

**BIOLOGICAL EVALUATION  
OF THE NEAR WEST ANALYSIS AREA**

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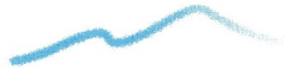
**RESOLUTION COPPER MINING**

*Prepared for:*



102 Magma Heights  
P.O. Box 1944  
Superior, Arizona 85173

*Prepared by:*



**WestLand Resources, Inc.**  
Engineering and Environmental Consultants

4001 E. Paradise Falls Drive  
Tucson, Arizona 85712

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## EXECUTIVE SUMMARY

WestLand Resources, Inc. (WestLand) was retained by Resolution Copper Mining (Resolution) to prepare a Biological Evaluation (BE) for the proposed Near West tailings alternatives area (the Analysis Area, **Figure 1**). The Analysis Area occurs on US Forest Service (USFS) lands located within Tonto National Forest (TNF) and privately owned patented and unpatented claim land (**Figure 2**). The Analysis Area encompasses approximately 12,870 acres and is on the Mesa and Globe Ranger districts located north of US Highway 60 (US 60) between Superior and Florence Junction in Pinal County, Arizona.

The purposes of this BE are: 1) to describe the physical and biological features of the Analysis Area, 2) to describe and map the plant communities, and 3) to identify the potential for special status species to occur within the Analysis Area. For the purposes of this BE, special status species are those currently listed by the US Fish & Wildlife Service (USFWS) in Pinal County as endangered, threatened, proposed for listing, or candidate for listing under the Endangered Species Act (ESA) or listed by the USFS as Sensitive in TNF.

WestLand conducted an analysis and mapping of the natural vegetation in the Analysis Area to assist in the identification of potential available habitats for special status species. A comprehensive vegetation map of the Analysis Area was produced by analysis of aerial imagery and surficial geology maps and integration of field reconnaissance. WestLand used vegetation mapping units consistent with the US National Vegetation Classification System (NVCS 2012), the standard system used in all major vegetation mapping projects by the Bureau of Land Management, USFS, National Park Service, US Geological Survey, USFWS, and Department of Defense.

Seven plant associations were recognized and mapped within the Analysis Area. The most common association, Jojoba-Paloverde Shrubland, occupies approximately 11,181 acres (approximately 87 percent of the Analysis Area). One other plant association was also dominated by jojoba, the Jojoba-Paloverde/Triangleleaf bursage Shrubland, occupying 314 acres (approximately two percent of the total Analysis Area). The other associations found within the Analysis Area are Mesquite-Catclaw acacia Wash occupying 769 acres (approximately six percent of the Analysis Area), Ocotillo-Paloverde/mixed cacti Shrubland occupying 459 acres (approximately four percent of the Analysis Area), Paloverde-Creosote Shrubland occupying 115 acres (approximately one percent of the Analysis Area), Rock Outcrop occupying 24 acres, and Crucifixion-thorn Shrubland occupying seven acres.

A screening analysis was conducted to evaluate the potential for occurrence of 20 species that are endangered, threatened, proposed for listing, or candidate for listing under the ESA in the Analysis Area. 18 of these species were determined to have no to limited potential to occur within the Analysis Area. The Sonoran desert tortoise (*Gopherus morafkai*), a candidate for listing, was observed during surveys conducted by WestLand in the Analysis Area. The desert tortoise uses rocky slopes and bajadas in Mohave and Sonoran Desertscrub.

There are no designated or proposed areas of critical habitat within the Analysis Area.



Fifty-three TNF sensitive species were evaluated for their potential occurrence in the Analysis Area. Species evaluated included three invertebrates, three fish, four amphibians, three reptiles, eight birds, ten mammals, and 22 plant species. The screening analysis and surveys of the Analysis Area determined that one species is known to occur in the analysis and 12 others have a reasonable potential to occur based on their range and habitat requirements.

The Analysis Area contains suitable habitat for and is within the range of two plants, Pima indian mallow (*Abutilon parishii*) and mapleleaf false snapdragon (*Mabrya acerifolia*); one reptile, Maricopa leaf-nosed snake (*Phyllorhynchus browni lucidus*); three birds, zone-tailed hawk (*Buteo albonotatus*), American peregrine falcon (*Falco peregrinus anatum*), and Abert's towhee (*Pipilo aberti*); and six mammals, California leaf-nosed bat (*Macrotus californicus*), western red bat (*Lasiurus blossevillii*), pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), greater western bonneted bat (*Eumops perotis californicus*), pocketed free-tailed bat (*Nyctinomops femorosaccus*), and desert bighorn sheep (*Ovis canadensis mexicana*). One reptile, reticulate Gila monster (*Heloderma supectum suspectum*), was observed during field surveys and is known to be present in the Analysis Area.

## 1. INTRODUCTION

WestLand Resources, Inc. (WestLand) was retained by Resolution Copper Mining, LLC (Resolution) to prepare a Biological Evaluation (BE) in support of Near West tailings alternatives area (the Analysis Area, *Figure 1*), a potential tailings storage facility, as part of overall mine planning. The Analysis Area is located on the Globe and Mesa Ranger districts, west and northwest of Superior and north of U.S. Highway 60 (US 60) in Pinal County, Arizona on federal lands managed by the Tonto National Forest (TNF) and on privately-owned lands within Township 1 South, Range 11 East, portions of Sections 13-15, 22-27, 35, and 36; Township 1 South, Range 12 East, portions of Sections 17-22 and 27-34; Township 2 South, Range 11 East, portions of Sections 1 and 2; and Township 2 South, Range 12 East, and portions of Sections 4-6 (*Figure 2*).

The Analysis Area is approximately 12,870 acres (5,208 ha) and was delineated to account for potential alternatives for the placement of mill tailings in support of Resolution's proposed underground mine. The proposed tailings alternatives were combined into two separate areas situated west and east of Potts Canyon (*Figure 1*). The Analysis Area for this BE encompasses the east and west tailings alternative areas; extends to portions of Queen Creek; and incorporates Potts Canyon (*Figures 1 and 2*).

The purposes of this BE are: 1) to describe the physical and biological features of the Analysis Area, 2) to describe and map the plant communities, and 3) to identify the potential for special status species to occur within the Analysis Area. For the purposes of this BE, special status species are those currently listed by the US Fish & Wildlife Service (USFWS) in Pinal County as endangered, threatened, proposed for listing, or candidate for listing under the Endangered Species Act (ESA) (*Appendix A*) or listed by the US Forest Service (USFS) as Sensitive in TNF (*Appendix B*).

## 2. METHODS

### 2.1. VEGETATION MAPPING

WestLand created a vegetation map (the Map) of the Analysis Area using vegetation associations consistent with the U.S. National Vegetation Classification System<sup>1</sup> (NVCS) (NVCS 2012). The NVCS is the standard used in all major vegetation mapping projects by the Bureau of Land Management, USFS, National Park Service, US Geological Survey, USFWS, and Department of Defense (Maybury 1999). The NVCS is being constantly updated by agency and university scientists, and has evolved from the early efforts of Brown, Lowe and Pace (1979), Brown (1980), and The Nature Conservancy's Natural Heritage Program (Maybury 1999).

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<sup>1</sup> The NVCS is a hierarchical system; the upper levels consist of broad categories defined primarily by the physiognomy of the vegetation such as Forest & Woodland, Shrubland & Grassland, and Semi-Desert. Lower levels incorporate local factors of climate, geology, hydrology, soils and disturbance regimes. The lowest, most specific level is the plant association, described by the plant species that are dominant (cover the greatest area) and diagnostic (found consistently in some vegetation types but not others) (Maybury 1999). Association names indicate the co-dominant species, separated by a hyphen if they are in the same vertical stratum of vegetation, or by a slash if in different strata.

The map was developed by identifying dominant vegetation associations using aerial and satellite imagery, surficial geology maps (Richard 1998, Spencer et al. 1998), and field visits to assign preliminary vegetation associations that were then refined during an iterative process. Observed correlations of vegetation to geological map units (**Figure 3**) were used to tentatively assign plant associations to geologic map units of the Analysis Area. Using the correspondences observed in the field, WestLand produced a preliminary vegetation map based on geomorphology and bedrock geology. The fit of the NVCS plant associations was evaluated, and discrepancies observed in the field were corrected, hand-drawn, and later digitized. As the NVCS is an ongoing project, it does not yet recognize all of the plant associations within the southwestern United States. It was necessary to create two plant associations not included in the current NVCS. The names of the plant associations conforms to the style and procedures of NVCS.

## 2.2. SCREENING ANALYSIS OF SPECIAL STATUS AND FOREST SENSITIVE SPECIES

Special status species are those currently listed by the USFWS in Pinal County as endangered, threatened, proposed for listing, or candidate for listing under the ESA (**Appendix A**) or listed by the USFS as Sensitive in TNF (**Appendix B**). Forest sensitive species are those species whose populations are of some concern because of overall declines or risks from land management activities on the TNF. These species are designated by the Regional Forester with the requirement that management activities do not contribute to declines in the species that might affect population viability.

A screening analysis was conducted to evaluate the potential for special status species to occur and the presence of proposed or designated critical habitat for special status species in the Analysis Area. Determinations of the potential for special status species to be present and to utilize habitats within the Analysis Area were based upon: 1) field observations and habitat assessments of the Analysis Area; 2) review of the natural history of the special status species; 3) evaluation of known range and distribution for the special status species; 4) comparisons of this information with habitats present in the Analysis Area; and, in some cases, 5) review of records of occurrences in published or gray literature. The screening analysis included consulting the Arizona Game and Fish Department (AGFD) Heritage Database Management System (HDMS) On-line Environmental Review Tool to obtain a list of species known to be present within 3 mi (4.8 km) of the Analysis Area (**Appendix C**).

The criteria used to determine the potential of occurrence of the species included in this screening analysis in the Analysis Area are defined as follows:

**Present:** The species has been observed to occur in the project area, the Analysis Area is within the known range of the species, and habitat characteristics required by the species are known to be present.

**Potential:** The species has not been observed in the project area, but the known, current distribution of the species includes the Analysis Area and the required habitat characteristics of the species appear to be present in the Analysis Area

**Limited Potential:** The known, current distribution of the species does not include the Analysis Area but the distribution of the species is close enough such that the Analysis Area may be within the dispersal distance of the species. The habitat characteristics required by the species may be present in the Analysis Area.

**No Potential:** The Analysis Area is outside of the known distribution of the species, the habitat characteristics required by the species are not known to be present, and/or species-specific surveys have been conducted and no detections of the species have been made.

Field reconnaissance was conducted in November and December 2012 by WestLand biologists to identify habitat types in order to evaluate the potential for any special status species to be present in the Analysis Area. During these field visits, biologists identified and mapped the vegetation associations, recorded plant and wildlife species observed, and took representative photographs of the Analysis Area. Species specific survey were conducted for Acuña Cactus (*Echinomastus erectocentrus* var. *acunensis*), Arizona hedgehog cactus (AHC; *Echinocereus triglochidiatus* var. *arizonicus*), Nichol's Turk's head cactus (NTHC; *Echinocactus horizonthalonius* var. *nicholii*), and the Sonoran desert tortoise (*Gopherus morafkai*).

## 2.3. SPECIAL STATUS PLANT SURVEY METHODS

WestLand carried out surveys for three cacti species in the Near West Analysis Area from December 10 through 13, and December 17 through 20, 2012.

### **Acuña cactus (*Echinocereus erectocentrus* var. *acunensis*)**

Acuña cactus occurs on a variety of substrates, including andesite, rhyolite, granite, and tuff, and landforms, including ridgetops, knolls, and valleys. Due to the size of Near West, areas that meet the habitat requirements (i.e. ridgelines) for this species were targeted and surveyed in transect fashion. Along these transects, crews of two field biologists walked 10 m apart, surveying the immediate area for this distinctive plant, being careful to investigate under shrubs (where Acuña cactus often grows).

### **Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*)**

A limited portion of Near West contains the elevation and geologic requirements for AHC, concentrated in the northeastern portion of the Analysis Area. Targeted surveys for AHC were conducted in these areas.

### **Nichol's Turk head cactus (*Echinocactus horizonthalonius* var. *nicholii*)**

In the northwestern portion of the Analysis Area, there are outcroppings of Paleozoic sedimentary rocks, specifically Escabrosa and Martin limestone. To survey for NTHC, crews focused on these areas, as NTHC is found on Horquilla limestone and occasionally on Paleozoic quartz and sandstone. Crews performed transects walking in pairs 10 m apart. Sites within the targeted areas that were dense with other cacti species were allotted more survey time.

## 2.4. DESERT TORTOISE SURVEY METHODS

Surveys were conducted on 19 transects in seven days between September 24 and October 4, 2012. These transects were generally located along washes in the southern and central portion of the Analysis Area. Transects were walked and scanned for signs of Sonoran desert tortoises including: live tortoises, scat, tracks, burrows, and skeletal remains. Burrows were scored as either “active” or “suitable”. Active burrows were considered to be those with live tortoises, skeletal remains, scat, or tracks inside the burrow. Suitable burrows were those that could harbor tortoises based on their size, depth, and accessibility, but which had no evidence of being utilized recently.

## 3. ANALYSIS AREA DESCRIPTION

### 3.1. HUMAN USE OF THE ANALYSIS AREA

Historic land uses within the Analysis Area have primarily included mineral exploration and mining, low-density cattle grazing, dispersed public recreation, off-road vehicle use, recreational shooting, and hunting. Mining activities have been fundamental to the economy of the region for many years, beginning with the establishment of the Silver King Mine in 1875 and the Magma Mine in the early 1900s (Buckles 2009). Modern mining activities and energy infrastructure are also present within the Analysis Area and vicinity. General disturbance is most evident along existing roadways that currently appear to be used mainly for recreation, grazing activities, and power line maintenance. Numerous pullout areas are found along the roadways, generally in flat areas. Older disturbances associated with mining and ranching are also apparent. Small ranches, rural housing, and Forest Service roads are found in the Analysis Area.

### 3.2. WILDLIFE OBSERVATIONS IN THE ANALYSIS AREA

WestLand biologists have observed numerous species of reptiles, birds, and mammals common to the Arizona Upland series of the Sonoran Desertscrub biotic community (see **Section 3.4.1.**) while conducting field reconnaissance, species specific surveys, and drainage studies within the Analysis Area. As discussed further in **Section 4.1.3.**, Sonoran Desert tortoise, has been recorded on site. Other reptiles observed include western diamond backed rattlesnake (*Crotalus atrox*) and Gila monster (*Hedeosperma suspectum*).

Birds observed by WestLand include red-tailed hawk (*Buteo jamaicensis*), Cooper’s hawk (*Accipiter cooperii*), great horned owl (*Bubo virginianus*), turkey vulture (*Cathartes aura*), common raven (*Corvus corax*), road runner (*Geococcyx californianus*), northern cardinal (*Cardinalis cardinalis*), Gambel’s quail (*Callipepla gambelii*), white-winged dove (*Zenaida asiatica*), mourning dove (*Zenaida macroura*), curved-billed thrasher (*Toxostoma curvirostre*), cactus wren (*Camplorhynchus brunneicapillus*), and phainopepla (*Phainopepla nitens*).

Mammal species observed by WestLand include mountain lion (*Puma concolor*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), grey fox (*Urocyon cinereoargenteus*), desert bighorn sheep (*Ovis canadensis*), white tailed deer (*Odocoileus virginianus cousi*), desert mule deer (*Odocoileus hemionus crooki*), javelina (*Tayassu tajacu*), cottontail rabbit (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*),

rock squirrel (*Spermophilus varigatus*), chipmunk (*Tamias* sp.), woodrat (*Neotoma* sp.), and pocket mouse (*Perognathus amplus*).

### 3.3. PHYSIOGRAPHIC SETTING

The Analysis Area occurs at the eastern edge of the Basin and Range Physiographic Province immediately adjacent to the Central Highlands Physiographic Province. The topography in the vicinity of the Analysis Area is characterized by long south-southwest-oriented ridges with numerous short arroyos. The Analysis Area is drained by several large washes: Silver King, Rice Water, Potts, Bear Tank, and Roblas that flow to the southwest towards Queen Creek. Elevations within the Analysis Area range from approximately 2,250 ft (685 m) above mean sea level (amsl) in the portions nearest to US 60 to 3,300 ft (1,000 m) amsl above Silver King Wash (**Figure 2**). Exposed rock occurs along some canyons and in the northern portions of the Analysis Area. In northern portions of the Analysis Area the landscape transitions into steep-sloped peaks with areas of bare rock and small cliffs.

Geology within the Analysis Area is mixed with the majority of the central and southern portions of the Analysis Area comprised of Quaternary and Tertiary basin-fill deposits with Quaternary alluvial deposits along Queen Creek and major washes. Tertiary volcanic rocks, Paleozoic sedimentary rocks, younger Precambrian sedimentary rocks, basalt, and diabase, Tertiary Apache Leap tuff and Whitetail Conglomerate, and older Precambrian Pinal Schist comprise the majority of the northern and western portions of the Analysis Area (Richard 1998, Spencer et al. 1998; **Figure 3**). There are no known natural caves within the Analysis Area.

Soils within the majority of the Analysis Area are deep, gravelly, moderately fine and fine-textured, moderately sloping to steep soils on dissected old alluvial fan surfaces. Soils within the northern and western portions of the Analysis Area are shallow, very gravelly and cobbly, moderately coarse to moderately fine-textured, gently sloping to very steep soils and rock outcrops on hills and mountains (**Figure 4**) (ALRIS 1975).

### 3.4. VEGETATION DESCRIPTION

#### 3.4.1. Brown and Lowe Biotic Communities

The Analysis Area lies entirely within an area classified by Brown and Lowe (1980) as the Arizona Upland series of the Sonoran Desertscrub biotic community (**Figure 5**). Saguaros (*Carnegie gigantea*) are the most diagnostic plant of Arizona Upland, and they are found across the Analysis Area. However, their relative densities vary, with some portions of the Analysis Area are almost entirely lacking saguaros and other areas contain dense patches of saguaros.

#### 3.4.2. National Vegetation Classification System Plant Associations

Utilizing the NVCS to map the vegetation in the Analysis Area, seven plant associations were observed (**Figure 6**) in contrast to the single unit mapped by Brown and Lowe. The plant associations identified in

the Analysis Area are under the North American Warm Desert Scrub and Grassland category, in three different groups (**Table 1**).

Two new plant associations not included in the current NVCS were identified as part of this analysis. The two new associations are Jojoba-Paloverde-Triangleleaf bursage Shrubland, and Ocotillo-Paloverde-mixed cacti Shrubland. The five recognized NVCS associations observed in the field are Jojoba-Paloverde Shrubland, Mesquite-Catclaw Wash, Paloverde-Creosotebush Shrubland, Rock Outcrop, and Crucifixion-thorn Shrubland. They are described in greater detail **Section 3.4.3** and photographs of each plant association are presented in **Appendix D**.

Table 1. Hierarchy of U.S. National Vegetation Classification Categories that were Mapped in the Analysis Area

<b>DESERT AND SEMI-DESERT CLASS</b>	
	<b>WARM DESERT &amp; SEMI-DESERT WOODLAND, SCRUB &amp; GRASSLAND SUBCLASS</b>
	<b>Warm Desert &amp; Semi-Desert Scrub &amp; Grassland Formation</b>
	<b><i>North American Warm Desert Scrub &amp; Grassland Division</i></b>
	Mojave-Sonoran Semi-Desert Scrub Macrogroup
	- Sonoran Paloverde-Mixed Cacti Desert Scrub Group
	Jojoba-Paloverde Shrubland Association
	* Jojoba-Paloverde/Triangleleaf bursage Shrubland Association
	* Ocotillo-Paloverde/Mixed Cacti Shrubland Association
	Paloverde-Creosotebush Shrubland Association
	Rock Outcrop Association
	- Mojave Mid-Elevation Mixed Desert Scrub Group
	Crucifixion Thorn Shrubland Association
	North American Warm-Desert Xero-Riparian Macrogroup
	- Warm Semi-Desert Shrub & Herb Wash-Arroyo Group
	Mesquite-Catclaw Acacia Wash Association

Source: USNVC 2012; for the purposes of this table common rather than scientific names of vegetation associations are used (see **Section 3.4.3** for scientific names of each vegetation association).

\* Denotes a new association created by WestLand.

### 3.4.3. Vegetation Associations Of The Analysis Area

#### 3.4.3.1. Jojoba-Paloverde Shrubland (*Simmondsia chinensis*-*Parkinsonia microphylla* Shrubland)

This is the most common association present throughout the Analysis Area (**Appendix D, Photo 1**). Jojoba (*Simmondsia chinensis*) and foothill paloverde (*Parkinsonia microphylla*) are the dominant shrubs within this association. In some areas, the emergent layer consists of saguaros. Ocotillo (*Fouquieria splendens*) is sometimes present as well, although usually in lower numbers relative to jojoba and foothill paloverde. Mixed cacti species present include teddybear cholla (*Opuntia bigelovii*), tree cholla (*O. arbuscula*), Engelmann pricklypear (*O. engelmannii*), and chainfruit cholla (*O. fulgida*). Most of the Analysis Area is a variation on this theme. Generally, west- to north-facing aspects tend to have much

less foothill paloverde compared to east- and south-facing aspects, while dense stands of jojoba occupy west-facing aspects (**Appendix D, Photo 2**). Flat-top buckwheat (*Eriogonum fasciculatum*) occurred as a co-dominant understory shrub with jojoba in the higher elevation zones within the project area. The perennial vines Arizona swallow-wort (*Cynanchum arizonicum*) and slender janusia (*Janusia gracilis*) were noted in the higher elevation areas as well.

