SAMPLING AND ANALYSIS PLAN

Section 5.0

Wildlife

APRIL 2009

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

Contents

5.0 Wildlife 5–1
5.1 Introduction and Background 5–1
Existing Habitat 5–1
5.2 Sampling Objectives 5-3
5.3 List of Data to be Collected 5-3
5.4 Methods of Collection 5-4
5.4.1 Wildlife Species Inventory 5-4
5.4.2 Species and Community Data 5-4
5.4.2.1 Data Collection and Analysis 5-4
5.4.2.2 Sampling Design 5-6
5.4.2.3 Field Methodology 5-6
5.4.3 Mapping 5-7
5.5 Parameters to be Analyzed 5-7
5.6 Maps Providing Sampling Locations 5-7
5.7 Sampling Frequency 5-7
5.8 Laboratory and Field Quality Assurance Plan 5-8
5.8.1 Personnel 5-8
5.8.2 Sampling Plan 5-8
5.9 Brief Discussion Supporting Proposal 5–9
5.10 References 5–9

Figures

Figure 5-1. Wildlife Habitat Types 5–2
Figure 5-2. Wildlife Survey and Transect Locations 5-5

Tables

Table 5-1. Data Needs Identified for Wildlife 5-4

5.0 Wildlife

5.1 Introduction and Background

Surveys for sensitive, threatened, and endangered wildlife species at the Roca Honda permit area were conducted in 2006 and 2007 (Wood 2007a, Wood 2007b). These reports provide a comprehensive overview of species present in the Roca Honda permit area at the time of the surveys. A general description of the Roca Honda permit area by section and by the wildlife communities present at the time of the surveys is provided in the following subsections.

Existing Habitat

Section 16

Section 16 consists of moderately to heavily-grazed 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. During the fall survey period, several small areas of standing water existed on site, including one man-made stock pond. 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 hairy grama, garden purslane, ring muhly, and annuals such as Colorado rubberweed. Open piñon-juniper areas are dominated by Utah juniper and two-needle piñon.

Wildlife habitat types are typically based on vegetation classification. Figure 5-1 identifies the habitat types for the project area including 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*).

Sections 9 and 10

The landscape in Section 9 varies from desert grassland and open piñon-juniper (*Pinus spp. / Juniperus spp.*) 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. Much of the surface is bare bedrock, and there are sand dunes in some areas. A topographic feature known as Jesus Mesa occupies approximately 50 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 NW1/4 of the section, with sheer cliff faces greater than 50 feet in height along its rim. Elevation in Section 10 ranges from 7,152 to 7,720 ft.

Plant communities in the two sections graduate from desert grassland, dominated by hairy grama, garden purslane, ring muhly, and annuals such as Colorado rubberweed to juniper

