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AESO/SE
02-21-05-F-0331

April 20, 2005

Memorandum

To: Regional Director, Fish and Wildlife Service, Albuquerque, New Mexico
(Attn: S. Rinkevich)

From: Field Supervisor

Subject: Intra-Service Formal Consultation and Conference Opinion on the Issuance of Recovery Permits for the Endangered Southwestern Willow Flycatcher for Scientific Purposes and/or Enhancement of Propagation or Survival (TE-100579)

This constitutes intra-service formal consultation and conference with the U.S. Fish and Wildlife Service's (FWS) Arizona Ecological Services Field Office (AESO) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request was dated March 1, 2005, and received by us on the same day. At issue are impacts that may result from the issuance of a 10(a)1(A) permit to Salt River Project (SRP) for the proposed 2005 Research Plan for Horseshoe Reservoir, located in Maricopa and Yavapai counties, Arizona. The proposed action "may affect, and is likely to adversely affect" the southwestern willow flycatcher (*Empidonax trailli extimus*) and its proposed critical habitat, the razorback sucker (*Xyrauchen texanus*) and its critical habitat, and the Gila topminnow (*Poeciliopsis occidentalis occidentalis*). We also conclude that the proposed project is not likely to jeopardize the continued existence of the experimental, nonessential population of Colorado pikeminnow (*Ptychocheilus lucius).* We also provide a concurrence (Appendix A) that the proposed action "may affect, but is not likely to adversely affect," the bald eagle (*Haliaeetus leucocephalus).*

This biological opinion and conference are based on information provided in the permit application package, meetings, telephone conversations, field investigations, and other sources of information. Literature cited in this biological opinion and conference is not a complete bibliography of all literature available on the species of concern and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file in this office of this consultation and conference is on file at the Arizona Ecological Service Field Office.

CONSULTATION HISTORY

* 2003 - Salt River Project began informal discussions with the FWS for a Habitat Conservation Plan (HCP) for the long-term operations of Horseshoe and Bartlett reservoirs.

* January 2005 –SRP hydrologist predicted that habitat for the southwestern willow flycatcher could be flooded this spring by unusually high precipitation levels in the Gila River basin.

* February 2005 – SRP and City of Phoenix meet with FWS staff in Albuquerque to discuss alternative operations for Horseshoe Reservoir and potential research opportunities presented by above-average precipitation.

* March 1, 2005 – The FWS Regional Office Division of Recovery submitted an intra-service section 7 evaluation form to the Phoenix Fish and Wildlife Office and requested formal consultation on the issuance of recovery permits for the southwestern willow flycatcher under 10(a)(1)(A) of the Act.

* March 28, 2005 - A draft of this biological opinion was transmitted to the RO for review. A copy was also provided to the Arizona Game and Fish Department (AGFD) and SRP.

* April 5, 2005 – We received informal comments on the draft biological opinion from SRP.

* April 8, 2005 – A draft Findings document was transmitted to the RO for review.

* April 13, 2005 - A revised draft of this biological opinion was transmitted to the RO for review. A copy was also provided to the Arizona Game and Fish Department (AGFD) and SRP.

* April 14, 2005 - We received informal comments on the revised draft biological opinion from SRP.

* April 14, 2005 – We received comments from the RO on the revised draft biological opinion along with a request to finalize the document.

* April 15, 2005 – We received comments from the RO on the Findings document.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the issuance of a recovery subpermit for take of the endangered southwestern willow flycatcher by the Albuquerque Regional Office of the Fish and Wildlife Service under section 10(a)(1)(A) of the Act. Recovery permits allow permittees to undertake

actions as specified in their permit, that may otherwise be prohibited by section 9 of the Act, for scientific purposes or to enhance the propagation or survival of the affected species.

Recovery permits will be issued to qualified individuals to experimentally hold water in Horseshoe Reservoir at levels that will inundate otherwise-suitable flycatcher habitat for research and population census purposes to benefit recovery of the southwestern willow flycatcher within its historical range. Specific flycatcher monitoring activities to be authorized under Section 10(a)(1)(A) permits for the flycatcher include: (1) playback of recorded vocalizations, (2) monitoring nesting activity and inspection of nest contents, (3) habitat suitability evaluations, and (4) monitoring dispersal of flycatchers. Specific study designs for this year are summarized below. A complete description of the proposed actions is provided in an attachment to the permit titled Research Plan – In Support of a Section 10(a)(1)(A) Permit 2005 Operations of Horseshoe Reservoir. The main goals and objectives of the permit are to evaluate the following:

1. Effect of Flood Flows and Inundation on Tall Dense Vegetation.

Objective: To evaluate the mortality of tall dense vegetation in Horseshoe Reservoir resulting from flood flows and inundation of the root crown for up to 6 months in 2005.

2. Suitability of Tall Woody Vegetation for Flycatcher Habitat at Horseshoe Reservoir during and after Inundation.

Objective: To evaluate the suitability of tall woody vegetation for flycatcher habitat at Horseshoe Reservoir during and after inundation.

3. Recruitment of Tall Dense Vegetation at the Upper End of Horseshoe Reservoir After Inundation.

Objective: To evaluate the success of modifying reservoir operations to recruit tall dense vegetation seedlings, especially willow, near the upper end of Horseshoe Reservoir.

4. Dispersal of Flycatchers from Horseshoe Reservoir and Use of Horseshoe Habitat Late in the Breeding Season.

Objective: To evaluate the dispersal of Horseshoe Reservoir flycatchers if habitat is unavailable at Horseshoe Reservoir early in the breeding season and their productivity if they return to Horseshoe Reservoir later in the breeding season.

5. Nonnative Fish Spawning and Survival In and Above Horseshoe Reservoir During a High Runoff Year.

Objective: To estimate species composition, relative abundance, and reproduction of nonnative fishes found in Horseshoe Reservoir and in the Verde River from Sheep Bridge to Horseshoe Dam during a year in which Horseshoe Reservoir fills (2005) and in a year where Horseshoe Reservoir remains mostly empty (2006 or later).

Proposed Permit Conditions to Minimize the Effects of Incidental Take

The FWS proposes the following permit conditions which must be adhered to by SRP, to minimize the effects of incidental take on the flycatcher:

1) Annual reporting requirements will be specified in the permit. Those reporting requirements outlined in the section 10(a)(1)(A) permit will satisfy the reporting/monitoring requirements pursuant to section 7 of the Act and its implementing regulations.

2) The following condition shall be included in the permit: Upon locating a dead, injured, or sick specimen, initial notification must be made within 24 hours to the nearest FWS Law Enforcement Office. Care should be taken in handling sick or injured specimens to ensure effective treatment and care, or in the handling of dead specimens to preserve biological material in the best possible state for later analysis as to the cause of death. In conjunction with the care of sick or injured specimens or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

3) The condition that all flycatcher surveys will employ standard techniques, as outlined in the Southwestern willow flycatcher protocol review (USFWS 2000), shall be specified in the permit.

4) The condition shall be specified in the permit that the permittee shall first receive our approval prior to implementation of any other southwestern willow flycatcher survey technique, other than what is specified in Item 3 above.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. For purposes of this project, the action area includes the bank-full channel of: 1) the full pool of Horseshoe Reservoir; 2) Lime Creek from the confluence with Horseshoe Reservoir to its headwaters; 3) Tangle Creek from its confluence with the Verde River to approximately 0.125 miles upstream; 4) Sycamore Creek (just upstream of Horseshoe Reservoir) from its confluence with the Verde River to approximately 0.125 miles upstream; and 5) the Verde River mainstem from Horseshoe Dam to river mile 60 (river mile zero is considered the Verde River's confluence with the Salt River) which is approximately eight miles upstream from the northern terminus of the full pool of Horseshoe Reservoir. The action area is in both Maricopa and Yavapai counties. Although a permit was not requested for the razorback sucker, the proposed project occurs in critical habitat for this species, and adverse effects may occur. We, therefore, will address this species and its critical habitat. Additionally, we will address potential effects to Colorado pikeminnow and Gila topminnow because these species occur within the action area. Finally, we will address potential effects to proposed critical habitat for the southwestern willow flycatcher which occurs in the action area.

STATUS OF THE SPECIES

Southwestern willow flycatcher

The southwestern willow flycatcher is a small grayish-green passerine bird (Family Tyrannidae) measuring approximately 5.75 inches. 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, and the lower is light yellow grading to black at the tip. The song is a sneezy fitz-bew or a fit-a-bew, the call is a repeated whitt.

The southwestern willow flycatcher is one of four currently recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993). It is a neotropical migrant that breeds in the southwestern U.S. 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 breeding 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).

Listing and critical habitat
The southwestern willow flycatcher was listed as endangered, without critical habitat on February 27, 1995 (USFWS 1995a). Critical habitat was later designated on July 22, 1997, (USFWS 1997a). A correction notice was published in the Federal Register on August 20, 1997 to clarify the lateral extent of the designation (USFWS 1997b).

On May 11, 2001, the 10th circuit court of appeals set aside designated critical habitat. Critical habitat was re-proposed by the FWS on October 12, 2004, and the final rule is expected by October 2005. The primary constituent elements are associated with habitat for breeding, non-breeding, territorial, dispersing, and migrating southwestern willow flycatcher habitat and include:

1) nesting habitat with trees and shrubs that include, but are not limited to willow species and boxelder;

2) dense riparian vegetation with thickets of trees and shrubs ranging from 2m to 30m (6 to 98 ft) with lower-stature thickets of trees (2-4 m or 6-13 ft) found at higher elevation riparian forests and tall-stature thickets found at middle and lower-elevation riparian forests;

3) areas of dense riparian foliage at least from the ground level up to approximately 4 m (13 ft) above ground or dense foliage only at the shrub level, or as a low dense tree canopy;

4) site for nesting that contain a dense tree and/or canopy (the amount of cover provided by tree and shrub branches measured from the ground) (i.e. a tree of shrub canopy with densities ranging from 50 to 100 percent); and

5) dense patches of riparian forests that are interspersed with small openings of open water or marsh, or shorter/sparser vegetation that creates a mosaic that is not uniformly dense. Patch size may be as small as a 0.1 ha (0.25 ac) or as large as 70 ha (175 ac); and a variety of insect prey populations.

A final recovery plan for the southwestern willow flycatcher was signed by the USFWS' Region 2 Director on August 30, 2002. The Plan describes the reasons for endangerment, current status of the flycatcher, addresses important recovery actions, includes detailed issue papers on management issues, and provides recovery goals.

Reasons for endangerment

Declining southwestern willow flycatcher numbers have been attributed to loss, modification, and fragmentation of riparian breeding habitat, loss of wintering habitat, and brood parasitism by the brown-headed cowbird (Sogge *et al.* 1997, McCarthey *et al.* 1998). Habitat loss and degradation are caused by a variety of factors, including urban, recreational, and agricultural development, water diversion and groundwater pumping, channelization, dams, and livestock grazing. Fire is an increasing threat to willow flycatcher habitat (Paxton *et al.* 1996), especially in monotypic saltcedar vegetation (DeLoach 1991) and where water diversions and/or groundwater pumping desiccates riparian vegetation (Sogge *et al.* 1997). Willow flycatcher nests are parasitized by brown-headed cowbirds (*Molothrus ater*), which lay their eggs in the host's nest. Feeding sites for cowbirds are enhanced by the presence of livestock and range improvements such as waters and corrals; agriculture; urban areas; golf courses; bird feeders; and trash areas. When these feeding areas are in close proximity to flycatcher breeding habitat, especially coupled with habitat fragmentation, cowbird parasitism of flycatcher nests may increase (Hanna 1928, Mayfield 1977a, b, Tibbitts *et al.* 1994).

Habitat

The southwestern willow flycatcher breeds in dense riparian habitats from sea level in California to approximately 8500 feet in Arizona and southwestern Colorado. Historical 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, San Diego Natural History Museum 1995). Currently, southwestern willow flycatchers primarily use Geyer willow (*Salix geyeriana*), Coyote willow (*Salix exigua*), Goodding's willow (*Salix gooddingii*), boxelder (*Acer negundo*), saltcedar (*Tamarix* sp.), Russian olive (*Elaeagnus angustifolio*), 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.). Based on the diversity of plant species composition and complexity of habitat structure, four basic 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).

Tamarisk is an important component of the flycatchers's nesting and foraging habitat in some parts of Arizona and other parts of the bird's range. Tamarisk had been believed by some to be a habitat type of lesser quality for the southwestern willow flycatcher; however, comparisons of reproductive performance (USFWS 2002a) and physiological conditions (Owen and Sogge 2002) of flycatchers breeding in native and exotic vegetation have revealed no difference.

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 were 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 among 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).

