Biological Evaluation

for

West Anthem Water and Wastewater Infrastructure
Phoenix, AZ
WS85500416, WS90400067, WS90500276, & WS90501005

Prepared for

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1 Project Location

The West Anthem Water and Wastewater Infrastructure Improvements Project (Project) is located in the City of Phoenix, Maricopa County, Arizona. The Project is located on the west side of Interstate 17 (I-17) within Sections 15, 22, 27, and 34 of Township 6 North, Range 2 East, and Sections 2 and 3 of Township 5 North, Range 2 East of the Gila and Salt River Baseline and Meridian (Figure 1). The project is within Arizona State Land Department (ASLD), Arizona Department of Transportation (ADOT), and Maricopa Department of Transportation (MCDOT)-owned or managed land.

The Project alignment begins at the existing Booster Pump Station (BPS) 8CP-B1 located on the southwest corner of 45th Avenue and Opportunity Way, and traverses south parallel to I-17 to near the intersection of Pioneer Road and I-17 (Figure 1). The sewer line then pivots east at Gavilan Peak Parkway, crosses I-17, and runs adjacent to North Valley Parkway just north of Carefree Highway. The water line will end just west of I-17, north of Daisy Mountain Drive.

Throughout this Biological Evaluation (BE) the term “project limits” is used to represent the construction footprint (area of disturbance), while the term “project area” also includes surrounding lands, outside but adjacent to the project limits. The term “project vicinity” is used to denote a more expansive landscape context such as the Phoenix area.

2 Project Description

The City of Phoenix currently provides water and wastewater service to the West Anthem area through a service agreement with Epcor Water Company. The area is currently the only developed area in the City of Phoenix west of I-17 and north of the Central Arizona Project canal not served directly by the City of Phoenix. This project includes installation of infrastructure needed to serve the West Anthem area directly from the City of Phoenix.

The project consists of 23,900 linear foot (LF) gravity sewer, 7700 LF water main, a new lift station, and three 4,600 LF force mains. Specific improvements include:

- 14,200 LF of new 18” gravity sewer main from West Anthem area south to future lift station on the west side of I-17
- New 4.3-Million Gallons per Day (MGD) Lift Station
- 4,600 LF of new single 8” force main from the new lift station to the south along Pioneer Road to I-17
- 4,600 LF of new dual 18” force mains from the new lift station to the south along Pioneer Road to I-17
- 9,700 LF of new 18” and 21” gravity sewer main to the south along the west side of I-17 and then east across I-17 to Gavilan Peak Parkway and North Valley Parkway then south to Carefree Highway
- 320 LF of jack and bore under I-17 to construct 18” gravity sewer main
- 7,700 LF new 24” and 36” water main from existing 36” stub on west side of I-17 towards the northwest to existing BPS 8CP-B1
- Upgrade/replace pumps in existing BPS 8CP-B1

Ground disturbance and vegetation removal will occur in an approximately 60-foot wide alignment. Native plant surveys have been conducted and plant salvage will occur. Impacts to native plants will be avoided where possible. Salvage Restricted native plants that must be removed will be replanted outside of the project limits when possible.
Figure 1
Project Location Map

West Anthem
Phoenix, Arizona

Legend

- Project Site
- Desert Tortoise Shelter and Movement Corridor

Several ephemeral drainages in the project limits are considered Waters of the U.S. and will be impacted by project construction, therefore a Clean Water Act Section 404 permit and Section 401 permit will be required for project activities. Localized noise will be generated during construction; however noise will likely be temporary in duration. Project components will involve ground disturbances totaling more than one acre of disturbed soils, therefore a Construction General Permit will be obtained and a Storm Water Prevention Plan (SWPPP) developed. A Clean Water Act Section 402 Arizona Pollutant Discharge Elimination System (AZPDES) permit from the Arizona Department of Environmental Quality (ADEQ) will be required.

3 Location Description

Pedestrian site visits were conducted of the project limits on August 8, 2016 and June 4, 2017. Photographs of the project area are provided in Appendix A. The elevation of the project alignment ranges from approximately 1,845 feet (amsl) at the northern limits to approximately 1,680 feet (amsl) at the southern limits. The project limits are within a large valley surrounded by rocky hillsides. Interstate 17 is adjacent to the east and the urban development of West Anthem is located to the north. The majority of the alignment is located on a large dirt road that runs north and south. A residential property, not a part of this project, is adjacent to the project limits. Vehicles have caused disturbance throughout the project area along with dumping and shooting.

The project limits are within the primarily undeveloped Lower Colorado River Valley subdivision of the Sonoran Desert Scrub biotic community (Brown, 1994). The area is primarily creosote flats and grassland with interspersed cacti, shrubs, and trees. Ground cover is dominated by the annual grass red brome (Bromus rubens) and the annual forb, Globe chamomile (Oncosiphon piloliferum), both invasive species that indicate a high degree of disturbance. Other ground cover includes redstem fillaree (Erodium cicutarium) and desert plantain (Plantago ovata). Shrubs include Coulter’s globemallow (Sphaeralcea coulteri), triangle-leaf bursage (Ambrosia deltoidea), brittlebush (Encelia farinosa), creosote bush (Larrea tridentata), ocotillo (Fouquieria splendens), and the trees velvet mesquite (Prosopis velutina), desert ironwood (Olneya tesota), foothills paloverde (Parkinsonia microphylla), desert hackberry (Celtis pallida), and blue paloverde (Cercidium floridum). Cacti include buckhorn cholla (Cylindropuntia acanthocarpa), teddy bear cholla (Cylindropuntia bigelovii), saguaro (Carnegia gigantean), and fishhook barrel cactus (Ferocactus wislizenii).

All cacti and ocotillo found in the project are categorized as Salvage Restricted Native Plants. Trees in the project limits; foothills paloverde, blue paloverde, and desert ironwood are categorized as Salvage Assessed Protected Native Plants and velvet mesquite is categorized as Harvest Restricted under Arizona Native Plant Law. The contractor is required to notify the Arizona Department of Agriculture if any protected native plant destruction will occur to obtain appropriate permits (ARS 3-904).

Ephemeral drainages in the project area generally run northeast to southwest and contribute to the Agua Fria River approximately 10 miles south of the project limits. Deadman Wash intersects the project limits. Xeririparian vegetation, which is denser desert vegetation concentrated on the ephemeral drainages due to the availability of water during rain events, is present and is dominated by foothills paloverde, blue paloverde, catclaw acacia (Acacia greggii), wolfberry (Lycium sp.), canyon bursage (Ambrosia ambrosioides), and desert hackberry.
4 Species Identification

The U.S. Fish and Wildlife Service (USFWS) list of threatened, endangered, proposed threatened, candidate, and delisted species per the federal Endangered Species Act (ESA) for the project area was obtained using the USFWS Information, Planning, and Conservation System (IPAC) (Appendix B). In addition to the USFWS database, the Arizona Game and Fish Department (AGFD) On-Line Environmental Review Tool was also queried for special status species records associated with the project area (Appendix C). The lists were reviewed to determine if any of the species has the potential to occur in the project area. No species covered by the ESA will be impacted as a result of this project. No critical habitat is present in the project area.

