

United States Department of the Interior

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AESO/SE
2-21-01-F-319

July 27, 2001

Mr. Terry Oda, Chief
Clean Water Act Standards and Permits Water Division
Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105-3901

Subject: Biological Opinion on the Crescent Ridge Apartments in Pima County, Arizona

Dear Mr. Oda:

This responds to the Environmental Protection Agency's (EPA) July 17, 2001, request for formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq. (ESA) on the effects of issuing a permit to Emery Chukly for construction of Crescent Ridge Apartments on the endangered cactus ferruginous pygmy-owl (CFPO) (*Glaucidium brasilianum cactorum*) with critical habitat and the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*).

The proposed action involves issuance of a National Pollutant Discharge Elimination System (NPDES) general permit under section 402 of the Clean Water Act (CWA) from EPA. The proposed project may require a section 404 permit under the CWA from the U.S. Army Corps of Engineers (Corps). Financing for the project is via a Federal Housing Administration insured loan under section 221(d)4 of the National Housing Act.

The EPA's request for formal consultation indicated that adverse impacts to the lesser long-nosed bat would be very unlikely. The Service concurs that the proposed action is not likely to adversely affect the lesser long-nosed bat.

Consultation History

The Service met with Mr. Chukly to discuss his proposed project on February 21, and March 29, 2001. On June 6, 2001, the Service met with the Arizona Game and Fish Department; Mr. Chukly; Mike Cross, project consultant; and Keri Silvyn, Lewis and Roca, L.L.P., lawyer for Mr. Chukly, to discuss the proposed project. On June 12, 2001, Lewis and Roca, L.L.P. sent the

Service a letter summarizing the June 6, 2001, meeting. On June 25, 2001, the Pima County Administrator's Office sent the Service a letter regarding the proposed conservation property. On June 29, 2001, the Service's Assistant Regional Director for Ecological Services met with Mr. Chukly and his consultant to discuss the proposed project. On July 3, 2001, the Assistant Regional Director contacted Mr. Chukly via telephone to advise him that the Service would expedite formal consultation on the proposed project once the necessary information was received. On July 5, 2001, Mr. Cross provided the Service with a copy of his letter to EPA requesting that EPA initiate formal consultation with the Service. On July 10, 2001, the Service met with Mr. Cross to discuss the conservation measures proposed for the project and other issues. On July 16, 2001, the Service received an electronic copy of the biological assessment (BA) for the proposed project and a hard copy of the BA exhibits from Mr. Cross. On July 17, 2001, the Service received a hard copy of the BA. On July 17, 2001, the Service received a facsimile of EPA's request to initiate formal consultation on the proposed action.

On July 18, 2001, the Service received a replacement page for the BA from Mr. Cross. On July 19, 2001, the Service responded to Pima County's letter. On July 23, 2001, the Service received a letter from Ms. Silvyn regarding the conservation property. We received a revised version of that letter later that same day. On July 24, 2001, the Service received an electronic version of the revised BA and the conservation property map and a facsimile of the conservation property map. On July 25, 2001, the Service received a hard copy of the revised conservation property legal description and a revised drawing of that property. On July 25, 2001, the Service received a facsimile from Mr. Cross containing a further revision of the conservation property and an updated letter from Ms. Silvyn.

This biological opinion is based on information provided in the BA; correspondence between the Service and the applicant; telephone conversations; field investigations; correspondence from, and meetings with, the applicant and AGFD; and other sources of information. A complete administrative record of this consultation is on file at this office. We have assigned log number 2-21-01-F-319 to this consultation. Please refer to that number in future correspondence on this consultation.

I. DESCRIPTION OF THE PROPOSED ACTION

The proposed action is EPA issuance of a general NPDES permit for storm water discharges associated with construction activities for Crescent Ridge Apartments. The proposed development is located on 9.6 acres zoned for intensive development in unincorporated Pima County, Arizona. The project site is located at 3980 West Linda Vista Boulevard, on the north side of Linda Vista Boulevard, west of the intersection of Linda Vista and Thornydale Boulevards. The site is approximately five miles north of the City of Tucson, four miles east of Interstate 10, and six miles west of Oracle Road. The Tortolita Mountains are located to the north, within approximately five miles.

The proposed 192-unit complex will include one, two, and three bedroom units contained in 12

two-story structures; a one-story, 2,742 sq. ft. recreation facility; and a one-story, 586 sq. ft. storage building. This is a development density of approximately 20 units per acre. On-site amenities will include a pool, spas, playground, and barbeque areas. The plan includes a total 285 parking spaces, including one covered parking space per unit.

In 1999, a Native Vegetation Preservation Plan (NPPO) was prepared which inventoried by size, species, number, and density, the plant communities existing on the site. The NPPO was submitted to Pima County on August 3, 1999. The plan was approved by the County and is on file with Pima County Development Services (reference # Co9-79-65).

The development plan has been designed to achieve a total site disturbance ratio of no more than 20% through acquisition of CFPO habitat in designated critical habitat Unit 4. The applicant will develop approximately 7 of the 9.6 acres and provide 28 additional acres to conserve the CFPO. This conservation property includes a utility easement which will not have public access. The applicant will fence the perimeter of the 28 acres and will prohibit any activity, clearing of vegetation, wood cutting, and free ranging cats and dogs in the conservation area. The legal description of the conservation property is located in the south three-quarters of the southeast quarter of the Southwest quarter of Section 28, Township 11 South, Range 13 East, Gila and Salt River base and Meridian, in Pima County. Crescent Ridge Apartments Corporation will grant a conservation easement to either the Arizona Open Land Trust (AOLT) or another entity acceptable to the Service. An endowment will be established based on PAR software analysis to provide funding for long-term management of the property subject to the conservation easement. Long-term management will include periodic CFPO surveys and monitoring as agreed upon between Crescent Ridge Apartments Corporation, the Service, and the AOLT. The applicant will post a bond until such time as the conservation easement is secured.

To facilitate dispersal of CFPOs, the applicant proposes to augment the vegetation cover of the retention basin located along the western boundary of the proposed development. This area will be vegetated with native trees such as mesquite (*Prosopis velutina*), palo verde (*Cercidium* spp.), and ironwood (*Olneya tesota*). These trees will be placed within the dispersal corridor at a density of two five-gallon trees planted side-by-side at 20-30 foot intervals. The lighting of the development will be installed in a manner that does not compromise the integrity of the dispersal corridor.

