United States Department of the Interior
U.S. Fish and Wildlife Service
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 FAX: (602) 242-2513

In Reply Refer To:
AESO/SE
02-21-05-F-0829

February 24, 2006

Memorandum

To: Park Superintendent, Tumacácori National Historical Park, National Park Service, Tumacácori, AZ

From: Field Supervisor

Subject: Biological Opinion for the Proposed Tamarisk Removal, Hazardous Fuels Treatment, and Boundary Fence Construction at Tumacácori National Historical Park

This responds to your October 5, 2005, memorandum to the Arizona Ecological Services Office requesting initiation of consultation for the Proposed Tamarisk Removal, Hazardous Fuels Treatment, and Boundary Fence Construction. The proposed action may affect the endangered southwestern willow flycatcher (*Empidonax traillii extimus*, WIFL) and the endangered cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*, CFPO).

This BO is based on information provided in your September 29, 2005, memorandum and biological assessment (BA); telephone conversations with Michele Girard of the National Park Service Southern Arizona Office; your December 21, 2005, email and memorandum; field investigations; and other sources of information. Literature cited in this BO is not a complete bibliography of all literature available on the species of concern, fire and fuels reduction and their effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

CONSULTATION HISTORY

December 3, 2004: We began discussions with the Park regarding the proposed actions within the Park's boundaries.

April 8, 2005: We conducted a site visit with Park personnel to look at the proposed action area and discuss the proposed actions in more detail.

June 8, 2005: We met with Park personnel to discuss the level of consultation necessary for the proposed actions; specifically, potential effects to the WIFL.

August 24, 2005: We conducted another site visit with Park personnel to look at the proposed action area and discuss the proposed actions in more detail; specifically, the treatment areas and treatment prescriptions.

October 5, 2005: We received the Park's request for initiation of formal consultation.

February 9, 2006: Draft Biological Opinion was sent to the Park.

February 21, 2006: We received your comments regarding the draft Biological Opinion.

BIOLOGICAL OPINION

Description of the Proposed Actions

Tamarisk Removal: There are approximately 160 acres of riparian habitat within the boundaries of Tumacácori National Historical Park (Park). Currently, tamarisk (saltcedar, *Tamarix ramosissima* or *chinensis*) is found in two relatively dense stands of approximately five acres and as small patches of scattered clones across the floodplain area impacting approximately 20 acres. The two dense stands of tamarisk are the highest priority for treatment. Treatments of tamarisk will occur within the boundaries of the Park in riparian areas adjacent to the Santa Cruz River and on one acre of adjacent private land along the northern boundary of the Park.

Chainsaws will be used to cut down tamarisk near ground level, and the stumps will be sprayed with the herbicide Garlon4 mixed with penetrating oil at a ratio of 25 percent herbicide to 75 percent oil. Oversight for the application of the Garlon4 will be by applicators licensed by the state of Arizona. Pressurized hand sprayers will be used, thus allowing precision herbicide application with minimum overspray or drift. Cut tamarisk will be piled, allowed to dry, and burned.

Treatment was originally planned for the winter months in order to avoid potential impacts to WIFLs and other migratory birds, and when volunteer help was available to cut down the tamarisk. However, treatments cannot be done in a timely manner using only volunteer help. The Park will be receiving assistance from the Saguaro National Park (SNP) fire crew. The SNP fire crew typically operates from March through October. Due to the uncertainty of when National Park Service and volunteer crews will be available to complete this work, the Park is proposing to remove, treat, and re-treat tamarisk year-round for the next 10 years, although all efforts will be made to work outside of the breeding season for CFPO (February through June) and WIFL (April through September).

Fuels Treatment: The Park is proposing to reduce hazardous fuels along the western portion of the park boundary, outside of the riparian area along the river. Recently acquired park land includes areas of interface with private lands, ladder fuels, production of fine fuels in wet years, and accumulations of dead and down woody material. Although exact prescriptions have not

been determined yet, trained fuels specialists will determine the appropriate prescriptions and treatment areas. In general, the fuel break will consist of an area less than one acre (approximately six-feet wide by 0.75-mile long) along the western boundary of the Park, where the Park interfaces with private property. Mechanical tools (chainsaws, pruners, hand-saws, etc.) will be used to remove small trees and to prune branches off of larger trees, where necessary. No trees greater than six inches in diameter at breast height (DBH) will be removed during these activities. Vegetation to be removed includes velvet mesquite, catclaw and whitethorn acacia, and catclaw mimosa. One year of CFPO surveys following a protocol similar to the large research project protocol (described below) will be conducted in the spring of 2006, prior to the construction of the fence and the fuels break. Because of the amount of avian surveys conducted previously and described below and discussed with us, one year of surveys is all that is required prior to the construction of the fuel break and boundary fence.

Large piles of dead and down woody material will be pile burned as determined by the fuels specialist. All efforts will be made to remove fuels and burn piles outside of the WIFL and CFPO breeding seasons; however, pile burning may occur at any time of the year, depending on local weather conditions and the Prescribed Fire Plan to be completed by the fuels specialist. Pile burning is expected to be ongoing for the next ten years, in conjunction with the tamarisk removal. Piles will be restricted to areas without canopy cover and in areas where the likelihood of the piles catching adjacent fuels on fire will be low. Piles will not exceed six feet tall and will be kept relatively small in diameter to avoid sterilization of the soil. Furthermore, no pile burning will be conducted within 50-feet of the active channel of the Santa Cruz River.

Boundary Fence Construction: In March 2005, the Park acquired additional lands along the Santa Cruz River. Due to insufficient boundary demarcations, there is a need to construct a new fence along the north, south, and west boundaries of the Park adjacent to the private land to prevent cattle and all-terrain vehicle (ATV) access. Construction will be done over the next two years as funds become available; however, the fence along the western boundary will follow the 0.75-mile fuel break proposed above, thus no additional vegetation removal is expected with the boundary fence construction along this portion. The fence will be four-strand wire with smooth top and bottom wire to facilitate wildlife movement. Posts will be 12-18 feet apart, depending on topography. The north and south boundary will be panel pipe fence on flat areas and four-strand wire fence across the main channel of the river, per Santa Cruz County floodplain requirements. The main vegetation along the north boundary is tamarisk that will be removed as described above. There are two cottonwood trees and one mesquite tree along the north boundary that will be avoided. The south boundary fence will be constructed along an already existing fence line. As described above, surveys for the CFPO will be conducted during Spring 2006.

STATUS OF THE SPECIES

SOUTHWESTERN WILLOW FLYCATCHER

Description

The WIFL is a small grayish-green passerine bird (Family Tyrannidae) measuring approximately 5.75 inches. It has a grayish-green back and wings, whitish throat, light gray-olive breast, and

pale yellowish belly. Two white wingbars are visible (juveniles have buffy wingbars). The eye ring is faint or absent. The upper mandible is dark, and the lower is light yellow grading to black at the tip. The song is a sneezy fitz-bew or a fit-a-bew; the call is a repeated whitt.

The WIFL is one of four currently recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993). It is a neotropical migrant that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). The historical breeding range of the WIFL included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987).

Listing and critical habitat

The WIFL was listed as endangered, without critical habitat on February 27, 1995 (U.S. Fish and Wildlife Service 1995). On October 19, 2005, the Fish and Wildlife Service re-designated critical habitat for the WIFL (U.S. Fish and Wildlife Service 2005). A total of 737 river miles across southern California, Arizona, New Mexico, southern Nevada, and southern Utah were included in the final designation. The lateral extent of critical habitat includes areas within the 100-year floodplain. The primary constituent elements of critical habitat include riparian plant species in a successional riverine environment (for nesting, foraging, migration, dispersal, and shelter), specific structure of this vegetation, and insect populations for food.