Table 1. Threatened, Endangered, and Proposed Threatened Species Excluded from Evaluation and Justification for their Exclusion

<table>
<thead>
<tr>
<th>Species name</th>
<th>Status</th>
<th>Habitat requirements</th>
<th>Exclusion justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Least Tern</td>
<td>E</td>
<td>This species is found on open, bare, or sparsely vegetated sand, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, or drainage systems below 2,000 ft. (USFWS, 2009).</td>
<td>No suitable habitat within project area. No aquatic resources or sandbars/gravel pits/shorelines will be impacted. No impacts to this species or its habitat will occur as a result of this project.</td>
</tr>
<tr>
<td>Yellow-billed Cuckoo</td>
<td>T</td>
<td>Within Arizona, this species is generally found in southern and central Arizona, and extreme northeast portion of the state. Despite losses of riparian habitats from historic levels, this species is still found in all Arizona counties. Western yellow-billed cuckoo prefer large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries) below 6,500 feet amsl (AGFD, 2011c).</td>
<td>No suitable habitat within project area. No riparian habitat will be impacted. No impacts to aquatic or riparian resources or to this species will occur as a result of this project.</td>
</tr>
<tr>
<td>Gila Topminnow</td>
<td>E</td>
<td>Gila topminnow occurs in small streams, springs, and cienegas below 4,500 ft. elevation, primarily in shallow areas with aquatic vegetation and debris for cover. Species occurs in small streams, springs, and cienegas in Gila, Pinal, Graham, Yavapai, Santa Cruz, Pima, Maricopa, and La Paz counties (USFWS, 2008).</td>
<td>No suitable habitat in project area. No streams, springs, or cienegas will be impacted. No impacts to this species or its habitat will occur as a result of this project.</td>
</tr>
<tr>
<td>Roundtail Chub</td>
<td>PT</td>
<td>Roundtail chub occupy cool to warm water, mid-elevation streams and rivers where typical adult microhabitat consists of pools up to 2.0 meters (6.6 feet) deep adjacent to swifter riffles and runs. The species also sometimes occupy large reservoirs (AGFD, 2015).</td>
<td>No suitable habitat in project area. No stream or rivers will be impacted. No impacts to this species or its habitat will occur as a result of this project.</td>
</tr>
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<td>Species name</td>
<td>Status</td>
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<td>Exclusion justification</td>
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</tr>
<tr>
<td>Lesser Long-nosed Bat</td>
<td>E</td>
<td>Habitat for this species consists of desert grassland and scrubland up to scrub oak and pinyon/juniper woodlands. The species roost in caves, mine tunnels, and forage in areas of saguaro, ocotillo, paloverde, prickly pear and organ pipe cactus and later in the summer among agaves and occasionally in old buildings. Species range is currently in southern Arizona with only two known occurrences in the Phoenix area (AGFD 2011b).</td>
<td>Project area does not contain caves or other structures that this species would utilize as a day roost. The project limits contains a small number of saguaros, ocotillos and palo Verde that will be impacted by the project. These few individuals are a small percentage of saguaros and agave present in project vicinity; therefore no impacts to this species will occur as a result of this project.</td>
</tr>
</tbody>
</table>

*Status Definitions: T=Threatened, E=Endangered, PT=Proposed Threatened

## 5 State Sensitive Species Evaluations

The following are State Sensitive Species expected to occur within the project limits with the potential to be impacted as a result of this project:

### 5.1 Sonoran Desert Tortoise

The project limits contains suitable Sonoran desert tortoise (*Gopherus morafkai*) habitat and the Sonoran desert tortoise has been documented within three miles of the project area. The closest documented Sonoran desert tortoises occurred 0.5 mile east of the project limits, approximately 2 miles to the northeast, and 2 miles to the northwest. There is no evidence of surveys being conducted in the project area since the mid-1990’s (Tonn, 2017).

Tortoises are not afforded formal protection under the ESA, however they are still protected under State law. Arizona Title 17 prohibits the “Take” of Sonoran desert tortoises. “Take” means pursuing, shooting, hunting, fishing, trapping, killing, capturing, snaring or netting wildlife or the placing or using of any net or other device or trap in a manner that may result in the capturing or killing of wildlife. The AGFD designates Sonoran desert tortoise as a “Species of Greatest Conservation Need”. A Candidate Conservation Agreement (CCA) is in place for the Sonoran desert tortoise; voluntary agreements between the USFWS and other government, tribal and private parties to address the conservation needs of candidate species or species likely to become candidates in the near future (USFWS et al., 2015).

The Sonoran desert tortoise is most closely associated with the Arizona Upland and Lower Colorado River subdivisions of Sonoran Desert Scrub and Mohave Desert Scrub vegetation types. Desert tortoises occur most commonly on rocky, steep slopes and bajadas often formed by the coalescing of several alluvial fans and in paloverde mixed cacti associations. Washes and valley bottoms may be used in dispersal. Sonoran desert tortoises in Arizona occur between 900 to 4,200 feet amsl (USFWS, 2015).

No Sonoran desert tortoises or potential burrows were detected during the site visit but tortoises are a cryptic species and are very difficult to observe and the site was not surveyed for desert tortoise according to USFWS survey protocol. The majority of the project limits is either on the
existing Pioneer Road alignment or on a creosote flat, areas that are not potential Sonoran desert tortoise habitat. The project area, south of Rockaway Hills Road, is mapped as suitable Sonoran desert tortoise habitat in AGFD’s Habimap. Specific areas of potential Sonoran desert tortoise habitat in the project limits are found in Figure 1. The potential tortoise habitat is located in the desert washes and on the rocky hill to the east of Pioneer Road within the project limits. The desert washes would provide potential burrowing and shelter sites as well as movement and dispersal corridors and the rocky hill’s boulders provide shelter sites.

Within the project area, the Sonoran desert tortoise habitat has been degraded by invasive species such as the annual grass red brome and the annual forb chamomile, causing a lack of preferred native forage plants as well as possibly reducing thermoregulation. A reduction in cover plants used by tortoises can limit thermoregulatory opportunities and reduce periods of potential surface activity, making individuals more susceptible to dehydration, as well as increase predation risk when the individuals are active on the surface (Gray, 2012). There is also disturbance caused by off-highway vehicles, shooting, and illegal dumping. In addition, only a limited amount of suitable burrowing substrate is available in the project limits.

It is recommended that a Sonoran desert tortoise survey be conducted in the project limits in their active periods prior to construction, April - May or September - October. Sonoran desert tortoises have been found in nearby areas of similar habitat however, the project area’s desert tortoise habitat has been degraded to a level that it is uncertain if the Sonoran desert tortoise occurs in the project limits. Being that their presence is questionable, the Recommended Standard Mitigation Measures for Projects in Sonoran Desert Tortoise Habitat (Appendix D) recommends that a species specific protocol survey be conducted by qualified biologists to determine if desert tortoises are present or absent.

If the Sonoran desert tortoise is present, mitigation should be included in the project design. Mitigation should be tailored to the nature of the proposed action, its anticipated effects, and the density and expected response of desert tortoises to the action. The development of an appropriate mitigation plan will require the input of a desert tortoise biologist and the Arizona Game and Fish Department. Some examples of possible mitigation would be: to avoid and minimizing impacts to Sonoran desert tortoise habitat, scheduling construction activity when tortoises are inactive (typically November 1 - March 1), information and education of project personnel, and/or monetary compensation for residual impacts.

Translocations of Sonoran desert tortoises are also possible if active tortoise burrows cannot be avoided. Only Arizona Game and Fish Department can authorize handling or moving tortoises. Should Sonoran desert tortoises be encountered during ground-disturbing activities, Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects issued by AGFD should be used (Appendix E).

5.2 Bald and Golden Eagles

Bald eagle (Haliaeetus leucocephalus) and golden eagle (Aquila chrysaetos) are protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act of 1918 (MBTA) and are identified as a "Species of Greatest Conservation Need" in Arizona by the AGFD. The Bald and Golden Eagle Protection Act prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald and golden eagles, including their parts, nests, or eggs. The Act defines "take" as "pursue, shoot, shot at, poison, wound, kill, capture, trap, collect, molest, or disturb. The MBTA also prohibits the pursuit, hunt, take, attempt to take, capture, kill or sale of
migratory birds. The bald eagle and golden eagle are also protected by Arizona Revised Statute Title 17 in which “take” is prohibited.

The nearest documented bald eagle nest is at Lake Pleasant, approximately 6 miles to the southwest of the project area (Tonn, 2017). No suitable habitat exists in the project area for bald eagle nesting or roosting and it is unlikely they would use the area for foraging. Bald eagles select wintering habitat with an adequate food supply, and open water such as river rapids, impoundments, dam spillways, lakes, and estuaries. Nesting habitat consists of areas with tall trees (usually old growth) that are taller than surroundings. Ideally, the nest lies below the top of the crown in a live tree, where young are sheltered above from the elements. In treeless areas, the nest is usually on a high place such as a cliff face. The bald eagle’s diet is comprised mainly of fish (catfish, suckers, and carp; and yellow bass followed by small mammals (jackrabbits, cottontails, squirrels, and woodrats), carrion (including large mammals), and avian (normally waterfowl, mainly American coots) (AGFD, 2011a).

