

BURROWING OWL PROJECT CLEARANCE  
GUIDANCE FOR LANDOWNERS

Arizona Burrowing Owl Working Group



Arizona Game and Fish Department  
5000 West Carefree Highway  
Phoenix, Arizona 85086

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### 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.



Figure 1. Adult burrowing owl. Photo by Bruce Taubert.

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 that 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 (*Chrysothamnus 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.

Fall or Winter Initial Survey	
Results	Action
No burrows detected	None.
Unoccupied burrows found	Implement conservation measures* and conduct a second survey 90 days prior to grading.
Occupied burrows or owls found	Implement conservation measures* and survey 30 days prior to grading.
Spring or Summer Initial Survey	
Results	Action
No burrows detected	None.
Unoccupied burrows found	Implement conservation measures* and conduct a second survey 30 days prior to grading.
Occupied burrows or owls found	See below.

\*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.



Figure 4. Adult burrowing owl at an artificial burrow entrance. Photo by Bruce Taubert.

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 + in]; burrow depth > 1 m [3 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 UTM's (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](mailto: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](http://azgfd.gov)
- Arizona Game and Fish Department. Arizona Revised Statutes, 17-235, Migratory birds, and 17-236, Taking birds; possession of raptors. Last accessed May 4, 2007. <http://www.azleg.state.az.us/ArizonaRevisedStatutes.asp?Title=17>
- Conway, C.J. and L.A. Ellis. 2004. Demography of Burrowing Owls Nesting in Urban and Agricultural Lands in Southern Arizona. Arizona Game and Fish Department, Heritage Grant Technical Report U03006, Phoenix, AZ.
- Millsap, B.A. and C. Bear. 2000. Density and reproduction of burrowing owls along an urban development gradient. *Journal of Wildlife Management* 64:33-41.
- Sheffield, S.R. 1997. Current status, distribution and conservation of the Burrowing Owl (*Speotyto cunicularia*) in midwestern and western North America. Pages 399-407 in J.R. Duncan, D.H. Johnson, and T.H. Nicholls [Eds.], *Biology and Conservation of Owls of the Northern Hemisphere: Second International Symposium*, February 5-9, 1997, Winnipeg, Manitoba, Canada. USDA For. Serv. Gen. Tech. Rep. NC-190.
- U.S. Fish and Wildlife Service. Migratory Bird Treaty Act, Migratory Bird Permit Office. Last accessed May 4, 2007. <http://www.fws.gov/permits/mbpermits/birdbasics.html>

APPENDIX A: CONTACTS

**In Tucson and southern AZ:**

**Arizona Game and Fish Department**  
Urban Wildlife Program, Tucson Office  
555 N. Greasewood Rd.  
Tucson, AZ 85745  
(520) 628-5376

**US Fish and Wildlife Service**  
Ecological Services Office  
201 N. Bonita Ave., Ste. 141  
Tucson, AZ 85745  
(520) 670-6144

**In Phoenix, central and northern AZ:**

**Arizona Game and Fish Department**  
Raptor Management Coordinator  
5000 W. Carefree Highway  
Phoenix, AZ 85086  
(623) 236-7500  
[www.azgfd.gov](http://www.azgfd.gov)

**US Fish and Wildlife Service**  
Ecological Services Office  
2321 W. Royal Palm Road, Ste. 103  
Phoenix, AZ 85021  
(602) 242-0210  
<http://www.fws.gov/southwest/es/arizona/>

**Burrowing Owl Working Group Members**

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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 / km<sup>2</sup> / m<sup>2</sup> (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                       | Sonoran desert scrub |
| Creosote flats                            | Agriculture          |
| Wash corridor                             | Urban development    |
| Suitable burrows                          |                      |
| Fossorial mammals present – list species: |                      |

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:

Observation Type (Owl or Burrow)	Coordinates

Observation Type (Owl or Burrow)	Coordinates

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](mailto:raptors@azgfd.gov)