

AESO/SE
2-21-99-F-363

October 23, 2000

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 effects of the Dove Mountain Development in Marana,
Arizona

Dear Mr. Oda:

This responds to the Environmental Protection Agency (EPA) August 4, 1999, request for formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) on the effects of the proposed Dove Mountain mixed use housing development on the endangered cactus ferruginous pygmy-owl (CFPO or owl) (*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 the EPA and a section 404 permit under the CWA from the Army Corps of Engineers (COE). The EPA is the lead federal agency for this consultation. These permits will facilitate development within an approximately 5,924-acre residential and commercial development with parks and open space, located in Marana, Arizona.

The EPA has requested Service concurrence that the proposed action is not likely to adversely affect the lesser long-nosed bat and will have no effect on the American peregrine falcon (*Falco peregrinus*). We concur with this determination for the lesser long-nosed bat. The American peregrine falcon was removed from the federal list of Endangered and Threatened Wildlife on August 25, 1999 (U.S. Fish and Wildlife Service 1998), and federal agencies are no longer required to consult with the Service under section 7 of the ESA.

Consultation History

The Service and the applicant began informal consultation on the proposed project on July 16, 1997, continuing with a series of meetings and telephone discussions. On August 4, 1999, the EPA requested initiation of formal consultation and submitted a biological assessment (BA) (WestLand Resources 1999a) to the Service. On September 10, 1999, we sent a letter to the EPA which stated that we did not concur that a portion of the project known as the North Canyon Area was not likely to adversely affect the CFPO, and if this area was to be included in this consultation, additional information and analysis were necessary. In October, 1999, the EPA submitted a supplemental BA (WestLand Resources 1999b) that included the requested additional information and determined that the development of North Canyon Area may adversely affect the CFPO. On March 3, 2000, we received a second supplement to the BA (WestLand Resources 2000a) which provided revisions to the October 1999 supplemental BA. On April 21, 2000 we received an integrated version of the BA (WestLand Resources 2000b), combining the original BA and the two supplemental BAs. On June 9, 2000, we received a final revised BA (WestLand Resources 2000c) which contained additional modifications from the previous April 2000 BA. The draft biological opinion was transmitted to the EPA, COE, applicant, and Arizona Game and Fish Department (AGFD) on September 26, 2000. Comments were received from the applicant on October 5 and October 19, 2000, and the EPA on October 16, and 23, 2000 and, are incorporated as appropriate in this biological opinion.

This biological opinion is based on information provided in the BA received on June 9, 2000 (WestLand Resources 2000c) which is incorporated herein by reference (hereafter BA); correspondence between the Service and the applicant; numerous telephone and personal conversations; field investigations; correspondence from, and meetings with the applicant, EPA, and AGFD; and other sources of information. References cited in this draft opinion are not a complete bibliography of all literature available on the species of concern, residential and commercial development and its effects, or on other subjects considered in this draft opinion. A complete administrative record of this consultation is on file at this office. We have assigned log number 2-21-99-F-363 to this consultation. Please refer to that number in future correspondence on this consultation.

I. DESCRIPTION OF THE PROPOSED ACTION

Proposed action

The proposed action is the issuance and the applicant's utilization of two CWA permits - a section 402 NPDES general permit from the EPA and a section 404 permit from the COE. The issuance of these permits will facilitate part of the development of Dove Mountain, a master-planned community in northwest Tucson, located in Pima County Arizona. Approximately 4,713 acres (81%) of the 5,924-acre project site is within Critical Habitat Unit 4 designated for the CFPO.

Development covered by this consultation includes a new 27-hole resort golf course, an 18-hole expansion of the existing Gallery Golf Club, a 500-room resort hotel, interval ownership units, single-family residential development (limited to 1,600 residences), retail/commercial development, Conservation Lands (i.e., Tortolita Preserve), Open Space, 5.75 miles of offsite sewer line, 1 mile of offsite reclaimed water line, 1 mile of offsite water line and a water storage reservoir, related facilities, infrastructure, and amenities as identified in Figures 3 and 12 of the BA (collectively the project site). Except for the utility identified in the BA, this total does not include the 1,062-acre Future Consultation Land; however, if the Tortolita Preserve is not preserved as described in this opinion, these areas would become part of the project and the conservation measures described herein. Native vegetation that is removed within the project site will be salvaged and transplanted where required by state and local regulations and in accordance with the conservation plan approved by the Town of Marana. For the purposes of this consultation, the project site also includes a 10-acre future elementary school site which is owned by the Marana School District (Figure 3 of the BA). This site was identified in the Dove Mountain Specific Plan (The Planning Center 1996). Excepting the school site, offsite utilities, and Conservation Lands, the project site is owned by Cottonwood Properties, Inc. RedHawk Marana LLC and Rita Land Corporation (collectively Cottonwood) and Palo Verde Partners (Cottonwood and Palo Verde Partners are collectively the applicant). This consultation also covers approximately 39 acres of previous development activities on land in Dove Mountain owned by Cottonwood (Cottonwood Land) at the time a court-approved settlement agreement was entered into with Defenders of Wildlife and the Center for Biological Diversity (Appendix A of the BA). Pursuant to this agreement, this biological opinion describes, analyzes, and considers the effects to federally listed species from the proposed development of Cottonwood Land within the project site as well as development on Cottonwood Land from and after March 10, 1997, pursuant to nationwide permits 13, 14, and 26. The Cottonwood Land is included within the project site, together with undeveloped land owned by Palo Verde Partners.

The BA (see Section 3) divides the project site and adjacent properties into several land management categories (i.e., Open Space, Development with Minimum Habitat Modification, Golf Course, Development with Moderate Habitat Modification, Development with Significant Habitat Modification, Conservation Lands, and Future Consultation Land) and sets forth the approximate areas for each. Land use and development densities within each of these areas will vary in accordance with the uses and their respective locations; however, there will be no material variations without prior approval of the Service. The development categories are described below and summarized in Table 1.

Open Space - Open space will remain predominately as natural open space. These areas will not be graded and no development activity will take place, except as needed for minor utility, road, and cart path crossings for the project. Salvage of plants will not take place within these areas. Use of insecticides, herbicides, firearms, motorbikes, and motorized vehicles (excepting golf related use of carts), and organized events attracting large groups of people are all prohibited within Open Space.

Development with Minimum Habitat Modification - These areas will contain low density development. The number of residences will be limited so the average density does not exceed one home per three acres and all lots will have a minimum size of at least one acre.

Table 1. Projected development area by land use category within the project site.

Development Land Use Category ¹	Gross Area (acres) ³	Area Disturbed (acres)	Percent Disturbance
<i>Open Space</i>	493	0	0%
<i>Minimum Habitat Modification</i>	2,009	452	23%
<i>Golf Course</i>	282	282	100%
<i>Significant Habitat Modification</i> ²	553	553	100%
<i>Moderate Habitat Modification</i>	169	127	75%
<i>Offsite Utilities</i>	21	5	24%
<i>Conservation Lands (Tortolita Preserve)</i>	2,397	5	0%
Total	5,924	1,424	24%

¹ This table does not include Future Consultation Lands (1,062 acres) which will not be developed under terms of the Interim Conservation Agreement (Appendix Y) until the Habitat Preservation Agreement (Appendix X) is approved and further section 7 consultation is conducted. The disturbance ratio calculation will include the Future Consultation Lands until the Preservation Lease is acquired.

² Includes a 10-acre future elementary school site which is not currently within the Project Plan but may be developed by the Marana School district at a future date.

³ Includes approximately 39 acres of existing development on Cottonwood Land at the time the court-approved settlement agreement was entered with Defenders of Wildlife and Center for Biological Diversity.

Development with Moderate Habitat Modification - The number of residences will be limited so the average density does not exceed one home per acre.

Development with Significant Habitat Modification - A resort, time-share units, retail and commercial developments, and high density residential areas will be developed. In addition an elementary school may be constructed at some time in the future.

Golf - A 45-hole target-style golf course will be constructed.

Conservation Lands - In order to facilitate the applicant's efforts to minimize project impacts through preservation of adjacent land, the Town of Marana has filed an application with the Arizona State Land Department (see Habitat Preservation Agreement - Appendix G of the BA) to obtain a 99-year lease on approximately 2,397 acres of adjacent State Trust Lands (i.e., Tortolita

Preserve) as defined in Figure 12 of the BA. Land obtained by the Town of Marana pursuant to a Habitat Preservation Agreement (as well as any other lands acquired by or at the direction of the applicant and acceptable to the Service) shall be considered Conservation Lands and included in the calculation of the gross area as set forth in the conservation measures of this opinion. These Conservation Lands will be managed as open space and a park by the Town of Marana or other entity approved by the Service as defined in the Habitat Preservation Agreement (Appendix X of this opinion). All activities occurring within the Conservation Lands will be conducive with conservation efforts for the CFPO and will be regulated in accordance with the Habitat Preservation Agreement (Appendix X). Specifically, the following activities will be prohibited (i) use of firearms, (ii) jeep tours and other off road uses, (iii) use of pesticides or herbicides for purposes other than controlling invasion of exotic species, (iv) racing events or other media publicized events that attract large crowds, (v) use of bright outdoor lights, and (vi) construction or vehicular use of roads. In the event the lease with the Arizona State Lands Department is not approved, other lands (with the prior approval of the Service) may be conserved, and development will be reduced within the project site and Future Consultation Lands to ensure the 24% overall vegetation disturbance ratio for the entire project site is not exceeded.

Future Consultation Land - All development activity (except as needed for location of the offsite sewer and water extensions and construction of a water storage reservoir) will be delayed (see Section 3.8 of the BA) within the Future Consultation Land. The applicant will not seek to initiate consultation with the Service with respect to the general development of these lands until the earlier of June 2002, or adoption of a regional habitat conservation plan. The applicant will also not seek to initiate consultation on these lands until the Preservation Lease or other Conservation Lands (with approval of the Service) have been established.