In the event that a CFPO enters the project site during construction and establishes a territory or nest site, qualified biologists retained by the applicant will assess the situation. If it is determined that a CFPO has established a territory, the applicant will consult with the Service to determine an appropriate course of action.

II. STATUS OF THE SPECIES/CRITICAL HABITAT

A detailed description of the life history and ecology of the CFPO may be found in the Birds of North America (Proudfoot and Johnson 2000), Ecology and Conservation of the Cactus

Ferruginous Pygmy-owl in Arizona (Cartron and Finch 2000), and other information available at the Arizona Ecological Services Field Office. Information specific to the CFPO in Arizona is limited. Research in Texas has provided useful insights into the ecology of the subspecies, and in some instances represents the best available information; however, habitat and environmental conditions are somewhat different in Arizona and conclusions based on Texas information are tentative.

Species/critical habitat description

The Service listed the Arizona population of the CFPO as a distinct population segment (DPS) on March 10, 1997, effective April 9, 1997 (U.S. Fish and Wildlife Service 1997 [62 FR 10730]). The past and present destruction, modification, or curtailment of habitat is the primary reason for the decrease in population levels of the CFPO. On July 12, 1999 we designated approximately 731,712 acres critical habitat supporting riverine, riparian, and upland vegetation in seven critical habitat units, located in Pima, Cochise, Pinal, and Maricopa counties in Arizona (U.S. Fish and Wildlife Service 1999 [64 FR 37419]). Only lands containing, or likely to develop, those habitat components that are essential for the primary biological needs of the owl and requiring special management are considered critical habitat. By definition, all areas above 4,000 ft, areas not containing or capable of developing constituent elements (e.g., saguaro, large diameter trees), existing features and structures (roads, buildings, etc.) and areas not requiring special management or other areas (National Parks, Tribal lands, etc.) were excluded and are not critical habitat. The actual area meeting this definition as defined in the final rule is substantially less than the total area within the exterior boundaries of the area designated.

Areas designated as critical habitat included recent owl locations and areas important for genetic and demographic interchange within the geographical area occupied by the species that are essential to the conservation of the species and requiring special management considerations. These units, containing the primary constituent elements, or the capacity to develop these habitat components are essential for the primary biological needs of this species and include foraging, nesting, rearing of young, roosting, sheltering, and dispersal. Actions that may destroy or adversely modify critical habitat are actions that destroy or alter the primary constituent elements to the extent that the value of critical habitat for both survival and recovery of the species is appreciably diminished. These activities include, but are not limited to: (1) removing vegetation; (2) water diversions or impoundments; (3) ground water pumping; and (4) recreational activities that appreciably degrade habitat.

Life history

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

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

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

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

CFPOs typically hunt from perches in trees with dense foliage using a perch-and-wait strategy; therefore, sufficient cover must be present within their home range for them to successfully hunt and survive. Their diverse diet includes birds, lizards, insects, and small mammals (Bendire 1888, Sutton 1951, Sprunt 1955, Earhart and Johnson 1970, Oberholser 1974) and frogs

(Proudfoot et al. 1994). The density of annuals and grasses, as well as shrubs, may be important to the CFPO's prey base. Shrubs and large trees also provide protection against aerial predation for juvenile and adult CFPOs and cover from which they may capture prey (Wilcox et al. 2000).

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

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

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

Species status and distribution range-wide

The CFPO is one of four subspecies of ferruginous pygmy-owl. CFPOs are known to occur from lowland central Arizona south through western Mexico to the States of Colima and Michoacan, and from southern Texas south through the Mexican States of Tamaulipas and Nuevo Leon. It is

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

The Service is currently funding habitat studies and surveys in Sonora, Mexico to determine the distribution and relative abundance of the CFPO there. Based on the lack of sightings, they may be absent, rare, or uncommon in northern Sonora, Mexico (Hunter 1988, U.S. Fish and Wildlife Service 1997). Preliminary results indicate that CFPOs are present in northern and central Sonora (U.S. Fish and Wildlife Service unpubl. data). Further studies are needed to determine their distribution in Mexico.

The range of the Arizona DPS of the CFPO extends from the International Border with Mexico north to central Arizona. The northernmost historic record for the CFPO is from New River, Arizona, about 35 miles north of Phoenix, where Fisher (1893) reported the CFPO to be "quite common" in thickets of intermixed mesquite and saguaro cactus. According to early surveys referenced in the literature, the CFPO, prior to the mid-1900s, was "not uncommon," "of common occurrence," and a "fairly numerous" resident of lowland central and southern Arizona in cottonwood forests, mesquite-cottonwood woodlands, and mesquite bosques along the Gila, Salt, Verde, San Pedro, and Santa Cruz rivers and various tributaries (Breninger 1898, Gilman 1909, Swarth 1914). Additionally, CFPOs were detected at Dudleyville on the San Pedro River as recently as 1985 and 1986 (Arizona Game and Fish Department unpubl. data, Hunter 1988).

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

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

While the majority of Arizona CFPO detections in the last seven years have been from the northwest Tucson area in Pima County, CFPOs have also been detected in southern Pinal County, at Organ Pipe Cactus National Monument (OPCNM), Cabeza Prieta National Wildlife Refuge (CPNWR), Buenos Aires National Wildlife Refuge (BANWR), and on the Coronado National Forest. The following is a brief summary of recent owl numbers and distribution¹:

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

In 1998, survey efforts in Arizona increased substantially and, as a result, more CFPOs were documented, which may at least in part account for a larger number of known owls. In 1998, a total of 35 CFPOs were confirmed (S. Richardson, Arizona Game and Fish Department unpubl. data, U.S. Fish and Wildlife Service unpubl. data, T. Tibbitts, Organ Pipe Cactus National Monument unpubl. data, D. Bieber, Coronado National Forest unpubl. data).

