

Appendix 15.D

Pinabete Permit Area: Threatened, Endangered, and Sensitive Flora and Fauna



Ecosphere
Environmental Services

Pinabete Permit Area: Threatened, Endangered, and Sensitive Flora and Fauna

**Navajo Mine, San Juan County,
New Mexico**

Prepared for:

**BHP Navajo Coal Company,
Fruitland, New Mexico**

November 2012

Durango, CO
Cortez, CO
Pagosa Springs, CO
Farmington, NM

TABLE OF CONTENTS

1. Introduction	1
2. Permit Area	2
2.1 Location	2
2.2 Physical Description	2
2.3 Vegetation.....	2
2.3.1 Dunes	3
2.3.2 Sands.....	3
2.3.3 Arroyo Shrub.....	3
2.3.4 Alkali Wash	3
2.3.5 Thinbreaks	3
2.3.6 Badlands	4
3. Threatened, Endangered, and Sensitive Species	4
3.1 Threatened, Endangered, and Sensitive Flora.....	7
3.1.1 Federally Listed Species	7
3.1.2 San Juan Milkweed	7
3.2 Threatened, Endangered, and Sensitive Fauna	8
3.2.1 Black-footed Ferret.....	8
3.2.2 Mountain Plover	11
3.2.3 Burrowing Owls	13
3.2.4 Ferruginous Hawk, Golden Eagle & Other Raptors	13
4. References	16

LIST OF TABLES

Table 3-1 Species Listed by the USFWS for San Juan County, New Mexico (Under the Authority of the Endangered Species Act of 1973)	4
Table 3-2 Navajo Nation Species of Concern with Potential to Occur in the Area Encompassed by Permit Area.....	6

APPENDIX A: LIST OF FIGURES

Figure 1. The vicinity of the Pinabete permit area	A-2
Figure 2: The Pinabete permit area	A-3
Figure 3: San Juan milkweed habitat and locations.....	A-4
Figure 4: Size and location of mapped prairie dog towns and survey areas for nocturnal black-footed ferret surveys	A-5
Figure 5: Raptor sightings and nest locations.....	A-6
Figure 6: Potential mountain plover habitat, sightings, and nests	A-7

APPENDIX B: SURVEY FORMS

Survey Form 1: First of three consecutive nocturnal surveys for black-footed ferret	B-2
Survey Form 2: Second of three consecutive nocturnal surveys for black-footed ferret.....	B-3
Survey Form 3: Third of three consecutive nocturnal surveys for black-footed ferret.....	B-4

APPENDIX C: LIST OF PHOTOGRAPHS

Photograph 1: Prairie Dog Colony 1 looking east; unoccupied colony.....	C-2
Photograph 2: Prairie Dog Colony 2-active colony in Area 4 South and 4 North.	C-2
Photograph 3: Active burrowing owl burrow-whitewash, pellets, and feathers, located in Prairie Dog Colony 2.	C-3
Photograph 4: Potential mountain plover habitat in Area 4 South.....	C-3
Photograph 5: Potential mountain plover habitat in Area 4 South.....	C-4
Photograph 6: Active mountain plover nest in Area 5, overview.....	C-4
Photograph 7: Active mountain plover nest in Area 5, zoomed, showing two hatched chicks and two un-hatched eggs.	C-5
Photograph 8: Red-tailed hawk nest with three young located along Pinabete Arroyo within the Pinabete permit area.	C-5

ACRONYMS

BNCC	BHP Navajo Coal Company
Cm	centimeters
CFR	Code of Federal Regulations
ESA	Endangered Species Act
Ecosphere	Ecosphere Environmental Services
GPS	Global Positioning System
TES	Threatened, Endangered, and Sensitive
NEPA	National Environmental Policy Act
NM	New Mexico
NNHP	Navajo Natural Heritage Program
NNDFW	Navajo Nation Department of Fish and Wildlife
NNC	Navajo Nation Code
SMCRA	Surface Mining Control and Reclamation Act
U.S.	United States
USC	United States Code
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service

1. INTRODUCTION

In May 2012, BHP Navajo Coal Company (BNCC) retained Ecosphere Environmental Services (Ecosphere) to conduct threatened endangered, and sensitive (TES) species surveys in the proposed Pinabete permit area. BNCC has proposed the development of a standalone Surface Mining Control and Reclamation Act (SMCRA) (30 CFR 780.16) mine permit to conduct surface coal mining activities within the undeveloped portions of BNCC's Navajo Mine Lease Area 4 North and the unpermitted and undeveloped portions of Navajo Mine Lease Area 4 South, known as the Pinabete Permit area (permit area)

The purpose of the field surveys was to refresh the occurrence data for TES flora and fauna species and their potential habitat information within the permit area. The surveys focused on species listed by the United States Fish and Wildlife Service (USFWS) and the Navajo Natural Heritage Program (NNHP) of the Navajo Nation Department of Fish and Wildlife (NNDFW) as documented or having potential to occur in the permit area. The survey data will be used primarily to support current SMCRA permits and National Environmental Policy Act (NEPA) analysis. The survey data may also be used in preparation of a Biological Assessment for compliance with the Endangered Species Act (ESA), as amended (16 U.S. Code [USC] 1531 et seq.) and a Biological Evaluation for compliance with the Navajo Nation Code (NNC) requirement for species of concern (17 NNC 507).

This report outlines the data collections and methodologies implemented for inventorying the proposed permit area. The methodologies used are consistent with USFWS and NNDFW guidelines and requirements.

2. PERMIT AREA

2.1 Location

Navajo Mine is located on Navajo Nation lands in San Juan County, New Mexico (NM), approximately 20 miles southwest of Farmington, NM (Figure 1, Appendix A). The BNCC mining lease is subdivided into six administrative areas known as Areas 1, 2, 3, 4 North, 4 South, and 5. The proposed permit area would be located immediately south of active Navajo Mine operations (Figure 2, Appendix A).

The permit area is found on the Hogback South, Newcomb NE, Kirtland SW and The Pillar NW, New Mexico 7.5-minute U.S. Geological Survey (USGS) quadrangles. The permit area comprises approximately 5,569 acres in BNCC lease Area 4 North and 4 South and is located within:

Sections 6, 7, 18, and 19
Township 26 North, Range 15 West
Sections 1, 9, 10, 11, 12, 13, 14, 15, 16, 22, 23, 24, 25, and 26
Township 26 North, Range 16 West
New Mexico Principal Meridian

2.2 Physical Description

The permit area is located on the western extremities of the San Juan Basin within the Colorado Plateau province. Much of the proposed permit area exhibits minimal relief. Erosional features such as badlands, short ridges, and tablelands are predominant near ephemeral drainages in the northeast corner and the along the western boundary of the proposed permit area. Elevation ranges from approximately 5,320 to 5,460 feet above sea level. The area slopes west toward the Chaco River, an intermittent drainage. The main Chaco River channel is located between 5,000 and 16,000 feet from the permit area. Three unnamed tributaries of Cottonwood Arroyo flow through the northeast portion of the permit area, while Pinabete Arroyo flows through the southwest portion. Two seasonal ponds are located within the permit area and there are no perennial water sources in the area. The San Juan River is located approximately 16 miles north of the permit area.

2.3 Vegetation

The permit area is comprised of Great Basin desert-scrub habitat (Dick-Peddie 1993). The great Basin desert-scrub habitat is a cold desert ecosystem dominated by a variety of shrubs with a sparse understory of forbs and grasses, with bare ground dominating in poor, alkaline soils (Fitzgerald et al. 1994, Dick-Peddie 1993). Six vegetation community types occur in the permit area. Each vegetation community type contains a few distinguishing or unique plant species. The following brief descriptions list some of those distinguishing or unique plant species that typically define the vegetation community.

