

CACTUS FERRUGINOUS PYGMY-OWL SURVEY PROTOCOL

REVISED JANUARY 2000

Introduction

This revised survey protocol¹ was developed by the Arizona Game and Fish Department (AGFD) and the U.S. Fish and Wildlife Service (FWS) for the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) (pygmy-owl). The purpose of this revised protocol is to provide land owners and managers with a survey methodology to determine if pygmy-owls are present on their land and to determine the current distribution of pygmy-owls. This revised survey protocol supercedes all previous survey protocols for the pygmy-owl².

On August 13, 1998, the FWS published in the *Federal Register* (63 FR 43362) a notice of availability and the opening of a 30-day public comment period for the survey protocol and the accompanying "Private Landowner Take Guidance for the pygmy-owl." The comment period was extended on September 15, 1998 (63 FR 49539) and again on November 20, 1998 (63 FR 64449), extending the comment period until March 14, 1999 to allow interested parties additional time to provide input. During this seven month period, we received many comments from Federal and State agencies, local jurisdictions, independent consultants, and private individuals on both the proposed protocol and take guidance. We reviewed these comments and revised the proposed survey protocol, incorporating changes we believed were appropriate. We thank all of those who commented for their assistance in helping us develop the following survey protocol.

Background

The FWS listed the pygmy-owl as endangered in Arizona on March 10, 1997³ under the Endangered Species Act (ESA) of 1973 as amended. The pygmy-owl is a small bird, averaging 6.75 inches (17 centimeters) in length. The average weight of a male is 2.2 ounces (62 grams), while females average 2.6 ounces (73 grams). Pygmy-owls are reddish-brown overall, with a cream-colored belly streaked with reddish-brown. Their crown is lightly streaked and there are paired black-and-white "eye" spots on the back of their head and neck. They have no ear tufts and their eye color is yellow. Their tail is reddish-brown with darker brown bars and is relatively long for an owl.

¹Arizona Game and Fish Department and U.S. Fish and Wildlife Service. 2000. Cactus ferruginous pygmy-owl survey protocol.

²Corman 1993, revised in 1995

³published in the *Federal Register* (62 FR 10730)

Unlike most owls, the pygmy-owl is primarily crepuscular/diurnal, although it can often be heard calling throughout daylight hours or in the middle of the night during the courtship and breeding season. Most activity is reported in early morning (1 hour before sunrise to 2 hours after sunrise), early evening (1 hour before sunset to 1 hour after sunset), and during bright moonlight nights. In Arizona, most vocalization occurs during the breeding season (January through June), with a decrease from July through December (Abbate et al. 1999⁴, Abbate et al. 1996⁵). Pygmy-owls have been documented calling in the fall (September - October), but this does not appear to be as consistent as spring calling (Abbate et al. 1999). The responsiveness of pygmy-owls to taped calls also appears to vary from year to year (Tim Tibbitts, Organ Pipe Cactus National Monument, pers. comm.).

Pygmy-owls generally nest from April to June, with nests usually containing from 1 to 5 eggs. Eggs hatch in 22 to 30 days; fledging follows in another 21 to 30 days. Young disperse from the nesting area at approximately 8 weeks post-fledging. Each sex and age class produces unique vocalizations. Males use the common single-note territorial call year round, but most consistently during the courtship, incubation, and fledging periods. The female vocalization, a rapid "chitter," is most commonly heard during the incubation and fledging periods. The young produce a call very similar to the female call, only higher in pitch, and give it almost constantly from fledging through dispersal. Familiarity with all of these vocalizations will improve a surveyor's ability to detect pygmy-owls in the field.

Pygmy-owls are generalists in their food habits, taking a wide variety of prey including insects, birds, small mammals, and reptiles. Habitats providing a diversity of prey species throughout the year should be considered higher quality habitats for pygmy-owls.

Suitable Habitat

Historically, pygmy-owls in Arizona were recorded in mature riparian systems characterized by cottonwood (*Populus fremontii*)-willow (*Salix* spp.) galleries or mesquite (*Prosopis* spp.) bosques (forests). Recent observations have been restricted to Sonoran desertscrub habitats characterized by braided-wash systems and dense vegetation including ironwood (*Olneya tesota*), palo verde (*Cercidium* spp.) and mesquite; and semidesert grasslands containing drainages with mesquite, hackberry (*Celtis* spp.), and ash (*Fraxinus velutina*). Historically, pygmy-owl nests were documented in cavities of cottonwoods, willows, or mesquites, although recent nest sites have primarily been located in saguaro (*Carnegiea gigantea*) cavities. However, in 1999, two

⁴Abbate, D.J., W.S. Richardson, R.L. Wilcox, M.J. Terrio and S.M. Belhumeur. 1999. Cactus ferruginous pygmy-owl investigations in Pima and Pinal counties, Arizona - 1997-1998. Region V Wildlife Program. Arizona Game and Fish Department, Tucson, Arizona.

