ECOLOGICAL OVERVIEW
APACHE LEAP SOUTH END PARCELS
PINAL COUNTY ARIZONA

Resolution Copper

Prepared for:

RESOLUTION COPPER

102 Magma Heights – Superior, Arizona 85173

Project Number: 807.98 13 06

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WestLand Resources

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EXECUTIVE SUMMARY

WestLand Resources, Inc. (WestLand) was retained by Resolution Copper Mining, LLC (Resolution Copper) to prepare an Ecological Overview for approximately 110 acres (45 hectares) in Pinal County, Arizona. The Apache Leap South End parcels ("the Property") are three non-contiguous private inholdings within the Tonto National Forest (TNF). The Property is situated along the southern end of the Apache Leap, a prominent geologic feature that visually dominates the skyline east of the town of Superior, Arizona. The Property encompasses portions of the Apache Leap cliff face as well as rugged terrain of several ridges and drainages emanating from the cliff.

This ecological evaluation was conducted to:

- Identify the type and relative condition of the onsite biological resources,
- Evaluate ecological characteristics of the Property to identify remarkable resource attributes, and
- Briefly assess the conservation values of these attributes in reference to local and regional contexts.

The Property is largely undeveloped but has evidence of historical mining use in the form of numerous prospects and adits (horizontal shafts) with associated small waste rock piles. There is no evidence of historical human occupation or intense recreational use of the site. The Apache Leap South End parcels were inspected for cultural resources in November 2015 and all of the findings are attributed to Historic period Euroamerican resources that, together, represent mining- and ranching-related activities from the late 1800s through mid-1900s (WestLand 2016). The "Legend of Apache Leap" appears to be an apocryphal story rather than truth, but nonetheless speaks to the extent of Native American connection with this area; however, due likely to the topography of the parcels, no Native American archaeological sites are present (WestLand 2016).

Value #1: Apache Leap

The Apache Leap is a visually dominant geographic feature of the area and is geologically significant as the western edge of volcanic flow. The Apache Leap Tuff forms the near-vertical cliffs of the buttress, which is underlain by Whitetail conglomerate, a sedimentary rock. This unique combination of bedrock stratigraphy has created the unusual formation. The Apache Leap South End parcels are positioned along the southern portion of the Apache Leap and incorporate portions of the cliff face as well as upper foothills extending westward from the cliff.

Value #2: Potential Habitat for Special-Status Species

Two special-status species are known to occur within the Apache Leap South End parcels[1]:

- American peregrine falcon (*Falco peregrinus anatum*); forest sensitive, and
- Golden eagle (*Aquila chrysaetos*); protected under the Bald and Golden Eagle Protection Act (1940).

The Apache Leap South End parcels lie within the known, current geographic range of, and provide potentially suitable habitat for, three special-status species:

- Arizona hedgehog cactus (*Echinocereus arizonicus var. arizonicus*); endangered,
- Sonoran desert tortoise (*Gopherus morafkai*); forest sensitive, and
- Bezy's night lizard (*Xantusia bezyi*); forest sensitive.

Opportunity #1: Apache Leap Special Management Area

Incorporating the Apache Leap South End parcels in the Apache Leap Special Management Area would expand the protected area from 697 acres (282 hectares) to 807 acres (327 hectares). A Management Plan for the area would be prepared by the USFS in consultation with affected Indian Tribes, the town of Superior, Resolution Copper, and other stakeholders. Resolution Copper's mining rights on the Property would be surrendered, protecting the physical integrity of the Apache Leap escarpment and preserving its natural character.

Opportunity #2: Protecting Special-Status Species

The Apache Leap South End parcels would be incorporated into the TNF and be managed by the USFS instead of being managed under private ownership. The five special-status species that may occur on the Apache Leap South End parcels (Arizona hedgehog cactus, American peregrine falcon, Bezy's night lizard, golden eagle, and Sonoran desert tortoise) would be protected by public land management policies that would not be present under private ownership.

[1] In this document, special-status species are those currently listed by the USFWS as endangered, threatened, proposed for listing, or candidate for listing under the ESA, species identified as sensitive by the USFS, and species protected by the Bald and Golden Eagle Protection Act. Several of these species are listed by more than one of these agencies.

1. INTRODUCTION AND METHODS

1.1. PURPOSE AND ORGANIZATION OF REPORT

WestLand Resources, Inc. (WestLand) was retained by Resolution Copper Mining, LLC (Resolution Copper) to prepare an Ecological Overview for approximately 110 acres (45 hectares) in Pinal County, Arizona. In this report, the site is referred to as the Apache Leap South End parcels or "the Property."

The Apache Leap South End parcels are three private non-contiguous inholdings within the Tonto National Forest (TNF; **Figure 1**). The three parcels are arranged in a generally north-south alignment and are separated by less than 330 feet (ft; 100 meters [m]) (**Figure 2**). The northernmost parcel comprises approximately 45 acres (18 hectares), the central parcel 37 acres (15 hectares), and the southernmost parcel 25 acres (10 hectares). Other private inholdings are contiguous to the three parcels, but are not part of the Property.

The Property occupies portions of Sections 1, 2, and 12 of Township 2 South, Range 12 East of the Gila and Salt River Baseline and Meridian. The Apache Leap South End parcels are accessible from Arizona State Route 177, Apache Leap Road, and unimproved roads or trails. The Property encompasses portions of the Apache Leap cliff face as well as rugged terrain of several ridges and drainages emanating from the cliff.

This ecological overview was conducted to

- Identify the type and relative condition of the onsite biological resources;
- Evaluate ecological characteristics of the Property to identify remarkable resource attributes; and
- Briefly assess conservation value of these attributes in reference to local and regional contexts.

This report is presented in seven sections:

- Section 1 – Introduction and Methods (this section)
- Section 2 – Regional Setting
- Section 3 – Property and Adjacent Land Uses
- Section 4 – Physical Resources
- Section 5 – Biological Resources
- Section 6 – Conservation Value and Opportunities
- Section 7 – References

1.2. METHODS AND APPROACH

WestLand completed this evaluation by conducting background research of available natural history information and aerial photography of the Property and surrounding region, and through field reconnaissance to identify, map, and photograph vegetation and habitat types. WestLand obtained and reviewed available literature pertaining to biotic communities of the southwest, riparian ecosystems, and the Apache Leap area. Primary sources of information that were reviewed include *Biotic Communities of the Southwestern United States and Northwestern Mexico* (Brown 1994; a comprehensive reference of the desert southwest), wildlife abstracts from the U.S. Fish & Wildlife Service (USFWS), and various documents prepared and websites maintained by the U.S. Forest Service (USFS) Tonto National Forest, Arizona Department of Water Resources (ADWR), and other agencies and conservation organizations. These references and aerial photographs were reviewed to identify potential and confirm observed vegetation communities on the Property.

WestLand biologists conducted field reconnaissance of the Property on May 8, 2015 to observe current site conditions, biological resources, and abiotic factors affecting biota distribution and relative habitat value within the Property. The reconnaissance consisted of a pedestrian survey that focused on accessible areas of interest identified during the background research phase of the evaluation. Inaccessible areas were scanned using binoculars to observe distant vegetation communities. Field observations were recorded and photographs taken to document the various physical and biological resources present on the Property. In particular, vegetation patterns were noted and observed species recorded. The general vegetation patterns were delineated on an aerial photograph and transcribed onto a vegetation map of the Property. Direct and indirect (tracks, scat, burrows, etc.) observation of wildlife were noted.

Specific attention was paid to the Property's potential to provide habitat for special-status species. Information such as the Property's elevation range, habitat type, water resources, climate, and other related information was compiled and compared to background research information. To identify special-status species with some potential to occur on the Property, we used the Information, Planning, and Conservation (IPaC) online environmental review tool maintained by USFWS and other federal agencies, and records of special-status species occurrences from the Arizona Game and Fish Department (AGFD) Heritage Data Management System (HDMS; **Appendix A**). The life history of each of these species was then reviewed to determine habitat requirements such as vegetation communities, elevation ranges, presence of surface water, and other landscape features. This information was used to eliminate those species that were unlikely to occur. Additional literature research was conducted and summarized for those species with known ranges and habitat requirements close to the Property or which have potential to occur there. The screening analysis resulted in a list of target species that have potential to occur on the Property (**Appendix A**).

2. REGIONAL SETTING

The Property lies in a transitional zone between the Basin and Range province and the Colorado Plateau province. The Basin and Range physiographic province is generally characterized by a series of smooth floored basins separated by mountain ranges (Chronic 1983). The northeastern edge of the province is a mountainous region that is transitional to the Central Highlands that border the Colorado Plateau province. This mountainous region consists of belts of generally linear ridges and valleys in which the rugged ranges predominate over the valleys. This is in contrast to much of the Basin and Range province where broad valleys predominate over relatively narrow mountain ranges generally oriented in a north-south alignment.

The Basin and Range physiographic province occupies a broad swath through Arizona in an arc extending from nearly the entire western border through all of the southwestern third of Arizona and eastward into the southeastern-most corner of the state (Nations and Stump 1996). This province supplies nearly all of the copper mined in Arizona (Rasmussen 2012).

The Property is situated at and near the Apache Leap, a prominent geologic buttress that visually dominates the eastern skyline from the basin below (**Appendix B, Photograph 1**). The Apache Leap is characterized by nearly horizontal tuff that has eroded into numerous canyons, plateaus, and scarps (Nations and Stump 1996). The tuff layer overlies sedimentary rocks that have similarly eroded into ridges and canyons forming the foothills below the Apache Leap. Within the Property area, these foothills include ephemeral drainages that primarily flow westward toward Queen Creek.

The closest metropolitan area is Phoenix, Arizona (city population approximately 1.5 million; metropolitan area population approximately 4.3 million) approximately 40 miles (65 km) to the west. The small town of Superior (approximate population 2,800) is the closest population center. Superior was settled in the 1800s to support local copper mines. Although there is no active mining in the immediate vicinity, the Resolution Copper project plans to open a new mine near one of the historical underground copper mines.

3. PROPERTY AND ADJACENT LAND USES

The Apache Leap South End parcels have historically been used for small mine operations. There has been no recent use of the Property by the current owner, but it is expected that passive recreational activities (e.g., rock climbing and hunting) on adjacent public lands have continued onto the private property. There is no onsite evidence of intensive recreational activities such as off-road vehicle use or camping.

The TNF road and trail network accesses the Property from the west, but does not enter the Apache Leap South End parcels. A dirt road in Belmont Canyon and trails in Donkey Canyon and Pacific Canyon lead from Ray Road (also known as Apache Leap Road) through the foothills to the Property. The primitive road is designated for high-clearance vehicles. There is no road or trail access to the Apache Leap South End parcels from the east.

Numerous mine prospects (exploration pits, adits, and associated waste rock piles), both mapped and unmapped, are located on and near the Apache Leap South End parcels. None of these nearby mine operations appear to have been extensive; the total area of land disturbance from mining activities on the Property is estimated to be less than 0.5 acres (0.2 hectares). In addition to the prospects, numerous rock cairns and other markers delineating mine claims were observed within the Property.

WestLand was provided the special warranty deed for the Property that accompanied the search of available land title records for environmental liens as well as activity and use limitations (AULs) on the Property. The Special Warranty Deed was executed August 12, 2004, and recorded the same month, conveying ownership from BHP Copper Inc. (formerly Magma Copper Company) to Resolution Copper Mining, LLC (Pinal County 2005). Title records available online for Pinal County are limited prior to 2005. An official Chain of Title Records search will be conducted as required for the transfer of private lands to federal ownership. Further historical land ownership information will be available as a result of this official records search.

The USFS administers the TNF that surrounds much of the Property. As part of the National Forest System, the TNF is managed for multiple uses, ranging from recreation (as described above) to resource procurement (such as mining). As noted above, numerous mine prospects, both mapped and unmapped, are located in the area. None of these nearby mine operations appear to have been extensive, although there are large historical and current mining operations elsewhere in the TNF distant from the Property. There are no substantive timber resources on the National Forest System land surrounding the Property, so logging has not been conducted near the site.

4. PHYSICAL RESOURCES

4.1. LANDFORM AND TOPOGRAPHY

The Apache Leap South End parcels are situated in the mountains immediately east and south of the Town of Superior, Arizona (**Figure 3**). The parcels are characterized as rugged terrain with considerable vertical relief, composed largely of exposed rock faces, boulders of various sizes, rocky slopes, and generally poor or little soil development. The western edge of this area is generally very steep, with the cliffs of the Apache Leap escarpment rising abruptly above Superior (**Appendix B, Photograph 2**). Elevations range from 3,680 to 4,720 ft (1,122 to 1,439 m) above mean sea level (amsl) at a high point on the Apache Leap escarpment that overlooks Superior.

The present-day topography of the area is dominated by the Apache Leap escarpment, a west-facing escarpment that shows 1,970 ft (600 m) of vertical displacement (**Appendix B, Photograph 2**). East of the escarpment is an upland capped by welded tuff (Apache Leap Tuff). West of the escarpment, rough terrain at lower elevations was formed by erosion acting on faulted basement blocks (**Appendix B, Photograph 3**). The town of Superior is located in a down-dropped, fault-formed basin. Notable peaks in the vicinity of the parcels include Picketpost Mountain (rising to 4,375 ft [1,333 m]) immediately west, Kings Crown Peak (rising to 5,541 ft [1,689 m]) to the north, and Teapot Mountain (rising to 4,485 ft [1,367 m]) to the southeast of the parcels. Queen Creek is located roughly 1 mile (1.6 km) north of the parcels and the Gila River is approximately 11 miles (17.7 km) south. Boyce Thompson Arboretum is located within the Queen Creek drainage roughly 4 miles (6.4 km) west of the parcel.

Regionally, the Apache Leap South End parcels lie within a transitional zone on the northeastern edge of the Basin and Range physiographic province. East of the Apache Leap escarpment, an area of parallel ridges and valleys trends to the northeast. These parcels are within the Middle Gila Watershed that covers approximately 12,250 square miles (mi^2, 31,727 square kilometers [km^2]) (ADEQ 2015; **Appendix B, Photograph 3**). The highest elevations within the upper reaches of this watershed are 7,400 ft (2,256 m) and 1,100 ft (335 m) with most of the watershed falling below 5,000 ft (1,524 m) (ADEQ 2015). The Middle Gila Watershed can be separated into sub-watersheds (drainage areas) including Gila-Queen Creek Drainage Area, Salt-Cave Creek Drainage Area, Gila-Painted Rock Drainage Area, Aqua Fria River Drainage Area, Hassayampa River Drainage Area, and Centennial River Drainage Area (ADEQ 2015). There are an estimated 165 perennial, 1,210 intermittent, and 5,460 ephemeral stream miles (50, 369, and 266 km, respectively) and 10,320 perennial and 6,830 non-perennial acres (4,179 and 2,764 hectares respectively) of lakes on non-tribal lands within the watershed.