2.3.1 Dunes

The deep sands found in dune communities allow for more consistent water availability. Since only deep-rooted perennial plants can exploit this deep water, the dunes have several unique plant species including San Juan milkweed (*Asclepias sanjuanensis*), as well as canaigre dock (*Rumex hymenosepalus*) and sand sagebrush (*Artemisia filifolia*). Other common species include cryptantha (*Cryptantha crassisejala*), tansy mustard (*Descurania pinnata*), twinpod (*Dimorphocarpa wislizeni*), globemallow (*Sphaeralcea parvifolia*), Indian ricegrass (*Achnatherum hymenoides*), galleta grass (*Pleuraphis jamesii*), and evening primrose (*Oenothera pallida*).

2.3.2 Sands

As with dunes, the deeper penetration of rainwater into sandy soil allows for greater water availability and increases plant species diversity. The types of sand in this vegetation community can vary from saline to calcareous. The sands community often transitions to and can be mixed with the thinbreaks community. In years with high amounts of spring rainfall, sandy soils display an abundance of annuals, especially of scorpion weed (*Phacelia crenulata*), annual Townsend daisy (*Townsendia annua*), and cryptantha. Other common species include Russian thistle (*Salsola tragus*), pincushion (*Chaenactis stevioides*), galleta grass, and wire lettuce (*Stephanomeria exigua*).

2.3.3 Arroyo Shrub

Arroyo shrub communities are commonly found in major drainages and washes, such as Pinabete Arroyo. Shrubs and perennials characteristic of this community include greasewood (*Sarcobatus vermiculatus*), Russian thistle, tansy mustard, alkali sacaton (*Sporobolus airoides*), four-winged saltbush (*Atriplex canescens*), cryptantha, and snakeweed (*Gutierrezia sarothrae*).

2.3.4 Alkali Wash

Alkali wash is a vegetation community associated with minor waterways. These areas are typically broad and level with occasional small, dense patches of galleta grass and alkali sacaton. Alkali wash vegetation communities are typically located in washes and drainages, as well as at the base of badlands. The terrain is nearly level to moderately sloping, ranging from 0 to 3 percent. Other plants that are locally common in alkali wash include tansy mustard, Russian thistle, scorpion weed, mound saltbush (*Atriplex obovata*), alkali sacaton, galleta grass, woolly plantain (*Plantago patagonica*), and annual Townsend daisy.

2.3.5 Thinbreaks

Thinbreaks is characteristic of rocky areas with loose rock and occasionally with large pieces of rock, usually shale, that are firmly embedded in the ground. Thinbreaks are typically upland vegetation communities with surface rock as a unifying feature. Flat, surface rocks allow for greater water to run off and accumulate in crevices or fissures between rocks. Thinbreaks plant species that occur in these fissures include Russian thistle, tansy mustard, cryptantha, shadscale saltbush (*Atriplex confertifolia*), alkali sacaton, stickseed (*Lappula occidentalis*), dwarf gilia (*Ipomopsis pumila*), and scorpion weed.

2.3.6 Badlands

Badlands have the least vegetation of any vegetation community in the permit area. Among the more common plants along the small relief channels of these barren areas are Powell's saltbush (*Atriplex powelli* var. *powelli*), mound saltbush, annual Townsend daisy, stickseed, woolly plantain, salty buckwheat (*Stenogonum salsuginosum*), Gordon's buckwheat (*Eriogonum gordonii*), scorpion weed, and globemallow.

3. THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Prior to conducting fieldwork, Ecosphere biologists compiled a list of TES species listed by the USFWS and NNHP. According to the USFWS, there are 11 federally listed threatened, endangered, and candidate species with potential to occur in San Juan County. Table 3-1 lists these species, as well as their status, habitat associations, and potential to occur in the permit area.

The species listed by the Navajo Nation are quadrangle map-specific rather than project site-specific. The NNHP currently lists 11 species of concern with potential to occur on the USGS 7.5-minute topographic maps that encompass the permit area.

Table 3-2 lists these species, as well as their conservation status, habitat associations, and potential to occur in the permit area.

**Table 3-1 Species Listed by the USFWS for San Juan County, New Mexico
(Under the Authority of the Endangered Species Act of 1973)**

SPECIES	STATUS	HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR IN THE PERMIT AREA
MAMMALS			
Black-footed ferret (<i>Mustela nigripes</i>)	Endangered	Open grasslands with year-round prairie dog (<i>Cynomys gunnisoni</i>) colonies greater than 198 acres in size and greater than 20 burrows per 2.5 acres.	There are prairie dog (<i>Cynomys gunnisoni</i>) towns of marginally sufficient size to support black-footed ferret in the permit area.
Canada lynx (<i>Lynx Canadensis</i>)	Candidate	Generally occurs in boreal and montane forests dominated by coniferous or mixed forest with thick undergrowth.	No boreal or montane forests occur within the permit area.
BIRDS			
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	Threatened with Critical Habitat	Nests in caves, cliffs, or trees in steep-walled canyons of mixed conifer forests.	No suitable habitat in the permit area due to lack of mixed conifer forests and forested canyons.
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	Endangered with Critical habitat	Breeds in dense, shrubby riparian habitats, usually in close proximity to surface water or saturated soil.	Suitable, but sparse migratory stopover habitat occurs in widely scattered patches of tamarisk (<i>Tamarix</i> sp.) in Pinabete and Cottonwood arroyos and at a small stock pond in the southern portion of the permit area.
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Candidate	Breeds in riparian woodlands with dense, understory vegetation.	No suitable habitat within the permit area due to lack of riparian woodland habitats and perennial water resources.
FISH			
Colorado pikeminnow (<i>Ptychocheilus lucius</i>)	Endangered with Critical Habitat	Large rivers with strong currents, deep pools, and quiet backwaters.	No suitable habitat within the permit area due to lack of perennial waters.
Razorback sucker (<i>Xyrauchen texanus</i>)	Endangered with Critical Habitat	Medium to large rivers with silty to rocky substrates. Prefers strong currents and deep pools.	No suitable habitat within the permit area due to lack of perennial waters.

SPECIES	STATUS	HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR IN THE PERMIT AREA
Roundtail chub (<i>Gila robusta</i>)	Candidate	Large rivers. Present in low numbers in the San Juan, Mancos, La Plata, and Animas rivers in Colorado and New Mexico.	No suitable habitat within the permit area due to lack of perennial waters.
PLANTS			
Knowlton's cactus (<i>Pediocactus knowltonii</i>)	Endangered	Alluvial deposits that form rolling, gravelly hills in piñon-juniper and sagebrush communities (6,200-6,400 feet).	No rolling, gravelly alluvial deposits vegetated with piñon-juniper woodland in the permit area.
Mancos milkvetch (<i>Astragalus humillimus</i>)	Endangered	Cracks of Point Lookout Sandstone of the Mesa Verde series (5,000-6,000 feet).	Point Lookout Sandstone does not occur in the permit area. The nearest protrusion of this formation is 6 to 7 miles west of the permit area, along the Hogback Monocline.
Mesa Verde cactus (<i>Sclerocactus mesae-verdae</i>)	Threatened	Highly alkaline soils in sparse shale or adobe clay badlands of the Mancos and Fruitland formations (4,000-5,550 feet).	The majority of soil substrates in the permit area are sands or alkali wash. Badlands in the permit area are capped with sandstone or red cinders and do not provide suitable habitat.

