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AESO/SE

02-21-03-F-0343 May 11, 2005
02-21-84-I-0062
CC2005188

Ms. Ruth B. Villalobos
Chief, Planning Division
Department of the Army
Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

Dear Ms. Villalobos:

This letter is in response to your December 15, 2004, letter requesting formal consultation on the effects of the proposed Nogales Wash and Chula Vista flood control project in Nogales, Santa Cruz County, Arizona on the endangered Gila topminnow (*Poeciliopsis occidentalis occidentalis*). Your letter also requested our concurrence that the proposed action may affect, but is not likely to adversely affect, the endangered cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) (pygmy-owl) with proposed critical habitat and the endangered southwestern willow flycatcher (*Empidonax traillii extimus*). Our concurrences are provided in Appendix A. We received your request on December 21, 2005. This response is provided in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

This final biological opinion and appendix (collectively BO) is based on: (1) the October 13, 2004, *Biological Assessment for Nogales Wash and Chula Vista Channel Flood Control Project, Santa Cruz County, Arizona* (BA), prepared for you by URS Corporation; (2) your November 16, 2004, transmittal of the *Draft Supplemental Environmental Assessment – Flood Control Channel – City of Nogales, Arizona – Nogales Wash and Tributaries – Santa Cruz County, Arizona* (Draft SEA); (3) Arizona Game and Fish Department's (AGFD) *Cactus Ferruginous Pygmy-owl, Southwestern Willow Flycatcher, and Yellow-billed Cuckoo surveys within Nogales Wash for the U.S. Army Corp.* (sic) *of Engineers* (USACE) *Chula Vista Flood Control Project* (Blackman and Ingraldi 2004); (4) a construction-phasing proposal and technical diagrams provided to us in an April 14, 2005, meeting with your staff; and (5) documents and other published and unpublished sources of information. We have assigned log numbers 02-21-03-F-0343 and 02-21-84-I-0062 to this project. Please refer to both numbers in future correspondence on this consultation. A complete administrative record of this consultation is on file at the Arizona Ecological Services Field Office (AESFO).

BIOLOGICAL OPINION

Consultation History

Note that the Consultation History, below, reflects only events and interactions related to consultation under section 7 of the Act. Background information regarding our preparation of a Fish and Wildlife Coordination Act Report (CAR) is only included in those instances where the impact/effect analyses of the parallel efforts intersect.

- June 4, 1984: We received your May 29, 1984, letter requesting a list of species that could occur in the area of the proposed action.

- June 7, 1984: We transmitted a letter to your office regarding the proposed action, and provided the requested species list as an enclosure. The letter provided general information regarding the need for a biological assessment.

- August 25, 1994: We received your request for a second species list for the proposed project site.

- October 27, 1994: We provided a second species list (File number AESO/SE 2-21-84-I-062) to your office.

- January 24, 1995: We received a facsimile request for a third species list. We provided said species list (File number AESO/SE 2-21-84-I-062) the same day.

- February 2004: We attended a meeting with your staff at our office to discuss the proposed action

- November 2004: We received your November 16, 2004, letter transmitting the Draft SEA and Draft BA.

- January 21, 2005: We transmitted a letter (File numbers: AESO/SE: 02-21-03-F-0343 and 02-21-84-I-0062) to you indicating that we had received your December 21, 2004, request for consultation on the proposed action and that we had sufficient information to initiate formal consultation.

- January 27, 2005: Scott Richardson and Jason Douglas of my staff participated in a project meeting with your staff, AGFD staff, and representatives from Santa Cruz County.

- February 1, 2005: We received a facsimile transmission from Michael Fink of your staff requesting clarification regarding the historical presence of Gila topminnow in the project area. Mr. Duncan provided a response via electronic mail.

- February 8, 2005: Mr. Richardson participated in a site visit to the project area to examine habitat conditions and potential for minimization of the project's effects.

- February 10, 2005: We received a courtesy copy of AGFD's letter of review on the Draft SEA and BA.

- February 23, 2005: Representatives from my staff, AGFD, and your staff discussed the proposed action during an interagency coordination meeting.

- March 17, 2005: We provided your staff with draft text from the biological opinion's Description of the Proposed Conservation Measures section to ensure it was consistent with your environmental documents.

- March 22, 2005: We met with representatives of your staff, AGFD, and Santa Cruz County to review the status of the consultation. We obtained verbal approval to forego a draft biological opinion and proceed directly to a final document, pending additional coordination between the respective agencies.

- April 14, 2005: We met with your staff, AGFD, consulting biologists, and Santa Cruz County officials to address the final issues related to this consultation. Verbal commitments to specific project elements were obtained, and appear under Description of the Proposed Conservation Measures, below.

Description of the Proposed Action

The proposed Nogales Wash and Chula Vista Channel Flood Control project is located along the old Tucson Road approximately 3 miles north of downtown Nogales, Arizona. The project occurs in Section 30 of the Range 14 East, Township 23 South, Rio Rico Quadrangle.

Nogales Wash originates approximately 7 miles south of the United States/Mexico International Boundary and flows north through Nogales, Sonora and Nogales, Arizona, joining Potrero Creek approximately 4.8 miles north of the border. Approximately 1 mile south of the border, Nogales Wash enters a covered channel referred to as the Nogales Wash Covered Channel (NWCC). The Outlet from the NWCC is located approximately 0.9 mile north of the border near its confluence with the Arroyo Boulevard Covered Channel (ABCC). The ABCC is a similar conduit draining the metropolitan area of Nogales, Sonora. Approximately 0.9 mile north of the border, both covered channels open to form two open concrete channels. Several hundred feet further north, the two open channels converge to form a single channel. This channel, called the Nogales Wash Open Channel (NWOC) empties into the natural Nogales Wash streambed approximately 1.1 miles below the confluence of the NWCC and the ABCC. The remainder of Nogales Wash, about 1.7 miles, is semi-natural up to the Chula Vista subdivision where it enters Potrero Creek. Some areas have been straightened and modified with small stretches of gabions or concrete. Potrero Creek then flows for 3.9 miles beyond its confluence with Nogales Wash before flowing into the Santa Cruz River. The total drainage area of Potrero Creek, including Nogales Wash, is approximately 94 square miles (mi^2), 48% of which lies in Mexico.

Nogales Wash flows north on the east side of Chula Vista and Potrero Creek flows northeast through the western portion of Chula Vista. The confluence of these two drainages occurs at the northern end of the community.

The 94 mi^2 Nogales Wash/Potrero Creek watershed renders the streams subject to appreciably large discharges and subsequent flooding. Nogales and surrounding communities are located within a narrow (less than ½ mile wide) valley floor, adjacent to the normally dry but potentially flood-prone washes. Flooding in the community of Chula Vista may originate from a number of sources. During a significant storm, flooding typically starts with overflow from Potrero Creek. With increased flood volume, Nogales Wash overtops the bank just upstream of Chula Vista and combines with Potrero Creek's overflow. With only a small addition of flood volume, the Valle Verde breakout would combine with the other two flows. The Potrero Creek floodwaters, the Nogales Wash breakout, and the Valle Verde breakout combine just south of Chula Vista and flow towards the existing Potrero Creek alignment. As flood volume increases, this flow spreads out and follows a more direct route through Chula Vista. The Nogales Wash floodwaters, which break out just upstream of Chula Vista, flow towards the southwest corner of Chula Vista; however, as flood volume increases, this flow fans out and penetrates the community farther to the east. This flooding may occur with events of less than a five-year frequency.

Lateral Collector Channels (LCC'S)

Two lateral collector channels are entrenched concrete channels would be placed adjacent and parallel to the international border on the United States side. The eastern LLC (4 ft. wide by 484 ft. long) will capture overland flow and direct it westward back into the existing NWCC through a 59-foot long and 48-inch diameter reinforced concrete pipe with flap gates. Unused capacity exists in the NWCC during flood events due to inadequate and unmaintained inlet structures in Mexico. The western LCC (30 inches wide by 162 ft. long) will also capture overland flow, but direct it toward both of the existing covered channels during flood events. The eastern LCC will be a fenced open channel except for a 53-ft. long section at the existing pedestrian crossing, which will be grated. All of the western LCC will be grated.

The level of protection provided by the LCCs will change over time due to increasing urbanization and changing watershed land use in both Mexico and the United States. Immediately after construction the level of protection ("present" level of protection) will be for a 44-year event. The level of protection provided by the LCCs at the end of the project life (100 years), or the "future" level of protection, is expected to be sufficient for a 33-year event.

In the remainder of the description of Alternative #1, and in the description of the other alternatives, all flood control features will display two numbers separated by a slash (/). The first number refers to the "future" (100 years after construction) level of protection. The second number refers to the "present" (immediately after construction) level of protection. As such, the LCCs for Alternative #1 provide 33/44-year flood protection.

Chula Vista Channel (CVC).

