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In Reply Refer To:
AESO/SE
22410-2006-F-0464

November 29, 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: X Diamond Ranch Little Colorado River Riparian Enhancement Project U.S. Corps of Engineers File Number; 2006-00204-DE

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 May 19, 2006, and received by us on May 23, 2006. At issue are impacts that may result from the proposed X Diamond Ranch Little Colorado River (LCR) Riparian Enhancement Project located in Apache County, Arizona. The proposed action may affect the endangered southwestern willow flycatcher (*Empidonax traillii extimus*) and its critical habitat and the threatened Little Colorado spinedace (*Lepidomeda vittata*).

In your letter, you requested our concurrence that the proposed action was not likely to adversely affect the threatened Apache trout (*Oncorhynchus apache*), Chiricahua leopard frog (*Rana chiricahuensis*), Mexican spotted owl (*Strix occidentalis lucida*), and the nonessential experimental population of the Mexican gray wolf (*Canis lupus baileyi*). We provided concurrences for these species in our June 30, 2006, initiation letter.

This biological opinion is based on information provided in the April 2006 biological evaluation, the August 2005 design report, the March 2006 baseline monitoring report, telephone and email conversations with 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

- May 23, 2006: The U.S. Army Corps of Engineers (Corps) requested formal consultation for the proposed X Diamond Ranch Little Colorado River Riparian Enhancement Project on the endangered southwestern willow flycatcher and its critical habitat. The Corps also requested our concurrence that the proposed project may affect, but would not likely adversely affect, the threatened Apache trout, Chiricahua leopard frog, Mexican spotted owl, Little Colorado spinedace, and the endangered Mexican gray wolf.
- June 30, 2005: We sent a 30-day letter initiating formal consultation. Included within that letter were concurrences with your determinations for Apache trout, Chiricahua leopard frog, Mexican spotted owl, and Mexican gray wolf. We were unable to concur with the Corps determination for Little Colorado spinedace and recommended that the Corps initiate formal consultation for this species.
- July 12, 2006: The Corps requested formal consultation for the Little Colorado spinedace via email.
- November 16, 2006: A draft biological opinion was sent to the Corps along with the request to extend the consultation period.
- November 28, 2006: The Corps responded to the draft biological opinion and granted a 30-day extension from the date of their letter. Therefore, the consultation ends December 28, 2006.

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 and aquatic enhancement project along a 1-mile reach of the Little Colorado River (LCR). The project is being funded through an Arizona Department of Water Resources 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 the privately owned X Diamond Ranch. The X Diamond Ranch is located along the LCR upstream from its confluence with the South Fork of the Little Colorado River (Appendix A: Map 1). The project is located in Sections 17, 18, 19, and 20, T8N, R28E and lies at approximately 7,500 feet in elevation in a landscape of Ponderosa pine forest. The property includes approximately 6,400 feet of the LCR.

Enhancement Recommendations:

The project area was divided into 4 reaches to facilitate assessment and design. Enhancement practices will increase channel complexity, decrease high channel velocities, and enhance riparian vegetation and aquatic habitat. The enhancement recommendations are broken down by reach. Disturbance includes areas where equipment is operating along banks, resloping of banks, or installing rock, and is the area from the toe of the bank extending back 20 feet for the length of the treatment.

Reach 1:

This upper reach generally represents reference conditions for the project. As a result, enhancement tasks will be limited in this reach to the repair and/or lowering of existing structures. Total disturbance along banks is 900 linear feet or 18,000 square feet.

Reach 2:

The lower end of this reach (below the vehicle bridge) represents the greatest opportunity for enhancement of riparian and aquatic habitats. Boulder clusters will be installed in the runs within this reach and boulder-bank treatments will be installed in the meander bends and/or transition sections in conjunction with boulder clusters. Willow trenches, vertical bundles, and pole plantings will be installed with boulder-bank treatments especially in the meander bends. The floodplain along the right bank will be lowered to match reference conditions and increase the bank habitats for small-bodied native fish [bluehead suckers (*Pantosteus discobolus*) and speckled dace (*Rhinichthys osculus*)]. Total disturbance along banks is 1,010 linear feet or 20,200 square feet.

Reach 3:

The willow community is well established in this reach, but extends only approximately 15 to 20 feet on either side of the channel. Enhancement will consist primarily of boulder clusters and boulder-bank treatments to enhance aquatic habitats. Willow clump plantings and/or layers will be installed to provide rooting structure. Two existing structures will be lowered to reduce flow velocities and provide more channel complexity. Heavy equipment will cross the river at two designated locations. These locations are in riffle sections with a hard bed, already impacted by livestock crossing. Total disturbance along banks is 1,440 linear feet or 28,800 square feet in this reach.

