# United States Department of the Interior

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In Reply Refer To:
AESO/SE
2-21-00-F-295

November 5, 2001

Memorandum

To: Superintendent, Organ Pipe Cactus National Monument, Ajo, AZ

From: Field Supervisor

Subject: Biological Opinion: Twin Peaks Access Road Stabilization Project

This biological opinion responds to your request for consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request for formal consultation was dated June 5, 2000, and received by us on June 7, 2000. At issue are impacts that may result from the proposed Twin Peaks Access Road Stabilization Project located in Organ Pipe Cactus National Monument in Pima County, Arizona. Your request for consultation and accompanying biological assessment found that the proposed action may affect the endangered cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*), Sonoran pronghorn (*Antilocapra americana sonorensis*), and lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*). You requested formal consultation in regard to the pygmy-owl and our concurrence that the proposed action may affect, but is not likely to adversely affect, the Sonoran pronghorn and the lesser long-nosed bat.

This biological opinion is based on information provided in the your June 5, 2000 request for consultation, the biological assessment (OPCNM 2000), the draft environmental assessment (OPCNM 2000), project modifications provided in your October 1, 2001 letter, a site visit, and information in our files. A complete administrative record of this consultation is on file at this office. Our concurrence with your determination that the proposed action may affect, but is not likely to adversely affect, the Sonoran pronghorn and the lesser long-nosed bat, is included in Appendix 1 of this opinion.

**Consultation History**

The NPS requested initiation of formal consultation on the Twin Peaks Access Road Stabilization Project in a memo dated June 5, 2000. A site visit was made on June 16, 2000 to gather additional information. In a letter dated October 1, 2001, the NPS submitted modifications to the project description.

**BIOLOGICAL OPINION**

I. Description of Proposed Action

Project Background

The National Park Service (NPS) proposes to widen the Twin Peaks Access Road to improve human safety. The Twin Peaks Access Road connects the main campground with the Visitor Center (Monument Headquarters). The total length of this road is 1.31 miles. A recent study (R.S. Engineering 2000) identified safety concerns with this road. The average daily traffic (ADT) of this road is 134 vehicles. However, traffic varies widely with season, approaching 500 ADT during the winter season; most are large recreational vehicles. The existing roadway is between 18 and 20 feet wide, less than desirable for a paved two-way road with traffic of this volume and nature. NPS standards require a minimum stopping sight distance of 150 feet for a design speed of 25 mph. Beginning at approximately mile 0.6 (mile 0.0 is the junction with the service road connecting the Visitor Center with the residence/maintenance areas), the road curves to the west until approximately mile 1.1. The rocky slope on the inside of the curve, in addition to the vertical alignment through the dip section, reduce sight distances to 50-100 feet. Furthermore, the staging/waiting area at the campground entry permit booth backs up a considerable distance during certain times of the day, possibly as far back as this curve. R.S. Engineering found that the sight distance was adequate for the posted speed limit, but recommended increasing sight distance if the road is reconstructed. Finally, safety of bicyclists and pedestrians is a concern because of a lack of adequate shoulders. Currently there are essentially no shoulders.

Project Description

The entire roadway (1.31 miles) would be increased from its present width to 26 feet. The road would consist of two 12-foot lanes and two 1-foot shoulders. At this time, the NPS has funding only to complete the first phase of this project, widening the road bench on approximately the first 1,395-foot section. The remainder of the Twin Peaks Access Road would be widened when funding becomes available. The first phase of this project would consist of the following elements:

1. Up to 1,395 feet of existing asphalt will be removed. Road width in this section varies between 19 and 20 feet.

2. One 24-inch diameter culvert will be installed. The following options may exist in dealing with the drainage in this location.

A. Road water may be drained to an existing concrete spillway which may require additional fill to the road in places to accommodate the proper drainage to this point. No work to the shoulder of the eastern edge of the road would be required.

B. A culvert end section to catch water will be installed on the west side of the road (in the asphalt drainage way); a concrete headwall would be poured where the culvert exits the road shoulder on the east side of the road. Riprap would be placed at the base of the headwall to break the force of water exiting the area out from the eastern edge of the road towards the wash, a horizontal distance of approximately 8 feet. Total work area would measure approximately 8 feet by 10 feet, plus surrounding disturbance caused by heavy equipment operation.

C. The roadway drainage will be reshaped to empty all water to the main wash at mile 0.55. No work to the shoulder of the eastern edge of the road would be required.

3. Rock will be excavated along approximately 1,395 feet along the west side of the road, which will involve removing various amounts of rock material back 7 feet from the existing road edge to gain the required new width. Additional rock will be removed to lay back the slope to provide stability and reduce potential for rockfall. Taking the road widening and slope layback together, the total disturbed area on the west side of the road will measure up to approximately 49 feet (15 meters) from the existing western road edge. Blasting may be necessary to accomplish the rock excavation, but only if the fractured nature of the rock slope is found to be solid and cannot otherwise be hammered out (e.g. with jackhammers or backhoe).

4. Approximately 4 to 8 inches depth of aggregate base will be added to the new road surface, over a length of up to approximately 1,395 feet. Some fill may be added to raise the road bed if required to gain the proper drainage into the rock hill or to an alternate drainage site.

5. Two inches of new asphalt surface will be added over a length of up to approximately 1,395 feet.

6. New signs will be installed and existing signs will be raised to meet safety standards.

When the remainder of the total length of the Twin Peaks Access Road is upgraded, it would involve project elements similar to those listed above, with the exception of item 2. The road way would receive 4 to 8 inches of aggregate base and would be repaved to a new total width of 26 feet. Some roadside rock excavation may be necessary. Concrete headwalls will be installed at wash crossings at miles 0.55, 0.85, and 1.10. Additionally, the turning radius at the junction of Twin Peaks Access Road and the road connecting the Visitor Center with the residence/maintenance area will be enlarged to allow turning by large recreational vehicles.

Pygmy-owl Conservation Measures

1. All project activities will take place August 1 through January 31, outside the pygmy-owl breeding season.

2. All road widening and reconstruction will take place from the eastern edge of the existing road, to the west. The only ground- or vegetation-disturbing project activities taking place east of the existing road would be the installation a culvert pipe. The resultant area of disturbance east of the current eastern road edge will be about 8 by 10 feet (horizontal distance).

3. The construction contract for the project will specifically state that the contractor is not to allow any impacts on the east side of the road (e.g., spilling material, cutting or damaging vegetation, re-contouring the landscape).

4. In the event that such impacts do occur, the NPS will immediately begin full revegetation of all impacted areas, using the plant species that were lost or damaged.

5. The NPS will make supplemental plantings between the road and the wash to create a barrier between the road and the xeroriparian pygmy-owl habitat. The planting will be primarily along the uppermost terrace of the wash floodplain and will consist of native trees and shrubs, at a spacing of about 40 feet.

## II. Status of the Species

Cactus Ferruginous Pygmy-Owl (*Glaucidium brasilianum cactorum*)

A detailed description of the life history and ecology of the pygmy-owl may be found in the Birds of North America (Proudfoot and Johnson 2000), Ecology and conservation of the cactus ferruginous pygmy-owl in Arizona (Cartron and Finch 2000), and other information available at the Arizona Ecological Services Field Office. Information specific to the pygmy-owl in Arizona is limited. Research in Texas has provided useful insights into the ecology of the subspecies, and in some instances represents the best available information; however, habitat and environmental conditions are somewhat different in Arizona and conclusions based on Texas information are tentative.

### Species description

The Service listed the Arizona population of the pygmy-owl as a distinct population segment (DPS) on March 10, 1997, effective April 9, 1997 (U.S. Fish and Wildlife Service 1997 [62 FR 10730]). The past and present destruction, modification, or curtailment of habitat is the primary

reason for the decrease in population levels of the pygmy-owl. On July 12, 1999 we designated approximately 731,712 acres critical habitat supporting riverine, riparian, and upland vegetation in seven critical habitat units, located in Pima, Cochise, Pinal, and Maricopa counties in Arizona (U.S. Fish and Wildlife Service 1999 [64 FR 37419]). However, on September 21, 2001, the U.S. District Court for the District of Arizona vacated this final rule designating critical habitat for the pygmy-owl, and remanded its designation back to the Service for further consideration.

