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2-21-99-F-096

March 31, 2000

Mr. Robert E. Hollis, Division Administrator
U.S. Department of Transportation
Federal Highway Administration, Arizona Division
234 North Central Avenue, Suite 330
Phoenix, Arizona 85004

Dear Mr. Hollis:

This biological opinion responds to your request for consultation with the U.S. Fish and Wildlife Service pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your original request for formal consultation was dated April 1, 1999, and received by us on April 12, 1999. Your amended request was dated January 24, 2000, and received by us on January 27, 2000. At issue are impacts that may result from proposed bridge replacement on Highway 75 across the Gila River at Duncan in Greenlee County, Arizona. The existing bridge does not meet current design and safety standards. Thus, Federal Highway Administration (FHWA) proposes replacing the structure with a safe, two-lane, all-weather crossing that satisfies all current safety and design standards. Impacts resulting from the project may affect the following listed species: southwestern willow flycatcher (*Empidonax traillii extimus*) and razorback sucker (*Xyrauchen texanus*), and critical habitat designated for the razorback sucker.

In your January 24, 2000, letter, you also requested concurrence from the Service that the proposed action may affect, but is not likely to adversely affect, the spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*). The Service concurs with FHWA's determinations for these species. Rationale for our concurrences are detailed in the "CONCURRENCES" section. Your letter also found that the action would not affect the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*). Service policy is that we do not comment on agency "no effect" determinations unless we believe the action would adversely affect a listed species or its critical habitat, in which case the Service would request that the agency enter into formal consultation on species adversely affected [50 CFR 402.14(a)]. Information available to us does not warrant such a request in this instance. However, we recommend that FHWA maintain a complete administrative record documenting the decision process and supporting information for "no effect" determinations.

This biological opinion was prepared using information from the following sources: your April

1, 1999, request for consultation; your January 24, 2000, amended request for consultation; a March 26, 1999, biological assessment for the project (EcoPlan Associates, Inc. 1999); additional information provided in a July 13, 1999, letter from FHWA to this office, site visits, and our files. Literature cited in this biological opinion is not a complete bibliography of all literature available on the affected species, nor is it a complete review of the effects of bridge construction on these species. A complete administrative record of this consultation is on file in our office.

In this biological/conference opinion, the Service concludes that the proposed action is not likely to jeopardize the continued existence of either the southwestern willow flycatcher or the razorback sucker. Nor is the proposed action likely to result in destruction or adverse modification of razorback sucker critical habitat. Reasonable and prudent measures and terms and conditions are presented for the razorback sucker. A summary of this opinion is included as Appendix 1.

CONSULTATION HISTORY

The Service reviewed information about the project and its effects provided in the April 1, 1999, request for consultation, and accompanying biological assessment (EcoPlan Associates, Inc. 1999). The Service found that the materials submitted for consultation lacked key information. In accordance with 50 CFR 402.14(c), the Service requested, in a letter dated April 16, 1999, additional information about the project and its effects. The April 1 request for consultation and the biological assessment were also ambiguous as to whether formal or informal consultation was requested. As a result, the Service asked for clarification of the effects determinations.

FHWA responded with a letter to the Service dated July 13, 1999. The letter included maps and photographs of the project area, additional information about construction activities, measures to minimize effects to listed species and critical habitat, and southwestern willow flycatcher survey data. The July 13, 1999, letter confirmed that FHWA requested concurrence from the Service that the project may affect, but is unlikely to adversely affect, the southwestern willow flycatcher, razorback sucker, cactus ferruginous pygmy-owl, loach minnow, spikedace, and critical habitat designated for the razorback sucker. On October 6, 1999, Service staff met with personnel from FHWA, Arizona Department of Transportation (ADOT), and EcoPlan Associates, Inc. to discuss the project and additional information needs. Steve Thomas of FHWA agreed at the meeting to initiate formal consultation on effects of the proposed action on the southwestern willow flycatcher, the razorback sucker, and the sucker's critical habitat. Staff met again on October 20 with ADOT engineers and others to obtain further information about project features and design. A letter from FHWA dated January 24, 2000, was received by us on January 27, 2000, which requested formal consultation on the flycatcher, razorback sucker, and critical habitat designated for the latter species. The amended request also included additional mitigation measures to reduce effects of the action on the species and their habitats. In a letter dated February 7, 2000, the Service acknowledged receipt of the amended request, and confirmed initiation of formal consultation. A draft biological opinion was transmitted from this office to FHWA in correspondence dated March 6, 2000. On March 29, Steve Thomas of your staff called Jim

Rorabaugh of this office to recommend that the Service proceed with issuing the opinion without revision.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

FHWA proposes to construct a new bridge over the Gila River on Highway 75, just northeast of Duncan, Arizona (Figure 1). According to the Arizona Bridge Management and Inventory System, the existing bridge is inadequate for the following reasons: 1) substandard width and shoulders, 2) inadequate structural capacity, 3) damaged railings, and 4) leaking deck and expansion joint systems. The new bridge would be constructed approximately 37.5 feet upstream (southeast) of the existing structure and would include replacement of highway approaches, including 800 feet of new roadway on the bridge's north end and 500 feet of new highway on the south end (mile post 379.4 to 378.9 - Figure 1). The bridge would be 53 feet wide, including two 12-foot lanes, 10-foot wide shoulders, and a five-foot-wide sidewalk on the upstream side of the bridge. A concrete half-barrier would separate the sidewalk from the vehicle lanes. The new bridge would contain conduits for utilities. New impact attenuators, guard rail extruder terminals, rub rails, and transitions (all of which are structures on the decking of the bridge) would be installed. Fourteen piers or groups of columns are proposed to support the new bridge. The first and last piers would consist of four columns, all other piers would be three columns. The western six piers would be spaced approximately 65 feet apart. The remaining columns would be spaced approximately 116 feet apart. The existing low flow channel would flow between two of the piers that would span 116 feet, three inches. These piers of three columns would be placed on the banks of the existing low flow channel. The existing bridge is supported by long walls or "H piles" that parallel the river channel. The low flow channel currently flows largely between two of these H piles, which are located on the banks of the channel (Figure 2).

Placement of columns requires drilling of holes and insertion of concrete. The bottom end of the columns would be 75-100 feet below the road surface of the bridge and as much as 75 feet below the existing ground surface. Fine clays (such as bentonite) are used in the drilling process, which would ultimately be displaced by the concrete. This clay would be disposed of out of the river channel. The first and last piers are proposed to be protected with riprap placed at a 2:1 slope to the elevation of the thalweg (3,635 feet). Approximately 1,050 cubic yards of riprap would be required.

Construction would occur in three phases, beginning approximately February 2001 and ending in February 2002 (Ralph Ellis, ADOT, pers. comm. 2000). During Phase 1, the old bridge would remain open to traffic while a portion of the new bridge is constructed. In Phase 2, traffic would be diverted to the new bridge, the downstream portion of the bridge would be constructed, and the old bridge would be demolished and removed. In Phase 3, traffic would be rerouted within the new bridge while sidewalk and barrier construction are completed. Bridge construction and

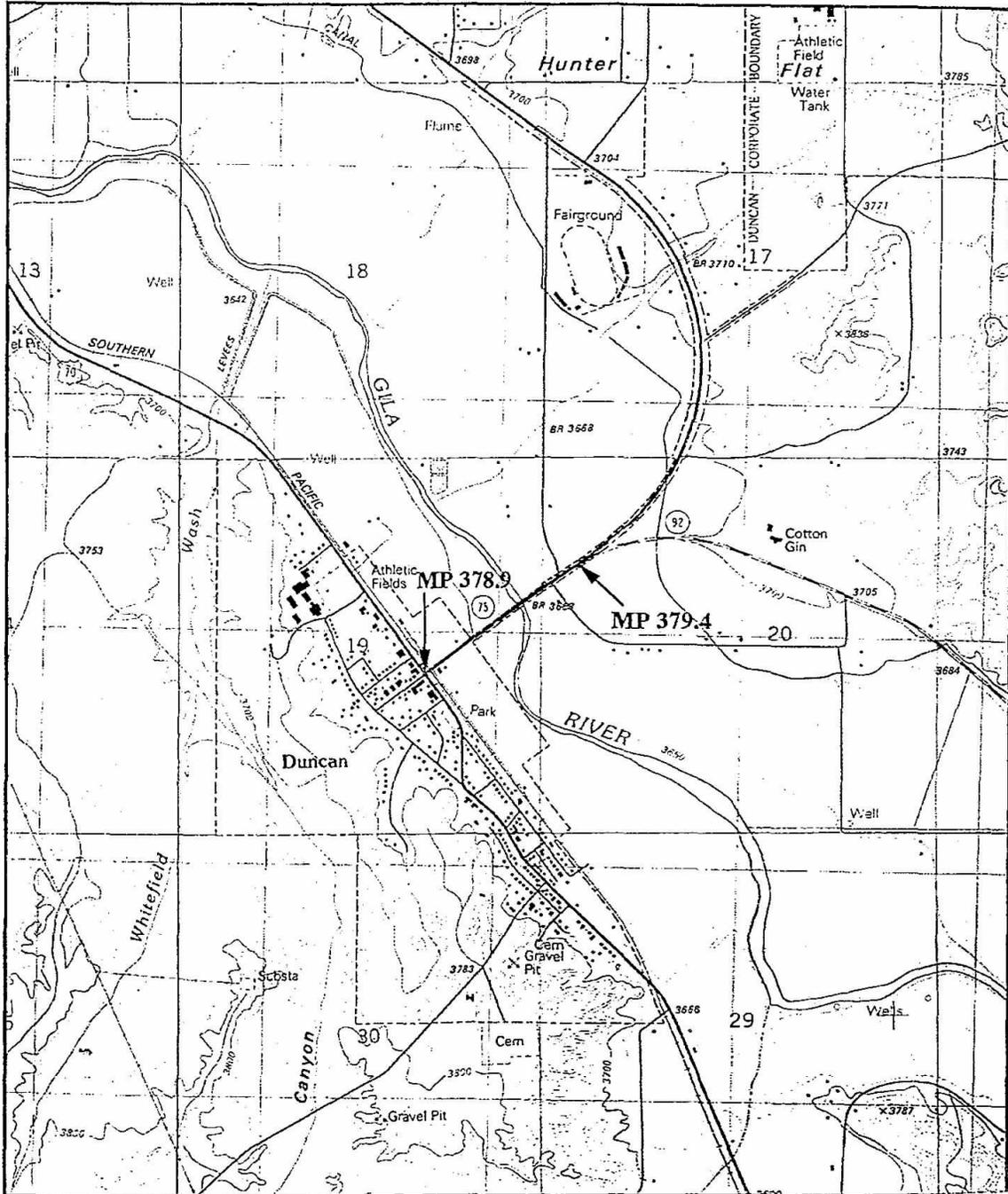


Figure 1: Project area, highway 75 bridge replacement project near Duncan, Greenlee County, Arizona.