Reach 4:

This lowermost reach is dominated by extensive beaver activity. No alterations will be made in the existing beaver ponds pending further study as these isolated ponds appear to benefit small-bodied native species. The willow community is well established and spreads across the valley floor in response to harvesting and ponding. Enhancement will concentrate on the channel immediately below the ponds and include boulder clusters and boulder-bank treatments to provide aquatic habitats and stabilize two vertical, eroding banks. An existing structure will be lowered near the bottom of the reach. Total disturbance along the banks is 545 linear feet or 10,900 square feet.

Enhancement Practices:

Stream Channel Morphology

A number of constructed rock drop structures are either damaged or installed at too high an elevation. These will be repaired. Equipment used for the installation of bank stabilization activities and aquatic enhancement will be limited to a single track hoe or large back-hoe and a dump truck.

Floodplain Lowering

This task includes the lowering of point bars or other floodplain features to restore access during high flow events. The practice will not be widely used and there is only one area in Reach 2 where this practice is planned. All disturbed areas will be reseeded, mulched, and protected with erosion fabric.

Repair Existing Structures

The majority of rock structures previously installed for fish habitat enhancement are sound and functioning, though there are several structures throughout the project which are experiencing erosion around the bank areas. These will be repaired and/or reconstructed to be more stable. In general, these structures should be constructed with a dip in the middle and a “V” or arch in the upstream direction. This geometry tends to center stream flow and reduce velocities and shear stress against the stream banks.

There are also several structures which have a drop exceeding 3 vertical feet. These create high flow velocities that do not create high-quality habitat conditions. Although the maximum height of weir structures is generally 1/3 bankfull depth (approximately 1 foot), a number of structures twice that high are functioning and appear stable. Therefore, structures with drops greater than 3 feet will be lowered to a maximum drop of approximately 1 foot.

Structural Practices

Bank resloping

Most eroding banks will be stabilized with bank-boulder treatments described above. Where necessary, individual banks may need to be resloped and planted with willows. These bank sections will be reshaped to a 2:1 ratio to provide a stable surface for streamside vegetation. Banks will be resloped using a backhoe or track excavator. Every effort will be made to pull excavated materials up the bank and away from the stream. Material will be smoothed on higher terraces or removed. These banks will then be treated through structural or bioengineering practices to provide further stabilization. All disturbed areas will be reseeded, mulched, and protected with erosion fabric.

Cross-Vane Weir

A number of weirs of varying configuration currently exist within the project area. No new cross-vane weirs are planned, but the cross-vane weir standard design will provide design guidance for the repair or replacement of failing existing structures.

This type of structure is placed to control channel bed grade, to center flows, and/or to create scour pools. The structure is constructed of individual boulders or smaller inter-locking rock. It is shaped in a V with the point aimed upstream. The arms are attached to the bank at approximately at floodplain elevation and angle away from the bank sharply (20° to 30° from the bank). The center of the weir dips gradually upstream (4 to 7%) and ties to channel bed elevation. If the cross-vane weir is used as a diversion structure or for grade control, the center height above the channel should never exceed 1/3 bankfull depth.

Riparian Habitats/Bioengineering

The series of practices described here serve dual purposes: 1) to provide long-term stabilization for stream banks, and 2) to support aquatic and riparian habitats. All plantings will utilize native species harvested locally. No more than 1/3 of mature stem on any plant will be removed. The plant responds by sending up new shoots to replace those harvested. Approximately 6,200 willow stems will be needed for plantings.

Brush Revetment

This practice consists of a series of evergreen or other brushy trees tied end-to-end and placed along the toe of the stream bank. The trees are 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 provided by the mass of tree limbs. 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 are inserted in the moist bank. Holes can be drilled mechanically or hydraulically. The willows will be native species and harvested locally.

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 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 plants 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

The following practices are designed to enhance the habitat characteristics needed to enhance aquatic habitats and restore proper stream geomorphology. The practices are designed to provide additional heterogeneity to channel reaches. The practices will be installed in 15-foot habitat units to facilitate monitoring their effectiveness. There will be an effort to install a minimum of 20 habitat units per reach to provide enough data for statistical analyses.

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. Boulder clusters will create cross-channel currents and/or vary channel widths. The structures should be placed in areas with relatively swift flow to prevent deposition. In general they will be placed in swift runs between the existing rock structures. Center channel clusters will be placed a minimum of 25 feet above and below a drop at the existing structures to minimize impinging on impoundments or scour pools. There will be 5- to 30-foot spacing between structures.