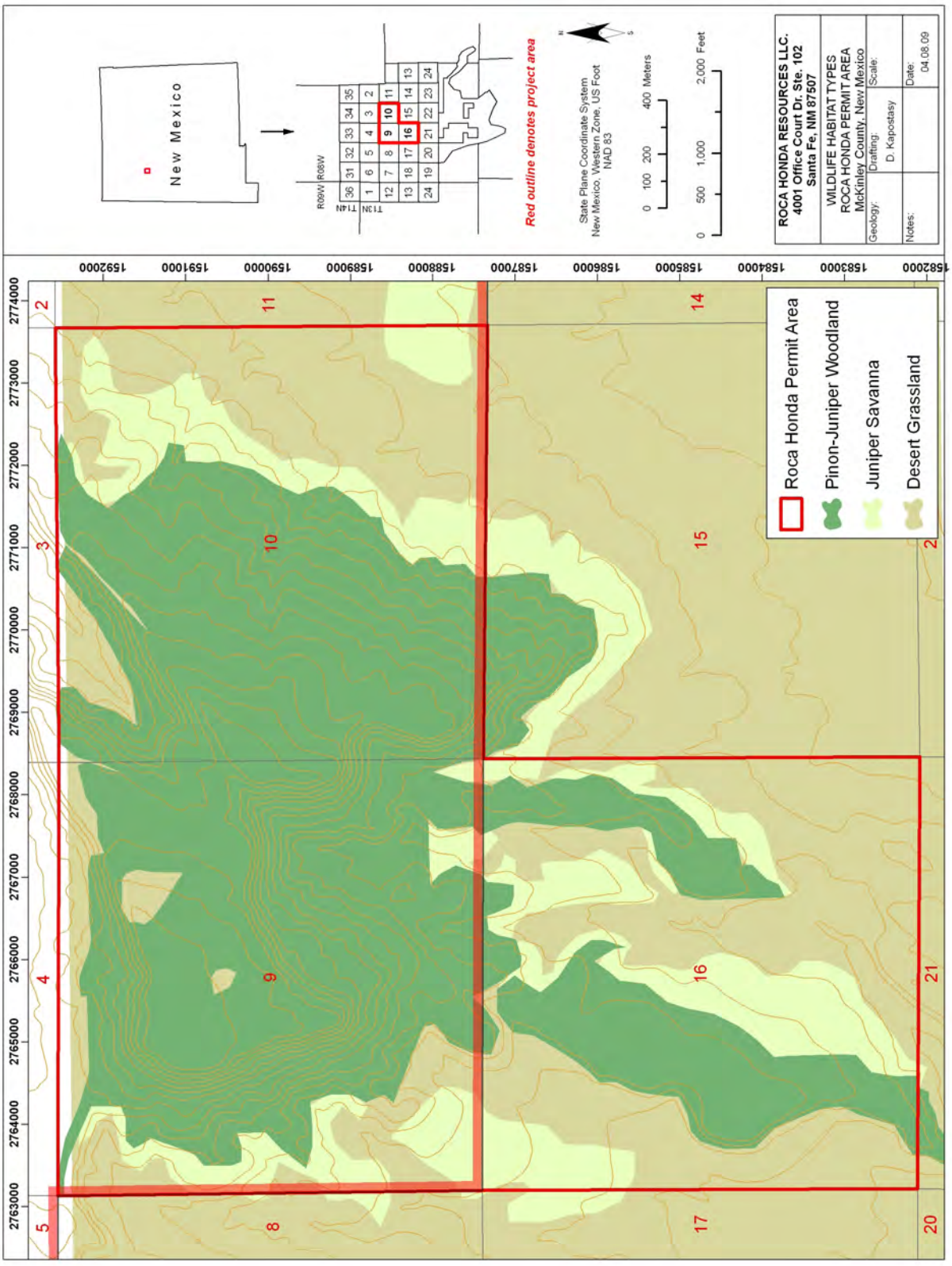

Figure 5-1. Wildlife Habitat Types

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 Sections 9 and 10 are dominated by Utah juniper and two-needle piñon.

Wildlife habitat types based on vegetation for Section 9 and 10 are provided in Figure 5-1. 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 evidence of grazing by native and domestic ungulates at higher elevations. Bladed roads and jeep trails wind throughout the two sections. There is evidence of multiple drill pads from historic exploratory drilling. Several cow trails are also evident at the lower elevations. United States Forest Service (USFS) boundary markers and fences are in place at both sections.

5.2 Sampling Objectives

Sampling objectives are to: (1) describe vertebrate fauna in the Roca Honda permit 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 potential 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.

The sampling approach to obtain the data for the baseline will be integrated into the long-term monitoring plan for the mining operations and reclamation activities. The approach will be adjusted with the site activity to ensure the objectives are met.

5.3 List of Data to be Collected

Three data needs were identified for wildlife. They are listed in Table 5–1, along with the proposed investigation to address the data needs.

The Wildlife SAP for the Roca Honda permit area was set up to address potential short- and long-term impacts associated with the proposed mining operations. The sampling results will be incorporated in the updated Baseline Data Summary which will be submitted as part of the Permit Application.

Figure 5-2 shows the currently identified sampling station locations and survey transects for mammals, birds, and herpetofauna in and around the permit area that will be used to characterize baseline wildlife. Additional sampling locations will be determined in the field as the data gathering effort proceeds. Figure 5-2 also shows the location of the reference area, i.e., Section 27, T 14N, R 8W, north of the permit area used as a control to allow accurate assessment of potential impacts.

Table 5–1. Data Needs Identified for Wildlife

Data Need	Plan to Address Data Need
Species composition, density, and relative abundance for vertebrate fauna in and around the Roca Honda permit area.	Wide-range sampling in approximately 7 ½ land sections, including one control site; Section 9, 10, 11, 15, 16, 21, 27 (control) and half of Section 12 and will include monitoring and/or sampling stations and survey transects for small to large mammals, birds, and herpetofauna. Faunal assessment will also include evaluation of potential wetland riparian areas within and below the permit area.
Species distribution and habitat affinity.	In order to accurately assess species distribution and habitat affinity, sampling will take place during the appropriate time periods (seasons). Faunal assessment will also include evaluation of potential wetland riparian areas within and below the permit area.
Mapping of wildlife habitat types and potentially critical habitat and/or range.	Sampling results will provide suitable data for creation of a comprehensive overview of existing habitat types and spatial habitat use (i.e. winter range) within and around the permit area. Project mapping will be created using GIS (Geographic Information System) data processing techniques. Faunal assessment will also include evaluation of potential wetland riparian areas within and below the permit area.

