



# United States Department of the Interior



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November 25, 2014

Ms. Loretta Vanegas  
USEPA Region 9  
Water Tribal Office (W10)  
75 Hawthorne Street  
San Francisco, California 94105

Dear Ms. Vanegas:

This biological opinion responds to your August 11, 2014 request for formal 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 request was received on August 18, 2014. At issue are impacts resulting from the proposed detention basins and associated infrastructure improvements located on Pascua Yaqui tribal lands southwest of Tucson, Pima County, Arizona, on the endangered Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*) (PPC).

This biological opinion (BO) is based on information provided in your August 11, 2014, correspondence, including Terracon's July 25, 2014 Biological Assessment (BA) of the proposed action, the Pascua Yaqui Tribe's Pima Pineapple Cactus Tribal Refuge Management Plan, and the associated Tribal Pima Pineapple Cactus Transplant Protocol, as well as various meetings, field visits, email communications, and phone calls. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, stormwater control facilities, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at the Arizona Ecological Services Office (AESO) in Phoenix, Arizona.

## Consultation history

- January 2012 through April 2014 – The Service reviewed preliminary documents related to the development of and consultation on the proposed detention basin project. The Service, the Pascua Yaqui Tribe (Tribe), the Environmental Protection Agency (EPA), and project consultants held a number of meetings and calls to coordinate issues related to the proposed project and consultation.
- April 28, 2014 – The Service conducted a site visit of the proposed PPC Tribal Refuge parcels with Tribal representatives and project consultants.

- June 2014 – The Tribe and project consultants provided a draft PPC Tribal Refuge Management Plan and draft PPC Transplant Protocol for Service review and comment.
- July 15, 2014 – A final coordination call among the Service, the EPA, the Tribe, and project consultants was held to discuss the final process and timeline for consultation.
- August 11, 2014 - The EPA requested formal consultation with the Service on the effects of proposed detention basins and associated infrastructure, and provided a Biological Assessment (BA) and background information related to the proposed action.
- October 9, 2014 – The Service provided the draft BO to the EPA for their review.
- November 12, 2014 – The Service received comments on the draft BO from EPA.

## **BIOLOGICAL OPINION**

### **DESCRIPTION OF THE PROPOSED ACTION**

The proposed action involves the construction of detention basins and infrastructure improvements to alleviate flood risks and erosion issues of the Pascua Yaqui Tribal Reservation (Reservation). When the tribal lands were designated in 1978, floodplain and drainage mitigation strategies were neither explored nor developed. As such, the entire Reservation is located within a floodplain. The Black Wash Floodway is the main cause of flooding hazard to the Reservation. Storm water travels north-northwest towards the Reservation from the Black Mountain on an alluvial fan. Hazards associated with alluvial fans are high velocity flows, erosion, deposition of sediment or debris, mudflows and flash flooding with little or no warning. Residents and businesses are burdened with the requirement to carry flood insurance, are subject to construction requirements to protect their buildings and property, and during heavy rains may be subject to safety hazards. The proposed action will provide flood hazard mitigation for the Reservation and the surrounding Pima County community.

Placing detention basins between the Black Mountain and the developed Reservation is critical to removing the flooding potential for portions of the Reservation and surrounding areas. The proposed location for the detention basins is in the south parcels that the Tribe owns. No additional locations are available that will sufficiently address drainage and design constraints. The proposed basins will be placed in known PPC habitat. The total area impacted by the proposed action is approximately 100 acres.

The Pascua Yaqui Drainage Master Plan (Drainage Plan) dated July 23, 2009, revised July 22, 2010 and updated July 17, 2013 (see Appendix A of the BA) was developed to manage flooding and erosion control of the Reservation. As part of the Drainage Plan, the Tribe is planning to develop approximately 100 acres of undeveloped land along the southern border of the Reservation into large detention basins with associated drainage infrastructure (Action Area). Typical improvements will include energy dissipaters, drainage corridors, culverts, storm water drains and gutters. At the completion of the project construction, the basins will be available for mixed-use recreation. A preliminary map of the detention basins and drainage corridors can be found in Figure 1 of this BO.

