

SUMMARY
BIOLOGICAL OPINION FOR
ORGAN PIPE CACTUS NATIONAL MONUMENT GENERAL MANAGEMENT PLAN

Date of opinion: June 26, 1997

Action agency: National Park Service

Project: Organ Pipe Cactus National Monument General Management Plan

Location: Pima County

Listed species affected: Endangered Sonoran pronghorn (Antilocapra americana sonoriensis) lesser long-nosed bat (Leptonycteris curasoae yerbabuenae) and cactus ferruginous pygmy-owl (Glaucidium brasilianum cactorum)

Biological opinion: The proposed project is not likely to jeopardize the continued existence of the lesser long-nosed bat, Sonoran pronghorn, or cactus ferruginous pygmy-owl.

Incidental take statement:

Anticipated take: *Exceeding this level may require reinitiation of formal consultation.* Anticipated take for the lesser long-nosed bat is based on possible unauthorized entry of a roost. Anticipated take for the Sonoran pronghorn is based on the possibility of injury or death due to traffic along State Route 85. Anticipated take for the cactus ferruginous pygmy-owl is based on the possibility of harassment of individuals due to human visitation in the Alamo Canyon Wash area.

Reasonable and prudent measures: *Implementation of these measures through the terms and conditions is mandatory.* Three reasonable and prudent measures reduce and minimize roost disturbance, monitoring and protection for the lesser long-nosed bat. Four reasonable and prudent measures reduce and minimize the effects of traffic, fences, and visitor use on the Sonoran pronghorn. Three reasonable and prudent measures reduce and minimize the effects of increased visitation to the Alamo Canyon Wash area.

Terms and conditions: *Terms and conditions implement reasonable and prudent measures and are mandatory requirements.* Three terms and conditions implement the reasonable and prudent measures for the lesser long-nosed bat. Five terms and conditions implement the reasonable and prudent measures for the Sonoran pronghorn. Six terms and conditions implement the reasonable and prudent measures for the cactus ferruginous pygmy-owl.

Conservation recommendations: *Implementation of conservation recommendations is discretionary.* Two conservation recommendations were given to help implement recovery and increase public awareness of the lesser long-nosed bat. One conservation recommendation was given to implement recovery of the Sonoran pronghorn. Two conservation recommendations were given to gain more information on the status and natural history of the cactus ferruginous pygmy-owl.



United States Department of the Interior
Fish and Wildlife Service

Arizona Ecological Services Field Office
2321 W. Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
(602) 640-2720 Fax (602) 640-2730



In Reply Refer To:

AESO/SE
2-21-89-F-078

June 26, 1997

MEMORANDUM

TO: Project Manager, Denver Service Center, National Park Service, Denver, Colorado

FROM: Field Supervisor

SUBJECT: Biological Opinion for Organ Pipe Cactus National Monument General Management Plan

The U.S. Fish and Wildlife Service (Service) has reviewed the biological assessment for the Organ Pipe Cactus National Monument General Management Plan (GMP) located in Pima County, Arizona. Your May 21, 1996, request for formal consultation was received on May 22, 1996. This document represents the Service's biological opinion on the effects of that action on the endangered lesser long-nosed bat (Leptonycteris curasoae yerbabuena), Sonoran pronghorn (Antilocapra americana sonoriensis), and cactus ferruginous pygmy-owl (Glaucidium brasilianum cactorum) in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended, (16 U.S.C. 1531 et seq.).

This biological opinion is based on information provided in the undated biological assessment, the May 1995 draft General Management Plan/Development Concept Plans/Environmental Impact Statement, the April 1996 supplement to the draft General Management Plan/Development Concept Plans/Environmental Impact Statement, telephone conversations, meetings, field investigations, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, park management and recreation and their effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file in this office.

In this biological opinion the Service finds that the effects of the proposed project are not likely to jeopardize the continued existence of the lesser long-nosed bat, the Sonoran pronghorn, or the cactus ferruginous pygmy-owl. Three terms and conditions are described to reduce or eliminate take anticipated for the lesser long-nosed bat. Seven terms and conditions are described to reduce or eliminate take anticipated for the Sonoran pronghorn. Six terms and conditions are described to reduce or eliminate take anticipated for the cactus ferruginous pygmy-owl.

CONSULTATION HISTORY

On April 4, 1989, the Service responded to a request from the Park Service for a species list for Organ Pipe Cactus National Monument. On July 21, 1993, the Park Service requested another species list for the Monument and reinitiated informal consultation. The Service provided a species list on August 5, 1993. The Park Service requested a species list on March 21, 1994. The Service provided a species list on April 5, 1994. The Park Service requested review of species lists on June 2, 1994. The Service provided a species list on June 16, 1994. The Park Service requested an updated species list on February 24, 1995. The Service provided a species list on March 29, 1995. On April 18, 1995, the Park Service issued a draft general management plan/development concept plans/environmental impact statement for Organ Pipe Cactus National Monument to the Service for review. The Service responded with comments regarding that review on August 24, 1995. On August 18, 1995, the Park Service issued a letter to the Service stating a supplement to the draft environmental impact statement would be developed. A meeting regarding section 7 consultation was conducted at Monument headquarters on March 26, 1996. On May 21, 1996, the Park Service requested formal consultation and provided a biological assessment to the Service. The Service responded to that request on September 16, 1996. On September 23, 1996, the Park Service issued a letter to the Service transmitting a copy of an internal draft of the final general management plan. On September 24, 1996, the Park Service and the Service agreed that December 10, 1996, would be the due date for a biological opinion. On October 29, 1996, the Park Service issued a memorandum to the Service regarding the December 10 due date. On November 21, 1996, the Service responded to that letter stating it hoped to have a biological opinion completed by February 15, 1997.

Because of higher priorities, the Service postponed work on the opinion and a Service biologist met with a biologist from Organ Pipe on-site to discuss the status of the pygmy-owl and alternatives to doubling the size of the campground at Alamo Wash. The Park Service was notified of possible problems concerning the effects of the campground expansion on the pygmy-owl in late April. On May 6, 1997, a draft modified description of the proposed action was received by the Service. Comments were returned on May 7, 1997, and the proposed action was modified.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The purpose of a general management plan is to guide future management of a park or other Park Service unit for the next ten or fifteen years. Some of the actions proposed in the General Management Plan include:

1. Working with the Arizona Department of Transportation to ensure continued travel and commerce while enhancing resource protection along the State Route 85 corridor within the monument.
2. Seeking redesignation of the monument to Sonoran Desert National Park:

3. Establishing partnerships with Federal agencies and private organizations to share facilities, staff, and costs in the Why and Lukeville areas.
4. Proposing an increase in designated wilderness and development of an interagency regional wilderness and backcountry management plan to coordinate and enhance protection of wilderness-related values.
5. Realigning the trail network in the Quitobaquito Springs area.
6. Retaining existing development in the Twin Peaks area with some additions and change in the use of some buildings.
7. Increasing the amount of primitive camping and designated trails in the monument.
8. Full implementation of the monument's Natural and Cultural Resources Management Plan.

Visitor surveys and demand for camping at the Alamo Canyon Wash campground show increasing interest in a primitive camping experience, accessible by vehicle. During the heavy use period (late October through mid-April), this campground is almost always full. The existing campground currently contains four campsites, a composting/vault toilet, and a large parking area. Each campsite has a maximum user capacity of four persons per site, for a total campground capacity of 20 campers. To help accommodate visitor demand, the GMP proposes conduct a feasibility study to determine if additional campsites could be added. The sites would be located within the non-wilderness road corridor (150 feet from either side of road centerline), in previously disturbed areas, to the extent possible, and somewhat separated from other sites to offer a sense of privacy. Previously, the proposed action called for development of up to 4 campsites in this area. Though informal consultations with the Service, the NPS decided to reconsider this proposal because of the need for further study before determining the appropriate number and location of added sites, if any. Currently, a compacted area (roughly 3,500 square feet in size), encircled by large rocks, is located at the end of the access road and serves as a day-use parking and vehicle turn-around area. The GMP proposes to better delineate this parking area while restricting ground disturbance to the roadbed. To further manage visitor use, the existing social trail that follows an old road scar along the wash would be formalized into a designated hiking trail, about 2.25 miles in length. Because the parking area and trail would be constructed on previously disturbed ground, there would be no additional vegetation removed.

According to the Park Service, there are no actions proposed in the GMP that would directly affect the Sonoran pronghorn. All proposed facilities would be located within areas of existing development and would involve relatively small tracts of land surrounded by larger areas of undisturbed habitat. However, increased visitor use may lead to indirect effects on the Sonoran pronghorn. Increased use of some front and backcountry areas has the potential to adversely affect pronghorn if it causes an alteration in behavior and habitat use. Increased visitation to the

Monument is also expected to result in increased traffic along State Route 85, adding to the barrier effect that existing traffic patterns already present to pronghorn movements.