Conservation measures identified in the BA and elsewhere include:

- Termination of Dove Mountain Boulevard, using target-style golf courses, and other measures to minimize vegetation disturbance to the natural desert.
- Upon the issuance of a final opinion, the applicant will pay funds in the amount of \$100,000 (Conservation Payment) into an escrow account. The Conservation Payment will be used by or at the direction of the Service to fund surveys, genetic studies, or other CFPO conservation efforts.
- Measures identified in the Dove Mountain Conservation Plan as approved by the Town of Marana will provide a framework to minimize impacts of the development on native plants, wildlife, and other natural resources.
- Conservation through limitations on total vegetation disturbance in the project site.
- In the event that a CFPO territory (nest or resident single owl) is identified within the project site, within the CFPO territory, the applicant shall (i) conduct public education and awareness programs with measures to reduce or eliminate free roaming cats within

the CFPO territory, Open Space, and Conservation Lands, (ii) provide educational information to all construction personnel regarding the requirements of the biological opinion, including requirements to minimize vegetation disturbances through maintenance of job site perimeters, and (iii) restrict broad cast application (but not the direct application within a golf course) of insecticides and herbicides.

To avoid, minimize, and mitigate the effects of the project, the applicant will maintain an overall vegetation disturbance ratio of 24% or lower (maximum disturbance ratio), as established by dividing (i) the area of land cleared or graded within the project site (development area) by (ii) the gross area. For the purposes of calculation this 24% maximum disturbance ratio, the gross area shall include the entire project site (including the Future Consultation Land until such time as the Interim Conservation Agreement with respect to the Future Consultation Land has been terminated), and the Tortolita Preserve when the 99-year lease and Habitat Preservation Agreement is signed or other Conservation Lands are approved by the Service. To assure compliance with the 24% maximum disturbance ratio, the applicant will calculate the total area to be graded or cleared prior to commencement of grading within each construction phase. If at any time a proposed construction phase would cause the 24% maximum disturbance ratio to be exceeded, the applicant shall not proceed. The applicant will have a licensed engineer review and re-calculate the vegetation disturbance ratio annually or more frequently to ensure that actual grading and clearing within the project site has not caused the 24% maximum disturbance ratio to be exceeded. With prior approval of the Service, adjustments may be made from time to time at the applicant's request to the location and intensity of use and vegetation disturbance within the various land use categories, provided, no such adjustments cause the 24% maximum disturbance ratio to be exceeded.

- Conservation through preservation of suitable CFPO habitat

The Town of Marana has filed an application with the Arizona State Land Department (Appendix G of the BA) to obtain a 99-year lease on a 2,397-acre parcel of adjacent State Lands (Tortolita Preserve). These lands or other Conservation Lands acceptable by the Service will be managed as a park by the Town of Marana or other entity in a manner that is conducive to the conservation of the CFPO as set forth in the Habitat Preservation Agreement.

- Long-Term management of Conservation Lands (Tortolita Preserve) for preservation

The applicant has completed a Property Analysis Record (PAR) developed by the Center for Natural Lands Management to determine the costs of long-term management of the Tortolita Preserve. As a result, a \$370,980 endowment will be paid by the applicant or the applicant shall otherwise satisfy the Town of Marana requirements to cover the annual maintenance costs of \$18,549. Maintenance and conservation measures occurring on these lands include: fencing, gating, signing, biological monitoring, habitat maintenance, and patrolling.

Use of Future Consultation Lands for Interim Conservation

Although the applicant intends for the Future Consultation Land to be developed in the future, upon the issuance of a final biological opinion, the applicant will execute an Interim Conservation Agreement for the Future Consultation Land (Appendix Y). The Interim Conservation Agreement ensures preservation of approximately 1,062 acres (excluding 5 acres of offsite sewer) of land within critical habitat until such time as other suitable Conservation Lands can be secured. The interim conservation agreement may be terminated in accordance with the language in Appendix Y.

Development Constraints

New Construction Phase

The applicant will conduct surveys in accordance with the Service's approved protocol (Arizona Game and Fish Department and U.S. Fish and Wildlife Service 2000) for each construction phase prior to commencement of clearing. If a CFPO is detected at that time within 600 meters (0.37 mile) of a proposed construction phase, the applicant and Service will immediately consult and determine whether a CFPO territory exists. The Service will identify the nest or activity center (CFPO territory) using the best available information, including survey detection and telemetry data (if available), and other monitoring information in this determination. The CFPO territory shall include all area within a 600-meter (0.37-mile) radius from a nest utilized by a CFPO (nest) or the centroid of observations where activity is concentrated of a resident single owl (activity center). If it is determined to be a pair or resident CFPO and the nest or activity center is located within 600 meters (0.37 mile) of a proposed construction activity, then within such construction phase the applicant will, (i) restrict development activity within 100 meters (330 feet) of the nest or activity center on a year-round basis, (ii) modify the development area so that no more than 20% of the property within 600 meters (0.37 mile) of the nest or activity center is cleared, (iii) schedule land clearing activity within 400 meters (0.25 mile) of the nest or activity center to occur outside of the breeding season (February 1 through July 31, (iv) avoid clustering the development in a manner that significantly restricts CFPO movement from the nest or activity center to other prime habitat areas, (v) the remaining vegetation within CFPO territories will be preserved in the same manner as Open Space. In areas more than 600 meters (0.37 mile) from the nest or activity center, and in areas where there is a CFPO response but no CFPO territory identified, development may proceed without restriction. If subsequent survey efforts in accordance with the Service's protocol fail to locate a previously detected CFPO, or other data demonstrate the CFPO territory may have been abandoned, the applicant, Service, and EPA shall mutually determine whether the CFPO territory has been abandoned, in which event any restrictions related to that area shall cease. After consideration of the Service input, a boundary adjustment will be made to the Future Consultation Land by the applicant to allow for an increase in the current project development area to offset any such reduction in the development area.

On-going Construction Phase

If clearing is commenced in a construction phase without a detection of a nest or activity center in the vicinity as provided above, then the construction may thereafter proceed within such construction phase. If a CFPO nest or activity center is thereafter detected within 600 meters (0.37 mile) of such construction phase, construction may thereafter proceed within such construction phase provided that (i) there shall be no construction activities which have the direct and immediate effect of causing physical injury to a CFPO, (ii) there shall be no removal of a nest, (iii) there shall be no additional land clearing activity within 100 meters (330 feet) of a nest or activity center on a year around basis without the Service's approval, (iv) additional habitat removal within a CFPO territory shall be subject to the requirements set forth above for new a construction phase, and (v) blasting, land clearing, or other construction activity which has a greater noise intensity than such activity shall occur outside of the breeding season (February 1 through July 31) within a 400-meter (0.25-mile) radius of a nest or activity center.

Offsite Utilities Conservation

Offsite utilities will be placed where possible along existing disturbed corridors. The applicant will seed all areas cleared for construction of offsite utilities with an appropriate mix of native species upon completion of construction activities. The applicant will also reseed any areas which do not attain a coverage of at least 70% of the natural cover of the native vegetation in the vicinity of the offsite utilities. This reseeding shall occur annually until compliance with this coverage requirement is achieved. In order to minimize the potential for use of offsite utility corridors as new routes for off-road vehicular traffic, the applicant will provide locked gates at three locations. Solid steel gates will be utilized and barbed wire will be installed for approximately 50 yards on each side of the gates to help prevent off-road vehicles from circumventing the gates.

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 et al. 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 is 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, etc.), existing features and structures (e.g., roads, buildings, etc.) and areas not requiring special management or other areas (e.g., 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: removing vegetation, water diversions or impoundments, ground water pumping, and 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 (*Prosopis velutina*) in uplands and linear woodlands of various tree species along bottoms and washes.

The density of trees and the amount of canopy cover preferred by 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 ft 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 in Arizona during 1999 resulted in generally greater dispersal distances, ranging from 1.4 to 12.9 miles (straight line distance) (n=6, mean 6.2 miles) (S. Richardson, Arizona Game and Fish Department unpubl. data). On-going studies in the fall of 2000 indicate that juvenile dispersal distances may be even greater than previously documented (S. Richardson, Arizona Game and Fish Department pers. comm.). 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 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.

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. However, genetic information indicates that eastern and western populations of the CFPO may be genetically dissimilar (G. Proudfoot, R. Zink, R. Blackwell, A. Fry, C. Tchida, P. Heidrich, and M. Wink unpubl. data). Genetic research is currently being funded by Pima County to determine whether there is any genetic variation within tissue samples collected in Arizona compared to samples from Mexico and Texas. Preliminary results remain consistent with earlier studies (about 1% difference between Arizona and Texas samples [G. Proudfoot unpubl. data]).

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, two CFPOs were located in northwest Tucson during informal survey work by AGFD (Abbate et al. 1996). In 1996, AGFD focused their survey efforts in northwest Tucson and Marana. A total of 16 CFPOs were detected, two of which were a pair, and two were fledglings. Three additional CFPOs were detected at OPCNM in 1996. There were also three additional, but unconfirmed, reports of CFPOs from OPCNM.

While the majority of Arizona CFPO detections in the last six years have been from the northwest Tucson area, CFPOs have also been detected in southern Pinal County, at Organ Pipe Cactus National Monument (OPCNM), on the Buenos Aires National Wildlife Refuge (BANWR), and on the Coronado National Forest.

In 1997, survey efforts of AGFD located a total of ten 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 the eight CFPOs documented from this area, one pair successfully fledged four young. 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, ten had nesting confirmed by AGFD and the Service. CFPOs were found in three distinct regions of the

state: Tucson Basin, Altar Valley, and OPCNM. 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 is unknown; however, they are presumed dead.