Bank-Boulders

Bank-boulders are a collection of unsorted rocks to provide bank protection and create aquatic habitats. The large size of the rock will create a complex bank profile producing varying flow directions and velocities and protective structure for small fishes. The structures should create an irregular shoreline. The bank-boulder habitats will be constructed in 15-foot units to facilitate effectiveness monitoring.

A variety of structural and bioengineering practices including rock vanes and brush revetments will also provide additional habitats.

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 Resources Water Protection Fund grant.

Monitoring along the 6,400 ft segment and livestock exclusions will occur for 3 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 if repairs are needed.
- 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 native fish species.

Description of the Action Area

For this consultation we are defining the action area as the 6,400 feet of stream corridor, adjacent floodplains, approximately 30 feet of terraces on either side of the channel and floodplain, and 15 miles downstream within the Little Colorado River since flows may carry impacts downstream. The construction area will be approximately 1.42 acres, separated into four areas: Reach 1 measuring 18,000 sq. ft. (0.41 acre), Reach 2 measuring 20,200 sq. ft. (0.46 acre), Reach 3 measuring 28,800 sq. ft. (0.66 acre), and Reach 4 measuring 10,900 sq.ft. (0.25 acre). These areas were calculated at the banks where resloping or rock placement activities will take place and include areas where the equipment will work. Construction will be limited to the disturbance of a 6-week period beginning in late 2006.

From the border of the Apache-Sitgreaves National Forest at River Reservoir downstream to X Diamond Ranch, brown trout (*Salmo trutta*) are known occupants in the Little Colorado River. Downstream from the X Diamond Ranch, the AGFD does not manage for brown or rainbow trout (*Oncorhynchus mykiss*) in the Little Colorado River proper. For the purpose of this consultation, the action area continues downstream where trout may reasonably move from the renovation site to adversely affect Little Colorado spinedace. This population of Little Colorado spinedace is located near the Wenima Wildlife Area approximately 15 miles downstream of the proposed project.

STATUS OF THE SPECIES

Little Colorado Spinedace

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 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. 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 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.

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.

AGFD 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. Surveys conducted in April 2006 in Nutrioso Creek located 128 spinedace, upstream of Nelson Reservoir. The largest concentration of spinedace was found on the EC Bar Ranch (private in-holding). The fish were associated with submerged woody debris from branches and exposed willow roots. No spinedace were located downstream of Nelson Reservoir (in Nutrioso Creek) or in Rudd Creek. However, in June 2006, AGFD located 415 spinedace in a drying pool in Nutrioso Creek above Nelson Reservoir that were moved into a more permanent pool on the EC Bar Ranch, and an additional 74 spinedace were located in Rudd Creek.

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 AGFD 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.

In order to try and increase the numbers of spinedace in the watershed, the AGFD, FWS, and Forest Service are implementing the stocking strategy identified in the *East Clear Creek Watershed Recovery Strategy for the Little Colorado Spinedace and Other Aquatic Species*. During the spring of 2000, the AGFD stocked approximately 50 spinedace in Houston Draw and approximately 30 spinedace in General Springs Canyon. These spinedace were translocated from the spinedace refugium at the Flagstaff Arboretum pond. Due to a lack of water, these two sites do not appear to have been successful stocking sites. In addition, the Forest Service stocked 57 spinedace into Dane Canyon on August 15, 2002. These fish were not located again during subsequent surveys. On July 30, 2004, the AGFD 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 June 2005, AGFD translocated 122 adult spinedace from the Flagstaff Arboretum to Dane and Bear Canyons. AGFD stocked 63 fish into two pools in West Bear Canyon and 59 fish into a single pool in Dane Canyon. Prior to the stocking, surveys conducted the last five to ten

years have not located spinedace in either Dane or Bear Canyons. Surveys conducted in 2006 have located adult and young-of-the-year spinedace in both Dane and Bear canyons.

During annual spring surveys in 2005, AGFD 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 Blue Ridge Reservoir. It is likely that the fish was flushed downstream following the heavy winter and spring precipitation.

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 A: 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 (2006) project was the Wilkin's Family Little Colorado River Riparian Enhancement Project (22410-2006-F-0222) located approximately 8.5 miles downstream of the X Diamond Ranch project. The Upper Little Colorado River Riparian Enhancement Demonstration Project (02-21-01-F-0218) approximately 9.5 miles downstream was consulted on in 1999 and was re-evaluated this year. 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 Eagar 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.

Southwestern Willow Flycatcher and Its Critical Habitat

Description

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.

Listing and critical habitat

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

On May 11, 2001, the 10th circuit court of appeals set aside designated critical habitat in those states under the 10th circuit's jurisdiction (New Mexico). The Fish and Wildlife Service decided to set aside critical habitat designated for the southwestern willow flycatcher in all other states (California and Arizona) until it could re-assess the economic analysis.