The Technical Recovery Team (USFWS 2002a) wrote the following about flycatcher habitat in relation to the dynamic environment it exists in and the importance of succession. "Because riparian vegetation typically occurs in floodplain areas that are prone to periodic disturbance, suitable (all references to suitability and/or occupancy in this paragraph refer to breeding flycatcher habitat) habitats will be ephemeral and their distribution dynamic in nature. Suitable habitat patches may become unsuitable through maturation or disturbance (though this may be temporary, and patches may cycle back to suitability). Therefore it is not realistic to assume that any given suitable habitat patch (occupied or unoccupied) will remain continually occupied and/or suitable over the long term. Unoccupied suitable habitat will therefore play a vital role in the recovery of the flycatcher, because they will provide suitable areas for breeding flycatchers to: (a) colonize as the population expands (numerically and geographically), and (b) move to following loss or degradation of existing breeding sites. Indeed, many sites will likely pass through a stage of being suitable but unoccupied before they become occupied. Potential habitats that are not currently suitable will also be essential for flycatcher recovery because they are the areas from which new suitable habitat develops as existing suitable sites are lost or degraded; in a dynamic riparian system, all suitable habitat starts as potential habitat. Furthermore, potential habitats are the areas where changes in management practices are most likely to become suitable habitat. Therefore, habitat management for recovery of the flycatcher must include developing and/or maintaining a matrix of riparian patches – some suitable and some potential – within a watershed so that sufficient suitable habitat will be available at any given time (USFWS 2002a)." The development of flycatcher habitat is a dynamic process involving, maintenance, recycling, and regeneration of habitat. Flycatcher habitat can quickly change and vary in suitability, location, and occupancy over time (Finch and Stoleson 2000).

Many willow flycatchers found migrating through riparian areas (dominated by both native and exotic plants) occupy in riparian habitats or patches that would be unsuitable for breeding (e.g. the vegetation structure is too short or sparse, or the patch is too small). Such migration stopover areas, even though not used for breeding are critically important resources affecting productivity and survival (USFWS 2002a).

The flycatcher's habitat is dynamic and can change rapidly: nesting willow habitat can grow out of suitability; saltcedar habitat can develop from seeds to suitability in five years; heavy runoff can remove/reduce habitat suitability in a day; or river channels, floodplain width, location, and vegetation density may change over time. Because of those changes, flycatcher "habitat" is often defined as either suitable or potential (USFWS 2002a). This demonstrates that areas other than existing occupied locations can be considered flycatcher "habitat," and as a result, essential to the survival and recovery of the flycatcher (USFWS 2002a). The development of flycatcher habitat is a dynamic process involving, maintenance, recycling, and regeneration of habitat. Flycatcher habitat can quickly change and vary in suitability, location, and occupancy over time (Finch and Stoleson 2000).

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 through mid-August (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). The entire breeding cycle, from egg laying to fledging, is approximately 28 days. Southwestern willow flycatcher nests are fairly small (3.2 inches tall and 3.2 inches wide) and its placement in a shrub or tree is highly variable (2.0 to 59.1 feet off the ground).

Rangewide distribution and abundance

Unitt (1987) documented the loss of more than 70 southwestern willow flycatcher breeding locations rangewide (peripheral and core drainages within its range) estimating the rangewide population at 500 to 1000 pairs. There are currently 255 known southwestern willow flycatcher breeding sites in California, Nevada, Arizona, Utah, New Mexico, and Colorado (all sites from 1993 to 2003 where a resident flycatcher has been detected) holding approximately 1137 territories (Durst et al. 2005). It is difficult to arrive at a grand total of flycatcher territories since not all sites are surveyed annually to determine the actual abundance of birds. Also, sampling errors may bias population estimates positively or negatively (e.g., incomplete survey effort, double-counting males/females, composite tabulation methodology, natural population fluctuation, and random events) and it is likely that the total breeding population of southwestern willow flycatchers fluctuates. Numbers have increased since the bird was listed and some habitat remains unsurveyed; however, after nearly a decade of intense surveys, the existing numbers are consistent with the upper end of Unitt's 1987 estimate. About 40 to 50 percent of the 986 territories currently found throughout the subspecies range are located at three locations (Cliff/Gila Valley - NM, Roosevelt Lake - AZ, San Pedro/Gila confluence - AZ).

Rangewide, the population is comprised of extremely small, widely-separated breeding groups including unmated individuals. For example, in Arizona, 63 percent (29/46) of the sites where flycatchers were found in 2001 (Smith *et al.* 2002) were comprised of 5 or fewer territories. In Arizona during the 2001 season, all but the "The Salt River Inflow" site at Roosevelt Lake had 20 pairs or less (Smith *et al.* 2002). Rangewide, 76 percent of all sites from 1993 to 2001 had 5 or less flycatcher territories present at the site (Sogge *et al.* 2002). Conversely, across the bird's range, there are fewer than six sites with greater than 50 territories (Sogge *et al.* 2002).

The survival and recovery of the flycatcher is not dependent on having a few locations with large numbers of birds, but rather properly distributed populations placed close together (USFWS 2002a). Southwestern willow flycatchers are believed to function as a group of meta-populations (USFWS 2002a).

Past Consultations

Between listing in 1995 to 2003, at least 80 Federal agency actions have undergone (or are currently under) formal section 7 consultation throughout the flycatcher's range. Six actions have resulted in jeopardy decisions. Many activities continue to adversely affect the distribution and extent of all stages of flycatcher habitat throughout its range (development, urbanization, grazing, recreation, native and nonnative habitat removal, dam operations, river crossings, ground and surface water extraction, etc.). Stochastic events also continue to adversely affect the distribution and extent of flycatcher habitat.

Reasonable and Prudent Alternatives (RPA) accompanied a jeopardy opinion developed by the USFWS (1996a) for Phelps Dodge's Verde Valley Ranch development near Clarkdale, AZ. This development was adjacent to the only one to two pairs of flycatchers on the Verde River at that time. The land has not yet been developed. One RPA directed Phelps Dodge (in cooperation with State Parks, AGFD, and National Park Service) to manage a two-mile stretch of river at the Tuzigoot Bridge for the flycatcher (within the Verde Greenway). A management plan was completed by SWCA, Inc. (2000).

Anticipated or actual loss of occupied flycatcher habitat due to Federal or federally permitted projects (modification of Roosevelt Dam, operation of Lower Colorado River dams, etc.) has resulted in biological opinions that led to acquisition of otherwise unprotected property specifically for the southwestern willow flycatcher. A small portion of the lower San Pedro River was acquired by the Bureau of Reclamation as a result of raising Roosevelt Dam and is now currently under the management of The Nature Conservancy. In 2002, about 20 flycatchers' territories were detected on this property (S. Sferra, U.S. Bureau of Reclamation, pers. comm.). Commitments to acquire and manage unprotected habitat specifically for breeding flycatchers have been made for loss of flycatcher habitat along the Lower Colorado River (Operations of Colorado River dams and 4.4 Plan/Change in Points of Diversion), Verde River (Mingus Ave. Bridge), Tonto Creek and Salt River (raising of Roosevelt Dam) in AZ and Lake Isabella, CA (operation of dams).

Much of the increase in the flycatcher's numbers in central Arizona and the subspecies range can be attributed to the rapid population growth at Roosevelt Lake and the San Pedro River; however, much of that occupied habitat is expected to be temporarily lost in the future due to inundation. Reclamation consulted on the new area of inundation around the perimeter of Roosevelt Lake as a result of raising the dam (USFWS 1996b). The FWS Biological Opinion provided to the Bureau of Reclamation authorized the incidental take of 45 pairs (or 90 flycatchers) around the perimeter of Roosevelt Lake. However, an additional 96 territories were found at Roosevelt Lake by 2001. Nearly all are located in the center of the conservation pool surrounded by the area consulted on by Reclamation, but not addressed by that consultation.

Thus, the large storm runoff that entered Roosevelt Lake in 2005 has inundated large areas of habitat used by breeding flycatchers. The Salt River Project, operators of Roosevelt Dam, applied for and was granted an incidental take permit for all southwestern willow flycatchers and their habitat at Roosevelt Lake by developing an HCP. SRP has acquired and continues to acquire mitigation properties for the flycatcher on the San Pedro, Verde, and Gila rivers. Such property acquisitions include the 1) Adobe Preserve, Black Farm Preserve, Spirit Hollow Preserve, and Stillinger property on the San Pedro River; 2) the Beta Venture property on the Verde River; and 3) the Hancock and McEuen properties on the Gila River (SRP 2005).

The inundation of occupied breeding habitat at Roosevelt and future uncertainty of re-colonization rate or frequency could limit the remaining abundance and distribution of flycatcher territories in Gila, Maricopa, and Yavapai counties to 19 along the Verde River (Camp Verde and Horseshoe), one on Pinal Creek, one on Agua Fria River, and ten on Tonto Creek (Munzer et al. 2005). We expect that much of this habitat will be unavailable to nesting flycatchers in 2005 due to habitat changes from flood flows. This emphasizes the critical need in Arizona for the protection and expansion of territories at existing sites and the development of suitable habitat for birds to colonize. In central Arizona, streams with the best physical characteristics to develop abundant flycatcher habitat are the Verde River and Tonto Creek (T. McCarthey, AGFD, pers. comm. 2002). The Salt River may have the potential to develop habitat in a few small locations, but it is largely regulated due to dams or has canyoned, high-gradient streams lacking the physical characteristics to develop suitable habitat. The Hassayampa and Agua Fria rivers and tributaries such as Sycamore, Red, West Clear, Pinto and other creeks provide the potential to develop smaller patches of suitable habitat.

Summary

The southwestern willow flycatcher has declined in range occupied and population size as a result of habitat loss, modification, and fragmentation. Water diversions, agriculture return flows, flood control projects, development, livestock grazing, and changes in annual flows due to off stream uses of water have affected the ability of the aquatic habitats to support native fish, plants, and wildlife. Riparian habitats by nature are dynamic, with their distribution in time and space governed mostly by flood events and flow patterns. Current conditions along southwestern rivers and streams are such that normal flow patterns have been greatly modified, flood events are more catastrophic as a result of degraded watershed conditions, stream channels are highly degraded, floodplains and riparian communities are reduced in extent, wildfires in riparian habitats are increasing, and the species composition of riparian communities are modified with exotic plant species. Habitat loss and fragmentation leads to increased brood parasitism and nest predation. These conditions have significantly diminished the potential for southwestern rivers and streams to develop suitable habitat for the southwestern willow flycatcher and for those habitats to remain intact and productive for nesting flycatchers.

Razorback sucker

The razorback sucker was listed as “endangered” under the Endangered Species Act of 1973, as amended, under a final rule published on October 23, 1991 (56 FR 54957). The decision to list the species was due, in part, to large mainstem dams, water diversions, degraded water quality,

habitat modification, as well as nonnative fish species predation and competition (Miller 1961, Minckley and Deacon 1991). A recovery plan was approved on December 23, 1998 (USFWS 1998). The final rule for determination of critical habitat was published on March 21, 1994 (59 FR 13374), and the final designation became effective on April 20, 1994. Critical habitat was designated in 15 river reaches in the historical range of the razorback sucker on March 21, 1994, which included the Verde River from the Prescott National Forest boundary to Horseshoe Dam (46 river miles). This river and reach area was designated as critical habitat generally because 1) flows were considered reliable and likely to continue; 2) the diversity of habitat offered within this reach offered runs, riffles, pools, eddies, and backwater habitats (fluctuations in Horseshoe Reservoir levels offer both riverine and reservoir habitats); and 3) existing nutrient resources are adequate to support aquatic communities and food items such plankton, benthic invertebrates, and periphyton throughout this reach (USFWS 1993).

Primary constituent elements for the species' critical habitat were described in the Federal Register upon designation addressed three general parameters: water, physical habitat, and biological environment (USFWS 1994). Under the general category of "water", the Federal Register describes "…. A quantity of water of sufficient quality (i.e. temperature, dissolved oxygen, lack of nutrients, turbidity, etc.) that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage (for razorback sucker)" (USFWS 1994). The discussion under "physical habitat" describes "areas of the Colorado River system that are inhabited or potentially habitable by fish 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, oxbows, backwaters, and other areas in the 100-year flood plain, which when inundated provide spawning, nursery, feeding and rearing habitats, or access to these habitats" (USFWS 1994). Lastly, the critical habitat designation describes criteria under the "biological environment" as "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" (USFWS 1994).

The razorback sucker is the only representative of the genus *Xyrauchen* and is distinguished 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 3.3 feet and weigh between 11 and 13 pounds (Minckley 1973). Razorback suckers are long-lived, reach the age of at least the mid-40's, and historically occurred at elevations ranging from 181 – 5,000 feet (McCarthy and Minckley 1987, AGFD 2003a).