- **Tucson Basin** - A total of 14 adults were confirmed at 10 sites (11 adults at 7 sites in northwest Tucson and 3 adults at 2 sites in southern Pinal County). Three nests in northwest Tucson produced 10 fledglings, of which 5 juveniles successfully dispersed. One nest in southern Pinal County produced 5 fledglings, of which 2 juveniles successfully dispersed. There were several unconfirmed CFPO sites.
- **Altar Valley** - A total of 7 adult CFPOs were documented at 6 sites. One nest was confirmed, producing 4 fledglings, of which 4 juveniles successfully dispersed from their natal area.
- **OPCNM** - Six sites were confirmed as active, although nesting was not confirmed at any of these sites.
- **Other** - There were two confirmed CFPO nest sites reported elsewhere in southern Arizona, producing 4 fledglings. It is unknown how many of these young successfully dispersed. There were several other reported, but unconfirmed CFPO sightings elsewhere in the state.

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 there are still fewer nest sites in Altar Valley than in the Tucson Basin (S. Richardson, Arizona Game and Fish Department unpubl. data). As a result, our knowledge is changing as to their distribution and habitat needs as new information is collected.

Range wide trend

One of most urgent threats to 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 in 2000. 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, AGFD 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).

During the first week of March 2000, an unpaired male CFPO was monitored two to three times a week, in the action area (S. Richardson, Arizona Game and Fish Department unpubl. data). This same male has been holding this territory since the fall of 1998. This owl was unpaired last year, and the duration of its vocalizations this year indicate that it may still be unpaired and trying to attract a mate. Vegetation was cleared in early 2000 on a 10-ac parcel which was within 130 ft of where this male had been repeatedly observed prior to grading. Subsequent to grading of this parcel, this male moved approximately 0.25 mile away from its previous location. It is unknown whether this activity, the removal of vegetation on the 10-ac site, the associated noise of large equipment grading the site, or both, affected this owl, causing it to move out of the area. However, it is unusual for adult males to move such a long distance in the spring, and such movement has not been observed in Arizona (S. Richardson, Arizona Game and Fish Department pers. comm.). Movement of a such a considerable distance, during this time of year, may indicate that such activities may have adverse impacts on owls and could force them out of an area, or cause them to move from areas where such activity takes place.

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). Conversely, CFPOs and screech-owls were also recorded successfully nesting within 2 meters (7 feet) of each other in the same tree without interspecific conflict. 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, AGFD, 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, AGFD 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 ft) 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 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 the BA, the applicant defines the action area as 1,500 ft of the project site. We disagree with this determination. The Service has determined the action area to include the project site and areas within 19 miles of the project site. We based this determination on the dispersal distance of juvenile 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 owls. On two separate occasions in the action area, siblings of the same nest were documented breeding with each other the following year (Abbate et al. 1999) (see Range wide Trend section below). Instances of sibling breeding may be a reflection of small isolated populations of owls, and maintaining genetic diversity within depressed populations is important to maintain genetic stochasticity and fitness. AGFD (unpubl. data) has documented movement between CFPOs in southern Pinal County and northwest Tucson, therefore, maintaining this genetic interchange is important. Therefore the action area includes known owls within northwest Tucson and southern Pinal County.

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 either saguaros (*Carnegiea gigantea*), or organ pipe cactus (*Stenocereus thurberi*). Trees within this subdivision include blue paloverde (*Cercidium floridum*), foothills paloverde (*C. microphyllum*), ironwood (*Olneya tesota*), 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 75 informal section 7 consultations within the action area (e.g., planned residential, commercial, and other developments) and have provided technical assistance to hundreds of individuals seeking to develop single family residences 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.

We have completed several livestock grazing consultations with the USDA Forest Service and Bureau of Land Management (BLM) in southern and central Arizona that addressed adverse impacts to CFPOs. These consultations resulted in non-jeopardy and no adverse modification determinations by the Service. 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. This consultation resulted in the conservation of 60 acres of offsite lands in the Tucson Basin that will be managed for the CFPO.

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 SDCP which, if approved, will result in the issuance of a section 10 permit to Pima County and other participating jurisdictions for not only CFPOs but also potentially several other listed and sensitive species.

Several thousand acres of State Trust land are located in a large continuous block immediately 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, etc.) also occur on these lands.

The project site is near existing urban development, and adjacent to a large expanse of undeveloped land that contains suitable CFPO habitat. It is currently zoned by the Town of Marana for a maximum of 13,362 dwelling units, 1,600 resort and hotel rooms, and about 300 acres of commercial and retail development. About 674 acres identified in the Dove Mountain Specific Plan for Dove Mountain and Heritage Highlands was developed before the CFPO was listed or critical habitat designated (The Planning Center 1996). The area immediately to the southwest is zoned by Pima County as low density residential (one house per 3.3 acre) suburban ranch (SR), and several parcels have been zoned by Marana R-8 (up to 8 houses per acre). The adjacent Heritage Highlands contains high density residential developments and a golf course. To the north is undeveloped State Trust Land and Pima County Mountain Park (containing the Tortolita Mountains) and to the west is a large expanse of undeveloped State Trust lands. East of the project site is generally low density residential lands zoned by Pima County as SR.

CFPOs were first documented in the action area around 1872 (see Status and Distribution section above) and historically were 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 1970's (Hunter 1988, Johnson et al. in prep.). Several sightings of CFPOs were documented during the 1970's 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 three 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 (14 adults in 2000) of CFPOs in the action area. 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. As of 1999, more owl sites in Arizona have been documented with little or no human activity and development (14 sites [20 adult owls]) compared to developed areas (10 sites [14 adult owls]) (S. Richardson, Arizona Game and Fish Department unpubl. data, U.S. Fish and Wildlife Service unpubl. data). 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, four of the six home ranges had levels below that average. Three of the six 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 breeding season. This male failed to pair with a female owl, even after vigorous calling throughout the spring and summer months. 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 and Recovery Team believe 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 2000). 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 late last summer. Surveys in 2000 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%. As stated above, 14 of the 24 known owl sites in 2000 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 2000).

The entire project site contains suitable habitat and provides potential nesting and 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 (4 out of the 7 confirmed nest sites for the entire listed population in 2000). Since 1997, there have been 13 confirmed CFPO sites (i.e., nest sites and resident male territories) within 6 miles of the project site. Four nest sites have been documented within approximately two miles of the project site (S. Richardson, Arizona Game and Fish Department, unpubl. data, U.S. Fish and Wildlife Service, unpubl. data).

There have been no documented nesting CFPOs within the project site, and it is not within a known CFPO territory, although a nesting pair was documented in 1999 and 2000 approximately one-half mile to the southwest. Single CFPOs have been documented moving through the project site in 1999 and in 2000. On September 11, 2000 AGFD tracked a radio transmitted juvenile male CFPO that dispersed from a nearby nest site to the project site (S. Richardson, Arizona Game and Fish Department, unpubl. data). It remained in the project site for 2-3 days, then continued to the west where it apparently has joined a female juvenile owl. The second owl was also tracked using radio telemetry as it dispersed from its natal area in southern Pinal County to approximately 0.75 mile to the northwest of the project site, where it has remained for the past several weeks. AGFD will continue to monitor these owls.

IV. EFFECTS OF THE ACTION

This proposed action will result in the permanent loss of approximately 1,424 acres of Sonoran desertscrub vegetation which 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. Loss of suitable habitat will occur in Significant Habitat Modification, Moderate Habitat Modification, and Golf Course, and to a lesser degree in Minimum Habitat Modification land use categories and offsite utilities, as described in the BA. This project will also increase fragmentation within the project site. The entire project site contains suitable habitat for the CFPO, and provides, or could provide, each of these life history components. The project site is near existing urban development and adjacent to a large expanse of undeveloped land that is also suitable habitat.

The 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 2000). 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. Approximately 1,929 acres (80%) of the 2,397-acre Conservation Land (Tortolita Preserve) for this project are within the Northwest Tucson and Tortolita Fan SMAs, and approximately 306 acres (29%) of the 1,062 acres of Future Consultation Land are within a SMA. Approximately 3,744 acres of the project site are outside of the SMAs.

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, and other conservation efforts) 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 2000). 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.

As of the date of this draft opinion, the lease application with State Lands Department for the 2,397-acre Tortolita Preserve has been approved by the State Board and is expected to be finalized after auction scheduled October 25, 2000. If the Preservation Lease is awarded to the Town of Marana the project's conservation efforts will be focused within the Northwest Tucson SMA, which is one of the highest priority areas identified by the Recovery Team. Although only a small proportion (2%) of proposed development in the project site occurs within a SMA, a substantial proportion (approximately 1,929 acres - 80%) of the Conservation Lands (Tortolita Preserve) is within a SMA. Of the 2,180 acres in the project site within a SMA, only about 7.2% will be developed and the remainder will be preserved as open space, which is well below the 20% recommendation by the Recovery Team. The Tortolita Preserve is of similar vegetative structure and type, as that area that will be developed in the project site.

In the event the Habitat Preservation Agreement is not established for the Tortolita Preserve, conservation measures will occur on Future Consultation Lands, other lands within the project site, or other appropriate areas approved by the Service. A portion of the Future Consultation Lands are within a SMA (306 acres [29%]). Fewer acres of open space will be conserved within

SMA's if the Habitat Preservation Agreement with the State Lands Department is not finalized. In that event, development of Future Consultation Lands will be restricted as set forth in the Interim Conservation Agreement and planned development within Significant Habitat Modification or other areas will be substantially reduced (i.e., about 59%) to assure that the 24% maximum disturbance ratio for the entire project site is not exceeded.

