Section 7 Analysis in Support of the Application for a Prevention of Significant Deterioration (PSD) Authorization and Significant Revision to Class I Air Quality Permit for Irvington Generating Station

Tucson Electric Power Company

Project Number: 60534109

August 9, 2017

Pima Pineapple Cactus (*Coryphantha scheeri* var. *robustispina*)
Source: Pima County Website:

http://www.pima.gov/CMO/SDCP/species/fsheets/ppc.html

Executive Summary

The Section 7 Endangered Species Act (ESA) analysis provided in this Biological Assessment is submitted in conjunction with Tucson Electric Power Company's (TEP) Class I/Prevention of Significant Deterioration (PSD) permit modification submitted to the Pima County Department of Environmental Quality and U.S. Environmental Protection Agency (USEPA) Region 9 by RTP Environmental Associates. The PSD permit application is for the installation of 10 reciprocating internal combustion engines (RICE) at the existing Irvington Generating Station (IGS), which is the Proposed Action. The purpose of the RICE Project is to provide load stabilization to accommodate intermittent renewable energy sources (solar and wind) that feed into the system and the retirement of existing gas-fired Units 1 and 2. IGS is considered a fossil fuel-fired steam electric plant (one of the "major emitting facility" identified in section 169 of the Clean Air Act), and is therefore subject to the PSD permitting requirements. The area around IGS is currently designated as attainment or unclassifiable for all criteria pollutants. The project area is located on private land in the City of Tucson, north of Interstate 10 and east of Alvernon.

Constituents in the air emissions as a result of the TEP RICE Project would include carbon monoxide (CO), volatile organic compounds (VOCs), particulate matter (PM), nitrogen oxides (NO_X), sulfur dioxide (SO_2), lead, and ammonia (NH_3).The expected annual emissions increases from the proposed engines were compared to the PSD significance levels to determine the PSD applicability as discussed in the permit application. It is noted that there is no PSD threshold for ammonia. The RICE Project will constitute a major modification at IGS and has the potential to increase emissions by more than 100 tons per year of CO, 15 tons of particulates less than 10 microns in size (PM_{10}), 10 tons of particulate less than 2.5 microns in size ($PM_{2.5}$), and 40 tons of VOCs. In addition, the project will exceed the PSD threshold for Greenhouse Gas (GHG). The RICE Project will not exceed PSD thresholds for NO_x, SO_2, or lead. Based on this review, CO, VOCs, PM_{10}, and $PM_{2.5}$ triggered modeling analyses. Additional modeling for ammonia was conducted for this analysis as it has the potential to be an ecological risk to aquatic species in waterbodies.

This Section 7 analysis was prepared for the purpose of informal consultation, per Section 7 of the ESA, between the action agencies (i.e., Pima County and USEPA; and the U.S. Fish and Wildlife Service, USFWS) on the expected effects of the Proposed Action on threatened, endangered, candidate, and proposed species with potential to occur in the action area, and designated or proposed critical habitat. The action area for the RICE Project is a 15-mile radius from the TEP facility at the IGS. The 15-mile radius is based on applying a conservative buffer to the dispersion model results in relation to the National Standard for $PM_{2.5}$ and the human threshold effect. The human threshold value was used because effect standards are not available for plant or animal species. Applying 1 percent of the maximum $PM_{2.5}$ air concentration using the human effect threshold indicated that the maximum effect would occur approximately 200 meters (656 feet) from the emission point within the facility. The extension of the area to 15 miles from the IGS was used as a conservative approach in analyzing potential effects of particulates on federally listed species.

The USFWS IPaC Project Planning Tool (https://ecos.fws.gov/ ipac/) was used to identify federally listed species to be considered for analysis in the Biological Assessment (BA). The IPaC results indicated that 23 federally listed species potentially occur within 50 kilometers (31 miles) of the TEP facility. In addition, critical habitat or proposed critical habitat for seven species is located within the species screening area. The initial species list was evaluated by the USFWS in terms of occurrence in relation to the TEP Project to determine those species to be carried forward in the BA analysis. Of the 23 species considered for the analysis, four species (lesser long-nosed bat (*Leptonycteris curasoae*), yellow billed-cuckoo (*Coccyzus americanus*), Chiricahua leopard frog (*Lithobates chiricahuensis*), and Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*) were identified as potentially occurring in the emissions area.

Based on the constituents of the air emissions from the TEP RICE Project due to the proposed modifications, the effects analysis includes a discussion of VOCs, CO, ammonia, and PM. However, VOCs, CO, and ammonia were eliminated from detailed consideration. VOCs were eliminated because they rapidly volatilize from surface soil and dermal contact by terrestrial wildlife to these contaminants in surface soils is expected to be minimal. VOCs deposited onto waterbodies also are likely to volatilize from the water surface resulting in minimal aquatic exposures. Carbon monoxide was eliminated from detailed analysis regarding effects on listed species because high levels are unlikely to occur in outdoor environments. As CO is emitted from the IGS stacks, the concentrations would be diluted and dispersed in the air currents. Concentrations of emitted CO would substantially decrease rapidly in distance from the IGS facility. Ammonia toxicity is mainly related to aquatic environments, which are limited within the action area, which means that ammonia occurrence is unlikely in the action area.

Due to the absence of effect levels or standards for plants and animals, a qualitative discussion is used in reference to the NAAQS and the projected change in PM compared to existing conditions. The NAAQS were developed to establish a limit on pollutants considered harmful to public health and the environment. The primary standards provide public health protection and the secondary standards provide for protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The projected increase in PM would be relatively small for the RICE Project when comparing maximum concentrations to background conditions (i.e., 1 percent PM_{10} and 8 percent for $PM_{2.5}$). The RICE Project would be well below both the primary and secondary NAAQS for PM_{10} and $PM_{2.5}$. As demonstrated in the dispersion modeling results, the Significant Impact Levels or the NAAQS for PM_{10} and $PM_{2.5}$ would not be exceeded as a result of adding the gas-fired reciprocating engines. Because the NAAQS are developed to be protective of the environment, it can be concluded that the PM emissions would not adversely affect the environment or the populations and habitat of listed species. Further information to support this conclusion is that PM concentrations would quickly decrease with distance from the IGS facility. In portions of the action area that represents potential habitat for the lesser long-nosed bat, yellow billed-cuckoo, Chiricahua leopard frog, and Pima pineapple cactus (approximately 5 to 15 miles from the facility), PM concentrations would be relatively low (0.02 to 0.03 $\mu g/m^3$) for both 24-hour and annual PM_{10} and $PM_{2.5}$. These PM concentrations would add a very small contribution to background PM levels (101 $\mu g/m^3$ for PM_{10} and 13 $\mu g/m^3$ for $PM_{2.5}$ [24-hour values]).

Based on the analysis of PM, VOCs, CO, and ammonia emissions, the following determinations were made for the federally listed species and critical habitat within the action area.

Effect on Species: There would be no adverse effect of the Proposed TEP RICE Project on the lesser long-nosed bat, yellow billed-cuckoo, and Chiricahua leopard frog, and Pima pineapple cactus due to air emissions containing PM, VOCs, CO, or ammonia. The estimated PM concentrations would be very small in portions of the action area that represents potential habitat for the federally listed species. The PM concentration estimated for the RICE Project would contribute less than 1 percent to background PM concentrations. VOCs and ammonia would not represent a risk to the federally listed species due to the rapid dispersal of VOCs and the fact that ammonia toxicity is mainly related to aquatic environments. Aquatic habitats are limited in the action area.

Effect on Critical Habitat: There would be no effect of the Proposed TEP RICE Project on the designated critical habitat for Chiricahua leopard frog and Pima pineapple cactus or proposed critical habitat for yellow billed-cuckoo due to air emissions containing PM, VOCs, CO, or ammonia, since the designated or proposed critical habitat does not overlap with the action area.

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1. Introduction

1.1 Purpose of Attachment

The Section 7 Endangered Species Act (ESA) analysis provided in this document is submitted in conjunction with Tucson Electric Power Company's (TEP) Class I/Prevention of Significant Deterioration (PSD) permit modification submitted to the Pima County Department of Environmental Quality (PDEQ) and U.S. Environmental Protection Agency (USEPA) Region 9 by RTP Environmental Associates. The PSD permit application is for the installation of 10 reciprocating engines at the existing Irvington Generating Station (IGS), also known as the H. Wilson Sundt Generating Station (Sundt). This Section 7 analysis presents the potential effects of the proposed TEP RICE Project on federally listed threatened and endangered species and species that have been proposed or are candidates for listing under the Endangered Species Act of 1973, as amended (ESA) (16 United States Code [USC] §1531 et seq.). The Proposed Action (Project) is described in detail in Chapter 2.0 of this Attachment.

This Section 7 analysis has been prepared for the purpose of informal consultation, per Section 7 of the ESA, between the action agencies (i.e., Pima County and USEPA; and the U.S. Fish and Wildlife Service (USFWS), on the expected effects of the Proposed Action on threatened, endangered, candidate, and proposed species with potential to occur in the action area, and designated or proposed critical habitat.

1.2 Proposed Action Location and Background

The proposed RICE Project will modernize IGS by replacing two 1950's era electric utility steam generating units (IGS Unit 1 and 2) with ten high-efficiency, fast-responding, state-of-the-art RICE, each having a generating capacity of 19 MW (nominal). TEP's basic purpose and fundamental objective for the RICE Project is to meet a critical need in its resource portfolio: Reliable, efficient, grid-balancing resources which can ramp up quickly and provide 100 percent of their effective load carrying capability during multiple peak periods of any length. The RICE Project will support the integration of renewable resources, consistent with TEP's 30 percent target by 2030. Tangential benefits of the proposed RICE Project include anticipated reductions in the capacity factors of the less-efficient steam generating units at IGS and improved overall environmental performance, including decreased water usage and wastewater discharge.

The IGS is located on private land in Township 15 South, Range 14 East, Section 3; southeast of the Gila and Salt River Baseline and Meridian, Pima County, Arizona. Geographic coordinates for the center of the IGS are latitude 32.1581660, longitude -110.8994510. The project area is located in the City of Tucson, north of Interstate 10 and east of Alvernon (**Figure 1-1**).