The CVC designed for Alternative #1 provides 100-year flood protection. The Chula Vista Channel Plan includes four sections: 1) the Potrero Creek Interceptor Channel (PCIC); 2) the Nogales Wash Concrete Channel (NWCC); 3) an Energy Dissipater (ED); and 4) an Outlet Channel (OC). Each of the four sections is listed below:

Potrero Creek Interceptor Channel

The PCIC will be designed to capture flood flows from Potrero Creek as well as overland breakout flows and direct them toward the east where the interceptor channel ties into the NWCC. The PCIC will be a riprap trapezoidal channel with a levee. The channel will be located on the south side of the Chula Vista community in an open, undeveloped field and will be approximately 700 feet in length and has a 2:1 trapezoidal cross section with a base width varying from 30 to 60 feet. A levee will be built on the north side of the channel and extend east from the high ground just southwest of Chula Vista to the southeast corner of the community near the Old Tucson Road. The slopes on the north side levee will be 1 foot vertical to 3 feet horizontal and will vary from 5 to 13 feet above the existing ground levels, with a top width of 15 feet. Except for the lower 57 feet of the channel reach, dumped stone revetment varying in thickness from 15 to 26 inches will be required on the channel bottom and side slopes. The lower 57 feet of the channel just above the transition to the NWCC will require a concrete lining due to the high flow velocities. To provide protection from scouring and possible over-topping of the levee, grouted stone, 12 inches thick, will be required. The stone at the levee back slope, 3 feet thick and 10 feet wide, will provide protection from undercutting from flows over the levee.

Nogales Wash Concrete Channel

The PCIC will cross under the Old Tucson Road just south of Chula Vista and will connect into the NWCC. This channel will be rectangular and run north for approximately 1,400 feet within the existing Nogales Wash natural channel. The channel will maintain its existing alignment where it crosses under the Old Tucson Road. The base width of the channel would vary between 50 and 65 feet, and the wall heights would range from 13 to 30 feet. The area immediately adjacent to the channel walls will be backfilled in with material to support the wall. Berms, 3 to 15 feet wide, are proposed on each side of the channel, with an access road to the channel. The entire Nogales Wash natural channel will need to be graded and leveled in order to construct the concrete channel. The existing drop structure near the fire station will be reconstructed into a gentle down slope grade to remove the likelihood of structural damage from water. In addition, the majority, if not all of the vegetation lining Nogales Wash, will be removed during construction (approximately 8 acres).

A subdrainage system comprised of either a 12-inch thick gravel layer underlain by a 6-inch thick sand layer or a 6-inch thick gravel layer underlain by a 6-inch thick sand layer would underlay the grouted stone and concrete sections of the channel, respectively. Six-inch diameter perforated pipes would be embedded in the gravel layer beneath and along each side of the channel to allow for lateral infiltration to the local groundwater table.

Energy Dissipater

At the end of the NWCC, a grouted-stone ED will be constructed to slow down the water flowing through the channel. This section of the channel would be 400 feet long and would have a trapezoidal section with 1 foot vertical to 2 feet horizontal side slopes. The channel base width would vary from 50 feet at the upstream end to 150 feet at the downstream end. The grouted stone revetment on the channel bottom and side slopes would be 18 inches thick and would be placed to form a rough surface. The height of the stone side slopes would vary from 8.5 to 18 feet. Berms 15 feet wide are proposed for each side of the channel.

Outlet Channel

The OC structure downstream from the ED would extend 800 feet. The west side of the channel in this area would remain undisturbed. The east bank, due to flow velocities, would require stone revetment of 15 inches thick and varying in height from 13.4 to 17.5 feet above the channel invert. The revetment will be tied down 10 feet below the invert.

Sound Walls

Temporary sound-deadening walls will be constructed immediately landward of the limits of temporarily-affected riparian vegetation along approximately 3,900 linear feet (total, both west and east sides) of the NWCC.

Flood Warning System.

This system will include seven self-reporting rain gages, four which will be placed in Mexico. Three self-reporting stream gages will also be installed (one of which is in Mexico). Three additional self-reporting stream gages equipped with sirens will be installed as well. Integrated communications equipment will be located at the Sheriff's station. This system will be used to provide advance warning to the people of the Nogales, Arizona area of potential impending flood conditions. This information would then be used to mobilize the community to take protective and defensive measures.

Recreation Plan.

The recreation plan for Alternative #1 includes a bicycle path along the north and west sides of the CVC. This path will also tie into a picnic site (Ramada with table and barbeque) at each end of the CVC. Recreational opportunities will not include access to Potrero Creek or Nogales Wash, as these channelized portions will be fenced.

Disposal Site

The disposal site for the anticipated 127,000 cubic yards of excess fill material remaining after construction is located at the Santa Cruz County municipal solid waste landfill.

Bridges

The PCIC and the NWCC cross the Old Tucson Road at two separate locations, requiring the removal of an existing bridge and construction of a new bridge. The existing bridge at the northeast corner of the Chula Vista Community (referred to as the North Bridge) will be replaced with a new bridge at this location. The bridge at the southeast corner of the community (referred to as the South Bridge) will be a new crossing required to convey flows from the PCIC under the Old Tucson Road. Construction of the two bridges and the NWCC adjacent to the Old Tucson Road will require the removal and reconstruction of approximately 960 feet of existing roadway.

Description of the Proposed Conservation Measures

Best Management Practices (BMPs) for sediment and erosion control will be specified in the construction contract. Requisite State Water Quality Permits will be obtained by the Contractor in coordination with the local project sponsor, Santa Cruz County. The proposed conservation measures action also include the following specific commitments intended to minimize adverse effects on the Gila topminnow:

- A survey for the presence/absence of Gila topminnow will be conducted by a qualified fisheries biologist one week before initiation of construction activities in Nogales Wash.

- If Gila topminnow are observed within Nogales Wash, the U.S. Army Corps of Engineers (USACE) will establish a block seine upstream and downstream of the project area to keep topminnows from entering the project site. All fish occurring in-between the block seines will be captured and relocated downstream of the project site. The confluence of Peck Canyon and the Santa Cruz River near the I-19 overpass has been preliminarily identified as a suitable repatriation site.

- If Gila topminnow are observed within Nogales Wash, a qualified fisheries biologist will also monitor the project area for fish kills.

- The Storm Water Pollution Prevention Plan will identify the Best Management Practices to reduce or eliminate sediment transport downstream.

- The USACE will establish two Gila topminnow populations at two separate sites that have been identified in the revised Gila topminnow Recovery Plan (1998) as sites suitable for the reintroduction of topminnow.

- The USACE will develop, in coordination with the USFWS and AGFD, a protocol for the collection, holding, and transportation of Gila topminnow to their release site.

- The USACE will develop, in coordination with the USFWS and AGFD, a plan for the monitoring of both Gila topminnow populations.

Status of the Species

The Gila topminnow was listed as endangered in 1967 without critical habitat (FWS 1967). The reasons for decline of this fish include past dewatering of rivers, springs, and marshlands; water management including impoundment, channelization, diversion, and regulation of flow; land management practices that promote erosion and arroyo formation; and the introduction of predacious and competing nonindigenous fishes (Miller 1961, Minckley 1985). Life history information can be found in the 1984 recovery plan (FWS 1984), the draft revised Gila topminnow recovery plan (Weedman 1999), and references cited in those plans.

Gila topminnow are highly vulnerable to adverse effects from nonindigenous aquatic species (Johnson and Hubbs 1989). Predation and competition from nonindigenous fishes have been a major factor in their decline and continue to be a major threat to the remaining populations (Meffe *et al.* 1983, Meffe 1985, Brooks 1986, Marsh and Minckley 1990, Stefferud and Stefferud 1994, Weedman and Young 1997). The native fish fauna of the Gila basin and of the Colorado basin overall, was naturally depauperate and contained few fish that were predatory on or competitive with Gila topminnow (Carlson and Muth 1989). The introduction of many predatory and competitive nonindigenous fish, frogs, crayfish, and other species, made it difficult for Gila topminnow to survive in many of their former habitats, or the small pieces of those habitats that had not been lost to human alteration. Both large (Bestgen and Propst 1989) and small (Meffe *et al.* 1983) nonindigenous fish cause problems for Gila topminnow as can nonindigenous crayfish (Fernandez and Rosen 1996) and bullfrogs.

Historically, the Gila topminnow was abundant in the Gila River drainage and was one of the most common fishes of the Colorado River basin, particularly in the Santa Cruz system (Hubbs and Miller 1941). This has been reduced to only 15 naturally occurring populations. Presently, only 12 of those 15 Gila topminnow populations are considered extant (Table 1) (Weedman and Young 1997, Voeltz and Bettaso 2004). Only three (Cienega Creek, Monkey Spring, and Cottonwood Spring) have no nonindigenous fish present and therefore can be considered secure from nonindigenous fish threats. There have been at least 175 wild sites stocked with Gila topminnow, however, topminnow persist at only 18 of these localities. Of the 18, 1 site is outside topminnow historical range and four now contain nonindigenous fish (Weedman and Young 1997).

The *Sonoran Topminnow Recovery Plan* (FWS 1984), which covers the Gila topminnow, established criteria for down- and delisting. Criteria for down-listing were met for a short period. However, due to concerns regarding the status of several populations, down-listing was delayed. Subsequently, the number of reestablished populations dropped below that required for down-listing, where it has remained. A draft revised recovery plan for the Gila topminnow is available (Weedman 1999). The plan's short-term goal is to prevent extirpation of the species from its natural range in the U.S. and reestablish it into suitable habitat within historical range. Downlisting criteria require a minimum of 82 reestablished populations, some of which must persist at least 10 years.

Table 1. Status of natural Gila topminnow populations in the US.