No documented golden eagle nests have been found near the project area but they are predicted by AGFD and USFWS range models to potentially use the area. The golden eagle is usually found in open country, in prairies, arctic and alpine tundra, open wooded country and barren areas, especially in hilly or mountainous regions. They nest on rock ledges, cliffs or in large trees. In Arizona, they are found primarily in mountainous areas but do breed in desert areas. Golden eagles avoid nesting near urban habitat (USFWS, 2011). The golden eagle is a carnivore that feeds mainly on small mammals like rabbits, marmots and ground squirrels (AGFD, 2002).

The project is not expected to result in “take” of bald or golden eagles, including their parts, nests, or eggs. Ground-disturbing activities will not approach any known bald or golden eagle nest locations. If during any construction activities bald or golden eagle are present and nesting, nests should be avoided and USFWS local or regional office notified. The dimension of the buffer zone is generally recommended by the USFWS to be at least 100 feet but will depend on the nest site location and activity in the area and should be coordinated with the USFWS local or regional office.

5.3 Western Burrowing Owl

Western burrowing owl (Athene cunicularia hypugaea) is protected by the MBTA and is designated as a “Species of Greatest Conservation Need” by the AGFD. Western burrowing owl is also protected by Arizona Revised Statute Title 17 which prohibits “Take”. Burrowing owl habitat includes any open grassland, scrubland, or park-like area devoid of dense tree cover and containing burrowing mammals or adequate artificial nest burrows (e.g., erosion channels or storm drain pipes) which can represent adequate nesting, wintering, or migratory habitat. Burrowing owls are found in semi-desert grassland, plains grassland, cropland, Great Basin desert-scrub, lower Colorado River biome of the Sonoran Desert-scrub, barren ground, Great Basin grassland, Arizona upland biome of Sonoran Desert-scrub, Mojave Desert-scrub, rural, and residential (AGFD, 2001).

Western burrowing owls have not been documented within 3 miles of the project area however; potential western burrowing owl habitat is present in the project limits. Del Sol Group’s Senior Biologist did not observe burrowing owls or potential burrows on the site visit, however the entire site was not surveyed according to established protocol. It is recommended the Arizona Burrowing Owl Working Group’s Burrowing Owl Project Clearance Guidance for Landowners be followed regarding surveys and mitigation for western burrowing owls in the project limits (Appendix F).
The Arizona Burrowing Owl Working Groups recommends preliminary surveys be conducted prior to project implementation to allow for adequate time to properly accommodate or mitigate for owls, if present. Additional surveys are recommended within 30 days of construction and a 90 day pre-construction survey if unoccupied burrows are found during the fall or winter. Additional surveys are not necessary if burrows were not present on the initial survey.

If burrowing owls are present and cannot be avoided, they can be translocated and the burrows can be permanently closed by a properly permitted individual or group before project-related activities. If owls or occupied burrows are detected within the construction area at any time during project implementation, burrows must be avoided until: 1) status of the burrows can be determined and owls removed by properly permitted individuals or groups, or 2) other mitigation measures are implemented.

Recommended mitigation measures are:

- The City of Phoenix’s burrowing owl construction flyer be provided to the contractor and posted on-site;
- Identify open space areas to be protected as a buffer around occupied and suitable owl burrows;
- Passive exclusion (closing of unoccupied burrows) or translocation of owls by permitted wildlife rehabilitator authorized under the City’s Office of Environmental Programs USFWS permit, Contractor shall contact Tricia Balluff at tricia.balluff@phoenix.gov, 602-534-1775.

6 Migratory Birds

The USFWS provided a list of 26 migratory bird species that may occur within the project vicinity (Appendix B). These and numerous other birds native to the project vicinity that are protected by the MBTA would be expected to use habitat in the parcel area throughout the year. Migratory birds are protected under the MBTA, as amended, which prohibits injury or death to migratory birds and their active nests, eggs, and young.

If active nests protected under the MBTA are observed during project activities, active nests shall be avoided until the young have fledged. Scheduling ground-disturbing activities outside the bird breeding season (generally February 1 - August 31) can lessen the chances for MBTA species-related impacts. If impacts to vegetation or ground-disturbing activities will occur between February 1 and August 31 of any calendar year, a survey for active nests protected under the MBTA will be needed prior to the start of those activities.

If active nests are found, nests would either need to be avoided until the young have fledged or the project proponent can choose to pursue a permit from the USFWS to have a permitted wildlife rehabilitator relocate the contents of the active nest. Please note that a permit generally takes six weeks to obtain after the documentation has been submitted to the USFWS.
7 **Findings and Mitigation Measures**

- No direct or indirect impacts are expected to occur to ESA threatened, endangered, proposed threatened, candidate, or delisted species.

- If during ground-disturbing activities adult birds are present and nesting, such activities should be avoided near the nests until young have fledged. Scheduling ground-disturbing activities outside the bird breeding season (generally February 1 – August 31) can lessen the chances for MBTA species-related impacts.

- If active nests are found, they would either need to be avoided until the young have fledged or a permit may be issued by USFWS to have a permitted wildlife rehabilitator relocate the active nest. A permit generally takes six weeks to obtain after the documentation has been submitted to the USFWS.

  *Recommended Standard Mitigation Measures for Projects in Sonoran Desert Tortoise Habitat and Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects* issued by AGFD should be used (Appendices D and E).

- If Sonoran desert tortoise or western burrowing owls and/or their burrows are observed, the contractor shall contact AGFD’s Project Evaluation Program for guidance by email at PEP@azgfd.gov or call Laura Canaca, Project Evaluation Supervisor, at (623) 236-7602.

- AGFD’s Burrowing Owl Project Clearance Guidance for Landowners should be followed (Appendix F) to survey and mitigate impacts for western burrowing owls which may be present in the project limits.

- The City of Phoenix’s burrowing owl construction flyer be provided to the contractor and posted on-site.

- Identify open space areas to be protected as a buffer around occupied and suitable owl burrows’.

- Passive exclusion (closing of unoccupied burrows) or translocation of owls by permitted wildlife rehabilitator authorized under the City’s Office of Environmental Programs USFWS permit, Contractor shall contact Tricia Balluff at tricia.balluff@phoenix.gov, 602-534-1775.

- Arizona noxious weed regulations (Arizona Revised Statutes, Rules R3-4-244 and R3-4-245) should be followed to minimize the potential introduction or spread of exotic invasive species. Precautions should be taken to wash all equipment utilized in project activities before entering and leaving the site. Known fill material free of weeds and contaminants should be used.

- An Arizona native plant survey and report of any native plant damage or removal be provided to Arizona Department of Agriculture in compliance with Arizona Plant Law (Titles 3-901 thru 3-916).

- Measures should be used to store and distribute petroleum, oil, lubricants to minimize the risk of these contaminants accidentally entering and contaminating sensitive species habitats.
8 Literature Cited


Tonn, S. 2017a. Email communication from Sabra Tonn, AGFD, to Natalie Robb, Del Sol Group, re. HGIS-05583 Species Occurrences, June 9, 2017.