⁵Abbate, D.J., A. Ditty, S. Richardson and R.J. Olding. 1996. Cactus ferruginous pygmy-owl surveys and nest monitoring in the Tucson Basin area, Arizona - 1996. Urban Wildlife Enhancement Final Report #U95503. Arizona Game and Fish Department, Phoenix, Arizona.

nests were also located in cavities of other tree species (one in an ash, one in an eucalyptus [*Eucalyptus* spp.]).

Suitable habitat for the pygmy-owl is defined as areas below 4,000 ft (1,220 m) in elevation containing one or more of the following vegetation communities:

- **Riparian vegetation:** Broadleaf, riparian gallery forests of cottonwoods, willows, mesquites, ash, or other trees growing along watercourses and associated species.
- **Sonoran desertscrub:** Characterized by braided wash systems and vegetation which is dense and well structured. Key species include mesquite, foothill and blue palo verdes, ironwood, saguaro, organ pipe cactus, and various other shrubs and cacti.
- **Semidesert grasslands:** Containing wooded drainages with mesquite, hackberry, ash, and a limited number of saguaros.

Vegetative communities listed above containing saguaro cactus or other columnar cactus that are 8 ft (4.5 m) or taller, or ironwood, mesquites, palo verde or other large trees with a trunk diameter of 6 in (15 cm) or greater measured at 4.5 ft (1.37 m) above the ground may provide nesting opportunities for pygmy-owls. Areas of low-density development are considered suitable habitat if one or more of the above vegetation communities are present. All areas of suitable habitat as defined above should be surveyed. However, urban areas (see map for excluded areas within the Tucson and Phoenix metropolitan areas) and areas currently devoid of saguaros, other columnar cactus, or large trees (e.g., agricultural fields) are excluded (see recommended FWS landowner guidance⁶ for more information).

Introduction and Purpose of Survey Protocols

By broadcasting recordings of pygmy-owl calls or vocally imitating their calls during the proper season, in suitable habitat, surveyors can often coax individual pygmy-owls to respond if they are within hearing distance. Responses may consist of a returned vocalization, silent approach of a pygmy-owl, or a combined approach with vocalization. In addition, it is often possible to locate a perched pygmy-owl by observing the behavior of songbirds in response to broadcast vocalizations. Pygmy-owls are often “mobbed” by songbirds that recognize them as predators.

Any survey protocol developed for this species must address two distinct needs. The first is the need to determine if pygmy-owls are present on project sites where an activity is proposed that would result in loss, modification, or disturbance of pygmy-owls or their habitat (e.g., project

⁶ Recommended Guidance for Private Landowners Concerning the Cactus Ferruginous Pygmy-owl (FWS 2000)

clearance). The second is the need to survey large areas of pygmy-owl habitat to gather information on distribution, occurrence, and numbers of pygmy-owls in Arizona (e.g., research). No single protocol can address both needs because of funding and personnel constraints, the potential ramifications if pygmy-owls are missed on a project site that may result in take of an owl, and the area of habitat that can be covered by a surveyor. Therefore, we have developed two survey protocols to address these needs. The first is a protocol developed to answer, with some degree of confidence, whether pygmy-owls occupy a project site where a loss or disturbance of pygmy-owl habitat has been proposed⁷. In Arizona, we know of so few individual pygmy-owls, that it is essential to locate and address potential impacts to pygmy-owls that may occur on a project site.

The second protocol is to be used by researchers, land managers, and others to survey large areas of unsurveyed habitat to answer key questions regarding distribution and occurrence of pygmy-owl locations in Arizona. Use of this survey protocol is not intended for project clearance.

Only a person with the necessary experience and surveyor permit (Section 10[a][1][A]) from the FWS is authorized to survey for pygmy-owls. Issuance of permits are conditioned upon the use of one of the survey protocols contained in this document. All subsequent permit renewals or new permits issued for the fall 2000 survey season or later, will be conditioned so that each permitted surveyor must attend an AGFD or FWS approved training session.