Figure 1-1 Aerial View of the TEP RICE Project Location at the Irvington Generating Station

2. Proposed Action

2.1 Tucson Electric Power Proposed Modifications

TEP is requesting a revision to the Class I permit for the IGS; an authorization pursuant to the preconstruction Prevention of Significant Deterioration ("PSD") permitting regulations to expand the IGS, and an approval of construction of new affected sources under federal National Emissions Standards for Hazardous Air Pollutants ("NESHAP"). As part of the proposed expansion project, TEP proposes to install up to ten natural gas-fired, reciprocating internal combustion engines ("RICE"), each with a nominal net generating capacity of 19 MW. In conjunction with the RICE Project, TEP will permanently cease operation of Units 1 and 2 at IGS, leaving the facility with a nominal, net generating capacity of 498 MW. Each RICE will be installed with selective catalytic reduction (SCR) control utilizing ammonia and oxidation catalyst for carbon monoxide (CO) and volatile organic compound (VOC) control. The 10 engines will be grouped into two sets for the appearance of two stacks.

IGS is considered a fossil fuel-fired steam electric plant (one of the "major emitting facility" identified in section 169 of the Clean Air Act), and is therefore subject to the Prevention of Significant Deterioration (PSD) permitting requirements. The area around IGS is currently designated as attainment or unclassifiable for all criteria pollutants.[1]

Constituents in the air emissions as a result of the TEP RICE Project would include CO, VOCs, particulate matter (PM), nitrogen oxides (NO_X), sulfur dioxide (SO_2), lead, and ammonia (NH_3). The expected annual emissions increases from the proposed engines were compared to the PSD significant levels to determine the PSD applicability as discussed in the permit application (RTP 2017). It is noted that there is no PSD threshold for ammonia. The RICE Project at IGS will constitute a major modification at IGS and has the potential to increase emissions by more than 100 tons per year of CO, 15 tons of particulates less than 10 microns in size (PM_{10}), 10 tons of particulate less than 2.5 microns in size ($PM_{2.5}$), and 40 tons of VOCs. In addition, the project will exceed the PSD threshold for Greenhouse Gas (GHG). The RICE Project will not exceed PSD thresholds for NO_x, SO_2, or lead. Based on this review, CO, VOCs, PM_{10}, and $PM_{2.5}$ triggered modeling analyses. Additional modeling for ammonia was conducted for this analysis. Additional modeling for ammonia was conducted for this analysis as it has the potential to be an ecological risk to aquatic species in waterbodies.

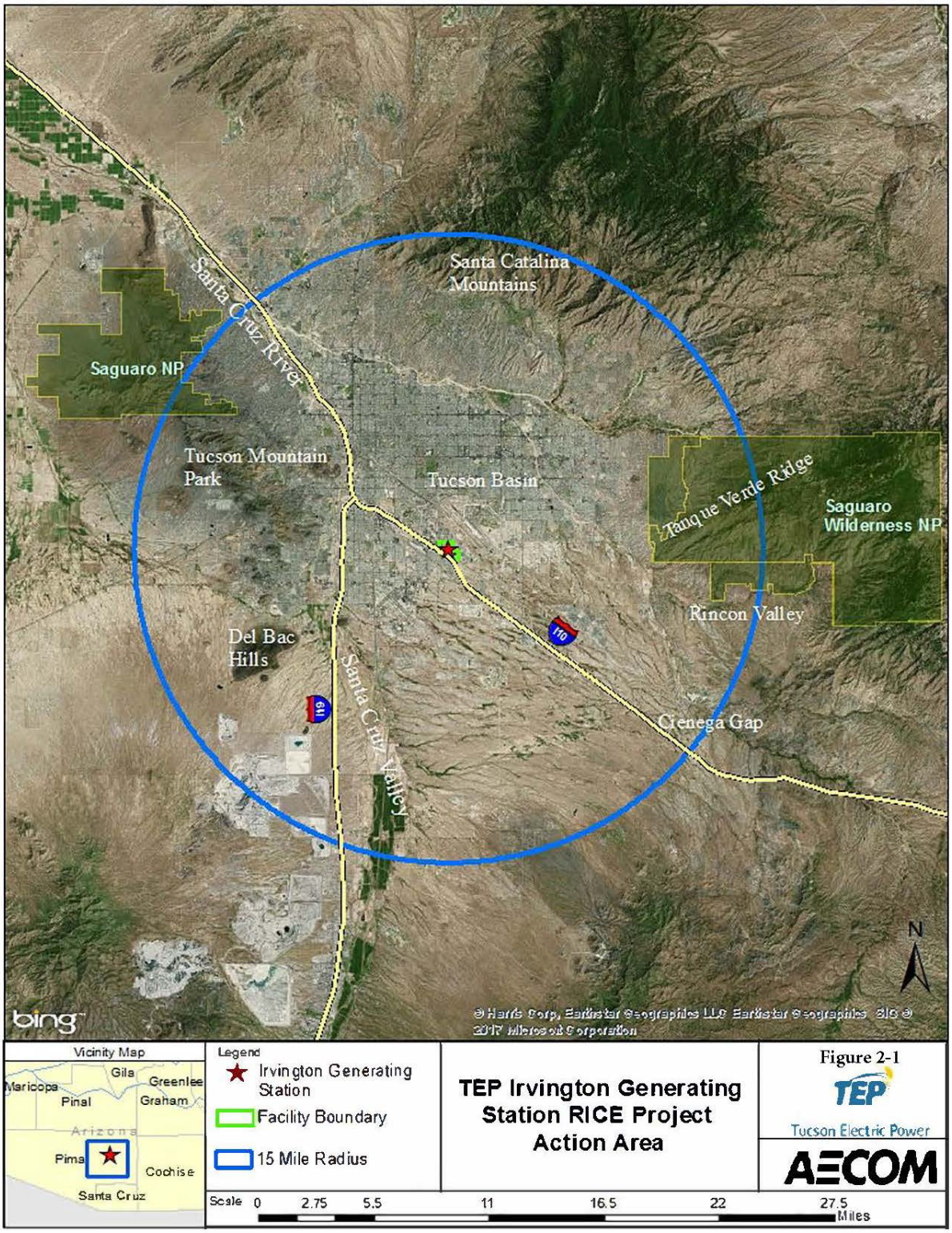
2.2 Action Area

The action area for the RICE Project is a 15-mile radius from the TEP facility at the Irvington Campus (**Figure 2-1**). The 15-mile radius is based on applying a conservative buffer to the dispersion model results in relation to the National Standard for $PM_{2.5}$ and the human threshold effect. The human threshold value was used because effect standards are not available for plant or animal species. Applying 1 percent of the maximum $PM_{2.5}$ air concentration using the human effect threshold indicated that the maximum effect would occur approximately 200 meters (656 feet) from the emission point within the facility. The

[1] 40 CFR § 81.303.

extension of the area to 15 miles from the IGS was used as a conservative approach in analyzing potential effects of particulates on federally listed species.

Figure 2-1 TEP Irvington Generating Station RICE Project Action Area



3. Consultation History

Informal consultation for the TEP RICE Project was initiated on June 7, 2017 through a telephone discussion with Mr. Scott Richardson (Supervisory Biologist, USFWS Tucson Sub-office). The discussion confirmed that a Section 7 analysis would be submitted in conjunction with TEP RICE Project's PSD Permit. Species to be considered for the Section 7 analysis were provided to Mr. Richardson, based on the Information, Planning, and Conservation (IPaC) Project Planning Tool analysis for a 50-kilometer (31-mile) distance from the IGS. Subsequent to this discussion, Mr. Richardson reviewed the list and identified four species that should be carried forward in the Section 7 analysis. Additional information on the species considered and the screening process to identify the species for analysis is provided in Section 4.1.

4. Species Accounts

4.1 Introduction and List of Species Analyzed

The USFWS IPaC Project Planning Tool (https://ecos.fws.gov/ipac/) was used to identify federally listed species to be considered for analysis in the Biological Assessment (BA). The IPaC results indicated that 23 federally listed species potentially occur within 50 kilometers (31 miles) of the TEP facility. The species screening table is provided in **Appendix A**; IPaC results are included in **Appendix B**. In addition, critical habitat or proposed critical habitat for seven species is located within the species screening area. The initial species list was evaluated by the USFWS in terms of occurrence in relation to the TEP Project to determine those species to be carried forward in the BA analysis. Of the 23 species considered for the analysis, four species (lesser long-nosed bat (*Leptonycteris curasoae*), yellow billed-cuckoo (*Coccyzus americanus*), Chiricahua leopard frog (*Lithobates chiricahuensis*), and Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*) were identified as potentially occurring in the emissions area. The following information was used in the analysis:

- Information from the USFWS and Arizona Natural Heritage Program;
- Arizona Game and Fish Department (AGFD); and
- Habitat requirements and the known distribution of these species from review of literature.

The following information provides the listing status, conservation plans, habitat associations, life history, and threats to the species analyzed in this Section 7 analysis.

4.2 Environmental Baseline Conditions

The action area lies within the Basin and Range Physiographic Province of Southern Arizona with elevations ranging from approximately 2,630 to 4,000 feet above mean sea level (amsl). Characteristics of this area include linear, north to south trending alluvial filled basins surrounded by normal fault-block mountain ranges. Perennial waterbodies are lacking in the action area, but scattered intermittent and ephemeral washes are present such as Santa Cruz River, Sabino Creek, Pantano Wash, Tanque Verde Wash, and Ventana Canyon Wash. The Santa Cruz River flows north from Mexico and goes through the Tucson area (along Interstate 10). It is perennial and intermittent south of Tucson but only ephemeral within the greater Tucson area.

Vegetation in the action area is representative of the Arizona Upland Subdivision of the Sonoran Desert Scrub biotic community (Brown 1994). However, vegetation within and immediately adjacent to the IGS is largely absent. Most of the IGS area has been graded and altered, since the original site was developed as an industrial facility in the 1950s (Bowers Environmental Consulting 2017). Several landscaped areas are scattered around the IGS area, and a few small patches of native vegetation are found near the southeast quadrant and perimeter of the facility. Grasses, and other ground cover species are nearly absent from the site and there are no large snags, permanent surface water, cliffs, caves, adits or other habitat features that would provide nesting, breeding, cover or forage opportunities for wildlife. Small patches of native habitat found on the project area are disconnected from

larger undeveloped tracks of natural desert land, as the entire Irvington Campus is surrounded by industrial, commercial and residential developments. Native plant species observed by Bowers Environmental Consulting (2017) within or immediately adjacent to the IGS included velvet mesquite (*Prosopis velutina*), foothills palo verde (*Cercidium microphyllum*), creosote bush (*Larrea tridentate*), triangle leaf bursage (*Ambrosia deltoidea*), Englemann prickly pear cactus (*Opuntia phaeacantha* var. *discata*), fish hook barrel cactus (*Ferocactus wislizenii*), and teddy bear cholla cactus (*Cylindropuntia bigelovii*). Vegetation in the remaining portion of the action area (0.5 to 15 miles from the IGS) consists of native desert scrub species in areas where there is minimal disturbance.