Adult razorback suckers use most of the available riverine habitats, although there may be an avoidance of whitewater type habitats. Main channel habitats used tend to be low velocity ones such as pools, eddies, nearshore runs, and channels associated with sand or gravel bars (Bestgen 1990). Adjacent to the main channel, backwaters, oxbows, sloughs, and flooded bottomlands are also used by this species.

Razorback suckers also use reservoir habitat, where the adults may survive for many years. In reservoirs, they use all habitat types, but prefer backwaters and the main impoundment (USFWS 1998). Much of the information on spawning behavior and habitat comes from fishes in reservoirs where observations can readily be made.

Habitat needs of larval and juvenile razorback sucker are reasonably well known. In reservoirs, larvae are found in shallow backwater coves or inlets (USFWS 1998). In riverine habitats, captures have involved backwaters, creek mouths, and wetlands. These environments provide quiet, warm water where there is a potential for increased food availability. During higher flows, flooded bottomland and tributary mouths may provide these types of habitats.

Spawning takes place in the late winter to early summer along gravelly shorelines or bays, depending upon local water temperatures which often coincide with the months of January and February in Arizona (AGFD 2003a). One female is joined by 2 to 12 males that nudge the female with their heads to entice gamete release marked by vibrating movements and a subsequent cloud of silt and sand (Minckley 1973).

Razorback sucker diet varies depending on life stage, habitat, and food availability. Larvae feed mostly on phytoplankton and small zooplankton and, in riverine environments, on midge larvae. Diet of adults taken from riverine habitats consisted chiefly of immature mayflies, caddisflies, and midges, along with algae, detritus, and inorganic material (USFWS 1998).

Razorback suckers are somewhat sedentary; however, considerable movement over a year has been noted in several studies (USFWS 1998). Spawning migrations have been observed or inferred in several locales (Minckley 1973, Osmundson and Kaeding 1989, Bestgen 1990, Tyus and Karp 1990). During the spring spawning season, razorbacks may travel long distances in both lacustrine and riverine environments, and exhibit some fidelity to specific spawning areas (USFWS 1998).

The razorback sucker is adapted to 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, the demographics of the population might shift, but future reproduction would not be compromised. Average fecundity recorded in studies ranges 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.

Gila Topminnow

The Gila topminnow was listed as endangered in 1967 without critical habitat (USFWS 1967). The species was later revised to include two subspecies, *P. o. occidentalis* (Gila topminnow) and *P. o. sonoriensis* (Yaqui topminnow) (Minckley 1969, 1973). *Poeciliopsis occidentalis*, including both subspecies, is collectively known as the Sonoran topminnow. Both subspecies are protected under the Act. Only Gila topminnow populations in the United States, and not in Mexico, are listed under the Act. The reasons for decline of this fish include past dewatering of rivers, springs, and marshlands, impoundment, channelization, diversion, regulation of flow, land management practices that promote erosion and arroyo formation, and the introduction of predacious and competing nonnative fishes (Miller 1961, Minckley 1985). Other listed fish suffer from the same impacts (Moyle and Williams 1990).

Gila topminnow belong to a group of live-bearing fishes within the family Poeciliidae that includes the familiar guppy (*Poecilia reticulata*), which is not native to the Gila basin. Males are smaller than females, rarely greater than 1 inch, while females are larger, reaching 2 inches. Body coloration is tan to olivaceous, darker above, lighter below, often white on the belly. Breeding males are usually blackened, with some golden coloration of the midline, and with orange or yellow at the base of the dorsal fin.

Gila topminnow mature a few weeks to many months after birth, depending on when they are born. They breed primarily from March to August, but some pregnant females occur throughout the year (Schoenherr 1974). Some young are produced in the winter months. Minckley (1973) and Constantz (1980) reported that Gila topminnow are opportunistic feeders which eat bottom debris, vegetation, amphipods, and insect larvae when available.

Gila topminnow and many other poeciliids can tolerate a variety of physical and chemical conditions. They are good colonizers in part because of this tolerance and in part because a single gravid female can start a population (Meffe and Snelson 1989). Minckley (1969, 1973) described their habitat as edges of shallow aquatic habitats, especially where abundant aquatic vegetation exists. Simms and Simms (1992) found the densities of Gila topminnow in Cienega Creek, Pima County, Arizona, to be greater in pool, glide, and backwater habitats and less dense in marsh, riffle, chute, cascade, and fall habitats. They occurred more frequently over sand substrates than over other categories of substrates. Although Gila topminnow may occupy pools and ponds that are up to 6 feet deep, they are normally found in the upper one-third of the water column (Forrest 1992).

Gila topminnow is known to occur in streams fluctuating from 51-99 °F, pH from 6.6 to 8.9, dissolved oxygen levels of (2.2-11 ppm), and can tolerate salinities approaching those of sea-water (Meffe *et al*. 1983). Topminnow can burrow under mud or aquatic vegetation when water levels decline (Deacon and Minckley 1974, Meffe *et al*. 1983). Sonoran topminnow (including both Gila and Yaqui (*P. o. sonoriensis*) subspecies) regularly inhabit springheads with high loads of dissolved carbonates and low pH (Minckley *et al*. 1977, Meffe 1983, Meffe and Snelson 1989). This factor has helped protect small populations of topminnow from mosquitofish (*Gambusia affinis*) that are usually rare or absent under these conditions (Meffe 1983).

Gila topminnow are highly vulnerable to adverse effects from nonnative aquatic species (Johnson and Hubbs 1989). Predation and competition from nonnative fishes have been major factors in their decline and continue to be a major threat to the remaining populations (Meffe *et al*. 1983, Meffe 1985, Brooks 1986, Marsh and Minckley 1990, Stefferud and Stefferud 1994, Weedman and Young 1997. Both large (Bestgen and Propst 1989) and small (Meffe *et al*. 1983) nonnative fish cause problems for Gila topminnow as can nonnative crayfish (Fernandez and Rosen 1996) and bullfrogs.

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

The status of the species is poor and declining. Gila topminnow has gone from being one of the most common fishes of the Gila basin to one that exists at not more than 30 localities (12 natural and 18 stocked). Many of these localities are small and highly threatened. The theory of island biogeography can be applied to these isolated habitat remnants, as they function similarly (Meffe 1983, Laurenson and Hocutt 1985). Species on islands are more prone to extinctions than continental areas that are similar in size (MacArthur and Wilson 1967). Meffe (1983) considered extinction of Gila topminnow populations almost as critical as recognized species extinctions, and Moyle and Williams (1990) noted that fish in California that are in trouble tend to be endemic, restricted to a small area, part of fish communities with fewer than five species, and found in isolated springs or streams. Gila topminnow has most of these characteristics.

The highest priority actions in the draft revised Gila topminnow recovery plan are ones that are absolutely essential to prevent extinction in the foreseeable future. These include the protection and maintenance of all known natural populations, as well as newly discovered natural populations (Weedman 1999). Federal actions have contributed to the degraded environmental baseline of the Gila topminnow. Federal actions requiring section 7 consultations affecting Redrock Canyon, Cienega Creek, and Sonoita Creek in the Santa Cruz River subbasin and others in the Gila River basin have contributed to the lowered baseline for the Gila topminnow. An indication of the poor status of the species is that two formal consultations have resulted in jeopardy biological opinions. Although the reasonable and prudent alternatives removed jeopardy, other adverse effects are not totally removed by the reasonable and prudent alternatives. Other Federal actions, as well as non-Federal actions that have not undergone section 7 consultation, also have some unmitigated adverse effects that contribute to the degraded baseline. Fortunately, recovery actions continue for this species, although some projects have been more successful than others.

Colorado Pikeminnow

The Colorado pikeminnow was included on the List of Endangered Species issued by the Office of Endangered Species on March 11, 1967 (32 FR 4001), was considered endangered under provisions of the Endangered Species Conservation Act of 1969 (16 U.S.C. 668aa), and is protected under the Endangered Species Act of 1973 (16 U.S.C. 1531 et. seq) as an endangered species. There is no critical habitat for this species in Arizona. A final rule for a section 10(j) experimental non-essential population of pikeminnow in the Salt and Verde rivers in Arizona was published July 24, 1985 (50 FR 30188) (USFWS 1985).

For section 7 consultations in Arizona, the 10(j) status of the pikeminnow provides for a different level of evaluation than for other endangered species. As a designated experimental non-essential population, the pikeminnow is treated as a species proposed for listing. Conference under section 7 is appropriate when a Federal action is likely to jeopardize the continued existence of a proposed species. A Federal agency may, at its discretion, request conference if a proposed action may affect a proposed species. For a determination of jeopardy, the status of the species as a whole, not just within the experimental non-essential population, must be considered.

The Colorado pikeminnow is a long, slender, cylindrical minnow, dusky-green in color with gold flecks on the dorsal surface, and a creamy white belly. The head is correspondingly long and slender with a large mouth (USFWS 2002b). The species is endemic to the Colorado River Basin of the southwestern United States. Pikeminnow attain a maximum size of approximately 6 feet total length and can weigh up to approximately 79 pounds.

Characterized as a “big river” generalist species, adult pikeminnow occur in turbid, deep, and strong current habitats with high spring flows whereas juvenile and subadult pikeminnow are known to prefer backwater habitat with no current and often a silt/sand substrate (Sublette *et al*. 1990, USFWS 2002). Spring flows are particularly important to adult pikeminnow because they maintain channel and habitat diversity, flush sediments from spawning areas, rejuvenate food production, form gravel and cobble deposits used as spawning habitat, and rejuvenate backwater nursery habitats (USFWS 2002b). Adults also migrate long distances (up to 124 miles) to and from spawning areas and require long stretches of river with unimpeded passage (Lucas and Baras 2001, USFWS 2002b).

Endemic to the Colorado River Basin and once abundant in its warm-water rivers and tributaries, wild populations of Colorado pikeminnow currently only exist in the upper basin (Green, Yampa, upper Colorado, Gunnison, and San Juan Rivers), or about 25% of its historical range (USFWS 2002b). Two major changes to the river system have resulted in the reduction or elimination of pikeminnow populations. Physical changes to the river system with the construction of dams and diversions that interrupt migrations, creation of reservoirs that eliminate riverine habitats and alter the natural hydrograph and water temperatures, and channelization of rivers that eliminates backwaters and floodplains used by adults for foraging and as nursery areas for young fish. Introduced nonnative fish species prey on eggs, larvae or young pikeminnow, reduce or eliminate recruitment, and have similar effects to the native fish species that provide forage for the pikeminnow. These effects have resulted in equally

significant biological changes to the river system. Specifically, in the upper basin where the last wild populations of Colorado pikeminnow persist, red shiner (*Cyprinella lutrensis*), common carp (*Cyprinus carpio*), fathead minnow (*Pimephales promelas*), channel catfish (*Ictalurus punctatus*), northern pike (*Esox lucius*), and green sunfish (*Lepomis cyanellus*) are of the greatest concern to the native fish community of the Colorado River Basin due to their documented negative interactions with native species (USFWS 2002b). Other nonnative species such as sand shiner, (*Notropis stramineus*), white sucker (*Catostomus commersoni*), black bullhead (*Ameiurus melas*), smallmouth bass (*Micropturus dolomieu*), and largemouth bass (*M. salmoides*) are of increasing concern due to their increasing abundance, habitat preference, and/or their piscivorous habits (USFWS 2002b). Additions of pesticides and pollutants to the river system may also have affected pikeminnow populations.

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 C.F.R. 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

ENVIRONMENTAL BASELINE

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

Southwestern Willow Flycatcher and Its Proposed Critical Habitat

The flycatcher was first documented nesting in Horseshoe Reservoir in 2002. As a result of several years of drought conditions, suitable nesting habitat in and around the Reservoir has developed. Approximately 150 acres of suitable nesting southwestern willow flycatcher habitat, dominated by Goodding's willow primarily and secondarily by salt cedar and cocklebur, occur within the action area. In 2004, a total of 17 southwestern willow flycatcher territories (representing 7 pairs) and 4 migrant flycatchers were located within the conservation pool of Horseshoe Reservoir. There was no monitoring of nesting success.

Proposed critical habitat includes the action area as a portion of the Verde Management Unit. The proposed critical habitat segment, that includes the action area, extends from the Verde River/East Verde River confluence downstream to the USGS gauging station located 4.5 miles below Horseshoe Dam. As a portion of the Gila Recovery Unit in Arizona and New Mexico, the conservation value of this unit is critical to the overall integrity of the proposed critical habitat.

Horseshoe Reservoir, at full pool, receives high recreation use due to its close proximity to the Phoenix metropolitan area. The most common recreational uses include angling, camping, and boating.