5.4 Methods of Collection

5.4.1 Wildlife Species Inventory

Surveys and sampling for vertebrate fauna in the Roca Honda permit area will be conducted to determine species composition, abundance, distribution, and habitat affinity prior to mining activities. Wildlife surveys and reports provided in 2006 and 2007 will fulfill the needed requirements for baseline data (i.e., comprehensive list of species and habitat types and associations for wildlife in the area).

Data will also be collected for:

- USFS Management Indicator Species (MIS) – Cibola National Forest, New Mexico.
- State of New Mexico Species of Concern (SOC) - McKinley and Cibola Counties, New Mexico.

5.4.2 Species and Community Data

In order to determine the relationship between potential impacts related to the proposed mining, data collection will include focus on habitat types and wildlife community use. Resulting information will help provide a basis for determining effectiveness of future mitigation activities and reclamation plans and practices.

5.4.2.1 Data Collection and Analysis

Data collection will focus on wildlife by category; big game (elk and mule deer), and mammals (canids, mustelids, etc.), including small mammals, all birds, and herpetofauna. There will also be special focus on Cibola National Forest MIS and State SOC that are known to occur in and

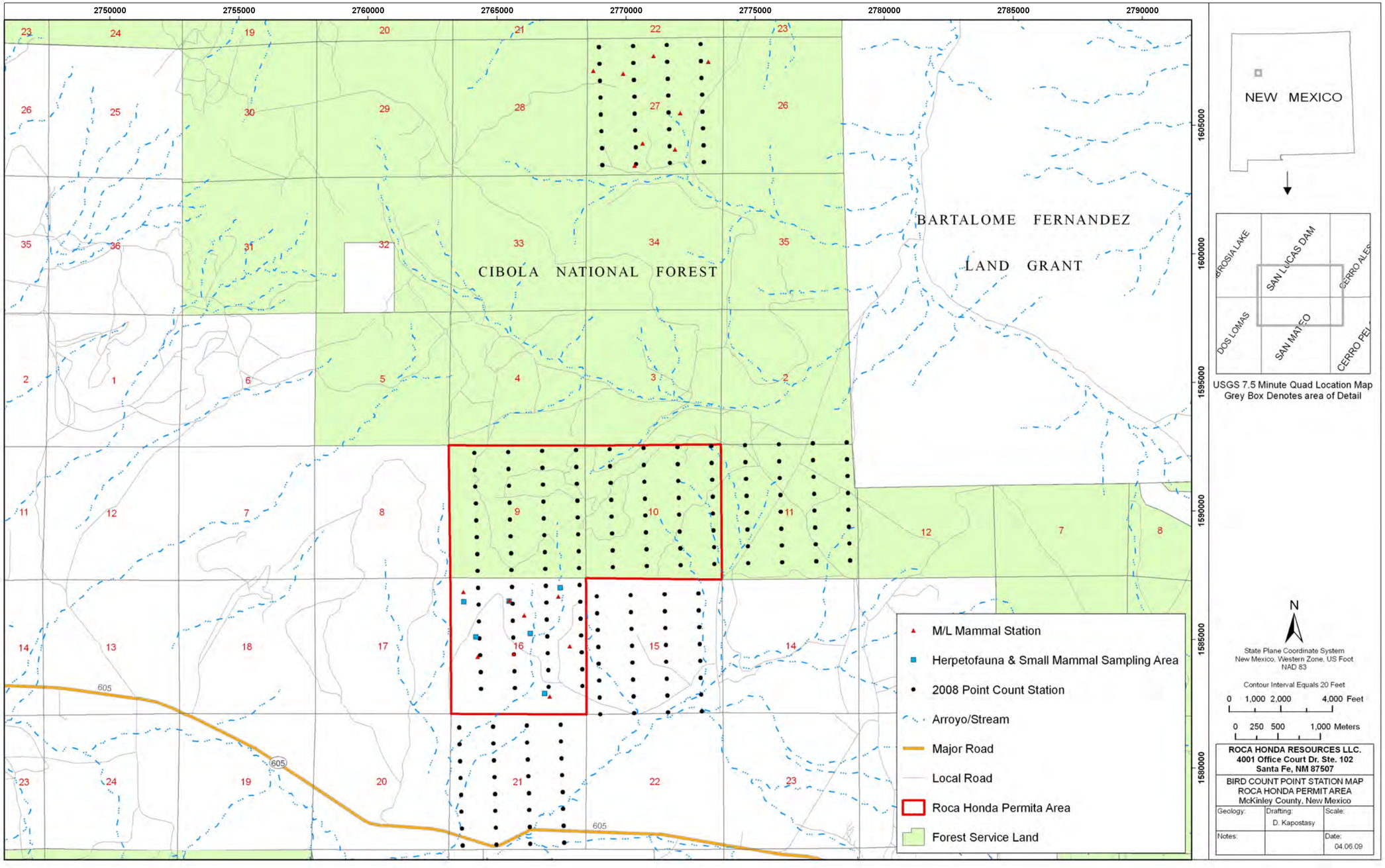

Figure 5-2. Wildlife Survey and Transect Locations

around the Roca Honda permit area. Native fish will not require special surveys due to lack of suitable habitat in the Roca Honda permit area.

Database search parameters will include information from a variety of sources, including but not limited to United States Fish and Wildlife Service (USFWS), New Mexico Department of Game and Fish (NMDGF), Biota Information System of New Mexico (BISON-M) database, New Mexico Natural Heritage, and the USFS. Data collection techniques will be standardized and calibrated through out the course of the long-term monitoring plan.

5.4.2.2 Sampling Design

The sampling design for the Roca Honda permit area wildlife is based upon the "context" monitoring type (Holthausen et al., 2005). Context monitoring for terrestrial animals provides information on animal populations and habitat conditions on a broad scale and for a variety of species. The sampling frame and density are set based on the objectives of detecting as many species as economically feasible rather than detecting single species with a specific power. This is considered an "omnibus" sampling strategy and is complementary with "targeted" and "cause and effect" monitoring types. For example, targeting monitoring protocols for specific species may be placed within the context plan's structure. The design is set up as a multi-year program with 1-year sampling periods. Plan design currently includes replicates of data sampling points, sampling