Figure 2. Gila River flowing through two of the “H piles” of the existing bridge. October 1999.

removal areas would be contained within a 117-foot corridor, 40 feet downstream and 77 feet upstream of the centerline of the existing bridge. Exceptions include equipment staging areas, material sources, stockpile areas, and hazardous material storage areas. The locations of these areas are uncertain, but they may be placed at the Greenlee County facility on the opposite side of the river from Duncan. In any case, they would be placed outside of the Gila River dikes, outside of riparian habitat and away from the river.

Removal of the existing bridge would entail removal of the bridge, piers, columns, spread footings, and H-piles. The existing river banks (outside of the typical high water mark) would be excavated for installation of new bank abutments and rail bank protection. During construction of the new piers and removal of the old piers that are or will be on the banks of the existing low flow channel, the river would be temporarily diverted around the work area to accommodate construction/removal of piers and columns. This “diversion” would occur within the existing low flow channel; in other words the river would be moved to one side or the other of the low flow channel, which is currently about 115 feet wide (see Figure 2). New right-of-way would be acquired upstream of the existing bridge for the proposed bridge. Temporary construction easements would be required for the approach road construction and access to the project area. No blasting or pile driving will occur. Construction activities would be conducted by a contractor.

A related action is annual maintenance, which includes removing silt from around the existing piers. This activity, which has been conducted four times in the last 12 years, would continue after construction of the new bridge. Silt is pushed with dozers away from the bridge on the south side of the river. In the past, some of this material has been apparently pushed up onto the



Figure 3. Area disturbed by maintenance activities immediately upstream of the bridge on the west bank. The mounded material is on the riverbank and is apparently used as a borrow site. November 1999.

south dike or levee (Duncan side of the river); however, other material has been simply pushed either upstream or downstream of the bridge. An area just upstream of the bridge has the appearance of a borrow pit, but evidence suggests it is a stockpile area for material pushed away from the bridge (Figure 3). Locals may occasionally drive into the area to excavate fill material. Under the current proposal, the material would be pushed onto the levees and all work would occur within ADOT's 117 foot right-of-way.

Proposed Minimization Measures

FHWA proposes the following measures to minimize potential adverse effects to listed species and critical habitat. These measures are taken from EcoPlan Associates, Inc. (1999), meeting notes from EcoPlan from the October 6, 1999, meeting on the project; FHWA's July 13, 1999, and January 24, 2000, letters to the Service, and a February 3, 2000, phone conversation between Jim Rorabaugh, Fish and Wildlife Service, and Ralph Ellis, ADOT.

1. Construction equipment would not be allowed to enter, work, or cross the low-flow channel.
2. The contractor would be required to use non-erodible materials for the temporary diversion of the low-flow channel during placement of the new bridge piers and removal of the existing bridge piers. Temporary diversions would be removed and all work areas restored upon completion of the work in the low-flow channel.
3. Prior to construction, ADOT would conduct southwestern willow flycatcher surveys along the Gila River within 0.25 mile upstream and 0.25 mile downstream of the bridge site. Surveys would conform to accepted protocol. If flycatchers are not detected during these

surveys, the contractor would be permitted to start work in riparian habitats upon survey completion (early July). If flycatchers are detected, no construction activities (including construction of road approaches and construction/operation of equipment staging and material storage areas) would occur within 0.25 mile of a territory (roughly 6-acre habitat patch around the territorial bird) from April 15 to September 15. Preconstruction surveys would be conducted in each year that construction is planned for the period April 15-September 15.

4. All construction activities in upland areas adjacent to the Gila River would be conducted in a manner that precludes any short- or long-term sediment loading of the stream. Specific precautionary measures, such as progressive seeding, would be included in the construction contract's special provisions in addition to standard best management practices.

5. Water for construction purposes would not be drawn from the Gila River or wells connected to the river. ADOT has agreed to confirm that there would be ample construction water available from other sources.

6. ADOT would conduct fish surveys 300 feet upstream and downstream of the bridge immediately prior to diverting the Gila River. If razorback sucker, loach minnow, or spokedace are found, ADOT would contact the Service immediately. Construction activity would be permitted during the breeding season (February 1 to early June) provided no razorback sucker, loach minnow, or spokedace are found. If fish or larvae are found, construction activity in the low flow channel would be limited to mid-June to January 31.

7. Prior to diverting the river for construction activities in the low flow channel, block seines would be placed 100 feet upstream and 100 feet downstream of the bridge. The area between the seines would be netted for fish. All fish netted would be moved downstream of the diversion by a qualified, permitted fish monitor. The block seines would stay in place until after the diversion is removed. If razorback sucker, loach minnow, or spokedace are found, or fish mortality of any non-listed species reaches more than 20 specimens per monitoring event, the Service would be contacted immediately.

8. All construction equipment would be removed from the 100-year floodplain prior to onset of storm events.

9. Equipment staging and storage areas would occur outside of the floodplain, probably on the east side of the river.

10. Silt removal from around the bridge abutments would consist of pushing material from under the bridge onto the nearby levee. Maintenance activity would not disturb riparian restoration described in part 12. Material would be pushed up onto the levee in a way as to prevent or inhibit vehicle access off the levee into the floodplain. All silt removal and deposition onto the levee would occur within the ADOT right-of-way.

11. Existing dirt roads would be used as access routes for construction.

12. As part of the mitigation package for the project Clean Water Act 404 permit, ADOT will plant 0.67 acres of riparian vegetation in a narrow strip along the downstream edge of the bridge, on the west side of the river. Plants would be planted the winter after construction of the bridge is complete. A total of 81 Goodding willow, 25 coyote willow, and 36 Fremont cottonwood poles are proposed to be planted (EcoPlan Associates, Inc. 2000). Cuttings would be taken as branches from trees or as short trees in dog-hair thickets of trees. No trees would be cut in or near areas where flycatchers have been detected. Although not part of FHWA's proposed

action, this activity would not occur but for the construction of the bridge. In accordance with definitions at 50 CFR 402.02, and at page 4-26 of the Service's March 1998 section 7 consultation handbook, these mitigation activities are interrelated and interdependent to the proposed action.

ANALYSES BY SPECIES:

Southwestern Willow Flycatcher

STATUS OF THE SPECIES

The southwestern willow flycatcher is a small passerine bird (Order Passeriformes; Family Tyrannidae) measuring approximately 5.75 inches in length from the tip of the bill to the tip of the tail and weighing only 0.4 ounces. It has a grayish-green back and wings, whitish throat, light gray-olive breast, and pale yellowish belly. Two white wingbars are visible (juveniles have buffy wingbars). The eye ring is faint or absent. The upper mandible is dark, the lower is light yellow grading to black at the tip. The subspecies was listed as endangered under the Act on February 27, 1995 (Service 1995). Critical habitat was designated on July 22, 1997, and includes 18 critical habitat units totaling 599 river miles in Arizona, California, and New Mexico. In Arizona, critical habitat was designated along portions of the San Pedro River, Verde River, Wet Beaver Creek, West Clear Creek, Colorado River in the Grand Canyon, and Little Colorado River (Service 1997a&b).

One of four currently-recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993), the southwestern willow flycatcher is a neotropical migratory species that breeds in the southwestern U.S. from approximately April 1 to September 1 and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994, Howell and Webb 1995). The historical range of the southwestern willow flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987). The flycatcher is a riparian obligate, nesting along rivers, streams, and other wetlands where dense growths of willow (*Salix* sp.), seepwillow (*Baccharis* sp.), buttonbush (*Cephalanthus* sp.), boxelder (*Acer negundo*), saltcedar (*Tamarix chinensis*), or other plants are present, often with a scattered overstory of cottonwood and/or willow.

Unitt (1987) reviewed historical and contemporary records of *E.t. extimus* throughout its range, determining that it had "declined precipitously..." and that although the data reveal no trend in the past few years, the population is clearly much smaller now than 50 years ago, and no change in factors responsible for the decline seem likely. There are currently 95 known southwestern willow flycatcher breeding sites (in CA, NV, AZ, UT, NM, and CO) holding approximately 615 territories. Almost 75 percent of the breeding sites where flycatchers have been found are comprised of five or fewer territorial birds. Approximately 20 percent of the breeding sites are comprised of single, unmated individuals. Declining numbers have been attributed to loss,

modification, and fragmentation of riparian breeding habitat, loss of wintering habitat, and nest predation/brood parasitism by the brown-headed cowbird (*Molothrus ater*) (McCarthy *et al.* 1998, Sogge *et al.* 1997). Habitat loss and degradation is caused by a variety of factors, including urban, recreational, and agricultural development, water diversion and groundwater pumping, channelization, and livestock grazing. Fire is an increasing threat to willow flycatcher habitat (Paxton *et al.* 1996). Fire frequency in riparian vegetation increases with dominance by saltcedar (DeLoach 1991), and water diversions or groundwater pumping that results in dessication of riparian vegetation (Sogge *et al.* 1997). The presence of livestock, range improvements such as waters and corrals, and agriculture provide feeding areas for cowbirds. These feeding areas, if near riparian habitats, coupled with habitat fragmentation, facilitate cowbird parasitism of flycatcher nests (Tibbitts *et al.* 1994, Hanna 1928, Mayfield 1977a&b). After five years of cowbird trapping on the South Fork of the Kern River, California, nest parasitism rates dropped from 65 to 22 percent, nest success increased from 28 to 43 percent, and mean number of young fledged per female flycatcher increased from 1.04 to 1.72 (Whitfield *et al.* 1998).

The southwestern willow flycatcher breeds in dense riparian habitats from sea level in California to just over 7,000 feet in Arizona and southwestern Colorado. Historic egg/nest collections and species' descriptions throughout its range, describe the southwestern willow flycatcher's widespread use of willow (*Salix* spp.) for nesting (Phillips 1948, Phillips *et al.* 1964, Hubbard 1987, Unitt 1987, T. Huels *in litt.* 1993, San Diego Natural History Museum 1995). Currently, southwestern willow flycatchers primarily use Geyer willow (*Salix geyeriana*), Gooddings willow (*Salix gooddingii*), boxelder (*Acer negundo*), saltcedar, Russian olive (*Elaeagnus angustifolia*), and live oak (*Quercus agrifolia*) for nesting. Other plant species less commonly used for nesting include: buttonbush (*Cephalanthus* sp.), black twinberry (*Lonicera involucrata*), cottonwood (*Populus* spp.), white alder (*Alnus rhombifolia*), blackberry (*Rubus ursinus*), and stinging nettle (*Urtica* spp.). In Arizona in 1999, all nests found above 6,890 feet elevation were constructed in Geyer willow. Of the 222 nesting attempts monitored below elevation (4,070 feet), 210 were constructed in saltcedar, and 12 were in willows (Paradzick *et al.* 2000). Based on the diversity of plant species composition and complexity of habitat structure, four basic nesting habitat types can be described for the southwestern willow flycatcher: monotypic willow, monotypic exotic, native broadleaf dominated, and mixed native/exotic (Sogge *et al.* 1997).