Scouring action from higher flows that resulted from the above-average 2004-2005 winter precipitation may have temporarily impacted components of proposed critical habitat in the action area. This is an example of the dynamic nature of southwestern willow flycatcher habitat in a free-flowing system, and the varied availability and suitability of the habitat over time. The effects from this phenomenon occur naturally and are considered essential to the conservation of the species.

Razorback Sucker and Its Critical Habitat

Critical habitat for the razorback sucker has been designated on the Verde River from the Prescott National Forest boundary downstream through and including the full pool of Horseshoe Reservoir, which includes the action area. In response to comments on the proposed designation, FWS indicated that state water law was considered in the designation, no changes in reservoir operations were foreseen as a result of recovery efforts, and maintenance of particular reservoir elevations were not implied by the designation (Id.). The conservation role of this razorback sucker critical habitat is an important one. The Verde River is a distinct basin, which provides structurally and hydrologically valuable habitat for the species upstream of Horseshoe Reservoir because the natural hydrologic regime generally remains intact, with the exception of existing water diversions. The Verde and other basins within the historical distribution of the species face an uncertain future in terms of growing human populations demanding higher quantities of water. Such demands may ultimately dewater perennial streams reducing their long-term suitability in razorback conservation. However, the Verde Basin is a critically important water supply to the largest city in Arizona. The provider of this Verde water supply and applicant for this proposed action, SRP, has helped protect this supply.

The following assesses the primary constituent elements for razorback sucker critical habitat within the action area:

Water: While various surface diversions exist upstream of razorback critical habitat on the Verde River, the amount of water in the mainstem channel within razorback critical habitat is not perceived as limiting. Historically, a few water quality sample parameters have experienced exceedences within the action area.

According to the Arizona Department of Environmental Quality's (ADEQ) "The Status of Water Quality in Arizona – 2004 Arizona's Integrated 305(b) Assessment and 303(d) Listing Report", the AGFD and the University of Arizona (U of A) collected a total of 19 water quality samples at four sites within Horseshoe Reservoir between 1999 and 2000 (ADEQ 2004). In one sample, the pH standard for the Aquatic and Wildlife (warm water) (A&Ww) designated use was exceeded at a pH of 9.3. Additionally, the former A&Ww turbidity standard [25 Nepholometric Turbidity Units (NTU)] was exceeded in four of eight samples with results ranging from (0.8 to 90 NTU). Lastly, core parameters such as total boron, mercury, manganese, copper and lead, and dissolved copper, cadmium and zinc were missing from the analyses for Horseshoe Reservoir. For these reasons, ADEQ assessed the A&Ww designated use for this reach as "Inconclusive".

For their surface water assessment purposes, ADEQ divided the Verde River into various reaches, one of which was delineated by the confluence of Tangle Creek to Ister Flat. The

A&Ww designated use in this reach was assessed as "Inconclusive" due to exceedances of the former turbidity standard (5 of 24 samples). The turbidity parameter standard for the state of Arizona has since changed and is now measured as suspended sediment concentration, or SSC, and has units of mg/L. Currently, too few samples have been collected within this reach to assess the status of the water quality in terms of suspended sediment concentration. Water quality, in and of itself, has not been identified as a concern for razorback conservation in the Verde River Basin.

Physical Habitat: The physical habitat characteristics of critical habitat within the action area are not considered a limiting factor for feeding, breeding, and sheltering behaviors of razorback sucker, although reproduction has never been observed in either the riverine portion of the critical habitat within the action area or within the full pool of Horseshoe Reservoir.

Biological Environment: Within the action area, nonnative fish species (intentionally introduced as sportfish or forage species and/or unintentionally introduced through bait-bucket transfers) dominate the fish community. Specifically, black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), channel catfish, common carp, flathead catfish (*Plyodictis olivaris*), green sunfish, largemouth bass, mosquitofish (*Gambusia affinis*), red shiner, and yellow bullhead (*Ameiurus natalis*) are found in this reach of the Verde River (Warnecke 1988).

Competition with, and predation from, nonnative fish species within the Verde River Basin, and within razorback critical habitat in particular, is considered the most limiting factor in razorback sucker conservation within the Verde River Basin (Hyatt 2004). Razorback sucker spawn in the Verde River prior to any other fish species which makes razorback larvae especially vulnerable to predation as they represent the entire larval (prey) community during that period of time (Hyatt 2004). Additionally, the lower velocity habitats preferred by both adult and juvenile razorback (pools, slower runs, etc.) are also preferred and occupied by adult flathead and channel catfish which places razorback at a constant risk of predation (Hyatt 2004). Flathead catfish in particular are capable of reaching lengths of 55 inches and 100 pounds in weight and as adults are recognized as strictly piscivorous, capable of eating all size-classes of fish (Sublette *et al.* 1990, Moyle 1976).

Reintroduction efforts of razorback sucker, which began in 1981, continue annually in the Verde River through an AGFD stocking program. Razorback are produced at both the Bubbling Ponds State Fish Hatchery near Cornville, Arizona as well as at our Dexter National Fish Hatchery and Technology Center in Dexter, New Mexico (Hyatt 2004). Approximately 12 million fingerling-sized razorbacks were stocked into the Verde River from 1981 to 1991 (Hyatt 2004). However, very few stocked fish were recaptured in subsequent years despite considerable monitoring effort. Loss of these fish was primarily due to predation by nonnative fishes within hours after stocking (Marsh and Brooks 1989). Laboratory tests indicated that larger suckers may have had a better chance of avoiding predators and surviving (Johnson *et al.* 1993).

Since 1991, 22,869 razorback suckers generally $\geq$12 inches have been released into the Verde River near the Childs power plant or Beasley Flat (28 and 44.5 miles upstream of the action area, respectively); and at the Perkinsville Bridge between 1991 and 1993 (n = 830) (Hyatt 2004). However, in the last 14 years, only 283 razorback suckers (slightly greater than 1% of stocked

numbers) have been captured though monitoring efforts, recruitment of young has never been documented in the Verde River, and survivorship of stocked razorback has remained low to very low, despite annual stocking efforts implemented by AGFD (Hyatt 2004).

Additionally, Clarkson *et al.* (1993) noted high infestation levels of the nonnative parasite *Lernaea cyprinacea* (anchorworm) on reintroduced razorbacks in the Verde River near Perkinsville, upstream of the action area. They suspected that high levels of parasitism increased mortality of the reintroduced fish, and considered that this could represent another obstacle to reestablishment of the species. Robinson *et al.* (1998) found levels of parasitism on both native and nonnative fishes were higher at Perkinsville than at Childs, but rated all fishes examined as "healthy", and concluded that parasitism was not seriously affecting Verde River fishes.

Bonar *et al.* (2004) encountered 17 razorback suckers during the 2002-2003 field season within the reach between Beasley Flats to Horseshoe Dam of the Verde River, within the reach and vicinity of where the majority of stocking has occurred. No razorbacks were encountered elsewhere in the Verde River during the 2002-2003 field season (Bonar *et al.* 2004). Hyatt (2004) reported that only four stocked razorback were captured in Horseshoe Reservoir between 1990 and 2003.

Data from radio-telemetered razorback suckers in the Verde River showed they used shallower depths and slower velocities than in the upper basin. They avoided depths of less than 1.3 feet, but selected depths between 2.0 and 3.9 feet, which likely reflected a reduced availability of deeper waters compared to the larger upper basin rivers. However, use of slower velocities (mean = 0.1ft/sec) may have been an influence of rearing in hatchery ponds. Similar to the upper basin, razorback suckers were found most often in pools or runs over silt substrates, and avoided substrates of larger material (Clarkson *et al.* 1993).

In the Verde River, any significant in-channel movements of radio-tagged and stocked razorback suckers tended to be in the downstream direction after release. However, Hyatt (2004) indicates that most native fish that are stocked remain at or near introduction sites. Clarkson *et al.* (1993) stated that "larger" fish (presumably greater than 12 inches total length) did not move as much from the stocking site as did smaller fish introduced in prior stockings.

Arizona Game and Fish Department biologists collected seven adult male razorback suckers in spawning condition in the upper end of Horseshoe Reservoir while conducting a fish community survey in early April of 2005 (C. Paradzick, AGFD, written comm., 2005). We partially attribute this unexpected discovery to the significant flows in the Verde River over the winter and spring seasons, which created a "new lake" effect that provides nutrient-rich backwaters that were previously dry. The high, sustained flood events likely adversely affected many species within the nonnative fish community that are both ill-adapted to such conditions and may have been displaced downstream as a result of higher flows (Minckley and Meffe 1987). A reduction in the abundance and distribution of nonnative fish may have temporarily relaxed predation on and competition with razorback suckers and allowed them an opportunity to disperse downstream and attempt to spawn in Horseshoe Reservoir. In general, survivorship of introduced razorbacks is believed to be generally low.

Gila Topminnow

Gila topminnow no longer have extant, naturally occurring populations in the Verde River basin. Although the AGFD has been actively stocking the species in selected areas within the drainage, these efforts have met with variable success. Four re-established, extant populations of Gila topminnow occur in the Verde River basin; Dutchmen Grave Spring, Lime Creek, Mud Springs, and Walnut Spring (Voeltz and Bettaso 2003). Of these four, only the Lime Creek population occurs within the action area. Within Lime Creek, it is believed that Gila topminnow persist in the uppermost reach within this intermittent drainage as more springs enhance the number and permanency of pools and the presence of nonnative fish species is less likely because the intermittent nature of the drainage affects upstream migration. Bonar *et al*. (2004) did not observe any Gila topminnow during their 2002-2003 field season as they did not survey suitable habitat for the species.

Colorado Pikeminnow

For assessment and analysis purposes, the habitat requirements and threats facing razorback sucker within the action area are the same as those for Colorado pikeminnow. Colorado pikeminnow, once common in the Verde River, were extirpated from this system. However, since 1981 and in addition to razorback sucker, repeated stocking efforts have been initiated for the Colorado pikeminnow in the Verde River. Colorado pikeminnow are also produced at both the Bubbling Ponds State Fish Hatchery near Cornville, Arizona as well as at our Dexter National Fish Hatchery and Technology Center in Dexter, New Mexico (Hyatt 2004).

Similar to razorback propagation and rearing, Colorado pikeminnow are grown-out to a length equal to or greater than 12 inches, harvested, and stocked into the Verde River in the vicinity of the Childs power plant or Beasley Flat (28 and 44.5 miles upstream of the action area, respectively) (Hyatt 2004). Since 1992, 11,231 Colorado pikeminnow have been stocked into the Verde River; half of which equaled or exceeded 15 inches in total length; no individual specimen has ever been captured twice through monitoring (Hyatt 2004).

Success of the stocking effort in recovery of this species in the Verde River has not been realized. Since 1999, only four Colorado pikeminnow have been captured with a few additional reports of angling mortalities in the areas of Childs and Beasley Flat, at the original stocking locations (Hyatt 2004, AGFD, unpublished data). All four of these captured fish were previously introduced within two months prior to their capture and long-term survival has not been documented. Bonar *et al.* (2004) counted only 2 individuals during their sampling effort from March 2002 through January 2003 in the Verde River. Both individuals were observed within the reach between Clarkdale and Beasley Flat, a minimum of 45 miles upstream of the action area, and were captured within the immediate vicinity of stocking locations.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Southwestern willow flycatcher and its proposed critical habitat

Overall project assessment

There are expected to be a range of outcomes associated with this single year of proposed research which could range from relatively small effects to more significant effects to the flycatcher at Horseshoe Reservoir. Because of the uncertainty, the goal of this recovery permit is to help understand possible outcomes. Compared to flycatcher habitat at Roosevelt Reservoir, less habitat exists at Horseshoe Reservoir. More of the habitat at Horseshoe Reservoir extends above the water which may continue to provide nesting areas for flycatchers. Also, there are different periods of inundation between the two locations; habitat at Horseshoe will tend to be inundated for shorter periods of time than at Roosevelt. All of these factors may lead to effects to the flycatcher that may be different from those assessed through biological opinions (USFWS 1996) and HCP (ERO 2002) for similar activities at Roosevelt Lake.

Research conducted under the proposed permit will help assess the status of the flycatcher population and identify threats. Investigation of the ecology of the flycatcher, its habitat use, nesting success, and dispersal capability, will help managers to address potential limiting factors and provide conditions that will sustain and recover the species at Horseshoe Reservoir and elsewhere. Any effects, conservation measures, mitigation, and/or incidental take occurring beyond the 2005 flycatcher nesting season from this research, is expected to be addressed in additional consultation.