A final recovery plan for the WIFL was signed by the U.S. Fish and Wildlife Service's Region 2 Director on August 30, 2002. The Plan describes the reasons for endangerment and current status of the WIFL, addresses important recovery actions, includes detailed issue papers on management issues, and provides recovery goals.

Reasons for endangerment

Reasons for decline have been attributed primarily to loss, modification, and fragmentation of riparian breeding habitat, along with a host of other factors including loss of wintering habitat and brood parasitism by the brown-headed cowbird (Sogge *et al.* 1997, McCarthey *et al.* 1998). Habitat loss and degradation are caused by a variety of factors, including urban, recreational, and agricultural development, water diversion and groundwater pumping, channelization, dams, and livestock grazing. Fire is an increasing threat to WIFL habitat (Paxton *et al.* 1996), especially in monotypic tamarisk vegetation (DeLoach 1991) and where water diversions and/or groundwater pumping desiccates riparian vegetation (Sogge *et al.* 1997). WIFL nests are parasitized by brown-headed cowbirds, which lay their eggs in the host's nest. Feeding sites for cowbirds are enhanced by the presence of livestock and range improvements such as waters and corrals, agriculture, urban areas, golf courses, bird feeders, and trash areas. When these feeding areas are in close proximity to WIFL breeding habitat, especially coupled with habitat fragmentation, cowbird parasitism of WIFL nests may increase (Hanna 1928, Mayfield 1977a,b, Tibbitts *et al.* 1994).

Habitat

The WIFL breeds in dense riparian habitats from sea level in California to approximately 8500 feet in Arizona and southwestern Colorado. Historical egg/nest collections and species'

descriptions throughout its range describe the WIFL's widespread use of willow for nesting (Phillips 1948, Phillips *et al.* 1964, Hubbard 1987, Unitt 1987, San Diego Natural History Museum 1995). Currently, WIFLs primarily use Geyer willow, coyote willow, Goodding's willow, boxelder, tamarisk, Russian olive, and live oak for nesting. Other plant species less commonly used for nesting include: buttonbush, black twinberry, cottonwood, white alder, blackberry, and stinging nettle. Based on the diversity of plant species composition and complexity of habitat structure, four basic habitat types can be described for the WIFL: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge *et al.*1997).

Tamarisk is an important component of the WIFL's nesting and foraging habitat in Arizona and other parts of the bird's range. In 2001 in Arizona, 323 of the 404 (80 percent) known WIFL nests (in 346 territories) were built in a tamarisk tree (Smith *et al.* 2002). Tamarisk had been believed by some to be a habitat type of lesser quality for the WIFL, however comparisons of reproductive performance (U.S. Fish and Wildlife Service 2002a), prey populations (Durst 2004) and physiological conditions (Owen and Sogge 2002) of WIFLs breeding in native and exotic vegetation has revealed no difference.

Breeding biology

Throughout its range, the WIFL arrives on breeding grounds in late April and May (Sogge and Tibbitts 1992, Sogge *et al.* 1993, Sogge and Tibbitts 1994, Muiznieks *et al.* 1994, Maynard 1995, Sferra *et al.* 1995, 1997). Nesting begins in late May and early June and young fledge from late June through mid-August (Willard 1912, Ligon 1961, Brown 1988a,b, Whitfield 1990, Sogge and Tibbitts 1992, Sogge *et al.* 1993, Muiznieks *et al.* 1994, Whitfield 1994, Maynard 1995). WIFLs typically lay three to four eggs per clutch (range = 1 to 5). Eggs are laid at one-day intervals and are incubated by the female for approximately 12 days (Bent 1960, Walkinshaw 1966, McCabe 1991). Young fledge approximately 12 to 13 days after hatching (King 1955, Harrison 1979). Typically one brood is raised per year, but birds have been documented raising two broods during one season and renesting after a failure (Whitfield 1990, Sogge and Tibbitts 1992, Sogge *et al.* 1993, Sogge and Tibbitts 1994, Muiznieks *et al.* 1994, Whitfield 1994, Whitfield and Strong 1995). The entire breeding cycle, from egg laying to fledging, is approximately 28 days.

WIFL nests are fairly small (3.2 inches tall and 3.2 inches wide) and its placement in a shrub or tree is highly variable (2.0 to 59.1 feet off the ground). Nests are open cup structures, and are typically placed in the fork of a branch. Nests have been found against the trunk of a shrub or tree (in monotypic tamarisk and mixed native broadleaf/tamarisk habitats) and on limbs as far away from the trunk as 10.8 feet (Spencer *et al.* 1996). Typical nest placement is in the fork of small-diameter (e.g., 0.4 in), vertical or nearly vertical branches (U.S. Fish and Wildlife Service 2002a). Occasionally, nests are placed in down-curving branches. Nest height varies considerably, from 1.6 to 60 feet, and may be related to height of nest plant, overall canopy height, and/or the height of the vegetation strata that contain small twigs and live growth (U.S. Fish and Wildlife Service 2002a). Most typically, nests are relatively low, 6.5 to 23 feet above ground (U.S. Fish and Wildlife Service 2002a). WIFLs nesting in habitat dominated by box elder nest the highest (to almost 60 feet) (U.S. Fish and Wildlife Service 2002a).

As reported by Munzer *et al.* (2005) for the 2004 breeding season, the largest concentrations of breeding WIFLs in Arizona in 2004 were at the Salt River and Tonto Creek inflows to Roosevelt Lake (374 WIFLs, 209 territories); near the San Pedro/Gila river confluence (352 WIFLs, 186 territories); Gila River, Safford area (6 WIFLs, 3 territories); Alamo Lake on the Bill Williams River (includes lower Santa Maria and Big Sandy river sites) (51 WIFLs, 31 territories); Topock Marsh on the Lower Colorado River (57 WIFLs, 34 territories); Big Sandy River, Wikieup (54 WIFLs, 28 territories); Horseshoe Lake, Verde River (28 WIFLs, 19 territories), and Alpine/Greer on the San Francisco River/Little Colorado River (7 WIFLs, 4 territories). Combined, Roosevelt Lake and the San Pedro/Gila confluence make up 395 (76 percent) of the 522 territories known in the state. In 2005, habitat at Roosevelt Lake flooded, reducing the number of nests and nest success.

Soon after listing, following the 1996 breeding season, 145 territories were known to exist in Arizona. In 2001, the known statewide population was 346 territories and in 2004, 522 territories were detected. From 1996 to 2004, there was a statewide increase of 377 territories. Over this nine year period, some sites became unoccupied or had reductions in number of territories, other new sites were detected, and some sites grew in numbers and better surveys provided more comprehensive information on actual abundance (Durst *et al.* 2005). Since 1996, the increase of 320 territories (75 to 395) at Roosevelt Lake and at San Pedro/Gila River confluence represents 85 percent of the statewide growth. Survey effort was initially a factor in detecting more birds at San Pedro/Gila river confluence (more recently, habitat growth has occurred), but the Roosevelt population grew as a result of increased habitat development and bird reproduction in the conservation pool of the reservoir.