4.2. GEOLOGY AND GEOMORPHOLOGY

The Apache Leap South End parcels are located within the USGS Superior 7.5-minute topographic quadrangle (1:24,000). The geomorphology of the area can be attributed to north- to northwest-trending, down-to-the-west, Basin and Range-style normal faults with Tertiary to Quaternary movement (Hehnke et al. 2012) (**Figure 4**). These faults include the Concentrator, Main, and Conley Springs. Relative downward movement of a structural block west of the Concentrator fault has formed the Superior Basin, and exposed the thick sequence of sedimentary rocks and tuff along Apache Leap (**Appendix B, Photograph 4**). South of the Conley Spring fault, between the Concentrator fault and the upland capped with Apache Leap Tuff (**Appendix B, Photograph 5**), the layered rocks are tilted eastward and cut by a complex of major faults that are subsidiary to the Concentrator fault. West of the Concentrator fault, the down-dropped Superior Basin is filled with horizontal to eastward-dipping volcanic flows, tuffaceous sediments, and alluvium (Hammer and Webster 1962). Regional extension, normal faulting, and tilting ended after Tertiary volcanism and during the deposition of conglomerate and sandstone (Spencer and Richard 1995).

4.2.1. Surficial Deposits

Data provided by the National Cooperative Soil Survey through Web Soil Survey (Soil Survey Staff 2015) indicate that the Apache Leap South End parcels are located within two soil complexes, as shown in **Figure 5**. The soil complexes are well drained and occur on mountainous areas. No data are available for 14 percent of the parcels.

Rock outcrop-Woodcutter complex—composed of 50 percent Rock outcrop (tuff) and 40 percent Woodcutter soils. The Woodcutter series consists of very shallow and shallow, well-drained soils that formed slope alluvium and is typically weathered from granite and metamorphic rock. The series is on hills and mountains with slopes ranging from 15 to 50 percent. Permeability is very low to low (Soil Survey Staff 2015).

Rock outcrop-Mabray-Pantak complex—composed of 40 percent Rock outcrop, 35 percent Mabray soils, and approximately 15 percent Pantak soils. The Mabray series consists of shallow and very shallow, well-drained soils formed in slope alluvium. Mabray soils are on hills and mountains and have slopes of 3 to 75 percent. Permeability is moderate. The Pantak series consists of very shallow and shallow, well drained soils formed in mixed slope alluvium, colluvium, and residuum from igneous rock. Pantak soils are on pediments, hills, and mountains with slopes of 5 to 60 percent. Permeability is moderate (Soil Survey Staff 2015).

4.2.2. Bedrock

Bedrock exposed on the Apache Leap South End parcels consist of Apache Leap Tuff (Tal) (**Appendix B, Photographs 5 and 6**) and Precambrian sedimentary rocks (pCy) (**Appendix B,**

Photograph 7). The central and southernmost of these parcels are underlain by the Apache Leap Tuff whereas the northernmost parcel is comprised mostly of Precambrian sedimentary rocks (**Figure 4**).

Apache Leap Tuff (Tal)—the youngest consolidated formation in the area, forms the Apache Leap escarpment. Apache Leap Tuff is a crystal-rich quartz latite ashflow tuff that overlies the Whitetail Conglomerate and forms the Apache Leap escarpment (**Appendix B, Photograph 7**). Underlying Paleozoic sedimentary rocks (Pz) and younger Precambrian sedimentary rocks (pCy) are exposed at the foot of the escarpment (**Appendix B, Photographs 5 and 6**).

Tertiary Whitetail Conglomerate (Tw)—is present, with limited exposure at the toe of the slope on the western side of Apache Leap. A Quaternary alluvial deposit (Qal) overlies the Apache Leap Tuff in a small area in the southwestern portion of the parcels. The Whitetail Conglomerate forms a northeast-thickening succession of predominantly poorly sorted conglomerates (Hehnke et al. 2012).

4.2.3. Structural Features

The Apache Leap South End parcels encompass the southern end of the Apache Leap escarpment (**Appendix B, Photograph 8**). The escarpment divides the area in the vicinity of the parcels into two major topographic units: upland areas capped by welded tuff occur on the eastern slope and lowland areas consisting of rough terrain made up of accumulations of eruptive rocks on the western slopes (Hammer and Webster 1962).

There are no major faults within these parcels, however, three major faults are in the vicinity (**Figure 4**). These faults include the Concentrator, Main, and Conley Spring (Hammer and Webster 1962). The Concentrator fault runs north-south in the valley roughly 2 miles (3.2 km) west of the parcels and south of Superior. The Main fault runs roughly northwest-southeast in the foothills of Silver King Wash roughly 3 miles (4.8 km) northwest. The Conley Spring fault runs northwest-southwest roughly 3 miles (4.8 km) north of the parcels.

4.3. CLIMATE

Average annual temperatures in the area of the Apache Leap South End parcels range from 51 to 77 degrees Fahrenheit (10.6 to 25 degrees Celsius), with an annual mean temperature of 64 degrees Fahrenheit (17.8 degrees Celsius). Average precipitation is approximately 18.8 inches (47.8 cm) per year, based on data from the Miami weather station (WRCC 2015). The Miami weather station is located approximately 14.5 miles (23 km) northeast of the parcels and is at an elevation of 3,560 ft (1,085 m), a nominal 120 ft (37 m) lower than the parcels.

4.4. WATER RESOURCES

4.4.1. General Considerations of Water Resources

There are no surface water features in the Apache Leap South End parcels but the upper canyons within the foothills area are headwaters for several drainages, including Pacific Canyon, Belmont Canyon, and Donkey Canyon, that report to Queen Creek.

4.4.2. Surface Water Resources

Based on review of recent aerial photography, topographic mapping, and field reconnaissance conducted on March 24, 2015 there are no perennial or intermittent surface water features within the Apache Leap South End parcels. A few minor ephemeral headwater drainage features that are tributaries to Queen Creek are present within the parcels (**Appendix B, Photograph 9**). The National Wetlands Inventory (NWI) map identifies no wetlands within these parcels (USFWS 2015). The nearest spring, Bored Spring, has an elevation of 2,880 ft (879 m) amsl (**Figure 6**). Regionally, the Apache Leap South End parcels have been mapped by the Federal Emergency Management Agency (FEMA) as Zone X or areas of minimal flood hazards.

4.4.3. Groundwater Resources

Resolution Copper started hydrochemical sampling of the groundwater in the vicinity (primarily East Plant Site and West Plant Site) in 2004, but groundwater has not been sampled within the Apache Leap South End parcels. Groundwater quality in the three groundwater systems generally meets EPA and State of Arizona groundwater quality standards, with a few exceptions (Montgomery & Associates 2012).

The Apache Leap South End parcels span two different groundwater basins; the East Salt River Valley sub-basin located within the larger Phoenix Active Management Area (AMA) groundwater basin (**Appendix B, Photograph 10**) and the Mammoth sub-basin within the larger Lower San Pedro groundwater basin. The vast majority of the Property lies within the East Salt River Valley sub-basin, topographically identified by the top of the Apache Leap escarpment. The small portion of the Property on the east side of the escarpment lies within the Mammoth sub-basin.

As described in the General Plan of Operations (GPO; RCM 2016), groundwater in the vicinity occurs in three separate local systems: a shallow groundwater system, the Apache Leap Tuff aquifer, and a deep groundwater system. Extensive characterization of the geology and hydrogeology in the vicinity (Montgomery & Associates 2010) indicates that the Concentrator fault, located to the west, acts as a barrier to groundwater movement between the shallow and intermediate-depth groundwater systems. Less information is available on the deep groundwater systems, but based on a lack of water level response to mine dewatering activities and large differences in hydraulic head across the fault, the

hydraulic connection of the deep groundwater systems across the Concentrator fault is limited to areas where legacy mine workings locally cross the fault.

Beneath the Property, groundwater may be present in the Apache Leap Tuff aquifer and the deep groundwater aquifer. Any groundwater within the shallow system, if present, is likely perched or very limited in extent and connection to other aquifers.

There are no water wells within the Property. The Arizona Department of Water Resources (ADWR) Well Registry database contained data for 23 wells within a 1-mile (1.6-km) radius of the Apache Leap South End parcels (ADWR 2013). Reported depth to groundwater is only available for 7 of the 23 wells and ranges between 320 and 797 ft (97.5 and 243 m) below ground surface (ADWR 2013). This excludes an outlier with reported depth to groundwater being 4,667 ft (1,423m), which may be an error. Groundwater flow direction at the Property likely follows surface gradient.

5. BIOLOGICAL RESOURCES

5.1. VEGETATION AND HABITAT DESCRIPTION

The Apache Leap South End parcels lie within one biotic community as mapped by Brown and Lowe (1980): the Arizona Upland subdivision of Sonoran desertscrub. Descriptions provided by Brown (1994) and WestLand's field investigations indicate that vegetation along the top of the Apache Leap is actually more consistent with that of the Interior Chaparral community. The remainder of the Property is mapped as Arizona Upland, though during field reconnaissance on May 8, 2015, WestLand biologists noted that vegetation on generally north-facing slopes that are west of the Apache Leap escarpment also more closely resembles the Interior Chaparral biotic community (**Figure 7**). The following descriptions of these biotic communities are synoptic, based on field observations, and on the general outlines provided by Brown (1994).

5.1.1. Arizona Upland Subdivision of Sonoran Desertscrub

The Arizona Upland subdivision typically consists of shrubs, cacti, and leguminous trees including paloverde (*Parkinsonia* spp.), ironwood (*Olneya tesota*), and mesquites (*Prosopis* spp.) (Turner and Brown 1994). Within the Property, the Arizona Upland subdivision is best represented by saguaro (*Carnegiea gigantea*), ocotillo (*Fouquieria splendens*), brittlebush (*Encelia farinosa*), desert spoon (*Dasylirion wheeleri*), jojoba (*Simmondsia chinensis*), and a variety of cholla species (*Cylindropuntia* spp.). Additional species common to this biotic community that were observed within the Property include century plant (*Agave chrysantha*.), prickly pear (*Opuntia engelmannii*), foothill paloverde (*Parkinsonia microphylla*), Ephedra (*Ephedra* spp.), fairyduster (*Calliandra eriophylla*), fishhook barrel cactus (*Ferocactus wislizeni*), and catclaw mimosa (*Mimosa aculeaticarpa*). **Appendix B, Photograph 2** (**Section 4.1**) shows vegetation characteristic of the Arizona Upland subdivision community found in the Apache Leap South End parcels.

Drainages within the Property are xeric and do not support riparian vegetation. Instead, these areas contain a greater density of species that are also present in the adjacent uplands, including jojoba, foothill paloverde, and catclaw mimosa. Velvet mesquite (*Prosopis velutina*), globemallow (*Sphaeralcea* spp.), and wolfberry (*Lycium* spp.) are also present in these areas.

5.1.2. Interior Chaparral

Vegetation on generally north-facing slopes within the Property is representative of Interior Chaparral (**Figure 7; Appendix B, Photograph 11**). This vegetation type is characterized by dense stands of woody, sclerophyllous shrubs. The most common (diagnostic) species of Interior Chaparral in central Arizona is scrub live oak (*Quercus turbinella*; Pase and Brown 1994; **Appendix B, Photograph 12**). Within the Property, this community is best represented by scrub live oak, barberry (*Mahonia* sp.) and sugar sumac (*Rhus ovata*). Other species observed within the Property include desert spoon, hopbush

(*Dodonaea viscosa*), and broom snakeweed (*Gutierrezia sarothrae*). Also noted on exposures of the Whitetail Conglomerate were groupings of limestone endemics including crucifixion thorn (*Canotia holocantha*), California rosewood (*Vauquelinia californica*), and beebush (*Aloysia wrightii*).

5.1.3. Human Altered Aspects of Vegetation on the Apache Leap South End Parcels

WestLand reviewed available information including aerial photography, USGS topographic maps, and the results of a Phase I Environmental Site Assessment (WestLand 2015a), to estimate the amount and type of human disturbance present within the Property. Results of this review, as well as observations made during the field reconnaissance, indicate the presence of multiple historical mine features and overgrown dirt roads throughout the Property. Disturbance to vegetation resulting from these activities is estimated to be less than 1.5 acres (0.6 hectares).

5.2. WILDLIFE

As described above, two biotic communities are present on the Apache Leap South End parcels:

- Arizona Upland Subdivision of Sonoran Desertscrub
- Interior Chaparral

Mammal species that can be expected to occur in these biotic communities on or adjacent to the Property include cottontail rabbit (*Sylvilagus* spp.), black-tailed jackrabbit (*Lepus californicus*), gray fox (*Urocyon cinereoargenteus*), California leaf-nosed bat (*Macrotus californicus*), California myotis (*Myotis californicus*), cliff chipmunk (*Tamias dorsalis*), white-throated woodrat (*Neotoma albigula*), pocket mouse (*Perognathus* spp.), mule deer (*Odocoileus hemionus*), and javelina (*Pecari tajacu*). Reptiles that are likely to occur include Arizona alligator lizard (*Elgaria kingii*), eastern fence lizard (*Sceloporus undulatus*), Sonoran whipsnake (*Masticophis bilineatus*), striped whipsnake (*Masticophis taeniatus*), subspecies of the side-blotched lizard (*Uta stansburiana*), western rattlesnake (*Crotalus atrox*), glossy snake (*Arizona elegans*), whiptail lizards (*Cnemidophorus* spp.), and Gila monster (*Heloderma suspectum*) (Brown 1994).

Common bird species expected to occur on or adjacent to the Property include white-winged dove (*Zenaida asiatica*), elf owl (*Micrathene whitneyi*), Harris's hawk (*Parabuteo unicinctus*), Inca dove (*Columbina inca*), pyrrhuloxia (*Cardinalis sinuatus*), Gila woodpecker (*Melanerpes uropygialis*), gilded flicker (*Colaptes chrysoides*), ladder-backed woodpecker (*Picoides scalaris*), curve-billed thrasher (*Toxostoma curvirostre*), and cactus wren (*Campylorhynchus brunneicapillus*). The more scrub-adapted species expected to occur on or adjacent to the Property include western scrub jay (*Aphelocoma californica*), canyon wren (*Catherpes mexicanus*), Crissal thrasher (*Toxostoma crissale*), black-chinned sparrow (*Spizella atrogularis*), bushtit (*Psaltriparus minimus*), brown towhee (*Pipilo fuscus*), and rufous-sided towhee (*Pipilo erythrophthalmus*) (Brown 1994).

Wildlife species observed[2] by WestLand within the Apache Leap South End parcels include cottontail rabbit (**Appendix B, Photograph 13**), javelina, turkey vulture (*Cathartes aura*), Scott's oriole (*Icterus parisorum*), house finch (*Haemorhous mexicanus*), Costa's hummingbird (*Calypte costae*), curve-billed thrasher, cactus wren, black-throated sparrow (*Amphispiza bilineata*), canyon wren, and Phainopepla (*Phainopepla nitens*).

5.3. SPECIAL-STATUS SPECIES

A preliminary screening analysis was conducted to determine the potential for occurrence of special-status species in the Apache Leap South End parcels. For the purpose of this screening, special-status species are those currently listed by the USFWS as endangered, threatened, proposed for listing, or candidate for listing under the ESA, as well as species identified as sensitive by the USFS, due to the proximity of National Forest System lands to the Property, and those species protected under the Bald and Golden Eagle Protection Act, due to the Property's proximity to suitable cliff habitat for those protected species.

Federally listed special-status species included in this evaluation were obtained using the IPaC online environmental review tool maintained by USFWS and other federal agencies. USFS sensitive species were identified via the AGFD HDMS Online Environmental Review Tool (**Appendix A**). The presence of proposed or designated critical habitat for special-status species in the Property was also evaluated. No specific surveys for special-status species were conducted as part of this effort.