Surveys and nest monitoring

Conducting presence/absence surveys of flycatchers in accordance with survey protocols, including efforts to resight banded birds and identify color bands, may result in disturbance to birds. Potential adverse effects include incidentally flushing birds during surveys, flushing as a result of observers approaching to conduct observations, and interruption of normal foraging or nesting behavior. Observers have been instructed to avoid disturbance to flycatchers whenever possible, and will work to minimize the duration of disturbance.

Searching for nests and nest monitoring may result in adverse effects to flycatcher adults, young, and eggs. These activities are expected to incidentally disturb flycatchers and interfere with normal behavior patterns. Nest searching and nest monitoring may affect flycatchers by increasing the risk of nest abandonment, failure, and depredation due to disturbance of adults, preventing adults from attending to eggs or young that are in the nest through the presence of an

observer in the area, a very small risk of accidental damage to nests or nest contents resulting from the presence of an observer, and increased risk of depredation due to human activity concentrated around nest sites and possible human scent trails or other cues that potential predators may exploit. Observers will minimize the duration that they are at or near nest sites, and will access nest locations for monitoring through several non-terminal routes to minimize increasing depredation.

Results from or research conducted under the proposed permit will help assess the status of the flycatcher population and identify threats. Investigation of the ecology of the flycatcher, its habitat use, nesting success, and dispersal capability, will allow managers to address potential limiting factors and better provide conditions that will sustain and recover the species.

Research associated with holding water at Horseshoe Reservoir

Southwestern willow flycatchers at Horseshoe Reservoir may be affected by the proposed research from operation of the dam, and reservoir levels associated with that operation, in two ways: (1) injury to or mortality of flycatcher eggs or nestlings, and harassment of nesting flycatchers; and (2) harm as a result of temporary modification or degradation of the species' riparian habitat.

Injury or mortality to eggs and nestlings, and harassment of nesting flycatchers

Impacts to flycatchers at Horseshoe Reservoir will be studied in the event that any remaining habitat is used by flycatchers for nesting. The largest of the willow trees at Horseshoe Reservoir that flycatchers have been using for nesting are, at their maximum, about 80 feet tall. Approximately 40 feet of the tallest trees will be above water when the reservoir is at its maximum. A tree with a nest being built, or a nest with eggs or nestlings, which has been undermined as a result of being inundated, could fall. Saturated soils associated with holding water in the reservoir may not be able to hold the weight of trees causing nest trees to fall over or adjacent trees to fall into nest trees. Additionally, inundation may cause branches to fall holding nests, or branches from adjacent trees into nests.

The effect of trees or branches falling could cause loss of nests and/or injury or death to eggs and/or nestlings. Such an event would be relatively unlikely to kill or injure adults, since adults in such cases would likely escape the tree prior to its impact with the ground or water surface, or would have vacated the tree. However, eggs or nestlings would almost certainly be killed on impact or would drown. The likelihood of death or injury of flycatchers in this manner overall is unknown but assumed to be relatively small. Flycatcher young-of-the-year could also die if they fledge into the water, but we expect water levels to be lowered by this time. High water levels will delay nesting and could reduce productivity. Horseshoe Reservoir levels are expected to recede during the nesting season (spring and early summer)

Changes to riparian habitat

Flycatcher nesting habitat (willow and salt cedar) in Horseshoe Reservoir can expected to be altered because of raising and holding water through the late winter and spring of 2005, which

could result in the reduction in nesting habitat availability and/or suitability. The result of inundation may harm southwestern willow flycatcher by causing habitat to be less suitable for nesting (causing reduced nesting success), or for habitat to either be unavailable or unsuitable for nesting.

Salt cedar is smaller and shorter component (i.e. understory) of the of the largely willow dominant nesting habitat, but salt cedar is expected to be the least tolerant to extended inundation (ERO 2002). Therefore, we can expect the salt cedar component of the flycatcher's nesting habitat to be less available due to water storage (due to shorter stature), and some portions, most likely will be killed due to inundation (due to being least tolerant). While salt cedar is a smaller component of the habitat used by southwestern willow flycatchers than willow, it is a part of mosaic of habitat that can be used by nesting flycatchers for nest protection, nest placement, insect production, and/or foraging. No nests have yet been detected in salt cedar at Horseshoe Reservoir; all that have been detected have all been placed in willow. While no nests were searched for and detected in 2004, in other areas, even when willow is an overwhelming component of the habitat, salt cedar has been used for nest placement. Salt cedar was identified as a larger component of habitat in the most southerly habitat at Horseshoe Reservoir and was suspected of holding nests in that location (S. Sferra, Bureau of Reclamation, pers. com.). Reducing the amount of salt cedar or causing it to be unavailable for flycatchers (due to inundation or death), can reasonably be expected to reduce overall habitat availability for the flycatchers, and may result in a reduction in breeding opportunities or nesting success. Because flycatchers depend on the amount and structure of vegetation for nesting, the reduction in the amount of exposed nesting and/or foraging habitat can reasonably be expected to affect breeding for southwestern willow flycatchers at Horseshoe Reservoir in 2005.

Inundation of willow habitat could also result in reduced availability and/or reduced suitability of habitat. Extended inundation is largely expected to be of a duration that will not surpass the tolerance of willows. However, raising the water and holding it throughout the winter and early spring into the early nesting season may result in other effects to flycatcher habitat and/or nesting success. Extended inundation of willow habitat may delay the leafing of existing trees, therefore reducing the amount of vegetation available to flycatchers when returning to the site. Also, because nearly half of the tree will be under water during the early part of the nesting season, the vegetation structure needed for nesting flycatchers may be altered to a degree where the flycatchers will not use it, or that it provides less suitable habitat resulting in reduced nesting success. The proposed research will help determine effects to flycatcher habitat from prolonged inundation at Horseshoe Reservoir.

Because flycatchers depend on the amount, structure, extent, availability, and overall suitability of vegetation for nesting, we expect that flycatchers will respond to a decrease in the amount and quality of nesting habitat (described in the previous paragraphs) in one or in a combination of the following ways.

a) Because of their site fidelity, flycatchers will return to Horseshoe Reservoir and attempt to nest, but the reduction in vegetation will limit the number of territories established, the number of nesting attempts, and the success of the nesting attempts.

b) Because of their site fidelity, flycatchers will return to Horseshoe Reservoir, but find the site unsuitable causing them to move to another location.

1) Once caused to disperse, flycatchers will find another suitable breeding location and produce young without any noticeable change or improved productivity.

2) Once caused to disperse, flycatchers will find another breeding location of lesser quality habitat resulting in reduced productivity.

3) Once caused to disperse, flycatchers will be unable to find a suitable breeding location, and will not reproduce.

It is uncertain how the change in habitat structure and availability will affect predation and/or parasitism rates. In instances where habitat density and/abundance is decreased, it is believed that flycatchers are more susceptible to increased rates of predation or parasitism. However, there is no baseline data to provide comparisons or contrast to results from 2003 and 2004. Regardless, reducing habitat abundance and density from habitat inundation can reasonably be expected to result in an increase in vulnerability to predation and/or parasitism of flycatchers.

Flycatchers numbers have increased in the two seasons birds have been detected at Horseshoe Reservoir, therefore birds from the 17 territories of 2004 and additional birds returning for 2005, could be impacted. This research proposal is expected to discover what those effects may be, and how to conserve flycatcher habitat in the future at Horseshoe Reservoir through a long-term HCP. However, while this analysis presents a variety of possibilities, we evaluate the best-case and reasonable worst-case scenario in order to adequately assess the possible effect to the flycatcher. The best-case would be no loss of habitat with water levels dropping before the birds arrive. A reasonable worst-case conclusion for 2005 would result in: a complete loss of productivity of all birds returning to Horseshoe Reservoir in 2005 from either loss of eggs/young produced and nests built at Horseshoe Reservoir, increased predation/parasitism, and/or loss of productivity from dispersing to unsuitable habitats resulting in no reproduction.

Southwestern willow flycatcher critical habitat

We expect the operation of Horseshoe Dam associated with this research proposal to have short-term adverse affects to the constituent elements within the conservation space of Horseshoe Dam. Habitat will temporarily be unavailable to flycatchers due to being underwater. Inundation is expected to cause mortality in portions of the salt cedar component of the habitat, and to some degree, alter the willow component of the habitat as well. Habitat will persist at Horseshoe, but components of the flycatcher habitat suitability, patch size, density, and canopy cover, is expected to be temporarily impacted by inundation. This loss will not be permanent. In the long-term the conservation space at Horseshoe Reservoir is still able and expected to provide habitat for breeding, non-breeding, territorial, dispersing, and migrating southwestern willow flycatchers. As described in the October 2004 proposed flycatcher critical habitat rule, “the same operating regimes that creates habitat, will also inundate and cause loss of habitat.” “It is this very process of the ebb and flow of the conservation pool that ensures persistence of habitat over time, although that habitat will vary spatially and temporally, as does flycatcher habitat in natural

settings." While this language specifically refers to Roosevelt Lake, we believe it also applies to Horseshoe Reservoir.

Razorback Suckers (& Critical Habitat), Gila Topminnow, and Colorado Pikeminnow

Retaining Horseshoe Reservoir at full capacity, as existing during most of the winter of 2004-2005, benefits the razorback sucker by providing the opportunity for spawning. Young require nursery environments with quiet, warm, shallow water such as tributary mouths, backwaters, or inundated floodplain habitats in rivers, and coves or shorelines in reservoirs, as has been created by high reservoir levels.

There are several other benefits to the study proposal in the 10(a)(1)(A) permit application that addresses the fish community in Horseshoe Reservoir. Important and timely information, such as data on abundance, population structure, distribution, and species composition, is expected to be collected as a result of the semiannual sampling efforts within and slightly above Horseshoe Reservoir in both a year when Horseshoe remains at comparatively higher levels for a longer period of time and again in a subsequent year when the reservoir is filled during the winter months but is drawn down in early spring to accommodate water delivery needs and southwestern willow flycatcher nesting and reproduction. The latter scenario represents status quo operations in the "Modified-Full Operation" scenario that is considered the preferred alternative in the developing section 10(a)(1)(B) and HCP discussions with the applicant.

However, as stated above, the research proposal calls for maintaining the Reservoir in 2005 at a higher level and for a longer duration within the spring months. This mode of operation may promote and enhance reproduction of both native and nonnative, warmwater fish species by: 1) providing additional, high-quality spawning and nursery habitat; and 2) bolstering the nutrient and food supplies from the prolonged inundation of abundant vegetation. This scenario, known to be advantageous to fish, is referred to as the "new lake effect". The 2005 cohort of nonnative fish species may disperse outside of the action area and as adults contribute to reproduction and expansion of nonnative fish within the Verde Basin. We anticipate an indirect effect from the research proposal will result in an increased number of adult individuals from the 2005 nonnative fish cohort preying upon and competing against razorback sucker, Gila topminnow, and Colorado pikeminnow.

Due to the recent observations of razorback sucker in the reservoir, we anticipate both positive and adverse effects to razorback sucker to occur within the short duration of this permit. Positive effects include enhanced spawning opportunities and increased reproduction. Negative effects may harm and/or harass razorback suckers. Specifically, razorback may be harmed from 1) potential stranding of juveniles and/or adults during reservoir drawdown; and 2) predation on juvenile razorback suckers and competition with adult razorback suckers by nonnative species concurrently produced in or benefiting from the inundation of habitat within Horseshoe Reservoir.

We do not anticipate direct effects to Gila topminnow or Colorado pikeminnow over the duration of this permit. We believe the short duration of the study and the intermittent characteristics of Lime Creek minimizes the likelihood that the 2005 cohort of nonnative fish spawned in

Horseshoe Reservoir will come in contact with the Gila topminnow in upper Lime Creek over the term of this permit. Due to the low numbers of Colorado pikeminnow and the infrequency of detection, it is difficult to identify any factors that would cause the loss of individual fish.

We anticipate that benefits to nonnative fish reproduction and growth from the 2005 research proposal for Horseshoe Reservoir may adversely affect the quality and suitability of the "Biological Environment" primary constituent element of razorback critical habitat in the Verde River. However, due to the current environmental baseline pertaining to this particular parameter of critical habitat for razorback sucker in the Verde River and the incremental effect over the short duration of this permit, we do not expect these effects to equate to adverse modification of critical habitat for razorback suckers. Again, data expected from the proposed research is expected to provide valuable insight on the fish community in the Verde River within razorback sucker critical habitat.

Finally, we recommended that amendments to the applicant's proposed study design be adopted as conditions for issuance of the permit. These recommended changes, if adopted, will not have bearing on the effects analysis presented above.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Since the land within the action area is managed by primarily by the Forest Service, most activities that could potentially affect these species are Federal activities and subject to additional section 7 consultation. We expect some juvenile and/or adult razorback suckers to incur effects from capture and handling during the survey and inventory efforts (shocking, netting, etc.). These effects are covered in the AGFD's existing authorities.

