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In Reply Refer To:
AESO/SE
22410-2006-F-0222

May 22, 2006

Ms. Cindy Lester, P.E.
Chief, Arizona Section
Regulatory Branch
U.S. Army Corps of Engineers
3636 North Central Avenue, Suite 900
Phoenix, Arizona 85012-1939

RE: Wilkin's Family Little Colorado River Riparian Enhancement Project
U.S. Corps of Engineers File Number; 2006-00217-RWF

Dear Ms. Lester:

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request was dated December 29, 2005, and received by us on January 5, 2006. At issue are impacts that may result from the proposed Wilkin's Family Little Colorado River Riparian Enhancement Project located in Apache County, Arizona. The proposed action may affect Little Colorado spinedace (*Lepidomeda vittata*).

You determined that the project "may affect, but is not likely to adversely affect" the threatened Southwestern willow flycatcher (*Empidonax trailli extimus*) and Chiricahua leopard frog (*Rana chiricahuensis*). We concur with your determinations and our reasoning is provided in Appendix A.

This biological opinion is based on information provided in the October 2005 biological evaluation, the February 2001 Upper Little Colorado River Concept Plan, telephone and email conversations with Tom Moody and Mark Wirtanen of Natural Channel Design, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, streambank stabilization and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

Consultation History

- December 29, 2005: The U.S. Army Corps of Engineers (Corps) requested formal consultation for the proposed Wilkins Family Little Colorado River Riparian Enhancement Project.
- February 7, 2006: We sent a 30-day letter initiating consultation. The letter noted that the consultation period would end on May 13, 2006.
- May 8, 2006: A draft biological opinion was sent to the Corps.
- May 16, 2006: The Corps responded to the draft biological opinion and granted a 30-day extension to the consultation process.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is issuance of a permit under 404 of the Clean Water Act for a riparian enhancement project on three non-adjacent parcels along the Little Colorado River. The project is being funded through a Water Protection Fund Grant. The Arizona legislature established the Water Protection Fund to provide monies for the development and implementation of measures to protect water of sufficient quality and quantity to maintain, enhance and restore rivers and streams and associated riparian habitats.

The proposed project includes properties belonging to the Bigelow (Reach 3) and Wilkins (Reach 2) families and properties owned and managed by the Arizona Department of Game and Fish (AZGF) (Reach 1). The properties lie at 7,000 feet elevation along the Little Colorado River in Springerville. The total proposed project is approximately 6,000 feet or 1.1 miles in length. The properties are not adjacent (Appendix B – Figure 1) but all share a similar goal of stabilizing streambanks, enhancing wildlife habitats, and maximizing stream function. The properties are located in Section 32, Township 9 North, Range 29 East (Wilkins and AZGF properties) and Sections 4 and 5, Township 8 North, Range 29 East (Bigelow properties).

Enhancement Recommendations:

These strategies include changes in management as well as installation of bioengineering and structural practices. These strategies are designed to meet project objectives and will be implemented in all reaches.

Reach 1:

Streambank stabilization using a variety of bioengineering and structural practices will be the primary enhancement activity in this reach. Bank treatments will include structural toe rock where necessary combined with revegetation using native plant species to provide long-term stability to streambanks and improve riparian habitats. The project area will be fenced and livestock excluded for a period of 5 years.

Reach 2:

Bank treatments will include structural toe rock where necessary combined with revegetation using native plant species to provide long-term stability to streambanks and improve riparian habitats. A rock vane will be installed to turn the water in a tight meander and to reestablish connectivity of an abandoned meander. This will create additional slow velocity habitats not found in existing reaches for both aquatic and avian species. Abandoned autos and concrete rubble will be removed off-site. Some boulder deflectors will be installed along the bank in a straight section to create more complex aquatic habitat.

Reach 3:

Bank treatments will include structural toe rock where necessary combined with revegetation using native plant species to provide long-term stability to streambanks and improve riparian habitats. Two sets of boulder clusters will be installed to assess the improvement in aquatic habitat.

Management:

Recreation and livestock use will be carefully managed to allow the revegetation and other enhancement practices to be successful. Recreational use will be limited to project implementation and outreach activities for the project period.

The riparian areas will be fenced on the Bigelow properties and livestock excluded for a minimum period of 5 years to allow establishment of revegetation efforts. Water will be supplied to adjacent livestock by one or more of the following methods in order of priority.

1. Off stream sources (irrigation water) when available,
2. River sources delivered outside the riparian corridor (nose pumps or other means), and/or
3. Water gaps that allow limited access to the stream channel.

It is expected that any on-stream watering (water gaps) will only be necessary during certain periods of the year. A long-term management plan will be in place before cattle are allowed back into the riparian enclosure (5 years).

Structural Bank Stabilization:*Bank resloping*

Bank sections will be reshaped to a 2:1 slope to provide a stable surface for streamside vegetation. This slope angle has been identified as a stable bank in this region when combined with herbaceous or woody native vegetation. Banks will be resloped using a backhoe or track excavator. Every effort will be made to pull excavated material up the bank and away from the stream. Material will be smoothed on higher terraces or removed. These banks will then be treated with a structural or bioengineering practice to provide further stabilization. All disturbed areas will be reseeded, mulched, and protected with erosion fabric.

Rock vanes

These low structures will be constructed of individual boulders or interlocking smaller rock to redirect flows away from a streambank. They will be placed on a meander bend, anchored into

the bank at approximately floodplain elevation. The structures will point upstream at a sharp angle (20° to 30° angle from the bank) and dip to the streambed at the upstream direction. They will be installed to a maximum of 1/3 bankfull channel width but often are shorter. Instead of armoring the bank, the structures will redirect flows and associated velocities away from the bank.

Toe Rock

This structural bank stabilization practice will consist of graded angular rock placed along the base of an eroding stream bank and is designed to protect the vulnerable bank toe. Rock will be graded from a minimum diameter of 3 inches to a maximum of 12 inches. Minimum thickness of toe rock is 18 inches placed on a maximum slope of 1.5:1. Rock will extend upward only to the elevation of the floodplain to minimize the structural component and encourage revegetation. Bioengineering practices will be integrated with this toe protection.

Riparian Habitats/Bioengineering

Brush Revetment

This practice will consist of a series of evergreen or other brushy trees tied end to end and placed along the toe of the stream bank. The trees will be secured to T-posts or bank anchors. The revetment provides temporary structural protection to the bank while vegetation becomes established. Over time, fine sediments accumulate partially burying in the degrading material. An added benefit is the aquatic habitat structure the mass of tree limbs provide. Once bank vegetation is established, T-posts or other anchors will be removed.

Pole Planting

This practice consists of planting bare pole willows or other woody species in stream banks. The poles will be inserted in the moist bank. Holes can be drilled mechanically or hydraulically. The willows will be native species and harvested locally.

Post Plantings

This practice involves planting of larger limbs (4 to 6 inches diameter) in clusters of three at 10-foot centers in designated areas. Cottonwood posts will be placed in holes excavated to groundwater elevation and backfilled.