#### **3.4.3.2. Ocotillo-Paloverde/Mixed Cacti Shrubland (*Fouquieria splendens*-*Parkinsonia microphylla*/mixed cacti Shrubland)**

Paleozoic (Escabrosa and Martin limestone) outcrops within the northwestern portion of the Analysis Area tend to be dominated by ocotillo and foothill paloverde, with an understory consisting of brittlebush (*Encelia farinosa*), mariola (*Parthenium incanum*), and white ratany (*Krameria grayi*) (**Appendix D, Photo 3**). Two conspicuous ferns, *Selaginella arizonica* and the limestone-loving Cochise cloakfern (*Astrolepis cochisensis*), are readily found on these outcroppings (**Appendix D, Photo 4**). Barrel cactus species (*Ferocactus wislizenii* and *F. cylindraceus*) occupy these areas in greater abundance relative to the surrounding areas. A diverse mix of limestone-affiliated plants were noted, including ayenia (*Ayenia microphylla*), red grama (*Bouteloua trifida*), desert rosemallow (*Hibiscus coulteri*), Parry's false prairie-clover (*Marina parryi*), and a *Polygala* sp. Jojoba was not generally observed to occur in areas of solid, unfragmented limestone. Sotol (*Dasylirion wheeleri*), uncommon in the Analysis Area, was restricted to limestone outcrops as well as north-facing aspects (**Appendix D, Photo 5**).

This association was also observed on areas of shallow bedrock (though not necessarily limestone), such as on the hilltops near Perlite Spring consisting of Tertiary volcanic rocks and in Near West canyon.

#### **3.4.3.3. Jojoba-Paloverde/Triangleleaf Bursage Shrubland (*Simmondsia chinensis*-*Parkinsonia microphylla*/*Ambrosia deltoidea* Shrubland)**

This association occurs sporadically throughout the Analysis Area, most notably around the Bomboy mine. Soils derived from Precambrian rock were observed to host dense patches of triangleleaf bursage (*Ambrosia deltoidea*), although jojoba is still present in low numbers. These sites occasionally harbor dense concentrations of saguaros (**Appendix D, Photo 6**). Fairyduster (*Calliandra eriophylla*) and creosotebush (*Larrea tridentata*) occur in this association as well.

#### **3.4.3.4. Paloverde-Creosotebush Shrubland (*Parkinsonia microphylla*-*Larrea tridentata* Shrubland)**

This association is found in a small portion of the Analysis Area, notably on the alluvial fan around Benson Spring. There is little to no slope on the terrain here, and the dominant shrubs include foothill paloverde and creosotebush (**Appendix D, Photo 7**). Mesquite (*Prosopis velutina*) and catclaw acacia (*Senegalia greggii*) are also present, and understory shrubs include Engelmann's prickly pear, snakeweed (*Gutierrezia sarothrae*) and ratany. Jojoba, a dominant shrub found on ridges and hillsides to the north, is excluded from this association. Evidence of heavy grazing was noted here.



**3.4.3.5. Mesquite-Catclaw Wash (*Prosopis velutina*-*Senegalia greggii* Wash)**

This association is widespread throughout the drainages in the Analysis Area, occurring in narrow arroyos, broad washes, and braided floodplains (**Appendix D, Photos 8**). While other shrubs may be present, mesquite and catclaw acacia are ubiquitous in areas of ephemeral water events. Blue paloverde (*Parkinsonia florida*) is also frequently encountered near drainages. Desert hackberry (*Celtis pallida*), wolfberry (*Lycium* sp.), and graythorn (*Ziziphus obtusifolia*) may also be encountered in or on terraces adjacent to this association. Cacti are common away from the main channel, including chainfruit cholla, cane cholla (*O. spinosior*), prickly pear, and barrel cactus. Some of the larger drainages, including Silver King Wash, Potts Canyon, and Roblas Canyon support singlewhorl burrobush (*Ambrosia monogyra*), desert broom (*Baccharis sarothroides*), ambrosia leaf burr ragweed (*A. ambrosioides*), and sugar sumac (*Rhus ovata*) in the channel itself. Roblas Canyon and Potts Canyon support intermittent reaches of large cottonwood trees (*Populus fremontii*), Goodding's willow (*Salix gooddingii*), desert willow (*Chilopsis linearis*), arrowweed (*Pluchea sericea*) and a few, scattered individuals of buttonbush (*Cephalanthus occidentalis*).

**3.4.3.6. Rock Outcrop**

This association occurs on a few rocky peaks and ridge crests in the central part of the Analysis Area. Although too small to map in many areas, a large sandstone outcrop in the northern section of the Analysis Area is sizable. The outcrop features an unusual mix of plants including hopbush (*Dodonaea viscosa*), several species of buckwheat (*Eriogonum fasciculatum*, *E. wrightii*), lemon verbena (*Aloysia wrightii*), turpentine bush (*Ericameria laricifolia*), and Coulter's brickellbush (*Brickellia coulteri*) (**Appendix D, Photo 9**). Arizona spikemoss (*Selaginella arizonica*) covers the exposed bedrock in places.

**3.4.3.7. Crucifixion-thorn Shrubland (*Canotia holacantha* Shrubland)**

In this association, the tall, upper shrub layer is composed of crucifixion-thorn (*Canotia holacantha*). These plants, growing to heights of over 10 ft (3 m) in some cases, form a dense colony, appearing from a distance as a homogenous stand (**Appendix D, Photo 10**). Foothill paloverde, creosotebush, and jojoba are found in lower numbers within the shrub layer, while ratany and snakeweed occur as understory shrubs. This association is represented in the Analysis Area by only one occurrence, where it is found on a hill composed of a loamy soil.

In addition to the identified associations, WestLand noted a few areas within the Analysis Area that were too small to be mapped, but featured unique assemblages of plants. Exposed tuff, an uncommon mix of plants, are restricted to soils derived from ash deposits (tuff) within the Analysis Area. Several perennial forbs are present, including desert zinnia (*Zinnia acerosa*), woody crinklemat (*Tiquilia canescens*), fluffgrass (*Dasyochloa pulchella*), and desert trumpet (*Eriogonum inflatum*), as well as the shrubs creosotebush and desert lavender (*Hyptis emoryi*). Some small patches featuring these plants occur around the Bomboy mine area (**Appendix D, Photo 11**).

Of the seven plant associations mapped within the Analysis Area, the most common association was Jojoba-Paloverde Shrubland, which occupies approximately 11,181 acres (4,525 ha). One other plant

association was also dominated by jojoba, the Jojoba-Paloverde/Triangleleaf bursage Shrubland, occupying 314 acres (127 ha). The combined area of vegetation dominated by jojoba was approximately 11,495 acres (4,652 ha) or about 89 percent of the undisturbed lands. The other associations found within the Analysis Area are Mesquite-Catclaw acacia Wash occupying 769 acres (310 ha), Ocotillo-Paloverde/mixed cacti Shrubland occupying 459 acres (186 ha), Paloverde-Creosote Shrubland occupying 115 acres (47 ha), Rock Outcrop occupying 24 acres (10 ha), and Crucifixion-thorn Shrubland occupying seven acres (three ha).

A list of plant species observed in the course of making the map is presented in **Table 2**.

Table 2. List of Plant Species Observed during Field Reconnaissance in the Analysis Area. Taxonomy follows ITIS (2012).

Plant Species Common Name	Plant Species Scientific Name	Plant Species Common Name	Plant Species Scientific Name
San Felipe dogweed	<i>Adenophyllum porophylloides</i>	Burweed	<i>Isocoma tenuisecta</i>
Agave	<i>Agave chrysantha</i>	Slender janusia	<i>Janusia gracilis</i>
Wright's beebrush	<i>Aloysia wrightii</i>	Snapdragon penstemon	<i>Keckiellia antirrhinoides</i>
Ambrosia leaf burr ragweed	<i>Ambrosia ambrosioides</i>	Starry bedstraw	<i>Galium stellatum</i>
Triangleleaf bursage	<i>Ambrosia deltoidea</i>	White ratany	<i>Krameria grayi</i>
Singlewhorl burrobush	<i>Ambrosia monogyra</i>	Creosotebush	<i>Larrea tridentata</i>
Fiddleneck	<i>Amsinckia intermedia</i>	Trefoil	<i>Lotus</i> sp.
Narrowleaf silverbush	<i>Argythamnia lanceolata</i>	Lupine	<i>Lupinus</i> sp.
New Mexico silverbush	<i>Argythamnia neomexicana</i>	Wolfberry	<i>Lycium</i> sp.
Threeawn	<i>Aristida purpurea</i>	Spiny haplopappus	<i>Machaeranthera pinnatifida</i>
Watson's dutchman's pipe	<i>Aristolochia watsonii</i>	Arizona fishhook pincushion	<i>Mammillaria grahamii</i>
Cochise scaly cloakfern	<i>Astrolepis cochisensis</i>	Parry's false prairie-clover	<i>Marina parryi</i>
Dense ayenia	<i>Ayenia microphylla</i>	Spearleaf	<i>Matelea parvifolia</i>
Desertbroom	<i>Baccharis sarothroides</i>	Blackfoot daisy	<i>Melampodium leucanthum</i>
Desert marigold	<i>Baileya multiradiata</i>	Rough menodora	<i>Menodora scabra</i>
Chuckwalla delight	<i>Bebbia juncea</i>	Four o'clock	<i>Mirabilis</i> sp.
Red grama	<i>Bouteloua trifida</i>	Teddybear cholla	<i>Opuntia bigelovii</i>
Sahara mustard	<i>Brassica tournefortii</i>	Engelmann's prickly pear	<i>Opuntia engelmannii</i>
Resinleaf brickellbush	<i>Brickellia baccharidea</i>	Jumping cholla	<i>Opuntia fulgida</i>
Coulter's brickellbush	<i>Brickellia coulteri</i>	Christmas cactus	<i>Opuntia leptocaulis</i>
Red brome	<i>Bromus rubens</i>	Owl clover	<i>Orthocarpus</i> sp.
Canotia	<i>Canotia holacantha</i>	Blue paloverde	<i>Parkinsonia florida</i>
Saguaro	<i>Carnegiea gigantea</i>	Littleleaf paloverde	<i>P. microphylla</i>
Fairyduster	<i>Calliandra eriophylla</i>	Combseed	<i>Pectocarya</i> sp.
Desert hackberry	<i>Celtis pallida</i>	Spiny cliffbrake	<i>Pellaea truncata</i>
Buttonbush	<i>Cephalanthus occidentalis</i>	Buffelgrass	<i>Pennisetum ciliare</i>
Rattlesnake weed	<i>Chamaesyce albomarginata</i>	Fountaingrass	<i>Pennisetum setaceum</i>
Brittle spineflower	<i>Chorizanthe brevicornu</i>	Gila rockdaisy	<i>Perityle gilensis</i> var. <i>gilensis</i>
Desert willow	<i>Chilopsis linearis</i>	Phacelia	<i>Phacelia</i> sp.
Ragged rock flower	<i>Crossosoma bigelovii</i>	Plantain	<i>Plantago</i> sp.
Arizona swallow-wort	<i>Cynanchum arizonicum</i>	White milkwort	<i>Polygala alba</i>
Bermudagrass	<i>Cynodon dactylon</i>	Glandleaf milkwort	<i>Polygala macradenia</i>

Plant Species Common Name	Plant Species Scientific Name	Plant Species Common Name	Plant Species Scientific Name
Gregg's prairie clover	<i>Dalea greggii</i>	Rabbitfoot grass	<i>Polypogon monspeliensis</i>
Sotol	<i>Dasylirion wheeleri</i>	Fremont's cottonwood	<i>Populus fremontii</i>
Hopbush	<i>Dodonaea viscosa</i>	Slender poreleaf	<i>Porophyllum gracile</i>
Engelmann hedgehog cactus	<i>Echinocereus engelmannii</i>	Velvet mesquite	<i>Prosopis velutina</i>
Pinkflower hedgehog cactus	<i>Echinocereus fasciculatus</i>	Whitestem paperflower	<i>Psilostrophe cooperi</i>
Brittlebush	<i>Encelia farinosa</i>	Plumeseed	<i>Rafinesquia</i> sp.
Jointfir	<i>Ephedra</i> sp.	Sugar sumac	<i>Rhus ovata</i>
Woollystar	<i>Eriastrum diffusum</i>	Chia	<i>Salvia columbariae</i>
Turpentine bush	<i>Ericameria laricifolia</i>	Arizona spikemoss	<i>Selaginella arizonica</i>
Flatop buckwheat	<i>Eriogonum fasciculatum</i>	Catclaw acacia	<i>Senegalia greggii</i>
Desert trumpet	<i>Eriogonum inflatum</i>	Desert senna	<i>Senna covesii</i>
Bastardsage	<i>Eriogonum wrightii</i>	Globe mallow	<i>Sphaeralcea ambigua</i>
Stork's bill	<i>Erodium cicutarium</i>	Jojoba	<i>Simmondsia chinensis</i>
Texas stork's bill	<i>Erodium texanum</i>	Wirelettuce	<i>Stephanomeria pauciflora</i>
Dwarf morning-glory	<i>Evolvulus</i> sp.	Tamarisk	<i>Tamarix</i> sp.
California barrel cactus	<i>Ferocactus cylindraceus</i>	Fiveneedle pricklyleaf	<i>Thymophylla pentachaeta</i>
Fishhook barrel cactus	<i>Ferocactus wislizenii</i>	Woody crinkleleaf	<i>Tiquilia canescens</i>
Ocotillo	<i>Fouquieria splendens</i>	Slim tridens	<i>Tridens muticus</i>
Broom snakewood	<i>Gutierrezia sarothrae</i>	American threefold	<i>Trixis californica</i>
Bladdermallow	<i>Herissantia crispa</i>	Thistle	<i>Cirsium neomexicanum</i>
Desert rosemallow	<i>Hibiscus coulteri</i>	Fluffgrass	<i>Dasyochloa pulchella</i>
Paleface	<i>Hibiscus denudatus</i>	Banana yucca	<i>Yucca baccata</i>
Wright's thimblehead	<i>Hymenothrix wrightii</i>	Desert zinnia	<i>Zinnia acerosa</i>
Desert lavender	<i>Hyptis emoryi</i>	Graythorn	<i>Ziziphus obtusifolia</i>

### 3.4.4. Invasive Plant Species Of The Analysis Area

Several invasive plants were observed in the Analysis Area, mainly confined to riparian zones. Tamarisk (*Tamarix* sp.), Bermuda grass (*Cynodon dactylon*), buffel grass (*Pennisetum ciliare*), and fountain grass (*Pennisetum setaceum*) were all observed within some of the larger drainage systems, including Roblas Canyon and Bear Tank Canyon (**Appendix D, Photo 12**). Rabbitfoot grass (*Polypogon monspeliensis*) was observed at Perlite Spring. Filaree (*Erodium cicutarium*) and Sahara mustard (*Brassica tournefortii*) were found in some of the upland areas. Red brome (*Bromus rubens*) is a ubiquitous groundcover throughout the Analysis Area.

## 4. LISTED, PROPOSED, AND CANDIDATE SPECIES SCREENING ANALYSIS

### 4.1. SCREENING ANALYSIS

Based on WestLand's screening analysis and field surveys one species that is a candidate for listing, the Sonoran desert tortoise, is present in the Analysis Area (**Table 3**). No proposed or designated critical habitat is in the Analysis Area.

Table 3. Screening Analysis for Species Listed by U.S. Fish & Wildlife Service (USFWS) as Threatened, Endangered, Proposed for Listing, or Candidate for Listing under the Endangered Species Act in Pinal County. Species highlighted in gray are either known to occur or have a reasonable potential to occur within the Analysis Area.

Species	USFWS Status	Potential to Occur in the Analysis Area	Basis for Determination
<b>PLANTS (3)</b>			
Arizona hedgehog cactus ( <i>Echinocereus triglochidiatus</i> var. <i>arizonicus</i> )	Endangered	No Potential	Occupies open slopes and cracks and crevices between boulders in Interior Chaparral and Madrean Evergreen Woodland habitats (Brown 1994) at elevations between 3,300 and 5,700 ft (1,006 and 1,737 m) (AGFD 2003a). AHC is associated with Apache Leap Tuff, Cretaceous or Tertiary Granite, and Pinal Schist substrates (AGFD 2003a). The Analysis Area is below the known elevation range and does not contain the vegetation communities with which this species is associated. The nearest known populations of AHC are 2.5 mi (4 km) to the southeast at East Plant, 3.5 mi (5.6 km) to the north at Haunted Canyon, and 4.25 mi (7 km) to the east at Silver King substation (WestLand 2012a). These locations of AHC are shown in <b>Figure 7</b> along with the occurrence of the preferred geologic rocktypes of AHC, and the elevational range of AHC in the Analysis Area. Based on the elevations in the Analysis Area, and the preferred geologic rock types of AHC, there is limited potential for this species to occur in the Analysis Area. Because the Analysis Area contains areas of Pinal Schist, some survey for this plant was conducted, focusing on the Pinal Schist rocktype in the areas above 3,000 ft (914 m) elevation ( <b>Figure 8b</b> ). No AHC were observed during the surveys.
Acuña cactus ( <i>Echinomastus erectocentrus</i> var. <i>acunensis</i> )	Proposed Endangered with Critical Habitat	Limited Potential	Occupies Arizona Upland Sonoran Desertscrub habitat on open knolls and ridges in granitic soils between major washes at elevations between 1,300 and 2,625 ft (400 and 800 m) (AGFD 2011a). One of the 10 proposed critical habitat parcels lies roughly 10 mi (16.1km) to the south of the Analysis Area, in the Mineral Mountains, where a survey by the USFWS in 2011 found 30 living individuals and 22 dead plants (USFWS 2012a). There is limited potential for this species to occur in the Analysis Area based on the substrate, vegetation community, and elevation and geographic range this cactus is known to occupy. Two specimens have been collected to the northwest of Phoenix (besides those collections, the population in the Mineral Mountains represents the northern limit for this species), substantiating the possibility for extending the range north of the Mineral Mountains.  WestLand conducted surveys for Acuña cactus in the Analysis Area, on a range of geologic substrates ( <b>Figure 8a</b> ). No Acuña cactus were observed during the surveys.

Table 3. Screening Analysis for Species Listed by U.S. Fish & Wildlife Service (USFWS) as Threatened, Endangered, Proposed for Listing, or Candidate for Listing under the Endangered Species Act in Pinal County. Species highlighted in gray are either known to occur or have a reasonable potential to occur within the Analysis Area.

Species	USFWS Status	Potential to Occur in the Analysis Area	Basis for Determination
Nichol's Turk's head cactus ( <i>Echinocactus horizonthalonius</i> var. <i>nicholii</i> )	Endangered	No Potential	Occupies Sonoran Desertscrub habitats at the foot of limestone mountains and on inclined terraces and saddles within limestone mountains (AGFD 2008a). The nearest known population is in the Waterman Mountains west of Tucson in Pima County approximately 65 mi from the Analysis Area. WestLand found no confirmed records of this species within the TNF. The main range of the species ( <i>E. horizonthalonius</i> ) is centered in New Mexico and Texas. The elevation range is from 2,400 to 4,000 ft (730 to 1,220 m) (USFWS 2009a). The Analysis Area is outside of the known geographic range of this species, but because the species has highly disjunct populations in northern Mexico, southern Arizona, and geology matching the apparent habitat requirements (Paleozoic rock) are found in small outcroppings and hills in the northwestern corner of the Analysis Area survey for this cactus was conducted ( <b>Figure 8c</b> ). No Nichol's Turk's head cactus was detected during surveys. This species is not considered further in this BE.
<b>FISH (7)</b>			
Desert pupfish ( <i>Cyprinodon macularius</i> )	Endangered	No Potential	Occupies shallow, clear waters with soft substrates between 1,200 and 3,450 ft (366 and 1,052 m) (AGFD 2001a). No naturally occurring populations remain in Arizona. No suitable aquatic habitat is present in the Analysis Area. The Analysis Area is outside the known geographic range and does not contain perennial waters suitable to maintain fish populations.
Gila chub ( <i>Gila intermedia</i> )	Endangered	No Potential	Occupies small headwater streams, cienegas, marshes and springs of Gila River Drainage between 2,720 and 5,420 ft (829 and 1,652 m) (AGFD 2002b). Historically found in headwater streams of the Gila River drainage in Arizona, Gila chub is currently known from the following drainages in Arizona: Santa Cruz River (Cienega Creek, Sabino Creek, and Sheehy Spring), Middle Gila River (Eagle, Bonito, and Harden Cienega Creeks and San Carlos and Blue Rivers), San Pedro River (Bass, O'Donnell, and Redfield Canyons, Babocomari River and Turkey Creek), Agua Fria River (Silver and Sycamore Creeks), Salt River (Fish and Cave Creeks), and Verde River (Spring and Walker Creeks) (AGFD 2002b). No suitable aquatic habitat is present in the Analysis Area. The Analysis Area is outside the known geographic range of this species.
Gila topminnow ( <i>Poeciliopsis occidentalis occidentalis</i> )	Endangered	No Potential	Occupies perennial streams, springs, and streams of the Gila River (AGFD 2001b). No suitable aquatic habitat is present in the Analysis Area.

Table 3. Screening Analysis for Species Listed by U.S. Fish & Wildlife Service (USFWS) as Threatened, Endangered, Proposed for Listing, or Candidate for Listing under the Endangered Species Act in Pinal County. Species highlighted in gray are either known to occur or have a reasonable potential to occur within the Analysis Area.

