BASELINE DATA REPORT

Section 5.0

Wildlife

OCTOBER 2009

Submitted To:

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

Prepared by:

Roca Honda Resources, LLC
4001 Office Court, Suite 102, Santa Fe, NM 87507

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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

RHR's initial goal at the Roca Honda permit area was to conduct confirmatory drilling and monitor well installation. Based upon this initial goal, PWI conducted wildlife surveys at the site during 2006 and 2007. 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 it was determined that a uranium mine permit application would be submitted, per 19.10.6 NMAC, formal methodologies for evaluating wildlife populations were developed and implemented.

Data collected to date includes information on habitat types and wildlife community use. RHR plans to perform continuing future surveys to help provide a basis for determining the effectiveness of future mitigation activities and reclamation plans and practices. The SAP currently under review for the Roca Honda permit area was designed to address potential short- and long-term impacts associated with the proposed mining operations. The SAP will be used to further characterize pre-existing, pre-mining wildlife habitats and communities, and to assess impacts to those habitats and communities during the operational phase of the mine.

The objectives of the additional monitoring are to:

1) describe vertebrate fauna in the project area by conducting pre-mining 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 related to the proposed mine and potential impacts,

3) provide a basis for determining the effectiveness of mitigation activities and reclamation plans, and

4) plan post-mine inventories to address potential impacts.

In order to assess the relationships among potential impacts related to the proposed mining on wildlife within the Roca Honda permit area, monitoring will focus on the wildlife community's use of existing habitat types. The resulting information will help provide a basis for determining the effectiveness of mitigation activities and reclamation plans and practices. Post-mine inventory data will provide critical information for the analysis of overall project impact. This section provides the results of surveys performed to-date.

The results of the presence/absence surveys conducted in 2006 and 2007 and baseline data results for formal surveys conducted in 2008 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. Predominant habitat types are depicted in Figure 5-1. Section 16 consists of desert grassland and open 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 desert grassland portions is dominated by sand sagebrush (*Artemsia filifolia),* four-wing saltbush *(Atriplex canescens),* rubber rabbitbrush *(Ericameria nauseosa),* ring muhly (*Muhlenbergia* torreyi), and gramma grasses (*Bouteloua spp.).* Open piñon-juniper areas are dominated by two-needle pinon pine (*Pinus edulis*), one-seed juniper (*Juniper monosperma*), Bigelow sagebrush (*Artemesia bigelovii*), and broom snakeweed (*Guitierrezia sarothrae*). Section 16 wildlife communities present are typical of Great Basin Desert and/or piñon-juniper woodlands interfaces. 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 desert grassland and open 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 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 thoughout 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.

Plant communities in Sections 9, 10, and 16 graduate from desert 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 grassland or desert vegetation but below pine forest elevations (Peiper 1977). Open piñon-juniper 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 desert grassland and piñon-juniper interfaces. Avian species detected included obligates and 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 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.

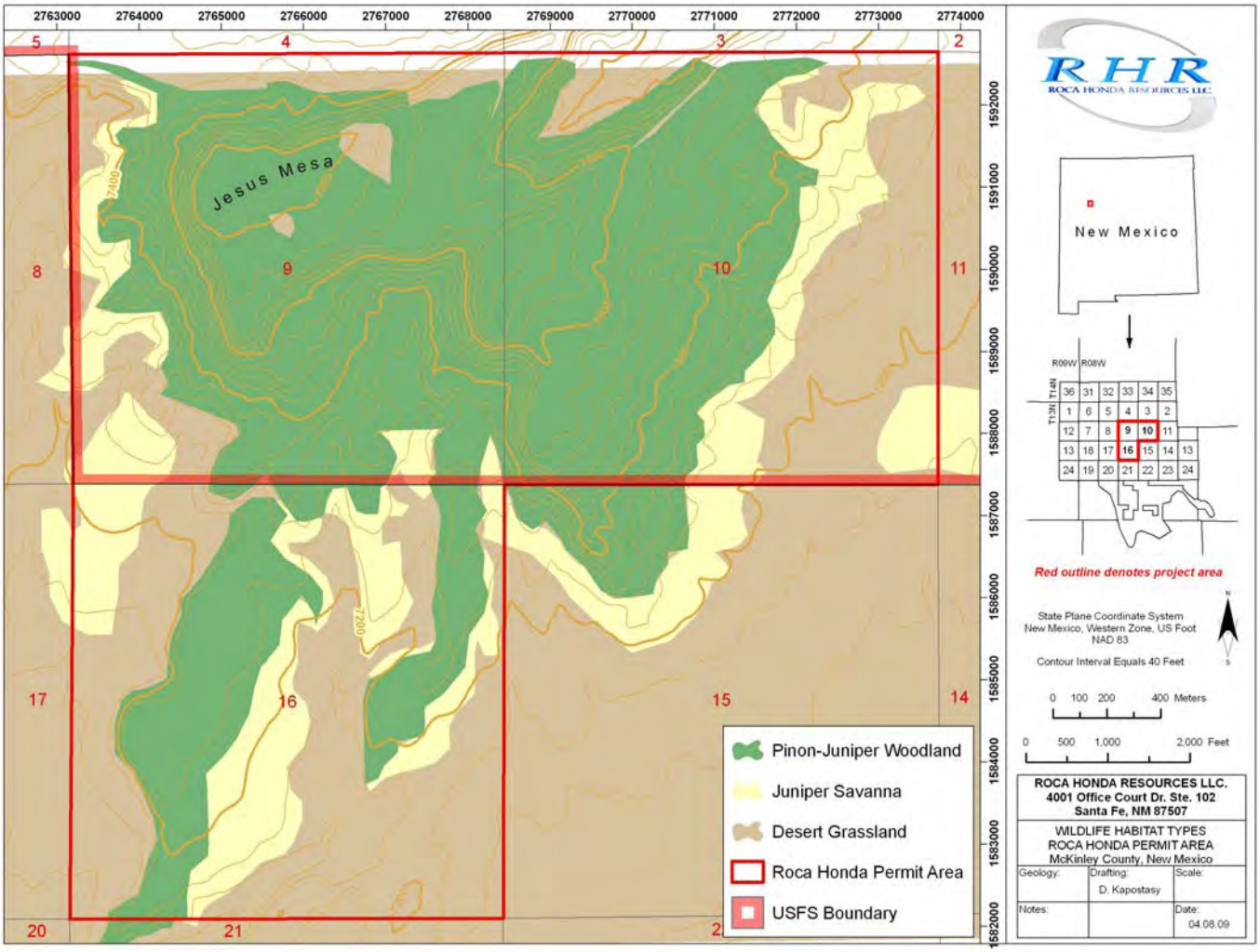


Figure 5-1. Wildlife Habitat Types

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. 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. 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 **
Mammals				
Western small-footed myotis bat (*Myotis ciliolabrum melanorhinus*)		S	Widespread. Roosts in rock crevices, buildings, caves, mine tunnels, and loose tree bark.	S
Occult little brown myotis bat (*Myotis lucifugus occultus*)		S	In the west. Found mainly in mountainous and riparian areas.	NP
Long-legged myotis bat (*Myotis volans interior*)		S	Piñon-juniper, oak, and coniferous forests (4,000–9,000 ft).	S
Fringed myotis bat (*Myotis thysanodes thysanodes)*		S	Roosts in caves, abandoned buildings, rock crevices, and trees.	S
Long-eared myotis bat (*Myotis evotis evotis*)		S	Coniferous forests in northern New Mexico (7,000–8,500 ft).	NP
Spotted bat (*Euderma maculatum)*		T	Highly variable habitats from coniferous forest to desert scrub.	S
Cebolleta southern pocker gopher (*Thomomys umbrinus paguatae*)	SOC		Limited to higher timbered parts of the Animas Mountains (Hidalgo County, NM).	NP
Gunnison's prairie dog (*Cynomys gunnisoni*)		S	Level to gently sloping grasslands, semi-desert and montane shrublands (6,000–12,000 ft).	K
Red fox (*Vulpes vulpes*)		S	Diverse habitats including forests, tundra, prairies, and farmland.	K
Black-footed ferret (*Mustela nigripes*)	E		Open grasslands with year-round prairie dog colonies. Strongly associated with Black-tailed Prairie Dogs.	NP
Western spotted skunk (*Spilogale gracilis)*		S	Variety of habitats including rocky bluffs, cliffs, and brush-bordered canyon streams or stream beds.	K

Table 5-1. (Continued)

Common Name (scientific name)	Federal Status	State Status	Habitat Associations	Potential to Occur in Permit Area **
Birds				
Bald eagle (*Haliaeetus leucocephalus*) **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 (*Accipiter gentilis*)	SOC	S	Ponderosa pine, mixed conifer, and spruce-fir forests.	NP
Peregrine falcon (*Falco peregrinus*)	SOC	T	Rare breeders (NM) in rocky, steep cliff areas, generally near water or mesic canyons.	S
Mountain plover (*Charadrius montanus*)	SOC	S	Dry, disturbed, or intensively grazed open and flat tablelands.	NP
Least tern (*Sterna antillarum*)	E	E	Marine or estuarine shores, or on sandbar islands in large rivers. Prefers areas free from humans and predators.	NP
Black tern (*Chilidonias niger surinamensis*	SOC		Freshwater marshes, wet meadows, lake margins, slow-moving rivers, bogs, shrub-swamps, and along prairie sloughs.	NP
Yellow-billed cuckoo (*Coccyzus americanus*)	C	S	Extensive, mature riparian corridors.	NP
Western burrowing owl (*Athene cunicularia*)	SOC		Grasslands and prairies, associated with prairie dog towns.	NP
Mexican spotted owl (*Strix occidentalis lucida*)	T	S	Rocky canyons in mature montane forests below 9,500 ft in elevation.	NP
Costa's hummingbird (*Calypte costae*)		T	Desert scrub, chaparral, thornscrub, tropical deciduous forest, and suburban areas.	NP
Southwestern willow flycatcher (*Empidonax trillii extimus*)	E	E	Dense, riparian vegetation near surface water or saturated soil, monotypic or mixed stands of native and/or exotic species.	NP
Loggerhead shrike (*Lanius ludovicianus*)		S	Open countryside, shortgrass prairies, weedy fields, grasslands, agricultural areas, swampy thickets, orchards, and right-of-way corridors.	K
Gray vireo (*Vireo vicinior*)		T	Thorn scrub, oak-juniper woodland, piñon-juniper, dry chapparal, mesquite and riparian willow habitats.	K – migrant
Fish				
Rio Grande sucker (*Catostomus plebeius*)	SOC		Currently inhabits the northern portion of the Rio Grande and its tributaries.	NP
Zuni bluehead sucker (*Catostomus discobolous yarrowi*)	C	E	Often inhabits swift water areas in mountain streams and smaller tributaries to large rivers (nursery habitat).	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 (*Cervis elaphus nelsoni*), mule deer (*Odocoileus hemionus*), juniper titmouse (*Baeolophus ridgwayi*), and hairy woodpecker (*Dendrocopos* villosus) - were documented during the surveys and are addressed below.

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

PERMITS WEST, INC.
PROVIDING PERMITS for LAND USERS
37Verano Loop, Santa Fe, New Mexico 87508 (505) 466-8120

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

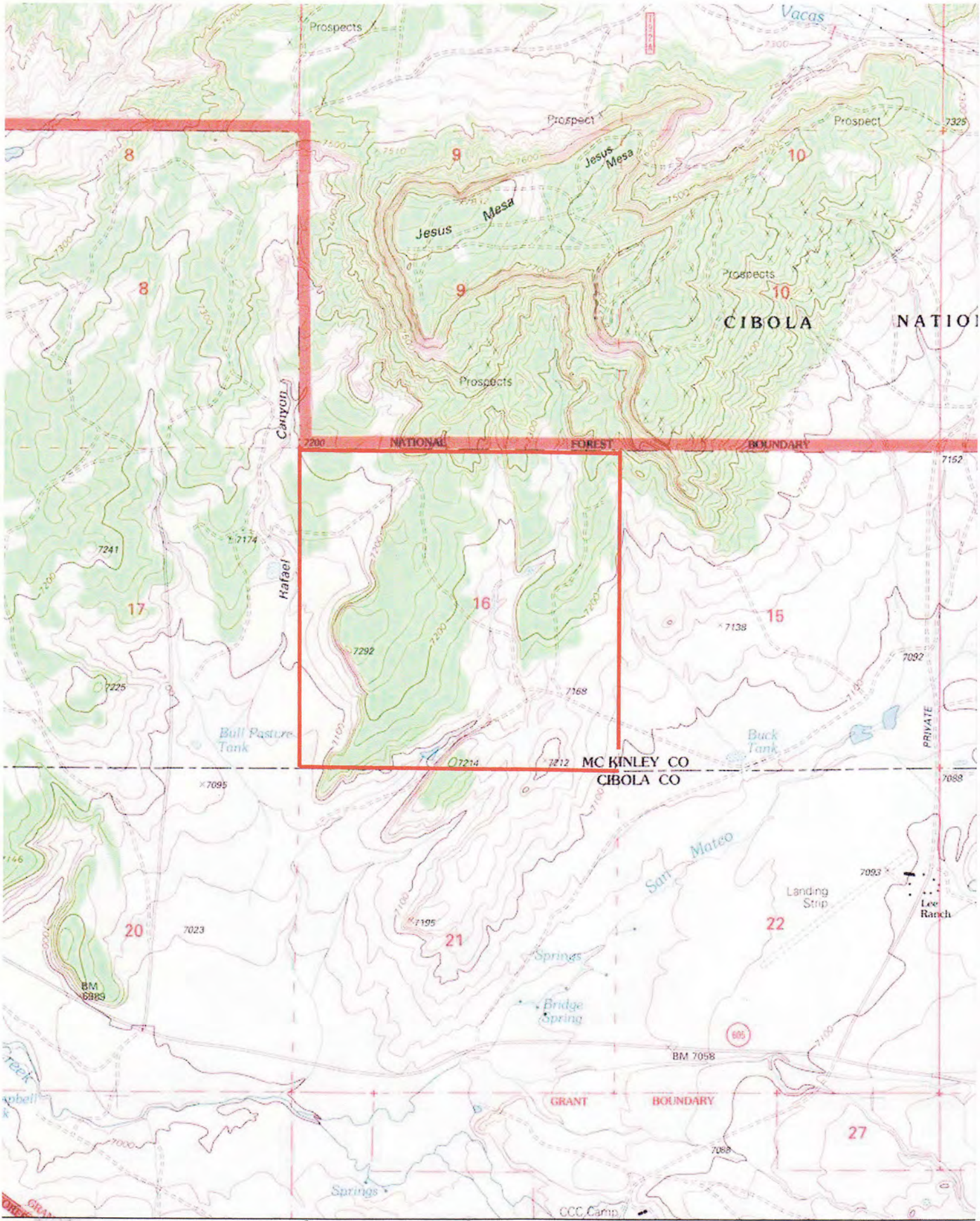
This report addresses the potential for disturbance to endangered, threatened, and special status wildlife species, as listed by Federal and State agencies,that may occur in the project area. The project area is located in McKinley County, New Mexico (Section 16 T. 13 N, R. 8 W), approximately 2 miles northwest of the town of San Mateo (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 (Figures 1- 4). 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*).