To minimize the effects of the habitat loss on the project site, the applicant will ensure that the 24% maximum disturbance ratio is not exceeded for the project site in all instances. To achieve this percentage, the applicant will either conserve land within the area of the Future Consultation Lands and reduce the amount of development area accordingly (e.g., by not developing about 318 acres [59%] within the Significant Habitat Modification Land), or cause the lease of 2,397 acres in the Tortolita Preserve from the State Land Department for management by Marana as open space, or acquire other appropriate lands that are acceptable to the Service.

Portions of the project site have been surveyed over multiple years, and the entire site has been surveyed over the past two years. There are no known nests or resident CFPOs onsite; however, a nest site is located about one-half mile to the southwest of the project site. Therefore, no known nest or resident CFPO or territory will be directly affected by this project. However, as stated above, juvenile owls have been observed dispersing through the project site in each of the past three years, most recently in September 11-13, 2000. A male juvenile was in the project site for 2-3 days before moving off to the west where it joined another juvenile owl approximately 0.75 mile from 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, etc.) 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.

Because there are active nest sites nearby, there is a high potential that juvenile CFPOs may continue to disperse through and onto the project site during construction of this phased development. 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. The Open Space and Conservation Lands will continue to allow the movement of CFPOs within the project site, and the Conservation Lands will provide areas for them to potentially establish territories in the future.

To permit the movement of owls through the project site and vicinity, and to partially offset adverse effects of the removal of dispersal and movement habitat in the project site, Open Space areas within the project site will be established along several major and minor washes and upland areas, and to provide linkages with the Tortolita Preserve or Future Consultation Lands. These natural open space areas are located in portions of the project site to allow connectivity of suitable habitat within the site and to adjacent areas. The project will maintain substantial areas of riparian vegetation, major north-south corridors for owl movement, and include other protective measures in the event an owl establishes a territory within the project site within this Recovery Area.

Vegetation disturbance and activities that cause noise disturbances will be extremely limited within the Open Space and Conservation Lands per the conservation measures set forth in the project description, Habitat Preservation Agreement, and this opinion (e.g., ORV, jeep tours, organized events, pesticides, bright lights, and other activities specified in Appendix X of this opinion). Because these activities are restricted within Open Space and Conservation Lands corridors, they will provide effective connectivity and cover for CFPOs and allow for movement through the project site.

Areas with significant and moderate habitat modification (i.e., high and medium density residential, resort/hotel, time-share units, retail/commercial developments, golf, school) will increase fragmentation, increase the overall size of an existing block of high-density development and golf courses, and render these areas functionally unsuitable for CFPOs. This project will also cause dispersing juvenile owls in the vicinity to move elsewhere to establish new territories. Although there will be corridors along several washes through the project site that provide open areas for movement through the site, based on current information, they will likely not be of sufficient size or configuration to support breeding activities; therefore, these areas will likely no longer be useable as nesting habitat. If the lease agreement for the 2,397-acre Tortolita Preserve is established, this will provide a substantial block of suitable nesting, foraging, and sheltering habitat and dispersal corridors for the owl. In the event these State Trust Lands (Tortolita Preserve) are not leased, planned development within the project site will be substantially reduced to ensure the 24% maximum disturbance ratio for the entire project site will not be exceeded. These areas will then be maintained as open space that will provide suitable nesting, foraging, and sheltering habitat and dispersal corridors for the CFPO.

If a new CFPO site is established prior to or after a construction phase has initiated on the project site, the applicant will take adequate conservation measures as defined in the development constraints above to ensure noise disturbances will not cause the CFPOs to abandon their nest or activity center. In addition, a sufficient amount and configuration of suitable habitat will be present within their territory for it to remain viable for CFPOs.

The southernmost 2.5 miles of offsite sewer line is located along an existing power line ROW and, as a result, removal of only a few individual trees within this heavily disturbed portion of the ROW may occur (Figure 12 of BA). Gates will be placed where the new sewer ROW continues north, through the Tortolita Preserve and into the Dove Mountain development where gates will

also be placed to control access. Construction of the off-site sewer line in a new portion of the ROW will remove about 11 acres of suitable habitat in this area, which will further reduce the amount of habitat in the area and increase fragmentation of remaining habitat. In addition, the construction, vegetation disturbance, and improved access that may result in increased human activity (e.g., ORV, motor bike use, etc.) within the sewer ROW. This ROW is located in a relatively undisturbed area. Although the applicant will gate the ROW where it enters the Tortolita Preserve to control access, non-authorized human activity (e.g., ORV, motor bike use and other human activity) often continues on gated roads. If these activities occur within this ROW, CFPO use may be precluded, and nest abandonment may occur if owls establish sites in these areas in the future.

Dove Mountain Boulevard (a four lane street) was originally approved by Marana to continue west from the project site to Interstate 10. In order to minimize the effects of increased development in this area, the applicant and the Town of Marana have amended the Specific Plan to stop this road within the project site, thereby reducing the possibility of future development and adverse impacts to the CFPO in this area. Subject to completion of this consultation, Marana has approved this change and, for the purposes of this analysis, the Service assumes that the road will not be developed beyond the project site, as shown in the BA. If this amendment had not been made and Dove Mountain Boulevard continued westward to Interstate 10, this road access would likely promote a substantial amount of growth and development on private and State Trust Lands (if they are sold for development), thereby causing indirect effects to the owl.

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. However, the open space nature of this development likely will help ameliorate this predation by maintaining corridors for coyote (*Canis latrans*) and other predator movement.

The number of free-roaming cats will likely increase in residential areas, which could affect CFPOs and their prey base if a new owl establishes a territory in the project site. It has been documented in Texas that free-roaming cats have killed both adult and fledgling owls. The applicant will establish public education and awareness programs targeted to residents of Dove Mountain to control free-roaming cats in Open Space and Conservation Lands or where a CFPO territory exists, which will significantly reduce or eliminate adverse effects to CFPOs and their prey base.

The use of herbicides and insecticides (pesticides) and fertilizers in the project site will increase. Pesticides and fertilizers are used extensively to maintain golf courses, and their use will occur in

residential and commercial areas as well. The applicant will utilize an integrated pest management program; however, the BA only specifies that the use of pesticides and fertilizers will be limited to direct application to golf courses only and they will not be used in Open Space and Conservation Lands. The use of pesticides could affect CFPOs indirectly by reducing prey species (e.g., insects, reptiles, birds) within their home ranges and directly if not used in a controlled and targeted manner. The application of pesticides will be limited in the project site, particularly in Open Space, Conservation Lands, and within new CFPO home ranges, therefore, these effects will be significantly reduced or eliminated in these areas.

The effects that non-directional and high intensity lighting has on CFPOs is unknown. In residential and commercial areas lighting is expected to increase substantially; 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 proposed action will also 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 in part 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 Significant Habitat Modification Areas, Golf, and Moderate Habitat Modification areas, and anticipated potential future use will likely be limited to the Open Space, Conservation Lands, and Minimum Habitat Modification areas within the project site.

Interrelated and Interdependent Actions

Interrelated activities are part of the proposed action that depend on the action for their justification, and interdependent activities have no independent utility apart from the action. The Service understands that the offsite water, reclaimed water, and sewer are to be primarily but not solely used for this project under consultation. It is possible that other projects could use a

portion of these offsite lines in the future; however, these actions will likely be subject to future consultation with the Service. These other interrelated and independent actions are discussed in the Direct and Indirect section above.

Critical Habitat

Approximately 4,749 acres (80%) of the 5,924-acre project site is within Critical Habitat Unit 4 designated for the CFPO. Primary constituent elements on about 1,167 acres of critical habitat will be eliminated under this proposed action (about 25% of the critical habitat within the project site), which equals approximately 0.16% of the total area designated as critical habitat in Arizona and 1.3% of Critical Habitat Unit 4. However, the actual percentage of critical habitat removed is higher since not all areas within the boundaries of critical habitat contain primary constituent elements (see Status of the Species section above). Constituent elements containing components essential for nesting, rearing of young, roosting, sheltering, and dispersal will be removed in this area. These elements include Sonoran desertscrub and xeroriparian vegetation containing saguaro cactus, and large diameter trees, including ironwood, palo verde, mesquite, etc. In addition, movement corridors will be maintained through the project site to allow for the movement of owls through the area. The conservation measures described above and in the BA will maintain the function and viability of designated critical habitat.

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 spacial scales. At a large scale, connectivity is necessary among large blocks of suitable habitat that are either currently known to have nesting owls or are important for recovery. This project contains measures to ensure connectivity between large blocks of habitat are maintained. At a finer scale, the protection of habitat within the vicinity of known owl 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 only a small proportion (7.2%) of development occurs within a SMA, a substantial proportion (44%) of the Conservation Lands occur in one of the areas of greatest concern (i.e., SMA).

A maximum of 24% of the project site, together with Conservation Lands will have vegetation disturbed and developed. About 1,929 acres (80%) of the Tortolita Preserve will be located within a SMA. The State Board has approved an application for a 99-year lease of the 2,397-acre Tortolita Preserve that will be managed by the Town of Marana or other entity approved by the Service as a park preserving natural open space. As a result, an overall maximum 24% disturbance ratio, averaged over the project site including the Tortolita Preserve will be maintained (Appendix Y). Management activities on these lands will be conducive with the conservation of the CFPO in accordance with measures in the Habitat Preservation Agreement. The Tortolita Preserve is within the area the Service and Recovery Team have identified as

essential to the survival and recovery of the species (i.e., Critical Habitat, Recovery Areas, and SMAs). In the event the Preservation Lease of the approximately 2,397-acre Tortolita Preserve is not awarded to the Town of Marana, the applicant will preserve the Future Consultation Lands in accordance with the Interim Conservation Agreement or obtain other Conservation Lands approved by the Service as open space. Approximately 306 acres (29%) of the Future Consultation Lands are within the Tortolita SMA. Open Space lands will be managed in a manner that is conducive with the conservation of the CFPO (Appendix X). We believe this approach to be consistent with the best available science and the intent of recommendations made by the Recovery Team (U.S. Fish and Wildlife Service 2000) for conservation of Arizona CFPO population.