______. 2009. California least tern (Sterna antillarum browni), General Species Information. 1 pp.


______. 2015. Sonoran Desert Tortoise (Gopherus morafkai), General Species Information. 1 pp.

Natalie Robb, Senior Biologist
Del Sol Group
APPENDIX A: SITE PHOTOS

Photo 1: View of north portion of alignment, facing south

Photo 2: View of alignment north of Rockaway Hills Road, facing south
Photo 3: View of east portion of alignment, facing west

Photo 4: View of southern portion of alignment, facing north
APPENDIX B: USFWS IPAC
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as trust resources) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location
Maricopa County, Arizona

Local office
Arizona Ecological Services Field Office

(602) 242-2020
(602) 242-2513

9828 North 31st Ave
#C3
Phoenix, AZ 85051-2517

http://www.fws.gov/southwest/es/arizona/
http://www.fws.gov/southwest/es/EndangeredSpecies_Main.html

NOT FOR CONSULTATION
Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

### Mammals

<table>
<thead>
<tr>
<th>NAME</th>
<th>STATUS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesser Long-nosed Bat <em>Leptonycteris curasoae yerbabuenae</em></td>
<td>Endangered</td>
<td>No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/3245">https://ecos.fws.gov/ecp/species/3245</a></td>
</tr>
</tbody>
</table>

### Birds

<table>
<thead>
<tr>
<th>NAME</th>
<th>STATUS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>California Least Tern <em>Sternula antillarum browni</em></td>
<td>Endangered</td>
<td>No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/8104">https://ecos.fws.gov/ecp/species/8104</a></td>
</tr>
</tbody>
</table>

| Yellow-billed Cuckoo *Coccyzus americanus* | Threatened | There is proposed critical habitat for this species. Your location is outside the critical habitat. [https://ecos.fws.gov/ecp/species/3911](https://ecos.fws.gov/ecp/species/3911) |

### Fishes

<table>
<thead>
<tr>
<th>NAME</th>
<th>STATUS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gila Topminnow (incl. Yaqui) <em>Poeciliopsis occidentalis</em></td>
<td>Endangered</td>
<td>No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/1116">https://ecos.fws.gov/ecp/species/1116</a></td>
</tr>
</tbody>
</table>

| Roundtail Chub *Gila robusta* | Proposed Threatened | No critical habitat has been designated for this species. [https://ecos.fws.gov/ecp/species/2782](https://ecos.fws.gov/ecp/species/2782) |

Critical habitats
Facilities

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act\(^1\) and the Bald and Golden Eagle Protection Act\(^2\).

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service\(^1\). There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured. Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures, as described below.

1. The **Migratory Birds Treaty Act** of 1918.
2. The **Bald and Golden Eagle Protection Act** of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:


MIGRATORY BIRD INFORMATION IS NOT AVAILABLE AT THIS TIME

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

**Nationwide Conservation Measures** describes measures that can help avoid and minimize impacts to all birds at any location year round. Such measures are particularly important when birds are most likely to occur in the project area. To see when birds are most likely to occur in your project area, view the Probability of Presence Summary. Special attention should be made to look for nests and avoid nest destruction during the breeding season. The best information about when birds are breeding can be found in **Birds of North America (BNA) Online** under the “Breeding Phenology” section of each species profile. Note that accessing this information may require a [subscription](http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php). Additional measures and/or [permits](http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS **Birds of Conservation Concern (BCC)** that might be affected by activities in your project location. These birds are of priority concern because it has been determined that without additional conservation actions, they are likely to become candidates for listing under the **Endangered Species Act (ESA)**.

The migratory bird list generated for your project is derived from data provided by the **Avian Knowledge Network (AKN)**. The AKN data is based on a growing collection of **survey, banding, and citizen science datasets**. The AKN list represents all birds reported to be occurring at some level throughout the year in the counties in which your project lies. That list is then narrowed to only the Birds of Conservation Concern for your project area.

Again, the Migratory Bird Resource list only includes species of particular priority concern, and is not representative of all birds that may occur in your project area. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To get a list of all birds potentially present in your project area, please visit the [E-bird Explore Data Tool](http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the **Avian Knowledge Network (AKN)**. This data is derived from a growing collection of **survey, banding, and citizen science datasets**.

Probability of presence data is continuously being updated as new and better information becomes available.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird’s range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The [Cornell Lab of Ornithology All About Birds Bird Guide](http://www.allaboutbirds.org/guide) or [if you are unsuccessful in locating the bird of interest there], the [Cornell Lab of Ornithology Neotropical Birds guide](http://www.allaboutbirds.org/guide). If a bird entry on your migratory bird species list indicates a breeding season, it is probable the bird breeds in your project’s counties at some point within the time-frame specified. If “Breeds elsewhere” is indicated, then the bird likely does not breed in your project area.
Wildlife refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.
APPENDIX C: AGFD Online Review Tool Report
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:
West Anthem Water and Waste Water Infrastructure improvements

Project Description:
The installation of over 4.25 miles of 18-inch gravity sewer mains, a 3 MGD sewer lift station, over a mile of sewer force main, nearly 1.5 miles of 20-inch water main, and upgrades to the existing West Anthem water booster station (8CP-B1) to serve the West Anthem area.

Project Type:
Water Use, Transfer, and Channel Activities, Water delivery and supply line or effluent delivery line (operated by municipality or water company), New lines or expansion of existing lines

Contact Person:
Natalie Robb

Organization:
Del Sol Group

On Behalf Of:
CONSULTING

Project ID:
HGIS-05583

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 Department's review of site-specific projects.

3. The Department's Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. 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.
West Anthem Water and Waste Water Infrastructure improvements

Aerial Image Basemap With Locator Map

Project Boundary
Buffered Project Boundary

Project Size (acres): 53.70
Lat/Long (DD): 33.8468 / -112.1489
County(s): Maricopa
AGFD Region(s): Mesa
Township/Range(s): T6N, R2E
USGS Quad(s): BISCUIT FLAT

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),
## Special Status Species and Special Areas Documented within 3 Miles of Project Vicinity

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>FWS</th>
<th>USFS</th>
<th>BLM</th>
<th>NPL</th>
<th>SGCN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gopherus morafkai</td>
<td>Sonoran Desert Tortoise</td>
<td>CCA</td>
<td>S</td>
<td>S</td>
<td></td>
<td>1A</td>
</tr>
<tr>
<td>Haliaeetus leucocephalus pop. 3</td>
<td>Bald Eagle - Sonoran Desert</td>
<td>SC, BG</td>
<td>S</td>
<td>S</td>
<td></td>
<td>1A</td>
</tr>
</tbody>
</table>

Note: Status code definitions can be found at [https://www.azgfd.com/wildlife/planning/wildlifeguidelines/statusdefinitions/](https://www.azgfd.com/wildlife/planning/wildlifeguidelines/statusdefinitions/)

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

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>FWS</th>
<th>USFS</th>
<th>BLM</th>
<th>NPL</th>
<th>SGCN</th>
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<td>Aix sponsa</td>
<td>Wood Duck</td>
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<tr>
<td>Ammospermophilus harrisii</td>
<td>Harris’ Antelope Squirrel</td>
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<tr>
<td>Anaxyrus microscaphus</td>
<td>Arizona Toad</td>
<td>SC</td>
<td>S</td>
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<tr>
<td>Aquila chrysaetos</td>
<td>Golden Eagle</td>
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<td>Athene cunicularia hypugaea</td>
<td>Western Burrowing Owl</td>
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<tr>
<td>Botaurus lentiginosus</td>
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<td>Buteo regalis</td>
<td>Ferruginous Hawk</td>
<td>SC</td>
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<tr>
<td>Castor canadensis</td>
<td>American Beaver</td>
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<tr>
<td>Chilomeniscus stramineus</td>
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<td>Colaptes chrysoides</td>
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<td>Coluber bilineatus</td>
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<td>Corynorhinus townsendii pallescens</td>
<td>Pale Townsend's Big-eared Bat</td>
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<tr>
<td>Crotalus tigris</td>
<td>Tiger Rattlesnake</td>
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<tr>
<td>Euderma maculatum</td>
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<td>Greater Western Bonneted Bat</td>
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<tr>
<td>Gopherus morafkai</td>
<td>Sonoran Desert Tortoise</td>
<td>CCA</td>
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<tr>
<td>Haliaeetus leucocephalus</td>
<td>Bald Eagle</td>
<td>SC</td>
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<td>Heloderma suspectum</td>
<td>Gila Monster</td>
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<td>Desert Mud Turtle</td>
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<td>Lasiurus blossevillii</td>
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<td>Leopardus pardalis</td>
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<td>Melanerpes uropygialis</td>
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Species of Greatest Conservation Need
Predicted within Project Vicinity based on Predicted Range Models