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 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 (*Aguila chrysaetos*) – Bald Eagle Protection Act, peregrine falcon (*Falco peregrinus*) – SOC (USFWS) and Threatened (NMGF), and burrowing owl (*Athene cunicularia*) – SOC (NMGF). 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 through out 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 through out 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 (AOU) 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 **
Mammals			
Black-footed ferret (*Mustela nigripes*)	E	Open grasslands with year-round prairie dog colonies. Strongly associated with black-tailed prairie dogs.	NP
Birds			
Bald eagle (*Haliaeetus leucocephalus*)	T	Mature shoreline forests with scattered openings and little human use, near water with abundant fish and waterfowl.	NP
Northern goshawk (*Accipiter gentilis*)	SOC	Ponderosa pine, mixed conifer, and spruce-fir forests.	NP
Peregrine falcon (*Falco peregrinus*)	SOC	Rare breeders (NM) in rocky, steep cliff areas, generally near water or mesic canyons.	NS
Mountain plover (*Charadrius montanus*)	SOC	Dry, disturbed, or intensively grazed, open and flat tablelands.	NP
Least tern (*Sterna antillarum*)	E	Marine or estuarine shores, or on sand bar islands in large rivers. Prefers areas free from humans and predators.	NP
Black tern (*Chilidonias niger surinamensis*	SOC	Freshwater marshes, wet meadows, lake margins, slow-moving rivers, bogs, shrub-swamps, and along prairie sloughs.	NP

Yellow-billed cuckoo (*Coccyzus americanus*)	C	Extensive, mature riparian corridors.	NP
Western burrowing Owl (*Athene cunicularia*)	SOC	Grasslands and prairies, associated with prairie dog towns.	NS
Mexican spotted owl (*Strix occidentalis lucida*) Designated Critical Habitat	T	Rocky canyons in mature montane forests below 9500 feet in elevation.	NP
Southwestern willow flycatcher (*Empidonax trillii extimus*)	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 (*Catostomus discobolous yarrowi*)	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 (*Myotis ciliolabrum melanorhinus*)		S	Widespread. Roosts in rock crevices, buildings, caves, mine tunnels, and loose tree bark.	S
Occult Little Brown Myotis Bat (*Mytois lucifugus occultus*)		S	In the west, found mainly in mountainous and riparian areas.	NP
Long-legged Myotis Bat (*Myotis volans interior*)		S	Pinyon-juniper, oak, and coniferous forests (4000-9000 ft.).	S
Fringed Myotis Bat (*Myotis thysanodes*		S	Roosts in caves, abandoned buildings, rock crevices, and	S

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

lucida)			feet in elevation.	
Costa's Hummingbird (*Calypte costae*)		T	Desert scrub, chaparral, thorn-scrub, tropical deciduous forest, and suburban areas.	NP
Southwestern Willow Flycatcher (*Empidonax trillii extimus*)	E	E	Dense, riparian vegetation near surface water or saturated soil, monotypic or mixed stands of native and/or exotic species.	NP
Loggerhead Shrike (*Lanius ludovicianus*)		S	Open countryside – shortgrass prairies, weedy fields, grasslands, agricultural areas, swampy thickets, orchards, and right-of-way corridors.	K
Gray Vireo (*Vireo vicinior*)		T	Thorn scrub, oak-juniper woodland, pinon-juniper, dry chapparal, mesquite and riparian willow habitats.	K – detected during migration
Fish				
Zuni Bluehead Sucker (*Catostomus discobolous yarrowi*)	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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Appendix I. Animal Species Documented At Section 16, T13N, R8W (McKinley County, NM).			
Taxa	**Survey Period**		
Common Name (scientific name)	**Fall (2006)**	**Winter (2006)**	**Breeding Season (2007)**
Mammals			
Mountain (Nuttall's) cottontail* (*Sylvilagus nuttalli*)	X	X	X
Desert cottontail (*Sylvilagus aububoni*)	X	X	X
Blacktail jackrabbit* (*Lepus californicus*)	X	X	X
Cliff chipmunk (*Tamias dorsalis*)	X		X
White-tailed antelope squirrel* (*Amnospermophilus leucurus*)	X	X	X
Rock squirrel (*Citellus variegates*)	X	X	X
Gunnison's (white-tailed) prairie dog* (*Cynomys gunnisoni*)	X		X
Kangaroo rat (*Dipodomys sp.*)	X		
White-footed mouse (*Peromyscus spp.- poss. truei and leucopus*)	X	X	X
White-throated woodrat* (*Neotoma albigula*)	X	X	X
Bushy-tailed woodrat* (*Neotoma albigua*)	X	X	X
Porcupine (*Erthizon dorsatum*)	X	X	X
Coyote* (*Canis latrans*)	X	X	X
Gray fox* (*Urocyon cineroargenteus*)	X	X	X
Weasel (*Mustela sp. - poss. frenata*)	X	X	X
Badger (*Taxidea taxus*)	X		
Bobcat (*Lynx rufus*)		X	
Rocky mountain elk* (*Cervus canadensis*)	X	X	X

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

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

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

(*Cnemidophorus velox*)			
Bullsnake (*Pituophis melanoleucus*)			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

PERMITS WEST, INC.
PROVIDING PERMITS for LAND USERS
37 Verano Loop, Santa Fe, New Mexico 87508 (505) 466-8120

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

PERMITS WEST, INC.
PROVIDING PERMITS for LAND USERS
37 Verano Loop, Santa Fe, New Mexico 87508 (505) 466-8120

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

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

1.0 Introduction

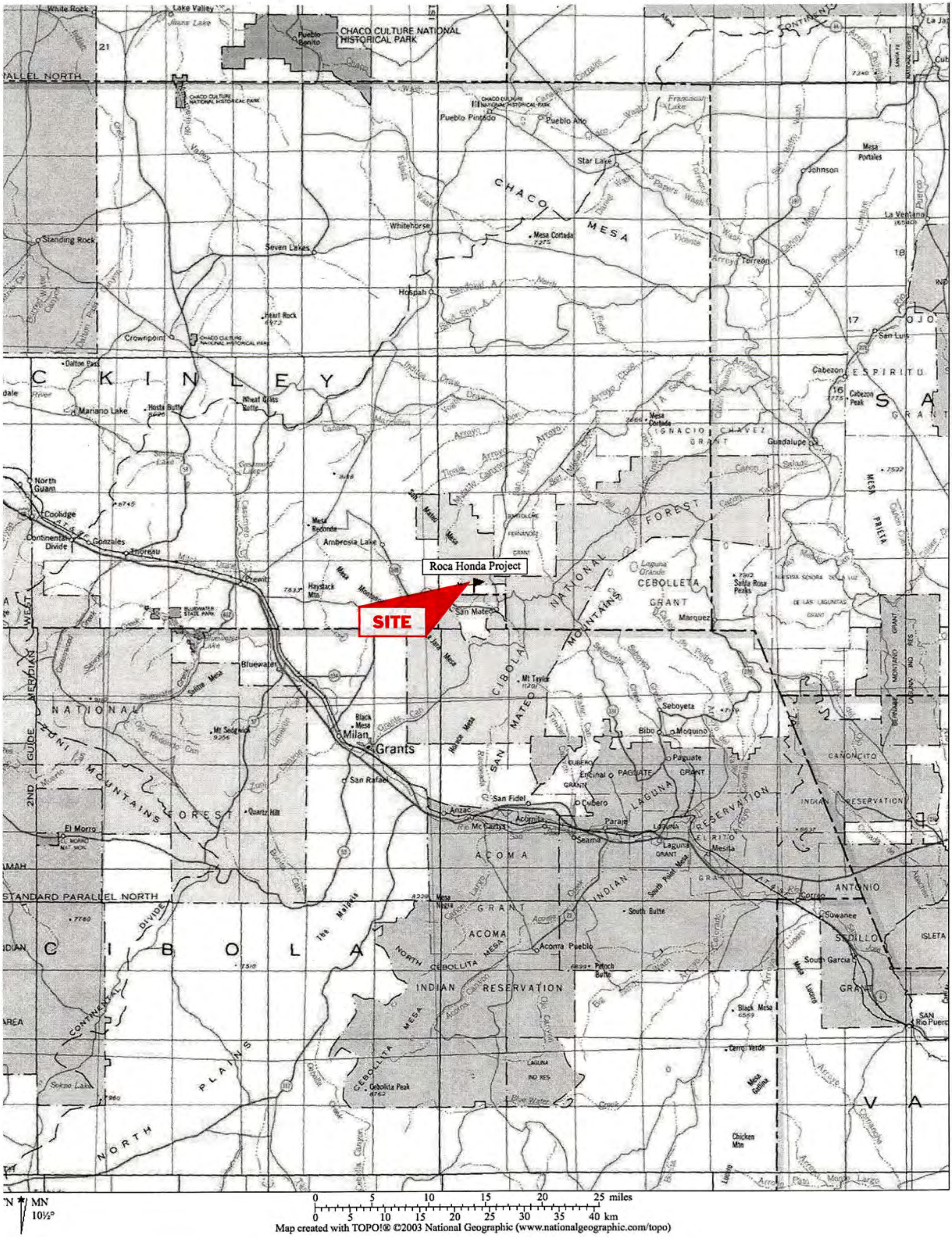
This report addresses the potential for disturbance to endangered, threatened, and special status wildlife species, as listed by State and Federal agencies, which may occur in the project area. The project area is located in Sections 9 and 10, T. 13 N., R. 8 W., McKinley County, New Mexico, approximately 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.



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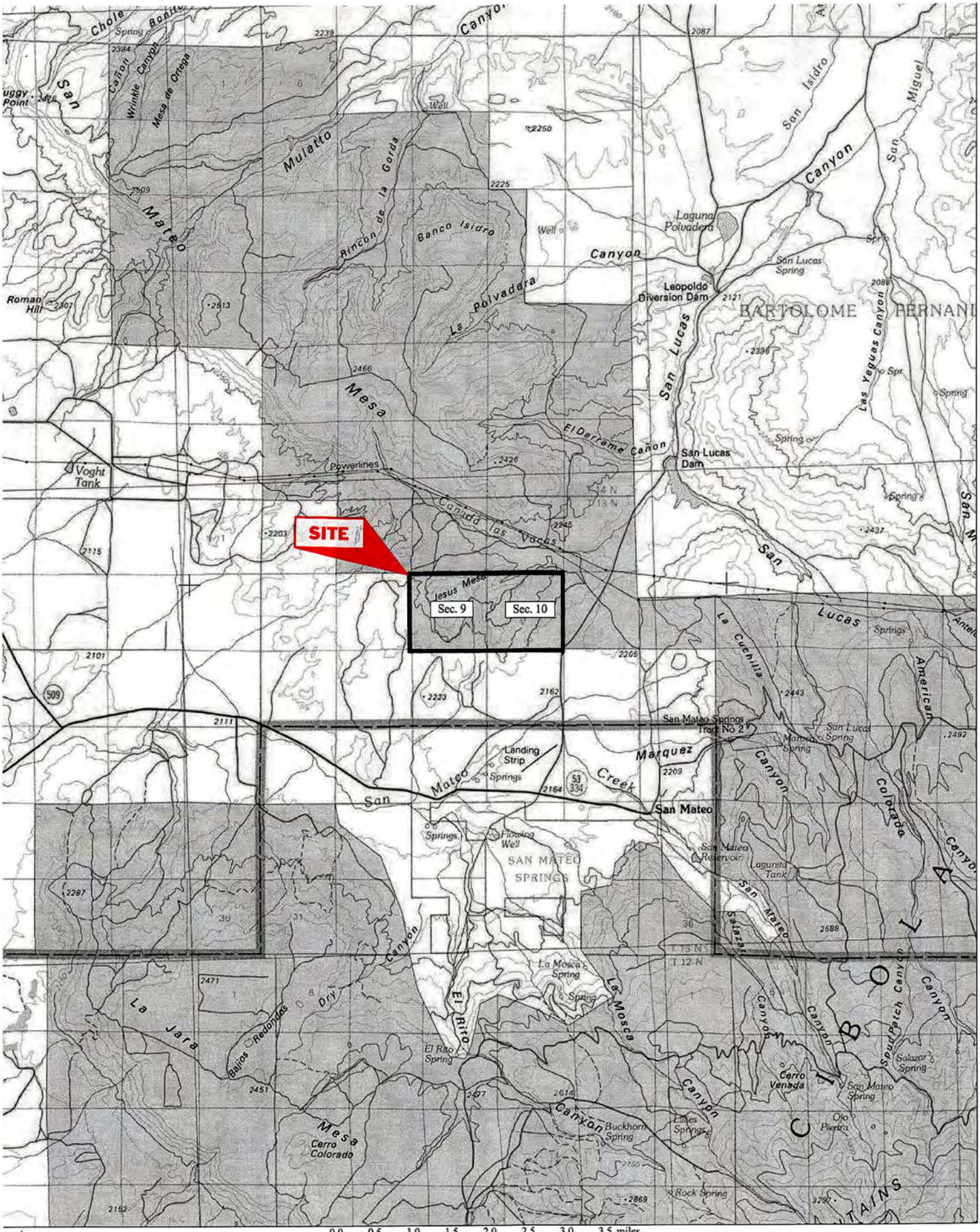

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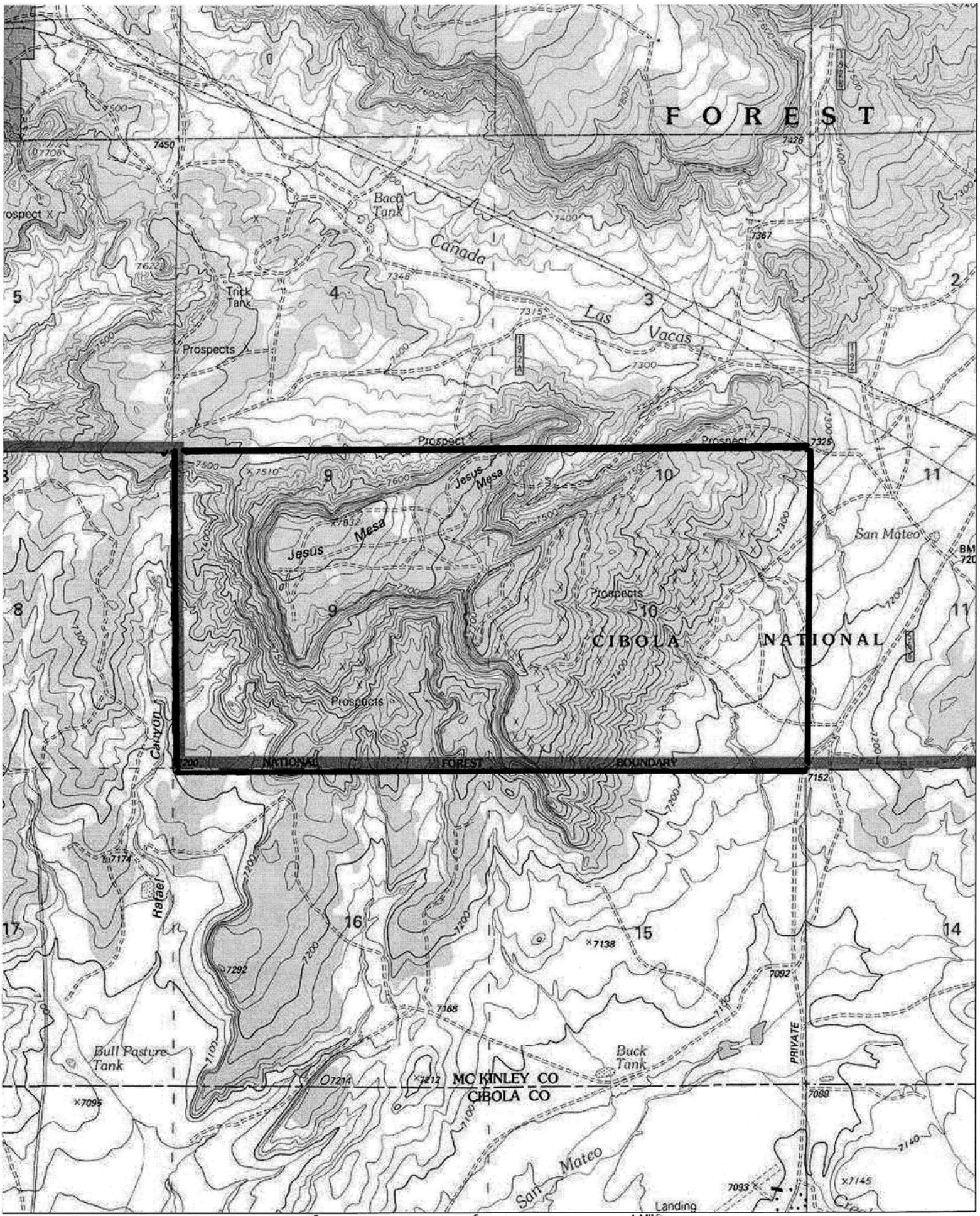