Approximately 22 miles of State Route 85 lie within the Monument. The Arizona Department of Transportation maintains the road and shoulders under a perpetual easement that applies to an area extending 35 feet from each side of the road centerline. ADOT is also responsible for establishing the speed limit and performing road improvements along the highway. Under a separate agreement, the State of Arizona Department of Public Safety and the Park Service share responsibility for patrolling the road and enforcing the posted speed limit of 55 mph within the monument.

The international port-of-entry at Lukeville is open from 6:00 AM until midnight each day. Average daily traffic on the road fluctuates but has generally increased in recent years. In 1992, ADOT reported average daily traffic counts of 940 vehicles on the section of State Route 85 within the Monument; in 1993 average daily traffic along this same section of highway fell to 728 vehicles, and in 1994, rose to 964 vehicles. Less than 25% of this traffic is attributed to Monument visitors.

Reasons for the increase in traffic are due to increased tourism in the region, including the Puerto Penasco area in northern Sonora, Mexico; the North American Free Trade Agreement (NAFTA); and increased visitation to the Monument. Actions proposed in the GMP that could further increase visitation and use of State Route 85 involve expanded visitor services and recreational opportunities including an increase in the number of trails (approximately 9 additional miles) and primitive camping opportunities (4 sites at Alamo Canyon campground and approximately 20 walk-in sites in the Twin Peaks area), as well as additional facilities offering interpretation and information to visitors particularly in the Why and Lukeville areas. Redesignation of the Monument to national park status is expected to cause a temporary surge in visitation. However, it is unknown if the increase would be long-term.

To help reduce the impact of State Route 85 on pronghorn, the Park Service proposes to do the following.

1. Pursue an agreement between the Park Service and Arizona Department of Transportation to establish a vehicle for continued communication regarding road-related issues, construct underpasses at known movement corridors to facilitate safe passage of pronghorn across the highway, and establish a program to explore other measures to better understand and subsequently reduce the impacts of State Route 85 on pronghorn.
2. Continue working with the Arizona Department of Public Safety to enforce the existing speed limit within the Monument.
3. Convert the bottom strands of the Monument's north and south boundary fences to smooth wire to encourage pronghorn movements between the Monument and surrounding areas.

4. Educate motorists about the plight of pronghorn using a variety of interpretive media in an effort to elicit lower speeds and increased awareness of wildlife use of the highway corridor.
5. Continue to serve as a member of the interagency Core Working Group for Sonoran pronghorn recovery and implement activities outlined in the recovery plan, including development of a monitoring program.
6. Monitor visitor use and restrict access where necessary to minimize the potential for disturbance to pronghorn.

STATUS OF THE SPECIES

Lesser long-nosed bat

The lesser long-nosed bat was listed (originally, as Sanborn's long-nosed bat) as endangered on September 30, 1988 (53 FR 38456). No critical habitat has been designated for this species. The lesser long-nosed bat is a small, leaf-nosed bat. It has a long muzzle and a long tongue. These features are adaptations to collect nectar from the flowers of columnar cactus, such as the saguaro and organ pipe, and from paniculate agaves (Hoffmeister, 1986). This migratory species is found throughout its historic range from southern Arizona, through western Mexico, and south to El Salvador. It occurs in southern Arizona from the Picacho Mountains southwest to the Agua Dulce Mountains and southeast to the Chiricahua Mountains and south to Mexico. Arizona roosts are occupied from late April to September (Cockrum and Petryszyn, 1991). Adult females, most of which are pregnant, and their recent young are the first to arrive, and they form maternity colonies at lower elevations near concentrations of flowering columnar cacti. After the young are weaned, these colonies disband in July and August; some females and young move to higher elevations, primarily in the southeastern parts of Arizona near concentrations of blooming paniculate agaves. Adult males are known mostly from the Chiricahua Mountains but also occur with adult females and young of the year at maternity sites (Fleming, 1994).

Loss of roost and foraging habitat, as well as direct taking of individual bats during animal control programs, particularly in Mexico, have contributed to the current status of the species. Suitable day roosts and suitable concentrations of food plants are the two resources that are critical for the lesser long-nosed bat (Fleming, 1994). As indicated above, the lesser long-nosed bat consumes nectar and pollen of paniculate agave flowers and the nectar, pollen, and fruit produced by a variety of columnar cacti. Caves and mines are used as day roosts. The factors that make roost sites useable have not yet been identified. Whatever the factors are that determine selection of roost locations, the species appears to be sensitive to human disturbance. Instances are known where a single brief visit is sufficient to cause a high proportion of lesser long-nosed bats to temporarily abandon their day roost and move to another. Perhaps most disturbed bats return to their preferred roost in a few days. However, the sensitivity suggests that the presence of alternate roost sites may be critical when human disturbance occurs. Interspecific interactions may also influence lesser long-nosed bat roost requirements.

Known major roost sites include 16 large roosts in Arizona and Mexico (Fleming, 1994). According to surveys conducted in 1992 and 1993, the number of bats estimated to occupy these sites was greater than 200,000. Twelve major maternity roost sites are known for Arizona and Mexico. According to the same surveys, the maternity roosts are occupied by over 150,000 lesser long-nosed bats. The numbers above indicate that although there may be relatively large numbers of these bats known to exist, the relative number of known large roosts is small. Disturbance of these roosts and the food plants associated with them could lead to the loss of the roosts. The limited numbers of maternity roosts may be the critical factor in the survival of this species.

Sonoran pronghorn

The Sonoran pronghorn is recognized as a distinct subspecies of the pronghorn (Antilocapra americana). It is distinguished from other subspecies by its small size, pale coloration, and distinctive cranial features (Goldman, 1945). The Sonoran pronghorn was listed as an endangered species on March 11, 1967. In Arizona, the Sonoran pronghorn occurs on the Cabeza Prieta National Wildlife Refuge (NWR), the Goldwater Range, and Organ Pipe Cactus National Monument, from Highway 85 west to the Cabeza Prieta Mountains and from approximately the Wellton-Mohawk Canal south to the Mexican border (Snow 1994, Service 1982). Recent unconfirmed sightings suggest some animals may occur on the Tohono O'odham Reservation and in the Lechuguilla Desert, west of the Cabeza Prieta Mountains, as well (Service 1994, J. Hervert, Arizona Game and Fish Department, Yuma, Arizona, pers. comm., 1996). In Sonora, the Sonoran pronghorn is known from near Sonoyta south to the Puerto Penasco area, east to the sandy plains around Bahia de San Jorge, and west into flats surrounding the Sierra de Pinacate (Service, 1994). The current range of the Sonoran pronghorn is estimated at more than 4.9 million acres (Service, 1994). Historically, the range of the Sonoran pronghorn may have been much larger, extending further west, possibly into the Yuma Desert, Imperial Valley of California, and northeastern Baja California; to north of the Gila River; east to the Baboquivari Mountains; and south to Bahia Kino or Guaymas (Service 1994, Hall and Kelson 1959, Hoffmeister 1986). However, precise determination of the historic range is precluded by a lack of specimens and the largely anecdotal nature of historic records.

Based on survey data collected from 1992 to 1994, an estimated 125 to 256 Sonoran pronghorn occur in Arizona and 179 to 313 occur in Sonora (Snow 1994, Service 1994). Data are insufficient to determine trends in population size (Service 1994). Pronghorn are typically found in broad, alluvial valleys. They inhabit creosote (Larrea tridentata) and bursage (Ambrosia deltoidea and A. dumosa) vegetation communities year round and more diverse vegetation associations from late winter to early fall (Service 1994). Hughes and Smith (1990) found Sonoran pronghorn in areas of approximately 11 percent perennial cover.

The diet of Sonoran pronghorn consists of a variety of plant materials, particularly cacti, such as fruits of jumping cholla (Opuntia fulgida); herbaceous species such as plantain (Plantago insularis) sources to Sonoran pronghorn is unknown. Hughes and Smith (1990) found no significant difference in distance of pronghorn localities to water between the wet and dry

seasons, implying that they do not congregate near water. Monson (1968) found no evidence that pronghorn drink water, even when it is available. Wright and deVos (1986) and J. Hervert (pers. comm. 1996) have documented Sonoran pronghorn at water sources on numerous occasions, but have only documented one instance of a Sonoran pronghorn drinking water.

Pronghorn become sexually mature at 12 to 16 months. Parturition occurs from February through May and animals rut from July to September (Kitchen and O'Gara 1982, Service 1994). Mean home range size is 56.1 square kilometers for males and 45.2 square kilometers for females (deVos 1990). At the onset of the hot, dry period in late spring, individual animals move distances of up to 50 km from lower, sparsely vegetated valleys to areas of more complex vegetation. With the onset of the summer rains, animals move back to areas with low vegetation diversity (deVos 1990).

