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March 18, 2002

Mr. David J. Dorworth, Chief
Site Selection and Environmental Review Branch
U.S. Department of Justice
Federal Bureau of Prisons
Washington, D.C. 20534

Dear Mr. Dorworth:

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 August 15, 2001, and received by us on August 21, 2001. We received a letter dated November 20, 2001, requesting a copy of the draft opinion. A draft opinion was provided to you and the Louis Berger Group, Inc. Comments were received by us on March 11, 2002, and incorporated into this final biological opinion.

At issue are impacts that may result from the proposed construction of a new United States Penitentiary located in Tucson, Arizona. The lead Federal agency for this project is the U.S. Department of Justice, Federal Bureau of Prisons (Bureau). In order to proceed with the project, the applicant requires a Clean Water Act (CWA) Section 402 National Pollutant Discharge Elimination System Permit (NPDES) for storm water discharges associated with construction activities in Arizona from the U. S. Environmental Protection Agency (EPA) and Nationwide Permit #12 from the U.S. Army Corps of Engineers (COE) for impacts to waters of the United States associated with construction of utilities. Impacts resulting from the project may affect Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*).

Your biological assessment also found that the action would not affect the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) and the lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*). Conservation measures are included in the proposed action for the cactus ferruginous pygmy-owl.

This biological opinion was prepared using information contained in the biological assessment (BA) prepared by WestLand Resources, Inc. and The Louis Berger Group, Inc. (August 2001),

amendments to the proposed action prepared by The Louis Berger Group, Inc. (January 25, 2002; February 5, 2002), comments on the draft biological opinion (March 11, 2002), office meetings, telephone conversations, 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 December 13, 2000, with a meeting with the consultants and staff from the Bureau. We reviewed the project and discussed possible ways to minimize the impacts to the site. The Bureau produced an Environmental Impact Statement (EIS) for the project (July 2001), with the Tucson location named as the preferred site. The Service met with consultants and staff from the Bureau (May 3, 2001) to finalize the details for the proposed project. Formal consultation was initiated on August 15, 2001, with the transmittal of the BA. The Service met again with all parties on December 7, 2001, to review and clarify points in the August BA. This meeting resulted in revisions to the proposed action that were received by the Service in January and February, 2002. A draft BO was sent to your agency on February 21, 2002. With the transmission of that draft document, we requested an additional 45-day extension of the consultation period requiring a final biological opinion by April 1, 2002.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The proposed Federal action is the construction and operation of a new high-security United States Penitentiary and minimum-security Federal Prison Camp located on a 255.5-ha (631-acre) parcel of land located in T15S, R14E, Section 36 in the southern part of the City of Tucson, Pima County, Arizona. The property is located immediately to the west of the Tucson Federal Correction Institution and immediately to the north of the Arizona State Prison. Components of the project include: inmate and prison support facilities, a staff training center, a utility corridor for phone lines along the eastern boundary of the property between the inmate and prison support facilities and the staff training center, and offsite utilities. The penitentiary will house approximately 1,000 inmates and the prison camp will house approximately 150-300 inmates. Two roads, both from Wilmot Road, will provide controlled access to the site. A parking lot would be located near the public entrance. Construction activities are planned to commence during the fall/winter of 2002 and will take approximately 30 months to complete.

Proposed facility access will be limited to the construction of two roads onto the property from Wilmot Road, one to the institution and another to the staff training facility. Construction of all the facilities, onsite telephone utilities, offsite utilities, and roads will result in 81 ha (200 acres) of disturbance. The Bureau is acquiring the entire parcel, but only plans on developing 81 ha.

The remaining lands (174.2 ha or 431 acres) are not proposed for development at this time. Of the remaining lands, 81 ha (200 acres) will be set aside as a conservation area for Pima pineapple cactus. The remaining 93.5 ha (231 acres) are excluded from this proposal and no development will occur on these acres. The Bureau understands that if future development is slated for these excluded lands additional section 7 consultation will be required. A portion of these lands are occupied by Pima pineapple cactus and are considered suitable habitat for the species. No land clearing activities will occur outside of the 81 ha delineated for construction of this proposed project. Maps and specific details of the proposed action are provided in the August 2001, BA, subsequent revisions, and are included here by reference.