Open water, cienegas, marshy seeps, or saturated soil are typically in the vicinity of flycatcher territories and nests; flycatchers sometimes nest in areas where nesting substrates are in standing water (Maynard 1995, Sferra *et al.* 1995, 1997). However, hydrological conditions at a particular site can vary remarkably in the arid Southwest within a season and between years. At some locations, particularly during drier years, water or saturated soil is only present early in the breeding season (i.e., May and part of June). However, the total absence of water or visibly saturated soil has been documented at several sites where the river channel has been modified (e.g. creation of pilot channels), where modification of subsurface flows has occurred (e.g. agricultural runoff), or as a result of changes in river channel configuration after flood events (Spencer *et al.* 1996).

Throughout its range the southwestern willow flycatcher arrives on breeding grounds in late April and May (Sogge and Tibbitts 1992, Sogge *et al.* 1993, Sogge and Tibbitts 1994, Muiznieks *et al.* 1994, Maynard 1995, Sferra *et al.* 1995, 1997). Nesting begins in late May and early June and young fledge from late June typically through mid August, but as late as early September (Willard 1912, Ligon 1961, Brown 1988a&b, Whitfield 1990, Sogge and Tibbitts 1992, Sogge *et al.* 1993, Muiznieks *et al.* 1994, Whitfield 1994, Maynard 1995, Service files). Estimated territory sizes are 0.59 to 3.21 acres for monogamous males and 2.72 to 5.68 acres for polygynous males at the Kern River (Whitfield and Enos 1996), 0.15 to 0.49 acres for birds in a 1.48 to 2.22 acre patch on the Colorado River (Sogge 1995c), and 0.49 to 1.24 acres in a 3.71 acre patch on the Verde River (Sogge 1995a).

The southwestern willow flycatcher is an insectivore, foraging in dense shrub and tree vegetation along rivers, streams, and other wetlands. Flying insects are the most important prey of the southwestern willow flycatchers; however, they will also glean larvae of non-flying insects from vegetation (Drost *et al.* 1998). Drost *et al.* (1998) found that the major prey items of the southwestern willow flycatcher (in Arizona and Colorado), consisted of true flies (Diptera); ants, bees, and wasps (Hymenoptera); and true bugs (Hemiptera). Other insect prey taxa included leafhoppers (Homoptera: Cicadellidae); dragonflies and damselflies (Odonata); and caterpillars (Lepidoptera larvae). Non-insect prey included spiders (Araneae), sowbugs (Isopoda), and fragments of plant material.

In Arizona in 1998, 404 resident willow flycatchers were detected at 48 sites on 12 drainages. A total of 179 paired flycatchers were found at 40 sites. Major concentrations of birds were found near the confluence of the Gila and San Pedro rivers; Roosevelt Lake; the lower Grand Canyon; from Fort Thomas to Solomon on the middle Gila River; Topock Marsh on the lower Colorado River, Verde River at Camp Verde, near Greer and Alpine; and Alamo Lake on the Bill Williams River (Paradzick *et al.* 1999). Willow flycatcher nesting attempts in Arizona in 1998 totaled 250, of which outcome of the nest was determined for 230. Of the 230 nests, an estimated 261 flycatchers fledged. Cowbird brood parasitism occurred at 14 nests, however, flycatchers fledged at five of these nests, despite parasitism. Twenty-eight nests were either deserted or abandoned (Paradzick *et al.* 1999). In 1999, 514 resident flycatchers were found at 46 sites, including 290 territories along 12 drainages statewide. The lowest elevation where territorial pairs were detected was 197 feet at Adobe Lake on the Bill Williams River; the highest elevation was at the Greer town site (8,300 feet). There were 327 nesting attempts in 1999 in Arizona. Of 227 nests with known outcomes at monitored sites, 114 were successful, and an estimated 259 flycatchers were fledged from those successful nests (Paradzick *et al.* 2000). The majority of breeding groups in Arizona is extremely small.

For further information on the ecology, range, status, and threats to this subspecies, refer to Brown (1988a), Harris (1991), Harris *et al.* (1987a&b), McCarthey *et al.* (1988), Paradzick *et al.* (1999, 2000), Paxton *et al.* (1996), Sferra *et al.* (1997), Sogge *et al.* (1997), Stoleson and Finch (1998), Tibbitts *et al.* (1994), Unitt (1987), and Uyehara *et al.* (1998).

ENVIRONMENTAL BASELINE

In the early 1800's the Gila River in eastern Arizona was described as "beautiful, running between banks covered with tall cottonwoods and willows. This bottom land extended back a mile on each side. Beyond rose high and rather barren hills" (Pattie 1962). Severe flooding during 1904-1917 scoured out essentially all of the riparian vegetation and widened the channel considerably in the Safford Valley (Arizona State University 1979); similar changes probably occurred in the project area at this time. Other channel widening events occurred in 1941 and 1965-1967, coincident with major floods. However, by the early 1970s, the channel width had decreased dramatically and aggraded in the Safford Valley compared to 1904-1917 period (Burkham 1972, Turner 1974). Acreage of the introduced saltcedar increased greatly on the middle Gila River after about 1937 (Turner 1974).

The river flows roughly north-south under the Highway 75 bridge. The "west bank" is the bank of the river closest to Duncan. Vegetation through the project area is typical of the middle Gila River; however, saltcedar is relatively uncommon. Dominant perennial plant species in the floodplain through the project area include coyote willow (*Salix exigua*), Goodding willow, Fremont cottonwood, seepwillow (*Baccharis glutinosa*), and desert broom (*Baccharis sarothroides*). Trees occur frequently in patches or small stands within otherwise low vegetation. Most stands of trees are visually dominated by cottonwoods or coyote willow. A small patch of mesquite (*Prosopis velutina* or *glandulosa*) and four-wing saltbush (*Atriplex canescens*) occurs upstream of the bridge on the east bank. Russian thistle (*Salsola iberica*), grasses, such as Johnson grass (*Sorghum halepense*), and other annual plants are common in open or disturbed areas. Comparison of a 1995 aerial photo with conditions on the ground as of October/November 1999 demonstrated that sandbars in 1995 west of the channel both upstream and downstream of the bridge are now vegetated to some degree with coyote willow, sapling cottonwoods, and other riparian plants.

Extensive agriculture exists along Highway 75 just outside of the river corridor, and active and fallow or abandoned agricultural fields exist in the floodplain both upstream and downstream of the bridge. Undeveloped upland areas are characterized by Chihuahuan desert scrub (Brown and Lowe 1980, Brown 1982) and dominated by creosote (*Larrea tridentata*), velvet mesquite (*Prosopis velutina*), and species of perennial grass.

The nearest U.S. Geological Service gaging station was on the Gila River at the Arizona-New Mexico state line. The Gila River drains an area of approximately 3,360 square miles above the gage. This gage was operated from 1939-1949, during which the river was intermittent, with peak flows typically in spring and late summer. A peak flow of 39,500 cubic feet per second (cfs) occurred at this gage on September 29, 1941. Typical flows rarely exceeded 500 cfs. The nearest gage downstream is on the Gila River near Clifton, which has been in operation since 1911. The river at Clifton drains an area of approximately 4,010 square miles. A peak flow of 57,000 cfs occurred at the gage on December 19, 1978. As with the gage at the State line, peak flows typically occur in spring and late summer. The Gila River is perennial at the Clifton gage,

but flows rarely exceed 500 cfs (U.S. Geological Survey 1999). The active channel at the Highway 75 bridge lies between two bridge pillars and is incised to a depth of 8-12 feet below the adjacent floodplain (Figure 2). Guana and Duffy (1999) estimated the 100-year flood through the project area at 11,350 cfs. Both the proposed and existing bridges would be overtopped at 40,000 cfs, which corresponds to a 43-year flood event.

The floodplain of the Gila River through the project area has been extensively modified by past and present agricultural development. Groundwater pumping, return flow, agricultural chemicals, and dikes associated with agriculture in the project area have likely affected flow regimes, water quality, and channel morphology. Guana and Duffy (1999) found that the dikes control river conveyance under the bridge. Modeling of hydraulic characteristics with and without the bridge demonstrated that the bridge had virtually no effect on channel depth and flow velocity.

The town of Duncan, with a population of 662, is located just southwest of the bridge site. Dikes on the Gila River are inadequate to prevent periodic flooding in Duncan. The dike upstream of the bridge is breached allowing flooding of Duncan during five to ten year flood events (Guana and Duffy 1999). The bridge is a site of sediment aggradation. A Greenlee County Engineer concluded that the bridge constricts the flow of the river, which causes sediment to accumulate there (July 23, 1993, memo from Hollis Jones, Safford Area Maintenance Superintendent, ADOT, to Dan Davis, Assistant State Engineer, ADOT). However, a study by ADOT in 1989 attributed the sedimentation problem to the dikes. In addition, a constriction of the river downstream of the bridge creates a slight reservoir effect, inducing deposition of sediment in the vicinity of the bridge (September 13, 1993, memo from George Lopez-Cepero, Manager Bridge Drainage Services, ADOT, to Hollis Jones, ADOT).

The Highway 75 bridge is the primary route for vehicles traveling east or south from the mines at Morenci/Clifton. Traffic consists of personal and recreational vehicles, as well as commercial vehicles, including copper transport and acid trucks serving the copper mines (EcoPlan Associates, Inc. 1999).

The existing bridge site has been subject to disturbance from dike construction and river channel contouring to protect the bridge and the town of Duncan from floods (EcoPlan Associates, Inc. 1999). On the west bank of the river heavy equipment has apparently been used in the floodplain to push accumulated sediment away from the bridge piers (Figure 3). This maintenance is conducted by District II (Safford Area) of ADOT (July 23, 1993, memo from Hollis Jones, Safford Area Maintenance Superintendent, ADOT, to Dan Davis, Assistant State Engineer, ADOT). Material is pushed both upstream and downstream of the bridge in this area. An area to which the material has been pushed upstream of the bridge may also serve as a borrow site (Figure 3). Material stockpiled in this area probably prevents the river from shifting south, at least during low to moderate flows. The river has been cutting away at the material piled in this area, probably resulting in downstream siltation.



Figure 4. Off-road vehicle tracks upstream of the bridge. November 1999.

The area is also accessed by recreationists who drive off the dikes into the river bottom. During a visit in November 1999, vehicle tracks were evident on the west bank near the bridge and in the wetted zone upstream of the bridge (Figure 4). If vehicle use is a common event, it is probably inhibiting the growth of riparian vegetation along the river, and thus may be inhibiting the development of willow flycatcher habitat. Recreational use could also disturb flycatchers. Upstream of the bridge where the river abuts the dike (center top of Figure 4), the bankline has been ripped with tires.