While a numbers have significantly increased in Arizona, overall distribution of WIFLs throughout the state has not changed much. Note that 85 percent of the growth of WIFLs in Arizona since listing has occurred at two locations. Recovery and survival of the WIFL depends not only on numbers of birds, but territories/sites that are well distributed (U.S. Fish and Wildlife Service 2002a). Currently, population stability in Arizona is believed to be largely dependent on the presence of two large populations (Roosevelt Lake and San Pedro/Gila River confluence). Therefore, the result of catastrophic events or losses of significant populations either in size or location could greatly change the status and survival of the bird. The long-term effects of flooding at Roosevelt Lake in 2005 are still uncertain. Conversely, expansion into new habitats or discovery of other populations, would improve the known stability and status of the WIFL.

Fire

The evidence suggests that fire was not a primary disturbance factor in southwestern riparian areas near larger streams (U.S. Fish and Wildlife Service 2002a). Yet, in recent time, fire size and frequency has increased on the lower Colorado, Gila, Bill Williams, and Rio Grande rivers. The increase has been attributed to increasing dry, fine fuels and ignition sources. The spread of the highly flammable plant, tamarisk, and drying of river areas due to river flow regulation, water diversion, lowering of groundwater tables, and other land practices is largely responsible for these fuels. A catastrophic fire in June of 1996 destroyed approximately a half mile of occupied tamarisk WIFL habitat on the San Pedro River in Pinal County. That fire resulted in the forced dispersal or loss of up to eight pairs of WIFLs (Paxton *et al.* 1996). Recreationists cause over 95 percent of the fires on the lower Colorado River (U.S. Fish and Wildlife Service

2002a). Brothers (1984) attributed increased fire along the Owens River in California to increased use of the riparian zones by campers and fishermen in the past 30 years.

Reproductive success

In 2004 in AZ, there were 207 failed nests, 42 of unknown outcome, and 25 parasitized nests (Munzer *et al.* 2005). Known causes of nest failure were predation (n=169), nest desertion (n=9), brood parasitism (n=7), infertile clutches (n=4), and other unknown causes (n=17) (Munzer *et al.* 2005). Cowbirds may have contributed to other abandoned nests, but no direct evidence was detected. Eleven of the 25 parasitized nests were depredated (Munzer *et al.* 2005). In 2004, the Topock site along the Lower Colorado River had cowbird trapping where parasitism was detected. Cowbird trapping also occurred at Camp Verde and Greer/Alpine.

Past Consultations

Since listing in 1995 to 2005, at least 143 Federal agency actions have undergone (or are currently under) formal section 7 consultation throughout the WIFL's range. Many activities continue to adversely affect the distribution and extent of all stages of WIFL habitat throughout its range (development, urbanization, grazing, recreation, native and non-native habitat removal, dam operations, river crossings, ground and surface water extraction, etc.). Stochastic events also continue to change the distribution, quality, and extent of WIFL habitat.

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 that 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.

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02). In this case, the action area is the entire Park due to the boundary fence construction including all boundary fences of the Park and one acre of adjacent private land along the northern boundary of the Park where Tamarisk will also be removed as part of the proposed action.

A. Status of WIFL within the action area.

Intensive avian surveys were conducted in the Park from 2001-2003 as part of a National Park Service Inventory and Monitoring Program. Four field methods were used during these surveys: variable circular plots for diurnal breeding birds, nocturnal surveys for owls and nightjars, line-transects for winter bird surveys, and incidental observations in all seasons. One WIFL was detected during these surveys in 2003. This WIFL was determined to be migrating because no territory or breeding behavior was observed. In addition to the survey methods described above, surveys for WIFLs in all suitable habitats in the action area, following current protocol methods, have also been done in the last four years. Approximately 20 acres of tamarisk occur within the

Park along the Santa Cruz River floodplain and are the subject of the tamarisk removal. Parts of this tamarisk are scattered across the floodplain providing generally poor WIFL habitat; however, there are small dense patches of tamarisk that could support WIFLs. Protocol surveys for the WIFL conducted during 2002 and 2005 resulted in no WIFLs being detected along the Santa Cruz River within or adjacent to the Park.

B. Factors affecting WIFL in the action area.

Most of the action area has supported significant recreational use by researchers, hikers, and birders. Additionally, illegal immigrants and drug smugglers use this portion of the Santa Cruz River corridor.

C. Status of Critical Habitat within the action area.

Critical habitat does not occur within the project area.

D. Factors affecting Critical Habitat in the action area.

Because critical habitat does not occur within the action area, there are no factors that affect critical habitat.

EFFECTS OF THE PROPOSED ACTION

Effects of the proposed actions to WIFLs will be limited to the tamarisk removal and subsequent pile burning, as well as the pile burning associated with the fuel break construction. Construction of the fuel break will occur outside of the river corridor, typically 330 feet or more from the river, and, thus, will not remove habitat suitable for nesting or migratory WIFLs. Because the west boundary fence will follow the fuel break construction, no habitat will be removed as a result of the west boundary fence construction. The north boundary fence will be placed in the same area as the tamarisk removal; therefore, no additional habitat will be removed for this portion of the boundary fence. All native vegetation along the north boundary fence will be avoided (two cottonwood trees and one mesquite tree). Construction of the south boundary fence will occur along a pre-existing fence line and will require no further habitat removal. As previously mentioned, the east boundary fence is in good condition and does not need replacement. The proposed fuel break is also anticipated to reduce the risk of catastrophic wildfires impacting the remaining riparian habitat along the Santa Cruz River. Additionally, the boundary fence construction is anticipated to reduce the chances of habitat and noise disturbance associated with illegal ATV activity and trespass cattle.

Tamarisk is widely used by WIFLs for nesting and during migration. Removal of dense stands of tamarisk will result in loss of potential habitat for this species; however, there is a strong native habitat component mixed in with the tamarisk. At least some regeneration of native vegetation may occur over time, thus potentially benefiting WIFLs and other riparian species. Recent surveys have only documented one confirmed migrating WIFL (2003). No nesting or territorial WIFLs have been documented within or adjacent to the Park, thus no known nests or territories would be affected. The Park will make every effort to conduct all vegetation removal

and subsequent pile burning of tamarisk and slash from the fuel break outside of the migration and nesting period for WIFLs (April through August); however, crew availability and funding may require this work to occur during that time. Slash pile burning from the removal of tamarisk and vegetation associated with the fuel break may also disturb birds if burning occurs during the migration and breeding season. Smoke may drift through the area and cause temporary disturbance. Slash piles will be limited to no more than six feet high to minimize disturbance, and the diameter of the piles will be minimized to avoid sterilization of soil under the piles. Additionally, piles will be placed in open areas devoid of vegetation to further reduce the risk of escaped fires burning surrounding vegetation.

Because no nesting or territorial WIFLs have been detected in or adjacent to the Park, working during the breeding season is not anticipated to displace nesting birds. Displacement of migrating birds is possible; however, only one has been documented along this portion of the Santa Cruz River since 2001. The chances of a migrating WIFL being displaced by the tamarisk removal and subsequent pile burning are minimal and not anticipated to be significant. Furthermore, the proposed tamarisk removal follows the habitat restoration recommendations in the Southwestern Willow Flycatcher Recovery Plan (U.S. Fish and Wildlife Service 2002a).

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. These actions include illegal smuggling and passage through the action area by undocumented immigrants, which have increased dramatically in recent years. Trespass cattle and illegal ATV traffic cause additional cumulative effects. These activities have resulted in creation of illegal routes, deposition of trash, and increased risk of human-caused fire. No private development is proposed in or near the action area.

