APPENDIX D
SECTION 7 CONSULTATION

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BIOLOGICAL ASSESSMENT, POTENTIAL EFFECTS ON FEDERALLY LISTED SPECIES FROM THE PROPOSED AIRFIELD SAFETY ENHANCEMENT PROJECT TUCSON INTERNATIONAL AIRPORT TUCSON, PIMA COUNTY, ARIZONA

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LIST OF ACRONYMS

Acronym	Title
AANG	Arizona Air National Guard
ADEQ	Arizona Department of Environmental Quality
AFP 44	Air Force Plant 44
AGFD	Arizona Game and Fish Department
Amsl	Above mean sea level
ANPL	Arizona Native Plant Law
ASEP	Airfield Safety Enhancement Project
AZDA	Arizona Department of Agriculture
BA	Biological Assessment
C	Candidate Species under the ESA
CA	Conservation Agreement
CFR	Code of Federal Regulations
CWA	Clean Water Act
ECM	Earth Covered Magazines
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
Ft	Feet
HS	Highly Safeguarded under the ANPL
IPaC	USFWS Information, Planning, and Conservation System
LE	Listed Endangered under the ESA
LT	Listed Threatened under the ESA
MBTA	Migratory Bird Treaty Act
MSA	Munitions Storage Area
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
OFA	Object Free Area
PPC	Pima Pineapple Cactus
PVS	Priority Vulnerable Species proposed for protection
RPZ	Runway Protection Zone
RSA	Runway Safety Area
SC	Species of Concern to the USFWS
SGCN	Species of Greatest Conservation Need
SDCP	Sonoran Desert Conservation Plan
TAA	Tucson Airport Authority
TUS	Tucson International Airport
USAF	United States Air Force
USC	United States Code
USFWS	United States Fish and Wildlife Service

SUMMARY

Section 7(a)(2) of the Endangered Species Act (ESA) requires federal agencies to insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any federally-listed endangered or threatened species or result in the destruction or adverse modification of critical habitat. Although Arizona does not have an equivalent endangered species law, Arizona Game and Fish Department (AGFD) policy and a native plant law provide protection for some rare species that require state agencies to protect state-listed threatened or endangered species.

This Biological Assessment (BA) is to be used by the Federal Aviation Administration (FAA), United States Air Force (USAF) and the National Guard Bureau (NGB) for consultation with the United States Fish and Wildlife Service (USFWS). The analysis includes an evaluation of the Detailed Study Area for potential impacts to ESA-listed threatened and endangered species and associated critical habitat under the jurisdiction of the USFWS. The results of the consultation effort will be included in an Environmental Impact Statement the FAA is preparing for the proposed Airfield Safety Enhancement Project (ASEP) also described in this BA as the "Proposed Action." **Table 1** and **Table 2** summarizes the finding in this BA.

Table 1. Federally listed Species

SPECIES		U.S. FISH AND WILDLIFE SERVICE	
		FEDERAL STATUS	FINDING
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	Listed Endangered	***May affect, but is not likely to adversely affect***
Pima pineapple cactus	*Coryphantha scheeri var. robustispina*	Listed Endangered	***May affect, and is likely to adversely affect***

Although not a federally-listed species, the following impact summary was included at the request of the USFWS.

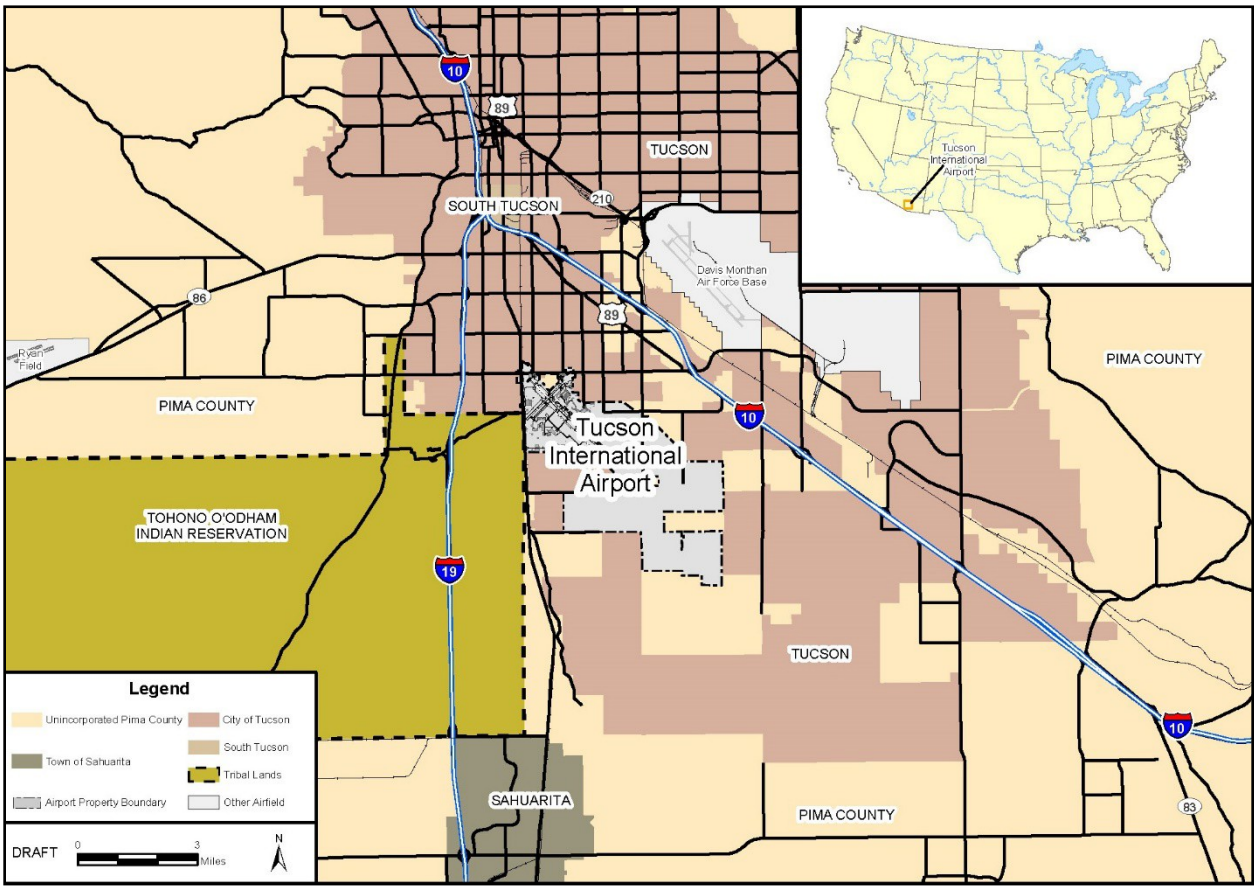
Table 2. Western Burrowing Owl

SPECIES		MIGRATORY BIRD TREATY ACT	IMPACT SUMMARY
Western burrowing owl	*Athene cunicularia hypugaea*	MBTA species	No western burrowing owls were directly observed at the pedestrian survey conducted in the spring and summer of 2017. However, at the request of the USFWS an additional pedestrian survey was conducted in November 2017. At that time one western burrowing owl was observed and documented in the Detailed Study Area. An additional survey would be conducted within 30 days of the start of construction activities. If western borrowing owls are found at that time mitigation measures will be identified and coordinated with AGFD and USFWS. Therefore no direct or affirmative purposeful actions that reduce migratory birds, their eggs, or their nests, by killing or capturing, to human control would occur.

1. INTRODUCTION

1.1 PURPOSE OF THE BA

This BA is intended to support formal consultation between the FAA and the USFWS as required by 50 C.F.R.§ 402.14(c) and Section 7 of the ESA regarding the likelihood of an adverse effect ("take") of any listed species with implementation of the Proposed Airfield Safety Enhancement Project (Proposed Action) at Tucson International Airport (TUS), Tucson, Pima County, Arizona. The location of the Airport is shown on **Exhibit 1**. The results of the consultation effort will be included in an EIS the FAA is preparing for the Proposed Action. Information in this BA will also be used for Clean Water Act (CWA) Section 404 and 402 permit applications from the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency (EPA), and the Arizona Department of Environmental Quality (ADEQ).



1.1.1 PURPOSE AND NEED OF PROPOSED ACTION

FAA PURPOSE AND NEED

The purpose of the Proposed Action is to fulfill FAA's statutory mission to ensure the safe and efficient use of navigable airspace in the U.S. as set forth under 49 United States Code (USC) § 47101 (a)(1). The FAA must ensure that the Proposed Action does not derogate the safety of aircraft and airport operations at TUS. Moreover, it is the policy of the FAA under 49 USC § 47101(a)(6) that airport development projects provide for the protection and enhancement of natural resources and the quality of the environment of the United States.

USAF PURPOSE AND NEED

The USAF's purpose and need is to maintain equivalent USAF Plant 44 operational capabilities. The USAF owns land, known as Air Force Plant 44 (AFP 44), adjacent to the Airport. Under the Proposed Action, Earth Covered Magazines (ECMs) located on AFP 44 would have to be demolished to prevent munitions storage safety arcs from extending onto the TUS airfield after relocation of Runway 11R/29L and to remove the ECMS from the relocated runway's safety area.

NGB PURPOSE AND NEED

The NGB's purpose and need is to maintain NGB safety standards and operational capabilities at the Tucson Air National Guard Base. The existing Munitions Storage Area (MSA) at the Tucson Air National Guard Base does not meet the USAF separation distances required for explosive operations and exposes non-munitions personnel to explosive hazards. Relocating the MSA would accommodate the required Quantity-Distance clear zone arcs that are required in accordance with USAF Manual 91-201, *Explosive Safety Standards*.

TAA PURPOSE AND NEED

The Tucson Airport Authority's (TAA) purpose and need is to enhance the safety of the airfield and ensure land use compatibility among users of TUS. TAA has conducted various planning studies with the goal of reducing airfield incursions and improving overall airfield safety. The Proposed ASEP, which is the subject of this EIS, was developed by TAA to meet this goal and to ensure that TUS operates in the safest manner possible.

1.1.2 CONSULTATION HISTORY

A pre-consultation meeting was held in Tucson with the USFWS on June 27, 2016. Member of the EIS consultant team briefed Scott Richardson, USFWS and Steve Spangle, USFWS (via telephone) about the Proposed Action. In addition Scott Richardson, USFWS and Steve Spangle, USFWS were invited to the Agency Scoping meeting held in Tucson on September 22, 2016. No USFWS staff attended the agency scoping meeting and no formal comments were received during the scoping comment period.

A pedestrian survey was conducted between April 20 and June 24, 2017 to collect site-specific vegetation and wildlife information within the Detailed Study Area. In addition, the USFWS Information, Planning, and Conservation System and the Arizona Game and Fish Department Online Environmental Review Tool were accessed in January 2018 to review the potential for listed species and critical habitat.

No western burrowing owls were directly observed at the pedestrian survey conducted in the spring and summer of 2017. In fall 2017, FAA staff conducted informal briefings to Scott Richardson, USFWS about the status of the EIS and the preparation of the BA. At that time the USFWS requested an additional pedestrian survey be conducted to verify the presence of the western burrowing owl in the Detailed Study Area. The additional survey was conducted in November 2017 as requested. One western burrowing owl was observed and documented in the Detailed Study Area. The USFWS has requested from FAA that information about the Western Burrowing Owl be included in this BA.

1.2 PROJECT DESCRIPTION

The FAA is preparing an EIS pursuant to NEPA to evaluate potential impacts of a proposed airport development program at TUS. The EIS is being prepared in compliance with the FAA policies for implementing *National Environmental Protection Act* (NEPA) in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* and FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*.

The proposed project includes the relocation and reconstruction of Runway 11R/29L as a 10,996-foot long, 150-foot wide runway. The relocation of Runway 11R/29L would require development and/or modification of associated arrival and departure procedures. Currently the narrow width and shorter length of Runway 11R/29L causes some pilots to confuse it with a taxiway when approaching from the south. On several occasions pilots on approach from the south have mistaken Runway 29R for Runway 29L and Taxiway A for Runway 29R, landing on the wrong runway or on Taxiway A.

The construction of a full length parallel runway would eliminate two Hot Spots on the airport that will enhance the safety of aircraft operations at the airport. The proposed relocated Runway 11R/29L would have its threshold aligned with Runway 11L/29R and have the same width, which would clearly differentiate it from a parallel taxiway. Having the length, width, and threshold locations of Runway 11R/29L and Runway 11L/29R the same, would increase safety and pilot situational awareness. Pilots on approach from the south would be better able to visually acquire the end of the runways if they have non-staggered landing thresholds. This would eliminate the potential to mistake Runway 29R for Runway 29L and Taxiway A for Runway 29R. The existing Runway 11R/29L would be demolished and the pavement materials recycled for use during construction of the relocated runway pavement.

The proposed project also includes construction of a new Centerline Parallel Taxiway between existing Runway 11L/29R and the new Runway 11R/29L. In addition, a new Outboard Parallel taxiway that will be west of the relocated Runway 11R/29L will be constructed. The project also

includes construction of various supporting connector taxiways between Runways 11R/29L and the outboard and centerline parallel taxiway.

A Bypass taxiway will be built northwest of the Runway Protection Zones for Runways 11L and 11R. The displaced arrivals thresholds would allow unrestricted taxiing of aircraft (regardless of size) accessing Runway 11R. This element would include removal of the existing concrete apron from the surrounding area and demolition of four existing buildings/hangars within the area. The Triple hangars would not be demolished as part of this element. Under this project, Taxiway A-2 will be closed between Runway 3/21 and Taxiway D.

As part of the replacement runway construction, the proposed project would construct/maintain the AANG blast pads for Runways 11L/29R and 11R/29L and paint/mark as non-runway/taxiway pavement. Additional drainage detention areas west of the new runway are proposed to be constructed to provide for the additional impervious pavement areas.

The proposed project also includes several Land Transactions between the USAF and the Tucson Airport. This element of the Proposed Action includes the TAA acquiring land from AFP 44 from USAF known as Parcel "F." This land is needed by TAA for the relocated runway object free area, taxiway object free area, runway safety area, and runway protection zone for the relocated runway. This Parcel "F" area is currently used by USAF to store explosives in ECMs.

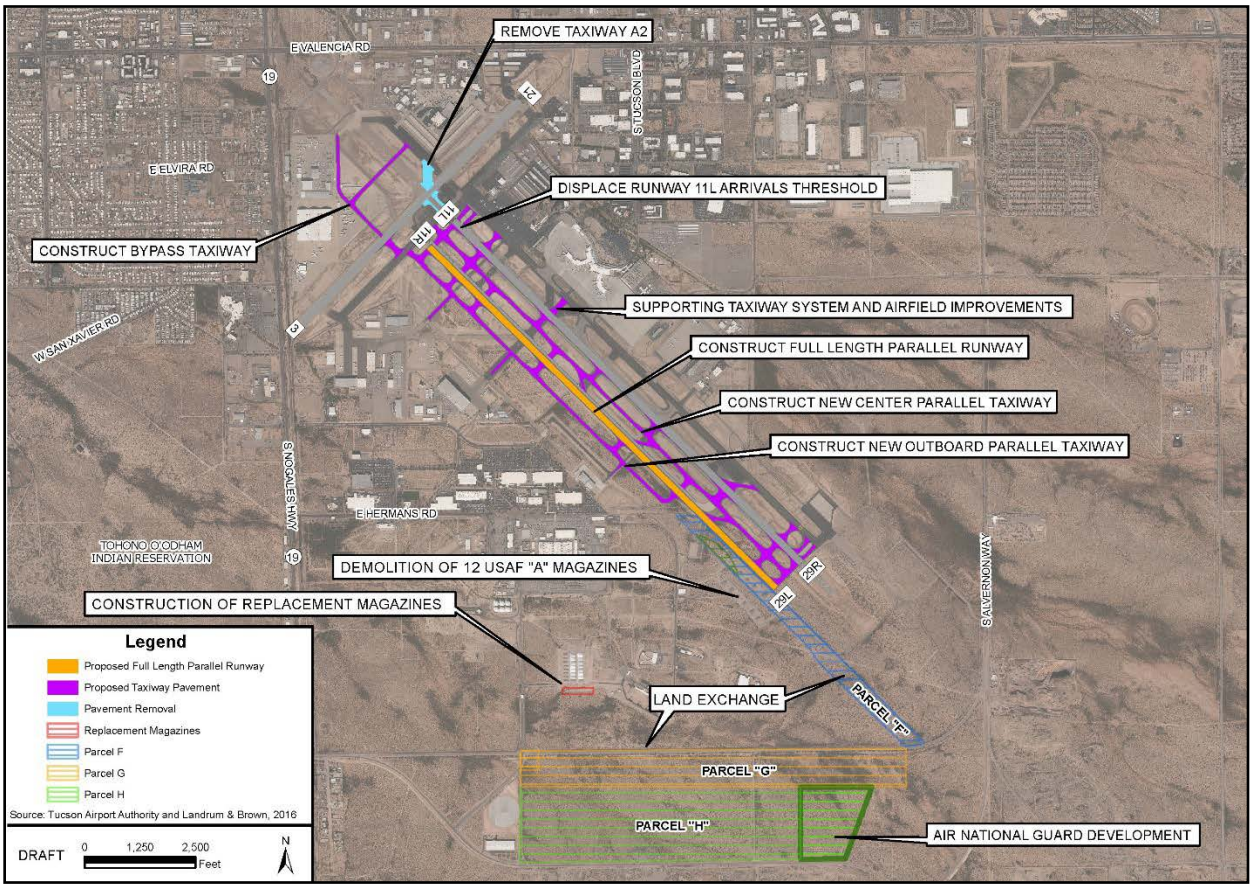
In exchange for Parcel "F," this element of the proposed project also includes the FAA releasing TAA from its federal obligations for the Airport land located between the former East Hughes Access Road and the new Aerospace Parkway, south of AFP 44 from TAA to USAF, and the release of that land from federal obligations. A portion of this land has been proposed for construction of a MSA, to include ECMs, and access road, for the AANG at the Tucson Air National Guard Base located adjacent to TUS.

Demolition of twelve USAF ECMs identified at AFP 44 as "A" Magazines located on Parcel F, is required to maintain the necessary FAA required safety areas for the relocated runway. In order to maintain the existing munitions storage capacity of AFP 44, replacement storage facilities would be constructed elsewhere on AFP 44 that would provide the same volume of storage provided in the "A" Magazines. These new ECMs would replace the twelve "A" Magazines to be demolished on Parcel "F" and adjacent to Parcel "F".

The last component of this project includes construction of a MSA for the AANG. This element of the Proposed Action includes transfer of land from Parcel "H" to the USAF on behalf of the National Guard Bureau for construction of a MSA and access road to support the AANG at Tucson Air National Guard Base. A conceptual layout of the MSA is shown on Exhibit 8 on Page 20 of this BA.

The key project elements include the following and are shown on **Exhibit 2**:

- Relocate Runway 11R/29L to the southwest and construct it to a total length of 10,996 feet and width of 150 feet.
- Construct new full-length parallel taxiway between Runway 11L/29R and Runway 11R/29L.
- Construct supporting connector taxiways between Runway 11R/29L and both outboard and centerline parallel taxiways.
- Construct bypass taxiways for Runways 11L and 11R.
- Closure of segments of taxiway A2 between taxiway A and Runway 3/21 and taxiway A2 and Runway 3/21.
- Construct/maintain AANG extended blast pads for Runways 11L/29R and 11R/29L.
- Construct additional drainage detention areas to support additional impervious pavement areas.
- Construct replacement Earth Covered Magazines on U.S. Air Force Plant 44 (AFP 44).
- Construct an MSA on land identified as "Parcel H" by the National Guard Bureau.



1.3 PROJECT LOCATION AND ACTION AREA

The Detailed Study Area is comprised of several noncontiguous project sites within an area that is approximately four miles long and two miles wide, in portions of Township 15S, Range 14E, Sections 17, 18, 19, 20, 21, 28, 29, 32, & 33, 32.11252 -110.93930, WGS 84. The Airport is located on 8,343 acres in Tucson, Arizona in Pima County south of the City of Tucson central business district and near both Interstate 10 and Interstate 19. 50 Code of Federal Regulations (CFR) § 402.02 defines the **action area** as "*all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."* Thus, for this proposed project, the **action area** is defined as the Detailed Study Area.