The cause of population declines and extirpation from portions of its historic range include unregulated hunting in historic times, current illegal hunting in Sonora (Service 1994), degradation of habitat by livestock grazing, disturbance of habitat resulting from military ground-based activities, disturbance of animals caused by military overflights, loss of riparian habitat on the Gila River and the Rio Sonoyta that may have been important as foraging or watering areas, and conversion of habitat to agriculture, particularly in the Gila River Valley and Imperial Valley, California (deVos 1990, Service 1994, 1982). Pronghorn that frequent artificial or natural water sources may be subject to increased predation levels due to the concentration of predators near water (Service 1994). Total number of pronghorn is less than 600 and this subspecies lives in an extremely harsh desert environment that is subject to extended drought. As a result, the viability of the species is sensitive to environmental and demographic stochastic events.

A population viability analysis conducted with the program VORTEX suggested that three factors are especially important in determining population persistence. The variability in population size increased, and in some cases, populations went extinct if any of the following three variables were included in a simulation: five catastrophic events, such as drought, occurring in 100 years; annual mortality of females in excess of 60 percent; or female fawn mortality in excess of 60 percent (deVos 1995).

The Service finalized a recovery plan for the Sonoran pronghorn in 1982. The recovery objective was defined as "maintain existing population numbers and distribution of Sonoran pronghorn while developing techniques which will result in a U.S. population of 300 animals (average for a five-year period) or numbers determined feasible for the habitat." The recovery plan is currently being revised. The draft plan calls for downlisting the Sonoran pronghorn to threatened when the number of animals in Arizona reaches at least 500 and remains stable for a five year period, or when numbers are determined adequate to sustain the population through time (Service 1994).

Additional information on the taxonomy, range, distribution, biology, and threats to the Sonoran pronghorn can be found in Service (1994, 1982), Wright and deVos (1986), Hoffmeister (1986), Mearns (1907), Hughes (1991), Edwards and Ohmart (1981), deVos (1990), and Cockrum (1981).

Cactus ferruginous pygmy-owl

I. SPECIES DESCRIPTION

A. Listing history

The Service included the cactus ferruginous pygmy-owl (Glaucidium brasilianum cactorum) on its Animal Notice of Review as a category 2 candidate species throughout its range on January 6, 1989 (54 FR 554). After soliciting and reviewing additional information, the Service elevated G. b. cactorum to category 1 status throughout its range on November 21, 1991 (56 FR 58804). A category 1 species was, at that time, defined as a species for which the Service has on file substantial information to support listing, but for which a proposal to list has not been issued as it is precluded at present by other listing activities.

On May 26, 1992, a coalition of conservation organizations (Galvin et al. 1992) petitioned the Service, requesting listing of the pygmy-owl as an endangered subspecies under the Act. The petitioners also requested designation of critical habitat. In accordance with Section 4(b)(3)(A) of the Act, on March 9, 1993, the Service published a finding that the petition presented substantial scientific or commercial information indicating that listing may be warranted, and initiated a status review on the pygmy-owl (58 FR 13045). In conducting its status review, the Service solicited additional comments and biological data on the status of the cactus ferruginous pygmy-owl, through mailings, a notice in the Federal Register (58 FR 13045), and other means.

On December 12, 1994, the Service published a 12-month finding on the petitioned action (59 FR 63975). This finding indicated that listing of the cactus ferruginous pygmy-owl was warranted and a proposed rule was published on the same date to list the pygmy-owl as endangered in Arizona with critical habitat and as threatened in Texas without critical habitat. New information was received during comment periods indicating that population levels are higher in Arizona and Texas than were known at the time of the proposed rule. The Service determined that the Arizona population still warranted endangered status. Conversely, the new information indicated that listing the species as threatened in Texas was not warranted. Listing was finalized on March 10, 1997, and was effective on April 9, 1997.

B. Description and Range

The cactus ferruginous pygmy-owl is a small bird, approximately 17 centimeters (cm) (6 3/4 inches (in)) long. Males average 62 grams (2.2 ounces), and females average 75 grams (2.6 ounces). The cactus ferruginous pygmy-owl is reddish-brown overall, with a cream-colored belly streaked with reddish-brown. Some individuals are grayish, rather than reddish-brown.

The crown is lightly streaked, and paired black-and-white spots on the nape suggest eyes. There are no ear tufts, and the eyes are yellow. The tail is relatively long for an owl and is colored reddish-brown with darker brown bars. The call of this diurnal owl, heard primarily near dawn and dusk, is a monotonous series of short notes.

The cactus ferruginous pygmy-owl (Order Strigiformes--Family Strigidae) is one of four subspecies of the ferruginous pygmy-owl. It occurs 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. The northernmost record for the pygmy-owl is from New River, Arizona, approximately 55 km (35 mi) north of Phoenix. South of these regions and through Central America, G. b. ridgwayi replaces G. b. cactorum. Throughout South America, G. b. brasilianum is the resident subspecies (Fisher 1893, van Rossem 1937, Friedmann et al. 1950, Schaldach 1963, Phillips et al. 1964, de Schauensee 1966, Karalus and Eckert 1974, Oberholser 1974, Johnsgard 1988). Additionally, Konig and Wink (1995) have identified a fourth subspecies of pygmy-owl from central Argentina. This new subspecies is G. b. stranecki.

The cactus ferruginous pygmy-owl (hereafter "pygmy-owl" unless otherwise noted) was described by van Rossem (1937), based on specimens from Arizona and Sonora. It is distinguished from G. b. ridgwayi and G. b. brasilianum by its shorter wings and longer tail, and by generally lighter coloration (van Rossem 1937, Phillips et al. 1964). G. b. cactorum occurs in several color phases, with distinct differences between regional populations (Sprunt 1955, Burton 1973, Tyler and Phillips 1978, Hilty and Brown 1986, Johnsgard 1988). Some investigators (e.g., van Rossem 1937, Tewes 1993) have suggested that further taxonomic investigation is needed, primarily to determine whether the current G. b. cactorum comprises more than one subspecies. G. b. cactorum is widely recognized as a valid subspecies (e.g., Friedmann et al. 1950, Blake 1953, Sprunt 1955, Phillips et al. 1964, Monson and Phillips 1981, Millsap and Johnson 1988, Binford 1989). The American Ornithologists' Union (AOU) recognized G. b. cactorum in its 1957 Checklist of North American Birds (AOU 1957), but subsequent lists did not include subspecies (AOU 1983).

C. Critical Habitat

Critical habitat, including 290 river miles in Arizona, was included in the draft rule, but was determined to be not prudent in the final rule.

II. LIFE HISTORY

A. Nesting Ecology

The pygmy-owl nests in a cavity in a tree or large columnar cactus. Cavities may be naturally formed (e.g., knotholes) or excavated by woodpeckers. No nest lining material is used. The pygmy-owl has also nested in fabricated nest boxes (Proudfoot et al. 1994a, Proudfoot 1996). Three, four, five, and occasionally six eggs are laid (Bent 1938, Heintzelman 1979, Glenn

Proudfoot, Texas A&M University at Caesar Kleberg Wildlife Research Institute, unpubl. data 1996) and are incubated for approximately 28 days. The young fledge about 28 days after hatching. The pygmy-owl begins nesting activities in late winter to early spring. It is nonmigratory throughout its range (Bendire 1888, Griscom and Crosby 1926, Oberholser 1974, Johnson *et al.* 1979).

B. Habitat selection

The pygmy-owl occurs in a variety of subtropical, scrub, and woodland communities, including riverbottom woodlands, woody thickets ("bosques"), coastal plain oak associations, thornscrub, and desertscrub. Unifying habitat characteristics among these communities are fairly dense woody thickets or woodlands, with trees and/or cacti large enough to provide nesting cavities. Throughout its range, the pygmy-owl occurs at low elevations, generally below 1,200 meters (m) [4,000 feet (ft)] (Swarth 1914, Karalus and Eckert 1974, Monson and Phillips 1981, Johnsgard 1988, Enriquez-Rocha *et al.* 1993).

In the western portion of its range, the pygmy-owl appears to use riparian woodlands and bosques dominated by mesquite and cottonwood, Sonoran Desertscrub (usually with relatively dense saguaro cactus forests), and Sinaloan Deciduous Forest (van Rossem 1945, Phillips *et al.* 1964, Karalus and Eckert 1974, Millsap and Johnson 1988). Fisher (1893) found the pygmy-owl to be "quite common" in thickets of intermixed mesquite and saguaro cactus near the New River, Arizona. Prior to the mid-1900s, the pygmy-owl was also described as not "uncommon", "of common occurrence," and "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 *in* Bent 1938, Gilman 1909, Swarth 1914). Bendire (1988) noted that he had taken "several" along Rillito Creek near Fort Lowell, in the vicinity of Tucson, Arizona. The pygmy-owl also occurs in Sonoran Desertscrub associations in southern and southwestern Arizona, comprised of palo verde, ironwood, mesquite, acacia, bursage, and columnar cacti such as the saguaro and organpipe (Phillips *et al.* 1964, Davis and Russell 1984 and 1990, Monson and Phillips 1981, Johnson and Haight 1985a, Johnsgard 1988).