Source: USFWS 2012

Table 3-2 Navajo Nation Species of Concern with Potential to Occur in the Area Encompassed by Permit Area

SPECIES	NNHP STATUS ^a	HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR IN THE PERMIT AREA
MAMMALS			
Black-footed ferret (<i>Mustela nigripes</i>)	Group 2	Open grasslands with year-round prairie dog (<i>Cynomys gunnisoni</i>) colonies greater than 198 acres in size and greater than 20 burrows per 2.5 acres.	There are prairie dog colonies of sufficient size to support black-footed ferret in the permit area.
Kit fox (<i>Vulpes macrotis</i>)	Group 4	Desert scrub or desert grassland with soft, alluvial or silty-clay soils with sparse vegetation cover.	Documented in the permit area.
BIRDS			
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	Group 2	Breeds in dense, shrubby riparian habitats, usually in close proximity to surface water or saturated soil.	Suitable, but sparse migratory stopover habitat occurs in widely scattered patches of tamarisk (<i>Tamarix sp.</i>) in Pinabete and Cottonwood arroyos and at a small stock pond in the southern portion of the permit area.
Ferruginous hawk (<i>Buteo regalis</i>)	Group 3	Nests in badlands, flat or rolling grasslands, and desert scrub.	Potential habitat for this species occurs within the permit area; the most recent successful nesting occurred east of the 1-mile buffer in 2011. Successful nesting was documented in Area 1 in 2012.
Golden eagle (<i>Aquila chrysaetos</i>)	Group 3	Open habitats in mountainous, canyon terrain. Nests primarily on steep cliffs and occasionally in large trees.	Potential habitat for this species occurs within the permit area. Most recent successful nesting occurred about 1 mile west of the 1-mile buffer in Area 4 South in 2012.
American peregrine falcon (<i>Falco peregrinus anatum</i>)	Group 4	Cliffs that generally exceed 200 feet in height near permanent surface water.	The permit area lacks high cliffs suitable for nesting/perching for this species.
Mountain plover (<i>Charadrius montanus</i>)	Group 4	Breeds in short sparse vegetation in disturbed prairies or semi-deserts with less than a two-degree slope.	Potential habitat for this species occurs within the permit area; breeding documented in the BNCC lease area (Area 5) in 2012.

SPECIES	NNHP STATUS ^a	HABITAT ASSOCIATIONS	POTENTIAL TO OCCUR IN THE PERMIT AREA
Western burrowing owl (<i>Athene cunicularia hypugea</i>)	Group 4	Nests in ground burrows (often deserted prairie dog (<i>Cynomys gunnisoni</i>) burrows) in dry open grasslands or desert scrub.	Potential habitat for this species occurs within the permit area. Burrows documented in the permit area.
PLANTS			
Mancos milkvetch (<i>Astragalus humillimus</i>)	Group 2	Cracks of Point Lookout Sandstone of the Mesa Verde series (5,000-6,000 feet).	Point Lookout Sandstone does not occur in the permit area. The nearest protrusion of this formation is 6 to 7 miles west of the permit area, along the Hogback Monocline.
Mesa Verde cactus (<i>Sclerocactus mesae-verdae</i>)	Group 4	Highly alkaline soils in sparse shale or adobe clay badlands of the Mancos and Fruitland formations (4,000-5,550 feet)	Potential habitat for this species occurs within the permit area. The majority of soil substrates in the permit area are sands or alkali wash. Badlands in the area are capped with sandstone or red cinders and do not provide suitable habitat.
San Juan milkweed (<i>Asclepias sanjuanensis</i>)	Group 4	Sandy loam soils in juniper savanna and Great Basin desert scrub at 5,000-5,500 feet.	Seven widely scattered populations of San Juan milkweed were documented in the permit area during 2012 surveys

Source: NESL 2008; Navajo Nation Endangered Species List: Group 2—species whose prospects of survival or recruitment are in jeopardy; Group 3—species whose prospects of survival or recruitment are likely to be in jeopardy in the foreseeable future; Group 4—species for which the NNDFW does not currently have sufficient information to support the species listed in Group 2 or Group 3. The NNDFW will actively seek information on these species to determine if they warrant inclusion in a different group or removal from the list. Group 4 species are candidates for listing and have no legal protection under section 507.

3.1 Threatened, Endangered, and Sensitive Flora

3.1.1 Federally Listed Species

The permit area does not contain potential habitat for any of the three, federally listed threatened or endangered flora species with the potential to occur in San Juan County (Table 3-1).

3.1.2 San Juan Milkweed

San Juan milkweed is listed as a Group 4 species by the Navajo Nation (Table 2-2). There are no federal, state, or Navajo Nation protections for this species. The Navajo Nation does not currently have sufficient information to support listing this species as threatened or endangered on the Navajo Endangered Species List.

The stems of this perennial milkweed grow from a woody taproot and are 4 to 8 centimeters (cm) tall. Stems are typically prostrate with leaves 2 to 4 cm long. Diagnostic characteristics are the white, hairy leaf margins and a terminal inflorescence with reddish-violet flowers. The San Juan milkweed flowers in

April and has mature fruits in mid- to late May. The characteristic habitat for this plant is sandy soil; however, sometimes this milkweed occurs in piñon (*Pinus* sp.) - juniper (*Juniperus* sp.) woodlands.

3.1.2.1 Methods

TES flora survey methods began with examination of the potential for species to occur in the permit area based on known habitat associations and agency consultation. Potential habitat in the permit area was evaluated and delineated using a combination of vegetation community types and soil survey map unit descriptions. All habitats were verified and observed using high-powered binoculars and a spotting scope. Field surveys were conducted between June 20 and July 2, 2012. Unique habitat or potential habitat was surveyed for TES flora presence/absence using teams consisting of two qualified botanists walking parallel transects about 20 feet apart. When TES flora species were found, their locations were digitally recorded with a handheld global positioning system (GPS) unit.

3.1.2.2 Results

None of the three, federally listed threatened or endangered flora species with the potential to occur in San Juan County was observed during surveys of the permit area.

Seven widely scattered populations of San Juan milkweed were documented in the permit area during the 2012 surveys (Figure 3, Appendix A). Generally, populations contained two to five individuals, with the largest population containing seven individuals. In the permit area, this species occurs in the sands vegetation community. Dunes in the permit area may also provide potential habitat, although the species was not recorded as occurring within this community type. There are approximately 1,515 acres of potential habitat for San Juan milkweed within the permit area based on the acres of sands and dunes vegetation communities (Figure 3, Appendix A).

3.2 Threatened, Endangered, and Sensitive Fauna

3.2.1 Black-footed Ferret

The USFWS (USFWS 1989) developed revised guidelines for the black-footed ferret (*Mustela nigripes*) surveys that established the minimum acres of prairie dog habitat needed to support black-footed ferrets. Consequently, the first task to determine if black-footed ferret surveys were warranted was to map the size of historical prairie dog towns and any new towns in the permit area. Towns were recently mapped in Areas 4 South and 5 in 2007 (Ecosphere 2008) and identified in Area 4 North in 2004 and 2012 (Ecosphere 2004; Ecosphere 2012).

3.2.1.1 Methods

Mapping prairie dog towns

The USFWS 1989 guidelines were established for black-tailed prairie dogs (*Cynomys ludovicianus*) and white-tailed prairie dogs (*Cynomys leucurus*) only and determined for the latter that prairie dog towns or complexes greater than 200 acres but less than 1,000 acres would be cleared by USFWS after completion of a survey for black-footed ferrets, provided that no ferrets or their sign are found. Based

on previous survey experience, Ecosphere followed the guidelines established for white-tailed prairie dogs, the species most similar to and of the same family as the Gunnison's prairie dog, as well as survey guidelines developed by NNHP. Prairie dog towns greater than 120 acres require protocol surveys per Navajo Nation requirements. However, prairie dog towns within 7-kilometers can also qualify if the complex added together totals more than 250 acres per the Navajo Nation or 200 acres per the USFWS. Ecosphere defaulted to the minimum requirements for black-footed ferret surveys.