The Action Area is defined as approximately 100 acres of undeveloped land which will be developed with storm water detention basins and associated infrastructure. The Action Area is part of the approximately 1,093 acre Project Area referred to in the Management Plan. The Action Area is south of the developed Reservation. These parcels are Tribe-owned lands and are contiguous to the present Reservation. The site is within unincorporated Pima County, approximately five miles southwest of Tucson. Figure 1 of this BO shows a preliminary map of the Action Area with detention basins and

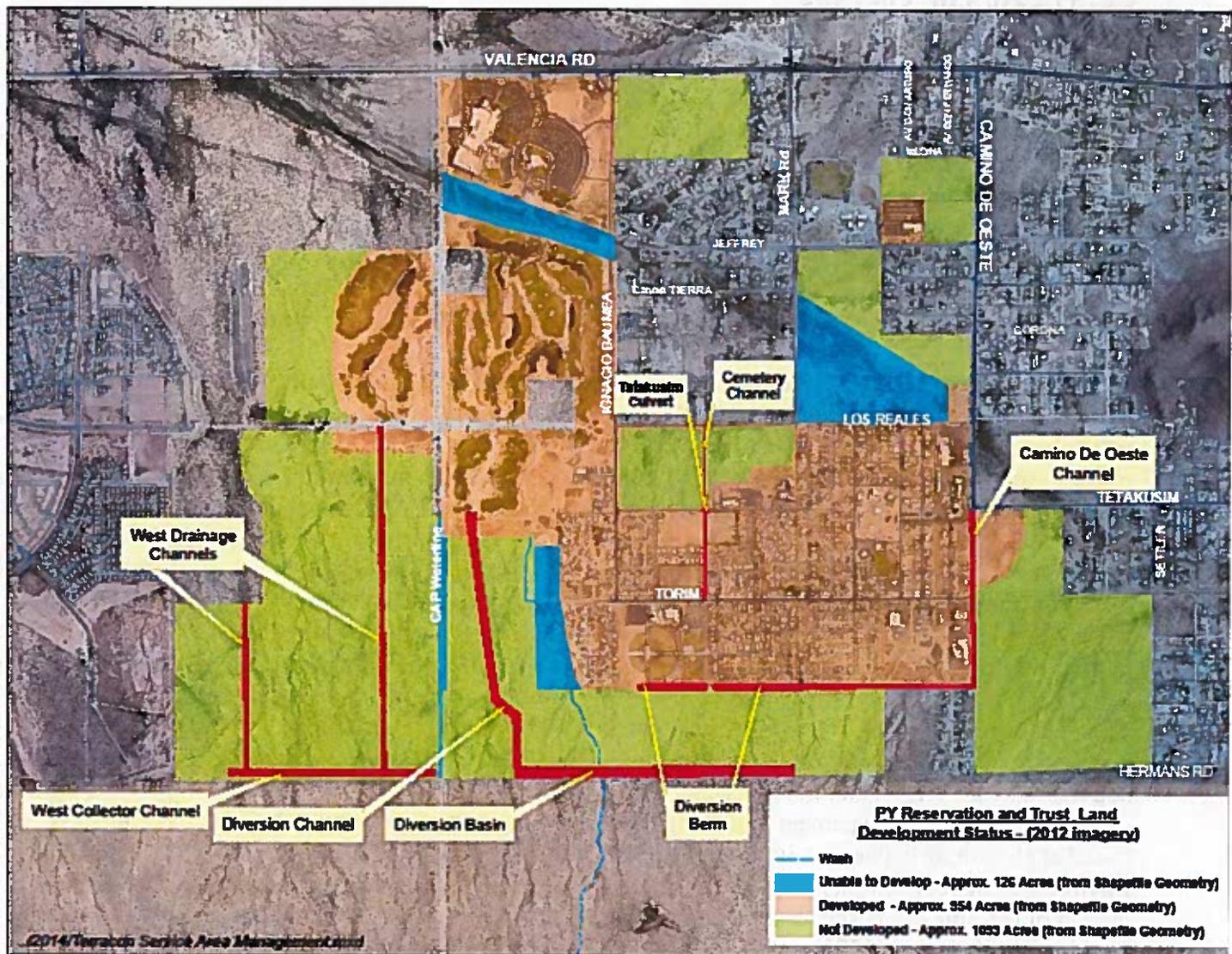


Figure 1. Proposed Detention Basins and Drainage Corridors

drainage corridors; however, as development is anticipated to occur in phases over time, the locations of all improvement areas have not been finalized.

**Conservation Measures**

To mitigate impacts to PPC habitat, the Tribe has coordinated with the Service to develop the Tribe’s Pima Pineapple Cactus Tribal Refuge (Tribal Refuge). The Tribal Refuge is a 34-acre, fenced parcel within the Reservation. The Tribal Refuge will protect and maintain existing PPC and PPC habitat and will be used as a transplant site for PPC removed from areas slated for development. The Pima Pineapple Cactus Tribal Refuge Management Plan and the Pima Pineapple Transplant Protocol describe the specific measures that the Tribe will undertake to conserve and manage the Tribal Refuge lands for the conservation of the PPC. These documents are found as appendices to the BA.