Species	USFWS Status	Potential to Occur in the Analysis Area	Basis for Determination
Loach minnow ( <i>Tiaroga cobitis</i> )	Endangered	No Potential	Occupies small to large perennial streams with swift shallow water over cobble and gravel (USFWS 2012b). No suitable aquatic habitat is present in the Analysis Area.
Razorback sucker ( <i>Xyrauchen texanus</i> )	Endangered	No Potential	Inhabits a variety of stream habitats, big rivers and reservoirs at elevations between 181 and 5,000 ft (55 and 1,524 m) (AGFD 2005a). This species is endemic to the Colorado River basin. Natural populations are found in Mohave, Mead, and Havasu lakes (AGFD 2005a). No suitable aquatic habitat is present in the Analysis Area. The Analysis Area is outside the known geographic range of this species.
Spikedace ( <i>Meda fulgida</i> )	Threatened	No Potential	Occupies shallow streams with eddies and riffles at elevations between 1,620 and 4,500 ft (494 and 1,372 m) (AGFD 2002c). Populations are found in segments of Aravaipa Creek, Eagle Creek, Gila River, and Verde River (AGFD 2002c). No suitable aquatic habitat is present in the Analysis Area. The Analysis Area is outside the known geographic range of this species.
Roundtail chub ( <i>Gila robusta</i> )	Candidate	No Potential	Inhabits warm to cool mid-elevation rivers and streams (AGFD 2002d). Populations are known in tributaries of Little Colorado River (2 tributaries), Bill Williams River (8 tributaries), Salt River (4 tributaries), Verde River (5 tributaries), Aravaipa Creek, and Eagle Creek (AGFD 2002d). No suitable aquatic habitat is present in the Analysis Area. The Analysis Area is outside the known geographic range of this species.
<b>REPTILES (3)</b>			
Tucson shovel-nosed snake ( <i>Chionactis occipitalis klauberi</i> )	Candidate	No Potential	Inhabits creosote-mesquite floodplains with loose substrates at elevations between 785 and 1,662 ft (239 and 507 m) (AGFD 2010b). The Analysis Area is outside the known geographic and elevational range of this species. Creosote-mesquite floodplain habitat is not present.
Sonoran desert tortoise ( <i>Gopherus morafkai</i> )	Candidate	Present	Found in rocky foothills and lower bajadas of the Sonoran Desert between 510 and 5,300 ft (155 and 1,615 m) (AGFD 2010a). The most northeastern records are along the Salt River near Roosevelt Lake (AGFD 2010a). The Analysis Area has rocky habitat and suitable soil development for burrow construction. WestLand has observed the species in the Analysis Area. This species is considered further in <b>Section 4.2</b> .

Table 3. Screening Analysis for Species Listed by U.S. Fish & Wildlife Service (USFWS) as Threatened, Endangered, Proposed for Listing, or Candidate for Listing under the Endangered Species Act in Pinal County. Species highlighted in gray are either known to occur or have a reasonable potential to occur within the Analysis Area.

Species	USFWS Status	Potential to Occur in the Analysis Area	Basis for Determination
Northern Mexican gartersnake ( <i>Thamnophis eques megalops</i> )	Candidate	No Potential	Inhabits densely vegetated habitats along water sources from 3,000 to 5,000 ft (914 to 1,524 m) (AGFD 2012). Populations are generally found south of Gila River. The Analysis Area is outside the known geographic range for the species and does not contain suitable aquatic habitat.
Narrow-Headed Gartersnake ( <i>Thamnophis rufipunctatus</i> )	Candidate	No Potential	Species requires shallow, swift moving, rocky rivers and streams along the Mogollon Rim (AGFD 2009b). Habitat is not available in Analysis Area.
<b>BIRDS (4)</b>			
Southwestern willow flycatcher ( <i>Empidonax traillii extimus</i> )	Endangered	Limited Potential	Inhabits densely vegetated multilayered blocks of willow/cottonwood/exotic riparian vegetation and standing water/saturated soils at elevations from 75 to 9,180 ft (22 to 2,798 m) (AGFD 2002a). Present mid-summer. The Analysis Area is within the known geographic range of the species but does not contain extensive willow and cottonwood riparian habitat with perennial water. Flycatchers breed along portions of Queen Creek, just south of the Analysis Area. The HDMS Online Review tool shows a record of this species within 3 mi (5 km) of the Analysis Area ( <b>Appendix C</b> ). Suitable habitat is not present for this species within the Analysis Area. Potentially suitable habitat for this species is present along Queen Creek, south of the Analysis Area. This flycatcher is not likely to be breeding or foraging in the vegetation of the Analysis Area. This subspecies and other subspecies of the willow flycatcher may occur as transients in the Analysis Area during fall and spring migration.
Yuma clapper rail ( <i>Rallus longirostris yumanensis</i> )	Endangered	No Potential	Occupies fresh water and brackish marshes with dense emergent riparian vegetation at elevations below 4,500 ft (1,372 m) (AGFD 2006a). The Analysis Area is outside the known geographic range and does not contain perennial water with dense emergent vegetation.
Mexican spotted owl ( <i>Strix occidentalis lucida</i> )	Threatened	No Potential	Inhabits dense mixed multistoried conifer forests in steep canyons between 4,100 and 9,000 ft (1,250 and 2,743 m) (AGFD 2005b). Critical habitat is designated in the Pinal Mountains within 3 mi of the Analysis Area. The Analysis Area is below the minimum elevation for this species and suitable dense, virgin, mixed conifer forests with steep slopes does not occur in the Analysis Area.

Table 3. Screening Analysis for Species Listed by U.S. Fish & Wildlife Service (USFWS) as Threatened, Endangered, Proposed for Listing, or Candidate for Listing under the Endangered Species Act in Pinal County. Species highlighted in gray are either known to occur or have a reasonable potential to occur within the Analysis Area.

Species	USFWS Status	Potential to Occur in the Analysis Area	Basis for Determination
Yellow-billed cuckoo ( <i>Coccyzus americanus</i> )	Candidate	Limited Potential	Utilizes large blocks of riparian woodlands with mature cottonwood-willow galleries at elevations below 6,710 ft (2,045 m) in Arizona (AGFD 2011b). Marginal habitat for this species can include isolated cottonwoods intermixed with large mesquites. Dense understory foliage is an important factor for nesting. Occurrences of this species have been recorded throughout Arizona including within Pinal County. Potentially suitable habitat for this species is present along Queen Creek, south of the Analysis Area. The Analysis Area does not provide suitable habitat characteristics of cottonwood-willow galleries or even isolated cottonwoods intermixed with tall mesquites and dense understory for nesting. This subspecies may occur as transients in the Analysis Area during fall and spring migration, but the cuckoo is not likely to be breeding or foraging in the Analysis Area.
<b>MAMMALS (2)</b>			
Lesser long-nosed bat ( <i>Leptonycteris curasoae yerbabuena</i> )	Endangered	No Potential	The Analysis Area occurs just outside the known late summer – fall range of lesser long-nosed bat (LLNB) in Arizona, when agave is its main forage resource ( <b>Figure 10</b> ). LLNB has not been detected in the Tonto National Forest (TNF 2000), and AGFD HDMS ( <b>Appendix C</b> ) reports no records of this species within 3 mi (5 km) of the Analysis Area. This species was not detected during WestLand's bat survey of areas along Queen Creek, Apache Leap, Devils Canyon, and Oak Flat/East Plant area (WestLand 2012b). The LLNB is known to fly up to 18.5 mi (30 km) to forage (AGFD 2011c). The closest known maternity site for these bats is approximately 66 mi (130 km) from the Analysis Area ( <b>Figure 11</b> ). Therefore, the Analysis Area is outside the foraging range of the nearest known roosts of the LLNB. This species forages in desert grassland or shrubland on saguaros and other cacti in the early summer and on agaves in the late summer (AGFD 2011c). The Analysis Area contains numerous saguaros but since no known maternity roosts with bats that would use saguaros as a foraging resource are nearby, this species is not likely to be present during the early summer. <i>Agave chrysantha</i> , which is found in the Analysis Area, is seldom used as a food source by this species occupying post-maternity roosts.



Table 3. Screening Analysis for Species Listed by U.S. Fish & Wildlife Service (USFWS) as Threatened, Endangered, Proposed for Listing, or Candidate for Listing under the Endangered Species Act in Pinal County. Species highlighted in gray are either known to occur or have a reasonable potential to occur within the Analysis Area.

Species	USFWS Status	Potential to Occur in the Analysis Area	Basis for Determination
Ocelot ( <i>Leopardus pardalis</i> )	Endangered	No Potential	Occupies dense thickets that are almost impenetrable in chaparral and thornscrub (AGFD 2010c). Established sightings in Arizona are rare for this species. A male was killed by a vehicle on US 60 between Globe and Superior in April 2010 (AGFD 2010c). The Analysis Area is outside the known geographic range for the species and does not contain suitable brushy habitat.

**US Fish & Wildlife Service Categories**

**Endangered** – Taxon in danger of extinction throughout all, or a significant portion, of its range.

**Threatened** – Taxon likely to become endangered in the foreseeable future throughout all, or a significant portion, of its range.

**Candidate** – Taxon for which sufficient data exist to support proposals to list, but formal proposals to list as Threatened or Endangered have not been made by the USFWS because this action is precluded by other listing activity.

## 4.2. SONORAN DESERT TORTOISE

The recognition of the Sonoran desert tortoise (*Gopherus morafkai*; Murphy et al. 2011) as a valid taxon is a recent development. It was formerly included with *G. agassizii*, which as a whole occupied an area from the Mojave and Colorado/Sonoran deserts of California, east and south through the Sonoran Desert of Arizona and into Sonora and Sinaloa, Mexico, where it is also found in foothills thornscrub and tropical deciduous forest/coastal thornscrub. The desert tortoise population west and north of the Colorado River was commonly referred to as the Mojave population while the population east and south of the Colorado River was referred to as the Sonoran population.

Based on genetic, physiological, morphological, and ecological differences between the Mojave and Sonoran populations, Murphy et al. (2011) split *G. agassizii* into two species, the Mojave or Agassiz's desert tortoise (*G. agassizii*) west and north of the Colorado River, and the Sonoran or Morafka's desert tortoise, *G. morafkai*, east and south of the Colorado River. Until recently, the USFWS referred to the Sonoran desert tortoise as *G. agassizii*, Sonoran DPS (Distinct Population Segment) in their 2011 annual review of Candidate species (USFWS 2011a). However, they mentioned a recent genetic study (likely the Murphy paper) and stated that they would be considering the evidence for adopting the new taxon. Now, both their General Species Information (USFWS 2012b) and their profile page (USFWS 2012c) refer to the Sonoran desert tortoise as *G. morafkai*.

In 1990, the Mojave population of the desert tortoise was listed as threatened (USFWS 1990), but the Sonoran population did not have status under the ESA. The Sonoran population was petitioned for listing as a DPS with critical habitat on October 9, 2008 (WildEarth Guardians and Western Watersheds Project 2008). On August 28, 2009, the USFWS published its 90-day finding that the Sonoran DPS warranted a status review to determine if it should be listed or not (USFWS 2009b). At the end of the 12-month review period, they announced that listing of the Sonoran DPS was warranted but precluded by higher priority items, and the species was added to the USFWS list of candidate species (USFWS 2010). A U.S. District Court settlement<sup>2</sup> reached with the WildEarth Guardians on May 10, 2011 outlined a timetable for resolving listing decisions on 251 species. The Sonoran desert tortoise is one of 24 species in Arizona affected by the settlement agreement, and, as outlined in the settlement agreement, the USFWS must issue a proposed listing rule or "not warranted" determination by the end of the U.S. Fiscal Year (September 30), 2015.

The northeastern extent of the Sonoran desert tortoise's range abuts the Salt River in Gila County, while the easternmost records are located along the middle San Pedro River drainage in Cochise. Tortoises have been recorded as far southwest as the Yuma Proving Ground, the Barry M. Goldwater Range, and the Cabeza Prieta National Wildlife Refuge.

Habitat for the Sonoran desert tortoise includes rocky slopes in desertscrub, including a variety of plant communities within the Sonoran Desert. They are most often found in paloverde-mixed cacti communities (AGFD 2010a). Specifically, Sonoran desert tortoises are found in the Arizona Upland and

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<sup>2</sup> United States District Court for the District of Columbia (Case 1:10-mc-00377-EGS Document 31 Filed 05/10/11).

Lower Colorado River Subdivisions of Sonoran Desertscrub, in desert grassland communities, and in ecotonal areas consisting of Sonoran Desertscrub with components of Interior Chaparral, Mojave Desertscrub and juniper woodland, and desert grassland (Averill-Murray and Klug 2000). Populations occur at elevations between 510 and 5,300 ft (155 to 1,615 m) (AGFD 2010a).

Desert tortoises typically utilize underground structures for thermoregulation, protection, and nesting (USFWS 2010). The availability of soils where tortoises can dig underground shelters is an essential habitat feature for this species. Tortoises require loose soils to excavate burrows; therefore, shelter sites are rarely found in areas with shallow soils. They also use caliche caves in incised washes and rock crevices. Occasionally, desert tortoises rest under live or dead vegetation without constructing a burrow (AGFD 2010a).

Sonoran desert tortoises are herbivores that have been documented to eat over 199 plant species. Their diet is comprised of roughly 53 percent herbaceous plants, 18 percent grasses, 22 percent woody plants, and 5 percent succulents (USFWS 2010). Tortoises obtain most of their water through their diet (AGFD 2010a).

Sonoran desert tortoises and signs of activity were found throughout suitable habitats in portions of the Analysis Area in reconnaissance surveys in 2012. Surveys were conducted on 19 transects during seven days between September 24 and October 4, 2012. These transects were generally located along washes in the southern and central portion of the Analysis Area. Transects were walked and scanned for signs of Sonoran desert tortoises including: live tortoises, scat, tracks, burrows, and skeletal remains. Burrows were scored as either “active” or “suitable”. Active burrows were considered to be those with live tortoises, skeletal remains, scat, or tracks inside the burrow. Suitable burrows were those that could harbor tortoises based on their size, depth, and accessibility, but which had no evidence of being utilized recently. Three live Sonoran desert tortoises, one tortoise skeleton, 23 tortoise scats, 15 active burrows with various levels of sign, and 31 suitable burrows were observed (**Figure 9**). These surveys and observations by field biologists indicate that the Analysis Area provides suitable habitat for tortoises.

## 5. TONTO NATIONAL FOREST SENSITIVE SPECIES SCREENING ANALYSIS

Fifty-three TNF sensitive species were evaluated for their potential occurrence in the Analysis Area (**Table 4**). Species evaluated included three invertebrates, three fish, four amphibians, three reptiles, eight birds, ten mammals, and 22 plant species. The screening analysis and surveys of the Analysis Area determined that one species is known to occur in the analysis and 12 others have a reasonable potential to occur based on their range and habitat requirements.

The Analysis Area contains suitable habitat for and is within the range of two plants, Pima indian mallow (*Abutilon parishii*) and mapleleaf false snapdragon (*Mabrya acerifolia*); one reptile, Maricopa leaf-nosed snake (*Phyllorhynchus browni lucidus*); three birds, zone-tailed hawk (*Buteo albonotatus*), American peregrine falcon (*Falco peregrinus anatum*), and Abert’s towhee (*Pipilo aberti*); and six mammals, California leaf-nosed bat (*Macrotus californicus*), western red bat (*Lasiurus blossevillei*), pale

Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), greater western bonneted bat (*Eumops perotis californicus*), pocketed free-tailed bat (*Nyctinomops femorosaccus*), and desert bighorn sheep (*Ovis canadensis mexicana*). One reptile, reticulate Gila monster (*Heloderma supectum suspectum*), was observed during field surveys and is known to be present in the Analysis Area.

Table 4. Screening Analysis for Tonto National Forest Sensitive Species. Species highlighted in gray are either known to occur or have a reasonable potential to occur in the Analysis Area.

Common Name	Scientific Name	Family	Potential to Occur	Comments
<b>PLANTS (22)</b>				
Aravaipa woodfern	<i>Thelypteris puberula</i> var. <i>sonorensis</i>	Thelypteridaceae	No Potential	This species requires riparian habitat (mostly found on riverbanks, seepage area, and wet meadows) in mesic canyons in the shade of boulders (AGFD 2004a). The Analysis Area does not contain mesic and shaded habitats required by the species.
<b>Pima Indian Mallow</b>	<i>Abutilon parishii</i>	Malvaceae	Potential	Inhabits rocky substrate, cliff bases, and flat secondary terraces, in higher elevation Arizona Upland Sonoran Desertscrub. Prefers southern exposure and full sun on bouldery, rocky, shallow soils (AGFD 2000a). The Analysis Area contains suitable habitat of Arizona Upland Sonoran Desertscrub and southwestern canyons with rocky substrate. The geographic range of the species is in the vicinity of the Analysis Area.
Hohokam agave	<i>Agave murpheyi</i>	Agavaceae	Limited Potential	Occurs along Queen Creek near Boyce Thompson Arboretum. Occurs along stream terraces or gentle bajada slopes with low rock check dams near archaeological sites between 1,300 and 2,400 ft (396 and 730 m) (AGFD 2003b). May occur in the lowest elevations of the Analysis Area. Elevations within the Analysis Area range from approximately 2,250 ft (685 m) amsl in the portions nearest to US 60 to 3,300 ft (1,000 m) amsl above Silver King Wash.
Tonto Basin agave	<i>Agave delamateri</i>	Agavaceae	No Potential	This species is only known from clones associated with Mogollon or Salado (pre-Columbian) agricultural and settlement features, primarily in the Tonto Basin near Globe (AGFD 2003c). No specimens of this plant have been observed by WestLand in the Analysis Area during surveys.
Mogollon fleabane	<i>Erigeron anchana</i>	Asteraceae	No Potential	One known from Superstition Mountains in Pinal County. Inhabits granite cliff faces from chaparral through pine forests between 3,500 and 7,000 ft (1,067 and 2,134 m) (AGFD 2003d). The maximum elevation in Analysis Area is below the minimum elevation for the species.
Ripley Wild Buckwheat	<i>Eriogonum ripleyi</i>	Polygonaceae	No Potential	The Analysis Area is outside the species range and habitat of white, calcareous substrates and volcanic tuff in Sonoran Desert Scrub and Pinyon Juniper Woodlands do not occur in the Analysis Area. (AGFD 1997).
Horseshoe Deer Vetch	<i>Lotus mearnsii</i> var. <i>equisolensis</i>	Fabaceae	No Potential	Habitat is calcareous lakebed deposits which do not occur in Analysis Area. Only one population known from Horseshoe reservoir along Verde river (ARPC 2001).

Table 4. Screening Analysis for Tonto National Forest Sensitive Species. Species highlighted in gray are either known to occur or have a reasonable potential to occur in the Analysis Area.

Common Name	Scientific Name	Family	Potential to Occur	Comments
Galiuro sage	<i>Salvia amissa</i>	Lamiaceae	No Potential	Known from Fish Creek in the Superstition Mountains. Found in shady canyon bottoms on upper floodplain terraces near streams in understory of mature sycamore, walnut, ash, and mesquite (AGFD 2002e). No suitable habitat of streams systems containing mature sycamore, ash, walnut, and mesquite occur in the Analysis Area.
<b>Mapleleaf false snapdragon</b>	<i>Mabrya acerifolia</i> (= <i>Maurandya a.</i> )	Scrophulariaceae	Potential	Occurs in Superstition Mountains on rhyolite rock crevices, shaded cliffs, and rock ledges in Sonoran Desertscrub from 1,800 to 3,350 ft (549 to 1,021 m) (AGFD 2005c). Analysis Area contains suitable habitat characteristics. Closest reported population is one mile west of the Analysis Area.
Cochise Sedge	<i>Carex ultra</i> (= <i>C. spissa</i> var. <i>ultra</i> )	Cyperaceae	Limited Potential	Occurs in aquatic/riparian and oak woodland habitats with "wet alluvial soil, sand and gravel" between 2,000 and 6,000 ft (610 and 1,830 m) (AGFD 2000b). The Analysis Area contains only scattered patches of riparian vegetation and a few small seeps and springs that may contain saturated soils. Given the paucity of nearby records and potential seep and spring habitats, we consider the possibility for occurrence to be low.
Arizona bugbane	<i>Cimicifuga arizonica</i>	Ranunculaceae	No Potential	Habitat occurs in "ecotone between coniferous forest and riparian" areas between 6,000 and 8,300 ft (AGFD 2008b) which is above the highest elevation in the Analysis Area.
Blumer's dock	<i>Rumex orthoneurus</i>	Polygonaceae	No Potential	Habitat occurs at "mid- to high-elevation wetlands with moist, organic soil adjacent to perennial springs or streams in canyons or meadow between 4,480 and 9,660 ft (AGFD 2002f) which is above the highest elevation in the Analysis Area.
Fish Creek Fleabane	<i>Erigeron piscaticus</i>	Asteraceae	No Potential	The Analysis Area is outside the species range and habitat of moist, sandy canyon bottoms associated with perennial streams do not occur in the Analysis Area (AGFD 2001c).
Toumey Groundsel	<i>Packera neomexicana</i> var. <i>toumeyi</i> (= <i>Senecio n.</i> var. <i>t.</i> )	Asteraceae	No Potential	Habitat is coniferous woodlands from 1800 to 2500 m (5,900 to 8,200) which is above the highest elevation in the Analysis Area. Known only from the Pinal, Chiricahua, and Santa Catalina mountains in Arizona (SEINet 2013).
Hualapai Milkwort	<i>Polygala rusbyi</i>	Polygalaceae	No Potential	The Analysis Area is outside the species range and habitat of desert grassland and juniper woodland does not occur in the Analysis Area (AGFD 2003e).
Arizona phlox	<i>Phlox amabilis</i>	Polemoniaceae	No Potential	Habitat is "within pinyon-juniper woodlands and ponderosa pine-gamble oak communities" (AGFD 2003f), which do not occur in the Analysis Area. Also outside known geographical range.