Site	Ownership	Extant?[1]	Nonindigenous?	Mosquitofish?	Habitat Size[2]	Threats[3]
Bylas Spring[5]	San Carlos	YES	NO[4]	NO[4]	S D	M/ N G
Cienega Creek	Bureau	YES	NO	NO	L	M/ R N
Cocio Wash	Bureau	NO 1982	UNKNOWN	UNKNOWN	S	H/ M
Cottonwood Spring	Private	YES	NO	NO[4]	S	M/ N
Fresno Canyon	State Parks	YES	YES	NO[4]	M	H/ N G U
Middle Spring[5]	San Carlos	YES	NO[4]	NO[4]	S	H/ N G
Monkey Spring	Private	YES	NO	NO	S	L/ W U
Redrock Canyon	USFS	YES	YES	YES	M D	H/ W R G N
Sabino Canyon	USFS	NO 1943	YES	NO	M	H/ R N
Salt Creek[5]	San Carlos	YES	NO[4]	NO[4]	S	M/ N G
San Pedro River	Private	NO 1976	YES	YES	-	H/ W N G R
Santa Cruz River San Rafael Tumacacori Tucson	Private, State Parks, TNC	 YES[6] YES NO 1943	 YES YES YES	 YES YES YES	L D	H/ W N R G C U
Sharp Spring	State Parks	YES	YES	YES	M	H/ N G U
Sheehy Spring	TNC	NO 1987	YES	YES	S	H/ N G U
Sonoita Creek	Private, TNC, State Parks	YES	YES	YES	L D	H/ W N G
Tonto Creek	Private, USFS	NO 1941	YES	YES	L	H/ N R G W

[1] if no, last year recorded
[2] L = large M= medium S = small D = disjunct
[3] Immediacy H = high M = moderate L = low
Type W = water withdrawal C = contaminants R = recreation N = nonindigenous G = grazing M = mining U = urbanization
[4] none recently, they have been recorded multiple times
[5] recently renovated
[6] in Mexico, US in 1993

The status of the species is poor and marginally stable. Gila topminnow has gone from being one of the most common fishes of the Gila basin to one that exists at about 30 localities (12 natural and 18 stocked). Many of these localities are small and highly threatened, and topminnow has not been found in recent surveys at some sites.

Environmental Baseline

The environmental baseline includes past and present impacts of all Federal, state, or private actions in the action area; the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation; and the impact of State and

private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation. The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02). In the case of the proposed action analyzed herein, the action area consists of: (1) the project area proper, including the Potero Creek and Nogales Wash channels, upland restorations sites, staging areas, etc.); and (2) the Santa Cruz River from the confluence with the above waters downstream to the mouth of Peck Canyon, the estimated reach of indirect effects on downstream Gila topminnow (primarily altered infiltration from the construction of in-channel features and the contribution of toxic concrete leachate to waters).

The action area is located in the Mexican Highland sub-province of the Basin and Range physiographic province of south-central Arizona. This region is characterized by numerous low, rugged mountain ranges separated by deep alluvial valleys. Nogales Wash and Potrero Creek occupy one such valley in the west side of the upper Santa Cruz drainage basin. The Santa Cruz basin extends southward into Mexico and is the major hydrographic feature of the region. In the action area, Nogales Wash and Potrero Creek consist of meandering channels incised 5 to 25 feet deep into the floodplain of an alluvium filled valley. Local elevations vary from approximately 3,500 feet above mean sea level (MSL) along Potrero Creek to greater than 4,800 feet above MSL in the surrounding mountains.

Climate within the action area is that of a semi-arid high desert. The maximum/minimum temperatures in January are 64/27 degrees Fahrenheit (°F), while temperatures in July are 93/64°F. Mean monthly precipitation over the drainage basin ranges from about 0.12 inch in May to 4.68 inches in July. About 50 percent of the 16.6 inches of mean annual precipitation falls during the months of July through September, mostly as a result of heavy local summer thunderstorms. Much of the remaining precipitation falls as the result of winter rains.

Stream gradients in the Santa Cruz River system in the vicinity of the action area range from approximately 270 feet per mile in the headwaters of the upper canyons to approximately 100 feet per mile in the valley regions. Perennial stream flow in Nogales Wash originates in the hills of Sonora, Mexico and flows northerly across the international boundary into the United States. Dry weather flows in the stream-bed range from 2 to 20 cubic feet per second.

The project site (location of construction activities) and other affected areas (action area) occur within the Riparian Forest biotic community along Nogales Wash and Potrero Creek. The riparian forest community is composed of four different plant communities. The first is characterized by Mexican elderberry (*Sambucus mexicana*) in pure stands. This type is found in the upstream reaches outside of the project area. The second community is composed of a mixture of species including Mexican elderberry, mesquite (*Prosopis* spp.), velvet ash (*Fraxinus velutina*), willow (*Salix* spp.), and herbaceous species common to the edges of persistent wetlands. This community occurs sporadically throughout both Nogales Wash and Potrero Creek. The third community, composed of mesquite, is found in the mid and lower reaches. In some places it forms a closed-canopy bosque. The fourth type is cottonwood/willow, dominated by Fremont cottonwood (*Populus fremontii*).

Within the Santa Cruz River drainage, Gila topminnow records exist from the headwaters above Lochiel; in the Sonora, Mexico, portion of the river; in the mainstem from the border downstream to Chavez Siding; at a formerly perennial reach of the river near San Xavier Mission; along Sonoita Creek between Patagonia and Patagonia Lake; and in Peck Canyon near the Santa Cruz River confluence. The species remains extant in all of these areas except the Santa Cruz River near San Xavier Mission (King *et al.* 1999, Weedman and Young 1997). Minckley (1985) reported that mosquitofish (*Gambusia affinis*) and fathead minnow (*Pimephales promelas*) were abundant in the mainstem of the Santa Cruz River through the area.

King *et al.* (1999) collected Gila topminnow on the Santa Cruz River at the confluence with Peck Canyon in 1997. Four visits and 2,012 seconds of electroshocking yielded 14 longfin dace (*Agosia chrysogaster*), 17 Gila topminnow, and one mosquitofish. In their sampling along the Santa Cruz River, fish abundance increased with distance from the Wastewater Treatment Plant. Total numbers of fish collected per unit effort at Tubac and Chavez Siding were more than an order of magnitude greater than yields at the Peck Canyon confluence.

Entranco and Arizona Game and Fish Department biologists sampled fish in Peck Canyon, a tributary entering the Santa Cruz River downstream of the project area, on August 25, 1998. The stream and pools were seined with a 12-foot seine and aquarium nets. Gila topminnow, green sunfish (*Lepomis cyanellus*), mosquitofish, and longfin dace were captured. Green sunfish have also been found in permanent pools several miles upstream in Peck Canyon (Service files, Don Mitchell pers. comm.).

The population of Gila topminnow in Peck Canyon may be important as a source for colonizing the Santa Cruz River in case of a catastrophic event, such as fuel spills or unusually high releases of toxic materials from the Wastewater Treatment Plant. The mid-1990s accidental spill of diesel fuel that spread from south of border all the way through the perennial reach to Chavez Siding illustrates the possibility of such an event. Alternatively, during drought periods or a catastrophe in the Santa Cruz River, Gila topminnow could recolonize the mainstem from Peck Canyon. A refugial population of Peck Canyon Gila topminnow has been established at the International Wildlife Museum in Tucson. Most recently, the AGFD documented Gila topminnow in Nogales Wash at the Ruby Road crossing (ca. 3 miles downstream of the project site) (Voeltz and Bettaso 2004).

On June 16, 2003, the USACE conducted a site visit to Nogales Wash and documented numerous fish, described as Poeciliid-like with the smaller fish being jet black in color. Based on the USACE description, these fish may have been Gila topminnow; however, this was not confirmed by a qualified fisheries biologist. On August 15, 2003, URS, FWS, AGFD, and the USACE conducted a joint survey for Gila topminnow, but none were found. Gila topminnow were not observed or collected. On April 15, 2004, the USFWS and URS conducted a second survey of Nogales Wash to determine the presence/absence of Gila topminnow, which resulted in no observations.

The presence of the Gila topminnow within the action area is likely given several factors, including the recent history of occupancy within and current occupancy downstream of the action area. The presence of the species is especially likely when considered on a temporal scale

that accounts for this resilient species' ability to persist within refugia during floods (Voeltz and Bettaso 2003), reproduce rapidly (FWS 1998), and recolonize habitats from already-occupied sites.

While Gila topminnow are present within the action area, the species status is tenuous. When sampled on the mainstem, Gila topminnow are not caught in great numbers per unit effort. Much of the Santa Cruz River lies adjacent to Interstate 19, a heavily traveled commerce route. The proximity of the stream to the highway renders Gila topminnow vulnerable to stochastic events such as fuel and other chemical spills. The Santa Cruz River also maintains an appreciable nonnative fish community, several species of which are known to compete with and/or prey upon Gila topminnow. Industrial activities and ongoing development within the Nogales sister cities on both sides of the border threaten all aquatic species, though it is likely that residential runoff and wastewater discharge are responsible for a great deal of the available surface flow in the Santa Cruz River.

Effects of the Proposed Action

Implementation of the proposed action will render up to 3,400 linear feet of Nogales Wash and Potrero Creek appreciably less suitable, if not unsuitable for Gila topminnow due to the removal of natural channel features (i.e. cobbles, irregular banks, transitory woody debris) and replacement of said features with a uniform, hydraulically highly-competent channel with high velocities and no refugia that would greatly diminish the ability of Gila topminnow to occupy the site, persist in floods, and/or move to the site from nearby occupied stream reaches. The exact linear footage cannot be determined because the channels are not necessarily entirely unaffected by flood damage reduction features at present. A description of the effects of riprap on native fishes can be found in the August 23, 2001, *Biological Opinion Based on our Review of the Army Corps of Engineers (Corps) proposed Contract 42E increment of the Sacramento River Bank Protection Project (SRBPP) in the Lower Sacramento River in Solano, Sacramento, Yolo, Sutter, Colusa, Glenn, Butte, and Tehama Counties, California* (1-1-00-F-0126) and associated June 2000, report entitled *Impacts of Riprapping to Ecosystem Functioning, Lower Sacramento River, California*, prepared by our Sacramento Fish and Wildlife Office (SFWO).