In the past, the pygmy-owl's occurrence in Sonoran Desertscrub was apparently less common and predictable. It was more predictably found in xeroriparian habitats (very dense desertscrub thickets bordering dry desert washes) than more open, desert uplands (Monson and Phillips 1981, Johnson and Haight 1985a, Johnson-Duncan *et al.* 1988, Millsap and Johnson 1988, Davis and Russell 1990). The pygmy-owl was also noted to occur at isolated desert oases supporting small pockets of riparian and xeroriparian vegetation (Howell 1916, Phillips *et al.* 1964).

Both riparian and desertscrub habitats are likely to provide several requirements of the pygmy-owl ecology. Trees and large cacti provide cavities for nesting and roosting. Also, these habitats along watercourses are known for their high density and diversity of animal species that constitute the pygmy-owl's prey base (Carothers 1977, Johnson *et al.* 1977, Johnson and Haight

1985b, Stromberg 1993). In addition, the dense vegetation along these washes provides protective cover from aerial predators.

In central and southern Arizona, the pygmy-owl's primary habitats were riparian cottonwood (*Populus* spp.) forests, mesquite bosques, and Sonoran desertscrub, but the subspecies currently occurs primarily in Sonoran Desertscrub associations of palo verde (*Cercidium* spp.), bursage (*Ambrosia* spp.), ironwood (*Olneya tesota*), mesquite (*Prosopis juliflora*), acacia (*Acacia* spp.), and giant cacti such as saguaro (*Cereus giganteus*), and organpipe (*Cereus thurberi*) (Gilman 1909, Bent 1938, van Rossem 1945, Phillips *et al.* 1964, Monson and Phillips 1981, Johnson-Duncan *et al.* 1988, Millsap and Johnson 1988). Farther south in northwestern Mexico, the pygmy-owl occurs in Sonoran Desertscrub, Sinaloan Thornscrub, and Sinaloan Deciduous Forest as well as riverbottom woodlands, cactus forests and thornforest (Enriquez-Rocha *et al.* 1993). The pygmy-owl's diet includes birds, lizards, insects, small mammals (Bendire 1888, Sutton 1951, Sprunt 1955, Earhart and Johnson 1970, Oberholser 1974), and frogs (Proudfoot *et al.* 1994b).

III. Population Dynamics

A. Population size

Hunter (1988) found fewer than 20 verified records of pygmy-owls in Arizona for the period of 1971 to 1988. Although pygmy-owls are diurnal and frequently vocalize in the morning, the subspecies was not recorded or reported in any breeding bird survey data in Arizona (Robbins *et al.* 1986). Formal surveys for the pygmy-owl on Organ Pipe Cactus National Monument began in 1990, with one bird located that year. Beginning in 1992, survey efforts on the Monument were conducted in cooperation with the Arizona Game and Fish Department (AGFD). In 1992, surveys located three single pygmy-owls in Arizona (Fish and Wildlife Service and National Park Service, unpubl. data 1992). In 1993, more extensive surveys again located three single pygmy-owls in Arizona (AGFD unpubl. data 1993, Felley and Corman 1993). During 1993-1994 surveys, one pair of owls was detected in north Tucson, near the sightings in 1992 and 1993 (Collins and Corman 1995). Two individual owls were found in northwest Tucson during 1995 surveys, and an additional owl was detected at Organ Pipe Cactus National Monument (Lesh and Corman 1995).

In 1996, the AGFD focused survey efforts in northwest Tucson and Marana, and detected a total of 16 birds, two of which were a pair, and two of which were fledged young. An additional three pygmy-owls were detected on Organ Pipe Cactus National Monument in 1996, with three additional but unconfirmed reports (Harold Smith, National Park Service, Organ Pipe Cactus National Monument, *in litt.* 1996). So far in 1997, a total of 8 birds has been detected. Two pygmy-owls have been observed on Organ Pipe Cactus National Monument and six others have been observed in northwest Tucson.

While additional individual birds have been identified since the proposed rule was published, total individuals in Arizona are still extremely low at under 20 (Abbate 1996).

B. Population variability

The available information indicates that distinct eastern and western populations of the pygmy-owl may be defined. The pygmy-owl occurs along the lower Rio Grande River and the coastal plain of southern Texas and northeastern Mexico. It also occurs in lowland areas of northwestern Mexico and southern Arizona. The pygmy-owl's elevational distribution, the distribution of habitat, and recorded locations indicate that these eastern and western ranges of the pygmy-owl are geographically isolated from one another and are ecologically distinct. In the U.S., the eastern and western portions of the pygmy-owl's range are separated by the basin-and-range mountains and intervening Chihuahuan Desert basins of southeastern Arizona, southern New Mexico, and western Texas. Although Grossman and Hamlet (1964) suggested that the pygmy-owl's range included this U.S.-Mexico border region, the pygmy-owl has never been recorded in this 805 kilometer (km) [500-mile (mi)] wide area (Bailey 1928, Phillips *et al.* 1964, Oberholser 1974, Sartor O. Williams, New Mexico Department of Game and Fish, *in litt.* 1991).

In Mexico, the eastern and western populations are separated by the highlands of the Sierra Madre Oriental and Occidental, and the Mexican Plateau. The pygmy-owl is considered rare on the Mexican Plateau and/or above elevations of 1,200 m (4,000 ft) on the west, and above 300 m (1,000 ft) on the east (Friedman *et al.* 1950). Some sources describe the eastern and western ranges as contiguous at the southern end of its range, near the southern end of the Mexican Plateau in central Mexico (Johnsgard 1988). Other sources describe these two ranges as being disjunct (Burton 1973). In his description of the subspecies, van Rossem (1937) found that Texas specimens exhibited characteristics of both *G. b. cactorum* and *G. b. ridgwayi*. Ultimately, he did not assign Texas ferruginous pygmy-owls to *G. b. cactorum*, but noted that Ridgway (1914, in Van Rossem 1937) considered them distinct from *G. b. ridgwayi*, and left the taxonomy of Texas pygmy-owls to be *G. b. cactorum* (e.g., Oberholser 1974, Millsap and Johnson 1988).

In addition to geographic separation, the pygmy-owl's eastern and western populations occupy different habitats. Although some broad similarities in habitat physiognomy are apparent (e.g., dense woodlands and thickets), floristically these eastern and western habitats are very dissimilar. The desertscrub and thornscrub associations in Arizona and western Mexico are unlike any habitats occupied by the pygmy-owl in eastern Mexico and southern Texas. Also, the oak association habitat occupied on coastal plains in southern Texas is unlike any habitat available in the western portion of the pygmy-owl's range. However, the Tamaulipan Thornscrub habitat of the east and the riverbottom mesquite-cottonwood bosque habitat once found in Arizona are more similar in physiognomy and to a slight degree in floristic makeup.

The potential for genetic distinctness further supports a distinction between eastern and western pygmy-owl populations. The fact that the pygmy-owl is nonmigratory throughout its range suggests that genetic mixing across wide areas may be infrequent. Considerable variation in plumage between regional populations has been noted, including specific distinctions between

Arizona and Texas pygmy-owls (van Rossem 1937, Burton 1973, Tyler and Phillips 1978, Johnsgard 1988).

The above information indicates that eastern and western populations of the cactus ferruginous pygmy-owl are distinct, based on geographic isolation, distribution and status of habitat, and potential morphological and genetic distinctness. Further, the status of the subspecies in Mexico is currently unclear (see discussion under "Factor A" below).

To date, the Service is aware of only one genetic study completed on pygmy-owls in the United States. Using toe clippings or blood samples, Zink *et al.* (1996) extracted DNA from pygmy-owls on the Norias Division of the King Ranch and from Rio Corona, Tamaulipas, Mexico. Data obtained from this study indicate that there is very little genetic difference between birds on the King Ranch and those in Tamaulipas, Mexico, and the authors concluded that any division between the two populations would therefore have occurred recently, likely within the last 75 years.

C. Population stability

Environmental stochasticity, demographic stochasticity, catastrophes, and genetic stochasticity are recognized as interacting factors that might 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. Catastrophes are events such as droughts or hurricanes that occur randomly. Genetic stochasticity is the random variation in gene frequencies of a population due to genetic drift, bottlenecks, inbreeding, and similar factors. When these factors interact with one another, there are likely to be positive feedback loops, or "snowballing" 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 does not have the ability to resist change or dramatic fluctuations over time caused by one or more of the factors mentioned above.