CONCLUSION

After reviewing the anticipated effects of the proposed Tamarisk Removal, Hazardous Fuels Treatment, and Boundary Fence Construction Project, the environmental baseline for the action area, the current status of the WIFL, and the cumulative effects, we find that that the proposed action is neither likely to jeopardize the continued existence of the WIFL, nor likely to result in adverse modification or destruction of the species' critical habitat. We base these determinations on the following:

1) Although up to 20 acres of tamarisk will be treated along the Santa Cruz River, the surrounding riparian habitat is dominated by native vegetation that will provide suitable habitat for any migrating WIFLs. Furthermore, removing the dense stands of tamarisk may promote some regeneration of native habitat along the river in areas currently dominated by tamarisk.

2) The proposed actions follow habitat restoration recommendations in the Southwestern Willow Flycatcher Recovery Plan.

3) Recent surveys (2001-2003 and 2005) indicate that no WIFLs have been observed nesting within the action area. One WIFL was detected within the Park in 2003; however that bird was determined to be migratory because no territorial or nesting behavior was observed.

4) The Park will make every effort to conduct all vegetation removal and pile burning outside of the WIFL migratory and breeding season of April through September.

5) The proposed fuel break is anticipated to reduce the risk of catastrophic wildfires impacting the remaining riparian habitat along the Santa Cruz River.

6) The proposed fuel break and boundary fence construction will occur mostly outside of the river corridor, in the upland vegetation, and will not require removal of WIFL habitat. Furthermore, the proposed boundary fence construction is anticipated to reduce the risk of habitat and noise disturbance by illegal ATV activity, as well as prevent cattle from trespassing onto the Park, further reducing the risk of habitat degradation.

7) Current conservation measures are sufficient to minimize the effects to WIFLs in the vicinity of the proposed actions.

8) No critical habitat occurs in the action area.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). "Harass" is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering (50 CFR 17.3). "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Because no WIFLs have been documented breeding in or near the proposed action areas and only one WIFL has been confirmed in the proposed action area during migration in the last four years, we do not anticipate incidental take of WIFLs as a result of the proposed action.

CONSERVATION RECOMMENDATIONS

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

1. We recommend that you continue to survey for WIFL according to protocol as funding allows, and include your results in an annual report to us. Finding of a nesting or territorial WIFL in the action prior to or during project implementation may require reinitiation of consultation (50 CFR 402.16b).

2. We recommend that you enhance habitat for WIFL along the Santa Cruz consistent with the recommendations of the recovery plan.

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

CACTUS FERRUGINOUS PYGMY-OWL

Species Description

The CFPO is in the order Strigiformes and the family Strigidae. They are small birds of prey, averaging 6.75 inches in length. Males average 2.2 ounces with females slightly larger, averaging 2.6 ounces. The CFPO is reddish brown overall, with a cream-colored belly streaked with reddish brown. The crown is lightly streaked, and a pair of dark brown/black spots outlined in white occurs on the nape suggesting “eyes”. The species lacks ear tufts and the eyes are yellow. The tail is relatively long for an owl and is reddish brown in color with darker brown bars. CFPO have large feet and talons relative to their size.

Listing and Critical Habitat

The Arizona population of the CFPO was listed as an endangered distinct population segment on March 10, 1997 (U.S. Fish and Wildlife Service 1997) without critical habitat. Approximately 1,208,000 acres in portions of Pima and Pinal counties are proposed as critical habitat (U.S. Fish and Wildlife Service 2002b). On August 3, 2005, we proposed to delist the Arizona distinct population segment of the CFPO and withdraw our proposed designation of critical habitat (70 FR: 44547). Until a final rule delisting the CFPO is published, the listing and all protections under the Act remain in place.

Life History

CFPO are considered non-migratory throughout their range. There are winter (November through January) CFPO location records from throughout its historical range in Arizona

(University of Arizona 1995, Tibbitts 1996, Abbate *et al.* 1999, 2000). These winter records suggest that CFPO are found within Arizona throughout the year and do not appear to migrate seasonally. The CFPO is primarily diurnal (active during daylight) with crepuscular (active at dawn and dusk) tendencies.

Usually, CFPO nest as yearlings (Abbate *et al.* 1999, Gryimek 1972), and both sexes breed annually thereafter. Territories normally contain several potential nest-roost cavities from which responding females select a nest. Hence, cavities/acre may be a fundamental criterion for habitat selection. Historically, CFPO in Arizona used cavities in cottonwood, mesquite, and ash trees, and saguaro cacti for nest sites (Millsap and Johnson 1988). Recent information from Arizona indicates nests were located in cavities in saguaro cacti for all but two of the known nests documented from 1996 to 2002 (Abbate *et al.* 1996, 1999, 2000, Arizona Game and Fish Department 2003). One nest in an ash tree and one in a eucalyptus tree were the only non-saguaro nest sites (Abbate *et al.* 2000).

Vegetation communities that provide a diversity of structural layers and plant species likely contribute to the availability of prey for CFPO (Wilcox *et al.* 2000). CFPO also utilize different groups of prey species on a seasonal basis. For example, lizards, small mammals, and insects are used as available during the spring and summer during periods of warm temperatures (Abbate *et al.* 1999). However, during winter months, when low temperatures reduce the activity by these prey groups, CFPO likely turn to birds as their primary source of food and appear to expand their use area in response to reduced prey availability (Proudfoot 1996). Therefore, conservation of the CFPO should include consideration of the habitat needs of prey species, including structural and species diversity and seasonal availability. CFPO habitat must provide sufficient prey base and cover from which to hunt in an appropriate configuration and proximity to nest and roost sites.

Habitat

CFPO were historically recorded in association with riparian woodlands in central and southern Arizona (Bendire 1892, Gilman 1909, Johnson *et al.* 1987, Johnson *et al*. 2003). However, recent records have documented CFPO in a variety of vegetation communities such as riparian woodlands, mesquite bosques (Spanish for woodlands), Sonoran Desert scrub, semidesert grassland, and Sonoran savanna grassland communities (see Brown 1994 for a description of these vegetation communities).

In recent years, CFPO have been primarily found in the Arizona Upland Subdivision of the Sonoran Desert, particularly Sonoran Desert scrub (Phillips *et al.* 1964, Monson and Phillips 1981, Davis and Russell 1984, Johnson and Haight 1985, Johnsgard 1988). It is described as a low woodland of leguminous trees with an overstory of columnar cacti and with one or more layers of shrubs and perennial succulents. Within the United States, columnar cacti include either saguaros or organ pipe cactus. Trees within this subdivision include blue paloverde, foothills paloverde, ironwood, mesquites, and cat-claw acacia (Brown 1994). The paloverde-cacti mixed scrub series is described as developed on the bajadas and mountainsides away from valley floors. A list of plant and wildlife species associated within this subdivision can be found in Appendix II of Brown (1994), and is incorporated herein by reference.

While there are millions of acres of Sonoran Desert scrub, not all of this plant community is suitable for CFPO. Preliminary habitat assessment data appears to indicate that those areas of Sonoran Desert scrub characterized by high plant species diversity, high structural diversity, and the presence of tall canopy are the areas being used by CFPO (Wilcox *et al.* 2000, Flesch 2003). These types of areas are typically located along drainages and wash systems, or in areas with better soil and moisture conditions such as bajadas. The occurrence of these areas is more limited than the overall distribution of Sonoran Desert scrub.

In addition to desert scrub, CFPO have also been found in riparian and xeroriparian communities and semidesert grasslands as classified by Brown (1994). An abundance of saguaros or large trees and a diversity of plant species and vegetation strata characterize occupied desert scrub communities. Xeroriparian habitats contain a rich diversity of plants that support a wide array of prey species and provide cover. Semidesert grasslands contain linear woodlands of various tree species occur along bottoms and washes. In Arizona, these grassland communities often transition into desert scrub, which results in the availability of some saguaros for nesting.