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

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

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

Surveys conducted during the recently completed 2001 season resulted in a total of 47 adult CFPOs confirmed at 29 sites² in Arizona (S. Richardson, Arizona Game and Fish Department unpubl. data, T. Tibbitts, Organ Pipe Cactus National Monument unpubl. data, U.S. Fish and Wildlife Service unpubl. data). There were also several other unconfirmed sites that are not included in these totals. Nesting was documented at 17 sites and it is unknown at this time how many young have successfully fledged at this time because not all young have fledged as of the date of this opinion. The following regions of the state are currently known to have CFPOs:

- **Tucson Basin** (northwest Tucson and southern Pinal County) - A total of 8 adults (3 pairs and 2 single resident males) were confirmed at 5 sites, all of which were in Pima County. For the first time in 3 years, no CFPOs were documented in southern Pinal County. Three nests in northwest Tucson were confirmed, all with young.
- **Altar Valley** - A total of 18 adult CFPOs were documented at 12 sites³. As a result of increased access to portions of the valley, the number of known owls increased to 7 pairs and 4 resident single owls. A total of 7 nests were confirmed.
- **OPCNM and CPNWR** - Twelve adults, consisting of 2 pairs and 4 single CFPOs were confirmed at 8 sites. Three nests were active. Two new sites were documented on the CPNWR and 1 north of OPCNM near Ajo.
- **Other** - A total of 9 adults, consisting of 4 pairs and 1 single CFPO at 5 sites documented elsewhere in southern Arizona. Nesting was confirmed at 4 of these sites. It is unknown how many of these young successfully dispersed. There were several other possible CFPO detections reported elsewhere in the state, but they were not confirmed.

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

² CFPO sites are nests and resident male CFPO sites that have been confirmed by AGFD or the Service.

³ There was one additional female found in Altar Valley dead in a saguaro cavity, suspected to have been killed by a screech owl (S. Richardson, Arizona Game and Fish Department unpubl. data).

Range wide-trend

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

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

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

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

In northwest Tucson, all currently known CFPO locations, particularly nest sites, are in low-density housing areas where abundant native vegetation separates structures. Additionally, they are adjacent to or near large tracts of undeveloped land. CFPOs appear to use non-native vegetation to a certain extent, and have been observed perching in non-native trees in close proximity to individual residences. However, the persistence of CFPOs in areas with an

abundance of native vegetation indicates that a complete modification of natural conditions likely results in unsuitable habitat conditions for CFPOs. While development activities are occurring in close proximity to owl sites, particularly nest sites, overall noise levels are low. Housing density is low, and as a result, human presence is also generally low. Roads in the areas are typically dirt or two-lane paved roads with low speed limits which minimizes traffic noise. Low density housing areas generally have lower levels of traffic noise because of the limited number of vehicles traveling through the area.

Other factors contributing to the decline of CFPO habitat include the destruction of riparian bottomland forests and bosques. It is estimated that 85 to 90% of low-elevation riparian habitats in the southwestern U.S. have been modified or lost; these alterations and losses are attributed to woodcutting, urban and agricultural encroachment, water diversion and impoundment, channelization, groundwater pumping, livestock overgrazing, and hydrologic changes resulting from various land-use practices (e.g., Phillips et al. 1964, Carothers 1977, Kusler 1985, Jahrsdoerfer and Leslie 1988, U.S. Fish and Wildlife Service 1988, U.S. General Accounting Office 1988, Szaro 1989, Dahl 1990, State of Arizona 1990, Bahre 1991). Cutting of trees for domestic and industrial fuel wood was so extensive throughout southern Arizona that, by the late 19th century, riparian forests within tens of miles of towns and mines had been decimated (Bahre 1991). Mesquite was a favored species because of its excellent fuel qualities. In the project area, the famous vast forests of "giant mesquites" along the Santa Cruz River in the Tucson area described by Swarth (1905) and Willard (1912) fell to this threat, as did the "heavy mesquite thickets" where Bendire (1888) collected CFPO specimens along Rillito Creek, a Santa Cruz River tributary, in present-day Tucson. Only remnant fragments of these bosques remain.

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

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

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

One of the few areas in Texas known to support CFPOs continues to be widely publicized as having organized field trips and birding festivals (American Birding Association 1993, Tropical Birds of the Border 1999). Resident CFPOs are found at this highly visited area only early in the breeding season, while later in the season they could not be detected. O'Neil (1990) also indicated that five birds initially detected in southern Texas failed to respond after repeated visits by birding tours. It is unknown if the birds habituate to the playing of taped calls and stopped responding, or if they abandoned the area. Oberholser (1974) and Hunter (1988) additionally indicated that in southern Texas, recreational birdwatching may disturb owls at highly visited areas.

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

Currently, all known nesting CFPOs within northwest Tucson are located in areas containing no development or low-density housing developments that are adjacent to undeveloped tracts of land with varying amounts of noise disturbance. Individual CFPOs may react differently to noise disturbances, some individuals exhibiting less tolerance than others. Noise can affect animals by disturbing them to the point that detectable change in behavior may occur. Such behavioral changes can affect their activity and energy consumption (Bowles 1995). Dangerous or unfamiliar noises are more likely to arouse wildlife than harmless and familiar noises. Habituation is the crucial determinant of success in the presence of noisy disturbances. Exposures of some experienced birds may produce no or minimal losses (Black et al. 1984). The

habituation process can occur slowly, so it may not be detected in the short-term. In the long-term, some nesting birds become more tenacious and less responsive in the presence of human disturbance if they are not deliberately harassed (Burger and Gochfeld 1981). It is unknown if noise habituation occurs in some CFPOs as it does with other bird species. Robert and Ralph (1975), Schreiber (1979), Cooke (1980), Parsons and Burger (1982), Ainley et al. (1983), and McNicholl (1983) found that adult birds, and chicks to some extent, habituated to the presence of humans, and their responses to people seemed to be less than those of undisturbed birds. Burger and Gochfeld (1981) and Knight et al. (1987) found responses to noise disturbances and habituation in nesting birds become more tenacious and less responsive in the presence of human disturbance if they were not deliberately harassed.

Raptors in frequent contact with human activities tend to be less sensitive to additional noise disturbances than raptors nesting in remote areas. However, exposure to direct human harassment may make raptors more sensitive to noise disturbances (Newton 1979). Where prey is abundant, raptors may even occupy areas of high human activity, such as cities and airports (Newton 1979, Ratcliffe 1980, White et al. 1988). The timing, frequency, and predictability of the noise disturbance may also be factors. Raptors become less sensitive to human disturbance as their nesting cycle progresses (Newton 1979). Studies have suggested that human activities within breeding and nesting territories could affect raptors by changing home range movements (Anderson et al. 1990) and causing nest abandonment (Postovit and Postovit 1987, Porter et al. 1973).