1.4 EXISTING CONDITIONS

The Detailed Study Area is in the Basin and Range physiographic province, characterized by mountain ranges on a northwest-southeast axis that are separated by broad alluvial valleys.

Elevations vary from about 2,540 feet above mean sea level (amsl) at the northwestern end to 2,690 feet above mean sea level at the southeastern end. The Detailed Study Area is near the interface of a lower alluvial fan terrace and the Santa Cruz River floodplain, and contains Sonoran Desert scrub communities in the Arizona Upland subdivision (Brown 1994; Brown and Lowe 1980). Vegetation is characterized by a diversity of low shrubs [dominated by creosote (*Larrea tridentate*) and woody crinklemat (*Tauilia canescens*)] and legume trees [e.g., velvet mesquite (*Prosopis velutina*) and blue paloverde (*Parkinsonia florida*)].

The Detailed Study Area is comprised chiefly of three soil units that are predominantly sandy loams. These units combined occur throughout 95 percent of the Detailed Study Area and include Cave soils and Urban land, Sahuarita and Mohave soils and Urban land, and Yaqui soils. Most of these soil units are formed in mixed alluvium, well-drained and calcareous, and some are mixed with amounts of modified Urban land soil (Cochran and Richardson 2003). A detailed discussion of soil characteristics within the Detailed Study Area is provided in **Appendix A**.

2. FEDERALLY LISTED SPECIES/CRITICAL HABITAT PRESENT

2.1 ESA-LISTED SPECIES

The objectives of this BA are to determine whether the action area supports ESA-listed threatened and endangered species or their habitat, and to address the potential effects associated with the Proposed Action on ESA-listed species and critical habitat.

"Listed species"[1] are defined as those plant and animal species currently listed by the USFWS under the ESA as threatened, endangered, or proposed as such. The list of ESA-listed species to be addressed in this BA was based on:

- A review of the list published by the USFWS;
- A review of the list published by AGFD; and
- A review of the list published by Pima County.

Harris Environmental Group, Inc. qualified biologists reviewed the threatened, endangered, proposed, and candidate flora and fauna species within the action area. In addition, the USFWS Information, Planning, and Conservation System (IPaC) (accessed by Scott Blackman, January 2018) was queried to review species and critical habitat occurring within one or more delineated U.S. Geological Survey 7.5 minute quadrangles intersecting the Detailed Study Area. The AGFD's Online Environmental Review Tool (accessed by Scott Blackman, January 2018) was also used to determine whether any special status species or special management areas have been documented as occurring within three miles of the Detailed Study Area.

Eleven of the 14 special status species were not analyzed in detail because the Detailed Study Area is outside the known range and/or does not contain suitable habitat as shown on **Table 3**.

The Detailed Study Area and action area contain suitable habitat for the federally endangered lesser long-nosed bat and Pima pineapple cactus.

[1] Endangered Species Act (16 U.S.C. Sections 1531-1544).

Table 3. Federally listed, proposed, and candidate species excluded from evaluation

SPECIES	STATUS (FEDERAL ARIZONA PIMA CO.)	SUITABLE HABITAT	EXCLUSION JUSTIFICATION
Jaguar (*Panthera onca*)	LE SGCN n.s.	Sonoran desertscrub through pine-oak woodland, with recent sightings in southeastern Arizona borderlands at 5,200 and 5,700 ft amsl (AGFD 2004a).	Jaguar is uncommon with no known breeding populations in the U.S. (NatureServe 2005; USFWS 2000). The detailed study area is outside the known
Ocelot (*Leopardus pardalis*)	LE SGCN n.s.	Dense thorn scrub along desert drainages less than 4,000 ft amsl. Populations in southeast Arizona are on the fringe of the range and are probably transient. The range of ocelot may be expanding north along the San Pedro River valley (AGFD 2004b).	Recent sightings of the ocelot occurred over 50 miles southeast of TUS in the Huachuca Mountains in southern Arizona. However, the Detailed Study Area is outside the known
Brazilian Free-tailed Bat (*Tadarida brasiliensis*)	n.s.	Roosts in caves, mine tunnels, crevices, and under bridges (AGFD 2004c).	The detailed study area contains no suitable roosting habitat.
Bald eagle (*Haliaeetus leucocephalus*)	LT, MBTA, SGCN, n.s.	Coastal lands, estuaries, some arid areas, inland waters (particularly with high water-to-land edge) and areas with unimpeded views including both horizontal and vertical aspects. Found from 460 to 7,930 ft amsl in Arizona (AGFD 2002a).	The detailed study area contains no suitable habitat.
California least tern (*Sterna antillarum browni)*	LE	Open, bare or sparsely vegetated sand, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, or drainage systems. Less than 2,000 feet elevation (USFWS	The detailed study area contains no suitable habitat.
Southwestern willow flycatcher (*Empidonax trailii extimus*)	LE, MBTA, SGCN, PVS	Dense, structurally complex riparian scrub with willow, cottonwood, and tamarisk from 75 to 9180 ft amsl (AGFD 2002b; Davis and Russell 1990; Monson and Philips 1981; Philips et al. 1964).	The detailed study area contains no suitable habitat.
Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	C, MBTA, SGCN, PVS	Sonoran riparian woodlands and forest from 90 to 6,710 ft amsl comprised of cottonwood, willow, and/or tamarisk galleries (AGFD 2002c).	The detailed study area contains no suitable habitat.

Table 3. Federally listed, proposed, and candidate species excluded from evaluation

SPECIES	STATUS (FEDERAL ARIZONA PIMA CO.)	SUITABLE HABITAT	EXCLUSION JUSTIFICATION
Northern Mexican gartersnake (*Thamnophis eques megalops*)	LT, SGCN	Inhabits areas that contain ponds, cienegas, lowland rivers, riparian forests, woodlands, and gallery forests (AGFD 2012).	The detailed study area contains no suitable habitat.
Sonoyta mud turtle (*Kinosternon sonoriense longifemorale*)	C, n.s.	Limited to aquatic habitat in desert scrub at Quitobaquito Springs in Organ Pipe Cactus National Monument and nearby Sonoyta, Sonora from 0 to 6,700 ft amsl (AGFD 2005; Stebbins 1985).	The detailed study area contains no suitable habitat and is outside the known geographic range.
Desert pupfish (*Cyprinodon macularis*)	LE SGCN PVS	Shallow waters of springs, marshes, and streams generally below 4,920 ft amsl (AGFD 2001a).	The detailed study area contains no suitable habitat.
Gila topminnow *Poeciliopsis occidentalis* (*occidentalis*)	LE SGCN PVS	Slow waters of small streams, springs, and cienegas from 1,320 to 7,510 ft amsl (usually below 5,000 ft) (AGFD 2001b).	The detailed study area contains no suitable habitat.
Key to Status: C = Candidate, CA = Conservation Agreement, LE = Listed Endangered, LT = Listed Threatened, HS = Highly Safeguarded, MBTA = Migratory Bird Treaty Act, PVS = Priority Vulnerable Species proposed for ESA Section 10 permit coverage, SC = Species of Concern, SGCN = Species of Greatest Conservation Need, n.s. = no status.			

2.1.1 LESSER LONG-NOSED BAT (LEPTONYCTERIS CURASOAE YERBABUENAE)

2.1.1.1 Status, Natural History, and Distribution

The lesser long-nosed bat is listed as endangered and is protected under the ESA (USFWS 1988), is listed as an Species of Greatest Conservation Need (SGCN) by the AGFD (1996), and *Priority Vulnerable Species (PVS)* by Pima County (RECON 2006). This species is a medium-sized, leaf-nosed bat that is yellow-brown to pale gray dorsally and cinnamon ventrally as shown on **Exhibit 3**. It is a nectivorous that also consumes pollen and fruit of agaves and columnar cacti.

In Arizona, this bat generally forages from dusk to dawn from April through September (AGFD 2003). In a single night, lesser long-nosed bats forage up to 30 miles from their daytime roost sites (USFWS 1995b). Pregnant females arrive in Arizona in early April and form large maternity colonies. Males arrive later and form smaller separated colonies. A single offspring per mother is born each year in May and can fly by late June. Maternity colonies dissociate by the end of July. Lesser long-nosed bats range from the southern United States to northern South America in semiarid to arid habitats. Food availability and suitable roosting habitat within commuting distance of food sources are requisite. In Arizona, lesser long-nosed bats roost in caves, mines, and tunnels in desert scrub, grassland, and oak woodlands from 1,190 to 7,320 ft amsl. This bat does not hibernate and leaves Arizona during the winter migration to the southern portion of its range (AGFD 2003).

Exhibit 3. Lesser long-nosed bat
Photo courtesy Scott Blackman, 2017

2.1.1.2 Current Threats

The lesser long-nosed bat is endangered from declines in the size and number of maternity colonies from roost site exclusion and disturbance in Sonora and Arizona. Further causes may be related to large-scale depletions of agaves in Mexico for tequila production (AGFD 2003).

2.1.1.3 Potential to Occur

The Airport is within the 30-mile foraging range of a historic roost site at Colossal Cave (AGFD 2003; Hoffmeister 1986) and other recently discovered roosts in the Catalina Mountains approximately 15 miles away (Lowery et al. 2009). Although the Airport is outside the Conservation Land System, a habitat model has identified 100 percent of the Detailed Study Area as medium value habitat (SDCP 2000). No day-roosting habitat occurs in the detailed study area, and no major maternity roosts have been recently documented within 30 miles of the detailed study area (AGFD 2003; SDCP 2001). Lesser long-nosed bats may use shelter sites such as buildings as night roosts in the detailed study area as resting areas during foraging activities; individuals may occasionally forage in the action area. The Detailed Study Area does not contain vegetation composition or structure, or geologic features that provide day- roosting or foraging habitat to support a viable lesser long-nosed bat population.

2.1.2 PIMA PINEAPPLE CACTUS (CORYPHANTHA SCHEERI VAR. ROBUSTISPINA)

2.1.2.1 Status, Natural History, and Distribution

The Pima pineapple cactus (PPC) is listed as endangered and is protected under the ESA (USFWS 1993, 2017). The Pima pineapple cactus is also listed as *Highly Safeguarded* by the Arizona Department of Agriculture (AZDA) and is protected under the Arizona Native Plant Law (ANPL) and Priority Vulnerable Species (*PVS*) by Pima County (RECON 2006).

The Pima pineapple cactus is a small spheroid, stemmed cactus with radial tubercles. Each tubercle has a longitudinal groove on the upper surface and 10 to 15 radial spines with one stout, curved central spine. Immature plants have six radial spines and lack the central spine (USFWS 2017). This cactus occurs as both solitary and clumping plants (i.e., in small clusters/groups). Mature plants vary from 2.0 to 8.5 inches in diameter and from 2.0 to 18.0 inches tall (USFWS 2017). Yellow flowers open after the start of the summer monsoon (in July and August), and fruits develop and mature the following month. The principal pollinators appear to be solitary, ground nesting bees (AGFD 2001d; Benson 1982).

The range of the PPC in Arizona includes eastern Pima County and parts of Santa Cruz County, extending north to the Airport, south to Nogales and Sasabe, east to Vail, and west to Pan Tak and San Pedro (EES 1992, AGFD 2001d). Studies conducted for the U.S. Bureau of Reclamation (EES 1992) and University of Arizona (Roller 1996) documented PPC distributed through mesquite shrub communities, grassland shrub communities, and creosote flats.

Generally, PPC are found from 2,300 to 5,000 ft amsl. These cacti typically grow on flat areas with sandy and silty soils on the lower sections of alluvial fans, and in gravelly to rocky soils on upper bajadas and hillsides (AGFD 2001d).

2.1.2.2 Current Threats

Populations of PPC are declining across its range (USFWS 2017). Nearly 38 percent of suitable habitat has been developed or adversely modified, and only a small proportion of the range is on federal land that affords PPC any protection (USFWS 1993, 2017). Threats include overgrazing, exotic grass encroachment, catastrophic fire, illegal collecting, and habitat loss and fragmentation from urbanization, development, and mining (USFWS 1993, 2017).

2.1.2.3 Potential to Occur

The Airport is at the northern fringe of the Pima pineapple cactus range, and 82 cactus individuals have been documented in the Detailed Study Area as shown on **Exhibit 4**.

Exhibit 4. Pima pineapple cactus
Photo courtesy Harris Environmental, 2017

A habitat model identified most of the Detailed Study Area as low value habitat; however, most consisted of medium value habitat (SDCP 2000). Surveys for Pima pineapple cactus based on methods described by Roller (1996) were conducted throughout this area by qualified biologists in the spring and summer of 2017. In summary, the survey protocol entailed three general parts:

1. Surveying in general short distance transects with repeated coverage or passages,
2. Performing local area searches associated with all surveyed individuals, and
3. Intensive searches within 50 square meters for random sample of individuals.

82 PPC were found in the Detailed Study Area as shown on **Exhibits 5**. 70 were found near the southeast terminus of Runway 11R/29L during the pedestrian surveys in spring and summer of 2017. 12 were found in Parcel "G and Parcel "H". No known PPC occur in the in the vicinity of the B-Mags on AFP-44 where the replacement earth-covered magazines will be built. **Appendix B** contains the specific location information of each PPC documented during protocol surveys.

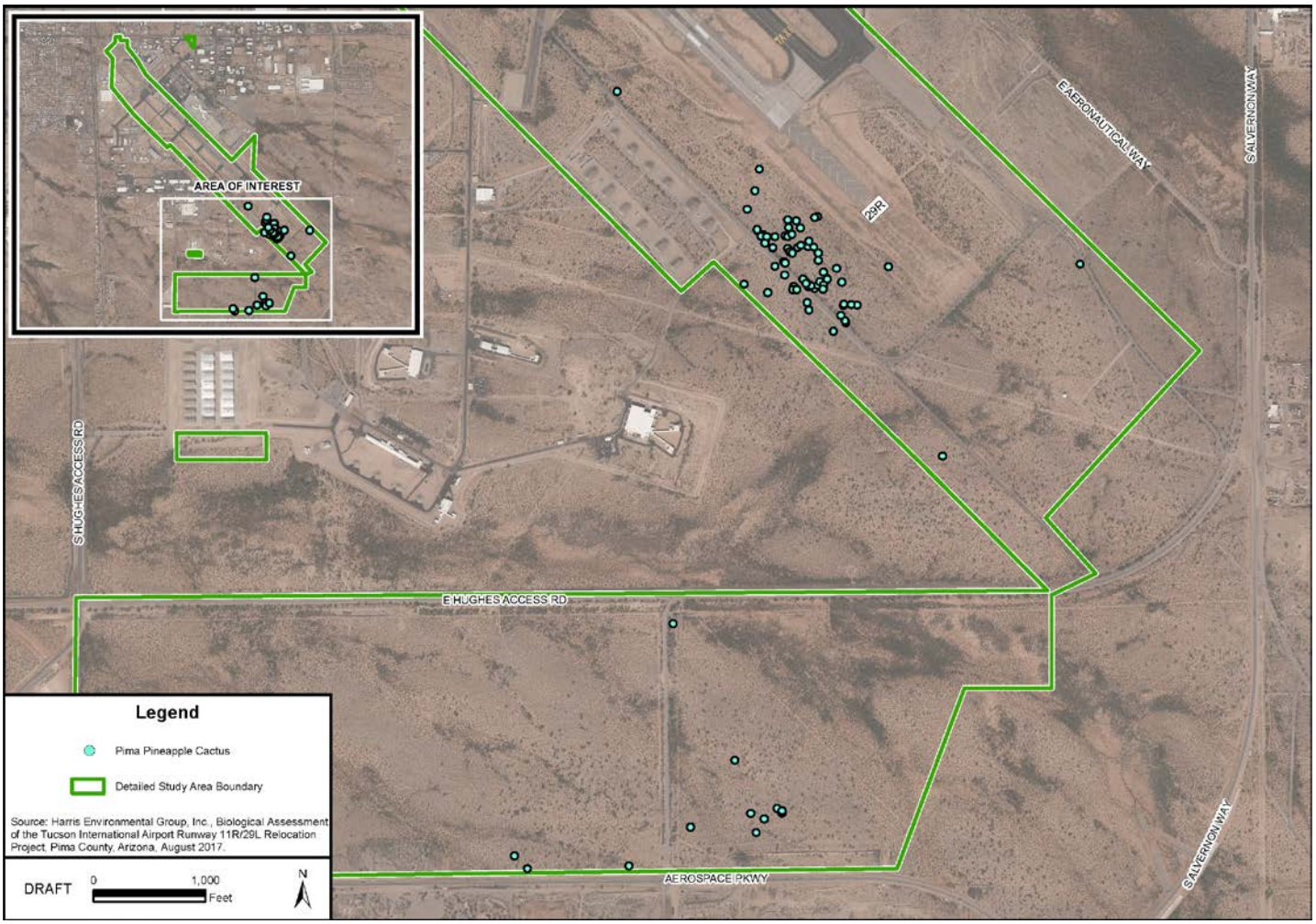


Exhibit 5. Distribution of Pima pineapple cactus in the Detailed Study Area

3. MIGRATORY TREATY BIRD ACT SPECIES PRESENT

3.1 MBTA-LISTED SPECIES

The following does not represent the complete listing of MBTA species potentially affected by the Propose Action. The following species was included in this BA specifically at the request of the USFWS.

3.1.1 WESTERN BURROWING OWL (ATHENE CUNICULARIA HYPUGAEA)

3.1.1.1 Status, Natural History, and Distribution

Although not a federally listed species, the western burrowing owl is protected under the MBTA and is listed as a *Species of Concern* by the USFWS and *PVS* by Pima County (RECON 2006). Threats to burrowing owls in Pima County include mortality from collisions with vehicles, direct and indirect poisoning from rodenticides, habitat loss through development of agricultural and rural areas, reduction in burrow availability resulting from decreased rodent populations, landscape maintenance, encroachment of open areas by invasive shrubs, and increased predation exposure from feral cats and dogs (AGFD 2001c; SDCP 2001)

The western burrowing owl is distributed throughout Arizona at elevations ranging from 650 to 6,140 ft amsl (AGFD 2001c). Populations in extreme northeast Arizona are probably migratory and the remaining populations are resident (deVos 1998). The western burrowing owl is gregarious and is associated with rodent populations that are an important prey item. This owl usually enlarges the burrows made by reptiles and mammals. Desert habitats in southern Arizona include open creosote-saltbush- bursage and grassland habitats that often have been grazed or are adjacent to agricultural fields. This owl is commonly found around canal banks (AGFD 2001c; deVos 1998; Davis and Russell 1990; Monson and Philips 1981; Philips et al. 1964), while nesting has been documented in culverts.

3.1.1.2 Potential to Occur

Suitable habitat exists in the Detailed Study Area for the western burrowing owl. The majority of known burrows in the Tucson area occur in undeveloped sites from which native vegetation was removed (SDCP 2001). The Detailed Study Area includes a large area of such habitats. No western burrowing owls were directly observed at the pedestrian survey conducted in the spring and summer of 2017. However, at the request of the USFWS an additional pedestrian survey was conducted in November 2017. At that time one western burrowing owl was observed and documented in the Detailed Study Area as shown on **Exhibit 6**.

Exhibit 6. Western burrowing owl observed in Detailed Study Area
Photo courtesy: Harris Environmental, 2017

4. DETERMINATION OF EFFECTS

4.1 DETERMINATION OF EFFECTS

This BA is intended to support formal consultation between the FAA and the USFWS as required by 50 C.F.R. § 402.14(c) and Section 7 of the ESA regarding the likelihood of an adverse effect ("take") of any listed species with implementation of the Proposed Action. The determination of effects were prepared by qualified biologists who visited the Detailed Study Area and action area in the spring and summer of 2017 and again in November 2017.