While plant species composition differs among these communities, there are certain unifying characteristics, such as the presence of vegetation in fairly dense thickets or woodlands, the presence of trees, saguaros, or organ pipe cactus large enough to support cavities for nesting, and elevations below 4,000 feet (Swarth 1914, Karalus and Eckert 1974, Monson and Phillips 1981, Johnsgard 1988, Enriquez-Rocha *et al.* 1993, Proudfoot and Johnson 2000). Large trees provide canopy cover and cavities used for nesting, while the density of mid- and lower-story vegetation provides foraging habitat and protection from predators, and it contributes to the occurrence of prey items (Wilcox *et al.* 2000). Perch substrates used by CFPO for calling are typically the tallest trees available within a home range, though CFPO have also been noted calling from within saguaro cavities (Flesch 2003).

Species Status and Distribution

Only the Arizona population of the CFPO is listed as an endangered species (U.S. Fish and Wildlife Service 1997). Documentation of the total number of CFPO and their current distribution in Arizona is incomplete. This is due to the lack of systematic or comprehensive surveys throughout the CFPO's historical range in Arizona, and respect for Tohono O'odham Nation's request to keep information related to CFPO on the Nation within tribal control. Survey and monitoring work in Arizona has documented an average of about 29 adult CFPO per year for the past six years (1999 – 2004). Over this same period, an average of eight nests per year has been recorded. In 2004, we documented a total of 20 adult CFPO and only four nests, a continuation of the low numbers observed in 2003. In 2005, we documented a total of 18 adult CFPO and five nests producing 16 young. For comparison, the highest number of adult CFPO recorded for a single year was 37 in 1999, and the most nests documented in a single year was 13 in 2001 (Arizona Game and Fish Department 2002)[1]. Most of the CFPO have been distributed in four general areas: northwest Tucson, southern Pinal County, Organ Pipe Cactus National

[1] These figures do not include documented CFPO locations on the Tohono O'odham Nation.

Monument, and the Altar Valley. We believe that more CFPO exist in Arizona, but for the reasons mentioned above, we do not have complete information.

Additionally, recent survey information has shown CFPO to be more numerous near the Arizona border in Mexico than early information indicated (Flesch and Steidl 2000). There also exists considerable unsurveyed habitat on the Tohono O'odham Nation, and, although we have no means of quantifying this habitat, the distribution of recent sightings on non-Tribal areas east, west, and south of the U.S. portion of the Tohono O'odham Nation lead us to reasonably conclude that these Tribal lands may support meaningful numbers of CFPO.

Rangewide Trend

Data collection related to the CFPO has only been consistent throughout the state for the past few years. Even with expanded survey efforts since the CFPO was listed as endangered in 1997, there are still many areas within Arizona that have not been surveyed or for which survey efforts are inadequate. Because research has been conducted for only a few years and because research and survey efforts have not been comprehensive or random in nature, it is not possible to determine a reliable recent population size or trend within Arizona. Additionally, the Tohono O'odham Nation supports CFPO, but due to cultural and political considerations, complete information on the numbers and distribution of CFPO on the Nation are not available. Given the historical distribution of CFPO in Arizona, it is clear that they have declined throughout the state to the degree that they are now much more limited in distribution (Monson and Phillips 1981, Davis and Russell 1984, Millsap and Johnson 1988, Proudfoot and Johnson 2000, Johnson *et al*. 2003). Johnson *et al*. (2003) hypothesized that large-scale water development (damming and diversion of the Salt and Verde rivers) led to initial declines in species' abundance and distribution in Maricopa County. Habitat loss and fragmentation, climatic factors, predation, and low population numbers all likely contribute to the current low CFPO population numbers in Arizona.

Information about non-listed populations of CFPO in Mexico is limited. However, the status of these Mexican populations is relevant to the listed U.S. population because Mexican birds likely immigrate to Arizona. Based on personal observations and anecdotal information, Russell and Monson (1998) recorded no decline in numbers from Sonora, Mexico. However, the first systematic surveys for CFPO in Sonora were conducted in 2000 and 2001 from the international border south to the Sonora/Sinaloa border. We are not aware of any management or conservation practices in Mexico that are directed towards CFPO. The expansion of agricultural and urban land uses increases habitat loss and fragmentation in Mexico, and the stability of CFPO populations cannot be determined. In Mexico, millions of acres of Sonoran Desert and thornscrub are being converted to buffelgrass, which represents both a direct and an indirect loss of habitat because of invasion into adjacent areas and increased fire frequency and intensity (McLaughlin and Bowers 1982). Thus, the long-term potential for Mexico to provide this source of immigrant CFPO is uncertain. Therefore, the importance of existing Arizona CFPO populations may increase if populations south of the border become imperiled.

Since listing in 1997, we have evaluated approximately 889 actions that have had potential effects to CFPO. The number of actions we evaluate continues to increase every year. In

addition, two Habitat Conservation Plans have been completed for CFPO, and three large multi-species Habitat Conservation Plans are being developed which include the CFPO. As a reference for current levels of activity, in 2004, we evaluated 156 actions, including one emergency consultation, 49 informal consultations (these are actions that included sufficient measures to avoid or minimize impacts to the CFPO so that the effects were insignificant or discountable), five formal consultations (these are actions where adverse effects to CFPO are anticipated), and 101 technical assistance projects.

Environmental Baseline

The action area is the entire Park due to the boundary fence construction including all boundary fences of the Park and one acre of adjacent private land along the northern boundary of the Park where Tamarisk will also be removed as part of the proposed action.

A. Status of CFPO within the action area.

Although no protocol surveys for land clearance projects have been completed in the Park, extensive general bird surveys have been conducted across the Park (National Park Service 2005). Nineteen surveys were conducted in 2001 and 2002 using various techniques, including tape playback surveys. Only three species of owls (barn, western screech, and elf owls) were observed; no CFPO were detected within or adjacent to the Park. Suitable habitat occurs within the Park, and the Park is within Survey Zone 2; however, there are no historical records of CFPO occurring in the Park or adjacent to it on private lands. The nearest known CFPO was a dispersing female that was located west of Green Valley, near the Sierrita Mountains. Additionally, CFPO surveys following a protocol similar to the large research project protocol were conducted in July 2005 with no CFPO found in the Park.

B. Factors affecting CFPO in the action area.

The same factors that affect WIFL in the action area affect CFPO (see above).

C. Status of Critical Habitat within the action area.

No critical habitat is proposed within the project area.

D. Factors affecting Critical Habitat in the action area.

Since there is no proposed critical habitat within the action area, there are no factors that affect critical habitat.

EFFECTS OF THE PROPOSED ACTION

Potential effects of the proposed actions on CFPO are limited to noise disturbance and the effects of smoke from pile burning during the breeding season. Although vegetation clearing activities associated with the fuel break and boundary fence construction will potentially take place during the breeding season, the total area cleared for the fuel break will be less than one acre, and no

trees greater than six inches dbh will be removed during these activities. CFPO seem to prefer trees greater than six inches dbh as the minimum size tree for perching, calling, hunting, etc. The tamarisk removal project will require the removal of potentially large tamarisk during the breeding season; however, tamarisk is not considered suitable nesting or roosting habitat for CFPO. The species of tamarisk found along the Santa Cruz River typically does not grow large enough to support CFPO perching or nesting. Additionally, these types of tamarisk grow too dense to support CFPO, which tend to prefer higher canopy cover, but less dense undergrowth. Therefore, the tamarisk removal project is not anticipated to have any adverse effects on CFPO beyond potential noise disturbance and smoke from pile burning during the breeding season. Because the area contains suitable native vegetation mixed in with the tamarisk, enhancement of the native vegetation might increase potential CFPO nesting and roosting habitat along the Santa Cruz River. The proposed fuel break is also anticipated to reduce the risk of catastrophic wildfires impacting the remaining riparian habitat along the Santa Cruz River.