The 800 linear feet of Nogales Wash that will be treated with rock revetment (riprapped) may retain some habitat function for Gila topminnow by virtue of the refugia available between individual stones, though near-bank velocities along the riprap may be greater than under natural conditions due to decreased roughness coefficients.

If water is present in the project area during construction, and Gila topminnow have managed to disperse to that reach, individuals could be killed or injured by vehicles and equipment in the stream. Tom Newman (Coronado National Forest retiree, pers. comm.) located a dead Sonora chub (*Gila ditaenia*) at the Ruby Road crossing of Sycamore Canyon west of Nogales that had apparently been splashed up onto the bank by a passing vehicle, where the fish died. Similar mortality of Gila topminnow could occur in the project area during construction. Mortality of Gila topminnow could also occur by pumping or coffer-damming the stream around work areas; by contamination of water via accidental hazardous materials spills or leachates from the

concrete; or if a flood event washed stockpiled spoil into the stream and caused increased turbidity or filling in of downstream ponds used by Gila topminnow.

In regard to the leachates mentioned above, fresh concrete leaches salts, lime, catalysts, and potentially other toxic materials for a period of up to nine months that are toxic to fish. Gila topminnow and desert pupfish were killed by leachates from concrete fish ponds constructed at the Phoenix Zoo (M. Demlong, AGFD, Phoenix, pers. comm. 2000). Toxic conditions can remain for longer than nine months if petroleum sealers are used on the concrete to extend drying times. Two-part epoxy concrete sealants are available to prevent leaching of toxins into water; however, the sealant itself can be toxic unless approved for potable water use. Use of such sealants is not possible for the proposed action because the concrete would be poured in place, thus the underside of the trapezoidal channels and other features cannot be treated.

The distance at which effects to fish attenuate and the length of time necessary for leachates to move through or disperse from the system, or be diluted to the point where they no longer cause adverse effects, are unknown. The example from the Phoenix Zoo is probably an extreme example, because the ponds were closed systems in which the substrate was curing concrete. Nevertheless, some mortality of Gila topminnow is expected at and downstream of the project area, possibly for periods up to nine months.

It is likely there will be altered infiltration because of the appreciable amount of channel that will be made impervious. Changes in alluvial ground water levels can lead to temporal and permanent reduction in riparian vegetation quantity and health. Shifts from deep-rooted to shallow-rooted vegetation contribute to bank destabilization and collapse and production of fine sediment (Meehan 1991). Loss of riparian shade results in increased fluctuation in water temperatures with higher summer and lower winter temperatures (Karr and Schlosser 1977, Platts and Nelson 1989). These effects are expected to occur along the stream at the bridges and where the access route is in or near the stream channel; however, the area affected is small (less than 0.5 acre of riparian vegetation removed). The proposed action included riparian reestablishment, which is anticipated to minimize loss of shade and restore some allochthonous input over time. Sediment increases are not anticipated in the portions of the channel to be lined with cement or rock, though altered hydrology and diminishment of riparian vegetation downstream could still occur.

The adverse effects of the various project elements discussed above are proposed to be reduced through the implementation of minimization and conservation measures. Gila-topminnow-specific minimization measures include preconstruction Gila topminnow surveys and relocation to suitable sites, blocking passage of Gila topminnow located adjacent to the project site, and the implementation of the Storm Water Pollution Prevention Plan's (SWPPP) best management practices (BMPs) for sediment and erosion control.

The proposed removal and relocation of Gila topminnow will contribute to the conservation and recovery of the species in the long-term. In the short-term, however, it will adversely affect individuals of the species through harassment and capture mortality. Further, since it is not likely all Gila topminnow that will be present at the site will be captured, those that remain will be adversely affected by construction activities. We are also concerned that no holding facility or

repatriation site has been identified, and husbandry techniques have not been outlined. Our concerns are, however, addressed through USACE's commitment to: (1) establish two Gila topminnow populations at two separate sites that have been identified in the revised Gila topminnow Recovery Plan (1998) as sites suitable for the reestablishment of topminnow; (2) utilize AGFD and FWS's existing protocols for the collection, holding, and transportation of Gila topminnow to their release site; and (3) develop a plan for the monitoring of both Gila topminnow populations in coordination with us and AGFD.

Cumulative Effects

Cumulative effects are those adverse effects of future non-Federal (State, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Effects of past Federal and private actions are considered in the Environmental Baseline.

Non-Federal actions most likely to affect Gila topminnow and its habitat in or near the project area are those that occur along or in Peck Canyon, Sonoita Creek, and the Santa Cruz River. Most of the Santa Cruz River corridor south of Tubac and between Atascosa-Pajarito and Patagonia mountains is privately owned. Development has occurred in Peck Canyon, but is low density, and new development is not occurring at a rapid rate. More development is occurring east of the Santa Cruz River and in nearby Rio Rico, where areas of riparian vegetation, particularly in the mesquite bosque, have been cleared for homes, farming, or pastures. Grazing by cattle and horses in the floodplain is expected to continue. With increased population, recreation such as off-highway vehicle use, fishing, woodcutting, and camping can be expected to increase. Vehicle use in the river channel can destabilize banklines, destroy riparian vegetation, and fish could be run over or splashed from shallow ponds. Fishing and use of live bait could result in introduction of nonnative fishes that may compete with or prey upon Gila topminnow. Camping could result in fires that could destroy riparian vegetation. A recent diesel spill in Mexico that spread through the project area illustrates that actions occurring far upstream may also affect Gila topminnow. Recent actions regarding the land status of portions of Sonoita Creek have been beneficial. Sonoita Creek State Natural Area has twice undergone appreciable land acquisitions; one in 2003 and, most recently, Coal Mine Canyon came under the purview of Arizona State Parks. One of the express purposes of these acquisitions was protection of Gila topminnow habitat from development.

Some non-Federal actions, such as development on private lands, may require Federal permits, such as Clean Water Act 404 permits from the USACE. The effects of such activities are not considered cumulative effects; these activities would be addressed through the section 7 process. Compliance with the Act for activities that may result in take of listed animals, but do not have a Federal nexus, could be addressed through section 10(a)(1)(B) of the Act.

Conclusion

After reviewing the current status of the Gila topminnow, the environmental baseline for the action area, and the effects of the proposed flood-control project, and cumulative effects, it is our

biological opinion that the proposed action is not likely to jeopardize the continued existence of the species. Critical habitat has not been designated for the species, therefore none will be affected.

The status of the Gila topminnow is tenuous. The number of occupied sites, including the mainstem Santa Cruz River, has dwindled to 14-naturally-occurring populations, 18 extant reestablished populations, and one reestablished population outside of the species' historical range. All known sites exist under perpetual threat of chronic drought and stochastic events such as wildland fire, floods, contaminant spills, and the accidental or purposeful introductions of competitive and/or predatory nonnative species.

The USACE has included a number of conservation measures that will meaningfully reduce the effects of the proposed action on Gila topminnow by: (1) conducting pre-construction surveys for Gila topminnow within the project area; (2) relocating any Gila topminnow found; (3) blocking ingress from Gila topminnow in adjacent reaches; (4) implementing BMPs to protect water quality; and (5) establishing and/or reestablishing Gila topminnow at two additional sites.

In summary, our conclusions are based on the record of this consultation including the NEPA documentation and BA, correspondence and meetings with you and AGFD, and the information outlined in this biological opinion. The pertinent points are summarized below:

1. Gila topminnow occur at the project site or within the range of downstream effects. Conservation measures will be implemented to minimize the death of Gila topminnow from construction actions. Gila topminnow will be relocated from the site, and block seines will ensure additional Gila topminnow do not enter the site while construction is underway.

2. There is a high likelihood that lethal take will occur during capture and relocation. This take will be minimized through the development and adoption of proper husbandry practices in consultation with us and AGFD.

3. Conservation measures will minimize the permanent loss of up to 3,400 linear feet of Gila topminnow habitat in Nogales Wash and Potrero Creek by reestablishing the species at two sites outside of the project area.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is defined (50 CFR §17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR §17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns which

include, but are not limited to, breeding, feeding or sheltering. “Incidental take” is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Under the terms of sections 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the USACE so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The USACE has a continuing duty to regulate the activity covered by this incidental take statement. If the USACE: (1) fails to assume and implement the terms and conditions; or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the applicant must report through the USACE the progress of the action and its impact on the species to the FWS as specified in the incidental take statement (50 CFR §402.14(i)(3)).

Amount of Extent of Take

We anticipate that incidental take of Gila topminnow (harm, harassment, and mortality) will occur as a result of the proposed action. The proposed capture and relocation of Gila topminnow will at least harm and harass all individuals captured, and may result in the mortality of a portion of the catch. The incidental take associated with the initial portions of relocation will be easily quantified; each captured Gila topminnow will be harassed or harmed. Subsequent mortality, either from handling stress or predation of weakened individuals at the repatriation site will be more difficult to detect. We also anticipate that finding a dead or injured Gila topminnow (that escaped relocation, as described above), or one that died as a result of construction activities or toxic leachate, will be unlikely due to the species’ small body size and the fact that the harm and mortality are likely to occur during periods of high discharge and turbidity. While it is possible to determine the numbers of Gila topminnow that will be harmed and harassed during initial capture, it is not possible to provide precise numbers of Gila topminnow that will be harassed, harmed, or killed during and/or after relocation and construction. An approach whereby take is quantified both in terms of numbers of fish and degradation or loss of habitat is thus warranted in this case. We anticipate the following forms of take:

1. Up to 20 Gila topminnow as a result of mortality due to stress during proposed capture and holding of fish.

2. Up to 20 Gila topminnow as a result of mortality or injury caused by toxic leachates from the lined portions of channel and banks, vehicle or equipment use in Potrero Creek and Nogales Wash, and other proposed activities.