Habitat information gathered for each sensitive species included life requisites, associations with vegetation and substrate, elevational range, and known geographic range and distribution. Determinations were based on: direct field observations, the best professional judgment of the qualified biologists conducting site visits, reliable records, and available literature. Special attention was given documenting all Pima pineapple cactus, and determining the potential for occurrence of lesser long-nosed bat.

4.1.1 LESSER LONG-NOSED BAT (LEPTONYCTERIS CURASOAE YERBABUENAE)

The Detailed Study Area does not contain quality day-roosting and only small amounts of foraging habitat. Therefore, the Proposed Action "***may affect, but is not likely to adversely affect***" the lesser long-nosed bat. Furthermore, as this species is nocturnal, construction activities would occur outside the activity window for this species.

4.1.1.1 Mitigation Measures

The following mitigation measure should be implemented to minimize the impact to the lesser long-nosed bat species:

- Grading activities at night should be suspended from 15 April to 15 September to the extent practicable to avoid impacts to potential foraging lesser long-nosed bats. However, recent monitoring of this species determined that migrants remain within the Tucson Basin into late October (Lowery et al. 2009). Thus, suspension window for construction activities for this species should be confirmed with USFWS.
- Protect in place, salvage and transplant, or replace any saguaros from the project area.

4.1.2 PIMA PINEAPPLE CACTUS (CORYPHANTHA SCHEERI VAR. ROBUSTISPINA)

Potential project effects are expected to include direct disturbance to PPC individuals, habitat loss, and disturbance of suitable habitat through vegetation removal, grading, and construction activities. Due to FAA requirements, the Runway Safety Area (RSA) and Object Free Area (OFA) must be cleared and graded to accommodate the occasional passage of an airplane without damage to the airplane. In addition to the OFA and RSA, the FAA requires a Runway Protection Zone (RPZ). The RPZ does not have to be cleared and graded. However, the Proposed Action includes proposed pavement for an overrun area beyond the runway. Therefore, a portion of the RPZ must be cleared and graded. PPC that are located directed in these safety areas would be affected by the Proposed Action.

In addition to PPC being affected by clearing and grading for FAA required safety areas, PPC that are located immediately next to or in areas where construction vehicles may traverse or in an area proposed to be used for construction staging activities would be affected.

Exhibit 7 and **Exhibit 8** show PPC individuals that would be affected due to the Proposed Action. Therefore, the Proposed Action "***may affect, and is likely to adversely affect"***, the Pima pineapple cactus.

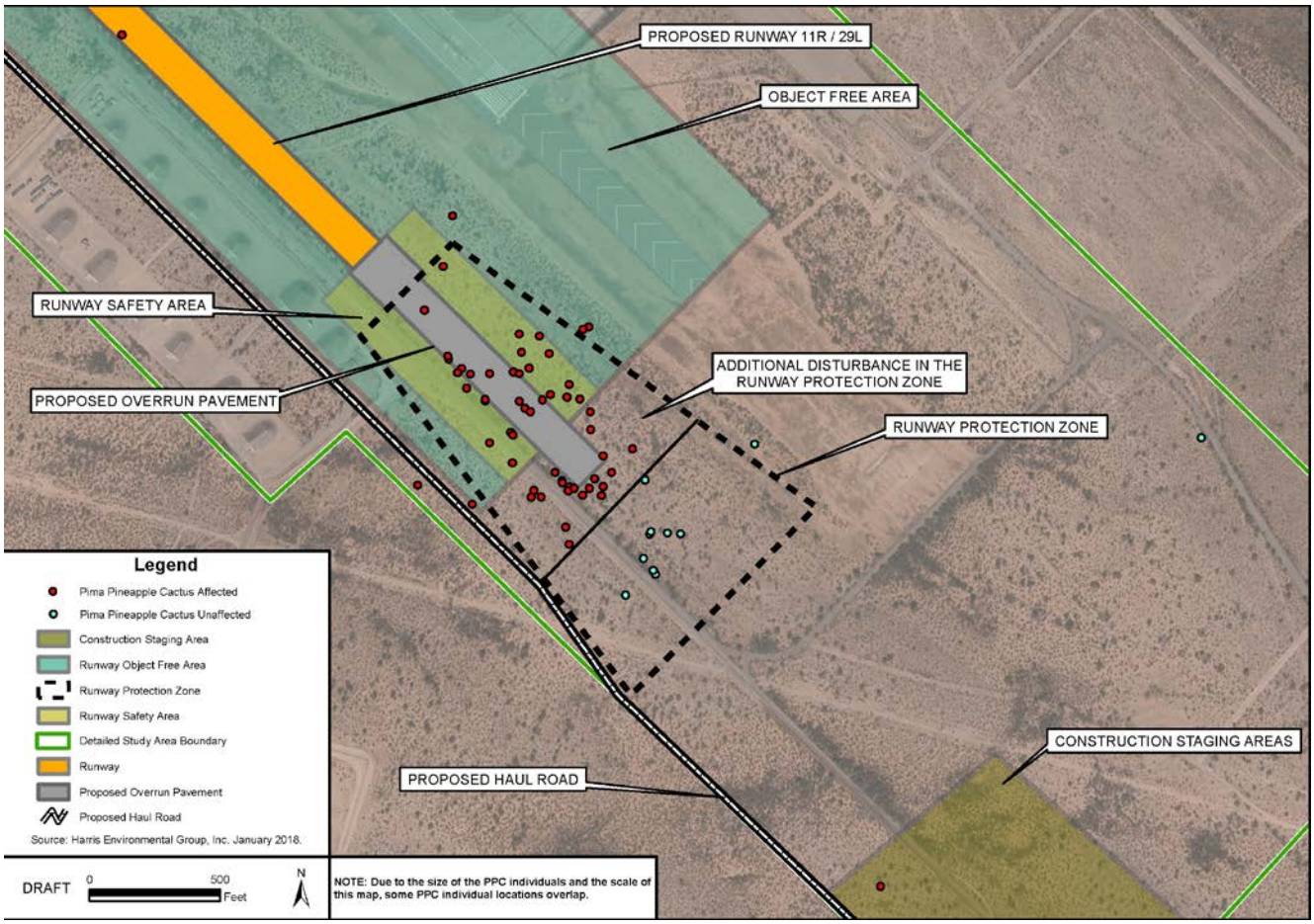


Exhibit 7. Pima pineapple cactus Affected by the Proposed Action

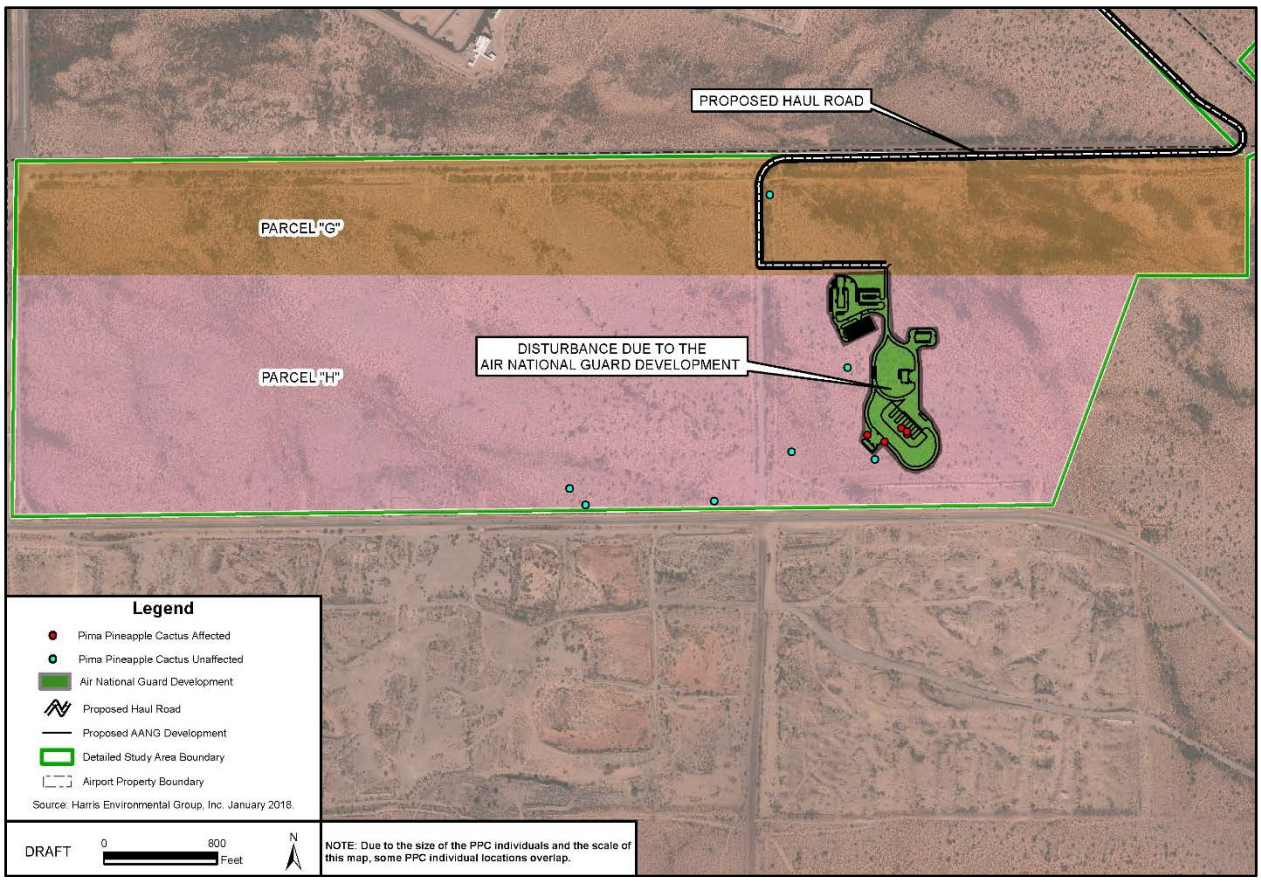


Exhibit 8. Pima pineapple cactus Affected by the Proposed Action

4.1.2.1 Mitigation Measures

Avoidance

Of the 82 PPC individuals within the Detailed Study Area, 11 PPC individuals could be avoided in the airfield area and seven could be avoided in Parcel "G" and Parcel "H". Therefore, 18 total PPC would be avoided. **Exhibits 7 and 8** show the PPC individuals to be avoided and those that would be affected by the Proposed Action. During the construction process, all PPC in the Detailed Study Area that can be avoided near the project limits would be marked and protected from traffic and equipment. Bright PPC markers (e.g., orange construction fence), and education and coordination with all construction workers would prevent direct impacts to those existing PPC that do not have to be directly affected by construction activities.

Mitigation Banking

A fundamental component of the PPC recovery strategy is to preserve and restore quality habitat to protect individuals and their seedbanks. Mitigation bank credits would be purchased to compensate for the loss of PPC habitat at a 1:1 ratio of area of modified habitat. Approximately 11 acres of PPC habitat would be removed in the airfield area. An additional 13 acres would be affected by the proposed Air National Guard development on Parcel "G" and "Parcel "H". Therefore, 24 acres as shown on **Exhibit 9** would be affected by the Proposed Action. Mitigation credits would be purchased for this amount from the Palo Alto PPC Conservation Bank.

Transplant and Monitoring

59 PPC individual would be affected in the airfield are due to clearing, grading, and paving for the proposed new runway and FAA required safety areas including the RSA, OFA, and RPZ. This also includes PPC affected by construction vehicles that may traverse the area and by the location of the proposed construction staging area. An additional five PPC individual would be affected by the proposed Air National Guard development on Parcel "G" and "Parcel "H". Therefore, a total of 64 individual PPC could be affected directly. A transplanting and monitoring program would be implemented, to remove, salvage, and restore those 64 individual PPC.

PPC removal, salvage, and restoration would follow the ANPL and Pima County Native Plant Preservation ordinance (Pima County Code §18.72) to salvage PPC specimens. PPC would be transplanted according to the guidelines that were used during the relocation of PPC individuals removed during the construction of the East Hughes Access Road Relocation Project (SWCA 2015).

The only exception for this Proposed Action would be that all PPC would be transplanted onto existing Airport property that is restricted from access by the general public so the PPC will not be stolen. **Exhibit 10** shows the location of the potential PPC transplant area which encompass approximately 11 acres primarily in the unaffected RPZ area.

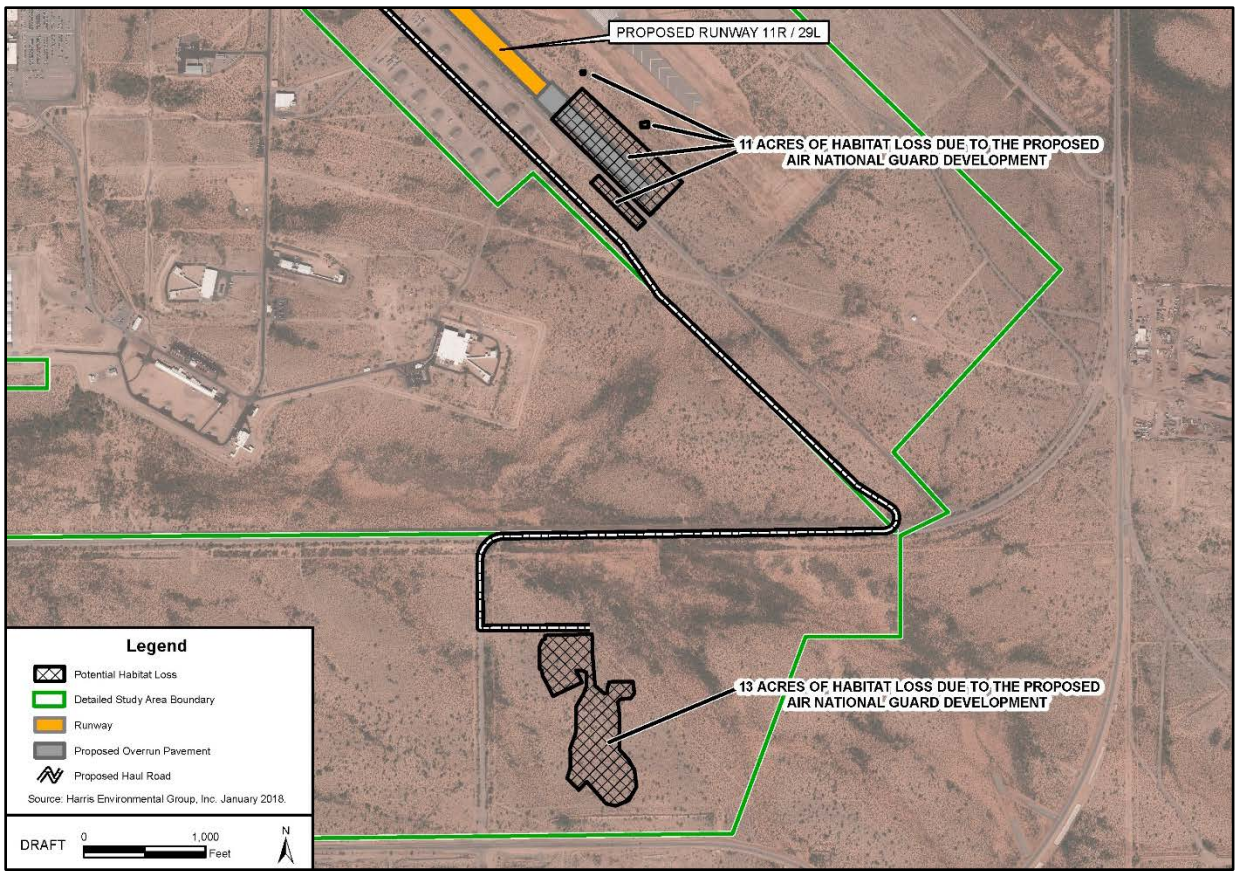


Exhibit 9. Pima pineapple cactus Habitat Loss

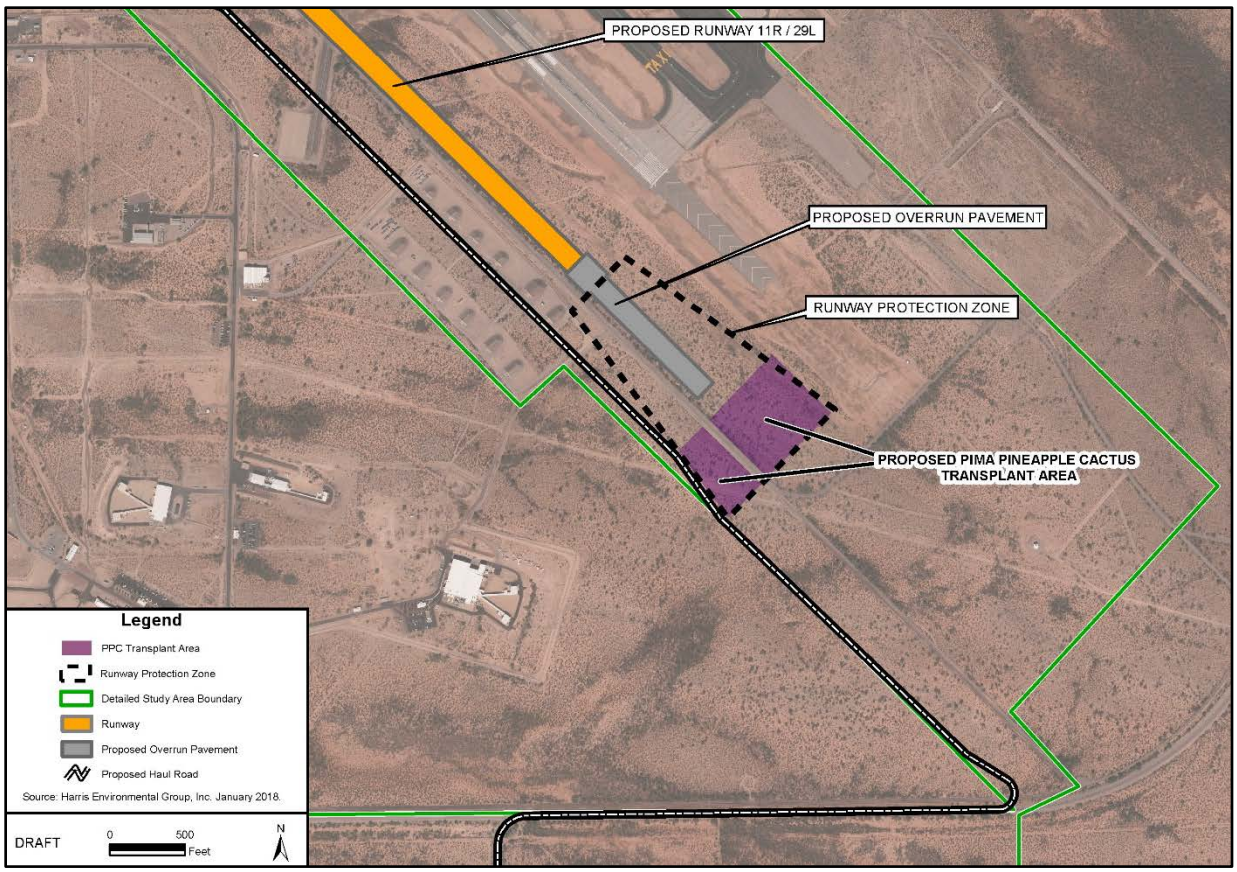


Exhibit 10. Pima pineapple cactus Proposed Transplant Area

Active salvage of PPC would occur after project design has been completed to ensure that all affected PPC are identified. Transplanting would occur before clearing and grubbing activities in that area would begin.