Noise associated with crew movements and the operation of hand tools, including chainsaws, during the breeding season may disrupt the normal behavior of any CFPO in the area. Crews will be using chainsaws and other hand tools to remove trees and limbs for the fuel break and tamarisk removal projects. The boundary fence construction project will follow the fuel break construction and, therefore, will not require further vegetation removal. The boundary fence construction will be limited to noise disturbance associated with crews moving through vegetation and driving fence posts into the ground. Additionally, the boundary fence construction is anticipated to reduce the chances of habitat and noise disturbance associated with illegal ATV activity and trespassing cattle. The Park will do their best to conduct all activities outside of the CFPO breeding season; however, activities may occur during the breeding season as funding and crews become available. Although no formal project clearance surveys following our guidelines have been conducted at the Park, significant avian surveys have been conducted in the past, including CFPO specific surveys following the large research project protocol. To date, no CFPO have been detected using these survey techniques, and no CFPO are currently known in the Santa Cruz River valley south of Tucson, thus, the chances of a CFPO occurring within or adjacent to the Park are minimal. However, because of the amount of avian surveys conducted previously, one year of surveys following a protocol similar to the large research project protocol (used in July 2005) will be conducted in the spring of 2006, prior to the construction of the fence and the fuels break. Although this is not the USFWS protocol, it is similar to it. If any CFPO are detected as a result of these surveys, all activities will stop, and the Park will notify us immediately.

Pile burning of the woody material from the tamarisk removal and fuel break projects may also occur during the CFPO breeding season. Smoke associated with the pile burning has the potential to drift towards CFPO that may be occupying the area. The Park will make every effort to burn outside of the breeding season; however, crew and funding availability may warrant burning during the breeding season. As mentioned previously, slash piles will be no more than six feet tall and of minimal diameter in order to minimize the amount of smoke produced and to avoid sterilization of the soil. Piles will also be restricted to areas without canopy cover and in areas with sparse to bare vegetation so that the chances of adjacent fuels catching on fire will be minimal to non-existent. As stated above, the likelihood of a CFPO occurring in the action area and thus having the opportunity to be affected by pile burning is low.

CUMULATIVE EFFECTS

Cumulative effects occur in the form of habitat disturbance and increased fire frequency due to illegal smuggling and passage through the action area by undocumented immigrants, which has increased dramatically in recent years. Additional habitat disturbance and noise occurs as a result of trespass cattle and illegal ATV traffic in the action area. No private development is proposed in or near the action area.

CONCLUSION

After reviewing the anticipated effects of the proposed Tamarisk Removal, Hazardous Fuels Treatment, and Boundary Fence Construction Project, the environmental baseline for the action area, the current status of the CFPO, and the cumulative effects, we conclude that the proposed action is neither likely to jeopardize the continued existence of the CFPO, nor result in adverse modification or destruction of the species' proposed critical habitat. We base these determinations on the following:

1) Less than one acre of CFPO habitat will be affected as a result of these projects. No trees suitable for nesting or roosting for CFPO will be removed as a result of the fuel break or boundary fence construction.

2) Recent avian surveys indicate that no CFPO have been observed within or adjacent to the Park. Although no project clearance surveys have been conducted according to protocol, the chances of CFPO occurring on the Park are minimal.

3) The Park will make every effort to conduct all vegetation removal and pile burning outside of the CFPO breeding season of February through June.

4) The proposed fuel break is anticipated to reduce the risk of catastrophic wildfires impacting the remaining riparian habitat along the Santa Cruz River.

5) The proposed boundary fence construction is anticipated to reduce the risk of habitat and noise disturbance by illegal ATV activity, as well as prevent cattle from trespassing onto the Park, further reducing the risk of habitat disturbance.

6) Proposed conservation measures are sufficient to minimize the effects to CFPO in the vicinity of the proposed actions.

7) No proposed critical habitat occurs in the action area.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt

to engage in any such conduct. "Harm" is defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). "Harass" is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering (50 CFR 17.3). "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement.

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Because effects to habitat are small in extent, no CFPO have been documented breeding in or near the proposed action area, and project activities would stop and we would be contacted if CFPO are found during pre-construction surveys, we do not anticipate incidental take of CFPO as a result of the proposed actions.

CONSERVATION RECOMMENDATIONS

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

1. We recommend that you conduct project clearance surveys for CFPO according to protocol as funding allows, and include your results in an annual report to us.

2. We recommend that you continue to support research regarding population trends and habitat use of CFPO.

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

DISPOSITION OF DEAD OR INJURED LISTED ANIMALS

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 2450 West Broadway Road #113, Mesa, Arizona [telephone: (480) 967-7900] within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animal species shall be submitted to educational or research institutions holding appropriate State and Federal permits. If such institutions are not available, the information noted above shall be obtained and the carcass left in place.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution prior to implementation of the action. Injured animals should be transported to a qualified veterinarian by a qualified biologist. Should any treated listed animal survive, the FWS should be contacted regarding the final disposition of the animal.

REINITIATION NOTICE

This concludes formal consultation on the proposed Tamarisk Removal, Hazardous Fuels Treatment, and Boundary Fence Construction at Tumacácori National Historical Park. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. If conservation measures or other aspects of the proposed action are not implemented as anticipated herein, including schedules for implementation, reinitiation may be warranted pursuant to 50 CFR 402.16(b).

We appreciate your consideration of listed species. For further information, please contact Brian Wooldridge of our Tucson Suboffice at (520) 670-6150 (x235), or Jim Rorabaugh at (602) 242-0210 (x238). Please refer to the consultation number 02-21-05-F-0829 in future correspondence concerning this project.

/s/ Steven L. Spangle

cc: Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff, AZ

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ

W:\Brian Wooldridge\Tumacacori Fuels-Tamarisk-Fence Final BO.doc:cgg

Literature Cited

Abbate, D., A. Ditty, S. Richardson, and R. Olding. 1996. Cactus ferruginous pygmy-owl survey and nest monitoring in the Tucson Basin area, Arizona: 1996. Final Rep. Internal Enhance. #U95503, Arizona Game and Fish Dept., Phoenix.

Abbate, D., S. Richardson, R. Wilcox, M. Terrio, and S. Belhumeur. 1999. Cactus ferruginous pygmy-owl investigations in Pima and Pinal counties, Arizona: 1997-1998. Arizona Game and Fish Dept. Reg. 5 Wildl. Prog., Phoenix.

Abbate, D.J., W.S. Richardson, R.L. Wilcox, and S. Lantz. 2000. Cactus ferruginous pygmy-owl investigations in Pima and Pinal Counties, Arizona: 1999. Reg. V Wldlf. Prog. Arizona Game and Fish Dept. Tucson

Arizona Game and Fish Department. 2002. Heritage management data system. Nongame Branch, Arizona Game and Fish Department, Phoenix.

Arizona Game and Fish Department. 2003. E-mail communication on September 2, 2003. Draft 2 response to request for information on CFPO unpublished data. Email to Scott Richardson at Scott_Richardson@fws.gov.