The Gila River corridor for approximately 0.5 mile upstream and downstream of the existing bridge was surveyed for southwestern willow flycatcher May 18, June 18-19, and July 8, 1998; and May 21, June 3, 29, and 30, 1999. In 1998, a flycatcher nest was found in a saltcedar approximately 1,450 feet upstream of the existing bridge. Both adults were observed feeding young, but the outcome of the nest is unknown. A second territorial male was also detected approximately 1,060 feet upstream of the existing bridge. In 1999, a nest was located to the east of the 1998 nest, again,

roughly 1,450 feet upstream of the existing bridge. The nest was constructed in a cottonwood and one egg was observed on June 29, but the outcome of the nest is unknown. Two other possible nest sites with territorial birds were located in 1999 near the 1998 nest site, and a fourth territorial bird was found adjacent to the river channel approximately 1,400 feet downstream of the bridge (Figure 5) (Ruffner and McMichael 1998, 1999; Paradzick *et al.* 1999, 2000).

No other flycatcher surveys have been conducted in this reach of the Gila River (Paradzick *et al.* 1999&2000, McCarthy *et al.* 1998, Sferra *et al.* 1997, Tracy McCarthy, pers. comm. 1999, Service files). Flycatcher surveys were conducted in 1998 and 1999 at “Half Mile” and Guthrie, roughly 19 miles downstream of the Highway 75 bridge, but no resident flycatchers were detected at these localities. Three apparently migrant flycatchers were found at Guthrie on June 16, 1999.

Flycatcher habitat in the project area is characterized by patches of willows and cottonwoods. Part (roughly 0.2 acre) of a small, developing patch of coyote willow lies in the disturbance footprint of the new bridge (upstream of the old bridge on the west bank). This patch could perhaps support nesting flycatchers in the future or may currently provide foraging habitat for dispersing young or migrants. Another small (0.1 acre) developing patch of coyote willow and



Figure 5. Willow and saltcedar thickets downstream of the bridge where a territorial flycatcher was found in 1999. November 1999.

cottonwood saplings also lies in the disturbance footprint upstream of the existing bridge on the west bank and adjacent to the active channel (Figure 6). The trees in this area are probably too short at present to support flycatchers, but in the future could develop into flycatcher nesting and foraging habitat. Other potential habitat exists downstream of the existing bridge for several hundred feet on the west bank, and on the east bank, 200+ feet upstream of the existing bridge (Figure 6). Mature cottonwoods and willows on the east bank just upstream of the existing bridge and within the project footprint could potentially provide foraging habitat. A stringer of large cottonwoods on the east bank downstream of the bridge is probably too dry and open in the understory to support nesting flycatchers. Brown-headed cowbirds were detected during flycatcher surveys in 1998 and 1999; however, the abundance of cowbirds or whether they have parasitized flycatcher nests in the Duncan area is unknown. Agriculture close to the project site has likely bolstered cowbird populations.

EFFECTS OF THE PROPOSED ACTION

Potential effects of the proposed action on the southwestern willow flycatcher include: 1) direct effects in the form of disturbance of birds or destruction nests as a result of construction activities, and 2) indirect effects resulting from disturbance or destruction of suitable habitat or habitat that might be suitable in the future.

Direct effects could occur only when flycatchers are present, generally from late April to mid September (Sogge *et al.* 1997). FHWA has proposed to conduct preconstruction surveys, in

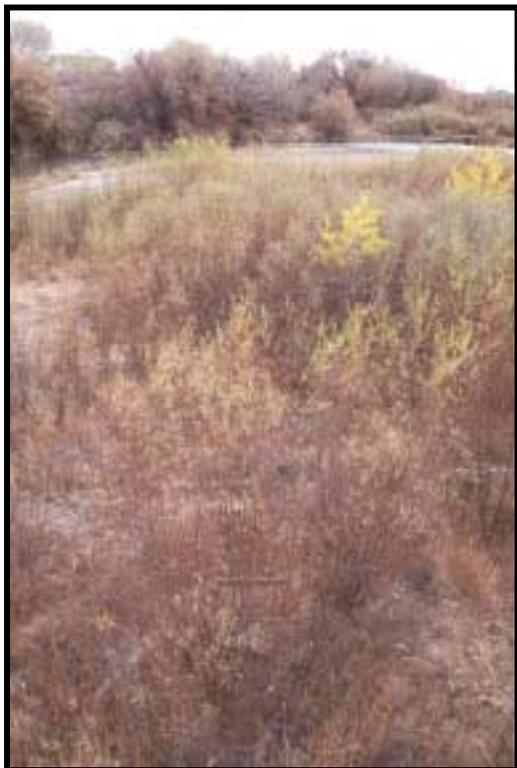


Figure 6. Young stand of coyote willow and cottonwood in the project footprint. November 1999.

accordance with survey protocol, for southwestern willow flycatchers 0.25 mile upstream and downstream of the bridge site. If nesting flycatchers are found, no construction activities would occur within 0.25 mile of a territory (six acre patch around the territorial bird) from April 15 to September 15. No construction would occur after April 15 until surveys are complete (by July 10). Because territories are less than six acres (see review above in “Status of the Species”), distancing construction activities at least 0.25 mile away is sufficient to preclude direct effects due to mechanical disturbance of the known territorial, nesting birds and nests. Because construction would not begin until surveys are complete, migrant flycatchers should no longer be present, thus no migrant birds would be expected to be directly affected by construction activities.

Another possible direct effect includes noise from heavy equipment and construction. Possible effects of construction noise at a distance of more than 0.25 mile is unclear. The birds probably habituate to vehicle traffic on the bridge and other roadways, as well as noise from tractors and other agricultural machinery. Thus, no disturbance of birds due to

vehicles or most other construction activities are expected. No exceedingly loud activities, such as pile driving or blasting, are proposed. Other types of construction noise would occur during the nesting season, such as electric drills, saws, pumps, generators, and other mechanized equipment. The effects of these or other types of noise on southwestern willow flycatcher have not been studied.

Bowles (1995) reviewed effects of noise on birds and other animals. Summarizing from that review: 1) domestic fowl experience declines in productivity after continuous exposure to noise at high levels (above 85 decibels), 2) impulsive noise can reduce the motivation of avian parents to brood or incubate, perhaps causing decreased fledging success, 3) energetic loss can occur in birds due to repeated startle response to noise, and 4) panic flight in response to noise, and possible ejection of young or eggs from a nest, or exposure of eggs and nestlings to predators. Bowles (1995) describes other physiological and behavioral effects of loud noises on wildlife, which are most evident in the case of chronic or repeated noise. The southwestern willow flycatcher is a sound-oriented bird relying on vocalizations to establish and defend territories, attract mates, and detect and deter predators and brood parasites (cowbirds). However, effects of noise on flycatchers would be minimized by limiting construction activities to no closer than 0.25 mile from territorial birds, and most construction noises (e.g. vehicles, power tools, generators)

would likely represent only an increase in the frequency of these and other similar noises (noise already occurs from vehicles, farm equipment use, etc.). Although effects of construction noise on willow flycatchers have not been studied, because of these mitigating factors, project noise is not anticipated to be a significant adverse effect to flycatchers.

Flycatchers could potentially come in contact with and be injured by fuels or other hazardous materials associated with construction activities. FHWA has stated (July 13, 1999, letter to this office) that locations of hazardous material storage sites are unknown at this time, but would be placed “outside of the riparian habitat and away from the river”. A hazardous materials storage site could be outside of the riparian habitat but adjacent to an area where flycatchers are nesting. Although a spill of some hazardous material is possible, strict Federal hazardous material handling and storage regulations make it unlikely that such spills would occur. If such spills occurred, they must be cleaned up immediately. Thus, the likelihood that a flycatcher would come in contact with a hazardous material associated with the project is low.

Indirect effects could occur as a result of habitat destruction or degradation resulting from stream flow alteration around bridge piers, and due to maintenance activities. The new bridge will be supported by 14 piers of columns. The column groups will be aligned to the flow to lessen debris accumulation and potential scour. The columns are expected to be less of an impediment to flows than are the existing H piles, which are walls that lie parallel to river flow. The river will be able to flow between and around columns. Modeling of hydraulic characteristics demonstrated that hydraulic parameters such as channel elevation, maximum channel depth, and flow velocity were nearly identical under “no bridge”, “existing bridge”, and “proposed bridge” scenarios (Guana and Duffy 1999). However, some debris (i.e. logs, branches and other floating material) and sediment accumulation is anticipated around the columns (Guana and Duffy 1999); necessitating periodic maintenance and associated effects to habitat.

If a high flow event occurred during construction, impacts to flycatcher habitat could be accentuated. Excavations could divert flows or increase downstream sediment deposition or erosion of banklines. Equipment would be removed from the 100-year floodplain prior to storm events, which would reduce potential impacts.

Probably the greatest impacts to flycatcher habitat in the area of the existing bridge have been those related to periodic maintenance. As discussed in the “Environmental Baseline”, heavy equipment has been used to push accumulated sediment and debris from around the bridge supports. This has resulted in probably several acres of disturbance within the riparian zone, including destruction of trees and shrubs by heavy equipment; preventing the river from moving west, upstream of the bridge (Figure 3); increased sediment loads in the river due to erosion of the sediment pile upstream of the bridge; and building up ground elevation in some areas to a degree that flycatcher habitat probably cannot develop because it is too far to the water table. Cottonwoods and willows growing around the bridge supports are also trimmed back nearly to ground level.

Maintenance will also be needed for the new bridge; however, ADOT has proposed measures to reduce the adverse effects of this activity (see “Effectiveness of Proposed Mitigation Measures” below). This maintenance work is not proposed by FHWA, but it would not occur but for the bridge; thus the maintenance is an interrelated and interdependent action and therefore the effects of maintenance are effects of the action (50 CFR 402.03).

As discussed in the environmental baseline, recreationists apparently drive into the river channel (Figure 4) and some of the material stockpiled in the channel during maintenance activities has apparently been used as a borrow site (Figure 3). Roads in the ADOT right-of-way on both sides of the bridge leading down off the levee from the west bank are apparently used by maintenance crews during silt removal. These same roads provide access for recreationists, those interested in harvesting borrow material, and probably wood cutters, etc. Thus, the maintenance access roads have probably encouraged public access, promoting habitat loss and degradation through creation of vehicle ways, soil compaction, and loss of vegetation from vehicles and probably wood cutting. Recreation, chain saws, and other human activities in the floodplain also increase the chances of wildfire, which could devastate willow flycatcher habitat, at least temporarily, and potentially result in destruction of nests. These activities could occur without the access provided by the maintenance roads, but the access through the ADOT right-of-way is the easiest way into the project area; thus greater activity has probably occurred in the floodplain as a result of that access. To reduce this problem, during siltation removal, ADOT will push silt up onto the levee in a way as to prevent or inhibit vehicular access off the levee in the ADOT right-of-way. This should eliminate the project’s contribution to this access problem and the effects that occur as a result.

No critical habitat occurs in the project area. The nearest critical habitat is a 56 mile reach of the Gila River that runs from the confluence of Steeple Rock Canyon, approximately five miles upstream of the project site in New Mexico, east and north to the confluence of Hidden pasture Canyon upstream of Cliff. As a result, no critical habitat will be affected by the proposed action.

