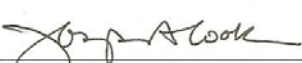
**Conditions of Authorization:**


- Furbearers, five of each species, statewide, except for state-listed species (2 each, statewide).
- Weasels, five of each species per locality.
- Jumping mice, 20 of each species, statewide (no more than 2 per locality for *Zapus hudsonius*).
- Tree squirrels, 100 total, statewide (no more than 20 per locality/mountain range), except up to 25 Arizona gray squirrels (no more than 5 per locality, i.e., per river drainage).
- Ground squirrels, 20 of each species, **per locality**.
- Chipmunks, 20 of each species, **per locality**, except for state-listed subspecies (2 each).
- Bats, 20 of each **per locality** of non-Threatened or Endangered species according to New Mexico state designations.
- Bats, State Threatened and/or Endangered: *Lasiurus xanthinus* (5, statewide); *Euderma maculatum* (5, statewide).

Collection of any federally protected species requires authorization from the U. S. Fish and Wildlife Service.

May also salvage dead, injured or otherwise incapacitated specimens of other protected species as encountered, with proper permitting from the U.S. Fish and Wildlife Service, provided that state/federally endangered/threatened species are to be reported to the New Mexico Department of Game and Fish (505/476-8107) within fourteen days of salvage. Specimens that are collected or salvaged will be used for research and teaching purposes as voucher material in the Museum of Southwestern Biology.

This permit does not authorize activity on private land without consent of the landowner and does not apply to lands where the New Mexico Department of Game and Fish does not have jurisdiction.

  
**Signature of Permittee**  
[Sign and retain in your possession]

  
**Director, Department of Game and Fish**  
P.O. Box 25112, Santa Fe, NM 87504 USA

\* Note: Banding, collecting, and/or salvage of migratory birds requires additional authorization from the U. S. Fish and Wildlife Service. If your activities involve the taking of federally protected species, your state permit is not valid without the appropriate authorization from the U. S. Fish and Wildlife Service. It is your responsibility to obtain the appropriate authorization from the U. S. Fish and Wildlife Service.

**Figure 25. NMDGF wildlife take authorization permit.**

**Procedure** - Traps were opened and baited during the late afternoon and closed each morning before 1000. This greatly reduced the occurrence of overheated specimens but at the same time, allowed for sampling of diurnal small mammals. Each morning, traps with captures were collected and replaced with spare empty traps. Captures were stored in shade until all arrays were checked and traps closed before processing. Data collected for each specimen included species information, gender, age, standard external measurements, mass, tag number, and status (new individual, seasonal recapture, or current recapture). (Seasonal recapture information can be used to infer population turnover and current recapture information is important for any relative abundance or density estimates to make sure that the same individuals are not recorded multiple times per trapping period.) Processed animals were released onto the same arrays that they were collected as soon as possible following processing.

#### ***COLONIAL SMALL MAMMALS***

Colonial small mammal (prairie dog) sampling was not conducted at the Roca Honda project site.

#### ***LAGOMORPHS***

**Procedure** - Counts, aging, and identification of lagomorph scat pellets among the rabbits and hares are unreliable and often lead to false conclusions. Instead, to gain knowledge of diversity and distribution of lagomorphs within the survey area, spotlight surveys were conducted. Surveys began at dusk and continued for two hours. Notes were taken on habitat affinities and identification to genus, as well as a relative abundance per mile of road traveled. Spotlight surveys were conducted twice per season, and coincident with the terrestrial small mammal seasonal trapping surveys.

#### ***FOSSORIAL SMALL MAMMALS***

**Procedure** - This group consists of pocket gophers that are only readily captured using standard gopher traps set in subterranean runways maintained by these species. Surveys consisted of opportunistic trapping to determine diversity within this group. Standard gopher traps are lethal, and all specimens collected were archived within the Museum of Southwestern Biology.

#### ***VOLANT MAMMALS***

**Procedure** - This group consists of bats, and surveys consisted of opportunistic trapping to determine diversity within this group. Mist netting was conducted twice per season, coincident with the terrestrial small mammal seasonal trapping surveys. Nets were set before dusk over available standing water sources and remained set until 2300, being checked at least every 30 minutes. Data collected for each specimen included species information, gender, age, standard external measurements, and mass.