- Move the PPC between March and April. Planting pits shall be pre-dug prior to any salvage operations and equal to the root ball width and depth.
- Backfill planting pit with a six inch layer of soil. Use soil from where the plant was originally growing if possible. Compact to 95% to remove all air pockets.
- Screen backfill soil before backfilling the plant pit. The intent of screening backfill is to eliminate soil clods or chunks that can create air pockets.
- Clearly mark the solar orientation of each cactus prior to salvaging operations. Cacti shall be replanted with a solar orientation that matches original solar orientation.
- Salvage cacti so that no or minimal damage occurs to the basal and lateral roots. Root balls should be dug on a case-by-case basis for each plant based on professional judgment, but usually the minimum being 12 inches wide (six inches from each edge of plant).
- Use pruning clippers to trim any roots damaged during the transplant process.
- Plant each cactus at the same planting depth that it was originally grown.
- Create a small mound around the base of the cacti after planting, backfilling and compaction of the plant pit.
- Replant each cactus at the designated transplant area immediately after it is removed from the original site. Do not harden off the roots and do not add sulfur in the planting hole or on the roots.
- Take notes of each PPC before starting a transplant. Observe and take notes of the environment and nearest plant neighbors for future reporting and monitoring efforts.
- Replant PPC away from any tree canopies, large shrubs, dense stands of perennial grasses or non-native grasses, steep slopes or wash bottoms, and not within 15 feet of a saguaro unless the PPC was under or on the edge of similar canopy, grassland, or steep slopes in its original location.
- Provide all transplanted PPC with gel water irrigation supplement time-release containers per manufacturer's instructions at the time of transplant and for a minimum of one year after transplant.
- Provide GPS locations and a location map of the transplanted cacti for future monitoring efforts.
- Topsoil from disturbed areas should be stockpiled and replaced to the extent practicable during restoration to retain the potential seed bank.

TAA should record data on the PPC for a period of five years following the transplant. Monitoring of the individual transplanted PPC should be conducted to document positive and negative changes in the PPC from year to year will inform future efforts to transplant this species and ultimately benefit PPC recover. TAA will provide this data to FAA and to USFWS.

USAF, and the Airport are conservation stewards of PPC. PPC surveys and monitoring are conducted every five years on AFP 44 and all PPC individuals are marked. Furthermore, at least one area containing a dense cluster of PPC is enclosed by protective fencing on AFP 44. These conservation stewardship activities should and will likely continue in perpetuity.

4.1.3 WESTERN BURROWING OWL (ATHENE CUNICULARIA HYPUGAEA)

Although not a federally listed species, the western burrowing owl is protected under the MBTA and is listed as a *Species of Concern* by the USFWS and *PVS* by Pima County (RECON 2006). This species was included in this BA specifically at the request of the USFWS.

4.1.3.1 Mitigation Measures

Since a western burrowing owl was located within the Detailed Study Area an additional survey for burrowing owls would be conducted prior to the immediate start of construction activities, generally within 30 days of the start. If any western burrowing owls are found, the AGFD and USFWS would be consulted to determine the appropriate action to remove any burrowing owls from the Detailed Study Area before construction.

Any owls that are found would not be disturbed without AGFD and USFWS consultation as it may violate the MBTA and AGFD guidelines. Mitigation may include flushing owls prior to grading, removal of western burrowing owl from the project site, and/or deferment of grading until artificial burrows can be constructed. Western burrowing owl removal and artificial burrow construction can be facilitated through Wild at Heart, the Burrowing Owl Project, and Partners in Flight. Assuming conservation measures are implemented, direct and indirect project effects are unlikely to reduce the viability of the local western burrowing owl population.

4.2 CUMULATIVE EFFECTS

Cumulative effects are effects of future state, tribal, local, or private activities that are reasonably certain to occur within the Detailed Study Area[2]. Federal actions that are unrelated to the Proposed Action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA. Federal lands adjacent to the detailed study area include those owned by the USAF and TAA-owned lands that are obligated to the FAA; therefore, any present or future activities on these lands that could affect ESA species would require separate consultation.

[2] See Section 1.3 above for definition of the Detailed Study Area as the Action Area required by 50 CFR § 402.02

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APPENDIX A – SOILS

The detailed study area is chiefly comprised of three soil units that are predominantly sandy loams. These units combined, occur throughout 95 percent of the detailed study area and include Cave soils and Urban land, Sahuarita and Mohave soils, and Urban land and Yaqui soils.

Cave soils and Urban land

The Cave soils and Urban land unit occurs on gently sloping (zero to eight percent) fan terraces. Urban land contains soils so modified or obscured that they are difficult to identify. Most of the Urban land is in the City of Tucson, but generally the underlying soils have characteristics of Cave soils.

Cave soils are formed in mixed alluvium, are well-drained, calcareous throughout, and are shallow to a lime-cemented hardpan. The surface layer is typically light brown gravelly fine sandy loam about four inches thick over a three-inch layer of pinkish white gravelly fine sandy loam. A white indurated lime hardpan layer (caliche) occurs at seven inches and ranges from four to 20 inches thick. The effective rooting depth is four to 20 inches. Cave soils are moderately permeable, have low available water capacity, medium to rapid runoff, a slight hazard of water erosion, and a slight hazard of wind erosion (Cochran and Richardson 2003).

Sahuarita soils, Mohave soils, and Urban land

The Sahuarita soils, Mohave soils, and Urban land unit occurs on gently sloping (one to five percent) fan terraces. Urban land contains soils that are difficult to impossible to identify, but generally have characteristics of the Sahuarita and Mohave soils.

Sahuarita soils are formed in mixed alluvium and are very deep, well-drained, and are calcareous throughout. The surface layer is typically covered by 35 to 55 percent gravel, and is light yellowish brown very gravelly fine sandy loam about three inches thick. In some areas, the surface layer is fine sandy loam. The next layer is a buried subsoil of brown loam 17 inches thick over brown, very gravelly sandy clay loam 15 or more inches thick with fine lime filaments. The subsoil depth ranges from 20 to 40 inches. Sahuarita soils have an effective rooting depth of 60 inches or more, and are moderately permeable in the upper part and moderately slow in the lower part of the profile. Sahuarita soils have a moderate available water capacity, a slight hazard of water erosion, and a very slight hazard of wind erosion. Runoff is generally slow to medium, but is rapid in rills and the few deep gullies (Cochran and Richardson 2003).

Mohave soil is formed in mixed alluvium and is very deep and well-drained. The surface layer is yellowish brown loam about three inches thick. In some areas the surface layer is gravelly sandy loam. The upper five inches of the subsoil is brown sandy clay loam, the next 13 inches is brown and light brown clay loam, and the lower 16 inches is reddish brown, light reddish brown, and pink sandy clay loam and clay loam. The substratum occurs at 60 inches or more and is light reddish brown and white loam. In some areas, the soils are effervescent to the surface. Many soft lime masses occur in the lower part of the subsoil and substratum. Mohave soil has an effective rooting depth to at least 60 inches, slow to medium runoff, moderately slow permeability, high

available water capacity, a slight to moderate hazard of water erosion, and a moderate hazard of wind erosion (Cochran and Richardson 2003).

Yaqui fine sandy loam

Yaqui fine sandy loam is formed in mixed alluvium and occurs on gently sloping (one to three percent) alluvial fans. Yaqui soils are very deep, well-drained, and calcareous throughout. Typically, the surface layer is strong brown fine sandy loam about four inches thick. In some areas, the surface layer is loam or very fine sandy loam. The subsoil is brown to dark brown sandy clay loam 27 inches thick. The next layer is buried subsoil of yellowish red clay loam over pink gravelly loam to 60 inches or more with fine lime filaments. Yaqui fine sandy loam has an effective rooting depth to 60 inches or more, a high available water capacity, and is moderately permeable to 31 inches and moderately slow below 31 inches. There is a slight hazard of water erosion and a moderately high hazard of wind erosion. Runoff is generally slow except where concentrated in shallow rills and gullies. Yaqui soils are subject to rare, brief flooding during prolonged, high- intensity storms. Channeling and deposition is common along stream banks, and shallow rills occur in some areas where deposition of soil around vegetation occurs (Cochran and Richardson 2003).

APPENDIX B – LOCATIONS OF PPC DOCUMENTED DURING 2017 PROTOCOL SURVEYS

PPC	LOCATION	EASTING UTM NAD 83	NORTHING UTM NAD
1	TUS	507369	3551364
2	TUS	507225	3551413
3	TUS	507473	3551241
4	TUS	507443	3551194
5	TUS	507276	3551361
6	TUS	507342	3551402
7	TUS	507310	3551473
8	TUS	507204	3551447
9	TUS	507203	3551451
10	TUS	507219	3551436
11	TUS	507214	3551431
12	TUS	507230	3551430
13	TUS	507252	3551430
14	TUS	507280	3551432
15	TUS	507287	3551429
16	TUS	507289	3551455
17	TUS	507298	3551436
18	TUS	507321	3551453
19	TUS	507286	3551398
20	TUS	507293	3551389
21	TUS	507299	3551385
22	TUS	507313	3551399
23	TUS	507322	3551405
24	TUS	507357	3551400
25	TUS	507335	3551304
26	TUS	507349	3551296
27	TUS	507359	3551287
28	TUS	507367	3551296
29	TUS	507373	3551306
30	TUS	507393	3551314
31	TUS	507383	3551333
32	TUS	507383	3551297
33	TUS	507437	3551241
34	TUS	507438	3551244

PPC	Location	Easting UTM NAD 83	Northing UTM NAD
35	TUS	507344	3551417
36	TUS	507287	3551476
37	TUS	507368	3551484
38	TUS	507361	3551481
39	TUS	507560	3551345
40	TUS	507457	3551242
41	TUS	507432	3551305
42	TUS	507418	3551341
43	TUS	507369	3551384
44	TUS	507246	3551398
45	TUS	507327	3551314
46	TUS	507343	3551297
47	TUS	506827	3551829
48	TUS	507177	3551505
49	TUS	507199	3551555
50	TUS	507210	3551614
51	AFP 44	507702	3550828
52	AFP 44	507408	3551171
53	AFP 44	507343	3551230
54	AFP 44	507339	3551250
55	AFP 44	507302	3551293
56	AFP 44	507299	3551286
57	AFP 44	507311	3551286
58	AFP 44	507252	3551349
59	AFP 44	507230	3551278
60	AFP 44	507167	3551301
61	AFP 44	507278	3551325
62	Pima Co. Parcels	506966	3550379
63	Pima Co. Parcels	507130	3550005
64	Pima Co. Parcels	507245	3549874
65	Pima Co. Parcels	507258	3549861
66	Pima Co. Parcels	507209	3549845
67	Pima Co. Parcels	507172	3549860

PPC	Location	Easting UTM NAD 83	Northing UTM NAD
68	Pima Co. Parcels	507187	3549808
69	Pima Co. Parcels	507257	3549867
70	Pima Co. Parcels	507009	3549825
71	Pima Co. Parcels	506841	3549721
72	Pima Co. Parcels	506564	3549715
73	Pima Co. Parcels	506530	3549751
74	TUS	508081	3551348
75	TUS	507441	3551199
76	TUS	507429	3551213
77	TUS	507381	3551286
78	TUS	507342	3551293
79	TUS	507349	3551295
80	TUS	507336	3551302
81	TUS	507278	3551358
82	TUS	507246	3551400
83	TUS	508468	3550538

APPENDIX C – FEDERALLY PROPOSED, CANDIDATE, THREATENED, AND ENDANGERED SPECIES IN DETAILED STUDY AREA USFWS INFORMATION, PLANNING, AND CONSERVATION SYSTEM; AGFD HERITAGE DATA MANAGEMENT SYSTEM

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arizona Ecological Services Field Office
9828 North 31st Ave
#c3
Phoenix, AZ 85051-2517
Phone: (602) 242-0210 Fax: (602) 242-2513
http://www.fws.gov/southwest/es/arizona/
http://www.fws.gov/southwest/es/EndangeredSpecies_Main.html

In Reply Refer To:
Consultation Code: 02EAAZ00-2018-SLI-0279
Event Code: 02EAAZ00-2018-E-00640
Project Name: TIA Runway Expansion

January 10, 2018

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The Fish and Wildlife Service (Service) is providing this list under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). The list you have generated identifies threatened, endangered, proposed, and candidate species, and designated and proposed critical habitat, that may occur within one or more delineated United States Geological Survey 7.5 minute quadrangles with which your project polygon intersects. Each quadrangle covers, at minimum, 49 square miles. In some cases, a species does not currently occur within a quadrangle but occurs nearby and could be affected by a project. Please refer to the species information links found at:
http://www.fws.gov/southwest/es/arizona/Docs_Species.htm
http://www.fws.gov/southwest/es/arizona/Documents/MiscDocs/AZSpeciesReference.pdf .

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to consult with us if their projects may affect federally listed species and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, we recommend preparing a biological evaluation similar to a Biological Assessment to determine whether the project may

affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If the Federal action agency determines that listed species or critical habitat may be affected by a federally funded, permitted or authorized activity, the agency must consult with us pursuant to 50 CFR 402. Note that a "may affect" determination includes effects that may not be adverse and that may be beneficial, insignificant, or discountable. You should request consultation with us even if only one individual or habitat segment may be affected. The effects analysis should include the entire action area, which often extends well outside the project boundary or "footprint." For example, projects that involve streams and river systems should consider downstream effects. If the Federal action agency determines that the action may jeopardize a proposed species or adversely modify proposed critical habitat, the agency must enter into a section 7 conference. The agency may choose to confer with us on an action that may affect proposed species or critical habitat.
Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend considering them in the planning process in the event they become proposed or listed prior to project completion. More information on the regulations (50 CFR 402) and procedures for section 7 consultation, including the role of permit or license applicants, can be found in our Endangered Species Consultation Handbook at:
http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF.

We also advise you to consider species protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668 et seq.). The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when authorized by the Service. The Eagle Act prohibits anyone, without a permit, from taking (including disturbing) eagles, and their parts, nests, or eggs. Currently 1026 species of birds are protected by the MBTA, including species such as the western burrowing owl (Athene cunicularia hypugea). Protected western burrowing owls are often found in urban areas and may use their nest/burrows year-round; destruction of the burrow may result in the unpermitted take of the owl or their eggs.

If a bald eagle (or golden eagle) nest occurs in or near the proposed project area, you should evaluate your project to determine whether it is likely to disturb or harm eagles. The National Bald Eagle Management Guidelines provide recommendations to minimize potential project impacts to bald eagles:
https://www.fws.gov/migratorybirds/pdf/management/
nationalbaldeaglenanagementguidelines.pdf
https://www.fws.gov/birds/management/managed-species/eagle-management.php.

The Division of Migratory Birds (505/248-7882) administers and issues permits under the MBTA and Eagle Act, while our office can provide guidance and Technical Assistance. For more information regarding the MBTA, BGEPA, and permitting processes, please visit the following: https://www.fws.gov/birds/policies-and-regulations/incidental-take.php. Guidance for minimizing impacts to migratory birds for communication tower projects (e.g. cellular, digital

television, radio, and emergency broadcast) can be found at: https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/collisions/communication-towers.php.

Activities that involve streams (including intermittent streams) and/or wetlands are regulated by the U.S. Army Corps of Engineers (Corps). We recommend that you contact the Corps to determine their interest in proposed projects in these areas. For activities within a National Wildlife Refuge, we recommend that you contact refuge staff for specific information about refuge resources.
If your action is on tribal land or has implications for off-reservation tribal interests, we encourage you to contact the tribe(s) and the Bureau of Indian Affairs (BIA) to discuss potential tribal concerns, and to invite any affected tribe and the BIA to participate in the section 7 consultation. In keeping with our tribal trust responsibility, we will notify tribes that may be affected by proposed actions when section 7 consultation is initiated.

We also recommend you seek additional information and coordinate your project with the Arizona Game and Fish Department. Information on known species detections, special status species, and Arizona species of greatest conservation need, such as the western burrowing owl and the Sonoran desert tortoise (Gopherus morafkai) can be found by using their Online Environmental Review Tool, administered through the Heritage Data Management System and Project Evaluation Program https://www.azgfd.com/Wildlife/HeritageFund/.

For additional communications regarding this project, please refer to the consultation Tracking Number in the header of this letter. We appreciate your concern for threatened and endangered species. If we may be of further assistance, please contact our following offices for projects in these areas:

Northern Arizona: Flagstaff Office 928/556-2001
Central Arizona: Phoenix office 602/242-0210
Southern Arizona: Tucson Office 520/670-6144

Sincerely,
/s/ Steven L. Spangle Field Supervisor

Attachment

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arizona Ecological Services Field Office
9828 North 31st Ave
#c3
Phoenix, AZ 85051-2517
(602) 242-0210

Project Summary

Consultation Code: 02EAAZ00-2018-SLI-0279

Event Code: 02EAAZ00-2018-E-00640

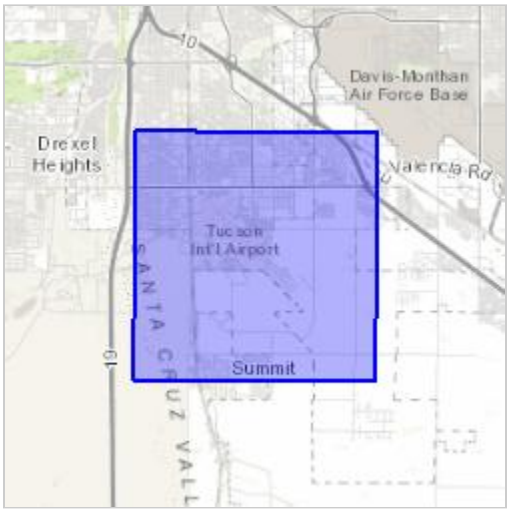
Project Name: TIA Runway Expansion

Project Type: TRANSPORTATION

Project Description: TIA Runway Expansion

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/32.109984527588985N110.9337741861022W



Counties: Pima, AZ

Endangered Species Act Species

There is a total of 7 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
Jaguar *Panthera onca* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3944	Endangered
Lesser Long-nosed Bat *Leptonycteris curasoae yerbabuenae* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3245	Endangered

Birds

NAME	STATUS
California Least Tern *Sterna antillarum browni* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Northern Mexican Gartersnake *Thamnophis eques megalops* There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7655	Threatened
Sonoyta Mud Turtle *Kinosternon sonoriense longifemorale* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7276	Endangered

Flowering Plants

NAME	STATUS
Pima Pineapple Cactus *Coryphantha scheeri var. robustispina*	Endangered

No critical habitat has been designated for this species.

Species profile: https://ecos.fws.gov/ecp/species/4919

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Arizona Environmental Online Review Tool Report

Arizona Game and Fish Department Mission
To conserve Arizona's diverse wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations.

Project Name:
TIA Runway Expansion

Project Description:
Runway Expansion

Project Type:
Transportation & Infrastructure, Airports, Construction of new runways, terminals/concourses, other facilities

Contact Person:
Scott Blackman

Organization:
Harris Environmental Group

On Behalf Of:
OTHER_FED

Project ID:
HGIS-06608

Please review the entire report for project type and/or species recommendations for the location information entered. Please retain a copy for future reference.

Disclaimer:

1. This Environmental Review is based on the project study area that was entered. The report must be updated if the project study area, location, or the type of project changes.
2. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area. This review is also not intended to replace environmental consultation (including federal consultation under the Endangered Species Act), land use permitting, or the Departments review of site-specific projects.
3. The Departments Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. HDMS data contains information about species occurrences that have actually been reported to the Department. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented population of species of special concern.
4. HabiMap Arizona data, specifically Species of Greatest Conservation Need (SGCN) under our State Wildlife Action Plan (SWAP) and Species of Economic and Recreational Importance (SERI), represent potential species distribution models for the State of Arizona which are subject to ongoing change, modification and refinement. The status of a wildlife resource can change quickly, and the availability of new data will necessitate a refined assessment.