1.1.1 Topography

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 (*Aguila chrysaetos*) – Bald Eagle Protection Act, Peregrine Falcon (*Falco peregrinus*) – SOC (USFWS) and Threatened (NMGF), and Burrowing Owl (*Athene cunicularia*) – SOC (NMGF). 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") 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 (AOU) 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 (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 **
Mammals			
Black-footed ferret (*Mustela nigripes*)	E	Open grasslands with year-round prairie dog colonies. Strongly associated with black-tailed prairie dogs.	NP
Birds			
Bald eagle (*Haliaeetus leucocephalus*)	T	Mature shoreline forests with scattered openings and little human use, near water with abundant fish and waterfowl.	NP
Northern goshawk (*Accipiter gentilis*)	SOC	Ponderosa pine, mixed conifer, and spruce-fir forests.	NP
Peregrine falcon (*Falco peregrinus*)	SOC	Rare breeders (NM) in rocky, steep cliff areas, generally near water or mesic canyons.	NS
Mountain plover (*Charadrius montanus*)	SOC	Dry, disturbed, or intensively grazed, open and flat tablelands.	NP
Least tern (*Sterna antillarum*)	E	Marine or estuarine shores, or on sand bar islands in large rivers. Prefers areas free from humans and predators.	NP
Black tern	SOC	Freshwater marshes, wet meadows, lake	NP

(*Chilidonias niger surinamensis*		margins, slow-moving rivers, bogs, shrub-swamps, and along prairie sloughs.	
Yellow-billed cuckoo (*Coccyzus americanus*)	C	Extensive, mature riparian corridors.	NP
Western burrowing Owl (*Athene cunicularia*)	SOC	Grasslands and prairies, associated with prairie dog towns.	NS
Mexican spotted owl (*Strix occidentalis lucida*) Designated Critical Habitat	T	Rocky canyons in mature montane forests below 9500 feet in elevation.	NP
Southwestern willow flycatcher (*Empidonax trillii extimus*)	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 (*Catostomus discobolous yarrowi*)	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, New Mexico (2006).

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

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

			and/or exotic species.	
Loggerhead Shrike (*Lanius ludovicianus*)		S	Open countryside – shortgrass prairies, weedy fields, grasslands, agricultural areas, swampy thickets, orchards, and right-of-way corridors.	K
Gray Vireo (*Vireo vicinior*)		T	Thorn scrub, oak-juniper woodland, pinon-juniper, dry chapparal, mesquite and riparian willow habitats.	K
Fish				
Zuni Bluehead Sucker (*Catostomus discobolous yarrowi*)	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 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)*, 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 Section 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 (*Myotis sp*).			X
Mountain (Nuttall's) cottontail* (*Sylvilagus nuttalli*)	X	X	X
Desert cottontail (*Sylvilagus aububoni*)	X	X	X
Blacktail jackrabbit* (*Lepus californicus*)	X	X	X
Cliff chipmunk (*Tamias dorsalis*)	X		X
White-tailed antelope squirrel* (*Amnospermophilus leucurus*)	X	X	X
Rock squirrel (*Citellus variegates*)	X	X	X
Gunnison's (white-tailed) prairie dog* (*Cynomys gunnisoni*)	X		X
Kangaroo rat (*Dipodomys sp.*)	X		X
White-footed mouse (*Peromyscus spp.*)	X		X
White-throated woodrat* (*Neotoma albigula*)	X	X	X
Bushy-tailed woodrat* (*Neotoma albigua*)	X	X	X
Porcupine (*Erthizon dorsatum*)	X		X
Coyote* (*Canis latrans*)	X	X	X
Red fox (*Vulpes fulvus*)		X	
Gray fox* (*Urocyon cineroargenteus*)	X	X	X
Weasel (*Mustela sp. - poss. frenata*)		X	
Rocky mountain elk* (*Cervus canadensis*)	X	X	X
Mule deer* (*Odocloieus hemionus*)	X	X	X

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

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

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

WILDLIFE SURVEY REPORT (BASELINE DATA) FOR ROCA HONDA RESOURCES, LLC ROCA HONDA PROJECT 2008 FIELD SEASON

ON STATE, PRIVATE AND FEDERAL LANDS (CIBOLA NATIONAL FOREST) SECTIONS 9, 10, 11, 12, 16, 21, T. 13 N, R. 8 W. SECTION 27, T. 14 N, R. 8 W. McKINLEY AND CIBOLA COUNTIES, NEW MEXICO

PREPARED BY PERMITS WEST, INC. SANTA FE, NEW MEXICO

25 SEPTEMBER 2009

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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 on page 5 identifies the Roca Honda Permit 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 study design.

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).

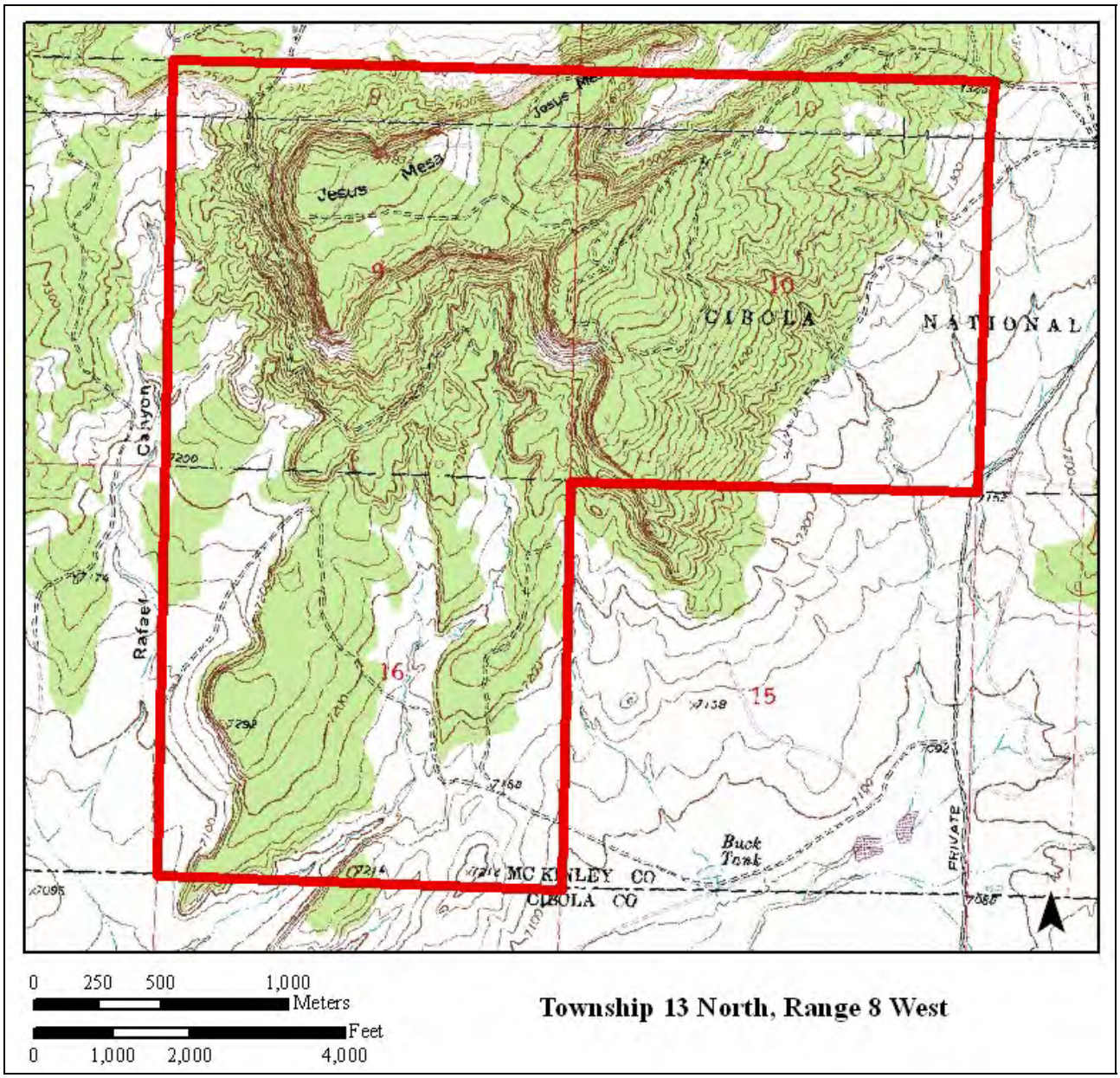


Figure 1. Roca Honda Permit Area

1.1 Wildlife Inventory Objectives

The purpose of the Wildlife Sampling and Analysis Plan (SAP), created by Permits West, Inc., for the proposed Roca Honda mine project (McKinley County, NM) was to address short and long-term impacts associated with uranium mining operations.

Monitoring objectives are 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 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 will include focus on wildlife community use of existing habitat types. Resulting information should help 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 Roca Honda project area. Section 27, T. 14 N., R. 8 W., as seen in the maps in Figures 2a and 2b on pages 6 and 7, was selected as the reference site (control) for avian, big game, and furbearing mammal monitoring based upon the following criteria; suitable distance from impact site, comparable habitat types and elevation, and comparable surface geological and habitat features.

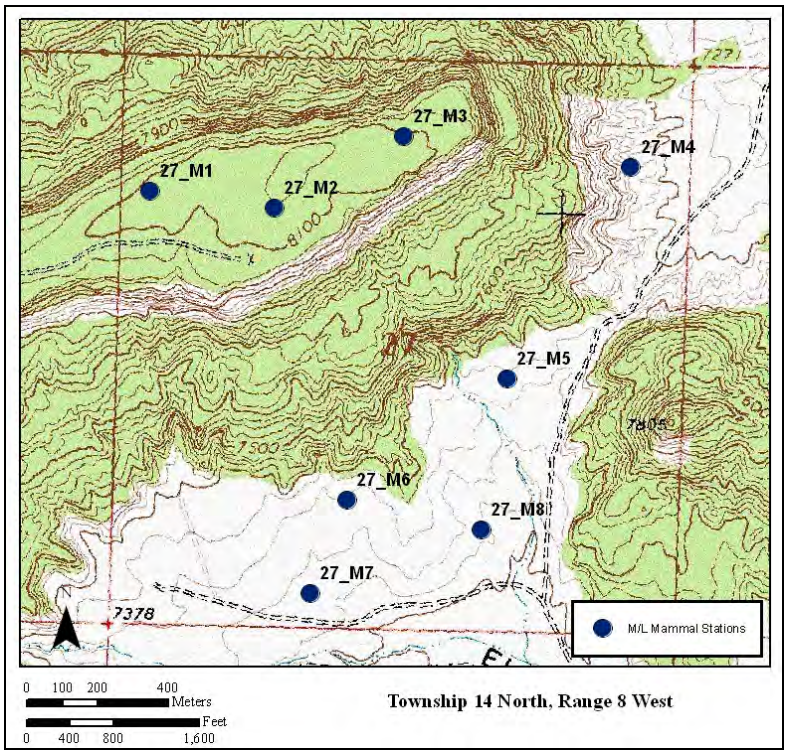


Figure 2a. Section 27, Roca Honda WildlifeReference Area.

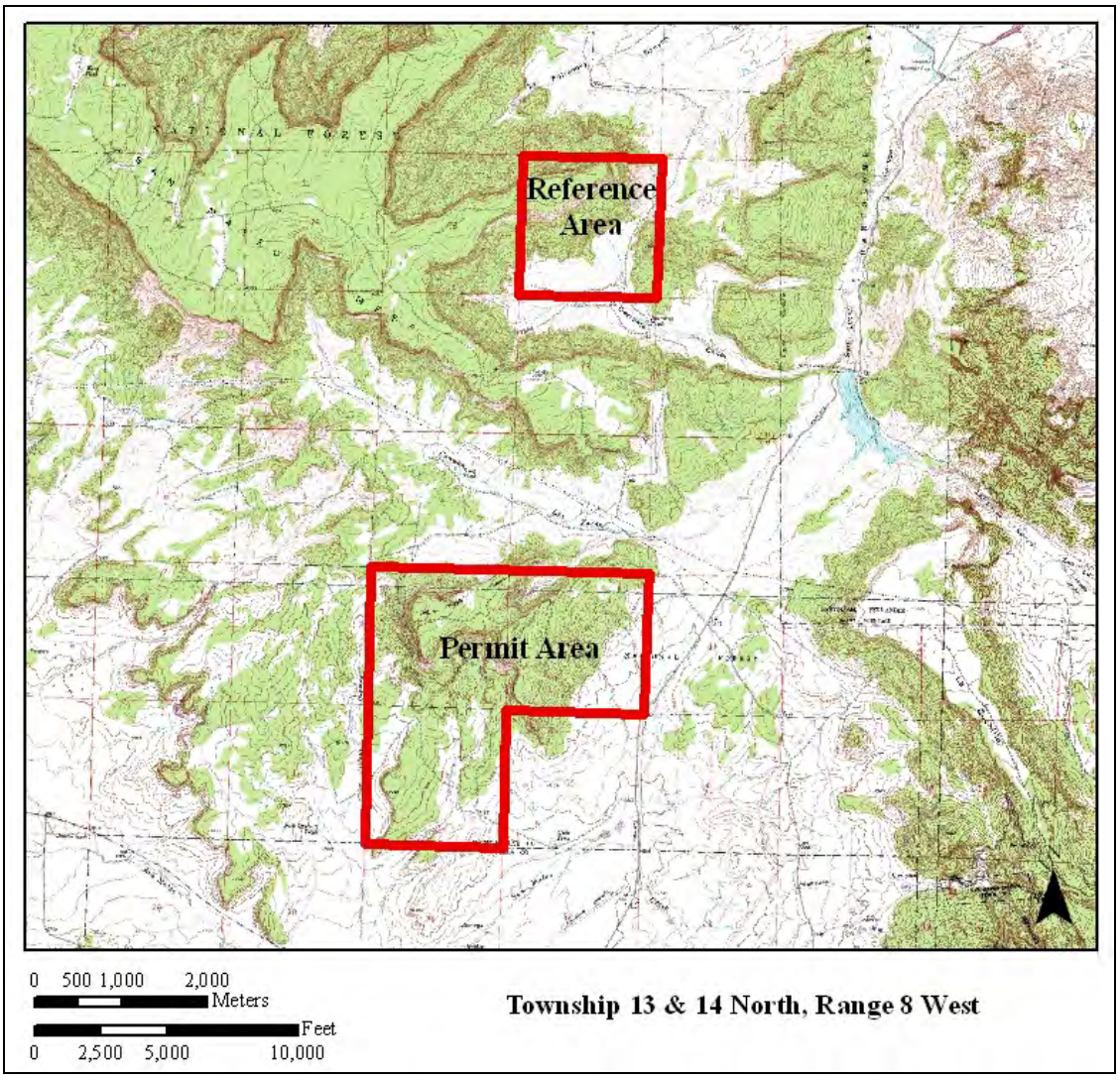


Figure 2b. Roca Honda Permit and Wildlife Reference Areas.