Project Clearance Protocol

There are two survey periods recommended for the project clearance protocol, depending on the expected level or risk of “take” of a pygmy-owl. Refer to the Recommended Guidance for Private Landowners Concerning the Cactus Ferruginous Pygmy-owl (FWS 2000) for more information on which survey period and the number of surveys recommended for your project.

Spring Surveys

Surveys recommended for the spring survey season must be conducted between January 1 through June 30. Areas must be surveyed a minimum of 3 times within this period, with no less than 15 days between surveys. At least one of these surveys must be conducted between February 15 and April 15. Recent data suggest peak calling activity occurs from February through April (Abbate et al. 1999, AGFD unpubl. data). These time frames are necessary to account for variations in annual weather patterns and responsiveness of individual pygmy-owls.

⁷NOTE: No survey protocol is 100 percent effective and some risk remains that a pygmy-owl will be missed or will show up after surveys are completed. If a pygmy-owl is detected at any time, surveys have been conducted as recommended and the results were negative, you will need to contact the FWS immediately for assistance in helping you to comply with the ESA.

Fall Surveys

Surveys must be conducted between September 15 and October 31. Survey stations must be surveyed a minimum of 2 times within this period, with no less than 15 days between surveys. Recent data indicates that territorial owls and dispersing juveniles are responsive to taped broadcasts for a period during the fall, although they are less responsive than during the spring (Abbate et al. 1999, AGFD unpubl. data). This period of responsiveness may be the result of similar day lengths as during spring or because juveniles are establishing territories.

The following procedures must be followed for all project clearance surveys:

1. Surveyors must contact the FWS prior to conducting any surveys in order to determine occupancy status and previous survey history of the area. This is needed to avoid unnecessary harassment of owls and to avoid unnecessary surveys.
2. A survey permit is not a license to trespass. Permission to access a property for surveying must be obtained from each private property owner or those having management authority (public lands) prior to conducting surveys. Where permission cannot be obtained from adjacent landowners, call stations must be placed on the property boundary and public roads without trespassing so that coverage may be extended to adjacent areas.
3. Conduct surveys in suitable habitat from 1 hour before sunrise to 2 hours after sunrise, or from 1 hour before sunset to 1 hour after sunset (use an official sunrise table for correct times). Surveys may also be conducted at night during a full moon or nearly full moon (two days either side of a full moon) while the moon is visible. If the moon sets or is obscured by clouds, surveys must not be conducted.
4. Surveys must not be conducted under adverse weather conditions (e.g., moderate or strong winds [greater than 12 mph] or during rain). Under these conditions, owls may not be able to hear broadcasted calls and the surveyor's ability to hear an owl response may be reduced. In addition, surveys must not be conducted at call stations that have loud noises (e.g., traffic, aircraft, barking dogs, etc.) that reduce the effectiveness of broadcasted calls or impair the surveyor's ability to hear an owl responding. Call stations must be placed away from noisy areas or rescheduled for another time (e.g., weekends when there is less traffic in urban areas). The survey period spent at stations with periodic noise (e.g., aircraft, traffic, etc.) must be extended to compensate for periodic noisy survey conditions if they cannot be avoided.
5. Call stations located in urban areas, sites with high noise disturbance (such as along roads or highways), or in riparian areas (due to tree density and noise) must be no more than 150 m (500 ft) apart. In more remote areas that do not have the above types of disturbance, the distance between call stations may be extended up to 0.25 mile (mi) (400 m), if complete coverage can be maintained. Distance between survey transects must be