High reservoir levels may provide opportunities for unregulated boaters access to inundated habitat used for nesting. Subsequent, noise, wave action, and the presence of people and water craft may cause flycatchers to temporarily or permanently abandon nests, or birds searching for nest sites may opt to not nest in such areas (see review in Appendix M of USFWS 2002b).

CONCLUSION

After reviewing the current status of the southwestern willow flycatcher, the razorback sucker, the Colorado pikeminnow, the Gila topminnow, the environmental baseline for the action area, the effects of the proposed permit issuance to SRP, and the cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of these species and is not likely to destroy or adversely modify designated critical habitat for the razorback sucker. Proposed critical habitat for the southwestern willow flycatcher is also not likely to be destroyed or adversely modified. We present these conclusions for the following reasons:

1) The project is of short-duration and will be conducted by trained surveyors who are instructed to minimize adverse effects to the southwestern willow flycatcher. The high reservoir levels associated with the proposed action may result in some habitat loss or disturbance, but may also result in the creation of some new habitat for the willow flycatcher. Data collected from the proposed research efforts will assist in future management decisions for the reservoir and may, in turn, provide benefits to reaching the recovery goal for flycatchers within this management area.

2) The high water levels in Horseshoe will benefit razorback suckers by providing spawning conditions in backwater habitats that were previously without water. The cottonwood-willow, marsh, and backwater rearing habitats will remain with few to no changes anticipated. Research data will be useful for an understanding of habitat suitablility, including spawning locations, species composition, and other factors.

3) The critical habitat for razorback sucker and the proposed critical habitat for southwestern willow flycatcher will not lose its functional role to provide for the species' conservation.

4) The experimental nonessential population of Colorado pikeminnow is at extremely low numbers which minimizes the likelihood for significant adverse effects to this species from this project. Because of their status as an experimental, non-essential population, Colorado pikeminnow found in Arizona are treated as though they are proposed for listing for section 7 consultation purposes. By definition, an experimental non-essential population is not essential to the continued existence of the species. Therefore, no proposed action impacting a population so designated could lead to a jeopardy determination for the entire species. Therefore, we conclude that the proposed action is "not likely to jeopardize" the continued existence of the species.

The conclusions of this biological opinion are based on full implementation of the project as described in the "Description of the Proposed Action" section of this document, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

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

AMOUNT OR EXTENT OF TAKE

We anticipate that incidental take of southwestern willow flycatcher resulting from nest searching, nest monitoring, and inundation of habitat may result from harm and/or harassment of up to 7 pairs and 17 territorial male flycatchers during 2005.

We also anticipate incidental take of razorback suckers resulting from 1) injury or death from potential stranding of juveniles and/or adults when the reservoir level is in active recession; and 2) injury or death from predation by and competition with nonnative species concurrently produced in or benefiting from the inundation of habitat within Horseshoe Reservoir. This incidental take could result in loss of all larval and juvenile razorback suckers spawned in Horseshoe Reservoir during 2005, and harm and/or harassment of adult razorback suckers present within the action area. Take will be assumed to have been exceeded if conditions persist for more than one season.

We do not anticipate take of Gila topminnow for the reasons provided above in the “Effects of the Action” section.

The Fish and Wildlife Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

EFFECT OF THE TAKE

In this biological opinion we determine that this level of anticipated take is not likely to result in jeopardy to the southwestern willow flycatcher or destruction or adverse modification of its proposed critical habitat. In addition, we determine that this level of anticipated take is not likely to result in jeopardy to the razorback sucker or destruction or adverse modification of its designated critical habitat.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, we must comply with the following terms and conditions, which implement the reasonable and prudent measures described

above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. We must immediately provide an explanation of the causes of the taking and review the need for possible modification of the reasonable and prudent measures.

Southwestern willow flycatcher

We determine that the permit conditions included as part of the proposed action are sufficient to minimize the effects of incidental take. No further reasonable or prudent measures are provided for the southwestern willow flycatcher

Razorback sucker

The following reasonable and prudent measure and terms and conditions are necessary and appropriate to ensure proper coordination with AESO:

Reasonable and Prudent Measure

1) The FWS shall require SRP to coordinate with the AESO via telephone (602/242-0210) or in writing (e-mail), within 48 hours, whenever razorback sucker (or Colorado pikeminnow) are caught during survey work. Contacts can be made to either Jeff Servoss (x237 or jeff_servoss@fws.gov) or Debra Bills (x239 or debra_bills@fws.gov).

Terms and Conditions

1.a. Include the number of fish captured.

1.b. Include the sex of fish captured.

1.c. Include the size (total length) of fish captured.

1.d. Include the location of capture.

1.e. Include the method of capture.

1.f. Record whether any individuals were marked, and what the marks indicate.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 2450 W. Broadway Rd, Suite 113, Mesa, Arizona, 85202,

telephone: 480/967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

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

1. We recommend the establishment of a database to track cumulative impacts of 10(a)(1)(A) permits.

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

REINITIATION NOTICE

This concludes formal consultation and conference on the action(s) outlined in your request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

For further information please contact Jeff Servoss (x237) or Debra Bills (x239). Please refer to the consultation number, 02-21-05-F-0331, in future correspondence concerning this project.

Steven L. Spangle

cc: Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ (Attn: C. Paradzick)
Paul Cherrington, Salt River Project, Phoenix, AZ
District Ranger, Cave Creek Ranger District, Tonto National Forest, Phoenix, AZ
Craig Sommers, ERO Resources, Denver, CO
Tom Buschatzke, City of Phoenix, Phoenix, AZ
Michelle Harrington, Center for Biological Diversity, Phoenix, AZ

W:Jeff Servoss\Verde HCP\2005 10(a)(1)(A)\Final BO 04-20-05.doc

LITERATURE CITED

Abarca, F. J., D. Hendrickson, and J. R. Simms. 1994. Draft revised Gila topminnow recovery plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 63pp.

Arizona Game and Fish Department (AGFD). 2003a. *Xyrauchen texanus*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ.

-----. 2003b. *Ptychocheilus lucius*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ.

Bestgen, K.R. 1990. Status review of the razorback sucker, *Xyrauchen texanus*. Report to U.S. Fish and Wildlife Service, Salt Lake City, Utah. Contribution 44, Larval Fish Laboratory, Colorado State University, Fort Collins, CO.

Bestgen, K. R., and D. L. Propst. 1989. Red shiner vs. native fishes: Replacement or displacement? Proc. of the Desert Fishes Council 18:209.

Bent, A.C. 1960. Life histories of North American flycatchers, larks, swallows and their allies. Dover Press, New York, New York. 555 pp.

Bonar, S. L.L. Leslie, and C.E. Velez. 2004. Influence of species, size class, environment, and season, on introduced fish predation on native species in the Verde River system, Arizona. Arizona Cooperative Fish and Wildlife Reach Unit, Fisheries Research Report 04-01.

Brittingham, M.C. and S.A. Temple. 1983. Have cowbirds caused forest songbirds to decline? *BioScience* 33:31-35.

Brooks, J. E. 1986. Status of natural and introduced Sonoran topminnow (*Poeciliopsis o. occidentalis*) populations in Arizona through 1985. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 19+pp.

Brothers, T.S. 1984. Historical vegetation change in the Owens River riparian woodland, pages 74-84 *in* R.E. Warner and K.M. Hendrix (eds.), California riparian systems: Ecology, conservation, and productive management. UC Press, Berkeley, CA.

Brown, B.T. 1988a. Breeding Ecology of a Willow Flycatcher Population in Grand Canyon, Arizona. Western Birds 19:25-33.

-----. 1988b. Monitoring bird population densities along the Colorado River in Grand Canyon: 1987 breeding season. Final Report to the Glen Canyon Environmental Studies. Bureau of Reclamation, Salt Lake City, Utah. 26 pp.

Browning, M.R. 1993. Comments on the taxonomy of *Empidonax traillii* (willow flycatcher). Western Birds 24:241-257.

Busch, J.D., M.P. Miller, E.H. Paxton, M.K. Sogge, and P. Keim. 2000. Genetic variation in the endangered southwestern willow flycatcher. The Auk: 117 (3): 586-595.

Camp Pendleton Marine Corps Base. 1994. Biological Assessment: Riparian and Estuarine Habitat.

Carlson, C. A., and R. Muth. 1989. The Colorado River: Lifeline of the American southwest. Pages 220-239 *in* D. P. Dodge, ed., Proc. of the International Large River Symposium. Canadian Special Publication of Fisheries and Aquatic Sciences 106.

Clarkson, R.W., E.D. Creed, and D.K. McGuinn-Roberts. 1993. Movements and habitat utilization of reintroduced razorback suckers (*Xyrauchen texanus*) and Colorado squawfish (*Ptychocheilus lucius*) in the Verde River, Arizona. Nongame and Endangered Wildlife Program Report, Arizona Game and Fish Department, Phoenix, AZ.

Constanz, G. D. 1980. Energetics of viviparity in the Gila topminnow (Pisces: Poeciliidae). Copeia 1980:676-678.

Deacon, J. E., and W. L. Minckley. 1974. Desert fishes. Pages 385-488 in G. W. Brown, Jr., ed., Desert Biology, Vol.2. Academic Press, New York.

DeLoach, C.J. 1991. Saltcedar, an exotic weed of western North American riparian areas: a review of its taxonomy, biology, harmful and beneficial values, and its potential for biological control. Report to the Bureau of Reclamation, Boulder City, NV, Contract No. 7-AG-30-04930.

Drost, C.A., M.K. Sogge, and E. Paxton. 1998. Preliminary Diet Study of the Endangered Southwestern Willow Flycatcher. Report to U.S. Bureau of Reclamation. U.S.G.S. Biological Resources Division/Colorado Plateau Res. Station/N. Arizona University. 26 pp.

ERO Resources, Inc. (ERO). 2002. Roosevelt Lake habitat conservation plan Gila and Maricopa counties, AZ. Prepared for Salt River Project, Phoenix, AZ.

Esler, D. 2000. Applying metapopulation theory to conservation of migratory birds. Conservation Biology, Volume 14, No. 2.

Fernandez, P. J., and P. C. Rosen. 1996. Effects of the introduced crayfish *Orconectes virilis* on native aquatic herpetofauna in Arizona. Rept. to Heritage Prog., Ariz. Game and Fish Dept., Phoenix. IIPAM Proj. No. I94054. 57+pp.

Finch, D.M. and S.H. Stoleson, eds. 2000. Status, ecology, and conservation of the southwestern willow flycatcher. Gen. Tech. Rep. RMRS-GTR-60. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 131 p.

Forrest, R. E. 1992. Habitat use and preference of Gila topminnow. MS. Thesis, University of Arizona, Tucson. 84pp.

Griffith, J.T and J.C. Griffith. 1995. Brown-headed cowbird trapping and least Bell's vireo recovery on Marine Corps base camp Pendleton, 1983-1993. Abstracts of the North American Research Workshop on the Ecology and Management of Cowbirds. The Nature Conservancy of Texas, Austin. 88 pp.

-----. 1996. Brown-headed cowbird trapping and the endangered least Bell's vireo: a management success story. 33 pp.

Hanna, W.C. 1928. Notes on the dwarf cowbird in southern California. Condor 30:161-162.

Harrison, H.H. 1979. A field guide to western birds' nests of 520 species found breeding in the United States west of the Mississippi River. Houghton Mifflin Company, Boston, Massachusetts. 279 pp.

Holmgren, M. A. and P. W. Collins. 1995. Interim report on the distribution, breeding status, and habitat associations of seven federal special-status bird species and Brown-headed Cowbirds at Vandenberg Air Force Base, Santa Barbara County, California. Museum of Systematics and Ecology, Department of Ecology, Evolution, and Marine Biology, University of California: Santa Barbara, California. Environmental Report No. 3.

Howell, S.N.G. and S. Webb. 1995. A guide to the birds of Mexico and northern Central America. Oxford University Press, New York, New York. 851 pp.

Hubbard, J.P. 1987. The Status of the Willow Flycatcher in New Mexico. Endangered Species Program, New Mexico Department of Game and Fish, Sante Fe, New Mexico. 29 pp.

Hubbs, C. L., and R. R. Miller. 1941. Studies of the fishes of the order Cyprinodonts. XVII: Genera and species of the Colorado River system. Occas. Papers Mus. Zool., Univ. Mich. 433:1-9.

