

**RESULTS OF RAPTOR SURVEYS
CONDUCTED AT FAR WEST 2011**

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TABLE OF CONTENTS

1. INTRODUCTION2

2. METHODS2

3. RESULTS AND DISCUSSION3

4. REFERENCES4

TABLES

Table 1. Raptor Observations and Breeding Status by Species3

FIGURES

(follow text)

- Figure 1. Vicinity Map
- Figure 2. Raptor Survey Locations and Observations
- Figure 3. Probable Harris’s Hawk Nest and Nestling in a Saguaro at Far West, May 23, 2011
- Figure 4. Great Horned Owl Nest and Nestlings in a Saguaro at Far West, April 26, 2011

1. INTRODUCTION

WestLand Resources, Inc. (WestLand) was retained by Resolution Copper Mining, LLC (RCM) to conduct a raptor¹ survey on a parcel of land administered by the Arizona State Land Department near Florence Junction, Pinal County Arizona (Far West). The purpose of this study was to gather information on raptor use of the Far West site and to provide baseline survey information in order to analyze potential impacts of the proposed mine features in the future.

Far West is situated south of US 60 and east of State Route 79 near Florence Junction in Pinal County, Arizona (**Figure 1**). This 7,000-acre (2,833-hectare) parcel slopes downhill from east to west. The highest elevation is 2,966 ft (904 m) at a ridge near its eastern boundary, and the lowest elevation is 1,950 ft (594 m) near the western boundary of the parcel. Boulder-strewn hills in the east give way to fluvial sands and gravels to the west, and the area is dissected by numerous dry desert washes. The Far West study area occurs within the Arizona upland subdivision of Sonoran desertscrub (Brown 1994). Saguaro (*Carnegiea gigantea*) and fishhook barrel cactus (*Ferocactus wislizenii*) are common on the eastern, hilly portion of the parcel. Desert ironwood (*Olneya tesota*) and palo verde (*Parkinsonia* spp.) occur along washes, and creosote (*Larrea tridentata*) dominates upland flats on the western portion of the parcel. The study area contains areas of disturbance including an El Paso Natural Gas pipeline and entrance of Off-Highway Vehicles (OHV) usage.

2. METHODS

Daytime surveys for raptors were conducted at 24 survey stations along roads within Far West, including Pipeline Road, El Molino Tank Road, N. Mineral Mountain Road, and N. Reymert Road to provide visual and auditory coverage of a large portion of the site. Survey stations were located roughly 1640 ft (500 m) apart (**Figure 2**). Surveyors drove to each station and scanned the treetops and sky with binoculars and a spotting scope for 10 minutes at each station from outside their vehicle. Survey times varied and most daytime surveys were conducted in the early morning or evenings to coincide with the greatest activity periods for diurnal raptors.

Nighttime surveys for owls were also conducted at these 24 stations. These surveys took place in the first three hours after sunset. Equipped with sound-amplifying headphones (Action Ear[®] Sport, Silver Creek Industries), surveyors listened quietly for owl calls from outside their vehicle for 10 minutes at each survey location. When a raptor was detected during any survey, the surveyors recorded the species of the raptor, a true bearing, and an estimated distance to the raptor.

Surveys in 2011 were spaced over three periods, timed to coincide with the breeding, nesting, and fledging periods for most raptors in the area. The first round of surveys was conducted on March 1, 2 and 15; the second on April 4, 5, 27 and May 13; and the third on June 22 and 26. Opportunistic observations of raptors were also recorded by WestLand field personnel during the course of other field activities. These observations are reported and identified accordingly.

¹ Raptors in this report are defined using the generally accepted meaning of the word; that is as birds of prey that use sight or sound to hunt and kill prey, typically including hawks and eagles (Falconiformes) and owls (Strigiformes). These birds have sharp talons and curved beaks that are adapted for killing and tearing apart prey. Using a broader definition of this term, we also considered new world vultures (Cathartiformes) in our study.

3. RESULTS AND DISCUSSION

A total of 138 observations of eight raptor species were recorded during the surveys at Far West. Turkey Vultures (*Cathartes aura*), Harris's Hawks (*Parabuteo unicinctus*), Red-tailed Hawks (*Buteo jamaicensis*), and American Kestrels (*Falco sparverius*) were observed during daytime surveys (**Figure 2**). Three owl species, Western Screech-owls (*Megascops kennicottii*), Great Horned Owls (*Bubo virginianus*), and Elf Owls (*Micrathene whitneyi*) were recorded during nighttime surveys. An active Great Horned Owl nest (**Figure 3**), an active Harris's Hawk nest (**Figure 4**), and an individual Western Burrowing Owl (*Athene cunicularia hypugaea*) were observed opportunistically. **Table 1** presents the number of observations of individual raptor species, the number of pairs observed, and whether breeding behaviors, nests and juvenile birds were observed. The numerous observations of Turkey Vultures, which were made throughout Far West, are not included on **Figure 2**.

