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

In Reply Refer To:

AESO/SE
2-21-02-F-071

May 30, 2002

Mr. Robert Hollis
U.S. Department of Transportation
Federal Highway Administration, Arizona Division
234 North Central Avenue, Suite 330
Phoenix, Arizona 85004

Dear Mr. Hollis:

This biological opinion responds to your request for consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your original request for formal consultation was dated December 13, 2001, and received by us on December 14, 2001. At issue are impacts that may result from the proposed federally funded improvements to the Duval Mine Road Traffic Interchange (TI) on Interstate 19, Milepost 43.2 in Pima County, Arizona, on the endangered Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*) and cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*).

The biological assessment determined that the proposed action may affect but is not likely to adversely affect the cactus ferruginous pygmy-owl. The Service concurs with this determination. Rationale for our concurrence is detailed in Appendix A.

This biological opinion was prepared using information contained in the biological assessment (BA) prepared by Logan Simpson Design Inc. (August 2001), a site visit, and our files. Literature cited in this biological opinion is not a complete bibliography of all literature available on the affected species, nor is it a complete review of the effects of development and subsequent habitat fragmentation on the species. A complete administrative record of this consultation is on file in our office.

CONSULTATION HISTORY

The informal consultation process for this project began with a site visit on August 10, 2000, with staff from Arizona Department of Transportation (ADOT) and Logan Simpson Design Inc. We reviewed the project and discussed possible ways to minimize the impacts to the site. The Service received the request for formal consultation on December 14, 2001. The Service requested a 30-day extension on April 23, 2002 to complete the biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The proposed Federal action is the construction of improvements to the Duval Mine Road Traffic Interchange (TI), located at Interstate 19 (I-19), Milepost (MP) 43.2 in eastern Pima County, Arizona, south of Sahuarita and north of Green Valley. The area is located within portions of Section 35 in Township 17S, Range 13E.

The primary goal of the project is to improve traffic operation and capacity. The existing Duval Mine Road TI is a Spread Diamond Interchange consisting of four on-off ramps, and three frontage roads. The project limits are defined as the entire width of the existing Arizona Department of Transportation (ADOT) right-of-way (with an additional 100 feet outside of the right-of-way) surrounding I-19, the frontage roads, and four on-off ramps from 3,000 feet north of Duval Mine Road, to 3,000 feet south of Duval Mine Road, as well as the Duval Mine Road right-of-way from La Canada Drive to approximately 1,700 feet east of Abrego Drive (Figure 1). In addition, approximately 5 acres of new right-of-way would be required for the realignment of the southwest frontage road.

The proposed action would modify the TI to a Compact Diamond Interchange by relocating all four on-off ramps approximately 250 feet closer to I-19, relocating the southwest frontage road approximately 330 feet to the west (farther away from I-19), and removing the southeast frontage road. Additional improvements include increasing the number of travel lanes on the overpass from two to eight, constructing a raised median that varies from 6 to 28 feet wide, and installing new traffic signals at the intersections of Duval Mine Road and the on-off ramps. Maps and specific details of the proposed action are provided in the August 2001, BA and are included here by reference.

The total amount of suitable habitat for Pima pineapple cactus that will be disturbed due to construction of the proposed project is 18.0 acres. There are a total of 10 Pima pineapple cactus that will be directly affected by the proposed action.

Proposed Conservation Measures

The U.S. Department of Transportation proposes the following measures to minimize potential adverse effects to Pima pineapple cactus and its habitat. These measures are taken from the August 2001, BA.

1. Prior to the initiation of clearing and construction, the applicant will purchase 36-acre credits in a Service-approved conservation bank for Pima pineapple cactus. The amount of credits is based on a 2:1 replacement ratio for the loss of occupied and suitable Pima pineapple cactus habitat on the parcel. In accordance with the banking agreement, the Service will receive documentation from the conservation bank of the credit transaction.

2. Prior to initiation of clearing and construction, the known Pima pineapple cactus on the site will be offered for salvage in accordance with the Arizona Native Plant Law.

STATUS OF THE SPECIES

Pima Pineapple Cactus

Life History

The final rule listing Pima pineapple cactus as endangered was published September 23, 1993 (58 FR 49875). The rule became effective on October 25, 1993; critical habitat was not designated at that time. Factors that contributed to the listing include habitat loss and degradation, habitat modification and fragmentation, limited geographic distribution and plant species rareness, illegal collection and difficulties in protecting areas large enough to maintain functioning populations. The biological information below is summarized from the proposed and final rules, and other sources.