Hull, T. and D. Parker. 1995. The Gila Valley revisited: 1995 survey results of willow flycatchers found along the Gila River near Gila and Cliff, Grant County, New Mexico. Prepared by Applied Ecosystem Management, Inc. for the Phelps Dodge Corporation. 25 pp.

Hunt, W.G., D.E. Driscoll, E.W. Bianchi, and R.E. Jackman. 1992. Ecology of Bald Eagles in Arizona. Part A: Population Overview. Report to U.S. Bureau of Reclamation, Contract 6-CS-30-04470. BioSystems Analysis Inc., Santa Cruz, California.

Hyatt, M. W. 2004. Assessment of Colorado pikeminnow and razorback sucker reintroduction programs in the Gila River Basin. Final Report to U.S. fish and Wildlife Service, Tucson, AZ. 28 pp.

Johnson, J. E., and C. Hubbs. 1989. Status and conservation of poeciliid fishes. Pages 301- 331 in G. K. Meffe, and F. F. Snelson, eds., Ecology and Evolution of Livebearing Fishes (Poeciliidae). Prentice Hall, Englewood Cliffs, New Jersey. 453pp.

Kenwood, K. E. and E. H. Paxton. 2001. Survivorship and movements of southwestern willow flycatchers at Roosevelt Lake, Arizona - 2001. U.S. Geologic Survey report to the U.S. Bureau of Reclamation, Phoenix, AZ.

King, J.R. 1955. Notes on the life history of Traill's Flycatcher (*Empidonax traillii*) in southeastern Washington. *The Auk* 72:148-173.

Koronkiewicz, T.J. and M.K. Sogge. 2001 Southwestern willow flycatchers recaptured at wintering sites in Costa Rica. North American Bird Bander, Volume 26, pp 161-162.

Kozie, K.D. and R.K. Anderson. 1991. Productivity, diet, and environmental contaminants in bald eagles nesting near the Wisconsin shoreline of Lake Superior. Archives of Environmental Contamination and Toxicology 20:41-48.

Kus, J. 1995. The status of the least Bell's vireo and southwestern willow flycatcher at Camp Pendleton, California, in 1995. Department of Biology, San Diego State University, San Diego, California.

Lamberson, R.H., B.R. Noon, and M.L. Farnsworth. 2000. An incidence function analysis of the viability of the southwestern willow flycatcher. Colorado State University. Report to the Bureau of Reclamation, Phoenix, AZ.

Laurenson, L. B. J., and C. H. Hocutt. 1985. Colonization theory and invasive biota: The Great Fish River, a case history. Environmental Monitoring and Assessment 6(1985):71-90

Ligon, J.S. 1961. New Mexico Birds and where to find them. The University of New Mexico Press, Albuquerque, New Mexico. 360 pp.

Luff, J., E.H. Paxton, K. Kenwood and M.K. Sogge. 2000. Survivorship and movements of southwestern willow flycatchers in Arizona. Colorado Plateau Research Station. U.S. Geological Survey Biological Resources Division. Northern Arizona University, Flagstaff, AZ.

MacArthur, R. H., and E. O. Wilson. 1967. The theory of island biogeography. Princeton University Press, Princeton, New Jersey.

Marsh, P. C., and W. L. Minckley. 1990. Management of endangered Sonoran topminnow at Bylas Springs, Arizona: description, critique, and recommendations. Great Basin Naturalist 50(3):265-272.

Mayfield, H.F. 1977a. Brown-headed cowbird: agent of extermination? *American Birds* 31:107-113.

-----. 1977b. Brood parasitism: reducing interactions between Kirtland's warblers and brown-headed cowbirds. Chapter 11 *in* Endangered birds: management techniques for preserving threatened species (S.A. Temple, ed.). University of Wisconsin Press, Madison Wisconsin.

Maynard, W.R. 1995. Summary of 1994 survey efforts in New Mexico for southwestern willow flycatcher (*Empidonax traillii extimus*). Contract # 94-516-69. New Mexico Department of Game and Fish, Sante Fe, New Mexico. 48 pp.

McAllister, K.R., T.E. Owens, L. Leschnew and E. Cummins. 1986. Distribution and productivity of nesting bald eagles in Washington, 1981- 1985. Murrelet 67:45-50.

McCabe, R.A. 1991. The little green bird: ecology of the willow flycatcher. Palmer publications, Inc., Amherst, Wisconsin. 171 pp.

McCarthey T.D., C.E. Paradzick, J.W. Rourke, M.W. Sumner, and R.F. Davidson. 1998. Arizona Partners In Flight southwestern willow flycatcher survey: 1997 Survey and Nest Monitoring Report. Arizona Game and Fish Department Technical Report. Nongame Branch, Arizona Game and Fish Department, Phoenix, AZ.

McCarthy, C.W., and W.L. Minckley. 1987. Age estimation for razorback sucker (Pisces: Catostomidae) from Lake Mohave, Arizona and Nevada. Journal of the Arizona-Nevada Academy of Science 21:87-97.

McDonald, K.P., J. Snider, L.C. Peterson, M. St. Germain, and S. Staats. 1995. Results of 1995 southwestern willow flycatcher surveys in the Virgin River drainage and southern Utah. Publication No. 95-17, Utah Division of Wildlife Resources, Cedar City, UT. 28 pp.

McGeen, D.S. 1972. Cowbird-host relationships. The Auk 89:360-380.

McKernan R.L. and G. Braden. 2001. Status, distribution, and habitat affinities of the southwestern willow flycatcher along the lower Colorado River: year 5 -2000. Report submitted to the U.S. Bureau of Reclamation, Boulder City, NV.

Meffe, G. K. 1983. Attempted chemical renovation of an Arizona springbrook for

management of the endangered Sonoran topminnow. North American J. Fisheries Management 3:315-321.

-----. 1985. Predation and species replacement in American Southwestern stream fishes: A case study. Southwest Nat. 30:173-187.

Meffe G. K. and F. F. Snelson, Jr. 1989. An ecological overview of poeciliid fishes. Pages 13-31 in G. K. Meffe and F. F. Snelson, Jr., eds., Ecology and Evolution of Livebearing Fishes. Prentice Hall, Englewood Cliffs, New Jersey. 453pp.

Miller, R. R. 1961. Man and the changing fish fauna of the American Southwest. Pap. Michigan Acad. Sci., Arts, Lett. 46:365-404.

Minckley, W. L. 1969. Native Arizona fishes, part I— livebearers. Arizona Wildlife Views 16:6-8.

Minckley, W. L. 1973. Fishes of Arizona. Ariz. Fish and Game Dept. Sims Printing Company, Inc., Phoenix, AZ.

Minckley, W. L. 1983. Status of the razorback sucker, *Xyrauchen texanus* (Abbott), in the lower Colorado River Basin. The Southwestern Naturalist 28:165-187.

-----. 1985. Native fishes and natural aquatic habitats in U.S. Fish and Wildlife Region II west of the Continental Divide. Rept. to U.S. Fish and Wildlife Service, Albuquerque, New Mexico. Dept. of Zoology, Ariz. State Univ., Tempe. 158pp.

Minckley, W. L. and G. Meffe. 1987. Differential selection for native fishes by flooding in streams of the arid southwest. Pp. 93-104 in W. J. Matthews and D. E. hines (eds.) Evolutionary and community ecology of North American stream fishes. University of Oklahoma Press, Norman, OK.

Minckley, W. L., J. N. Rinne, and J. E. Johnson. 1977. Status of the Gila topminnow and its co-occurrence with mosquitofish. USDA Forest Service, Research Paper RM-198, Rocky Mtn. For. & Range Exp. Stn., Ft. Collins, Colorado. 8pp.

Moyle, P. B., and J. E. Williams. 1990. Biodiversity loss in the temperate zone: Decline of the native fish fauna of California. Conservation Biology 4(3):275-284.

Muiznieks, B.D., S.J. Sferra, T.E. Corman, M.K. Sogge, and T.J. Tibbitts. 1994. Arizona Partners In Flight southwestern willow flycatcher survey, 1993. Draft report: Nongame and Endangered Wildlife Program, Arizona Game and Fish Department, Phoenix, Arizona. Draft of April 1994. 28 pp.

Osmundson, D.B., and L.R. Kaeding. 1989. Studies of Colorado squawfish and razorback sucker use of the "15-mile reach" of the Upper Colorado River as part of conservation measures for the Green Mountain and Ruedi Reservoir water sales. Final Report, U.S. Fish and Wildlife Service, Region 6. Grand Junction, CO.

Owen, J.C. and M.K. Sogge. 2002. Physiological condition of southwestern willow flycatchers in native and saltcedar habitats. U.S. Geological Survey report to the Arizona Department of Transportation.

Paradzick C.E., R.F. Davidson, J.W. Rourke, M.W. Sumner, A.D. Wartell, T.D. McCarthey. 2000. Southwestern willow flycatcher 1999 survey and nest monitoring report. Nongame and Endangered Wildlife Program Technical Report #151. Arizona Game and Fish Department, Phoenix, Arizona.

Paradzick C.E., T.D. McCarthey, R.F. Davidson, J.W. Rourke, M.W. Sumner, A.B. Smith. 2001. Southwestern willow flycatcher 2000 survey and nest monitoring report. Nongame and Endangered Wildlife Program Technical Report #175. Arizona Game and Fish Department, Phoenix, Arizona.

Paxton, E., J. Owen, and M.K. Sogge. 1996. Southwestern willow flycatcher response to catastrophic habitat loss. Colorado Plateau Research Station. U.S. Geological Survey Biological Resources Division. Northern Arizona University, Flagstaff, AZ. 12 pp.

Paxton, E., S.M. Langridge, and M.K. Sogge. 1997. Banding and Population Genetics of Southwestern willow flycatchers in Arizona-1997 Summary Report. Colorado Plateau Research Station. U.S. Geological Survey Biological Resources Division. Northern Arizona University, Flagstaff, AZ. 63 pp.

Peterson, R.T. 1990. A field guide to western birds. Third edition. Houghton Mifflin Company, Boston, Massachusetts. 432 pp.

Phillips, A.R. 1948. Geographic variation in *Empidonax traillii*. *The Auk* 65:507-514.

Phillips, A.R., J. Marshall, and G. Monson. 1964. The Birds of Arizona. University of Arizona Press, Tucson, Arizona. 212 pp.

Ridgely, R.S. and G. Tudor. 1994. The Birds of South America: Suboscine Passerines. University of Texas Press, Austin, Texas.

Salt River Project (SRP). 2005. Annual report 2004 Roosevelt habitat conservation plan. Prepared for the U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office. 38 pp. + Appendices.

San Diego Natural History Museum. 1995. *Empidonax traillii extimus* in California. The willow flycatcher workshop. 17 November 1995. 66 pp.

Schoenherr, A. A. 1974. Life history of the topminnow *Poeciliopsis occidentalis* (Baird and Girard) in Arizona and an analysis of its interaction with the mosquitofish *Gambusia affinis* (Baird and Girard). Ph.D. Diss., Ariz. State Univ., Tempe.

Sferra, S.J., R.A. Meyer, and T.E. Corman. 1995. Arizona Partners In Flight 1994 southwestern willow flycatcher survey. Final Technical Report 69. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program, Phoenix, Arizona. 46 pp.

Sferra, S.J., T.E. Corman, C.E. Paradzick, J.W. Rourke, J.A. Spencer, and M.W. Sumner. 1997. Arizona Partners In Flight southwestern willow flycatcher survey: 1993-1996 summary report. Arizona Game and Fish Department Technical Report 113. 104 pp.

Simms, J. R. and K. M. Simms. 1992. What constitutes high quality habitat for Gila topminnow (*Poeciliopsis occidentalis occidentalis*)? An overview of habitat parameters supporting a robust population at Cienega Creek, Pima Co., AZ. Proc. of the Desert Fishes Council 24:22-23.

Skaggs, R.W. 1996. Population size, breeding biology, and habitat of willow flycatchers in the Cliff-Gila Valley, New Mexico. New Mexico Department of Game and Fish, Sante Fe, New Mexico. 38 pp.

Smith, A.B., C.E. Paradzick, A.A. Woodward, P.E.T. Dockens, and T.D. McCarthey. 2002. Southwestern willow flycatcher 2001 survey and nest monitoring report. Nongame and Endangered Wildlife Program Technical Report #191. Arizona Game and Fish Department, Phoenix, Arizona.

Sogge, M. K. 1995*a*. Southwestern willow flycatcher (*Empidonax traillii extimus*) monitoring at Tuzigoot National Monument. 1995 progress report to the Natl. Park Serv. Natl. Biol. Serv., Colorado Plateau Res. Stn./Northern Arizona University, Flagstaff, Arizona. 20 pp.