Vertical Bundles

This practice consists of planting a series of willow bundles along the stream bank. The bundles will have their bases in the permanent water and extend up the bank. The stems will be buried and will sprout all along their length providing willow rooting well above the groundwater table.

Willow Trench

A willow trench consists of a thick line of pole-planted willows buried along the stream. The practice will be installed above toe rock to provide short- and long-term protection to a stream bank. Other applications will include redirecting flows on terraces and slowing velocities from overland flows.

Erosion Fabric Over Reseeding

All disturbed areas will be reseeded using native grass and riparian seed. In order to maximize moisture retention and protect the seed and seedlings from winds, straw or other mulch will be applied to reseeded banks and disturbed areas and protected with erosion fabric or other jute netting.

Aquatic Habitat Structures

Boulder Clusters

Boulder clusters are sets of 3 to 7 large rocks or boulders installed singly or in groups in the center of the stream channel. The clusters are partially buried in the channel substrate for stability. The boulders will extend above the water surface at base flow but will often be submerged during flood events. Clusters in the center channel will divide the flow providing a complex set of flow patterns. Bank clusters will create cross channel currents and/or vary channel widths.

The structures should be placed in areas with relatively swift flow, such as swift runs, to prevent deposition. In general they will be sited in swift runs. Two of these structures are to be installed in the AZGF property in reach 3.

Boulder-Wing Deflectors

Boulder-wing deflectors will be constructed to protect a portion of one bank by deflecting flow away from the bank. They are also used to create scour by constricting the channel width and accelerating flow and/or to create quiet water resting areas for fish species. The deflectors are built in a triangular shape to funnel flows between the apexes of opposing wing-deflectors or to the apex of a single deflector.

Monitoring

The proposed action includes a complete monitoring plan that includes cross-sections, bank conditions, photo monitoring, and benthic monitoring. The annual monitoring will occur for 3-years, the life of the Arizona Department of Water Protection fund grant.

DESCRIPTION OF THE ACTION AREA

For this consultation we are defining the action area as the 6,000 feet of stream corridor, adjacent floodplains, and approximately 30 feet of terraces on either side of the channel and floodplain. The total disturbance area will be approximately 2.8 acres, separated into three areas: Reach 1 measuring 63,800 sq. ft. (1.5 acre), Reach 2 measuring 36,300 sq. ft. (0.83 acre), and Reach 3 measuring 21,200 sq. ft. (0.49). These areas were calculated at the banks where resloping or rock placement activities will take place and include where the equipment will work from. Direct effects of the project will be limited to the disturbance of a 6-week construction period. Additionally, effects are expected to occur some distance downstream. Monitoring and livestock exclusions will occur for 5 years.

Conservation Measures

Impacts from the use of heavy equipment will be minimized with the following methods:

- All heavy equipment used in the project will be cleaned prior to use and without oil leaks. Equipment will be checked daily for oil leaks and removed from service until repaired.
- Equipment will work from the bank areas whenever possible. This is expected to represent the majority of time. Working within the river will be unusual and limited to necessity.
- Stream crossing will be kept to a minimum.
- Bank materials excavated during bank resloping or floodplain lowering will be removed from the active, bankfull channel, and spread across the terrace areas.
- All disturbed areas will be reseeded. Those disturbed areas exposed to erosive stream flows will be reseeded and protected by erosion matting.
- All channel and floodplain work will take place during the dormant growing season and outside the spawning periods for Little Colorado spinedace.

STATUS OF THE SPECIES AND CRITICAL HABITAT

The Little Colorado spinedace was listed as threatened with critical habitat designated on October 16, 1987 (USFWS 1987). Threats were identified as habitat alteration and destruction, predation by and competition with non-native aquatic organisms, and recreational fishery management. Forty-four stream miles of critical habitat were designated: 18 miles of East Clear Creek immediately upstream and 13 miles downstream from Blue Ridge Reservoir in Coconino County; eight miles of Chevelon Creek in Navajo County; and five miles of Nutrioso Creek in Apache County. Constituent elements of critical habitat consist of clean, permanent flowing water with pools and a fine gravel or silt-mud substrate.

The spinedace is a small (about 4 inch) minnow native to the Little Colorado River (LCR) drainage. This fish occurs in disjunct populations throughout much of the LCR drainage in Apache, Coconino, and Navajo counties. Extensive collections summarized by Miller (1963) indicated that the spinedace had been extirpated from much of the historical range from 1939 to 1960. Although few collections were made of the species prior to 1939, the species is believed to have inhabited the northward flowing LCR tributaries of the Mogollon Rim, including the northern slopes of the White Mountains.

Food habits of spinedace include chironomid larvae, dipterians, filamentous green algae, and crustaceans (Runck and Blinn 1993, Blinn and Runck 1990). Spinedace are late-spring to early-summer spawners (Blinn 1993, Blinn and Runck 1990, Miller 1961, Minckley 1973, Minckley and Carufel 1967) although some females have been found to contain mature eggs as late as October (Minckley and Carufel 1967). A complete discussion of the taxonomic, distributional, and life history information of the spinedace has been compiled in the Little Colorado Spinedace Recovery Plan (USFWS 1998).

Mitochondrial DNA work on the spinedace was initiated in the 1990s and indicated the existence of three sub-groups identifiable by geographic area (Tibbets *et al.* 1994): the East Clear Creek

drainage, Chevelon Creek, and the upper Little Colorado River including Nutrioso and Rudd creeks. The study concluded that the genetic patterns seen were likely the result of populations isolated and differentiated by both natural and human-caused events. The East Clear Creek and Chevelon Creek sub-groups are more individually distinctive, likely the result of a higher degree of isolation, and possess unique haplotypes. Individuals from the upper Little Colorado sub-group are more similar to each other. Possibly, until recent time, there was one population with considerable gene flow until various dams and diversions increased local isolation. The cause and exact time of the isolation of the three sub-groups are not known, but Tibbets *et al.* (1994) recommend that all of these populations be maintained to conserve genetic variation in this species.

As would be expected for a species adapted to fluctuating physical conditions, the spinedace is found in a variety of habitats (Blinn and Runck 1990, Miller 1963, Miller and Hubbs 1960, Nisselson and Blinn 1989). It is unclear whether occupancy of these habitats reflect the local preferences of the species or its ability to tolerate less-than-optimal conditions. Available information indicates that suitable habitat for the Little Colorado spinedace is characterized by clear, flowing pools with slow to moderate currents, moderate depths, and gravel substrates (Miller 1963, Minckley and Carufel 1967). Cover provided by undercut banks or large rocks is often a feature. Spinedace have also been found in pools and flowing water conditions over a variety of substrates, with or without aquatic vegetation, in turbid and clear water (Denova and Abarca 1992, Nisselson and Blinn 1991). Water temperatures in occupied habitats ranged from 58 to 78 degrees Fahrenheit (Miller 1963). Miller (1963) called the spinedace “trout like” in behavior and habitat requirements, and it is likely that prior to 1900 the spinedace used habitats now dominated by non-native salmonids.