The maximum amount of suitable habitat for Pima pineapple cactus that will be disturbed due to construction of the proposed development is 81 ha. There were a total of 18 Pima pineapple cactus on the parcel. Fourteen of them were dug up and moved to a nursery in the northwest portion of the parcel. Four cacti remain in their original locations.

The Bureau is proposing to set aside 81 ha south of the proposed prison site, within the parcel, as an undisturbed area for Pima pineapple cactus conservation.

Proposed Conservation Measures

The U.S. Department of Justice, Federal Bureau of Prisons, 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, and the January and February 2002, revisions to the proposed action.

1. The Bureau will set aside 81 ha (200 acres) of the property as undisturbed open space. The Service and the Bureau will enter into a Memorandum of Understanding that will ensure that the lands remain in conservation status in perpetuity and the management and monitoring actions needed to preserve the integrity of the site. The Memorandum of Understanding must be approved and signed by both parties before construction can take place.
2. Once construction is complete, the Pima pineapple cactus found and re-located to the nursery site will be returned to the area where they were originally located within the 81-ha conservation area. These cacti will be monitored for five years following their transplant. Monitoring reports shall be submitted annually in early February of each calendar year. In addition, the Bureau will monitor any Pima pineapple cactus in the excluded areas and any Pima pineapple cactus within the action area every three years in perpetuity.
3. The entire parcel may be fenced along the outer perimeter. If there is no fencing, the outer perimeter will be marked with signs that notify the public that the area is the property of the federal government and not open for public use. Trespass is unlikely as the site will have high security and unauthorized users will be removed quickly by Federal prison security personnel.

4. No construction will occur outside of the 81-ha development plan. There will be no disturbance of the excluded areas in this proposal. The Bureau will contact the Service if plans are subsequently developed for these areas.

5. Temporary construction fencing will be placed at the limits of all grading activities. This fence will consist, at a minimum, of T-post and single-wire fence clearly marked with flagging tape or its equivalent. All construction activities and disturbance will be contained within these fenced areas.

6. Consistent with the public safety mandates and responsibilities associated with the operation of a prison facility, the Bureau may allow independent researchers access to the property to study the ecology and population dynamics of Pima pineapple cactus. The Bureau and the Service acknowledge that any long-term studies being conducted on the property by independent researchers shall not be allowed to interfere with the monitoring efforts required by this biological opinion. The granting of access to the property by the Bureau creates no obligation on the part of the Bureau to fund, in part or in full, any research conducted on the property by independent research.

7. Surveys for the cactus ferruginous pygmy owl have been conducted on the site. These will continue until construction begins, following Service protocol. If an owl is detected during survey within 600 m (1980 ft) of the project, all reasonable effort shall be made by the Bureau, Service, and Arizona Game and Fish Department (AGF) to determine the breeding status, location, and extent of its territory. Depending on the findings of the survey, construction may be suspended until authorization is received from the Service. The Service shall work expeditiously with the Bureau to resolve any issue that may arise from the detection and shall not unreasonably withhold authorization to proceed with the proposed development.

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 5 to 7 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 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 the Arizona upland of Sonoran desert scrub or semidesert grasslands or a combination of both (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 5 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 the 255.5-ha (631-acre) parcel located in T15S, R14E, Section 36, with the property boundaries corresponding to the section boundaries. The property is bounded on the east by Wilmot Road, on the south by Old Vail Road, and on the west by an unnamed dirt road. The parcel consists of open space with no built structures. There is evidence of disturbance from human activities and livestock grazing. Limited surface disturbance, which appears to have resulted from earth-moving equipment, is evident on the southwestern portion of the parcel. There is also evidence of off-road vehicle activity in various areas of the parcel. In addition, a utility corridor is proposed along Wilmot Road in the existing corridor from the central access road to the facility to Interstate 10.

Approximately 5.2 ha (13 acres) of Section 36 are not included as part of the parcel. El Paso Natural Gas maintains a right-of-way to the south of a dirt road that runs diagonally across the

northern part of the property. There is also private property in the northwestern part of the site that is not included as part of the property.