IV. Status and distribution

A. Reasons for listing and range wide trend

1. The present or threatened destruction, modification, or curtailment of its habitat or range. The pygmy-owl is threatened by past, present, and potential future destruction and modification of its habitat, throughout a significant portion of its range in the U.S., and, to a less well-known extent, in portions of its range in Mexico (Phillips *et al.* 1964, Oberholser 1974, Johnson *et al.* 1979, Monson and Phillips 1981, Johnson and Haight 1985a, Hunter 1988, Jahrsdoerfer and Leslie 1988, Millsap and Johnson 1988, Ditto 1993, Tewes 1993, Mays 1996). The severity

of habitat loss and threats varies across the pygmy-owl's range. Population numbers have been drastically reduced in Arizona, which once constituted its major U.S. range. In Texas, the pygmy-owl has been virtually extirpated from the lower Rio Grande valley but persists in oak associations on the coastal plain north of the Rio Grande valley. The majority of these losses are due to destruction and modification of riparian and thornscrub habitats. It is estimated that between 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 urban and agricultural encroachment, woodcutting, water diversion and impoundment, channelization, livestock overgrazing, groundwater pumping, and hydrologic changes resulting from various land-use practices (e.g., Phillips *et al.* 1964, Carothers 1977, Kusler 1985, AGFD 1988a, DOI 1988, General Accounting Office 1988, Jahrsdoerfer and Leslie 1988, Szaro 1989, Dahl 1990, State of Arizona 1990, Bahre 1991). Status information for Mexico is very limited, but some observations suggest that although habitat loss and reduced numbers are likely to have occurred in northern portions of the two subspecies in Mexico, the pygmy-owl persists as a locally common bird in southern portions of Mexico. Habitat loss and population status are summarized below for the four populations of the pygmy-owl.

The trend of Sonoran Desertscrub habitats and pygmy-owl occupancy is not as clear. Historical records from this habitat in Arizona are few. This may be due to disproportionate collecting along rivers where humans were concentrated, while the upland deserts were less intensively surveyed. Johnson and Haight (1985a) suggested that the pygmy-owl adapted to upland associations and xeroriparian habitats in response to the demise of Arizona's riverbottom woodlands. However, conclusive evidence to support this hypothesis is not available. It may be that desertscrub habitats simply are of lesser quality and have always been occupied by pygmy-owls at lower frequency and density (Johnson and Height 1985b, Taylor 1986). While historical records of pygmy-owls do exist for Sonoran Desertscrub in areas such as the Santa Catalina foothills, they generally note that the birds are rare in these areas (Kimball 1921).

The pygmy-owl has declined throughout Arizona to the degree that it is now extremely limited in distribution in the State (Davis and Russell 1979, Johnson *et al.* 1979, Monson and Phillips 1981, AGFD 1988a, Johnson-Duncan *et al.* 1988, and Millsap and Johnson 1988). Riverbottom forests and bosques, which supported the greatest abundance of pygmy-owls, have been extensively modified and destroyed by clearing, urbanization, water management, and hydrological changes (Willard 1912, Brown *et al.* 1977, Rea 1983, Szaro 1989, Bahre 1991, Stromberg *et al.* 1992, Stromberg 1993). Cutting for domestic and industrial fuelwood 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. 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, also in what is now Tucson. Only remnant fragments of these bosques remain. Cottonwoods were also felled for fuelwood, fenceposts, and for the bark, which was used as cattle feed (Bahre 1991). 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 1993). Sonoran Desertscrub has been affected to varying degrees by urban and agricultural development, woodcutting, and livestock grazing (Bahre 1991).

In addition to clearing woodlands, 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 1993). 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., the Colorado, Gila, Salt, and Verde) have altered riparian habitat downstream of dams through hydrological and vegetational changes, and have inundated habitat upstream.

Livestock overgrazing in riparian habitats is one of the most common causes of riparian degradation (e.g., Ames 1977, Carothers 1977, Behnke and Raleigh 1978, Forest Service 1979, General Accounting Office 1988). Effects of overgrazing include changes in plant community structure, species composition, relative species abundance, and plant density. These changes are often linked to more widespread changes in watershed hydrology (Brown *et al.* 1977, Rea 1983, GAO 1988), and are likely to affect the habitat characteristics critical to the pygmy-owl.

2. Overutilization for recreational purposes. The pygmy-owl is highly sought by bird watchers, who concentrate at several of the remaining known locations of pygmy-owls in the United States. Limited, careful bird watching is probably not harmful; however, excessive attention by bird watchers may at times constitute harassment and affect the occurrence and behavior of the pygmy-owl (Oberholser 1974, Tewes 1993). For example, in early 1993, one of the few areas in Texas known to support the pygmy-owl continued to be widely publicized (American Birding Association 1993). The resident pygmy-owls were detected at this highly-visited area only early in the breeding season and then disappeared. O'Neil (1990) also indicated that five birds initially detected in southern Texas failed to respond after repeated visits by birding tours. Oberholser (1974) and Hunter (1988) additionally indicated that, in southern Texas, recreational birdwatching may disturb owls at highly visited areas.

3. Disease or Predation. One disease potentially affecting the pygmy-owl, as identified by the AGFD (D. Shroufe, *in litt.* 1996), is trichomoniasis. Because owls prey on finches, sparrows, and other seed-eating birds known to carry trichomoniasis, they have a higher risk of contracting the disease. According to Boal and Mannan (1996), raptors in urban areas experience a higher exposure rate to trichomoniasis, and the result is high mortality of raptor nestlings. No studies have been completed to date on the pygmy-owl in urban or other areas to determine if, in fact, pygmy-owls have been affected by this disease.

Recent work by Proudfoot (1996) indicates that snake predation may be an additional factor adversely affecting the pygmy-owl population in Texas on the Norias Division of the King Ranch. Proudfoot noted that nest boxes previously containing eggs would later be discovered

empty, without sufficient time having elapsed to allow for fledging to occur. A lack of egg shell remains in nest boxes may indicate that snakes have predated nests containing pygmy-owl eggs. Although long-tailed weasels (Mustela frenata) also occur in this study area, the lack of egg shell remains and the nest box configuration indicate that weasels are not likely to have eaten the eggs. Nest boxes are typically 14 x 14 x 46 cm (5.5 x 5.5 x 18 in) with a 5.13 cm (2.0 in) entrance hole placed 31 cm (12 in) above the box bottom.

Proudfoot (1996) has observed the indigo snake (Drymarchon corais) climbing trees on the King Ranch and notes that the indigo snake is known to prey on cavity nesting green-cheeked Amazon parrots (Amazona viridigenalis). Proudfoot notes that, from 1993 to 1996, eight out of 112 available nest boxes (or 232 nest box opportunities) were used. Where flashing was placed around trees to prevent the possibility of predation by snakes, eggs were not disturbed. For the four nest boxes left unprotected, three were predated before the eggs hatched, while one was predated following hatching. Proudfoot further noted that fecundity (the number of young successfully raised per year), for natural cavities was approximately one-third that of fecundity for nest boxes, and speculates that eggs and birds in natural cavities were likely to have been predated by both snakes and long-tailed weasels, resulting in a lower fecundity rate (G. Proudfoot, pers. comm. 1996).

4. The inadequacy of existing regulatory mechanisms. The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) is the only direct, current Federal protection provided for the cactus ferruginous pygmy-owl. The MBTA prohibits "take" of any migratory bird. "Take" is defined as "... to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect". However, unlike the Endangered Species Act, there are no provisions in the MBTA preventing habitat destruction unless direct mortality or destruction of active nests occur.

The Federal Clean Water Act contains provisions for regulating impacts to river systems and their tributaries. These mechanisms have been insufficient to prevent major losses of riparian habitat, including habitats occupied by the pygmy-owl.

The Barry M. Goldwater Range, which overlaps the historical distributional range of the pygmy-owl, has an existing policy stating that, for any species that have been identified as State or Federal species of concern, the range will be inventoried, and potential impacts to those species analyzed with other information gathered. Projects can then be modified to avoid or minimize impacts to the species. The Goldwater Range also has identified any habitats that are unique or significant on the range, including desert washes, bajadas, and dunes. The Goldwater Range additionally has the flexibility to create management plans for any species of concern; however, no such policy currently exists for the pygmy-owl.

Organ Pipe Cactus National Monument (OPCNM), the second major location for pygmy-owls in the State of Arizona, provides protection for the pygmy-owl, as it does for all other natural and cultural resources. This protection has been compared as similar to the takings prohibitions of the MBTA and wildlife taking regulations for the State of Arizona (H. Smith, in litt. 1996).

The State of Arizona lists the ferruginous pygmy-owl (subspecies not defined) as endangered (AGFD 1988). However, this designation does not provide special regulatory protection. Arizona regulates the capture, handling, transportation, and take of most wildlife, including G. b. cactorum, through game laws, special licenses, and permits for scientific investigation. There are no provisions for habitat protection under Arizona endangered species law.