-----. 1995*b*. Southwestern willow flycatcher surveys along the San Juan River, 1994 - 1995. Final report to Bureau of Land Management, San Juan Resource Area. Natl. Biol. Serv., Colorado Plateau Res. Stn./Northern Arizona University, Flagstaff, Arizona. 27 pp.

-----. 1995*c*. Southwestern willow flycatchers in the Grand Canyon. Pages 89-91 *in* E. T. LaRoe, G. S. Farris, C. E. Puckett, P. D. Doran, and M. J. Mac eds., Our Living Resources: a Report to the Nation on the Distribution, Abundance, and Health of U.S. Plants, Animals, and Ecosystems. USDI, National Biological Service, Washington, DC.

Sogge, M. K., and T. J. Tibbitts. 1992. Southwestern willow flycatcher (*Empidonax traillii extimus*) surveys along the Colorado River in Grand Canyon National Park and Glen Canyon National Recreation Area. NPS CPSU/N. Arizona University, Flagstaff, Arizona. 43 pp.

-----. 1994. Distribution and status of the southwestern willow flycatcher along the Colorado river in the Grand Canyon - 1994. Summary Report. Natl. Biol. Serv., Colorado Plateau Res. Stn./N. Arizona Univ., Flagstaff, Arizona. 37 pp.

Sogge, M. K., T. J. Tibbitts, and S. J. Sferra. 1993. Status of the southwestern willow flycatcher along the Colorado River between Glen Canyon Dam and Lake Mead - 1993. Summary Report. Natl. Park Serv. Coo. Park Studies Unit/N. Ariz. University, U.S. Fish and Wildlife Service, and Arizona Game and Fish Department., Flagstaff, Arizona. 69 pp.

Sogge, M. K., R. M. Marshall, S. J. Sferra, and T. J. Tibbitts. 1997. A southwestern willow flycatcher survey protocol and breeding ecology summary. National Park Service/Colorado Plateau Res. Station/N. Arizona University, Tech. Rept. NRTR-97/12. 37 pp.

Sogge, M.K., S.J. Sferra, T. McCarthey, S.O. Williams III, B.E. Kus. 2002. Southwestern Willow Flycatcher Breeding Site and Territory Summary - 2001. Prepared for The Southwestern Willow Flycatcher Recovery Team. U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Colorado Plateau Field Station, Northern Arizona University, Flagstaff, AZ.

Spencer, J. A., S. J. Sferra, T. E. Corman, J. W. Rourke, and M. W. Sumner. 1996. Arizona Partners In Flight 1995 southwestern willow flycatcher survey. Technical Report 97, March 1996. Arizona Game and Fish Department, Phoenix. 69 pp.

Sprunt, A., W.B. Robertson Jr., S. Postupalsky, R.J. Hensel, C.E. Knoder and F.J. Ligas. 1973. Comparative productivity of six bald eagle populations. Transactions of the North American Wildlife and Natural Resources Conference 39:96-105.

Stefferud, J. A., and S. E. Stefferud. 1994. Status of Gila topminnow and results of monitoring of the fish community in Redrock Canyon, Coronado National Forest, Santa Cruz County, Arizona, 1979-1993. Pages 361-369 in L. F. DeBano, P. F. Ffolliott, A. Ortega-Rubio, G. J. Gottfried, R. H. Hamre, and C. B. Edminster, tech. coords., Biodiversity and Management of the Madrean Archipelago: The Sky Islands of Southwestern United States and Mexico. USDA Forest Service, Gen. Tech. Rept. RM-GTR-264, Rocky Mtn. For. & Range Exp. Stn., Ft. Collins, Colorado. 669pp.

Stiles, F. G., and A. F. Skutch. 1989. A guide to the birds of Costa Rica. Comstock, Ithaca, New York. 364 pp.

Stransky, K. 1995. 1995 field survey by the Colorado Division of Wildlife, southwestern willow flycatcher. Colorado Division of Wildlife, Grand Junction. 21 pp.

Sublette, J. E., M. D. Hatch, and M. Sublette. 1990. The Fishes of New Mexico. University of New Mexico Press, Albuquerque, NM.

SWCA Inc. 2000. Verde River management plan for the southwestern willow flycatcher. Submitted to Phelps Dodge Development Corporation. SWCA, Inc. Environmental Consultants, Salt Lake City, UT.

Tibbitts, T.J., M.K. Sogge, and S.J. Sferra. 1994. A survey protocol for the southwestern willow flycatcher (*Empidonax traillii extimus*). Technical Report NPS/NAUCPRS/NRTR-94-04. National Park Service, Colorado Plateau Research Station at Northern Arizona University, Flagstaff. 24 pp.

Tomlinson, C. 1997. Summary of surveys in 1997 for southwestern willow flycatchers in southern Nevada.

Tyus, H.M., and C.A. Karp. 1990. Spawning and movements of razorback sucker, *Xyrauchen texanus*, in the Green River basin of Colorado and Utah.

Unitt, P. 1987. *Empidonax traillii extimus*: An endangered subspecies. *Western Birds* 18:137-162.

U.S. Fish and Wildlife Service (USFWS). 1967. Native Fish and Wildlife. Endangered Species. Federal Register 32(48):4001.

-----. 1993. Colorado River endangered fishes critical habitat draft biological support document. Utah/Colorado field Office. Salt Lake City, Utah. 225 pp.

-----. 1994. Endangered and threatened wildlife and plants; determination of critical habitat for the Colorado River endangered fishes: razorback sucker, Colorado squawfish, humpback chub, and bonytail chub. Final Rule. Federal Register 59(54):13374-13400.

-----. 1995a. Final rule determining endangered status for the southwestern willow flycatcher. *Federal Register* 60:10694-10715.

-----. 1996a. Biological opinion for development of the Verde Valley Ranch, Arizona Ecological Services Office, Region 2, Phoenix, AZ.

-----. 1996b. Biological opinion for modification of Roosevelt Dam, Arizona Ecological Services Office, Region 2, Phoenix, AZ.

-----. 1997a. Final determination of critical habitat for the southwestern willow flycatcher. *Federal Register* 62(140):39129-39146.

-----. 1997b. Correction; final determination of critical habitat for the southwestern willow flycatcher. *Federal Register* 62 (161): 44228.

-----. 1998. Razorback sucker (*Xyrauchen texanus*) recovery plan. U.S. Fish and Wildlife Service. Denver, CO.

-----. 2000. Southwestern Willow Flycatcher Protocol Revision. Regional Office, Region 2, Albuquerque, N.M. 3pp.

-----. 1999. Endangered and threatened wildlife and plants; proposed rule to remove the bald eagle in the lower 48 states from the list of endangered and threatened wildlife. Federal Register 64(128):36454-36464.

-----. 2002a. Southwestern Willow Flycatcher Recovery Plan, Region 2, Albuquerque, NM.

-----. 2002b. Colorado pikeminnow (*Ptychocheilus lucius*) Recovery Goals: amendment and supplement to the Colorado Squawfish Recovery Plan. U.S. Fish and Wildlife Service, Mountain-Prairie Region (6), Denver, Colorado

Walkinshaw, L.H. 1966. Summer biology of Traill's Flycatcher. Wilson Bulletin 78:31-46.

Warneke, J. J. 1988. Statewide fisheries investigation survey of aquatic resources: Horseshoe Lake fish management report. Arizona Game and Fish Department Federal Aid Project F-7-R-30.

Weedman, D.A. 1999. Draft Gila topminnow, *Poeciliopsis occidentalis occidentalis*, revised recovery plan. Prepared by Arizona Game and Fish Department for U.S. Fish and Wildlife Service, Albuquerque, New Mexico, 83 pp.

Weedman, D.A. and K.L.Young. 1997. Status of the Gila topminnow and desert pupfish in Arizona. Ariz. Game & Fish Department, Nongame and Endangered Wildlife Program, Phoenix. 141pp.

Whitfield, M.J. 1990. Willow flycatcher reproductive response to brown-headed cowbird parasitism. Masters Thesis, California State University, Chico, California. 25 pp.

Whitfield, M.J. 1994. A brown-headed cowbird control program and monitoring for the southwestern willow flycatcher, South Fork Kern River, California, 1994. Prepared for the California Department of Fish and Game. Kern River Research Center, Weldon, CA 12 pp.

Whitfield, M.J. and C. M. Strong. 1995. A brown-headed cowbird control program and monitoring for the southwestern willow flycatcher, South Fork Kern River, California. Calif. Dept. Fish and Game, Bird and Mammal Cons. Program Report 95-4, Sacramento, California. 17 pp.

Whitfield, M.J. and Enos, K.M. 1996. A Brown-headed Cowbird control program and monitoring for the Southwestern Willow Flycatcher, South Fork Kern River, California, 1996. Final report to the U.S. Army Corps of Engineers, Contract DACW05-96-P-0900. Weldon, California: Kern River Research Center; 1996. 16 pp.

Willard, F.C. 1912. A week afield in southern Arizona. The Condor 14:53-63.

Woodward, H.D. and S.H. Stoleson. 2002. Brown-headed cowbird attacks southwestern willow flycatcher. The Southwestern Naturalist: 47(4).

Appendix A - Concurrence

Bald eagle

In Arizona, bald eagles occur in the greatest density along the Verde River. While bald eagles nest nearly along the entire length of the Verde River from Perkinsville downstream to the Verde River's confluence with the Salt River and migrant and non-breeding Arizona bald eagles will also use the length of the Verde River, only two bald eagle breeding areas (Horseshoe and Table Mountain) use the action area.

Bald eagles at Horseshoe were discovered in 1975, and have used a variety of cliff nests and trees nests within this breeding area. Horseshoe eagles have taken advantage of prey within Horseshoe Reservoir and the free-flowing Verde River (Hunt *et al*. 1992). Mexican chicken bugs, inundation of nests, and a known shooting event have been the known cases of egg, nestling, and adult mortality found at this site (Hunt *et al*. 1992). However, since the eagles began nesting in a cottonwood tree upstream of Horseshoe Reservoir, no occurrences of ecto-parasites or inundation have occurred. Productivity since 1975, has resulted in 7 fledglings from 75-85, 8 fledglings from 86-95, and 11 fledglings from 96-04.

Upstream of Horseshoe Reservoir, also in the action area, is the Table Mountain Breeding Area, discovered in 1986. Tree and cliff nests have been detected at this breeding area; however, cliff nests have almost solely been used since discovery. Productivity has resulted in 7 fledglings from 86-95, and 3 fledglings from 96-04.

Effects of the Action

The holding of water at Horseshoe Reservoir will not result in the inundation of any known nest trees. Horseshoe bald eagles are currently nesting in a cottonwood tree immediately upstream of Horseshoe Reservoir, outside of the conservation pool (J.Driscoll, Arizona Game and Fish Department, pers. comm. 2005).

The increase in surface area at Horseshoe Reservoir is not expected to cause adverse effects to the bald eagle's ability to acquire food. Horseshoe eagles have been successful in previous years when Horseshoe Reservoir has been held higher. Typically, eagles are able to take advantage of increased surface area in central Arizona lakes if foraging is not limited by reduced access to fish. Fish may be more difficult to acquire following a quick fill of a lake following an extended drought due to reduced number of fish suddenly surrounded in a large pool of water. However, the varying degrees of success by eagles in response to a variety of fill events over the years, and the eagles' access to the Verde River above Horseshoe Reservoir, prevents us from determining whether fluctuating Reservoir levels influence productivity at the Horseshoe Breeding Area.

The proliferation of predatory exotic fish that cause a loss of native fish (most notably native suckers), may have an impact to breeding eagles in riverine environments (AGFD 1999). These

native suckers provide an important resource in the temporal sequencing of prey availability for Arizona eagles breeding on riverine environments (Hunt *et al.* 1992). We are unable to conclude, based upon the limited one-season scope of this research project, that any production of exotic fish at Horseshoe Reservoir as a result of this research proposal would result in adverse effects to bald eagles in 2005.

Conclusion

We believe the effects to eagles breeding upstream of Horseshoe Reservoir in 2005 are insignificant and discountable for the following reasons:

1. The research operations will not result in inundation of any known nest trees or existing nesting attempts.
2. The research plan is short-lived and is not expected to modify the species' feeding or sheltering opportunities in the action area.

Literature Cited

Arizona Game and Fish Department (AGFD). 1999. Draft conservation assessment and strategy for the bald eagle in Arizona. Nongame and Endangered Wildlife Program. September. 67 pp.

Hunt, W.G., D.E. Driscoll, E.W. Bianchi, and R.E. Jackman. 1992. Ecology of Bald Eagles in Arizona. Part A: Population Overview. Report to U.S. Bureau of Reclamation, Contract 6-CS-30-04470. BioSystems Analysis Inc., Santa Cruz, California.