3. Up to 3,400 linear feet of aquatic habitat that will rendered unsuitable for Gila topminnow by the placement of concrete and riprap.

Because dead or injured Gila topminnow will be difficult to detect, the following will also indicate that take, as measured in items 1 and 2, has been exceeded:

More than 40 fish of any species are found dead in Potrero Creek or Nogales Wash (40 fish total in both streams) during required monitoring in the first nine months following completion of construction.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If the incidental take anticipated in the preceding paragraphs is met, the USACE shall immediately notify the Service in writing. If, during the course of the action, the level of anticipated incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation. In the interim, the USACE must cease the activity resulting in the take if it is determined that the impact of additional taking will cause an irreversible and adverse impact on the species. The USACE must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures. This biological opinion does not authorize any form of take not incidental to the USACE proposed action as described herein.

Effect of the Take

In this biological opinion, the Service finds the anticipated level of take is not likely to jeopardize the continued existence of the Gila topminnow.

Reasonable and Prudent Measures

We believe the following reasonable and prudent measures are necessary and appropriate to minimize take of Gila topminnow:

1. Personnel education programs, defined construction areas, and well-defined operational procedures shall be implemented during construction.

2. Proposed capture of Gila topminnow shall be designed to salvage and hold as many fish as is practicable that may be adversely affected by the proposed action. Holding of Gila topminnow shall occur until two sites have been identified and, if necessary, rehabilitated (physical habitat made suitable) and renovated (nonnative fish removed). Existing protocols shall be implemented to minimize the effects on Gila topminnow from the proposed capture, holding, and release.

3. The USACE shall monitor implementation of the proposed action and any resulting incidental take and report to the FWS and AGFD the findings of that monitoring.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, USACE must comply with the following terms and conditions in regard to the proposed action. These terms and conditions implement the reasonable and prudent measures described above. Terms and conditions are nondiscretionary. We assume implementation of "Proposed Measures to Minimize the Effects of the Action"; thus those measures, which are part of the Proposed Action, do not need to be restated here.

1. The following terms and conditions implement reasonable and prudent measure number one:

    a. The USACE shall designate a field contact representative (FCR) who shall be responsible for overseeing compliance with these terms and conditions and proposed minimization measures, and shall also be responsible for coordinating compliance with us. The FCR shall have the authority and the responsibility to halt all project activities that are in violation of these terms and conditions. The FCR shall have a copy of the terms and conditions and proposed minimization measures of this biological opinion while on the work site.

    b. Construction personnel shall be informed of terms and conditions and proposed minimization measures herein, and the need to comply with them.

2. The following terms and conditions implement reasonable and prudent measure number two:

    a. All aquatic habitats capable of supporting Gila topminnow within the project area on Nogales Wash and Potrero Creek shall be seined or dip netted in an attempt to capture most Gila topminnow. Proposed capture of Gila topminnow shall proceed within one week of the species' detection. Identity of Gila topminnow shall be confirmed by three fisheries biologists able to identify topminnow and mosquitofish.

    b. Block seining shall be discouraged in favor of a more-effective method of preventing ingress by the small-bodied Gila topminnow. The alternate method shall be determined and implemented in consultation with us and AGFD.

    c. Captured Gila topminnow shall be transported and repatriated downstream from the project area to an area approved by AGFD and us. The confluence of Peck Canyon and the Santa Cruz River has been preliminarily identified as a release site. Transport and holding/husbandry locations and protocols shall be agreed upon by the FWS and AGFD.

    d. Only qualified fisheries biologists permitted by the FWS and AGFD shall capture and transport Gila topminnow. Holding facilities must also be permitted by both wildlife agencies.

e. The identification and, if necessary, construction and/or renovation of the proposed two Gila topminnow sites outside of the action area shall be initiated before the end of construction activities and completed no later than 2 years after that time.

f. The first priorities for site selection are that they are within the Santa Cruz River watershed and within Santa Cruz County and suitable for, or can be made suitable for the species. Consideration may also extend to suitable or potentially-suitable sites within Santa Cruz, Cochise, or Pima counties.

g. Gila topminnow shall be released to the two sites as soon as the sites are capable of supporting the species. Releases, including procedures and numbers released at each suitable pool or aquatic site, shall be agreed to by the FWS and AGFD. The reestablishment of genetic lineages appropriate to the upper Santa Cruz River system is a management consideration.

3. The following terms and conditions implement reasonable and prudent measure number three:

a. A qualified biological monitor shall monitor aquatic sites in the project area from the respective streams to the Santa Cruz River each day construction crews are on-site until construction is completed. The same reach of the streams shall be monitored, at a minimum one week, one month, six months, and nine months after construction is complete. During these monitoring efforts, the monitor shall document and record any take of Gila topminnow, dead fish of any species, and take notes on the condition of the habitat.

b. A qualified biologist shall monitor both Gila topminnow sites that are established outside of the project areas. Monitoring shall occur one week, one month, six months, and nine months after Gila topminnow have been placed in the respective sites. Monitors shall possess applicable permits from us and AGFD and will note the presence and abundance of Gila topminnow, the presence and abundance of nonnative fishes, and the general habitat function of the pool (i.e. bank stability; proportion of open water; presence of emergent, submergent, and riparian vegetation; and other parameters to be developed by FWS, and AGFD)

c. We encourage development of a standard form to record these data. A brief written report shall be prepared by the biological monitor summarizing the results of such monitoring/documentation; the report shall also describe any deviations from the proposed action, and procedures and results of fish captures, transport, holding, and release. This report shall be submitted to the Service within one year of completion of construction, and within one year of the placement of Gila topminnow in each of the off-site localities. The report shall also make recommendations, as needed, for modifying or refining these terms and conditions

to enhance protection of the Gila topminnow or reduce needless hardship on the USACE and the non-Federal sponsor.

Conservation Recommendations

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the Gila topminnow. In furtherance of the purposes of the Act, we recommend implementing the following actions:

1. Assist the FWS and AGFD in implementation of the revised Gila topminnow recovery plan, when finalized, in regard to issuance of 404 permits and Civil Works projects.

2. Assist the FWS and AGFD in implementation of the southwestern willow flycatcher recovery plan, in regard to issuance of 404 permits and Civil Works projects.

3. Consider the habitat requirements and life history of the yellow-billed cuckoo (*Coccyzus americanus occidentalis*) in all civil works projects and regulatory permit actions.

4. Develop a riparian in-lieu fee program for projects in the Santa Cruz basin, to which projects such as this one could contribute. When sufficient funds are collected, meaningful aquatic habitat conservation projects could be enacted, such as purchase of conservation easements and restoration of hydrologic processes. In order for us to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species, we request notification of implementation of any conservation actions.

REINITIATION-CLOSING STATEMENT

This concludes formal consultation on the USACE’s proposed Nogales Wash/Chula Vista Flood Control Project, Santa Cruz County, Arizona. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may adversely affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by this action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation, if it is determined that the impact of such taking will cause an irreversible and adverse impact to the species.

We have assigned log numbers 02-21-03-F-0343 and 02-21-84-I-0062 to this consultation. Please refer to both of these numbers in future correspondence regarding this consultation. Any questions of comments should be directed to Jason Douglas (520) 670-6150, (x226) or Sherry Barrett (x223), of my Tucson staff.

Sincerely,

/s/ Steven L. Spangle
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
Federal Projects, Fish and Wildlife Service, Phoenix, AZ
Bob Broscheid, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ
Michael Fink, U.S. Army Corps of Engineers, Phoenix, AZ
Ken Zehentner, Santa Cruz County Flood Control District, Nogales, AZ

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Appendix A: Concurrences

Cactus Ferruginous Pygmy-Owl

Description of the Proposed Conservation Measures

The proposed action was described in the preceding biological opinion. The following narrative incorporates those portions of the proposed action relevant to the terrestrial riparian community and the cactus ferruginous pygmy owl.

The USACE has proposed the following measures to specifically minimize potential effects to the pygmy-owl: (1) removal of riparian vegetation within Nogales Wash will occur between the months of October 1st and December 31st (in-water work not involving terrestrial disturbance may begin in January) and (2) Nogales Wash will be revegetated with a mixture of cottonwood, willow, and mesquite trees on a 2:1 ratio. The final details of the revegetation plan will be developed during construction.

The USACE has also proposed general riparian conservation measures to reduce the potential impacts of the project to Potrero Creek between the PCIC and its confluence with Nogales Wash. The conservation measures entail an easement and fee acquisition of approximately 30 feet on either side of the existing creek, and riparian habitat improvement, excluding that portion of the creek bounded on both sides by mobile homes in Pete Kitchen. The improved riparian habitat along this reach of Potrero Creek will be supplied with a natural water supply by the placement of a low-flow pipe (no less than 36-inches in diameter) in the west end of the interceptor channel and its associated embankment. The low-flow pipe will enable all natural low flows coming down Potrero Creek to reach the conservation site. This feature is specifically for aesthetic treatment purposes, as local residents want to maintain the normal flows. Thus, the PCIC will only divert flows during a flood event. This conservation site will be further improved by constructing permanent fencing along both sides of the creek to exclude grazing animals from inhibiting regeneration of riparian tree species in the future. In addition, the USACE will construct a temporary sprinkler irrigation system along 2.5 acres of the channel right-of-way (ROW) during the vegetation establishment period, with the exception of the south side of the channel, where vegetation would interfere with the function of the interceptor channel. The channel ROW will be planted with riparian species that will develop, over time, into cottonwood/willow and mesquite woodland.