As with most aquatic habitats in the southwest, the Little Colorado River basin contains a variety of aquatic habitat types and is prone to rather severe seasonal and yearly fluctuations in water quality and quantity. Both mountain streams and lower-gradient streams and rivers have provided habitat for the spinedace. Residual pools and spring areas are important refuges during periods of normal low water or drought. From these refuges, spinedace are able to recolonize other stream reaches during wetter periods. This ability to quickly colonize an area has been noted in the literature (Minckley and Carufel 1967) as well as in observations by others familiar with the species. Populations seem to appear and disappear over short time frames and this has made specific determinations on status and exact location of populations difficult. This tendency has been observed by both researchers and land managers (Miller 1963, Minckley 1965, Minckley 1973) and has led to concerns for the species' survival.

The spinedace is assumed to still occupy the streams it is known from historically (Chevelon, Silver, Nutrioso, East Clear Creek, and the LCR proper). However, populations are generally small and the true population size for any occupied stream is unknown due to the yearly fluctuations and difficulty in locating fish. Spinedace have a tendency to disappear from sampling sites from one year to the next and may not be found for several years. For example, the Silver Creek population was considered extirpated until fish were collected from the creek again in 1997. Although AZGF surveyed Silver Creek in 2003 and 2004, no fish have been located since 1997. This ephemeral nature makes management of the species difficult since responses of the population to changes within the watershed cannot be measured with certainty.

AZGF personnel surveyed several 328-foot transects in Nutrioso and Rudd creeks in spring 2005, with a single spinedace and a few speckled dace captured from Rudd Creek. A total of 7 spinedace were captured upstream of Nelson Reservoir. No spinedace were found below the reservoir, but many fathead minnow and green sunfish were captured. Additionally, two rainbow trout were found below the reservoir.

Spinedace are currently considered rare in East Clear Creek (Denova and Abarca 1992). However, recent conservation actions in 2000 by the AGFD and the Coconino National Forest have led to the reintroduction of spinedace into three tributaries (Yeager Canyon, Houston Draw, and General Springs) of this drainage. Houston Draw and General Springs dried and have not been monitored, though it is believed these stockings were unsuccessful. Sampling of Yeager Canyon in October 2001 located seven young-of-the-year and eight adult spinedace. Yeager Canyon dried during the 2002 drought and these fish died.

Drought conditions have confounded cooperative recovery efforts for the Little Colorado spinedace in the East Clear Creek watershed. Recent inspections have found drying of the stream courses within the watershed. Of particular concern at this point are Dines Tank, West Leonard Canyon, and Yeager Canyon. The Forest Service, FWS, and AZGF salvaged spinedace from Dines Tank, West Leonard Canyon, and Yeager Canyon in 2002. A pool in Dane Canyon held water throughout the summer of 2002 and 57 of the spinedace salvaged from West Leonard Canyon were stocked into Dane Canyon in August 2002. On July 30, 2004, the AZGF stocked 49 adult and one young-of-the-year spinedace from the Flagstaff Arboretum pond into Bear Canyon Creek in the East Clear Creek drainage. In May 2005, AZGF translocated approximately 120 adult spinedace from the Flagstaff Arboretum to Dane and Bear Canyons (60 fish to each site). Prior to the stocking, surveys conducted the last five to ten years have not located spinedace in either Dane or Bear Canyon. We anticipate that the fish can re-establish in these streams.

During annual spring surveys in 2005, AZGF found one adult (gravid) female spinedace in East Clear Creek below the Blue Ridge Dam. This is the first time in many years that a spinedace has been documented below the reservoir. It is likely that the fish was flushed downstream following the heavy winter and spring precipitation.

Native fishes associated with spinedace include speckled dace (*Rhinichthys osculus*), bluehead sucker (*Pantosteus discobolus*), Little Colorado sucker (*Catostomus* sp.), roundtail chub (*Gila robusta*), and Apache trout (*Oncorhynchus gilae apache*) (FWS 1998). The list of non-native fishes is much larger and includes species with varying degrees of incompatibility with the spinedace's long-term survival. The presence of non-natives was one of the primary reasons the species was listed, and may contribute to the disjunct distribution patterns observed and the spinedace's retreat to what may be suboptimal habitats. Non-native fish compete with, prey upon, harass, and alter habitat utilized by native fish. In the last 100 years, at least ten non-native fish species have been introduced into spinedace habitats. These include rainbow trout (*Oncorhynchus mykiss*), fathead minnow (*Pimephales promelas*), and golden shiner (*Notemigonus crysoleucus*). Surveys in East Clear Creek have documented the presence of these three non-native species and brown trout (*Salmo trutta*) in the watershed (Denova and Abarca

1992). Data from research experiments and field observations indicate that at least the rainbow trout is a predator and potential competitor with the spinedace (Blinn *et al.* 1993).

Since the spinedace was listed, the Rudd Creek population was discovered. There is also one refugial population of East Clear Creek spinedace (located at the Flagstaff Arboretum), totaling between 300 and 400 individuals. There are no refugial populations for the other two genetic sub-groups, although we expect to have a captive population established at Winslow High School for the Chevelon Creek genetic sub-group by 2006. All of the known populations have decreased since 1993 and drought conditions continue to put additional strain on all known populations.

Our information indicates that, rangewide, 19 formal consultations have been completed and there are 4 others underway for actions affecting Little Colorado spinedace (Appendix C: Table 1). Adverse effects to Little Colorado spinedace have occurred due to the completed projects and many of these consultations have required reasonable and prudent measures to minimize effects to Little Colorado spinedace. However, the species is still declining.

There have not been many section 7 consultations that have involved the project portion of the Little Colorado River population of spinedace. The nearest and most recent (1999) project was the Upper Little Colorado River Riparian Enhancement Demonstration Project (02-21-01-F-0218). This project is immediately downstream of the AZGF property that is part of this proposed project. A formal bank protection project along the Little Colorado River, approximately 3.5 river miles upstream of the proposed project, and about 1.3 miles west of Eager, Arizona, along Highway 260 (2-21-99-F-167) was consulted on in 1999. A biological opinion was issued in 1996 for repairs to River Reservoir dam near Greer, in Apache County (2-21-96-F-339). Lands in the immediate area of the proposed action area are private and have been developed for agriculture, livestock pasturage, and urban development in Eager and Springerville. Upstream of the proposed action area is the Apache-Sitgreaves National Forest (ASNF). In 1999, a biological opinion was issued to the ASNF on the effects of livestock grazing on spinedace in the Colter and Riggs Creek watersheds. Effects to spinedace habitats from direct access of livestock to streamside habitats, from road placement and maintenance, and from recreation were considered. The extent to which the condition of the river in the action area was affected is unknown and would be very difficult to estimate.

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.