Pima pineapple cactus is a low-growing hemispherical cactus with adults varying in stem diameter from 5.0 cm (2.0 inches) to 21.0 cm (8.3 inches) and height from 4.5 cm (1.8 inches) to 45.7 cm (18.0 inches). Individuals are considered adults when they reproduce sexually. Plants can be either single or multi-stemmed with yellow flowers blooming with the summer rains. Clusters of Pima pineapple cactus stems are formed primarily from vegetative clones produced at the plant base (Benson 1982, Roller 1996). The diagnostic field character of this taxon is the presence of one stout, straw-colored, hooked central spine. Radial spines extend laterally around the central spine and average 10 to 15 spines on large cacti and 6 on small cacti (Benson 1982).

Pima pineapple cactus occurs south of Tucson, in Pima and Santa Cruz counties, Arizona and adjacent northern Sonora, Mexico. It is distributed at very low densities throughout both the Altar and Santa Cruz Valleys, and in low lying areas connecting the two valleys.

Groups of flowers begin to bloom for single day periods following five to seven days after the first monsoon rains. Flowering is triggered by as little precipitation as 3 mm (0.12 inches). Generally flowers begin opening midmorning and close at dusk (Roller 1996). Adult plants bloom one to three days each year; flowering is usually over by the end of August. Cross-pollination produces significantly more viable seeds than self-pollination. Fruits are mature within two weeks following successful pollination. Germination has been observed in the field during the summer monsoon rainy season (Roller 1996). Anecdotal observations indicate the species' flowers are visited by a variety of native bees and European honey bees, which have been observed to leave the flowers with their forehead and hind legs covered in Pima pineapple cactus pollen.

Habitat fragmentation and isolation may be an important factor limiting future seed set of this cactus. Recent data show that the species cannot successfully self pollinate in situ and is reliant on invertebrate pollinators. One hypothesis is that the spatial distribution pattern of individual Pima pineapple cacti within a given area may regulate pollinator visitations, thus resulting in more successful cross-pollination and subsequent seed set over the population (Roller 1996). If the pollinators are small insects, with limited ability to fly over large distances, habitat fragmentation may contribute to a decrease in pollinator effectiveness with a subsequent decrease in seed set and recruitment.

Population Stability

Extrapolations from recent (1992-1997) surveys of known Pima pineapple cactus locations suggest that the cactus may be more numerous than previously thought. Projections based only on known individuals may underestimate the total number of individuals. This in no way indicates that the cactus is not rare or endangered. Pima pineapple cactus is widely dispersed in very small clusters across land areas well suited for residential, commercial or mining development. As well, field observations suggest a great deal of land area within the range boundaries would not support Pima pineapple cactus today due to historic human impacts. Thus, populations are already considerably isolated from each other in many portions of the range, and population size and apparent recruitment varies significantly across the range. On a more local scale, population variability may relate to habitat development, modification, and/or other environmental factors such as slope, vegetation, pollinators, dispersal mechanisms, etc.

The transition zone between the two regions of vegetation described by Brown (1982) as semidesert grassland and Sonoran desert-scrub contains denser populations, better recruitment, and individuals exhibiting greater plant vigor. Vegetation within this transition zone is dominated by mid-sized mesquite trees, half shrubs (snakeweed, burroweed, and desert zinnia) with patches of native grass and scattered succulents. Because populations are healthier in this transition zone, conservation within these areas is very important (Roller and Halvorson 1997). However, this important habitat type is not uniformly distributed throughout the plant's range. Populations of Pima pineapple cacti are patchy, widely dispersed and highly variable in density. The higher population densities have only been documented at three sites. Compared to other surveys, two of these sites are very small in scale and range from 6.3-7.5 plants per ha (1-3 plants per acre). Other densities across the majority of the plant's range vary between one plant per 1.9 ha (4.6 acres) and one plant per 8.5 ha (21 acres) (Mills 1991, Ecosphere 1992, Roller 1996).