Significant Habitat Modification, Moderate Habitat Modification, and Golf Course will permanently remove approximately 962 acres of suitable nesting, foraging, sheltering habitat. Movement and CFPO dispersal corridors will also be eliminated in these areas. Approximately 2,009 acres of Minimum Habitat Modification will likely no longer provide potential nesting habitat and anticipated vegetation disturbance levels will be above the average found in other breeding territories within the action area (i.e., 20%). Areas with Minimum Habitat Modification will likely continue to support non-breeding owls and provide movement corridors for CFPOs. CFPO use within the Tortolita Preserve and Open Space will vary depending on their size, location, and configuration.

Measures defined in the BA and revised project descriptions adequately provide for future breeding CFPO sites in or immediately adjacent to the project site. The BA states 20% disturbance will be allowed within their estimated home ranges (600 meters [0.37 mile]) of a new nest or activity center. This level is based on an analysis of the most recent data representing the best available information indicating breeding CFPOs require less disturbed home ranges and they are less tolerant to higher levels of vegetation disturbance than non-breeding owls. A 20% vegetation disturbance level is the median found in breeding territories. In addition, measures to ensure that the highest quality habitat is retained in the estimated territories and connectivity to adjacent habitat as specified in the project description will not preclude nesting in these areas.

AGFD has documented CFPOs moving through existing wash corridors between high density developments in northwest Tucson that in some cases were narrower in width than what will exist in this action. Conservation measures on Open Space and the Habitat Preservation Agreement management plan for Tortolita Preserve should allow for movement of owls through the project site.

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 draft 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 and State, local, and private actions are expected to continue development immediately to the south and east 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 COE. As a result, a substantial number of these anticipated projects will be subject to future section 7 consultations and are not considered. Many individual undeveloped parcels will not require a federal permit or other federal nexus and will continue to be built, and not subject to future consultation. This is particularly important in the action area due to the large number of undeveloped small parcels zoned as SR and low density residential areas that, when developed, will further reduce the amount of suitable habitat, increase fragmentation, and degrade habitat conditions. Also, we are aware of at least two projects that have graded ten acres or more without filing for a section 402 or 404 permit and have thus not undergone section 7 consultation.

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 (four active nest sites in 2000). 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, Tucson-area building permits were 10.9% more than in 1988, and topped 7,000 for the first time. Permits were highest in northwest Tucson and, for the first time, Marana issued more than 1,100 permits, with a strong building trend expected to continue steady or increasing (The Arizona Star 2000a). We have received, and continue to receive notification of numerous new housing subdivisions and commercial developments in this region as well. During the period from 1990 - 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).

Subject to issuance of the final biological opinion, the applicant has obtained approval of a specific plan amendment to terminate Dove Mountain Boulevard within the project site, thereby reducing the possibility of future development and adverse impacts to the CFPO to the west of the project site.

VI. CONCLUSION

After reviewing the current status of the CFPO, the environmental baseline for the action area, the effects of the proposed Dove Mountain residential and commercial development and associated off-site utilities, 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 location of the proposed action within critical habitat and the conservation measures identified in

this opinion and 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. These conclusions are based on the record of this consultation including the BA, project description and the following:

1. The project site is not within a known territory of a pair or resident CFPO.
2. Conservation measures will be implemented to minimize noise and vegetation disturbance if a new CFPO shows up on the project site after commencement of construction.
3. At no time will the 24% maximum disturbance ratio be exceeded for the entire project site including the Conservation Lands. This level of disturbance will be calculated prior to the commencement of salvaging activities and grading for each construction phase, and at least annually (Appendix X and Y of this opinion). This amount of vegetation disturbance is within the range of non-breeding CFPOs in northwest Tucson.
4. The loss of 1,424 acres of suitable habitat will be offset with the protection of 2,890 acres of Conservation Lands (i.e., Tortolita Preserve and Open Space) managed for conservation purposes. These lands will be managed in a manner that will protect suitable habitat for the CFPO and contribute to its conservation.
5. Of the 2,180 acres in a SMA, only about 156 acres (7.2%) of this area will be developed. Although only a small proportion (7.2%) of development within the project site occurs within a SMA, a substantial proportion (44%) of the Conservation Lands occur there which is in one of the areas of greatest concern. Approximately 1,929 acres (80%) of the Tortolita Preserve is within a SMA.
6. Conservation Lands (i.e., Tortolita Preserve) and Open Space will maintain connectivity within the project site and to adjacent suitable habitat areas offsite.
7. If Conservation Lands other than the Tortolita Preserve or Future Consultation Lands are utilized, they will have prior approval of the Service to ensure they adequately offset impacts of the action.
8. Conservation Lands will provide habitat suitable for breeding, sheltering, feeding, and movement.
9. Conservation Lands will be located in Recovery Area 3, specifically Northwest SMA or southern portion of the Tortolita Fan SMA as identified in the September 2000 Draft Recovery Plan (U.S. Fish and Wildlife Service 2000).
10. Additional clearing, and salvaging activities will not commence on the project site prior to the applicant obtaining and securing the lease for the Tortolita Preserve or entering into the Interim Conservation Agreement for conservation within Future Consultation Lands as specified in Appendix Y of this opinion. The applicant will provide a management

endowment or otherwise satisfy the requirement of the management entity prior to establishment of the Preservation Lease.

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.

The measures described below are non-discretionary, and must be undertaken by the EPA and COE so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The EPA and COE have a continuing duty to regulate the activity covered by this incidental take statement. If the EPA and COE (1) fail to assume and implement the terms and conditions or (2) fail to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the applicant must report through the EPA the progress of the action and its impact on the species to the Service as specified in the incidental take statement (50 CFR §402.14(i)(3)).

Amount or Extent of Take Anticipated

We do not anticipate the proposed action will incidentally cause any take in the form of harm, death, or injury of a CFPO. There are no currently known nesting or resident CFPO sites or portions of their home range (within 600 meters [0.37 mile]) in the project site. However, because nesting owls are nearby, we anticipate that, for a 20-30 year phased development project such as this, it is reasonably certain that CFPOs will move onto or into the immediate vicinity of the project site (within 600 meters [0.37 mile]) and establish a nest or activity center. These CFPOs could be affected by construction noise, dust, traffic, or other human activity in connection with the construction or utilization of the developments. In the event a nest or activity center is established on or immediately adjacent to the project site, the project description includes conservation measures such that the Service does not anticipate that these activities will

constitute incidental take. Generally, we believe that the construction measures adopted by the applicant as a result of this consultation, will reduce any CFPO effects below take. However, it is possible that non-lethal incidental take (in the form of harassment only) of a pair or resident single CFPO will occur if a CFPO establishes a territory within 600 meters (0.37 mile) of ongoing development activity.

If a new CFPO is found within 600 meters (0.37 miles) of the proposed school site, the Marana School District shall reinitiate section 7 consultation with the Service. The Reasonable and Prudent Measures and Terms and Conditions stated in this opinion do not apply to the proposed school site property and incidental take is not anticipated.

Effect of the take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures

Pursuant to section 7(b)(4) of the ESA, Service believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of the CFPO:

1. Minimize vegetation disturbance, loss of key habitat components, and other potential adverse effects to CFPOs which are first detected prior to commencement of clearing vegetation for a construction phase within the estimated home range of a pair or resident single CFPO.
2. Minimize noise disturbance immediately adjacent to a CFPO nest or activity center which is first detected prior to the commencement of clearing vegetation for a construction phase.
3. Minimize vegetation disturbance, loss of key habitat components, and other potential adverse effects to CFPOs which are first detected after commencement of clearing vegetation for a construction phase within the estimated home range of a pair or resident single CFPO.
4. Minimize noise disturbance immediately adjacent to a CFPO nest or activity center which is first detected after commencement of vegetation clearing for a construction phase.
5. Promote connectivity to allow for movement within CFPO home ranges, between CFPO sites and adjacent suitable habitat, in Conservation Lands (or Future Consultation Lands if the Habitat Preservation Agreement is not finalized), and Open Space areas.
6. Monitor development activities within the home range of a new CFPO, and conservation measures identified in this opinion, to ensure compliance with the terms and conditions listed below. Report the findings of this monitoring to the Service and corrective measures that will be taken if measures are not met.

Terms and conditions

In order to be exempt from the prohibitions of section 9 of the Act, the EPA, COE, and applicant must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

Terms and conditions necessary to implement reasonable and prudent measure 1:

- 1.1 Because this is a phased project that will take several years until build out is achieved, there is a potential that CFPOs may move into the project site. To determine whether CFPOs have moved onto or adjacent to a planned new construction phase, protocol surveys shall be conducted (using the Service's approved survey protocol in effect at the time of such activity) prior to initiating salvaging, clearing, or construction activities. Within the project site, surveys shall be conducted in all suitable habitat within a 600-meter (0.37-mile) radius where the vegetation disturbance is to take place. If vegetation disturbance activities have not been completed in these areas prior to January 1st of any given year, CFPO surveys shall be conducted the following survey season according to protocol approved by the Service, prior to such activity. The Service, in coordination with AGFD, shall determine whether a CFPO activity center or nest site exists and whether a change in status (i.e., abandonment) is appropriate, using the best available information, including survey detection and telemetry data (if available), and other monitoring information. The Service believes protocol surveys and monitoring should be completed over a several consecutive year period with no detections prior to considering any change in status (i.e., abandonment) of a site. The Service will also consider the amount of suitable habitat within their home ranges and any changes in the landscape in this assessment.
- 1.2 If the Service or applicant become aware of a new CFPO nest or activity center of a CFPO on or within 600 meters (0.37 mile) of the subject property, they shall immediately notify each other. There shall be no additional clearing of vegetation within this area until the Service, federal agency, and applicant conduct a site specific analysis regarding this new information, and the effects of ongoing and proposed activities to the CFPO.
- 1.3 There shall be no removal of a nest site and no land clearing or development activity within a 100-meter (330-foot) radius of a new nest or resident CFPO activity center year-round.
- 1.4 Only directional and low intensity lights shall be used within 100 meters (330 feet) of a new nest site or activity center to minimize adverse effects to resident CFPOs.
- 1.5 No more than 20% vegetation disturbance shall occur within the estimated home range (600-meter [0.37-mile] radius) of a new CFPO nest or activity center.