Most Federal agencies have policies to protect species listed by States as threatened or endangered, and some also protect species that are candidates for Federal listing. However, until agencies develop specific protection guidelines, evaluate their effectiveness, and institutionalize their implementation, it is uncertain whether any general agency policies adequately protect the pygmy-owl and its habitat.

No conservation plans or habitat restoration projects specific to the cactus ferruginous pygmy-owl exist for lands managed by the U.S. Government, Native American entities, State agencies, or private parties. The Forest Service, Bureau of Land Management, and Bureau of Reclamation have focused some attention on modifying livestock grazing practices in recent years, particularly as they affect riparian ecosystems. Several of these projects are in the former range of the pygmy-owl, including some historical nesting locations. In addition, some private landowners in Southern Texas are accommodating and funding research and have expressed an interest in carrying out conservation measures to benefit the pygmy-owl.

5. Other natural or unnatural factors affecting its continued existence. Environmental stochasticity, demographic stochasticity, catastrophes, and genetic stochasticity are recognized as interacting factors that might contribute to a population's extinction (Hunter 1996).

In addition, the data indicate low levels of genetic variation in the pygmy-owls. Populations without genetic variation are often considered imperiled due to either the effects of low population numbers, increased chances of inbreeding, or both (Soule 1986, Meffe and Carroll 1994).

Pesticides may pose an additional threat to the pygmy-owl, as it occurs in floodplain areas that are now largely agricultural. Jahrsdoerfer and Leslie (1988) note that >100 pesticides are used on agricultural crops throughout the lower Rio Grande Valley, with use beginning in the late 1940s. Pesticide application occurs year-round. Because crops, such as cotton, are grown repeatedly year after year, an accumulation of resistant pesticides may result.

Pesticide contamination is described as "widespread" throughout the inland waters of the lower Rio Grande Valley, and includes concentrations of DDT, dieldrin, endrin, lindane, endosulfan, Guthion, and PCBs which exceeded 1976 EPA criteria for propagation of fish and wildlife. Without appropriate precautions, these agents may potentially affect pygmy-owls through direct toxicity or effects on their food base. No quantitative data on the effects of this potential threat on the pygmy-owl are known at this time, however, the effects of pesticides such as DDT on the reproductive success of other bird species are well known.

The pygmy-owl nests in cavities excavated by woodpeckers in trees or large cacti. Some sources (AGFD 1988) believe that increasing competition with exotic European starling (*Sturnus vulgaris*) for nest cavities may be a threat to cavity nesters like the pygmy-owl. Starlings were first reported as occurring in Arizona in 1946 (Monson 1948).

An additional potential threat to the pygmy-owl is low recruitment. Recruitment is the number of young who survive long enough to leave the nest per nesting attempt. Proudfoot (1996) found through a study of four active nest cavities that only one was successful in fledging young. The recruitment rate for this study was therefore 1.0 (four nesting attempts with four young fledging from one nest, while the other three nests failed). We do not know what recruitment rate would be necessary for the pygmy-owl because of the lack of information on reproduction, longevity, natality, and mortality for this subspecies. However, Proudfoot estimated that, based on information for the eastern screech owl (*Otus asio*), a recruitment rate of 2.25 was necessary for a stable pygmy-owl population.

B. Future threats

Potential future threats to pygmy-owl habitat in Arizona persist. Through the public comment period, the Service was made aware of five specific housing and development projects operating or in the planning stages that would affect habitat where the majority of birds in Arizona currently exist. Housing and industrial development continue to expand in the Tucson area, and the northwest portion of the Tucson area is experiencing rapid growth. It was estimated that only 60 percent of the people living in the Tucson area are in the City of Tucson itself, even though the city limits continue to be expanded to keep up with urban expansion (Sierra Club 1988, Duane Shroufe, AGFD, in litt. 1996).

The AGFD (D. Shroufe, in litt. 1996) has estimated the number of suitable habitat acres (ac) in the northwest Tucson area, where the majority of birds for the western population are found, to be 22,032 hectares (ha) (54,400 ac). Surveys completed in 1996 covered 44.2 km² (17.0 mi²) of this area (Abbate 1996). The AGFD notes that, while 60 percent of this land is in State Trust or BLM ownership, much of the land may be subject to development as the Town of Marana is developing a General Plan for future growth that may incorporate these areas. In addition, the BLM is evaluating a proposal to sell all of its land within this area to a developer.

At Organ Pipe Cactus National Monument, potential threats include the increased risk of wildfire associated with invasion of the Organ Pipe Cactus National Monument by non-native grasses such as red brome (*Bromus tectorum*) and buffelgrass (*Pennisetum ciliare*). An additional threat in this area is the increasing visitation and through-traffic from the international port of entry at Lukeville (H. Smith, in litt. 1996).

In addition, expanding human populations in the border region are expected to continue to increase impacts and threats discussed above. Further, extensive industrial, municipal, and agricultural developments facilitated by NAFTA are anticipated along the U.S.-Mexico

International border. These developments may result in accelerated habitat loss and demands on groundwater.

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 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.

Lesser long-nosed bat

The lesser long-nosed bat is a seasonal resident in the monument, visiting between April and September. In 1989, the largest known maternity colony in the United States, consisting of approximately 20,000 bats, was discovered roosting in an abandoned mine adit near Alamo Canyon. The Park Service has instituted an annual monitoring program to obtain data on the colony including its size, productivity, diet, and habitat requirements. However, no monitoring results were provided for the consultation.

Sonoran pronghorn

Organ Pipe Cactus National Monument is within the historic and current range of the Sonoran pronghorn. Prior to a recent verified sighting of two pronghorn just west of State Route 85 near the Alamo Canyon road in mid-August 1995, the last verified observation of a pronghorn near this highway was a carcass found on Ajo Mountain Drive in 1972. There is an unconfirmed report of four Sonoran pronghorn crossing SR 85 in August 1993, approximately 1.5 km north of the monument visitor center. Although observations along SR 85 have been limited in recent decades, pronghorn were supposedly not uncommon along the highway and throughout the Sonoyta Valley as recently as the 1960s. Long-time residents reported seeing more Sonoran pronghorn along the highway near Ajo and south in the Valley of the Ajo in previous decades.

Cactus ferruginous pygmy-owl

Organ Pipe National Monument is within the historic range of the pygmy-owl and is one of the few places in Arizona where owls are consistently detected. Pygmy-owl presence has been surveyed within the action area since 1977 when two pairs were recorded. In 1982, one pair of pygmy-owls was found followed by two pairs in 1985, and one individual was found in 1992. No pygmy-owls were confirmed in the action area during any of the 8 surveys conducted

between November 1994 and April 1997. However, one probable and one possible pygmy-owl were detected along with unconfirmed sightings in 1995 and 1996 (Tim Tibbitts pers comm. 1997).

EFFECTS OF THE ACTION

Lesser long-nosed bat

Three actions proposed in the plan have the potential to increase visitor use in the Alamo Canyon area and could possibly lead to human disturbance at the nearby maternity roost. These actions include: expanding the campground by four sites, establishing a formal day-use parking area within the existing roadbed, and formalizing an existing social trail (an old road scar) into a designated trail. No restrictions would be placed on visitor use of the Alamo Canyon area.

Lesser long-nosed bat colonies appear to be sensitive to human disturbance. The highly gregarious roosting behavior of the lesser long-nosed bat makes it vulnerable to catastrophic population loss caused by human disturbance. Such disturbance could have potentially adverse effects on the species' survival if it resulted in abandonment of a major roost or decline in juvenile survivorship or recruitment. The proximity of the maternity roost to Alamo Canyon Campground, located 2.25 miles away, coupled with the fact that features such as mine adits are attractive destinations for hikers, increases the potential for human-induced disturbance at the roost site. The Park Service stated that previous indications are that little, if any, visitation presently occurs at the site, particularly at the time of year when bats are present. Specifically, the Park Service stated that in the past five years, Monument staff have suspected only three or four unauthorized entries, and disturbance of the resident bats was detected only once in 1995, when barn owls were found nesting in the adit and preying on the bats.

The entrance to the adit is currently fenced with four-strand barbed wire and signed in both Spanish and English as a dangerous site. To prohibit entry, the Park Service proposes a more permanent closure to minimize potential disturbance on the maternity colony. A "bat friendly" grate would be placed at each opening of the adit that would allow bats unimpeded access to the mine's interior, while prohibiting human entry.

Sonoran pronghorn

Observations of pronghorn movements suggest that traffic along SR 85 may act as a barrier to pronghorn, restricting their movements to areas east of the highway. Not only is the highway a possible deterrent to expanding pronghorn populations, but the resulting modified behavior patterns may lead to a reduction in genetic exchange, reduced viability, and the ability to adapt to environmental change.