**Life history**

Pygmy-owls are small birds, averaging 6.75 inches in length. Pygmy-owls are reddish-brown overall, with a cream-colored belly streaked with reddish-brown. The pygmy-owl is crepuscular/diurnal, with a peak activity period for foraging and other activities at dawn and dusk. During the breeding season, they can often be heard calling throughout the day, but most activity is reported between one hour before sunrise to two hours after sunrise, and late afternoon/early evening from two hours before sunset to one hour after sunset (Collins and Corman 1995).

A variety of vegetation communities are used by pygmy-owls, such as: riparian woodlands, mesquite "bosques" (Spanish for woodlands), Sonoran Desert scrub, and semidesert grassland communities, as well as nonnative vegetation within these communities. While plant species composition differs among these communities, there are certain unifying characteristics such as the presence of vegetation in a fairly dense thicket or woodland, the presence of trees or saguaros large enough to support cavity nesting, and elevations below 4,000 ft. Historically, pygmy-owls were associated with riparian woodlands in central and southern Arizona. Plants present in these riparian communities include cottonwood, willow (*Salix* spp.) and hackberry (*Celtis* spp.). Cottonwood trees are suitable for cavity nesting, while the density of mid- and lower-story vegetation provides necessary protection from predators and an abundance of prey items for the pygmy-owl. Mesquite bosque communities are dominated by mesquite trees, and are described as mesquite forests due to the density and size of the trees.

Over the past several decades, pygmy-owls have been primarily found in the Arizona Upland Subdivision of the Sonoran Desert, particularly Sonoran Desert scrub (Brown 1994). This community in southern Arizona consists of paloverde, ironwood, mesquite, acacia, bursage (*Ambrosia* spp.), and columnar cacti (Phillips et al. 1964, Monson and Phillips 1981, Davis and Russell 1984, Johnson and Haight 1985, Johnsgard 1988). However, over the past several years, pygmy-owls have also been found in riparian and xeroriparian habitats and semidesert grasslands as classified by Brown (1994). Sonoran Desert scrub communities are characterized by an abundance of saguaros or large trees, and a diversity of plant species and vegetation strata. Xeroriparian habitats contain a rich diversity of plants that support a wide array of prey species and provide cover. Semidesert grasslands have experienced the invasion of mesquites (*Prosopis velutina*) in uplands and linear woodlands of various tree species along bottoms and washes.

The density of trees and the amount of canopy cover preferred by pygmy-owls in Arizona is unclear. However, preliminary results from a habitat selection study indicate that nest sites tend to have a higher degree of canopy cover than random sites (Wilcox et al. 2000). For areas outside Arizona, pygmy-owls are most commonly characterized by semi-open or open woodlands, often in proximity to forests or patches of forests. Where they are found in forested areas, they are typically observed along edges or in openings, rather than deep in the forest itself (Binford 1989, Sick 1993), although this may be a bias of increased visibility. Overall, vegetation density may not be as important as patches of dense vegetation with a developed canopy layer interspersed with open areas. The physical settings and vegetation composition varies across *G. brasilianum's* range and, while vegetation structure may be more important than composition (Wilcox et al. 1999, Cartron et al. 2000a), higher vegetation diversity is found more often at nest sites than at random sites (Wilcox et al. 2000).

Pygmy-owls typically hunt from perches in trees with dense foliage using a perch-and-wait strategy; therefore, sufficient cover must be present within their home range for them to successfully hunt and survive. Their diverse diet includes birds, lizards, insects, and small mammals (Bendire 1888, Sutton 1951, Sprunt 1955, Earhart and Johnson 1970, Oberholser 1974) and frogs (Proudfoot et al. 1994). The density of annuals and grasses, as well as shrubs, may be important to the pygmy-owl's prey base. Shrubs and large trees also provide protection against aerial predation for juvenile and adult pygmy-owls and cover from which they may capture prey (Wilcox et al. 2000).

Pygmy-owls are considered non-migratory throughout their range by most authors, and have been reported during the winter months in several locations, including OPCNM (R. Johnson unpubl. data, T. Tibbitts, OPCNM, unpubl. data). Pygmy-owls begin nesting activities in late winter to early spring. In Arizona differences between nest sites may vary by as much as two months (Abbate et al. 1996, S. Richardson, Arizona Game and Fish Department unpubl. data). As with other avian species, this may be the result of a second brood or a second nesting attempt following an initial failure (Abbate et al. 1996). In Texas, juveniles remained within approximately 165 feet of adults until dispersal. Dispersal distances (straight line) of 20 juveniles monitored from their natal sites to nest sites the following year averaged 5 miles (range of 0.75 to 19 miles, G. Proudfoot unpubl. data). Telemetry studies of dispersing juveniles in Arizona during 1999 and 2000 ranged from 1.4 to 12.9 miles (straight line distance) (n=6, mean 6.2 miles) in 1999, and 1.6 to 11.7 miles (n=6, mean 5.8 miles) in 2000 (S. Richardson and M. Ingraldi, Arizona Game and Fish Department unpubl. data). Pygmy-owl telemetry studies have documented movement of owls between southern Pinal County and northwest Tucson (S. Richardson and M. Ingraldi, Arizona Game and Fish Department unpubl. data). Juveniles typically dispersed from natal areas in July did not appear to defend a territory until September. They may move up to one mile in a night; however, they typically fly short distances from tree to tree instead of long single flights (S. Richardson, Arizona Game and Fish Department unpubl. data). Subsequent surveys during the spring have found that locations of male pygmy-owls are in the same general location as last observed the preceding fall.

Apparently unpaired females may also remain in the same territory for some period of time. In the spring of 2001, an unpaired female (the male died in 2000) remained in its previous years territory well into the spring, exhibiting territorial behavior (calling) for 2 months until ultimately switching territories and paring with an unpaired male and successfully nesting (S. Richardson, Arizona Game and Fish Department unpubl. data). Researchers suspect that if this unpaired female could have attracted an unpaired male during that time, she would have likely remained in her original territory. Apparently at some point the urge to pair is too strong to remain and they seek out new mates.

In Texas, Proudfoot (1996) noted that, while pygmy-owls used between 3 and 57 acres during the incubation period, and they defend areas up to 279 acres in the winter. Therefore, a 280 acre home range is considered necessary for pygmy-owls. Proudfoot and Johnson (2000) indicate males defend areas with radii from 1,100 - 2,000 feet. Initial results from ongoing studies in Texas indicate that the home range of pygmy-owls may also expand substantially during dry years (G. Proudfoot unpubl. data).

**Species status and distribution range wide**

The pygmy-owl is one of four subspecies of ferruginous pygmy-owl. Pygmy-owls are known to occur from lowland central Arizona south through western Mexico to the States of Colima and Michoacan, and from southern Texas south through the Mexican States of Tamaulipas and Nuevo Leon. It is unclear at this time if the ranges of the eastern and western populations of the ferruginous pygmy-owl merge in southern Mexico. Recent genetic studies suggest that ferruginous pygmy-owl populations in southern Arizona and southern Texas are distinct subspecies, and that there is no genetic isolation between populations in the United States and those immediately south of the border in northwestern or northeastern Mexico (Proudfoot and Slack 2001). Results also indicate a comparatively low haplotypic diversity in the northwest Tucson population, suggesting that it may be recently separated from those in the Altar Valley, Arizona, and in Sonora and Sinaloa, Mexico.

The Service is currently funding habitat studies and surveys in Sonora, Mexico to determine the distribution and relative abundance of the pygmy-owl there. Preliminary results indicate that pygmy-owls are present in northern and central Sonora (U.S. Fish and Wildlife Service unpubl. data). Further studies are needed to determine their distribution in Mexico.