Table 1. Raptor Observations and Breeding Status by Species

Raptor	Number of Sightings	Number of Pairs	Breeding Behaviors	Nest Location Observed	Young Observed
Turkey Vulture <i>Cathartes aura</i>	83				
Harris's Hawk <i>Parabuteo unicinctus</i>	20	1	Yes	Yes	Yes
Red-tailed Hawk <i>Buteo jamaicensis</i>	11	1	Yes		
American Kestrel <i>Falco sparverius</i>	2				
Western Screech-owl <i>Megascops kennicottii</i>	7				
Great Horned Owl <i>Bubo virginianus</i>	9	1	Yes	Yes	Yes
Western Burrowing Owl <i>Athene cunicularia hypugaea</i>	1				
Elf Owl <i>Micrathene whitneyi</i>	5				
Total	138	3			

Breeding was documented for three species of raptors at Far West during the 2011 survey period. Harris's Hawks were observed perching, vocalizing, and soaring in breeding groups of up to four individuals on March 15, April 27, and May 13, 2011. The frequency with which these communal behaviors were observed suggests the existence of an active breeding area at Far West or nearby. On May 23, 2011, a large stick nest with a nestling hawk was observed opportunistically high in a mature saguaro (**Figure 3**). Though nestling Harris's and Red-tailed Hawks appear similar, the presence of four Harris's Hawks nearby suggested that the observed nest was a Harris's Hawk nest. A pair of Red-tailed Hawks, the second species breeding at Far West, was seen sitting on the tops of saguaros close to each other, suggesting a mated pair. On April 27, 2011, a WestLand cultural resources

survey crew opportunistically located a Great Horned Owl nest with two nestlings. The nest was constructed high in a mature saguaro (*Figure 4*).

While not likely breeding at Far West, Turkey Vultures were the most commonly observed raptor, representing 60% (83/138) of all observations and 72% (83/116) of daytime observations. Despite their ubiquitous presence in the sky over Far West, none of the individuals observed during the survey displayed any behavioral indicators that they were breeding at Far West.

Four more raptor species were observed at Far West, but no direct evidence of the breeding status of these species was observed. Daytime surveys located individual American Kestrels on March 15 and June 22. During nighttime surveys, Western Screech Owls were heard vocalizing at several stations on March 1, March 2, April 4, April 27, and June 22, and Elf Owls were heard at multiple locations on June 22. While direct evidence of breeding by these species was not observed, it is reasonable to assume that they are breeding on this site, given the repeated observations of these raptors throughout the breeding season.