A. Status of the species within the action area

Little Colorado spinedace have been documented upstream and downstream of the action area. In the Little Colorado River mainstem, spinedace are found sporadically from the area around St.

Johns upstream to near the town of Greer (Appendix B: Figure 2). Upstream of the proposed project there are records from the 1990's around the State Route 260 (SR260) bridge crossing and near the rest area on United State route 180/666 (US180/666) north of Springerville (Dorum and Young 1995).

Surveys at the SR260 Bridge (upstream of the proposed project) between 1991-1995 found spinedace in 1991 when they represented 9.1 percent of the catch (Dorum and Young 1995). The appearance of brook trout (*Salvelinus fontinalis*) in this portion of the Little Colorado River in 1993 may have had an effect on the spinedace population, although other factors were likely involved in their disappearance from this site. Spinedace were located downstream of the action area at the rest area site on US60 2 miles west of Springerville in 1995, where they made up 1 percent of the catch (Dorum and Young 1995). Larger and more stable spinedace populations are found downstream of the rest area site.

Little Colorado River spinedace have been collected approximately 1.55 stream miles downstream of Hwy 191/60 on State Trust land in 1995, 1996 and 1999 (every sampling trip made to that location found spinedace) (downstream of the action area). A diversion dam exists just upstream of those collection sites and is a fish barrier. AGFD has surveyed not far upstream of Hwy 260 recently and did not find spinedace. Forest Service surveys on USFS land just upstream of Springerville have also failed to document spinedace.

Additional fish sampling was conducted by AZGF in 2002 and 2005. Robust populations of Little Colorado spinedace were found including many juveniles around the Airport Road Bridge at the beginning of Reach 2, as well as the AZGF property in Reach 3. These populations appear to be thriving in this section of the river.

Critical habitat does not occur in the action area.

B. Factors affecting species environment within the action area

The Little Colorado River in the proposed action area is affected by upstream water management including, diversions for agriculture and other purposes, road crossings, livestock use of streambanks, urbanization and runoff, and efforts to protect human developments from floods by channelization or other forms of channel alteration.

The Little Colorado River is perennial in the project reach. Greer Lakes, a series of reservoirs located below Greer Valley and upstream of the project, store waters to be utilized for agricultural uses downstream. Below the reservoirs a number of smaller tributaries join the river above the project. These reservoirs are not large but their operations complicate the base and flood flows at the project site.

Although a well-established native riparian plant community is associated with the Little Colorado River within the project area, much of the community is impacted by past management practices. The woody plant community is dominated by small, flexible species such as strapleaf willow (*Salix ligulifolia*), coyote willow (*Salix exigua*), and Arizona rose (*Rosa arizona*). Tree species are generally found in single individuals of a mixture of native and non-native species

including Siberian elm (*Ulmus pumila*), narrowleaf cottonwood (*Populus angustifolia*), New Mexico locust (*Robinia neomexicana*), Buckthorn (*Rhamis sp*), and box-elder (*Acer negundo*). The herbaceous community is comprised of a variety of sedge/rush and grass species. Tamarisk is present but is at the upper limits of its range and is very uncommon. It does not appear to be a threat to the native community.

Present and past management differ across the reaches. The Bigelow properties have been and are currently managed for moderate livestock grazing. The Wilkins property has not been grazed in the decades and the AZGF properties were intensively grazed up to 2002 when ownership was transferred. As a result of the lack of historical livestock use in portions of Reach 2, the Wilkins property has the greatest amount of intermediate class woody species (willows) and the least impacted herbaceous community. Over 75% of this reach is covered with healthy vegetation. Reach 3 has a relatively healthy herbaceous community but few willows even though it is actively managed for livestock. Reach 3 has a more even split between intermediate class woody species and herbaceous species but substantial areas with impaired native communities. Tall overstory is not a major component of the riparian vegetation in any reach.

Native species represent the riparian zones in all reaches. Toe, bank, and overbank zones are dominated by a mixture of native herbaceous wetland and grass species that provide a functional and appropriate riparian plant community. Woody species are less common in these zones in the reaches managed for livestock. This lowers the habitat potential to some degree in these reaches but does not appear to affect floodplain stability or function.

The woody community that provides the intermediate structure is almost completely missing in Reach 1 and much of Reach 3. This lack of intermediate structure decreases the quality of habitat in these reaches. Additional supple woody species contribute to greater long-term bank stability by strengthening soils and slowing low velocities. Additionally, tall trees which provide overstory within a riparian community are uncommon anywhere along the Little Colorado River in the general area. The reason for the lack of tall trees is not known.

Bank instability and the associated fine sediments delivered to the streambed are a substantial concern within the project area (Moody *et al.* 2005). Bank instability is generally limited to the outside of meander banks. These meander banks represent approximately 36 percent of the total bank length. Three-quarters of these banks are actively eroding.

The project portion of the Little Colorado River is currently listed as impaired by the Arizona Department of Environmental Quality due to high turbidity and sediment loads. Field observations indicate that the main cause of turbidity is loss of vegetative cover due to historical and current grazing practices. The loss of vegetation, especially riparian, allows increased runoff, soil erosion, and bank destabilization (Arizona Dept of Environmental Quality 2002).

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.

Since no critical habitat exists within the action area, effects of the action only encompass effects to the Little Colorado spinedace itself. Adverse effects to spinedace are likely to occur in three primary ways. The first is through the sediment that will temporarily be generated from construction activities and as the channel adjusts to the flow of water. Sediment will also be generated in areas where bioengineering will take place on established river banks. The second is the possibility of direct mortality from the placement of toe rock and boulder clusters in portions of the wet channel. The third is direct and indirect effects to spinedace from watering of cattle on the Bigelow property either through water gaps or pumping to an off-stream location. These effects are discussed below.

Sedimentation Effects:

Direct effects to the spinedace from the Wilkins Family Little Colorado River Riparian Enhancement Project will occur from sediment producing activities during installation of bioengineering practices, toe rock, rock vanes, and during channel and floodplain restoration. Sedimentation caused by all construction activities will generally be limited to fine particles and gravels found in bank sections. Sediments derived from bioengineering practices will be limited to soils displaced by hand tools as the banks are smoothed. Toe rock placed along the base of an eroding stream bank and is designed to protect the vulnerable bank toe. Once the toe rock is installed, the erosion mat and brush layers will reduce sediment supplied by existing banks. Large flood events that occur immediately after construction could result in accelerated bank erosion. Rock vanes will extend one-third of the way across the channel to maintain natural sediment transport. This will cause some local scour around the vane tip. Although some scour is expected from the rock vanes, the biological evaluation suggests that such installations in other gravel streams have not contributed to excessive scour or channel bed degradation or aggradation.

Sediment generated by this project may settle directly onto occupied spinedace areas. Adverse effects of stream sedimentation to fish and fish habitat have been extensively documented (Murphy *et al.* 1981, Newcombe and MacDonald 1991, Barrett 1992), and although spinedace can cope with some amount of sediment being carried in the water column, they prefer clear water. Sediment control measures are built into the project that will, if correctly implemented, prevent some of the fine sediment from entering the stream.