Cactus Ferruginous Pygmy-owl

Status of the Species

We listed the Arizona population of the pygmy-owl as an endangered distinct population segment on March 10, 1997 (USFWS 1997) without critical habitat. The listing rule (USFWS 1997) and administrative record contain detailed discussions of the factors affecting the pygmy-owl that we believe are responsible for the species' decline and endangered status. The Cactus Ferruginous Pygmy-Owl Recovery Team was convened in September 1998. A draft recovery plan was released for public comment in January 2003 (USFWS 2003).

In response to a court order, approximately 731,712 acres of critical habitat were designated on July 12, 1999, in areas within Pima, Cochise, Pinal, and Maricopa counties in Arizona (USFWS 1999). The listing and designation of critical habitat were followed by several years of intensive litigation in Federal Court, the results of which are detailed in the administrative record for this consultation. At this writing, the pygmy-owl is listed as endangered, and its critical habitat status is "proposed".

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 C.F.R. §402.02 within its analysis of the proposed action's effects to critical habitat. Instead, we have relied upon: (1) the statutory provisions under Sections 7(a)(2) and 7(a)(4) of Act; (2) the definitions of "critical habitat" and "conservation" under section 3 of the Act; and (3) the procedures for delineating and adjusting areas included in a designation under section 4 of the Act. A complete description of the primary constituent elements of proposed critical habitat and the proposed critical habitat units can be found in the Federal Register announcement of the proposed rule to designate critical habitat for the pygmy-owls (FWS 2002).

A detailed description of the life history and ecology of the pygmy-owl can be found in the Birds of North America (Proudfoot and Johnson 2000), Ecology and Conservation of the Cactus Ferruginous Pygmy-owl in Arizona (Cartron and Finch 2000; Cartron *et al*. 2000a, 200b), and in other information available from the Arizona Ecological Services Field Office website (arizonaes.fws.gov). The life history of pygmy-owls is detailed in prior consultations, occurs in the administrative record for this consultation, and is incorporated herein by reference. This section contains primarily those aspects of the species' life history (breeding and dispersal seasons, sources of mortality, habitat preferences, dispersal requirements, etc.) directly relevant to (and mentioned in) our analysis of the effects of the proposed action.

The pygmy-owl's courtship and nesting period occurs from February through June. Fledging and dispersal occurs from June through August. Once established by males, territories contain several potential nest-roost cavities from which responding females select a nest; thus, cavities/acre may be a fundamental criterion for habitat selection. Pygmy-owls exhibit a high degree of site fidelity once territories (the area defended) and home ranges (the area used throughout the year) have been established (AGFD 2003), so it is important that habitat characteristics within territories and home ranges be maintained over time in order for them to remain suitable. This is important for established pygmy-owl sites, as well as new sites established by dispersing pygmy-owls. Pygmy-owls are more likely to be affected by projects within their home range because of the species' strong site fidelity. Behaviorally, the option to seek alternative areas outside of the supposed 280-acre home range (Proudfoot 1996, Proudfoot, pers. comm.) appears limited, particularly for males. Banded and telemetered juvenile pygmy-owls in Arizona have dispersed from 1.4 miles to over 150 miles (Abbate *et al.* 1999, Abbate *et al.* 2000, AGFD 2004). Outside of the potentially aberrant 100-mile dispersal distance, the maximum documented dispersal distance is 21.8 miles (AGFD 2002b).

Juvenile owls typically disperse from natal areas in July and August and do not appear to defend a territory until September. They typically fly from tree to tree instead of long flights and may

move up to 1 mile or more in a night (Abbate *et al.* 1999). Trees of appropriate size and spacing appear to be necessary for successful dispersal, but specific data describing this pattern are currently unavailable. Once dispersing male pygmy-owls settle in a territory (the area defended by a pygmy-owl), they rarely make additional movements outside of their home range. For example, spring surveys have found male juveniles in the same general location as observed the preceding autumn (Abbate *et al.* 2000), but unpaired female dispersers may make additional movements that sometimes continue into the subsequent breeding season (AGFD 2003). The ability and opportunity for pygmy-owls to disperse within population segments (behaving perhaps as metapopulations), as well as emigrate to adjacent population segments is likely important for the long-term persistence of pygmy-owls in Arizona.

Little is known about the rate or causes of mortality in pygmy-owls; however, they are susceptible to predation from a wide variety of species. Documented and suspected pygmy-owl predators that occur on BLM lands include great horned owls (*Bubo virginianus*), Harris' hawks (*Parabuteo unicinctus*), Cooper's hawks (*Accipiter cooperii*), and screech-owls (*Otus kennicottii*) (Abbate *et al.* 2000, AGFD 2003). Pygmy-owls may be particularly vulnerable to predation and other threats during and shortly after fledging (Abbate *et al.* 1999). Cover near nest sites may be important for young to fledge successfully (Abbate *et al.* 1999, AGFD 2003, Wilcox *et al.* 1999, Wilcox *et al.* 2000).

Knowledge of the species' habitat associations is critical in determining the effects of the proposed action. Pygmy-owls were historically recorded in association with riparian woodlands in central and southern Arizona (Bendire 1892, Gilman 1909, Johnson *et al.* 1987, Johnson *et al.* 2003). Plants present in these riparian communities included cottonwood, willow (*Salix* spp.), ash, and hackberry (*Celtis* spp.), although this may have reflected a site-selection bias among early researchers. Recent records have documented pygmy-owls in a variety of vegetation communities such as riparian woodlands, mesquite (*Prosopis velutina*) bosques (Spanish for woodlands), Sonoran desertscrub, semidesert grassland, and Sonoran savanna grassland communities (see Brown 1994 for a description of these vegetation communities). Currently, pygmy-owls are thought to reside primarily within the Arizona Upland Subdivision of the Sonoran Desert, particularly Sonoran desertscrub (Phillips *et al.* 1964, Monson and Phillips 1981, Davis and Russell 1984, Johnson and Haight 1985, Johnsgard 1988). This subdivision's major components include saguaros (*Carnegiea gigantea*), organ pipe cactus (*Stenocereus thurberi*), rarely cordon (*Pachycereus pringlei*), blue paloverde (*Parkinsonia florida =Cercidium floridum*), foothills paloverde (*P. microphylla = C. microphyllum*), ironwood (*Olneya tesota*), mesquites (*Prosopis* spp.), and acacias (*Acacia* spp.) (Brown 1994). Saguaros appear to be the preferred nest substrate (Abbate *et al.* 1996, 1999, 2000, AGFD 2003).

Within these communities, pygmy-owls appear to occur primarily within areas of high plant species diversity, high structural diversity, and the presence of tall canopy (Wilcox *et al.* 2000, Flesch 2003a, Swarth 1914, Karalus and Eckert 1974, Monson and Phillips 1981, Johnsgard 1988, Enriquez-Rocha *et al.* 1993, Proudfoot and Johnson 2000). Vegetation structure may be more important than species composition (Wilcox *et al.* 1999, Cartron *et al.* 2000a). Perch substrates used by pygmy-owls for calling are typically the tallest trees available within a home range, although pygmy-owls have also been noted calling from within saguaro cavities (Flesch 2003a).

Pygmy-owls formerly ranged throughout Arizona from as far north as New River (Fisher 1893). The species resided in riparian and xeroriparian forests along the Gila, Salt, Verde, San Pedro, and Santa Cruz rivers and various tributaries (Breninger 1898, Gilman 1909, Swarth 1914). Riparian-associated pygmy-owls were detected at Dudleyville on the San Pedro River as recently as 1985 and 1986 (Hunter 1988, AGFD 2002a). Records from the eastern portion of the pygmy-owl's range include an 1876 record from Camp Goodwin (nearby current-day Geronimo) on the Gila River, and a 1978 record from Gillard Hot Springs, also on the Gila River. Pygmy-owls have been found as far west as the Cabeza Prieta Tanks, Yuma County in 1955 (Monson 1998).

Precipitous population declines have occurred since the early surveys. Hunter (1988) found fewer than 20 verified records of pygmy-owls in Arizona for the period of 1971 to 1988. Documentation of the total number of pygmy-owls and their current distribution in Arizona is incomplete. Survey and monitoring work in Arizona resulted in documenting 41 adult pygmy-owls in 1999, 34 in 2000, 36 in 2001, 24 in 2002, 21 in 2003, and, most recently, 19 in 2004 (AGFD 2002a, Scott Richardson, pers. comm.). Data for 2005 are not yet available. We believe that more pygmy-owls exist in Arizona, but systematic surveys have not been conducted in all areas of potential habitat. Recent survey information has shown pygmy-owls to be more numerous adjacent to and near the Arizona border in Mexico (Flesch and Steidl 2000). There is also considerable unsurveyed habitat on the Tohono O'odham Nation, and we feel that these Tribal lands may support meaningful numbers of pygmy-owls.