Determinations of the potential for special-status species to be present and to utilize habitats within the Property were based upon:

- Field observations,
- Review of the natural history of the special-status species,
- Evaluation of known range and distribution for the special-status species,
- Comparisons of this information with habitats present in the Property,
- Review of records of occurrences in published or gray literature, and
- Review of the results of the AGFD HDMS on-line environmental review tool query (**Appendix A**).

The criteria used to determine the potential of occurrence of the species included in this screening analysis within the Apache Leap South End parcels are defined as follows:

[2] Wildlife observations included direct visual/aural observations and the observation of tracks and scat.

Present – The species has been observed in the Property during site visits or has been documented in the Property based on records from recent, reliable sources (e.g., AGFD, USFWS, museum records, eBird), and habitats required by the species are known to be currently present.

Possible – The species has not been documented in the Property, but the known, current geographic and elevational range of the species includes the Property, and habitat required by the species appears to be present in the Property.

Unlikely – Generally, the known, current geographic range of the species does not include the Property, but the range of the species is close enough such that the Property may be within the dispersal distance of the species. The required habitat characteristics of the species may be present in the Property; however, the potential for occurrence of these species is insignificant and detailed discussion in this screening analysis was not deemed warranted.

None – The Property is outside the known geographic and/or elevational range of the species and the habitat required by the species is not present.

Table 1 includes the species' common and scientific name, federal listing status, and WestLand's evaluation of the likelihood of occurrence within the Property.

Table 1. Screening Analysis for the Apache Leap South End Parcels

Species	Status		Potential Occurrence Within the Apache Leap South End Parcels and Basis for Potential Occurrence Determination
	USFWS	USFS	
American peregrine falcon (*Falco peregrinus anatum*)	SC	S	**Present**: The Property is within the known, current geographic (AGFD 2015a) and elevational range and contains potentially suitable habitat for this species. Peregrine falcons typically nest on steep, sheer cliffs overlooking open areas for foraging in a variety of habitats including woodlands, riparian areas, and even very xeric areas. Optimum habitats support an abundance of avian prey species (Corman and Wise-Gervais 2005). WestLand has documented a peregrine falcon eyrie (nest) nearby on the west side of Apache Leap that has been active for many years (WestLand 2012a). A portion of the Apache Leap escarpment, as well as open areas that may be suitable for hunting, are present within the Property. The species has been documented in this location (eBird, 2016) and HDMS has records for this species within 5 miles (8 km) of the Property (**Appendix A**).
Arizona hedgehog cactus (*Echinocereus arizonicus* var. *arizonicus*)	E	--	**Possible**: The Property is within the known, current geographic and elevational range and contains potentially suitable habitat for this species. This cactus is found in areas of Interior Chaparral or Madrean Evergreen Woodland from 3,300 to 5,700 ft (1,000 to 1,740 m) (Baker 2013). HDMS has records for this species within 5 miles (8 km) of the Property (**Appendix A**). WestLand has also documented this cactus at Oak Flat, north of the Property (WestLand 2012b).
Bald eagle* *(Haliaeetus leucocephalus)*	--	--	**None:** The Property occurs within the known, current geographic and elevational range but does not contain suitable habitat for the species. Bald eagles nest in large riparian trees (cottonwoods, willows, sycamores) and pines, as well as on ledges and cliff faces. Nest locations are typically in areas of low human disturbance with unimpeded views, and are located near foraging areas with abundant prey. Wintering habitat has an adequate food supply, and open water (AGFD 2016). In Arizona, bald eagles feed primarily on fish, but waterfowl, small mammals, and carrion also constitute a portion of the diet (USFWS 2011).
Bezy's night lizard (*Xantusia bezyi*)	--	S	**Possible**: The Property occurs within the known, current geographic and elevational range and contains potentially suitable habitat for this species. Bezy's night lizards are primarily associated with crevices found in rock outcrops, cliff faces, and boulder fields in the Arizona upland Subdivision of Sonoran desertscrub, semi-desert grassland, interior chaparral, and oak woodland communities. They have also been occasionally found in decaying sotol (Dasylirion wheeleri) and yucca (Yucca spp.), under plant material on the desert floor, and in buildings (Bezy 2005, Brennan and Holycross 2006, Leavitt et al. 2007). HDMS has records for this species within 5 miles (8 km) of the Property (**Appendix A**).

Table 1. Screening Analysis for the Apache Leap South End Parcels

Species	Status		Potential Occurrence Within the Apache Leap South End Parcels and Basis for Potential Occurrence Determination
	USFWS	USFS	
Desert pupfish (*Cyprinodon macularius*)	E	--	**None:** The Property is not within the known, current geographic range and does not include any suitable aquatic environments required by this species. Desert pupfish occupy shallow water of desert springs, small streams, and marshes below 5,000 ft (1,515 m) elevation (USFWS 2010a). No natural populations of this fish remain in Arizona, though several populations have been reintroduced (TNF 2000). HDMS has records for this species within 5 miles (8 km) of the Property (**Appendix A**); however, these records represent an introduced population in Ayer Lake at the Boyce-Thompson Arboretum (Mark Taylor, USFS, pers. comm. 2014).
Gila topminnow (*Poeciliopsis occidentalis occidentalis*)	E	--	**None:** The Property is not within the known, current geographic range and does not include any suitable aquatic environments required by this species. Gila topminnow occupy small streams, springs, and cienegas below 4,500 ft (1,350 m) elevation, primarily in shallow areas with aquatic vegetation and debris for cover (USFWS 2008). HDMS has records for this species within 5 miles (8 km) of the Property (**Appendix A**); however, these records represent an introduced population in Ayer Lake at the Boyce-Thompson Arboretum (Mark Taylor, USFS, pers. comm. 2014).
Golden eagle* (*Aquila chrysaetos*)	--	--	**Present:** The Property is within the known, current geographic range of the species and contains suitable habitat. Golden eagles breed in pinyon pine-juniper woodlands, Sonoran desertscrub, Madrean evergreen oak woodlands, semiarid grasslands, chaparral, and landscapes dominated by big sagebrush. They are known to construct nests in areas with little to no human activity, in tall trees, cliffs, canyons, or rock ledges, near large open areas where they forage for prey (Corman & Wise-Gervais, 2005). Golden eagles are known to forage within 4.4 miles of the nest (Tesky, 1994), generally in open habitats where prey is available (Kochert, Steenhof, Mcintyre, & Craig, 2002). The species has been documented in this location (eBird, 2016) and HDMS has records for this species within 5 miles (8 km) of the Property (**Appendix A**).
Lowland leopard frog (*Lithobates yavapaiensis*)	SC	S	**None:** The Property is within the known, current geographic range of the species, however, does not contain any suitable aquatic environments required by this species. Lowland leopard frog occurs in a variety of perennial to near perennial waters (AGFD 2006). This species has been documented within 5 miles (8 km) of the Property (**Appendix A**).
Northern Mexican gartersnake (*Thamnophis eques megalops*)	T	--	**None:** The Property is outside of the currently recognized geographic range (Brennan and Holycross 2006) and does not contain suitable habitat for this species. Northern Mexican gartersnakes are strongly associated with perennial aquatic environments (e.g., streams, cienegas, and occasionally stock tanks) that support dense riparian or wetland vegetation where they forage primarily on native fish and leopard frogs (USFWS 2014a).

Table 1. Screening Analysis for the Apache Leap South End Parcels

Species	Status		Potential Occurrence Within the Apache Leap South End Parcels and Basis for Potential Occurrence Determination
	USFWS	USFS	
Ocelot (*Leopardus pardalis*)	E	--	**None:** This species has been documented within 5 miles (8 km) of the Property (**Appendix A**); however, this is considered an extreme occurrence and well out of the species' current known geographic range and breeding populations. This species is more typically found in southern Arizona in desert scrub communities in areas of dense cover or vegetation and high prey populations, avoiding open country. Although the Property contains suitable habitat it lacks the prey population necessary for ocelots (elk and deer). The species has been documented in southeastern Arizona (Cochise County), along Highway 60 between Superior and Globe, and in the Huachuca Mountains (AGFD 2010).
Roundtail chub (*Gila robusta*)	C	--	**None:** The Property is outside of the known, current geographic range (USFWS 2009) and does not include any suitable aquatic environments required by this species. Roundtail chub occupy open areas of deep pools and eddies within cool to warm rivers and streams (USFWS 2010b).
Sonoran desert tortoise (*Gopherus morafkai*)	C	S	**Possible:** The Property is within the known, current geographic (AGFD 2015c) and elevational range and contains potentially suitable habitat for this species. Sonoran desert tortoise occur on rocky, steep slopes and bajadas and within inter-mountain washes in Sonoran desertscrub (USFWS 2010c). There are records of Sonoran desert tortoise within 5 miles (8 km) of the Property (**Appendix A**). WestLand has also observed the species within the proposed Near West Tailings Storage Facility Study Area located west of the town of Superior (WestLand 2014b).
Southwestern willow flycatcher (*Empidonax traillii extimus*)	E	--	**None:** The Property is not within the known, current geographic range (AGFD 2015b) and lacks suitable habitat for this species. Nesting habitat includes willow and/or tamarisk communities with dense under- and mid-story vegetation, along streams, rivers, lakesides, and wetlands. During migration, the species uses riparian habitats along major drainages, often with only small patches of riparian vegetation (USFWS 2013).
Yellow-billed cuckoo (*Coccyzus americanus*)	T	S	**Unlikely:** The Property is within the known, current geographic range (AGFD 2015d); however, lacks suitable habitat for this species. Yellow-billed cuckoo is typically associated with dense riparian forest and woodland environments including cottonwood-willow galleries and mesquite bosques (USFWS 2014b). HDMS has records of yellow-billed cuckoo within 5 miles (8 km) of the Property (**Appendix A**).

USFWS: E = Endangered, T = Threatened, C = Candidate, SC = Species of Concern
USFS: S = Sensitive
* Species protected under the Bald and Golden Eagle Protection Act (1940) and analyzed due to the proximity of cliff features to the Property.

The screening analysis conducted by WestLand indicates that two special-status species are known to occur within the Property and three special-status species have potential to occur within the Property. One species that is listed by the USFWS as a species of concern and identified by the USFS as sensitive

is known to occur on the Property, American peregrine falcon (*Echinocereus arizonicus* var. *arizonicus).* One species, the golden eagle, which is protected under the Bald and Golden Eagle Protection Act is known to occur on the Property. One species with potential to occur, Arizona hedgehog cactus (*Echinocereus arizonicus var. arizonicus*), is listed by the USFWS as endangered under the Endangered Species Act (ESA). Three species identified by the USFS as sensitive, Sonoran desert tortoise, American peregrine falcon, and Bezy's night lizard, also have potential to occur. There is no proposed or designated critical habitat for special-status species located in the Property.

The life history and potential for occurrence of the Arizona hedgehog cactus is discussed further in the following section.

5.3.1. Arizona Hedgehog Cactus

Life History

The taxonomy of the red-flowered species of *Echinocereus* has been in flux for nearly a century. Arizona hedgehog cactus (AHC) was first collected in the type locality in 1922, and named *Echinocereus arizonicus* in 1926 (Orcutt 1926). Benson included eight varieties of *E. triglochidiatus* in *The Cacti of Arizona*, naming AHC *E. triglochidiatus* var. *arizonicus* (Benson 1982). AHC was also named *E. coccineus* var. *arizonicus* (Ferguson 1989), but more recent studies have proposed *E. arizonicus, E. coccineus and E. triglochidiatus* as separate species based on morphology, number of chromosomes, molecular studies, and habitat (WestLand 2014a).

Blum et al. (1998) recognized three subspecies within *E. arizonicus: E. arizonicus* var. *arizonicus, E. arizonicus* var. *nigrihorridispinus,* and *E. arizonicus* var. *matudae.* The name, *E. arizonicus* var. *arizonicus*, is restricted to those populations in the Mescal and Pinal Mountains, and Devil's Canyon areas of Pinal and Gila Counties (Baker 2006). Though USFWS uses Benson's nomenclature, *E. triglochidiatus* var. *arizonicus,* this report follows the more recent taxonomy and therefore refers to AHC as *E. arizonicus* var. *arizonicus* to identify the federally listed subspecies.

AHC has dark green cylindroid stems that occur singly or in clusters. Large, robust stems are 9.1 to 16.1 inches (23 to 41 cm) high and average 3.1 inches (8 cm) in diameter. Each stem has an average of nine tuberculate ribs. AHC has one to three gray or pinkish central spines; the largest is deflexed (points down). Its five to eleven radial spines are slightly curved. Relative to other *Echinocereus*, AHC spines are shorter and more robust (AGFD 2003). The flowers, which usually bloom in mid-April, are stout, mostly erect, and range from orange-red to red (Baker 2013). Flowers are broad, measuring about 2.0 inches (5.0 cm) in diameter and 2.9 inches (7.4 cm) long, and burst through the sides of the stem, leaving a scar right above the spine. Flowers occur on the upper third of stem ribs, distinguishing them from other hedgehog cacti below 6,000 ft (1,830 m) (AGFD 2003).

The known, currently occupied range of AHC includes portions of the highlands of Pinal and Gila counties from the Superstition Wilderness south to Devil's Canyon, east along US 60 to Top of the

World and south to the Mescal and Pinal mountains. Within these areas, AHC is found within Interior Chaparral and Madrean Evergreen Forest and Woodland habitats between 3,300 ft (1,000 m) and 5,700 ft (1,740 m) (Baker 2013).

The distribution of AHC within its range appears to be closely associated with the following geologic substrates: Apache Leap Tuff (dacite), diabase, Dripping Spring quartzite (with Barnes conglomerate at base), earlier volcanic rocks, Pinal schist, quartz monzonite porphyry, quartz diorite, rhyolite, Schulte granite, Troy quartzite, and Whitetail conglomerate. Although individuals occur mostly in the open on 40 to 80 percent rocky slopes, a substantial percentage occurs in the partial shade of cliffs, boulders, and shrubs, and are sometimes most abundant near ravine bottoms. Individuals are often rooted in rock crevices or small soil pockets between boulders and on weathered surfaces of bedrock (Baker 2013).

The AHC is federally listed under the ESA as endangered without critical habitat (USFWS 1979). AHC is also protected by the Arizona Native Plant Law (A.R.S. Chapter 7 [AZDA 2013]) as a Highly Safeguarded Native Plant and is protected from international trade by the Convention of International Trade in Endangered Species.

Potential for Occurrence within the Apache Leap South End Parcels

The Property is located within the known, current geographic and elevational range and contains potentially suitable habitat for AHC. Vegetation on north-facing slopes within the Property consists of species typical of Interior Chaparral, one of two biotic communities in which AHC is known to occur. The Property also contains Apache Leap Tuff and Whitetail conglomerate substrates that have been linked to the distribution of AHC. Rocky slopes, cliffs, and bedrock, and cover types including boulders and shrubs were also observed.

No AHC were observed during the field reconnaissance; however, the AGFD HDMS indicates records of the species within 5 miles (8 km) of the Property (**Appendix A**). WestLand has also observed AHC within the East Plant Site, northeast of the Apache Leap South End parcels (WestLand 2015b). Due to the presence of potentially suitable habitat and nearby occurrence records, it is possible for AHC to occur within the Property.