Land uses to the north of the parcel consists of privately-owned open space interspersed with low-density single-family residences. Undisturbed lands to the east belong to the State. The Tucson Federal Correction Institution is also located to the east of the parcel. The Arizona State Prison complex is located south of the parcel. Land to the west is privately-owned open space.

The vegetation on the site is typical of the Arizona Upland subdivision of Sonoran Desertscrub biome (Brown 1994). The site supports cheesebush (*Hymenoclea salsola*), desert zinnia (*Zinnia acerosa*), greythorn (*Ziziphus obtusifolia*), triangle-leaf bursage (*Ambrosia deltoidea*), mariola (*Parthenium incanum*), mixed cacti (*Opuntia* spp.), mesquite (*Prosopis velutina*), creosotebush (*Larrea tridentata*), and white thorn acacia (*Acacia constricta*). The property lacks dense saguaro (*Carnegiea gigantea*), with less than one, mature, multi-armed individual per 40.5 ha (100 acres) observed.

Elevations on the property range from approximately 837 to 858 m (2,745 to 2,815 ft). The relatively flat-topped ridges are gently sloping and the nearly level drainage areas are characterized by several narrow braided channels or branches. Three wash basins cross the property, all joining a short distance west of the property. Only one drainage, the South Fork Airport Wash, is considered to constitute jurisdictional waters of the United States.

A portion of the site was surveyed for Pima pineapple cactus in September 1999, and nine cacti were located. Those cacti were found on the southern portion of the parcel. In October 1999, those cacti were transplanted to the nursery site, located in the northwest corner of the property, along with an additional cactus that was found during the transplant effort. The parcel was in private ownership at this point. The remainder of the parcel was surveyed in October and November 1999, and an additional 4 cacti were located and transplanted to the nursery. Since 1999, three additional surveys have taken place. The central ridge, where the main prison facility is to be located, has been surveyed several times and no cacti were found there. In January 2001, during an informal walk-through of the site, three more cacti were located on the northern portion of the property and one more in the southern portion. To date, the site supported a total of 18 cacti; 14 of them were transplanted to the nursery, four remain in their original locations.

There is no evidence to suggest that the central ridge, where no cactus were located, is not suitable habitat for Pima pineapple cactus. The vegetation on that ridge is composed of the same elements that are present on the north and south ridges, where Pima pineapple cactus were found. The parcel is characterized by two distinct alluvial surfaces; a late Pliocene-early Pleistocene alluvium and an active or recently active alluvial deposition (corresponding to the large wash on the property). All of the cacti found were located on the older alluvium. Soil samples taken at the sites were unable to discern a pattern that corresponded to the distribution of the cactus. Pima pineapple cactus were found growing on the calcium carbonate-rich soils of the older alluvium. The cacti were also found growing on red patches of soil on the south ridge that is

younger alluvium (Middle to late Pleistocene) with less calcium carbonate than the older alluvium. A total of eight cacti were located on the calcium-rich carbonate, 6 cacti were associated with the red alluvium, and three were found on soils associated with the early Holocene. No plants were located in the drainages. Since the central ridge is classified as the calcium-rich carbonate alluvial surface, there is no reason why this area should not be classified as Pima pineapple cactus habitat.

Within the action area, suitable habitat exists on approximately two-thirds of the site (ca. 171 ha; 423 acres). The site was not mapped for suitable habitat, therefore this is an estimate of how much suitable habitat exists on the site. The estimate was derived by removing the wash areas, since these are not areas where the cactus is found. The density of cactus on the site would be approximately 0.10 per ha (0.04 per acre).

The surrounding parcels of State and private land have not been surveyed, but the habitat is identical to the site proposed for development and cactus are likely present. A biological opinion was issued for expansion of the State Prison, located directly south of this proposed action (2-21-99-F-227). There were 68 pineapple cactus found on that site. That project has not yet been implemented.

EFFECTS OF THE PROPOSED ACTION

The proposed action will result in the development of 81 ha of suitable Pima pineapple cactus habitat. Approximately 78.6 ha (194 acres) of this loss will occur on-site, as direct loss associated with the construction of the prison and the staff training facility. The remaining 2.4 ha (6 acres) is associated with the off-site right-of-way for utilities along Wilmot Road. There will be no direct loss of Pima pineapple cactus, as none were present in the disturbance zone. All 18 Pima pineapple cactus on the site were located in areas outside of proposed construction. Fourteen were transplanted to the nursery area. Of those, eleven remain alive. The four Pima pineapple cacti left in place will not be disturbed by construction. Three are located in the exclusion area and one is in the proposed conservation area. The remaining Pima pineapple cacti in the nursery will be relocated to the proposed conservation area.