Despite the lack of comprehensive, rangewide surveys, information gathered over the past few years indicates that pygmy-owls occur in Arizona in low numbers and are patchily distributed across southern Arizona. They occur in four main areas of the State, and numbers found within each area tend to vary on an annual basis. Based on personal observations and anecdotal information, Russell and Monson (1998) recorded no decline in numbers from Sonora, Mexico. Data collected from Mexico are presently insufficient to determine meaningful trends, but it is likely that for the pygmy-owl to persist in Arizona, additional pygmy-owls need to be located, productivity needs to be expanded, and population support from Mexico or artificial augmentation is probably required. Recent genetic work (Proudfoot and Slack 2001) may indicate that the pygmy-owls in Texas are genetically distinct from the pygmy-owls in Arizona, possibly to the subspecies level. Pygmy-owl populations in Texas are geographically separated from Arizona and currently provide no genetic or demographic support for Arizona populations.

Since listing in 1997, about 165 Federal agency actions in Arizona have undergone informal consultation regarding the potential effects of their projects to pygmy-owls. These are actions that included sufficient measures to avoid or minimize impacts to the pygmy-owls so that the effects were insignificant or discountable. At least 49 Federal agency actions have undergone formal section 7 consultation throughout the pygmy-owl's range. Of these, only one resulted in a draft jeopardy opinion, and that was resolved as a non-jeopardy final opinion. Six formal consultations anticipated incidental take of one or more pygmy-owls; however, only "take" in the form of harassment was authorized. Given the extremely low number of known pygmy-owls in Arizona, lethal "take" of even a single owl would make it difficult to avoid jeopardizing the species. Since 1997, we have provided technical assistance to hundreds of projects that do not have a Federal nexus, primarily single-family residences. These actions have no legal

requirement to follow the recommendations we provide under technical assistance, and we have no way of monitoring if or to what extent the recommendations are incorporated. They may or may not contribute to the conservation of the pygmy-owl, but they certainly contribute to ongoing effects to pygmy-owl habitat. Stochastic events, such as fire, drought, and spikes in predator populations, also continue to adversely affect the distribution and extent of pygmy-owl habitat.

More detailed treatments of the pygmy-owl's status can be found within the species' *Draft Recovery Plan*; our February 11, 2005, *Biological Opinion on the Tangerine Hills Residential Development Project in the Town of Marana, Pima County, Arizona*; our December 21, 2004, *Biological Opinion on the Arcturus Linda Vista Limited Partnerships proposed development project in the Town of Marana* (AESO/SE: 02-21-03-F-0495); and our September 15, 2004, *Biological Opinion on Flood Control Improvements within the Santa Cruz River, Yuma Mine Wash, and Two Unnamed Washes* (AESO/SE: 02-21-02-F-0333). These documents are available on the AESFO web site at http://arizonaes.fws.gov/.

Environmental Baseline

The environmental baseline includes past and present impacts of all Federal, state, or private actions in the action area; the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation; and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation. The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02).

The proposed project's action area includes 3,400 linear feet of Potrero Creek and Nogales Wash. The extent of downstream effects is uncertain, but we anticipate that there will be indirect effects (altered hydrograph or diminished groundwater infiltration, geomorphic adjustments, contribution of additional contaminants) to approximately 3 miles of stream. The action area also includes proposed staging and conservation lands adjacent to the streams. As described in the Environmental Baseline section of the preceding Biological Opinion, the project area's upland vegetation's dominant overstory consists primarily of broadleaf riparian species in well-watered alluvial reaches and mesquite bosques in drier, high-terrace sites. While not necessarily a determining factor in pygmy-owl occupancy, the project area contains no columnar cactus.

There are no current records of pygmy-owl within the project area, and protocol-level surveys conducted in 2004 (Blackman and Ingraldi 2004) did not result in detections of the species. Surveys are underway in 2005. An informal site visit by Scott Richardson of my staff on February 8, 2005, determined that while the existing riparian habitat does provide habitat for pygmy-owls, its limited extent, laterally-narrow configuration, and location immediately adjacent to residential and industrial sites render it unlikely to support pygmy-owl nesting. The project sites' habitat is therefore presently suitable primarily for dispersal.

The potential for pygmy-owls to disperse from adjacent sites is uncertain; the region surrounding the Santa Cruz River near Nogales has not been extensively surveyed, nor have lands immediately south in Sonora, Mexico The closest known pygmy-owl territories are in the Altar Valley and the far-western Atascosa Mountains; this represents a flight distance of approximately 20 miles. Given the pattern of intensive land use along the Santa Cruz River in Nogales, Arizona and Nogales, Sonora, we feel there is a low likelihood that pygmy-owls will disperse north from potentially-occupied, adjacent habitat through the project area.

Effects of the Proposed Action

This analysis primarily considers the effects of the propose action on the potential use of the project area as a dispersal corridor for pygmy-owls. There is a low likelihood that pygmy-owls will establish breeding territories in the project area due to the limited lateral extent of suitable riparian habitat, absence of columnar cactus, and high level of human activity.

Construction of the proposed action will temporarily affect up to 12.51 acres of riparian vegetation and permanently affect up to 8.0 acres of riparian vegetation. The USACE has proposed to minimize this effect by conducting vegetation removal between October 1st and December 31st . This construction window is outside of the pygmy-owl's dispersal and territory-establishment season. Continuing protocol-level surveys will be employed to ascertain if pygmy-owls have entered the project site post initiation of construction activities. Riparian conservation measures will include the retention of large trees at certain sites and the revegetation of Nogales Wash with a mixture of cottonwood, willow, and mesquite trees on a 2:1 ratio. The final details of the revegetation plan will be developed during construction, but it is expected that the specific site design and adherence to USACE-standard 5-year success timeframes will ensure that the site retains at least a portion of its existing value as a potential pygmy-owl dispersal corridor.

Conclusion

After reviewing the current status of the cactus ferruginous pygmy-owl, the environmental baseline for the action area, and the effects of the proposed flood control project, we concur that the proposed action is not likely to adversely affect the pygmy-owl or proposed critical habitat. We conclude that the effects of the action on pygmy-owls are insignificant and discountable given the project's: (1) negative survey history in the project area; (2) distance from known-to-be occupied pygmy-owl territories; (4) the minimal amount of impact to riparian vegetation relative to the overall amount of such habitat along the Santa Cruz River; and (5) post-project restoration of affected riparian vegetation.

Southwestern Willow Flycatcher

Description of the Proposed Conservation Measures

The proposed action was described in the preceding biological opinion. The following narrative incorporates those portions of the proposed action relevant to the terrestrial riparian community and the southwestern willow flycatcher.

The USACE has proposed the following measures to specifically minimize potential effects to the southwestern willow flycatcher: (1) removal of riparian vegetation within Nogales Wash will occur between the months of October 1st and December 31st; and (2) Nogales Wash will be revegetated with a mixture of cottonwood, willow, and mesquite trees on a 2:1 ratio. The final details of the revegetation plan will be developed during construction.

The USACE has also proposed general riparian conservation measures to reduce the potential impacts of the project to Potrero Creek between the PCIC and its confluence with Nogales Wash. The conservation measures entail an easement and fee acquisition of approximately 30 feet on either side of the existing creek, and riparian habitat improvement, excluding that portion of the creek bounded on both sides by mobile homes in Pete Kitchen. The improved riparian habitat along this reach of Potrero Creek will be supplied with a natural water supply by the placement of a low-flow pipe (no less than 36-inches in diameter) in the west end of the interceptor channel and its associated embankment. The low-flow pipe will enable all natural low flows coming down Potrero Creek to reach the conservation site. This feature is specifically for aesthetic treatment purposes, as local residents want to maintain the normal flows. Thus, the PCIC will only divert flows during a flood event. This conservation site will be further improved by fencing along both sides of the creek to exclude grazing animals from inhibiting regeneration of riparian tree species in the future. In addition, the USACE will construct a permanent sprinkler irrigation system along 2.5 acres of the channel right-of-way (ROW), with the exception of the south side of the channel, where vegetation would interfere with the function of the interceptor channel. The channel ROW will be planted with riparian species that will develop, over time, into cottonwood/willow and mesquite woodland.

Status of the Species

We listed the southwestern willow flycatcher as endangered, without critical habitat, on February 27, 1995 (FWS 1995). Critical habitat was later designated on July 22, 1997 (FWS 1997a). A correction notice was published in the Federal Register on August 20, 1997 to clarify the lateral extent of the designation (FWS 1997b). On May 11, 2001, the 10th circuit court of appeals set aside designated critical habitat in those States under the 10th circuit's jurisdiction (New Mexico). FWS subsequently set aside critical habitat designated for the southwestern willow flycatcher in all other States (California and Arizona) until it can re-assess the economic analysis. We are currently seeking public comment on a proposed critical habitat designation.

A *Final Recovery Plan* for the southwestern willow flycatcher was signed by the FWS Region 2 Director on August 30, 2002, and was released to the public in March 2003. This plan describes reasons for endangerment and the current status of the flycatcher, recovery actions, management

needs, and recovery goals. Range-wide, the southwestern willow flycatcher recovery plan has designated different recovery units, each of which list numerous management units (FWS 2002). Each recovery and management unit has specific recovery criteria in order to down or de-list the flycatcher.

The southwestern willow flycatcher breeds in dense riparian habitat from sea level in California to just over 8,000 feet in Arizona and southwestern Colorado. Southwestern willow flycatchers primarily use coyote, Geyer's, and Goodding's willow, boxelder (*Acer negundo*), saltcedar (*Tamarix* sp.), Russian olive (*Elaeagnus angustifolia*) and live oak (*Quercus agrifolia*) for nesting. Based on the diversity of plant species composition and complexity of habitat structure, four basic habitat types have been identified for the flycatcher: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge *et al.* 1997a, 1997b).