## STATUS OF THE SPECIES

Recent investigations of taxonomy and geographical distribution focused in part on assessing the validity of the taxon (see Baker 2004, Baker 2005, and Schmalzel *et al.* 2004). Although there is evidence for a general pattern of clinal variation across the range of the species (Schmalzel *et al.* 2004), this does not preclude the recognition of taxonomic varieties within *C. sheeri* (= *C. robustispina*). Baker (2005) found that there are distinct geographical gaps between the distribution of this subspecies and the other subspecies, which occur in eastern Arizona, New Mexico, and Texas, and that the subspecies are morphologically coherent within their respective taxa (Baker 2004). His geographical and morphological work supports the idea that the sub-specific groups within *C. robustispina* are indeed discrete, and merit separate taxonomic status as subspecies (U.S. Fish and Wildlife Service 2007).

We have determined that PPC that are too isolated from each other may not be effectively pollinated. For example, the major pollinator of PPC is thought to be *Diadasia rinconis*, a ground-nesting, solitary, native bee. McDonald (2005) found that PPC plants need to be within approximately 600 m (1,969 ft) of each other in order to facilitate effective pollination. Based on this information and other information related to similar cacti and pollinators, we have determined that PPC plants that are located at distances greater than 900 meters from one another become isolated with regard to meeting their life history requirements. The species is an obligate outcrosser (not self-pollinating), so it is important for plants to be within a certain distance to exchange pollen with each other. Also, the study found that pollination was more effective when other species of native cacti are near areas that support PPC. The native bees pollinate a variety of cacti species and the sole presence of PPC may not be enough to attract pollinators.

The PPC occurs south of Tucson, in Pima and Santa Cruz counties, Arizona, as well as in adjacent northern Sonora, Mexico. In Arizona, it is distributed at very low densities throughout both the Altar and Santa Cruz valleys, and in low-lying areas connecting the two valleys. This cactus generally grows on slopes of less than 10 percent and along the tops (upland areas) of alluvial bajadas. The plant is found at elevations between 2,360 feet (ft) and 4,700 ft (Phillips *et al.* 1981, Benson 1982, Ecosphere Environmental Services Inc. 1992), in vegetation characterized as either or a combination of Arizona upland of the Sonoran desertscrub community and semi-desert grasslands (Brown 1982, Johnson 2004). Paredes-Aguilar *et al.* (2000) reports the subspecies from oak woodlands in Sonora. Several attempts have been made to delineate habitat within the range of PPC (McPherson 2002, RECON Environmental Inc. 2006, U.S. Fish and Wildlife Service unpublished analysis) with limited success. As such, we are still unable to determine exact ecological characters to help us predict locations of PPC or precisely delineate PPC habitat (U.S. Fish and Wildlife Service 2007), except perhaps in localized areas (U.S. Fish and Wildlife Service 2005). We appreciate the discussion in the BA regarding the extent of potential habitat within the range of the PPC, but the existing uncertainty regarding habitat characteristics and the lack of a range-wide scientific PPC habitat evaluation result in only being able to discuss these attributes in a general manner.

As a consequence of its general habitat requirements, considerable habitat for this species appears to exist in Pima and Santa Cruz counties, much of which is unoccupied. PPC occurs at low densities, widely scattered, sometimes in clumps, across the valley bottoms and bajadas. The species can be difficult to detect, especially in dense grass cover. For this reason, systematic surveys are expensive and have not been conducted extensively throughout the range of the PPC. As a result, location information has been gathered opportunistically, either through small systematic surveys, usually associated with specific development projects, or larger surveys that are typically only conducted in areas that seem highly suited for the species. Furthermore, our knowledge of the distribution and status of this species is gathered primarily through the section 7 process; and we only see projects that require a Federal permit

or have Federal funding. There are many projects that occur within the range of PPC that do not undergo section 7 consultation, and we have no information regarding the status or loss of plants or habitat associated with those projects. For these reasons, it is difficult to address abundance and population trends for this species. We do not find that the best available information allows for very specific PPC population estimates such as was presented in the BA. The approach and methodology used to make the PPC population estimates in the BA limit their reliability and utility as we analyze the effects of the proposed action on the conservation and recovery of this species.