Post-mine inventory data will provide critical information for the analysis of overall project impact. Field survey requirements and methodology are based upon current research techniques (i.e. Holthausen et al., 2005, Williams et al., 2002) and standard methodology utilized by the US Forest Service, USFWS, and NMDGF. Expected survey timing sequences are 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).
- Big game—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 have been widely used to obtain data on a variety of arthropods, amphibians, reptiles, and small mammals. For the Roca Honda monitoring, each array was composed of four five-gallon (19 liters) buckets buried in the ground. One bucket served as the center of the array. The other three buckets were set 10 meters (32.8 feet) out on three 120^{o} rays of silt fencing to form a Y-array. The Herptofauna array is shown in Figure 3 below. Buckets were outfitted with 16 inches x 16 inches (40.5 centimeter x 40.5 centimeter) coverboards. Centered on each of the rays was a 25 inches long x 7 inches round (63.5 centimeter x 17.8 centimeter) funnel trap constructed of hardware cloth with funnels on each end, through which herps may enter and become trapped. Each set/array consisted of four pitfalls (buckets) and three funnel traps. During sampling periods coverboards were elevated approximately one (1) inch (25 millimeter) 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 3. Herptofauna 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, two (2) arrays in Section 12, and six (6) arrays in Section 16 for a total of 20 arrays. The herptofauna and small mammal sampling areas are shown in Figure 4a below.

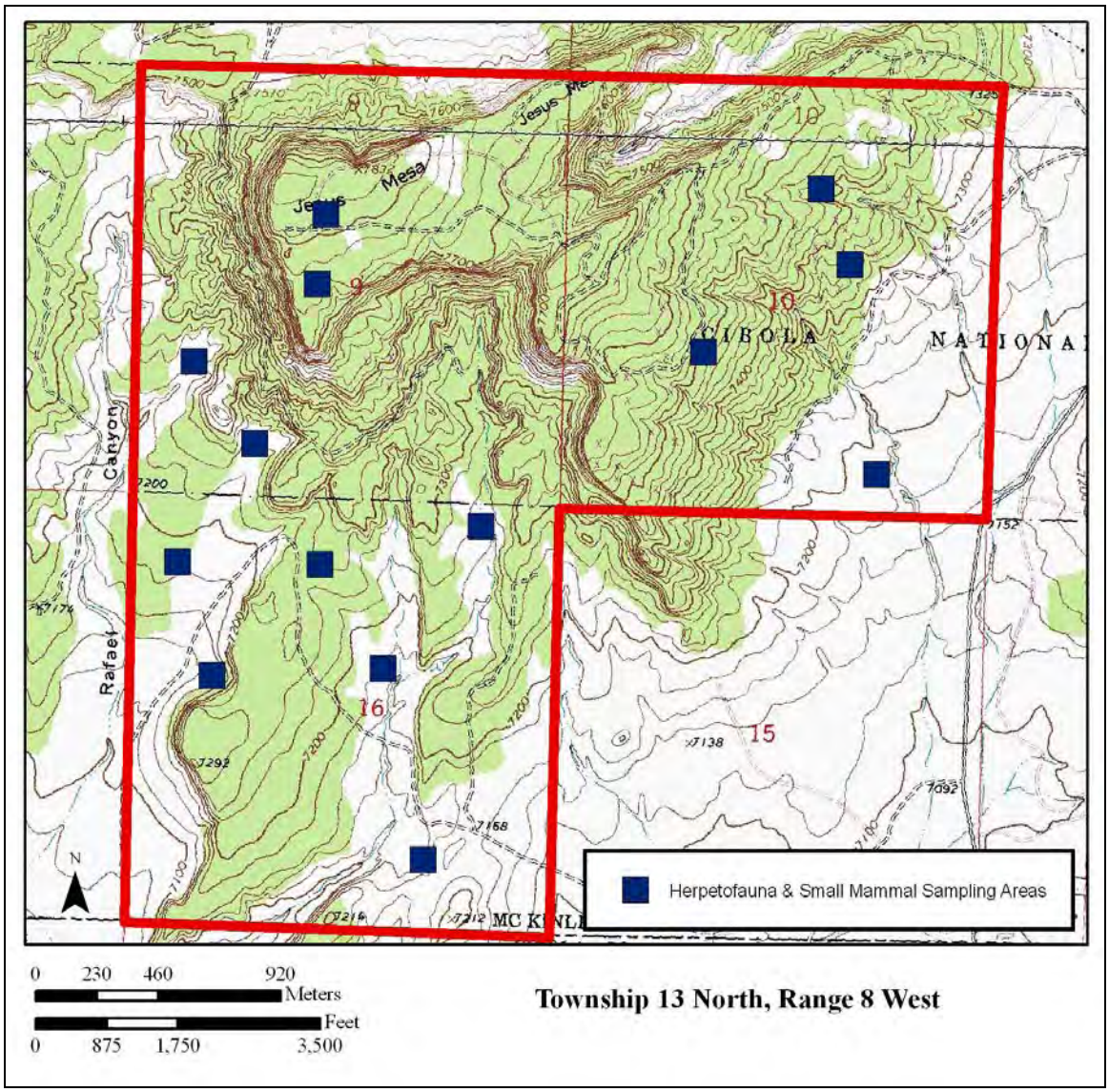


Figure 4a. Herpetofauna and Small Mammal Sampling Areas at Roca Honda (2008).

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 herpetofuana 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, 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. A sample herpetofauna data collection form is shown in Figure 4b on page 10.

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

SITE & REPL	DATE	TIME	OBSV.	SPECIES	SEX	AGE CLASS	REPROD. COND.	SVL	TOT-L	tail-break (lizards)	MASS	ID# (mark)	RECAP?	NOTES

Figure 4b. 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.

Terrestrial Small Mammals

This group contains both nocturnal and diurnal small mammals, all of which can readily be caught in standard Sherman live traps. The Sherman live trap can be seen in Figure 5a on page 11.

i)  ii) 

Figure 5a. i) Checking small mammal traps at Roca Honda (2008), and ii) Sherman Trap scale.

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 meters (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 4a on page 8. For consistency of orientation, each small mammal array was rooted with a south corner trap placed 10 meters (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. Data collection forms are shown in Figure 5b on page 12. Processed animals were released onto the same arrays where they were collected as soon as possible following processing.

Roca Honda Biological Assessment - Small Mammal Capture Data | Array # | Trap nights (SBE included) | GPS coordinates on S corner

Grants, NM

Inclusive Dates at Site: (Date Set:_____; Date Removed:_____)

Notes:_____

_____

_____

_____

_____

Moon phase per night: _____

Cloud cover per night: _____

Temperature per night: _____

Other weather: _____

_____

___ ___ ___ = ___

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

#	Date	Array/trap Number	Tag #	Species	Sex (♀/♂)	Measurements (mm) Total	Tail	Foot	Ear	Mass (g)	Disposition *	NK Number	Comments (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…

#	Date	Array/trap Number	Tag #	Species	Sex (♀/♂)	Measurements (mm) Total	Tail	Foot	Ear	Mass (g)	Disposition *	NK Number	Comments (Age: A/SA/J; ♂: S/NS; ♀: C/O, S/E, N/L)
21													

Figure 5b. Small Mammal data collection forms.

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.

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.

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 remained open until 23:00 pm and were checked at least every 30 minutes. Mist-netting of bats is shown in Figure 6 below. Data collected for each specimen included species information, gender, age, standard external measurements, and mass.

Figure 6. Mist-netting bats at Roca Honda (July 2008).

2.3 Aves (Birds)

At each land section where the potential existed for direct and indirect impacts from the proposed mine, and access was authorized by appropriate land managers, point count stations were established. An example of the point count station can be seen in Figure 7 on page 14. Count stations were based upon global positioning coordinates (GPS) and were placed in a north to south alignment. All stations were positioned approximately 150 meters (492 feet) apart, north to south, and roughly 400 meters (1312 feet) apart, east to west.

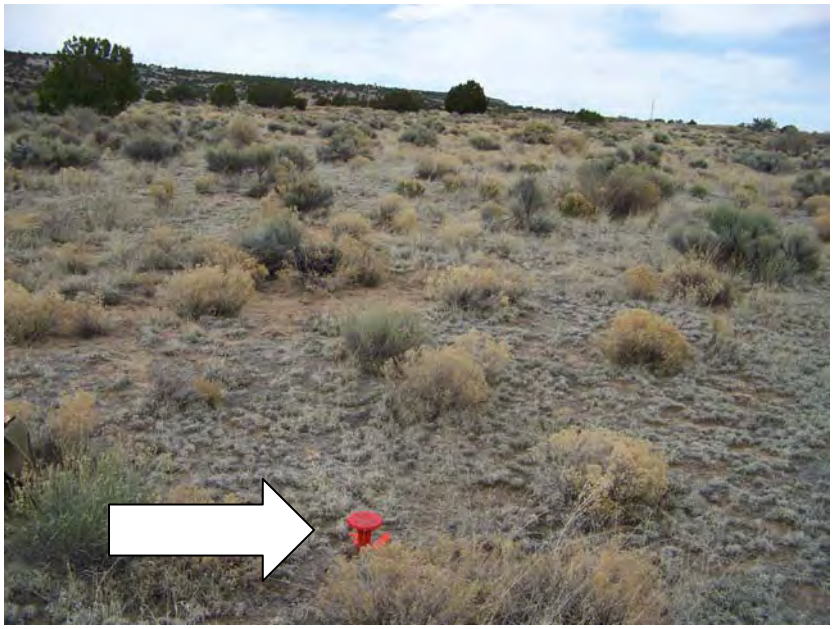


Figure 7. Point count sampling station at Roca Honda (2008).

Thirty-two (32) point count stations were established per square mile in Sections 9, 10, 11, 15, 16, 21, and 27, with sixteen stations placed in Section 12. A map showing these stations can be seen in Figure 8 below.

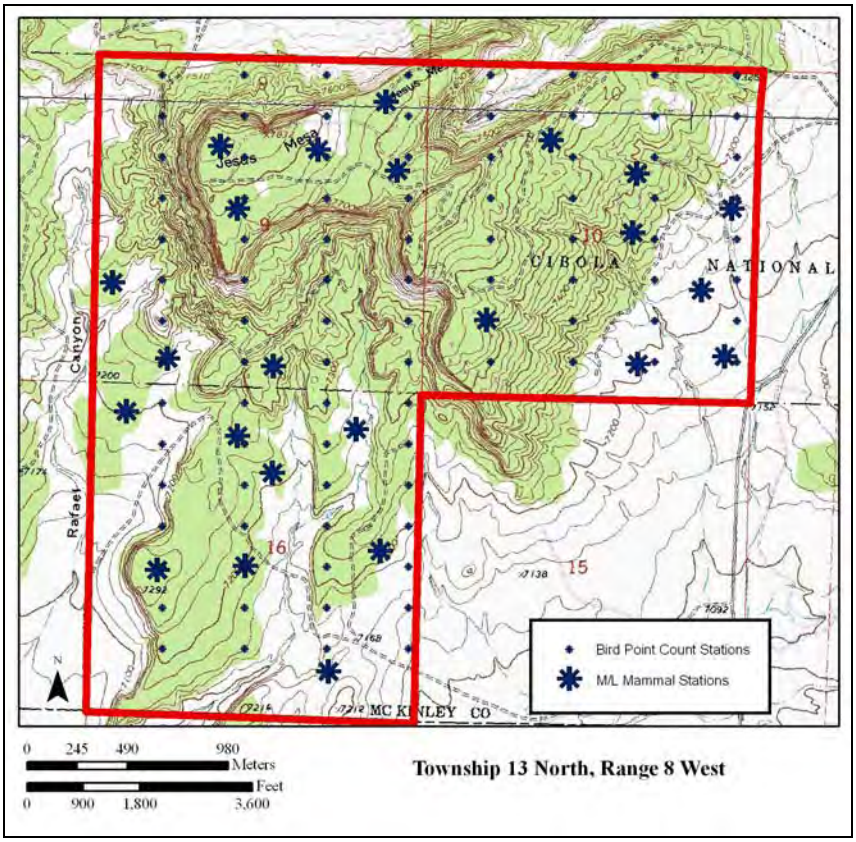


Figure 8. Bird Point Count Stations and Mid to Large Mammal Stations.

In order to provide appropriate data for comparison between before and after site conditions, a reference site was established. The reference site, 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 2a and 2b on pages 6 and 7 show the reference site, 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 data collection form can be seen in Figure 9 below.

Roca Honda Project – Avian Point Count Data Form
Permits West, Inc., 37 Verano Loop Santa Fe, NM 87508
Tel: (505) 466-8120

Site # _____ - _____ - _____ Surveyor _____
Section Line Point

Date: _____ - _____ - _____ Temp (^{o} 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 9. Sample Avian Count Form.

Avian habitat was evaluated at all point count stations by establishing a 25 meter (82 foot) 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 data form seen in Figure 10 on page 16.

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 (0-360º)	Slope (0-99%)	*Canopy Cover (0-25%, 25-50%, 50-75%, >75%) *List species, predominant sp. first*	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 10. Avian Habitat Data Evaluation Form.

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 (Section 9, 10, and 16). Although active nests were not routinely monitored, raptor nests were rechecked when possible.