4.3 Lesser Long-nosed Bat

4.3.1 Listing and Conservation Status

The lesser long-nosed bat was listed as federally endangered on September 30, 1988 (53 Federal Register [FR] 38456); no critical habitat has been proposed for this species. The USFWS has proposed to remove the lesser long-nosed bat from the list of endangered and threatened wildlife in January 2017, which is under review by the USFWS (83 FR 1665 1676). The *Multi-species Conservation Plan for Pima County* (Pima County 2016) identifies conservation measures for the lesser nosed bat. A recovery plan was prepared for this species in 1994 (USFWS 1994).

4.3.2 Life History and Habitat Association

Life History. Current information suggests females give birth to a single pup weighing about 30 percent of its mother's weight. Young lesser long-nosed bats have well-developed feet and are left to hang in the day roost from the day of birth, while the mother leaves the roost to forage. Young probably are nursed for about 6 weeks, begin to fly at 4 weeks, and begin leaving the roost on evening flights at 6 to 7 weeks (USFWS 1994).

As discussed by the USFWS (1994), the lesser long-nosed bat has specialized food requirements. Columnar cactus flowers and fruits and agave flowers are believed to represent the core diet. Flowers and fruits of two to three species of columnar cacti (*Pachycereus pringlei*, *Carnegia gigantea*, and *Stenocereus thurberi*) provide nearly all of the energy and nutrients obtained by pregnant and lactating females roosting in the Sonoran desert in the spring and early summer.

Two sets of resources, suitable day roosts and suitable concentrations of food plants, are critical for the lesser long-nosed bat. Caves and mines are used as day roosts. Factors that identify potential roost sites as being "suitable" have not been fully identified, but maternity roosts tend to be very warm and poorly ventilated, at least where the young are actually raised. Such roosts reduce the energetic requirements of adult females while they are raising their young (USFWS 1994).

There appear to be both sexual and seasonal differences in their Arizona range. During the early part of their stay (late April to late July) pregnant females congregate at traditional roost sites, give birth, and raise their young at lower elevations within the range of columnar cacti.

Males and perhaps non-pregnant females do not arrive until sometime in July. By late July, most females and young have dispersed from the maternity colonies and some have moved to higher elevations where they are found feeding on agave flowers. By late September or October all of these bats are migrating south into Mexico and into Central and South America (AGFD 2011a).

Habitat. The lesser long-nosed bat habitat is mainly consists of desert scrub vegetation between 1,600 and 7,500 feet amsl in elevation with agave and columnar cacti present as food plants (USFWS 2001). In Arizona, they feed on nectar and pollen from flowers of saguaro and organ pipe cactus in early summer and agave later in the summer and early fall. They may feed on ripe cactus fruits at the end of the flowering season. They also may take a few insects incidentally when taking nectar.

Lesser long-nosed bats roosting in Arizona are found living in caves and mines displaying a variety of microclimates (e.g., dry and hot, wet and hot, dry and cool, and wet and cool). It occurs in well-ventilated caves, as well as those that are poorly ventilated and filled with strong ammonia fumes. Abandoned mines are important roost sites throughout its range. Lesser long-nosed bats use night roosts for digesting their meals. These roosts include the bats' day roosts as well as other caves, mines, rock crevices, trees and shrubs, and occasionally abandoned buildings (USFWS 1994).

4.3.3 Occurrence in the Action Area

In the United States, this species historically ranged from central Arizona into southwest New Mexico. The current range is similar to the historic range; however, the number of occupied roost sites and the number of individuals per colony have recently declined. These bats are seasonal (April-September) residents of southeastern Arizona, and possible extreme western Arizona (USFWS 2001).

They occur in southern Arizona from the Picacho Mountains southwesterly to the Agua Dulce Mountains and southeasterly to the Galiuro and Chiricahua mountains and then southerly into Mexico and beyond. Late-summer records of immature individuals from the Phoenix area and the Pinaleno Mountains also have occurred in recent years. This species is not present in Arizona during winter months (AGFD 2011a).

An extremely important feature of the population ecology of the lesser long-nosed bat is its mobility. Many individuals undertake long seasonal migrations and fly long distances from their day roosts to forage each night. Tracking data indicate these bats will fly up to 6 hours each night to forage and can cover distances of 50 to 62 miles (80 to 100 kilometers) per night (USFWS 1994).

The greater Tucson area has been identified as 'predicted distribution' for the lesser long-nosed bat, with historic records occurring within the action area (i.e., 15-mile radius from the TEP facility [AGFD 2011a]). However, as a result of urban development, the action area is not considered to be conducive for this species. The surrounding desert habitats adjacent to the urban area provide sufficient food sources. No known caves or mines occur within the action area are known to be utilized by this species.

4.3.4 Threats

As discussed by the USFWS (2016a), impacts on maternity roost sites (caves and abandoned mines) including physical destruction and human disturbances have caused seasonal abandonment of the roost sites or reduction in successful rearing of pups. Furthermore, destruction or disturbances of bachelor and night roost sites have detrimental effects to local populations of bats. The lesser long-nosed bat feed on columnar cacti flowers and fruits, therefore additional indirect effects have occurred to local bat populations, as cacti are removed for urban development and commercial enterprises such as mining.

4.4 Yellow-billed Cuckoo

4.4.1 Listing and Conservation Status

The Western U.S. Distinct Population Segment (DPS) of the western yellow-billed cuckoo (herein referred to as western yellow-billed cuckoo) became a candidate species for listing as threatened or endangered on October 30, 2001 (66 FR 54807-54832). On October 3, 2013, the western yellow-billed cuckoo was proposed for listing under the ESA (78 FR 61621-61666). On November 3, 2014, the species was listed as threatened by the USFWS (79 FR 59992-60038). On August 15, 2014, the USFWS proposed critical habitat for the western yellow-billed cuckoo (79 FR 48548-48652). A final critical habitat designation for the species has not been issued.

4.4.2 Life History and Habitat Association

Life History. As summarized by the USFWS (2016b), both adults build the nest, often in willow or mesquite thickets from 4 to 30 feet above ground. The nest is a stick platform, thinly lined with leaves, mesquite and cottonwood strips, grass, and catkins with little depression to hold eggs, but well concealed by surrounding foliage. Clutches of three to four eggs are laid with incubation lasting four to 11 days. Young birds leave the nest in seven to eight days. If double clutching occurs, the male feeds the first brood of fledglings, while the female feeds the second brood. The predominate food base for this species includes hairy caterpillars, bird eggs, frogs, lizards, ants, beetles, wasps, flies, berries, and fruit. Young are fed regurgitated insects.

Habitat. As summarized by the AGFD (2011b), suitable habitat for the yellow-billed cuckoo is limited to narrow, and often widely separated, riparian cottonwood-willow galleries and salt cedar stands at elevations less than 6,600 feet amsl. Dense understory foliage appears to be an important factor in nest site selection. In addition to cottonwood-willow galleries, cuckoos in Arizona occur in larger mesquite bosques. They are sometimes observed as transients in xeric desert or urban settings.

Yellow-billed cuckoos in the western U.S. are recognized as a DPS by the USFWS. In the arid Southwest, yellow-billed cuckoos are primarily restricted to densely wooded rivers, streams and damp thickets with relatively high humidity. In Arizona, this species primarily occurs along low-elevation drainages where stands of multi-storied native riparian woodlands are present (AGFD 2011b).

Arizona probably contains the largest remaining known cuckoo population among states west of the Rocky Mountains. Approximately 70 percent of Arizona Breeding Bird Atlas observations were in lowland riparian woodlands that often contained some combination of Fremont cottonwood, willow, velvet ash, Arizona walnut, mesquite, and tamarisk. In southeastern Arizona, cuckoos also occurred along intermittent drainages with dense stands of velvet mesquite and netleaf hackberry (AGFD 2011b).

Proposed Critical Habitat. In 2014, the USFWS proposed to designate 546,335 acres of critical habitat for the western distinct population segment of the yellow-billed cuckoo in 80 separate units in Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah, and Wyoming (USFWS 2016b). No proposed critical habitat for the western-billed cuckoo overlaps with the action area. The closest critical habitat for this species is located approximately 0.5 mile to the southeast of the action area, 15.5 miles from IGS.

4.4.3 Occurrence in the Action Area

Historically, western cuckoos occurred from southern British Columbia through the states of Washington, Oregon, California, and eastward to the Rocky Mountains. They were considered locally common and widespread in Arizona and California; locally common but restricted to a few river reaches in New Mexico; common locally in Oregon and Washington, and local and uncommon in arid and semiarid portions of scattered drainages in western Colorado, western Wyoming, Idaho, Nevada, and Utah, and probably uncommon and local in British Columbia (AGFD 2011b).

In Arizona, cuckoos have been reported in the following drainages: Aqua Fria River, Little Colorado River, Alter Valley, Oak Creek, Arivaca Creek, Pinal Creek, Babocomari River, Salt River, Big Sandy River, San Francisco River, Bill Williams River, San Pedro River, Blue River, Santa Cruz River, Burro Creek, Santa Maria River, Cherry Creek, Sonoita Creek, Cienega Creek, Sycamore Canyon, Colorado River, Tonto Creek, Eagle Creek, Verde River, Gila River, Virgin River, Hassayampa River, West Clear Creek, Little Ask Creek, and Wet Beaver Creek (AGFD 2011b).

The drainages surrounding the greater Tucson area have not been identified as part of the current distribution for this species (USFWS 2016b). The closest known habitat considered to be part of the current distribution for this species is located southeast of the greater Tucson area along Cienega Creek at a distance of approximately 0.5 mile of the action area. This location also is the closest proposed critical habitat to the action area. Critical habitat also occurs in the Santa Cruz River south of Tucson, but the location is further from the action area.

4.4.4 Threats

As summarized by the USFWS (2016b), the primary cause for the cuckoos decline is the extensive loss of riparian forest habitat throughout the west. Principal causes of riparian habitat destruction, modification, and degradation in the range have occurred from alteration of hydrology due to dams, water diversions, management of river flow that differs from natural hydrological patterns, channelization, and levees and other forms of bank stabilization that encroach into the floodplain. These losses have been further exacerbated

by conversion of floodplains for agricultural uses, such as crops and livestock grazing. In combination with altered hydrology, these threats promote the conversion of existing primarily native habitats to monotypic stands of non-native vegetation, reducing the suitability of riparian habitats for the cuckoo.