Table 4. Screening Analysis for Tonto National Forest Sensitive Species. Species highlighted in gray are either known to occur or have a reasonable potential to occur in the Analysis Area.

Common Name	Scientific Name	Family	Potential to Occur	Comments
Fish creek rockdaisy	<i>Perityle saxicola</i>	Asteraceae	No Potential	Habitat occurs on limestone, conglomerate and quartzite with an elevational limit of 3,800 ft (AGFD 2004b). These substrates occur in the Analysis Area but this plant is endemic to Fish Creek in the Superstition Mountains.
Salt River Rockdaisy	<i>Perityle gilensis</i> var. <i>salensis</i>	Asteraceae	No Potential	This plant is known only from the type locality on the San Carlos Indian Reservation on the Salt River between Show Low and Globe, but it is expected to occur in the Salt River Canyon down river on the Tonto National Forest (TNF 2000).
Arizona Alum root	<i>Heuchera glomerulata</i>	Saxifragaceae	No Potential	Analysis Area does not contain habitat requirements of shaded rocky slopes, in humus soil, near seeps, streams and riparian areas between 4,000 to 9,000 ft (AGFD 2004c).
Eastwood Alum Root	<i>Heuchera eastwoodiae</i>	Saxifragaceae	No Potential	Not known from Analysis Area and habitat of Ponderosa pine forests with rocky, clay soils from 5,000 to 6,000 ft does not occur in the Analysis Area (AGFD 2005d).
Mt. Dellenbaugh sandwort	<i>Arenaria aberrans</i>	Caryophyllaceae	No Potential	Habitat is oak and pine forests from 5,500 to 9,000 ft (AGFD 2004d) which is above the highest elevation of the Analysis Area.
Chihuahua Sedge	<i>Carex chihuahuensis</i>	Cyperaceae	No Potential	Habitat is "streambeds, riparian woodland, wet meadows, cienegas, marshy areas and canyon bottoms" between 3,600 and 7,200 ft (AGFD 2004e) which does not occur in Analysis Area.
<b>FISH (3)</b>				
Sonora Sucker	<i>Catostomus insignis</i>	Catostomidae	No Potential	Analysis Area does not contain perennial water required by this species (AGFD 2002g).
Desert Sucker	<i>Catostomus clarkii</i>	Catostomidae	No Potential	Analysis Area does not contain perennial water required by this species (AGFD 2002i).
<b>AMPHIBIANS (4)</b>				
Western Barking Frog	<i>Eleutherodactylus augusti cactorum</i>	Leptodactylidae	No Potential	Inhabits outcrops or caves on rocky slopes, often in shrub oak or pine-oak woodlands, within the Madrean evergreen woodlands and woodland-grassland (AGFD 2009a). The Analysis Area is outside the species range.
Northern Leopard Frog	<i>Lithobates pipiens</i>	Ranidae	No Potential	The Analysis Area is outside the species range and lacks suitable aquatic habitat (AGFD 2002j).

Table 4. Screening Analysis for Tonto National Forest Sensitive Species. Species highlighted in gray are either known to occur or have a reasonable potential to occur in the Analysis Area.

Common Name	Scientific Name	Family	Potential to Occur	Comments
Lowland Leopard Frog	<i>Lithobates yavapaiensis</i>	Ranidae	Potential	Inhabits aquatic systems from desert grasslands to pinyon-juniper. Species occurs in a variety of perennial to near perennial waters (AGFD 2006b). HDMS has records for this species within 3 miles of the Analysis Area ( <b>Appendix C</b> ). The Analysis Area does not include any perennial creeks or streams and the few, small isolated seeps, and springs in the vicinity likely provide suitable marginal breeding habitat at best. Stock tanks in the Analysis Area, though of unknown water holding capacity (i.e., perennial versus temporary) could provide seasonal breeding or dispersal habitat.
Arizona Toad	<i>Anaxyrus microscaphus</i>	Bufo	No Potential	Occurs in perennial rocky streams and canyons in the pine-oak belt and can also occur in lower deserts (AGFD 2002k).
<b>REPTILES (3)</b>				
<b>Reticulate Gila Monster</b>	<i>Heloderma suspectum suspectum</i>	Helodermatidae	Present	Inhabits Sonoran Desertscrub, Semidesert Grassland, Interior Chaparral, and occasionally woodlands. Encountered in mountainous terrain, rocky slopes, and canyon bottoms (Brennan and Holycross 2006). This species has been seen in the Analysis Area.
<b>Maricopa Leaf-nosed Snake</b>	<i>Phyllorhynchus browni lucidus</i>	Colubridae	Potential	Species found in south-central Arizona at elevations ranging from about 1,000 to 3,000 ft (305 to 915 m). Inhabits alluvial soils and fans in Arizona Upland Sonoran Desertscrub and Lower Colorado River subdivision near Florence. It is usually found above the flats in foothills and on moderate bajadas (Brennan and Holycross 2006). Reported from US 60, south of the Analysis Area. Limited potential for this species to occur.
<b>BIRDS (8)</b>				
Northern Goshawk	<i>Accipiter gentilis</i>	Accipitridae	No Potential	Occurs in ponderosa pine and mixed conifer forests, including some riparian habitats. They occur statewide breeding in high, forested mountains and plateaus, usually above 6,000 ft (AGFD 2003g).
Common Black-Hawk	<i>Buteogallus anthracinus</i>	Accipitridae	Limited Potential	This species is an obligate riparian nester, dependent on mature, relatively undisturbed habitat supported by permanently flowing water (AGFD 2005e). Known to occur at Boyce Thompson Arboretum during summer. Analysis Area does not have permanently flowing water therefore suitable habitat is not present, but foraging may occur over the Analysis Area.
<b>Zone-tailed Hawk</b>	<i>Buteo albonotatus</i>	Accipitridae	Potential	Nests in high elevation forests, lowland riparian areas, and dry desert washes (Corman and Wise-Gervais 2005). This species has been documented breeding in middle Queen Creek, directly south of Analysis Area (WestLand 2012c). Suitable foraging habitat characteristics may occur in Analysis Area.



Table 4. Screening Analysis for Tonto National Forest Sensitive Species. Species highlighted in gray are either known to occur or have a reasonable potential to occur in the Analysis Area.

Common Name	Scientific Name	Family	Potential to Occur	Comments
Northern Gray Hawk	<i>Buteo nitidus maxima</i>	Accipitridae	Limited Potential	Occurs in riparian woodlands with large trees (cottonwoods), usually near mesquite forests in the southeastern part of state in watersheds of the San Pedro River and Santa Cruz River in Pima, Santa Cruz, and Pinal Counties (AGFD 1999). Analysis Area does not have permanently flowing water therefore suitable habitat is not present, but foraging may occur over the Analysis Area.
<b>American Peregrine Falcon</b>	<i>Falco peregrinus anatum</i>	Falconidae	Limited Potential	Occurs in steep, sheer cliffs overlooking woodlands, riparian areas or other habitats supporting avian prey species. They occur wherever sufficient prey is available near cliffs (AGFD 2002l). This species nests along Apache Leap and in middle Devils Canyon (WestLand 2012c). Suitable nest sites, such as high cliffs as used by the local nesting pairs, are not available in the Analysis Area. Foraging may occasionally occur over the Analysis Area.
<b>Abert's Towhee</b>	<i>Pipilo aberti</i>	Emberizidae	Potential	Inhabits dense riparian brush with cottonwood and willows as well as dry desert washes that empty into wetter drainages (Corman and Wise-Gervais 2005). The Analysis Area is within the known range of this species and it has been recorded during WestLand bird surveys in the Apache Leap escarpment east of Superior. The Analysis Area contains a number of dry desert washes with xeroriparian vegetation that may provide suitable habitat for this species, especially in wet years. This species could also inhabit the Sonoran desertscrub habitat. Considered common year-round residents at the Boyce Thompson Arboretum near Superior.
Clark's grebe	<i>Euptilotis neoxenus</i>	Trogonidae	No Potential	Occurs in pine and pine-oak forests at elevations from 1536 to 2195 m (5,040 to 7,200 ft) which is above the highest elevation in the project area (AGFD 2002m).
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Accipitridae	No Potential	Occurs along high water to land edge with open water such as river rapids, impoundments, dam spillways, lakes and estuaries. Closest known occurrences are at Roosevelt Lake and Gila River near Hayden (AGFD 2011d). The Analysis Area does not contain suitable habitat.
<b>MAMMALS (10)</b>				
<b>California Leaf-nosed Bat</b>	<i>Macrotus californicus</i>	Phyllostomidae	Potential	May occur if open cavern habitat is available. Forages in Sonoran Desertscrub (AGFD 2001d). Captured at Boyce Thompson 2001 and 2002. Captured by WestLand in the Oak Flat/East Plant Mine site area (WestLand 2012b).
<b>Western Red Bat</b>	<i>Lasiurus blossevillii</i>	Vespertilionidae	Limited Potential	Roosts in riparian habitat with large trees. Specimen found in Queen Creek (AGFD 2011e). Captured by WestLand in the Oak Flat/East Plant Mine site area (WestLand 2011).

Table 4. Screening Analysis for Tonto National Forest Sensitive Species. Species highlighted in gray are either known to occur or have a reasonable potential to occur in the Analysis Area.

Common Name	Scientific Name	Family	Potential to Occur	Comments
<b>Pale Townsend's Big-eared Bat</b>	<i>Corynorhinus townsendii pallescens</i>	Vespertilionidae	Potential	Inhabits open-ceiling caves and mines from Desertscrub up to woodlands. Maternity roosts prefer dim light near edge of lighted zone (AGFD 2003h). May occur if open cavern habitat is available. Captured at Boyce Thompson 2001 and 2002. Captured by WestLand in the Oak Flat/East Plant Mine site area (WestLand 2012b).
<b>Greater Western Bonneted Bat</b>	<i>Eumops perotis californicus</i>	Molossidae	Potential	Found in upper and lower Sonoran Desertscrub near cliffs. Prefers rugged, rocky terrain and tight crevices (AGFD 2002n). Captured at Boyce Thompson 2001 and 2002. Captured by WestLand in the Oak Flat/East Plant Mine site area (WestLand 2012b).
<b>Pocketed Free-tailed Bat</b>	<i>Nyctinomops femorosaccus</i>	Molossidae	Potential	Captured near project area. Cliffy habitat present. Was captured at Boyce Thompson 2001 and 2002. Captured by WestLand in the general RCM project area (WestLand 2012b).
Spotted Bat	<i>Euderma maculatum</i>	Vespertilionidae	No Potential	Recorded near Tempe and Yuma, AZ (AGFD 2001e). Cliffy habitat present. There are no records for this species in the vicinity of the Analysis Area. The closest recorded detections of this species are over 80 miles away from the Analysis Area.
Allen's Lappet-browed Bat	<i>Idionycteris phyllotis</i>	Vespertilionidae	Limited Potential	Species occurs in woodlands and riparian areas in proximity to cliffs, rocky outcrops, or lava flows, often above water (AGFD 2001f). The Analysis Area contains potential habitat and is within the known geographic range for this species and it could use available roost sites and forage in the Area. The AGFD has not captured Allen's big-eared bat during mist netting efforts at the Boyce Thompson Arboretum (Tim Snow, AGFD, pers. comm.) and species was not detected during WestLand's bat survey of the Analysis Area vicinity (WestLand 2012b).
White-nosed Coati	<i>Nasua narica</i>	Procyonidae	No Potential	Inhabits oak woodlands, hardwood riparian canyons or open forests. Rarely seen in open grassland or desert (Hoffmeister 1986). The Analysis Area does not contain suitable habitat for the species.
Rocky mountain bighorn sheep	<i>Ovis canadensis canadensis</i>	Bovidae	No Potential	The project area is outside the species range (AGFD 2013). The closest known occurrence was a solitary individual hit by a car near Winkelman (Brian Wakeling, AGFD, pers. comm.).
<b>Desert bighorn sheep</b>	<i>Ovis canadensis mexicana</i>	Bovidae	Potential	The western portion of the project area falls within the eastern portion of the Superstition Wilderness population (AGFD 2013). WestLand personnel observed a skull from a 3-year-old ram at the eastern edge of the Analysis Area.

Table 4. Screening Analysis for Tonto National Forest Sensitive Species. Species highlighted in gray are either known to occur or have a reasonable potential to occur in the Analysis Area.

Common Name	Scientific Name	Family	Potential to Occur	Comments
<b>INVERTEBRATES (3)</b>				
Fossil Springsnail	<i>Pyrgulopsis simplex</i>	Hydrobiidae	No Potential	Project Area does not have perennial water, which is required by this species. Found only at a spring at the extreme NW corner of Gila County and at Fossil Springs, Yavapai County (AGFD 2003i).
Net-winged Midge	<i>Agathon arizonicus</i>	Bephariceridae	No Potential	Only occurs above 6,000 ft; closest known population is in the Sierra Ancha Mountains (AGFD 2003j).
Parker's cyloepus riffle beetle	<i>Cylloepus parkeri</i>	Elmidae	No Potential	Project Area does not have perennial water, which is required by this species. Found only in Yavapai County (AGFD 2003k).

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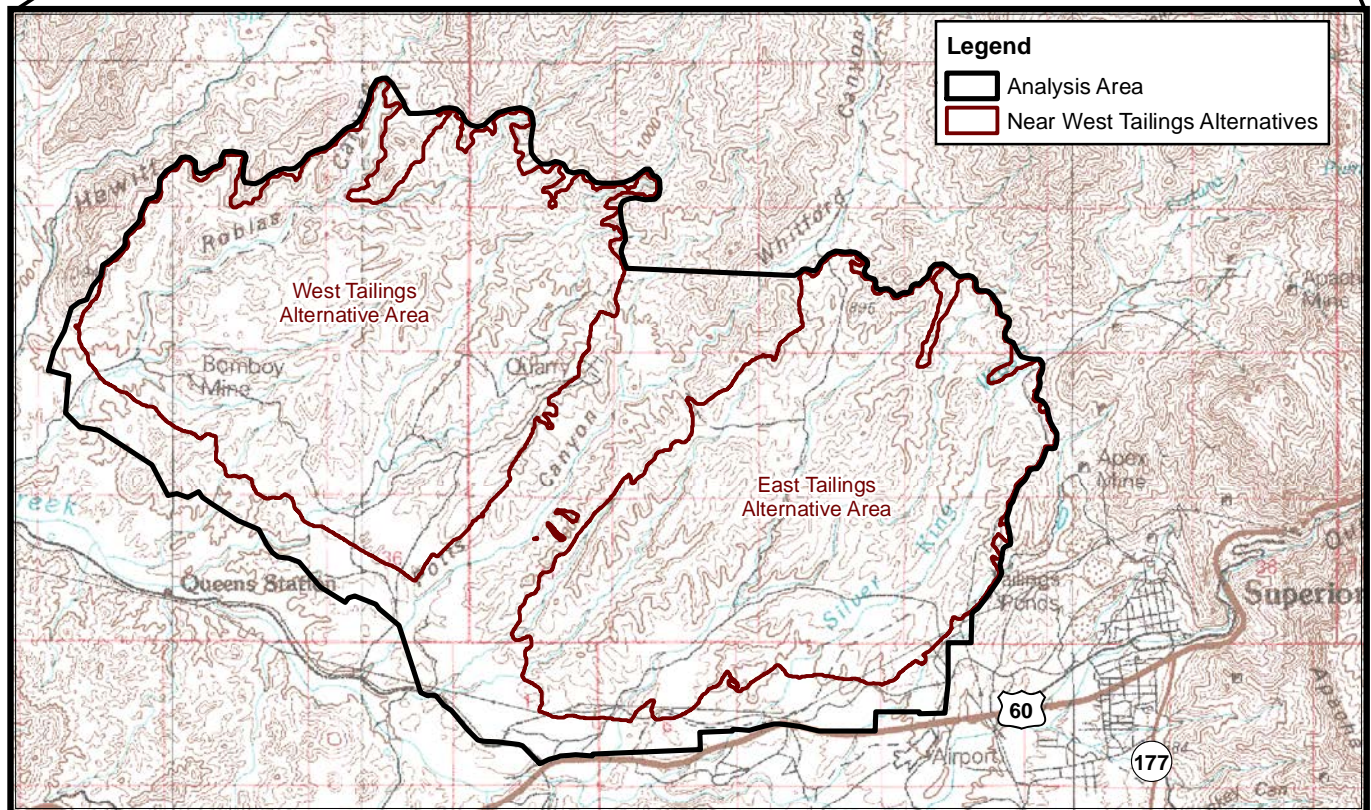
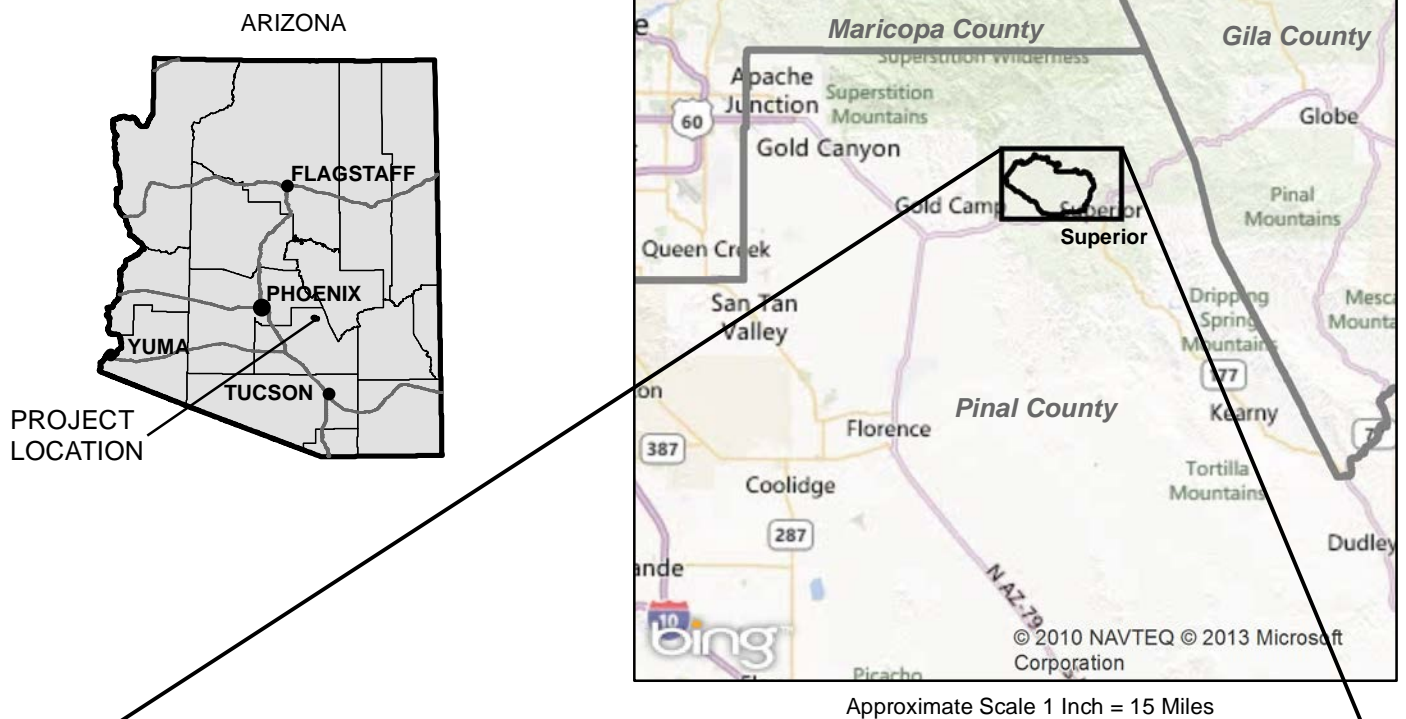
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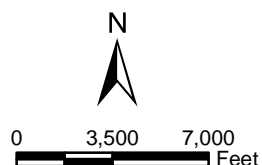
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# FIGURES



T1S, R11E, Portion of Sections 13-15, 22-27, & 35-36,  
 T1S, R12E, Portion of Sections 17-22, & 27-34,  
 T2S, R11E, Portion of Sections 1 & 2,  
 T2S, R12E, Portion of Sections 4-6  
 Pinal County, Arizona,  
 Picketpost Mountain & Superior USGS 7.5' Quadrangles