Bendire, C.E. 1892. Life histories of North American birds with special reference to their breeding habits and eggs. U.S. Nat. Mus. Spec. Bull. 1.

Bent, A.C. 1960. Life histories of North American flycatchers, larks, swallows and their allies. Dover Press, New York, New York. 555 pp.

Brothers, T.S. 1984. Historical vegetation change in the Owens River riparian woodland, pages 74-84 *in* R.E. Warner and K.M. Hendrix (eds.), California riparian systems: Ecology, conservation, and productive management. UC Press, Berkeley, CA.

Brown, B.T. 1988a. Breeding Ecology of a Willow Flycatcher Population in Grand Canyon, Arizona. *Western Birds* 19:25-33.

Brown, B.T. 1988b. Monitoring bird population densities along the Colorado River in Grand Canyon: 1987 breeding season. Final Report to the Glen Canyon Environmental Studies. Bureau of Reclamation, Salt Lake City, Utah. 26 pp.

Brown, D.E. 1994. Biotic communities of the southwestern United States and northwestern Mexico. University of Utah Press, Salt Lake City, Utah. 342 pp.

Browning, M.R. 1993. Comments on the taxonomy of *Empidonax traillii* (willow flycatcher). *Western Birds* 24:241-257.

Davis, W.A. and S.M. Russell. 1984. Birds in southeastern Arizona. 2nd ed. Tucson Audubon Soc., Tucson, AZ.

DeLoach, C.J. 1991. Saltcedar, an exotic weed of western North American riparian areas: a review of its taxonomy, biology, harmful and beneficial values, and its potential for biological control. Report to the Bureau of Reclamation, Boulder City, NV, Contract No. 7-AG-30-04930.

Durst, S.L. 2004. Southwestern willow flycatcher potential prey base and diet in native and exotic habitat. Masters Thesis. Northern Arizona University, Flagstaff, AZ.

Durst, S.L., M.K. Sogge, A.B. Smith, S.O. Williams, B.E. Kus, and S.J. Sferra. 2005. Southwestern willow flycatcher breeding site and territory summary – 2003. U.S. Geological Survey, Colorado Plateau Research Station, Flagstaff, AZ.

Enriquez-Rocha, P., J.L. Rangel-Salazar, and D.W. Holt. 1993. Presence and distribution of Mexican owls: a review. Journal of Raptor Research 27: 154-160.

Flesch, A.D. 2003. Perch-site selection and spatial use by cactus ferruginous pygmy-owls in south-central Arizona. FWS Coop. Agreement No. 1448-00002-99-G943. J. Raptor Res. 37(2):151-157.

Flesch, A.D. and R.J. Steidl. 2000. Distribution, habitat and relative abundance of cactus ferruginous pygmy-owls in Sonora, Mexico: 2000 annual report. School of Renewable Natural Resources, University of Arizona, Tucson, Arizona.

Gilman, M.F. 1909. Some owls along the Gila River in Arizona. Condor 11:145-150.

Gryimek, H.C.B. (ed.). 1972. Gryimek's animal life encyclopedia. Van Nostrand Reinhold Co., New York.

Hanna, W.C. 1928. Notes on the dwarf cowbird in southern California. Condor 30:161-162.

Harrison, H.H. 1979. A field guide to western birds' nests of 520 species found breeding in the United States west of the Mississippi River. Houghton Mifflin Company, Boston, Massachusetts. 279 pp.

Howell, S.N.G. and S. Webb. 1995. A guide to the birds of Mexico and northern Central America. Oxford University Press, New York, New York. 851 pp.

Hubbard, J.P. 1987. The Status of the Willow Flycatcher in New Mexico. Endangered Species Program, New Mexico Department of Game and Fish, Sante Fe, New Mexico. 29 pp.

Johnsgard, P.A. 1988. North American owls. Smithson. Inst. Press, Washington D.C.

Johnson, R.R., and L.T. Haight. 1985. Status of the ferruginous pygmy-owl in the southwestern United States. Abstracts, 103rd Stated Meeting of the American Ornithologists' Union, Arizona State University, Tempe, Arizona.

Johnson, R.R., L.T. Haight, and J.M. Simpson. 1987. Endangered habitats versus endangered species: a management challenge. Pp. 89-96 *in* Management and preservation of endangered birds in riparian ecosystems (S. A. Laymon, ed.). West. Birds 18:1-96.

Johnson, R.R., J.E. Cartron, L.T. Haight, R.B. Duncan, and K.J. Kingsley. 2003. Cactus Ferruginous Pygmy-owl in Arizona, 1872-1971. The Southwestern Naturalist. 48(3):389-401

Karalus, K.E. and E.W. Eckert. 1974. The owls of North America: north of Mexico. Doubleday and Co., Inc., Garden City, New York. 278 pp.

King, J.R. 1955. Notes on the life history of Traill's Flycatcher (*Empidonax traillii*) in southeastern Washington. *The Auk* 72:148-173.

Ligon, J.S. 1961. New Mexico Birds and where to find them. The University of New Mexico Press, Albuquerque, New Mexico. 360 pp.

Mayfield, H.F. 1977a. Brown-headed cowbird: agent of extermination? *American Birds* 31:107-113.

Mayfield, H.F. 1977b. Brood parasitism: reducing interactions between Kirtland's warblers and brown-headed cowbirds. Chapter 11 *in* Endangered birds: management techniques for preserving threatened species (S.A. Temple, ed.). University of Wisconsin Press, Madison Wisconsin.

Maynard, W.R. 1995. Summary of 1994 survey efforts in New Mexico for southwestern willow flycatcher (*Empidonax traillii extimus*). Contract # 94-516-69. New Mexico Department of Game and Fish, Sante Fe, New Mexico. 48 pp.

McCabe, R.A. 1991. The little green bird: ecology of the willow flycatcher. Palmer publications, Inc., Amherst, Wisconsin. 171 pp.

McCarthey T.D., C.E. Paradzick, J.W. Rourke, M.W. Sumner, and R.F. Davidson. 1998. Arizona Partners In Flight southwestern willow flycatcher survey: 1997 Survey and Nest Monitoring Report. Arizona Game and Fish Department Technical Report. Nongame Branch, Arizona Game and Fish Department, Phoenix, AZ.

McLaughlin, S.P. and J.E. Bowers. 1982. Effects of wildfire on the Sonoran desert plant community. Ecology 61:246-24.

Millsap, B.A. and R.R. Johnson. 1988. Ferruginous pygmy-owl. Pages 137-139 *in* Glinski, Richard L.; Pendleton, Beth Giron; Moss, Mary Beth; [and others], eds. Proceedings of the southwest raptor management symposium and workshop; 1986 May 21-24; Tucson, AZ. NWF Scientific and Technical Series No. 11. Washington, DC: National Wildlife Federation. 395 pp.

Monson, G. and A.R. Phillips. 1981. Annotated checklist of the birds of Arizona. The University of Arizona Press, Tucson, Arizona. 240 pp.

Muiznieks, B.D., S.J. Sferra, T.E. Corman, M.K. Sogge, and T.J. Tibbitts. 1994. Arizona Partners In Flight southwestern willow flycatcher survey, 1993. Draft report: Nongame and Endangered Wildlife Program, Arizona Game and Fish Department, Phoenix, Arizona. Draft of April 1994. 28 pp.

Munzer, O.M., H.C. English, A.B. Smith, A.A. Tudor. 2005. Southwestern willow flycatcher 2004 survey and nest monitoring report. Nongame and Endangered Wildlife Program Technical Report 244. Arizona Game and Fish Department, Phoenix, Arizona.