4.5 Chiricahua Leopard Frog

4.5.1 Listing and Conservation Status

Chiricahua leopard frog was listed as federally threatened on June 13, 2012 (67 FR 40790) with critical habitat designated on March 20, 2012 (77 FR 16324). A final recovery plan was prepared for this species in 2007 (USFWS 2007a). The *Multi-species Conservation Plan for Pima County* (Pima County 2016) identifies conservation measures for the Chiricahua leopard frog. A recovery plan was prepared for this species in 1994 (USFWS 1994).

4.5.2 Life History and Habitat Association

Life History. As summarized by the USFWS (2011), the life history of the Chiricahua leopard frog is characterized as a complex life cycle, consisting of eggs and larvae that are entirely aquatic and adults that are primarily aquatic. The male fertilizes the eggs as the female attaches a spherical mass to submerged vegetation. Eggs are laid mainly from February into October, with most masses being present in the warmer months. The numbers of eggs in a mass range from 300 to approximately 1,500 and may be correlated with female body size. Egg masses in the wild hatch between 8 and 14 days depending on water temperature. Upon hatching, tadpoles are mainly herbivorous and remain in the water, where they feed and grow, with growth rates being faster in warmer conditions. Tadpoles have a long larval period of three to nine months. After metamorphosis, Chiricahua leopard frogs eat an array of invertebrates and small vertebrates and are generally inactive between November and February. Males reach sexual maturity in 1 year. Under ideal conditions, Chiricahua leopard frogs may live as long as 10 years in the wild.

Home ranges for males tend to be larger than females (AGFD 2011c). Meta-population dynamic studies suggest that Chiricahua leopard frogs can travel up to 1 mile overland, 3 miles along ephemeral or intermittent drainages, and up to 5 miles along perennial waterways (USFWS 2011c). Dispersal routes can be overland, but typically follow drainages that connect aquatic habitats, provide cover from predators, and contain aquatic features to prevent against desiccation (drying) (USFWS 2011c). The most likely dispersal routes usually include combinations of ephemeral, intermittent, and perennial drainages, as well as uplands.

Habitat. Chiricahua leopard frog is a highly aquatic habitat generalist that over-winters near breeding sites. This species is known to occur within a wide variety of permanent and semi-permanent aquatic systems in oak and pine woodlands, chaparral, grasslands, and desert habitats (AGFD 2011c). Chiricahua leopard frog historically occurred in aquatic resources at elevations of 3,200 feet to 8,900 feet amsl. The species is now often restricted to the upper portions of watersheds where non-native predators either have yet to invade or where habitats are only marginal for the predators (USFWS 2011). As summarized by the USFWS

(2011), riparian areas adjacent to water provide essential foraging and basking sites. Vegetation in these areas provide habitat for prey species and protection from terrestrial predators (those living on dry land). In particular, Chiricahua leopard frogs use these upland areas during the summer rainy season. Dispersal routes must include vegetation cover for protection from predators, and contain aquatic sites that can serve as buffers against desiccation as well as stop overs for foraging. A lack of barriers that would block dispersal is critical. Features on the landscape likely to serve as partial or complete barriers to dispersal include cliff faces and urban areas, reservoirs 20 acres or more in size that are stocked with sport fish species or other nonnative predators, highways, major dams, walls, or other structures that physically block movement.

Critical Habitat. Critical habitat has been designated for this species in nine Arizona counties including Pima County, as well as New Mexico. The physical and biological features of critical habitat in stream and riverine lotic (actively moving water) systems are contained within the riverine and riparian ecosystems formed by the wetted channel and adjacent floodplains within 328 lateral feet (100 lateral meters) on either side of bank-full stage. The use of bank-full stage and 328 feet on either side recognizes the naturally dynamic nature of riverine systems, recognizes that floodplains are an integral part of the stream ecosystem, and contains the features essential to the conservation of the species (USFWS 2012).

Under the Endangered Species Act, Primary Constituent Elements (PCE) are the physical and biological features that, when laid out in the appropriate quantity and spatial arrangement to provide for a species' life-history processes, are essential to the conservation of the species. As discussed by the USFWS (2012) in the *Final Environmental Assessment for the Designation of Critical Habitat for the Chiricahua Leopard Frog*, the USFWS has determined that the PCEs essential to the conservation of the Chiricahua leopard frog are: (1) aquatic breeding habitat and immediately adjacent uplands; (2) dispersal and non-breeding habitat, consisting of areas with ephemeral (water present for only a short time), intermittent, or perennial water that are generally not suitable for breeding, and associated upland or riparian habitat that provides corridors (overland movement or along wetted drainages) for frogs among breeding sites in a meta-population.

4.5.3 Occurrence in the Action Area

Chiricahua leopard frog populations in Arizona are divided into two areas; the northern population (Mogollon Rim population), which extends from montane areas in central Arizona, east and south along the Mogollon Rim to montane parts of western and southwestern New Mexico. The second population (Southern) is located in the mountains and valleys south of the Gila River in southeastern Arizona and southwestern New Mexico, and extends into Mexico (AGFD 2011c).

As summarized by the AGFD (2011a), this species historically ranged from central, east-central, and southeastern Arizona (Santa Cruz, Apache, Gila, Pima, Cochise, Greenlee, Graham, Yavapai, Coconino, and Navajo counties); west-central and southwestern New Mexico; and in Mexico, northeastern Sonora and the Sierra Madre Occidental of northwestern Chihuahua. A total of 298 historical localities are known for the species in Arizona. The current range is generally similar to its historical range, but populations are often small and isolated, and the frog has apparently disappeared from some drainages and mountain ranges (AGFD 2011c).

Critical habitat for this species does not occur within the action area. The drainages surrounding the greater Tucson area have not been identified as part of the current distribution for this species (USFWS 2012). The nearest known habitat considered as part of the current distribution for this species is located in a livestock tank in the Sierrita Mountains; approximately 11.5 miles southwest of the closest point from the action area, as well as habitat located southeast of the action along mountain intermittent drainages. The nearest critical habitat for this species is the location mentioned above in the Sierrita Mountains.

4.5.4 Threats

Common predators of adult and juvenile Chiricahua leopard frog include non-native American bullfrogs, native and non-native fishes, garter snakes, great blue herons, and many mammals including rats, coyotes, gray foxes, raccoons, ringtail cats, coatis, black bear, badgers, skunks, bobcats, and mountain lions. Vegetation, undercut banks, root masses, and other cover objects would probably be important retreats from predators (USFWS 2012).

Chiricahua leopard frogs are fairly tolerant of variations in water quality, but likely do not persist in waters severely polluted with cattle feces, or runoff from mine tailings or leach ponds (USFWS 2011). Threats to this species include predation by non-native organisms; the fungal disease chytridiomycosis; drought; floods; degradation and loss of habitat as a result of water diversions and groundwater pumping, livestock management that degrades frog habitats, catastrophic wild fire (fire-prone upland habitats) resulting from a long history of fire suppression, mining, development, and other human activities; disruption of meta-population dynamics; increased chance of extirpation or extinction resulting from small numbers of populations and individuals existing in dynamic environments; and environmental contamination such as runoff from mining operations and airborne contaminants from copper smelters. Loss of Chiricahua leopard frog populations fits a pattern of global amphibian decline, suggesting other regional or global causes of decline may be important as well, such as elevated ultra-violet radiation, pesticides or other contaminants, and climate change.

4.6 Pima Pineapple Cactus

4.6.1 Listing and Conservation Status

Pima pineapple cactus was listed as a federally endangered species on September 23, 1993 (58 FR 49875); no critical habitat has been designated or proposed for this species. A draft recovery plan was made available for this species by the USFWS in June 2017 (82 FR 28875). The *Multi-species Conservation Plan for Pima County* (Pima County 2016) identifies conservation measures for the Pima pineapple cactus. A recovery plan was prepared for this species in 1994 (USFWS 1994).

4.6.2 Life History and Habitat Association

Life History. As summarized by the USFWS (2007b), the Pima pineapple cactus is a hemispherical plant. The flowers are silky yellow (rarely white) in color and appear in early

July with the summer rains. Flowering continues until August. The fruit is green, ellipsoid, succulent and sweet with each plant producing flowers over a 1- to 3-day period.

The species typically reproduce from seed or from vegetative offshoots. The species does not self-pollinate. Bees are the presumed pollinators. Fruits mature in about two weeks and rabbits and rodents act as seed dispersers. Young plants are hard to found, and this is presumed to be due to difficulty in locating small plants or due to low seedling establishment rate (USFWS 2007b).

Habitat. As discussed by the USFWS (2000), Pima pineapple cacti are well camouflaged within their micro-habitat and general habitat characteristics vary across the taxon's range. Pima pineapple cacti generally occupy alluvial basins and hillsides in semi-desert grasslands, desert scrub and the transition area between the two. This species is most commonly found on open areas on flat ridge-tops or slopes of less than 10 to15 percent. Soils range from shallow to deep and silty to rocky. The distribution of the cactus is patchy, with highly variable densities, and widely distributed across the areas of suitable habitat. Few locations have significant populations, and those tend to be clumped within a smaller area. Due to topography, hydrology, plant community type, and elevation, there are extensive areas within the overall range of the cactus that do not qualify as habitat. Lands subject to considerable disturbances due to human development or other land uses generally do not support the cactus.

4.6.3 Occurrence in Action Area

Pima pineapple cactus at elevations from 2,300 to 4,500 feet amsl in Pima and Santa Cruz counties, Arizona, and northern Sonora, Mexico. The range extends east from the Baboquivari Mountains to the western foothills of the Santa Rita Mountains. The northernmost boundary is near Tucson. Specific areas within the geography area stated above are difficult to estimate due to its habitat requirements and the topographic complexity within its range (AGFD 2001). There are known occurrences for the Pima pineapple cactus within the action area in suitable habitat (AGFD 2015).

4.6.4 Threats

Threats to this species include illegal collection, habitat degradation due to recreation, and historical and present overuse of the habitat by livestock, habitat loss due to mining, agriculture, road construction, urbanization, aggressive non-native grasses, and range management practices to increase livestock forage (USFWS 2000). This cactus is vulnerable to ground disturbing activities that remove or degrade natural vegetation cover, including mining, poor livestock management, and urban/exurban development that also fragments remaining habitat areas. Expansion of non-native invasive plants that alter the fire frequency and intensity, predation by insects and small mammals, and extended drought also are threats to the cactus (USFWS 2000).