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. Lands in the Gila River bottom and adjacent croplands are privately owned. Lands northeast of the Virden Highway and Route 75 are a mix of private and State lands; lands southwest of Route 70 are also primarily private and State lands. Periodic flooding in the Gila River bottom precludes most development in the floodplain; however, recreational activities, such as off-road vehicle use (Figure 5), occur in the river channel. Woodcutting of riparian trees may affect quality of flycatcher habitat. As discussed in the Environmental Baseline, dike construction and maintenance, groundwater pumping, return flow, and agricultural chemicals have likely affected flow regimes, water

quality, and channel morphology. Use of State lands is primarily as rangeland. However, as State lands reach a certain market value, they are often sold and then become available for various types of development.

Livestock grazing is widespread in the Gila River corridor and adjacent uplands. Effects of grazing on western riparian systems are numerous and well-documented, including effects to watershed hydrology, stream channel morphology, water quality, soils, vegetation, wildlife, fish and other species (see review in Belsky *et al.* 1999). Some activities on State and private lands will require Federal permits (such as Clean Water Act 404 or 402 permits), and thus would be subject to section 7 consultation. In the absence of a Federal nexus, activities that may result in a take of a listed animal can be addressed through the section 10(a)(1)(B) permit process.

Effectiveness of Proposed Mitigation

FHWA proposes substantial measures to minimize potential adverse effects to the southwestern willow flycatcher and its habitat. For instance, measures would be taken to minimize the effects of diverting the river during construction, water would not be drawn from the river or wells connected to the river, thus flows would not be affected; preconstruction surveys would be conducted each year that construction is planned during the flycatcher breeding season; and construction activities would not occur within 0.25 mile of territorial flycatchers from April 15 to September 15. Silt removal would involve pushing material onto the levee in a way that eliminates or inhibits vehicular access off the levee in the ADOT right-of-way. This would remove the material from the floodplain, rather than leaving it in piles on the riverbank in flycatcher habitat, which has occurred in the past, and would reduce public access to flycatcher habitat.

The right-of-way downstream of the bridge would be revegetated with cottonwoods and willows. This will likely enhance existing flycatcher habitat to some degree; however, the Service believes some of the effort will be unsuccessful in creating flycatcher habitat. The area in which poles would be planted is characterized by depths to groundwater of 6-18 feet (EcoPlan Associates, Inc. 2000). Growth of Fremont cottonwood and Goodding willow is significantly restricted where groundwater depth exceeds about eight feet (Anderson 1995). Survival of poles or irrigated container stock can be acceptable at sites with relatively deep ground water, but trees will almost certainly be stunted and provide little wildlife value (Pinkney 1992, Anderson 1995, Carothers, *et al.* 1990). Additional complications such as high salinity, herbivory, fluctuating water tables, and lack of maintenance can cause further reductions in habitat value (Swenson 1988, Anderson 1995, Rorabaugh 1995). Cutting of large poles (up to 25 feet long) would be necessary to plant poles to the water table in the deeper sites. This could require cutting healthy cottonwoods and willows of that height or taller which, unless they are in the project footprint, may do more damage than good to habitat values. Smaller poles can be cut from branches, which minimizes damage to existing trees. Ralph Ellis, ADOT, has stated that he is considering options to improve the benefits of the mitigation project without affecting existing habitats. He stated no large trees would be cut for the project. ADOT may create a nursery to produce poles.

CONCLUSION

After reviewing the current status of the southwestern willow flycatcher, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the southwestern willow flycatcher. Critical habitat does not occur in the project area; thus none will be affected. We present our conclusion of “no jeopardy” for the following reasons:

1. No flycatchers have been documented in areas to be disturbed by the project. Preconstruction surveys will be conducted, and if any territorial flycatchers are found, construction activities will not occur within 0.25 mile of the territory from April 15 to September 15.
2. No critical habitat occurs in or near the project area.
3. FHWA proposes significant measures to reduce or eliminate adverse effects to the flycatcher and its habitat.

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 without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined in the same regulation by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take of a listed animal species that is incidental to, and not the purpose of, the carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, 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 FHWA so that they become binding conditions of any grant or permit issued to any applicant, permittee, or contractor, as appropriate, in order for the exemption in section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by this incidental take statement. If the FHWA (1) fails to assume and implement the terms and conditions or (2) fails to require any applicant, permittee, or contractor 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 FHWA must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

With implementation of proposed bridge construction as described, including the mitigation measures, the Service does not anticipate that any southwestern willow flycatchers will be taken as a result of the proposed action. As a result, no reasonable and prudent measures or terms and conditions are included for the flycatcher.

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 southwestern willow flycatcher. In furtherance of the purposes of the Act, we recommend implementing the following actions.

1. The Service is in the process of developing a recovery plan for the southwestern willow flycatcher. Upon completion, FHWA should work with the Service to develop standard procedures for highway construction and maintenance projects that would promote recovery of the species, consistent with the recovery plan.

2. FHWA should work with ADOT, the U.S. Army Corps of Engineers, and private landowners in the project area to relocate the revegetation project to a site (perhaps upstream of the project area) that is more suited to successful riparian restoration and that would benefit flycatchers to a greater degree. Existing trees in the project footprint should be used for cuttings and poles. Cottonwoods and willow should not be planted where groundwater depths exceed eight feet.

3. FHWA should monitor the effectiveness of the vehicular barrier proposed for the levee in the right-of-way. If the barrier is not effective at preventing vehicle access through the right-of-way, FHWA should work with the Service and ADOT to take additional measures (such as increased maintenance of the barrier, or actions suggested in conservation measure 4) to limit vehicle access.

4. FHWA should work with ADOT and private landowners to limit vehicular access to the right-of-way and other portions of the Gila River corridor. Measures that could be taken (in addition to creating barriers to vehicles on the levee in the right-of-way), include fencing, locked

gates with access for landowners and FHWA/ADOT, additional barriers on the levee outside of the right-of-way, etc.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

(Note: Surveys for southwestern willow flycatchers must be in accordance with appropriate permits from the Service and Arizona Game and Fish Department.)

Razorback Sucker

STATUS OF THE SPECIES

The final rule listing the razorback sucker as a threatened species was published on October 23, 1991. A final rule designating critical habitat was published on March 21, 1994. Critical habitat was designated on portions of the Colorado, Duchesne, Green, Gunnison, San Juan, White and Yampa rivers in the Upper Colorado River Basin, and the Colorado, Gila, Salt, and Verde rivers in the Lower Colorado River Basin. All critical habitat reaches were considered to be occupied by the species at the time of the designation.

The razorback sucker is the only representative of the genus *Xyrauchen* and was described from specimens taken from the "Colorado and New Rivers" (Abbott 1861) and Gila River (Kirsch 1889) in Arizona. This native sucker is distinguished from all other suckers by the sharp-edged, bony keel that rises abruptly behind the head. The body is robust with a short and deep caudal peduncle (Bestgen 1990). The razorback sucker may reach lengths of more than three feet and weigh 11 to 13 pounds (Minckley 1973). It is a long lived species, reaching the age of at least the mid-40's (McCarthy and Minckley 1987).

Life history information for the razorback sucker has been summarized by Bestgen (1990), Minckley and Deacon (1991), and in the biological support document for critical habitat designation (Service 1993). The life history information presented in this biological opinion is primarily taken from these sources.

The razorback sucker was once abundant in the Colorado River and its major tributaries throughout the Colorado River Basin, occupying 3,500 miles of river in the United States and Mexico (Service 1993). Records from the late 1800's and early 1900's indicated the species was abundant in the lower Colorado and Gila River drainages (Kirsch 1889, Gilbert and Scofield 1898, Minckley 1973, Bestgen 1990).

Adult razorback suckers use most of the available riverine habitats, although there may be an avoidance of whitewater. Main channel habitats used tend to be low velocity, such as pools, eddies, nearshore runs, and channels associated with sand or gravel bars (summarized in Bestgen 1990). Backwaters, oxbows, and sloughs were well-used habitat areas adjacent to the main

channel; flooded bottomlands are important to the species in the spring and early summer (summarized in Bestgen 1990). Razorback suckers are somewhat sedentary; however, considerable movement over a year has been noted in several studies (Service 1993). Spawning migrations have been observed or inferred in several locales (Jordan 1891, Minckley 1973, Osmundson and Kaeding 1989, Bestgen 1990, Tyus and Karp 1990).

Spawning takes place in the late winter to early summer depending upon local water temperatures. Various studies have presented a range of water temperatures at which spawning occurs. In general, temperatures between 50° and 68°F are appropriate for spawning (summarized in Bestgen 1990). Spawning areas include gravel bars or rocky runs in the main channel (Tyus and Karp 1990), and flooded bottomlands (Osmundson and Kaeding 1989). There is an increased use by adults of higher velocity waters in the spring, although this is countered by movements into warmer, shallower backwaters and inundated bottomlands in early summer (McAda and Wydoski 1980, Tyus and Karp 1989, Osmundson and Kaeding 1989).

Habitat needs of larval razorback suckers are not well known. Warm, shallow water appears to be important. Shallow shorelines, backwaters, inundated bottomlands and similar areas have been identified as nursery habitats (Sigler and Miller 1963, Marsh and Minckley 1989, Tyus and Karp 1989, 1990, Minckley et al. 1991).

For the first period of life, larval razorback suckers are nocturnal and hide during the day. Diet during this period is mostly plankton (Marsh and Langhorst 1988, Papoulias 1988). Young fish grow fairly quickly, with growth slowing once adult size is reached (McCarthy and Minckley 1987). Little is known about habitat preferences of juvenile razorback suckers.

The razorback sucker is adapted to the widely fluctuating physical environments characteristic of rivers in the pre-settlement Colorado River Basin. Adults can live 45-50 years and, once reaching maturity between two and seven years of age (Minckley 1983), apparently produce viable gametes even when quite old. The ability of razorback suckers to spawn in a variety of habitats, flows, and over a long season are also survival adaptations. In the event of several consecutive years with little or no recruitment (due to either too much or too little water), the demographics of the population as a whole might shift, but future reproduction would not be compromised. Average fecundity recorded in studies ranged from 46,740 to 100,800 eggs per female (Bestgen 1990). With a varying age of maturity, and the fecundity of the species, it would be possible to quickly repopulate after a catastrophic loss of adults.

The razorback sucker was listed as an endangered species due to declining or extirpated populations throughout the range of the species. The causes of these declines are changes to the biological and physical features of the habitats. Tyus and Karp (1989) and Osmundson and Kaeding (1989) considered that cumulative environmental impacts from competition with and predation by nonnative fish, high winter flows, reduced high spring flows, seasonal changes in river temperatures, and lack of inundated shorelines and bottomlands are factors that potentially limit the survival, successful reproduction, and recruitment of the razorback sucker. The effects

of these changes have been most clearly noted by the almost complete lack of natural recruitment to any population in the historic range of the species. Populations are generally small and composed of aging adults.