The range of the Arizona DPS of the pygmy-owl extends from the International Border with Mexico north to central Arizona. The northernmost historic record for the pygmy-owl is from New River, Arizona, about 35 miles north of Phoenix, where Fisher (1893) reported the pygmy-owl to be "quite common" in thickets of intermixed mesquite and saguaro cactus. According to early surveys referenced in the literature, the pygmy-owl, prior to the mid-1900s, was "not uncommon," "of common occurrence," and a "fairly numerous" resident of lowland central and southern Arizona in cottonwood forests, mesquite-cottonwood woodlands, and mesquite bosques along the Gila, Salt, Verde, San Pedro, and Santa Cruz rivers and various tributaries (Breninger

1898, Gilman 1909, Swarth 1914). Additionally, pygmy-owls were detected at Dudleyville on the San Pedro River as recently as 1985 and 1986 (Arizona Game and Fish Department unpubl. data, Hunter 1988).

Records from the eastern portion of the pygmy-owl's range include a 1876 record from Camp Goodwin (nearby current day Geronimo) on the Gila River, and a 1978 record from Gillard Hot Springs, also on the Gila River. Pygmy-owls have been found as far west as the Cabeza Prieta Tanks, Cabeza Prieta National Wildlife Refuge, in 1955 (Monson 1998).

Hunter (1988) found fewer than 20 verified records of pygmy-owls in Arizona for the period of 1971 to 1988. Formal surveys for the pygmy-owl on OPCNM began in 1990, with one located that year. Beginning in 1992, survey efforts conducted in cooperation with the AGFD, located three single pygmy-owls on OPCNM (U.S. Fish and Wildlife Service and Organ Pipe Cactus National Monument unpubl. data). In 1993, surveys were conducted at locations where pygmy-owls had been sighted since 1970. Only one pygmy-owl was detected during these survey periods, and it was located in northwest Tucson (Felley and Corman 1993). In 1994, a pair and single owl of unknown breeding status were located in northwest Tucson during informal survey work by AGFD (Abbate et al. 1996). In 1995, AGFD confirmed 5 adult pygmy-owl and one juvenile, one of which was the first nest in many years. In 1996, AGFD focused their survey efforts in the Tucson Basin. A total of 12 pygmy-owls were detected, including one known nesting pair and their 2 fledglings which successfully fledged. Three additional pygmy-owls and three other unconfirmed reports were also recorded at OPCNM in 1996.

While the majority of Arizona pygmy-owl detections in the last seven years have been from the northwest Tucson area in Pima County, pygmy-owls have also been detected in southern Pinal County, at Organ Pipe Cactus National Monument (OPCNM), Cabeza Prieta National Wildlife Refuge (CPNWR), Buenos Aires National Wildlife Refuge (BANWR), and on the Coronado National Forest. The following is a brief summary of recent owl numbers and distribution[1]:

In 1997, survey efforts of AGFD located a total of five pygmy-owls in the Tucson Basin study area (the area bounded to the north by the Picacho Mountains, the east by the Santa Catalina and Rincon mountains, the south by the Santa Rita and Sierrita mountains, and the Tucson Mountains to the west). Of these owls, one pair successfully fledged two young which were banded. Two adult males were also located at OPCNM, with one reported from a previously unoccupied area (T. Tibbitts, Organ Pipe Cactus National Monument pers. comm. 1997).

In 1998, survey efforts in Arizona increased substantially and, as a result, more pygmy-owls were documented, which may at least in part account for a larger number of known owls. In 1998, a

[1] To a large degree, survey effort plays an important factor in where owls have been documented. Survey effort has not been consistent over the past several years in all areas of the state, affecting the known distribution and numbers of owls in any particular area.

total of 35 pygmy-owls were confirmed (S. Richardson, Arizona Game and Fish Department unpubl. data, U.S. Fish and Wildlife Service unpubl. data, T. Tibbitts, Organ Pipe Cactus National Monument unpubl. data, D. Bieber, Coronado National Forest unpubl. data).

In 1999, a total of 41 adult pygmy-owls were found in Arizona at 28 sites. Of these sites, 11 had nesting confirmed by AGFD and the Service. pygmy-owls were found in three distinct regions of the state: Tucson Basin, Altar Valley, and OPCNM. Almost half of the know owl sites were in the Altar Valley. Overall, mortality was documented for a number of fledglings due to natural (e.g., predation) or unknown causes. Of the 33 young found, only 16 were documented as surviving until dispersal (juveniles known to have successfully dispersed from their natal area). It is unclear what the survival rate for pygmy-owls is; however, as with other owls and raptors, a high mortality (50 percent or more) of young is typical during the first year of life.

Surveys conducted in 2000 resulted in 24 confirmed pygmy-owl sites (i.e. nests and resident pygmy-owl sites) and several other unconfirmed sites (S. Richardson, Arizona Game and Fish Department unpubl. data, T. Tibbitts, Organ Pipe Cactus National Monument unpubl. data, U.S. Fish and Wildlife Service unpubl. data). A total of 34 adult pygmy-owls were confirmed. Nesting was documented at 7 sites and 23 fledglings were confirmed; however, as in 1999, over a 50 percent fledgling mortality was documented (S. Richardson, Arizona Game and Fish Department unpubl. data). A total of 9 juveniles were known to have successfully dispersed from their natal areas in 2000. Successful dispersal was not confirmed at two nests with four fledglings. The status of the remaining fledglings was unknown; however, they were presumed dead.

Surveys conducted during the recently completed 2001 season resulted in a total of 46 adult pygmy-owls confirmed at 29 sites[2] in Arizona (S. Richardson, Arizona Game and Fish Department unpubl. data, T. Tibbitts, Organ Pipe Cactus National Monument unpubl. data, U.S. Fish and Wildlife Service unpubl. data). There were also several other unconfirmed sites that are not included in these totals. Nesting was documented at 17 sites and it is unknown at this time how many young have successfully fledged at this time because not all young have fledged as of the date of this opinion. The following regions of the state are currently known to have pygmy-owls:

- **Tucson Basin** (northwest Tucson and southern Pinal County) - A total of 8 adults (3 pairs and 2 single males) were confirmed at 5 sites, all of which were in Pima County. For the first time in 3 years, no pygmy-owls were documented in southern Pinal County. Three nests in northwest Tucson were confirmed, all with young.

[2] Pygmy-owl sites are nests and resident male pygmy-owl sites that have been confirmed by AGFD or the Service.

- **Altar Valley** - A total of 19 adult pygmy-owls were documented at 12 sites. As a result of increased access to portions of the valley, the number of known owls increased to 7 pairs and 5 resident single owls. A total of 7 nests were confirmed.

- **OPCNM and CPNWR** - Ten adults, consisting of 3 pairs and 4 single pygmy-owls were confirmed at 7 sites. Three nests were active. Two new sites were documented on the CPNWR.

- **Other** - A total of 9 adults, consisting of 4 pairs and 1 single pygmy-owl at 5 sites documented elsewhere in southern Arizona. Nesting was confirmed at 4 of these sites. It is unknown how many of these young successfully dispersed. There were several other possible pygmy-owl detections reported elsewhere in the state, but they were not confirmed.

One factor affecting the known distribution of pygmy-owls in Arizona is where early naturalists spent most of their time and where recent surveys have taken place. For example, a majority of surveys in the recent past (since 1993) have taken place in OPCNM and in the Tucson Basin, and these areas are where most owl locations have been recorded. However, over the past three years, large, previously unsurveyed areas have been inventoried for owls, resulting in a much wider distribution than previously thought. As a result, our knowledge is changing as to pygmy-owl distribution and habitat needs as new information is collected. For example, before 1998, very few surveys had been completed in the Altar Valley in southern Pima County. Prior to 1999, the highest known concentration of pygmy-owls in the state was in northwest Tucson. However, in 1999, after extensive surveys in Altar Valley, more owls were found there (18 adults) than in northwest Tucson (11 adults), although until 2001, there have been fewer nest sites in Altar Valley than in the Tucson Basin (S. Richardson, Arizona Game and Fish Department unpubl. data). As a result, our knowledge is changing as to their distribution and habitat needs as new information is collected.

**Range wide trend**

One of most urgent threats to pygmy-owls in Arizona is thought to be the loss and fragmentation of habitat (U.S. Fish and Wildlife Service 1997, Abbate et al. 1999). The complete removal of vegetation and natural features required for many large scale and high-density developments directly and indirectly impacts pygmy-owl survival and recovery (Abbate et al. 1999).