Prairie dog towns were mapped using a systematic approach by identifying functional prairie dog burrows. Functional burrows are structurally suitable to house prairie dogs (entirely open; only partially filled with dirt; or open but blocked by sticks, weeds, cobwebs, or other debris) and are either occupied or unoccupied. Both occupied and unoccupied burrows were included, as prairie dog towns can shift depending on resource availability and old towns can be recolonized over time. Non-functional burrows—burrows with an opening less than 3 inches or those filled in with dirt—were not recorded. The current occupation (occupied or unoccupied) of each town mapped was documented based on visual observations (prairie dogs seen or heard or recent prairie dog activity such as fresh digging, scat, or tracks).

Previously mapped prairie dog towns were located using a sub-meter GPS unit. One team of two to three biologists walked within and along the perimeter of each prairie dog town visited. Each biologist walked approximately 100 to 200 feet apart and using radios to maintain communication. One biologist marked burrows using a handheld GPS unit while walking along the established perimeter of the prairie dog town. If a burrow was observed by a biologist outside the established perimeter, the whole crew shifted in that direction to maintain the structure of the line and delineate the perimeter. If burrows were not observed within 750 feet from the last known burrow, the crew returned to that spot to find burrows and established the perimeter until the entire prairie dog town was mapped. Burrows observed over 750 feet from the prairie dog town were considered a different town. Binoculars were used to assist with the identification of burrows. Notes were taken to document the current occupation (occupied or unoccupied) of the prairie dog towns. The burrows located on the perimeter of the prairie dog town were used to define the boundary of the habitat polygons using ArcView.

Historic colonies were considered unoccupied if they met one of the following criteria:

- The majority (>75 percent) of burrows were completely filled in with dirt.
- The majority (>75 percent) of burrows were observed as functional, but with no evident prairie dog activity from 2012.

As biologists observed incidental burrows while driving to historic colonies, the biologists would determine if they were functional. If the burrows were filled in, biologists would not pursue mapping the edge of the colony and would move to the next colony. If the colonies contained functional burrows, pedestrian surveys were conducted to establish the edge of the colony. Burrows that were used by other species (kangaroo rats, coyotes, or rabbit species) were marked with GPS when it was clear what

species was using the burrow. Wildlife sign (including fresh scat or footprints) was documented if it would help determine the occupant of the burrow(s).

Nocturnal spotlighting surveys

Nocturnal surveys were developed following USFWS and NNDFW protocols (USFWS 1989, NNDFW 1985). Nocturnal surveys were conducted rather than diurnal surveys because the former method is designed to observe black-footed ferrets when their population is greatest (1 July - 31 October) and activity levels are highest, resulting in better detection of any possible remnant black-footed ferret population occurring in the permit area.

Prior to conducting field work, the total acres of all prairie dog towns was calculated and divided by 320 acres to determine the number of survey tracts (UWFWS 1989). Each survey track was inspected by a field crew of two biologists in a 4-wheel drive vehicle. Each crew was equipped with two-million candle power spotlights, high-powered binoculars, hand held GPS unit, and digital camera. The mapped prairie dog towns were spotlighted, weather permitting, continuously from dusk until dawn until a minimum of two passes was made over each town for three consecutive nights (September 24, 25, and 26, 2012); the surveys were conducted at a different prairie-dog town on each of the three nights.

3.2.1.2 Results

Mapping prairie dog towns

Ecosphere documented seven prairie dog towns totaling 1,064 acres (ranging in size from 53 to 422 acres) all within a 6.5-mile range from Area 4 North to Area 5 (Figure 4, Appendix A). Two prairie dog towns (town 2 and portions of town 3) had a few prairie dogs present and sign of fresh activity (digging and scat). The other three prairie dog towns (towns 1, 4, and 10) had functional burrows present, but were unoccupied (i.e., no signs of recent activity was observed). Although town 1 (located in Area 4 North) contained functional burrows, most burrows appeared inactive for several years previous since they were predominantly filled with litter and debris. (Figure 4, Appendix A).

The following summarizes the status of each prairie dog town mapped in 2012 (Appendix A, Figure 4):

- Occupied Prairie dog colonies: sign of recent activity and individuals present
 - Town 2 and portions of Town 3
- Unoccupied Prairie dog colonies: no burrows observed
 - Towns 8, 9, and 11
- Unoccupied Prairie dog colonies: >75% of burrows are filled-in with dirt (non-functional burrows)
 - Colony 5, 6, 7,10
- Unoccupied Prairie dog colonies: >75% of burrows are functional, but no sign of recent activity
 - Colony 1 and 4, portions of Colony 3

Multiple prairie dogs were observed near the Navajo Agricultural Products Industry fields located north of the Navajo Mine Lease, suggesting that prairie dog activity is presently higher close to irrigated fields. Although anecdotally we did not observe a lot of prairie dog activity in the towns that were mapped relative to other towns nearby, the size of the prairie dog towns warranted protocol surveys for black-footed ferrets.

Nocturnal spotlighting surveys

Ecosphere established one survey tract to conduct nocturnal surveys for black-footed ferrets. Although the total acres of prairie dog towns were over 1,064 acres, the lack of occupation at most of the towns did not justify more survey tracks. Further, because the towns were in proximity to each other, two or three complete surveys at all of the mapped towns in 2012 (Appendix A, Figure 4) were completed on each survey. Ecosphere logged 93.5 total biologist hours on three consecutive survey nights (Appendix B).

The results of the nocturnal spotlighting surveys conducted for black-footed ferrets in September 2012 were negative; i.e., no black-footed ferrets or their sign were detected (Appendix B). Ecosphere made three incidental raptor sightings during nocturnal spotlighting surveys including a ferruginous hawk (*Buteo regalis*), great-horned owl (*Bubo virginianus*), and burrowing owl (*Athene cunicularia*) (Figure 5, Appendix A). Other wildlife observed included a kit fox (*Vulpes macrotis*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audobonii*), unidentified mice, and kangaroo rat (*Dipodomys* sp.).

3.2.2 Mountain Plover

3.2.2.1 Methods

In May and June 2012, Mountain plover surveys were conducted in suitable habitat in the Pinabete Permit area and a 1-mile buffer. The survey area included Area 4 North and a portion of Area 4 South. Mountain plover suitable nesting habitat is characterized by short-vegetation (less than four inches tall), a bare ground component of at least 30 percent, on flat or gently sloping landscapes (usually less than 5 percent slopes), and sometimes associated with prairie dog towns (Dinsmore 2003). To identify suitable habitat, past mountain plover sightings on Navajo Mine were mapped using the aforementioned criteria. Additionally, the vegetation characteristics where mountain plover were historically sighted were reviewed. Subsequently, suitable habitat was identified using GIS and included sands and thinbreaks vegetation communities with a slope less than 5 percent (Dinsmore 2003). Additionally, historic prairie dog towns and previous mountain plover sightings were surveyed (Figure 4, Appendix A).