transects and arrays, and control plots in seven and a half (7.5) land sections (State and USFS administered) with focus on five habitat types (3 vegetative, 2 intermittent/topographic). These five habitat types are piñon-juniper woodland, juniper savannah, desert grassland, rock/cliffside, arroyo/drainages. Sampling will also include a 2-mile buffer zone for transient species. Additional project-related areas, including a 1-mile utility corridor/access road and 3 miles of associated pipeline, will be surveyed using transects and road-based sampling techniques. Additional survey areas, such as privately-owned land sections where access is not currently permitted, may also be added.

5.4.2.3 Field Methodology

Field survey requirements and methodology is based upon the most current research techniques (Holthausen et al., 2005 and Williams et al., 2002) and standard methodology utilized by the USFS, USFWS, and NMDGF. The planned collection methods by wildlife category are listed below:

- Big game—Assessment for population size, distribution, and habitat use: winter and reproductive season.
- Other mammals—Sampling for small mammals will consist of an assessment of distribution, diversity, and relative abundance during three seasons. This sampling will involve the use of Sherman live traps baited with peanut butter and rolled oats set in arrays of 25 traps (5x5), with 2 arrays per section and three nights per season. Bat diversity will be assessed using mist nets set over standing water where available. Medium sized mammal distribution and diversity will be assessed by scat surveys and visual confirmation.
- Birds—Breeding densities and migratory and winter occurrence and abundance, including raptors.
- Baseline focal raptor surveys and winter presence/absence surveys.

- Herpetofauna—Sampling for amphibians and reptiles will involve the use of pitfall arrays with five gallon buckets set in the ground, drift fencing, and funnel traps. Sampling areas will be based on topography, habitat type, elevation, and areas that are to receive extreme impact versus those at which impacts will be relatively unsubstantial. Sampling will be for species occurrence and relative abundance. Reptile focus based upon area topography. Species occurrence and relative abundance.

5.4.3 Mapping

Wildlife mapping for the project will present an overview of habitat types and spatial and temporal wildlife use (i.e., winter range areas) within the Roca Honda permit area. In order to protect sensitive and/or critical areas, locations such as nesting and denning sites will be determined. This information will be used to implement the recommended restrictions and avoidance measures during construction activities and mining operations.

On-site sampling and/or monitoring stations and transects will also be delineated. Project mapping will be created by using GIS data processing techniques.