The Arizona Game and Fish Department maintains the Heritage Data Management System (HDMS), a database identifying elements of concern in Arizona and consolidating information about their distribution and status throughout the state. This database has 5,553 PPC records, 5,449 PPC of which have coordinates. Some of the records are quite old, and we have not confirmed whether the plants are still alive. We also cannot determine which plants may be the result of multiple surveys in a given area. Of the known individuals (5,553), approximately 1,340 PPC plants are documented in the database as extirpated as of 2003. There have been additional losses since 2003, but that information is still being compiled in the database. The database is dynamic, based on periodic entry of new information, as time and staffing allows. As such, the numbers used from one biological opinion to the next may vary and should be viewed as a snapshot in time at any given moment. We have not tracked loss of habitat because a limited number of biological assessments actually quantify habitat for PPC.

We do know the number and fate of PPC that have been detected during surveys for projects that have undergone section 7 consultation. Through 2014, section 7 consultations on development projects (e.g., residential and commercial development, mining, infrastructure improvement) considered 2,939 PPC plants found on approximately 15,771 acres within the range of the PPC. Of the total number of plants, 2,170 PPC (74 percent) were destroyed, removed, or transplanted as a result of development, mining, and infrastructure projects. In terms of PPC habitat, some of the 15,771 acres likely did not provide PPC habitat, but that amount is difficult to quantify because PPC habitat was not consistently delineated in every consultation. Of the 15,771 acres, however, we are aware that 15,106 acres (96 percent) have been either permanently or temporarily impacted. Some of these acres may still provide natural open space, but we have not been informed of any measures (e.g., conservation easements) that have been completed to ensure these areas will remain open. Through section 7 consultation on non-development-related projects (e.g., fire management plans, grazing, buffelgrass control), we are aware of an additional 781 plants within an unknown number of acres; we do not know the number of acres because these types of projects are often surveyed for PPC inconsistently, if at all. Across the entire PPC range, it is difficult to quantify the total number of PPC lost and the rate and amount of habitat loss for three reasons: 1) we review only a small portion of projects within the range of PPC (only those that have Federal involvement and are subject to section 7 consultation), 2) development that takes place without any jurisdictional oversight is not tracked within Pima and Santa Cruz counties, and 3) many areas within the range of the PPC have not been surveyed; therefore, we do not know how many plants exist or how much habitat is presently available.

Some additional information related to the survival of PPC comes from six demographic plots that were established in 2002 in the Altar Valley. The results from the first year (2002-2003) indicate that the populations were relatively stable; out of a total of over 300 PPC measured, only 10 died, and two PPC seedlings were found (Routson *et al.* 2004). The plots were not monitored in 2004, but were visited again starting in May 2005. In the two years between September 2003 and September 2005, 35 individuals, or 13.4 percent, of the original population had died and no new seedlings were found (Baker 2006). Baker (2006) suggests that recruitment likely occurs in punctuated events in response to quality and timing of precipitation, and possibly temperature, but there is little evidence until such events occur.

He goes on to say that further observations need to be made to determine the rate at which the population is declining, because, based on an overall rate of die-off of 13.4 percent every two years, few individuals will be alive at this site after 15 years. More recently, a nearly 25% loss of individuals across these six study sites occurred between 2010 and 2011; these deaths were attributed largely to drought and associated predation by native insects and rodents (Baker 2011). As this monitoring program continues, critical questions regarding the life cycle of this species may be answered.

Further, there are still significant gaps in our knowledge of the life history of PPC; for instance, we have yet to observe a good year for seed germination. From researcher observations and motion sensing cameras, we have learned that ants, Harris' antelope squirrels, and jackrabbits act as seed dispersal agents. Demographic plots have been only recently established, and information is just now beginning to be reported with regard to describing population dynamics for PPC in the Altar Valley.

Threats to PPC continue to include habitat loss and fragmentation, competition with non-native species, drought and climate change, and inadequate regulatory mechanisms to protect this species. We believe residential and commercial development, and its infrastructure, is by far the greatest threat to PPC and its habitat. However, we have only a limited ability to track the cumulative amount of development within the range of PPC. What is known with certainty is that development pressure continues in Pima and Santa Cruz counties.

Invasive grass species may be a threat to the habitat of PPC. Habitat in the southern portion of the Altar Valley is now dominated by Lehmann lovegrass (*Eragrostis lehmanniana*). According to Gori and Enquist (2003), Boer lovegrass (*Eragrostis chloromelas*) and Lehmann lovegrass are now common and dominant on 1,470,000 acres in southeastern Arizona. They believe that these two grass species will continue to invade native grasslands to the north and east, as well as south into Mexico. These grasses have a completely different fire regime than the native grasses, tending to form dense stands that promote higher intensity fires more frequently. Disturbance (like fire) tends to promote the spread of these non-natives (Ruyle *et al.* 1988, Anable *et al.* 1992). Roller and Halvorson (1997) hypothesized that fire-induced mortality of PPC increases with Lehmann lovegrass density. Buffelgrass (*Pennisetum ciliare*) has become locally dominant in vacant areas in the City of Tucson and along roadsides, notably in the rights-of-way along Interstate 10 and State Route 86. Some portions of PPC habitat along these major roadways are already being converted to dense stands of buffelgrass, which can lead to recurring grassland fires and the destruction of native desert vegetation (Buffelgrass Working Group 2007).