Land areas surrounding developed parts of Green Valley and Sahuarita, Arizona (including adjacent areas of the San Xavier District of the Tohono O'odham Nation) may be important for the conservation of this species within its range. Analysis of surveys conducted from 1992 to 1995 with a multivariate statistical analysis established a pattern of greater population densities, higher ranks of cactus vigor and reproduction occurring within the transition vegetation type found in this area of the northern Santa Cruz Valley (Roller and Halvorson 1997). This area could be defined as an ecotone boundary between semidesert grassland and Sonoran desert scrub.

Seedling and sub-adult size classes are uncommon in documented populations across the range. However, this may be a function of the difficulty of finding such small, well-camouflaged plants in a large-scale survey, or because the establishment phase of the seedling may be limited in some unknown way. Research on Pima pineapple cactus reproduction has suggested that the establishment phase of Pima pineapple cactus life history may limit recruitment within populations (Roller 1996). Evidence presented to support this conclusion was the abundance of flowers, fruits and viable seed, and the rarity of seedling presence at different sites spread through the plant's range (Roller 1996). Other research has confirmed that the establishment phase of other Sonoran cacti species may be critical for survival to reproductive maturity (Steenbergh and Lowe 1977).

Status and Distribution

Generally, the Pima pineapple cactus grows on gentle slopes of less than 10 percent and along the tops (upland areas) of alluvial bajadas nearest to the basins coming down from steep rocky slopes. The plant is found at elevations between 720 m (2,362 ft) and 1,440 m (4,593 ft) (Phillips et al. 1981, Benson 1982, Ecosphere 1992), in vegetation characterized as either or as combination of both the Arizona upland of the Sonoran desert scrub and semidesert grasslands (Brown 1982).

The acquisition of baseline information began with surveys documenting the presence of Pima pineapple cactus as early as 1935. More intensive surveys were initiated in 1991 and other research established in 1993 further investigated the reproductive biology, distribution, fire effects and mortality associated with various threats. Therefore, the best available baseline information is relatively recent and may not represent actual changes in distribution since the decline in the status of the species began.

Widely scattered surveys have been conducted across sites that varied considerably in cacti density. Densities ranged between 0.1-7.5 plants per ha (0.05-3 plants per acre). Pima pineapple cactus occurs in 50 townships within its U.S. range. However, a considerable amount of land area within the range boundaries does not provide habitat for the species due to elevation, topography, hydrology, plant community type, and human degradation. To date, an estimated 22,959 ha (56,730 acres), (10 to 20 percent of the U.S. range) has been surveyed. Not all of this area has been intensively surveyed; some has only been partially surveyed using small land blocks to estimate densities rather than 100 percent ground surveys. A conservative estimate of total cacti located to date would be 3,800 individuals. The majority of those were located after 1991.

It is important to clarify that the above number represents the total number of locations ever found and not the current population size. It would be impossible to estimate densities over the remaining unsurveyed area because of the clumped and widely dispersed pattern of distribution of this species. Of the 3,800 individuals known at this time, 2,203 (58 percent) of them have

been removed throughout the range. This quantity includes observed and authorized mortalities and individuals transplanted since the species was listed in 1993 to present. A small portion of these mortalities were caused by natural factors (i.e., drought). Moreover, this figure does not take into account those cacti that are removed from private land or other projects that have no Federal nexus.

Transplanted individuals are not considered as functioning within the context of a self-sustaining population. Efforts to transplant individual cacti to other locations have only had limited success and the mortality rate has been high, especially after the first year. Furthermore, once individuals are transplanted from a site it is considered to be extirpated as those individuals functioning in that habitat are irretrievably lost. The Service hopes that continued experimentation will improve the success rate of transplantation. In the meantime, until information suggests that reintroduction efforts are successful, transplanted individuals will not be counted as operative units of the entire population.

The approach to transplanting Pima pineapple cactus involves three general phases: i) selection of suitable habitat to sustain viable populations, ii) replanting techniques and, iii) salvage operations which include proper removal of the plant and root system. The Service is currently updating the transplant protocol through the recovery planning process. The Service views transplanting cacti as a measure of last resort for conserving the species. Transplanting will be recommended only when on-site and off-site habitat conservation is not possible and the death of cacti is unavoidable.