6. CONSERVATION VALUES AND OPPORTUNITIES

6.1. VALUES

Value #1: Apache Leap

The Apache Leap is a visually dominant geographic feature of the area and is geologically significant as the western edge of volcanic flow. The Apache Leap Tuff forms the near-vertical cliffs of the buttress, which is underlain by Whitetail conglomerate, a sedimentary rock. This unique combination of bedrock stratigraphy has created the unusual formation. The Apache Leap South End parcels are positioned along the southern portion of the Apache Leap and incorporate portions of the cliff face as well as upper foothills extending westward from the cliff.

The Apache Leap visually marks the western extent of the Pinal Mountains; eastbound travelers on US Highway 60 exit the Phoenix Basin passing through the town of Superior and climbing into the Pinal Mountains through the Queen Creek canyon at the northern extent of the Apache Leap escarpment. The escarpment is of interest to amateur and professional geologists as well as rock climbers.

The Legend of Apache Leap appears to be an apocryphal story about suicide that may have been invented by Euro-Americans in the late 1800s or early 1900s for promoting a romanticized perception of Native Americans (WestLand 2007). The story takes on several guises, ranging from a Romeo-and-Juliet style suicide pact between ill-fated lovers to a won't-be-taken-alive escape by trapped warriors. Obsidian nuggets collected from the base of the buttress are sold locally as "Apache tears" that allegedly reflect the Native Americans' sorrow regarding the suicide event, whatever it may have been. Although no basis for any version of the story has been found in Apache traditions, the legend speaks to the extent of Native American connection with this area.

Value #2: Potential Habitat for Special-Status Species

Two special-status species have been observed within the Apache Leap South End parcels. These species include one that is listed by both the USFWS as a species of concern and by the USFS as sensitive. The other species is protected under the Bald and Golden Eagle Protection Act. The Apache Leap South End parcels also lie within the known, current geographic range of, and contain potentially suitable habitat for three special-status species. These species include one that is listed by the USFWS as endangered, under the ESA, and two species identified by the USFS as sensitive.

Arizona hedgehog cactus (*Echinocereus arizonicus* var. *arizonicus*) is listed as endangered by the USFWS. The Property is within the known, current geographic and elevational range and contains potentially suitable habitat for this species. This cactus is found in areas of Interior Chaparral such as occur on the upper portions of the Apache Leap South End parcels. There are records for this species within

5 miles (8 km) of the Property (**Appendix A**). WestLand has also documented this cactus at Oak Flat, north of the Property.

American peregrine falcon (*Falco peregrinus anatum*) is identified as a species of concern by the USFWS and a sensitive species by the USFS. Peregrine falcons typically nest on steep, sheer cliffs overlooking open areas for foraging in a variety of habitats including woodlands, riparian areas, and even very xeric areas. Optimum habitats support an abundance of avian prey species. The species has been documented in this location (eBird, 2016) and there are records for this species within 5 miles (8 km) of the Property (**Appendix A**). The Apache Leap South End parcels are within the known, current geographic and elevational range and contain potentially suitable habitat for this species. A portion of the Apache Leap escarpment, as well as open areas that may be suitable for hunting, are present within the Property. WestLand has also documented a peregrine falcon eyrie nearby on the west side of Apache Leap that has been active for many years.

Bezy's night lizard (*Xantusia bezyi*) is identified as a sensitive species by the USFS. Bezy's night lizards are primarily associated with crevices found in rock outcrops, cliff faces, and boulder fields in the Arizona Upland subdivision of Sonoran desertscrub, semi-desert grassland, interior chaparral, and oak woodland communities. They have also been occasionally found in decaying sotol (*Dasylirion wheeleri*) and yucca (*Yucca* spp.), under plant material on the desert floor, and in buildings. There are records for this species within 5 miles (8 km) of the Property (**Appendix A**). The Apache Leap South End parcels are within the known, current geographic and elevational range, and contain potentially suitable habitat for this species.

Golden eagle (*Aquila chrysaetos)* is protected under the Bald and Golden Eagle Protection Act of 1940. Golden eagles breed in pinyon pine-juniper woodlands, Sonoran desertscrub, Madrean evergreen oak woodlands, semiarid grasslands, chaparral, and landscapes dominated by big sagebrush. They are known to construct nests in areas with little to no human activity, in tall trees, cliffs, canyons, or rock ledges, near large open areas where they forage for prey (Corman & Wise-Gervais, 2005). Golden eagles are known to forage within 4.4 miles of the nest (Tesky, 1994), generally in open habitats where prey is available (Kochert et al., 2002). The species has been documented in this location (eBird, 2016) and there are records for this species within 5 miles (8 km) of the Property (**Appendix A**).

Sonoran desert tortoise (*Gopherus morafkai*) is identified as a sensitive species by the USFS (the species was previously a USFWS candidate species and was determined to be not warranted for listing on October 6, 2015). Sonoran desert tortoise occur on rocky, steep slopes and bajadas and within inter-mountain washes in Sonoran desertscrub (USFWS 2010c). There are records of Sonoran desert tortoise within 5 miles (8 km) of the Property (**Appendix A**). The Apache Leap South End parcels are within the known, current geographic and elevational range and contain potentially suitable habitat for this species. WestLand has also observed the species nearby, west of the town of Superior.

6.2. OPPORTUNITIES

Opportunity #1: Apache Leap Special Management Area

Incorporating the Apache Leap South End parcels in the Apache Leap Special Management Area would expand the protected area from 697 acres to 807 acres. A Management Plan for the area would be prepared by the USFS in consultation with affected Indian Tribes, the town of Superior, Resolution Copper, and other stakeholders. Resolution Copper's mining rights on the Property would be surrendered, protecting the physical integrity of the Apache Leap escarpment and preserving its visual presence in the area. The Apache Leap would remain as an iconic landmark and, depending upon the elements selected for the Management Plan, be available for active or passive public use and enjoyment.

Opportunity #2: Protecting Special Status Species

The Apache Leap South End parcels would become incorporated into the TNF and be managed by the USFS instead of being managed under private ownership. The five special-status species that may occur on the Apache Leap South End parcels (Arizona hedgehog cactus, American peregrine falcon, Bezy's night lizard, golden eagle, and Sonoran desert tortoise) would be protected by public land management policies that would not be present under private ownership.

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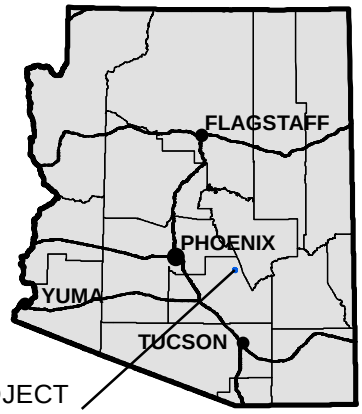
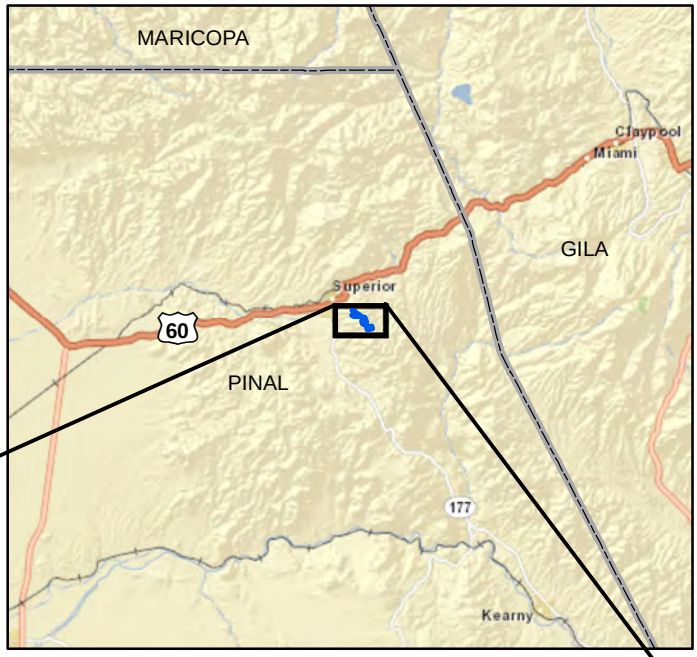
FIGURES

ARIZONA



PROJECT LOCATION

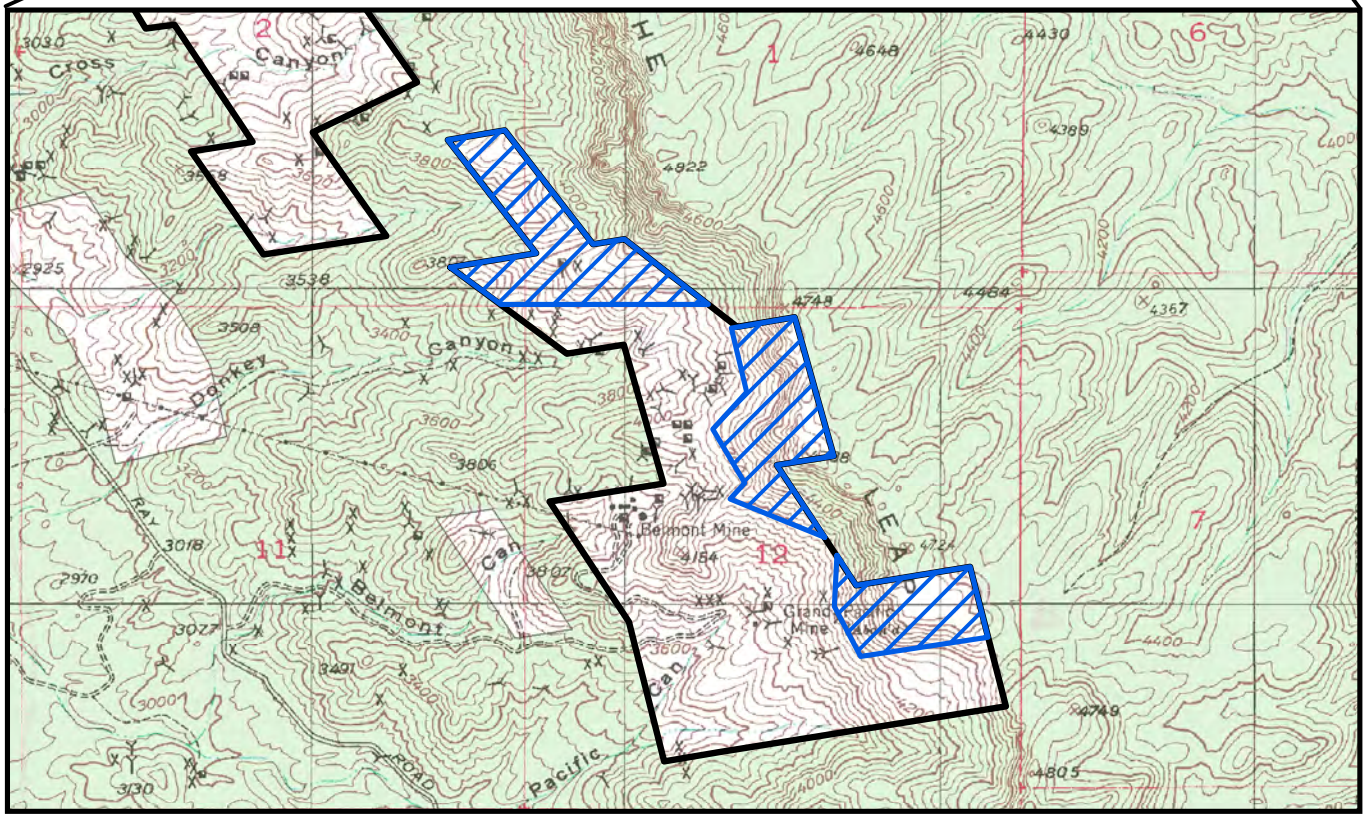
NORTHERN PINAL COUNTY



Approximate Scale 1 Inch = 10 Miles

Legend

- Apache Leap South End Parcels
- RCML Patented & Fee Land
- Other Private Ownership (No Color)
- USFS (Tonto National Forest)



T2S, R12E, Portion of Sections 1, 2 & 12,
Pinal County, Arizona,
Superior USGS 7.5' Quadrangle
Data Source: BLM Surface Management 2012

N

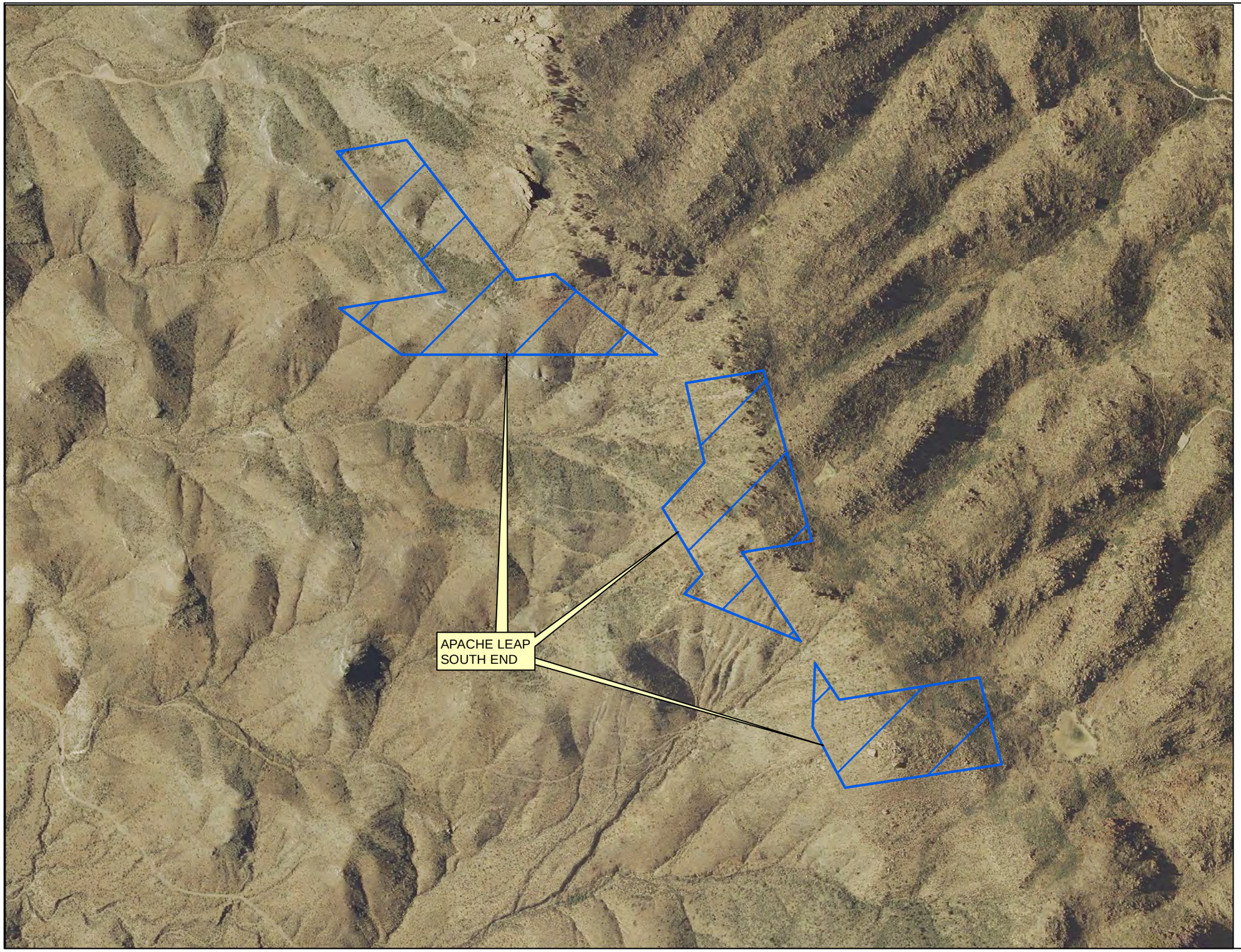
0 1,000 2,000 Feet

WestLand Resources, Inc.
Tucson • Phoenix • Flagstaff
4001 E. Paradise Falls Drive
Tucson, Arizona 85712 (520) 206-9585

RESOLUTION COPPER
Ecological Overview

VICINITY MAP
APACHE LEAP SOUTH END PARCELS
Figure 1

Path: M:\Jobs\800's\807.98\ENV\LandExchangeMaps\MXD\EcoOverviewReport\ReportFiguresALSouthEnd\Fig02_SiteMapAerial_ALSEnd.mxd



Apache Leap South End Parcels:
110 Acres of Resolution Copper Property offered to the USFS,
T2S, R12E, Portion of Sections 1, 2, and 12.
Pinal County, Arizona.
Image Source: NAIP Imagery, 2013
Disclaimer: Map boundaries are based on best available data. Legal descriptions pending field verfication by professional surveyors.