## RESOLUTION COPPER MINING

### Biological Evaluation of the Near West Analysis Area



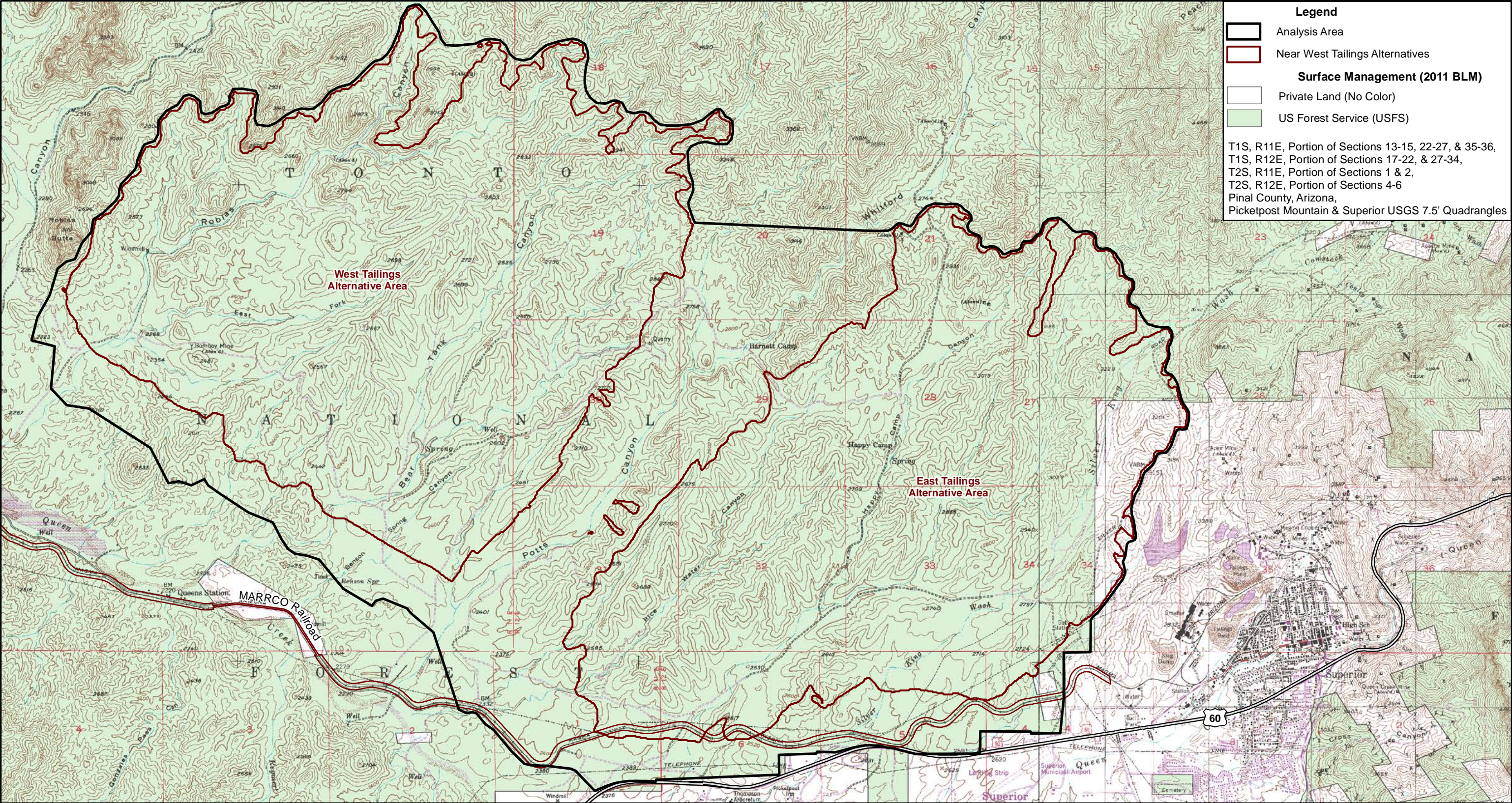
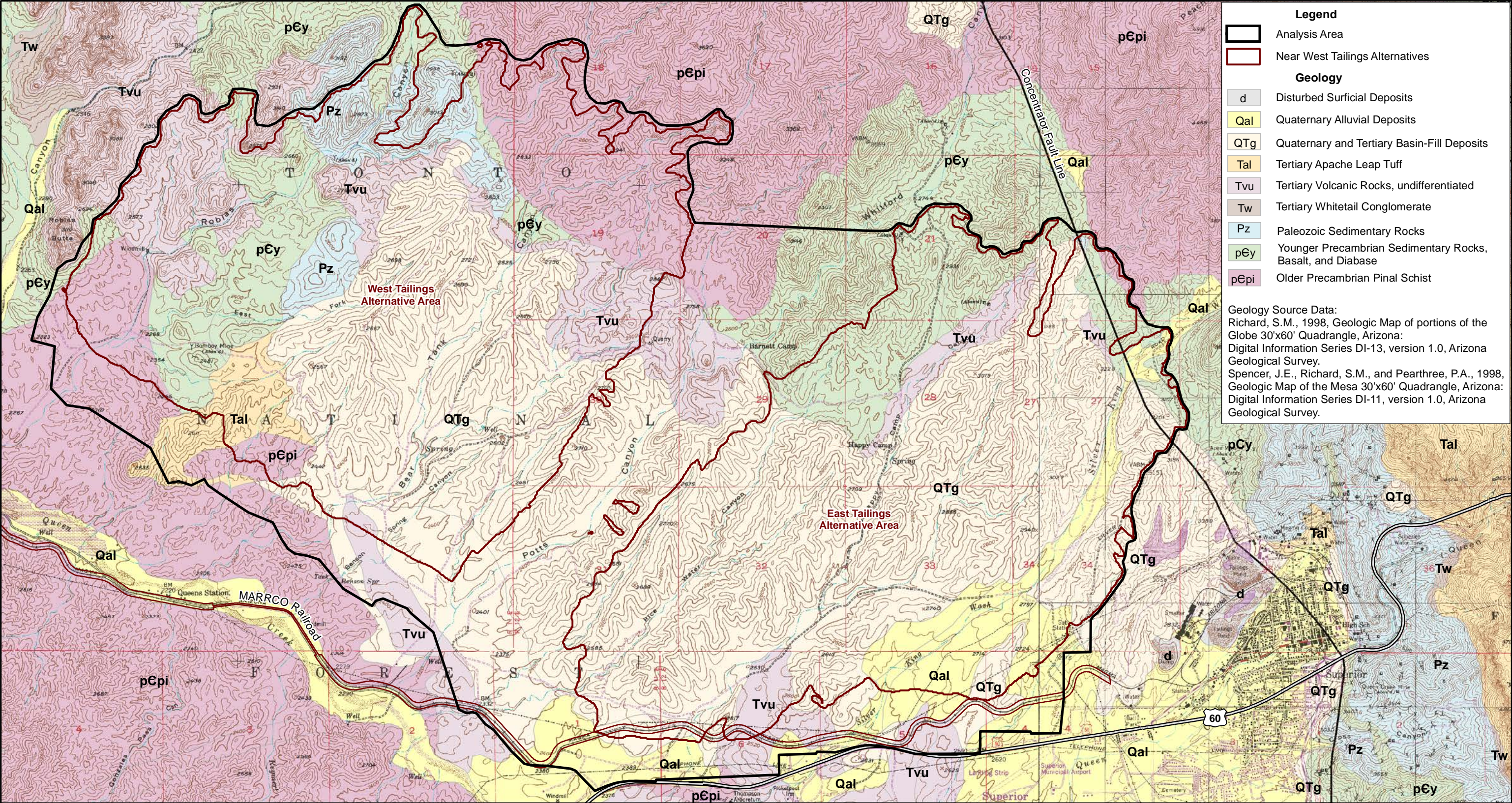


Image Source 1:24,000 USGS Quadrangles





**Legend**

Analysis Area

Near West Tailings Alternatives

**Geology**

d Disturbed Surficial Deposits

Qal Quaternary Alluvial Deposits

QTg Quaternary and Tertiary Basin-Fill Deposits

Tal Tertiary Apache Leap Tuff

Tvu Tertiary Volcanic Rocks, undifferentiated

Tw Tertiary Whitetail Conglomerate

Pz Paleozoic Sedimentary Rocks

pEy Younger Precambrian Sedimentary Rocks, Basalt, and Diabase

pEpi Older Precambrian Pinal Schist

Geology Source Data:  
Richard, S.M., 1998, Geologic Map of portions of the Globe 30'x60' Quadrangle, Arizona: Digital Information Series DI-13, version 1.0, Arizona Geological Survey.  
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Image Source: 1:24,000 USGS Quadrangles



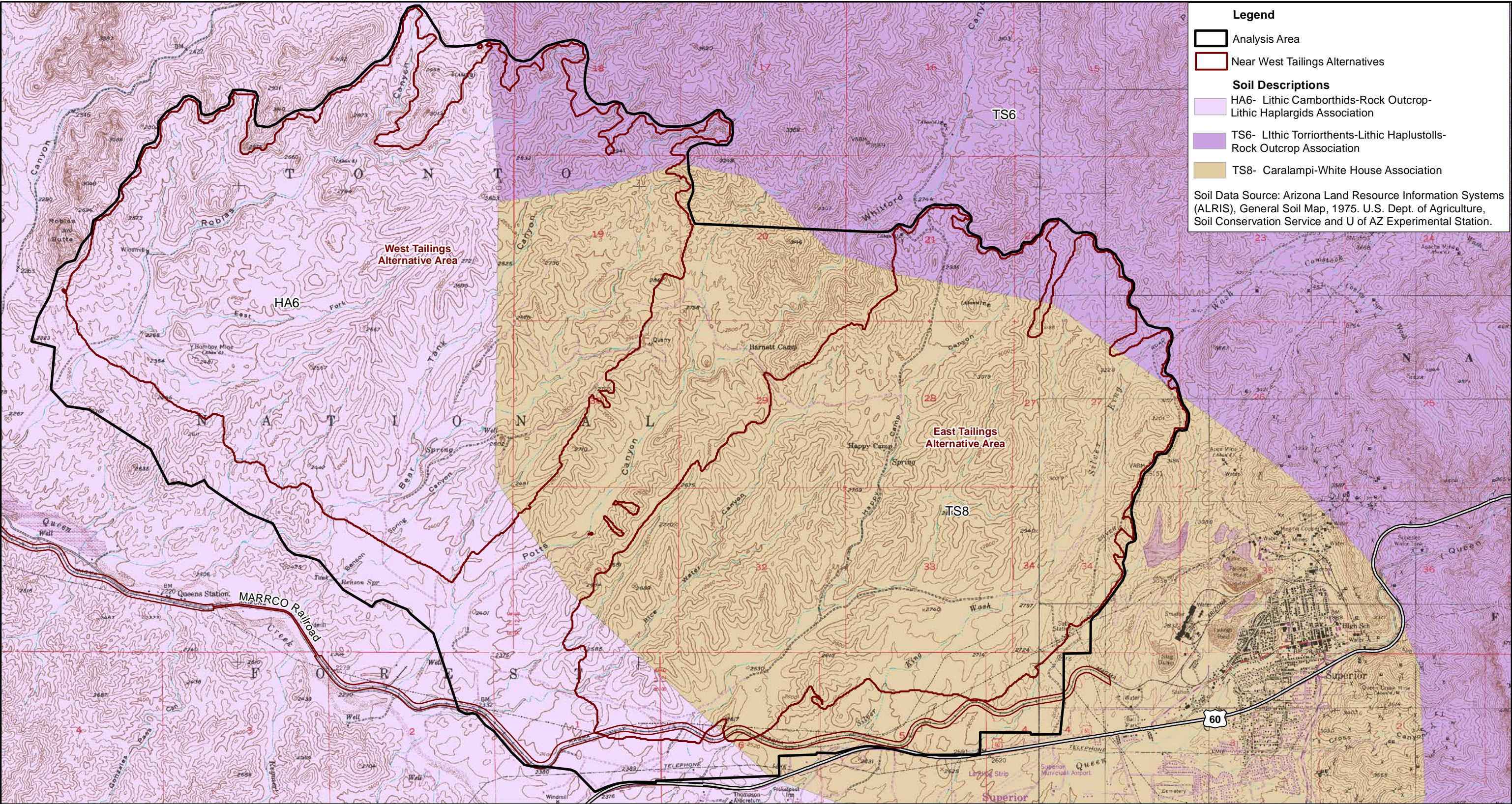
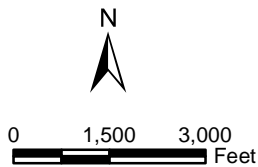


Image Source 1:24,000 USGS Quadrangles



RESOLUTION COPPER MINING  
Biological Evaluation of the  
Near West Analysis Area



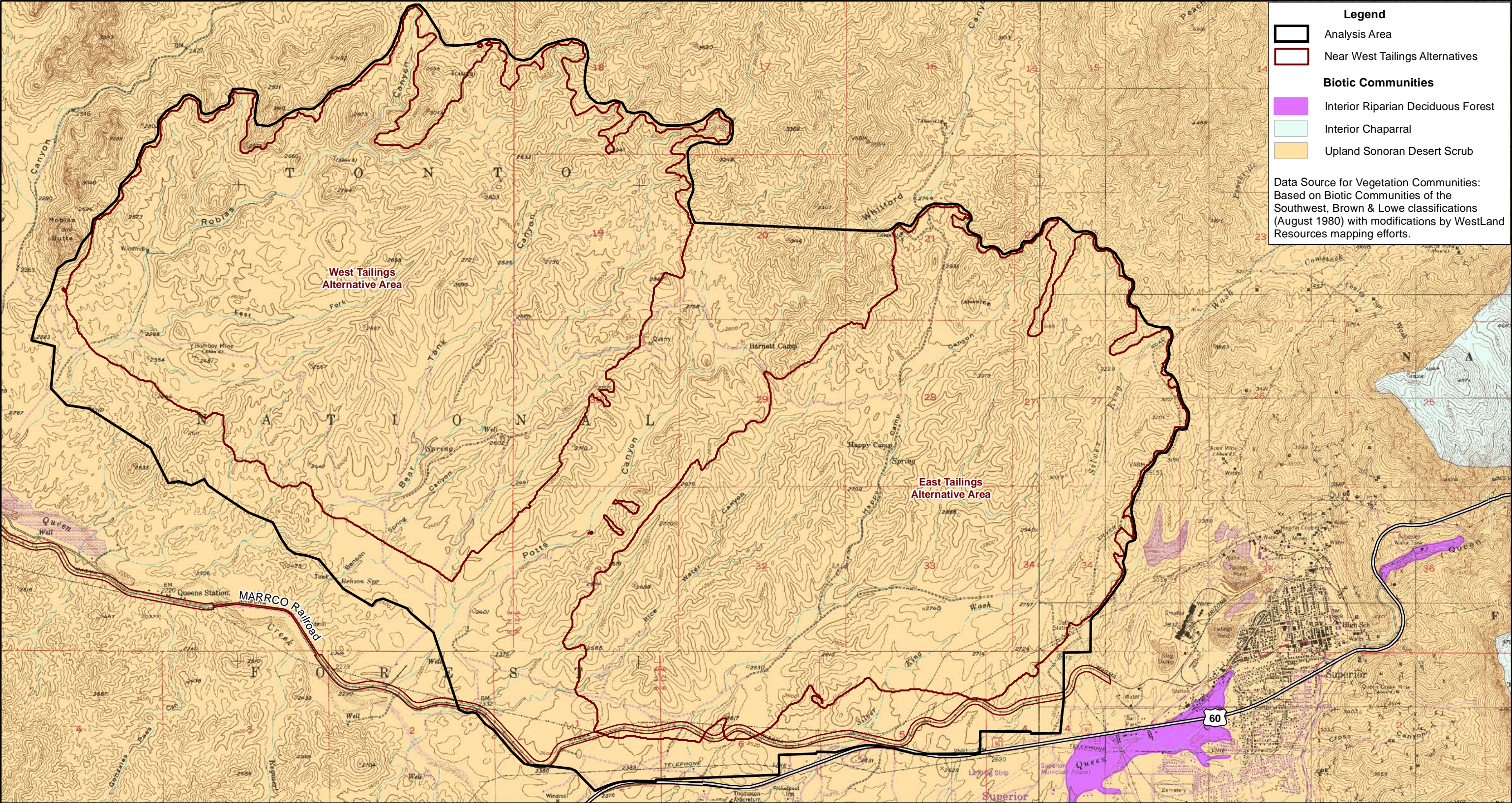
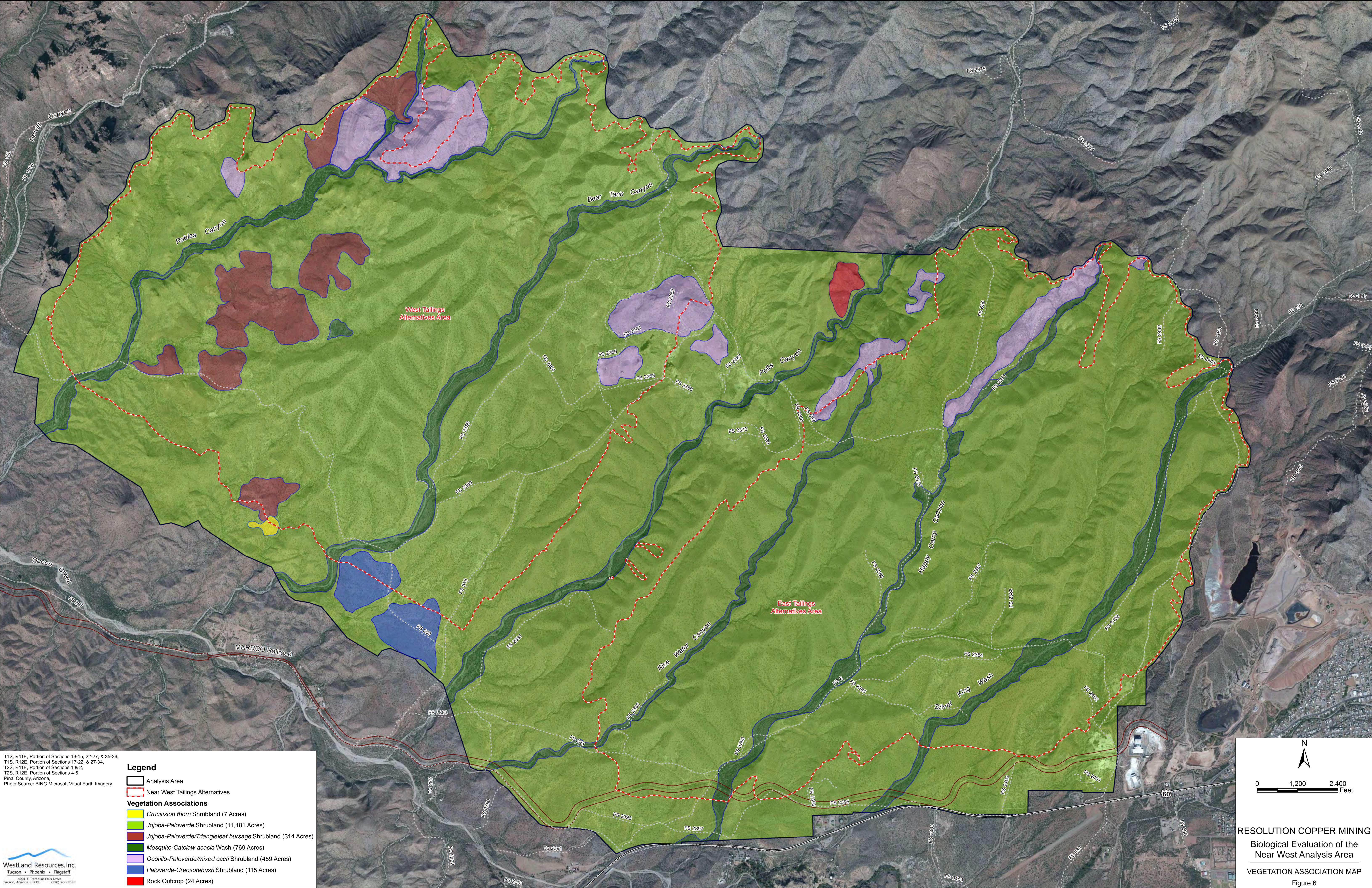


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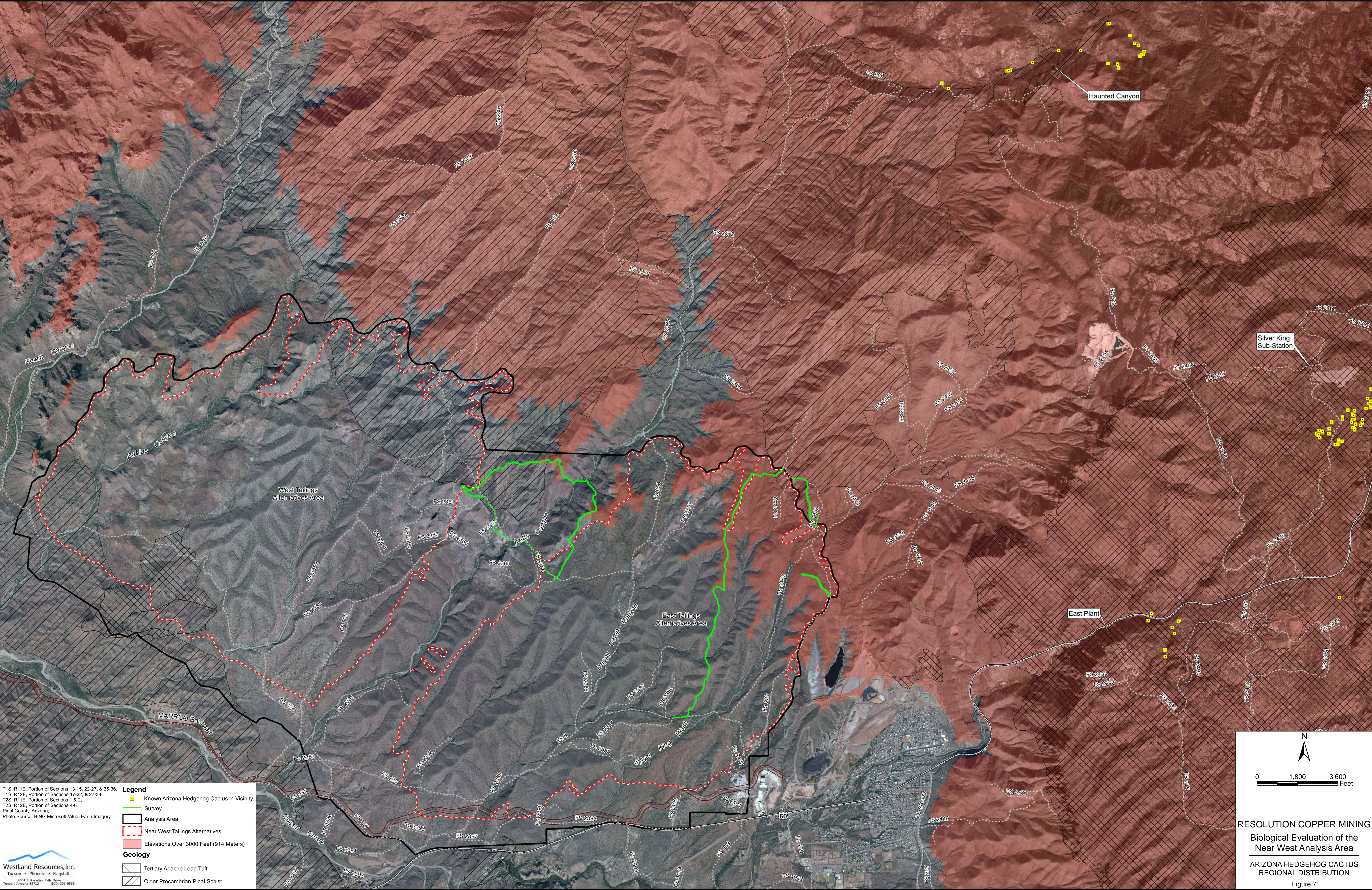