Habitat loss, degradation, and fragmentation are widely accepted causes contributing to raptor population declines worldwide (Snyder and Snyder 1975, Newton 1979, LeFranc and Millsap 1984). Habitat fragmentation is the process by which a large and continuous block of natural habitat is transformed into much smaller and isolated patches by human activity (Noss and Csuti 1994). Fragmentation has two components (1) reduction of the total amount of habitat type and (2) apportionment of remaining habitat into smaller, more isolated patches (Harris 1984, Wilcove et al. 1986, Saunders et al. 1991).

Nesting in small natural patches may have additional risks. For example, Haug (1985) found burrowing owl home range size increases with the percentage of vegetation disturbance. In fragmented landscapes, burrowing owls may forage greater distances and spend more time away from the nest, making them more vulnerable to predators, and therefore, less efficient at reproduction (Warnock and James 1997). As fragmentation increases, competition for fewer productive pygmy-owl territories may occur (Abbate et al. 1999). Unlike other larger birds that can fly long distances over unsuitable or dangerous areas to establish new territories, pygmy-owls, because of their small size, and their short style of flight are exposed to greater risks from predation and other threats (Abbate et al. 1999).

Site tenacity in birds is one of many factors that may create time lags in response to fragmentation and other disturbances. Individuals may remain in sites where they bred successfully in the past, long after the habitat has been altered (Wiens 1985). Because of lack of data, it is unclear whether site tenacity for pygmy-owls, in increasingly fragmented landscapes, such as exists in the action area is a factor. For example, researchers have been closely monitoring an established pygmy-owl site (documented each year since 1996) in which the male died in 1999, apparently from a collision with a fence (S. Richardson, Arizona Game and Fish Department unpubl. data.). This site was not known to be occupied since 1999. This site has the highest amount of development (33 percent) within its estimated home range of any other known nest site (S. Richardson, Arizona Game and Fish Department unpubl. data.). The site will continued to be monitored to determine if new owls reestablish a nest site.

In northwest Tucson, all currently known pygmy-owl locations, particularly nest sites, are in low-density housing areas where abundant native vegetation separates structures. Additionally, they are adjacent to or near large tracts of undeveloped land. Pygmy-owls appear to use non-native vegetation to a certain extent, and have been observed perching in non-native trees in close proximity to individual residences. However, the persistence of pygmy-owls in areas with an abundance of native vegetation indicates that a complete modification of natural conditions likely results in unsuitable habitat conditions for pygmy-owls. While development activities are occurring in close proximity to owl sites, particularly nest sites, overall noise levels are low. Housing density is low, and as a result, human presence is also generally low. Roads in the areas are typically dirt or two-lane paved roads with low speed limits which minimizes traffic noise. Low density housing areas generally have lower levels of traffic noise because of the limited number of vehicles traveling through the area.

Other factors contributing to the decline of pygmy-owl habitat include the destruction of riparian bottomland forests and bosques. It is estimated that 85 to 90 percent of low-elevation riparian habitats in the southwestern U.S. have been modified or lost; these alterations and losses are attributed to woodcutting, urban and agricultural encroachment, water diversion and impoundment, channelization, groundwater pumping, livestock overgrazing, and hydrologic changes resulting from various land-use practices (e.g., Phillips et al. 1964, Carothers 1977, Kusler 1985, Jahrsdoerfer and Leslie 1988, U.S. Fish and Wildlife Service 1988, U.S. General Accounting Office 1988, Szaro 1989, Dahl 1990, State of Arizona 1990, Bahre 1991). Cutting of

trees for domestic and industrial fuel wood was so extensive throughout southern Arizona that, by the late 19th century, riparian forests within tens of miles of towns and mines had been decimated (Bahre 1991). Mesquite was a favored species because of its excellent fuel qualities. In the project area, the famous vast forests of "giant mesquites" along the Santa Cruz River in the Tucson area described by Swarth (1905) and Willard (1912) fell to this threat, as did the "heavy mesquite thickets" where Bendire (1888) collected pygmy-owl specimens along Rillito Creek, a Santa Cruz River tributary, in present-day Tucson. Only remnant fragments of these bosques remain.

Regardless of past distribution in riparian areas, it is clear that the pygmy-owl has declined throughout Arizona to the degree that it is now extremely limited in distribution in the state (Johnson et al. 1979, Monson and Phillips 1981, Davis and Russell 1984, Johnson-Duncan et al. 1988, Millsap and Johnson 1988, Monson 1998). A very low number of pygmy-owls in riparian areas in recent years may reflect the loss of habitat connectivity rather than the lack of suitability (Cartron et al. 2000b).

In recent decades, the pygmy-owl's riparian habitat has continued to be modified and destroyed by agricultural development, woodcutting, urban expansion, and general watershed degradation (Phillips et al. 1964, Brown et al. 1977, State of Arizona 1990, Bahre 1991, Stromberg et al. 1992, Stromberg 1993a and 1993b). Sonoran Desert scrub has been affected to varying degrees by urban and agricultural development, woodcutting, and livestock grazing (Bahre 1991). Pumping of groundwater and the diversion and channelization of natural watercourses are also likely to have reduced pygmy-owl habitat. Diversion and pumping result in diminished surface flows, and consequent reductions in riparian vegetation are likely (Brown et al. 1977, Stromberg et al. 1992, Stromberg 1993a and 1993b). Channelization often alters stream banks and fluvial dynamics necessary to maintain native riparian vegetation. The series of dams along most major southwestern rivers (e.g., Colorado, Gila, Salt, and Verde rivers) have altered riparian habitat downstream of dams through hydrological and vegetational changes, and have inundated former habitat upstream.

In the United States, pygmy-owls are rare and highly sought by bird watchers, who concentrate at a few of the remaining known locations. Limited, conservative bird watching is probably not harmful; however, excessive attention and playing of tape-recorded calls may at times constitute harassment and affect the occurrence and behavior of the pygmy-owl (Oberholser 1974, Tewes 1993). For example, in 1996, a resident in Tucson reported a pygmy-owl sighting which subsequently was added to a local birding hotline and the location was added to their website on the internet. Several car loads of birders were later observed in the area of the reported location (S. Richardson, Arizona Game and Fish Department pers. comm. 1999).

One of the few areas in Texas known to support pygmy-owls continues to be widely publicized as having organized field trips and birding festivals (American Birding Association 1993, Tropical Birds of the Border 1999). Resident pygmy-owls are found at this highly visited area only early in the breeding season, while later in the season they could not be detected. O'Neil

(1990) also indicated that five birds initially detected in southern Texas failed to respond after repeated visits by birding tours. It is unknown if the birds habituate to the playing of taped calls and stopped responding, or if they abandoned the area. Oberholser (1974) and Hunter (1988) additionally indicated that in southern Texas, recreational birdwatching may disturb owls at highly visited areas.

Human activities near nests at critical periods of the nesting cycle may cause pygmy-owls to abandon their nest sites. In Texas, 3 of 102 pygmy-owl nests monitored from 1994-1999 were abandoned during the early stage of egg laying. Although unknown factors may have contributed to this abandonment, researchers in Texas associated nest abandonment with nest monitoring (G. Proudfoot pers. comm.). Some outdoor recreational activities (e.g., off road vehicle [ORV] and motor bike use/racing, firearm target practicing, jeep tours, etc.) may disturb pygmy-owls during their breeding season (particularly from February through July (G. Proudfoot pers. comm. 1999 and S. Richardson, Arizona Game and Fish Department pers. comm. 1999). Noise disturbance during the breeding season may affect productivity; disturbance outside of this period may affect the energy balance and, therefore survival. Wildlife may respond to noise disturbances during the breeding season by abandoning their nests or young (Knight and Cole 1995). It has also become apparent that disturbance outside of a species' breeding season may have equally severe effects (Skagen et al. 1991).