2.4 Furbearers and Big Game

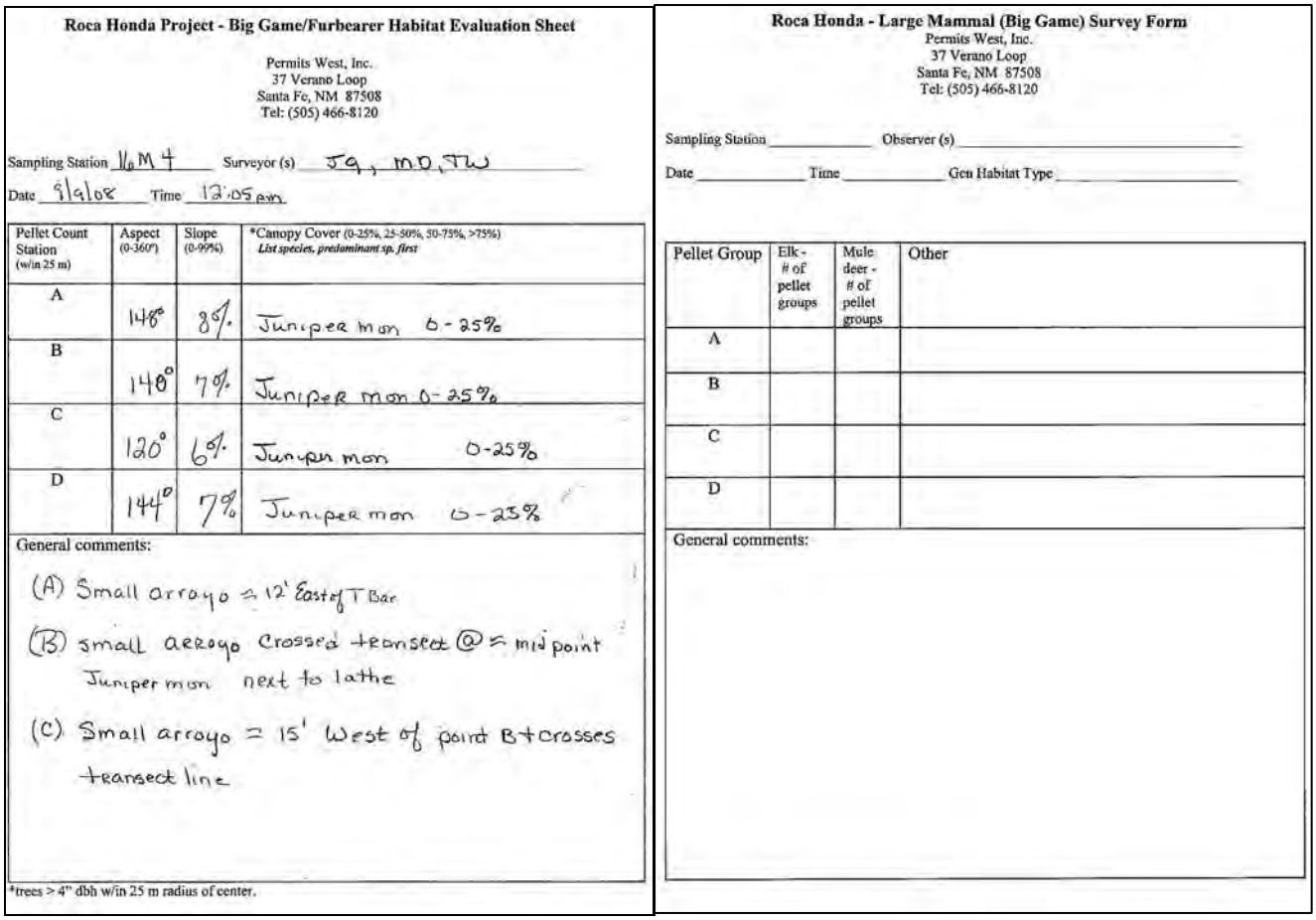
Sampling stations were established in primary habitat types to estimate presence of terrestrial big game and furbearing mammalian species.

Big Game

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, 15, 16, 21, and 27). Each sampling station was established with one stationary central point, with three 50 meter (164 foot) 'arms' placed approximately 120 degrees apart. The 'arms' represent 5 meter (16 foot) wide, 50 meter (164 foot) long belt transects with pellet count station centers situated at the end of each arm, including the center starting point. A picture of a big game and furbearer sampling station can be seen in Figure 11 on page 17. Pellet count stations were set up to measure a 0.01 acre (0.004 hectare) area per count station.

Figure 11. Big game and furbearer sampling station at Roca Honda (2008).

Data was recorded on the large mammal (big game) pellet count and habitat evaluation forms in Figure 12 on page 18. Big game 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).



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 1 & M 4 Surveyor (s) JG, MD, TW
Date 9/9/08 Time 12:05 pm

Pellet Count Station (w/in 25 m)	Aspect (0-360°)	Slope (0-99%)	*Canopy Cover (0-25%, 25-50%, 50-75%, >75%) List species, predominant sp. first
A	148°	8%	Juniper mon 0-25%
B	148°	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 @ ≈ mid point 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:

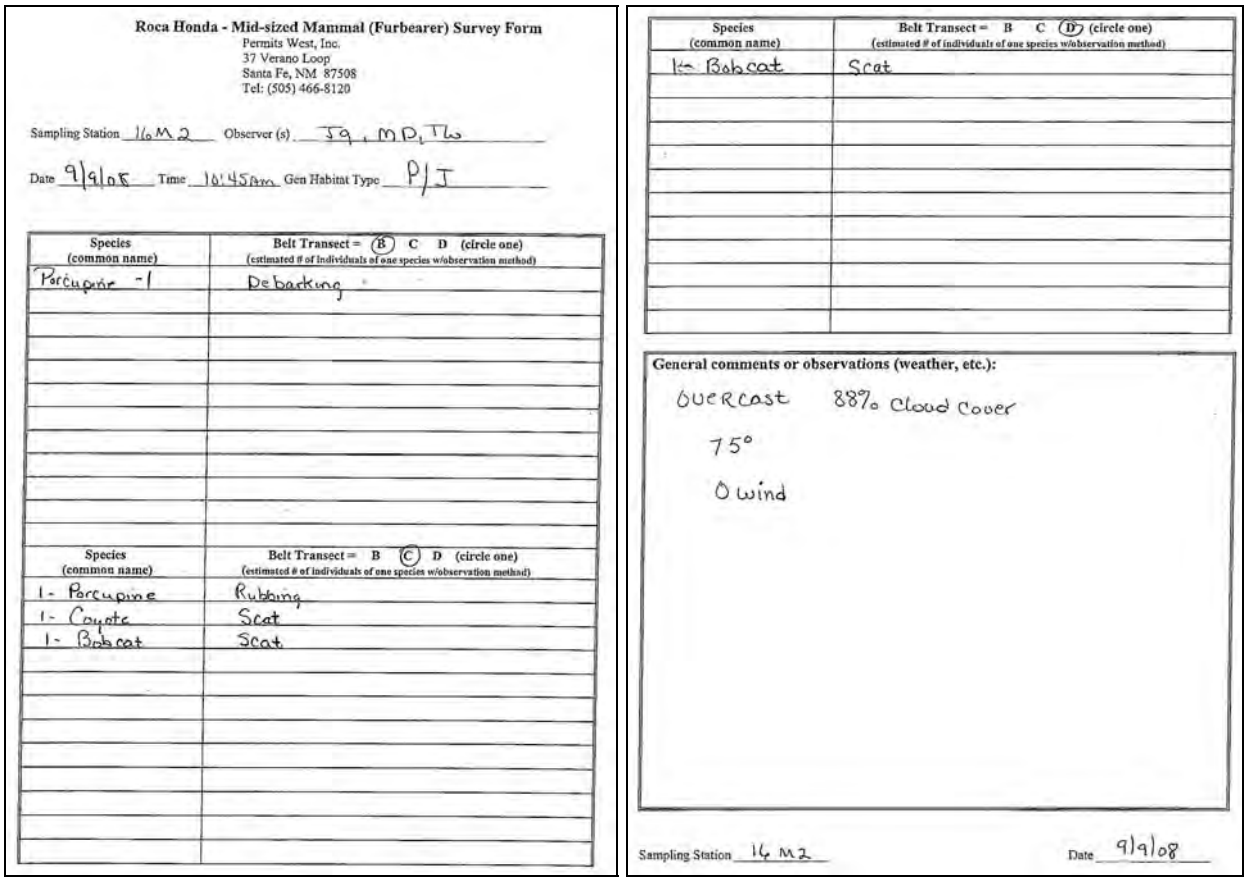
Figure 12. Big Game/Furbearer Habitat Evaluation and Survey sample forms.

It has been documented that mineral exploration and extraction, as well as urban development, can preclude use of critically important reproductive and winter range, through direct loss of habitat, by native ungulates (Heffelfinger et al., 2006). 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 meter 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^{o}), slope (0-99%), and canopy cover (25% increments). Station number, date, time, surveyors, and weather were also recorded on the big game/furbearer habitat evaluation sheet in big-mammals survey form in Figure 12 above.

Furbearers

This grouping includes mid-sized terrestrial mammals that are both nocturnal and diurnal and have a variety of habitat and food preferences (i.e. porcupine, badger). Since furbearing mammals will be surveyed at the Roca Honda project site in association with big game surveys, each sampling station has been set up to assess on-site presence of both wildlife groups. Stations were set up with three sampling units (transect routes). Each belt transect was set up as a 50 meter-long by 5 meter-wide swath (164 foot x 16 foot). For each transect, any individual sets of tracks for identifiable species which crossed the transect line were identified and counted. Visual observation of species, along with scat and any ancillary sign that indicated the presence of a

specific species were also recorded on the mid-sized mammal (furbearer) survey form in Figure 13 below. Although the surveys were focused on mid-sized furbearing mammals, big game species such as black bear and mountain lion were also included. Surveys were set up to run concurrently with big game surveys in the fall and to be done separately in the spring.



Roca Honda - Mid-sized Mammal (Furbearer) Survey Form

Permits West, Inc.
37 Verano Loop
Santa Fe, NM 87508
Tel: (505) 466-8120

Sampling Station 16M2 Observer (s) SG, MP, TG

Date 9/9/08 Time 10:45am Gen Habitat Type PJ

Species (common name)	Belt Transect = B (C) D (circle one) (estimated # of individuals of one species w/observation method)
Porcupine -1	Debarking

Species (common name)	Belt Transect = B (C) D (circle one) (estimated # of individuals of one species w/observation method)
1- Porcupine	Rubbing
1- Coyote	Scat
1- Bobcat	Scat

Species (common name)	Belt Transect = B C (D) (circle one) (estimated # of individuals of one species w/observation method)
1- Bobcat	Scat

General comments or observations (weather, etc.):

Overcast 88% Cloud Cover

75°

0 wind

Sampling Station 16 M2 Date 9/9/08

Figure 13. Mid-Sized Mammal Survey Form.

3.0 Existing Habitat

3.1 Sections 9, 10, and 16 (direct impact areas)

Section 9

Topography in Section 9 varies from desert grassland and open pinon-juniper (*Pinyon sp / Juniperus sp.*) woodland in the low-lying areas to sheer rock faces in the higher elevations. Altitude ranges from roughly 7100 to 7840 feet (2164 to 2390 meters) 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 14 on page 21. 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.

Section 10

Section 10 is positioned along the northeastern slope of Jesus Mesa, which can be seen on the map in Figure 14 on page 21. 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 200 foot (61 meter) deep canyon is in the northwest corner of Section 10. Elevation throughout the site ranges from 7200 to 7600 feet (2194.6 to 2316.5 meters) above sea level.

Analogous to Section 9, vegetation throughout the majority of the project area is dominated by pinon-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.

Section 16

Section 16 consists of moderately to heavily-grazed desert grassland and open pinon-juniper woodland which can be seen on the map in Figure 14 on page 21. 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 feet (2155-2225 meters) 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.

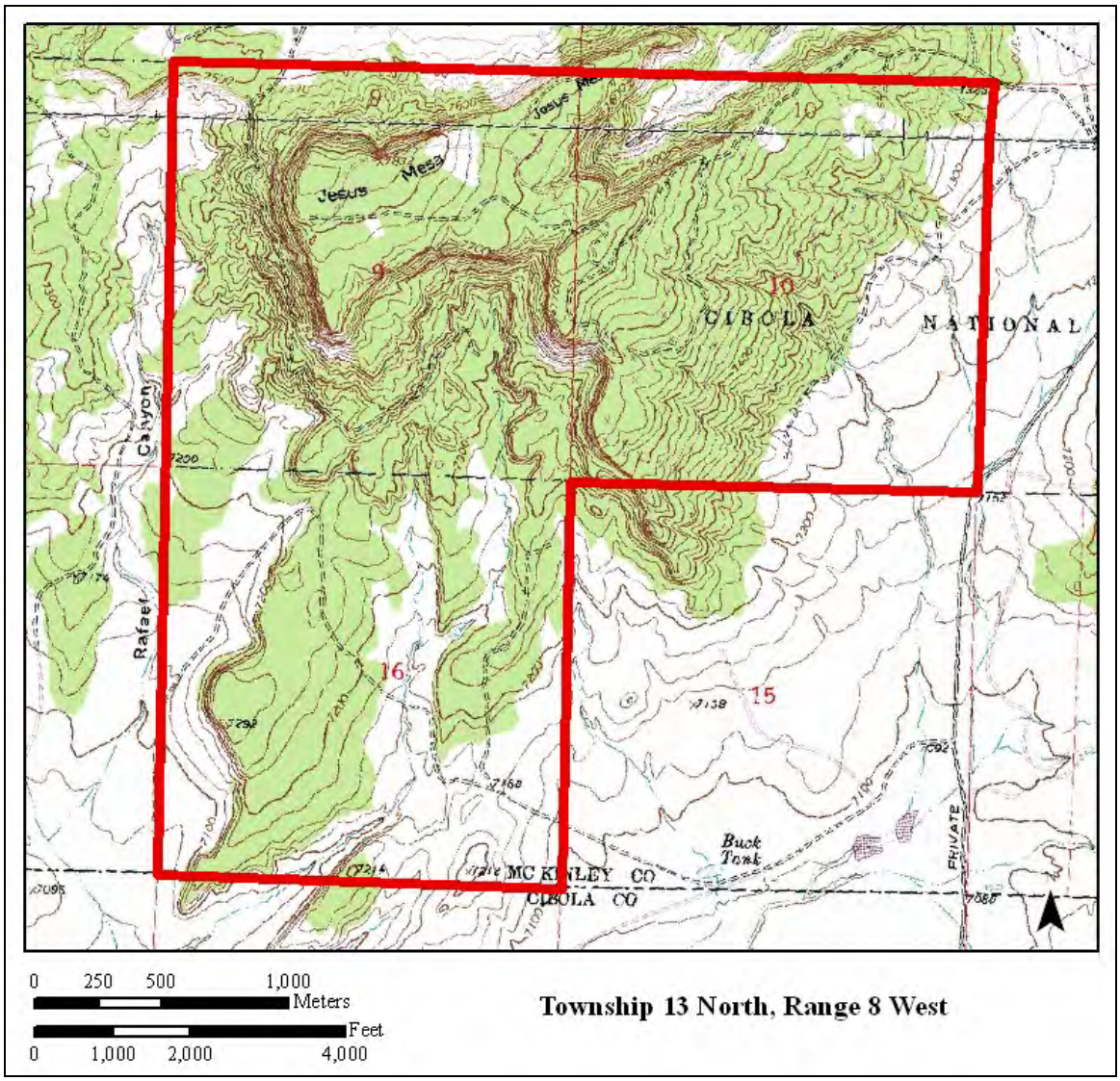


Figure 14. Project area map of Roca Honda.