The area of habitat authorized to be modified or destroyed between 1987 and 2000 (i.e., habitat developed or significantly modified beyond the point where restoration would be a likely alternative) is approximately 9,886 ha (24,429 acres) which represents 43 percent of the total area surveyed to date. In 1998, more than 445.5 ha (1,100 acres) of Pima pineapple cactus were lost including 143 ha (353 acres) from the Las Campanas Housing Development project, and 304.6 ha (752 acres) from the ASARCO, Inc. Mission complex project. In 2000, 237.3 ha (586 acres) of habitat were lost with the expansion of a state prison in Tucson. In 2001, 71.7 ha (177 acres) of habitat were lost through development, but 375.8 ha (888 acres) of occupied and suitable habitat were conserved through conservation easements. The Service is aware of housing developments along Valencia Road, Pima County, Arizona, in the vicinity of T15S, R12E, Section 15 and surrounding areas, that support Pima pineapple cactus. These developments affect several hundred acres of habitat and have not been evaluated through the section 7 process. The number of acres lost through private actions, not subject to Federal jurisdiction, is not known but given the rate of urban development in Pima County, is expected to be significant.

Most of the documented habitat development has occurred south of Tucson down through the Santa Cruz Valley to the town of Amado. This area is critical for the future recovery of the species. The expansion of urban centers, population and mining activities will continue to eliminate habitat and individuals, and result in habitat fragmentation.

The protection of habitat and individuals is complicated by the varying land ownership within the range of this species. An estimated 10 percent of the potential habitat for Pima pineapple cactus is held in Federal ownership. The remaining 90 percent is on Tribal, State, and private lands. Most of the federally owned land is either at the edge of the species' range or in scattered parcels. The largest contiguous piece of federally owned land is the Buenos Aires National Wildlife Refuge, located at the southwestern edge of the species' range at higher elevations and lower plant densities.

Based on surveys and habitat analysis, land areas south of Tucson through the Santa Cruz Valley to the town of Amado and surrounding developed parts of Green Valley and Sahuarita, and parts of the San Xavier District of the Tohono O'odham Nation, appear to support abundant populations, some recruitment, and units of extensive habitat still remain. However, the primary threat to the status of this species throughout its range is the accelerated rate (i.e., since 1993) at which this prime habitat is being developed, fragmented or modified.

Under section 9 of the Act, the taking of listed animals is specifically prohibited, regardless of landownership status. For listed plants, these prohibitions and the protection they afford do not apply. Listed plant species are protected only from deliberate removal from Federal lands. There is no protection against removal from, or destruction of, plants on any non-Federal lands under the Act by a land owner. The Arizona Native Plant Law may delay vegetation clearing on private property for the salvage of specific plants species within a 30-day period. Although the Arizona State Native Plant Law does prohibit the illegal taking of this species on state and private lands without a permit for educational or research purposes, it does not provide for protection of plants in situ through restrictions on development activities.

Section 7 protection extends to listed plants regardless of landownership if there is a Federal nexus. However, without Federal agency involvement, section 7 does not apply to projects on non-Federal lands. Much of the development likely on State or private lands has a limited exposure to Federal regulatory requirements. Additional Pima pineapple cacti and associated habitat on these lands are almost certain to be lost as development in southern Arizona continues through the Santa Cruz Valley. Efforts to transplant individual cacti to other locations have had limited success, and as development increases, suitable locations will become scarce as habitat is converted.

Based on current knowledge, the following threats documented with this reduction in habitat alter the landscape in a manner that would be nearly irreversible in terms of supporting Pima pineapple cactus populations: urbanization, farm and crop development, and exotic species invasion. Prescribed fire can have a negative effect if not planned properly.

Other specific threats which have been previously documented (U.S. Fish and Wildlife Service 1993), such as overgrazing and mining, have not yet been analyzed to determine the extent of effects to this species. However, partial information does exist and can be applied. Mining has resulted in the loss of hundreds, if not thousands, of acres of potential habitat throughout the

range of the species. Much of the mining activity has been occurring in the Green Valley area, which is the center of the species' distribution and the area known to support the highest densities of individuals. Overgrazing by livestock, illegal plant collection, and fire-related interactions involving exotic Lehmann lovegrass (*Eragrostis lehmanniana*) may also negatively affect Pima pineapple cactus populations (U.S. Fish and Wildlife Service 1993).