Individual pygmy-owls may react differently to noise disturbances, some individuals exhibiting less tolerance than others. Noise can affect animals by disturbing them to the point that detectable change in behavior may occur. Such behavioral changes can affect their activity and energy consumption (Bowles 1995). Dangerous or unfamiliar noises are more likely to arouse wildlife than harmless and familiar noises. Habituation is the crucial determinant of success in the presence of noisy disturbances. Exposures of some experienced birds may produce no or minimal losses (Black et al. 1984). The habituation process can occur slowly, so it may not be detected in the short-term. In the long-term, some nesting birds become more tenacious and less responsive in the presence of human disturbance if they are not deliberately harassed (Burger and Gochfeld 1981). It is unknown if noise habituation occurs in some pygmy-owls as it does with other bird species. Robert and Ralph (1975), Schreiber et al. (1979), Cooke (1980), Parsons and Burger (1982), Ainley et al. (1983), and McNicholl (1983) found that adult birds, and chicks to some extent, habituated to the presence of humans, and their responses to people seemed to be less than those of undisturbed birds. Burger and Gochfeld (1981) and Knight et al. (1987) found responses to noise disturbances and habituation in nesting birds become more tenacious and less responsive in the presence of human disturbance if they were not deliberately harassed.

Raptors in frequent contact with human activities tend to be less sensitive to additional noise disturbances than raptors nesting in remote areas. However, exposure to direct human harassment may make raptors more sensitive to noise disturbances (Newton 1979). Where prey is abundant, raptors may even occupy areas of high human activity, such as cities and airports (Newton 1979, Ratcliffe 1980, White et al. 1988). The timing, frequency, and predictability of the noise disturbance may also be factors. Raptors become less sensitive to human disturbance

as their nesting cycle progresses (Newton 1979). Studies have suggested that human activities within breeding and nesting territories could affect raptors by changing home range movements (Anderson et al. 1990) and causing nest abandonment (Postovit and Postovit 1987, Porter et al. 1973).

Application of pesticides and herbicides in Arizona occurs year-round, and these chemicals pose a potential threat to the pygmy-owl. The presence of pygmy-owls in proximity to residences, golf courses, agricultural fields, and nurseries may cause direct exposure to pesticides and herbicides. Furthermore, ingestion of affected prey items may cause death or reproductive failure (Abbate et al. 1999). Illegal dumping of waste also occurs in areas occupied by pygmy-owls and may be a threat to pygmy-owls and their prey; in one case, drums of toxic solvents were found within one mile of a pygmy-owl detection (Abbate et al. 1999).

Little is known about the rate or causes of mortality in pygmy-owls; however, they are susceptible to predation from a wide variety of species. In Texas, eggs and nestlings were depredated by racoons (*Procyon lotor*) and bullsnakes (*Pituophis melanoleucus*). Both adult and juvenile pygmy-owl are likely killed by great horned owls (*Bubo virginianus*), Harris' hawks *(Parabuteo unicinctus*), Cooper's hawks, and eastern screech-owls (*Otus asio*) (Proudfoot and Johnson 2000, G. Proudfoot unpubl. data). Pygmy-owls are particularly vulnerable to predation and other threats during and shortly after fledging (Abbate et al. 1999). Therefore, cover near nest sites may be important for young to fledge successfully (Wilcox et al. 1999, Wilcox et al. 2000). Although nest depredation has not been recorded in Arizona, only a few nests have been monitored (n = 21 from 1996-1999). Additional research is needed to determine the effects of predation, including nest depredation, on pygmy-owls in Arizona and elsewhere.

Another factor that may affect pygmy-owls is interspecific competition/predation. In Texas, depredation of two adult female pygmy-owls nesting close to screech-owls was recorded. These incidences were recorded as "depredation by screech-owl" after examination of the pygmy-owl corpses and assessment of circumstances (i.e., one pygmy-owl attempted to nest in a box that was previously used as screech-owl roost site, the other established a nest in a box within 16 feet of screech-owl nest site). In 2001, an unpaired female pygmy-owl was found dead in a tree cavity, apparently killed by a screech-owl (S. Richardson, Arizona Game and Fish Department unpubl. data). Conversely, pygmy-owls and screech-owls have also been recorded successfully nesting within 7 feet of each other in the same tree without interspecific conflict (G. Proudfoot, unpubl. data). The relationship between pygmy-owl and other similar small owl species needs further study.

Direct and indirect human-caused mortalities (e.g., collisions with cars, glass windows, fences, power lines, domestic cats [*Felis domesticus*], etc.), while likely uncommon, are often underestimated, and probably increase as human interactions with owls increase (Banks 1979, Klem 1979, Churcher and Lawton 1987). This may be particularly important in the Tucson area where many pygmy-owls are located. Pygmy-owls flying into windows and fences, resulting in serious injuries or death to the birds, have been documented twice. A pygmy-owl collided into a

closed window of a parked vehicle; it eventually flew off, but had a dilated pupil in one eye indicating serious neurological injury as the result of this encounter (Abbate et al. 1999). In another incident, an adult owl was found dead on a fence wire; apparently it flew into a fence and died (S. Richardson, Arizona Game and Fish Department, unpubl. data). AGFD also has documented an incident of individuals shooting BB guns at birds perched on a saguaro which contained an active pygmy-owl nest. In Texas, two adult pygmy-owls and one fledging were killed by a domestic cat. These owls used a nest box about 246 feet from a human residence. Free roaming cats can also affect the number of lizards, birds, and other prey species available to pygmy-owls; however, very little research has been done in the Southwest on this potential problem.

Because pygmy-owls have been observed moving around the perimeter of golf courses, avoiding non-vegetated areas; roads and other openings may act as barriers to their movements (Abbate et al. 1999, S. Richardson, Arizona Game and Fish Department unpubl. data). On one occasion, a radio-tagged dispersing juvenile stopped within 0.7 mile of Interstate 10 where there were large openings and few trees or shrubs, and reversed its direction (Abbate et al. 1999). However, radio-tagged, juvenile pygmy-owls have been observed on several occasions crossing two-lane roads with light to moderately heavy vehicular traffic, where trees and large shrubs were present on either side (Abbate et al. 1999).

Fires can affect pygmy-owls by altering their habitat (Abbate et al. 1999). A recent fire altered habitat near an active pygmy-owl nest site (Flesch 1999) and although four mature saguaros in the area survived (at least in the short-term), post-fire mortality of saguaros has been recorded (Steenbergh and Lowe 1977 and 1983, McLaughlin and Bowers 1982). Flesch (1999) also noted that approximately 20 to 30 percent of the mesquite woodland within 164 feet of the nest was fire- or top-killed, and ground cover was also eliminated until the summer monsoons. Careful use of prescribed fires in areas potentially suitable for pygmy-owls is necessary so that habitat is not lost or degraded (Flesch 1999).

Low genetic variability can lead to a reduction in reproductive success and environmental adaptability. Caughley and Gunn (1996) further note that small populations can become extinct entirely by chance even when their members are healthy and the environment favorable. The pairing of siblings or parents with their offspring, particularly in raptors, is rare, and has been documented in only 18 cases, representing 7 species (Carlson et al. 1998). Four of these species were owls: barn owls, burrowing owls (*Athene cunicularia*), screech-owls, and spotted owls (*Strix occidentalis*). In 1998 and 1999, two cases of sibling pygmy-owls pairing and breeding were documented (Abbate et al. 1999). In both cases, young were fledged from the nesting attempts. These unusual pairings may have resulted from extremely low numbers of available mates within their dispersal range, and/or from barriers (including fragmentation of habitat) that has influenced dispersal and limited the movement of young owls (Abbate et al. 1999). Further, because the pygmy-owl is nonmigratory, there may be an additional limitation on the flow of genetic material between populations which may reduce the chance of demographic and genetic rescue from immigration from adjacent populations.

Environmental, demographic, and genetic stochasticity, and catastrophes have been identified as interacting factors that may contribute to a population's extinction (Hunter 1996). Environmental stochasticity refers to random variation in habitat quality parameters such as climate, nutrients, water, cover, pollutants, and relationships with other species such as prey, predators, competitors, or pathogens. Demographic stochasticity is uncertainty due to random variation in reproductive success and survivorship of individuals. Genetic stochasticity is the random variation in gene frequencies of a population due to genetic drift, bottlenecks, inbreeding, and similar factors. Catastrophes are events such as droughts or hurricanes that occur randomly. When these factors interact with one another, there are likely to be a combination of effects, such that a random environmental change like habitat fragmentation can result in population and genetic changes by preventing dispersal. These factors are much more likely to cause extinction when a species' numbers are already extremely low. The small, fragmented population of pygmy-owls in Arizona may not have the ability to resist change or dramatic fluctuations over time caused by one or more of the factors mentioned above.