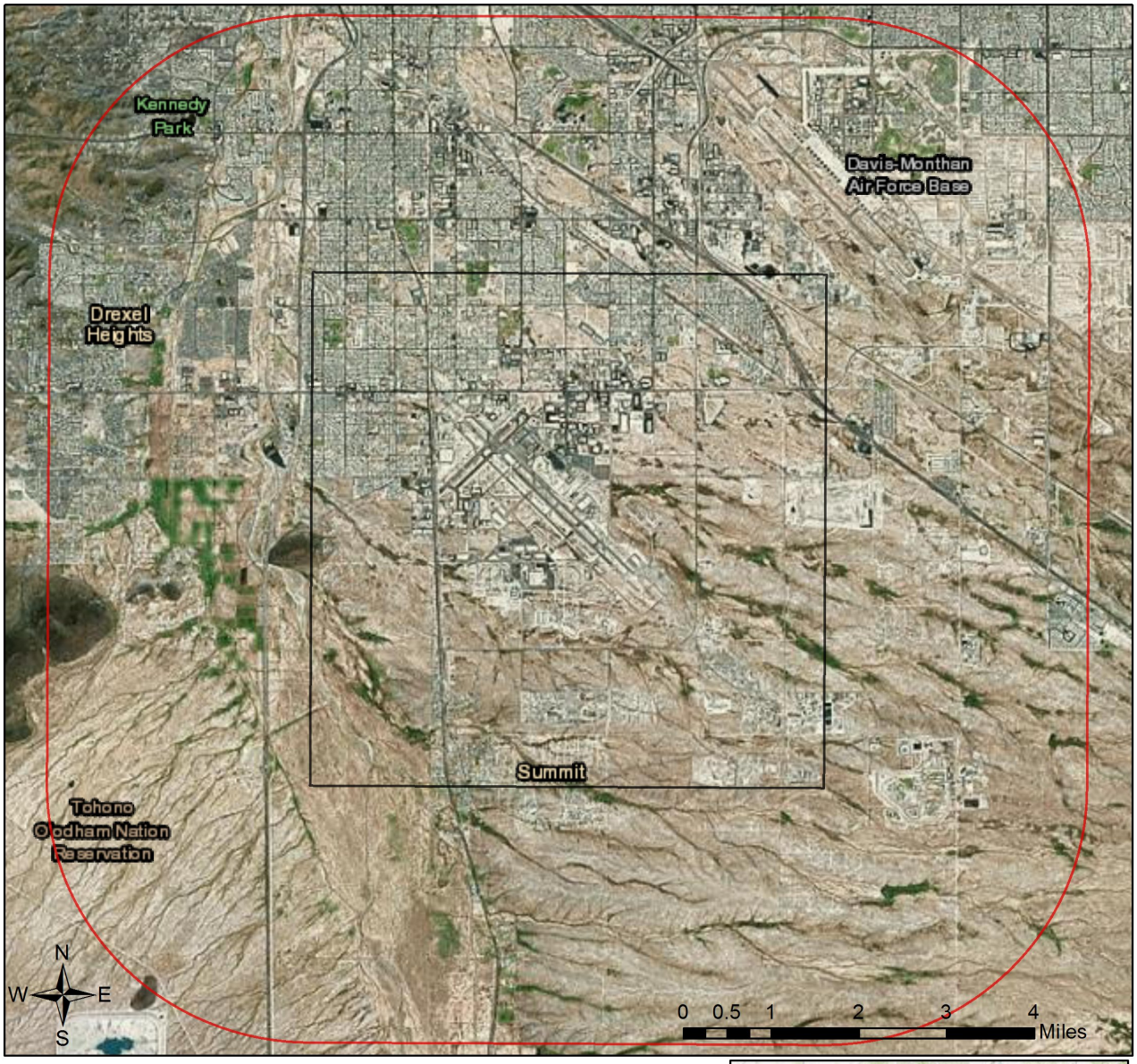
Locations Accuracy Disclaimer:
Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Report is solely responsible for the project location and thus the correctness of the Project Review Report content.

Recommendations Disclaimer:

1. The Department is interested in the conservation of all fish and wildlife resources, including those species listed in this report and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.
2. Recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation).
3. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project. These recommendations are preliminary in scope, designed to provide early considerations on all species of wildlife.
4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.
5. Further coordination with the Department requires the submittal of this Environmental Review Report with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(s) are to be accomplished, and project locality information (including site map). Once AGFD had received the information, please allow 30 days for completion of project reviews. Send requests to:
   Project Evaluation Program, Habitat Branch
   Arizona Game and Fish Department
   5000 West Carefree Highway
   Phoenix, Arizona 85086-5000
   Phone Number: (623) 236-7600
   Fax Number: (623) 236-7366
   Or
   PEP@azgfd.gov
6. Coordination may also be necessary under the National Environmental Policy Act (NEPA) and/or Endangered Species Act (ESA). Site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies

TIA Runway Expansion

Aerial Image Basemap With Locator Map



Project Boundary

Buffered Project Boundary

Project Size (acres): 22,492.28

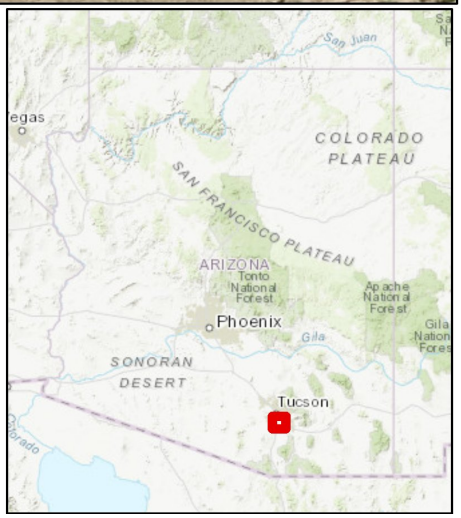
Lat/Long (DD): 32.1100 / -110.9338

County(s): Pima

AGFD Region(s): Tucson

Township/Range(s): T15S, R13E; T15S, R14E; T16S, R13E +

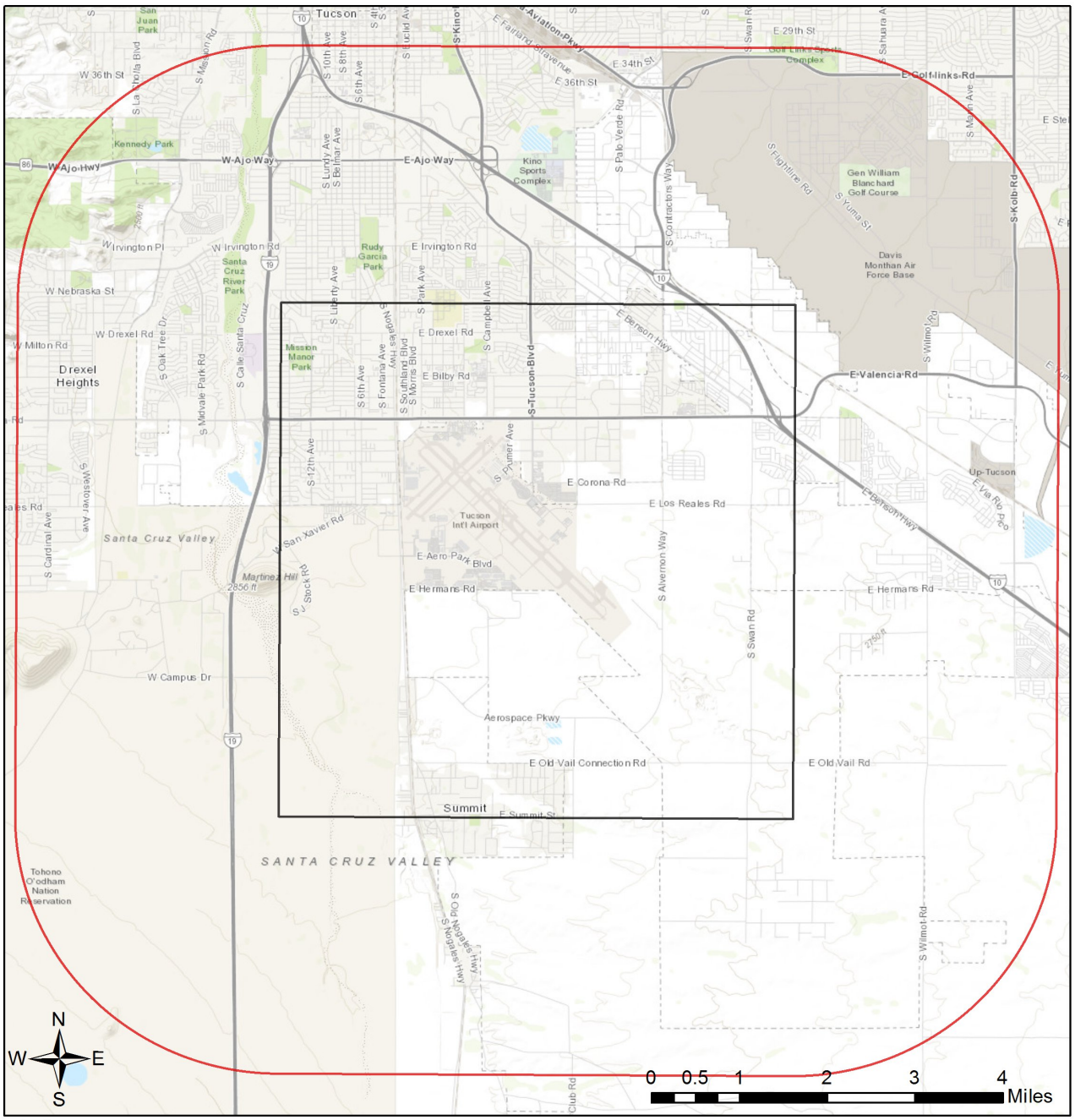
USGS Quad(s): TUCSON; TUCSON SW



Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo,

TIA Runway Expansion

Web Map As Submitted By User



Project Boundary

Buffered Project Boundary

Project Size (acres): 22,492.28

Lat/Long (DD): 32.1100 / -110.9338

County(s): Pima

AGFD Region(s): Tucson

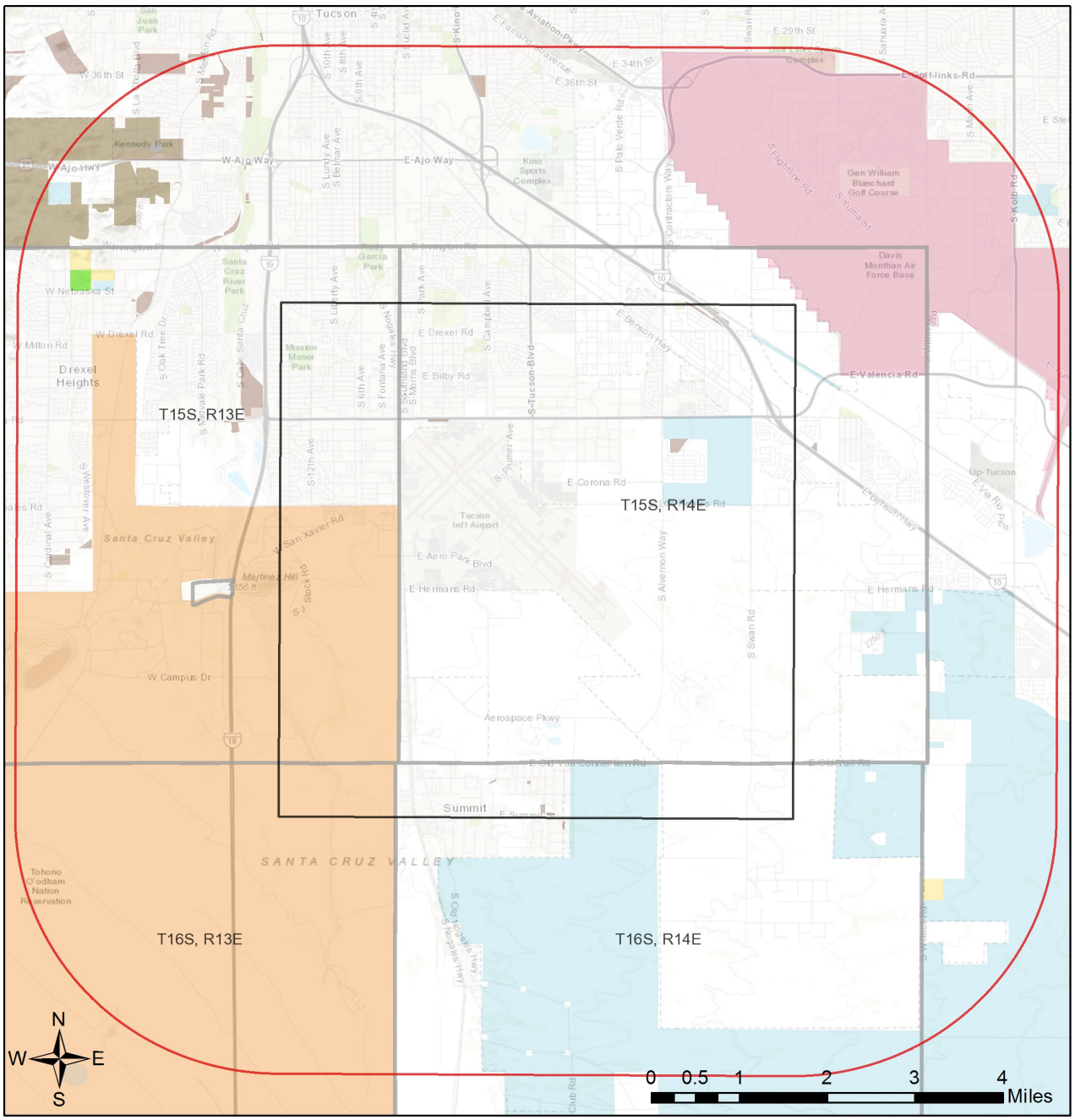
Township/Range(s): T15S, R13E; T15S, R14E; T16S, R13E +

USGS Quad(s): TUCSON; TUCSON SW

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

TIA Runway Expansion

Topo Basemap With Township/Ranges and Land Ownership



- Project Boundary
- Buffered Project Boundary
- Township/Ranges

Land Ownership

- AZ Game and Fish Dept.
- BLM
- BOR
- Indian Res.
- Military
- Mixed/Other
- National Park/Mon.
- Private
- State and Regional Parks
- State Trust
- US Forest Service
- Wildlife Area/Refuge

Project Size (acres): 22,492.28

Lat/Long (DD): 32.1100 / -110.9338

County(s): Pima

AGFD Region(s): Tucson

Township/Range(s): T15S, R13E; T15S, R14E; T16S, R13E +

USGS Quad(s): TUCSON; TUCSON SW

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Special Status Species and Special Areas Documented within 3 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Aspidoscelis stictogramma	Giant Spotted Whiptail	SC	S			1B
Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S		1B
Bat Colony						
Coccyzus americanus	Yellow-billed Cuckoo (Western DPS)	LT	S			1A
Coryphantha scheeri var. robustispina	Pima Pineapple Cactus	LE			HS	
Gastrophryne olivacea	Western Narrow-mouthed Toad			S		1C
Heloderma suspectum	Gila Monster					1A
Lasiurus xanthinus	Western Yellow Bat		S			1B
Macrotus californicus	California Leaf-nosed Bat	SC		S		1B
Myotis velifer	Cave Myotis	SC		S		1B
Nyctinomops femorosaccus	Pocketed Free-tailed Bat					1B
Peucaea carpalis	Rufous-winged Sparrow					1B
San Xavier Indian Reservation	San Xavier Indian Reservation					
Sonorella papagorum	Black Mountain Talussnail					1B
Tadarida brasiliensis	Brazilian Free-tailed Bat					1B
Tumamoca macdougalii	Tumamoc Globeberry		S	S	SR	

Note: Status code definitions can be found at https://www.azgfd.com/wildlife/planning/wildlifeguidelines/statusdefinitions/
.

Species of Greatest Conservation Need
Predicted within 3 Miles of Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Aix sponsa	Wood Duck					1B
Ammospermophilus harrisii	Harris' Antelope Squirrel					1B
Anaxyrus retiformis	Sonoran Green Toad			S		1B
Anthus spragueii	Sprague's Pipit	SC				1A
Antrostomus ridgwayi	Buff-collared Nightjar		S			1B
Aquila chrysaetos	Golden Eagle	BGA		S		1B
Aspidoscelis stictogramma	Giant Spotted Whiptail	SC	S			1B
Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S		1B
Botaurus lentiginosus	American Bittern					1B
Buteo regalis	Ferruginous Hawk	SC		S		1B
Chilomeniscus stramineus	Variable Sandsnake					1B
Colaptes chrysoides	Gilded Flicker			S		1B
Coluber bilineatus	Sonoran Whipsnake					1B
Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S	S		1B
Crotalus tigris	Tiger Rattlesnake					1B
Crotaphytus nebrius	Sonoran Collared Lizard					1B

Species of Greatest Conservation Need
Predicted within 3 Miles of Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Cynanthus latirostris	Broad-billed Hummingbird		S			1B
Cynomys ludovicianus	Black-tailed Prairie Dog	CCA		S		1A
Cyprinodon macularius	Desert Pupfish	LE				1A
Dipodomys spectabilis	Banner-tailed Kangaroo Rat			S		1B
Euderma maculatum	Spotted Bat	SC	S	S		1B
Eumops perotis californicus	Greater Western Bonneted Bat	SC		S		1B
Falco peregrinus anatum	American Peregrine Falcon	SC	S	S		1A
Glaucidium brasilianum cactorum	Cactus Ferruginous Pygmy-owl	SC	S	S		1B
Gopherus morafkai	Sonoran Desert Tortoise	CCA	S	S		1A
Haliaeetus leucocephalus	Bald Eagle	SC,BGA	S	S		1A
Heloderma suspectum	Gila Monster					1A
Hypsiglena sp. nov.	Hooded Nightsnake					1B
Incilius alvarius	Sonoran Desert Toad					1B
Kinosternon sonoriense sonoriense	Desert Mud Turtle			S		1B
Lasiurus blossevillii	Western Red Bat		S			1B
Lasiurus xanthinus	Western Yellow Bat		S			1B
Leopardus pardalis	Ocelot	LE				1A
Leptonycteris curasoae yerbabuenae	Lesser Long-nosed Bat	LE				1A
Lepus alleni	Antelope Jackrabbit					1B
Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S		1A
Macrotus californicus	California Leaf-nosed Bat	SC		S		1B
Melanerpes uropygialis	Gila Woodpecker					1B
Melospiza lincolnii	Lincoln's Sparrow					1B
Melozone aberti	Abert's Towhee		S			1B
Micruroides euryxanthus	Sonoran Coralsnake					1B
Myotis occultus	Arizona Myotis	SC		S		1B
Myotis velifer	Cave Myotis	SC		S		1B
Myotis yumanensis	Yuma Myotis	SC				1B
Notiosorex cockrumi	Cockrum's Desert Shrew					1B
Nyctinomops femorosaccus	Pocketed Free-tailed Bat					1B
Panthera onca	Jaguar	LE				1A
Passerculus sandwichensis	Savannah Sparrow					1B
Perognathus amplus	Arizona Pocket Mouse					1B
Peucaea carpalis	Rufous-winged Sparrow					1B
Phrynosoma solare	Regal Horned Lizard					1B
Phyllorhynchus browni	Saddled Leaf-nosed Snake					1B

Species of Greatest Conservation Need
Predicted within 3 Miles of Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Poeciliopsis occidentalis occidentalis	Gila Topminnow	LE				1A
Progne subis hesperia	Desert Purple Martin			S		1B
Setophaga petechia	Yellow Warbler					1B
Sonorella papagorum	Black Mountain Talussnail					1B
Tadarida brasiliensis	Brazilian Free-tailed Bat					1B
Terrapene ornata	Ornate Box Turtle					1A
Thomomys umbrinus intermedius	Southern Pocket Gopher					1B
Troglodytes pacificus	Pacific Wren					1B
Vireo bellii arizonae	Arizona Bell's Vireo					1B
Vulpes macrotis	Kit Fox	No Status				1B

Species of Economic and Recreation Importance Predicted within 3 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	NPL	SGCN
Callipepla gambelii	Gambel's Quail					
Callipepla squamata	Scaled Quail					1C
Odocoileus hemionus	Mule Deer					
Pecari tajacu	Javelina					
Puma concolor	Mountain Lion					
Zenaida asiatica	White-winged Dove					
Zenaida macroura	Mourning Dove					

Project Type: Transportation & Infrastructure, Airports, Construction of new runways, terminals/concourses, other facilities

Project Type Recommendations:
During the planning stages of your project, please consider the local or regional needs of wildlife in regards to movement, connectivity, and access to habitat needs. Loss of this permeability prevents wildlife from accessing resources, finding mates, reduces gene flow, prevents wildlife from re-colonizing areas where local extirpations may have occurred, and ultimately prevents wildlife from contributing to ecosystem functions, such as pollination, seed dispersal, control of prey numbers, and resistance to invasive species. In many cases, streams and washes provide natural movement corridors for wildlife and should be maintained in their natural state. Uplands also support a large diversity of species, and should be contained within important wildlife movement corridors. In addition, maintaining biodiversity and ecosystem functions can be facilitated through improving designs of structures, fences, roadways, and culverts to promote passage for a variety of wildlife. Guidelines for many of these can be found at: https://www.azgfd.com/wildlife/planning/wildlifeguidelines/.