Very little is known regarding the effects of low to moderate levels of livestock grazing on Pima pineapple cactus distribution. Currently, a study has been established to observe the effects of grazing on Pima pineapple cactus on the Coronado National Forest. The species is patchy in distribution and widely dispersed and occupies relatively xeric soils (i.e., these plants do not inhabit areas immediately adjacent to or along water tanks or streambanks) (Roller 1996). The grazing use of these sites varies considerably. Some areas have received use above the authorized intensity (Falk, pers. obs.). The monitoring from allotments on the Coronado have not shown significant differences between cacti in the exclosures and those that are not protected. However, the plots have been monitored only for five years and the differences may not be seen for many years to come. Young cacti could be trampled by livestock, or site hydrology may be altered in ways that might affect seedling establishment and recruitment.

Habitat effects of livestock overuse could include erosion, hydrological and micro-climatic changes, invasion or expansion of exotic grasses due to livestock preferences for native grass species over exotics. Some range management practices such as mechanical imprinting, chaining, ripping, and seeding of non-native grasses have contributed to the modification and loss of habitat and individual cacti. Overgrazing in some areas continues today.

It is uncertain the extent to which overgrazing affects the cactus by altering the structure and function of the ecosystem. However, long-term grazing, (particularly overgrazing), fire suppression, and drought in arid grassland ecosystems have all been hypothesized as being the cause, either individually or collectively, of changes in community structure and function (Bahre 1985). Altered edaphic (stability and water infiltration ability) conditions, caused by damage to micro-biotic and biological crusts over soils with grazing, have been documented in arid land systems (Schlesinger et al. 1990, Fleischner 1994).

Vegetation associated with higher Pima pineapple cactus densities, reproduction, and greater levels of cactus vigor is described as a mid-sized mesquite shrub land with an assortment of other succulent species and native bunch grasses. Many of the species dominant in this vegetation type are associated with grazing (i.e., "increasers" under some grazing practices). Less intensively grazed pastures did support greater native grass coverage with more species present. However, even with an increased bunch grass abundance, the fuel structure of the community was not continuous and allowed for substantial open patches along the drip line of shrub species where the cactus often occurs (Roller and Halvorson 1997). Also, specific levels of soil movement are required for seed germination because the seed will not germinate on the surface; it generally germinates at a depth of 0.5-1.5 cm (0.2 - 0.6 inches) (Roller 1996). Few locations throughout the plant's range have documented the presence of seedlings or sub-adults. However, all but one

of the known locations had been grazed within three years of the observation. Whether light to moderate grazing practices provide the appropriate level of soil movement to cause seed germination has not been determined. Over-land sheet flow across these areas may also move soil and deposit it over sediments. The study established on the Coronado National Forest should provide some insight on seed germination relative to specific grazing intensities.

Reduced herbaceous biomass within the immediate proximity of individuals may reduce heat intensity with fire. Reduced herbaceous cover and continuity decrease fire frequencies in semidesert grasslands, and over the long-term increase cactus survival following fire (McPherson 1995, Thomas and Goodson 1992, Wright and Bailey 1982).

The invasion of Lehmann lovegrass combined with fire is a threat to Pima pineapple cactus populations. Continuous distributions of fuels and greater biomass near the apex of individual plants are believed to increase mortality following fire (Roller and Halvorson 1997). Fire increases Lehmann lovegrass distribution; correspondingly, fire intensity and fire frequency increases with Lehmann lovegrass invasion (McPherson 1995), a positive-feedback cycle.

Even with complete data on historical change related to Pima pineapple cactus distribution and abundance, the Service cannot reliably predict population status due to compounding factors such as climate change, urbanization, legal and political complexities (McPherson 1995). We do not know if the majority of populations of Pima pineapple cactus can be sustainable under current reduced and fragmented conditions. Thus, the need for information on what limits the plant's distribution under current habitat conditions is significant.

Based on monitoring results, the range-wide status of the Pima pineapple cactus appears to have been recently affected by threats that completely alter or considerably modify more than a third of the species' surveyed habitat, and have caused the elimination of nearly 60 percent of documented locations. These values are supplied to serve as an extrapolation of the situation which might be taking place across the rest of the entire population. Current information regarding the status of this species must be supplemented by more precise and thorough spatial analysis through the use of geographical information systems, databases and on the ground surveys.