Legend

Offered Lands

N

0 400 800 Feet

0 150 300 Meters

RESOLUTION COPPER
Ecological Overview

SITE MAP
APACHE LEAP SOUTH END PARCELS
Figure 2

Path: M:\Jobs\800's\807.98\ENV\LandExchangeMaps\MXD\EcoOverviewReport\ReportFiguresALSouthEnd\Fig03_AreaMapTopo_ALSEnd.mxd

Apache Leap South End Parcels:
110 Acres of Resolution Copper Property offered to the USFS,
T2S, R12E, Portion of Sections 1, 2, and 12.
Pinal County, Arizona.
Image Source: Superior 7.5 Minute USGS Quadrangle
Disclaimer: Map boundaries are based on best available data. Legal descriptions pending field verfication by professional surveyors.

Legend

- Offered Lands
- RCML Patented & Fee Land

Surface Management (BLM 2012)

- Other Private Land (No Color)
- State Trust Land
- USFS (Tonto National Forest)

APACHE LEAP SOUTH END

N

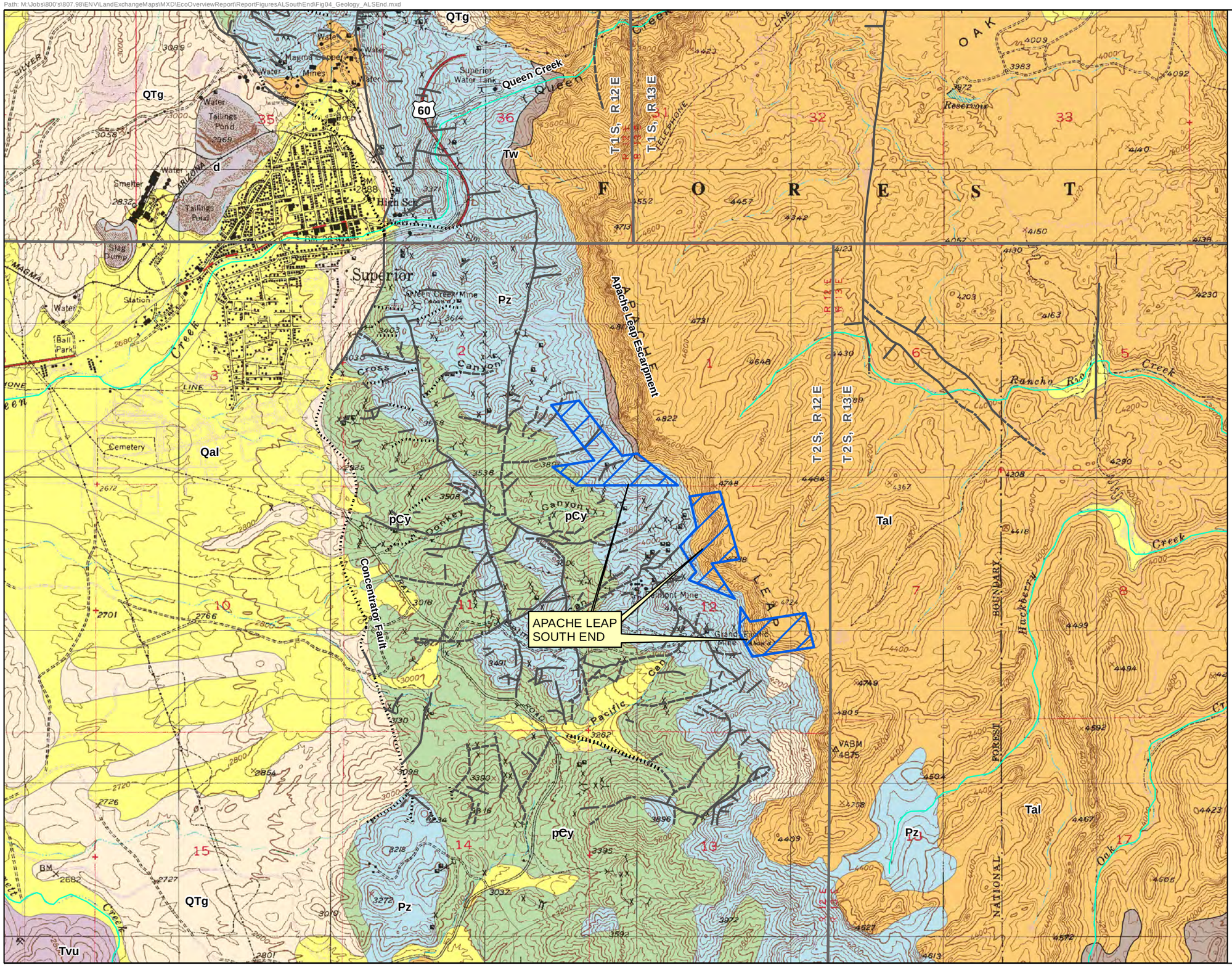
0 800 1,600 Feet

0 300 600 Meters

RESOLUTION COPPER
Ecological Overview

TOPOGRAPHICAL OVERVIEW
APACHE LEAP SOUTH END PARCELS
Figure 3

Path: M:\Jobs\800's\807.98\ENV\LandExchangeMaps\MXD\EcoOverviewReport\ReportFiguresALSouthEnd\Fig04_Geology_ALSEnd.mxd



Data Sources:
Image Source: Superior 1:24,000 USGS Quadrangle.
Geology Map
Spencer, J.E., Richard, S.M., and Pearthree, P.A., 1998, Geologic Map of the Mesa 30'x60' Quadrangle, Arizona: Digital Information Series DI-11, version 1.0, Arizona Geological Survey.
Fault Lines
Peterson, 1969, and Spencer and Richard, 1995
Spencer et al., 1998
Geology generalized from Spencer, Richard, and Pearthree, 1998, by Montgomery & Associates, 2013
Image Source: Picketpost Mountain & Superior 1:24,000 USGS Quadrangles
Disclaimer: Map boundaries are based on best available data. Legal descriptions pending field verfication by professional surveyors.

Legend

- Offered Lands
- Pz — Paleozoic Sedimentary Rocks Undifferentiated
- d — Disturbed Superficial Deposits
- Qal — Quaternary Alluvial and Surficial Deposits
- QTg — Quaternary and Tertiary Basin-Fill Deposits
- Tal — Tertiary Apache Leap Tuff
- Tvu — Tertiary Volcanic Rocks, Undifferentiated
- Tw — Tertiary Whitetail Conglomerate
- pЄy — Younger Precambrian Sedimentary and Intrusive Rocks, Undifferentiated
- Fault
- Fault-Approximate
- Fault-Concealed

N

0 1,000 2,000 Feet

0 300 600 Meters

RESOLUTION COPPER
Ecological Overview

GEOLOGIC MAP
APACHE LEAP SOUTH END PARCELS
Figure 4

Path: M:\Jobs\800's\807.98\ENV\LandExchangeMaps\MXD\EcoOverviewReport\ReportFiguresALSouthEnd\Fig05_Soils_ALSEnd.mxd

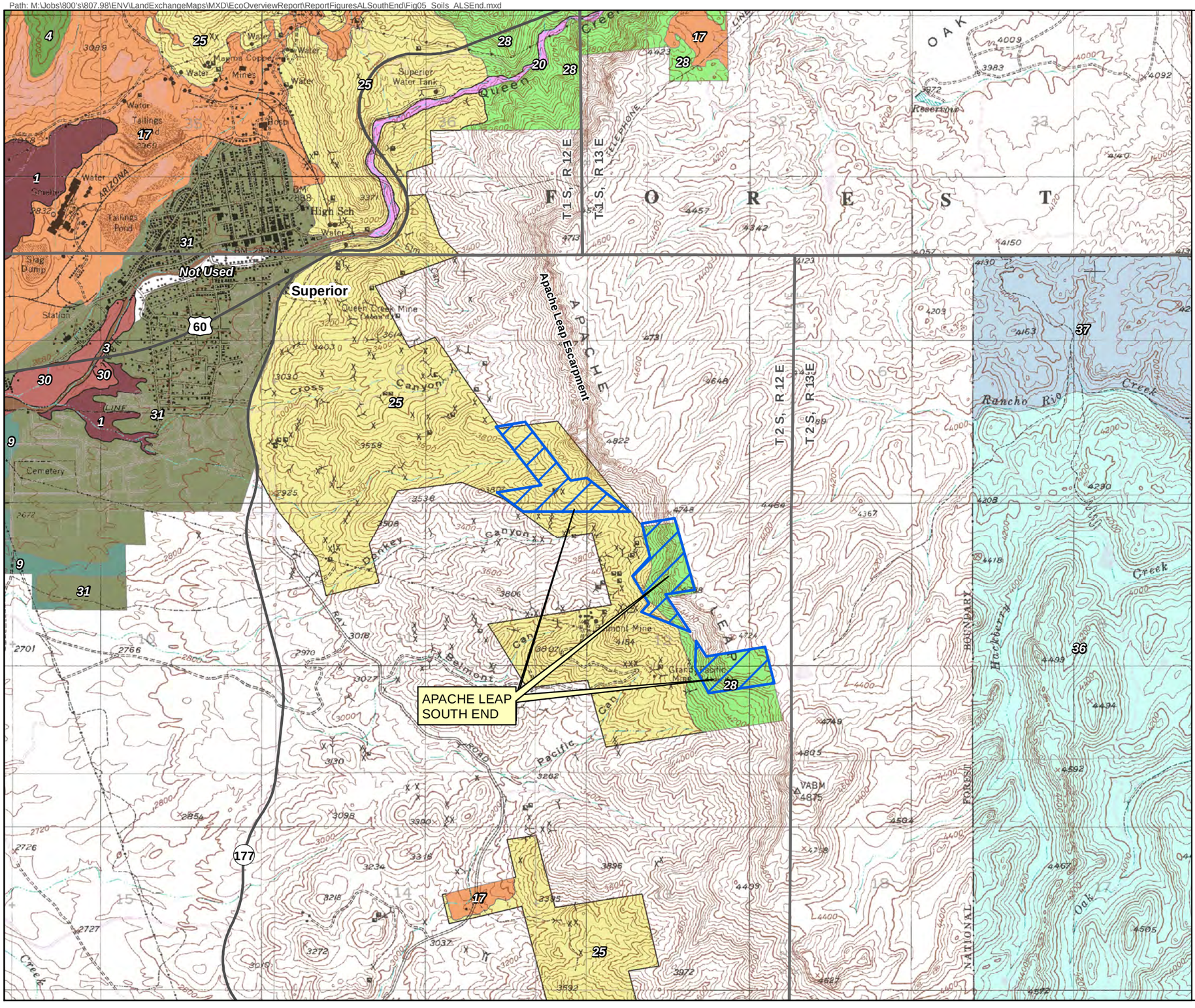


Image Source: Superior 1:24,000 USGS Quadrangle.
Soil Data Source: U.S. Department of Agriculture,
Natural Resources Conservation Service,
Soil Survey Geographic Database for Tonto National Forest, AZ,
Parts of Gila, Maricopa, Pinal & Yavapai Counties, AZ
Soil Survey Area Data for AZ687, Publication Date: 20101022.
Soil Data Source: U.S. Department of Agriculture, Natural Resources Conservation Service Soil Survey Geographic Database for Eastern Pinal & Southern Gila Counties, AZ
Soil Survey Area Data for AZ661, Publication Date: 20090428.
Disclaimer: Map boundaries are based on best available data.
Legal descriptions pending field verfication by professional surveyors.

Legend

- Offered Lands

USDA NRCS Soil AZ 687

- 1 - Andrada extremely gravelly sandy loam, 10 to 40 percent slopes
- 3 - Bodecker soils and Riverwash, 0 to 5 percent slopes
- 4 - Caralampi extremely gravelly sandy loam, moderately deep, 20 to 40 percent slopes
- 9 - Deloro-Andrada-Sasabe, deep complex, 2 to 15 percent slopes
- 17 - Mined land
- 20 - Oxyaquic Torrifluvents and Typic Fluvaquents soils and Riverwash, 0 to 5 percent slopes
- 25 - Rock outcrop-Mabray-Pantak complex, 20 to 70 percent slopes
- 28 - Rock outcrop-Woodcutter complex, tuff, 15 to 50 percent slopes
- 30 - Tenneco-Bodecker complex, 0 to 3 percent slopes
- 31 - Urban land and Haplic Torriarents soils, 2 to 15 percent slopes

USDA NRCS Soil AZ 661

- 36-Rock outcrop-Lampshire complex, 10 to 60 percent slopes
- 37-Rock outcrop-Lampshire complex, chaparral, 5 to 50 percent slopes