To reduce wildlife mortality and habitat fragmentation along SR 85, the Park Service proposes to work with state and federal agencies to develop a research program examining the effectiveness of various traditional and innovative measures aimed at reducing wildlife mortality and facilitating

safe passage across the roadway. Some of the traditional methods to be examined include bridge construction and placement of oversized culverts beneath the roadway; vegetation removal along road shoulders; and educating motorists about wildlife use of the road corridor through various interpretive media, including road signs and wayside exhibits. Because fenced highways have been shown to fragment pronghorn habitat and isolate herds, the Park Service does not support their use to keep animals off SR 85 or to guide them to culverts. Because the effectiveness of techniques varies, the Park Service would not rely on any one method exclusively. Measures proven to be effective would be applied on a limited basis and further environmental analysis completed before expanding their use on a broader scale. In the meantime, the Park Service would continue working with the Arizona Department of Transportation towards enforcing the existing speed in the Monument.

The Park Service examined the effectiveness of various mitigation strategies at reducing the barrier that State Route 85 currently presents to pronghorn. Eleven methods traditionally used to decrease wildlife-vehicle accidents and facilitate safe passage across highways were examined. These methods included driver education, speed and traffic volume reductions, vegetation removal along road shoulders, construction of underpasses and overpasses, and the use of fencing, lighting, warning signs, reflectors, and ultrasonic devices.

Several methods were dismissed by the Park Service from further consideration due to their impracticality (e.g., installation of ultrasonic devices on vehicles), or because of their incompatibility with the Monument's wilderness values (e.g., highway lighting would be a source of light pollution and degrade night sky visibility; overpasses would provide a visual intrusion that would be conspicuous from many miles away. Other measures were dropped from consideration due to public controversy and because they were beyond the Park Service's control (e.g., speed limit reductions; reducing traffic volume by rerouting non-monument traffic outside the park). Because fenced highways have been shown to fragment pronghorn habitat and isolate herds, this technique was also dismissed from further study by the Park Service. The Park Service did consider driver education, construction of underpasses, vegetation removal along road shoulders, and use of warning signs and reflectors for implementation.

Vegetation removal along road shoulders would cause further habitat losses and may increase the barrier that SR 85 presents to pronghorn. Although bridge construction and culvert placement would focus on areas of known wildlife use, such as xeroriparian corridors (i.e., washes), some pronghorn may have difficulty locating or may simply refuse to enter culverts. Moreover, any gains experienced by ensuring safe passage across the highway could be offset by a potential increase in predator-related mortality. Such structures could serve as a predator trap, allowing mountain lions and coyotes to successfully ambush pronghorn at culvert openings. Because pronghorn, like other animals, are not restricted to xeroriparian habitats, the Park Service believes that increased efforts to educate motorists and enforce the existing speed limit may have the most impact on reducing the potential for vehicle-related mortality.

The Park Service stated that despite efforts to educate motorists, enforce the existing speed limit, and create underpasses to facilitate safe passage across State Route 85, such measures may do

little in alleviating the barrier that existing and future traffic patterns will present to Sonoran pronghorn. Pronghorn may still avoid the highway corridor due to the visual and noise disturbance associated with the heavy volume of traffic traveling at high speeds. Although response of Sonoran pronghorn to moving vehicles and other ground-based activities has not been rigorously investigated, some information exists.

DeVos (1989) investigated the relationship of telemetered Sonoran pronghorn localities to the proximity of "concentrated military activities" on the Goldwater Range. Numbers of localities were found to be greater than expected particularly in areas within 200 meters of military zones and were less than expected in areas 1,600 to 6,400 meters from military zones. The author attributed the latter to the fact that many pronghorn were initially captured on the Cabeza Prieta NWR and at Organ Pipe Cactus National Monument, at points distant from military activity, and would not be expected to occur near military zones. The author concludes that "it appears that the data from radio-collared pronghorn indicates that the presence of a military use zone is not a factor in determining habitat use by Sonoran pronghorn." However, as the author noted in regards to the paucity of localities at points distant from military zones, the localities of telemetered animals are probably related to the point of initial capture. Moreover, the use patterns and movements of the telemetered animals may or may not be representative of Sonoran pronghorn in general. The data presented by DeVos (1989) do show that pronghorn can be found very close to and within areas of intensive military use. However, it does not indicate whether animals alter habitat use patterns or avoid, to some degree, active military zones.

Evidence suggests that ground-based activities, such as those of troops and vehicles at ground-support areas are likely to affect pronghorn habitat use. Sonoran pronghorn typically become alarmed and flee if humans on foot or vehicles approach closely (Laura Thompson-Olais, pers. comm. 1996). Wright and DeVos (1986) noted that Sonoran pronghorn exhibit "a heightened response to human traffic" as compared to other subspecies of pronghorn. They noted that "once aware of an observer, Sonoran pronghorn are quick to leave the area. One herd was observed 1 ½ hours later 18 kilometers north of the initial observation in October 1984. Other pronghorn have run until out of the observer's sight when disturbed." Hughes and Smith (1990) noted that on all but one occasion, pronghorn ran from their vehicle and continued to run until they were out of sight. Locality records suggest that Sonoran pronghorn may avoid towns, highways, agriculture, and fences. All of this information indicates that Sonoran pronghorn would be expected to avoid areas where human use is occurring. In addition, encampments and years of repeated use by vehicles and troops have caused considerable surface disturbance and areas of "moondust" or highly eroded soils in ground-support areas (Dames and Moore 1995). This disturbance would be expected to reduce both perennial and ephemeral forage availability. Sonoran pronghorn move, in part, in response to forage availability (Wright and DeVos 1986); thus areas of intensive ground activities may be avoided by pronghorn because of reduced forage availability as well as to avoid interactions with humans. In addition, oil and other hazardous materials spills could damage vegetation and create hazards for pronghorn and other animals.

Disturbance and flight of ungulates are known to result in a variety of physiological effects that are adverse, including elevated metabolism, lowered body weight, reduced fetus survival, and

withdrawal from suitable habitat (Geist 1971). Mule deer disturbed by snowmobiles and humans on foot expended from 0.2 to 5.0 percent of their daily metabolizable energy in each encounter (Freddy et al. 1986). Frequent disturbance imposes a burden on the energy and nutrient supply of animals (Geist 1978), which may be exacerbated in harsh environments such as the Goldwater Range. Repeated stimuli commonly leads to habituation and reduced response (Harris 1943); however, animals should habituate reluctantly to stimuli that pose a threat (MacArthur et al. 1979). White-tailed deer, mule deer, and mountain sheep did not exhibit signs of habituation to persons on foot (Freddy et al. 1986, MacArthur et al. 1982, Moen et al. 1982). The physiological responses of Sonoran pronghorn to human disturbance has not been studied; however, these and other ungulate studies suggest that human disturbance may result in a number of adverse physiological changes.

A continued increase in traffic levels along highway 85 due, in part, to an anticipated increase in Monument visitation, may adversely affect the Sonoran pronghorn by continuing to restrict pronghorn movements, which could lead to a reduction in genetic exchange and therefore a reduction in viability of the already small population.

Cactus ferruginous pygmy-owl

Two actions proposed in the plan have the potential to increase visitor use in the Alamo Canyon area, and therefore increase disturbance to the pygmy-owl. These actions include: establishing a formal day-use parking area within the existing roadbed, and formalizing an existing social trail (an old road scar) into a designated trail. No restrictions would be placed on visitor use of the Alamo Canyon area.

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 adult owls. An increase in visitation could result in any of the above. However, the establishment of a formal day-use parking area and a formal trail is likely to keep habitat degradation to a minimum by encouraging visitors to park in the designated parking area and to stay on the trail. A very low level of take through harassment by visitors walking within territories is expected.

The Monument plans to conduct a feasibility study to determine if any campsites could be added at Alamo Canyon Wash. The Service believes a well planned feasibility study that includes a research program aimed at learning more about the bird will have beneficial effects on the conservation of this species. It is estimated that the number of pygmy-owls in Arizona is an estimated 11 individuals in 1997. In such low numbers, it would be impossible for the owls to occupy all suitable habitat. If we can determine what vegetation parameters are selected by the pygmy-owls, we will be more able to identify areas that need to be protected. Continuing to alter suitable pygmy-owl habitat would preclude the owl's recovery because, as the population began to increase, the owls would have no place to which they could emigrate.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, 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 ESA. No non-federal actions are expected within the action area.

CONCLUSION

After reviewing the current status of the lesser long nosed bat, the Sonoran pronghorn and the cactus ferruginous pygmy-owl, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the lesser long-nosed bat, the Sonoran pronghorn, or the cactus ferruginous pygmy-owl. No critical habitat has been designated for these species, therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as 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 any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. 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 a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The National Park Service has a continuing duty to regulate the activity covered by this incidental take statement. If the National Park Service (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

The Service anticipates incidental take of lesser long-nosed bats will be difficult to detect because the species is wide-ranging, crepuscular, has small body size; finding a dead or impaired specimen is unlikely; losses may be masked by seasonal fluctuations in numbers; and the species occurs in habitat that makes detection difficult. However, the following level of take of this species can be anticipated. Take is expected to occur if unauthorized human disturbance of the roost occurs. If, through continuing monitoring efforts, the Park Service discovers that at least one unauthorized entry to the roost has occurred, then re-initiation regarding this project is required.