Consider impacts of outdoor lighting on wildlife and develop measures or alternatives that can be taken to increase human safety while minimizing potential impacts to wildlife. Conduct wildlife surveys to determine species within project area, and evaluate proposed activities based on species biology and natural history to determine if artificial lighting may disrupt behavior patterns or habitat use. Use only the minimum amount of light needed for safety. Narrow spectrum bulbs should be used as often as possible to lower the range of species affected by lighting. All lighting should be shielded, canted, or cut to ensure that light reaches only areas needing illumination.

Consider tower designs and/or modifications that reduce or eliminate impacts to migratory birds (i.e. free standing, minimally lighted structures).

Minimization and mitigation of impacts to wildlife and fish species due to changes in water quality, quantity, chemistry, temperature, and alteration to flow regimes (timing, magnitude, duration, and frequency of floods) should be evaluated. Minimize impacts to springs, in-stream flow, and consider irrigation improvements to decrease water use. If dredging is a project component, consider timing of the project in order to minimize impacts to spawning fish and other aquatic species (include spawning seasons), and to reduce spread of exotic invasive species. We recommend early direct coordination with Project Evaluation Program for projects that could impact water resources, wetlands, streams, springs, and/or riparian habitats.

The Department recommends that wildlife surveys are conducted to determine if noise-sensitive species occur within the project area. Avoidance or minimization measures could include conducting project activities outside of breeding seasons.

Based on the project type entered, coordination with State Historic Preservation Office may be required (http://azstateparks.com/SHPO/index.html).

Based on the project type entered, coordination with Arizona Department of Environmental Quality may be required (http://www.azdeq.gov/).

Based on the project type entered, coordination with U.S. Army Corps of Engineers may be required (http://www.usace.army.mil/)

Based on the project type entered, coordination with County Flood Control district(s) may be required.

Based on the project type entered, coordination with U.S. Fish and Wildlife Service (Migratory Bird Treaty Act) may be required (http://www.fws.gov/southwest/es/arizona/).

The Department requests further coordination to provide project/species specific recommendations, please contact Project Evaluation Program directly. PEP@azgfd.gov

Project Location and/or Species Recommendations:
HDMS records indicate that one or more native plants listed on the Arizona Native Plant Law and Antiquities Act have been documented within the vicinity of your project area. Please contact:
Arizona Department of Agriculture
1688 W Adams St.
Phoenix, AZ 85007
Phone: 602.542.4373
https://agriculture.az.gov/environmental-services/np1

HDMS records indicate that one or more listed, proposed, or candidate species or Critical Habitat (Designated or Proposed) have been documented in the vicinity of your project. The Endangered Species Act (ESA) gives the US Fish and Wildlife Service (USFWS) regulatory authority over all federally listed species. Please contact USFWS Ecological Services Offices at http://www.fws.gov/southwest/es/arizona/ or:

Phoenix Main Office
2321 W. Royal Palm Rd, Suite 103
Phoenix, AZ 85021
Phone: 602-242-0210
Fax: 602-242-2513

Tucson Sub-Office
201 N. Bonita Suite 141
Tucson, AZ 85745
Phone: 520-670-6144
Fax: 520-670-6155

Flagstaff Sub-Office
SW Forest Science Complex
2500 S. Pine Knoll Dr.
Flagstaff, AZ 86001
Phone: 928-556-2157
Fax: 928-556-2121

HDMS records indicate that Western Burrowing Owls have been documented within the vicinity of your project area. Please review the western burrowing owl resource page at: https://www.azgfd.com/wildlife/speciesofgreatestconservneed/burrowingowlmanagement/.

Tribal Lands are within the vicinity of your project area and may require further coordination. Please contact:
Tohono O'odham Nation
PO Box 837
Sells, AZ 85634
(520) 383-2028
(520) 383-3379 (fax)

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U.S Department
of Transportation
**Federal Aviation
Administration**

Western-Pacific Region
Office of Airports

Federal Aviation Administration
15000 Aviation Blvd, Room 3012
Lawndale, CA 90261

February 8, 2018

Mr. Steven L. Spangle
Field Supervisor
U.S. Fish and Wildlife Service
Arizona Ecological Services Office
9828 North 31st Avenue #C3
Phoenix, Arizona 85051-2517

Dear Mr. Spangle:

Proposed Airfield Safety Enhancement Project
Tucson International Airport
Tucson, Pima County, Arizona
Request for Formal Section 7 Consultation

The Federal Aviation Administration (FAA), as lead federal agency, along with the United States Air Force (USAF), and National Guard Bureau (NGB), as cooperating agencies, are preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) of 1969, as amended, for the Tucson Airport Authority's (TAA) proposed Airfield Safety Enhancement Project and associated land transactions at Tucson International Airport (TUS). TUS is located in the City of Tucson and is owned and operated by TAA.

The purpose of this letter is to initiate formal consultation with U.S. Fish and Wildlife (Service) under Section 7 of the Endangered Species Act (ESA) for the proposed project. We are enclosing a Biological Assessment (BA) prepared by Harris Environmental Group, Inc., of Tucson, Arizona that provides information in support of FAA's determinations of effect on federally listed threatened and endangered species and designated critical habitat.

Project Background:
TAA completed an Airfield Safety Enhancement (ASE) Study in 2011 to analyze, categorize, and recommend mitigations to enhance aviation safety at TUS. In 2014, TAA completed the most recent Airport Master Plan Update, which further analyzed enhancements recommended in the ASE Study. This set of improvements included the Proposed Airfield Safety Enhancement Project, which recommended relocation of Runway 11R/29L, and construction of a center parallel taxiway, as well as additional safety elements.

The purpose of the Proposed Action is to fulfill FAA's statutory mission to ensure the safe and efficient use of navigable airspace in the U.S. as set forth under Title 49, United

States Code (U.S.C.) § 47101(a)(1). The FAA must ensure that the Proposed Action does not derogate the safety of aircraft and airport operations at TUS. Moreover, it is the policy of the FAA under 49 USC § 47101(a)(6) that airport development projects provide for the protection and enhancement of natural resources and the quality of the environment of the United States in the FAA's purpose and need.

The USAF owns land, immediately west of TUS, known as Air Force Plant 44 (AFP-44). The USAF currently leases AFP-44 to Raytheon Missile Systems, which operates AFP-44 for the manufacture of various explosives and munitions. The USAF's purpose and need in this process is to maintain the operational capabilities and capacities of AFP-44. Under the Proposed Action, Earth Covered Magazines (ECMs) located on AFP 44 would have to be demolished to protect airport safety areas. An ECM is a specific structure that is used to store explosives. Land identified as Parcel "F" would be transferred from AFP 44 to TAA in order include the appropriate dimensional safety areas on airport property. This would require demolition of the ECMs on Parcel "F." TAA would also transfer a parcel of airport land identified as Parcels "G" and Parcel "H" ultimately to the USAF for AFP 44. These parcels would incorporate the various USAF safety arcs onto USAF property. Incorporation of USAF safety arcs onto USAF property would help to ensure continued operational capabilities of AFP 44 while accommodating the proposed safety enhancement project at TUS. Therefore, the USAF's purpose of the Proposed Action is to maintain AFP-44 operational capabilities while removing 6 ECMs from Parcel "F" and 6 ECMs directly adjacent to Parcel "F".

The NGB's purpose and need is to maintain NGB safety standards and operational capabilities at the Tucson Air National Guard Base. More specifically, NGB needs to meet required separation distances for its Munitions Storage Area (MSA). The existing MSA at the Tucson Air National Guard Base, at the north end of TUS, does not meet the USAF separation distances required for explosive operations and exposes non-munitions personnel to explosive hazards. Relocating the MSA to Parcel H would accommodate the required Quantity-Distance (QD) clear zone arcs that are required in accordance with United States Air Force Manual 91-201, *Explosive Safety Standards*.

The purpose of the Proposed Action is to enhance the overall safety of aircraft operations at the airport and includes the following components: Construction of a Full Length Parallel Runway 11R/29L that is 10,996 feet long by 150 feet wide about 800 feet from the centerline of Runway 11L/29R; Construction of a new Centerline Parallel Taxiway between the two runways; Construction of a New Outboard Parallel Taxiway; Displace the Runway 11L Arrivals Threshold; Construction of connector and bypass taxiways; Close Taxiway A2; Construct/maintain the Arizona Air National Guard Extended Blast Pads for Runways 11L/29R and 11R/29L; Installation of associated drainage improvements; Transfer of about 58 acres from USAF Plant 44 (AFP-44) to the TAA (Parcel F), and about 150 acres of TAA Land to USAF AFP-44 and convey ultimately up to 291 acres from TAA land to the USAF (Parcel H); Demolition of 12 Earth Covered Magazines on AFP-44; Construct replacement earth covered magazines elsewhere on AFP-44; and Construction of a Munitions Storage Area for the Arizona Air National Guard on Parcel H.

The federal action requiring compliance with NEPA is approval of the TAA's Airport Layout Plan depicting the Proposed Action, approval of further processing of an application for federal financial assistance to pay for the proposed project and release of federal obligations for certain lands TAA would like to dispose of. Federal funding for the Proposed Action would come from the Airport Improvement Program.

Project Description:
Construction of a Full Length Parallel Runway 11R/29L that is 10,996 feet long by 150 feet wide about 800 feet from the centerline of Runway 11L/29R; Construction of a new Centerline Parallel Taxiway between the two runways; Construction of a New Outboard Parallel Taxiway; Displace the Runway 11L Arrivals Threshold; Construction of connector and bypass taxiways; Close Taxiway A2; Construct/maintain the Arizona Air National Guard Extended Blast Pads for Runways 11L/29R and 11R/29L; Installation of associated drainage improvements; Transfer of about 58 acres from USAF Plant (AFP) 44 to the TAA (Parcel F), and about 150 acres of TAA Land to USAF AFP-44 and convey ultimately up to 291 acres from TAA land to the USAF (Parcel H); Demolition of 12 Earth Covered Magazines on AFP-44; Construct replacement earth covered magazines elsewhere on AFP-44; and Construction of a Munitions Storage Area for the Arizona Air National Guard on Parcel H.

The Proposed Action also includes drainage improvements including construction of stormwater detention basins along the west side of the new parallel runway at various locations with reinforced concrete box culverts. FAA has consulted with the U.S. Army Corps of Engineers (USACE), due to potential impacts to Waters of the U.S.

Effects on Federally-Listed Species and Designated Critical Habitat:
The Proposed Action has been reviewed for its effects on federally-listed threatened and endangered species, and designated critical habitat. Based on the analysis contained in the attached BA, the FAA has determined that two federally-listed species have a reasonable potential to occur in the Action Area as defined in Title 50, Code of Federal Regulations (CFR) § 402.02[1] and are evaluated in the BA: lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) and Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*). There is no proposed or designated critical habitat for either of these species in the Detailed Study Area, described below.

As discussed in the BA, the primary threats to the lesser long-nosed bat are roost site loss or disturbance and impacts to forage availability. No direct effects are anticipated because roosting habitat (i.e., caves, mine, crevices, etc.) is not located within the action area. Section 2.1.1.3 of the BA states that the Detailed Study Area (which is the same area as the Action Area) does not contain vegetation composition or structure, or geological features that provide day-roosting or foraging habitat to support a viable lesser long-nosed bat population. In addition, as stated in Section 3.1.1.1 of the BA, the FAA will take measures to avoid and minimize construction-related effects.

After reviewing the current status of the lesser long-nosed bat, the effects of the proposed project, and proposed measures to avoid, minimize and compensate for effects to listed

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[1] 50 CFR 402.02 defines Action Area as: "*all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.*"

species, and designated critical habitat, the FAA has determined that the project: ***may affect, is not likely to adversely affect,*** the lesser long-nosed bat.

The BA also evaluates whether the Proposed Action could affect the Pima pineapple cactus (PPC). Section 4.1.2.1 of the BA states 82 PPC are located within the Action Area. A Total of 24 acres of PPC habitat would be directly affected by the proposed project. 11 acres of PPC habitat would be removed from the airfield area. 13 acres of PPC habitat would be removed for the NGB's Munitions Storage Area in Parcel H. As compensation for these effects 24 acres of mitigation credits for PPC at the Palo Alto PPC Conservation Bank would be purchased. TAA would also salvage the 64 directly affected PPC by transplanting them to an area on existing airport property south of the end of the new runway. TAA would protect in place 18 PPC that can be avoided during construction. No PPC are located in the area for the replacement ECMs on AFP-44.

After reviewing the current status of the PPC, the effects of the proposed project, and proposed measures to avoid, minimize and compensate for effects to listed species, and designated critical habitat, the FAA has determined that the project: ***may affect, is likely to adversely affect,*** the Pima pineapple cacti.

At the request of the Service, the BA also includes information about the western burrowing owl because it is listed as a Species of Concern and protected under the Migratory Bird Treaty Act. Section 2.1.3.2 of the BA states that suitable habitat exists in the Detailed Study Area for the western burrowing owl. No western burrowing owls were observed during pedestrian surveys in the spring and summer of 2017. However, one western burrowing owl was observed and documented in the Detailed Study Area during a Survey in November 2017 that was conducted at the request of the Service. Section 3.1.3.1 of the BA states that prior to the immediate start of construction activities, additional surveys for western burrowing owl are to be conducted. While FAA has included information on western burrowing owl in the BA, since the western burrowing owl is not a federally-listed species, FAA makes no determinations of effect on the western burrowing owl as a result of the proposed project.

FAA seeks the Service's concurrence with our determinations made pursuant to 50 CFR Part 402, for the proposed Airfield Safety Enhancement Project and Associated Land Transactions. FAA also requests the Service provide a Draft Biological Opinion to this office for review as soon as it is available.

Please call me at (310) 725-3615 or by email at dave.kessler@faa.gov, if you have any questions or need additional information concerning this matter.

Sincerely,

David B. Kessler, AICP
Regional Environmental Protection Specialist

Enclosure: Biological Assessment

United States Department of the Interior
Fish and Wildlife Service
Arizona Ecological Services Office
9828 North 31st Avenue
Phoenix, Arizona 85051
Telephone: (602) 242-0210 Fax: (602) 242-2513

AESO/SE
02EAAZ00-2018-F-0526

March 8, 2018

Mr. David B. Kessler
Federal Aviation Administration
15000 Aviation Boulevard, Room 3012
Lawndale, California 90261

DRAFT Biological Opinion on the proposed Airfield Safety Enhancement Project at Tucson International Airport in Tucson, Pima County, Arizona.

Dear Mr. Kessler:

This letter transmits our DRAFT biological opinion (BO) regarding effects of the proposed Airfield Safety Enhancement Project located at the Tucson International Airport, in Pima County, Arizona. The proposed action is likely to adversely affect the endangered Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*), and it is this species that is the subject of our DRAFT Biological Opinion (BO).

The DRAFT BO also includes our concurrence with your determination that the proposed action is not likely to adversely affect the endangered lesser long-nosed bat (*Leptonycteris yerbabuenae)*.

We are forwarding the draft of this BO for your review. Please let us know of any errors or omissions in the project description, any factual errors in other portions of the document, and any concerns that you believe should be addressed. To expedite completion of the BO, we request your input by March 23, 2018. We will provide a final biological opinion within ten work days after receiving any comments or information. Please refer to log number 02EAAZOO-2018-F-0526 in future correspondence on this consultation.

We are increasing our efforts to coordinate endangered species issues with the Arizona Game and Fish Department (AGFD). We encourage you to provide a copy of this draft biological opinion to AGFD's Habitat Branch Chief, Arizona Game and Fish Department, 5000 West Carefree Highway, Phoenix, Arizona 85086-5000, indicating the review time line discussed above.

If you have questions regarding this draft biological opinion or the consultation process, please have your staff contact Scott Richardson (520) 670-6150 (x242).

Sincerelv.

Steven L. Spangle
Field Supervisor

Enclosure (Draft BO)

cc (electronic copy):
Field Supervisor, Fish and Wildlife Service, Phoenix, AZ
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
(w/o Enclosure) (pep@azgfd.gov)
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ (Attn: John Windes)
(w/o Enclosure)

C:\Users\scottrichardson\Documents\Documents\Documents\Section 7-10\TIA Airfield Safety Enhancement Project.FAA.Cover Letter.Draft BO.sr.doc

AESO/SE
02EAAZ00-2018-F-0526

March XX, 2018

Mr. David B. Kessler
Federal Aviation Administration
Western-Pacific Region
15000 Aviation Boulevard, Room 3012
Lawndale, California 90261

~DRAFT~

Dear Mr. Kessler:

This biological opinion responds to your February 8, 2018 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 February 12, 2018. At issue are impacts resulting from the proposed airfield safety enhancement project at Tucson International Airport located in Tucson, Pima County, Arizona, on the endangered Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*) (PPC).

In your correspondence, you also requested our concurrence that the proposed action may affect, but is not likely to adversely affect the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*). Our concurrence is provided in Appendix A of this biological opinion.

As indicated in Harris Environmental Group's biological assessment (BA), the western burrowing owl (*Athene cunicularia hypugaea*) is a migratory bird species protected under the Migratory Bird Treaty Act. As such, it receives no regulatory protection under the Act and you are not required to consult on this species under the Act for this project. We will not discuss this species further in this biological opinion (BO). However, the Service does implement the Migratory Bird Treaty Act and we are supportive of any actions that the project proponents can take to further the conservation of this species within the project area. We recommend complete implementation of the proposed Sonoran desert tortoise conservation measures outlined in the BA (see page 25 of the BA).

This biological opinion (BO) is based on information provided in your February 8, 2018, correspondence, including Harris Environmental Group, Inc.'s February 2018 BA of the proposed action. This information is incorporated into this BO by reference. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, airfield facilities, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at Arizona Ecological Services Office (AESO) in Phoenix, Arizona.

Consultation history

- June 27, 2016 – A pre-consultation meeting was held in Tucson that included the EIS Consultant and the Service.
- September 26, 2017 – The Service received a purpose, needs, and alternatives analysis paper from the Federal Aviation Administration (FAA) regarding the proposed Airfield Safety Enhancement Project.
- October 11, 2017 – The Service and the FAA hold a conference call to discuss the proposed project and section 7 consultation issues.
- January 19, 2018 – The Service and the FAA hold a conference call to discuss details related to the Pima pineapple cactus.
- February 12, 2018 – The Service receives the FAA's request for consultation and the associated BA.
- March 7, 2018 – The Service provides a draft Biological Opinion to the FAA for review.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed project includes the relocation and reconstruction of Runway 11R/29L as a 10,996-foot long, 150-foot wide runway. The relocation of Runway 11R/29L would require development and/or modification of associated arrival and departure procedures. The construction of a full length parallel runway would eliminate two Hot Spots on the airport that will enhance the safety of aircraft operations at the airport. The proposed relocated Runway 11R/29L would have its threshold aligned with Runway 11L/29R and have the same width, which would clearly differentiate it from a parallel taxiway. Having the length, width, and threshold locations of Runway 11R/29L and Runway 11L/29R the same, would increase safety and pilot situational awareness. The existing Runway 11R/29L would be demolished and the pavement materials recycled for use during construction of the relocated runway pavement (See Figure 1).

The proposed project also includes construction of a new Centerline Parallel Taxiway between existing Runway 11L/29R and the new Runway 11R/29L. In addition, a new Outboard Parallel taxiway that will be west of the relocated Runway 11R/29L will be constructed. The project also includes construction of various supporting connector taxiways between Runways 11R/29L and the outboard and centerline parallel taxiway (See Figure 1).