- no further apart than call stations. Call stations along transects must be staggered with adjacent transects to provide more complete coverage. To avoid interference between surveyors, adjacent transects must not be surveyed simultaneously.
6. Areas proposed to have vegetation removed or disturbed must be surveyed for presence of pygmy-owls within the same calendar year in which surface disturbance occurs. These surveys must be conducted in suitable pygmy-owl habitat within 0.25 mi (400 m) of the area being disturbed (see number 2 above).
 7. Conduct a 2-minute listening period at each call station prior to broadcasting a taped call. This will allow the surveyor to detect any spontaneous calling and also to become familiar with features at the station (i.e., large trees or saguaros, residences, water sources, etc.) that may affect pygmy-owl presence or observations.
 8. Following the initial listening period, broadcast calls (using a AGFD and FWS approved survey tape) for 30-seconds, followed by a 90-second listening and observation period. Broadcast calls in all directions containing habitat. Set the volume at an adequate level to get complete coverage along a survey route without causing distortion of the call. Equipment used must be able to produce a loud, clear call without distortion. We recommend equipment similar in quality to Johnny Stewart "Game Callers" or Radio Shack "Power Horns."
 9. Repeat this calling/listening sequence for at least 10 minutes. Extend this sequence for an additional 5 minutes or more if noise disturbances such as barking dogs, air traffic or vehicles cannot be avoided and they affect your broadcast or ability to hear (see number 4 above).
 10. During the survey/listening sequence, periodically scan trees and cactus, particularly cavities and trees, for pygmy-owls that may be present and not vocalizing. Binoculars should be used to assist the surveyor in locating owls. Also note any mobbing behavior by other birds in response to the tape broadcast and investigate appropriately.
 11. After completing the 10-minute survey/listening sequence, observe and listen for an additional 3 minutes before proceeding to the next call station. Combined with the initial 2-minute listening period, the total time spent at each call station must be a minimum of 15 minutes.
 12. For each route surveyed, complete the AGFD/FWS approved *Pygmy-owl Survey Form* (attached), making sure all entries are legible. Complete all data fields, recording survey date, time, weather conditions, moon phase, official sunrise (use attached sunrise/sunset table for official times), etc. Attach a 7.5 minute USGS topographic map showing all survey routes and call stations, and label with the date and surveyor's name.

13. No later than 30 days after completion of each survey period (June 30 and October 31), all negative survey and detection forms with attached maps must be sent to FWS⁸. In addition, an electronic spreadsheet containing the survey information and results (positive and negative data) must be completed and submitted to the FWS to be entered into the statewide data base.

If a pygmy-owl is heard or seen:

1. End broadcasts to reduce further harassment, unless additional responses are needed to pinpoint the location of the pygmy-owl.
2. Observe the pygmy-owl as long as possible without disturbing it (i.e., do not chase the owl or harass it with calls). Record all observations, use of cavities and prey observations are especially important. Listen for female or fledgling vocalizations or other evidence that there may be other pygmy-owls in the area.
3. Flag the location of the pygmy-owl, or your best estimate of its location, with surveyor's tape (flagging). Use discretion in placing flagging near roads or other public areas and in labeling, so as not to draw attention to the location of the owl response. All flagging should be removed when follow-up visits are completed. Use global positioning system (GPS) if available to obtain a more accurate location.
4. Using the AGFD approved *Pygmy-owl Detection Form* (attached), complete all data fields, making sure they are legible. Record survey date, time, weather conditions, moon phase, official sunrise (use attached table), responses of other birds, etc. Record owl locations using UTM coordinates and legal description (to nearest quarter section). Using a 7.5 minute USGS topographic map, show the owl response location, all survey routes and stations, and label with the date and surveyor's name.
5. Fax a copy of the detection form and map indicating the location of the pygmy-owl to the FWS (602/640-2730) within 24 hours of the detection.

⁸Arizona Ecological Services Field Office, 2321 W. Royal Palm Road, Suite 103, Phoenix, AZ 85021-4951

Large Area Search (Research) Survey Protocol

The following procedures should be followed for all large area (e.g., research) surveys:

1. Surveyors must contact the FWS prior to conducting any surveys in order to determine occupancy status and previous survey history of the area. This is needed to avoid unnecessary harassment of owls and to avoid unnecessary surveys.
2. A survey permit is not a license to trespass. Permission to access a property for surveying must be obtained from each private property owner or those having management authority (public lands) prior to conducting surveys. Where permission cannot be obtained from adjacent landowners, call stations should be placed on the property boundary and public roads without trespassing so that coverage may be extended to adjacent areas.
3. Surveys should be conducted between January 1 and June 30. Call stations should be surveyed a minimum of 3 times within this period, with no less than 15 days between surveys. At least one of these surveys should be conducted between February 15 and April 15. Recent data suggest peak calling activity occurs from February through April (Abbate et al. 1999 and 1996). These time frames are necessary to account for variations in annual weather patterns and in the responsiveness of individual pygmy-owls. Surveys may also be conducted from September 15 through October 31. Survey routes should also be surveyed three times during this period.
4. Surveys should be conducted in suitable habitat from 1 hour before sunrise to 2 hours after sunrise, or from 1 hour before sunset to 1 hour after sunset (use an official sunrise table for correct times). Surveys may also be conducted at night during a full moon or nearly full moon (two days either side of a full moon) while the moon is visible. If the moon sets or is obscured by clouds, surveys should not be conducted.
5. Sites should be surveyed for at least 2 consecutive years during the above protocol period in order to validate survey results.
6. Surveys should not be conducted under adverse weather conditions (e.g., moderate or strong winds [greater than 12 mph] or during rain). Under these conditions, owls may not be able to hear broadcasted calls and the surveyor's ability to hear an owl response may be reduced. In addition, surveys should not be conducted at call stations that have loud noises (e.g., traffic, aircraft, barking dogs, etc.) that reduce the effectiveness of broadcasted calls or impair the surveyor's ability to hear an owl responding. Call stations should be placed away from noisy areas or rescheduled for another time (e.g., weekends when there is less traffic in urban areas). The survey period spent at stations with periodic noise (e.g., aircraft, traffic, etc.) should be extended to compensate for periodic noisy survey conditions if they cannot be avoided.