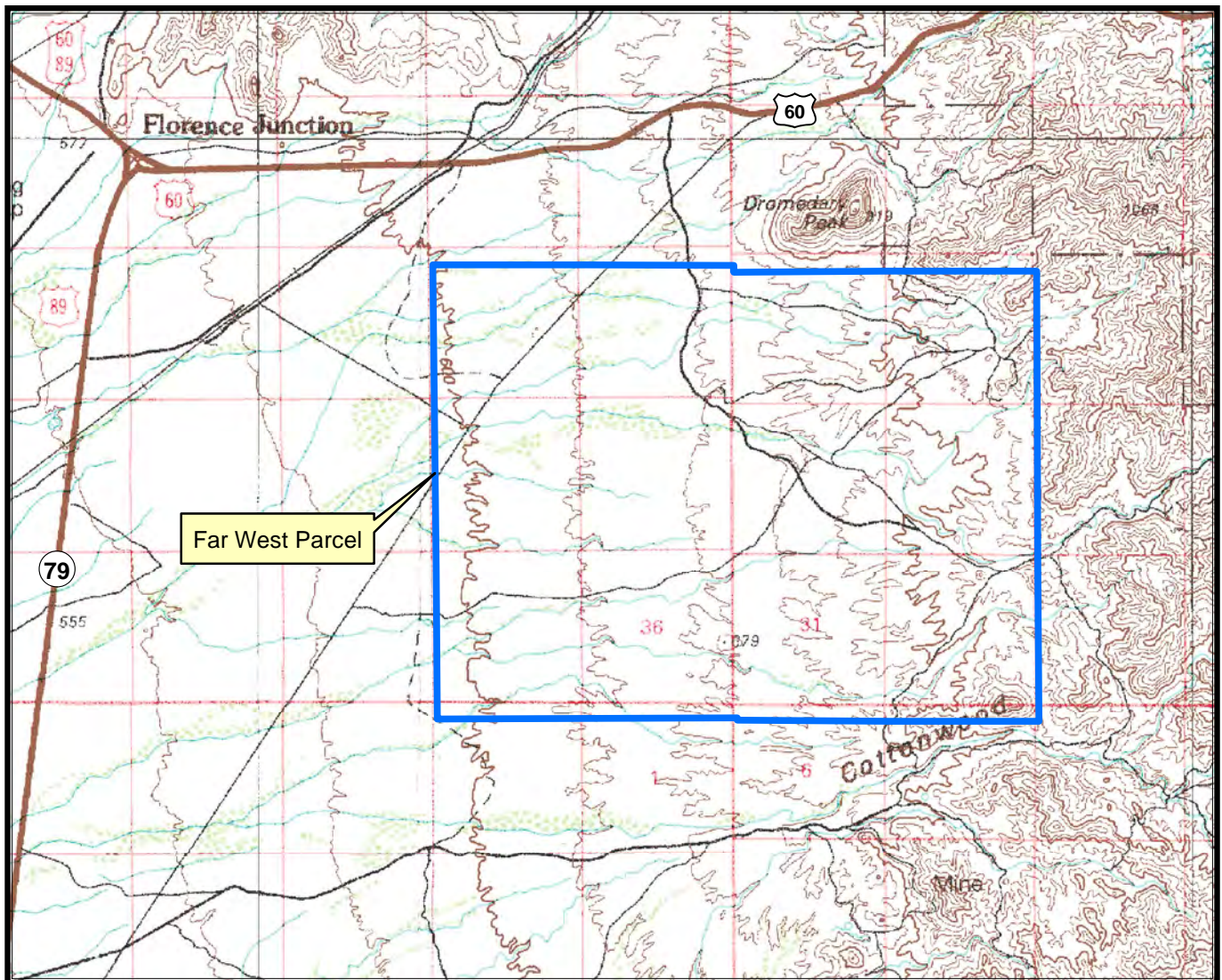
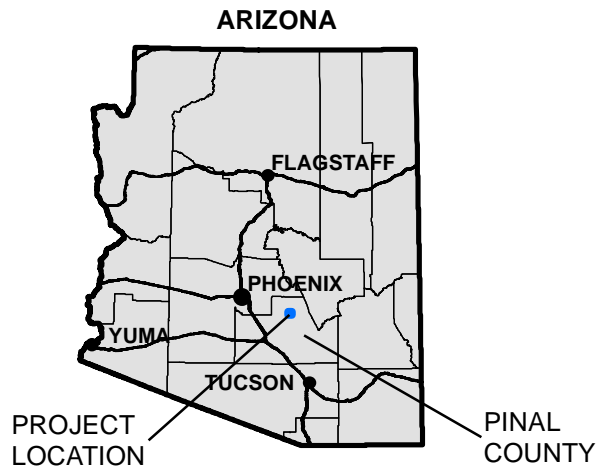
An incidental observation of a Western Burrowing Owl flushed from a caliche cave was made during reptile surveys in July. Of the eight raptor species observed at Far West, the Western Burrowing Owl is the only raptor species with any special state or federal status. This owl is considered a sensitive species in Arizona by the US Forest Service and the Bureau of Land Management (BLM) (2010). However, this owl has not been federally listed as threatened, endangered, or as a candidate species, and it is not a Wildlife Species of Concern by the Arizona Game and Fish Department.

A total of eight raptor species were recorded at Far West during the 2011 raptor survey period. Three of these species—Harris's Hawks, Red-tailed Hawks, and Great Horned Owls—were confirmed breeding or likely breeding at Far West in 2011. The remaining five species—Turkey Vultures, American Kestrels, Western Screech-owls, Western Burrowing Owls, and Elf Owls—did not display any behavioral indicators of breeding, though the latter four may be breeding at Far West.

4. REFERENCES

- Brown, D. E. (Ed.) 1994. *Biotic Communities: Southwestern United States and Northwestern Mexico*. University of Utah Press. Salt Lake City, Utah.
- Bureau of Land Management (BLM). 2010.
http://www.blm.gov/pgdata/etc/medialib/blm/az/pdfs/efoia/2011IM_IB.Par.64105.File.dat/IMAZ-2011-005.pdf