The Service anticipates incidental take of Sonoran pronghorns will be difficult to detect because the species is wide-ranging; finding a dead or impaired specimen is unlikely; losses may be masked by seasonal fluctuations in numbers; and the species is sparsely distributed in habitat that makes detection difficult. However, the following level of take of this species can be anticipated. Injury or death of Sonoran pronghorn associated with traffic on State Route 85 can be expected to occur. In the event that at least one Sonoran pronghorn is injured or killed due to traffic using State Route 85, then re-initiation regarding this project is required.

The Service anticipates incidental take of cactus ferruginous pygmy-owls will be difficult to detect because species numbers are extremely low and harassment is difficult to document. The Service anticipates 15 instances of incidental take of cactus ferruginous pygmy-owls through harassment of individuals nesting or foraging in the area during the life of the project. If, through continuing monitoring efforts, the Park Service discovers that this level is exceeded, then re-initiation regarding this project is required.

If, during the course of the action, the amount or extent of the incidental take anticipated is exceeded, the Park Service must reinitiate consultation with the Service immediately to avoid violation of section 9. Operations must be stopped in the interim period between the initiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an irreversible and adverse impact on the species, as required by 50 CFR 402.14(i). An explanation of the causes of the taking should be provided to the Service.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the lesser long-nosed bat and the Sonoran pronghorn or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of lesser long-nosed bats:

1. Monitoring of the roost for presence and abundance of bats as well as for detection of unauthorized human disturbance will continue.
2. Existing structures intended to prevent unauthorized human disturbance will be maintained and improved as necessary.
3. No bat gates will be installed at the roost until it is clearly appropriate to do so.

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of Sonoran pronghorn:

4. The Park Service will work with other agencies to develop and implement appropriate actions to reduce the effects of current and future traffic patterns on State Route 85 on Sonoran pronghorn.
5. The fences along the borders of the Monument will be modified to better facilitate passage of Sonoran pronghorn through them.
6. The Park Service will educate motorists about the vulnerability of Sonoran pronghorn to traffic.
7. The Park Service will monitor use and restrict access where necessary to minimize the potential for disturbance to Sonoran pronghorn.

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of cactus ferruginous pygmy-owls:

8. The feasibility study must evaluate the effects of human presence on pygmy-owls in the Alamo Canyon campground.
9. If pygmy-owls are detected along trails or other visited sites, the Park Service and the Service will cooperatively establish closure areas on a case-by-case basis.
10. If the presence of pygmy-owls becomes common public knowledge and pygmy-owls are being harassed, interpretive media will be developed and implemented to elicit increased awareness of the vulnerability of pygmy-owls on the Monument.
11. The effects of human visitation to Alamo Canyon Wash on the pygmy-owl must be monitored for the life of the project.

The Federal agency (or designated applicant or contractor) as part of their action will provide a means to determine the level of incidental take that actually results from the project.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the National Park Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for the lesser long-nosed bat. These terms and conditions are nondiscretionary.

1. Terms and conditions for reasonable and prudent measure 1:

The Park Service will continue to monitor the roost to determine the presence and abundance of, and any disturbance to, lesser long-nosed bats. In addition, the roost will be regularly examined for evidence of unauthorized human entry year-round.

2. Terms and conditions for reasonable and prudent measure 2:

Existing fences will be regularly inspected and maintained promptly to ensure prevention of unauthorized entry. The Park Service will consider improvements to the fences and, if reasonable, they will be made. If unauthorized entry is discovered, improvements to the fences, or other appropriate exclusion devices, will be implemented.

3. Terms and conditions for reasonable and prudent measure 3:

No bat gates will be installed at the roost prior to completion of experimental gate studies that will soon be conducted at Coronado National Memorial. If that study results in an appropriate gate design and a bat gate is needed at the roost, then no gates will be installed prior to further consultation with the Service.

In order to be exempt from the prohibitions of section 9 of the Act, the National Park Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for the Sonoran pronghorn. These terms and conditions are nondiscretionary.

4. Terms and conditions for reasonable and prudent measure 4:

a. The Park Service will work with the Arizona Department of Transportation to establish a program to explore measures to reduce the impacts of traffic speed and volume along State Route 85 on Sonoran pronghorn.

b. The Park Service will continue to serve as a member of the Sonoran Pronghorn Core Working Group and will implement activities outlined in the Recovery Plan, including development of a monitoring program.

5. Terms and conditions for reasonable and prudent measure 5:

Fences existing along the borders of the Monument will be modified and maintained so that there is at least 18 inches between the ground and the first wire, which will be smooth.

6. Terms and conditions for reasonable and prudent measure 6:

A variety of interpretive media will be developed and implemented to elicit an increased awareness of the presence and vulnerability of Sonoran pronghorn along State Route 85. Techniques to be employed will include the use of signs along the corridor and wayside exhibits at the north and south ends.

7. Terms and conditions for reasonable and prudent measure 7:

To reduce the potential for adverse impacts on Sonoran pronghorn resulting from increased use by park visitors, illegal aliens, and other activities throughout the Monument, the Park Service will monitor all use and restrict access where necessary to minimize the potential or actual disturbance of pronghorn.

In order to be exempt from the prohibitions of section 9 of the Act, the National Park Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for the cactus ferruginous pygmy-owl. These terms and conditions are nondiscretionary.

8. Terms and conditions for reasonable and prudent measure 8:

a. The feasibility study must evaluate the effects of human presence on pygmy-owls and explore all alternatives to expanding the campground at Alamo Canyon Wash.

b. The specific components of the feasibility plan must be agreed upon by both the Park Service and the Fish and Wildlife Service.

c. If the only way to determine the effects of human presence on pygmy-owls is to go off site (e.g. gather information from pygmy-owls that are or may have been impacted by human activity elsewhere in Arizona), the Park Service must continue to survey for and monitor owls present in the area extending from Alamo Well to a point approximately 1.5 miles downstream from Alamo Campground.

d. The Park Service must show the Service convincing evidence, either from Organ Pipe Monument or from elsewhere within the range of the pygmy-owl, that expanding the campground will have negligible effects on pygmy-owl occupation, foraging, breeding, and recruitment before beginning construction for additional camping capacity.

9. Terms and conditions for reasonable and prudent measure 9:

If pygmy-owls are detected along trails or other visited sites, the Park Service and the Service will cooperatively establish closure areas on a case-by-case basis.

10. Terms and conditions for reasonable and prudent measure 10:

If the presence of pygmy-owls becomes common public knowledge and pygmy-owls are being harassed, interpretive media will be developed and implemented to elicit increased awareness of the vulnerability of pygmy-owls on the Monument.

11. Terms and conditions for reasonable and prudent measure 11:

The pygmy-owls at Alamo Canyon Wash must be monitored for the life of the project to determine what short-term and long-term effects increased visitation has on habitat selection and nesting success and to implant term and condition number 9.

To the extent that this statement concludes that take of any threatened or endangered species of migratory bird will result from the agency action for which consultation is being made, the Service will not refer the incidental take of any such migratory bird for prosecution under the MBTA of 1918, as amended (16 U.S.C. §§ 703-712), or the Bald Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions (including amount and /or number) specified herein.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of ESA directs Federal agencies to utilize their authorities to further the purposes of ESA 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.

Lesser long-nosed bat:

1. The Park Service should coordinate with agencies and individuals knowledgeable on the ecology of nectar-feeding bats, columnar cacti, and paniculate agaves and help to implement appropriate management actions as new information becomes available.
2. Develop interpretive media to elicit increased awareness of the presence of lesser long-nosed bats on the monument and their sensitivity to human disturbance.

Sonoran pronghorn:

1. The Park Service should continue to contribute to multi-agency recovery effects and help to implement appropriate management actions as new information becomes available.

Cactus ferruginous pygmy-owl:

1. The Park Service should survey all suitable habitat according to protocol within the Monument boundaries.
2. In areas where pygmy-owls are detected, the Park Service should monitor those owls to determine if breeding is occurring and if so, continue to monitor all nesting activity.

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 - CLOSING STATEMENT

This concludes formal consultation on the action(s) outlined in the (request/reinitiation request). 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 maintained (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 that was 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.

Thank you for your continuing efforts to conserve listed species. If we can be of further assistance, please contact Bill Austin, Sheldon Plentovich, or Ted Cordery. Please refer to the consultation number 2-21-89-F-078 in future correspondence concerning this project.

Sincerely,



Sam F. Spiller
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (GM:AZ)(AES)
Superintendent, Organ Pipe Cactus National Monument, Ajo, AZ

Director, Arizona Game and Fish Department, Phoenix, AZ

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