## ***SPECIMEN VOUCHER COLLECTION***

Mining activities at the Roca Honda site will potentially highly impact the existing wildlife communities, in some areas resulting in complete removal of the biota. Very few if any representative specimens of mammals are currently available in recognized museum collections from the vicinity of this survey area. This project provided a valuable opportunity to form a voucher collection of museum specimens for this site to reflect the biota, in this case the mammal fauna, from the survey area before mining activities commence. Collection permits for unprotected non-game small mammals are generally not required for state residents. However, during the surveys, Mr. Hope held a valid permit issued by the New Mexico Department of Game and Fish for scientific collection and salvage of protected wildlife.

### **Roca Honda Potential Mammal Species List**

#### **Order Soricomorpha**

##### **Family Soricidae**

- Sorex monticolus* – montane shrew ..... Unlikely  
*Notiosorex crawfordi* – desert shrew ..... Probable

#### **Order Chiroptera**

##### **Family Vespertilionidae**

- Myotis yumanensis* – Yuma myotis ..... Unknown  
*Myotis lucifugus* – little brown myotis ..... Unknown  
*Myotis auriculus* – southwestern myotis ..... Unlikely  
*Myotis evotis* – long-eared myotis ..... Probable  
*Myotis thysanodes* – fringed myotis ..... Probable  
*Myotis volans* – long-legged myotis ..... Probable  
*Myotis californicus* – California myotis ..... Unknown  
*Myotis ciliolabrum* – western small-footed myotis ..... Probable  
*Lasionycteris noctivagans* – silver-haired bat ..... Probable  
*Pipistrellus hesperus* – western pipistrelle ..... Probable  
*Eptesicus fuscus* – big brown bat ..... Probable  
*Lasiurus cinereus* – hoary bat ..... Unlikely  
*Euderma maculatum* – spotted bat ..... Unlikely  
*Plecotus townsendii* – Townsend's big-eared bat ..... Unlikely  
*Antrozous pallidus* – pallid bat ..... Probable

##### **Family Molossidae**

- Tadarida brasiliensis* – Brazilian free-tailed bat ..... Unknown  
*Nyctinomops macrotus* – big free-tailed bat ..... Unlikely

#### **Order Lagomorpha**

##### **Family Leporidae**

- Sylvilagus nuttalli* – Nuttall's mountain cottontail ..... Definite  
*Sylvilagus auduboni* – desert cottontail ..... Definite  
*Lepus californicus* – black-tailed jackrabbit ..... Definite

## Order Rodentia

### Family Sciuridae

<i>Tamias dorsalis</i> – cliff chipmunk .....	Definite
<i>Tamias quadrivittatus</i> – Colorado chipmunk .....	Probable
<i>Ammospermophilus leucurus</i> – white-tailed antelope squirrel .....	Definite
<i>Spermophilus spilosoma</i> – spotted ground squirrel .....	Unknown
<i>Spermophilus variegates</i> – rock squirrel .....	Definite
<i>Cynomys gunnisoni</i> – Gunnison's prairie dog .....	Definite
<i>Sciurus aberti</i> – Abert's squirrel .....	Unlikely

### Family Geomyidae

<i>Thomomys bottae</i> – Botta's pocket gopher .....	Probable
<i>Thomomys talpoides</i> – northern pocket gopher .....	Unlikely

### Family Heteromyidae

<i>Perognathus flavus</i> – silky pocket mouse .....	Unknown
<i>Perognathus flavescens</i> – plains pocket mouse .....	Unknown
<i>Chaetodipus intermedius</i> – rock pocket mouse .....	Unknown
<i>Dipodomys ordii</i> – Ord's kangaroo rat .....	Probable
<i>Dipodomys spectabilis</i> – banner-tailed kangaroo rat .....	Definite
<i>Dipodomys merriami</i> – Merriam's kangaroo rat .....	Unknown