5. Effects of Proposed Action

5.1 Dispersion Modeling and Constituents

As discussed in Section 2.1 of this Attachment, air dispersion modeling was required only for CO, VOCs, PM_{10}, and $PM_{2.5}$. The rationale for ammonia modeling is discussed in Section 2.1 of this BA. Dispersion modeling was performed for the TEP RICE Project in support of a Class I/PSD permit modification) using the most recent version of AERMOD (v16216). Detailed descriptions of the modeling approach used in evaluating air quality impacts of the proposed RICE Project including model selection criteria, good engineering practice stack height determination, refined modeling analyses, ambient air quality compliance, and assumptions are provided in the *Air Quality Dispersion Modeling Report in Support of the Application for a Prevention of Significant Deterioration (PSD) Authorization and Significant Revision to Class I Air Quality Permit for Irvington Generating Station* (AECOM 2017). The ten engines were grouped into two sets where the five stacks from each group were modeled as a merged stack consistent with USEPA Model Clearinghouse Memo 91-II-01[2], creating the appearance of two new stacks at IGS. The following key assumptions were used in the modeling analyses.

- Each engine was modeled assuming 8,760 hours of operation per year. Except as noted below, all ten engines were conservatively assumed to start simultaneously for each hour modeled over the course of the 5-year period.
- For PM_{10} and $PM_{2.5}$, the daily average emission rates assume 5 hours of startup emissions and 19 hours of non-startup (normal) emissions. This rate was used for the 24-hour and annual averaging periods.
- For the 8-hour averaging period of CO, the emission rate assumes 5 hours of startup emissions and 3 hours of non-startup emissions. The 1-hour averaging period of CO, the modeled emission rate assumes all 10 engines start simultaneously in the same hour, every hour of the year.

In accordance with pre-construction monitoring requirements (40 CFR 52.21(m)), an application for a PSD permit must contain an analysis of ambient air quality in the vicinity of the proposed Project for each pollutant subject to PSD review. The definition of existing air quality can be satisfied by air measurements from either a state-operated or private network, or by a pre-construction monitoring program that is specifically designed to collect data in the vicinity of the proposed source. A source can fulfill the pre-construction monitoring requirement for PSD without conducting on-site monitoring if data collected from existing monitoring sites are conservatively representative of the air quality in the vicinity of the proposed Project site.

The existing monitoring data must be determined by the reviewing authority to be representative of air quality for the area in which the proposed Project would be constructed and operated. In determining whether ambient monitoring data can be considered representative for satisfying the PSD pre-construction monitoring requirement for a project, the USEPA guidance in *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)* (EPA-450/4-87-007, May 1987) was reviewed.

[2] Available at: https://cfpub.epa.gov/oarweb/MCHISRS/index.cfm?fuseaction=main.resultdetails&recnum=91-II%20%20-01.

Figure 5-1 shows the locations of the monitoring sites relative to the Project site. The CO/Ozone monitor at 22nd and Craycroft is approximately 5 kilometers (3.1 miles) northeast of IGS. Ozone is a product of VOC and NO_x. The South Tucson PM_{10} monitor is located approximately 6 kilometers (3.7 miles) northwest of IGS and the Children's Park $PM_{2.5}$ monitor is located approximately 15 kilometers (9.3 miles) north-northwest of IGS. These monitors are well situated such that emissions from IGS and other sources in the downtown Tucson area would impact these monitors based on the windrose in **Figure 5-2**.

Table 5-1 provides a summary of the most recent 3-year period (2013-2015) ambient background design values, which represents existing air quality conditions. Design values for the 2014-2016 period have yet to be posted on USEPA's website. The background concentrations for CO and PM are considerably lower than the NAAQS but exceed the SILs.

Table 5-1 Background Design Values for TEP Project Site

Pollutant	Monitor Location	Avg. Period	Design Value	SIL[1]	NAAQS	Units
CO	22nd & Craycroft	1-hr	1.6	1.75	35	Ppm
CO	22nd & Craycroft	8-hr	0.8	0.44	9	Ppm
PM_{10}	South Tucson	24-hr	101	5.0	150	µg/m³
$PM_{2.5}$	Children's Park NCORE	24-hr	13	1.2	35	µg/m³
		Annual	5.5	0.3	12	

[1] SIL = Significant Impact Level assessed using AERMOD Class II receptor locations in comparison to Class II SILs.

Ammonia is monitored at fewer locations, with the nearest location at the Chiricahua National Monument approximately 100 miles southeast of Tucson. The most recent year of data published by the Ammonia Monitoring Network under the National Atmospheric Deposition Program is 2012[3]. The annual average concentration at this location is 1.01 µg/m³. There are no monitors for VOCs.

A comparison of the modeled concentrations with the SILs and National Ambient Air Quality Standards (NAAQS) is presented in **Table 5-2** for the locations shown in **Figure 5-2**. The annual concentration represents an average concentration for a 12-month period. The model results show maximum concentrations at the fence line of the IGS facility, with reduced concentrations at 1 to 15 miles from the facility. The 24-hour and annual PM concentrations decreased by 19 to 50 percent at a distance of 1 mile from the IGS facility. The PM and ammonia concentrations continued to decrease with distance from the facility. The PM concentrations at the outer boundary of the action area (i.e., 15 miles from the IGS facility) decreased by approximately 80 to 86 percent. All modeled concentrations were considerably below their respective SILs or Reference Exposure Levels (RELs). The $PM_{2.5}$ concentrations would be the same as shown for PM_{10} at the distance intervals from the IGS because the emission rates are the same for both PM size categories.

[3] http://nadp.sws.uiuc.edu/amon/images/AmonAnnual2012-thumb.png

Figure 5-1 Locations of Nearby Ambient Monitors

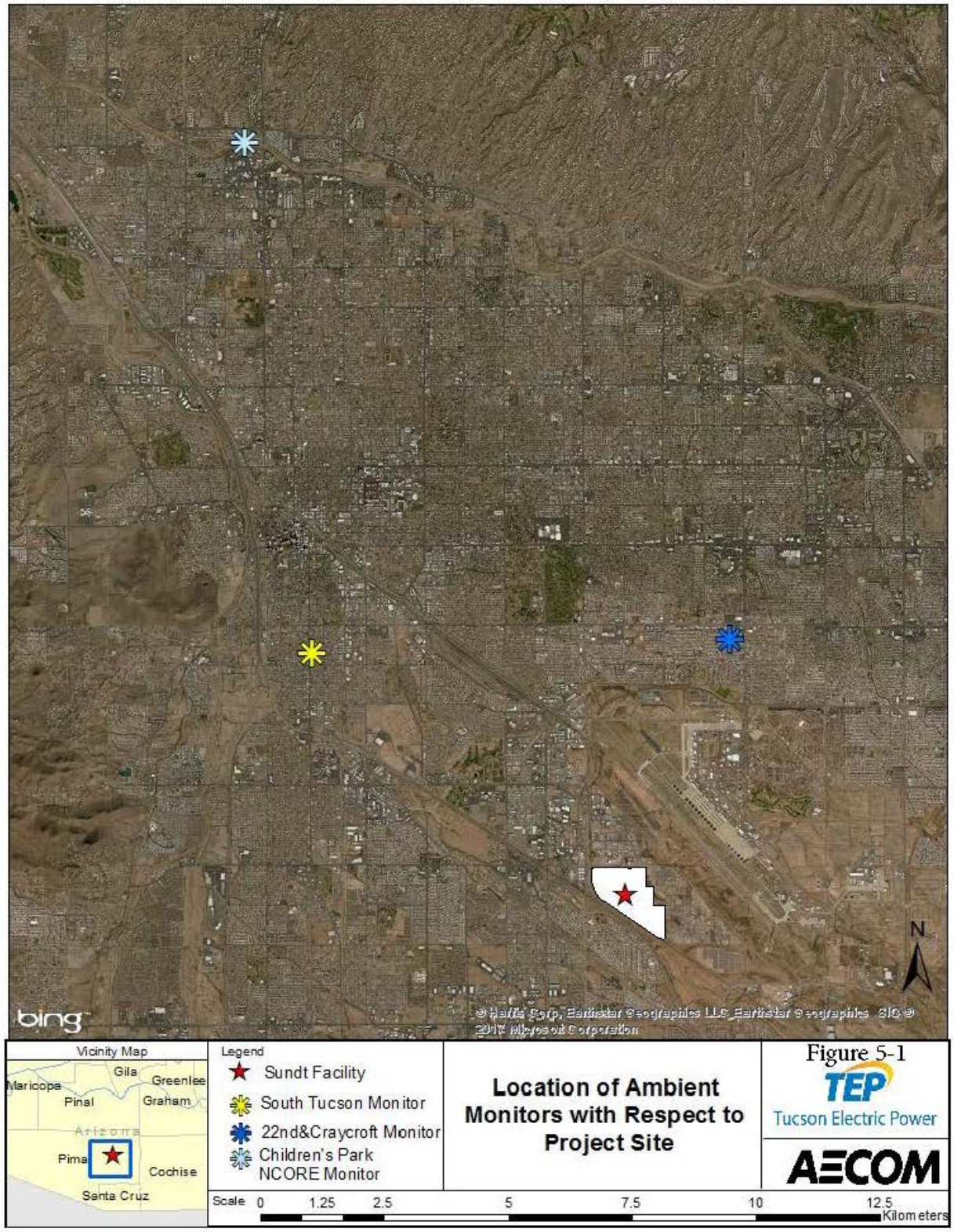
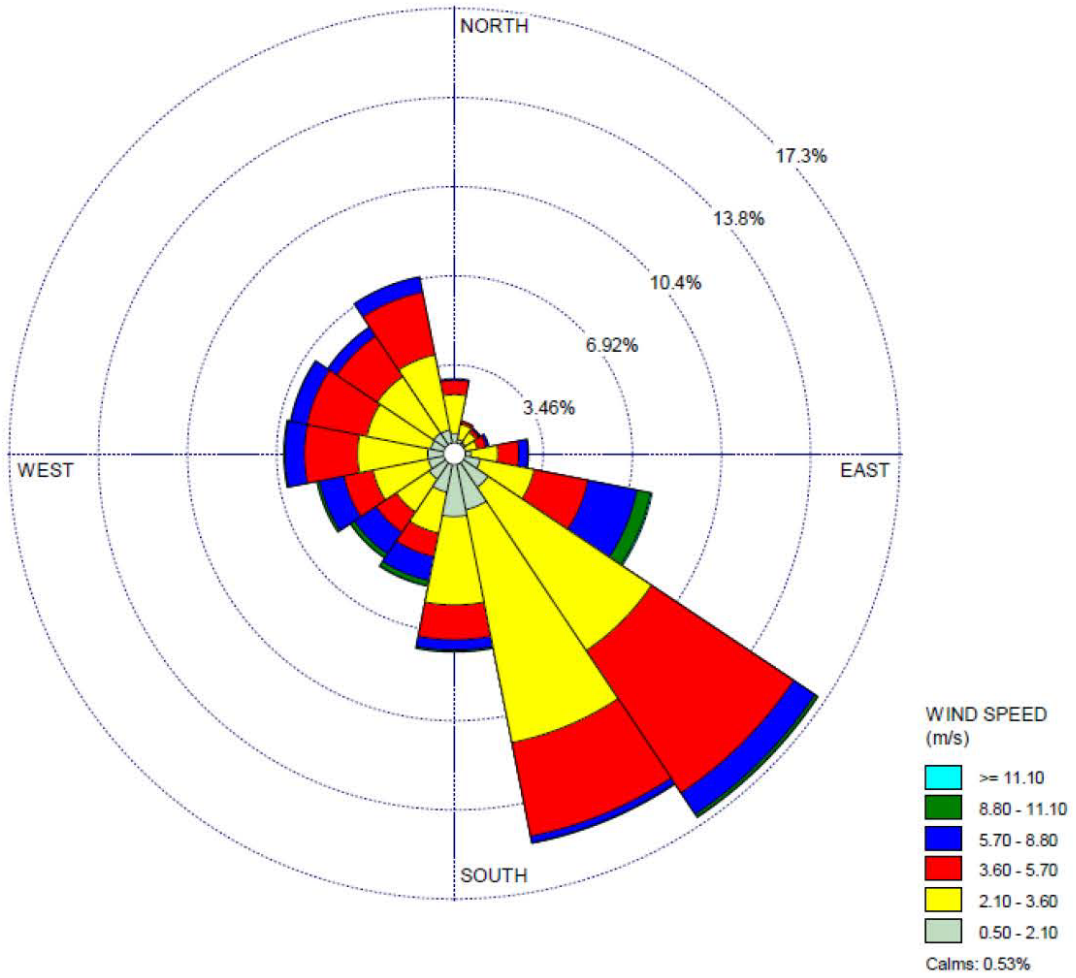