FIGURES

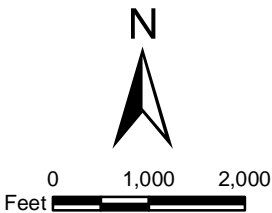
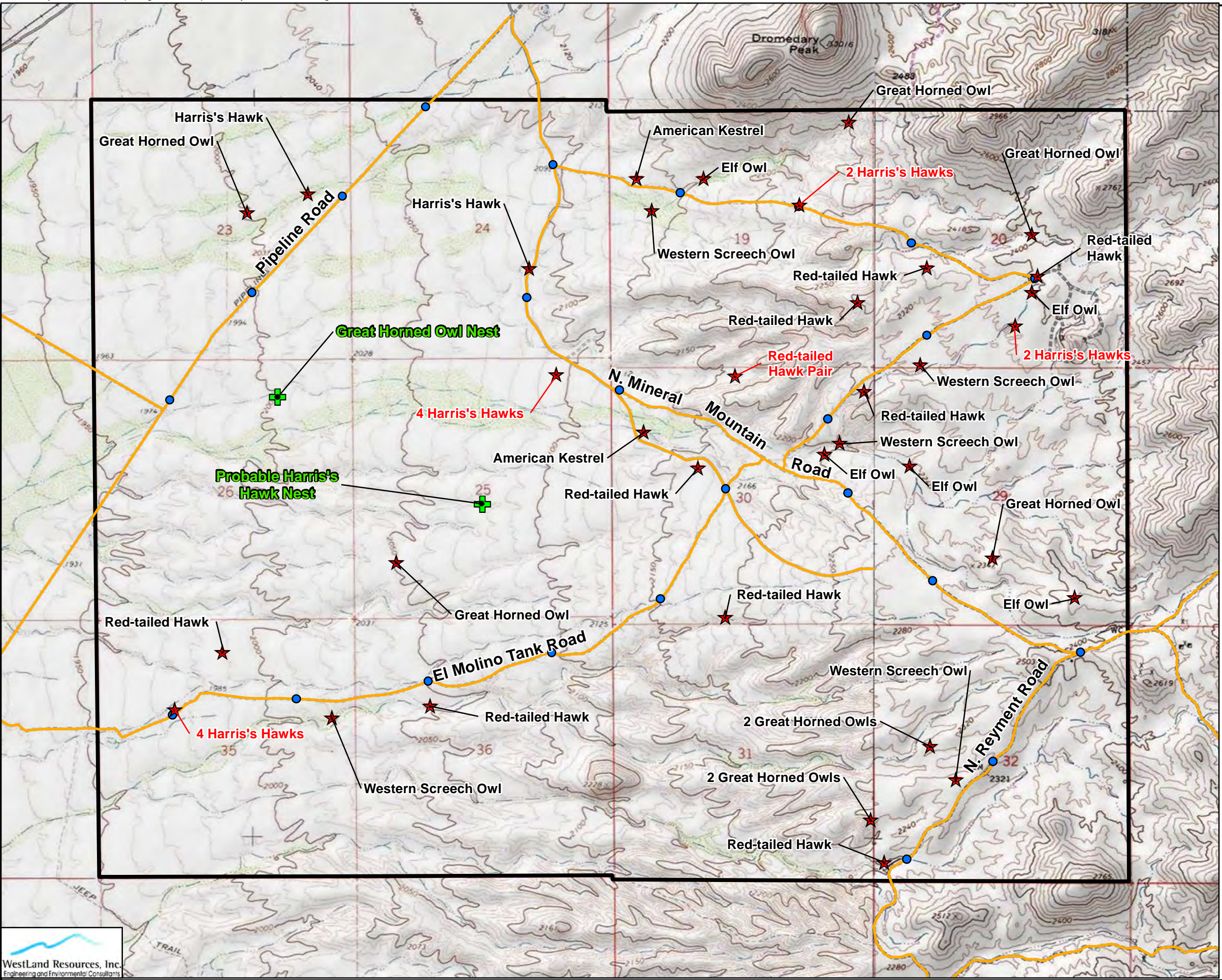


Pinal County, Arizona,
 Florence Junction, Picketpost Mtn., Florence NE,
 & Mineral Mtn. USGS 7.5' Quadrangles

RESOLUTION COPPER MINING Raptor Survey at Far West 2011

VICINITY MAP
 Figure 1





LEGEND

- Study Area Boundary
- Linear Transect Survey
- Nest Location
- Owl and Hawk Station
- Approximate Location of Observed Raptors

Red Text = Breeding Behaviors Observed

Green Text = Breeding Status Confirmed

RESOLUTION COPPER MINING
Raptor Survey at Far West 2011

RAPTOR SURVEY
LOCATIONS & OBSERVATIONS
Figure 2



Figure 3. Probable Harris's Hawk Nest and Nestling in a Saguaro at Far West, May 23, 2011.

(Note that adults were not seen at the nest, and although the juvenile looks most like a Harris Hawk, it could be a Red-tailed Hawk.)



Figure 4. Great Horned Owl Nest and Nestlings in a Saguaro at Far West, April 26, 2011.