Machinery may contribute some sediment to the stream during construction. During installation of the bioengineering materials, machinery will only be used to construct trenches for the brush layering and brush trenches. These effects will be minimized as these practices are not immediately adjacent to the stream channel. For installation of the toe rock, the excavator can do the work from the terrace or nearby floodplain areas to limit impact to the channel itself. Rock will be placed as the trench is excavated to minimize disturbance and siltation. Generally, an excavator can work from the bank while constructing the trench.

Instream Construction:

Toe rock will be placed along 1,630 feet of the eroding bank in numerous locations in the wetted portion of channel. Additionally, boulder clusters will be placed in portions of Reach 3. Spinedace using the shallow shoreline waters may not be able to avoid the substrate disturbances caused by placement of rocks and incidental mortality is possible.

Excavation equipment can remain outside the channel for most operations. However, operations from the floodplain or terrace create disturbance to the existing vegetation on these features. Although these areas will be reseeded, they may contribute some additional sediment to the stream in the short-term. While heavy equipment work will not occur within the channel, crossing of the channel will be necessary. The proponents expect to work and finish on one side of the stream and then cross the equipment across the channel to the opposite side. A total of three crossings may be necessary. Crossings will typically be placed in riffle habitat with harder floors to support the weight of the excavator. Heavy equipment tracks create disturbance to the channel substrate and may directly impact aquatic macro-invertebrates and fishes including spinedace. Spinedace are generally not found in high velocity situations and are more likely to be found in moderately shallow areas with low velocities and cover in the form of rocks and undercut banks. However, there is a potential for spinedace to be present and harmed by the heavy equipment crossing the channel.

Off-stream watering for cattle:

Water gaps will permit a small segment of the stream where the livestock can go to reach water. Water gaps generally have a hardened or rocky surface so trampling does not destroy the shoreline vegetation resulting in poor fish habitat. However, if not properly designed bank erosion will result in sediment entering the Little Colorado River which will reduce the spinedace habitat.

Water pumping for off-channel watering of cattle can be a risk to fish, especially juveniles, if the pump intake has enough velocity to suck fish in. Piping and creating a drinker would create the risk of removing fish from the stream and transporting them to the off-stream drinker. There is the potential of killing any fish removed from the stream in this manner.

Indirect effects:

Indirect effects are those effects caused by the proposed action, happen later in time, and are reasonably certain to occur. These effects largely involve changes to instream habitats that result from the placement of the rock vanes. Rock vanes are designed to slow the flow of water, causing a drop in velocity and the ability to transport bedload. Such changes can be expected from the river as it alters its behavior to accommodate the new restrictions on movement.

The Little Colorado River is not a pristine river. Watershed changes, creation of dams and diversions, gravel mining from the channel, past and present cattle grazing practices, and land use changes in the floodplain have all affected the flow and physical behavior of the river. These

alterations and how the river channel is dealing with them are at the root of the need for the proposed action. Significant changes to a river's geology, hydrology, geometry or hydraulics result in a loss of the dynamic equilibrium that characterizes a healthy river. The river processes adjust in an attempt to move from the unstable condition to a restored equilibrium that may be different from the pre-disturbance equilibrium.

From the information provided in the biological evaluation, the goal of the proposed action is to restore equilibrium conditions in the project area. Although we do not anticipate effects that are characteristic of typical channelization projects, if the assumption regarding the proposed action has mistakenly identified the stable geometry of the river, then the proposed restoration will not contribute to improvements for long-term stability of the reach. Human disturbances of the watershed, floodplain, and stream channel change many of the factors determining channel configuration. Increased sediment off the watershed is a common result of human actions and sediment is a major determinant of channel shape (Leopold 1997). When the dynamic equilibrium has been disrupted, the channel begins a process of adjustment as it attempts to restore a dimension, pattern, and profile that are consistent with controlling hydraulic variables (Rosgen 1996). These adjustments may lead to dramatic changes in the stream channel width, depth, and geometry that encroach on human activities, such as has occurred in the Little Colorado River. Again, we only expect such adjustment of the stream channel if the proposed action has inaccurately identified the stable geometry of the river. If the project is successful, restoring natural dimension, pattern, and profile to the channel/floodplain could provide benefits to habitat. Inadvertent benefits to habitats for predacious, exotic fish species could increase direct and indirect competition and decrease (or limit potential increases to) spinedace populations.

The American Fisheries Society has adopted a position statement regarding the cumulative effects of small modifications to fish habitat (Burns 1991). That statement concludes that accrual of localized impacts, often from unrelated human actions, can pose a threat to fisheries. It also points out that some improvement efforts to fish habitat may not result in cumulative increases in the status of species, but instead may simply mitigate cumulative habitat alterations from other activities. This is particularly true on the Little Colorado River, where the accumulating effects of a large number of small and localized impacts over the past century have resulted in a damaged stream channel with depleted flows and degraded aquatic habitat. As a result, each small and localized project that will affect the stream and its listed fish must be viewed in the context of the current degraded situation.

Summary

Effects to the Little Colorado spinedace from the proposed action primarily occur in three ways. The first is through the sediment that will temporarily be generated in areas where bioengineering will take place on established river banks. The second is the possibility of direct mortality through from instream work (the placement of toe rock) in a portion of wet channel. Indirect effects may also occur through continued and exacerbated unraveling of the stream channel in the future if a stable channel geometry is not achieved. Overall, the project is designed to restore and enhance the Little Colorado River and its associated riparian habitat.

CUMULATIVE EFFECTS

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

A majority of the lands in the action area and adjacent areas are owned and managed by private entities. Thus, the effects of many activities likely to occur in the project area are considered cumulative effects. Among these activities is cattle grazing. In the biological evaluation, grazing has been implicated as the major cause for degraded riparian conditions, sloughing stream banks, and the near absence of riparian vegetation. However, this project proposal includes an action to fence cattle out of the riparian area for five years. Because Arizona Water Protection Fund monies are funding this proposed action, the grantee is required to “operate and maintain grant-assisted structures, human access or educational facilities, and revegetation sites(s) for 5 years”. The grantee retains the responsibilities for maintaining the project even if a change in ownership takes place. As a result, formal agreements are in place to protect the riparian community through 2011. We do not have information as to the nature of this protection, and its effectiveness is questionable if cattle are allowed back in the riparian area after five years’ time. Thus, we must assume that there is some possibility of future riparian degradation if cattle are allowed to graze in the riparian zone. This habitat degradation would adversely affect the spinedace (through increases in sedimentation, reduction in aquatic vegetation through cattle consumption and soil compaction, and through headcutting initiated by trampling and vegetation loss). However, we do not anticipate future conditions to be any worse than current conditions by virtue of the contract between the grantee and the Arizona Water Protection Fund to maintain the integrity of the restored area.