On October 19, 2005, the Fish and Wildlife Service re-designated critical habitat for the southwestern willow flycatcher (U.S. Fish and Wildlife Service 2005). A total of 737 river miles across southern California, Arizona, New Mexico, southern Nevada, and southern Utah were included in the final designation. The lateral extent of critical habitat includes areas within the 100-year floodplain. The primary constituent elements of critical habitat include riparian plant species in a successional riverine environment (for nesting, foraging, migration, dispersal, and shelter), specific structure of this vegetation, and insect populations for food. A variety of river features such as broad floodplains, water, saturated soil, hydrologic regimes, elevated groundwater, fine sediments, etc., help develop and maintain these constituent elements (U.S. Fish and Wildlife Service 2005).

A final recovery plan for the southwestern willow flycatcher was signed by the U.S. Fish and Wildlife Service's Region 2 Director on August 30, 2002, and was released to the public in 2002 (U.S. Fish and Wildlife Service 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. Recovery is based on reaching numerical and habitat-related goals for each specific Management Unit established throughout the subspecies range and establishing long-term conservation plans (U.S. Fish and Wildlife Service 2002). Extensive information on the species, its life history, habitat, and other relevant information is available in the recovery plan.

Reasons for endangerment

Reasons for decline have been attributed to primarily loss, modification, and fragmentation of riparian breeding habitat, along with a host of other factors including loss of wintering habitat and brood parasitism by the brown-headed cowbird (*Molothrus ater*) (Sogge *et al.* 1997, McCarthy *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, 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 (tamarisk; *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 Arizona and other parts of the bird's range. In 2001 in Arizona, 323 of the 404 (80 percent) known flycatcher nests (in 346 territories) were built in a tamarisk tree (Smith *et al.* 2002). Tamarisk had been believed by some to be a habitat type of lesser quality for the southwestern willow flycatcher, however comparisons of reproductive performance (U.S. Fish and Wildlife Service 2002), prey populations (Durst 2004), and physiological conditions (Owen and Sogge 2002) of flycatchers breeding in native and exotic vegetation has revealed no difference.

The flycatcher's habitat is dynamic and can change rapidly: nesting 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. The flycatcher's use of habitat in different successional stages may also be dynamic. For example, over-mature or young habitat not suitable for nest placement can be occupied and used for foraging and shelter by migrating, breeding, dispersing, or non-territorial southwestern willow flycatchers (McLeod *et al.* 2005, Cardinal and Paxton 2005). That same habitat may subsequently grow or cycle into habitat used for nest placement. Because of those changes, flycatcher "nesting habitat" is often described as occupied, suitable, or potential (U.S. Fish and Wildlife Service 2002). Areas other than locations where nests are located (foraging, sheltering, territory defense, singing, etc.) can also be "occupied flycatcher habitat," and as a result, essential to the survival and recovery of the flycatcher (U.S. Fish and Wildlife Service 2002). 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, use, and occupancy over time (Finch and Stoleson 2000).

Past Consultations

Since listing in 1995 to 2005, at least 146 Federal agency actions have undergone (or are currently under) formal section 7 consultation throughout the flycatcher's range. Since critical habitat was finalized in October 2005, one formal opinion has been issued for southwestern willow flycatcher critical habitat in Arizona. While many opinions were issued for the previous critical habitat designation, the stream reaches and constituent elements have changed. 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 non-native habitat removal, dam operations, river crossings, ground and surface water extraction, etc.). Stochastic events also continue to change the distribution, quality, and extent of flycatcher habitat.

Critical Habitat

Stream segments within 21 Management Units found in five Recovery Units were designated as critical habitat. Stream segments occur in southern California, southern Nevada, southwestern Utah, Arizona, New Mexico, and south-central Colorado. In Arizona there are critical habitat segments in Apache, Cochise, Gila, Graham, Greenlee, La Paz, Maricopa, Mohave, Pima, Pinal, and Yavapai counties. These areas of critical habitat are expected to provide sufficient riparian habitat for breeding, non-breeding, dispersing and migrating southwestern willow flycatchers and to sustain southwestern willow flycatchers across their range. A summary of primary constituent elements essential to the conservation of the southwestern willow flycatcher as described in the rule are:

1. Riparian habitat in a dynamic successional riverine environment (for nesting, foraging, migration, dispersal, and shelter) that comprises:
 - a. Trees and shrubs that include Goodings willow (*Salix gooddingii*), coyote willow (*Salix exigua*), Geyers willow (*Salix geyerana*), arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), yewleaf willow (*Salix taxifolia*), pacific willow (*Salix lasiandra*), boxelder (*Acer negundo*), tamarisk (*Tamarix ramosissima*), and Russian olive (*Eleagnus angustifolia*).
 - b. Dense riparian vegetation with thickets of trees and shrubs ranging in height from 6 to 98 feet. Lower-stature thickets (6 to 13 ft tall) are found at higher-elevation riparian forests and tall-stature thickets are found at middle- and lower-elevation riparian forests;
 - c. Areas of dense riparian foliage at least from the ground level up to approximately 13 ft above ground or dense foliage only at the shrub level, or as a low, dense tree canopy;
 - d. Sites for nesting that contain a dense tree and/or shrub canopy (the amount of cover provided by tree and shrub branches measured from the ground) (*i.e.*, a tree or shrub canopy with densities ranging from 50 percent to 100 percent);

- e. Dense patches of riparian forests that are interspersed with small opening 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 0.25 acre or as large as 175 acres; and
2. A variety of insect prey populations found within or adjacent to riparian floodplains or moist environments, including: flying ants, wasps, and bees (Hymenoptera); dragonflies (Odonata); flies (Diptera); true bugs (Hemiptera); beetles (Coleoptera); butterflies/moths and caterpillars (Lepidoptera); and spittlebugs (Homoptera).

The primary constituent elements described above are results of the dynamic river environment that germinates, develops, maintains, and regenerates the riparian forest and provides food for breeding, non-breeding, dispersing, territorial, and migrating southwestern willow flycatchers.

Placed in the context of the subspecies' wide geographic distribution, the disjunct nature of the populations, the dynamic aspects of its habitat, its endangered status, and its recovery goals, each stream segment identified within the Management Units is essential for the conservation of the southwestern willow flycatcher (USFWS 2002). Segments are distributed throughout a large portion of the subspecies' range in order to help avoid catastrophic losses and to provide metapopulation stability, gene flow, and connectivity. Each segment is essential because it contains one or more of the primary constituent elements and, as a result, provides flycatcher habitat for breeding, feeding, sheltering, and migration. Each segment contributes to the conservation role of critical habitat by providing for the numerical and habitat-related goals identified in the Recovery Plan (USFWS 2002). Each segment was identified in the Recovery Plan as an area that sustains flycatcher habitat. The distribution and abundance of territories and habitat within each segment are expected to shift over time as a result of natural disturbance events such as flooding that reshape floodplains, river channels, and riparian habitat. The factors affecting critical habitat within all Management Units are similar to the listing factors described above.

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 AND CRITICAL HABITAT WITHIN THE ACTION AREA

Little Colorado spinedace

Four fish sampling surveys were conducted in the renovation area from the spring through the winter of 2005 specifically for this project. The four sampling efforts resulted in no individuals of the Little Colorado River spinedace. Arizona Game and Fish Department staff indicated that

there are no records of the spinedace being located above the project on Forest Service lands or immediately below the project area on State Lands (Natural Channel Design 2006a). The nearest populations known in this system occur approximately 8 miles downstream of the renovation site (within the action area) in the Little Colorado River above the confluence with Nutrioso Creek. Fish sampling surveys of this downstream population on the Little Colorado River portion of the AGFD's Becker Lake - Enders Wildlife Area were conducted in 2002 and 2005 by AGFD. During these surveys robust populations of the spinedace, including many juvenile fish, were found on the AGFD property (spinedace comprised approximately 11.4% of the fish caught). Non-native fathead minnows (*Pimephales promelas*) are present in this area, but the spinedace appear to be able to withstand the current level of competition at this time. Surveys in 2005 also located native Little Colorado suckers (*Catostomus sp.*), bluehead suckers (*Castostomus d. discobolus*), speckled dace (*Rhinichthys osculus*) and an unidentified sucker (too small to accurately identify). Other non-native species captured included crayfish, bullfrog tadpoles, and Asiatic clams (*Corbicula sp.*). Approximately 1.7 miles downstream of the renovation site, a large diversion dam exists on the Little Colorado River and has a drop which serves as an effective fish barrier for fish moving upstream, but fish can move downstream below the barrier, especially in flood years. Critical habitat for this species does not exist in the action area.

Southwestern willow flycatcher and its critical habitat

No known willow flycatchers occur at the renovation site and no surveys have been conducted specifically for the Southwestern willow flycatcher. Surveys have been conducted on Forest Service lands upstream of the project. The nearest known occurrence is to the south of the Greer lakes approximately 4 miles to the south of the project area.

Critical habitat occurs throughout the action area. Riparian vegetation within the action area includes dense alders, Geyers willows, and associated insect populations which are constituent elements of critical habitat. The density of riparian vegetation varies across the project area. The riparian band is marginal nesting habitat (constituent element 1d) but most of the project can be considered forging habitat and could be used for dispersal or as a migration corridor.