Soule (1986) notes that very small populations are in extreme jeopardy due to their susceptibility to a variety of factors, including demographic stochasticity, where chance variations in birth and death rates can result in extinction. A series of environmental changes such as habitat reduction reduce populations to a state in which demographic stochasticity takes hold. In small populations such as with the pygmy-owl, each individual is important for its contributions to genetic variability of that population. As discussed above, low genetic variability can lead to a lowering in reproductive success and environmental adaptability, affecting recovery of this species.

## III. Environmental Baseline

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area; the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation; and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

### Definition of the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02). The Service has determined the action area to include the project site and areas within 19 miles of the project site. We based this determination on the dispersal distance of juvenile pygmy-owls in Texas and Arizona (Proudfoot unpubl. data, S. Richardson, Arizona Game and Fish Department unpubl. data).

**Action Area - Climate, Terrain, and Vegetation Communities**

The climate of OCPNM can be described as semiarid or semi-desert. It is typified by relatively little annual rainfall (< 10 in), high summer temperatures, intense solar radiation, low humidity, and high evaporation rates. The proximity of the Gulf of California, the Pacific Ocean, and the Gulf of Mexico, as well as the distribution of high mountain barriers in the region, influence the amount, apportionment, and seasonality of rainfall. Average annual rainfall recorded at Monument Headquarters is approximately 10 in per year (1943-1999), but this value varies with location. The Ajo Mountains in the east receive as much as 20 in per year, while the western portion of the Monument receives much less than 10 in. The seasonality of precipitation is bimodal, with frontal Pacific storms occurring in late winter and early spring, and local and occasionally violent convectional storms (Arizona monsoons) occurring in late summer. The summer monsoon precipitation is usually intense, localized, and of short duration, often resulting in flash floods. Precipitation during the winter is not as dependable temporally but less erratic spatially, and is usually typified by gentle widespread rains of a much longer duration.

The Monument lies within the Basin and Range Geologic Province, which extends from northwest Mexico to southeast Oregon, and from the Colorado Plateau and Sierra Madre on the east, to the Sierra Nevada on the west. The Basin and Range is named for its numerous elongated mountain ranges alternating with wide alluvial valleys. The geology and topography of the Monument is typical of the Basin and Range. The variability seen from range to range is attributable to differences in the kinds of rock that were uplifted, the extent of uplift, and the amount of erosion that has occurred.

Both the Lower Colorado River Valley and the Arizona Upland Subdivisions of the Sonoran Desert scrub vegetation communities (Brown 1994) occur on the Monument. The Lower Colorado River Valley Subdivision occurs in the western portion of the Monument. The creosotebush-white bursage series best characterizes the plant associations in this area. Creosote bush (*Larrea tridentata*), triangle-leaf bursage (*Ambrosia deltoidea*), and white bursage (*A. dumosa*) are well represented in the Valley of the Ajo and Growler Valley. Mixed shrub communities of brittlebush (*Encelia farinosa*), triangle-leaf bursage, and foothill paloverde (*Parkinsonia microphyllum*) are found throughout the Bates, Puerto Blanco, Sonoyta, and Diablo Mountains, as well as the Cipriano and Quitobaquito hills.

The eastern portion of the Monument and the project site are within the Arizona Upland Subdivision. This subdivision is limited in its distribution, forming a narrow, curved band along the northeast edge of the Sonoran Desert from the Buckskin Mountains, southeast to Phoenix, Arizona, and south to Altar, Sonora, Mexico. It is described as a low woodland of leguminous trees with an overstory of columnar cacti and one or more layers of shrubs and perennial succulents. Typical plant associations include the paloverde-cacti-mixed scrub series. This series is well developed on bajadas and mountain sides away from valley floors. In this portion of the Monument, cacti such as the saguaro (*Carnegiea gigantea*) and organ pipe cactus (*Stenocereus thurberi*) are prominent landscape features. The prevalent tree species is the

foothill paloverde. At higher elevations in the Ajo Mountains, the jojoba-mixed scrub series occurs. Here, where rainfall is more abundant, plants such as jojoba (*Simmondsia chinensis*), agave (*Agave deserti*), Ajo oak (*Quercus ajoensis*), and one-seed juniper (*Juniperus monosperma*) are found.

Within the immediate project area, the vegetation community in order of percent cover composition is as follows: creosotebush, foothill paloverde, ocotillo (*Fouquieria splendens*), brittlebush, buckhorn cholla (*Opuntia acanthocarpa*), organ pipe cactus, saguaro cactus, sangré de drago (*Jatropha cuneata*), range rhatany (*Krameria erecta*), jumping cholla (*O. fulgida*), whitethorn acacia (*Acacia constricta*), *Acourtia wrightii*, allscale (*Atriplex cf. polycarpa*), hedgehog cactus (*Echinocereus engelmannii*), barrel cactus (*Ferocactus wislizenii*), fishhook cactus (*Mammillaria grahami*), and teddybear cholla (*O. bigelovii*).

**Status of the Cactus Ferruginous Pygmy-Owl in the Action Area**

Pygmy-owl habitat in the action area is of moderate to above-average quality. The area offers relatively dense and diverse upper bajada Sonoran Desert scrub, with a number of larger xeroriparian areas, and numerous smaller washes, including wash confluence areas. Pygmy-owl presence at the Monument has been surveyed since 1977 when two pairs were recorded. In 1982, one pair of pygmy-owls was found followed by two pairs in 1992. Through limited surveys, approximately 3 to 5 pygmy-owl territories have been located and monitored since 1995. Four pairs of pygmy-owls were located in 1999 and 4 pairs and two individuals were discovered in 2000. Recent surveys in 2001 detected 5 occupied territories, including 3 confirmed pairs with an additional pair strongly suspected.

The project area has been documented as occupied by pygmy-owls. Records of pygmy-owls span from 1949 to 1997, from the residence area, Visitor Center/Headquarters (both old and present sites), the un-named wash flowing adjacent to Twin Peaks Road, the un-named wash approximately ½ mile east of the project area, the campground, and the foot trails connecting the campground and Headquarters area. Nesting was confirmed in 1946, 1969, 1976, and 1996. Thus, records suggest that the area is occupied by pygmy-owls, but not in every year.

**Past and Ongoing Actions Affecting the Cactus Ferruginous Pygmy-Owl in the Action Area**

Two actions were identified in the Service's Biological Opinion for the Monument's General Management Plan (GMP) that had the potential to adversely affect pygmy-owls. The actions included establishing a parking area within an existing roadbed and formalizing an existing social trail into a designated trail. Both of these actions have the potential to increase visitor use in the Alamo Canyon area and thereby increase disturbance to the pygmy-owl.

Construction and development projects in the Monument have impacted the pygmy-owl and its habitat. Most of the construction and development is related to maintaining, improving, and/or

expanding facilities used for management of the Monument and providing services to the visiting public. The majority of these actions center on the Twin Peaks area (Visitor Center, residence area, maintenance area, and campground) and have taken place in or adjacent to pygmy-owl habitat and territories. Furthermore, additional maintenance and upgrading projects are planned.

The first structure built on the Monument by the NPS was a visitor contact station. This structure was built in 1940 near the Ajo-Sonoyta Road. From the mid-1940s to the mid-1950s small residences, a maintenance area, horse corral, well house, and a small camp ground were added. During the 10-year Mission '66 effort (1956-1966), the Visitor Center, residences, maintenance yard, leach fields, playground, campground, and several roads were constructed. Internal roads were also paved during this period. Maintenance and construction has continued in more recent years and has included: closure of the original residence, Headquarters, and campground area; construction of a radio shed and access road; 'Tiger Cage' creation and continued use; removal of former and construction of new Volunteer-In-Parks campground; removal of residence trailers and construction of duplexes; maintenance shop sewer system replacement; maintenance shop extension construction; replacement of fire hydrants; replacement of residence roofs and the addition of new ramadas; and the completion and landscaping of duplex units.

