



United States Department of the Interior



Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In Reply Refer to:
AESO/SE
22410-2010-F-0458

November 2, 2010

Mr. Dennis Rankin
Engineering and Environmental Staff
Rural Utilities Service
1400 Independence Avenue, S.W.
Washington, DC 20250-0700

RE: New Tucson Substation Section 7 Consultation

Dear Mr. Rankin:

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to Section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended. Your request was dated July 12 and received in this office July 20. In the same letter you designated Southwest Transmission Cooperative, Inc. (SWTC) as your non-Federal representative for this consultation. Please note that 50 CFR 402.08 authorizes Federal agencies to designate a non-Federal representative in informal consultation; however, the regulations do not provide this opportunity for formal consultation. As a result, we are addressing this biological opinion (BO) to you, rather than SWTC. This BO addresses anticipated impacts to the endangered Pima pineapple cactus (*Coryphantha scheeri robustispina*, also known as *C. robustispina robustispina*) (PPC) from the construction of the proposed New Tucson Substation, Pima County, Arizona. You have determined that the project may adversely affect the PPC.

This BO is based on information provided in the August, 2010, Biological Assessment of Impacts to Pima Pineapple Cactus from the Proposed New Tucson Substation, Pima County, Arizona (BA), prepared for the Rural Utility Service (RUS) on behalf of SWTC by SWCA Environmental Consultants, information you have provided us through correspondence and phone calls, as well as published and non-published literature available on the species of concern and related impacts. A complete administrative record of this consultation is on file at the Arizona Ecological Services Office.

Consultation History

The following summarizes the consultation history for this opinion.

- May 4, 2010: SWTC contacted us regarding the proposed New Tucson Substation.
- May 24, 2010: SWTC submitted preliminary PPC mitigation measures to us for the proposed project.
- June 28, 2010: SWTC requested informal consultation on impacts to PPC from geotechnical soil boring activities necessary for the proposed project.
- July 12, 2010: We received a letter from RUS requesting formal consultation and designating SWTC as their non-Federal representative.
- July 15, 2010: We concurred with SWTC's determination of impacts to PPC due to geotechnical soil boring activities.
- August 4, 2010: We received the BA regarding impacts to PPC from the proposed project.
- October 28, 2010: We provided you with our draft Biological Opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

SWTC proposes to construct a new 230-kV electrical substation (the New Tucson Substation) on 24.93 acres of land owned by the Arizona State Land Department (ASLD) in the vicinity of Corona de Tucson, Pima County, Arizona, to tap off of the existing Pantano to Sahuarita 230-kV line. The 230-kV substation yard would be designed as a 4-breaker ring bus configuration, but will initially be operated as a 3-breaker ring bus configuration. The substation would initially consist of a 230-/24.9-kV 30-/40-/50-Megavolt Ampere (MVA) transformer and 230-kV bay for use of a mobile transformer during fault conditions, or a second 230-/24.9-kV 30-/40-/50-MVA transformer for future load growth. A low-side breaker would be installed on the 24.9-kV side to sectionalize the transformer from the 24.9-kV yard under fault conditions. The substation would also include a control building, circuit breakers, disconnect switches, bus work, conduit, grounding grid, and relaying and other auxiliary equipment necessary to complete substation installation. The project, as proposed, includes enough area for the potential future expansion of the substation to include a 69-kV yard with required transformer and infrastructure.

The disturbance footprint of the substation (including future expansion) and access corridors is depicted in Figure 1. The substation fence would be a chain-link security fence. The graded and leveled substation area would be extended 10 feet outside the substation fence. Crushed rock, applied to a depth of 4 inches, would be used to cover the entire substation yard and would extend three feet beyond the substation fence. The crushed rock would reduce the effects of electrical shock, provide a reasonably dry walking surface during wet periods, and minimize weed growth. The total disturbance footprint, including substation, crushed rock apron, and access corridors, would total 7.01 acres within the 24.93-acre area.