Dispersed, patchy clusters of individuals are becoming increasingly isolated as urban development, mining, and other commercial activities continue to detrimentally impact the habitat. The remaining habitat also is subject to degradation or modification from current land management practices, increased recreational use when adjacent to urban expansion (i.e., off-road vehicle use and illegal collection), and the continuing aggressive spread of nonnative grasses into its habitat. Habitat fragmentation and degradation will likely continue into the foreseeable future based on historic data and growth projections produced by the Pima County Association of Governments (1995). There is very little Federal oversight on conservation measures that would protect or recover the majority of the potential habitat. Even some areas

legally protected under the Act have been modified and may not be able to support viable populations of the Pima pineapple cactus over the long-term.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, and the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation. It also includes 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 under consultation.

The action area is all of the area within the dotted lines on Figure 1. It includes the existing Duval Mine Road interchange and associated frontage roads. The area of new disturbance within the action area amounts to 18.0 acres. The majority of that (13 acres) is within the diamonds of the existing interchange. The remaining 5 acres is associated with the relocation of the southwest frontage road. Land use surrounding the action area is primarily commercial (restaurants, movie theater, and a shopping mall). A recreation vehicle park is located approximately 0.25 mile west of the interchange, and a residential development is adjacent to the southeast off-ramp. Areas that have not yet been developed surrounding the action area are state and private lands.

The vegetation on the site is typical of the Arizona Upland subdivision of Sonoran Desertscrub biome (Brown 1994). Elevation at the site is approximately 2,820 feet. The project area is located approximately one mile west of the Santa Cruz river. The site supports blue paloverde (*Cercidium floridum*), mixed cacti (*Opuntia* spp.), mesquite (*Prosopis velutina*), acacia (*Acacia* spp.), desert broom (*Baccharis sarothroides*), and creosote bush (*Larrea tridentata*). There are no saguaros within the action area. Three unnamed ephemeral tributaries of the Santa Cruz river flow through the action area, but the washes are fragmented and cut-off by surrounding development.

Logan Simpson Design, Inc. conducted three formal surveys for Pima pineapple cactus within the 150-acre action area. A total of 11 Pima pineapple cactus were detected during the surveys, which occurred from December 1999, to March 2001. Eight cacti were found in December 1999. Two additional cacti were detected in January 2001, and one more was found in March 2001. One of the cacti found in December 2000, could not be relocated in March 2001. The site currently supports ten Pima pineapple cactus. All of the 18 acres to be disturbed are considered suitable habitat for Pima pineapple cactus.

The surrounding parcels of State land have not been surveyed, but the habitat is identical to the site proposed for development, and cactus are likely present.

EFFECTS OF THE PROPOSED ACTION

The proposed action will result in the development of 18 acres of occupied and suitable Pima pineapple cactus habitat and the loss of ten Pima pineapple cacti. Loss of the cacti is unavoidable as they occur in the areas slated for construction. The density of the cactus in the proposed development site is 0.61 per acre. This is a relatively high density for the cactus. Pima pineapple cactus densities on projects that have been through section 7 consultation in the last three years range from 0.04 to 0.5 cactus per acre. This high density would indicate that the habitat is suitable and quality habitat. The surrounding area probably supported a similarly dense population of Pima pineapple cactus, of which these ten cacti are the remnants. They are totally isolated and cut-off from the remaining undeveloped habitat. The long-term viability of this isolated group of cacti is greatly diminished. Additional loss of habitat and individuals continues a downward trend for the species. The ongoing high rate of habitat loss will continue to impede recovery for this species.

There is no appropriate place to transplant these Pima pineapple cactus. Cacti left in ADOT right-of-ways would be subject to the effects of maintenance activities in the future. The plants would no longer function within a functioning plant community and would be isolated; maintained as garden specimens. Past efforts to transplant individual cacti to other locations has had only limited success. These Pima pineapple cactus would be considered "ecologically dead" even if they did survive the transplant.

There are no immediate indirect effects from the proposed action. One of the project objectives is to improve traffic operation and capacity. Growth is expected to continue along the I-19 corridor and the remaining undeveloped Pima pineapple cactus habitat will almost certainly be developed in the future.