3.2 Sections 11, 12, 15, 21, and 27 (indirect impact and reference)

The sections immediately surrounding the project area, where indirect and cumulative impacts could occur, were also surveyed. Federal lands (Cibola NF) include Sections 11, 12, and 27. Section 27, as seen in the maps in Figures 2a and 2b on pages 6 and 7, was selected as the wildlife reference site (control) based upon the following criteria; suitable distance from impact site, comparable habitat types and elevation, and comparable geological and habitat features. Sections 15 and 21 are private and part of the Lee Ranch in San Mateo, NM. Access was granted to these sections by the landowner for the purpose of survey work.

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 (*Guitierrezia sarothrae*) 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 all sections is 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 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*).

Five general wildlife habitat types were selected for the Roca Honda project area, including reference areas; piñon-juniper woodland, juniper savannah, desert grassland, rock/cliff side, and drainage/drainage. The three primary vegetative habitat types; piñon-juniper woodland, juniper savanna, and desert grassland/shrubland are depicted on the project's habitat map in Figure 15 on page 23.

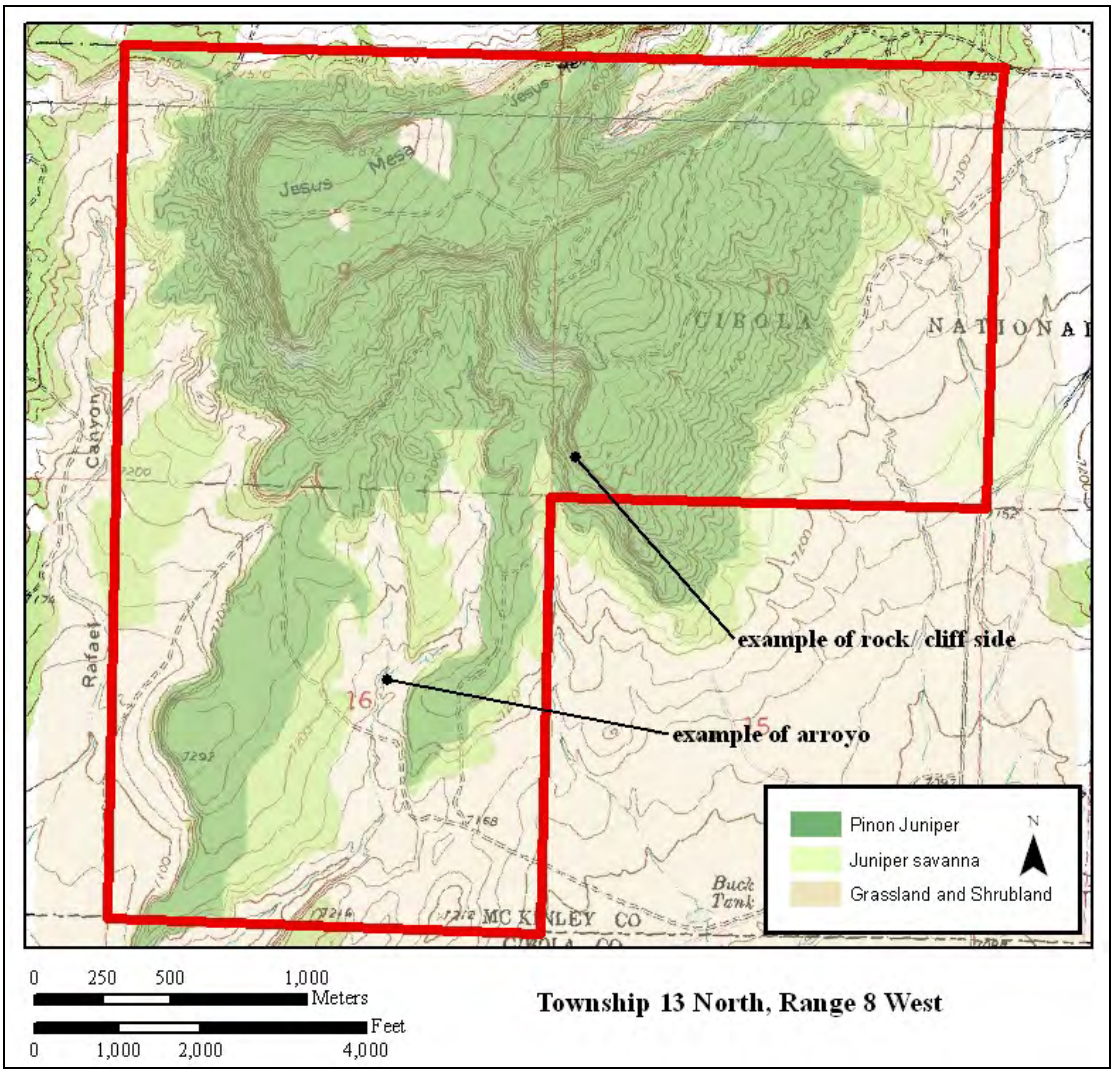


Figure 15. Habitat Map.

Predominant plant species documented in each habitat type and topographical area are as follows:

1) Habitat Type – Piñon-juniper woodland (including uplands):

   Piñon pine (*Pinus edulis*)
   Ponderosa pine (*Pinus ponderosa*) –some, isolated
   Gambel's, Rocky Mountain white, and scrub oak (*Quercus sp.*) - some
   One-seed juniper (*Juniper monosprema*)
   Bigelow sagebrush (*Artemisia bigelovii*)
   Four-wing saltbush (*Atriplex canescens*)
   Broom snakeweed (*Guitierrezia sarothrae*)

2) Habitat Type – Juniper savanna:

One-seed juniper (*Juniper monosperma*)
Four-wing saltbush (*Atriplex canescens*)
Broom snakeweed (*Guitierrezia sarothrae*)
Gramma grasses (*Bouteloua spp.)*

3) Habitat Type – Desert Grassland/shrubland:

Sand sagebrush (*Artemisia filifolia*)
Four-wing saltbush (*Atriplex canescens*)
Rubber rabbitbrush (*Ericameria nauseosa*)
Broom snakeweed (*Guitierrezia sarothrae*)
Pale wolfberry (*Lycium pallidum*)
Gramma grasses (*Bouteloua spp.*)
Ring muhly (*Muhlenbergia torreyi*)

4) Habitat Type – Rock/cliffside:

Piñon pine (*Pinus edulis*) - some
Ponderosa pine (*Pinus ponderosa*) – some
One-seed juniper (*Juniper monosperma*) – some
Woodland beargrass (*Nolina greenieei*)
Littleleaf mock orange (*Philadelphis microphyllus*)

5) Habitat Type – Arroyo:

Four-wing saltbush (*Atriplex canescens*)
Broom snakeweed (*Guitierrezia sarothrae*)
Rubber rabbitbrush (*Ericameria nauseosa*)
Gramma grasses (*Bouteloua spp.*)
Wheatgrasses *Agropyron spp.*

4.0 Preliminary Results

Preliminary results for the 2008 field season focus on the proposed direct impact sections (Sections 9, 10, and 16).

4.1 Herpetofauna

Sampling periods for reptiles and amphibians were from 6-12 July and from 21-28 September 2008. All herpetofaunal arrays were run for five days during each sampling period. All of the arrays were run during the July sampling period except for the arrays in Section 12, which were run during September sampling. 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 1 and 2 on pages 25-26. 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 our summer or fall sampling.

Table 1. Herpetofauna collected at Roca Honda (McKinley & Cibola Co. NM)

Table 1. 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/ Species	9-1	9-2	9-3	9-4	9-3	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
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 2 on page 26 lists possible herpetofaunal species which may occur at the project site.

Table 2. Herpetofauna potentially present at Roca Honda (McKinley & Cibola counties, NM)

Family	Common Name	*Species*	Likelihood of Occurance	Verified 2008
Ambystomidae	Tiger Salamander	*Ambystoma tigrinum*	High	
Pelobatidae	Plains Spadefoots	*Spea bombifrons*	High	
Pelobatidae	New Mexico Spadefoot	*Spea mutliplicata*	High	X
Bufonidae	Red-spotted toad	*Bufo punctatus*	possible	
Bufonidae	Woodhouse's Toad	*Bufo woodhousii*	possible	
Ranidae	Bullfrog	*Rana catesbienna*	present	X
Hylidae	Canyon Treefrog	*Hyla arenicolor*	unlikely	X
Crotaphytidae	Eastern Collared Lizard	*Crotaphytus collaris*	present	X
Crotaphytidae	Lepoard Lizard	*Gambelia wislizenii*	possible	
Phrynosomatidae	Lesser Earless Lizard	*Holbrookia maculata*	present	X
Phrynosomatidae	Greater Short-horned Lizard	*Phrynosoma hernandesi*	present	X
Phrynosomatidae	Roundtail Horned Lizard	*Phrynosoma modestum*	unlikely	
Phrynosomatidae	Sagebrush Lizard	*Sceloporus graciosus*	present	X
Phrynosomatidae	Prairie Lizard	*Sceloporus tristichus*	present	X
Phrynosomatidae	Tree Lizard	*Urosaurus ornatus*	high	
Phrynosomatidae	Side-blotched Lizard	*Uta stansburiana*	present	CB
Teidae	Western Whiptail	*Aspidoscelis tigris*	present	CB
Teidae	Plateau Striped Whiptail	*Aspidoscelis velox*	present	X
Teidae	Little Striped Whiptail	*Aspidoscelis inornatus*	unlikely	
Scincidae	Many-lined skink	*Eumeces multivirgatus*	high	
Scincidae	Great Plains Skink	*Eumeces obsoletus*	possible	
Colubridae	Glossy Snake	*Arizona elegans*	unlikely	
Colubridae	Ringneck Snake	*Diadophis punctatus*	possible	
Colubridae	Corn Snake	*Elaphe guttata*	possible	
Colubridae	Night Snake	*Hypsiglena torquata*	possible	
Colubridae	Coachwhip	*Masticophis flagellum*	high	
Colubridae	Striped Whipsnake	*Masticophis taeniatus*	high	
Colubridae	Gopher Snake	*Pituophis melanoleucus*	present	X
Colubridae	Mountain Patchnose Snake	*Salvadora grahamiae*	possible	
Colubridae	Western Terrestrial Garter Snake	*Thamnophis elegans*	high	X
Colubridae	Western Diamondback Rattlesnake	*Crotalus atrox*	high	
Colubridae	Blacktail Rattlesnake	*Crotalus molossus*	possible	
Viperidae	Prairie Rattlesnake	*Crotalus viridis*	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. Several examples of captured specimens can be seen in Figures 16 and 17 below.

Figure 16. Prairie rattlesnake (*Crotalus viridus*) at Roca Honda (2008).

Figure 17. 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 3 below on page 28.

Table 3. Summary of herpetofuana 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 1 on page 25.

4.2 Small Mammals

Terrestrial Small Mammals

For each small mammal array, sampling occurred for three consecutive nights in the summer (between 9-15 July 2008) and in the fall (between 22-28 September 2008). Capture results and summary statistics for the small mammals have been recorded separately for each monitoring period, shown in Tables 4 and 5 on pages 28-29, and cumulatively to represent patterns over multiple seasons, shown in Table 6 on page 29. 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.

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

Table 5. Small mammal captures 22-28 September 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		4															1	6
Ammospermophilus leucurus								1											1	1	3
Perognathus flavus	1	1	1	2	1	1	2	3	2	3	5	2	6	1	3	6	9	4	5	7	65
Perognathus flavescens								1													1
Dipodomys ordii	3	2					3	1		2	1	1			1		1		1	4	20
Dipodomys spectabilis							1		1						1					4	7
Reithrodontomys megalotis						1			2		1		1								5
Peromyscus maniculatus	2	1		4	1	5	1	2	7	2	2	5	3	2	1	1	4			2	45
Peromyscus boylii								1			1										2
Peromyscus truei	4	2	4	6	10	6		8		10	7	8	1			6		6	1	11	90
Onychomys leucogaster							1													1	2
Neotoma albigula		1			2		3	1		3	5	6		3			1	5		3	33
Other																					
Notiosorex crawfordi		1					1				1										3
Thomomys bottae							1					1					1			1	4
Diversity (# of species)	4	6	3	3	5	4	8	8	4	5	8	6	4	3	4	3	5	3	4	10	14
Trapping intensity (trap nights)	146	148	144	146	142	145	145	145	145	143	136	142	69	72	146	146	142	144	135	141	2722
Total # captures	16	9	7	17	20	13	13	23	12	20	24	28	11	8	6	13	18	20	8	47	333
Total # unique individuals	10	7	6	12	18	13	11	18	12	20	22	22	11	6	6	13	15	15	8	34	279
Capture success (%)	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	12.2
% recapture	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	16.2

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 6 on page 29, was pinyon 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 pinyon/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 to be commonly found throughout the Roca Honda study area. This 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 shrew, desert shrew (*Notiosorex crawfordi*), that is common in the arid southwest although not normally caught. All shrews in this survey were recovered from herpetofauna pitfalls. Rock squirrel (*Spermophilus variegates)* were abundant throughout the Roca Honda study area and on all sites.

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 6 on page 29. 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 site 4 and Section 10 site 3, as shown in Table 5 on page 29.

Lagomorphs

Both black-tailed jackrabbit *(Lepus californicus*) and desert cottontail (*Sylvilagus auduboni*) were common throughout the study area. The desert cottontail can be seen in Figure 18 on page 31.


Figure 18. Desert cottontail (*Sylvilagus auduboni*) at Roca Honda (July 2008).

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 at a later date. 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.

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).

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

In 2008, birds were sampled twice (replicate) during the breeding season at all established point count stations (240 stations in 7 1/2 land sections). Surveys were conducted during the main breeding season for most resident species, from May 26 through June 24, 2008.

A total of 1781 individuals, of fifty-nine (59) species, were recorded during breeding bird surveys at Sections 9, 10, and 16 as shown in Table 7 on pages 32-35.

Table 7. Avian species diversity and total number of species (Roca Honda 2008).