Proposed Conservation Measures

SWTC proposes the following conservation measures to minimize the effects to PPC and its habitat:

- 1) Any PPC that are not within the area of permanent disturbance but are present within the project vicinity will be flagged by a qualified biologist prior to the commencement of work to avoid accidental damage during construction.
- 2) SWTC will provide just over 2:1 on-site mitigation for impacts to possible PPC habitat by setting aside in perpetuity the approximate 17.92 acres, or 72 percent, of the 24.93-acre project area outside of the disturbance footprint. Henceforth the set-aside area will be referred to as "Conservation Lands." In addition to the Conservation Lands, SWTC will re-seed approximately 2.38 acres inside the disturbance footprint that will be temporarily impacted by construction activities. Assurance that the Conservation Lands will remain as set-aside in perpetuity is provided both in the regulatory framework of Pima County's entitlement process and in the conditions of the ASLD right-of-way agreement. SWTC will delineate 17.92 acres of the property as Natural Open Space on all Pima County submittals, including the Development Plan, Native Plant Preservation Plan, and Landscape Plan. These plans become legally binding once approved by the county. Additionally, the ASLD requires that the "grantee shall acquire required permits prior to construction, and adhere to all applicable rules, regulations, ordinances, and building codes as promulgated by local jurisdictions and any applicable State or Federal Agency."
- 3) If, for some unforeseen reason, SWTC were to lose the ASLD perpetual lease covering the Conservation Lands, SWTC will purchase 7.0 acres of mitigation credits from an approved PPC mitigation bank. SWTC will provide PPC monitoring during maintenance activities associated with maintaining the existing 230-kV transmission line.
- 4) Plant species protected under the Arizona Native Plant Law (cactus, yucca, and native trees) will be avoided to the extent practicable during construction. If impacts to native plants cannot be avoided, the plants will be treated in accordance with state law. All PPC within the area of permanent disturbance will be salvaged and replanted on Conservation Lands north of the substation footprint by a biologist with previous experience transplanting PPC. Transplantation will be accomplished in accordance with the cactus transplantation methodology described by the University of Arizona (2009).
- 5) The applicant will conduct vehicle inspections to prevent the transfer of the seeds of noxious and invasive plant species to and from the work site; outline procedures for the removal and disposal of noxious and invasive plants; and propose methods of control, such as the application of herbicides and mechanical or manual removal around the substation boundary and along the access road. To maintain a weed-free substation, including surrounding the crushed stone apron, SWTC will control vegetation at the site. To be consistent with ongoing maintenance at other SWTC substations, a pre-emergent herbicide for weed control within the fenced area of the substation site will be applied

after construction is complete. The initial application will be followed up with annual applications as part of the scheduled maintenance for the site. Herbicide application will be conducted twice each year: pre-emergent herbicide applications would be completed during October–January, and post-emergent applications would be completed during March–September. Herbicides will be applied based on rates prescribed by the manufacturers, and it is required that an authorized SWTC representative be present during all applications. The following precautions will be taken to prevent drift beyond the target area during applications: 1) herbicides will not be applied during windy weather conditions; 2) application techniques will be limited to hand application or application using a truck with a boom that applies the chemical within three feet of the ground; and 3) anti-drift agents will be used.

- 6) SWTC Environmental Staff will conduct annual site visits to inspect the Conservation Lands. The monitoring efforts will be focused on the changing abundance of buffelgrass (*Pennisetum ciliare*) and recreational all-terrain vehicle (ATV) use. No annual reports of monitoring efforts will be submitted to the FWS; however, if an increase of the density of buffelgrass or ATV use is detected, SWTC will work with the FWS to develop a strategy for protection of the Conservation Lands.

STATUS OF THE SPECIES – PPC

The PPC was listed as an endangered species without critical habitat on September 23, 1993 (58 FR 49875). Factors that contributed to the listing include habitat loss and degradation, habitat modification and fragmentation, limited geographical distribution and species rareness, illegal collection, and difficulties in protecting areas large enough to maintain functioning populations. In 2005, a 5-year review was initiated for PPC (70 FR 5460). This review was completed in 2007 and recommended no change to the cactus's classification as an endangered species (U.S. Fish and Wildlife Service 2007).