The effects of drought and climate change (i.e., decreased precipitation and water resources) are a threat to the long-term survival and distribution of native plant species, including the PPC. For example, temperatures rose in the twentieth century and warming is predicted to continue over the twenty-first century. Although climate models are less certain about predicted trends in precipitation, the southwestern United States is expected to become warmer and drier. In addition, precipitation is expected to decrease in the southwestern United States, and many semi-arid regions will suffer a decrease in water resources from climate change as a result of less annual mean precipitation and reduced length of snow season and snow depth. Approximately half of the precipitation within the range of the PPC typically falls in the summer months; however, the impacts of climate change on summer precipitation are not well understood. Drought conditions in the southwestern United States have increased over time and may have contributed to loss of PPC populations through heat stress, drought stress, and related insect attack, as well as a reduction in germination and seedling success since the species was originally listed in 1993, and possibly historically. Climate change trends are likely to continue, and the impacts on species will likely be complicated by interactions with other factors (e.g., interactions with non-native species and other habitat-disturbing activities).

The Arizona Native Plant Law can delay vegetation clearing on private property for the salvage of specific plant species within a 30-day period. Although the Arizona Native Plant Law prohibits the 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. Even if PPC are salvaged from a site, transplanted individuals only contribute to a population if they survive and are close enough (within 900 m [(2,970 ft)]) to other PPC to be part of a breeding population from the perspective of pollinator travel distances and the likelihood of effective pollination. Transplanted PPC have variable survival rates, with moderate to low levels of survival documented. Past efforts to transplant individual PPC to other locations have had limited success. For example, on two separate projects in Green Valley, the mortality rate for transplanted PPC after two years was 24 percent and 66 percent, respectively (SWCA, Inc. 2001, WestLand Resources, Inc. 2004). One project southwest of Corona de Tucson involved transplanting PPC into areas containing *in situ* plants. Over the course of three years, 48 percent of the transplanted individuals and 24 percent of the *in situ* individuals died (WestLand Resources, Inc. 2008). There is also the unquantifiable loss of the existing PPC seed bank associated with the loss of suitable habitat. Furthermore, once individuals are transplanted from a site, PPC is considered by the Service to be extirpated from that site, as those individuals functioning in that habitat are moved elsewhere.

Pima County regulates the loss of native plant material associated with ground-disturbing activities through their Native Plant Protection Ordinance (NPPO) (Pima County 1998). The NPPO requires inventory of the site and protection and mitigation of certain plant species slated for destruction by the following method: the designation of a minimum of 30 percent of on-site, permanently protected open space with preservation in place or transplanting of certain native plant species from the site. There are various tables that determine the mitigation ratio for different native plant species (e.g. saguaros, ironwood trees, PPC) with the result that mitigation may occur at a 1:1 or 2:1 replacement ratio. Mitigation requirements are met through the development of preservation plans. The inadvertent consequence of this ordinance is that it has created a "market" for PPC. Any developer who cannot avoid this species or move it to another protected area must replace it. Most local nurseries do not grow PPC (and cannot grow them legally unless seed was collected before the listing). As a result, some environmental consultants are collecting PPC seed from existing sites (which can be done with a permit from the Arizona Department of Agriculture and the permission of the private landowner), germinating seed, and placing PPC plants grown from seed back on these sites. There have been no long-term studies of transplant projects, thus the conservation benefit of these actions is unknown. Moreover, growing and planting PPC does not address the loss of PPC habitat that necessitated the action of transplanting cacti in the first place.

Other specific threats that have been previously documented (U.S. Fish and Wildlife Service 1993), such as overgrazing, illegal collection, prescribed fire, and mining, have not yet been analyzed to determine the extent of effects to this species. However, partial information exists. Overgrazing by livestock, illegal collection, and fire-related interactions involving exotic Lehmann lovegrass and buffelgrass may negatively affect PPC populations. Mining has resulted in the loss of hundreds, if not thousands, of acres of potential habitat throughout the range of the plant.