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

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

Another factor that may affect CFPOs is interspecific competition/predation. In Texas, depredation of two adult female CFPOs nesting close to screech-owls was recorded. These incidences were recorded as "depredation by screech-owl" after examination of the CFPO

corpses and assessment of circumstances (i.e., one CFPO attempted to nest in a box that was previously used as screech-owl roost site, the other established a nest in a box within 5 meters (16 feet) of screech-owl nest site). In 2001, an unpaired female CFPO was found dead in a tree cavity, apparently killed by a screech-owl (S. Richardson, Arizona Game and Fish Department unpubl. data). Conversely, CFPOs and screech-owls have also been recorded successfully nesting within 2 meters (7 feet) of each other in the same tree without interspecific conflict (G. Proudfoot, unpubl. data). The relationship between CFPO and other similar small owl species needs further study.

Direct and indirect human-caused mortalities (e.g., collisions with cars, glass windows, fences, power lines, domestic cats [*Felis domesticus*], etc.), while likely uncommon, are often underestimated, and probably increase as human interactions with owls increase (Banks 1979, Klem 1979, Churcher and Lawton 1987). This may be particularly important in the Tucson area where many CFPOs are located. CFPOs flying into windows and fences, resulting in serious injuries or death to the birds, have been documented twice. A CFPO collided into a closed window of a parked vehicle; it eventually flew off, but had a dilated pupil in one eye indicating serious neurological injury as the result of this encounter (Abbate et al. 1999). In another incident, an adult owl was found dead on a fence wire; apparently it flew into a fence and died (S. Richardson, Arizona Game and Fish Department, unpubl. data). AGFD also has documented an incident of individuals shooting BB guns at birds perched on a saguaro which contained an active CFPO nest. In Texas, two adult CFPOs and one fledging were killed by a domestic cat. These owls used a nest box about 75 meters (246 feet) from a human residence. Free roaming cats can also affect the number of lizards, birds, and other prey species available to CFPOs; however, very little research has been done in the Southwest on this potential problem.

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

Fires can affect CFPOs by altering their habitat (Abbate et al. 1999). A recent fire altered habitat near an active CFPO nest site (Flesch 1999) and although four mature saguaros in the area survived (at least in the short-term), post-fire mortality of saguaros has been recorded (Steenbergh and Lowe 1977 and 1983, McLaughlin and Bowers 1982). Flesch (1999) also noted that approximately 20 to 30% of the mesquite woodland within 50 meters (164 feet) of the nest was fire- or top-killed, and ground cover was also eliminated until the summer monsoons. Careful use of prescribed fires in areas potentially suitable for CFPOs is necessary so that habitat is not lost or degraded (Flesch 1999).

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

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

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

III. ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all federal, state, or private actions in the action area; the anticipated impacts of all proposed federal actions in the action area that have undergone formal or early section 7 consultation; and the impact of State and

private actions which are contemporaneous with the consultation process. The environmental baseline describes 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). The Service has determined the action area to include the 9.6-acre project site and areas within 19 miles of the project site, including the conservation property. We based this determination on the dispersal distance of juvenile CFPOs in Texas and Arizona (Proudfoot unpubl. data, S. Richardson, Arizona Game and Fish Department unpubl. data). With so few individual CFPOs in Arizona, the maximum dispersal distance may be periodically needed to maintain genetic interchange between groups of CFPOs.

The project site is within the Arizona Upland Subdivision of the Sonoran Desertscrub vegetation community (Brown 1994). This subdivision is limited in its distribution, forming a narrow, curved band along the northeast edge of the Sonoran Desert from the Buckskin Mountains, southeast to Phoenix, Arizona, and south to Altar, Sonora, Mexico. It is described as a low woodland of leguminous trees with an overstory of columnar cacti and with one or more layers of shrubs and perennial succulents. Within the United States, columnar cacti include saguaros (*Carnegiea gigantea*) or organ pipe cactus (*Stenocereus thurberi*). Trees within this subdivision include blue paloverde (*Cercidium floridum*), foothills paloverde (*C. microphyllum*), ironwood, mesquites (*Prosopis* spp.), and cat-claw acacia (*Acacia* spp.). Cacti of many species are found within this subdivision, and include many varieties of cholla and prickly pear (*Opuntia* spp.), fish-hook barrel cactus (*Ferocactus wislizenii*), and compass barrel cactus (*F. acanthodes*) (Brown 1994).

The project site is within the paloverde-cacti-mixed scrub series of the Arizona Upland Subdivision of the Sonoran Desertscrub community. The paloverde-cacti-mixed scrub series is described as developed on the bajadas and mountain sides away from valley floors. A bajada is the area between level plains and the foot of a mountain, and is dissected by arroyos, exhibiting numerous variations in slope and pattern. While there is great variation between bajadas, they are generally characterized by good drainage and slowed evaporation, resulting in enhanced growing conditions for xerophytic plants. Cacti are particularly prevalent on bajadas, and woody, spiny shrubs and small trees, and annuals are abundant. The increased diversity of plants in turn supports a diversity of wildlife species (Benson and Darrow 1981, Olin 1994). 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.

Over the past 12-month period, we have conducted over 100 informal section 7 consultations within the action area (e.g., planned residential, commercial, and other developments) and have provided technical assistance to approximately 500 individual projects without a federal nexus (projects not requiring a federal permit, authorization, or funding e.g., develop single family residences, churches, fire stations, etc on individual lots). In addition, in December 1999, approximately 40 acres were graded for the Amphitheater High School site in northwest Tucson.

We did not receive a request for consultation on this activity prior to grading. In 2001, there have been an additional approximately 50 acres of suitable habitat in northwest Tucson that have also been graded, without undergoing section 7 consultation.

We have completed several livestock grazing consultations with the Forest Service and Bureau of Land Management in southern and central Arizona that addressed adverse impacts to CFPOs. Also, within the project area we have completed several other consultations. In July 2000, we completed a consultation with the EPA for a 20-acre residential development (Countryside Vistas Blocks 5 and 6) approximately 3.5 miles to the south of the project site. In October 2000, we completed a consultation with the EPA for a 5,924-acre residential and commercial development (Dove Mountain) approximately 4.5 miles to the northwest of the project site. In December 2000, we completed a consultation with the EPA for a 29-acre residential development (Tecolote de Oro) approximately 2 miles to the northeast. We have also completed consultations on several smaller projects including a utility substation, water recharge facility, recreation facility, and 5-year hiking trail work plan. All of these consultations resulted in non-jeopardy and no adverse modification determinations by the Service.