PPC occurs south of Tucson, in Pima and Santa Cruz counties, Arizona and 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 the Arizona upland of the Sonoran desertscrub 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 very limited success. As such, we are still unable to determine exact ecological characters to help us predict locations of PPC or precisely delineate habitat (U.S. Fish and Wildlife Service 2007).

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 in much of its range. 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.

Recent investigation 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).

Six demographic plots were established in 2002 in the Altar Valley. The results from the first year (2002-2003) indicate that the populations were 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 (mostly during the summer months), 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. As this monitoring program continues, critical questions regarding the life cycle of this species will be answered.

The major pollinator of PPC is *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. PPC plants that are located at distances greater than that from one another become isolated. 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 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 very few biological assessments 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 section 7 consultation on development projects (e.g., residential and commercial development, mining, infrastructure improvement), we are aware of 2,680 plants found on approximately 15,192 acres within the range of the PPC. Of the total number of plants, 1,985 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 15,192 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 15,192 acres, however, we are aware that 14,545 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.

Threats to PPC continue to include habitat loss and fragmentation, competition with non-native species, 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 no way of tracking 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 quite 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 Arizona Native Plant Law may 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 600 m [(1,969 ft)] of other PPC to be part of a breeding population from the perspective of pollinator travel distances. Transplanted PPC have variable, but moderate to low levels of survival. 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 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, 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 habitat.

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. 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, 131.6 acres have been conserved to date. In Pima County's Bank, a total of 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). These areas, currently totaling 1,739.6 acres, 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.

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. 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 and, with the exception of a few personal observations from researchers, we have not identified the seed dispersal agent(s). Demographic plots have been only recently established, and it will likely be years before we have enough information to assess population dynamics for PPC in the Altar Valley.

Development and associated loss of habitat remain the primary proximate 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. 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. 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.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Description of the Action Area

The “action area” means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur (50 CFR 402.02). For this project, we define the action area as the 24.93-acre project area that contains the footprint of the substation, future expansion of the substation, crushed rock apron outside the security fence, access corridors, and Conservation Lands.

The proposed New Tucson Substation would be located in the vicinity of Corona de Tucson, south of Vail and Interstate 10 (I-10), east of Wentworth Road (called Colossal Cave Road north of I-10), west of North Calle Rinconado Road, and just north of East Andrada Road on an approximately 24.93-acre parcel of land owned by the ASLD (Figure 1). The legal description of the land parcel is Township 16 South, Range 16 East, Section 33 in Pima County, Arizona.

Elevation in the action area ranges from 3,420 to 3,448 feet above mean sea level. An unnamed ephemeral wash crosses the southwestern corner of the project area from southeast to northwest. Site vegetation is ecotonal between the semi-desert grassland and the Arizona upland subdivision of the Sonoran desertscrub biotic communities (Brown 1982), with plants more typical of semi-desert grassland dominating the site.

Undeveloped State Trust Land borders the action area to the north and west, and low-density development borders on the south and east. Disturbances in the action area are limited to an

existing dirt access road used by SWTC to access an existing transmission line. There is very little evidence of dumping or litter on the site and no evidence of recent livestock grazing.

Status of the species within the Action Area

Surveys for PPC within the 24.93-acre action area were conducted in July and August 2008 and verified in April 2009. A total of 25 PPC were found, seven within the disturbance footprint and 18 within the Conservation Lands. Approximately 7.01 acres of potential PPC habitat would be directly impacted by the project. Of these, 2.38 acres would be treated with a native seed mix after construction is completed.

EFFECTS OF THE ACTION

The proposed action will result in the direct removal of seven PPC and approximately 7.01 acres of PPC habitat within the 24.93-acre project site. Within the context of PPC individuals and surveyed area we have reviewed through section 7 consultation on development projects, this project adds 25 individuals (including the seven individuals that will be transplanted) and 25 acres (including the seven acres within the substation footprint) to the known baselines. This brings each baseline up to 2,705 PPC individuals, of which 1,992 will have been destroyed, removed, or transplanted, and 15,217 acres surveyed, of which 14,552 will have been permanently or temporarily impacted by development projects.