B. FACTORS AFFECTING SPECIES AND CRITICAL HABITAT ENVIRONMENT WITHIN THE ACTION AREA

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 adapts 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.

The Little Colorado River is perennial in the project reach. The Little Colorado River 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. Greer Lakes, a

series of reservoirs located below Greer Valley and upstream of the project, store waters for agricultural uses downstream. These reservoirs are not large but their operations complicate the base and flood flows at the project site. Below the reservoirs a number of smaller tributaries join the river above the project.

The Little Colorado River is a relatively low gradient, gravel bed, meandering stream with a well-vegetated floodplain through the project reach. Channel slopes are greatest in the upper reaches where the stream exits from a steep, narrow canyon section. Channel slopes decrease downstream through the project. Sinuosity increases through the project area and substrate topography changes from step-pools to riffle-runs in response to the decreasing channel slope. The channel geomorphology has been altered by renovation following large flood events in the 1960s. This repair work was generally intended to stabilize the stream channel to reduce additional erosion. This work may have influenced channel alignment in Reaches 2, 3, and 4. However, stream modification over the past 40 years has been limited to stabilization of eroding banks, planting of native vegetation, and the installation of a number of rock weir structures by the Soil Conservation Service in the late 1980s to improve aquatic habitat.

A well-established native riparian plant community is associated with the project area. These communities include various native woody species such as Arizona alder, narrowleaf cottonwood (*Populus angustifolia*), New Mexico locust (*Robinia neomexicana*), black walnut (*Juglans nigra*), box elder, red osier dogwood (*Cornus sericea*), Geyers willow, and coyote willow. The herbaceous community is comprised of a variety of sedge and rush species. Tamarisk is present but is at the upper limits of its range and very uncommon. It does not appear to be a threat to the native community.

Vertical structure in the form of woody plant species on the project site was assessed by dividing the woody communities into 4 categories (Table 2). Extensive overstory canopy is created by alder, narrowleaf cottonwood, and boxelder and limited to the upper end of Reach 1 where the stream exists within a narrow canyon. Reaches 2-4 are a mixture of willow stands and open grasses/wetland plants. However, the mix of willows and open areas is not evenly distributed within each reach.

Reach	Native I	Native II	Native II	Native IV	% Native Vegetation
1	43%	0%	57%	0%	100%
2	0%	0%	52%	48%	100%
3	0%	0%	76%	24%	100%
4	0%	0%	50%	50%	100%

Native I: Overstory more than 15 feet tall; intermediate class 2-15 feet tall.
 Native II: Overstory more than 15 feet tall; no intermediate class 2-15 feet tall.
 Native III: No overstory more than 15 feet tall; intermediate class 2 -15 feet tall.
 Native IV: Native grasses/wetland species; no overstory or intermediate class.

Currently, the riparian habitat through the 6,400 feet of the project site is limited to an average of 30 to 60 feet wide, non-contiguous band which follows along the river and is surrounded by open

pasture or thinned woodland. This vegetation consists of dense alders and Geyers willows at the southern end of the project in Reach 2, thinning out to sparsely growing coyote willows at the northern end. The riparian corridor is fairly continuous with woody species (willow and alder) in Reach 1, becoming scattered and narrower in Reach 2 where it converts to an approximately 950-foot section devoid of most woody riparian species. Reach 3 has denser Geyer willows which thin out towards the lower end. Reach 4 has a large beaver dam complex in the upper end with scattered Geyer and coyote willows, converting to mostly smaller and sparser coyote willow towards the end of the project. The riparian band is marginal southwestern willow flycatcher nesting habitat in Reach 1 due to the narrow size of the corridor, and becomes patchier downstream.

Fish communities in the renovation area were sampled four times between March and June 2005. The purpose of the sampling was to identify associations between fish species and specific habitat characteristics. Healthy communities of both small-bodied native species and larger trout species were present within the project area (the entire action area was not surveyed). The native fish community was dominated by speckled dace with small numbers of adult blue head suckers. The trout community consisted of all age classes of brown trout suggesting local natural recruitment. Rainbow trout captured tended to be adults suggesting that these are the result of stocking rather than local reproduction. No Little Colorado River spinedace or Apache trout were found in sampling.

Naturally reproducing trout populations occur in some stream segments of the Little Colorado River. The ancestors of these fish were probably stocked as fingerlings into the stream or reservoirs prior to 1993, by FWS and AGFD in support of a recreational fishery. Brook, brown, and rainbow trout, which have not been stocked since 1993, still survive in waters of the Little Colorado basin (AGFD files). However, the Little Colorado River downstream of the project site is considered to be less-suitable for trout.