Three mountain plover surveys were conducted following methodology recommended by the USFWS (USFWS 2002). The USFWS guidelines recommend three surveys between May 1 and June 15. The surveys were conducted on May 31 and June 13 and 20, 2012. The first and second surveys were spaced 14 days apart, while the last survey was spaced seven days apart to target the best detection period. Surveys were conducted between local sunrise and 11:00 am. Biologists utilized existing roads, stopping at 0.2- to 0.3-mile intervals to scan the landscape for mountain plovers for three minutes with high-

powered binoculars. The biologists would exit and stand next to the vehicle while scanning the landscape to avoid alerting birds to human presence. During each survey stop, a recording of a mountain plover whistle call, display call, and anxiety call was played in multiple directions, followed by additional scanning and listening. Pedestrian surveys are not generally recommended because plovers usually flush at greater distances when approached on foot; therefore, surveys were conducted along roads and suitable habitat observable from roads. Driving routes and mountain plover stops were recorded using a handheld GPS unit.

3.2.2.2 Results

Ecosphere mapped approximately 1,621 acres of potential habitat for mountain plover within the permit area based on the amount of sands and thinbreaks vegetation communities with a slope less than five percent (Figure 6, Appendix A). Surveys were conducted along 14 miles of roads scanning all suitable habitat. No mountain plovers or nests were identified in the permit area or the 1-mile survey buffer in 2012. Two mountain plover adults and one active nest containing two recently hatched chicks and two un-hatched eggs were observed in Area 5 on May 31, 2012 (Photographs 6 and 7, Appendix C). The nest was encountered while walking towards historic mountain plover sightings, but located outside the Pinabete permit area three miles south. When this site was revisited during the second and third surveys, no mountain plovers were detected; only small egg shell fragments remained in the nest scrape.

During colony mapping surveys on August 31, 2012, a possible mountain plover call was heard in prairie dog colony 2. No individual mountain plovers were visualized and no mountain plover surveys were conducted in the colony in 2012 since it is located outside the permit area and 1-mile buffer.

Suitable breeding habitat for mountain plovers improves while traveling south, through the mine Lease and is best in Area 4 South and Area 5, outside of the permit area. Past mountain plover sightings were concentrated in Area 4 South and 5. Pedestrian surveys are not effective for detecting plovers; therefore, only areas observable from roads were surveyed in 2012. Plovers are rarely detected at their initial locations because the birds actively avoid detection by humans (Dreitz 2006). Plovers do not avoid vehicles, but vehicles cannot be driven off-road on the mine Lease. Thus, sampling was confined to roads and surrounding habitats.

Mountain plovers are considered a low-density bird species; that is, they occur in low-densities across expansive landscapes, making detectability variable (Dreitz 2006). Detection probability for mountain plovers increases when multiple visits are conducted, but plovers are not always detectable; therefore, false negative survey results are common without an extensive survey effort extended multiple times during the breeding season and for multiple consecutive seasons.

The active mountain plover nest was the first positive confirmation of plover breeding on the mine lease. The discovery of the mountain plover nest, especially while birds were hatching, was remarkable because mountain plovers are difficult to detect and nests are rarely found — chicks typically leave the nest within three hours of the last egg hatching (Knopf 2006).

3.2.3 Burrowing Owls

3.2.3.1 Methods

Occupied burrowing owl burrows were recorded during prairie dog mapping efforts at the end of August and early September, 2012. All burrows encountered were checked for fresh burrowing owl sign including feathers, whitewash, or regurgitated pellets containing hair, bone, or insect parts. Burrowing owls often aggregate their burrows in clusters spaced 340 to 410 feet apart. Burrowing owl families often switch burrows every 10 to 15 days when the young are three to four weeks old and remain as a loose-knit group until early fall when the young may begin to disperse to nearby burrows. Burrowing owls may use “satellite” or non-nesting burrows, moving chicks at 10 to 15 days presumably to reduce risk of predation and possibly avoiding nest parasites (Klute et. al 2003). Therefore, burrows greater than 400 feet apart were considered separate nest groups.

Biologists documented burrowing owl individuals or sign encountered during the plant, habitat mapping and the mountain plover surveys conducted at the mine property in 2012. Mountain plover surveys entailed stopping every several hundred feet in potential habitat and scanning the area with binoculars and a spotting scope for birds. Thus, areas surveyed for mountain plover were also scanned for burrowing owls.

3.2.3.2 Results

Ecosphere conducted raptor surveys in the spring, when migratory burrowing owls had not yet arrived on their breeding grounds. Subsequently, burrowing owl activity was documented during prairie dog town mapping surveys in August and September 2012 and mountain plover surveys in May and June 2012 (Figure 5, Appendix A). Evidence of burrowing owl activity was documented in prairie dog town 2 and 3 (based on an inter-group distance of 400 feet), town 2 contained two separate burrowing owl groups, and town 3 contained three separate groups — for a total of five burrowing owl locations in Areas 4 South and 5.

3.2.4 Ferruginous Hawk, Golden Eagle & Other Raptors

3.2.4.1 Methods

On April 20, 2012, Ecosphere conducted an aerial survey of historic raptor nests and of ferruginous hawk (*Buteo regalis*) territories over the entire BNCC mine lease and a 1-mile boundary. The aerial survey also searched for new raptor nests. Ecosphere biologists surveyed the majority of suitable potential raptor habitat in one day (i.e., badlands, mesa tops, and rim edges). Historically, biologists have focused efforts on ferruginous hawks because they are listed on the Navajo Nation Endangered Species List as a Group 3 species, which is a species or subspecies likely to become endangered within the foreseeable future throughout all or a significant portion of its range on the Navajo Nation.

Follow-up pedestrian surveys were conducted to active nests identified during the aerial survey in late May to June 2012. Ecosphere biologists used high-powered binoculars, spotting scopes, and hand-held GPS units to locate and record raptor nest locations and determine the status of the nests. To avoid

disturbing the adults and young, Ecosphere biologists used existing two-track roads to access known nest locations and walked to vantage points at a distance (≥ 250 meters) from the nests. Ecosphere used a spotting scope to survey the nests from a distance and photographed each nest when possible.

In general, biologists considered raptor nests active if one or more of the following scenarios were observed:

- Egg(s) in nest
- Young in nest
- Adult in the incubating posture on the nest

In some instances, Ecosphere could not confirm active breeding status of a raptor nest, but considered the site to be an occupied territory. Ecosphere considered a location an occupied territory if adults were in or near the nest, exhibiting territorial behavior, or seen on more than one occasion in the same area during the breeding season. For raptor nests determined to be active during the aerial flight, Ecosphere attempted to follow up with additional surveys to document nestling presence and fledging success.

In general, Ecosphere followed survey methods outlined in Fuller and Mosher (1987) to avoid disturbing sensitive nesting raptors, including:

- Making observations from a distance using binoculars and spotting scopes
- Approaching nests indirectly to avoid direct disturbance
- Limiting the time spent near active nests
- Determining inactivity before approaching a nest to get a GPS location
- Avoiding visiting nests in inclement weather

3.2.4.2 Results

Ecosphere observed two active raptor nests within the Pinabete permit area during the aerial survey — one belonging to a golden eagle (*Aquila chrysaetos*) and the other to a red-tailed hawk (*Buteo jamaicensis*). An adult golden eagle was seen incubating on a west-facing cliff during the aerial survey and at least one nestling was visible in the nest. Ecosphere did not conduct a follow-up ground survey to this nest because it is more than one mile southwest of Area 4 North. Ecosphere also determined it was likely difficult to observe the contents of the nest from the ground and dangerous to observe from the cliff edge.

The red-tailed hawk nest was re-visited twice. The nest contained three white downy nestlings on May 31 and the chicks were darker in color and branching by the second visit on June 13.

During the aerial surveys, a pair of American kestrel (*Falco sparverius*) flushed in Area 4 North. Flushing a pair of raptors in nesting habitat is a good indicator of an active territory. However, no nest was located for this species. Kestrels nest in cavities in trees or rock/cliff faces and, due to their small size

and lack of obvious stick nests, it is often difficult to locate the actual nest. Further, this possible nest was located outside the permit area.