Recovery efforts under the Recovery Implementation Program in the Upper Colorado River Basin have begun, but significant recovery results have not yet been achieved. In the Lower Colorado River Basin, efforts to reintroduce the species to the Gila, Salt and Verde rivers have not been successful in establishing self-sustaining populations. Reintroduction efforts continue in the Verde River. Augmentation programs along the lower Colorado River are working to replace the aging razorback sucker populations in Lakes Havasu and Mohave with young fish from protected-site rearing programs. These activities may prevent the imminent extinction of the species in the wild, but appear less capable of ensuring long-term survival or recovery. Overall, the status of the razorback sucker in the wild continues to decline.

ENVIRONMENTAL BASELINE

Information regarding historic and present conditions on the Gila River, habitats, river hydrology, and other information from the “Environmental Baseline” for the southwestern willow flycatcher are included here by reference. That baseline describes effects to habitats caused by recreational activities encouraged by access through the ADOT right-of-way. Some of these recreationists are anglers who may introduce, via bait buckets, nonnative fish or crayfish to the Gila River that prey upon and/or compete with razorback suckers or alter their habitat.

Historically, the razorback sucker was found at least as far upstream as Fort Thomas but was extirpated by the late 1970's. Hundreds of thousands of small razorback suckers were released into the Gila River, Bonita Creek, and Eagle Creek from 1981 through 1987 (Hendrickson 1993); however, mortality of released fish was very high, probably due mostly to predation by nonnative fishes (Marsh and Minckley 1991, Marsh and Brooks 1989). These releases have apparently not been successful in establishing a self-sustaining population. No razorback suckers were found during preliminary surveys of the Gila River in 1991 (U.S. Bureau of Land Management 1996), nor during surveys at five sites near Safford in 1997 (SWCA Inc. 1998). However, the Bureau of Land Management (1996) reported a large razorback sucker found on Bonita Creek in 1991. It is likely that small or very small numbers of the released razorback suckers survived in the Gila River, Eagle Creek, and Bonita Creek.

In the project area, critical habitat was designated for the razorback sucker in 1994 on the Gila River and its 100-year floodplain from the Arizona-New Mexico border to Coolidge Dam, including San Carlos Reservoir. The 100-year event through the project area is a 28,000 cfs flood, which would inundate lands below 3,658 feet elevation (including the proposed construction area from levee to levee) (FEMA 1988). During a 100-year event, portions of the town of Duncan would also be flooded, due to a breach of levee upstream of the project area (Guana and Duffy 1999).

EFFECTS OF THE PROPOSED ACTION

Direct Effects to Razorback Suckers

The only direct effects to razorback suckers would occur during removal of the H piles and construction of the two piers of columns in the low flow channel. Preconstruction surveys would occur 300 feet upstream and downstream of the bridge prior to this work. Construction activity adjacent to the low flow channel would be permitted during breeding season (February 1 to early June) provided no razorback sucker, loach minnow, or spikedeace are found during preconstruction surveys. If fish or larvae are found, construction activity adjacent to the low flow channel would be limited to mid-June to January 31. This limitation would reduce possible direct effects to breeding razorback suckers, eggs, and larvae.

The river would be diverted away from the pier under construction, but the river would still be within the low flow channel. Block seines would be in place 100 feet upstream and downstream of the new bridge during pier construction. Fish between the seines would be netted and moved downstream of the lower block seine. If razorback suckers occur in the project area at this time, they would be prevented from moving through the construction site by the block seines, and razorback suckers between the seines would be captured and moved downstream. The block seines would prevent movement of all but the smallest fish. Razorback suckers are probably rare in the project area; thus the likelihood of direct effects occurring is probably low.

Indirect Effects to Razorback Suckers through Modification of Habitat

Indirect effects include effects of the action on the physical environment inhabited by the razorback sucker. Through alterations of the habitat, individual razorback suckers in the project area may be affected. Indirect effects include 1) potential siltation and erosion in the river channel in the vicinity of the diversion, 2) potential spills of oil, fuel, or other hazardous materials into the river, 3) loss of riparian vegetation and subsequent changes in erosion and sedimentation rates and nutrient flow, and 4) decreased recreation and other human activities in the project area. Effects 1-3 would likely be exacerbated if high flows occur during construction.

Potential siltation and erosion in the river channel in the vicinity of the bridge

Indirect effects could occur as a result of habitat destruction or degradation resulting from stream flow alteration around bridge piers. The new bridge will be supported by 14 piers of columns. The column groups will be aligned to the flow to lessen debris accumulation and potential scour. The columns are expected to be less of an impediment to flows than are the existing H piles, which are walls that lie parallel to river flow. The river will be able to flow between and around columns. Modeling of hydraulic characteristics demonstrated that hydraulic parameters such as channel elevation, maximum channel depth, and flow velocity were nearly identical under “no bridge”, “existing bridge”, and “proposed bridge” scenarios (Guana and Duffy 1999). However, some debris (i.e. logs, branches and other floating material) and sediment accumulation is

anticipated around the columns (Guana and Duffy 1999); necessitating periodic maintenance and associated effects to habitat.

If a high flow event occurred during construction, impacts to razorback sucker habitat could be accentuated. Excavations could divert flows or increase downstream sediment deposition or erosion of banklines. Equipment would be removed from the 100-year floodplain prior to storm events, which would reduce potential impacts.

FHWA has proposed to use a non-erodible material to temporarily divert the river during construction of the two piers in the low flow channel. Thus, no increased sedimentation would occur directly as a result of deterioration of the diversion. However, the river will be constrained to one side of the channel. Thus, flow velocity will increase, increasing erosive forces on substrates and banks. Greater sediment transport, erosion of the channel in and near the diversion, and increased downstream sedimentation will result. Adverse effects of stream sedimentation to fish and fish habitat have been extensively documented (Murphy *et al.* 1981, Wood *et al.* 1990, Newcombe and MacDonald 1991, Barrett 1992, Megahan *et al.* 1992). Excessive sedimentation may cause channel changes that are adverse to razorback suckers. Excessive sediment may smother invertebrates, reducing razorback sucker food production and availability.

Erosion and sedimentation resulting from the diversion would be limited to the area of the diversion and short reaches of the river upstream and downstream of the bridge. Increased rates of erosion and sedimentation caused by the diversion would reverse and effects would diminish once the diversion is removed. Also, all fish will be removed from the diverted reach; thus no razorback suckers should be in the area of greatest effect.

Potential spills of oil, fuel, or other hazardous materials into the river

Toxic substances may affect fish directly or indirectly. Toxins may kill benthic organisms, plankton, algae, or other species with varying effects on fish habitat. For instance, dying plant material may trigger changes in water chemistry, such as lower dissolved oxygen, high CO₂, and low pH. Toxins may also directly affect fish. Symptoms may be acute and accompanied by significant mortality, or sublethal and chronic (Hunn and Schnick 1990). Toxicants may also increase susceptibility of fishes to infectious agents (Herman 1990).

As described in the “Effects of the Action” for the southwestern willow flycatcher, the likelihood of significant spills that may affect listed species is low because: 1) hazardous material storage sites would be located outside of the levees, and 2) regulations greatly reduce the chances of a spill occurring, and if a spill occurs, it must be promptly cleaned up. The likelihood of hazardous materials entering the river could be increased if a flood event occurs and a spill occurs during transport of equipment out of the floodplain.

Loss of riparian vegetation and subsequent changes in erosion and sedimentation rates and nutrient flow

Loss of riparian vegetation reduces natural bankline stabilization and increases the susceptibility of banks to erosion. Presence of riparian vegetation reduces flow velocity thereby increasing sedimentation rates (Belsky *et al.* 1999). Thus, loss of riparian vegetation due to project construction could alter river geomorphology and increase turbidity. Excessive sedimentation may cause channel changes that are adverse to razorback suckers. Excessive sediment may smother invertebrates, reducing razorback sucker food production and availability. Loss of riparian shade also results in increased fluctuation in water temperatures with higher summer and lower winter temperatures (Karr and Schlosser 1977, Platts and Nelson 1989).

Construction activities would result in an estimated loss of 0.6 acre of riparian vegetation (EcoPlan Associates, Inc. 2000). A similar acreage of riparian vegetation would be replanted in ADOT's right-of-way (EcoPlan Associates, Inc. 2000), and natural revegetation is expected as well. Effects of maintenance activities (silt removal) are expected to decline as a result of mitigation measures proposed by FHWA. Thus, effects of vegetation removal are expected to be temporary (a few years). The effects are also relatively small due to the small acreage of riparian vegetation affected. Effects on hydrology, water quality and temperature are not likely to be measurable or discernible from background variability in these parameters.

Decreased recreation and other human activities in the project area

As discussed in the Environmental Baseline, maintenance access routes over the levee in the ADOT right-of-way have probably encouraged off-road vehicle activity, including angling and introduction of nonnative fish and crayfish, driving through the river, increased potential for fire, reduced germination and recruitment of riparian plants, and potentially woodcutting. These activities are likely to increase sedimentation, and destabilize banklines; vehicles in the river could disturb or injure any razorback suckers that may be in the project area (especially fry or eggs); and fire or woodcutting could remove large amounts of vegetation with results similar to that described above under "Loss of riparian vegetation...". Fire could also contribute large quantities of ash to the river. In salmonid fish, ash and slurry flow into streams can be toxic and populations of macroinvertebrates can be drastically reduced after a fire (Rinne 1996), at least temporarily (Roby and Azuma 1995). Smoke diffusion into water and ash flow can result in high levels of phosphorus and nitrogen (Spencer and Hauer 1991), with possible toxic effects to razorback suckers.

FHWA proposes to push sediment from around the bridge piers to the levee within the right-of-way. This would be done in a manner so as to inhibit vehicular access off the levee. Although recreationists can probably access this same area via routes on private land, FHWA's action would remove what is the easiest and most prominent route into the river bottom. We expect that recreational activity and its impacts would decrease as a result. Or at the least, the contribution to this problem attributable to the proposed action would be eliminated or much reduced.

Effects to Critical Habitat

Effects analyses for critical habitat must determine if the proposed action would destroy or adversely modify critical habitat. "Destruction or adverse modification" means a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical (50 CFR 402.02). The primary constituent elements identified as necessary for the survival and recovery of the razorback sucker are (Service 1994a):

Water. This includes a quantity of water of sufficient quality (i.e. temperature, dissolved oxygen, lack of contaminants, nutrients, turbidity, etc.) that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage of the razorback sucker.

Physical Habitat. Including areas of the Colorado River system (including the Gila River drainage system in the project area) that are inhabited or potentially habitable by razorback suckers for use in spawning, nursery, feeding, and rearing, or corridors between these areas. In addition to river channels, these areas also include bottom lands, side channels, secondary channels, oxbows, backwaters, and other areas in the 100-year floodplain, which when inundated provide spawning, nursery, feeding, and rearing habitats, or access to these habitats.