X Diamond Ranch currently has a blue ribbon fly fishery on a portion of the Little Colorado River. This is a catch and release program. Rainbow trout are stocked about once a year (Mark Whirtanen, Natural Channel Design, pers. comm. August 24, 2006).

Reach-Specific Conditions:

In Reach 1, the riparian corridor ranges from 20 to 60 feet wide and consists of a single story of Arizona alder mixed with Geyer's willow, with an occasional individual box elder, Arizona walnut, or narrowleaf cottonwood further from the river. To the east is open pasture and to the west is a mixture of pasture and stands of scattered older narrowleaf cottonwood, walnuts, ponderosa pines, and junipers with an open understory throughout.

Reach 2 has a narrower band of riparian vegetation, averaging 10 feet wide on either side of the stream for the first 200 feet of the reach. The lower end of the reach is mostly devoid of woody vegetation except for the occasional larger tree. Also, the majority of ranch buildings are located in the middle third of this reach. Again, open pasture dominates the east side of the stream with an occasional individual ponderosa pine or walnut, while the west side transitions from open pasture to the ranch buildings, and then to a dry hillside with junipers and occasional ponderosa pines.

Reach 3 has a return of more woody vegetation along the stream, mostly Geyer's willow. The riparian band ranges from 20 feet on either side of the stream at the upper end to 60 feet in width at the lower end. Open pasture is present on the east side and a mixture of open pasture converting to the dry hillside exists on the west side.

Reach 4 includes a relatively flat piece of ground which has numerous beaver dams in the upper end causing a widening of the riparian vegetation band. The woody vegetation includes clumps of Geyer's willow and increasing amounts of coyote willow. None of the willows grow very dense. After the dams, the riparian band narrows again and consists primarily of stands of small coyote willows. Reach 4 also contains a series of beaver dams that form pool/drop structures consisting of woody debris. These large pools and side channels form an extensive shoreline perimeter. According to the biological evaluation, the habitats associated with this area around the beaver dams appear to provide refugia for small-bodied native fish.

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

Construction activities are planned for the early fall (September) 2006, and are anticipated to take no longer than 6 weeks. These activities will occur after the breeding season and during or after the time when individual flycatchers are expected to be migrating out of the state. The main activities of the project include structures for fisheries habitats within the river corridor along with stabilization of eroding banks. Activities include resloping vertical cutbanks and installing bioengineering treatments (vertical bundles, willow poles, etc.). Willows will establish on vertical banks currently lacking a willow component. Since willows are a constituent element, this will have a long-term beneficial effect to southwestern willow flycatcher critical habitat. In addition, planting of willows in Reach 2 will increase the connectivity of the woody component of the riparian corridor between Reaches 1 and 3. Dense patches of riparian forest that are interspersed with small patches of open water, marsh, or shorter/sparser vegetation creates a mosaic, which is also a constituent element. In the rest of the project area, the riparian corridor is not likely to change substantially in the near future but may receive increased seed sources and woody debris.

Harvesting the willows involves removing up to 1/3 of the mature stems off an individual willow clump or stand. This practice will temporarily reduce the density of stems in an individual plant clump. The willow plants will respond the following season by increasing the branching and by sending up new shoots to replace the stems removed. Overall the total aerial extent of the willow patches should remain the same in the long-term. In the short-term there will be an effect to the

vegetative structure within the project area. There will be a short-term delay in the growth of the cut willows, and a percentage of the planted willow poles will not survive.

Additionally, heavy equipment working in the area may impact critical habitat. Heavy equipment may compact soil which effects germination and development of plants. Furthermore, vegetation can be damaged and/or destroyed from heavy equipment within critical habitat.

Since herbivory by elk, beaver, and domestic livestock can impact revegetation efforts, the renovation area will be fenced or otherwise managed to exclude all domestic livestock for a minimum period of 5 years. Fencing will be monitored regularly by the livestock manager.

The status of the species and its critical habitat and the effects of the proposed restoration action can be summarized in the following points:

1. The flycatcher is endangered, and loss of riparian habitat is the primary cause.
2. Critical habitat within the action area occurs on the Little Colorado River and occupied nesting habitat occurs approximately four miles upstream of the project area at the Greer site. This nesting site is south of the project and outside the action area.
3. Riparian habitat is, at least in part, unsatisfactory within the action area.
4. The restoration work should have a long-term beneficial effect to the constituent elements of critical habitat.

Little Colorado spinedace

Since no critical habitat exists within the action area, effects of the action only address effects to the Little Colorado spinedace itself. Adverse effects to spinedace are likely to occur in two 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 likelihood of increased predation and competition due to an increase in nonnative fish in spinedace habitat.