In 1999, the Upper Little Colorado River Watershed Partnership (Partnership) developed a comprehensive plan for the upper Little Colorado River watershed. This project accomplishes a part of their goal of riparian enhancement along a section of the Little Colorado River. This project in conjunction with past and future projects will stabilize stream banks, enhance wildlife habitat, and maximize stream function of the Little Colorado River.

Any currently unforeseen effects of activities in the project area that do not have a Federal nexus could be addressed by a section 10(a)(1)(B) incidental take permit, if the action may result in take of spinedace.

CONCLUSION

After reviewing the current status of the Little Colorado spinedace, the environmental baseline for the action area, the anticipated effects of the proposed stream work, and the cumulative effects, it is FWS’s biological opinion that the proposed action is not likely to jeopardize the continued existence of the Little Colorado spinedace. No critical habitat exists within the action area, thus none would be affected. We make these findings for the following reasons:

1. The Little Colorado spinedace is found in East Clear Creek and its tributaries (Coconino County), Chevelon and Silver creeks (Navajo County), and Nutrioso Creek and the Little Colorado River (Apache County) in Arizona. The proposed action affects a very small portion of the species' range within the Little Colorado River drainage.
2. Provided that the project is successful, the effects will be transitory and are expected to be of short duration. Aspects of the project (revegetation and bank stabilization) are expected to benefit the spinedace.

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, with their implementing terms and conditions, are nondiscretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the permittee, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the permittee 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 Corps or permittee must report the progress of the action and its impact on the species to FWS as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

AMOUNT OR EXTENT OF TAKE

FWS anticipates that the proposed riparian enhancement project covered by this Biological Opinion is reasonably certain to result in incidental take of Little Colorado spinedace. Some level of incidental take is expected to occur within the action area as a result of the proposed

action due to the potential for increased sedimentation in the stream due to bioengineering activities, river crossings, water diversions, disturbance of spinedace due to placement of rocks in the stream, and increased sediment due to ground disturbing activities. Because of the inherent biological characteristics of aquatic species such as the Little Colorado spinedace, however, the likelihood of discovering take attributable to these actions is very small. Effects of actions such as those addressed in this Biological Opinion are largely unquantifiable in the short term, and may not be measurable as long-term effects on the species' habitat or population levels. Therefore, even though FWS expects some incidental take to occur, the best scientific and commercial data available are not sufficient to estimate a specific amount of incidental take of listed fish at any life stage.

In addition to the direct loss of fish due to construction activities, the implementation of the proposed action will have some effect on the aquatic habitats in the project area and reaches below. The extent of this effect is not known. The Corps believes that this action will benefit fish by improving habitat. If the project is successful, we agree that the project could benefit spinedace. Since this type of action is likely to be proposed again for streams with similar instability problems, it would be prudent to evaluate the changes to the streams so that effects can be gauged more accurately. Although the project is designed to have a beneficial effect on occupied spinedace habitats, there is a potential for taking due to harm or harassment. This take can be estimated by evaluating the changes to the river in and immediately below the proposed action area. Thus, incidental take will be exceeded if any of the following conditions occur:

1. If channel width at bankfull stage and bank erodibility increase in more than 20% of the project area, as determined by monitoring data.
2. If channel bed elevations in riffle sections do not remain at current elevations, or if structural design components fail in more than 20% of the project area, as determined by monitoring data.

EFFECT OF THE TAKE

In the accompanying biological opinion, the FWS determined that this level of anticipated take is not likely to result in jeopardy to the species.

REASONABLE AND PRUDENT MEASURES and TERMS AND CONDITIONS

The measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the permittee, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the permittee 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 Corps 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)].

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described below and the reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following reasonable and prudent measure(s) and terms and conditions are necessary and appropriate to minimize take of Little Colorado spinedace:

1. Minimize interactions between heavy equipment and Little Colorado spinedace and their habitat.
 - a. River crossings will be designated in the least suitable spinedace habitat.
 - b. All crossing for heavy machinery will be blocked and seined before equipment crosses the river.
 - c. All seining activities shall be performed by trained fishery biologists or others with demonstrated expertise in this capture technique.
2. Conduct all proposed actions in a manner that will minimize take of Little Colorado spinedace.
 - a. All non-natives caught will be removed from the Little Colorado River. Any natives caught will be placed downstream of the blocked area.
 - b. If, in the future, a water trough/drinker is installed, the Corps will ensure that the design includes a screen filter at the intake to prevent the entrainment of Little Colorado spinedace.
3. Measures shall be taken to assess the long-term effects to fish habitats from the implementation of the proposed action.
 - a. The proposed action includes a thorough stream channel monitoring plan for three years for the proposed action. However, it is essential that such monitoring continue further into the future to determine the success of the project. Therefore, the Corps shall require channel monitoring measurements and photo points be collected during the month of October for years 2010 and 2011 so five years of monitoring will occur.
 - b. The Corps shall ensure that FWS is provided an annual report containing the photographs and any analysis done of noticeable changes to erosion and deposition patterns for each year the photographs are taken. This report shall be due annually on December 31, until year 2011.
 - c. The Corps shall require the applicant to evaluate the changes to the river channel in terms of creating new fish habitat that result from the implementation of the proposed action. This evaluation shall accompany the annual report with the photographs.

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. The Corps of Engineers must immediately provide an explanation of the causes of the taking and review with the AESO the need for possible modification of the reasonable and prudent measures.

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 and care, and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

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

1. We recommend the Corps work with the FWS and AZGF to begin an aggressive program to control nonnative aquatic organisms on the Little Colorado River, particularly fish and crayfish.
2. We recommend that livestock not be allowed to graze in the project area for the duration of the agreement with the Arizona Water Protection Fund (20 years).

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

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the 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.

The FWS appreciates the Corps of Engineers efforts to identify and minimize effects to listed species from this project. For further information please contact Jennifer Graves (x232) or Debra Bills (x239). Please refer to the consultation number, 22410-2006-F-0222, in future correspondence concerning this project.

Sincerely,

/s/ Steven L. Spangle
Field Supervisor

cc: Project Leader, Arizona Fishery Resources Office, Pinetop, AZ

Bob Broscheid, Arizona Game and Fish Department, Phoenix, AZ

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APPENDIX A: CONCURRENCE

Concurrence

Appendix A documents our concurrence with your determination of “may affect, is not likely to adversely affect” for the Southwestern willow flycatcher. In addition, the FWS has provided reasoning for this concurrence.