Three, historic ferruginous hawk territories occur in proximity to the Pinabete permit area—Territories 13, 15, and 16. The nests in Territory 13 are either old, flat, or fallen; Territory 15 was active in 2011; and Territory 16 has not been active since 1999 (Ecosphere 2009; Figure 5, Appendix A,). During the aerial survey or the other grounds surveys, no active nest was observed in any of these territories or in any other area within the one-mile buffer of the permit area.

4. REFERENCES

- Dick-Peddie, W. A. 1993. *New Mexico Vegetation: Past, Present, and Future*. University of New Mexico Press, Albuquerque, New Mexico.
- Dinsmore, S.J. 2003. Mountain Plover (*Charadrius montanus*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/mountainplover.pdf> [Accessed October 9 2012].
- Dreitz, V.J., P. M. Lukacs, F. L. Knopf. 2006. Monitoring Low Density Avian Populations: An Example using Mountain Plovers. *The Condor*, Vol. 108, No. 3, pp. 700-706. <http://www.jstor.org/stable/4151089> Accessed: October 2012.
- Ecosphere Environmental Services (Ecosphere). 2004. Wildlife Baseline Report Area IVN. Prepared for BHP-Billiton Navajo Coal Company. Farmington, New Mexico. Unpublished document.
- _____. 2008. 2008 Black-footed Ferret Nocturnal Surveys. Prepared for BHP Navajo Coal Company Navajo Mine Extension Project. Fruitland, New Mexico. Unpublished document.
- _____. 2009. 2009-2010 Raptor Data Consolidation Project Draft Report BHP Navajo Coal Company Navajo Mine, San Juan County, New Mexico
- Fuller, M. R., and J. A. Mosher. 1987. Raptor survey techniques. Pages 37–66 in B. A. Giron Pendleton, B. A. Millsap, K. W. Cline, and D. M. Bird, editors. *Raptor management techniques manual*. Scientific and Technical Series No. 10. Institute for Wildlife Research, National Wildlife Federation, Washington, D.C
- Fitzgerald, J.P., C.A. Meaney, and D.M. Armstrong. 1994. *Mammals of Colorado*. Denver Museum of Natural History and University Press of Colorado.
- Hoogland, J.L. 2006. *Conservation of the Black-tailed Prairie Dog: Saving North America's Western Grasslands*. Island Press, Washington, D.C.
- Klute, D. S., L. W. Ayers, M. T. Green, W. H. Howe, S. L. Jones, J. A. Shaffer, S. R. Sheffield, and T. S. Zimmerman. 2003. *Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States*. U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C.
- Knopf, Fritz L. and M. B. Wunder. 2006. Mountain Plover (*Charadrius montanus*), *The Birds of North America Online* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/211>
- U.S. Fish and Wildlife Service (USFWS). 1989. *Black-footed ferret survey guidelines for compliance with the Endangered Species Act*. Denver.

USFWS. 2002. Mountain Plover Survey Guidelines, USFWS March 2002. Developed by USFWS and Fritz Knopf, USGS.

U.S. Fish and Wildlife Service (USFWS). 2012. Endangered species lists. U.S. Fish and Wildlife Service, Southwest Region Ecological Services. Available at <http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ListSpecies.cfm>.