- 1.6 The applicant shall provide educational information to construction crews within the estimated home range (600-meter [0.37-mile]) radius) of a new CFPO site for all new grading or construction activity. The purpose of the educational information is to inform crews of these terms and conditions, to minimize vegetation disturbances to CFPOs, and to ensure maintenance of job site perimeters.
- 1.7 The applicant shall conduct public education and awareness programs and develop measures that reduce or eliminate free-roaming cats within the home range of a new CFPO (600-meter [0.37-mile] radius of a nest or activity center), Open Space, and Conservation Lands (or Future Consultation Lands if the Habitat Preservation Agreement is not finalized), to minimize potential adverse effects to CFPOs.
- 1.8 Broadcast application (but not direct application within a golf course) of insecticides and herbicides shall be restricted within the estimated home range (600-meter [0.37-mile] radius) of a new CFPO nest or activity center to minimize effects to nesting and resident owls and their prey base.
- 1.9 The applicant shall require adherence to the Habitat Preservation Agreement, which addresses acceptable and prohibited uses and management actions. Vegetation disturbance and other activities (e.g., ORV, motorbike use/racing, firearm target practicing, jeep tours, and application of insecticides and herbicides etc.) that might significantly degrade CFPO habitat shall be restricted within all Open Space and Conservation Lands (or Future Consultation Lands if the Habitat Preservation Agreement is not finalized).
- 1.10 The Service and the applicant shall review development plans within 600 meters (0.37 mile) of a nest or activity center and ensure that habitat retained has an appropriate amount and configuration of constituent elements for a CFPO within its 280-acre home range. Alternatively, a minimum lot size of 3 acres may be used provided that the amount of vegetation disturbance within the CFPO territory does not exceed 20%. Remaining areas shall be preserved in the same manner as Open Space.

Terms and conditions necessary to implement reasonable and prudent measure 2:

- 2.1 To determine whether CFPOs have moved onto or adjacent to a planned new construction phase, protocol surveys shall be conducted as identified in reasonable and prudent measure 1, term and condition 1 above.
- 2.2 Land clearing, heavy equipment operation, and blasting shall be prohibited within a 400-meter (0.25-mile) radius of a new CFPO nest or activity center during the breeding season (February 1 through July 31).

- 2.3 The applicant shall minimize human activities that may cause substantial noise disturbances that could disturb breeding and non-breeding CFPOs in all areas designated as Open Space and in Conservation Lands.
- 2.4 The applicant shall provide educational information to construction crews within a 400-meter (0.25-mile) radius of a new CFPO site for all new grading or construction activity. The purpose of the educational information is to inform crews of these terms and conditions, to minimize noise disturbances to CFPOs, and to ensure maintenance of job site perimeters.

Terms and conditions necessary to implement reasonable and prudent measure 3:

- 3.1 If the Service or applicant become aware of a new CFPO nest or activity center of a CFPO on or within 600 meters (0.37 mile) of the subject property, they shall immediately notify each other.
- 3.2 There shall be no removal of a nest site and no additional land clearing within a 100-meter (330-foot) radius of a new nest or resident CFPO activity center year-round without the Service's approval.
- 3.3 The Service and the applicant shall review development plans within 600 meters (0.37 mile) of a nest or activity center and ensure that habitat retained has an appropriate amount and configuration of constituent elements for a CFPO within its 280-acre home range. Alternatively, a minimum lot size of 3 acres may be used provided that the amount of vegetation disturbance within the CFPO territory does not exceed 20%. Remaining areas shall be preserved in the same manner as Open Space.
- 3.4 Only directional and low intensity lights shall be used within 100 meters (330 feet) of a new nest site or activity center to minimize adverse effects to resident CFPOs.
- 3.5 The applicant shall provide educational information to construction crews within the estimated home range (600-meter [0.37-mile]) radius) of a new CFPO site for all new grading or construction activity. The purpose of the educational information is to inform crews of these terms and conditions, to minimize vegetation disturbances to CFPOs, and to ensure maintenance of job site perimeters.
- 3.6 The applicant shall conduct public education and awareness programs and develop measures that reduce or eliminate free-roaming cats within the home range of a new CFPO (600-meter [0.37-mile] radius of a nest or activity center), Open Space, and Conservation Areas (or Future Consultation Lands if the Habitat Preservation Agreement is not finalized), to minimize potential adverse effects to CFPOs.
- 3.7 Broadcast application (but not direct application within a golf course) of insecticides and herbicides shall be restricted within the estimated home range (600-meter [0.37-mile])

radius) of a new CFPO nest or activity center to minimize effects to nesting and resident owls and their prey base.

- 3.8 The applicant shall require adherence to the Habitat Preservation Agreement, which addresses acceptable and prohibited uses and management actions. Vegetation disturbance and other activities (e.g., ORV, motorbike use/racing, firearm target practicing, jeep tours, and application of insecticides and herbicides etc.) that might significantly degrade CFPO habitat shall be restricted within all Open Space and Conservation Lands (or Future Consultation Lands if the Habitat Preservation Agreement is not finalized).

Terms and conditions necessary to implement reasonable and prudent measure 4:

- 4.1 Blasting, land clearing, or other construction activity which has a greater noise intensity than such activity shall occur outside of the breeding season (February 1 through July 31) within a 400-meter (0.25-mile) radius of a nest or activity center.
- 4.2 The applicant shall minimize all human activities in all areas designated as Open Space and in Conservation Lands that may cause substantial noise disturbances that could disturb breeding and non-breeding CFPOs.
- 4.3 The applicant shall provide educational information to construction crews within a 400-meter (0.25-mile) radius of a new CFPO site for all new grading or construction activity. The purpose of the educational information is to inform crews of these terms and conditions, to minimize noise disturbances to CFPOs, and to ensure maintenance of job site perimeters.

Terms and conditions necessary to implement reasonable and prudent measure 5:

- 5.1 Vegetative screening (i.e., plant native tree species) shall be planted along identified portions of the golf course bordering Wild Burro Wash to provide visual and noise screening except as set forth in this biological opinion.
- 5.2 Activities shall be restricted to passive recreation within Open Space and Conservation Lands (or Future Consultation Lands if the Habitat Preservation Agreement is not finalized).
- 5.3 With respect to habitat removal after a CFPO territory is identified, suitable habitat providing effective movement corridors within the 600-meter (0.37-mile) radius of a new owl site and to adjacent suitable habitat using drainages or other linkages shall be maintained.

Terms and conditions necessary to implement reasonable and prudent measure 6:

- 6.1 If a nest or activity center is located within 400 meters (0.25 mile) of a construction phase, the applicant shall employ an onsite monitor during construction in order to ensure compliance with the terms and conditions of the ITS.
- 6.2 The applicant shall submit to the Service an annual (by January 1 of each year until development activities are completed) written report and maps to keep the Service informed of the status of activities (e.g. CFPO surveys, ongoing and completed construction phases, etc.) and compliance with these terms and conditions. In addition, the applicant shall seek technical assistance from the Service in implementing these terms and conditions in a manner most effective for minimizing CFPO impacts.
- 6.3 Surveys and monitoring of the project area and Conservation Lands shall continue not only through the construction phase, but also at periodic intervals after build-out, to provide information on usage of owls in the area.
- 6.4 Appropriate measures shall be taken to ensure the utility ROW remains closed to all unauthorized motorized use.

The Service believes it is possible that non-lethal incidental take (in the form of harassment only) of a pair or resident single CFPO could occur if a CFPO establishes a territory within 600 meters (0.37 mile) of ongoing development activity. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

The Fish and Wildlife Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

Disposition of Dead or Injured Listed Animals

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

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

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

CONSERVATION RECOMMENDATIONS

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 and COE 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.
2. The EPA and COE should continue to actively participate in regional planning efforts, such as Pima County's SDCP, and other conservation efforts for the CFPO.
3. The EPA and COE should assist in the implementation of recovery tasks identified in the CFPO Recovery Plan when approved by the Service.

REINITIATION NOTICE

This concludes formal consultation on the project site within the Dove Mountain development in Marana, Arizona. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been 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 are outside of the parameters specified in the Conclusion Section of 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 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 new CFPO is found within 600 meters (0.37 mile) of the proposed school site, the Marana School District shall either elect to proceed under the provisions of this opinion or reinitiate section 7 consultation with the Service for their proposed action. If the Habitat Preservation Agreement for the Tortolita Preserve (Appendix X of this opinion) is not finalized, and other Conservation Lands are proposed to offset adverse effects for this project analyzed in this opinion (i.e., 24% maximum disturbance ratio), the EPA and applicant shall reinitiate consultation with the Service.

We have assigned log number 2-21-99-F-363 to this consultation. Please refer to that number in future correspondence on this consultation. Any questions or comments should be directed to me or Mike Wrigley at 602/640-2720 or Sherry Barrett at 520/670-4617.