In December 1998, an ESA section 10(a)(1)(B) permit for the CFPO was issued by the Service for a guest ranch (Lazy K Bar) which may eventually be converted to low density residential housing in northwest Tucson. Pima County is currently working with the Service on developing a county-wide Sonoran Desert Conservation Plan (SDCP) which, if approved, will result in the issuance of a section 10 permit to Pima County and other participating jurisdictions for CFPOs and potentially several other listed and sensitive species. We are also currently working with applicants on two additional section 10 permits in northwest Tucson, ranging from 300 to 500 acres in size.

Several thousand acres of State Trust land are located in a large continuous block to the south and west of the project site. This land contains suitable CFPO habitat. Surveys in this area have not been comprehensive, but there is documentation of dispersing juveniles moving through the area. Nests have not been documented in this area, but this may be due to the low level of survey efforts to date. At present, this land is not developed; however, State Trust lands may be sold or exchanged and could be used by future owners for development. Presently, State Trust lands are being leased for grazing. Other activities (e.g., recreational off-road vehicle [ORV] use, shooting/target practice, hunting) also occur on these lands.

The project site is a 9.6-acre undeveloped site located in unincorporated Pima County, near the intersection of Linda Vista and Thornydale Roads. The site is located within Unit 4 of designated critical habitat for the CFPO. The elevation of the property is 2,425 to 2,445 feet. The BA states that there are no jurisdictional waters of the U.S. on the site. The majority of private land in the vicinity is zoned for high-density residential and commercial development. To the south of the property is Linda Vista Road and Mountain View High School. The eastern boundary consists of a commercial center (Safeway Plaza) and an apartment complex. The western boundary consists of a CR5 (8 homes per acre) residential development. The northern boundary includes another CR5 residential development. There is a band of native vegetation at the northwest corner of the

property that provides a link between the project site and suitable CFPO habitat off-site. The densest stand of vegetation of the type typically associated with CFPO habitat is located at the southern end of the property approximately 100 meters from Safeway Plaza and Mountain View High School. The project site has been subject to illegal dumping, vandalism, parties, and transient camps. The site contains a network of trails used by local residents going to and from school, walking their dogs, cycling, and jogging.

The dominant plants on the site are foothills palo verde, saguaro, velvet mesquite (*Prosopis velutina*) triangle-leaf bursage (*Ambrosia deltoidea*), creosote bush (*Larrea tridentata*), and several species of cholla cacti (*Opuntia* spp.). The two general habitat types at the project site are xeroriparian (approximately 0.3 acres) and Arizona Upland. The following is a list of plant species observed on the property in 1998 and 1999: foothills palo verde, blue paloverde, velvet mesquite, ironwood, whitethorn acacia (*Acacia constricta*), catclaw acacia (*Acacia greggi*), graythorn (*Ziziphus obtusifolia*), ocotillo (*Fouquieria splendens*), saguaro, prickly pear cactus (*Opuntia engelmannii*), fish hook barrel cactus (*Ferocactus wislizenii*), cholla species (*Opuntia* spp.), desert Christmas cactus (*Opuntia leptocaulis*), Engelmann hedgehog cactus (*Echinocereus engelmannii*), creosote bush, triangle leaf bursage, desert broom (*Baccharis sorothroides*), thornbush (*Lycium* spp.), ephedra (*Ephedra* spp.), turpentine bush (*Ericamoria laricifolia*), and canyon ragweed (*Ambrosia ambrusoides*).

The vegetation community of the conservation property is the palo verde-cacti-mixed scrub series of the Arizona Upland Subdivision of the Sonoran Desertscrub (Brown 1994). The dominant plants on the site include foothill palo verde, saguaro, velvet mesquite, triangle-leaf bursage, creosote bush, and several species of cholla. The site is located in an area currently zoned Suburban Ranch (SR) and is surrounded by large tracts of vacant land and isolated SR home-sites. There are no high-density residential or commercial developments in the vicinity. There is an existing dirt road associated with a utility easement on-site; otherwise the site is comprised of undisturbed Sonoran Desertscrub.

The CFPO was first documented in the action area around 1872 (see Status and Distribution section above) and historically was widespread in the action area. Collections of CFPOs were fairly regular in this region compared to elsewhere in the state until 1918 (Johnson et al. in prep.). Only one CFPO observation was recorded between 1918 and the 1970s (Hunter 1988, Johnson et al. in prep.). Several sightings of CFPOs were documented during the 1970s in the Tucson Basin; however, systematic surveys did not take place until 1993 by AGFD. Survey efforts in this area have dramatically increased since listing, particularly in the last 4 years (U.S. Fish and Wildlife Service unpubl. data). In addition, AGFD initiated radio telemetry research in the action area in 1998, which has provided valuable information on habitat use and movement patterns of adult and juvenile CFPOs.

We currently know of only a small population (8 adults in 2001) of CFPOs in the action area (northwest Tucson and southern Pinal County). However, the information regarding owl use of this area over time has been limited. Information collected in the action area, and particularly the

vicinity of the project site, represents only limited data, collected primarily over the past few years. For example, use of radio telemetry equipment, which provides detailed information on use patterns and areas was not utilized until 1998, and its use has been limited by the small number of birds transmittered and available resources (i.e., limited personnel for intensive monitoring and equipment). In addition, battery life on radio transmitters is limited to only 90 days because of the small size that must be used on these small owls, which further limits the amount of telemetry data that can be collected.

Current information suggests that CFPOs can live and breed successfully in areas which have undergone at least some degree of low density human development; however, they do not appear to be able to tolerate all types of development, particularly high density development. Since widespread surveys began in Arizona in 1999, more owl sites have been documented in areas with little or no human activity or development. For example, in 2001, of the 29 known CFPO sites (46 adult owls) in the state, 24 sites (37 adults) were in undeveloped or areas with very little human activity, compared to only 5 sites (9 adults) that were in areas with some level of low density development (S. Richardson, Arizona Game and Fish Department unpubl. data, U.S. Fish and Wildlife Service unpubl. data). No CFPOs have been documented in high density developments. To determine the level of vegetation disturbance nesting CFPOs may be able to tolerate, a group of CFPO experts completed an analysis of all nest site home ranges (n=6) occurring in developed areas that successfully produced offspring. They calculated the amount of vegetation disturbance (e.g., roads, buildings, horse corals, pastures, parking lots, golf courses, etc.) within the estimated home range (280 acres) at each nest site. They calculated their average percent disturbance to be 21% (median 21%). However, 4 of the 6 home ranges had levels below that average. Three of the 6 sites were within the 20-25% disturbance range.