Figure 5-2 Wind Rose from Tucson International Airport 2012-2016

WIND ROSE PLOT:
Tucson International Airport
2012-2016

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 1/1/2012 - 00:00 **End Date: 12/31/2016 - 23:59**	**AECOM**	Figure 5-2 AECOM
	CALM WINDS: **0.53%**	TOTAL COUNT: **43696 hrs.**	
	AVG. WIND SPEED: **3.53 m/s**	DATE: **6/8/2017**	PROJECT NO.:

Table 5-2 AERMOD Modeled Concentrations Compared to Significant Impact Levels

Pollutant	Averaging Period	Maximum Concentration[1] ($\mu g/m^3$)	Distance Interval				SIL[2]/REL[3] ($\mu g/m^3$)	Exceeded SIL/REL (Yes or No)
			1-mile ($\mu g/m^3$)	5-mile ($\mu g/m^3$)	10-mile ($\mu g/m^3$)	15-mile ($\mu g/m^3$)		
CO	8-Hour	10.00	6.28	1.43	3.09	2.08	500	N
NH_3	Annual	0.038	0.019	0.007	0.007	0.006	200	N
PM_{10}	24-Hour	1.23	0.81	0.20	0.27	0.20	5	N
	Annual	0.14	0.07	0.02	0.02	0.02	1	N
$PM_{2.5}$	24-Hour	1.00	0.81	0.20	0.27	0.20	1.2	N
	Annual	0.13	0.07	0.02	0.02	0.02	0.3	N

[1] Maximum concentration would occur at the IGS facility fence.

[2] SIL = Significant Impact Levels are used to determine whether a proposed new or modified stationary source will cause or contribute to a violation of the NAAQS) or PSD increments.

[3] REL = Reference Exposure Level.

5.2 Species Analyses and Determinations

Based on the constituents of the air emissions from the TEP RICE Project due to the proposed modifications, the effects analysis includes a discussion of VOCs, CO, ammonia, and PM. However, VOCs CO, and ammonia were eliminated from detailed consideration as explained below.

5.2.1 VOCs

VOCs released from the reciprocating engines at the IGS are expected to disperse very rapidly in air following emission from the stacks. This dispersion, caused by wind and advection, is likely to result in low concentrations of VOCs in ambient air that are not expected to result in significant concerns for ecological receptors (i.e., federally listed species). Since VOCs rapidly volatilize from surface soil, dermal contact by terrestrial wildlife to these contaminants in surface soils is expected to be minimal. Paterson et al. (1990) suggested that organic compounds with soil half-lives of <10 days are generally lost from soil before significant exposure can occur. As a consequence, significant exposure to VOCs through inhalation of ambient air is unlikely (Sample et al. 1997). VOCs deposited onto waterbodies also are likely to volatilize from the water surface resulting in minimal aquatic exposures. VOCs have log octanol/water partition coefficient (Kow) values less than 3.5 and are unlikely to bioaccumulate into plant and animal tissues at significant levels (USEPA and USACE 1998). Additionally, most VOCs are generally not highly toxic to wildlife species (USEPA 2003). Therefore, ecological risks associated with VOCs due to emissions from the reciprocating units are expected to be negligible. For these reasons VOCs were eliminated from additional consideration.

5.2.2 CO

Carbon monoxide was eliminated from detailed analysis regarding effects on listed species because high levels are unlikely to occur in outdoor environments USEPA 2016). As CO is emitted from the IGS stacks, the concentrations would be diluted and dispersed in the air currents. Concentrations of emitted CO would substantially decrease rapidly in distance from the IGS facility.

5.2.3 Ammonia

The toxicity of ammonia solutions does not usually cause toxicity issues for humans and other mammals because they have specific mechanism to prevent the build-up in their bloodstream However, fish and amphibians lack this mechanism, so they eliminate ammonia from their bodies by direct excretion. Ammonia toxicity is mainly related to aquatic environments where even dilute concentrations can be highly toxic to aquatic animals. However, aquatic environments are limited within the action area, which means that ammonia occurrence is unlikely in the action area. In addition, the only species with aquatic life stages is the Chiricahua leopard frog, which has not been documented within the action area.

Atmospheric processes and deposition of ammonia can adversely affect vegetation and soils (Krupa 2003). The exact mechanism of ammonia toxicity to vegetation is still not exactly clear, but it likely due to physiological perturbation rather than direct toxicity of the ion (Pearson and Stewart 1993). However, the estimated ammonia levels resulting from the TEP IGS facility would result in a very minor increase in ammonia levels in the action area (i.e., 3.7 percent increase when comparing annual concentrations to background conditions), which would not be expected to cause effects to vegetation such as the Pima pineapple cactus.

5.2.4 PM

Literature pertaining to the effects of PM on vegetation and wildlife species is limited. There are no National or state effect levels or standards that have been established for plant or animals species largely due the lack of literature pertaining to effect levels. Studies have identified ecological effects of PM, but the effect levels are poorly understood (Grantz et al. 2003; Prajapati 2012). In general, the concern of fine PM is related to the presence of metals or PAHs rather than the fine particles themselves. In the case of this analysis, PAHs are not associated with the PM and metals comprise a very small portion (approximately 4 percent) of the PM chemistry.

Due to the absence of effect levels or standards for plants and animals, a qualitative discussion is used in reference to the NAAQS and the projected change in PM compared to existing conditions. The NAAQS were developed to establish a limit on pollutants considered harmful to public health and the environment. The primary standards provide public health protection and the secondary standards provide for protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The projected increase in PM would be relatively small for the RICE Project when comparing maximum concentrations to background conditions (i.e., 1 percent PM_{10} and 8 percent for $PM_{2.5}$). The RICE Project would be well below both the primary and secondary NAAQS for PM_{10} and $PM_{2.5}$. As demonstrated in the dispersion modeling results, the SILs or the NAAQS for PM_{10} and $PM_{2.5}$ would not be exceeded as a result of adding the gas-fired reciprocating engines (see **Table 5-2**). Because the NAAQS are developed to be protective of the environment, it can be concluded that the PM emissions would not adversely affect the environment or the populations and habitat of listed species. Further information to support this conclusion is that PM concentrations would quickly decrease with distance from the IGS facility. In portions of the action area that represents potential habitat for the lesser long-nosed bat, yellow billed-cuckoo, Chiricahua leopard frog, and Pima pineapple cactus (approximately 5 to 15 miles from the facility), PM concentrations would be relatively low (0.02 to 0.03 $\mu g/m^3$) for both 24-hour and annual PM_{10} and $PM_{2.5}$. These PM concentrations would add a very small contribution to background PM levels (101 $\mu g/m^3$ for PM_{10} and 13 $\mu g/m^3$ for $PM_{2.5}$ [24-hour values]).

5.2.5 Species Determinations

Effect on Species: There would be no adverse effect of the Proposed TEP RICE Project on the lesser long-nosed bat, yellow billed-cuckoo, and Chiricahua leopard frog, and Pima pineapple cactus due to air emissions containing PM, VOCs, CO, or ammonia. The estimated PM concentrations would be very small in portions of the action area that represents potential habitat for the federally listed species. The PM concentration estimated for the RICE Project would contribute less than 1 percent to background PM concentrations. VOCs and ammonia would not represent a risk to the federally listed species due to the rapid dispersal of VOCs and the fact that ammonia toxicity is mainly related to aquatic environments. Aquatic habitats are limited in the action area.

Effect on Critical Habitat: There would be no effect of the Proposed TEP RICE Project on the designated critical habitat for Chiricahua leopard frog and Pima pineapple cactus or proposed critical habitat for yellow billed-cuckoo due to air emissions containing PM, VOCs, CO, or ammonia, since the designated or proposed critical habitat does not overlap with the action area.