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T1S, R12E, Portion of Sections 17-22, & 27-34,  
T2S, R11E, Portion of Sections 1 & 2,  
T2S, R12E, Portion of Sections 4-6  
Pinal County, Arizona,  
Photo Source: BING Microsoft Virtual Earth Imagery

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Tucson • Phoenix • Flagstaff  
4001 E. Paradise Falls Drive  
Tucson, Arizona 85712 (520) 205-9585







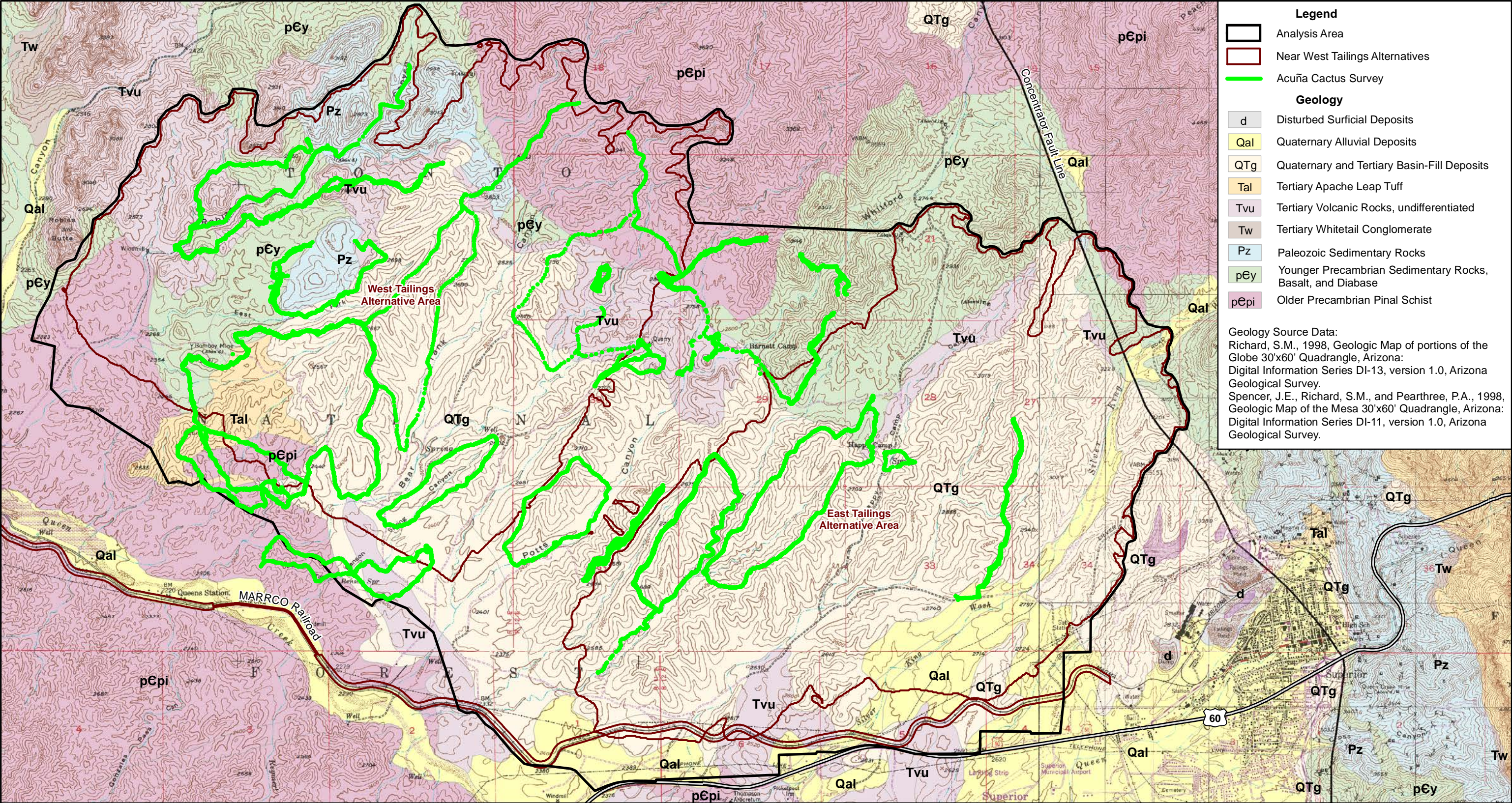
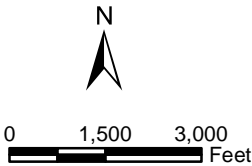


Image Source: 1:24,000 USGS Quadrangles



## RESOLUTION COPPER MINING

Biological Evaluation of the  
Near West Analysis Area

ACUÑA CACTUS  
SURVEY AREA TRANSECTS  
Figure 8a



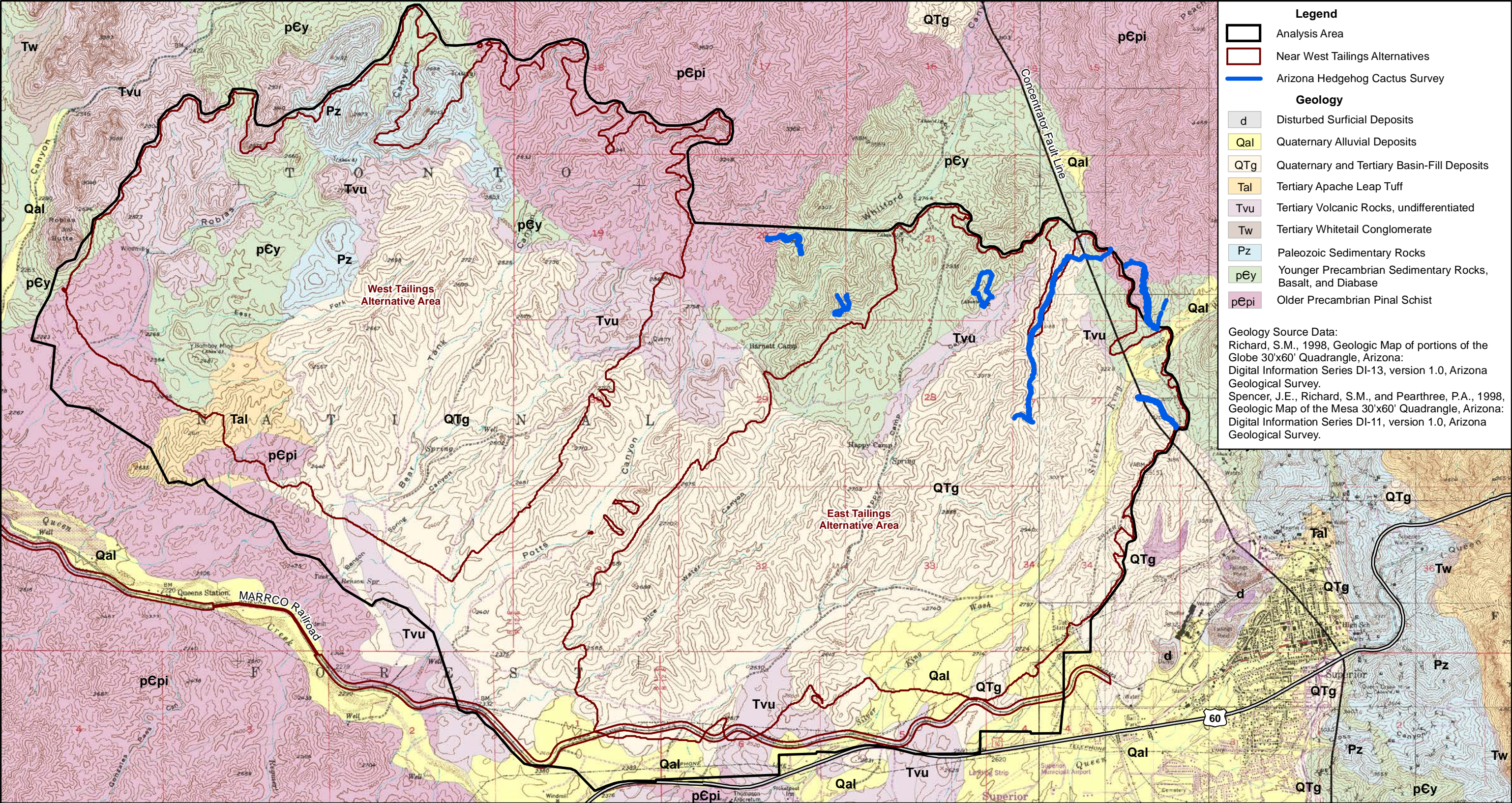


Image Source: 1:24,000 USGS Quadrangles

## RESOLUTION COPPER MINING

Biological Evaluation of the  
Near West Analysis Area

ARIZONA HEDGEHOG CACTUS  
SURVEY TRANSECTS

Figure 8b



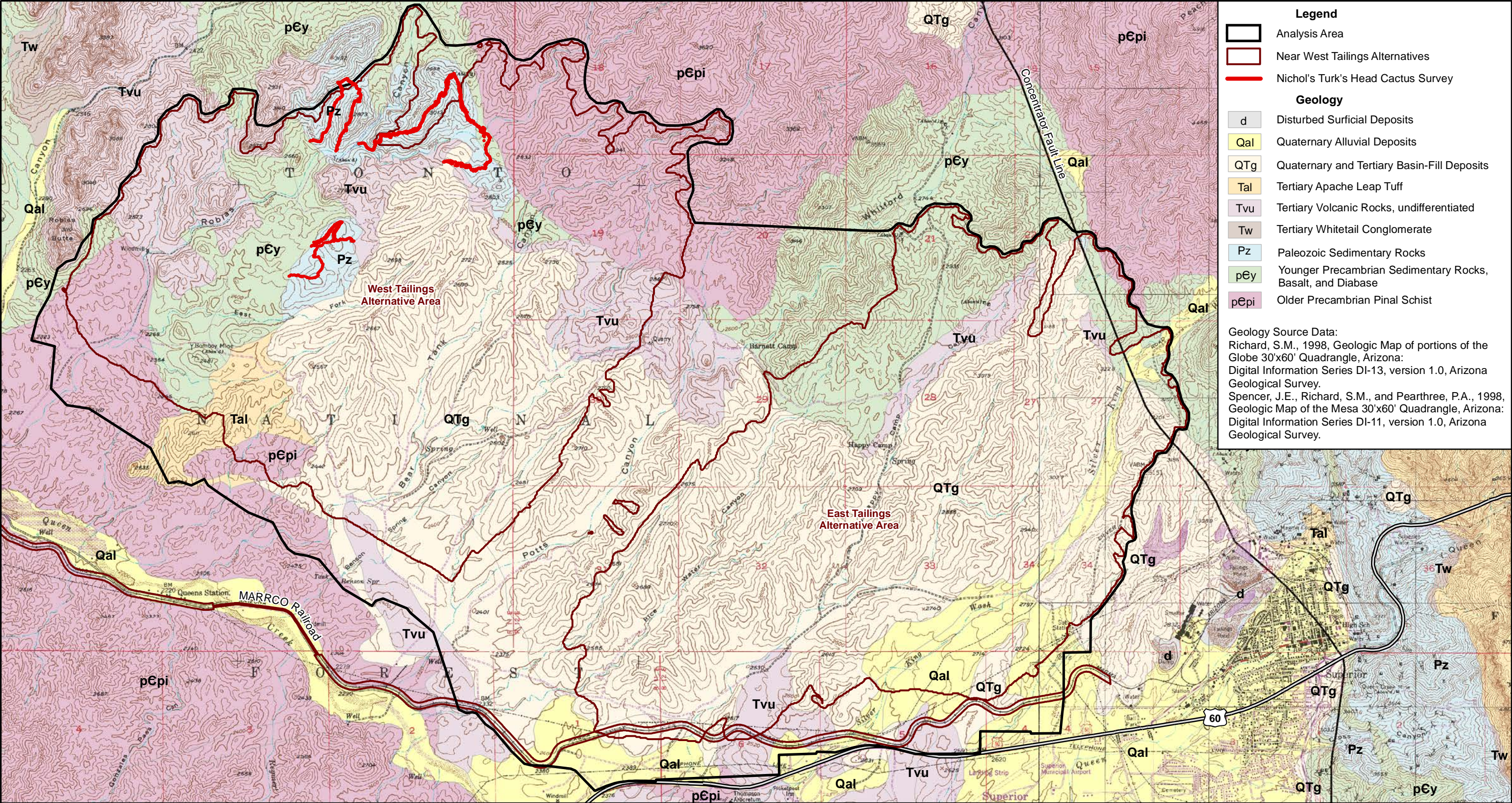
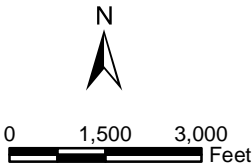


Image Source: 1:24,000 USGS Quadrangles



RESOLUTION COPPER MINING

Biological Evaluation of the  
Near West Analysis Area

NICHOL'S TURK'S HEAD  
CACTUS SURVEY TRANSECTS  
Figure 8c



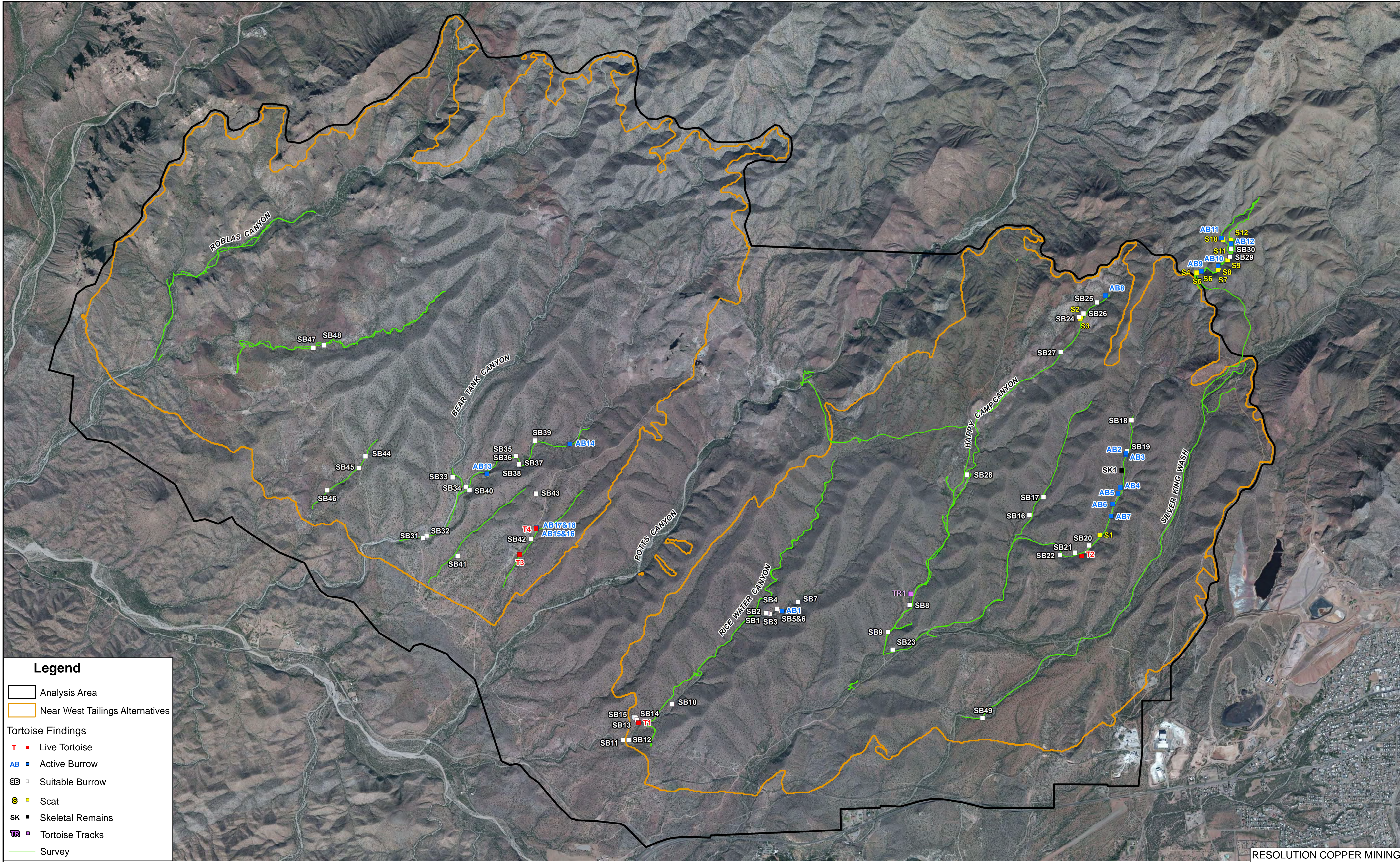
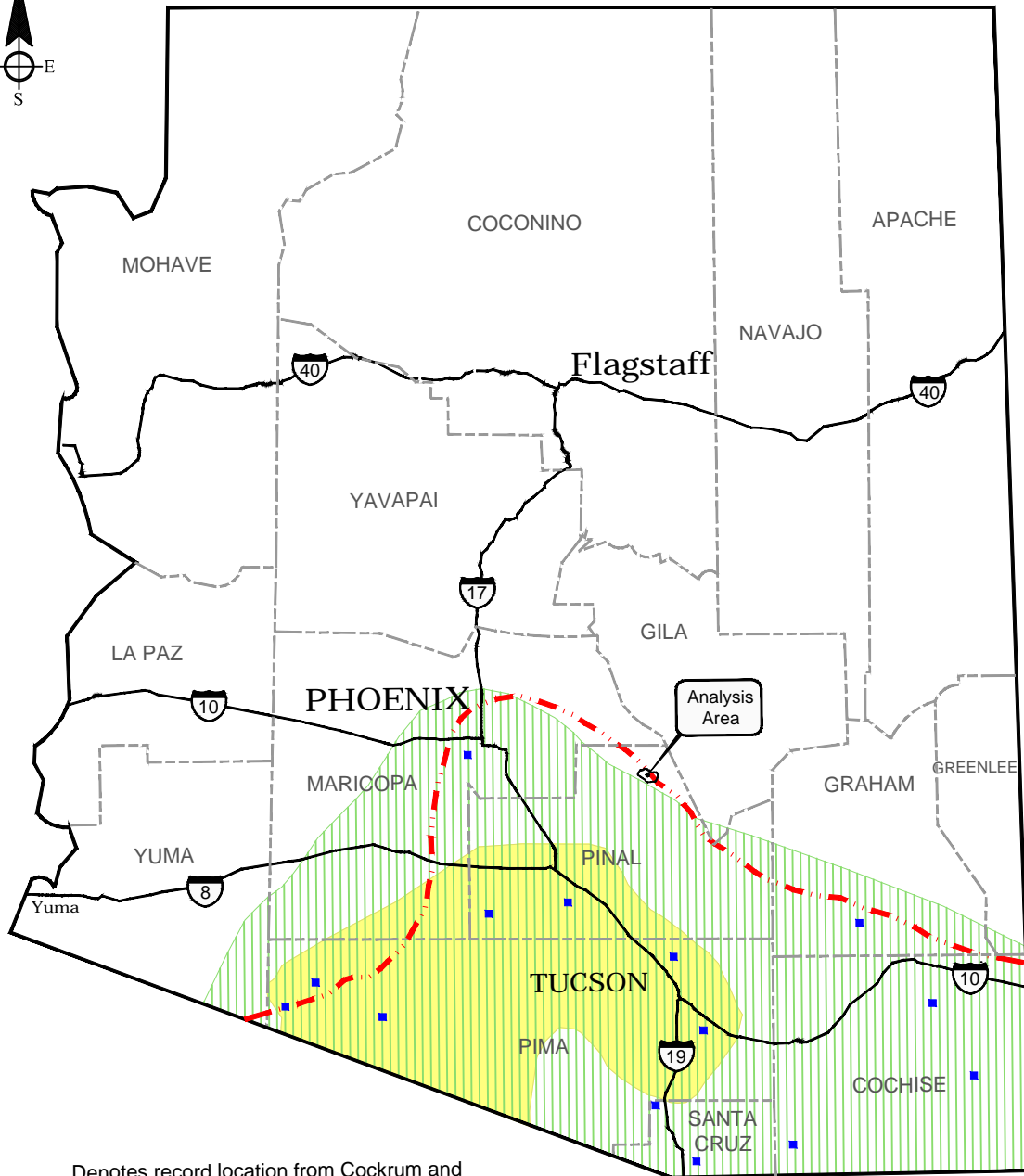


Photo Source: BING Microsoft Virtual Earth Imagery



# ARIZONA



■ Denotes record location from Cockrum and Petryszyn 1991

--- Limits of range shown by Hoffmeister 1986 (summer only)