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<tr>
<th>Scientific Name</th>
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<td>Myotis occultus</td>
<td>Arizona Myotis</td>
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<tr>
<td>Myotis velifer</td>
<td>Cave Myotis</td>
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<td>Myotis yumanensis</td>
<td>Yuma Myotis</td>
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<tr>
<td>Nyctinomops femorosaccus</td>
<td>Pocketed Free-tailed Bat</td>
<td></td>
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<td>1B</td>
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<tr>
<td>Panthera onca</td>
<td>Jaguar</td>
<td>LE</td>
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<tr>
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<td>Perognathus longimembris</td>
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<td>Phrynosoma solare</td>
<td>Regal Horned Lizard</td>
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<td>Phyllorhynchus browni</td>
<td>Saddled Leaf-nosed Snake</td>
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<tr>
<td>Setophaga petechia</td>
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<td>Tadarida brasiliensis</td>
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<tr>
<td>Troglydotes pacificus</td>
<td>Pacific Wren</td>
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<td>Vireo bellii arizonae</td>
<td>Arizona Bell's Vireo</td>
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<td>Vulpes macrotis</td>
<td>Kit Fox</td>
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Species of Economic and Recreation Importance Predicted within Project Vicinity

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<th>Scientific Name</th>
<th>Common Name</th>
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<th>USFS</th>
<th>BLM</th>
<th>NPL</th>
<th>SGCN</th>
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<tr>
<td>Callipepla gambelli</td>
<td>Gambel's Quail</td>
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<td>Odocoileus hemionus</td>
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<tr>
<td>Pecari tajacu</td>
<td>Javelina</td>
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<td>Puma concolor</td>
<td>Mountain Lion</td>
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<tr>
<td>Zenaida asiatica</td>
<td>White-winged Dove</td>
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<tr>
<td>Zenaida macroura</td>
<td>Mourning Dove</td>
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</table>

Project Type: Water Use, Transfer, and Channel Activities, Water delivery and supply line or effluent delivery line (operated by municipality or water company), New lines or expansion of existing lines

Project Type Recommendations:
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/](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](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 [https://www.azgfd.com/hunting/regulations](https://www.azgfd.com/hunting/regulations).
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 State Historic Preservation Office may be required (http://azstateparks.com/SHPO/index.html).

Trenches should be covered or back-filled as soon as possible. Incorporate escape ramps in ditches or fencing along the perimeter to deter small mammals and herptfauna (snakes, lizards, tortoise) from entering ditches.

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

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.

**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: https://www.azgfd.com/wildlife/nongamemanagement/tortoise/
APPENDIX D: Recommended Standard Mitigation Measures for Projects in Sonoran Desert Tortoise Habitat
RECOMMENDED STANDARD MITIGATION MEASURES FOR PROJECTS IN SONORAN DESERT TORTOISE HABITAT

Arizona Interagency Desert Tortoise Team
June 2008

The following mitigation process and measures are recommended by the Arizona Interagency Desert Tortoise Team (AIDTT) for proposed surface-disturbing projects located in the habitat of the Sonoran population of the desert tortoise, *Gopherus agassizii*.

Mitigation for projects in the habitat of the Mojave population, located north and west of the Colorado River, will be addressed by project proponents, land management agencies, Arizona Game and Fish Department, and the Fish and Wildlife Service through consultations between the Service and Federal agencies in accordance with section 7 of the Endangered Species Act and in the habitat conservation planning process for private actions. This document is a supplement to the AIDTT Management Plan (AIDTT 1996).

Determining the Need for Mitigation

Project proponents, in coordination with local land managers, Arizona Game and Fish Department, and Fish and Wildlife Service, must determine whether desert tortoises are present or may occur in areas that would be disturbed by proposed projects. Presence can often be confirmed by contacting biologists with the Bureau of Land Management, Arizona Game and Fish Department, or other local biologists that have knowledge of specific areas or access to the Arizona Game and Fish Department Heritage Data Management System or other data bases that list locality data for desert tortoises. Tortoises can be expected to occur in desert mountains, rocky areas, washes cut through caliche, and bajadas in desert scrub vegetation communities. Tortoises are typically absent above 4,500 feet elevation. Mitigation will generally not be needed above 4,500 feet.

If tortoises have been found in the project area or nearby areas of similar habitat, the species can be presumed present and appropriate mitigation must be included in the proposed project. If presence is questionable, surveys by qualified biologists should be conducted. Often, casual surveys by qualified biologists that focus on microsites with the greatest potential for supporting tortoises can confirm the presence of the species. More intensive work is needed to suggest absence of tortoises. We recommend that these intensive surveys generally follow Fish and Wildlife Service survey protocol for the Mojave population (Fish and Wildlife Service 1992), except that areas with little or no potential for desert tortoises, such as dry lake beds and riparian areas need not be surveyed. Tortoise biologists conducting surveys should be familiar with the habitats and survey methods for Sonoran tortoises, which are in many ways different from those of the Mojave population. If the species is present in the project area (including the zone of influence - Fish and Wildlife Service 1992), mitigation should be included as a component of the project design.
Mitigation should be tailored to the nature of the proposed action, its anticipated effects, and the density and expected response of desert tortoises to the action. The following mitigation actions are grouped to assist in selection of appropriate actions for specific projects. Nevertheless, each project is different and development of an appropriate mitigation plan will require the input of a desert tortoise biologist and authorizing agencies, such as the Arizona Game and Fish Department and, for actions on Federal lands, the Bureau of Land Management, Forest Service, Bureau of Reclamation, and Department of Defense. Approval of a mitigation plan will typically be by an authorizing or permitting/authorizing land management agency, but only Arizona Game and Fish Department can authorize handling or moving tortoises. Mitigation measures suggested herein are recommendations to be used in developing mitigation plans for specific projects. Required mitigation will be developed by permitting agencies and project proponents in accordance with land management plans, the Desert Tortoise Rangewide Plan (Spang et al. 1988), the National Environmental Policy Act (NEPA), and other applicable guidance and regulations. In general, more rigorous mitigation should be sought in areas supporting moderate to high density tortoise populations (>20 tortoises/mi²), in category 1 and 2 habitats (Spang et al. 1988), and in Sonoran Desert Management Areas (AIDTT 1996).

The first set of mitigation measures are presented as a generic mitigation outline. Within the outline, measures are listed in the general order and priority in which they should be applied to project proposals. This step-down process is in accordance with NEPA regulations and Fish and Wildlife Service mitigation policy. A second set of measures follow the outline and consist of project-specific mitigation recommendations. These and/or other measures developed during project planning should be added to the generic mitigation outline as appropriate. A good source of ideas for mitigation measures is the biological analysis for the proposed Eagle Mountain Landfill (Circle Mountain Biological Consultants 1996), in which the author summarizes mitigation measures used as terms and conditions in biological opinions for the Mojave population of the desert tortoise.

Some of the following recommended measures are defined fairly specifically; others provide more general guidance to be considered in the process of developing a project mitigation plan. As these measures are adapted for inclusion into a mitigation plan, replace "should" with "shall" to indicate that they are mandatory stipulations.

**Generic Mitigation Plan For Projects in Desert Tortoise Habitat:**

**Priority 1: Avoid the Impacts**

To the extent possible, project features should be located in previously disturbed areas or outside of desert tortoise habitat.

*If impacts to desert tortoises or their habitat can not be avoided, then:*
Priority 2: Minimize the Impacts

A. Scheduling Activities to Reduce Potential Adverse Effects:

To the extent possible, project activities should be scheduled when tortoises are inactive (typically November 1 to March 1).

B. Information and Education of Project Personnel:

A desert tortoise protection education program should be presented to all employees, inspectors, supervisors, contractors, and subcontractors who carry out proposed activities at the project site. The education program should include discussions of the following:

1. The legal and sensitive status of the tortoise;
2. A brief discussion of tortoise life history and ecology;
3. Mitigation measures designed to reduce adverse effects to tortoises;
4. And protocols to follow if a tortoise is encountered, including appropriate contact points.

C. Designation of a Desert Tortoise Coordinator:

The project proponent should designate a desert tortoise coordinator (DTC) who should be responsible for overseeing compliance with the mitigation program, coordination with permitting agencies, land managers, and Arizona Game and Fish Department; and as a contact point for personnel that encounter desert tortoises. The DTC should be on site during project activities and should be familiar with and have a copy of the desert tortoise mitigation plan.