The protection of PPC habitat and individuals is complicated by the varying land ownership within the range of this species in Arizona. An estimated 10 percent of the potential habitat for PPC 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 plant's range or in scattered parcels. The largest contiguous parcel of federally-owned habitat is the Buenos Aires National Wildlife Refuge, located at

the southwestern edge of the plant's range at higher elevations and with lower plant densities. No significant populations of PPC are known from Sonora or elsewhere in Mexico (Baker 2005).

There have been some notable conservation developments for this species. As of 2010, there are two conservation banks for PPC, one on a private ranch in the Altar Valley (Palo Alto Ranch Conservation Bank) and another owned by Pima County that includes areas in both the Altar Valley and south of Green Valley. In the Palo Alto Ranch Conservation Bank to date, a total of 700 acres have been conserved through the execution of conservation easements. In Pima County's Bank, a total of approximately 530 acres are under a conservation easement at this time (the County offsets its own projects within this bank). Additionally, three large blocks of land totaling another 1,078 acres have been set aside or are under conservation easements through previous section 7 consultations (see consultations 02-21-99-F-273, 02-21-01-F-101, and 02-21-03-F-0406). While not formal conservation banks, these areas are set aside and managed specifically for PPC as large blocks of land, and likely contribute to recovery of the taxon for this reason; therefore, we consider these acres conserved. Another 647 acres of land have been set aside as natural open space within the developments reviewed through section 7 consultation between 1995 and 2010. However, these are often small areas within residential backyards (not in a common area) that are difficult to manage and usually isolated within the larger development, and often include areas that do not provide PPC habitat (e.g., washes). Some conservation may occur onsite because of these open space designations, but long-term data on conservation within developed areas are lacking; the value of these areas to PPC recovery over the long-term is likely not great. However, if small blocks of PPC habitat are conserved with adequate protection and in a context of adequate habitat connectivity, even small blocks of conserved habitat can contribute to the overall conservation of the species.

In summary, PPC conservation efforts are currently hampered by a lack of information on the species. Specifically, we have not been able to determine exact ecological characters to help us predict locations of PPC or precisely delineate its habitat, and considerable area within the PPC range has not been surveyed. However, this lack of information may also mean that there is considerable suitable PPC habitat within its range, and that this habitat supports populations of PPC that continue to contribute to the viability of this species.

Development and associated loss of habitat remain important and continuing threats to this taxon. However, the expanding threat of non-native grasses and resulting altered fire regimes are a serious concern for the long-term viability of the species, as is ongoing drought. The full impact of drought and climate change on PPC has yet to be studied, but it is likely that, if recruitment occurs in punctuated events based on precipitation and temperature (Baker 2006), PPC will be negatively affected by these forces. Already we have seen a nearly 25% loss of individuals across six study sites in the Altar Valley between 2010 and 2011; these deaths were attributed largely to drought and associated predation by native insects and rodents (Baker 2011). Conservation efforts that focus on habitat acquisition and protection, like those proposed by Pima County and the City of Tucson, are important steps in securing the long-term viability of this taxon. Regulatory mechanisms, such as the native plant protection ordinances, provide conservation direction for PPC habitat protection within subdivisions, and may serve to reduce PPC habitat fragmentation within areas of projected urban growth. Given the many unknowns related to the total extent of suitable habitat, the current number of extant PPC, and the long-term benefit of existing conservation actions, we are optimistic that there are considerable areas of PPC habitat supporting additional populations of PPC that are persisting and contribute to the overall viability of this species.

## **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 Federal actions in the Action Area that have undergone formal or early section 7 consultation, and 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.

### **Description of the Action Area**

The Action Area for this project is defined as those areas directly and indirectly affected by the proposed action. Exhibit 2 of the BA shows the extent of the proposed detention basins and associated infrastructure. As indicated in the description of the proposed action, the Action Area for this project is the 100 acres of disturbance associated with the detention basins and the drainage infrastructure. The Action Area is characterized primarily as undisturbed native desert. Adjacent to the Action Area are a number of dirt roads and rights-of-way, and a golf course. Some additional areas of undisturbed native desert occur adjacent to the Action Area, but these areas will likely be subject to some type of development in the future (see description above of the Project Area). Additionally, the area to the north and northeast of the Action area is characterized by residential, commercial, and municipal development. Land ownership within the Action Area is completely Tribal-owned lands. Adjacent areas include private lands and some lands administered by the Arizona State Land Department and Bureau of Land Management.

#### **A. Status of the Species within the Action Area**

As described in the BA, the entire Project Area (areas within the Reservation that have some potential for development) is considered PPC habitat. Some areas within drainages and some areas of existing development do not provide PPC habitat, but generally, all undeveloped natural desert areas are considered to be suitable PPC habitat. Therefore, we conclude that the entire 100-acre Action Area is suitable PPC habitat.