N

0 1,000 2,000 Feet

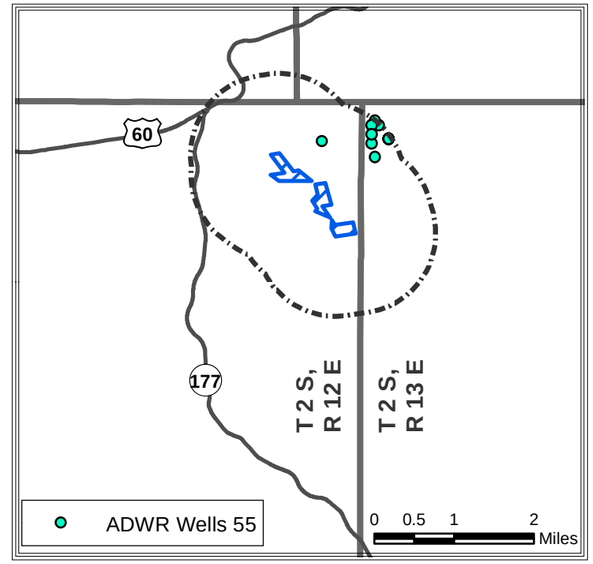
0 300 600 Meters

RESOLUTION COPPER
Ecological Overview

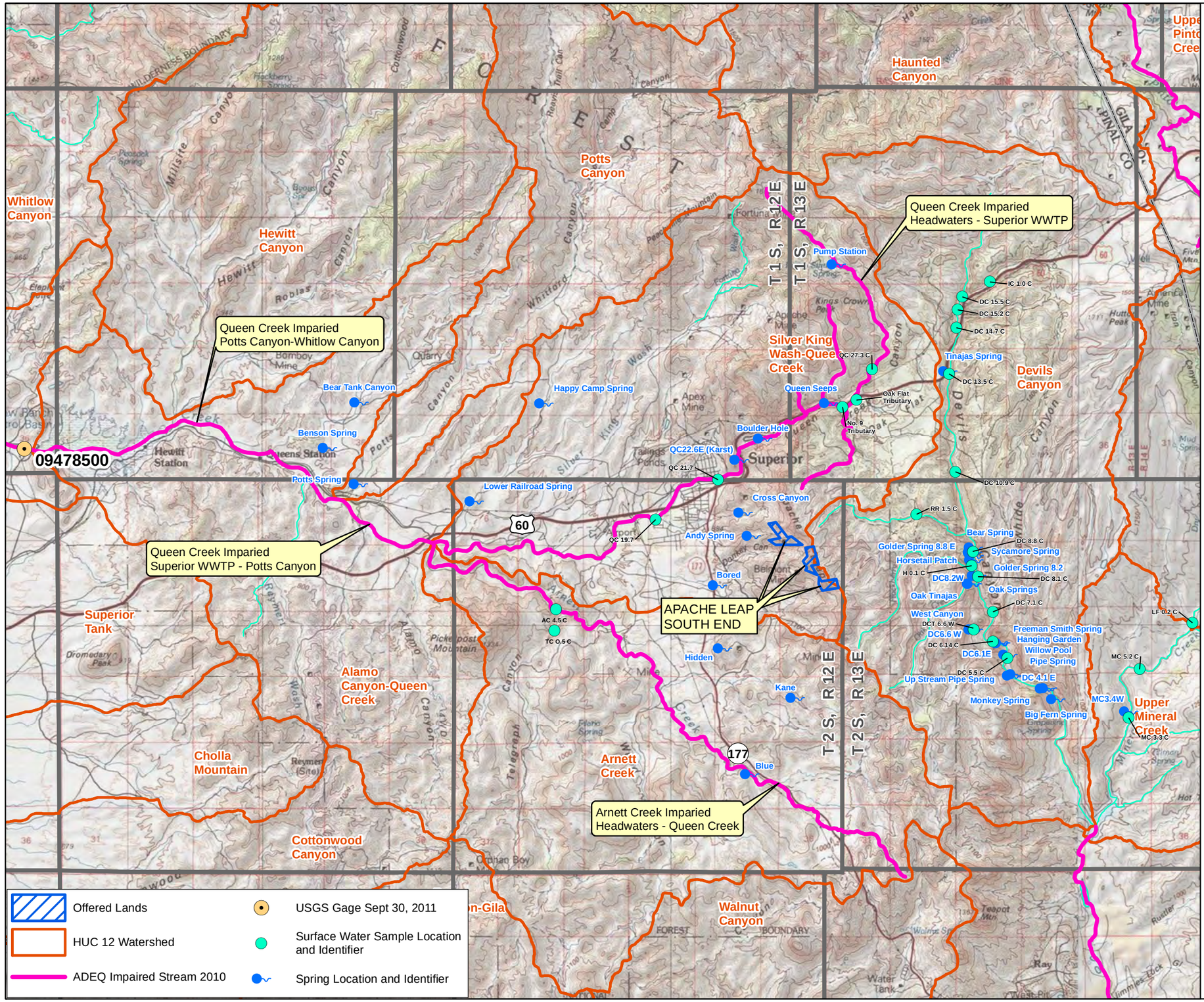
SOILS MAP
APACHE LEAP SOUTH END PARCELS
Figure 5

Apache Leap South End:
110 Acres of Resolution Copper Property offered to the USFS,
T2S, R12E, Portion of Sections 1, 2, and 12.
Pinal County, Arizona.
Image Source: ESRI Online USA Topo Maps
Data Source: ADWR, USGS, NHDH HUC 12, ADEQ
Disclaimer: Map boundaries are based on best available data.
Legal descriptions pending field verfication by professional surveyors.

ADWR Well Locations
Within a 1-Mile Buffer of Parcel



The ADWR Wells 55 Registry contains all wells registered in the state.
Dowloaded from ADWR Website 4/2/2013 -Http://www.azwater.gov/azdwr/gis/



N
0 4,000 8,000 Feet
0 1,500 3,000 Meters

RESOLUTION COPPER
Ecological Overview

SURFACE WATER RESOURCES AND WELLS
APACHE LEAP SOUTH END PARCELS
Figure 6

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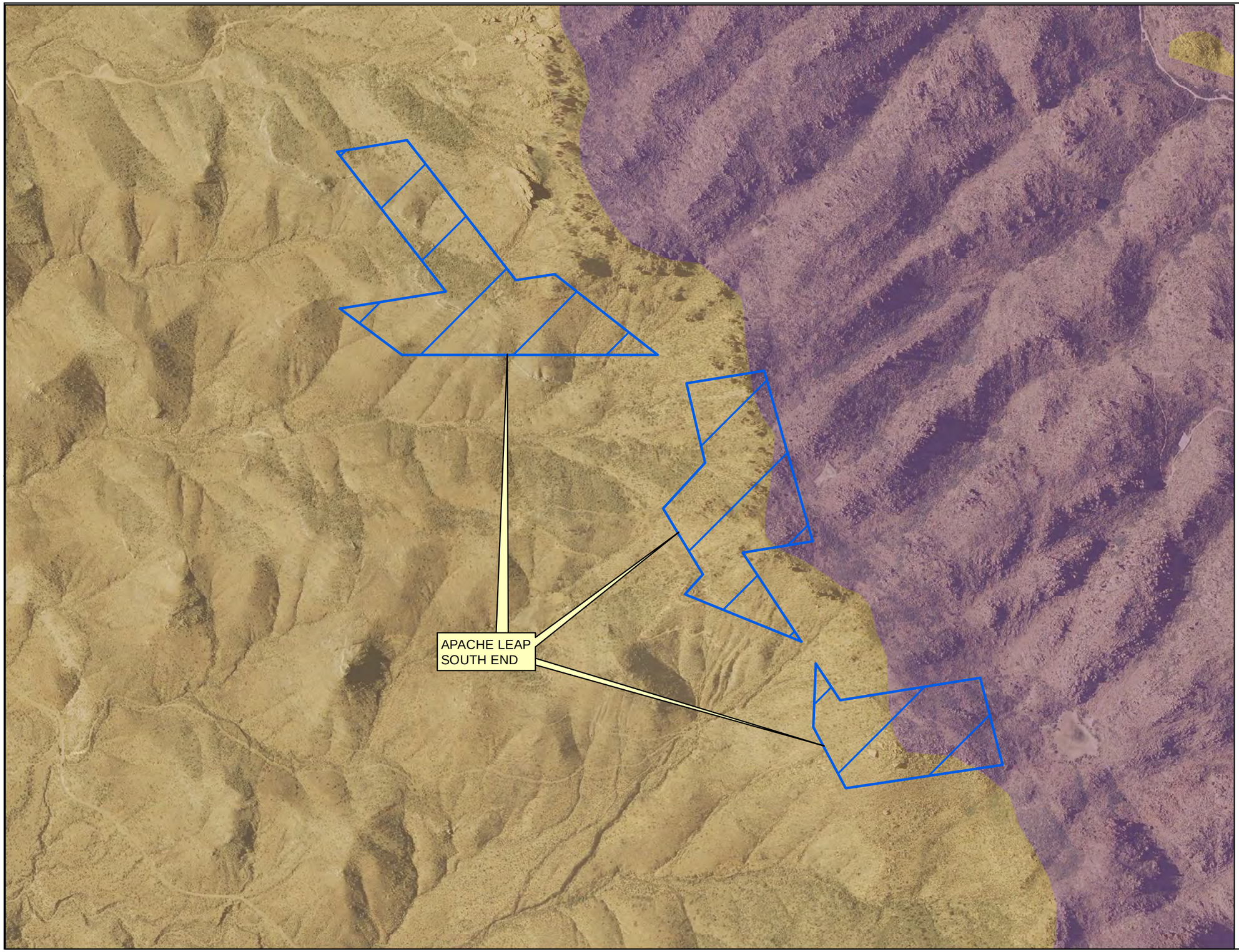


Apache Leap South End Parcels:
110 Acres of Resolution Copper Property offered to the USFS,
T2S, R12E, Portion of Sections 1, 2, and 12.
Pinal County, Arizona.
Image Source: NAIP 6-3-2013
Data Source: Vegetation Communities based on Biotic Communities of the Southwest, Brown & Lowe Classifications, August 1980, with modifications by WestLand Resources mapping efforts. Further, within the Apache Leap South End parcels, north-facing slopes typically display characteristics of Interior Chaparral, while south-facing slopes typically display characteristics of the AZ Upland Subdivision of Sonoran Desertscrub. Thus, in some areas, these two biotic communities intertongue along ridgelines and drainageways rather than only along the Apache Leap crest.
Disclaimer: Map boundaries are based on best available data. Legal descriptions pending field verfication by professional surveyors.

Legend

Offered Lands

Biotic Communities

Interior Chaparral

Arizona Upland Subdivision of Sonoran Desertscrub

N

0 400 800 Feet

0 150 300 Meters

RESOLUTION COPPER
Ecological Overview

BIOTIC COMMUNITIES
APACHE LEAP SOUTH END PARCELS
Figure 7

APPENDIX A

AGFD HDMS and USFWS IPaC System Special Status Species Records Online Query

Arizona Environmental Online Review Tool Report

Arizona Game and Fish Department Mission
To conserve Arizona's diverse wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations.

Project Name:
Land Exchange - Apache Leap South End

Project Description:
Land Exchange

Project Type:
Mining, Extraction Other minerals (copper, limestone, cinders, shale, salt), Other minerals (copper, limestone, cinders, shale, salt)

Contact Person:
Jessica Gilligan

Organization:
WestLand Resources, Inc.

On Behalf Of:
CONSULTING

Project ID:
HGIS-00724

Please review the entire report for project type and/or species recommendations for the location information entered. Please retain a copy for future reference.

Disclaimer:

1. This Environmental Review is based on the project study area that was entered. The report must be updated if the project study area, location, or the type of project changes.
2. 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. This review is also not intended to replace environmental consultation (including federal consultation under the Endangered Species Act), land use permitting, or the Departments review of site-specific projects.
3. The Departments 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. HDMS data contains information about species occurrences that have actually been reported to the Department. 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. HabiMap Arizona data, specifically Species of Greatest Conservation Need (SGCN) under our State Wildlife Action Plan (SWAP) and Species of Economic and Recreational Importance (SERI), represent potential species distribution models for the State of Arizona which are subject to ongoing change, modification and refinement. The status of a wildlife resource can change quickly, and the availability of new data will necessitate a refined assessment.

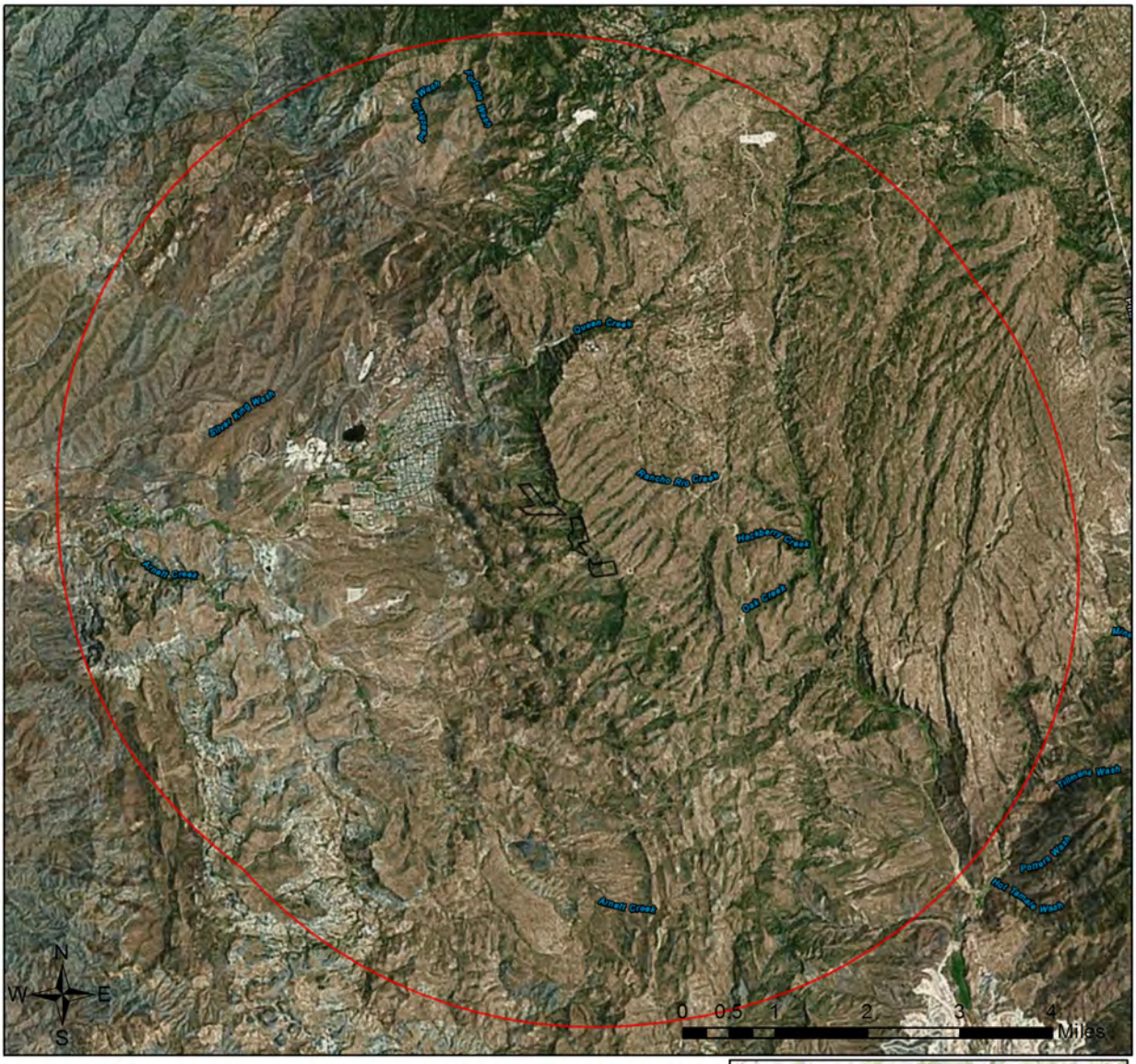
Locations Accuracy Disclaimer:
Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Report is solely responsible for the project location and thus the correctness of the Project Review Report content.