The loss or modification of PPC and its habitat can impact the taxon both directly and indirectly. Areas of permanent disturbance will remove portions of the seed bank and occupied habitat, and temporary disturbance can also alter the seed bank. Disturbance of soils will change water infiltration, compact soil, and change local site conditions. Additionally, recently disturbed areas have an increased potential to be invaded by noxious weeds (e.g., Lehmann lovegrass), which can negatively affect PPC. Although some areas of temporary disturbance may recover, it may take many years before full recovery is achieved. Vasek *et al.* (1975) found that desert vegetation is fragile and easily destroyed, but does have a long-term potential (probably measured in centuries) to recover from drastic disturbance such as a pipeline project. PPC can be found in areas of recent disturbance, as competition with other plants for nutrients and light are reduced.

To offset the indirect effects to PPC and its habitat, SWTC proposes to conduct vehicle inspections to prevent the transfer of the seeds of noxious and invasive plant species to and from the work site; outline procedures for the removal and disposal of noxious and invasive plants; and propose methods of control, such as the application of herbicides and mechanical or manual removal around the substation boundary and along the access road. To maintain a weed-free substation, including surrounding the crushed stone apron, SWTC proposes to control vegetation at the site, and will apply a pre-emergent herbicide for weed control within the fenced area of the substation site after construction is complete. The initial application will be followed up with annual applications as part of the scheduled maintenance for the site. Herbicide application will be conducted twice each year: pre-emergent herbicide applications will be completed during October–January, and post-emergent applications will be completed during March–September. Herbicides will be applied based on rates prescribed by the manufacturers, and an authorized

SWTC representative be present during all applications. Additionally, precautions will be taken to prevent drift beyond the target area during applications, including: 1) herbicides will not be applied during windy weather conditions; 2) application techniques will be limited to hand application or application using a truck with a boom that applies the chemical within three feet of the ground; and 3) anti-drift agents will be used. SWTC also proposes to reseed 2.38 acres of disturbed ground with native seed after the project is completed. These conservation measures should offset this project's indirect effects to PPC and its habitat by minimizing the spread of noxious weeds during construction activities and encouraging native plants to reoccupy temporarily disturbed areas.

To offset the direct impacts to PPC and its habitat, SWTC proposes to translocate the seven PPC that will be directly affected to Conservation Lands north of the substation footprint using the cactus transplantation methodology described by the University of Arizona (2009). A biologist with previous PPC transplanting experience will conduct this work. Additionally, SWTC will set aside in perpetuity approximately 17.92 acres, or 72 percent, of the 24.93-acre project area as Conservation Lands. Salvage of PPC has shown limited success. Based on previous work, it is likely that two to four of the seven transplanted individuals will not survive the first few years. However, by setting aside 17.92 acres as permanent Conservation Lands, in addition to monitoring the effects of buffelgrass distribution and ATV activity, SWTC is offsetting the direct effects of this project to PPC habitat at a 2:1 ratio, which contributes to the overall recovery and conservation of the species. Should SWTC, for some unforeseen reason, lose the perpetual lease covering the Conservation Lands, SWTC will purchase 7.0 acres of mitigation credits from an approved PPC conservation bank to offset the effects of this project to PPC habitat.

In summary, the proposed project will result in the direct loss of seven PPC and 7.01 acres of PPC habitat. This represents a loss of less than one percent of the known individuals and surveyed area we have reviewed through section 7 consultations. The applicant proposes to offset this loss by setting aside 17.92 acres within the action area as natural open space. The project, while contributing to further fragmentation of PPC habitat, also contributes to the survival and recovery of PPC because it will provide for onsite conservation of PPC individuals and habitat (or off-site in an approved PPC conservation bank, should the perpetual lease be lost), which will be protected in perpetuity.

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. For example, additional booster stations will require a separate consultation if a federal nexus occurs and if any listed species may be adversely affected.