A Bypass taxiway will be built northwest of the Runway Protection Zones for Runways 11L and 11R. The displaced arrivals thresholds would allow unrestricted taxiing of aircraft (regardless of size) accessing Runway 11R. This element would include removal of the existing concrete apron from the surrounding area and demolition of four existing buildings/hangars within the area. The Triple hangars would not be demolished as part of this element. Under this project, Taxiway A-2 will be closed between Runway 3/21 and Taxiway D (See Figure 1).

As part of the replacement runway construction, the proposed project would construct/maintain the AANG blast pads for Runways 11L/29R and 11R/29L and paint/mark as non-

runway/taxiway pavement. Additional drainage detention areas west of the new runway are proposed to be constructed to provide for the additional impervious pavement areas.

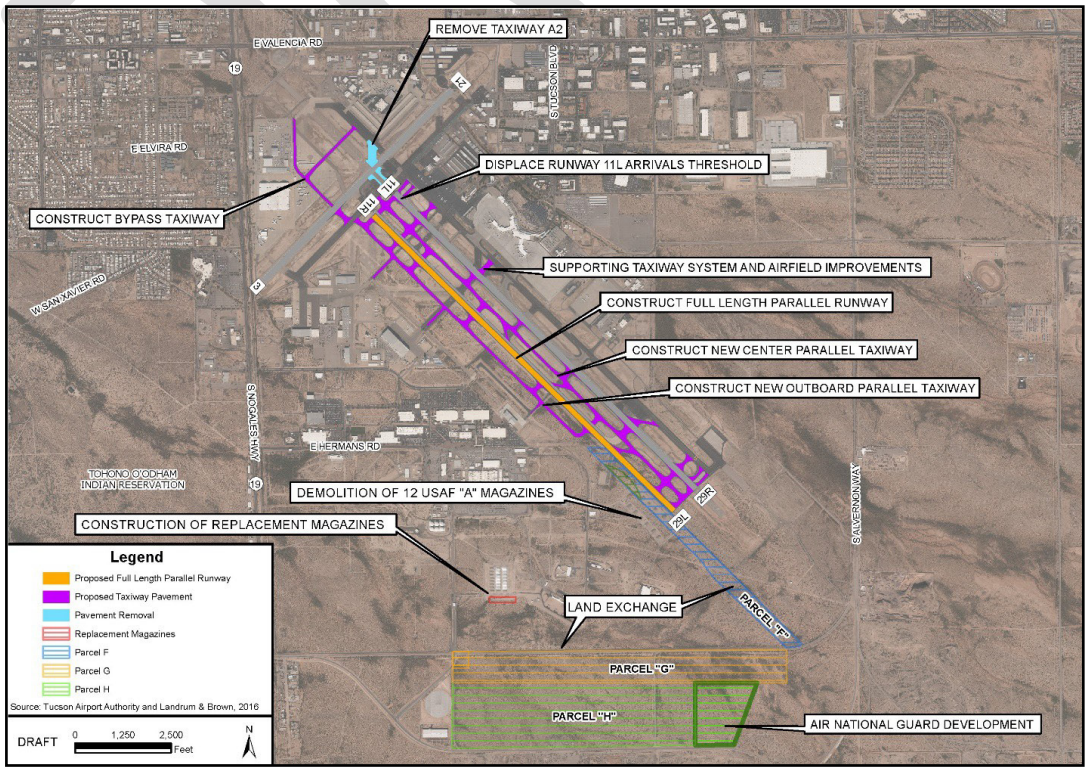
The proposed project also includes several Land Transactions between the USAF and the Tucson Airport. This element of the Proposed Action includes the TAA acquiring land from AFP 44 from USAF known as Parcel "F." This land is needed by TAA for the relocated runway object free area, taxiway object free area, runway safety area, and runway protection zone for the relocated runway. This Parcel "F" area is currently used by USAF to store explosives in ECMs.

In exchange for Parcel "F," this element of the proposed project also includes the FAA releasing TAA from its federal obligations for the Airport land located between the former East Hughes Access Road and the new Aerospace Parkway, south of AFP 44 from TAA to USAF, and the release of that land from federal obligations. A portion of this land has been proposed for construction of a MSA, to include ECMs, and access road, for the AANG at the Tucson Air National Guard Base located adjacent to TUS (See Figure 1).

Demolition of twelve USAF ECMs identified at AFP 44 as "A" Magazines located on Parcel F, is required to maintain the necessary FAA required safety areas for the relocated runway. In order to maintain the existing munitions storage capacity of AFP 44, replacement storage facilities would be constructed elsewhere on AFP 44 that would provide the same volume of storage provided in the "A" Magazines. These new ECMs would replace the twelve "A" Magazines to be demolished on Parcel "F" and adjacent to Parcel "F" (See Figure 1).

The last component of this project includes construction of a MSA for the AANG. This element of the Proposed Action includes transfer of land from Parcel "H" to the USAF on behalf of the National Guard Bureau for construction of a MSA and access road to support the AANG at Tucson Air National Guard Base (See Figure 1).

Figure 1. Key Project Elements



The key project elements include the following and are shown on Figure 1:

- Relocate Runway 11R/29L to the southwest and construct it to a total length of 10,996 feet and width of 150 feet.
- Construct new full-length parallel taxiway between Runway 11L/29R and Runway 11R/29L.
- Construct supporting connector taxiways between Runway 11R/29L and both outboard and centerline parallel taxiways.
- Construct bypass taxiways for Runways 11L and 11R.
- Closure of segments of taxiway A2 between taxiway A and Runway 3/21 and taxiway A2 and Runway 3/21.
- Construct/maintain AANG extended blast pads for Runways 11L/29R and 11R/29L.
- Construct additional drainage detention areas to support additional impervious pavement areas.
- Construct replacement Earth Covered Magazines on U.S. Air Force Plant 44 (AFP 44).
- Construct an MSA on land identified as "Parcel H" by the National Guard Bureau.

Conservation Measures

The following conservation measures will be implemented to minimize effects of the proposed action on the lesser long-nosed bat:

- Grading activities at night should be suspended from 15 April to 15 September to the extent practicable to avoid impacts to potential foraging lesser long-nosed bats. However, recent monitoring of this species determined that migrants remain within the Tucson Basin into late October (Lowery et al. 2009). Thus, suspension window for construction activities for this species should be confirmed with USFWS.
- Protect in place, salvage and transplant, or replace any saguaros from the project area.

The following conservation measures will be implemented to minimize effects of the proposed action on the PPC:

- Avoidance

Of the 82 PPC individuals within the Detailed Study Area, 11 PPC individuals can be avoided in the airfield area and seven can be avoided in Parcel “G” and Parcel “H”. Therefore, 18 total PPC would be avoided. Exhibits 7 and 8 of the BA show the PPC individuals to be avoided and those that would be affected by the Proposed Action. During the construction process, all PPC in the Detailed Study Area that can be avoided near the project limits would be marked and protected from traffic and equipment. Bright PPC markers (e.g., orange construction fence), and education and coordination with all construction workers would prevent direct impacts to those existing PPC that do not have to be directly affected by construction activities.

- Mitigation Banking

A fundamental component of the PPC recovery strategy is to preserve and restore quality habitat to protect individuals and their seedbanks. Mitigation bank credits will be purchased to compensate for the loss of PPC habitat at a 1:1 ratio of area of modified habitat. Approximately 11 acres of PPC habitat would be removed in the airfield area. An additional 13 acres would be affected by the proposed Air National Guard development on Parcel "G" and "Parcel "H". Therefore, 24 acres as shown on Exhibit 9 of the BA would be affected by the Proposed Action. Mitigation credits will be purchased for this amount from the Palo Alto PPC Conservation Bank.

- Transplant and Monitoring

59 PPC individuals would be affected in the airfield due to clearing, grading, and paving for the proposed new runway and FAA required safety areas including the RSA, OFA, and RPZ. This also includes PPC affected by construction vehicles that may traverse the area and by the location of the proposed construction staging area. An additional five PPC individual would be affected by the proposed Air National Guard development on Parcel "G" and "Parcel "H". Therefore, a total of 64 individual PPC are likely to be directly affected. A transplanting and monitoring program will be implemented to remove, salvage, and restore those 64 individual PPC.

PPC removal, salvage, and restoration would follow the ANPL and Pima County Native Plant Preservation ordinance (Pima County Code §18.72) to salvage PPC specimens. PPC would be transplanted according to the guidelines that were used during the relocation of PPC individuals removed during the construction of the East Hughes Access Road Relocation Project (SWCA 2015)(See page 24 of the BA for the detailed transplanting protocol).

All PPC will be transplanted onto existing Airport property that is restricted from access by the general public so the PPC will not be stolen or vandalized. Exhibit 10 of the BA shows the location of the potential PPC transplant area which encompass approximately 11 acres primarily in the unaffected RPZ area.

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 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. As this monitoring program continues, critical questions regarding the life cycle of this species will be answered.

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 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 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 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. We appreciate the additional discussion in the BA related to the potential effects of mining on PPC and find that the potential future effects of mining are uncertain.

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 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, 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. 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.

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.

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 Detailed Study Area of this project as described in the BA is comprised of several noncontiguous project sites within an area that is approximately four miles long and two miles wide, in portions of Township 15S, Range 14E, Sections 17, 18, 19, 20, 21, 28, 29, 32, & 33, 32.11252 -110.93930, WGS 84. The Airport is located on 8,343 acres in Tucson, Arizona in Pima County south of the City of Tucson central business district and near both Interstate 10 and Interstate 19. 50 Code of Federal Regulations (CFR) § 402.02 defines the action area as "*all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."* Thus, for this proposed project, the action area is defined as the Detailed Study Area.

The Detailed Study Area is in the Basin and Range physiographic province, characterized by mountain ranges on a northwest-southeast axis that are separated by broad alluvial valleys.

Elevations vary from about 2,540 feet above mean sea level (amsl) at the northwestern end to 2,690 feet above mean sea level at the southeastern end. The Detailed Study Area is near the interface of a lower alluvial fan terrace and the Santa Cruz River floodplain, and contains Sonoran Desert scrub communities in the Arizona Upland subdivision (Brown 1994; Brown and Lowe 1980). Vegetation is characterized by a diversity of low shrubs [dominated by creosote (*Larrea tridentate*) and woody crinklemat (*Tauilia canescens*)] and legume trees [e.g., velvet mesquite (*Prosopis velutina*) and blue paloverde (*Parkinsonia florida*)].

The Detailed Study Area is comprised chiefly of three soil units that are predominantly sandy loams. These units combined occur throughout 95 percent of the Detailed Study Area and include Cave soils and Urban land, Sahuarita and Mohave soils and Urban land, and Yaqui soils.

Most of these soil units are formed in mixed alluvium, well-drained and calcareous, and some are mixed with amounts of modified Urban land soil (Cochran and Richardson 2003).

A. Status of the Species within the Action Area

One habitat model identified most of the Detailed Study Area as low value habitat; however, a different approach indicated that most of the area consisted of medium value habitat (SDCP 2000). Surveys for PPC based on methods described by Roller (1996) were conducted throughout this area by qualified biologists in the spring and summer of 2017. In summary, the survey protocol entailed three general parts:

1. Surveying in general short distance transects with repeated coverage or passages,
2. Performing local area searches associated with all surveyed individuals, and
3. Intensive searches within 50 square meters for random sample of individuals.

82 PPC were found in the Detailed Study Area as shown on Exhibit 5 of the BA. 70 were found near the southeast terminus of Runway 11R/29L during the pedestrian surveys in spring and summer of 2017. 12 additional PPC were found in Parcel "G and Parcel "H". No known PPC occur in the in the vicinity of the B-Mags on AFP-44 where the replacement earth-covered magazines will be built.

B. Factors Affecting Species Environment within the Action Area

PPC within the action area are protected from some of the threats faced by this species in other portions of its range. Threats such as urban development and recreational off-road vehicle use are limited because the action area is primarily lands owned by TAA and these types of activities are limited because of the restrictions and access control related to airport activities in the vicinity of these lands. Therefore, the primary threats to PPC in the action area are related to future facilities development related to airport activities.

Ongoing urbanization and residential and commercial development adjacent to project area and within the action area are 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.

Potential project effects are expected to include direct disturbance of individual PPC, habitat loss, and disturbance of suitable habitat through vegetation removal, grading, and construction activities. Due to FAA requirements, the Runway Safety Area (RSA) and Object Free Area (OFA) must be cleared and graded to accommodate the occasional passage of an airplane without damage to the airplane. In addition to the OFA and RSA, the FAA requires a Runway Protection Zone (RPZ). The RPZ does not have to be cleared and graded. However, the Proposed Action includes proposed pavement for an overrun area beyond the runway. Therefore, a portion of the RPZ must be cleared and graded. PPC that are located directed in these safety areas would be affected by the Proposed Action.

In addition to PPC being affected by clearing and grading for FAA required safety areas, PPC that are located immediately next to or in areas where construction vehicles may traverse or in an area proposed to be used for construction staging activities would be affected by vehicles running over individuals and by dust. Approximately 11 acres of PPC habitat will be removed in the airfield area. An additional 13 acres of PPC habitat would be affected by the proposed Air National Guard development of Parcel "G" and Parcel "H". Therefore, 24 acres of PPC habitat will be affected by the proposed action. In addition, 59 individual PPC will be affected in the airfield due to clearing, grading, and paving. An additional five PPC will be affected by the proposed Air National Guard development. Therefore, a total of 64 PPC will be directly affected by the proposed action.

To compensate for the permanent loss of PPC habitat, mitigation bank credits will be purchased from the Palo Alto PPC Mitigation Bank. Credits will be purchased at a 1:1 ratio for areas of habitat modified by the proposed action. Therefore, the project proponents will purchase 24 acre credits from the mitigation bank.

In addition, PPC that fall within the area of the project that will experience ground disturbance will be transplanted to an area within the RPZ zone that will remain undisturbed. The transplanting efforts will follow a previously successful protocol used for an adjacent project in 2015. Although documented transplant success of PPC has typically been low, there may be some plants that survive. Monitoring the success of this transplant effort will provide us with valuable information related to transplanting as a conservation measure for PPC. 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.

Federal lands adjacent to the project area include those owned by the United States Air Force (USAF) Plant 44 (leased by Raytheon) and TAA-owned lands that are obligated to the FAA. Cumulative effects include changes in land use and development patterns. Any development of adjacent properties on TAA land would be subject to separate environmental evaluations and Section 7 consultation, if required. We are not aware of any additional future developments in the action area.

CONCLUSION

After reviewing the current status of the Pima pineapple cactus, the environmental baseline for the action area, the effects of the proposed airfield safety enhancements, and the cumulative effects, it is our biological opinion that the Tucson International Airport airfield safety enhancements project, as proposed, is not likely to jeopardize the continued existence of the pineapple cactus. 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:

- To the extent possible, existing PPC within the project area will be avoided. For those that cannot be avoided, they will be transplanted to an area of the airfield that will remain undisturbed. This transplanting effort will be documented and monitored, producing information that will be useful in assessing transplanting of PPC as a potential conservation measure for this species. These transplanted PPC will also continue to contribute to the viability of the population at some level.
- The loss of occupied PPC habitat is offset by the conservation in perpetuity of 24 acres of PPC habitat within the Palo Alto PPC Mitigation Bank. This will contribute to the conservation of core blocks of PPC habitat within its range.

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.

Disposition of Dead or Injured Listed Species (Lesser long-nosed bat)

Upon locating a dead, injured, or sick listed species, initial notification must be made to the FWS's Law Enforcement Office, 2450 W. Broadway Rd, Suite 113, Mesa, Arizona, 85202, telephone: 480/967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a

photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

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 FAA, in conjunction with the TAA, work with the Service to improve core PPC habitat areas and habitat connectivity at TIA.
2) We recommend that the FAA continue to work with the TAA and FWS to monitor the success of the PPC transplant efforts associated with this and other projects.
3) We recommend that the FAA work with the TAA to address invasive species issues within and adjacent to TIA in areas supporting PPC.

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 FAA's efforts to identify and minimize effects to listed species from this project. For further information please contact Scott Richardson (520) 670-6150 (x242). Please refer to the consultation number 02EAAZ00-2018-F-0526 in future correspondence concerning this project.

Sincerely,

Steven L. Spangle
Field Supervisor

Cc (electronic copy):

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APPENDIX A.

Lesser Long-nosed Bat (*Leptonycteris curasoae yerbabuenae*)

Environmental Baseline

This species is known from grasslands, arid scrublands, and oak woodlands below 5500 ft. in elevation. In Arizona, these bats arrive in mid- April, roosting in caves, abandoned mine shafts and tunnels. Young are typically born in maternity colonies in mid-May in western Arizona. Females and young remain in maternity roosts and forage on primarily saguaros below about 3500 ft. until approximately mid-July. At this time, the range expands and bats are found up to about 5500 ft. in areas of semi-desert grassland and lower oak woodland, foraging primarily on agaves. These bats typically leave southern Arizona by late September to early October. While there are known lesser long-nosed bat roosts in the mountain ranges surrounding TIA (Santa Catalina, Rincon, Santa Rita mountains), no roost sites or maternity colonies are known to be within the action area for the proposed airfield safety enhancement project.

The primary threats to the lesser long-nosed bat are roost site loss or disturbance and impacts to forage availability (FWS 2007b). Other threats that have contributed to the current endangered status of the species include roost disturbance and deterioration, border activities, recreation, vandalism, fire, vampire bat control, mine closures, and forage availability. The effects of climate change (i.e., decreased precipitation and water resources) are a threat to many species, including the lesser long-nosed bat (Lenart 2007). 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 lesser long-nosed bat 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 lesser long-nosed bat populations since the species was originally listed in 1988, 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 habitat-disturbing activities and impacts to forage resources).

Lesser long-nosed bats are not know to forage in the action area, but are known to forage in the general vicinity of the TIA, using species of agave and columnar cacti, as well as hummingbird feeders. Agaves and saguaro cacti are not numerous within the action area.

<u>Conclusion</u>

The Service concurs with the FAA's determination that the action may affect, but is not likely to adversely affect lesser long-nosed bat, based upon the following:

- There are no known roost sites within the action area; therefore, the effects to roosts will be discountable.
- There are no significant occurrences of saguaro cacti or agaves within the action area, therefore the effects to lesser long-nosed bat forage resources will be insignificant.

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AESO/SE
02EAAZ00-2018-F-0526

March 19, 2018

Mr. David B. Kessler
Federal Aviation Administration
Western-Pacific Region
15000 Aviation Boulevard, Room 3012
Lawndale, California 90261

Dear Mr. Kessler:

This biological opinion responds to your February 8, 2018 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 February 12, 2018. At issue are impacts resulting from the proposed airfield safety enhancement project at Tucson International Airport located in Tucson, Pima County, Arizona, on the endangered Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*) (PPC).

In your correspondence, you also requested our concurrence that the proposed action may affect, but is not likely to adversely affect the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*). Our concurrence is provided in Appendix A of this biological opinion.

As indicated in Harris Environmental Group's biological assessment (BA), the western burrowing owl (*Athene cunicularia hypugaea*) is a migratory bird species protected under the Migratory Bird Treaty Act. As such, it receives no regulatory protection under the Act and you are not required to consult on this species under the Act for this project. We will not discuss this species further in this biological opinion (BO). However, the Service does implement the Migratory Bird Treaty Act and we are supportive of any actions that the project proponents can take to further the conservation of this species within the project area. We recommend complete implementation of the proposed Sonoran desert tortoise conservation measures outlined in the BA (see page 25 of the BA).

This biological opinion (BO) is based on information provided in your February 8, 2018, correspondence, including Harris Environmental Group, Inc.'s February 2018 BA of the proposed action. This information is incorporated into this BO by reference. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, airfield facilities, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at Arizona Ecological Services Office (AESO) in Phoenix, Arizona.