7. Call stations along the survey transect should be spaced at no more than 500 m (0.3 mi), unless a bionic ear or other listening-enhancement device is used, in which case distance between stations may be extended up to 0.5 mi (800 m). Call stations in riparian areas should be no more than 500 ft (150 m) apart due to tree density and noise. Distance between survey transects should be no greater than call stations, and stations along adjacent transects should be staggered to provide more complete coverage. To avoid interference between surveyors, adjacent transects should not be surveyed simultaneously.
8. Conduct a 2-minute listening period at each call station prior to broadcasting a taped call. This will allow the surveyor to detect any spontaneous calling and also to become familiar with features at the station (i.e., large trees or saguaros, residences, water sources, etc.) that may affect pygmy-owl presence or observations.
9. Following the initial listening period, broadcast calls (using a AGFD and FWS approved survey tape) for 30 seconds, followed by a 90-second listening and observation period. Broadcast calls in all directions containing habitat. Set the volume at an adequate level to get complete coverage along a survey route without causing distortion of the call. Equipment used should be able to produce a loud, clear call without distortion. We recommend using survey equipment similar in quality to “Johnny Stewart Game Callers” or “Radio Shack Power Horns.”
10. Repeat this calling/listening sequence for at least 8 minutes. Extend this sequence for an additional 5 minutes or more if noise disturbances such as barking dogs, air traffic or vehicles cannot be avoided and they affect your broadcast or ability to hear (see number 6 above).
11. During the survey/listening sequence, periodically scan trees and cactus, particularly cavities and trees, for pygmy-owls that may be present and not vocalizing. Binoculars should be used to assist the surveyor locate owls. Note any mobbing behavior by other birds in response to the tape broadcast and investigate appropriately.
12. After completing the 8-minute survey/listening sequence, observe and listen for an additional 1 minute before proceeding to the next call station. Combined with the initial 2-minute listening period, the total time spent at each call station should be a minimum of 11 minutes.
13. For each route surveyed, complete the AGFD/FWS approved *Pygmy-owl Survey Form* (attached), making sure all entries are legible. Complete all data fields, recording survey date, time, weather conditions, moon phase, official sunrise (use attached sunrise/sunset table for official times), etc. Attach a 7.5 minute USGS topographic map showing all survey routes and call stations, and label with the date and surveyor’s name.
14. No later than 30 days after completion of each survey period (June 30 and October 31) all

negative survey and detection forms with attached maps must be sent to FWS. In addition, an electronic spreadsheet containing the survey information and results (positive and negative data) must be completed and submitted to FWS to be entered into the statewide data base.

If a pygmy-owl is heard or seen:

1. End broadcasts to avoid further harassment, unless additional responses are needed to pinpoint the location of the pygmy-owl.
2. Observe the pygmy-owl as long as possible without disturbing it (i.e., do not chase the owl or harass it with calls). Record all observations, use of cavities and prey observations are especially important. Listen for female or fledgling vocalizations or other evidence that there may be other pygmy-owls in the area.
3. Flag the location of the pygmy-owl, or your best estimate of its location, with surveyor's tape (flagging). Use discretion in placing flagging near roads or other public areas and in labeling, so as not to draw attention to the location of the owl response. All flagging should be removed when follow-up visits are completed. Use GPS if available to obtain a more accurate location.
4. Using the AGFD approved *Pygmy-owl Detection Form* (attached), complete all data fields, making sure they are legible. Record survey date, time, weather conditions, moon phase, official sunrise (use attached table), responses of other birds, etc. Record owl locations using UTM coordinates and legal description (to nearest quarter section). Using a 7.5 minute USGS topographic map, show the owl response location, all survey routes and stations, and label with the date and surveyor's name.
5. Fax a copy of the detection form and map indicating the location of the pygmy-owl to the FWS (602/640-2730) within 24 hours of the detection.