Open space, such as that made available by the Conservation Lands, often provides recreational areas for nearby residents, and the use of these lands for recreation, off-road vehicle use, and illegal dumping of trash can ultimately lead to habitat degradation and possible loss of PPC. SWTC Environmental Staff will conduct annual site visits to inspect the Conservation Lands

specifically to monitor off-road vehicle use and the abundance of buffelgrass. This should help to off-set these effects, as a strategy to protect the Conservation Lands will be developed with the FWS if off-road vehicle use or an increase in the density of buffelgrass is detected.

CONCLUSION

After reviewing the current status of PPC, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the proposed construction of the New Tucson Substation 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. Our rationale for this conclusion is as follows:

- The loss of seven PPC and 7.01 acres of PPC habitat represent less than one percent of the PPC individuals and area surveyed for which we have conducted section 7 consultation. Additional PPC and habitat occur throughout the range of the taxon.
- The proposed project will contribute to the overall conservation and recovery of PPC by conserving 17.92 acres onsite within the PPC range habitat in perpetuity as Conservation Lands. Should the perpetual lease protecting these lands be lost, seven acre-credits will be purchased off-site in an approved PPC conservation bank.

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.

CONSERVATION RECOMMENDATIONS

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

1. We recommend that RUS participate in efforts to identify and conserve PPC throughout its range, including participation in forums that address the control of invasive, exotic plants (e.g. buffelgrass and Lehmann lovegrass).
2. We recommend that RUS consider coordinating the translocation of the PPC with the Arizona-Sonora Desert Museum and local PPC experts, and that the survival and vigor of translocated cacti be monitored and reported to us.

In order that we are kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the construction of the New Tucson Substation, 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 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.

We appreciate RUS's and SWTC's efforts to identify and minimize effects to listed species from this project. For further information please contact Ms. Marit Alanen at (520) 670-6150 (x 234) or Mr. Jim Rorabaugh (x 230). Please refer to the consultation number 22410-2010-F-0458 in future correspondence concerning this project.

Sincerely,


SR Steven L. Spangle
Field Supervisor

cc (hard copy):

Field Supervisor, Fish and Wildlife Service, Phoenix, AZ (2)
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Fish and Wildlife Service, Tucson, AZ (Attn: Marit Alanen)

cc (electronic copy):

Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ
Environmental Planner, SWTC, Benson, AZ (Attn: Kevin Barnes)

LITERATURE CITED

- Anable, M.E., M. P. McClaran, and G.B. Ruyle. 1992. Spread of introduced Lehmann lovegrass (*Eragrostis lehmanniana* Nee.) in southern Arizona, USA. *Biological Conservation* 61:181-188.
- Baker, M. 2004. Phenetic analysis of *Coryphantha*, section *Robustispina* (Cactaceae), part 1: stem characters. Final report submitted to U.S. Fish and Wildlife Service under contract with the Arizona Board of Regents, University of Arizona, Tucson. 21 pp.
- Baker, M. 2005. Geographic distribution and DNA analysis of *Coryphantha robustispina* ssp. *robustispina*, part 1: geographic distribution. Final report submitted to the Department of Agriculture on 7 July 2005. 7 pp. + appendices.
- Baker, M. 2006. 2005 demographic study of *Coryphantha robustispina* ssp. *robustispina*. Status report prepared for Bureau of Reclamation. 17 pp.
- Benson, L. 1982. The Cacti of the United States and Canada. Stanford University Press, Stanford, CA. Page 820.
- Brown, D. E. 1982. Biotic communities of the American Southwest – United States and Mexico. *Desert Plants* (4)1-4:1-342.
- Buffelgrass Working Group. 2007. Buffelgrass invasion in the Sonoran Desert: Imminent risks and unavoidable mitigation. 4 pp. <http://www.buffelgrass.org/pdf/invasion.pdf>, accessed May 19, 2009.
- Ecosphere Environmental Services Inc. 1992. Final Report: A survey for threatened and endangered plant species at three proposed reservoir sites and associated pipelines. Bureau of Reclamation contract 0-CS-32-1950. Farmington, NM. 69 pp.
- Gori, D. F. and C. A. F. Enquist. 2003. An assessment of the spatial extent and condition of grasslands in Central and Southern Arizona, Southwestern New Mexico and Northern Mexico. Prepared by the Nature Conservancy, Arizona Chapter. 28 pp.
- Johnson, M. B. 2004. Cacti, other succulents, and unusual xerophytes of southern Arizona. Boyce Thompson Southwestern Arboretum, Superior, AZ. 96 pp.
- McDonald, C. J. 2005. Conservation of the rare Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*): recruitment after fires and pollination in the Altar Valley of southern Arizona. Master of Science Thesis, School of Natural Resource, The University of Arizona. 82 pp.
- McPherson, G. R. 2002. Relationship of ecological variables in the field with the presence of Pima pineapple cactus. Report to USFWS under agreement 1448-20181-01-J818. 4 pp.