Pygmy-owls were last detected in the immediate project area in 1997 when the frequency and intensity of development increased. In early 1997, a thicket of plants was removed from the leach field servicing the residence area. The area cleared was approximately 0.14 acre and was located within the central use area of a resident pygmy-owl. This project took place just prior to the pygmy-owl's listing as endangered. Contemporaneous with this action, a resident male pygmy-owl in the Visitor Center/residence area relocated to an area east of Highway 85. Further monitoring suggested that the male failed to attract a mate, and either left the area or ceased to respond to imitated calls. A trench, connecting the Headquarters/Visitor Center, the maintenance compound, and the campground, was dug in 1999 in order to bury fiber optic cable. This action resulted in an impact area averaging 13 feet wide and 1,473 feet long, which ran through the interior of the residence loop. The area of impact was larger than anticipated, with a total of 0.45 acre of desert scrub disturbed. During 1999 and 2000, new water/chlorination lines were installed. The area impact averaged 13 feet in width over its 4,260-foot course. The loss of desert scrub was greater than anticipated by the NPS and totaled 1.13 acre. The activities in this area have resulted in a total loss of 1.72 acre of desert scrub since 1997.

Several other proposed actions will take place near the current project area. The Monument is in the process of preparing to widen the North Puerto Blanco Drive. The road will be widened from a one-way to a two-way drive to approximately mile 5.9 (mile 0.0 is where North Puerto Blanco Drive originates between the Visitor Center and the residence area). The Monument is also in the process of preparing to re-design the entrance to the Visitor Center. The parking area at the Visitor Center will also be re-designed and a new water line will be installed alongside the southern edge of the parking/entrance area. The re-design will include constructing deceleration, acceleration, and passing lanes on Highway 85 at the entrance road. The new lanes will extend

approximately 1500 feet to the south and north of the Visitor Center's entrance. Further modifications of Highway 85 include the construction of three wayside interpretive exhibits. The Monument is currently planning construction of these waysides which will be located between miles 62 and 63, 66 and 67, and 72 and 73. Waysides will be approximately 180 by 200 feet and will accommodate approximately 8 recreational vehicles and 8 passenger vehicles.

**IV. Effects of the Action**

Because of the extremely low known pygmy-owl population levels, any action with the potential to disturb habitat known to be important to the pygmy-owl could have detrimental effects on the owl's continued existence in Arizona. Such disturbance could have potentially adverse effects on the species' survival if it resulted in habitat alteration, nest abandonment, or simply disturbance of the normal behavior patterns of owls.

This proposed action will result in the permanent loss of approximately 2.5 acres of Sonoran Desert scrub vegetation which likely provides foraging, sheltering, and movement and dispersal habitat for pygmy-owls and has the potential to support nesting pairs and resident owls as they disperse from nearby nests. A total of 47 ocotillo greater than 3 feet high, 13 saguaro and four organ pipe cactus will be removed. As the reestablishment success of large columnar cacti (> 6 ft) is low, only smaller individuals (< 6.0 ft) of these species will be transplanted. Of the columnar cacti removed, 5 saguaros and 1 organ pipe cactus will be transplanted. Construction activities will involve clearing the hillside to the west of the road back to bedrock, making revegetation essentially impossible. However, two recently completed project areas, a chlorination line and additions to the Visitor Center, are in need of transplant stock to offset localized vegetation removal caused by the construction.

Just over half of the loss of habitat will result from the approximately 1,395 linear feet of phase one of the project. In phase one, the habitat loss will be on relatively steep upslope topography. Outside of the 1,395 feet of phase one activities, vegetation loss would take place on topography ranging from rolling hills to flat upper floodplain terraces. The pygmy-owl is typically found on plains, bajadas, and in riverbottoms, and only rarely observed on steep rocky slopes or in hilly areas (Cartron et al. 2000*b*). The construction area is, however, adjacent to high-quality, formerly occupied xeroriparian pygmy-owl habitat. Due to the high quality of this habitat for pygmy-owls, all road construction activities will occur to the west of the eastern edge of the existing road. In recognition that road construction may inadvertently stray outside of the intended boundaries, the NPS will take the following measures to ensure the protection of the xeroriparian area: 1) the construction contract for this project will specifically state that the contractor will not allow any impacts (spilling material, cutting or damaging vegetation, or re-contouring the landscape) to occur to the east of the existing road, and 2) in the event that such impacts do occur, the NPS will immediately begin full revegetation of all impacted areas, using the plant species that were lost or damaged.

Although all reconstruction activities will take place to the west of the road, concerns regarding the potential effects of road construction activities on the adjacent xeroriparian pygmy-owl habitat remain. The loss of vegetation and resulting exposed rock hillside may have microsite effects on the ecology of the adjacent xeroriparian area. While the necessity of clearing this area to bedrock prevents immediate revegetation, the NPS will make supplemental plantings between the road and the wash along the uppermost terrace of the floodplain to create a barrier between the road and the xeroriparian pygmy-owl habitat. Supplemental plantings will consist of native trees and shrubs, at a spacing of about 40 feet. These plantings will increase the vegetative cover and enhance the screening of the xeroriparian area from the road. Further, some habitat values (i.e., foraging and sheltering) may redevelop as vegetation matures.

The proposed action will also cause short-term noise disturbance associated with construction. The project will involve loud intrusive activities, including heavy machinery, jackhammers, earth haulers, and possible blasting. Noise disturbance during the breeding season may affect productivity; disturbance outside of this period may affect the energy balance and, therefore survival. Because project construction will not be carried out during the breeding season, potential adverse effects to pygmy-owl productivity resulting from noise disturbance will be avoided.

Based on the best available scientific information, it appears this species may be tolerant, at least to some extent, of certain low level noise disturbances associated with human activity. These disturbances include daily activities in residential areas such as people walking, voices, children playing, horses and other livestock, dogs, low to moderate vehicle and large truck traffic, and some occasional construction equipment activity. The threshold between noise levels and types of activities that an owl can tolerate versus those that will cause an owl to leave an area are not clearly known at this time. The relocation of a pygmy-owl in 1997 from an area near the site of an ongoing maintenance project at the Monument suggests, however, that pygmy-owls may be adversely affected by relatively low levels of human activity and noise.

The road widening is being conducted to facilitate travel by recreational vehicles that continue to increase in size. The widening may also induce higher rates of vehicular speed. However, the negative impacts of increased vehicular size and speed to pygmy-owls are expected to be minimal due to the small scale of this project.

## V. Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The increasing number of illegal border crossings by undocumented aliens and smugglers within OPCNM raises concerns regarding disturbance to wildlife and the destruction of habitat. Deportable alien apprehensions by Border Patrol agents in the Ajo Station increased steadily from 9,150 in 1996 to 20,340 in 2000. In 2001, estimates of undocumented aliens traffic reached 1,000 per night in OPCNM alone (OPCNM 2001). Increased presence of Border Patrol in the Douglas, Arizona area, and in San Diego (Operation Gatekeeper) and southeastern California, California have pushed undocumented alien traffic into remote desert areas, such as Cabeza Prieta NWR, OPCNM, and BMGR (Klein 2000). Illegal activities result in habitat damage in the form of new roads, discarded trash, cutting of firewood, illegal campfires and increased chance of wildfire (OPCNM 2001), and likely result in disturbance of wildlife. These activities are likely to continue into the future and may continue to increase.

## VI. Conclusion

After reviewing the current status of cactus ferruginous pygmy-owl, the environmental baseline for the action area, the effects of the proposed Twin Peaks Road stabilization project, and the cumulative effects, it is the Service's biological opinion that the Twin Peaks Road stabilization project, as proposed, is not likely to jeopardize the continued existence of the cactus ferruginous pygmy-owl. We base this conclusion on the following:

1. The project site is not within a known territory of a pair or resident pygmy-owl.

2. All project activities will take place August 1 through January 31, outside the pygmy-owl breeding season.

3. All construction work will occur on the western side of the road in lower-quality pygmy-owl habitat and only a small amount of desert scrub (2.5 acres) will be removed.