The density of Pima pineapple cactus in the action area is 0.10 per ha (0.04 cactus per acre). This density falls within the average density of the cactus. Based on previous consultations, densities less than 1.0 per ha are fairly common. This would indicate that the habitat is typical and suitable for Pima pineapple cactus. The proposed action would result in the loss of 81 ha of suitable habitat. In addition, Pima pineapple cacti on the northern portion of the parcel will now be separated from the Pima pineapple cacti in the southern parcel. The loss of the middle ridge may reduce gene flow and remove a seed bank that may have been important for the long-term viability of this population of Pima pineapple cactus (Silvertown and Lovett Doust 1993, Crawley 1997). Past efforts to transplant individual Pima pineapple cactus to other locations have had only limited success. There has been a 20% mortality associated with the initial transplant and there will undoubtedly be additional loss with the subsequent transplant effort.

The effects of the original transplant on the demographics of the population will never be known as the site will now be fragmented and the transplanted cacti have been subjected to environmental stresses that have affected them in unknown, and unquantifiable, ways. 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.

Indirect effects are not anticipated for the action area. The staff training area, proposed for the northeast portion of the parcel, will not be fenced. There is the possibility that personnel or actions associated with the training center could affect the excluded areas, but the Bureau will take whatever means necessary to insure that habitat is not degraded within the excluded areas. There will be no road construction outside of the proposed construction zone. All patrolling will be done on existing roads within the construction envelope. The Bureau will have strict controls over access to the entire property and the entire perimeter will be posted. It is not anticipated that trespass or unauthorized off-road vehicle use will occur in the proposed conservation area or in the excluded areas.

To minimize the effects of the proposed action on habitat loss, the Bureau is proposing to set aside 81 ha on the parcel. All of this area lies to the south of the construction zone. This is the area that had the majority of Pima pineapple cactus on the site (78%). It is anticipated that a seed bank remains on the site and that recruitment will take place over time. Perhaps some proportion of the relocated Pima pineapple cacti will survive. The site will receive a higher level of protection under Federal ownership than in private ownership. The excluded lands (93.5 ha: 231 acres) will contribute towards conservation by being within the action area and protected by the Bureau from trespass and other forms of habitat degradation. The Bureau understands that a portion of the excluded lands are currently occupied by Pima pineapple cactus and that future development will require section 7 compliance. This on-site conservation measure will contribute to recovery of the species. Pima pineapple 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 Pima pineapple 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 Bureau proposes to set aside 81 ha, in perpetuity, as a conservation area for Pima pineapple cactus that will contribute to the overall recovery of the species
- 2) The Bureau will monitor the transplanted Pima pineapple cacti over a five-year period to assess the success of the transplant effort; in addition, the Bureau will continue to monitor any Pima pineapple cacti in the excluded areas and in the proposed conservation area every three years in perpetuity.

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. At the time of relocating the cacti to the proposed conservation area, coordinate those activities with personnel that have experience in transplanting Pima pineapple cacti. The Service recommends consulting with staff from the Arizona-Sonora Desert Museum.
2. The Service recommends expanding the proposed conservation area to include the 93.5 ha of excluded lands. This will provide the conservation area with connectivity to outside parcels by including the wash areas and provide for long-term protection for the Pima pineapple cacti located on the northern portion of the parcel.

REINITIATION NOTICE

This concludes formal consultation on the proposed Tucson Federal Correction Facility, 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,

/s/

David L. Harlow
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
Environmental Protection Agency, San Francisco, CA (Attn: Eugene Bromley)

Westland Resources, Inc. Tucson, AZ (Attn: Jim Tress)
The Louis Berger Group, Inc. Washington, D.C. (Attn: Shannon Cauley)
Director, Arizona Game and Fish Department, Phoenix, AZ
Arizona Department of Agriculture, Phoenix, Az (Attn: Jim McGinnis)

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