Consultation history

- June 27, 2016 – A pre-consultation meeting was held in Tucson that included the EIS Consultant and the Service.
- September 26, 2017 – The Service received a purpose, needs, and alternatives analysis paper from the Federal Aviation Administration (FAA) regarding the proposed Airfield Safety Enhancement Project.
- October 11, 2017 – The Service and the FAA hold a conference call to discuss the proposed project and section 7 consultation issues.
- January 19, 2018 – The Service and the FAA hold a conference call to discuss details related to the Pima pineapple cactus.
- February 12, 2018 – The Service receives the FAA's request for consultation and the associated BA.
- March 7, 2018 – The Service provides a draft Biological Opinion to the FAA for review.
- March 16, 2018 – The FAA provides comments to the Service on the draft BO. Comments incorporated into the final BO.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed project includes the relocation and reconstruction of Runway 11R/29L as a 10,996-foot long, 150-foot wide runway. The relocation of Runway 11R/29L would require development and/or modification of associated arrival and departure procedures. The construction of a full length parallel runway would eliminate two Hot Spots on the airport that will enhance the safety of aircraft operations at the airport. The proposed relocated Runway 11R/29L would have its threshold aligned with Runway 11L/29R and have the same width, which would clearly differentiate it from a parallel taxiway. Having the length, width, and threshold locations of Runway 11R/29L and Runway 11L/29R the same, would increase safety and pilot situational awareness. The existing Runway 11R/29L would be demolished and the pavement materials recycled for use during construction of the relocated runway pavement (See Figure 1).

The proposed project also includes construction of a new Centerline Parallel Taxiway between existing Runway 11L/29R and the new Runway 11R/29L. In addition, a new Outboard Parallel taxiway that will be west of the relocated Runway 11R/29L will be constructed. The project also includes construction of various supporting connector taxiways between Runways 11R/29L and the outboard and centerline parallel taxiway (See Figure 1).

A Bypass taxiway will be built northwest of the Runway Protection Zones for Runways 11L and 11R. The displaced arrivals thresholds would allow unrestricted taxiing of aircraft (regardless of size) accessing Runway 11R. This element would include removal of the existing concrete apron from the surrounding area and demolition of four existing buildings/hangars within the area. The Triple hangars would <u>not</u> be demolished as part of this element. Under this project, Taxiway A-2 will be closed between Runway 3/21 and Taxiway D (See Figure 1).

As part of the replacement runway construction, the proposed project would construct/maintain the AANG blast pads for Runways 11L/29R and 11R/29L and paint/mark as non-runway/taxiway pavement.

Additional drainage detention areas west of the new runway are proposed to be constructed to provide for the additional impervious pavement areas.

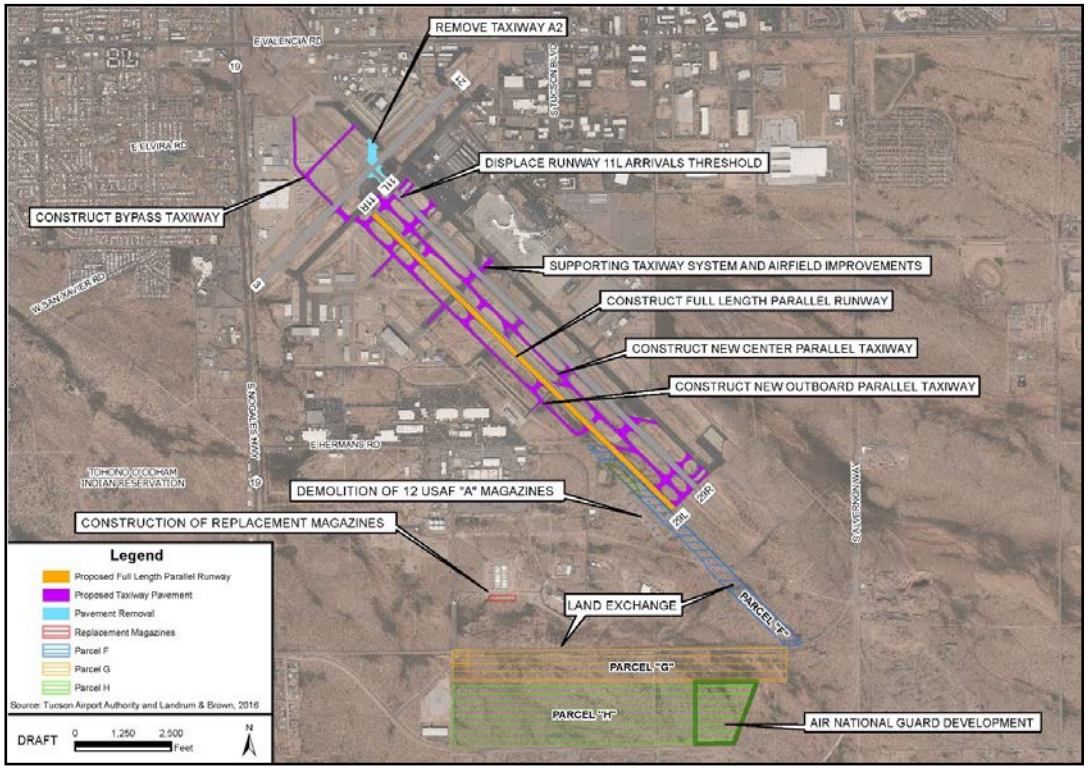
The proposed project also includes several Land Transactions between the USAF and the Tucson Airport. This element of the Proposed Action includes the TAA acquiring land from AFP 44 from USAF known as Parcel "F." This land is needed by TAA for the relocated runway object free area, taxiway object free area, runway safety area, and runway protection zone for the relocated runway. This Parcel "F" area is currently used by USAF to store explosives in ECMs.

In exchange for Parcel "F," this element of the proposed project also includes the FAA releasing TAA from its federal obligations for the Airport land located between the former East Hughes Access Road and the new Aerospace Parkway, south of AFP 44 from TAA to USAF, and the release of that land from federal obligations. A portion of this land has been proposed for construction of a MSA, to include ECMs, and access road, for the AANG at the Tucson Air National Guard Base located adjacent to TUS (See Figure 1).

Demolition of twelve USAF ECMs identified at AFP 44 as "A" Magazines located on Parcel F, is required to maintain the necessary FAA required safety areas for the relocated runway. In order to maintain the existing munitions storage capacity of AFP 44, replacement storage facilities would be constructed elsewhere on AFP 44 that would provide the same volume of storage provided in the "A" Magazines. These new ECMs would replace the twelve "A" Magazines to be demolished on Parcel "F" and adjacent to Parcel "F" (See Figure 1).

The last component of this project includes construction of a MSA for the AANG. This element of the Proposed Action includes transfer of land from Parcel "H" to the USAF on behalf of the National Guard Bureau for construction of a MSA and access road to support the AANG at Tucson Air National Guard Base (See Figure 1).

Figure 1. Key Project Elements



The key project elements include the following and are shown on Figure 1:

- Relocate Runway 11R/29L to the southwest and construct it to a total length of 10,996 feet and width of 150 feet.
- Construct new full-length parallel taxiway between Runway 11L/29R and Runway 11R/29L.
- Construct supporting connector taxiways between Runway 11R/29L and both outboard and centerline parallel taxiways.
- Construct bypass taxiways for Runways 11L and 11R.
- Closure of segments of taxiway A2 between taxiway A and Runway 3/21 and taxiway A2 and Runway 3/21.
- Construct/maintain AANG extended blast pads for Runways 11L/29R and 11R/29L.
- Construct additional drainage detention areas to support additional impervious pavement areas.
- Construct replacement Earth Covered Magazines on U.S. Air Force Plant 44 (AFP 44).
- Construct an MSA on land identified as "Parcel H" by the National Guard Bureau.

Conservation Measures

The following conservation measures will be implemented to minimize effects of the proposed action on the lesser long-nosed bat:

- Grading activities at night should be suspended from 15 April to 15 September to the extent practicable to avoid impacts to potential foraging lesser long-nosed bats. However, recent monitoring of this species determined that migrants remain within the Tucson Basin into late October (Lowery et al. 2009). Thus, suspension window for construction activities for this species should be confirmed with USFWS.
- Protect in place, salvage and transplant, or replace any saguaros from the project area.

The following conservation measures will be implemented to minimize effects of the proposed action on the PPC:

- Avoidance

Of the 82 PPC individuals within the Detailed Study Area, 11 PPC individuals can be avoided in the airfield area and seven can be avoided in Parcel “G” and Parcel “H”. Therefore, 18 total PPC would be avoided. Exhibits 7 and 8 of the BA show the PPC individuals to be avoided and those that would be affected by the Proposed Action. During the construction process, all PPC in the Detailed Study Area that can be avoided near the project limits would be marked and protected from traffic and equipment. Bright PPC markers (e.g., orange construction fence), and education and coordination with all construction workers would prevent direct impacts to those existing PPC that do not have to be directly affected by construction activities.

- Mitigation Banking

A fundamental component of the PPC recovery strategy is to preserve and restore quality habitat to protect individuals and their seedbanks. Mitigation bank credits will be purchased to compensate for the loss of PPC habitat at a 1:1 ratio of area of modified habitat. Approximately 11 acres of PPC habitat would be removed in the airfield area. An additional 13 acres would be affected by the proposed Air

National Guard development on Parcel "G" (access road to the MSA may traverse Parcel G) and Parcel "H" (actual National Guard MSA will occur on Parcel H). Therefore, 24 acres as shown on Exhibit 9 of the BA would be affected by the Proposed Action. Mitigation credits will be purchased for this amount from the Palo Alto PPC Conservation Bank.

- Transplant and Monitoring

59 PPC individuals would be affected in the airfield due to clearing, grading, and paving for the proposed new runway and FAA required safety areas including the RSA, OFA, and RPZ. This also includes PPC affected by construction vehicles that may traverse the area and by the location of the proposed construction staging area. An additional five PPC individual would be affected by the proposed Air National Guard development on Parcel "G" (access road to the MSA may traverse Parcel G) and Parcel "H" (actual National Guard MSA will occur on Parcel H). Therefore, a total of 64 individual PPC are likely to be directly affected. A transplanting and monitoring program will be implemented to remove, salvage, and restore those 64 individual PPC.

PPC removal, salvage, and restoration would follow the ANPL and Pima County Native Plant Preservation ordinance (Pima County Code §18.72) to salvage PPC specimens. PPC would be transplanted according to the guidelines that were used during the relocation of PPC individuals removed during the construction of the East Hughes Access Road Relocation Project (SWCA 2015)(See page 24 of the BA for the detailed transplanting protocol).

All PPC will be transplanted onto existing Airport property that is restricted from access by the general public so the PPC will not be stolen or vandalized. Exhibit 10 of the BA shows the location of the potential PPC transplant area which encompass approximately 11 acres primarily in the unaffected RPZ area.

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 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. As this monitoring program continues, critical questions regarding the life cycle of this species will be answered.

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 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 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 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. We appreciate the additional discussion in the BA related to the potential effects of mining on PPC and find that the potential future effects of mining are uncertain.

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 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, 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. 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.

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.

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 Detailed Study Area of this project as described in the BA is comprised of several noncontiguous project sites within an area that is approximately four miles long and two miles wide, in portions of Township 15S, Range 14E, Sections 17, 18, 19, 20, 21, 28, 29, 32, & 33, 32.11252 -110.93930, WGS 84. The Airport is located on 8,343 acres in Tucson, Arizona in Pima County south of the City of Tucson central business district and near both Interstate 10 and Interstate 19. 50 Code of Federal Regulations (CFR) § 402.02 defines the action area as "*all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."* Thus, for this proposed project, the action area is defined as the Detailed Study Area.

The Detailed Study Area is in the Basin and Range physiographic province, characterized by mountain ranges on a northwest-southeast axis that are separated by broad alluvial valleys.

Elevations vary from about 2,540 feet above mean sea level (amsl) at the northwestern end to 2,690 feet above mean sea level at the southeastern end. The Detailed Study Area is near the interface of a lower alluvial fan terrace and the Santa Cruz River floodplain, and contains Sonoran Desert scrub communities in the Arizona Upland subdivision (Brown 1994; Brown and Lowe 1980). Vegetation is characterized by a diversity of low shrubs [dominated by creosote (*Larrea tridentate*) and woody crinklemat (*Tauilia canescens*)] and legume trees [e.g., velvet mesquite (*Prosopis velutina*) and blue paloverde (*Parkinsonia florida*)].

The Detailed Study Area is comprised chiefly of three soil units that are predominantly sandy loams. These units combined occur throughout 95 percent of the Detailed Study Area and include Cave soils and Urban land, Sahuarita and Mohave soils and Urban land, and Yaqui soils. Most of these soil units are formed in mixed alluvium, well-drained and calcareous, and some are mixed with amounts of modified Urban land soil (Cochran and Richardson 2003).

A. Status of the Species within the Action Area

One habitat model identified most of the Detailed Study Area as low value habitat; however, a different approach indicated that most of the area consisted of medium value habitat (SDCP 2000). Surveys for PPC based on methods described by Roller (1996) were conducted throughout this area by qualified biologists in the spring and summer of 2017. In summary, the survey protocol entailed three general parts:

1. Surveying in general short distance transects with repeated coverage or passages,
2. Performing local area searches associated with all surveyed individuals, and
3. Intensive searches within 50 square meters for random sample of individuals.

82 PPC were found in the Detailed Study Area as shown on Exhibit 5 of the BA. 70 were found near the southeast terminus of Runway 11R/29L during the pedestrian surveys in spring and summer of 2017. 12 additional PPC were found in Parcel "G and Parcel "H". No known PPC occur in the in the vicinity of the B-Mags on AFP-44 where the replacement earth-covered magazines will be built.

B. Factors Affecting Species Environment within the Action Area

PPC within the action area are protected from some of the threats faced by this species in other portions of its range. Threats such as urban development and recreational off-road vehicle use are limited because the action area is primarily lands owned by TAA and these types of activities are limited because of the restrictions and access control related to airport activities in the vicinity of these lands. Therefore, the primary threats to PPC in the action area are related to future facilities development related to airport activities.

Ongoing urbanization and residential and commercial development adjacent to project area and within the action area are 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.

Potential project effects are expected to include direct disturbance of individual PPC, habitat loss, and disturbance of suitable habitat through vegetation removal, grading, and construction activities. Due to FAA requirements, the Runway Safety Area (RSA) and Object Free Area (OFA) must be cleared and graded to accommodate the occasional passage of an airplane without damage to the airplane. In addition to the OFA and RSA, the FAA requires a Runway Protection Zone (RPZ). The RPZ does not have to be cleared and graded. However, the Proposed Action includes proposed pavement for an overrun area beyond the runway. Therefore, a portion of the RPZ must be cleared and graded. PPC that are located directed in these safety areas would be affected by the Proposed Action.

In addition to PPC being affected by clearing and grading for FAA required safety areas, PPC that are located immediately next to or in areas where construction vehicles may traverse or in an area proposed to be used for construction staging activities would be affected by vehicles running over individuals and by dust. Approximately 11 acres of PPC habitat will be removed in the airfield area. An additional 13 acres of PPC habitat would be affected by the proposed Air National Guard development of Parcel "G" and Parcel "H". Therefore, 24 acres of PPC habitat will be affected by the proposed action. In addition, 59 individual PPC will be affected in the airfield due to clearing, grading, and paving. An additional five PPC will be affected by the proposed Air National Guard development. Therefore, a total of 64 PPC will be directly affected by the proposed action.

To compensate for the permanent loss of PPC habitat, mitigation bank credits will be purchased from the Palo Alto PPC Mitigation Bank. Credits will be purchased at a 1:1 ratio for areas of habitat modified by the proposed action. Therefore, the project proponents will purchase 24 acre credits from the mitigation bank.

In addition, PPC that fall within the area of the project that will experience ground disturbance will be transplanted to an area within the RPZ zone that will remain undisturbed. The transplanting efforts will follow a previously successful protocol used for an adjacent project in 2015. Although documented transplant success of PPC has typically been low, there may be some plants that survive. Monitoring the success of this transplant effort will provide us with valuable information related to transplanting as a conservation measure for PPC. 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.

Federal lands adjacent to the project area include those owned by the United States Air Force (USAF) Plant 44 (leased by Raytheon) and TAA-owned lands that are obligated to the FAA. Cumulative effects include changes in land use and development patterns. Any development of adjacent properties on TAA land would be subject to separate environmental evaluations and Section 7 consultation, if required. We are not aware of any additional future developments in the action area.

CONCLUSION

After reviewing the current status of the Pima pineapple cactus, the environmental baseline for the action area, the effects of the proposed airfield safety enhancements, and the cumulative effects, it is our biological opinion that the Tucson International Airport airfield safety enhancements project, as proposed, is not likely to jeopardize the continued existence of the pineapple cactus. 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:

- To the extent possible, existing PPC within the project area will be avoided. For those that cannot be avoided, they will be transplanted to an area of the airfield that will remain undisturbed. This transplanting effort will be documented and monitored, producing information that will be useful in assessing transplanting of PPC as a potential conservation measure for this species. These transplanted PPC will also continue to contribute to the viability of the population at some level.
- The loss of occupied PPC habitat is offset by the conservation in perpetuity of 24 acres of PPC habitat within the Palo Alto PPC Mitigation Bank. This will contribute to the conservation of core blocks of PPC habitat within its range.

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.

Disposition of Dead or Injured Listed Species (Lesser long-nosed bat)

Upon locating a dead, injured, or sick listed species, initial notification must be made to the FWS's Law Enforcement Office, 2450 W. Broadway Rd, Suite 113, Mesa, Arizona, 85202, telephone: 480/967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

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 FAA, in conjunction with the TAA, work with the Service to improve core PPC habitat areas and habitat connectivity at TIA.
2) We recommend that the FAA continue to work with the TAA and FWS to monitor the success of the PPC transplant efforts associated with this and other projects.
3) We recommend that the FAA work with the TAA to address invasive species issues within and adjacent to TIA in areas supporting PPC.

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 FAA's efforts to identify and minimize effects to listed species from this project. For further information please contact Scott Richardson (520) 670-6150 (x242). Please refer to the consultation number 02EAAZ00-2018-F-0526 in future correspondence concerning this project.

Sincerely,

Steven L. Spangle
Field Supervisor

cc (electronic copy):

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Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ (Attn: Scott Richardson)
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ (pep@azgfd.gov)
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APPENDIX A.

Lesser Long-nosed Bat (*Leptonycteris curasoae yerbabuenae*)

Environmental Baseline

This species is known from grasslands, arid scrublands, and oak woodlands below 5500 ft. in elevation. In Arizona, these bats arrive in mid- April, roosting in caves, abandoned mine shafts and tunnels. Young are typically born in maternity colonies in mid-May in western Arizona. Females and young remain in maternity roosts and forage on primarily saguaros below about 3500 ft. until approximately mid-July. At this time, the range expands and bats are found up to about 5500 ft. in areas of semi-desert grassland and lower oak woodland, foraging primarily on agaves. These bats typically leave southern Arizona by late September to early October. While there are known lesser long-nosed bat roosts in the mountain ranges surrounding TIA (Santa Catalina, Rincon, Santa Rita mountains), no roost sites or maternity colonies are known to be within the action area for the proposed airfield safety enhancement project.

The primary threats to the lesser long-nosed bat are roost site loss or disturbance and impacts to forage availability (FWS 2007b). Other threats that have contributed to the current endangered status of the species include roost disturbance and deterioration, border activities, recreation, vandalism, fire, vampire bat control, mine closures, and forage availability. The effects of climate change (i.e., decreased precipitation and water resources) are a threat to many species, including the lesser long-nosed bat (Lenart 2007). 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 lesser long-nosed bat 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 lesser long-nosed bat populations since the species was originally listed in 1988, 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 habitat-disturbing activities and impacts to forage resources).

Lesser long-nosed bats are not know to forage in the action area, but are known to forage in the general vicinity of the TIA, using species of agave and columnar cacti, as well as hummingbird feeders. Agaves and saguaro cacti are not numerous within the action area.

Conclusion

The Service concurs with the FAA's determination that the action may affect, but is not likely to adversely affect lesser long-nosed bat, based upon the following:

- There are no known roost sites within the action area; therefore, the effects to roosts will be discountable.
- There are no significant occurrences of saguaro cacti or agaves within the action area, therefore the effects to lesser long-nosed bat forage resources will be insignificant.