Biological Environment. Food supply, predation, and competition are important elements of the biological environment and are considered components of this constituent element. Food supply is a function of nutrient supply, productivity, and availability to each life stage of the species. Predation and competition, although considered normal components of this environment, are out of balance due to introduced nonnative fish species in many areas.

Effects to critical habitat and constituent elements can be summarized from the discussion of the four effects categories above:

Potential siltation and erosion in the river channel in the vicinity of the diversion

As discussed above, some increased erosion at and near the diversion is expected with increased sedimentation downstream. These effects would be temporary and would reverse once the diversion is removed. Increased turbidity and sedimentation adversely affect all three constituent elements above. For instance, elevated turbidity adversely affects water quality (constituent element #1), increased sedimentation may contribute to the filling in of side channels or backwaters, which are important habitats (constituent element #2), and sedimentation may cover or smother invertebrates that the razorback suckers feed upon (constituent element #3). However, these effects are expected to be very localized around the bridge. Significant

sedimentation is not likely to occur for more than a few hundred feet downstream, and the effect would be temporary. This is within the context of a critical habitat reach that runs from the Arizona-New Mexico border to Coolidge Dam, and a total of 1,724 miles of river in all critical habitat reaches.

Potential spills of oil, fuel, or other hazardous materials into the river

Although some potential exists for contamination of the Gila River and subsequent effects to water quality (constituent element #1) and food resources (constituent element #3), the likelihood of a spill occurring, particularly one that would affect the Gila River, is very low due to strict regulations on use, storage, and cleanup of any hazardous materials. Hazardous materials associated with the project would be stored outside of the levees.

Loss of riparian vegetation and subsequent changes in erosion and sedimentation rates and nutrient flow

Loss of riparian vegetation in the project area has the potential to adversely affect all three constituent elements, because presence of riparian vegetation reduces flow velocity thereby increasing sedimentation rates. Loss of riparian vegetation due to project construction could increase turbidity and alter water temperatures (constituent element #1), alter river geomorphology (constituent element #2), and excessive sediment may smother invertebrates, reducing razorback sucker food production and availability (constituent element #3). However, only 0.6 acre of riparian vegetation would be removed and FHWA proposes a riparian restoration project to mitigate the loss of vegetation. The effects would be small, localized, and temporary.

Decreased recreation and other human activities in the project area

As discussed under the “Effects of the Proposed Action” above, current access off the levee in ADOT’s right-of-way encourages recreational activities that may result in loss of riparian vegetation, driving through the river, introduction of nonnative species, and increased risk of wildfire in the riparian zone. These activities affect all three constituent elements. However, FHWA has proposed to conduct maintenance activities in a manner so as to inhibit vehicular access off the levee. This will reduce or eliminate the project’s current contribution to this problem.

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 action. Effects of past Federal and private actions are considered in the Environmental Baseline. Lands in the Gila River bottom and adjacent croplands are privately owned. Lands northeast of the Virden Highway and Route

75 are a mix of private and State lands; lands southwest of Route 70 are also primarily private and State lands. Periodic flooding in the Gila River bottom precludes most development in the floodplain; however, recreational activities, such as off-road vehicle use (Figure 5), occurs in the river channel. Woodcutting of riparian trees may affect quality of flycatcher habitat. As discussed in the Environmental Baseline for the southwestern willow flycatcher, dike construction and maintenance, groundwater pumping, return flow, and agricultural chemicals have likely affected flow regimes, water quality, and channel morphology. Anglers fish the Gila River and often transport bait fish among aquatic sites. This can result in new introductions that exacerbate effects of predation and competition by nonnative fishes on the razorback sucker. Livestock grazing is widespread in the Gila River corridor and adjacent uplands. Effects of grazing on western riparian systems are numerous and well-documented, including effects to watershed hydrology, stream channel morphology, water quality, soils, vegetation, wildlife, fish and other species (see review in Belsky *et al.* 1999). Some activities on State and private lands will require Federal permits (such as Clean Water Act 404 or 402 permits), and thus would be subject to section 7 consultation. In the absence of a Federal nexus, activities that may result in a take of a listed animal can be addressed through the section 10(a)(1)(B) permit process.

Effectiveness of Proposed Mitigation

The FHWA proposes substantial measures to eliminate or reduce most of the potential adverse effects of the proposed action on the razorback sucker and its habitat. Most notably, measures would be taken to minimize the effects of diverting the river during construction (use of non-erodible materials to create the diversion, placement of block seines above and below the diversion, and netting and movement of fish between the seines to downstream of the lower seine); water would not be drawn from the river or wells connected to the river, thus flows would not be affected; silt removal around the base of the piers would involve pushing material onto the levee in a way that eliminates or inhibits vehicular access off the levee in the ADOT right-of-way, and the right-of-way downstream of the bridge would be revegetated with riparian plants.

CONCLUSION

After reviewing the current status of the razorback sucker, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of razorback sucker nor result in destruction or adverse modification of critical habitat. We present these conclusions for the following reasons:

1. The FHWA proposes substantial measures that eliminate or reduce the adverse effects of the proposed action to the razorback sucker and its critical habitat.
2. The project area is relatively small, and effects of the action are mostly temporary.

3. Modeling of hydraulic characteristics demonstrated that hydraulic parameters such as channel elevation, maximum channel depth, and flow velocity were nearly identical under “no bridge”, “existing bridge”, and “proposed bridge” scenarios (Guana and Duffy 1999).
4. Razorback suckers are probably rare in the project area, reducing the chances of direct effects to individual fish.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act prohibits the take of listed species without special exemption. Taking is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is any take of a listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The FHWA has a continuing duty to regulate the activity covered by this incidental take statement. If the FHWA (1) fails to require any 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, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

Take of razorback sucker is anticipated as a result of: 1) temporarily blocking the movement of individual fish with block seines, and 2) capture of razorback suckers during proposed seining between the block seines. Although less likely, take could also occur as a result of increased sedimentation during construction and subsequent adverse effects to breeding or feeding areas.

The anticipated level of incidental take cannot be directly quantified because of presumed very low numbers of razorback suckers in the project area, potentially rapid population fluctuations inherent in fish populations, changes in instream habitat distribution over time, and uncertainties regarding effects of such activities on razorback suckers. Therefore, anticipated levels of

incidental take are indexed to effects on habitat that are reasonably likely to result in take, or to documented mortality of razorback suckers. Anticipated take will be considered to have been exceeded if: 1) more than one dead razorback sucker is found in the project area during construction and the cause of mortality is unknown or can be attributed to the proposed action, or 2) a hazardous material spill in the Gila River occurs, or 3) proposed placement of block seines and seining between the block seines are not conducted as proposed.

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, FHWA 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 FHWA 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 FHWA 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 FHWA's proposed action as described herein.

EFFECT OF THE TAKE

In this biological opinion, the Service finds the anticipated level of take is neither likely to result in jeopardy to the species nor in destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of razorback sucker:

1. The FHWA shall minimize the effects to razorback suckers from setting and monitoring block seines and netting fish.
2. The FHWA shall monitor implementation of the proposed action and any resulting incidental take and report to the Service the findings of that monitoring.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, FHWA 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.

The following term and condition implements reasonable and prudent measure number 1:

The FHWA shall ensure that individuals engaged in setting and monitoring block seines and in netting fish in the area between the seines are qualified fisheries biologists who hold appropriate State and Federal permits to conduct these activities, including netting razorback suckers.

The following term and condition implements reasonable and prudent measure number 2:

The FHWA shall monitor implementation of the proposed action and these terms and conditions, and document any disturbance, capture, or take of razorback suckers, and effects to the sucker's habitat. A brief written report summarizing the results of such monitoring/documentation shall be submitted to the Service within 90 days of completion of construction. The report shall also make recommendations, as needed, for modifying or refining these terms and conditions to enhance protection of the razorback sucker or reduce needless hardship on the FHWA or its contractors.

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 recommendation provided here does not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the razorback sucker. In furtherance of the purposes of the Act, we recommend implementing the following action:

FHWA should work with the Service to implement the recovery plan for the razorback sucker. This could include development of standard design features that result in projects with minimum impacts to aquatic resources, development of standard mitigation and compensation measures to further reduce adverse effects from FHWA projects, and including in projects enhancement of habitat features and constituent elements while still achieving project objectives.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

(Note: capture or collection of fish requires appropriate permits from Arizona Game and Fish Department and, for listed species, from the Service.)

DISPOSITION OF DEAD OR INJURED LISTED ANIMALS

Upon locating a dead or injured threatened or endangered animal, initial notification must be made to the Service's Division of Law Enforcement, Federal Building, 26 North McDonald, #105, Mesa, Arizona 85201 (602/379-6443) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph, and any other pertinent information. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animal species shall be submitted to educational or research institutions holding appropriate State and Federal permits. If such institutions are not available, the information noted above shall be obtained and the carcass left in place.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution prior to implementation of the action. Injured animals should be transported to a qualified veterinarian by a qualified biologist. Should any treated listed animal survive, the Service should be contacted regarding the final disposition of the animal.

CONCURRENCES

The Service concurs with the FHWA's determinations that the proposed action may affect, but is not likely to adversely affect the spikedace and loach minnow. The rationale for these concurrences is detailed in the following discussions.

Spikedace

STATUS OF THE SPECIES

The spikedace was listed as a threatened species on July 1, 1986 (Service 1986). Critical habitat was designated for spikedace on March 8, 1994, including Aravaipa Creek, portions of the Gila River in New Mexico, and the upper Verde River; however, that critical habitat designation was set aside by court order in Catron County, New Mexico. Recently, the Service re-proposed critical habitat for spikedace on 822 miles of rivers and creeks in the Gila River basin, Arizona and New Mexico.

The spikedace is a small silvery fish whose common name alludes to the well-developed spine in the dorsal fin (Minckley 1973). Spikedace historically occurred throughout the mid-elevations of the Gila River drainage, but is currently known only from Aravaipa Creek (Graham and Pinal Counties, Arizona), the upper Gila River (Grant and Catron Counties, New Mexico), the middle Gila River (Pinal County, Arizona), Eagle Creek (Greenlee County, Arizona), and the Verde River (Yavapai County, Arizona) (Barber and Minckley 1966, Minckley 1973, Anderson 1978, Barrett *et al.* 1985, Bestgen 1985, Marsh *et al.* 1990, Sublette *et al.* 1990, Jakle 1992, Knowles 1994). Habitat destruction, and competition and predation from introduced nonnative fish species are the primary causes of the species' decline (Miller 1961, Williams *et al.* 1985, Service 1986, Douglas *et al.* 1994).

Spikedace live in flowing water with slow to moderate water velocities over sand, gravel, and cobble substrate (Propst *et al.* 1986, Rinne and Kroeger 1988). Specific habitat for this species consists of shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at downstream riffle edges (Propst *et al.* 1986). Spikedace spawn from March through May with some yearly and geographic variation (Barber *et al.* 1970, Anderson 1978, Propst *et al.* 1986). Spawning has not been observed, but spawning behavior indicates eggs are laid over gravel and cobble where they adhere to the substrate. Spikedace live about two years with reproduction occurring primarily in one-year old fish (Barber *et al.* 1970, Anderson 1978, Propst *et al.* 1986). It feeds primarily on aquatic and terrestrial insects (Schreiber 1978, Barber and Minckley 1983, Marsh *et al.* 1989).