There also appears to be a difference in the tolerance to the amount of vegetation disturbance (i.e., development) between nesting and non-breeding CFPOs. Single owls may be able to tolerate higher levels of development and more marginal habitats, while breeding owls may need less disturbed vegetation within their home ranges. An analysis of all known CFPO sites in northwest Tucson resulted in a considerably lower amount of vegetation disturbance at nest sites compared to non-breeding sites (e.g., unpaired males) (S. Richardson, Arizona Game and Fish Department unpubl. data). As stated above, the average amount of vegetation disturbance within the home range of 1998-2000 nesting sites was 21% (also the median). The amount of vegetation disturbance within the home range of non-breeding sites was considerably higher, averaging 39% (median 31%). Although these overall results are based on a small sample size (n=10), they represent the best available information and indicate that nesting CFPOs may require less disturbed areas than unpaired owls. For example, a juvenile male CFPO established a new territory in the fall of 1999 in a highly developed residential area in northwest Tucson and remained there throughout the 2000 and 2001 breeding seasons. This male has failed to pair with a female owl, even after vigorous calling throughout the spring and summer months both years. Within its estimated home range, habitat is highly fragmented, containing the highest degree of development (50%) of any other known CFPO territory (S. Richardson, Arizona Game and Fish Department unpubl. data.). Differences in the tolerance of vegetation disturbance between

breeding and non-breeding owls are important because nesting owls are necessary for recruitment of young owls and demographic support to achieve recovery of the CFPO in Arizona. Although also important to the population from a demographic standpoint, non-breeding males do not directly contribute to the increase of the population by producing young. Therefore, the Service believes that because successful breeding sites are necessary to produce offspring for the survival and eventual recovery of the CFPO Arizona population, vegetation disturbance levels found at breeding sites should be used as guidelines rather than those in non-breeding territories. These guidelines are particularly important within specific areas of the state (i.e., Special Management Areas [SMAs]) identified by the Recovery Team (U.S. Fish and Wildlife Service 2001). The sites proposed for development and preservation are within the proposed Northwest Tucson SMA. More research and monitoring is needed to better understand habitat needs and the relationship between development and CFPO requirements.

It should be noted that the nest site with the highest amount of vegetation disturbance (33%) is that of a long established pair that was documented from 1997 through 1999. Development in the general vicinity of this site continued during this time. As noted above, the male of this pair was found dead in 1999. Surveys in 2000 and 2001 did not locate any CFPOs at this site. Site tenacity in the short-term may have been a factor in this pair's ability to withstand this higher level of vegetation disturbance compared to other sites in Arizona; however, the long-term effect of this amount of disturbance is unknown. Other than at this site, nesting owls have not been documented in areas with more than 25% vegetation disturbance. In 2001, 5 of the 29 known owl sites were located in undeveloped areas, which places the level of vegetation disturbance at this nest site even further as an extreme, compared to all the other sites in the state. The amount of development at this site is considered an exception rather than the norm; therefore, a maximum of 20% vegetation disturbance guideline is used for this SMA, particularly for large projects, to provide for the survival and recovery of the CFPO (U.S. Fish and Wildlife Service 2001).

The proposed development site is located within Unit 4 of designated critical habitat for the CFPO. The proposed development and conservation sites contain suitable habitat and provide potential nesting, foraging, sheltering, and movement/dispersal habitat for the CFPO. The action area supports one of the highest known concentrations of breeding CFPOs in the state.

Telemetry data from AGFD has documented CFPO dispersal within 0.25 miles of the proposed project site. Since 1997, four separate CFPO sites/nests have been documented within four miles of the project site. In 1997, 1998, and 1999, a CFPO nest was documented 1.5 miles from the project site. In 1998, a CFPO nest was documented 1 mile away. In 2000, two CFPO nests were documented 1.5 miles away. In 2001, an active territorial male CFPO was documented approximately 1.75 miles from the project site. Also in 2001, three active CFPO nests have been documented in the project vicinity. One nest is approximately 1.5 miles away and contains three or four nestlings. The second nest is approximately 1 mile away with an unknown number of fledglings. The third nest is approximately 1 mile away and contains four fledglings.

Surveys to determine presence/absence of CFPOs were conducted on the project site in 1999, 2000, and 2001. Survey methodology developed by the AGFD in 1993 and 1995 was used for the surveys completed before 2000 and according to the current protocol in 2001 (AGFD and U.S. Fish and Wildlife Service 2001). No CFPOs were detected on or adjacent to the site in 1999, 2000, or 2001.

The conservation property is within 0.5 mile of documented CFPO dispersal and is within the Northwest Tucson SMA.

IV. EFFECTS OF THE ACTION

The project site is located within the Northwest Tucson SMA that the Service has determined to be of high conservation value for the CFPO. The proposed action will result in the permanent loss and/or degradation of 9.6 acres (footprint of developed area is approximately 7 acres) of suitable habitat that likely provides foraging, sheltering, and movement and dispersal habitat for CFPOs and has the potential to support nesting pairs and resident owls as they disperse from nearby nests. The proposed project will increase fragmentation within the action area. The project site contains suitable habitat for the CFPO, and provides, or could provide, each of the life history components required by CFPOs. The project site is surrounded on three sides by high-density urban development and to the north is connected to undeveloped land containing suitable CFPO habitat.

The CFPO Recovery Team has recommended recovery areas that they believe are necessary for the survival and recovery of the CFPO in Arizona (U.S. Fish and Wildlife Service 2001). Pertaining to this project, all areas within designated critical habitat are also within recommended recovery areas. The team also has recommended specific areas within recovery areas for special management (i.e., SMAs) that are of the highest concern because: (1) they contain high concentration of CFPOs, particularly nesting owls, that are important sources of young owls to increase the population; (2) CFPO recovery is dependent on the availability of suitable habitat near breeding areas not currently known to have owls where juvenile owls can disperse into and successfully breed; and (3) they are threatened by rapid urban development or other immediate threats. Within the action area, two SMAs have been recommended by the Recovery Team: (1) Northwest Tucson SMA – located generally north of Cortaro Farms Road, south of the 136000 N street alignment, east of Interstate 10, and west of La Cholla Blvd; and (2) Tortolita Fan SMA – containing major washes and upland corridors connecting the Northwest Tucson SMA to southern Pinal County.