Yellow shaded area: Late spring and early summer records from Cockrum and Petryszyn 1991

Green hatched area: Late summer and fall records from Cockrum and Petryszyn 1991

## RESOLUTION COPPER MINING

### Biological Evaluation of the Near West Analysis Area

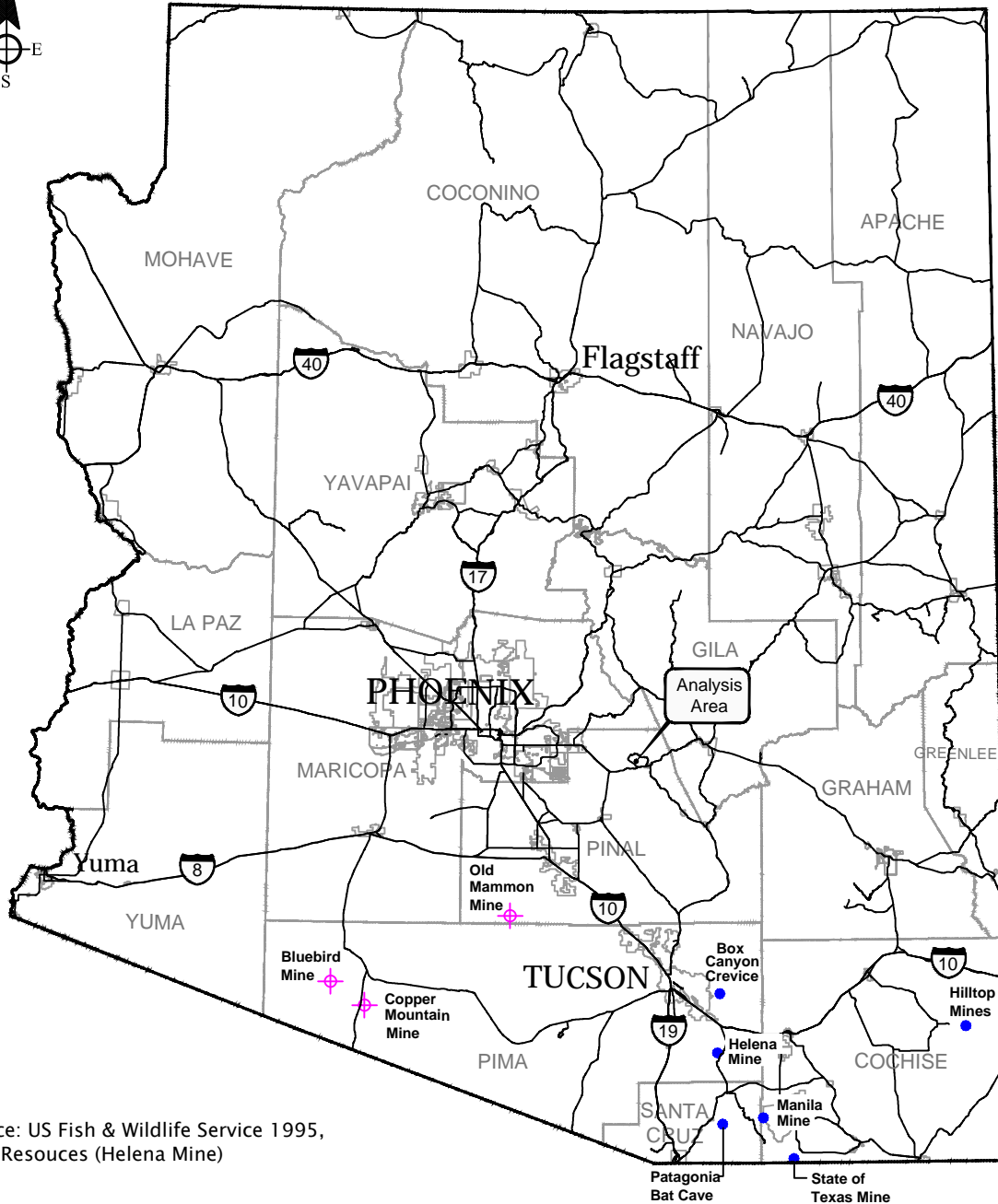
ARIZONA RANGE OF THE LESSER LONG-NOSED BAT (from Hoffmeister 1986, and Cockrum and Petryszyn 1991)

Figure 10

**WestLand Resources Inc.**  
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2343 E. Broadway Blvd, Suite 202  
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0 30 60 MI.  
APPROX. SCALE: 1" = 60 MILES

# ARIZONA



Data Source: US Fish & Wildlife Service 1995,  
WestLand Resources (Helena Mine)

- ✦ Maternity Roosts
- Post Maternity Roosts

## RESOLUTION COPPER MINING

Biological Evaluation of the  
Near West Analysis Area

KNOWN MAJOR ROOST SITES OF LESSER  
LONG-NOSED BATS IN ARIZONA

Figure 11

  
WestLand Resources Inc.  
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0 30 60 Miles

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## **APPENDIX A**

### **USFWS SPECIAL STATUS SPECIES IN PINAL COUNTY**

# Pinal County

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Acuna cactus	<i>Echinomastus erectocentrus</i> var. <i>acunensis</i>	Proposed Endangered	Less than 12 inches tall; spine clusters borne on tubercles, each with a groove on the upper surface. 2-3 central spines and 12 radial spines. Radial spines are dirty white with maroon tips. Flowers pink to purple.	Maricopa, Pima, Pinal	1,198 to 3,773 ft	Well drained knolls and gravel ridges in Sonoran desertscrub.	Immature plants distinctly different from mature plants. Immatures are disc-shaped or spherical and have no central spines until they are about 1.5 inches. Critical habitat is being proposed for a total of 53,720 ac in Maricopa, Pima, and Pinal counties (77 FR 60510).
Arizona hedgehog cactus	<i>Echinocereus triglochidiatus</i> var. <i>arizonicus</i>	Endangered	Dark green cylindroid stem, 2.5-12 inches tall, 2-10 inches in diameter. Occurs singly or in clusters. Has 1-3 gray or pinkish central spines, the largest deflexed, and 5-11 radial spines. Flower are brilliant red along side of stem.	Gila, Pinal	3,200-5,200 ft	Ecotone between interior chaparral and madrean evergreen woodland.	Open slopes, in narrow cracks between boulders, and in understory of shrubs. Additional genetic studies have determined that the species does not occur outside of the type locality.
Desert pupfish	<i>Cyprinodon macularius</i>	Endangered	Small (2 inches) smoothly rounded body shape with narrow vertical bars on the sides. Breeding males blue on head and sides with yellow on tail. Females and juveniles tan to olive colored back and silvery sides.	Cochise, Graham, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,000 ft	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	Two subspecies are recognized: Desert Pupfish ( <i>C.m. macularis</i> ) and Quitobaquito Pupfish ( <i>C.m. eremus</i> ). Critical habitat includes Quitobaquito Springs, Pima County, portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash, Imperial County, California.
Gila chub	<i>Gila intermedia</i>	Endangered	Deep compressed body, flat head. Dark olive-gray color above, silver sides. Endemic to Gila River Basin.	Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, Yavapai	2,000-5,500 ft	Pools, springs, cienegas, and streams.	Occurs on Federal, State, and private lands, including the Nature Conservancy and the Audubon Society. Also occurs in Sonora, Mexico. Critical habitat includes Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai counties (70 FR 66664).
Gila topminnow	<i>Poeciliopsis occidentalis occidentalis</i>	Endangered	Small (2 inches), guppy-like, live bearing, lacks dark spots on its fins. Breeding males are jet black with yellow fins.	Cochise, Gila, Graham, La Paz, Maricopa, Pima, Pinal, Santa Cruz, Yavapai	< 4,500 ft	Small streams, springs, and cienegas vegetated shallows.	Species historically also occurred in backwaters of large rivers but is currently isolated to small streams and springs.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Lesser long-nosed bat	<i>Leptonycteris curasoae yerbabuenae</i>	Endangered	Elongated muzzle, small leaf nose, and long tongue. Yellowish brown or gray above and cinnamon brown below. Tail minute and appears to be lacking. Easily disturbed.	Cochise, Gila, Graham, Greenlee, Maricopa, Pima, Pinal, Santa Cruz, Yuma	1,600-7,500 ft	Desert scrub habitat with agave and columnar cacti present as food plants.	Day roosts in caves and abandoned tunnels. Forages at night on nectar, pollen, and fruit of paniculate agaves and columnar cacti. This species is migratory and is present in Arizona usually from April to September and south of the border the remainder of the year.
Loach minnow	<i>Tiaroga cobitis</i>	Endangered	Small (<3 inches) slender, elongated fish, olive colored with dirty white spots at the base of the dorsal and caudal fins. Breeding males vivid red on mouth and base of fins.	Apache, Cochise, Gila, Graham, Greenlee, Navajo, Pinal, Yavapai	< 8,000 ft	Benthic species of small to large perennial streams with swift shallow water over cobble and gravel. Recurrent flooding and natural hydrograph important.	<p>Presently found in Aravaipa Creek, Deer Creek, Turkey Creek, Blue River, Campbell Blue Creek, Little Blue Creek, San Francisco River, Eagle Creek, North Fork of the East Fork Black River, Boneyard Creek, and White River and East Fork White River in Arizona, and Dry Blue Creek, Pace Creek, Frieborn Creek, the San Francisco River, Tularosa River, Negrito Creek, Whitewater Creek, the East, Middle, and West Forks of the Gila River, mainstem upper Gila River. Bear Creek and Mangas Creek in New Mexico.</p> <p>Populations have been recently reintroduced in Hot Springs and Redfield canyons in Cochise and Graham counties; Fossil Creek in Gila County; and Bonita Creek in Graham County Arizona. Critical habitat has been designated in Apache, Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai counties, Arizona, as well as in Catron, Grant, and Hidalgo counties in New Mexico (77 FR 10810).</p>
Mexican spotted owl	<i>Strix occidentalis lucida</i>	Threatened	Medium sized with dark eyes and no ear tufts. Brownish and heavily spotted with white or beige.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai	4,100-9,000 ft	Nests in canyons and dense forests with multi-layered foliage structure.	Generally nest in older forests of mixed conifer or ponderosa pine/gambel oak type, in canyons, and use variety of habitats for foraging. Sites with cool microclimates appear to be of importance or are preferred. Critical habitat was finalized on August 31, 2004 (69 FR 53182) in Arizona in Apache, Cochise, Coconino, Gila, Graham, Greenlee, Maricopa, Navajo, Pima, Pinal, Santa Cruz, and Yavapai counties.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Nichol Turk's head cactus	<i>Echinocactus horizonthalonius</i> var. <i>nicholii</i>	Endangered	Blue-green to yellowish-green, columnar, 18 inches tall, 8 inches in diameter. Spine clusters have 5 radial and 3 central spines; one curves downward and is short; 2 spines curve upward and are red or pale gray. Flowers: pink; fruit: woolly white.	Pima, Pinal	2,400-4,100 ft	Sonoran desertscrub.	Found in unshaded microsites in Sonoran desertscrub on dissected alluvial fans at the foot of limestone mountains and on inclined terraces and saddles on limestone mountain sides.
Ocelot	<i>Leopardus pardalis</i>	Endangered	Medium-sized spotted cat that is yellowish with black streaks and stripes running from front to back. Tail is spotted and about 1/2 the length of head and body. Face is less heavily streaked than the back and sides.	Cochise, Gila, Graham, Pima, Pinal, Santa Cruz	< 8,000 ft	Desert scrub in Arizona. Humid tropical and sub-tropical forests, and savannahs in areas south of the U.S.	Little is known about ocelot habitat use in Arizona; however, ocelots are typically associated with areas of dense cover. Four confirmed reports of ocelots have been received from Gila (one) and Cochise (three) counties since 2009. Based on photographic evidence, two of the reports from Cochise County were most likely of the same ocelot.
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered	Large, up to 3 feet long and up to 6 lbs, high sharp-edged keel-like hump behind the head. Head flattened on top. Olive-brown above to yellowish below.	Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pinal, Yavapai, Yuma	< 6,000 ft	Riverine and lacustrine areas, generally not in fast moving water and may use backwaters.	Big River fish also found in Horseshoe reservoir (Maricopa County). Critical habitat includes the 100-year floodplain of the river through the Grand Canyon from confluence with Paria River to Hoover Dam; Hoover Dam to Davis Dam; Parker Dam to Imperial Dam. Also Gila River from Arizona/New Mexico border to Coolidge Dam; and Salt River from Hwy 60/SR77 Bridge to Roosevelt Dam; Verde River from FS boundary to Horseshoe Lake (59 FR 13374).

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	Endangered	Small passerine (about 6 inches) grayish-green back and wings, whitish throat, light olive-gray breast and pale yellowish belly. Two wingbars visible. Eye-ring faint or absent.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 8,500 ft	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.	Riparian-obligate bird that occupies migratory/breeding habitat from late April-Sept. Critical habitat was finalized on October 19, 2005 in Apache, Cochise, Gila, Graham, Greenlee, Maricopa, Mohave, Pima, Pinal, and Yavapai counties (70 FR 60886). Revised critical habitat was proposed August 15, 2011 (76 FR 50542) and includes river segments in counties currently designated plus those in La Paz, Santa Cruz, and Yuma counties. The 2005 critical habitat designation remains in effect until the current proposal is finalized. Training seminar/permits required for those conducting call playback surveys.
Spikedace	<i>Meda fulgida</i>	Endangered	Small (<3 inches) slim fish with silvery sides and "spine" on dorsal fin. Breeding males are a brassy golden color.	Cochise, Gila, Graham, Greenlee, Pinal, Yavapai	< 6,000 ft	Medium to large perennial streams with moderate to swift velocity waters over cobble and gravel substrate. Recurrent flooding and natural hydrograph important to withstand invading exotic species.	Presently found in Aravaipa Creek, Eagle Creek, and the Verde River in Arizona, and the Gila River, the East, Middle, and West Forks of the Gila River, and Mangas Creek in New Mexico.  Populations have been recently reintroduced in Hot Springs and Redfield canyons in Cochise and Graham counties; Fossil Creek in Gila County; and Bonita Creek in Graham County Arizona, and in the San Francisco River in Catron County, New Mexico. Critical habitat (77 FR 10810) has been designated in Cochise, Gila, Graham, Greenlee, Pinal, and Yavapai counties in Arizona, and in Catron, Grant, and Hidalgo counties in New Mexico.
Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	Endangered	Water bird with long legs and short tail. Long, slender decurved bill. Mottled brown or gray on its rump. Flanks and undersides are dark gray with narrow vertical stripes producing a barring effect.	Gila, La Paz, Maricopa, Mohave, Pinal, Yuma	< 4,500 ft	Fresh water and brackish marshes.	Species is associated with dense emergent riparian vegetation. Requires wet substrate (mudflat, sandbar) with dense herbaceous or woody vegetation for nesting and foraging. Channelization and marsh destruction are primary sources of habitat loss.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Desert tortoise, Sonoran population	<i>Gopherus agassizii</i>	Candidate	Large herbivorous reptile with domed shell and round stumpy hind legs. The carapace is a dull brown or grey color and the plastron is unhinged, often pale yellow in coloration. Sonoran desert tortoises generally have a flatter carapace than tortoises in the Mohave population. Active in spring and during the monsoon; dormant in winter and mid-summer months.	Cochise, Gila, Graham, La Paz, Maricopa, Mohave, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 7,800 ft	Primarily rocky (often steep) hillsides and bajadas of Mohave and Sonoran desertscrub but may encroach into desert grassland, juniper woodland, interior chaparral habitats, and even pine communities. Washes and valley bottoms may be used in dispersal.	Desert tortoises that occur east and south of the Colorado River in Arizona are referred to as the Sonoran population. Individuals are found throughout their historic range; but populations are becoming increasingly fragmented due to threats to their habitat in valley bottoms, which are used for dispersal and exchange of genetic material.
Northern Mexican Gartersnake	<i>Thamnophis eques megalops</i>	Candidate	Background color ranges from olive, olive-brown, to olive-gray. Body has three yellow or light colored stripes running down the length of the body, darker towards tail. Species distinguished from other native gartersnakes by the lateral stripes reaching the 3rd and 4th scale rows. Paired black spots extend along dorsolateral fields.	Apache, Cochise, Coconino, Gila, Graham, Navajo, Pima, Pinal, Santa Cruz, Yavapai	130-8,500 ft	Cienegas, stock tanks, large-river riparian woodlands and forests, streamside gallery forests.	Core population areas in the U.S. include mid/upper Verde River drainage, mid/lower Tonto Creek, and the San Rafael Valley and surrounding area. Status on tribal lands unknown. Distributed south into Mexico along the Sierra Madre Occidental and Mexican Plateau. Strongly associated with the presence of a native prey base including leopard frogs and native fish.
Roundtail chub	<i>Gila robusta</i>	Candidate	Member of the minnow family Cyprinidae and characterized by streamlined body shape. Color usually olive gray with silvery sides and a white belly. Breeding males develop red or orange coloration on the lower half of the cheeks and on the bases of paired fins. Individuals may reach 49.0 cm (19.3 in) but usually average 25-30 cm (9.8 - 11.8 in).	Apache, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pinal, Yavapai	1,000-7,500 ft.	Cool to warm waters of rivers and streams, often occupy the deepest pools and eddies of large streams.	Historical range of roundtail chub included both the upper and lower Colorado River basins. A 2009 status review determined that the lower Colorado River basin roundtail chub population segment (Arizona and New Mexico) qualifies as a distinct vertebrate population segment (DPS). Populations in the Little Colorado, Bill Williams, and Gila River basins are considered candidate species.



COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
Tucson shovel-nosed snake	<i>Chionactis occipitalis klauberi</i>	Candidate	Small snake (10-17 inches total length) in the family Colubridae, with a shovel-shaped snout and an inset lower jaw. Overall coloring mimics coral snakes, with pale yellow to cream-colored body, 21 or more black or brown saddle-like bands across the back, and orange-red saddle-like bands in between. The subspecies is distinguished from the other subspecies in that these secondary orange-red crossbands are suffused with dark pigment, making them appear brown or partly black, and the black and red crossbands do not encircle the entire body.	Maricopa, Pima, Pinal	785-1,662 ft	Sonoran Desertscrub; associated with soft, sandy soils having sparse gravel.	Found in creosote-mesquite floodplain environments, finds refuge under desert shrubs, active during crepuscular (dawn and dusk) and daylight hours.
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	Candidate	Medium-sized bird with a slender, long-tailed profile, slightly down-curved bill that is blue-black with yellow on the lower half. Plumage is grayish-brown above and white below, with rufous primary flight feathers.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	< 6,500 ft	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries).	Neotropical migrant that winters primarily in South America and breeds primarily in the U.S. (but also in southern Canada and northern Mexico). As a migrant it is rarely detected; can occur outside of riparian areas. Cuckoos are found nesting statewide, mostly below 5,000 feet in central, western, and southeastern Arizona. Concern for cuckoos are primarily focused upon alterations to its nesting and foraging habitat. Nesting cuckoos are associated with relatively dense, wooded, streamside riparian habitat, with varying combinations of Fremont cottonwood, willow, velvet ash, Arizona walnut, mesquite, and tamarisk. Some cuckoos have also been detected nesting in velvet mesquite, netleaf hackberry, Arizona sycamore, Arizona alder, and some exotic neighborhood shade trees.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
American peregrine falcon	<i>Falco peregrinus anatum</i>	Delisted	A crow-sized falcon with slate blue-gray on the back and wings, and white on the underside; a black head with vertical "bandit's mask" pattern over the eyes; long pointed wings; and a long wailing call made during breeding. Very adept flyers and hunters, reaching diving speeds of 200 mph.	Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Santa Cruz, Yavapai, Yuma	3,500-9,000 ft	Areas with rocky, steep cliffs, primarily near water, where prey (primarily shorebirds, songbirds, and waterfowl) concentrations are high. Nests are found on ledges of cliffs, and sometimes on man-made structures such as office towers and bridge abutments.	Species recovered with over 1,650 breeding birds in the US and Canada.
Bald eagle	<i>Haliaeetus leucocephalus</i>	Delisted	Large, adults have white head and tail. Height 28 to 38 inches; wingspan 66 to 96 inches. Juveniles and subadults are dark brown with varying degrees of white mottling on chest, wings, and head.	Apache, Coconino, Gila, Graham, La Paz, Maricopa, Mohave, Pinal, and Yavapai	Varies	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Nationwide and throughout the State of Arizona, the bald eagle is currently not listed under the Endangered Species Act. On September 30, 2010, the U.S. District Court dissolved an injunction that led to the bald eagle in the Sonoran Desert Area of central Arizona being placed on the Endangered Species list in 2008. This determination is presently (January 2011) under judicial consideration. Bald eagles are protected under the Bald and Golden Eagle Protection Act (Eagle Act) and other Federal and state statutes. The word "disturb" under the Eagle Act was recently clarified, as well as the implementation of new regulations requiring permits to incidentally "take" eagles. Retrieve more information on management and life history at <a href="http://SWBEMC.org">http://SWBEMC.org</a> .
Cactus ferruginous pygmy-owl	<i>Glaucidium brasilianum cactorum</i>	Delisted; petitioned for relisting	Small reddish-brown owl with a cream-colored belly streaked with reddish-brown. Males average 2.2 oz and females average 2.6 oz. Length is approximately 6.5 in., including a relatively long tail. Lacks ear tufts, and has paired black spots on the back of the head.	Pima, Pinal	< 4,000 ft	Areas of desert woodlands with tall canopy cover. Primarily found in Sonoran desert scrub and occasionally in riparian drainages and woodlands within semi-desert grassland communities. Prefers to nest in cavities in saguaro cacti but has been found in low-density suburban developments that include natural open spaces.	Not recognized as a protected taxonomic entity under the Act, but protected from direct take of individuals and nests/eggs under the Migratory Bird Treaty Act. A 2006 petition for relisting under the Act is currently being evaluated. Due to low population numbers, captive breeding research was initiated in 2006 with some success.