D. Removal of Harm to Desert Tortoises on Project Sites:

If a tortoise is found in a project area, activities should be modified to avoid injuring or harming it. If activities cannot be modified, tortoises in harm's way should be moved in accordance with Arizona Game and Fish Department's "Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects", revised October 23, 2007 (or the latest revision). Take, possession, or harassment of a desert tortoise is prohibited by State law, unless specifically authorized by Arizona Game and Fish Department.

E. Minimization of Project Footprint:

1. Vehicle use should be limited to existing or designated routes to the extent possible.
2. Areas of new construction or disturbance should be flagged or marked on the ground prior to construction. All construction workers should strictly limit their activities and vehicles to areas that have been marked. Construction personnel should be trained to recognize markers and understand the equipment movement restrictions involved.

F. Limitation of Habitat Disturbance within the Project Footprint:

1. Blading of new access or work areas should be minimized to the extent possible. Disturbance to shrubs should be avoided if possible. If shrubs cannot be avoided during equipment operation or vehicle use, wherever possible they should be crushed rather excavated or bladed and removed.

2. Project features that might trap or entangle desert tortoises, such as open trenches, pits, open pipes, etc should be covered or modified to prevent entrapment. [This may only be necessary during the tortoise active season and may be unnecessary if an on-site biologist is monitoring activities - see "Suggested Mitigation Measures for Projects Conducted During the Tortoise Activity Period... "below.]

G. Preventing Attraction of Predators or Enhancement of Predator Populations:

Construction sites should be maintained in a sanitary condition at all times. The project proponent should be responsible for controlling and limiting litter, trash, and garbage by immediately placing refuse in predator-proof, sealable receptacles. Trash and debris should be removed when construction is complete.

Priority 3: Rectify the Impacts

A. Removal of Hazards:

After completion of the project, trenches, pits, and other features in which tortoises could be entrapped or entangled, should be filled in, covered, or otherwise modified so they are no longer a hazard to desert tortoises.

B. Habitat Restoration:

After project completion, measures should be taken to facilitate restoration. Restoration techniques should be tailored to the characteristics of the site and the nature of project impacts identified in the mitigation plan as developed by project biologists, Arizona Game and Fish Department, and permitting State and Federal agencies. Techniques may include removal of equipment and debris, recontouring, replacing boulders that were moved during construction; and seeding, planting, transplanting of cacti and yuccas, etc. Only native plant species, preferably from a source on or near the project area, should be used in restoration.
Priority 4.- Reduce or Eliminate the Impacts over Time, and Provide Guidance and Information for Improving Future Mitigation Plans

**Monitoring and Reporting Requirements:**

The project proponent should submit a monitoring report to the Arizona Game and Fish Department and any permitting State or Federal agency within 90 days of project completion. For long-term or ongoing projects that may result in continuing impacts to tortoises and habitat, annual monitoring reports should be prepared. Monitoring reports should briefly document the effectiveness of the desert tortoise mitigation measures, actual acreage of desert tortoise habitat disturbed, the number of desert tortoises excavated from burrows, the number of desert tortoises moved from construction sites, and other applicable information on individual desert tortoise encounters. The report should make recommendations for modifying or refining the mitigation program to enhance desert tortoise protection and reduce needless hardship on the project proponents.

**Priority 5: Compensate for Residual Impacts**

In accordance with "Compensation for the Desert Tortoise" (Desert Tortoise Compensation Team 1991), signed by Desert Tortoise Management Oversight Group, authorizing agencies should require compensation for residual impacts to desert tortoise habitat.

*The following mitigation measures are designed for specific project types or conditions. Most act to minimize project impacts (priority 2 measures).*

**For Projects Involving Hazardous Materials:**

Oil, fuel, pesticides, and other hazardous material spills should be cleaned up and properly disposed of as soon as they occur in accordance with applicable State and Federal regulations. All hazardous material spills must be reported promptly to the appropriate surface management agencies and hazardous materials management authorities.

**For Projects Conducted During the Tortoise Activity Period (typically March 1 to November 1)**

1. Construction and operation activities should be monitored by a qualified desert tortoise biologist. The biologist should be present during all activities in which encounters with tortoises may occur. The biologist should watch for tortoises wandering into construction areas, check under vehicles, check at least three times per day any excavations that might
trap tortoises, and conduct other activities necessary to ensure that death and injury of tortoises is minimized. This measure may only be warranted in areas of moderate to high tortoise density, category 1 or 2 habitat, or in Sonoran Desert Management Areas.

2. Unleashed dogs should be prohibited in project areas.

3. Temporary fencing, such as chicken wire, snow fencing, chain link, and other suitable materials should be used in designated areas to reduce encounters with tortoises on short-term projects, such as construction of power lines, burial of fiber optic cables, etc, where encounters with tortoises are likely.

For **Long-term or Permanent Projects in Which Continued Encounters with Desert Tortoises Are Expected**:

Construction of schools, factories, power plants, office buildings, and other permanent or long-term projects in moderate to high density desert tortoise habitat should be enclosed with desert tortoise barrier fencing to prevent tortoises from wandering onto the project site where they may be subject to collection, death, or injury. Barrier fencing should consist of wire mesh with a maximum mesh size of 1 inch (horizontal) by 2-inch (vertical) fastened securely to posts. The wire mesh should extend at least 18 inches above the ground and preferably 12 inches below the surface of the ground. Where burial is not possible, the lower 12 inches should be folded outward, away from the enclosed site, and fastened to the ground so as to prevent tortoise entry. Any gates or gaps in the fence should be constructed and operated to prevent desert tortoise entry (such as installing "tortoise guards" similar to cattle guards, and/or keeping gates closed). Specific measures for tortoise-proofing gates and gaps should be addressed project by project. Fencing is a relatively expensive mitigation measure and may only be appropriate in areas of moderate to high tortoise density, category 1 or 2 habitats, or Sonoran Desert Management Areas.

For **Projects in Which Encounters Between Vehicles and Tortoises are Likely**:

In desert tortoise habitat project-related vehicles should not exceed 25 miles per hour on unpaved roads.

For **Road and Railroad Construction or Improvements in Desert Tortoise Habitat**:

1. New paved roads and highways or major modifications of existing roads through desert tortoise habitat should be fenced with desert tortoise barrier fencing (described above). Culverts, to allow safe passage of tortoises, should be constructed approximately every mile of new paved roads and railroads (culverts can also serve the more typical purpose of conducting water under roads and railroads). The culvert diameter needed to encourage tortoise use is correlated with culvert length, but generally short culverts of large diameter are most likely to be used. Culvert design should be coordinated with
Arizona Game and Fish Department and authorizing State and Federal agencies. The floor of the culvert should be covered with dirt and maintenance should be performed as necessary to maintain an open corridor for tortoise movement. Fencing and culverts may only be warranted in areas of moderate to high tortoise densities, category 1 or 2 habitats, or in Sonoran Desert Management Areas.

2. Use of roads constructed for specific non-public purposes, such as access routes to microwave towers, should be limited to administrative use only.

3. Temporary access routes created during project construction should be modified as necessary to prevent further use. Closure of access routes could be achieved by ripping, barricading, posting the route as closed, and/or seeding and planting with native plants.

References Cited


APPENDIX E: Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects
GUIDELINES FOR HANDLING SONORAN DESERT TORTOISES ENCOUNTERED ON DEVELOPMENT PROJECTS
Arizona Game and Fish Department
Revised September 22, 2014

The Arizona Game and Fish Department (Department) has developed the following guidelines to reduce potential impacts to desert tortoises, and to promote the continued existence of tortoises throughout the state. These guidelines apply to short-term and/or small-scale projects, depending on the number of affected tortoises and specific type of project.

The Sonoran desert tortoise occurs south and east of the Colorado River. Tortoises encountered in the open should be moved out of harm’s way to adjacent appropriate habitat. If an occupied burrow is determined to be in jeopardy of destruction, the tortoise should be relocated to the nearest appropriate alternate burrow or other appropriate shelter, as determined by a qualified biologist. Tortoises should be moved less than 48 hours in advance of the habitat disturbance so they do not return to the area in the interim. Tortoises should be moved quickly, kept in an upright position parallel to the ground at all times, and placed in the shade. Separate disposable gloves should be worn for each tortoise handled to avoid potential transfer of disease between tortoises. Tortoises must not be moved if the ambient air temperature exceeds 40°C Celsius (105°F Fahrenheit) unless an alternate burrow is available or the tortoise is in imminent danger.