### Family Muridae

<i>Reithrodontomys megalotis</i> – western harvest mouse .....	Probable
<i>Peromyscus eremicus</i> – cactus mouse .....	Unknown
<i>Peromyscus maniculatus</i> – deer mouse .....	Probable
<i>Peromyscus leucopus</i> – white-footed mouse .....	Unknown
<i>Peromyscus boylii</i> – brush mouse .....	Probable
<i>Peromyscus truei</i> – pinon mouse .....	Probable
<i>Peromyscus nasutus</i> – northern rock mouse .....	Unknown
<i>Onychomys leucogaster</i> – northern grasshopper mouse .....	Probable
<i>Neotoma micropus</i> – southern plains woodrat .....	Unlikely
<i>Neotoma albigula</i> – white-throated woodrat .....	Probable
<i>Neotoma stephensi</i> – Stephens' woodrat .....	Unknown
<i>Neotoma mexicana</i> – Mexican woodrat .....	Unknown

### Family Erethizontidae

<i>Erethizon dorsatum</i> – porcupine .....	Probable
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## Order Carnivora

### Family Canidae

<i>Canis latrans</i> – coyote .....	Definite
<i>Vulpes macrotis</i> – kit fox .....	Unknown
<i>Urocyon cinereoargenteus</i> – gray fox .....	Probable

### Family Procyonidae

<i>Bassariscus astutus</i> – ringtail .....	Unknown
<i>Procyon lotor</i> – raccoon .....	Unknown

### Family Mustelidae

<i>Mustela frenata</i> – long-tailed weasel .....	Definite
<i>Taxidea taxus</i> – badger .....	Definite



**Family Mephitidae**

<i>Spilogale gracilis</i> – spotted skunk .....	Probable
<i>Mephitis mephitis</i> – striped skunk.....	Definite
<i>Conepatus mesoleucus</i> – hog-nosed skunk.....	Unknown

**Family Felidae**

<i>Felis concolor</i> – puma .....	Definite
<i>Lynx rufus</i> – bobcat.....	Definite

**Order Artiodactyla**

**Family Tayassuidae**

<i>Peccary tajacu</i> – collared peccary .....	Unknown
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**Family Cervidae**

<i>Cervus elaphus</i> – elk.....	Definite
<i>Odocoileus hemionus</i> – mule deer .....	Probable

**Family Antilocapridae**

<i>Antilocapra americana</i> – pronghorn.....	Unknown
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**7.3.3 Comments**

The likelihood of occurrence for each species was based upon personal experience of AGH and not upon any published data or specimen information. Species considered to definitely occur at the Roca Honda site were based upon visual evidence to date from the survey region. Taxonomy is based upon Wilson and Reeder 2005. Totals are as follows (potentially): Orders = 6; Families = 17; Species = 66.

**7.4 ROCA HONDA HERPETOFAUNAL SAMPLING PROTOCOL**

**7.4.1 Introduction**

Herpetofaunal sampling ran concurrently with small mammal sampling. Sampling periods were from 6-12 July and from 21-28 September 2008. All arrays were run for five days during each sampling period.

**7.4.2 Methodology**

***PITFALL ARRAYS***

Each array consisted of four five-gallon buckets buried in the ground. One bucket served as the center of the array. The other three buckets were set 10 m (32.1 ft) out on three 120° rays of silt fencing to form a Y-array. Buckets were outfitted with 40.64 cm x 40.64 cm (16 in x 16 in) coverboards. Centered on each of the rays was a 63.5 cm x 17.78 cm (25 in x 7 in) funnel trap constructed of hardware cloth (a cylinder with funnels on each end, through which herps may enter and become trapped). Thus, each set/array consisted of four pitfalls (buckets) and three funnel traps. During sampling periods, coverboards were elevated approximately 2.54 cm (1 in) with rocks, sticks or soils, allowing herps to fall into the buckets after running into and being directed along the fence. Between sampling periods, traps were shut down, coverboards were tightly closed onto the tops of buckets and covered with soil and rocks, and funnels were sealed with small cardboard drinking cups.

Four (4) arrays per section were set up in Sections 9, 10, and 11, with two (2) in Section 12 and six (6) in Section 16 for a total of 20 arrays. All of the arrays were run during the July sampling period, and all but the arrays in Section 12 were run during September sampling. Three of the Section 9 arrays and two of the Section 10 arrays were located on Jesus Mesa. The reference site on Jesus Mesa was not sampled for herpetofauna (nor for small mammals).