National Park Service. 2005. Biological assessment for the proposed tamarisk removal,hazardous fuels treatment, and boundary fence construction at Tumacácori National Historical Park. Prepared by Tumacácori National Historical Park.

Owen, J.C. and M.K. Sogge. 2002. Physiological condition of southwestern willow flycatchers in native and saltcedar habitats. U.S. Geological Survey report to the Arizona Department of Transportation.

Paxton, E., J. Owen, and M.K. Sogge. 1996. Southwestern willow flycatcher response to catastrophic habitat loss. Colorado Plateau Research Station. U.S. Geological Survey Biological Resources Division. Northern Arizona University, Flagstaff, AZ. 12 pp.

Peterson, R.T. 1990. A field guide to western birds. Third edition. Houghton Mifflin Company, Boston, Massachusetts. 432 pp.

Phillips, A.R. 1948. Geographic variation in *Empidonax traillii*. *The Auk* 65:507-514.

Phillips, A.R., J. Marwill, and G. Monson. 1964. The birds of Arizona. University of Arizona Press, Tucson, Arizona. 212 pp.

Proudfoot, G.A. 1996. Natural history of the cactus ferruginous pygmy-owl. Master's Thesis, Texas A & M University, Kingsville.

Proudfoot, G.A. and R.R. Johnson. 2000. Ferruginous Pygmy-Owl (*Glaucidium brasilianum*). *In* The Birds of North America, no. 498 (A. Poole and F. Gill, eds.). Birds of North America, Inc., Philadelphia, PA.

Ridgely, R.S. and G. Tudor. 1994. The Birds of South America: Suboscine Passerines. University of Texas Press, Austin, Texas.

Russell, S.M. and G. Monson. 1998. The birds of Sonora. Univ. of Arizona Press, Tucson.

San Diego Natural History Museum. 1995. *Empidonax traillii extimus* in California. The willow flycatcher workshop. 17 November 1995. 66 pp.

Sferra, S.J., R.A. Meyer, and T.E. Corman. 1995. Arizona Partners In Flight 1994 southwestern willow flycatcher survey. Final Technical Report 69. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program, Phoenix, Arizona. 46 pp.

Sferra, S.J., T.E. Corman, C.E. Paradzick, J.W. Rourke, J.A. Spencer, and M.W. Sumner. 1997. Arizona Partners In Flight southwestern willow flycatcher survey: 1993-1996 summary report. Arizona Game and Fish Department Technical Report 113. 104 pp.

Smith, A.B., C.E. Paradzick, A.A. Woodward, P.E.T. Dockens, and T.D. McCarthey. 2002. Southwestern willow flycatcher 2001 survey and nest monitoring report. Nongame and Endangered Wildlife Program Technical Report #191. Arizona Game and Fish Department, Phoenix, Arizona.

Sogge, M. K., and T. J. Tibbitts. 1992. Southwestern willow flycatcher (*Empidonax traillii extimus*) surveys along the Colorado River in Grand Canyon National Park and Glen Canyon National Recreation Area. NPS CPSU/N. Arizona University, Flagstaff, Arizona. 43 pp.

Sogge, M. K., and T. J. Tibbitts. 1994. Distribution and status of the southwestern willow flycatcher along the Colorado river in the Grand Canyon - 1994. Summary Report. Natl. Biol. Serv., Colorado Plateau Res. Stn./N. Arizona Univ., Flagstaff, Arizona. 37 pp.

Sogge, M. K., T. J. Tibbitts, and S. J. Sferra. 1993. Status of the southwestern willow flycatcher along the Colorado River between Glen Canyon Dam and Lake Mead - 1993. Summary Report. Natl. Park Serv. Coo. Park Studies Unit/N. Ariz. University, U.S. Fish and Wildlife Service, and Arizona Game and Fish Department., Flagstaff, Arizona. 69 pp.

Sogge, M. K., R. M. Marshall, S. J. Sferra, and T. J. Tibbitts. 1997. A southwestern willow flycatcher survey protocol and breeding ecology summary. National Park Service/Colorado Plateau Res. Station/N. Arizona University, Tech. Rept. NRTR-97/12. 37 pp.

Spencer, J. A., S. J. Sferra, T. E. Corman, J. W. Rourke, and M. W. Sumner. 1996. Arizona Partners In Flight 1995 southwestern willow flycatcher survey. Technical Report 97, March 1996. Arizona Game and Fish Department, Phoenix. 69 pp.

Stiles, F. G., and A. F. Skutch. 1989. A guide to the birds of Costa Rica. Comstock, Ithaca, New York. 364 pp.

Swarth, H.S. 1914. A distributional list of the birds of Arizona. Cooper Ornithological Club, Hollywood, California.

Tibbitts, T. 1996. Organ Pipe Cactus National Monument: Ferruginous pygmy-owl observations. Compiled by the Organ Pipe Cactus National Monument Natural Resources Management Department. Organ Pipe Cactus National Monument, Arizona. 11 pp.

Tibbitts, T.J., M.K. Sogge, and S.J. Sferra. 1994. A survey protocol for the southwestern willow flycatcher (*Empidonax traillii extimus*). Technical Report NPS/NAUCPRS/NRTR-94-04. National Park Service, Colorado Plateau Research Station at Northern Arizona University, Flagstaff. 24 pp.

Unitt, P. 1987. *Empidonax traillii extimus*: An endangered subspecies. *Western Birds* 18:137-162.

University of Arizona. 1995. Records from the University of Arizona Bird Collection. Provided by T. Huels.

U.S. Fish and Wildlife Service. 1995. Final rule determining endangered status for the southwestern willow flycatcher. *Federal Register* 60:10694-10715.

U.S. Fish and Wildlife Service. 1997. Endangered and threatened wildlife and plants; Determination of endangered status for the cactus ferruginous pygmy-owl in Arizona. Federal Register. 62:10730-10747.

U.S. Fish and Wildlife Service. 2002a. Southwestern Willow Flycatcher Recovery Plan, Region 2, Albuquerque, NM.

U.S. Fish and Wildlife Service. 2002b. Endangered and threatened wildlife and plants; Designation of critical habitat for the Arizona distinct population segment of the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*). Federal Register. 67:71032-71064

U.S. Fish and Wildlife Service. 2005. Designation of Critical Habitat for the Southwestern Willow Flycatcher: Final Rule. *Federal Register* 70 (201): 60886.

Walkinshaw, L.H. 1966. Summer biology of Traill's Flycatcher. *Wilson Bulletin* 78:31-46.

Whitfield, M.J. 1990. Willow flycatcher reproductive response to brown-headed cowbird parasitism. Masters Thesis, California State University, Chico, California. 25 pp.

Whitfield, M.J. 1994. A brown-headed cowbird control program and monitoring for the southwestern willow flycatcher, South Fork Kern River, California, 1994. Prepared for the California Department of Fish and Game. Kern River Research Center, Weldon, CA 12 pp.

Whitfield, M.J. and C. M. Strong. 1995. A brown-headed cowbird control program and monitoring for the southwestern willow flycatcher, South Fork Kern River, California. Calif. Dept. Fish and Game, Bird and Mammal Cons. Program Report 95-4, Sacramento, California. 17 pp.

Wilcox, R.L., W.S. Richardson, D. Abbate. 2000. Habitat selection by cactus ferruginous pygmy owls in southern Arizona B preliminary results. Region V Wldlf. Prog. Rep. Arizona Game and Fish Dept., Tucson.

Willard, F.C. 1912. A week afield in southern Arizona. *The Condor* 14:53-63.