5.5 Parameters to be Analyzed

Data collection will focus on habitat types and wildlife community use by category; big game (elk and mule deer), and mammals (canids, mustelids, etc.), including small mammals, all birds, and herpetofauna. There will also be special focus on Cibola National Forest MIS and State SOC that are known to occur in and around the Roca Honda permit area.

Database search parameters will include information from a variety of sources, including but not limited to USFWS, NMDGF, BISON-M database, New Mexico Natural Heritage, and the USFS.

5.6 Maps Providing Sampling Locations

Figure 5-2 identifies the sampling and survey locations that will be utilized the proposed area to gather the data needed.

5.7 Sampling Frequency

Field survey requirements and methodology are based upon the most current research techniques (Holthausen et al., 2005 and Williams et al., 2002) and standard methodology utilized by the USFS, USFWS, and NMDGF. Survey timing sequences expected are listed below along with the actual dates of surveys completed this year.

- Big game—Assessment for population size, distribution, and habitat use: winter (January through February/March) and reproductive season (August through September).
- Other mammals—Sampling for small mammals will consist of an assessment of distribution, diversity, and relative abundance during three seasons: fall (September through October), spring (March through May), and summer (June through July). The first survey was completed July 12, 2008. The first bat survey was completed July 9 and 10, 2008. Medium sized mammal distribution and diversity will be assessed by scat surveys and visual confirmation.

- Birds—Breeding densities (May through mid-July) and migratory and winter occurrence and abundance, including raptors (December through February). The first breeding bird survey was conducted May 26 through June 5 and the second was June 15 through June 24, 2008.
- Baseline focal raptor surveys and winter presence/absence surveys were performed on site in 2007.
- Herpetofauna—Sampling will be for species occurrence and relative abundance and will take place from April through October each year. Species occurrence and relative abundance (May through September). The first survey was conducted July 12, 2008.

5.8 Laboratory and Field Quality Assurance Plan

5.8.1 Personnel

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 Leader will 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. Names and qualifications of individuals involved in project surveying and data collection will be included in annual reports and survey reports.

5.8.2 Sampling Plan

The Field Leader and team members will follow the field sampling plan as established and discussed above. They will record their observations to ensure the data can be interpreted by others for the map and report. There is no analytical laboratory required for this field effort. Data collection techniques will be standardized and calibrated throughout the course of the sampling and long-term monitoring.

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

To evaluate the plan for sources of error, the sampling design and monitoring protocols will be reviewed by an experienced independent biologist before implementation. In order to avoid type I (missing important changes) or type II (falsely concluding that changes have taken place) errors, the same independent biologist will make a critical review of the methods and conclusions by assessing the logic used and the validity of procedures.

5.9 Brief Discussion Supporting Proposal

This sampling plan will provide an accurate description of wildlife species occurring in the Roca Honda permit area. Selection of the appropriate sampling design aids in assuring that the wildlife long-term monitoring program will meet data quality standards and be both defensible and efficient (Williams, et al., 2002). By utilizing a sampling design that involves sampling over several seasons per year and several times during each sampling period, there is less chance for data to become biased toward early or late seasonal species (Holthausen et al., 2005).

All sampling protocols and field methodology were developed based upon peer-reviewed and standardized methodology. Sampling stations and transects will be placed using the most accurate measurements available and will be checked and calibrated throughout the sampling periods.

5.10 References

Holthausen, R., R.L. Czaplewski, D. DeLorezo, G. Hayward, W.B. Kessler, P. Manley, K.S. McKevley, D.S. Powell, L.F. Ruggiero, M.K. Schwartz, B. Van Horne, and C.D. Vojta, 2005. "Strategies for Monitoring Terrestrial Animals and Habitats," Gen, Tech. Rep. RMRS-GTR-161, Fort Collins, Colorado, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, 34 p.

Peiper, R.D., 1977. "The Southwestern Pinyon-Juniper Ecosystem," In: Aldon, E.F., and T.J. Loring, tech. cords, "Ecology, Uses, and Management of Pinyon-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.

Williams, B.K., J.D. Nichols, and M.J. Conroy, 2002. *Analysis and Management of Animal Populations: Modeling, Estimation, and Decision Making*, Academic Press, San Diego, California, April.

Wood, B., 2007a. Wildlife Survey Report for Strathmore Resources US LTD., Roca Honda Project, Sections 9 and 10, August 11, 2007.

Wood, B., 2007b. Wildlife Survey Report for Strathmore Resources US LTD., Roca Honda Project, Section 5, September 24, 2007.