6. Cumulative Effects

Cumulative effects are defined in the ESA Section 7 Consultation Handbook (USFWS 1998) as the incremental impacts of future state, private, or Tribal activities that are reasonably certain to occur within the project area or proximity to the project area. Future USEPA actions that are unrelated to the Proposed Action are not considered in this section because they would be subject to separate consultation pursuant to Section 7 of the ESA.

A wide variety of activities that may contribute to the loss of a federally listed species are known to occur in the action area. These activities include human population expansion and urban development, irrigation and water diversion activities, energy development, transportation system expansion or modifications, recreation, and non-native wildlife and plant species. Of these activities, urban growth and requirements for land and water resources represents the primary cumulative activity. The *Pima Prospers Comprehensive Plan Initiative Comprehensive Plan* (Comprehensive Plan) projects that Pima County will grow by approximately 454,000 people or 35 percent during the next 20 years (The Planning Center 2015). All of these activities are expected to continue within the action area, which overlaps the habitat and known or potential occurrence of lesser long-nosed bat, yellow billed-cuckoo, and Chiricahua leopard frog, and Pima pineapple cactus, and could contribute to cumulative effects to the species within the action area. In general, the severity of the cumulative effects would depend on factors such as the sensitivity of the species impacted, seasonal intensity of use, type of project activity, and physical parameters (e.g., topography). As discussed in Section 5.2 of this Attachment, the proposed TEP RICE Project would contribute no adverse effects to the listed species.

As part of the Comprehensive Plan, an “environmental planning element” is required that involves the “analysis, policies and strategies to address anticipated effects of implementation of plan elements on natural resources. Policies and strategies under this plan element are designed to have countywide applicability. Conservation actions are to be encouraged, and protection of biological resources is considered an essential component of land use planning.” One of the policies related to the environmental planning element provides guidelines to Special Species Management Areas. Therefore, the Comprehensive Plan and environmental element policies would minimize adverse effects to special status species including federally listed species in relation to individual cumulative actions in the action area.

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Appendix A

Species Screening Table

Appendix A Federally Listed, Proposed, and Candidate Species with Potential to Occur in the Action Area[1]

Common Name	Scientific Name	Status[2]	Critical Habitat Designated (Yes or No) / Within Action Area (Yes or No)	Potential for Occurrence Within the Action Area	Carried Forward in BA Analysis
Mammals					
Jaguar	*Panthera onca*	FE	Yes/No	None. Closest occurrence is over 20 miles from TEP facility.	No
Lesser long-nosed bat	*Leptonycteris curasoae*	FE	No	Potential foraging habitat located adjacent to the urban area.	Yes
Ocelot	*Leopardus pardalis*	FE	No	None. Closest occurrence is over 20 miles from TEP facility.	No
Sonoran pronghorn	*Antilocapra americana*	EXPN	No	None. Closest occurrence is over 100 miles from TEP facility.	No
Birds					
California least tern	*Sterna antillarum browni*	FE	No	None. Closest occurrence is over 20 miles from TEP facility.	No
Masked bobwhite	*Colinus virginianus ridgwayi*	FE	No	None. Closest occurrence is over 30 miles from TEP facility.	No
Mexican spotted owl	*Strix occidentalis lucida*	FT	Yes/No	None. Closest occurrence is over 20 miles from TEP facility.	No
Northern Aplomado falcon	*Falco femoralis septentrionalis*	FT	No	None. Closest occurrence is over 20 miles from TEP facility.	No
Southwestern willow flycatcher	*Empidonax traillii extimus*	FE	Yes/No	None. Closest occurrence is over 20 miles from TEP facility.	No
Yellow-billed cuckoo	*Coccyzus americanus*	FT	Proposed/No	The closest known occurrence and critical habitat is located in the Cienega Creek drainage approximately 0.5 mile beyond the action area.	Yes
Amphibians					
Chiricahua leopard frog	*Lithobates chiricahuensis*	FT	Yes/Yes	Potential habitat could be present but the closest known occurrence considered as part of the current distribution is located in a livestock tank in the Sierrita Mountains; approximately 11.5 miles southwest of the closest point from the action area, as well as habitat located southeast of the action along mountain intermittent drainages. No critical habitat is located in the action area.	Yes
Reptiles					
Northern Mexican gartersnake	*Thamnophis eques megalops*	FT	Proposed/No	None. Closest occurrence is over 20 miles from TEP facility.	No
Sonoyta mud turtle	*Kinosternon sonoriense longifemorale*	PE	No	None. Closest occurrence is over 100 miles from TEP facility.	No
Fish					
Desert pupfish	*Cyprinodon macularius*	FE	Yes/No	None. Closest occurrence is over 20 miles from TEP facility.	No
Gila chub	*Gila intermedia*	FE	Yes/No	None. Closest occurrence is over 20 miles from TEP facility.	No
Gila topminnow	*Poeciliopsis occidentalis*	FE	No	None. Closest occurrence is over 20 miles from TEP facility.	No
Loach minnow	*Tiaroga cobitis*	FE	Yes/No	None. Closest occurrence is over 20 miles from TEP facility.	No
Spikedace	*Meda fulgida*	FE	Yes/No	None. Closest occurrence is over 20 miles from TEP facility.	No
Plants					
Canelo Hills ladies-tresses	*Spiranthes delitescens*	FE	No	None. Closest occurrence is over 50 miles from TEP facility.	No
Huachuca water-umbel	*Lilaeopsis schaffneriana* var. *recurva*	FE	Yes/No	None. Closest occurrence is over 20 miles from TEP facility.	No
Nichol's turk's head cactus	*Echinocactus horizonthalonius* var. *nicholii*	FE	No	None. Closest occurrence is over 20 miles from TEP facility.	No
Pima pineapple cactus	*Coryphantha scheeri* var. *robustispina*	FE	No	There are known occurrences for this species located within the action area.	Yes
Wright's marsh thistle	*Cirsium wrightii*	C	No	None. Closest occurrence is over 20 miles from TEP facility.	No

[1] Source: IPaC Project Planning Tool results and AGFD Heritage Data.

[2] Status: FE = Federal Endangered; FT = Federally Threatened; PT = Proposed Threatened; PE = Proposed Endangered; EXPN = Experimental and Essential; and C = Candidate.

Appendix B

IPaC Results

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Arizona

Local office

Arizona Ecological Services Field Office

(602) 242-0210
(602) 242-2513

9828 North 31st Ave
#c3
Phoenix, AZ 85051-2517

http://www.fws.gov/southwest/es/arizona/
http://www.fws.gov/southwest/es/EndangeredSpecies_Main.html

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] are managed by the Endangered Species Program of the U.S. Fish and Wildlife Service.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

Amphibians

NAME	STATUS
Chiricahua Leopard Frog Rana chiricahuensis There is a **final** critical habitat designated for this species. Your location overlaps the designated critical habitat. https://ecos.fws.gov/ecp/species/1516	Threatened

Birds

NAME	STATUS
California Least Tern Sterna antillarum browni No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8104	Endangered
Masked Bobwhite (quail) Colinus virginianus ridgwayi No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3484	Endangered
Mexican Spotted Owl Strix occidentalis lucida There is a **final** critical habitat designated for this species. Your location overlaps the designated critical habitat. https://ecos.fws.gov/ecp/species/8196	Threatened
Northern Aplomado Falcon Falco femoralis septentrionalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1923	EXPN

Not for consultation

Southwestern Willow Flycatcher Empidonax traillii extimus — Endangered

There is a **final** critical habitat designated for this species. Your location overlaps the designated critical habitat.
https://ecos.fws.gov/ecp/species/6749

Yellow-billed Cuckoo Coccyzus americanus — Threatened

There is a **proposed** critical habitat for this species. Your location overlaps the proposed critical habitat.
https://ecos.fws.gov/ecp/species/3911

Fishes

NAME	STATUS
Desert Pupfish Cyprinodon macularius There is a **final** critical habitat designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/7003	Endangered
Gila Chub Gila intermedia There is a **final** critical habitat designated for this species. Your location overlaps the designated critical habitat. https://ecos.fws.gov/ecp/species/51	Endangered
Gila Topminnow (incl. Yaqui) Poeciliopsis occidentalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1116	Endangered
Headwater Chub Gila nigra No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1373	Proposed Threatened
Loach Minnow Tiaroga cobitis There is a **final** critical habitat designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/6922	Endangered
Roundtail Chub Gila robusta No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2782	Proposed Threatened

Spikedace Meda fulgida — Endangered

There is a **final** critical habitat designated for this species.
Your location is outside the designated critical habitat.
https://ecos.fws.gov/ecp/species/6493

Flowering Plants

NAME	STATUS
Canelo Hills Ladies-tresses Spiranthes delitescens No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8098	Endangered
Huachuca Water-umbel Lilaeopsis schaffneriana var. recurva There is a **final** critical habitat designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/1201	Endangered
Nichol's Turk's Head Cactus Echinocactus horizonthalonius var. nicholii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5343	Endangered
Pima Pineapple Cactus Coryphantha scheeri var. robustispina No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4919	Endangered
Wright's Marsh Thistle Cirsium wrightii No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8963	Candidate

Mammals

NAME	STATUS
Jaguar Panthera onca There is a **final** critical habitat designated for this species. Your location overlaps the designated critical habitat. https://ecos.fws.gov/ecp/species/3944	Endangered

Lesser Long-nosed Bat Leptonycteris curasoae yerbabuenae No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3245	Endangered
Ocelot Leopardus (=Felis) pardalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4474	Endangered
Sonoran Pronghorn Antilocapra americana sonoriensis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4750	EXPN

Reptiles

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

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Chiricahua Leopard Frog Rana chiricahuensis https://ecos.fws.gov/ecp/species/1516#crithab	Final designated

Gila Chub Gila intermedia https://ecos.fws.gov/ecp/species/51#crithab	Final designated
Jaguar Panthera onca https://ecos.fws.gov/ecp/species/3944#crithab	Final designated
Mexican Spotted Owl Strix occidentalis lucida https://ecos.fws.gov/ecp/species/8196#crithab	Final designated
Northern Mexican Gartersnake Thamnophis eques megalops https://ecos.fws.gov/ecp/species/7655#crithab	Proposed
Southwestern Willow Flycatcher Empidonax traillii extimus https://ecos.fws.gov/ecp/species/6749#crithab	Final designated
Yellow-billed Cuckoo Coccyzus americanus https://ecos.fws.gov/ecp/species/3911#crithab	Proposed

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service[3]. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The migratory birds species listed below are species of particular conservation concern (e.g. Birds of Conservation Concern) that may be potentially affected by activities in this location. It is not a list of every bird species you may find in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To view available data on other bird species that may occur in your project area, please visit the AKN Histogram Tools and Other Bird Data Resources. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