To minimize the effects of the proposed action on habitat loss, the applicant is purchasing credits in a Service-approved conservation bank for Pima pineapple cactus. The ratio of 2:1 replacement for the loss of habitat takes into account not just the loss of habitat, but the removal of ten Pima pineapple cactus that will no longer function as a population. Also, an existing seed bank may be present on the site that has value to the species. Off-site conservation lands, such as the conservation bank, will contribute to the recovery of Pima pineapple cactus. The cactus will not be able to survive in the long-term in small, fragmented areas surrounded by urban development. Large, contiguous blocks of habitat need to be set aside and managed for their natural values. All of the proposed conservation actions included in the biological assessment are critical to offset impacts to Pima pineapple cactus and its habitat.

CUMULATIVE EFFECTS

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

As described previously, development in this geographic area can be expected to increase. State and private lands not presently developed in the action area are quickly becoming urbanized. It is unknown what the plans are for the State and private lands. Much of this development will have little or no Federal nexus. Without any protection under the Act, the only protection available is through the Arizona Native Plant Law, which provides only for salvage for scientific and educational purposes. Regardless of salvaged cacti transplant success, the habitat would be lost.

Much of the habitat and the individuals of the species are at significant risk of destruction or continued degradation. Without the protection under section 9 that applies on non-Federal lands, there is little regulatory authority to use in reducing those risks.

CONCLUSION

After reviewing the current status of Pima pineapple cactus, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of Pima pineapple cactus. No critical habitat has been designated; therefore, none will be affected. The Service bases this conclusion on the following:

1) The applicant will purchase 36.0 credits in a Service-approved conservation bank for Pima pineapple cactus. The bank provides protection in perpetuity for the cactus and its habitat. It contributes to the overall recovery and conservation of the species.

2) The ten Pima pineapple cactus in the project area are most likely remnants from a much larger population that is no longer present, due to habitat destruction. The cacti are totally isolated and cut-off from remaining suitable habitat in the area. The long-term viability of this isolated group of cacti is greatly diminished.

INCIDENTAL TAKE STATEMENT

Sections 7(b)(4) and 7(o)(2) of the Act do not apply to the incidental take of listed plant species. However, protection of listed plants is provided to the extent that the Act requires a Federal permit for removal or reduction to possession of endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law. Neither incidental take nor recovery permits are needed from the Service for implementation of the proposed action.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and

threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the agency's section 7(a)(1) responsibility for this species. Actions proposed as part of the proposed project are not included here. The Service recommends the following action:

1. The Service recommends that ADOT participate on the stakeholder participation team developing the Pima pineapple cactus recovery plan. ADOT may want to consider contributing to on-going survey efforts in Pima and Santa Cruz counties to determine the density of Pima pineapple cactus on State lands.

2. ADOT should review future projects that may occur in areas suitable for Pima pineapple cactus and develop long-term conservation strategies to further recovery efforts for this species.

REINITIATION NOTICE

This concludes formal consultation on the proposed upgrade of the Duval Mine Road Traffic Interchange, in Pima County, Arizona. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) new information reveals effects of the agency action that may affect Pima pineapple cactus in a manner or to an extent not considered in this opinion; (2) the agency action is subsequently modified in a manner that causes an effect to the Pima pineapple cactus that was not considered in this opinion; or (3) a new species is listed or critical habitat designated that may be affected by the action.

If we can be of further assistance, please contact Mima Falk (520) 670-4550 or Sherry Barrett (520) 670-4617.

Sincerely,

for David L. Harlow
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
Director, Arizona Game and Fish Department, Phoenix, AZ
Arizona Department of Agriculture, Phoenix, AZ (Attn: Jim McGinnis)
Ross Humphreys, Tucson, AZ