Limiting the amount of vegetation disturbance to 20% is imperative in these two SMAs because of their importance; however, these levels do not necessarily need to be applied universally to all recovery areas or critical habitat. Although all areas within recovery areas and critical habitat are essential to the survival and recovery of the CFPO, the role and relative importance of each specific area must be assessed individually for each project under section 7 consultation. For example, some areas were designated as critical habitat to provide connectivity for movement

between subpopulations of known owls or suitable habitat. Others are of higher importance because they have nesting owls and provide areas for recruitment near active nests for the establishment of new breeding pairs. SMAs are recommended as highest importance for recovery of this subspecies, and therefore, are recommended for the most conservative management guidelines based on the best available information. Conservation measures (e.g., open space acquisitions, land trades, conservation easements) should be focused in SMAs, particularly the Northwest Tucson SMA which contains the highest number of known breeding owls and is of the highest immediate risk from development (U.S. Fish and Wildlife Service 2001). Recovery areas outside SMAs are still important for the survival and recovery of the CFPO; however, their role is different than that of SMAs and higher levels of disturbance may be acceptable.

To minimize the effects of the habitat loss, the applicant will ensure that the 20% maximum disturbance is not exceeded. To achieve this percentage, the applicant plans to conserve 28 acres of CFPO habitat to be conserved and managed for CFPOs. The land will be held by AOLT or another organization acceptable to the Service.

There are no known CFPO nests or resident CFPOs at the project site; however, three active nest sites are located within 1.5 miles and a resident male CFPO is located within 1.75 miles. No known nest or resident CFPO or territory will be directly affected by this project. However, as stated above, CFPOs have been observed dispersing near the project site.

Researchers in Arizona have found that CFPOs require habitat linkages, within and between territories for movement and dispersal, consisting of continuous cover or patches of trees and large shrubs spaced at regular intervals, to provide concealment and protection from predators and mobbing, as well as shade and cool temperatures (S. Richardson, Arizona Game and Fish Department unpubl data, Abbate et al. 1999). CFPOs, particularly juveniles, are susceptible to predation, weather extremes, human-related injury/mortality factors (e.g., cars, buildings, fences, domestic cats) and other mortality factors (mortality of juveniles is typically 50% or more for owls and other raptors). Therefore, it is essential to maintain habitat conditions that reduce their exposure to these threats and provide protection as they disperse from their natal areas. A high degree of cover throughout the landscape increases the likelihood of survivorship to the next breeding season. Limiting these mortality factors is critical, especially for small, depressed populations, such as CFPOs in Arizona.

To facilitate dispersal of CFPOs at the project site, the applicant proposes to augment the vegetation cover of the retention basin located along the western boundary of the proposed development. This area will be vegetated with native trees such as mesquite, palo verde, and ironwood. These trees will be placed within the dispersal corridor at a density of two five-gallon trees planted side-by-side at 20-30 foot intervals.

Because there are active nest sites nearby, it is likely that juvenile CFPOs may disperse through and onto the project site during construction. Dispersing CFPOs typically move great distances

during the dispersal period, ranging several miles and over wide areas before selecting a territory, where they will remain throughout the remainder of the fall and winter. After the proposed construction is completed, it is possible, but unlikely, that CFPOs will be able to move through the project site. In addition, the project will no longer be able to support nesting owls or CFPO foraging activities.

Development of this area will increase habitat fragmentation, increase the overall size of an existing block of high-density development and golf courses, and render this area functionally unsuitable for CFPOs. This project will also cause dispersing juvenile owls in the vicinity to move elsewhere to establish new territories.

CFPO casualties caused by pest control, pollution, collisions with cars, radio towers, glass windows, power lines, and cat predation are often underestimated, although likely increasing in occurrence due to human population growth (Banks 1979, Klem 1979, Churcher and Lawton 1987). Even where human-related deaths are uncommon, they may still substantially affect populations of rare birds (Cartron et al. 2000a). Because of the proximity of CFPO sites to residential areas in northwest Tucson, these interactions may be a significant cause of owl mortality there (Cartron et al. 2000a). It is expected that with this residential development, the number of cats will increase, resulting in increased possibility of predation of CFPOs and a reduction in the abundance of CFPO prey species (e.g., lizards, birds) in this area, causing additional adverse impacts to CFPOs. It has been documented in Texas that free-roaming cats have killed both adult and fledgling owls. Herbicides, pesticides, and fertilizers will be used at the project site. Application of the contaminants could affect CFPOs by reducing prey species (e.g., insects, reptiles, birds) within their home ranges and potentially affecting the owl directly if not used in a controlled and targeted manner.

The effects that non-directional and high intensity lighting has on CFPOs is unknown. Lighting is expected to increase; however, it is not quantified in the BA. Of particular concern is high intensity lighting in the close proximity of CFPO nests, activity centers, and movement corridors. Increased exposure to predation of adult CFPOs and fledglings may occur from great horned owls and other predators where bright lights are used near owl sites. If low intensity and directional lighting is used to reduce the exposure to predation of CFPOs in these areas, adverse effects would be substantially reduced or eliminated. The BA states that lighting of the development will be installed in a manner that does not compromise the integrity of the proposed dispersal corridor.

The proposed action will cause short-term noise disturbance associated with construction and long-term noise disturbance and increased human activity. Because of the lack of data specific to this subspecies in Arizona, we must also rely on our knowledge of effects this type of action may have on CFPOs elsewhere and other species, particularly raptors.

Based on the best available scientific information, it appears this species may be tolerant, at least to some extent, of certain low level noise disturbances associated with human activity. These

disturbances include daily activities in residential areas such as people walking, voices, children playing, horses and other livestock, dogs, low to moderate vehicle and large truck traffic, and some occasional construction equipment activity. However, the threshold between noise levels and types of activities that an owl can tolerate versus those that will cause an owl to leave an area are not clearly known at this time.

With respect to CFPOs and noise disturbance at the project site, it is noted that human use in and around the site is on-going; however, activity levels will substantially increase with construction activities and the resulting residential and commercial development. We do not expect that any CFPO will be killed as a direct result of this project. The Service expects that CFPOs will avoid use of the proposed project site and potential future use will likely be limited to the dispersal corridor within the project site, if it occurs at all.

Critical Habitat

The entire project and conservation sites are within critical habitat Unit 4 designated for the CFPO. Primary constituent elements on more than 7 acres of critical habitat will be eliminated under this proposed action, which equals much less than 1% of the total area designated as critical habitat in Arizona. Constituent elements containing components essential for nesting, rearing of young, roosting, sheltering, and dispersal will be removed in this area. These elements include Sonoran desert scrub and xeroriparian vegetation containing saguaro cactus, ironwood, palo verde, mesquite, etc.