Southwestern willow flycatcher (*Empidonax traillii extimus*)

The FWS concurs with your determination that the proposed action may affect, but is not likely to adversely affect the Southwestern willow flycatcher for the following reasons:

1. While there is designated critical habitat for the southwestern willow flycatcher, none is found in the action area, so none will be affected.
2. No known willow flycatchers occur at the project site; however, no surveys have been conducted specifically for the species. Surveys have been conducted on Forest Service habitat to the south, and the nearest known occurrence is south of the Greer Lakes, approximately 12 miles south of the project area.
3. Habitat in the project area is not currently suitable for nesting southwestern willow flycatchers. Reach 1 has no willows associated with the riparian corridor and only a few sparse larger trees consisting of individual buckthorn, narrowleaf cottonwoods, and a single large box elder. Reach 2 and 3 have coyote and strapleaf willows growing along portions of the riparian area but these are typically less than 10-feet high and occur in smaller clumps and patches along the river corridor.
4. Bioengineering activities will lead to an increase in woody vegetation along this portion of the Little Colorado River which will benefit the willow flycatcher by providing habitat for dispersal or migration.

Chiricahua leopard frog

The FWS concurs with your determination that the proposed action may affect, but is not likely to adversely affect the Chiricahua leopard frog for the following reasons:

1. While no surveys have been conducted for this project, Arizona Game and Fish Heritage Database have no records of this species within a 3-mile radius of the project. Additionally, the Final Rule listing the species as threatened notes that the species is considered to be extirpated from the Little Colorado watershed (67 FR 40790, June 13, 2002). However, given the species range and habitat suitability in the action area, there is potential habitat for the species within the project area. It is extremely unlikely that the species currently occurs in the action area of the proposed project based on survey information. Therefore, any potential direct or indirect effects on the species are discountable.
2. Indirect effects to frogs and their habitats may occur from small amounts of sediment generated by the proposed action. The amount of these sediments expected to reach and impact frogs is unknown but is likely to be insignificant because of the distance to known populations.

3. APPENDIX B: FIGURES

Figure 1: Project Location

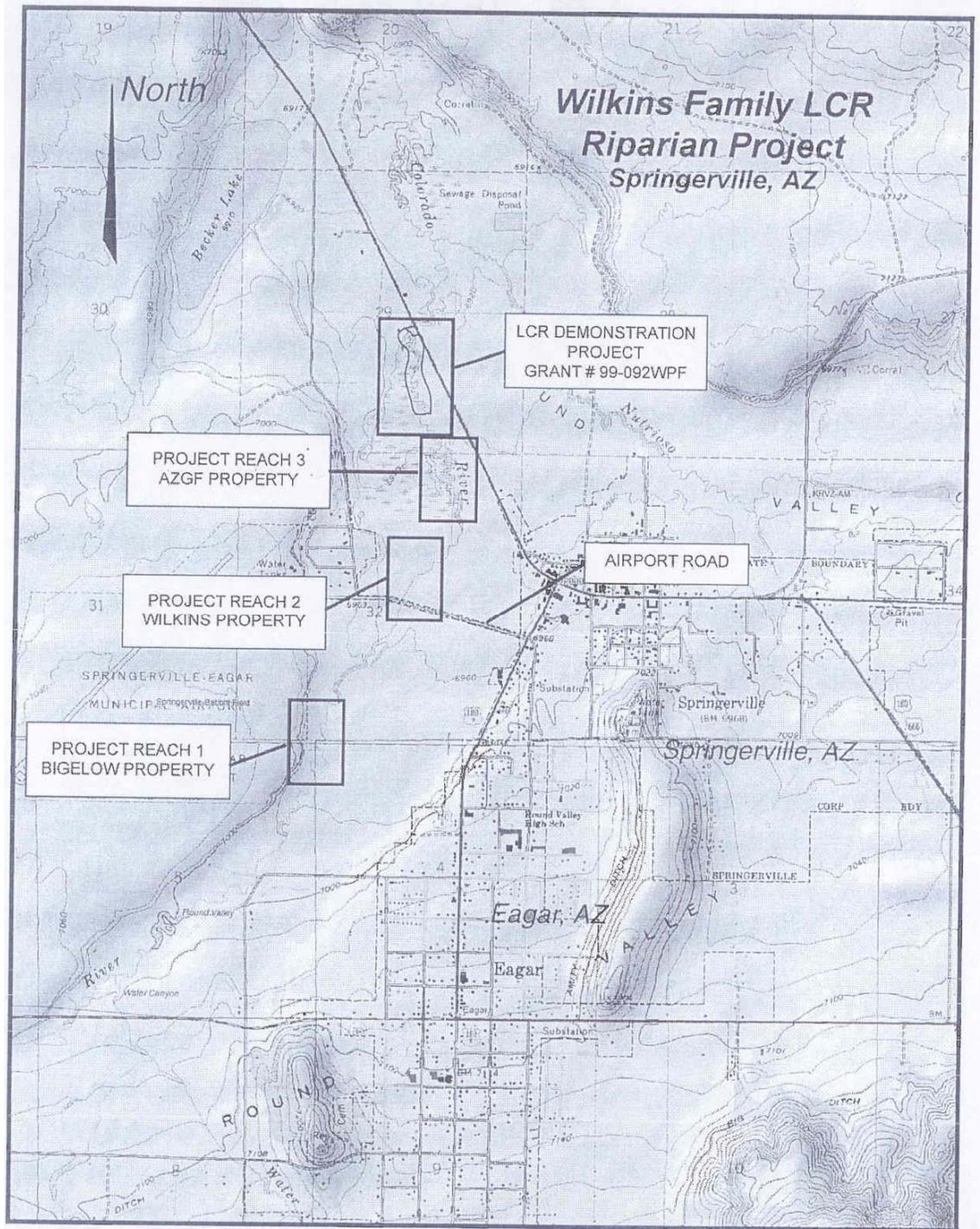
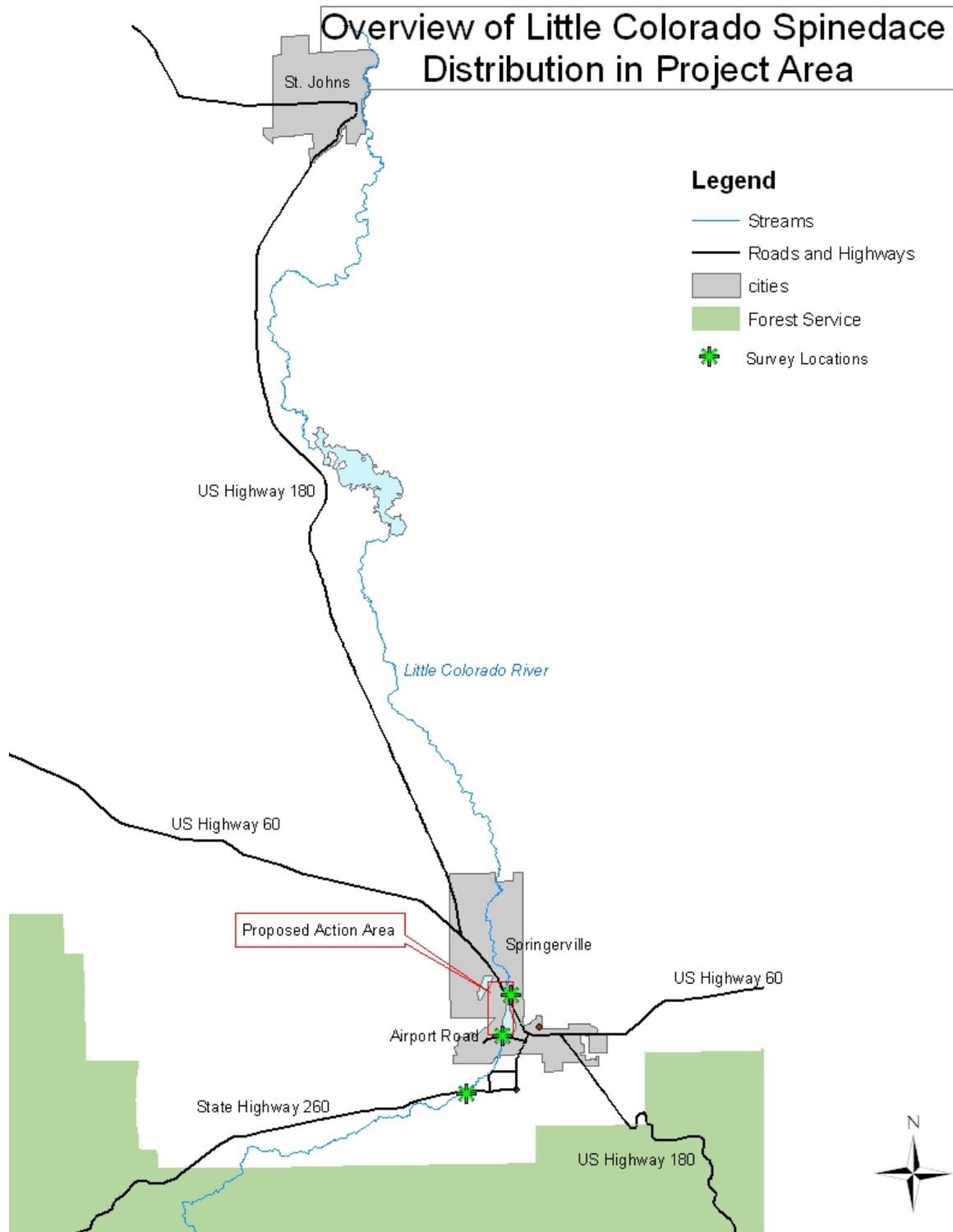