4. Only minimal vegetation disturbance will occur in the xeroriparian area running next to the eastern side of the road. Activities on the east side of the road will consist only of the installation of a concrete headwall, should the installation of a culvert be deemed necessary.

5. The construction contract for the project will specifically state that the contractor is not to allow any impacts on the east side of the road (e.g., spilling material, cutting or damaging vegetation, re-contouring the landscape).

6. In the event that such impacts do occur, the NPS will immediately begin full revegetation of all impacted areas, using the plant species that were lost or damaged.

7. A relatively small number of columnar cacti will be removed during construction (13 saguaros and four organ pipe cactus). Columnar cacti removed from the project site that are suitable for transplant (< 6 ft tall) will be used to revegetate previous project sites within the action area where the removal of desert scrub vegetation has also occurred.

8. The NPS will make supplemental plantings between the road and the wash to the east along the uppermost terrace of the wash floodplain to create a barrier between the road and the xeroriparian pygmy-owl habitat. These plantings will be of native trees and shrubs, at a spacing of about 40 feet.

9. Although increase in the size and speed of vehicles may result from the road widening activities, the impacts are expected to be minimal due to the small scale of this project.

**INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by FWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by FWS as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

**Amount or Extent of Take Anticipated**

We do not anticipate the proposed action will incidentally take any pygmy-owl based on the lack of any documented use on or immediately adjacent (within 0.5 mile) to the project site. However, if a pygmy owl is located on or immediately adjacent to the project site immediately prior to or during the implementation of construction activities, then the effects of the action would be different than that described here, and we would recommend that NPS reinitiate consultation pursuant to 50 CFR 402.16(b).

**Disposition of Dead or Injured Listed Animals**

Upon finding a dead or injured threatened or endangered animal, initial notification must be made to the Service's Division of Law Enforcement, Federal Building, Room 8, 26 North McDonald, Mesa, Arizona (602/261-6443) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph, and any other pertinent information. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact

specimens of listed animal species shall be submitted as soon as possible to the nearest Fish and Wildlife Service or AGFD office, educational, or research institutions (e.g., University of Arizona in Tucson) holding appropriate state and federal permits.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution before implementation of the action. A qualified biologist should transport injured animals to a qualified veterinarian. Should any treated listed animal survive, the Service should be contacted regarding the final disposition of the animal.

**Conservation Recommendations**

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. The Monument should promote visitor awareness and education about the pygmy-owl and its specific biological needs.

2. The Monument should continue to survey for pygmy-owls annually.

3. The Monument should assist the Service in implementing the pygmy-owl Recovery Plan, once the plan is finalized.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

**Reinitiation Notice**

This concludes formal consultation on the proposed Twin Peaks Access Road Stabilization Project located in Organ Pipe Cactus National Monument in Pima County, Arizona. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We have assigned log number 2-21-00-F-295 to this consultation. Please refer to that number in future correspondence on this consultation. If we can be of further assistance in this matter, please contact Suzie Hatten (x225) or Jim Rorabaugh (x238) of my staff.

/s/ David L. Harlow

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)

Director, Arizona Game and Fish Department, Phoenix, AZ

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## Appendix 1: CONCURRENCES

### Lesser Long-nosed Bat (*Leptonycteris curasoae yerbabuenae*)

The lesser long-nosed bat was listed as endangered in 1988. No critical habitat has been designated. This animal is a medium size, leaf-nosed bat. It has a long muzzle, a long tongue, and is capable of hover flight. These features are adaptations that allow the bat to feed on nectar from the flowers of columnar cacti such as the saguaro (*Carnegiea giganteus*) and organ pipe cactus (*Stenocereus thurberi*), and from paniculate agaves such as Palmer's agave (*Agave palmeri*) and Parry's agave (*A. parryi*). The lesser long-nosed bat is migratory and found throughout its historic range from southern Arizona and extreme southwestern New Mexico through western Mexico and south to El Salvador. The bats arrive in southwestern and south central Arizona in April, and occupy maternity roosts until July or August when most bats move to southeastern Arizona. This migration to southeastern Arizona corresponds to the cessation of most columnar cactus blooming and fruiting in southwestern Arizona and the beginning of the agave flowering period in southeastern Arizona, particularly Palmer's agave. Most lesser long-nosed bats depart Arizona by mid September, but a few stay as late as November or may overwinter (US Fish and Wildlife Service 1994, Sidner 2000).

This species is present in the Monument from mid-April through September. One large maternity colony of approximately 16,000 to 21,000 bats is known, approximately 12 miles northeast of the project area. Additional day roosts are suspected in rock crevices in the Puerto Blanco, Bates, and Ajo Mountains at various locations, 2 to 20 miles from the project area. Numerous temporary night roosts are known in rock crevices and abandoned outbuildings throughout the Monument. This species forages throughout the project area, and throughout the Monument where large columnar cacti and/or agaves are present. Temporary night roosting takes places near the project area, evidenced by characteristic guano splatters under the eaves of buildings in the Visitor Center and residence areas. Approximately 80 percent of the Monument (264,500 ac) provides suitable foraging habitat for this bat.

Lesser long nosed bats are most sensitive to activities that might adversely affect roost sites. While temporary night roosting takes place near the project area, day roosts are located from 2 to 20 miles away for the area, and the maternity colony is 12 miles away. The proposed project will result in the loss of 2.5 acres of foraging habitat for the lesser long nosed bat. However, this area is insignificant when compared to the total amount of foraging habitat available at the Monument (264,500 ac). With regard to the bat's food resources, the loss will consist of 13 saguaros and four organ pipe cactus. Of these, five saguaros and one organ pipe cactus will be replanted.

The Service concurs with the NPS's determination that the proposed action may affect, but is not likely to adversely affect, the lesser long-nosed bat. We base this determination on the following:

1. The proposed project will not affect any roosting habitat.

2. The proposed project would result in removal of 13 mature saguaro cactus, four mature organ pipe cactus, and no agaves; however, of these, five saguaros and one organ pipe cactus will be replanted.

**Sonoran Pronghorn (*Antilocapra americana sonorensis*)**

The Sonoran pronghorn (*Antilocapra americana sonoriensis*) was listed throughout its range as endangered on March 11, 1967 (32 FR 4001) under the Endangered Species Preservation Act of October 15, 1966, and is currently recognized as one of five subspecies of pronghorn (Nowak and Paradiso 1983). The subspecies presently inhabits southwestern Arizona in the U.S. and northwestern Sonora in Mexico. Critical habitat has not been designated for the Sonoran pronghorn.

Pronghorn does become sexually mature at 16 months and bucks at 1 year of age (Kitchen and O'Gara 1982). Gestation for all *A. americana* subspecies is approximately 240 days. Parturition occurs from February through May. Sonoran pronghorn tend to occupy valley floors and bajadas in winter, but tend to move south and east and upslope in midsummer. Seasonal movements are correlated with high temperatures and are most likely motivated by the need for water available in succulent cactus such as chain fruit cholla (Hervert et al. 1997).

This species is present in the Monument year-round, but probably in greater numbers during the late winter and spring dry season. Historic records and one recent record of a radio-collared individual have documented pronghorn within one to two miles of the project area. However, this area of foothills and relatively dense Sonoran Desert scrub represents habitat not often used by Sonoran pronghorn. Most contemporary records (telemetry locations and visual records) are from the drier valley and foothill habitats to the west and north, e.g. Valley of the Ajo, Growler Valley, Bates Mountains, and Puerto Blanco Mountains.

A potential effect of this project to pronghorn is short-term noise disturbance associated with construction and the presence of humans. However, pronghorn do not often use habitat of the type found within the project area. Additionally, pronghorn tend to avoid roads and this fact further decreases the likelihood of a pronghorn occurring within the project area.

The Service concurs with the NPS's determination that the proposed action may affect, but is not likely to adversely affect, the Sonoran pronghorn. We base this determination on the following:

1. The proposed project would result in loss of Sonoran Desert scrub habitat, but at a relatively small scale.

2. Construction activities and the resulting habitat loss will occur on relatively steep topography, adjacent to a heavily-used road, where pronghorn are unlikely to occur.

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