A tortoise may be moved up to one-half mile, but no further than necessary from its original location. If a release site or alternate burrow is unavailable within this distance, and ambient air temperature exceeds 40°C Celsius (105°F Fahrenheit), contact the Department for guidance. Tortoises salvaged from projects which result in substantial permanent habitat loss (e.g. housing and highway projects), or those requiring removal during long-term (longer than one week) construction projects, may be placed in the Department’s tortoise adoption program. Managers of projects likely to affect desert tortoises should obtain a scientific collecting license from the Department to facilitate handling or temporary possession of tortoises. Likewise, if large numbers of tortoises (>5) are expected to be displaced by a project, the project manager should contact the Department for guidance and/or assistance.

Please keep in mind the following points:

- Use the Department’s Environmental On-Line Review Tool Department during the planning stages of any project that may affect desert tortoise habitat.

- Unless specifically authorized by the Department, or as noted above, project personnel should avoid disturbing any tortoise.

- Take is prohibited by state law.

- These guidelines do not apply to Mojave desert tortoises (north and west of the Colorado River). Mojave desert tortoises are listed as threatened under the Endangered Species Act, administered by the U.S. Fish and Wildlife Service.

- These guidelines are subject to revision at the discretion of the Department.
APPENDIX F: Burrowing Owl Project Clearance
Guidance for Landowners
INTRODUCTION

The western burrowing owl (*Athene cunicularia*) is one of the most interesting birds of prey in Arizona (Figure 1). Its species name, *cunicularia*, means “miner”, in reference to this owl’s unusual habit of spending time underground. It is also called the “rattlesnake owl”, because young burrowing owls make a buzzing sound that sounds like a rattlesnake when disturbed. Burrowing owls can be seen during daylight hours, and use underground burrows for nesting and escape cover. Despite the fact they are active during the day and are adaptable to human presence, the burrowing owl can go unnoticed in an area due to their secretive nature. Their use of burrows also makes them susceptible to impacts from ground disturbing activities.

Over the past 50 years, most burrowing owl populations have experienced declines throughout their range in North America. Because of this decline, these owls are protected by various Federal, state, and local laws. The burrowing owl is listed by the USFWS as a National Bird of Conservation Concern, listed as endangered in Canada, and threatened in Mexico. It is also listed as endangered, threatened, or a species of concern in 9 U.S. States. All owls in Arizona are protected federally by the Migratory Bird Treaty Act (MBTA) and Arizona state law (ARS Title 17). Violation of these laws, intentional or benign, may result in prosecution.

Burrowing owls are found in areas of Arizona where urbanization and other human activities are occurring. Arizona is one of the fastest growing states in the U.S., leading to frequent conflicts between burrowing owls and development. Owls can be affected by disturbance and habitat loss, even though there may be no direct impacts to the birds themselves or their burrows. There is often inadequate information about the presence of burrowing owls on a project site until ground disturbance is imminent. By then, it is too late to develop a solution that is helpful to the owls or the developer. These guidelines are intended to provide information and tools than can be applied when there is the potential for a project or action to adversely affect burrowing owls and the resources that support them. Each project and situation is different and should be evaluated for the tools and approach that is most effective in allowing a project to move forward while achieving burrowing owl conservation. These guidelines may not provide the necessary procedures for every project, and we encourage coordination with the agencies and entities listed in the Contact section of this document (Appendix A).
BURROWING OWLS SURVEY PROTOCOL

This guidance was developed by State, Federal, and other burrowing owl experts to help individuals avoid violating the laws protecting burrowing owls. This effort will provide a standardized means for conducting burrowing owl surveys in areas where burrows are likely to be disturbed by projects that may displace them in order to minimize impacts to the owls.

This protocol involves visual surveying for owls and burrows using transects to look for occupancy and/or signs of occupancy. We recommended that only individuals with proper training and certification conduct the survey. This document will be revised as necessary, and updates will be provided to certified surveyors, along with any guidance related to maintaining certification. Updates to this document will also be made available to the public. To facilitate statewide burrowing owl management, we recommend that all survey areas, routes, times, and detections be reported to Arizona Game and Fish Department (AGFD) within 30 days of survey completion. If owls or active burrows are detected, coordination with the appropriate agencies prior to initiating ground-disturbing activity will facilitate compliance with the applicable laws (see Appendix A).

SUITABLE HABitat

Burrowing owl nesting habitat typically consists of dry, treeless, short-grassland or prairie plains. In the desert environment they nest in areas of short, open scrublands such as mesquite (*Prosopis* spp.), creosote bush (*Larrea tridentate*), rabbit-brush (*Chrysothanmus nauseous*), and four-wing saltbush (*Atriplex canescens*). They tend to be tolerant of human presence, and will nest in human-modified landscapes such as: abandoned lots within rapidly developing urban areas, airports, golf courses, agricultural fields, irrigation canals, storm drains, roadsides, and parking lots (Figure 2). In the western United States, burrowing owls do not dig their own burrows, and therefore depend on the presence of burrowing mammals. Throughout Arizona, burrowing owls are associated with Gunnison’s prairie dogs (*Cynomys gunnisonii*), American badgers (*Taxidea taxus*), ground squirrels (*Spermophilus* spp.), rock squirrels (*Spermophilus variegatus*), foxes (*Vulpes* spp.), and coyotes (*Canis latrans*). Therefore, any open grassland, scrubland, or park-like area devoid of dense tree cover and containing burrowing mammals or adequate artificial nest burrows (e.g., erosion channels or storm drain pipes) can represent adequate nesting, wintering or migratory habitat.

Figure 2. Natural burrow on a wash bank. Photo by Elissa Ostergaard.
SURVEYOR CREDENTIALS

Burrowing owl surveyors should have burrowing owl survey protocol certification (training provided by AGFD; see Website in Contacts below for next date and location) with appropriate documentation.

Completed burrowing owl survey reports provided to AGFD should include each surveyor’s certification. Certification will be awarded on an individual basis based on attendance at the training, and will not need to be renewed unless new information or conditions dictate substantial change to the survey protocol.

SURVEY TIMING

Burrowing owls are most likely to occupy breeding burrows between March and mid-July (Figure 3). While burrowing owl migration habits are not well documented, it is believed that owls in northern Arizona generally migrate south for the winter, whereas a larger proportion (12 to 61%; Conway and Ellis 2004) of owls in southern and western Arizona is thought to be non-migratory (Sheffield 1997).

We recommend that preliminary surveys be conducted at the time of property acquisition or before project design to allow time to properly accommodate or mitigate for owls, if present (Table 1). We recommend avoiding project initiation in March due to the possibility of new owls arriving during construction unless all suitable burrows were permanently closed by a properly permitted individual or group before project-related activities. If owls or occupied burrows are detected within the construction area at any time during project implementation, burrows must be avoided (see below for buffer requirements) until: 1) status of the burrows can be determined and owls removed by properly permitted individuals or groups, or 2) other conservation measures are implemented.

Surveys should be conducted within first light (typically ½ hour before sunrise) and 3 hours after sunrise, and between 2 hours before sunset until dusk (typically ½ hour after sunset). Do not conduct surveys during or within 24 hours after a heavy rain or when wind speed is greater than 32 km/hr (20 mi/hr).

Figure 3. Artificial burrow with signs of occupancy. Photo by Elissa Ostergaard.
Table 1. Schedule for burrowing owl surveys.

<table>
<thead>
<tr>
<th>Fall or Winter Initial Survey</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>No burrows detected</td>
<td>None.</td>
</tr>
<tr>
<td>Unoccupied burrows found</td>
<td>Implement conservation measures* and conduct a second survey 90 days prior to grading.</td>
</tr>
<tr>
<td>Occupied burrows or owls found</td>
<td>Implement conservation measures* and survey 30 days prior to grading.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring or Summer Initial Survey</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>No burrows detected</td>
<td>None.</td>
</tr>
<tr>
<td>Unoccupied burrows found</td>
<td>Implement conservation measures* and conduct a second survey 30 days prior to grading.</td>
</tr>
<tr>
<td>Occupied burrows or owls found</td>
<td>See below.</td>
</tr>
</tbody>
</table>

*Potential conservation measures include: 1) collapsing all unoccupied burrows of suitable dimensions by a permitted individual, 2) identifying open space areas to be protected as a buffer around occupied and suitable owl burrows, 3) passive exclusion of owls, or 4) translocation of owls by a permitted individual.