Figure 2: Overview of Little Colorado Spinedace in Project Area.



APPENDIX C: TABLES AND FIGURES**Table 1:** Formal consultations for actions affecting Little Colorado spinedace.

Consultation #	Date	Name	Anticipated Incidental Take
02-21-88-F-0029	May 22, 1989	US Route 180/Arizona 666	Yes, death to approximately 8% of the population and loss of 500 linear feet of habitat
02-21-88-F-0029 R1	April 30, 1991	Reinitiaion of US Route 180/Arizona 666	Yes, death to approximately 8% of the population and loss of 275 linear feet of habitat
02-21-92-F-0403	August 2, 1995	Federal Aid's Transfer of Funds to the Arizona Game and Fish Department for Exotic Fish Stocking in Nelson Reservoir, Blue Ridge Reservoir, and Knoll Lake	Yes, take anticipated; however, take is not quantifiable so surrogate measures are provided
02-21-92-F-0403	November 20, 1995	Federal Aid's Transfer of Funds to the Arizona Game and Fish Department for Exotic Fish Stocking in Nelson Reservoir, Blue Ridge Reservoir, and Knoll Lake	Yes, take anticipated; however, take is not quantifiable so surrogate measures are provided
02-21-96-F-339	July 31, 1996	Greer River Reservoir Dam	None anticipated
02-21-01-F-0425	May 6, 1997	Buck Springs Range Allotment Management Plan	Yes, take anticipated; however, take is not quantifiable so surrogate measures are provided
02-21-88-F-167	March 30, 1998	Phoenix Resource Management Plan for the Bureau of Land Management	None anticipated
02-21-97-F-343	March 31, 1998	Bank Stabilization on the Little Colorado River South of St. Johns, Arizona	Yes, take of 5 adults or juveniles Little Colorado spinedace anticipated
000089RO	February 2, 1999	Regional ongoing grazing activities on allotments (Buck Springs, Colter Creek, Limestone, South Escudilla)	Yes, take anticipated; however, take is not quantifiable so surrogate measures are provided
2-21-96-F-422 and 423	April 16, 1999	Amendment No 1 Phoenix District AZ Grazing EIS Upper Gila San Simon	None anticipated
02-21-99-F-0167	July 1, 1999	McCain and Sears Whip Bank Stabilization on the Little Colorado River	Yes, take anticipated; however, take is not quantifiable so surrogate measures are provided

02-21-92-F-0403	May 25, 2001	Federal Aid's Transfer of Funds to the Arizona Game and Fish Department for Exotic Fish Stocking in Nelson Reservoir, Blue Ridge Reservoir, and Knoll Lake	Yes, take anticipated; however, take is not quantifiable so surrogate measures are provided
2-21-01-F-218	August 21, 2001	Upper Little Colorado River Riparian Enhancement Demonstration Project	Yes, take anticipated; however, take is not quantifiable so surrogate measures are provided
02-21-02-0220	October 4, 2002	Crayfish Study in Nutrioso Creek *	Yes, take of 10 Little Colorado spinedace anticipated
02-21-01-101	April 19, 2002	Apache trout reintroduction	None anticipated
2-21-01-F-0425	April 30, 2003	Buck Springs Allotment Management Plan	Yes, take anticipated; however, take is not quantifiable so surrogate measures are provided
02-21-03-0369	October 16, 2003	Replacement of Little Colorado River Bridge #1184 State Route 87	Yes, take anticipated; however, take is not quantifiable so surrogate measures are provided
02-21-03-F-0210	September 3, 2005	BLM Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management	None anticipated
02-22-03-F-0366	June 10, 2005	Region 3 Forest Service Continued Implementation of the Land and Resource Management Plans for the 11 Southwestern Forests and Grasslands	Yes, take anticipated; not possible to quantify. FWS concludes that IT of LCS will be exceeded if there is a loss of one population in the current number of spinedace populations on NFS lands without being off-set by newly established populations.
02-21-05-F-0640	December 29, 2005 (DRAFT)	Eager South Wildland Urban Interface Project	Yes, take anticipated; not able to quantify. FWS defined incidental take in terms of habitat conditions, and used surrogate measures to identify when take is exceeded.
02-21-05-F-XXXX	In progress (DRAFT to FS?)	Nutrioso Wildland Urban Interface Project	Yes, take anticipated; not able to quantify
02-21-02-F-0206	In progress	East Clear Creek Watershed Health Project	Biological Opinion due May 5, 2006
02-21-05-I-0316	Formal consultation not initiated yet	C.C. Cragin Reservoir	Formal consultation not initiated yet

* The project "Crayfish Study in Nutrioso Creek" never occurred.