Appendix A. Figures

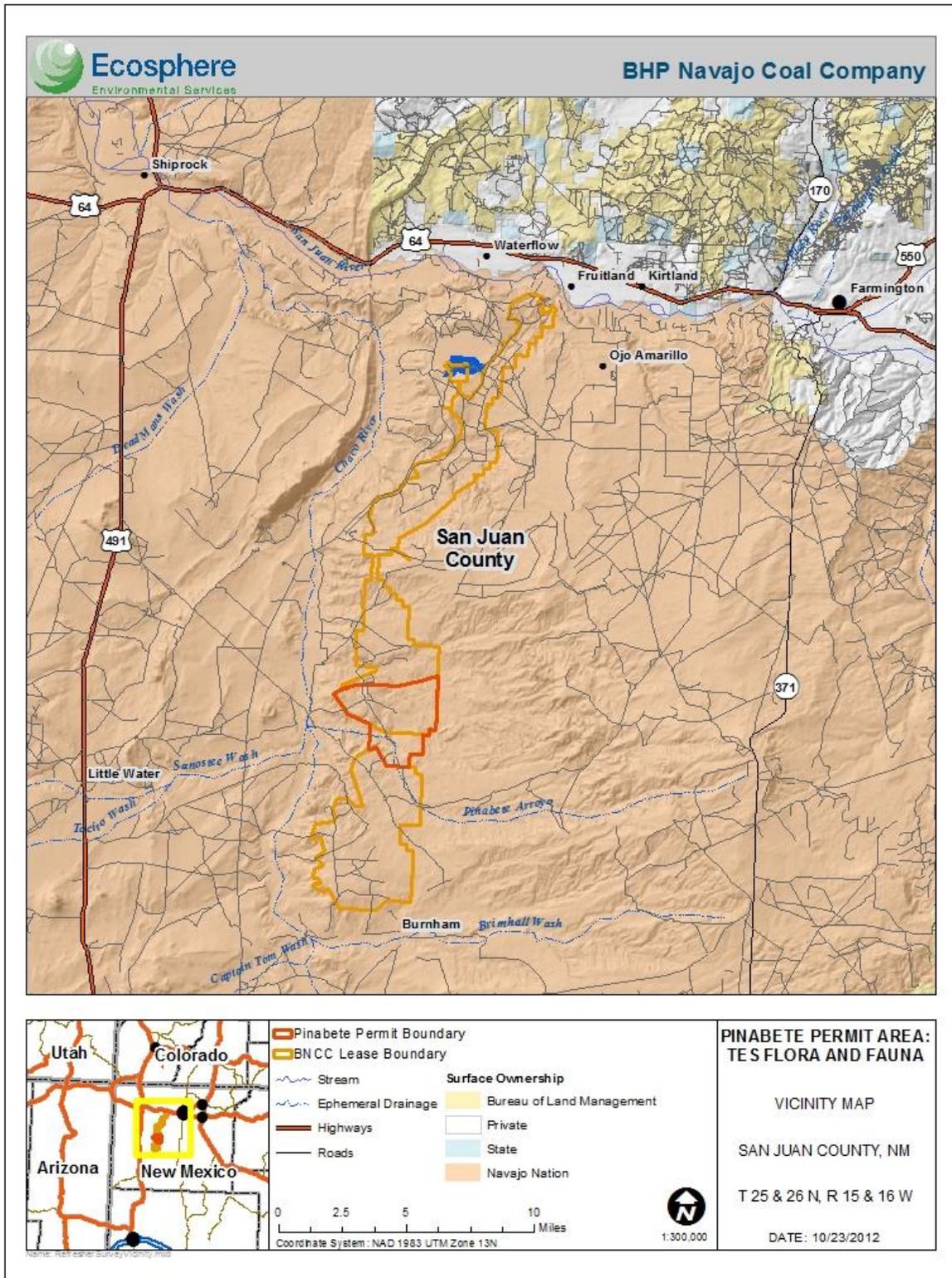


Figure 1. The vicinity of the Pinabete permit area

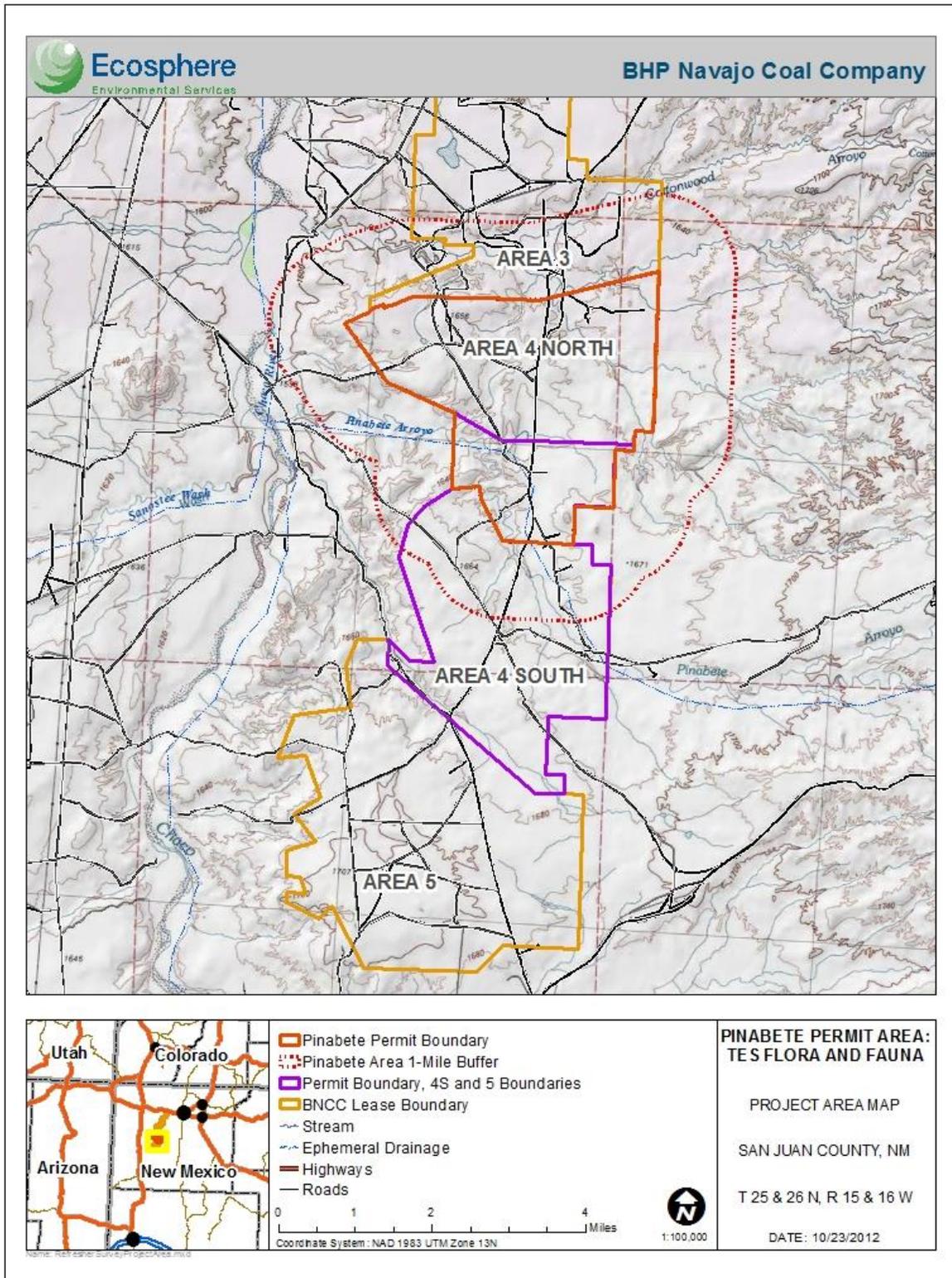


Figure 2: The Pinabete permit area

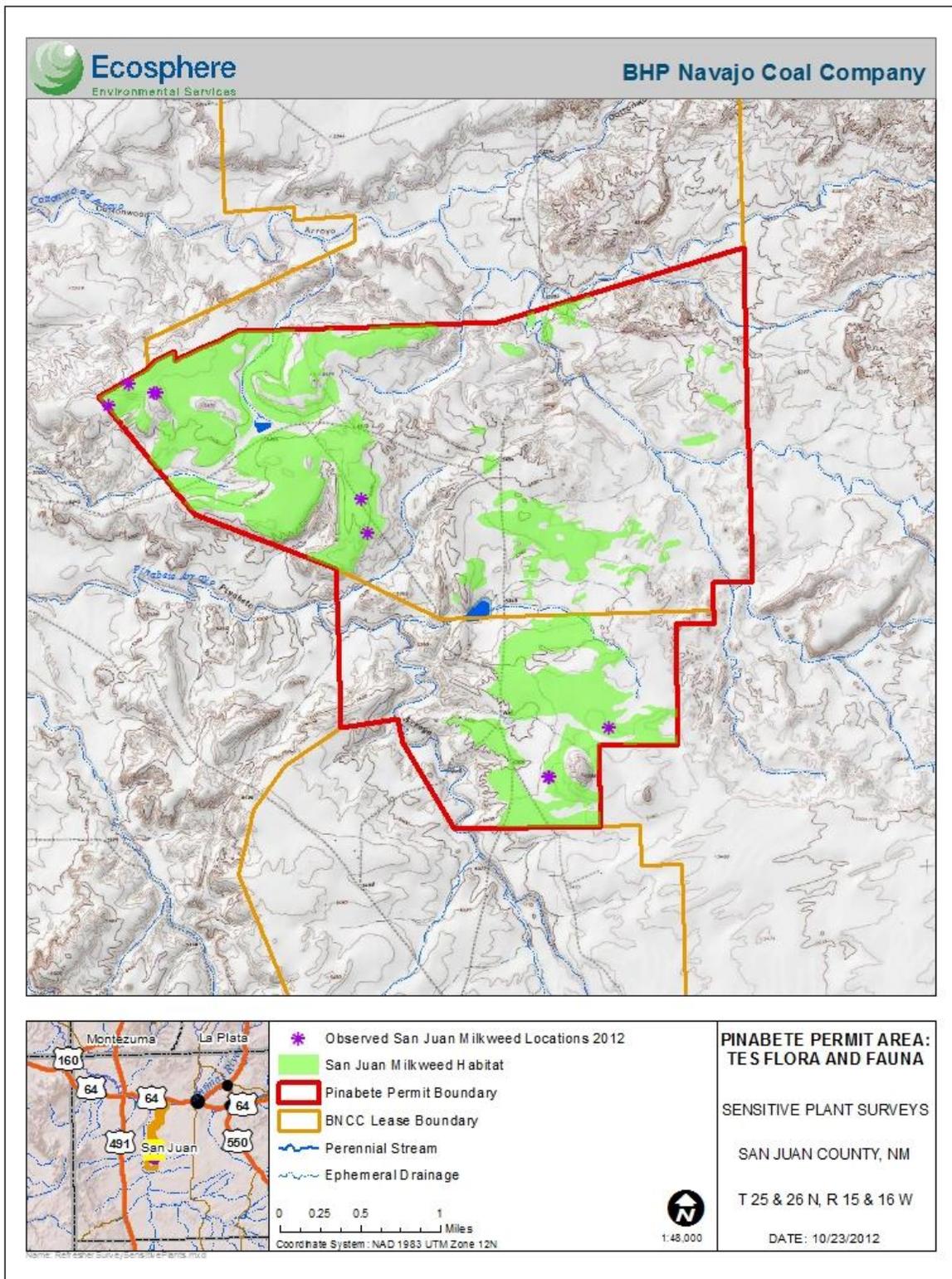


Figure 3: San Juan milkweed habitat and locations

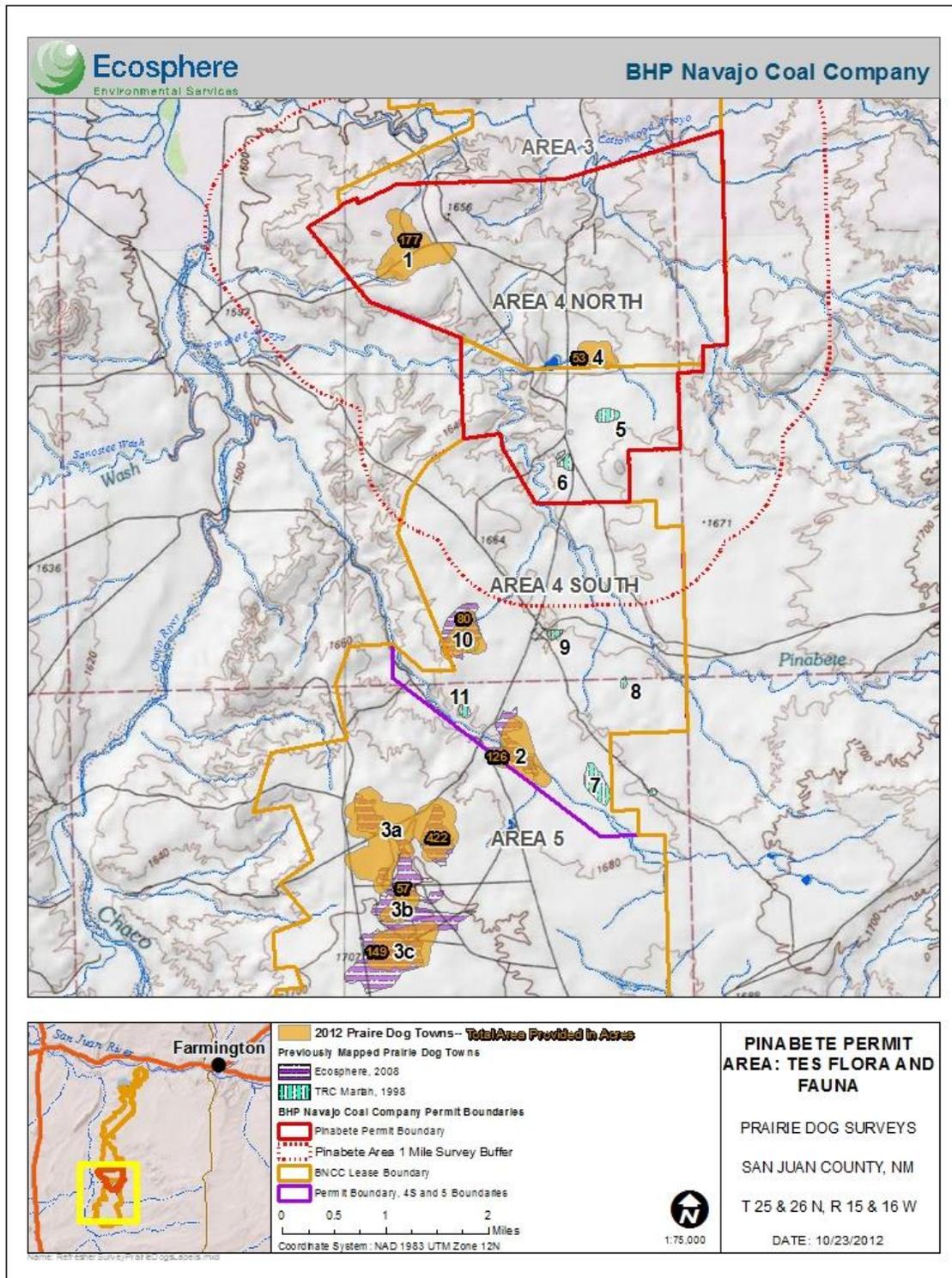


Figure 4: Size and location of mapped prairie dog towns and survey areas for nocturnal black-footed ferret surveys

CONFIDENTIAL

Figure 5: Raptor sightings and nest locations

CONFIDENTIAL

Figure 6: Potential mountain plover habitat, sightings, and nests

Appendix B: Black-footed Ferret Survey Forms

215 miles
Trimble

Black-Footed Ferret Suvey Form

Nocturnal (Nighttime) Survey

Date of Survey 9/24-9/25 Species of Prairie Dog Gunnison's P Dog

Company Ecosphere

Name of Surveyer Aimee Way / Mike Vivalda

Location of Survey Navajo Mine Area IV, N, IVS + IV

Weather Temperature 65 (begin) 54 (stop) Wind Speed 10-20 begin 5mph end

Cloud Cover 80% 10% end

Begin Survey 9:47 pm 9:50 AM End Survey 05:30 am

Total Man/Hours 9.75 x 2 people

General Comments

(possible ferret sign encountered, tracks observed, unidentified green eyeshine observed, etc)

P Dog colony 1 looped once
 P Dog Colony 2 + 3 looped 3 times each
 Eye shine observed: ² B-tailed jackrabbit, ³ cottontail, ² mice, ¹ kang. rat
² p dog or ground squirrel, spiders, several birds (possibly horned
 lark). No BFF observed.

Survey Form 1: First of three consecutive nocturnal surveys for black-footed ferret

Black-Footed Ferret Survey Form
Nocturnal (Nighttime) Survey

Date of Survey 25 Sept 2012 Species of Prairie Dog Cynomys gunnisoni

Company Ecosphere

Name of Surveyer JZ.MV

Location of Survey Narajo Mine

Weather Temperature 63°F - Wind Speed calm → windy

Cloud Cover cloudy, drizzle beginning 2245 hrs