Recommendations Disclaimer:

1. The Department is interested in the conservation of all fish and wildlife resources, including those species listed in this report and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.
2. 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).
3. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project. These recommendations are preliminary in scope, designed to provide early considerations on all species of wildlife.
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. Further coordination with the Department requires the submittal of this Environmental Review Report 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). Once AGFD had received the information, please allow 30 days for completion of project reviews. Send 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
   Or
   PEP@azgfd.gov
6. Coordination may also be necessary under the National Environmental Policy Act (NEPA) and/or Endangered Species Act (ESA). Site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies

Land Exchange - Apache Leap South End

Aerial Image Basemap With Locator Map



Project Boundary

Buffered Project Boundary

Project Size (acres): 105.12

Lat/Long (DD): 33.2801 / -111.0782

County(s): Pinal

AGFD Region(s): Mesa

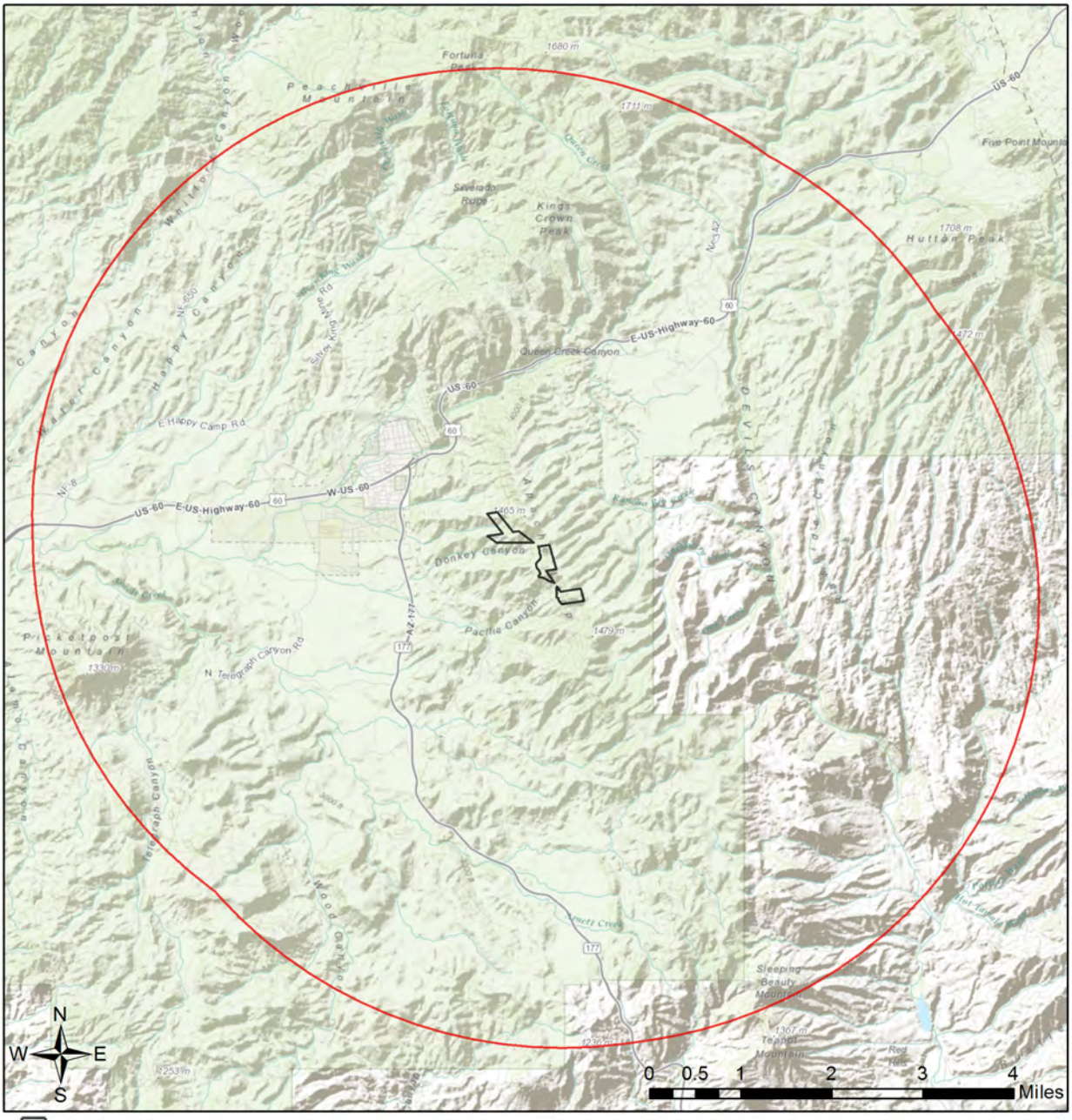
Township/Range(s): T2S, R12E

USGS Quad(s): SUPERIOR

Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong),

Land Exchange - Apache Leap South End

Web Map As Submitted By User



Project Boundary

Buffered Project Boundary

Project Size (acres): 105.12

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County(s): Pinal

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Township/Range(s): T2S, R12E

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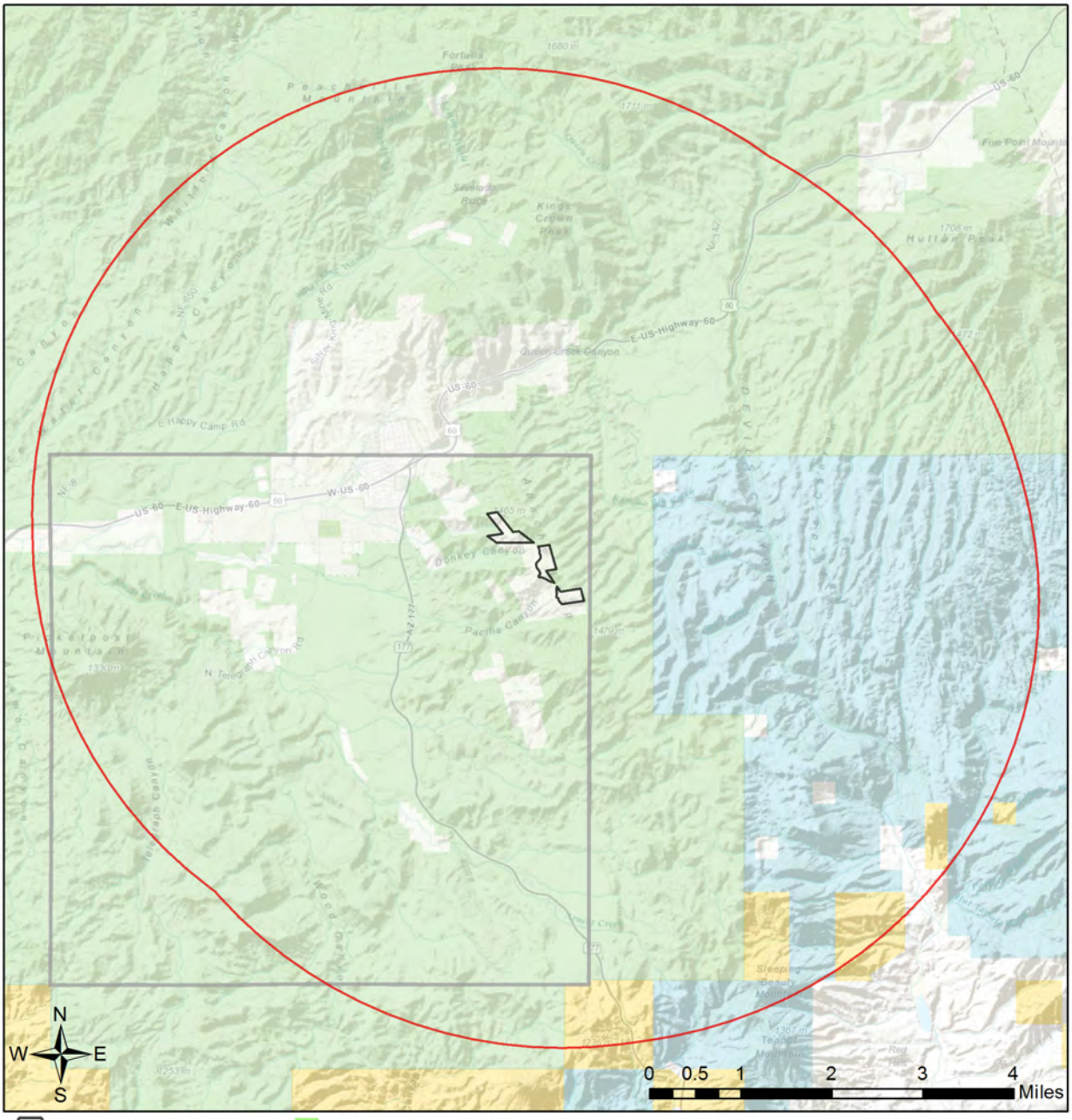
Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Land Exchange - Apache Leap South End

Topo Basemap With Township/Ranges and Land Ownership



- Project Boundary
- Buffered Project Boundary
- Township/Range
- AZ Game and Fish Dept.
- BLM
- BOR
- Indian Res.
- Military
- Mixed/Other
- National Park/Mon.
- Private
- State and Regional Parks
- State Trust
- US Forest Service
- Wildlife Area/Refuge

Project Size (acres): 105.12

Lat/Long (DD): 33.2801 / -111.0782

County(s): Pinal

AGFD Region(s): Mesa

Township/Range(s): T2S, R12E

USGS Quad(s): SUPERIOR

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Special Status Species and Special Areas Documented within 5 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
Agosia chrysogaster chrysogaster	Gila Longfin Dace	SC		S		1B
Bat Colony						
Boyce Thompson Arboretum and Arnett -Queen Creeks	Important Bird Area					
Buteogallus anthracinus	Common Black Hawk				WSC	1C
CH for Gila intermedia	Gila chub Designated Critical Habitat					
Coccyzus americanus	Yellow-billed Cuckoo (Western DPS)	LT	S		WSC	1A
Cyprinodon macularius	Desert Pupfish	LE			WSC	1A
Echinocereus triglochidiatus var. arizonicus	Arizona Hedgehog Cactus	LE			HS	
Eumops perotis californicus	Greater Western Bonneted Bat	SC		S		1B
Falco peregrinus anatum	American Peregrine Falcon	SC	S	S	WSC	1A
Gopherus morafkai	Sonoran Desert Tortoise	C*	S		WSC	1A
Leopardus pardalis	Ocelot	LE			WSC	1A
Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC	1A
Myotis yumanensis	Yuma Myotis	SC				1B
Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE			WSC	1A
Xantusia bezyi	Bezy's Night Lizard		S			1B

Note: Status code definitions can be found at http://www.azgfd.gov/w_c/edits/hdms_status_definitions.shtml.

Species of Greatest Conservation Need
Predicted within Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
Agosia chrysogaster	Longfin Dace	SC		S		1B
Aix sponsa	Wood Duck					1B
Ammodramus savannarum perpallidus	Western Grasshopper Sparrow					1B
Ammospermophilus harrisii	Harris' Antelope Squirrel					1B
Anaxyrus microscaphus	Arizona Toad	SC				1B
Anthus spragueii	Sprague's Pipit	C*			WSC	1A
Aquila chrysaetos	Golden Eagle	BGA		S		1B
Aspidoscelis flagellicauda	Gila Spotted Whiptail					1B
Botaurus lentiginosus	American Bittern				WSC	1B
Buteo regalis	Ferruginous Hawk	SC		S	WSC	1B
Catostomus clarkii	Desert Sucker	SC	S	S		1B
Catostomus insignis	Sonora Sucker	SC	S	S		1B
Chilomeniscus stramineus	Variable Sandsnake					1B
Chordeiles minor	Common Nighthawk					1B
Coccyzus americanus	Yellow-billed Cuckoo (Western DPS)	LT	S		WSC	1A
Colaptes chrysoides	Gilded Flicker			S		1B
Coluber bilineatus	Sonoran Whipsnake					1B
Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S	S		1B

Species of Greatest Conservation Need
Predicted within Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
Crotalus cerberus	Arizona Black Rattlesnake					1B
Crotalus tigris	Tiger Rattlesnake					1B
Cynanthus latirostris	Broad-billed Hummingbird		S			1B
Cyprinodon macularius	Desert Pupfish	LE			WSC	1A
Dipodomys spectabilis	Banner-tailed Kangaroo Rat			S		1B
Empidonax traillii extimus	Southwestern Willow Flycatcher	LE			WSC	1A
Euderma maculatum	Spotted Bat	SC	S	S	WSC	1B
Eugenes fulgens	Magnificent Hummingbird					1B
Eumops perotis californicus	Greater Western Bonneted Bat	SC		S		1B
Falco peregrinus anatum	American Peregrine Falcon	SC	S	S	WSC	1A
Gila intermedia	Gila Chub	LE			WSC	1A
Gopherus morafkai	Sonoran Desert Tortoise	C*	S		WSC	1A
Haliaeetus leucocephalus	Bald Eagle	SC, BGA	S	S	WSC	1A
Heloderma suspectum	Gila Monster					1A
Ictinia mississippiensis	Mississippi Kite				WSC	1B
Idionycteris phyllotis	Allen's Lappet-browed Bat	SC	S	S		1B
Incilius alvarius	Sonoran Desert Toad					1B
Junco phaeonotus	Yellow-eyed Junco		S			1B
Kinosternon sonoriense sonoriense	Desert Mud Turtle			S		1B
Lasiurus blossevillii	Western Red Bat		S		WSC	1B
Lasiurus xanthinus	Western Yellow Bat		S		WSC	1B
Leopardus pardalis	Ocelot	LE			WSC	1A
Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	LE			WSC	1A
Lepus alleni	Antelope Jackrabbit					1B
Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC	1A
Macrotus californicus	California Leaf-nosed Bat	SC		S	WSC	1B
Meda fulgida	Spikedace	LE			WSC	1A
Melanerpes uropygialis	Gila Woodpecker					1B
Melospiza lincolnii	Lincoln's Sparrow					1B
Melozone aberti	Abert's Towhee		S			1B
Microtus mexicanus	Mexican Vole					1B
Micruroides euryxanthus	Sonoran Coralsnake					1B
Myotis occultus	Arizona Myotis	SC		S		1B
Myotis velifer	Cave Myotis	SC		S		1B
Myotis yumanensis	Yuma Myotis	SC				1B
Nyctinomops femorosaccus	Pocketed Free-tailed Bat					1B
Odocoileus virginianus	White-tailed Deer					1B
Ovis canadensis nelsoni	Desert Bighorn Sheep					1B
Panthera onca	Jaguar	LE			WSC	1A
Passerculus sandwichensis	Savannah Sparrow					1B

Species of Greatest Conservation Need
Predicted within Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
Perognathus amplus	Arizona Pocket Mouse					1B
Peucaea carpalis	Rufous-winged Sparrow					1B
Phrynosoma solare	Regal Horned Lizard					1B
Phyllorhynchus browni	Saddled Leaf-nosed Snake					1B
Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE			WSC	1A
Progne subis hesperia	Desert Purple Martin			S		1B
Setophaga petechia	Yellow Warbler					1B
Strix occidentalis lucida	Mexican Spotted Owl	LT			WSC	1A
Tadarida brasiliensis	Brazilian Free-tailed Bat					1B
Terrapene ornata	Ornate Box Turtle					1A
Troglodytes pacificus	Pacific Wren					1B
Vireo bellii arizonae	Arizona Bell's Vireo					1B
Vulpes macrotis	Kit Fox					1B
Xantusia bezyi	Bezy's Night Lizard		S			1B

Species of Economic and Recreation Importance Predicted within Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
Callipepla gambelii	Gambel's Quail					
Odocoileus hemionus	Mule Deer					
Odocoileus virginianus	White-tailed Deer					1B
Ovis canadensis mexicana	Mexican Desert Bighorn Sheep					1B
Patagioenas fasciata	Band-tailed Pigeon					1C
Pecari tajacu	Javelina					
Puma concolor	Mountain Lion					
Zenaida asiatica	White-winged Dove					

Project Type: Mining, Extraction Other minerals (copper, limestone, cinders, shale, salt), Other minerals (copper, limestone, cinders, shale, salt)

Project Type Recommendations:

Fence recommendations will be dependant upon the goals of the fence project and the wildlife species expected to be impacted by the project. General guidelines for ensuring wildlife-friendly fences include: barbless wire on the top and bottom with the maximum fence height 42", minimum height for bottom 16". Modifications to this design may be considered for fencing anticipated to be routinely encountered by elk, bighorn sheep or pronghorn (e.g., Pronghorn fencing would require 18" minimum height on the bottom). Please refer to the Department's Fencing Guidelines located on the home page of this application at http://www.azgfd.gov/hgis/guidelines.aspx.