Common Name (scientific name)	Section 9	Section 10	Section 16
Birds			
Scaled quail (*Callipela squamata*)		X	
Turkey vulture (*Cathartes aura*)	X	X	X
Red-tailed hawk (*Buteo jamicensis*)	X	X	X
American kestrel (*Falco sparverius*)	X	X	X
Prairie falcon (*Falco mexicanus*)		X	
Mourning dove* (*Zenaida macroura*)	X	X	X
White-winged dove (*Zenaida asiatica*)		X	X
Common nighthawk (*Chordeiles minor*)		X	
Common poorwill (*Phalaenoptilus nuttallii*)	X		
White-throated swift (*Aeronautes saxatalis*)	X	X	X
Black-chinned hummingbird (*Archilochus alexandri*)	X	X	X
Broad-tailed hummingbird (*Selasphorus platycercus*)	X	X	X
Hairy woodpecker (*Picoides villosus*)	X	X	
Northern flicker (Red-shafted)*	X	X	X

(*Colaptes auratus*)			
Olive-sided flycatcher (*Contopus cooperi*)	X	X	X
Western wood-peewee (*Contopus sordidulus*)	X		X
Gray flycatcher (*Empidonax wrightii*)	X	X	X
Say's phoebe* (*Sayornis saya*)	X	X	X
Ash-throated flycatcher* (*Myiarchus tuberculifer*)	X	X	X
Cassin's kingbird* (*Tyrannus cassinii*)	X	X	X
Loggerhead shrike (*Lanius ludovicianus*)	X		
Plumbeous vireo (*Vireo plumbeous*)	X	X	X
Warbling vireo (*Vireo gilvus*)	X		X
Western scrub jay (*Aphelocoma californica*)	X	X	X
Pinyon jay* (*Gymnorhinus cyanocephalus*)	X	X	X
Common raven* (*Corvus corax*)	X	X	X
Cliff swallow (*Petrochelidon pyrrhonata*)	X	X	X
Violet-green swallow* (*Tachycineta thalassina*)	X	X	X
Mountain chickadee (*Poecile gambeli*)		X	X
Juniper titmouse (*Baeolophus ridgewayi*)	X	X	X
Bushtit (*Psatriparus minimus*)	X		X
White-breasted nuthatch* (*Sitta carolinensis*)	X	X	

Rock wren (*Sappinctes obseletus*)	X	X	X
Canyon wren* (*Catherpes mexicanus*)	X	X	X
Bewick's wren (*Thryomanes bewickii*)	X	X	X
Blue-gray gnatcatcher (*Polioptila caerulea*)	X	X	X
Western bluebird* (*Sialia mexicana*)	X	X	X
Mountain bluebird* (*Sialia currucoides*)	X	X	X
American robin (*Turdus migratorius*)	X	X	X
Northern mockingbird (*Mimus polyglottus*)	X	X	X
Virginia's warbler (*vermivora virginiae*)		X	
Yellow-rumped warbler (*Dendroica coronata*)	X	X	X
Black-throated gray warbler (*Dendroica nigrescens*)	X	X	
Western tanager (*Piranga ludoviciana*)	X	X	X
Chipping sparrow* (*Spizella asserine*)	X	X	X
Brewer's sparrow (*Spizella breweri*)		X	
Vesper sparrow (*Pooecetes gramineus*)		X	
Lark sparrow (*Chonestes grammacus*)	X	X	X
White-crowned sparrow (*Zonotrichia leucophrys*)			X
Dark-eyed junco – Oregon and Gray-head (*Junco hyemalis*)	X	X	

Spotted towhee (*Pipilo maculates*)	X	X	
Canyon towhee (*Pipilo fuscus*)	X	X	X
Black-headed grosbeak (*Pheucticus melanocephalus*)	X	X	X
Red-winged blackbird (*Agelaius phoeniceus*)			X
Western meadowlark (*Sturnella neglecta*)		X	X
Brown-headed cowbird (*Molothrus ater*)	X	X	X
House finch (*Carpodacus mexicanus*)	X	X	X
Pine siskin (*Carduelis pinus*)			X
Lesser goldfinch (*Carduelis psaltria*)	X	X	X
Species diversity (# of species)	47	53	47
Total number of individuals detected	663	432	686
Total (sp. diversity/ total individuals)		59 / 1781	

**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 tuberculifer*), juniper titmouse (*Baeolophus ridgewayi*), rock wren (*Sappinctes obseletus*), 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 species listed in 2009 by the USFWS or NMDGF as having the potential to occur in the project area were documented during sampling, as shown in Table 8 on page 36. Completion of data entry for point counts and habitat measurements, and associated analysis, will provide a more accurate and complete picture of species occurrence and habitat use within and around the project area.

Table 8. Wildlife species listed by the USFWS and NMDGF as Endangered, Threatened, or Candidate with potential to occur in McKinley and Cibola County, New Mexico (2009).

Common Name (scientific name)	Federal Status*	State Status*	Habitat Associations	Potential to occur in project area **
Mammals				
Spotted bat (*Euderma maculatum*)		T	Highly variable habitats from coniferous forests to desert scrub.	S
Cebolleta southern pocket gopher (*Thomomys umbrinus paguatae*)	SOC		Limited to the higher timbered parts of the Animas Mountains (Hidalgo County).	NP
Black-footed ferret (*Mustela nigripes*)	E		Open grasslands with year-round prairie dog colonies. Strongly associated with black-tailed prairie dogs.	NP
Birds				
Bald eagle (*Haliaeetus leucocephalus*)		T	Mature shoreline forests with scattered openings and little human use, near water with abundant fish and waterfowl.	NP
Northern goshawk (*Accipiter gentilis*)	SOC		Ponderosa pine, mixed conifer, and spruce-fir forests.	NP
American peregrine falcon (*Falco peregrinus*)	SOC	T	Rare breeders (NM) in rocky, steep cliff areas, generally near water or mesic canyons.	NS (marginal habitat)
Artic peregrine falcon (*Falco peregrinus tundrius*)	SOC	T	Nest in treeless tundra of Alaska, Canada, and Greenland. Occasional winter migrant. Rare.	NP
Mountain plover (*Charadrius montanus*)	SOC		Dry, disturbed, or intensively grazed, open and flat tablelands.	NP
Least tern (*Sterna antillarum*)		E	Marine or estuarine shores, or on sand bar islands in large rivers. Prefers areas free from humans and predators.	NP
Black tern (*Chilidonias niger surinamensis*	SOC		Freshwater marshes, wet meadows, lake margins, slow-moving rivers, bogs, shrub-swamps, and along prairie sloughs.	NP
Yellow-billed cuckoo (*Coccyzus americanus*)	C		Extensive, mature riparian corridors.	NP
Western burrowing owl (*Athene cunicularia*)	SOC		Grasslands and prairies, associated with prairie dog towns.	NS (marginal habitat)
Mexican spotted owl (*Strix occidentalis lucida*)	T		Rocky canyons in mature montane forests below 9500 feet in elevation.	NP
Costa's hummingbird (*Calypte costae*)		T	Desert scrub, chaparral, thornscrub, tropical deciduous forest, and suburban areas.	NS
Southwestern willow flycatcher (*Empidonax trillii extimus*)	E	E	Dense, riparian vegetation near surface water or saturated soil, monotypic or mixed stands of native and/or exotic species.	NP
Gray vireo (*Vireo vicinior*)		T	Thorn scrub, oak-juniper woodland, pinyon-juniper, dry chapparal, mesquite and riparian willow habitats.	NS
Fish				
Rio Grande sucker (*Catostomus plebeius*)	SOC		Currently inhabits the northern portion of the Rio Grande and its tributaries	NP
Zuni Bluehead Sucker (*Catostomus discobolous yarrowi*)	C	E	Often inhabits swifootwater 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.

Migratory bird surveys were conducted at proposed direct impact areas; Sections 9, 10, and 16 in their entirety and portions of Sections 11, 15, 21, and 27 (158 stations).

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 7 on pages 32-35. Pinon 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 below in Figure 19. These two species are obviously an important nest site habitat component for local birds as fifteen of the twenty nests documented in trees were in either piñon or pondersosa pine. The highest number 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 Figure 15 on page 23.

Figure 19. Mountain bluebird feeding nestlings at Roca Honda (June 2008).

4.4 Furbearers and Big Game (Mid-large Mammals)

Big Game

Information about big game 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. Big game 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 big game species expected to occur within the area, three (3) were documented; Rocky Mountain elk (*Cervus elaphus nelsoni*), mule deer - Rocky Mountain subspecies (*Odocoileus hemionus*), and mountain lion (*Puma concolor*). 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 20 on page 38.

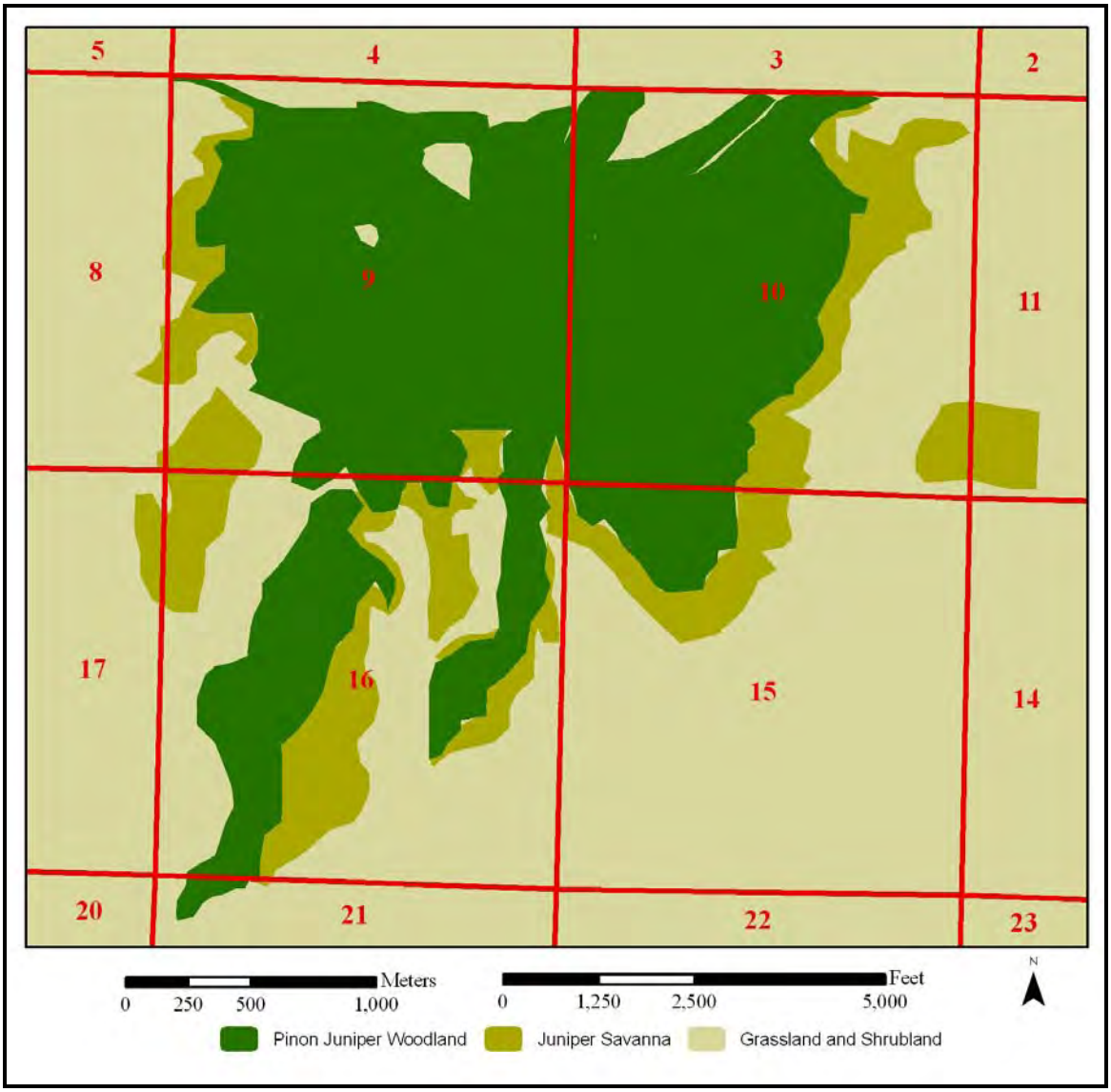


Figure 20. Vegetation types at Roca Honda.

Mountain lion activity had previously been documented at Roca Honda and the area provides suitable habitat and prey base (elk, mule deer, porcupine) for the species. 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 Section 10 and 16.

Furbearers

Mid-sized furbearing mammals documented in Sections 9, 10, 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 9 on page 39.

Table 9. List of big game and 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	*Erethizon dorsatum*	Probable	X
Canidae	Coyote	*Canis latrans*	Definite	X
Canidae	Kit fox	*Vulpes macrotis*	Probable	
Canidae	Gray fox	*Urocyon cinereoargenteus*	Probable	X
Procyonidae	Ringtail	*Bassariscus astutus*	Unknown	
Procyonidae	Raccoon	*Procyon lotor*	Unknown	
Mustelidae	Long-tailed weasel	*Mustela frenata*	Unknown	X
Mustelidae	Badger	*Taxidea taxus*	Definite	X
Mephitidae	Spotted skunk	*Spilogale gracilis*	Probable	
Mephitidae	Striped skunk	*Mephitis mephitis*	Probable	X
Mephitidae	Hog-nosed skunk	*Conepatus mesoleucus*	Unknown	
Felidae	Mountain lion (puma)	*Felis concolor*	Definite	X
Felidae	Bobcat	*Lynx rufus*	Probable	X
Tayassuidae	Collared peccary	*Peccary tajacu*	Unknown	
Cervidae	Rocky Mountain elk	*Cervus elaphus nelsoni*	Definite	X
Cervidae	Mule deer – Rocky Mountain	*Odocoileus hemionus*	Probable	X
Antilocapridae	Pronghorn	*Antilocapra americana*	Unknown	

Taxonomy based on Wilson and Reeder (2005).

Species identification was based upon sightings, scat, and other ancillary sign, as sample of which can be seen in Figure 21 on page 40. 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 21. 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 transect's survey area. 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.

4.5 Threatened, Endangered, and 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 8 on page 36 presents currently listed species and associated habitat suitability evaluations.

4.6 Management Indicator Species (MIS – 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 Management Indicator Species; Rocky Mountain elk (*Cervis elaphus nelsoni*), mule deer (*Odocoileus hemionus*), juniper titmouse (*Baeolophus ridgwayi*), and hairy woodpecker (*Dendrocopos* villosus) were documented during the surveys and are addressed below.

Game Species

Rocky Mountain Elk (*Cervus elaphus*)
(Habitat type – Mountain grassland / mixed-conifer)

Site use by elk was verified during fall sampling. Pinon-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 / 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 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.

Non-game Species

Juniper titmouse (*Baeolophus ridgwayi*)
(Habitat type – Pinon-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.

5.0 Laboratory and Field Quality Assurance

Following the most currently accepted survey protocols, as determined by federal and state agencies, will help ensure 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's 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 through representation of project impacts.

To evaluate the 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.

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7.0 Statement of Qualifications & Project Resumes
Roca Honda Project – Wildlife Leads and Support Staff

June Galloway, Lead Wildlife Biologist
Twelve years experience as a professional wildlife biologist with expertise in carnivores and ornithology. June came to PWI 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 US 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

Geoff Carpenter, Contract Biologist (Herpetologist)
Geoff is a Herpetologist with broad experience working across the Rocky Mountains and Southwest. He brings expertise in working with reptile and mammals and compliments 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

Andrew Hope, Contract Biologist (Mammalologist)
Andrew 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

Steve Buskirk, Consulting Biologist
Steve 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

Charlie Black, Wildlife Biologist
Charlie has been with Permits West, Inc. since 1997. Prior to that, he worked as an assistant zoologist at the New Mexico Natural Heritage Program. Charlie handles surface negotiations, onsite inspections, and writes biological assessments for Permits West, Inc. He specializes in field ornithology.
BS, Arts & Sciences, University of New Mexico.

Ben Yanda, Natural Resources & GIS
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

Juanita Ladyman, Lead Botanist
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.
PHD, Botony, Michigan State University

8.0 Protocols

8.1 Roca Honda Big Game and Furbearing Mammal Formal Protocol

June M. Galloway, Wildlife Biologist (Permits West, Inc.)