FIELD SURVEY PROTOCOL

We recommend that surveys be conducted in all portions of the project site that fit the description of Suitable Habitat (see above). Surveys are conducted by walking straight-line transects 10 m (33 ft) apart (or arranged so that all ground surfaces can be seen) and looking for evidence of owls: individuals, burrows, and sign of occupancy at burrow entrances (pellets, feces or other “ornamentation”, feathers, prey remains, whitewash, etc) (Figure 4). Transects should be located over the entire project area, and oriented so the tops and sides of all topographic features are examined. For example, if the project area includes a wash with a steep bank, one transect should be near the top of the bank, and another near the base of the bank in the wash.

At the start of each transect and every 100 m (300 ft), scan the entire visible project area for owls using binoculars or a spotting scope. Record the location of all burrows (natural and artificial). Burrows may include holes dug by mammals, birds, or created by erosion, pipes, spaces below concrete or other solid structures, etc. Each burrow (entrance height 8 + cm [3 + in]; width 8 +
cm \[3 + \text{ in}\]; burrow depth > 1 m \[3 \text{ ft}\]) should be assessed to determine potential use by burrowing owls, unless owls are present.

An “active” burrow has a live owl or owls, or shows sign of recent use (e.g., fresh whitewash, fresh pellets, feathers, or nest ornamentation – Figure 2). A “potentially active” burrow is one with evidence of previous use, but not recent (e.g., old whitewash, old pellets, cobwebs over entrance, and/or debris at burrow entrances). An “inactive” burrow exhibits no evidence of use by burrowing owls but is of suitable size for occupancy.

Record the number and location of all owls seen within or near the project area. Clean and remove all owl sign at potentially active burrows. Visit the site again after 2-8 days and check all potentially active burrows for fresh sign.

**SURVEY REPORTING**

Record the surveys locations, dates, and the details of all burrow and owl detections (even if outside the construction zone), either on a hard copy map or as UTMs (Universal Transverse Mercator map coordinates compatible with GIS and GPS systems) using the standard form provided. Attach credentials of all surveyors as described above. Send within 30 days to raptors@azgfd.gov (preferred) or by mail:

Raptor Management Coordinator
Arizona Game and Fish Department
Nongame Branch
5000 West Carefree Highway
Phoenix, Arizona 85086

**OWL DETECTIONS, CONSERVATION AND MITIGATION**

Should preliminary measures fail to prevent burrowing owl occupancy of a project site during implementation, or if active burrows are located in the construction zone during construction activities, the owls should not be disturbed as it may violate federal and state laws. A 35-m (100-ft) radius buffer, excluding all heavy machinery and foot traffic, should be set up around all active burrow entrances during construction and until the appropriate conservation action is determined (B. Fox, pers. comm.). To permanently accommodate owls on site, we recommend that a buffer of 35-m (100-ft) should remain in perpetuity between the burrows and new construction and managed to maintain breeding habitat suitability (Millsap and Bear 2000). On-site conservation areas should be connected to adjacent burrowing owl habitat through the use of habitat connections. Conservation areas should avoid isolation or fragmentation of burrowing owl habitat. Delineating protected areas (fencing, cones, etc.) is encouraged as long as it does not enclose the owls or prevent the owls’ ability to see nearby predators.
If after surveys are completed and reports submitted to AGFD, burrowing owls or active or potentially active burrows are located within the project boundaries, the landowner is advised to contact the nearest AGFD office (see Appendix A) for direction. Further mitigation or costs may be avoided if occupied owl areas can be set aside for at least 10 years and if suitable habitat for nesting and foraging will remain after development is finished. If it is determined that the best option is to disturb and then mitigate for the disturbance of the owls, the owner must obtain a permit from U.S. Fish and Wildlife Service. Mitigation may include excluding owls from disturbed burrows prior to construction and/or providing artificial burrows on-site or in a different location and monitoring to determine the success of the actions taken.

Figure 5. Owlets at a natural burrow entrance. Photo by Bruce Taubert.

LITERATURE CITED

Arizona Burrowing Owl Working Group. 2007. Burrowing Owl Mitigation Standards and Guidelines. Arizona Game and Fish Department, Phoenix, AZ. Azgfd.gov


APPENDIX A: CONTACTS

### In Tucson and southern AZ:

<table>
<thead>
<tr>
<th>Arizona Game and Fish Department</th>
<th>Arizona Game and Fish Department</th>
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</thead>
<tbody>
<tr>
<td>Urban Wildlife Program, Tucson Office</td>
<td>Raptor Management Coordinator</td>
</tr>
<tr>
<td>555 N. Greasewood Rd.</td>
<td>5000 W. Carefree Highway</td>
</tr>
<tr>
<td>Tucson, AZ 85745</td>
<td>Phoenix, AZ 85086</td>
</tr>
<tr>
<td>(520) 628-5376</td>
<td>(623) 236-7500</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>US Fish and Wildlife Service</th>
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<tbody>
<tr>
<td>Ecological Services Office</td>
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</tr>
<tr>
<td>201 N. Bonita Ave., Ste. 141</td>
<td>2321 W. Royal Palm Road, Ste. 103</td>
</tr>
<tr>
<td>Tucson, AZ 85745</td>
<td>Phoenix, AZ 85021</td>
</tr>
<tr>
<td>(520) 670-6144</td>
<td>(602) 242-0210</td>
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www.azgfd.gov

http://www.fws.gov/southwest/es/arizona/

### In Phoenix, central and northern AZ:

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### Burrowing Owl Working Group Members

Marit Alanen, U.S. Fish and Wildlife Service
Troy Corman, Nongame Branch, Arizona Game and Fish Department
Tim Snow, Region V, Arizona Game and Fish Department
James Driscoll, Nongame Branch, Arizona Game and Fish Department
Bob Fox, Wild At Heart (Burrowing Owl Conservation Group)
Sam Fox, Wild At Heart (Burrowing Owl Conservation Group)
David Grandmaison, Research Branch, Arizona Game and Fish Department
Mike Ingraldi, Research Branch, Arizona Game and Fish Department
Shawn Lowery, Research Branch, Arizona Game and Fish Department
Scott Richardson, U.S. Fish and Wildlife Service
Ray Schweinsberg, Research Branch, Arizona Game and Fish Department
Aninna Thornburg, Region V, Arizona Game and Fish Department
APPENDIX B. BURROWING OWL SURVEY REPORT FORM

Surveyor(s):       Date of Survey:

Project Location Information
Project Name:
City:
County:
Legal Description (address, ¼ Section, Township, Range):

Weather Conditions During Survey
Precipitation: Y / N (circle one)
Wind Speed (mph):
Temperature: °F / °C (circle)
% Cloud Cover:

Survey Data
Area Surveyed:       acres / ha / km² / m² (circle one)
# Adult burrowing owls detected:
# Juvenile burrowing owls detected:
Total # burrowing owls detected:
Total # Active burrows:
Total # Potentially Active burrows:

Habitat Description within Project Area (check if applicable)
Open, treeless area
Creosote flats
Wash corridor
Suitable burrows
Fossorial mammals present – list species:
Sonoran desert scrub
Agriculture
Urban development

Attach map of surveyed area with locations of survey transects. Identify locations of owls and suitable burrows. List owl detections and active or potentially active burrow locations in the following table (please include coordinates and datum) Attach additional pages if necessary:

<table>
<thead>
<tr>
<th>Observation Type (Owl or Burrow)</th>
<th>Coordinates</th>
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<th>Coordinates</th>
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Return completed forms (regardless of whether burrowing owls are detected) along with the surveyor’s certification to:
Raptor Management Coordinator
Arizona Game and Fish Department
Nongame Branch
5000 West Carefree Highway
Phoenix, AZ 85086
(623) 236-7500
raptors@azgfd.gov