Sincerely,

David L. Harlow
Field Supervisor

cc: William Hallinan, Cottonwood Properties, Tucson, AZ
Army Corps of Engineers, Phoenix, AZ (Attn: Robert Dummer)
Arizona Game and Fish Department, Region 5, Tucson, AZ (Attn: Scott Richardson and
Sherry Ruther)
Assistant Regional Director, Ecological Services, Albuquerque, NM

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Appendix X

HABITAT PRESERVATION AGREEMENT

(Tortolita Preserve)

This Habitat Preservation Agreement (“Agreement”) dated as of _____, 2000 by and among RedHawk Marana, LLC, Rita Land Corporation and Cottonwood Properties, Inc., (collectively “Applicant”), The Town of Marana (“Town”), and the United States Fish and Wildlife Service (“USFWS”).

WITNESSETH:

WHEREAS, pursuant to Section 7(a)(2) of the Endangered Species Act (the “ESA”), USFWS has issued to the Environmental Protection Agency (the “EPA”) and the U.S. Army Corps of Engineers (“Corps”) a Biological Opinion dated October 23, 2000 (the “Biological Opinion”) concerning potential impacts to the cactus ferruginous pygmy owl (“Pygmy Owl”) and its designated critical habitat (collectively “Project Impacts”) in connection with Applicant’s development of certain property in Pima County, Arizona, locally known as a portion of Dove Mountain as such term is defined in the Biological Opinion; and

WHEREAS, the Town desires to facilitate certain development activity within Dove Mountain because this activity will result in significant planning and economic benefits to the Town from increased sales tax revenue, from creating jobs through new businesses to be located in Dove Mountain and otherwise; and

WHEREAS, the Biological Opinion calls for significant conservation measures including the Town executing a 99 year lease for 2,397 acres of open space and park purposes with the Arizona State Land Department (“Preservation Lease”) for certain land adjacent to Dove Mountain (Tortolita Preserve), as shown in Exhibit A; and

WHEREAS, the Town has made application to the Arizona State Land Department for the Preservation Lease and desires to assume responsibility for management of the Tortolita Preserve; and

WHEREAS, USFWS desires assurances that there is a continuing commitment to manage the Tortolita Preserve in a manner that minimizes and mitigates Project Impacts, if and when the Preservation Lease is approved by the Arizona State Land Department.

NOW, THEREFORE, the parties hereby covenant and agree as follows:

1. Preservation Lease. Commencing upon notice from the Applicant to the Town that the Applicant has accepted the terms of the Biological Opinion, the Town will use reasonable and best efforts to obtain the Preservation Lease. The Town is obligated to maintain the Preservation Lease with the State of Arizona in good standing. The only basis for termination of the Lease prior to expiration of the ninety nine year term is provided in paragraph 8 of this Agreement.

2. Tortolita Preserve. Commencing upon issuance of the Preservation Lease, the Town shall promptly and continuously maintain and manage the Tortolita Preserve throughout the term of the lease by taking the measures described below and more specifically described in the Property Analysis Record, dated May 1, 2000, attached as Exhibit B:

- a. The Tortolita Preserve will be maintained in a natural condition, except as expressly set forth herein.
- b. The USFWS may require the Town to fence the perimeter of the 2,397-acre Tortolita Preserve, in whole or in part, should USFWS determine that adjacent land uses are adversely affecting the biological values of the Tortolita Preserve lands. Such fencing will be constructed in accordance with Arizona Game and Fish Department's designs for wildlife friendly fencing.
- c. Perimeter signs will be posted and the Tortolita Preserve will be monitored to discourage unauthorized entry.
- d. The Tortolita Preserve will be surveyed by a plant ecologist at least once every 3 years and at least once each year an ornithologist will conduct a large area search (i.e. research) surveys for Pygmy Owls in accordance with the Arizona Game & Fish Department & USFWS 2000 protocol.
- e. Native plants will be salvaged and replanted from any authorized disturbances (as described below) that occur within the Tortolita Preserve.
- f. Invasions of exotic species will be controlled.
- g. No development or other activities will be permitted in the Tortolita Preserve except (i) for trails that are consistent with the Town of Marana Trail System, (ii) use of trails for hiking, non motorized biking, and horse back riding, (iii) for construction of offsite utilities as described in the BA, and (iv) as otherwise permitted by USFWS.
- h. The following activities are prohibited in the Tortolita Preserve: (i) use of firearms, (ii) jeep tours and other off road vehicle uses, (iii) use of

pesticides or herbicides for purposes other than controlling invasion of exotic species, (iv) racing events or other media publicized events that attract large crowds, (v) use of bright outdoor lights, and (vi) construction or vehicular use of roads.

- i. Gates along existing or proposed easements in the Tortolita Preserve will be checked periodically and maintained as necessary.

The Town is obligated to comply with its other covenants and agreements hereunder. These obligations shall constitute covenants burdening and running with the Tortolita Preserve and shall be binding upon any and all subsequent lessors or managers thereof.

3. Access to Tortolita Preserve. The Town agrees to provide access to the Tortolita Preserve to USFWS, their respective representatives, from time to time upon reasonable prior notice, for the purpose of evaluating ongoing compliance with this Agreement. If at any time USFWS determines that the Town has not properly performed under this Agreement, USFWS will provide written notice of such failure to perform to the Town. The written notice shall identify the specific nature of such failure and outline such action as may be necessary to correct such failure. The Town shall have a reasonable opportunity, which shall in no event be less than forty-five (45) days, within which to develop and commence a reasonable plan for the corrective action. If unforeseen circumstances exist that prevent the Town from accomplishing those actions recommended by USFWS, USFWS will diligently consult with the Town as to alternative actions to correct the deficiencies identified by USFWS. The Town shall also provide unimpeded access to any entity contracted to carry out the obligations under this agreement to manage and maintain the Tortolita Preserve.

4. Remedies and Enforcement. In the event that the Preservation Lease between the Town and the State of Arizona is terminated or relinquished by the Town, USFWS shall be entitled to injunctive relief which would either require the Town to (1) use its best efforts to immediately reinstate the Lease or (2) if reinstatement is not possible, to obtain a new lease of the Tortolita Preserve property within a reasonable period of time. If reinstatement or issuance of a new lease on the Tortolita Preserve from the State of Arizona is impossible for the Town to obtain within 12 months, then the parties agree that the Town shall lease or purchase other pygmy owl habitat of sufficient size and quality to replace the Tortolita Preserve. The Town may satisfy this requirement by providing funding to an environmental land management entity (such as the Nature Conservancy) for purchase or lease of suitable replacement habitat. The term of any lease of replacement habitat shall not be less than that required to complete the remaining term left on the original 99 year lease. The choice of the environmental land management entity and the replacement habitat shall be subject to the approval of the USFWS.

5. Assignment. This Agreement shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and assigns; provided, however, that, in no

event shall the Town be released or discharged of its obligations hereunder without the prior written consent of USFWS. Any assignment is subject to the terms of this Agreement. Notice of this agreement shall be provided to any successor of the Town and to any successor developer to whom Applicant assigns its rights as Master Developer under the Dove Mountain Specific Plan.

6. Notices. Notices under this Agreement may be given by personal delivery, facsimile, or by U.S. mail, return receipt requested, to the parties at their respective addresses set out below, with notice being deemed effective on the date so delivered;

If to Applicant: Cottonwood Properties, Inc.
William Hallinan
3567 E. Sunrise Dr. , Ste. 219
Tucson, AZ 85718

copy to: W. James Harrison, Esq.
W.J. Harrison & Associates
3561 E. Sunrise Dr. , Ste. 201
Tucson, AZ 85718

If to Town: Mike Hein, Town Manager
Town of Marana
13291 North Lon Adams
Marana, AZ 85653

If to USFWS: United States Fish & Wildlife Service
Attn: Dave Harlow
2321 W. Royal Palm Rd. , Ste. 103
Phoenix, AZ 85021

7. Entire Agreement. This Agreement with its attached exhibits, establishes the entire agreement for habitat maintenance and management between the Town and USFWS and supersedes all prior written or oral understandings and communications regarding same.

8. Termination. In the event that the authorization of the Project Impacts pursuant to the Biological Opinion (or the Corps Individual Permit) is terminated or determined to be invalid by a final non-appealable order of a court of competent jurisdiction, then the Town and the Applicant can terminate this Agreement by giving joint written notice to USFWS, provided that any habitat disturbance, described as Project Impacts, that has occurred on the portion of the Dove Mountain project addressed in the Biological Opinion complies with the 24% maximum disturbance ratio requirements set forth in the Biological Opinion.

9. Amendment. This Agreement may be amended only by an instrument in writing signed by the parties hereto. Upon termination of this Agreement for whatever reason all parties hereto agree to execute and record a written memorandum of such termination upon request.

10. Applicable Law. This Agreement shall be governed by and construed in accordance with the laws and regulations of the United States and the State of Arizona.

11. Authority. Each party represents to the other that it has the full power and authority to enter into and perform the obligations under this Agreement.

12. Recording. A Memorandum of this Agreement shall be filed in the real property records of Pima County, Arizona.

EXECUTED in multiple counterpart originals as of the date first set forth above.

TOWN OF MARANA

By: _____
Name: _____
Title: _____

REDHAWK MARANA, L.L.C., an Arizona limited liability company

By: DMBG Investments, Inc., an Arizona corporation, its manager

By: _____
Name: _____
Title: _____

RITA LAND CORPORATION

By: _____
Name: _____
Title: _____

COTTONWOOD PROPERTIES, INC.