Some survey work has been completed within the Project Area. Much of the Action Area has been surveyed with the PPC detected occurring at an average density of approximately 0.20 PPC/acre. If a similar density of PPC is found within the Action Area, the total number of PPC within the Action Area would be somewhere around 20. Given the range of PPC densities throughout the Action Area, the range in the number of PPC affected would be 37 at the high end of the density spectrum and 11 at the low end of the density spectrum.

#### **B. Factors Affecting Species Environment within the Action Area**

The Reservation has a limited land base from which the Tribe must provide services to Tribal members. Because of the limited nature of the Tribal lands, the Tribe anticipates needing to use the entire area for development of goods and services for Tribal members. This means that undeveloped areas within the Action Area will be used for drainage and detention, utility infrastructure, recreational facilities, and residential, commercial, and municipal development. There is some potential for actions related to roadway infrastructure and utility construction that may or may not be part of Tribal development plans. Local municipalities and the Arizona Department of Transportation may establish rights-of-way across

the Action Area. These actions would contribute to the loss of individual PPC, as well PPC habitat loss and fragmentation.

Ongoing urbanization and residential development adjacent to the Action Area is likely to continue at some level. Such activities can affect the conservation and recovery of PPC within the Action Area if such actions increase PPC habitat loss and fragmentation. The conservation and recovery of this species is dependent on maintaining large blocks of unfragmented habitat that are supported by appropriate habitat connectivity. These habitat configurations are necessary for this species to provide for seed dispersal, the maintenance of a seed bank, and the ongoing occurrence of pollinators and other plant species that support the pollinators of PPC.

## **EFFECTS OF THE ACTION**

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

The proposed detention basins and associated infrastructure will disturb the 100-acre Action Area. The entire 100 acres provides potential PPC habitat. This acreage likely supports from approximately 20 individual PPC (range of potential occurrence is 11 PPC to 37 PPC) and, because the entire acreage would be disturbed, all of these PPC would be affected. Accordingly, the proposed action would result in the permanent loss of 100 acres of habitat and the removal of 11 to 37 PPC.

To compensate for the permanent loss of PPC habitat, the Tribe has agreed to establish a Tribal Refuge that will permanently conserve and manage 34 acres of PPC habitat within the Reservation. This area has been placed in perpetual conservation status through the passing of a Tribal resolution, an instrument that will provide permanent protection of this site from activities that could affect the conservation of PPC. The Service has inspected the proposed Tribal Refuge lands and confirmed that this acreage supports occupied PPC habitat, as well as an important wash corridor that promotes species diversity and provides a corridor for PPC pollinators. A survey of the Tribal Refuge documented a total of 79 PPC within the Tribal Refuge. The Service has found the proposed Tribal Refuge is an appropriate area to offset the impacts to PPC that will result from the proposed action. The Tribal Refuge provides occupied PPC habitat of equal or greater quality than the habitat that will be impacted as a result of the proposed action. Additionally, this site, while small, can provide connectivity and act as a "stepping stone" for the PPC seed bank and pollinator travel. The conservation values of this site will be maintained in perpetuity through Tribal resolution and an approved management plan.

Conservation of PPC affected by the proposed action will also occur through the transplanting of individual PPC from the Action Area to the Tribal Refuge. As discussed above, the use of transplanting or relocating PPC from affected project areas has not been shown to be effective as a tool for conservation and recovery of PPC. However, there is only limited data from a limited number of projects from which to draw conclusions regarding this approach. The Tribe has provided the Service with information related to the results of previous efforts on the Reservation to transplant and relocate PPC. This information, though limited, indicates that the methods used by the Tribe to implement these efforts have been relatively successful. Twenty-eight of the 79 PPC within the Tribal Refuge are PPC

that were successfully relocated from previous development projects on the Reservation within the past 10 years and have continued to contribute to the viability of the local PPC population.

The Service recognizes that the purpose of the Tribe's Reservation is for the use and benefit of the Tribe, and that the Tribe manages its lands in accordance with Tribal goals and objectives, within the framework of applicable laws. Because the Tribe has very limited land resources which they can use to provide conservation lands for PPC, and limited financial resources with which to purchase credits from an existing PPC conservation bank, they have proposed, and the Service has accepted, the use of transplanting PPC affected by this project, using an approved protocol and subsequent management and monitoring, as a conservation tool that will: 1) potentially retain existing PPC on the landscape as viable individuals contributing to the conservation of the species in this area, and 2) provide scientific data related to the success or failure of the methods used to transplant the PPC. Such data will contribute to conservation of this species by increasing our knowledge and understanding of the potential to use transplanting as a tool in the conservation and recovery of the PPC. This approach is acceptable to the Service because it is being used in conjunction with the conservation of occupied PPC habitat also committed by the Tribe to offset the effects of the proposed action.