Throughout its range, the southwestern willow flycatcher arrives on breeding grounds in late April and May (Sogge *et al.* 1997a, 1997b). Nesting begins in late May and early June and young fledge from late June through mid-August (Sogge *et al.* 1997a, 1997b). Typically one brood is raised per year, but birds have been documented raising two broods during one season and renesting after a failure (Whitfield 1990; Sogge *et al.* 1997a, 1997b).

The Recovery Plan (FWS 2002) includes a description of the riparian patches used by nesting southwestern willow flycatchers. These riparian patches vary widely in size and shape, from as small as 0.25 acre along the Rio Grande to 175 acres on the upper Gila River in New Mexico. Mean patch size is 21.2 acres and the median size is 4.4 acres. Flycatchers do not typically nest in narrow strips of riparian vegetation less than 33 feet wide, although they may use these strips if they extend out into larger patches, and during migration. Flycatchers often cluster their territories into small portions of riparian sites, and large parts of these sites may be irregularly occupied or not occupied at all. Territories are often bordered by additional habitat that is not defended as breeding territory, but may be important in attracting flycatchers to the site and/or providing an environmental buffer from wind or heat, for post-nesting use, and for dispersal.

Declining southwestern willow flycatcher numbers have been attributed to loss, modification, and fragmentation of riparian breeding habitat, loss of wintering habitat, and brood parasitism by the brown-headed cowbird (Sogge *et al.* 1997a, 1997b; McCarthey *et al.* 1998). Habitat loss and degradation are caused by a variety of factors, including urban, recreational, and agricultural development, water diversion and groundwater pumping, channelization, dams, and livestock grazing. Fire is an increasing threat to willow flycatcher habitat (Paxton *et al.* 1996), especially in monotypic saltcedar vegetation (DeLoach 1991) and where water diversions and/or groundwater pumping desiccates riparian vegetation (Sogge *et al.* 1997a, 1997b).

Willow flycatcher nests are parasitized by brown-headed cowbirds (*Molothrus ater*), which lay their eggs in the host's nest. Brown-headed cowbird parasitism of southwestern willow flycatcher broods has been documented throughout its range (Whitfield 1990, Sferra *et al.* 1995). Cowbird eggs hatch earlier than those of many passerine hosts, thus giving cowbird nestlings a competitive advantage Mayfield 1977, Brittingham and Temple 1983). Flycatchers can attempt to renest, but these attempts often result in reduced clutch sizes, delayed fledging, and reduced nest success (Smith, A.B., P.E.T. Dockens, A.A. Tudor, H.C. English, and B.L. Allen. 2004.

Whitfield and Strong (1995) found that flycatcher nestlings fledged after July 20 had a significantly lower return rate; cowbird parasitism was often the cause of delayed fledging.

The species has been the subject of several formal consultations including projects on grazing, recreation, and other types of projects. Non-Federal actions including groundwater pumping and urban development compete for the limited aquatic and riparian resources. Specific information on trends in population is generally not available, but annual surveys are conducted in many areas in Arizona.

More detailed treatments of the southwestern willow flycatcher's status can be found within the species' *Final Recovery Plan*; our March 8, 2004, *Biological Opinion on the Bureau of Reclamation's Approval of Water Exchange by the San Carlos Apache Tribe for Retention in San Carlos Reservoir* (R2/ES: 02-02-04-F-0001 and 02-21-04-F-0077); our December 30, 2003, *Issuance of a 10(a)(1)(A) Enhancement of Survival Permit to James W. Crosswhite on 394 Ares of the EC Bar Ranch for Two Federally Listed Species* (AESO/SE: 02-21-04-F-0060); and our October 23, 2003, *Livestock Grazing 18 Allotments Along Middle Gila River Ecosystem* (AESO/SE: 02-21-00-F-0029). These documents are available on the AESFO web site at http://arizonaes.fws.gov/.

Environmental Baseline

The environmental baseline includes past and present impacts of all Federal, state, or private actions in the action area; the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation; and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation. The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02).

The proposed project's action area includes Nogales Wash from the upstream end on the in-channel work in Potrero Creek and Nogales wash. The extent of downstream effects are uncertain, but we anticipate that at least three river miles will be affected by changed hydrology (altered hydrograph or diminished groundwater infiltration), hydraulics (geomorphic adjustments), and/or the chemical effects of concrete immersion in water. The action area also includes proposed conservation lands adjacent to the streams and staging areas.

Comprehensive surveys of the Santa Cruz River are generally lacking. Contemporary investigations (post-1990) have stated that the southwestern willow flycatcher persists within the major watershed of Arizona, including the Santa Cruz River system, albeit at much-reduced numbers relative to historic levels (Sferra *et al.* 1997, Sogge *et al.* 1997a, McKernan and Braden 1999, Paradzick *et al.* 1999, Tibbitts and Johnson 1999, Smith *et al.* 2004). Southwestern willow flycatchers were historically known along the Santa Cruz River near Tucson (Swarth 1914, Phillips 1948), but habitat in that area is highly diminished.

Recent southwestern willow flycatcher surveys have been performed in Tumacacori National Historic Park (NHP), which is situated approximately 15 miles downstream of the project area. Powell *et al*. (2004) conducted intensive surveys of Tumacacori NHP in 2001 to 2003 using four field methods: variable circular plots for diurnal breeding birds, nocturnal surveys for owls and nightjars, line-transects for winter bird surveys, and incidental observations in all seasons. They had one confirmed sighting of the southwestern willow flycatcher. Three other flycatchers observed may have been the southwestern subspecies but they didn't vocalize in the presence of observers. Surveys specifically targeted for the flycatcher by Powell in 2002 did not locate this subspecies (Powell, unpublished data; submitted to Arizona Game and Fish Department). Other surveys in the area have not detected nesting southwestern willow flycatchers, and have detected only a few migrant willow flycatchers.

There are no current records of southwestern willow flycatchers within the project area, and protocol-level surveys (Blackman and Ingraldi 2004) did not result in detections of the species. Blackman and Ingraldi (2004) further noted that while the sites' riparian habitat is capable of supporting southwestern willow flycatchers, its limited extent, laterally-narrow configuration, and location immediately adjacent to residential and industrial sites render it unlikely to support nesting activities. This observation was confirmed during an informal site visit by Scott Richardson of my staff on February 8, 2005. The project sites' habitat is therefore presently suitable primarily for migration, for which it may serve as a stopover site for northward (spring) and southward (autumn) migrants.

Migration stopover areas for the southwestern willow flycatcher may be critically important, (i.e., essential) resources affecting productivity and survival (Sogge *et al*. 1997b; Yong and Finch 1997; Johnson and O'Brien 1998; McKernan and Braden 1999; and FWS 2002: E–3 and 19). Use of riparian habitats along major drainages in the Southwest during migration has been documented (Sogge *et al*. 1997a, 1997b; Yong and Finch 1997; Johnson and O'Brien 1998; McKernan and Braden 1999; Koronkiewicz *et al*. 2004). Many of the willow flycatchers found migrating through riparian areas are detected in riparian habitats or patches that would be unsuitable for breeding (e.g., the vegetation structure is too short or sparse, or the patch is too small). On these drainages, migrating flycatchers use a variety of riparian habitats, including ones dominated by native or exotic plant species, or mixtures of both (FWS 2002: E–3). Willow flycatchers, like most small passerine birds and perhaps neotropical migrants in particular, require food-rich stopover areas in order to replenish energy reserves and continue their northward or southward migration (Finch *et al*. 2000; FWS 2002: E–3 and 42).

Effects of the Proposed Action

This analysis primarily considers the effects of the proposed action on the continuing use of the project area by southwestern willow flycatchers. There is a low likelihood that southwestern willow flycatchers will establish breeding territories in the project area due to the limited lateral extent of suitable riparian habitat.

Construction of the proposed action will temporarily affect up to 12.51 acres of riparian vegetation and permanently affect up to 8.0 acres of riparian vegetation. The USACE has proposed to minimize this effect by conducting vegetation removal between October 1st and

December 31st. This construction window is outside of the southwestern willow flycatcher's arrival, breeding, fledging, and departure seasons. Continuing protocol-level surveys will be employed to ascertain if southwestern willow flycatchers have entered the project site post initiation of construction activities. Riparian conservation measures will include the retention of large trees at certain sites and the revegetation of Nogales Wash with a mixture of cottonwood, willow, and mesquite trees on a 2:1 ratio. The final details of the revegetation plan will be developed during construction, but is expected that the specific site design and adherence to USACE-standard 5-year success timeframes will ensure that the site retains at least a portion of its existing value as a southwestern willow flycatcher migration corridor and stopover site.

Conclusion

After reviewing the current status of the southwestern willow flycatcher, the environmental baseline for the action area, and the effects of the proposed flood control project, we concur that the proposed action is not likely to adversely affect the southwestern willow flycatcher or proposed critical habitat. We conclude that the effects of the action on the species are insignificant and discountable given the project's: (1) negative survey history for breeding individuals; (2) distance from known breeding territories downstream; (3) confinement of vegetation clearing to times when southwestern willow flycatchers are unlikely to be dispersing through or breeding in the affected area; (4) the minimal amount of impact to riparian vegetation relative to the overall amount of such habitat along the Santa Cruz River; and (5) post-project restoration of affected riparian vegetation.

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