By: _____
Name: _____
Title: _____

UNITED STATES FISH & WILDLIFE SERVICE

By: _____
Name: _____
Title: _____

THE STATE OF ARIZONA

§

COUNTY OF PIMA §

This instrument was acknowledged before me on the _____ day of _____, 2000 by _____ of the Town of Marana.

(SEAL)

Notary Public in and for
the State of _____

(Printed Name of Notary)

My commission expires: _____

THE STATE OF ARIZONA §

COUNTY OF PIMA §

This instrument was acknowledged before me on the _____ day of _____, 2000 by _____ of DMBG Investments, Inc., an Arizona corporation, on behalf of said corporation as manager of RedHawk Marana, LLC.

(SEAL)

Notary Public in and for
the State of _____

(Printed Name of Notary)

My commission expires: _____

THE STATE OF ARIZONA §
 §
COUNTY OF PIMA §

This instrument was acknowledged before me on the _____ day of _____, 2000 by _____ of Rita Land Corporation, an Arizona corporation, on behalf of said corporation.

(SEAL)

Notary Public in and for
the State of _____

(Printed Name of Notary)

My commission expires: _____

THE STATE OF ARIZONA §
 §
COUNTY OF PIMA §

This instrument was acknowledged before me on the _____ day of _____, 2000 by _____ of Cottonwood Properties, Inc., an Arizona corporation, on behalf of said corporation.

Appendix Y

INTERIM CONSERVATION AGREEMENT

This Interim Conservation Agreement (“Agreement”) is made as of _____, 2000 by and among the United States Fish and Wildlife Service (“USFWS”) and Lawyers Title of Arizona, Inc. Trust Nos. 7804 and 7805 and the beneficiaries of such trusts, RedHawk Marana, LLC and Rita Land Corporation (cumulatively “Owner”).

WITNESSETH:

WHEREAS, pursuant to Section 7(a)(2) of the Endangered Species Act (the “ESA”), USFWS has issued to the Environmental Protection Agency (the “EPA”) and the U.S. Army Corps of Engineers (“Corps”) a Biological Opinion and Incidental Take Statement dated October 23, 2000 (the “Biological Opinion”) concerning potential impacts to the cactus ferruginous pygmy owl (“Pygmy Owl”) and its designated critical habitat (collectively “Project Impacts”) in connection with the Owner’s development of certain property in Pima County, Arizona, locally known as a portion of Dove Mountain as such term is defined in the Biological Opinion; and

WHEREAS, the Biological Opinion calls for significant conservation measures including the Town of Marana executing a 99 year lease for open space and park purposes with the Arizona State Land Department (“Preservation Lease”) for certain land adjacent to Dove Mountain (“Offsite Mitigation Lands”); and

WHEREAS, the Biological Opinion also provides for the potential acquisition of other lands by or at the direction of Applicants and acceptable to USFWS as Offsite Mitigation Lands; and

WHEREAS, the Owner owns the real property depicted on the attached Exhibit A (“Future Consultation Land”); and

WHEREAS, although the Owner intends for the Future Consultation Land to be developed in the future, it has agreed to preserve the Future Consultation Land on an interim basis until such time as other Offsite Mitigation Lands are secured or this Agreement is otherwise terminated in accordance with its terms.

NOW, THEREFORE, the parties hereby covenant and agree as follows:

That, in consideration of the terms herein contained, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged for all purposes, the parties hereby covenant and agree as follows:

1. Future Consultation Land Maintenance. Commencing upon issuance of the Biological Opinion and Corps Individual Permit in form satisfactory to the Owner, the Owner shall promptly and continuously maintain and manage the Future Consultation Land by taking the measures described below:

- a. The Future Consultation Land will be maintained in a natural condition, except as expressly set forth herein.
- b. Perimeter signs will be posted and the Future Consultation Land will be monitored to discourage unauthorized entry.
- c. No development will be permitted in the Future Consultation Land except (i) for trails that are consistent with the Pima County Regional Plan, (ii) for construction of offsite utilities as described in the Biological Opinion, and (iii) as otherwise permitted by USFWS.
- d. Gates along existing or proposed easements in the Future Consultation Lands will be checked periodically and maintained as necessary.
- e. The following activities will be prohibited in the Future Consultation Land: (i) use of firearms, (ii) jeep tours and other off road vehicle uses, (iii) use of pesticides or herbicides for purposes other than controlling invasion of exotic species, (iv) racing events or other media publicized events that attract large crowds, (v) use of bright outdoor lights, and (vi) construction or vehicular use of roads.

The Owner's obligation to so maintain and manage the Future Consultation Land, and to comply with its other covenants and agreements hereunder, shall constitute covenants burdening and running with the Future Consultation Land until this Agreement is terminated as provided herein, and shall be binding upon any and all subsequent owners thereof.

2. Adjustment to Boundary of Future Consultation Land. The boundaries of the Future Consultation Land may be adjusted as provided in the Biological Opinion to account for Development Area lost as a result of the location of a Territory Center as described in the Biological Opinion.

3. Access to Future Consultation Land. The Owner agrees to provide access to the Future Consultation Land to USFWS from time to time upon reasonable prior notice, for the purpose of evaluating ongoing compliance with this Agreement. If at any time USFWS determines that the Owner has not properly performed under this Agreement, USFWS will provide written notice of such failure to perform to the Owner. The written notice shall identify the specific nature of such failure and outline such action as may be necessary to correct such failure. The Owner shall have a reasonable opportunity, which shall in no event be less than forty-five (45) days, within which to develop and commence a reasonable plan for the corrective action. If unforeseen circumstances exist that prevent the Owner from accomplishing those actions recommended by USFWS, USFWS will diligently consult with the Owner as to alternative actions to correct the deficiencies identified by USFWS.

4. Remedies and Enforcement. Should the Owner fail to carry out the requirements of this Agreement to maintain and manage the Interim Consultation Lands after the Owner has been notified by USFWS of default and has had a reasonable opportunity to cure the default, the Owner shall then contract the services of another entity, as approved by the USFWS, to perform management and maintenance activities as described in Item 1 above. In the event that the Owner fails to perform its obligations under this Agreement, then USFWS shall, after giving the required notice and opportunity to cure, be entitled to seek specific performance hereof, as well as any other remedy available at law.

5. Assignment. This Agreement shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and assigns; provided, however, that, in no event shall the Owner be released or discharged of its obligations hereunder without the prior written consent of USFWS. It is incumbent upon the Owner to notify successor owners of the content and existence of this agreement prior to transfer of the ownership of Future Consultation Lands. Such notice shall also be provided to any successor developer to whom Owner assigns its rights as Master Developer under the Dove Mountain Specific Plan.

6. Notices. Notices under this Agreement may be given by personal delivery, facsimile, or by U.S. mail, return receipt requested, to the parties at their respective addresses set out below, with notice being deemed effective on the date so delivered;

If to Owner: Cottonwood Properties, Inc.
 William Hallinan
 3567 E. Sunrise Dr., Ste. 219
 Tucson, AZ 85718

copy to: W. James Harrison, Esq.
 W.J. Harrison & Associates
 3561 E. Sunrise Dr., Ste. 201
 Tucson, AZ 85718

If to USFWS: United States Fish & Wildlife Service
 Attn: Dave Harlow
 2321 W. Royal Palm Rd., Ste. 103
 Phoenix, AZ 85021

7. Entire Agreement. This Agreement with its attached exhibits establishes the entire agreement for habitat maintenance and management between the Owner and USFWS and supersedes all prior written or oral understandings and communications regarding same.

8. Termination. In the event that the authorization of the Project Impacts pursuant to the Biological Opinion (or the Corps Individual Permit) is terminated or determined to be invalid by a final non-appealable order of a court of competent jurisdiction, then the Owner can terminate this Agreement by giving written notice to USFWS, provided that any habitat disturbance, described as Project Impacts, that has occurred on the portion of the Dove Mountain project

addressed in the Biological Opinion (“Existing Project Impacts”) complies with the maximum disturbance ratio requirements set forth in the Biological Opinion (24% Maximum Disturbance Ratio). Additionally, and provided Existing Project Impacts comply with the 24% Maximum Disturbance Ratio, this Agreement may be terminated by the Owner upon the earlier of (i) execution of the Preservation Lease by the Town of Marana or (ii) acquisition by the Applicant under the Biological Opinion or its designee of other Offsite Mitigation Lands acceptable to USFWS and of a size equal to or greater than the Future Consultation Land. In the event that a Regional HCP for preservation of the pygmy-owl is approved and permitted (such as the Sonoran Desert Conservation Plan), the Owner may opt to mitigate those lands which have not yet been disturbed in accordance with the terms of that HCP and terminate this Agreement provided that Existing Project Impacts comply with the 24% Maximum Disturbance Ratio requirements set forth in the Biological Opinion.

9. Amendment. This Agreement may be amended only by an instrument in writing signed by the parties hereto. Upon termination of this Agreement for whatever reason all parties hereto agree to execute and record a written memorandum of such termination upon request.

10. Applicable Law. This Agreement shall be governed by and construed in accordance with the laws and regulations of the United States and the State of Arizona.

11. Authority. Each party represents to the other that it has the full power and authority to enter into and perform the obligations under this Agreement.

12. Recording. A Memorandum of this Agreement shall be filed in the real property records of Pima County, Arizona.

EXECUTED in multiple counterpart originals as of the date first set forth above.

UNITED STATES FISH & WILDLIFE
SERVICE

By: _____
Name: _____
Title: _____

TRUST BENEFICIARIES:

REDHAWK MARANA, LLC

LAWYERS TITLE OF ARIZONA, INC., as
Trustee under Trust Nos. 7804 and 7805 only
and not in its individual or corporate capacity

By: DMBG Investments, Inc.,
Its Manager

By: _____
Name: _____

the State of _____

(Printed Name of Notary)

My commission expires: _____