- Paredes-Aguilar, R., T. R. Van Devender, and R. S. Felger. 2000. Cactáceas de Sonora, México: Su diversidad, uso, y conservación. Instituto del Medio Ambiente y el Desarrollo Sustentable del Estado de Sonora (IMADES), Hermosillo, Sonora y Arizona-Sonora Desert Museum, Tucson, AZ. 143 pp.
- Phillips, A. M. III, B. G. Phillips, and N. Brian. 1981. Status report for *Coryphantha scheeri* var. *robustispina*. Unpublished Report. U.S. Fish and Wildlife Service, Office of Endangered Species, Albuquerque, NM.
- Pima County. 1998. Native Plant Preservation. Chapter 18.72.
- RECON Environmental, Inc. 2006. Draft Pima County Multi-Species Conservation Plan, Pima County, Arizona and Attachments.
- Roller, P. S. and W. L. Halvorson. 1997. Fire and Pima pineapple cactus (*Coryphantha scheeri* Kuntze var. *robustispina* Schott) in southern Arizona. In Proceedings of Fire Effects on Rare and Endangered Species and Habitats Conference, Coeur d'Alene, Idaho. Pp. 267-274.
- Routson, R., M. Dimmitt, and R. C. Brusca. 2004. A demographic study of *Coryphantha scheeri* var. *robustispina*. Final report to USFWS. NFWF contract # 2000-0015. 18 pp.
- Ruyle, G. B., B. A. Roundy, and J. R. Cox. 1988. Effects of burning on germinability of Lehmanns lovegrass. *Journal of Range Management* 41:404-406.
- Schmalzel, R. J., R. T. Nixon, A. L. Best, and J. A. Tress. 2004. Morphometric variation in *Coryphantha robustispina* (Cactaceae). *Systematic Botany* 29:553-568.
- SWCA, Inc. 2001. September 12, 2001 Technical Memorandum regarding the PPC mitigation program at Las Campanas.
- U.S. Fish and Wildlife Service. 1993. Determination of endangered status for the plant PPC (*Coryphantha scheeri* var. *robustispina*). *Federal Register* 58(158):49875-49880.
- U.S. Fish and Wildlife Service. 2007. 5-year review for Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*). Arizona Ecological Services Office, Phoenix, Arizona. 17 pp. Available at:
http://www.fws.gov/southwest/es/arizona/Documents/SpeciesDocs/PimaPineappleCactus/PPC_5yrReview.pdf
- University of Arizona. 2009. Cactus, agave, yucca, and ocotillo. Arizona Cooperative Extension, College of Agriculture and Life Sciences. Publication AZ1125. Available at:
<http://ag.arizona.edu/pubs/garden/az1225.pdf>.
- Vasek, F.C., H.B. Johnson, and D.H. Eslinger. 1975. Effects of pipeline construction on creosote bush scrub vegetation of the Mojave Desert. *Madroño* 23: 1-13.

WestLand Resources, Inc. 2004. January 26, 2004, Technical Memorandum regarding the transplanted PPC at the Madera Highland Reserve.

WestLand Resources, Inc. 2008. May 22, 2008, Technical Memorandum regarding the survival of transplanted Pima pineapple cactus on the Sycamore Highland Property.