During the planning stages of your project, please consider the local or regional needs of wildlife in regards to movement, connectivity, and access to habitat needs. Loss of this permeability prevents wildlife from accessing resources, finding mates, reduces gene flow, prevents wildlife from re-colonizing areas where local extirpations may have occurred, and ultimately prevents wildlife from contributing to ecosystem functions, such as pollination, seed dispersal, control of prey numbers, and resistance to invasive species. In many cases, streams and washes provide natural movement corridors for wildlife and should be maintained in their natural state. Uplands also support a large diversity of species, and should be contained within important wildlife movement corridors. In addition, maintaining biodiversity and ecosystem functions can be facilitated through improving designs of structures, fences, roadways, and culverts to promote passage for a variety of wildlife.

Consider impacts of outdoor lighting on wildlife and develop measures or alternatives that can be taken to increase human safety while minimizing potential impacts to wildlife. Conduct wildlife surveys to determine species within project area, and evaluate proposed activities based on species biology and natural history to determine if artificial lighting may disrupt behavior patterns or habitat use. Use only the minimum amount of light needed for safety. Narrow spectrum bulbs should be used as often as possible to lower the range of species affected by lighting. All lighting should be shielded, cantered, or cut to ensure that light reaches only areas needing illumination.

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 leaving the site. 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, https://agriculture.az.gov/. 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

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 (include 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.

Based on the project type entered, coordination with the Office of Surface Mining may be required (http://www.osmre.gov/index.shtm).

Based on the project type entered, coordination with the Environmental Protection Agency may be required (http://www.epa.gov/).

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

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 at the Main Office in Nongame Branch, http://www.azgfd.gov/inside_azgfd/agency_directory.shtml .

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 Arizona Department of Water Resources may be required (http://www.azwater.gov/azdwr/default.aspx).

Vegetation restoration projects (including treatments of invasive or exotic species) should have a completed site-evaluation plan (identifying environmental conditions necessary to re-establish native vegetation), a revegetation plan (species, density, method of establishment), a short and long-term monitoring plan, including adaptive management guidelines to address needs for replacement vegetation.

Avoid/minimize wildlife impacts related to contacting hazardous and other human-made substances in facility water collection/storage basins, evaporation or settling ponds and/or facility storage yards. Design slopes to discourage wading birds and use fencing, netting, hazing or other measures to exclude wildlife.

Project Location and/or Species Recommendations:

HDMS 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. The Endangered Species Act (ESA) gives the US Fish and Wildlife Service (USFWS) regulatory authority over all federally listed species. Please contact USFWS Ecological Services Offices at http://www.fws.gov/southwest/es/arizona/ or:

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

Tucson Sub-Office
201 N. Bonita Suite 141
Tucson, AZ 85745
Phone: 520-670-6144
Fax: 520-670-6155

Flagstaff Sub-Office
SW Forest Science Complex
2500 S. Pine Knoll Dr.
Flagstaff, AZ 86001
Phone: 928-556-2157
Fax: 928-556-2121

HDMS records indicate that Sonoran Desert Tortoise have been documented within the vicinity of your project area. Please review the Tortoise Handling Guidelines found at:
http://www.azgfd.gov/hgis/pdfs/Tortoisehandlingguidelines.pdf

The analysis has detected one or more Important Bird Areas within your project vicinity. Please see http://aziba.org/?page_id=38 for details about the Important Bird Area(s) identified in the report.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arizona Ecological Services Field Office
2321 WEST ROYAL PALM ROAD, SUITE 103
PHOENIX, AZ 85021
PHONE: (602)242-0210 FAX: (602)242-2513
URL: www.fws.gov/southwest/es/arizona/;
www.fws.gov/southwest/es/EndangeredSpecies/lists/

Consultation Code: 02EAAZ00-2015-SLI-0351 March 06, 2015
Event Code: 02EAAZ00-2015-E-00355
Project Name: Land Exchange - Apache Leap South End

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The Fish and Wildlife Service (Service) is providing this list under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The list you have generated identifies threatened, endangered, proposed, and candidate species, and designated and proposed critical habitat, that *may* occur within one or more delineated United States Geological Survey 7.5 minute quadrangles with which your project polygon intersects. Each quadrangle covers, at minimum, 49 square miles. Please refer to the species information links found at http://www.fws.gov/southwest/es/arizona/Docs_Species.htm or http://www.fws.gov/southwest/es/arizona/Documents/MiscDocs/AZSpeciesReference.pdf for a quick reference, to determine if suitable habitat for the species on your list occurs in your project area.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect federally listed species and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If the Federal action agency determines that listed species or critical habitat *may be affected* by a federally funded, permitted or authorized activity, the agency must consult with us pursuant to 50 CFR 402. Note that a "may affect" determination includes effects that may not be adverse and that may be beneficial, insignificant, or discountable. An effect exists even if only one individual or habitat segment may be affected. The effects analysis should include the entire action area, which often extends well outside the project boundary or "footprint" (e.g., downstream). If the Federal action agency determines that the action may jeopardize a *proposed* species or adversely modify *proposed* critical habitat, the agency must enter into a section 7 conference. The agency may choose to confer with us on an action that may affect proposed species or critical habitat.

Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event they become proposed or listed prior to project completion. More information on the regulations (50 CFR 402) and procedures for section 7 consultation, including the role of permit or license applicants, can be found in our Endangered Species Consultation Handbook at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF.

In addition to species listed under the Act, we advise you to consider species protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 *et seq.*). Both laws prohibit the take of covered species. The list of MBTA-protected birds is in 50 CFR 10.13 (for an alphabetical list see http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/MBTANDX.HTML). The Service's Division of Migratory Birds is the lead for consultations under these laws (Southwest Regional Office phone number: 505/248-7882). For more information regarding the MBTA, BGEPA, and permitting processes, please visit the following web site: http://www.fws.gov/migratorybirds/mbpermits.html. Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g. cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/southwest/es/arizona/CellTower.htm

Although bald eagles (*Haliaeetus leucocephalus*) are no longer listed under the Act, they are protected under both the BGEPA and the MBTA. If a bald eagle nest occurs in or near the proposed project area, our office should be contacted. An evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles (see http://www.fws.gov/southeast/es/baldeagle/) and the Division of Migratory Birds consulted if necessary. The National Bald Eagle Management Guidelines provide recommendations to minimize potential project impacts to bald eagles (see http://www.fws.gov/midwest/eagle/pdf/NationalBaldEagleManagementGuidelines.pdf).

Activities that involve streams and/or wetlands are regulated by the U.S. Army Corps of Engineers (Corps). We recommend that you contact the Corps to determine their interest in proposed projects in these areas. For activities within a National Wildlife Refuge, we recommend that you contact refuge staff for specific information about refuge resources.

If your action is on Indian land or has implications for off-reservation tribal interests, we encourage you to contact the tribe(s) and the Bureau of Indian Affairs (BIA) to discuss potential

tribal concerns, and to invite any affected tribe and the BIA to participate in the section 7 consultation. In keeping with our tribal trust responsibility, we will notify tribes that may be affected by proposed actions when section 7 consultation is initiated. For more information, please contact our tribal coordinator, John Nystedt, at (928) 556-2160 or John_Nystedt@fws.gov.

The State of Arizona protects some species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department (AGFD) for animals and Arizona Department of Agriculture for plants to determine if species protected by or of concern to the State may occur in your action area. The AGFD has an Environmental Review On-Line Tool that can be accessed at http://www.azgfd.gov/hgis/. We also recommend that you coordinate with the AGFD regarding your project.

For additional communications regarding this project, please refer to the consultation Tracking Number in the header of this letter. We appreciate your concern for threatened and endangered species. If we may be of further assistance, please contact Brenda Smith at 928/556-2157 for projects in Northern Arizona, our general Phoenix number (602/242-0210) for central Arizona, or Jean Calhoun at 520/670-6150 (x223) for projects in southern Arizona.

Sincerely,

/s/

Steven L. Spangle

Field Supervisor

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Land Exchange - Apache Leap South End

Official Species List

Provided by:

Arizona Ecological Services Field Office
2321 WEST ROYAL PALM ROAD, SUITE 103
PHOENIX, AZ 85021
(602) 242-0210
http://www.fws.gov/southwest/es/arizona/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

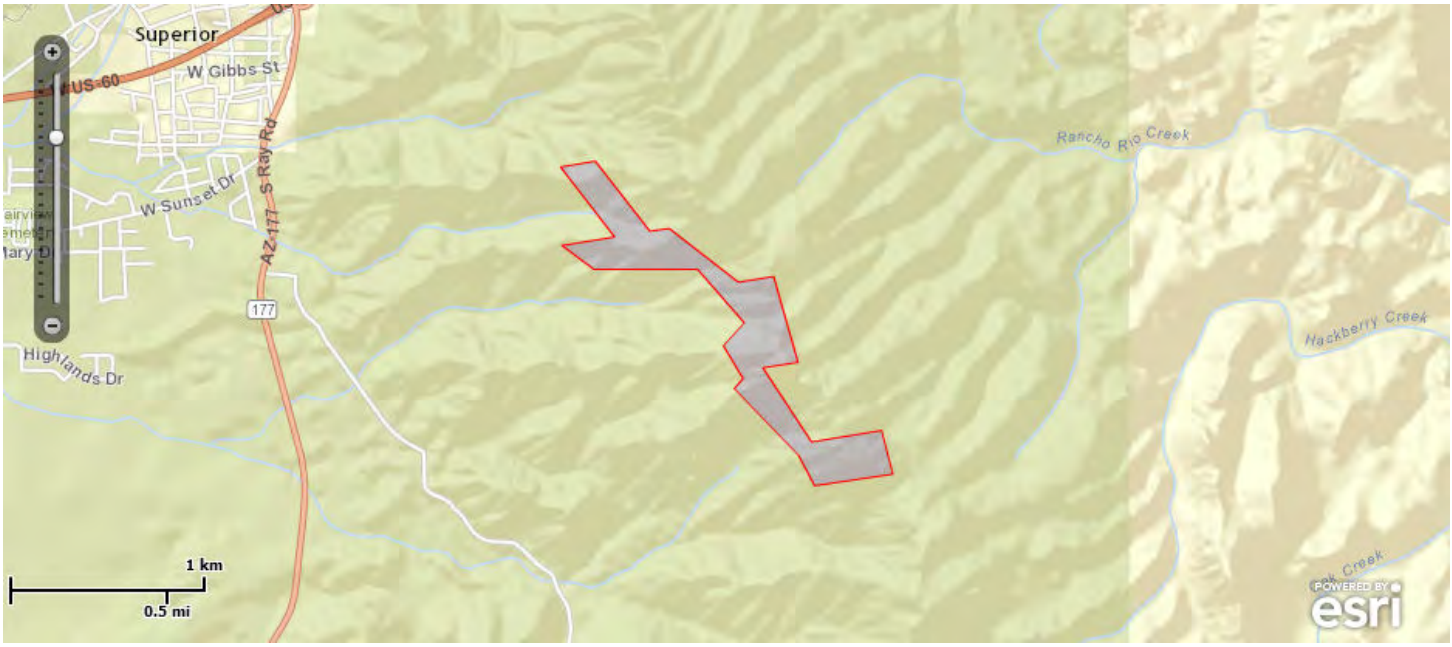
Consultation Code: 02EAAZ00-2015-SLI-0351
Event Code: 02EAAZ00-2015-E-00355

Project Type: Mining

Project Name: Land Exchange - Apache Leap South End
Project Description: Land Exchange

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-111.0818806 33.2830522, -111.0799472 33.2833189, -111.0769327 33.2800681, -111.0758575 33.280208, -111.0720221 33.2776985, -111.0700594 33.2779679, -111.0687126 33.2740021, -111.0706516 33.273739, -111.0679462 33.2703053, -111.0640715 33.2708297, -111.0634554 33.2688067, -111.067789 33.2682623, -111.0686935 33.2696842, -111.0722464 33.2727656, -111.071745 33.2732335, -111.0728497 33.2747654, -111.0716861 33.2758289, -111.074302 33.2783361, -111.0800754 33.2783314, -111.0817987 33.2794077, -111.078871 33.2798059, -111.0818806 33.2830522)))

Project Counties: Pinal, AZ

Endangered Species Act Species List

There are a total of 6 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Birds	**Status**	**Has Critical Habitat**	**Condition(s)**
Southwestern Willow flycatcher *(Empidonax traillii extimus)* Population: Entire	Endangered	Final designated	
Yellow-Billed Cuckoo *(Coccyzus americanus)* Population: Western U.S. DPS	Threatened	Proposed	
Fishes			
Roundtail chub *(Gila robusta)* Population: Lower Colorado River Basin DPS	Candidate		
Flowering Plants			
Arizona Hedgehog cactus *(Echinocereus triglochidiatus var. arizonicus)*	Endangered		
Reptiles			
Northern Mexican gartersnake *(Thamnophis eques megalops)*	Threatened	Proposed	
Sonoran desert tortoise *(Gopherus*	Candidate		

morafkai)			

Critical habitats that lie within your project area

There are no critical habitats within your project area.

APPENDIX B

Apache Leap
South End
Reprehensive
Photographs

Photograph 1. View of Apache Leap South End parcels.

Photograph 3. Rocky slopes typical of the Apache Leap South End parcels. Apache Leap escarpment in background.

Photograph 2. Rugged areas west of Apache Leap escarpment in Apache Leap South End parcels.

Photograph 4. Apache Leap escarpment with steep drainages below.

Photograph 5. Exposed Apache Leap Tuff geologic unit within Apache Leap South End parcels.

Photograph 7. Boulder comprised of sedimentary materials within Apache Leap South End parcels.

Photograph 6. Boulder comprised of Apache Leap Tuff within Apache Leap South End parcels.

Photograph 8. Apache Leap escarpment, showing Apache Leap Tuff overlying Whitetail Conglomerate, within Apache Leap South End parcels.

Photograph 9. Ephemeral drainages at base of Apache Leap escarpment that report to Queen Creek.

Photograph 11. Interior Chaparral vegetation on generally north-facing slope within the Property.

Photograph 10. View of the ephemeral drainages within the Apache Leap South End parcels.

Photograph 12. Scrub live oak.

Photograph 13. Cottontail rabbit scat observed within the Property.