#### **NIGHT SAMPLING**

Roads on-site and nearby were driven at dusk and after dark searching for herpetofauna crossing or using the road as a substrate for thigmothermic warming.

#### **OPPORTUNISTIC ENCOUNTERS**

Herpetofauna encountered opportunistically were always recorded; they were captured, and morphometric and reproductive data were recorded when possible.

#### **HIGH GRADE SEARCHES**

High grade, time-constrained pedestrian surveys were conducted as time allowed during field sampling periods. The focal areas of these searches were areas that were not in close proximity to any of the arrays. The purpose was to find and record species not captured at or near the arrays.

<b>List of herpetofauna potentially present at Roca Honda (McKinley &amp; Cibola Co. NM).</b>				
<b>Family</b>	<b>Common Name</b>	<b>Species</b>	<b>Likelihood of Occurrence</b>	<b>Verified 2008</b>
Ambystomidae	Tiger Salamander	<i>Ambystoma tigrinum</i>	high	
Pelobatidae	Plains Spadefoot	<i>Spea bombifrons</i>	high	
Pelobatidae	New Mexico Spadefoot	<i>Spea multiplicata</i>	high	Yes
Bufo	Red-spotted toad	<i>Bufo punctatus</i>	possible	
Bufo	Woodhouse's Toad	<i>Bufo woodhousii</i>	possible	
Rana	Bullfrog	<i>Rana catesbienna</i>	present	Yes
Hyla	Canyon Treefrog	<i>Hyla arenicolor</i>	unlikely	Yes
Crotaphytidae	Eastern Collared Lizard	<i>Crotaphytus collaris</i>	present	Yes
Crotaphytidae	Leopard Lizard	<i>Gambelia wislizenii</i>	possible	
Phrynosomatidae	Lesser Earless Lizard	<i>Holbrookia maculata</i>	present	Yes
Phrynosomatidae	Greater Short-horned Lizard	<i>Phrynosoma hernandesi</i>	present	Yes
Phrynosomatidae	Roundtail Horned Lizard	<i>Phrynosoma modestum</i>	unlikely	
Phrynosomatidae	Sagebrush Lizard	<i>Sceloporus graciosus</i>	present	Yes
Phrynosomatidae	Prairie Lizard	<i>Sceloporus tristichus</i>	present	Yes

List of herpetofauna potentially present at Roca Honda (McKinley & Cibola Co. NM).				
Family	Common Name	Species	Likelihood of Occurrence	Verified 2008
Phrynosomatidae	Tree Lizard	<i>Urosaurus ornatus</i>	high	
Phrynosomatidae	Side-blotched Lizard	<i>Uta stansburiana</i>	present	Yes
Teiidae	Western Whiptail	<i>Aspidoscelis tigris</i>	present	Yes
Teiidae	Plateau Striped Whiptail	<i>Aspidoscelis velox</i>	present	Yes
Teiidae	Little Striped Whiptail	<i>Aspidoscelis inornatus</i>	unlikely	
Scincidae	Many-lined skink	<i>Eumeces multivirgatus</i>	high	
Scincidae	Great Plains Skink	<i>Eumeces obsoletus</i>	possible	
Colubridae	Glossy Snake	<i>Arizona elegans</i>	unlikely	
Colubridae	Ringneck Snake	<i>Diadophis punctatus</i>	possible	
Colubridae	Corn Snake	<i>Elaphe guttata</i>	possible	
Colubridae	Night Snake	<i>Hypsiglena torquata</i>	possible	
Colubridae	Coachwhip	<i>Masticophis flagellum</i>	high	
Colubridae	Striped Whipsnake	<i>Masticophis taeniatus</i>	high	
Colubridae	Gopher Snake	<i>Pituophis melanoleucus</i>	present	Yes
Colubridae	Mountain Patchnose Snake	<i>Salvadora grahamiae</i>	possible	
Colubridae	Western Terrestrial Garter Snake	<i>Thamnophis elegans</i>	high	Yes
Colubridae	Western Diamondback Rattlesnake	<i>Crotalus atrox</i>	high	
Colubridae	Blacktail Rattlesnake	<i>Crotalus molossus</i>	possible	
Viperidae	Prairie Rattlesnake	<i>Crotalus viridis</i>	high	Yes

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