The effects of historic and present perturbations in the Gila River basin have resulted in fragmentation of spikedace range and isolation of remnant spikedace populations. Recent taxonomic and genetic work on spikedace indicate there are substantial differences in morphology and genetic makeup among remnant spikedace populations. Anderson and Hendrickson (1994) found that spikedace from Aravaipa Creek are morphologically distinguishable from spikedace from the Verde River, while spikedace from the upper Gila River and Eagle Creek populations have intermediate measurements and partially overlap the Aravaipa and Verde populations. Mitochondrial DNA and allozyme analyses have found similar patterns of geographic variation within the species (Tibbets 1992).

Although the spikedace is currently listed as threatened, the Service has found that it warrants uplisting to endangered status. Reclassification is pending; however, work on it is precluded due to work on other higher priority listing actions (Service 1994b). The need for reclassification is not due to data on declines in the species itself, but is based upon increases in serious threats to a large portion of its habitat.

Loach Minnow

STATUS OF THE SPECIES

The loach minnow was listed as a threatened species on October 28, 1986. Critical habitat was designated for loach minnow on March 8, 1994, including portions of the San Francisco, Tularosa, Blue, and upper Gila rivers, and Aravaipa Creek. However, that critical habitat designation was set aside by court order in Catron County, New Mexico. Recently, the Service re-proposed critical habitat for loach minnow on 894 miles of rivers and creeks in the Gila River basin, Arizona and New Mexico.

The loach minnow is a small, slender, elongate fish with markedly upwardly-directed eyes (Minckley 1973). Historic range of the loach minnow included the basins of the Verde, Salt, San Pedro, San Francisco, and Gila rivers (Minckley 1973, Sublette *et al.* 1990). Competition and predation by nonnative fish and habitat destruction have reduced the range of the species by about 85 percent (Miller 1961, Williams *et al.* 1985, Marsh *et al.* 1989). Loach minnow remains in limited portions of the upper Gila, San Francisco, Blue, Black, Tularosa, and White rivers; and

Aravaipa, Eagle, Campbell Blue, and Dry Blue creeks in Arizona and New Mexico (Barber and Minckley 1966, Silvey and Thompson 1978, Propst *et al.* 1985, Propst *et al.* 1988, Marsh *et al.* 1990, Knowles 1995).

The loach minnow is a bottom-dwelling inhabitant of shallow, swift water over gravel, cobble, and rubble substrates (Rinne 1989, Propst and Bestgen 1991). The loach minnow uses the spaces between, and in the lee of, larger substrate for resting and spawning (Propst *et al.* 1988, Rinne 1989). It is rare or absent from habitats where fine sediments fill the interstitial spaces (Propst and Bestgen 1991). Some studies have indicated that the presence of filamentous algae may be an important component of loach minnow habitat (Barber and Minckley 1966). The life span of a loach minnow is about two years (Britt 1982, Propst and Bestgen 1991). Loach minnow feeds exclusively on aquatic insects (Schreiber 1978, Abarca 1987). Spawning occurs primarily in March through May (Britt 1982, Propst *et al.* 1988); however, under certain circumstances loach minnow also spawn in the autumn (Vives and Minckley 1990). The eggs of the loach minnow are attached to the underside of a rock that forms the roof of a small cavity in the substrate on the downstream side. Limited data indicate that the male loach minnow may guard the nest during incubation (Propst *et al.* 1988, Vives and Minckley 1990).

Recent biochemical genetic work on loach minnow indicate there are substantial differences in genetic makeup among remnant loach minnow populations. Remnant populations occupy reaches of the Gila basin that are isolated from each other. Tibbets (1992) recommended that the genetically distinctive units of loach minnow should be managed as separate units to preserve the existing genetic variation.

Although the loach minnow is currently listed as threatened, the Service has found that it warrants uplisting to endangered status. Reclassification is pending; however, work on it is precluded due to work on other higher priority listing actions (Service 1994b). The need for reclassification is not due to data on declines in the species itself, but is based upon increases in serious threats to a large portion of its habitat.

ENVIRONMENTAL BASELINE - SPIKEDACE AND LOACH MINNOW

Current and past environmental conditions in the project area are summarized in the environmental baselines for the southwestern willow flycatcher and razorback sucker. They are included here by reference.

Historic records indicate the species was once widespread in the Gila River basin (Minckley 1973). No records of spikedace or loach minnow are known from the Gila River in the project area; however, both are still relatively common in the headwaters of the Gila River in New Mexico, and recent records exist from approximately 10 miles upstream of Duncan. Both were found near the New Mexico state line in the early 1980's (Service files), and both were recently found near the Virden, New Mexico, diversion (John Rinne, pers. comm., March 2000). The BA mentions that fish surveys have been conducted in the project area by Arizona Game and Fish

Department as recent as about ten years ago. No spikedace or loach minnow were found during those surveys. There are no barriers to movement of fish between the project area and occupied reaches upstream; thus, spikedace and loach minnow may occur rarely or periodically in the project area. Critical habitat was proposed in December 1999 for both species on the upper Gila River in New Mexico from the confluence with Moore Canyon upstream to the east and middle forks in Catron County. This critical habitat reach begins approximately seven miles upstream of the project area.

EFFECTS OF THE PROPOSED ACTION

Spikedace and loach minnow could conceivably be directly affected during construction of the two piers of columns in the low flow channel. Preconstruction surveys would occur 300 feet upstream and downstream of the bridge. Construction activity adjacent to the low flow channel would be permitted during the breeding season (February 1 to early June) provided no razorback sucker, loach minnow, or spikedace are found during preconstruction surveys. If fish or larvae are found, construction activity adjacent to the low flow channel would be limited to mid-June to January 31. This limitation would reduce possible direct effects to breeding spikedace, loach minnow, and their eggs and larvae.

During construction in the low flow channel, the river would be diverted away from the pier under construction, but the river would still be within the low flow channel. Block seines would be placed 100 feet upstream and downstream of the new bridge. Fish between the seines would be netted and moved downstream of the lower block seine. If spikedace or loach minnow occur in the project area at this time, they would be prevented from moving through the construction site by the block seines, and spikedace and loach minnow between the seines would be captured and moved downstream. The block seines would prevent movement of all but the smallest fish. Both species are probably rare in the project area; thus the likelihood of direct effects occurring is probably low. Biologists conducting the fish surveys and netting would be required to have State and Federal permits authorizing capture of spikedace and loach minnow. The likelihood of spikedace or loach minnow being netted or having their movements restricted is low due to the probable rare status of these species in the project area and the temporary nature of the construction activities in the low flow channel.

Indirect effects to the spikedace and loach minnow are similar to those described for the razorback sucker, and include potential siltation and erosion in the river channel in the vicinity of the diversion; loss of riparian vegetation and subsequent changes in erosion and sedimentation rates and nutrient flow; potential spills of oil, fuel, or other hazardous materials into the river; and decreased recreation and other human activities in the project area. These effects are expected to be localized and temporary, and are largely mitigated by FHWA's proposed mitigation measures (as discussed for the razorback sucker). Decreased recreation and other human activities should benefit the species.

CONCLUSION

The Service concurs with the FHWA's finding that the proposed action may affect, but is not likely to adversely affect spikedace and loach minnow. We also find that the proposed action is not likely to adversely modify or destroy proposed critical habitat. We base these findings on the following:

1. Potential direct adverse effects to the species are expected to be discountable (i.e. extremely unlikely to occur).
2. Indirect adverse effects are considered insignificant (i.e. small size, extent of the impacts), because effects would be temporary and localized to the area near the bridge.
3. Biologists conducting the fish surveys and netting would be required to have permits authorizing capture of spikedace and loach minnow.
4. FHWA has proposed significant mitigation measures that reduce or eliminate potential adverse effects to spikedace and loach minnow, and their habitats.
5. No proposed critical habitat occurs in the project area, and no critical habitat would be affected by the project.

REINITIATION NOTICE

This concludes formal consultation on Federal Highway Administration's proposal to replace a bridge on Highway 75 at Duncan in Greenlee 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. Any questions or comments should be directed to Jim Rorabaugh (x238) or Sherry Barrett (520/670-4617) of my staff.

Sincerely,

David L. Harlow
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (PARD-ES)
Fish and Wildlife Service, Tucson Suboffice, Tucson, AZ

Field Office Manager, Bureau of Land Management, Safford, Arizona
Director, Arizona Game and Fish Department, Tucson, AZ

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APPENDIX 1

2-21-99-F-096

SUMMARY: BIOLOGICAL OPINION: BRIDGE REPLACEMENT ON HIGHWAY 75 OVER THE GILA RIVER AT DUNCAN, ARIZONA

Date of Opinion: May 1, 2001

Action Agency: Federal Highway Administration, Phoenix, Arizona

Project: The existing bridge on Highway 75 across the Gila River at Duncan in Greenlee County, Arizona does not meet current design and safety standards. Thus, Federal Highway Administration proposes replacing the structure with a safe, two-lane, all-weather crossing that satisfies all current safety and design standards.

Listed/Proposed Species and Critical Habitat Affected: Impacts resulting from the project may affect the following listed species: southwestern willow flycatcher (*Empidonax traillii extimus*) and razorback sucker (*Xyrauchen texanus*), and critical habitat designated for the razorback sucker.

Biological Opinion: The Service determined that the proposed action is not likely to jeopardize the continued existence of the southwestern willow flycatcher and the razorback sucker. Nor is the project likely to result in destruction or adverse modification of razorback sucker critical habitat. The opinion includes concurrences that the proposed action may affect, but is not likely to adversely affect, the spinedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*).

Incidental Take Statement:

Level of take anticipated: One or more forms of take is anticipated for the razorback sucker. No take of southwestern willow flycatcher is anticipated.

Reasonable and Prudent Measures: Measures include ensuring that biologists conducting fisheries work are permitted and qualified, and that implementation of the project and its effects to razorback sucker are monitored and reported to the Service. Implementation of these measures through the terms and conditions is mandatory.

Terms and Conditions: Mandatory terms and conditions are included for the razorback sucker to implement the reasonable and prudent measures. They include: 1) FHWA shall ensure that individuals engaged in setting and monitoring block seines and in seining the area between the seines are qualified fisheries biologists who hold appropriate State and Federal permits to conduct these activities, including netting razorback suckers, and 2) The FHWA shall monitor implementation of the proposed action and any resulting incidental take and report to the Service the findings of that monitoring.

Conservation Recommendations: Conservation measures are recommended for the flycatcher and razorback sucker. Suggested measures include implementation of recovery plans, developing mitigation guidelines for bridge construction projects, and other actions.