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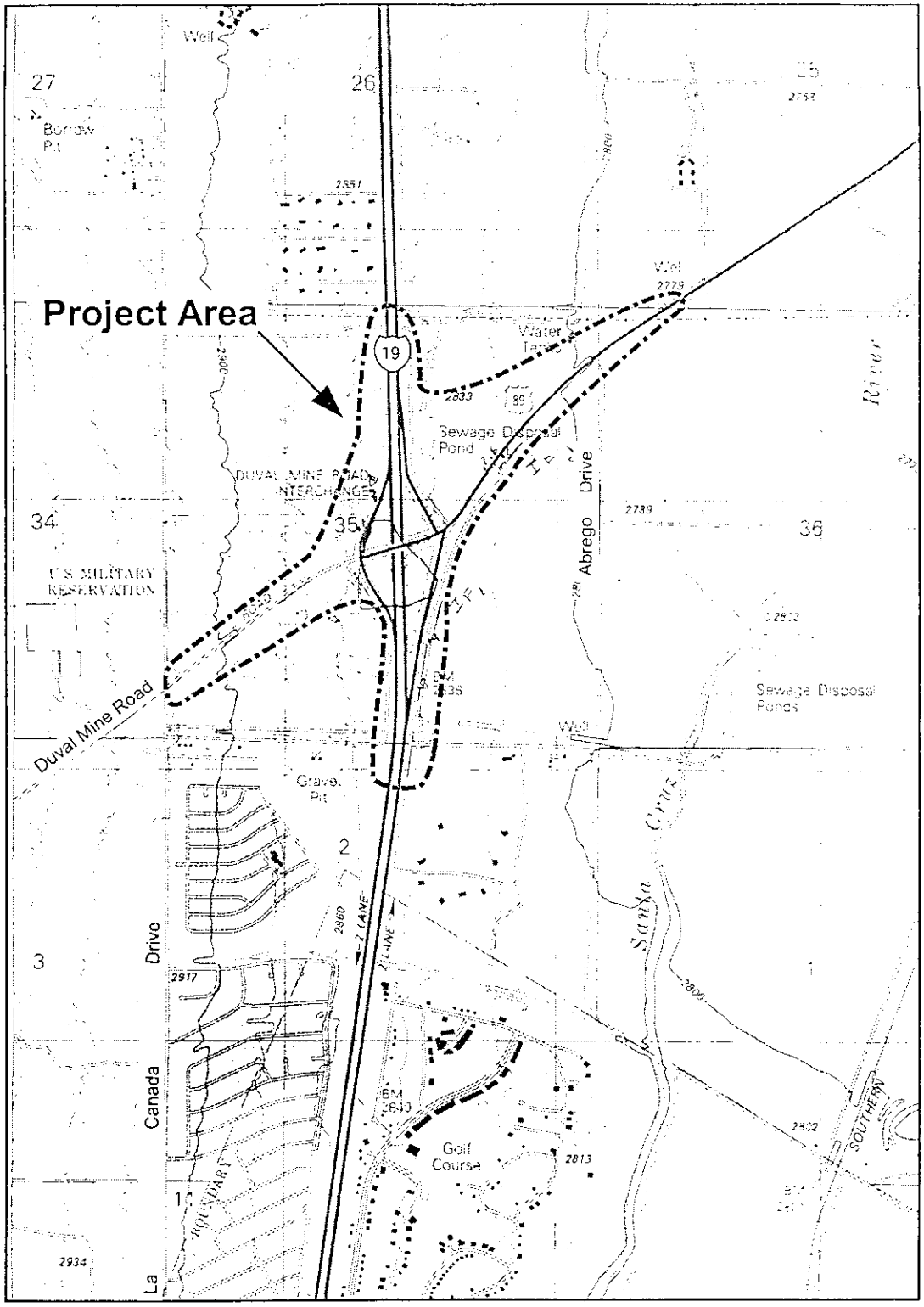

Source: Sahuarita, Arizona 1981 USGS 7.5' Quadrangle

Key

Project Boundary

Mile

0.0 0.5 1.0

NORTH TRUE

Figure . Project Area Map

Appendix A

CONCURRENCES

In the December 14, 2001, request for formal consultation, the U.S. Department of Transportation concluded that the proposed upgrade for the Duval Mine Traffic Interchange is not likely to adversely affect the cactus ferruginous pygmy-owl. The Service concurs with this finding based on the following reasons:

Cactus ferruginous pygmy owl (*Glaucidium brasilianum cactorum*)

- cactus ferruginous pygmy-owl surveys were done at a location adjacent to the TI in 1999 and 2000, there were no owls detected;
- there are no saguaros within the project area;
- the affected area does not represent preferred foraging habitat, due to its isolation from surrounding habitat or potential movement corridors;
- the project will remove approximately 319 mesquite trees and 55 palo verde trees, trees with a diameter greater than 6 inches were surveyed for cavities, none were found; and
- staff from the Service evaluated the habitat within the project area and decided that it was unlikely that cactus ferruginous pygmy owls would use it.