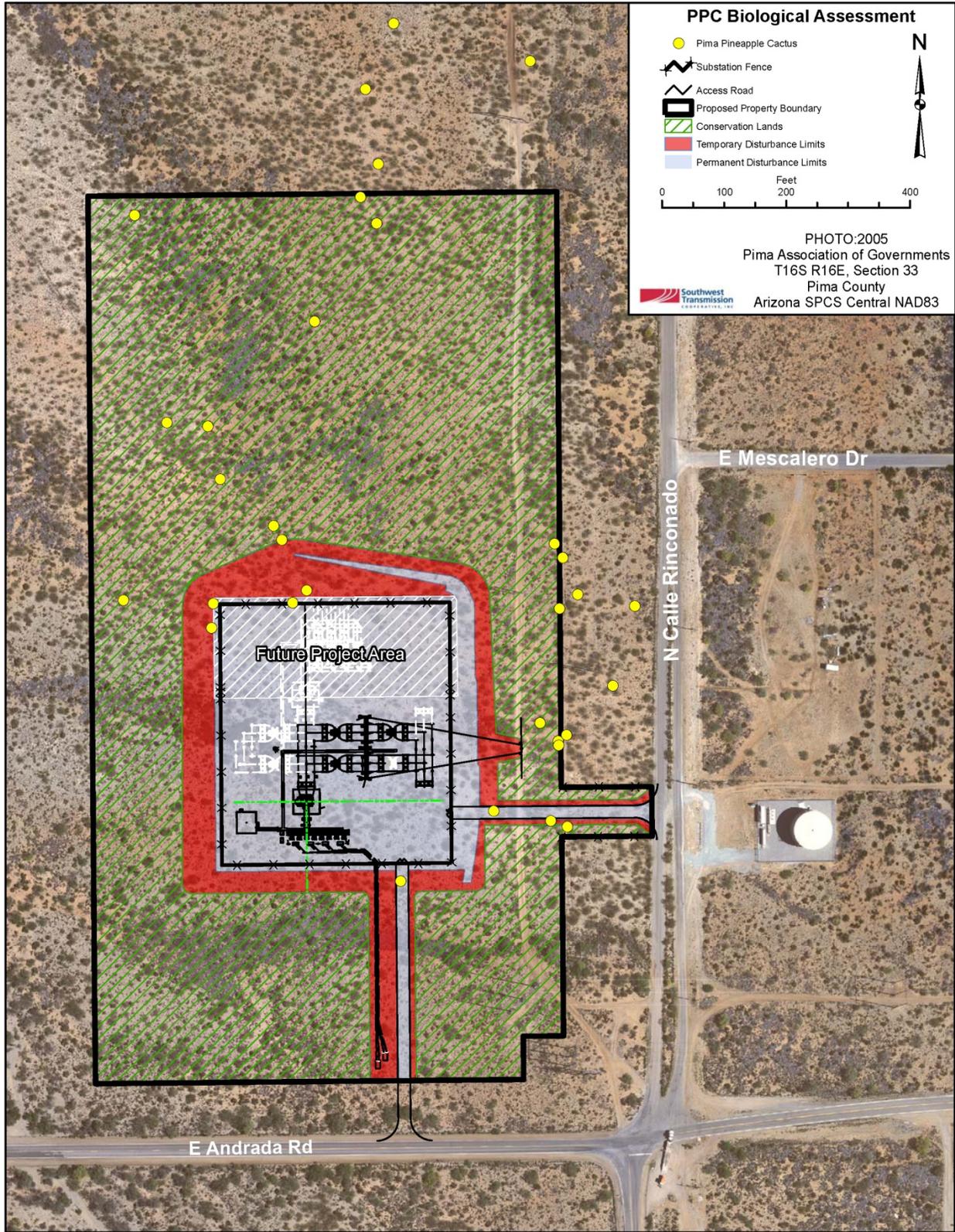


Figure 1. Action area detail showing proposed disturbance footprint, PPC locations, and Conservation Lands.