Begin Survey ~ 2030 End Survey 0200 hrs
(started raining)

Total Biologist/Hrs 5.5 x 2

Observations: General Comments

(possible ferret sign, tracks, unidentified green eyeshine, other eyeshine, individuals, etc.)

black-tailed jackrabbit 11
cottontail 1

FEHA (spotlighted) MAD 83 125 0722 313
403 2197

mouse 1

GTHW (west side of pond) MAD 83 125 0722 061
@ 45 + 5 boundary 403 4462

Ord's Kangaroo rat 11
cottontail roadkill
salamander 1 (photo)

Survey Form 2: Second of three consecutive nocturnal surveys for black-footed ferret

Black-Footed Ferret Suvey Form

Nocturnal (Nighttime) Survey

Date of Survey Species of Prairie Dog

Company

Name of Surveyer

Location of Survey

Weather Temperature Wind Speed

Cloud Cover

Begin Survey End Survey

Total Biologist/Hrs

Observations: General Comments

(possible ferret sign, tracks, unidentified green eyeshine, other eyeshine, individuals, etc.)

Cottontail 111
Black tail Jackrabbit 1
Burrowing owl 1 0720776 4033157

Survey Form 3: Third of three consecutive nocturnal surveys for black-footed ferret

Appendix C: Photo Gallery



Photograph 1: Prairie Dog Colony 1 looking east; unoccupied colony.



Photograph 2: Prairie Dog Colony 2-active colony in Area 4 South and 4 North.



Photograph 3: Active burrowing owl burrow-whitewash, pellets, and feathers, located in Prairie Dog Colony 2.



Photograph 4: Potential mountain plover habitat in Area 4 South.



Photograph 5: Potential mountain plover habitat in Area 4 South.



Photograph 6: Active mountain plover nest in Area 5, overview.



Photograph 7: Active mountain plover nest in Area 5, zoomed, showing two hatched chicks and two un-hatched eggs.



Photograph 8: Red-tailed hawk nest with three young located along Pinabete Arroyo within the Pinabete permit area.