COMMON NAME	SCIENTIFIC NAME	STATUS	DESCRIPTION	COUNTY	ELEVATION	HABITAT	COMMENTS
California brown pelican	<i>Pelecanus occidentalis californicus</i>	Delisted	Large, dark gray-brown water bird with webbed feet, pouch underneath its long bill, and wingspan of 7 ft. Adults have a white head and neck, brownish black breast, and silver gray upper parts.	Gila, La Paz, Maricopa, Mohave, Pinal, Yuma	Varies	Coastal land and islands; species found occasionally around Arizona's lakes and rivers.	Considered an uncommon transient in Arizona. Most observations recorded along the Colorado River and in the Gila Valley. Individuals known to wander up from Mexico in summer and fall. No breeding has been documented in Arizona. Delisted on November 17, 2009 (74 FR 59444).

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## **APPENDIX B**

### **TONTO NATIONAL FOREST SENSITIVE SPECIES**

**Tonto National Forest**  
**Forest Sensitive Species (includes Federal candidate species)**  
**Mar 2011**

<b>Common Name</b>	<b>Scientific Name</b>
<b>Mammals</b>	
Bat, Allen's lappet-browed	<i>Idionycteris phyllotis</i>
Bat, California leaf-nosed	<i>Macrotus californicus</i>
Bat, greater western mastiff	<i>Eumops perotis californicus</i>
Bat, pale townsend's big-eared	<i>Corynorhinus townsendii pallescens</i>
Bat, pocketed free-tailed	<i>Nyctinomops femorosaccus</i>
Bat, spotted	<i>Euderma maculatum</i>
Bat, western red	<i>Lasiurus blossevillii</i>
Coati, white-nosed	<i>Nasua narica</i>
Sheep, desert bighorn	<i>Ovis canadensis mexicana</i>
Sheep, rocky mountain bighorn	<i>Ovis canadensis canadensis</i>
<b>Birds</b>	
Blackhawk, common	<i>Buteogallus anthracinus</i>
Cuckoo, western yellow-billed*	<i>Coccyzus americanus occidentalis</i>
Eagle, bald	<i>Haliaeetus leucocephalus</i>
Falcon, American peregrine	<i>Falco peregrinus anatum</i>
Goshawk, northern	<i>Accipiter gentilis</i>
Grebe, Clark's	<i>Aechmophorus clarkii</i>
Hawk, northern gray	<i>Asturina nitida maximus</i>
Hawk, zone-tailed	<i>Buteo albonotatus</i>
Towhee, Abert's	<i>Pipilo aberti</i>
<b>Reptiles</b>	
Gartersnake, northern Mexican*	<i>Thamnophis eques megalops</i>
Gartersnake, Narrow-headed	<i>Thamnophis rufipunctatus</i>
Monster, reticulate Gila monster	<i>Heloderma suspectum suspectum</i>
Snake, Maricopa leaf-nosed	<i>Phyllorhynchus browni lucidus</i>
Tortoise, Sonoran desert*	<i>Gopherus agassizii</i>
<b>Amphibians</b>	
Frog, lowland leopard	<i>Rana yavapaiensis</i>
Frog, northern leopard	<i>Rana pipiens</i>
Frog, western barking	<i>Eleutherodactylus augusti cactorum</i>
Toad, Arizona	<i>Bufo microscaphus</i>
<b>Fish</b>	
Chub, headwater*	<i>Gila nigra</i>
Chub, roundtail*	<i>Gila robusta</i>
Dace, longfin	<i>Agosia chrysogaster</i>
Sucker, desert	<i>Catostomus clarki</i>
Sucker, Sonora	<i>Catostomus insignis</i>
<b>Invertebrates</b>	
Beetle, Parker's cyloepus riffle	<i>Cylloepus parkeri</i>
Midge, netwing	<i>Agathon arizonicus</i>
Springsnail, fossil	<i>Pyrgulopsis simplex</i>
<b>Plants</b>	
Agave, Hohokam	<i>Agave murpheyi</i>
Agave, Tonto basin	<i>Agave delamateri</i>
Buckwheat, Ripley wild	<i>Eriogonum ripleyi</i>
Bugbane, Arizona	<i>Cimicifuga arizonica</i>

<b>Common Name</b>	<b>Scientific Name</b>
Dock, blumer's	<i>Rumex orthoneurus</i>
Fleabane, fish creek	<i>Erigeron piscaticus</i>
Fleabane, Mogollon	<i>Erigeron anchana</i>
Groundsel, toumey	<i>Packera neomexicana</i> var. <i>toumeyi</i> (= <i>Senecio</i> n. var. <i>t.</i> )
Mallow, Pima Indian	<i>Abutilon parishii</i>
Milkwort, Hualapai	<i>Polygala rusbyi</i>
Phlox, Arizona	<i>Phlox amabilis</i>
Rockdaisy, fish creek	<i>Perityle saxicola</i>
Rockdaisy, salt river	<i>Perityle gilensis</i> var. <i>salensis</i>
Root, Arizona alum	<i>Heuchera glomerulata</i>
Root, eastwood alum	<i>Heuchera eastwoodiae</i>
Sage, galiuro	<i>Salvia amissa</i>
Sandwort, Mt. Dellenbaugh	<i>Arenaria aberrans</i>
Sedge, Chihuahuan	<i>Carex chihuahuensis</i>
Sedge, Cochise	<i>Carex ultra</i> (= <i>C. spissa</i> var. <i>ultra</i> )
Snapdragon, mapleleaf false	<i>Mabrya acerifolia</i> (= <i>Maurandya a.</i> )
Vetch, horseshoe deer	<i>Lotus mearnsii</i> var. <i>equisolensis</i>
Woodfern, Aravaipa	<i>Thelypteris puberula</i> var. <i>sonorensis</i>
* also a federal candidate species.	

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## **APPENDIX C**

### **AGFD HDMS SPECIAL STATUS SPECIES RESULTS FROM ONLINE REVIEW TOOL**

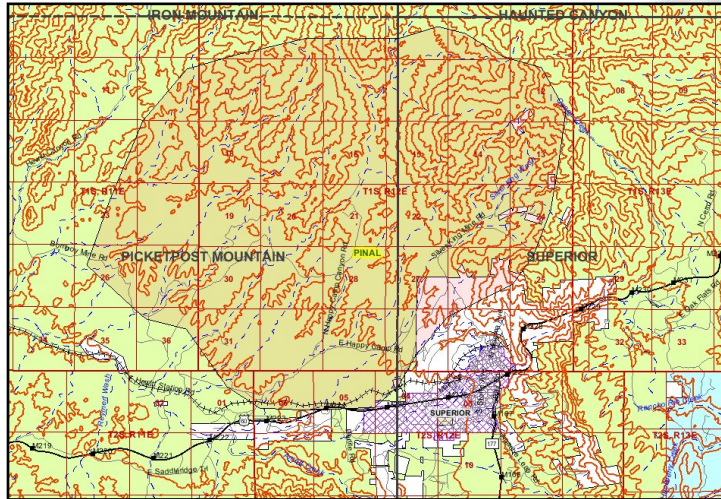
# Arizona's On-line Environmental Review Tool

Search ID: 20121211019208

Project Name: Happy Camp

Date: 12/11/2012 3:54:14 PM

## Project Location



**Project Name:** Happy Camp

**Submitted By:** Margaret Blais

**On behalf of:** PRIVATE

**Project Search ID:** 20121211019208

**Date:** 12/11/2012 3:54:08 PM

**Project Category:** Mining, Exploration

**Project Coordinates (UTM Zone 12-NAD 83):** 486673.915, 3687964.378 meter

**Project Area:** 21385.277 acres

**Project Perimeter:** 35150.253 meter

**County:** PINAL

**USGS 7.5 Minute Quadrangle ID:** 1359

**Quadrangle Name:** PICKETPOST MOUNTAIN

**Project locality is not anticipated to change**

The Department appreciates the opportunity to provide in-depth comments and project review when additional information or environmental documentation becomes available.

## Special Status Species Occurrences/Critical Habitat/Tribal Lands within 3 miles of Project Vicinity:

Name	Common Name	FWS	USFS	BLM	State
Aquila chrysaetos	Golden Eagle	BGA		S	
Bat Colony					
Buteogallus anthracinus	Common Black-Hawk		S		WSC
Cyprinodon macularius	Desert Pupfish	LE			WSC
Echinocereus triglochidiatus var. arizonicus	Arizona Hedgehog Cactus	LE			HS
Eumops perotis californicus	Greater Western Bonneted Bat	SC	S	S	
Falco peregrinus anatum	American Peregrine Falcon	SC	S	S	WSC
Gopherus agassizii (Sonoran Population)	Sonoran Desert Tortoise	C	S		WSC
Leopardus pardalis	Ocelot	LE			WSC
Mabrya acerifolia	Mapleleaf False Snapdragon		S		
Mammillaria viridiflora	Varied Fishhook Cactus				SR
Myotis yumanensis	Yuma Myotis	SC			
Nyctinomops femorosaccus	Pocketed Free-tailed Bat		S		
Phyllorhynchus browni	Saddled Leaf-nosed Snake		PS		
Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE			WSC
Rana yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC

## Location Accuracy Disclaimer

Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Receipt is solely responsible for the project location and thus the correctness of the Project Review Receipt content.



## Arizona's On-line Environmental Review Tool

Search ID: 20121211019208

Project Name: Happy Camp

Date: 12/11/2012 3:54:14 PM

**Please review the entire receipt for project type recommendations and/or species or location information and retain a copy for future reference.** If any of the information you provided did not accurately reflect this project, or if project plans change, another review should be conducted, as this determination may not be valid.

### Arizona's On-line Environmental Review Tool:

1. This On-line Environmental Review Tool inquiry has generated recommendations regarding the potential impacts of your project on Special Status Species (SSS) and other wildlife of Arizona. SSS include all U.S. Fish and Wildlife Service federally listed, U.S. Bureau of Land Management sensitive, U.S. Forest Service sensitive, and Arizona Game and Fish Department (Department) recognized species of concern.
2. These recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation). These recommendations are preliminary in scope, designed to provide early considerations for all species of wildlife, pertinent to the project type you entered.
3. This receipt, generated by the automated On-line Environmental Review Tool does not constitute an official project review by Department biologists and planners. Further coordination may be necessary as appropriate under the National Environmental Policy Act (NEPA) and/or the Endangered Species Act (ESA).

The U.S. Fish and Wildlife Service (USFWS) has regulatory authority over all federally listed species under the ESA. Contact USFWS Ecological Services Offices: <http://arizonaes.fws.gov/>.

Phoenix Main Office  
2321 W. Royal Palm Road, Suite 103  
Phoenix, AZ 85021  
Phone 602-242-0210  
Fax 602-242-2513

Tucson Sub-Office  
201 North Bonita, Suite 141  
Tucson, AZ 85745  
Phone 520-670-6144  
Fax 520-670-6154

Flagstaff Sub-Office  
323 N. Leroux Street, Suite 101  
Flagstaff, AZ 86001  
Phone 928-226-0614  
Fax 928-226-1099

### Disclaimer:

1. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area.
2. The Department's Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there.
3. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented population of species of special concern.
4. HDMS data contains information about species occurrences that have actually been reported to the Department.

### Arizona Game and Fish Department Mission

***To conserve, enhance, and restore Arizona's diverse wildlife resources and habitats through aggressive protection and***

***management programs, and to provide wildlife resources and safe watercraft and off-highway vehicle recreation for the enjoyment, appreciation, and use by present and future generations.***

## **Project Category: Mining, Exploration**

### **Project Type Recommendations:**

Based on the project type entered; coordination with Arizona Department of Environmental Quality may be required (<http://www.azdeq.gov/>).

Based on the project type entered; coordination with State Historic Preservation Office may be required  
<http://azstateparks.com/SHPO/index.html>

Complete reclamation of the disturbed area(s) should occur after all project activities have ceased. The Department recommends that all land contours and topography be restored to their original condition (where applicable). Local soils and native vegetation should be used for all reclamation activities. Consider the local wildlife and design reclamation efforts to meet their habitat needs. Avoid reclamation/restoration designs that would prohibit wildlife from moving through the reclamation site to adjacent habitats.

During planning and construction, minimize potential introduction or spread of exotic invasive species. Invasive species can be plants, animals (exotic snails), and other organisms (e.g. microbes), which may cause alteration to ecological functions or compete with or prey upon native species and can cause social impacts (e.g. livestock forage reduction, increase wildfire risk). The terms noxious weed or invasive plants are often used interchangeably. Precautions should be

taken to wash all equipment utilized in the project activities before and after project activities to reduce the spread of invasive species. Arizona has noxious weed regulations (Arizona Revised Statutes, Rules R3-4-244 and R3-4-245). See Arizona Department of Agriculture website for restricted plants <http://www.azda.gov/PSD/quarantine5.htm>. Additionally, the U.S. Department of Agriculture has information regarding pest and invasive plant control methods including: pesticide, herbicide, biological control agents, and mechanical control: <http://www.usda.gov/wps/portal/usdahome>. The Department regulates the importation, purchasing, and transportation of wildlife and fish (Restricted Live Wildlife), please refer to the hunting regulations for further information [http://www.azgfd.gov/h\\_f/hunting\\_rules.shtml](http://www.azgfd.gov/h_f/hunting_rules.shtml).

For mine closures, pre- and post-survey monitoring should be conducted to determine alternative access/exits to mines and to identify and/or minimize potential impacts to bat species. For further information when developing alternatives to mine closures, contact the Arizona Game and Fish Department Bat Coordinator in Nongame Branch: [http://www.azgfd.gov/inside\\_azgfd/agency\\_directory.shtml](http://www.azgfd.gov/inside_azgfd/agency_directory.shtml)

Minimization and mitigation of impacts to wildlife and fish species due to changes in water quality, quantity, chemistry, temperature, and alteration to flow regimes (timing, magnitude, duration, and frequency of floods) should be evaluated. Minimize impacts to springs, in-stream flow, and consider irrigation improvements to decrease water use. If dredging is a project component, consider timing of the project in order to minimize impacts to spawning fish and other aquatic species (including spawning seasons), and to reduce spread of exotic invasive species. We recommend early direct coordination with Project Evaluation Program for projects that could impact water resources, wetlands, streams, springs, and/or riparian habitats.

The Department recommends that wildlife surveys are conducted to determine if noise-sensitive species occur within the project area. Avoidance or minimization measures could include conducting project

activities outside of breeding seasons.

**Project Location and/or Species recommendations:**

Heritage Data Management System records indicate that one or more listed, proposed, or candidate species or Critical Habitat (Designated or Proposed) have been documented in the vicinity of your project (refer to page 1 of the receipt). Please contact:

Ecological Services Office  
US Fish and Wildlife Service  
2321 W. Royal Palm Rd.  
Phoenix, AZ 85021-4951  
Phone: 602-242-0210  
Fax: 602-242-2513

Heritage Data Management System records indicate that one or more native plants listed on the Arizona Native Plant Law and Antiquities Act have been documented within the vicinity of your project area (refer to page 1 of the receipt). Please contact:

Arizona Department of Agriculture  
1688 W Adams  
Phoenix, AZ 85007  
Phone: 602-542-4373

**Recommendations Disclaimer:**

1. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project.
2. These recommendations are proposed actions or guidelines to be considered during **preliminary project development**.
3. Additional site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected

agencies.

4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.

5. The Department is interested in the conservation of all fish and wildlife resources, including those Special Status Species listed on this receipt, and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.

6. **Further coordination requires the submittal of this initialed and signed Environmental Review Receipt with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(s) are to be accomplished, and project locality information (including site map).**

7. Upon receiving information by AZGFD, please allow 30 days for completion of project reviews. Mail requests to:

**Project Evaluation Program, Habitat Branch  
Arizona Game and Fish Department  
5000 West Carefree Highway  
Phoenix, Arizona 85086-5000  
Phone Number: (623) 236-7600  
Fax Number: (623) 236-7366**

**Terms of Use**

By using this site, you acknowledge that you have read and understand the terms of use. Department staff may revise these terms periodically. If you continue to use our website after we post changes to these terms, it will mean that you accept such changes. If at any time you do not wish to accept the Terms, you may choose not to use the website.

1. This Environmental Review and project planning website was developed and intended for the purpose of screening projects for

## Arizona's On-line Environmental Review Tool

Search ID: 20121211019208

Project Name: Happy Camp

Date: 12/11/2012 3:54:14 PM

potential impacts on resources of special concern. By indicating your agreement to the terms of use for this website, you warrant that you will not use this website for any other purpose.

2. Unauthorized attempts to upload information or change information on this website are strictly prohibited and may be punishable under the Computer Fraud and Abuse Act of 1986 and/or the National Information Infrastructure Protection Act .

3. The Department reserves the right at any time, without notice, to enhance, modify, alter, or suspend the website and to terminate or restrict your access to the website.

4. This Environmental Review is based on the project study area that was entered. The review must be redone if the project study area, location, or the type of project changes. If additional information becomes available, this review may need to be reconsidered.

5. A signed and initialed copy of the Environmental Review Receipt indicates that the entire receipt has been read by the signer of the Environmental Review Receipt.

### Security:

The Environmental Review and project planning web application operates on a complex State computer system. This system is monitored to ensure proper operation, to verify the functioning of applicable security features, and for other like purposes. Anyone using this system expressly consents to such monitoring and is advised that if such monitoring reveals possible evidence of criminal activity, system personnel may provide the evidence of such monitoring to law enforcement officials. Unauthorized attempts to upload or change information; to defeat or circumvent security measures; or to utilize this system for other than its intended purposes are prohibited.

This website maintains a record of each environmental review search result as well as all contact information. This information is maintained for internal tracking purposes. Information collected in this application will not be shared outside of the purposes of the Department.

If the Environmental Review Receipt and supporting material are not mailed to the Department or other appropriate agencies within six (6) months of the Project Review Receipt date, the receipt is considered to be null and void, and a new review must be initiated.

Print this Environmental Review Receipt using your Internet browser's print function and keep it for your records. Signature of this receipt indicates the signer has read and understands the information provided.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Proposed Date of Implementation: \_\_\_\_\_

Please provide point of contact information regarding this Environmental Review.

*Application or organization responsible for project implementation*

Agency/organization: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Address: \_\_\_\_\_

Arizona's On-line Environmental Review Tool

Search ID: 20121211019208

Project Name: Happy Camp

Date: 12/11/2012 3:54:14 PM

City, State, Zip: \_\_\_\_\_

Phone: \_\_\_\_\_

E-mail: \_\_\_\_\_

*Person Conducting Search (if not applicant)*

Agency/organization: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Phone: \_\_\_\_\_

E-mail: \_\_\_\_\_

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## **APPENDIX D**

### **REPRESENTATIVE PHOTOGRAPHS OF VEGETATION ASSOCIATIONS IN THE ANALYSIS AREA**





Photo 1. Jojoba-Paloverde Shrubland

This association is widespread within the Analysis Area, occurring on a wide range of soil types, aspects, and landforms. Jojoba is the greyish shrub while paloverde is the green tree.



Photo 2. Jojoba-Paloverde Shrubland

Photo showing difference in density between foothill paloverde (*Parkinsonia microphylla*) on east (far right side of photo) and west aspects (left side of photo).





Photo 3. Ocotillo-Paloverde/mixed cacti Shrubland association

This association is limited to Paleozoic outcrops in the northwestern portion of the Analysis Area (such as seen in this photo), and a few hillsides of Tertiary volcanic rock (seen around the Perlite Spring vicinity).



Photo 4. Ocotillo-Paloverde/mixed cacti Shrubland association

This association occurs on limestone outcrops in the Analysis Area. Note the dense understory of Cochise scaly cloakfern (*Astroblepis cochisensis*), the gray understory plant beneath the green paloverde.





Photo 5. Sotol

Sotol (*Dasylirion wheeleri*) occurring in dense numbers on exposed Paleozoic limestone. Areas such as this are few within the Analysis Area.



Photo 6. Jojoba-Paloverde/triangleaf bursage Shrubland association.

A dense stand of saguaros (*Carnegiea gigantea*) occurring within a Jojoba-Paloverde/triangleaf bursage shrubland. This association often appeared on reddish soils. Triangleleaf bursage is the small shrub.





**Photo 7. Paloverde-Creosotebush Shrubland**

This association occurs on the alluvial fan around Benson Spring. Creosotebush is the olive-green shrub in the center of the photo.



**Photo 8. Mesquite-Catclaw acacia Wash**

This association is widespread throughout the main drainages in the Analysis Area. Catclaw acacia is the tree on the left side of the photo.





**Photo 9. Rock Outcrop**

Areas such as this are few within the Analysis Area. The bright green shrub is hopbush (*Dodonaea viscosa*).



**Photo 10. Crucifixion Thorn Shrubland**

This association is represented in the Analysis Area by only one occurrence, where it is found on a hill composed of a loamy soil. The form of the Crucifixion thorn tree is distinctive.





Photo 11. Exposed Tuff

An uncommon mix of plants are restricted to soils derived from ash deposits (tuff) within the Analysis Area. The smaller perennial forbs are woody crinklemat (*Tiquilia canescens*) and desert zinnia (*Zinnia acerosa*).



Photo 12. Invasive Plant Species

Fountain grass (*Pennisetum setaceum*), a non-native grass, is invading areas of the Analysis Area, particularly the washes.