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 terrestrial big game 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 consists of one stationary central point, with three 50 meter 'arms' placed approximately 120 degrees apart. The 'arms' represent 5 meter wide, 50 meter long belt transects with pellet count station centers situated at the end of each arm, including the center starting point. Since furbearing mammals will be surveyed at the Roca Honda project site in association with big game surveys, each sampling station has been set up to assess on-site presence of both wildlife groups. Sampling will take place during critical time periods such as fall (rut) and winter (winter range). Counts will start 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.

Methodology

Terrestrial Furbearing Mammals

This grouping includes 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 will be assessed by surveying three (3) 50 meter long, five meter wide (2.5 meters on each side of center line) transect belts at each sampling station. Presence will be determined by visual observation, tracks, and ancillary sign (i.e. hair, scat, tree scarring/rubs). Although these surveys will primarily focus on medium-sized, typically furbearing mammals, sampling will also include big game species easily identified by track and sign (mountain lion and black bear) as well as smaller furbearing species such as weasels. Additional survey methods such as scent stations and remote trip cameras may be utilized at a later date, if feasible.

Big Game

Big game surveys will focus on native ungulate species, elk and mule deer, with mountain lion and black bear counted using transects. At each station 4 'points', including the central point, serve as pellet count stations. These 'stations' are marked with a labeled wooden stake which serves as the center of a circular plot. Plot boundaries will be determined by attaching an 11' 9" chain to the stake and creating a 360º diameter. Using a chain of this length allows for sampling of an 0.01 acre area. Once the plot is established, the number of 'fresh' pellet groups within each circle for each species (elk or mule deer, in almost all cases) will be estimated. For the purposes of this study, pellet groups will be defined as an association of 10 or more fecal pellets of the same size. For the first round of surveys, 'fresh' pellets should be those that appear to have been deposited within the last several weeks. After the initial survey, all

pellets from the plot will be removed or destroyed to ensure that pellets will not be recounted during subsequent survey periods.

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 meter 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^{o}), slope (0-99%), and canopy cover (25% increments). Station number, date, time, surveyors, and weather were also recorded.

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

Complied by June M. Galloway - 2008

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

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8.2 Roca Honda Avian Monitoring Formal Protocol

June M. Galloway, Wildlife Biologist

Introduction

At each land section where there was the potential for direct and indirect impacts from the proposed mine, we established eight point count stations per mile along a north to south alignment based on global positioning system (GPS) coordinates to assess bird populations. All stations were positioned approximately 150 meters apart north to south and roughly 400 meters 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, 15, 16, 21, and 27, with sixteen stations placed in Section 12 (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 (T. 14 N, R. 8 W.) 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).

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 will be surveyed in a north-south direction, alternating direction each session. A round of counts for all sites will be completed before beginning a new session. During each point count survey, the observer at each point will record all birds seen or heard for 10 minutes. Detection mode (heard, seen), sex, relative age of bird, and distance from point (m) will also be 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 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 surveys 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 will be searched for active bird nests throughout the breeding season. Every effort will be made to keep nest search effort relatively even across sites, with higher effort placed on proposed direct impact areas (Section 9, 10, and 16). Although active nests will not be routinely monitored, raptor nests will be rechecked when possible.

Habitat Variables

Avian habitat will be evaluated at all point count stations by establishing a 25 meter 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 will also be recorded.

References

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8.3 Roca Honda Small Mammal Sampling Protocol

Andrew G. Hope, Wildlife Biologist

Overview

The small mammal component of biological inventory and monitoring for the Roca Honda project encompasses a variety of different life histories that will require variable sampling techniques. I have thus categorized the small mammals 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.

Terrestrial Small Mammals

Trapping Design

This group contains both nocturnal and diurnal small mammals, all of which can readily be caught in standard Sherman live traps. These traps will be set, baited with a mixture of peanut butter and rolled oats, in trapping arrays (square grids) of 25 traps each (5x5) spaced at 10m apart. The small mammal and herpetofauna sampling stations have been 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. For consistency of orientation, each small mammal array is rooted with a south corner trap placed 10m north of the northernmost edge of the herpetofauna pitfall array. The remainder of the array is set in a square grid with corners located at north, south, east and west. For each small mammal array, sampling will occur for three consecutive nights at each of three sampling periods through the year: spring (March through April; this is aimed to capture data concerning the pre-breeding annual population relative abundance and diversity and should reflect 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). Thus it should be possible to trap all small mammal arrays in six consecutive nights, three times per year (8-12 arrays concurrently for three nights followed by the remaining 8-12 arrays for three nights).

Procedure

Traps will be opened and baited during the late afternoon and closed each morning before 1000. This greatly reduces the occurrence of overheated specimens but at the same time allows for sampling of diurnal small mammals. Each morning traps with captures will be collected and replaced with spare empty traps. Captures will be stored in shade until all arrays have been checked and traps closed before processing. Data collected for each specimen will include species information, gender, age, standard external measurements, mass, tag number (if a recapture; tagging method has yet to be determined), 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 will be released onto the same arrays that they were collected as soon as possible following processing.

Colonial Small Mammals

Trapping design
Gunnison's prairie dogs (*Cynomys gunnisoni*) are prevalent within the Roca Honda survey area in at least three separate colonies of variable size. This species is considered to be a species of conservation concern and are pending enlistment under the Endangered Species Act by the US Fish and Wildlife Service. As such it would be beneficial to critically examine demographics of the Roca Honda colonies. For at least one colony and potentially all recognized colonies within the survey area, a size and density analysis will be conducted. This will consist of accurately delineating the perimeter of a colony by walking around the edge using a GPS unit. Within the colony, individuals will be trapped using appropriate sized mesh traps (Tomahawk or Havahart) baited with a mixture of peanut butter and rolled oats, and then tagged (tagging method is yet to be determined). Placement of traps will be determined in a systematic manner depending on the shape of the colony. If colony size is large, a representative array of traps firmly within the colony will be used to determine a sub-density and this can then be extrapolated to the whole colony for a true density estimate. The trapping array will consist of 100 traps set in a 10x10 square grid. Trapping will continue until all individuals are tagged and density of each colony will be calculated. Prairie dog surveys will occur either once only, or once each year (yet to be determined) for a provisional period of 6 days consecutively.

Procedure
Traps will be opened and baited in the morning before prairie dogs commence activity (around dawn) and will remain open until 1100 and checked once per hour. Traps will remain closed during the hottest parts of the day and then reopened in the afternoon from 1600 to 1900 again, being checked once per hour. Data collected for each specimen will include gender, age, standard external measurements, and mass. Specimens will be processed and released at the trap locality to maintain spatial recognition of individuals.

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 will be conducted. Surveys will begin at dusk and will continue for two hours. Notes will be taken on habitat affinities and identification to genus, as well as a relative abundance per mile of road traveled. Spotlight surveys will be conducted twice per season, and coincident with the terrestrial small mammal seasonal trapping surveys. Species within the genus *Sylvilagus* are cryptic and morphological differences are slight. In addition to spotlight surveys, I would strongly encourage firearm collection of specimens within this genus to confirm presence of potential species. Subsequently, where necessary, species ID can be accomplished using molecular ID confirmation at the University of New Mexico and voucher specimens can be archived into the

mammal collections at the Museum of Southwestern Biology. Any such collection would take place during daylight hours unless a spotlight collection permit is obtained.

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. At least two potential species may occur within the survey area and gopher sign has been identified in multiple habitats. A sporadic distribution and fossorial habit make these mammals hard to quantify in terms of densities or even relative abundance. Surveys will consist of opportunistic trapping to determine diversity within this group. Standard gopher traps are lethal and all specimens collected will be archived within the Museum of Southwestern Biology.

Volant Mammals

Procedure
This group consists of bats of which there is a high diversity possible within the survey area. 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, these water sources are often ephemeral and may not be available to use on a repeatable basis over multiple sampling periods. This does not lend to accurate density or even relative abundance estimates. Surveys will consist of opportunistic trapping to determine diversity within this group. Mist netting will be conducted twice per season, and coincident with the terrestrial small mammal seasonal trapping surveys. Nets will be set before dusk over available standing water sources and will remain set until 2300, being checked at least every 30 minutes. Data collected for each specimen will include 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 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 will provide a very 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. This will form a critical reference for future investigation of many aspects of a potentially changing landscape. Museum voucher collections can provide information not only for genetic and morphological analysis but also for parasite interactions, chemical analysis, and species turnover. The effects of mining operations can thus be witnessed but in addition, the effects of climate change on the geographic distribution of mammal species and finally within population variability over time. In addition, many closely related taxa, especially among the small mammals are cryptic and difficult to accurately identify to species in the field. Without voucher specimens to confirm their occurrence at a given locality and time, presence cannot be reliably inferred. I propose to form a voucher collection of small and medium sized

mammals from the survey area not only before the major impact of mining operations but during operations over the course of several years. This will consist of specimen collection of a representative sample of each species and not removal of all individuals. In addition, trap mortalities will be collected and incidental road-kill or otherwise dead mammal specimens will be salvaged. Specimens will be frozen on dry ice in the field then will undergo a standard curation process and deposited in the Museum of Southwestern Biology. If certain materials are required for chemical analysis or otherwise at another institution, these parts will be separated and forwarded. Otherwise, skin and skeleton will be cleaned and dried, frozen tissues will be deposited in the Division of Genomic Resources, and data will be entered and available to the public in the museum online catalog at http://arctos.database.museum/SpecimenSearch.cfm. Thus, all parts of these specimens will be available to researchers for future scientific investigation. Collection permits for unprotected non-game small mammals are generally not required for state residents. However, permission from the appropriate government agencies and land owners will be obtained and in addition, I currently hold 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
Compiled by Andrew G. Hope (UNM) – June 2008

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

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

Family Geomyidae

Thomomys bottae – Botta's pocket gopher	Probable
Thomomys talpoides – northern pocket gopher	Unlikely

Family Heteromyidae

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

Family Muridae

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

Family Erethizontidae

Erethizon dorsatum – porcupine	Probable

Order Carnivora

Family Canidae

Canis latrans – coyote	Definite
Vulpes macrotis – kit fox	Probable
Urocyon cinereoargenteus – gray fox	Probable

Family Procyonidae	
Bassariscus astutus – ringtail	Unknown
Procyon lotor – raccoon	Unknown
Family Mustelidae	
Mustela frenata – long-tailed weasel	Unknown
Taxidea taxus – badger	Definite
Family Mephitidae	
Spilogale gracilis – spotted skunk	Probable
Mephitis mephitis – striped skunk	Probable
Conepatus mesoleucus – hog-nosed skunk	Unknown
Family Felidae	
Felis concolor – puma	Definite
Lynx rufus – bobcat	Probable
Order Artiodactyla	
Family Tayassuidae	
Peccary tajacu – collared peccary	Unknown
Family Cervidae	
Cervus elaphus – elk	Definite
Odocoileus hemionus – mule deer	Probable
Family Antilocapridae	
Antilocapra americana – pronghorn	Unknown

Comments

The likelihood of occurrence for each species is 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 are 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.

References

Findley, JS, Harris AH, Wilson, DE, Jones, C. 1975. *Mammals of New Mexico*. University of New Mexico Press, Albuquerque, NM. 1-360pp.

Wilson, DE, and Reeder, DM. 2005. *Mammal Species of the World: A Taxonomic and Geographic Reference*. Third Edition. Johns Hopkins University Press, Baltimore.

8.4 Roca Honda Herpetofaunal Sampling Protocol

Dr. Geoffrey C. Carpenter, Herpetologist

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.

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 out on three 120$_o$ rays of silt fencing to form a Y-array. Buckets were outfitted with 16" x 16" coverboards. Centered on each of the rays was a 25" x 7" funnel trap constructed of hardware cloth (a 25" x 7" 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 one inch 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 herpetofuana 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.

List of herpetofauna potentially present at Roca Honda (McKinley & Cibola Co. NM)

FAMILY	COMMON NAME	*SPECIES*	LIKLIHOOD OF OCCURANCE	VERIFIED 2008
Ambystomidae	Tiger Salamander	*Ambystoma tigrinum*	high	
Pelobatidae	Plains Spadefoots	*Spea bombifrons*	high	
Pelobatidae	New Mexico Spadefoot	*Spea mutliplicata*	high	Yes
Bufonidae	Red-spotted toad	*Bufo punctatus*	possible	
Bufonidae	Woodhouse's Toad	*Bufo woodhousii*	possible	
Ranidae	Bullfrog	*Rana catesbienna*	present	Yes
Hylidae	Canyon Treefrog	*Hyla arenicolor*	unlikely	Yes
Crotaphytidae	Eastern Collared Lizard	*Crotaphytus collaris*	present	Yes
Crotaphytidae	Lepoard Lizard	*Gambelia wislizenii*	possible	
Phrynosomatidae	Lesser Earless Lizard	*Holbrookia maculata*	present	Yes
Phrynosomatidae	Greater Short-horned Lizard	*Phrynosoma hernandesi*	present	Yes
Phrynosomatidae	Roundtail Horned Lizard	*Phrynosoma modestum*	unlikely	
Phrynosomatidae	Sagebrush Lizard	*Sceloporus graciosus*	present	Yes
Phrynosomatidae	Prairie Lizard	*Sceloporus tristichus*	present	Yes
Phrynosomatidae	Tree Lizard	*Urosaurus ornatus*	high	
Phrynosomatidae	Side-blotched Lizard	*Uta stansburiana*	present	Yes -CB
Teidae	Western Whiptail	*Aspidoscelis tigris*	present	Yes -CB
Teidae	Plateau Striped Whiptail	*Aspidoscelis velox*	present	Yes
Teidae	Little Striped Whiptail	*Aspidoscelis inornatus*	unlikely	
Scincidae	Many-lined skink	*Eumeces multivirgatus*	high	
Scincidae	Great Plains Skink	*Eumeces obsoletus*	possible	
Colubridae	Glossy Snake	*Arizona elegans*	unlikely	
Colubridae	Ringneck Snake	*Diadophis punctatus*	possible	
Colubridae	Corn Snake	*Elaphe guttata*	possible	
Colubridae	Night Snake	*Hypsiglena torquata*	possible	
Colubridae	Coachwhip	*Masticophis flagellum*	high	
Colubridae	Striped Whipsnake	*Masticophis taeniatus*	high	

Colubridae	Gopher Snake	*Pituophis melanoleucus*	present	Yes
Colubridae	Mountain Patchnose Snake	*Salvadora grahamiae*	possible	
Colubridae	Western Terrestrial Garter Snake	*Thamnophis elegans*	high	Yes
Colubridae	Western Diamondback Rattlesnake	*Crotalus atrox*	high	
Colubridae	Blacktail Rattlesnake	*Crotalus molossus*	possible	
Viperidae	Prairie Rattlesnake	*Crotalus viridis*	high	Yes

CB = verified sighting by Charles Black, Wildlife Biologist

References

Degenhardt, W. G., Painter, C. W., and Price, A. H.. 1996. Amphibians and Reptiles of New Mexico. University of New Mexico Press. Albuquerque.

List of standard English and current scientific names: Amphibians and Reptiles of New Mexico, compiled by Charles W. Painter and James N. Stuart. March 2004
http://www.msb.unm.edu/herpetology/publications/NM_species.htm