NAME	SEASON(S)
Allen's Hummingbird Selasphorus sasin https://ecos.fws.gov/ecp/species/9637	Migrating
Arizona Woodpecker Picoides arizonae	Year-round
Baird's Sparrow Ammodramus bairdii https://ecos.fws.gov/ecp/species/5113	Wintering
Bald Eagle Haliaeetus leucocephalus https://ecos.fws.gov/ecp/species/1626	Wintering
Bell's Vireo Vireo bellii https://ecos.fws.gov/ecp/species/9507	Breeding
Bendire's Thrasher Toxostoma bendirei https://ecos.fws.gov/ecp/species/9435	Year-round

Black-chinned Sparrow Spizella atrogularis https://ecos.fws.gov/ecp/species/9447	Year-round
Black-throated Gray Warbler Dendroica nigrescens	Breeding, Migrating
Blue-throated Hummingbird Lampornis clemenciae	Breeding
Botteri's Sparrow Aimophila botterii	Breeding
Brewer's Sparrow Spizella breweri https://ecos.fws.gov/ecp/species/9291	Wintering
Buff-breasted Flycatcher Empidonax fulvifrons https://ecos.fws.gov/ecp/species/9586	Year-round
Burrowing Owl Athene cunicularia https://ecos.fws.gov/ecp/species/9737	Year-round
Calliope Hummingbird Stellula calliope https://ecos.fws.gov/ecp/species/9526	Migrating
Canyon Towhee Pipilo fuscus	Year-round
Chestnut-collared Longspur Calcarius ornatus	Wintering
Common Black-hawk Buteogallus anthracinus	Breeding
Costa's Hummingbird Calypte costae https://ecos.fws.gov/ecp/species/9470	Year-round
Elegant Trogon Trogon elegans	Year-round
Elf Owl Micrathene whitneyi https://ecos.fws.gov/ecp/species/9085	Breeding
Five-striped Sparrow Aimophila quinquestriata	Breeding

Flammulated Owl Otus flammeolus https://ecos.fws.gov/ecp/species/7728	Breeding
Fox Sparrow Passerella iliaca	Wintering
Gila Woodpecker Melanerpes uropygialis https://ecos.fws.gov/ecp/species/5960	Year-round
Gilded Flicker Colaptes chrysoides https://ecos.fws.gov/ecp/species/2960	Year-round
Golden Eagle Aquila chrysaetos https://ecos.fws.gov/ecp/species/1680	Year-round
Grace's Warbler Dendroica graciae	Breeding
Grasshopper Sparrow Ammodramus savannarum ammolegus	Year-round
Gray Vireo Vireo vicinior https://ecos.fws.gov/ecp/species/8680	Breeding, Wintering
Lark Bunting Calamospiza melanocorys	Wintering
Lawrence's Goldfinch Carduelis lawrencei https://ecos.fws.gov/ecp/species/9464	Year-round
Le Conte's Thrasher toxostoma lecontei https://ecos.fws.gov/ecp/species/8969	Year-round
Least Bittern Ixobrychus exilis https://ecos.fws.gov/ecp/species/6175	Year-round
Lewis's Woodpecker Melanerpes lewis https://ecos.fws.gov/ecp/species/9408	Wintering

Loggerhead Shrike Lanius ludovicianus https://ecos.fws.gov/ecp/species/8833	Year-round
Long-billed Curlew Numenius americanus https://ecos.fws.gov/ecp/species/5511	Wintering
Lucifer Hummingbird Calothorax lucifer	Breeding
Lucy's Warbler Vermivora luciae https://ecos.fws.gov/ecp/species/6626	Breeding
Mccown's Longspur Calcarius mccownii https://ecos.fws.gov/ecp/species/9292	Wintering
Mountain Plover Charadrius montanus https://ecos.fws.gov/ecp/species/3638	Wintering
Northern Beardless-tyrannulet Camptostoma imberbe	Breeding
Olive Warbler Peucedramus taeniatus	Year-round
Peregrine Falcon Falco peregrinus https://ecos.fws.gov/ecp/species/8831	Year-round
Phainopepla phainopepla nitens https://ecos.fws.gov/ecp/species/1372	Year-round
Pinyon Jay Gymnorhinus cyanocephalus https://ecos.fws.gov/ecp/species/9420	Year-round
Prairie Falcon Falco mexicanus https://ecos.fws.gov/ecp/species/4736	Year-round
Red-faced Warbler Cardellina rubrifrons	Breeding

Rose-throated Becard Pachyramphus aglaiae	Breeding
Rufous Hummingbird selasphorus rufus https://ecos.fws.gov/ecp/species/8002	Migrating
Rufous-crowned Sparrow Aimophila ruficeps https://ecos.fws.gov/ecp/species/9718	Year-round
Rufous-winged Sparrow Aimophila carpalis	Year-round
Short-eared Owl Asio flammeus https://ecos.fws.gov/ecp/species/9295	Wintering
Sonoran Yellow Warbler Dendroica petechia ssp. sonorana https://ecos.fws.gov/ecp/species/2893	Breeding
Sprague's Pipit Anthus spragueii https://ecos.fws.gov/ecp/species/8964	Wintering
Swainson's Hawk Buteo swainsoni https://ecos.fws.gov/ecp/species/1098	Breeding
Varied Bunting Passerina versicolor	Breeding
Virginia's Warbler Vermivora virginiae https://ecos.fws.gov/ecp/species/9441	Breeding
Williamson's Sapsucker Sphyrapicus thyroideus https://ecos.fws.gov/ecp/species/8832	Wintering
Willow Flycatcher Empidonax traillii https://ecos.fws.gov/ecp/species/3482	Breeding

What does IPaC use to generate the list of migratory bird species potentially occurring in my specified location?

Landbirds:

Migratory birds that are displayed on the IPaC species list are based on ranges in the latest edition of the National Geographic Guide, Birds of North America (6th Edition, 2011 by Jon L. Dunn, and Jonathan Alderfer). Although these ranges are coarse in nature, a number of U.S. Fish and Wildlife Service migratory bird biologists agree that these maps are some of the best range maps to date. These ranges were clipped to a specific Bird Conservation Region (BCR) or USFWS Region/Regions, if it was indicated in the 2008 list of Birds of Conservation Concern (BCC) that a species was a BCC species only in a particular Region/Regions. Additional modifications have been made to some ranges based on more local or refined range information and/or information provided by U.S. Fish and Wildlife Service biologists with species expertise. All migratory birds that show in areas on land in IPaC are those that appear in the 2008 Birds of Conservation Concern report.

Atlantic Seabirds:

Ranges in IPaC for birds off the Atlantic coast are derived from species distribution models developed by the National Oceanic and Atmospheric Association (NOAA) National Centers for Coastal Ocean Science (NCCOS) using the best available seabird survey data for the offshore Atlantic Coastal region to date. NOAANCCOS assisted USFWS in developing seasonal species ranges from their models for specific use in IPaC. Some of these birds are not BCC species but were of interest for inclusion because they may occur in high abundance off the coast at different times throughout the year, which potentially makes them more susceptible to certain types of development and activities taking place in that area. For more refined details about the abundance and richness of bird species within your project area off the Atlantic Coast, see the Northeast Ocean Data Portal. The Portal also offers data and information about other types of taxa that may be helpful in your project review.

About the NOAANCCOS models: the models were developed as part of the NOAANCCOS project: Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf. The models resulting from this project are being used in a number of decision-support/mapping products in order to help guide decision-making on activities off the Atlantic Coast with the goal of reducing impacts to migratory birds. One such product is the Northeast Ocean Data Portal, which can be used to explore details about the relative occurrence and abundance of bird species in a particular area off the Atlantic Coast.

All migratory bird range maps within IPaC are continuously being updated as new and better information becomes available.

Can I get additional information about the levels of occurrence in my project area of specific birds or groups of birds listed in IPaC?

Landbirds:

The Avian Knowledge Network (AKN) provides a tool currently called the "Histogram Tool", which draws from the data within the AKN (latest,survey, point count, citizen science datasets) to create a view of relative abundance of species within a particular location over the course of the year. The results of the tool depict the frequency of detection of a species in survey events, averaged between multiple datasets within AKN in a particular week of the year. You may access the histogram tools through the Migratory Bird Programs AKN Histogram Tools webpage.

The tool is currently available for 4 regions (California, Northeast U.S., Southeast U.S. and Midwest), which encompasses the following 32 states: Alabama, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North, Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin.

In the near future, there are plans to expand this tool nationwide within the AKN, and allow the graphs produced to appear with the list of trust resources generated by IPaC, providing you with an additional level of detail about the level of occurrence of the species of particular concern potentially occurring in your project area throughout the course of the year.

Atlantic Seabirds:

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAANCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Facilities

Wildlife refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuges:

REFUGE	ACRES

Buenos Aires National Wildlife Refuge 232,864.6 acres

(520) 823-4251
(520) 823-4247

MAILING ADDRESS
P.O. Box 109
Sasabe, AZ 85633-0109

PHYSICAL ADDRESS
7.5 Miles North Of Sasabe On Highway 286
Sasabe, AZ 85633

https://www.fws.gov/refuges/profiles/index.cfm?id=22530

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location overlaps the following wetlands:

The area of this project is too large for IPaC to load all NWI wetlands in the area. The list below may be incomplete. Please contact the local U.S. Fish and Wildlife Service office or visit the NWI map for a full list.

FRESHWATER EMERGENT WETLAND

PEM1C

- PEM
- PEM1A
- PEM1Cx
- PEM1Ah

FRESHWATER FORESTED/SHRUB WETLAND

- PSS
- PFO
- PSS1/2A
- PSS1A
- PSS1J

FRESHWATER POND

- PUB
- PUBHx
- PUS
- PUBHh
- PUBKHx
- PUBFx
- PUBFh
- PAB4Fx
- PABKHx
- PUBF

LAKE

- L2USAh
- L1UB
- L2UB
- L2USKh

OTHER

- PUSAh
- PUSCh
- PUSAx
- PUSJh
- PUSKCx
- PUSCx
- PUSJx
- PUSA

RIVERINE

- R4SB
- R2UB

R4USJ
R4USA
R2US
R2UBF
R2USC
R4USAx
R2EM
R2USA
R4USC

A full description for each wetland code can be found at the National Wetlands Inventory website: https://ecos.fws.gov/ipac/wetlands/decoder

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory

programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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