PPC 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 managed for their natural values. Because the Tribe will implement development within the approximately 1,093-acre Project Area in a phased approach, areas of core PPC habitat and habitat connectivity will remain within the Reservation until such future development occurs. The Service will continue to work with the Tribe as future development projects are considered in order to maintain core blocks of PPC habitat and appropriate habitat connectivity to the maximum extent practicable. All of the proposed conservation actions included in the biological assessment and this BO are necessary to offset impacts to PPC 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.

Cumulative impacts from private actions include potential future residential and commercial development adjacent to the Action Area. We also anticipate that there will be transportation, utility, and other infrastructure projects associated with this development. While some of these activities are likely to have a Federal nexus, some will not. Some consideration for the conservation of PPC may be afforded through Pima County's development processes. However, without any protective measures under the Act or through Pima County, the only protection available is through the Arizona Native Plant Law, which provides only for salvage for scientific and educational purposes. Regardless of the process or the outcome of salvaged PPC transplants, PPC habitat will continue to be lost, cumulatively impacting the potential for the survival and recovery of this species.

## **CONCLUSION**

After reviewing the current status of the PPC, the environmental baseline for the Action Area, the effects of the proposed detention basins and associated infrastructure, and the cumulative effects, it is our biological opinion that the Pascua Yaqui Detention Basin Project, as proposed, is not likely to jeopardize the continued existence of the PPC. No critical habitat has been designated for this species; therefore,

none will be affected. This conclusion is based on the full implementation of the project as described in the Description of the Proposed Action section of this document, particularly the conservation measures that were incorporated into the project design and proposed action. Specifically:

- The Tribe will establish a 34-acre Tribal Pima Pineapple Cactus Refuge on Reservation lands that currently supports at least 79 PPC. This Refuge will be managed in perpetuity for the conservation of PPC.
- All PPC located within the Action Area will be salvaged and transplanted into the Tribal Refuge in appropriate locations and at appropriate densities. Transplant activities will follow an approved transplant protocol and will be managed and monitored according to the approved Refuge Management Plan. The results of this and future PPC transplanting efforts will be monitored and the results reported to the Service. This will increase the amount of information available to the Service to evaluate the use of salvage and transplanting PPC as a future conservation measure for this species, and will increase our understanding of important PPC life history elements.

As a result, although 100 acres of PPC habitat will be permanently impacted, areas of core PPC habitat and habitat connectivity will remain within the Reservation, some of which, the Tribal PPC Refuge for example, will be protected in perpetuity. Other areas will persist as PPC habitat until future development occurs, and these projects may be subject to section 7 consultation where the Service and the Tribe will work together to maintain core blocks of PPC habitat and appropriate habitat connectivity to the maximum extent practicable. Additionally, individual PPC that would typically have been removed during a project such as this will continue to be present in the vicinity of this project as a result of the proposed salvage program and will continue, at some level, to contribute to the persistence of the PPC population in this area.

### **INCIDENTAL TAKE STATEMENT**

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally-listed 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.

- 1) We recommend that the EPA work with the Tribe and the Service to expand the size of the PPC Tribal Refuge to improve core PPC habitat areas and habitat connectivity.
- 2) We recommend that the EPA work with the Tribe and the Service to collect information from other ongoing PPC transplant programs to develop a comprehensive assessment of the success of using salvage and transplanting as a conservation tool for PPC.

3) We recommend that the EPA, in cooperation with the Service, develop long-term conservation strategies for PPC and incorporate those strategies into EPA funding and permitting processes.

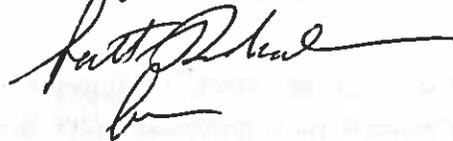
In order for us to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

### REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the reinitiation request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Our office appreciates the Pascua Yaqui Tribe's and EPA's efforts to identify and minimize effects to listed species from this project. For further information please contact Scott Richardson (520) 670-6150 (x242) or Jean Calhoun (520) 670-6150 (x223). Please refer to the consultation number 02EAAZ00-2014-F-0574 in future correspondence concerning this project.

Sincerely,



Steven L. Spangle  
Field Supervisor

cc (hard copy):

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