Summary

Survival and recovery of the CFPO will require not only protection of all known sites, but also the conservation of other areas not currently known to have nesting owls, which can be measured at two spatial scales. At a large scale, connectivity is necessary among large blocks of suitable habitat that are either currently known to have nesting CFPOs or are important for recovery. This project contains measures to assist in connecting large blocks of habitat. At a finer scale, the protection of habitat within the vicinity of known CFPO sites for establishment of new sites and movement between them is also essential. The Northwest Tucson and Tortolita Fan SMAs contain the highest number and density of breeding CFPOs known in Arizona. They also contain habitats not currently known to have nesting owls that are near nests that are particularly important for the expansion of the population. Although the proposed development occurs within the Northwest Tucson SMA, the conservation property which is three times larger than the proposed development also occurs in this SMA. A maximum of 20% of the project site, together with conservation property, will have vegetation disturbance and development. The applicant will provide funding to manage the conservation property in a manner conducive to the conservation of the CFPO prior to salvage and any ground disturbance.

V. CUMULATIVE EFFECTS

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

The action area is subject to ongoing residential and commercial development pressures. State, local, and private actions are expected to continue to result in development in the vicinity of the project site and elsewhere in the action area. Any activity clearing five acres or more requires a NPDES section 402 permit under the CWA from the EPA, and activities occurring within jurisdictional waters and wetlands of the U.S. require a section 404 permit under the CWA from the Corps. As a result, a substantial number of these anticipated projects will be subject to future section 7 consultations and therefore are not considered here. Many individual undeveloped parcels will not require a federal permit. For example, we are aware of many private actions (e.g., single family residences, churches, fire stations) that have taken place within northwest Tucson over the past year. This is particularly important due to the large number of undeveloped small parcels zoned as SR and low-density residential areas that, when developed, further reduce the amount of suitable habitat, increase fragmentation, and degrade habitat conditions.

We are aware of many planned residential and commercial developments, schools, churches, etc. in the action area that may further reduce and fragment CFPO habitat in this area. As stated above (Species Distribution section), this area supports one of the highest known concentrations of CFPOs in the state. Additionally, this area is currently experiencing a rapid growth in new home sales and development. Since the listing of this distinct population segment in Arizona, housing construction has continued to increase in the Tucson area. For example, in May 1999, new-home closings were a record 467 units, higher than any other May within the past decade (The Arizona Star 1999). In 1999, 10.9% more Tucson-area building permits were issued than in 1988, and topped 7,000 for the first time. Permits issuance was highest in northwest Tucson and, for the first time, Marana issued more than 1,100 permits, with a strong building trend expected to continue or increase (The Arizona Star 2000a). We have received, and continue to receive notification of numerous new housing subdivisions and commercial developments in this region. From 1990 to 1999, the number of people living in Marana grew by 467%; the Arizona State Department of Economic Security stated that Marana is one of the two fastest growing communities in Arizona (The Arizona Daily Star 2000b). Such development results in CFPO habitat fragmentation, loss of breeding and nesting habitat, loss of dispersal and movement corridors, declines or local elimination of prey species, and direct killing or injury of owls themselves through domestic pet predation, exposure to contaminants, collisions with structures, and vehicular strikes.

VI. CONCLUSION

After reviewing the current status of the CFPO, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, it is the Service's biological opinion

that the proposed action is not likely to jeopardize the continued existence of the CFPO. Due to the landscape location of the proposed action within critical habitat and the conservation measures identified in the BA, it is the Service's biological opinion that the proposed development is not likely to result in the destruction or adverse modification of critical habitat.

The Service's opinion is based on the following:

1. The project site is not within a known territory of a CFPO pair or resident CFPO.
2. The 20% vegetation disturbance ratio will not be exceeded.
3. Lighting of the development will be installed in a manner that does not compromise the integrity of the dispersal corridor.
4. The loss of approximately 7 acres of suitable habitat will be offset with the protection of 28 acres managed to conserve suitable habitat for the CFPO and contribute to its conservation.

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

Amount or Extent of Take Anticipated

The Service does not anticipate that the proposed action will result in incidental take of CFPOs.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the ESA direct Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to

develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the CFPO. In furtherance of the purposes of the ESA, we recommend implementing the following discretionary actions:

1. The EPA should promote connectivity to allow for movement within CFPO home ranges, between CFPO sites and adjacent suitable habitat within all proposed development projects in CFPO habitat.
2. The EPA should conduct or fund studies using both monitoring and telemetry, to determine CFPO habitat use patterns and relationships between owls and the human interface in northwest Tucson. Surveys involving simulated or recorded calls of CFPOs require an appropriate permit from the Service. AGFD should also be contacted in regard to state permitting requirements.
3. The EPA should continue to actively participate in regional planning efforts, such as Pima County's SDCP, and other conservation efforts for the CFPO.
4. The EPA should assist in the implementation of recovery tasks identified in the CFPO Recovery Plan when approved by the Service.
5. The EPA should request a programmatic consultation with the Service on the effects of small developments that minimize CFPO habitat loss and degradation.

REINITIATION NOTICE

This concludes formal consultation on the proposed action. 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) any incidental take not authorized herein occurs, (2) new information reveals effects of the agency action that may adversely 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 way that causes an effect to a 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 this action. In instances where any incidental take not authorized herein occurs, any operations causing such take must cease pending reinitiation.

Effects to the CFPO that were not analyzed in this opinion will require a case-by-case analysis to determine if reinitiation of consultation is necessary. If reinitiation is necessary, the Service shall expeditiously consult with the EPA and the applicant to resolve any concerns related to the CFPO and to determine what, if any, measures are needed to minimize potential adverse effects to the CFPO. If a CFPO is documented within 600 meters (0.37 miles) of the proposed

development, reinitiation of consultation with the Service may be necessary. If the protection of and funding mechanism for the conservation property are not finalized prior to implementation of ground disturbance/vegetation removal, EPA must reinitiate consultation with the Service.

The map of the conservation property shows an undeveloped homesite (1.02 acres) immediately adjacent to the southeast corner of the conservation area. Any impacts to CFPOs from development of that homesite are not considered in this opinion. To ensure compliance with section 9 of the ESA, prior to vegetation removal or ground clearing at the homesite, the Service must be contacted to determine if further actions are needed to ensure ESA compliance.

Any questions or comments should be directed to me or Mike Wrigley at (602) 640-2720, or Sherry Barrett at (520) 670-4617.

Sincerely,

/s/ David L. Harlow
Field Supervisor

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