Sedimentation Effects:

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. Large flood events that occur immediately after construction could result in accelerated bank erosion.

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 which provides improved spawning sites. Sediment control measures are built into the project that will, if correctly implemented, prevent some of the fine sediment from entering the stream.

Non-native fish

The effect of the proposed action to Little Colorado spinedace largely involves changes to instream habitats that will improve the blue-ribbon trout fishery and result in an increase in the numbers and distribution of non-native fish. Spread of non-native fishes into southwestern freshwater ecosystems has historically resulted in the reduction or elimination of native fish populations due to predation, competition, hybridization, and other factors. The project includes treatments to reduce bank erosion and increase the quality of aquatic habitats for trout species and will enhance habitat for the small-bodied native species that currently occupy the renovation area. By enhancing trout habitat the proposed project is expected to result in an increase in overall health and abundance of rainbow and brown trout in spinedace habitat.

Natural Channel Design collected baseline data on the movement of trout within the project area (Natural Channel Design 2006b). During 2005, three mark recapture surveys (late September, late October, and mid November 2005) were conducted throughout the renovation site. A total of 831 rainbow trout were marked with floy tags and recaptured once or twice. Most fish recaptured stayed within their original capture section (65.2%). Some 289 (34.5%) fish demonstrated movement outside the original capture section. The median distance of upstream or downstream movement was 164 feet. The network of beaver dams located in Reach 4 appears to create at least a partial barrier to movement; however, to what degree fish will move across this barrier remains uncertain.

Introduction and proliferation of nonnative fishes has been documented as one of the most pervasive threats to the status of native fish communities in the southwestern United States. Nonnatives affect native fish and other aquatic fauna through predation (Meffe *et al.* 1983, Meffe 1985, Marsh and Brooks 1989, Propst *et al.* 1992, Rosen *et al.* 1995, Rinne 1999), competition (Schoenherr 1974, Lydeard and Belk 1993, Baltz and Moyle 1993, Douglas *et al.* 1994), aggression (Meffe 1984, Dean 1987), habitat disruption (Hurlbert *et al.* 1972, Ross 1991, Fernandez and Rosen 1996), introduction of diseases and parasites (Sinderman 1993, Clarkson *et al.* 1997, Robinson *et al.* 1998), and hybridization (Dowling and Childs 1992, Echelle and Echelle 1997). Little Colorado spinedace are vulnerable to predation from nonnative aquatic species, especially brown and rainbow trout. When the project area is enhanced and able to support more trout, it is reasonably certain that more trout will leave the project site and persist in the action area.

A large diversion dam exists on the Little Colorado River approximately 1.7 miles downstream of the X Diamond Ranch and has a drop which serves as an effective fish barrier for fish moving upstream. However, the barrier is ineffective at preventing brown and rainbow trout from moving downstream to occupied Little Colorado spinedace habitat, especially in flood years.

Blinn *et al.* (1993) conducted experiments in Nutrioso Creek enclosures. Wild rainbow trout and spinedace (all from Nutrioso Creek) were placed in 6.6 to 9.8 ft enclosures and fish interactions monitored. Although spinedace declined within enclosures with and without trout, significantly

more spinedace were lost from enclosures that contained wild rainbow trout (Blinn *et al.* 1993). Even though macroinvertebrates were abundant in the enclosed areas, trout consumed spinedace. However, Robinson *et al.* (2000) examined stomach contents of 54 rainbow trout captured from Nutrioso Creek and the Little Colorado River and detected no predation on spinedace although spinedace persist. Blinn *et al.* (1993) also noted that trout presence modified spinedace behavior. In the presence of trout, spinedace moved into open water, possibly making them more vulnerable to a wide variety of predators (Blinn and Runck 1990; Blinn *et al.* 1993). Robinson *et al.* (2000) also documented changes in spinedace habitat use when in the presence of rainbow trout and the shifts appeared to be dependent on the density of rainbow trout present. These studies document the adverse effects that Little Colorado spinedace in the action area may encounter due to increased interactions with either brown or rainbow trout. Trout moving into the occupied spinedace habitat are expected to prey on spinedace.

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 Apache-Sitgreaves National Forest Service lands. A number of additional activities occur at the X Diamond Ranch. Among these activities is cattle grazing and recreation. X Diamond Ranch has been a working cattle ranch since the early 1900's. Additionally, the Ranch hosts numerous recreational opportunities including lodging, horseback riding, tours and fishing.

The private property portion of the stream will continue to be managed as a private, "catch and release" fishery with populations of rainbow and brown trout. The trout community at the project site consists of all age classes of brown trout suggesting local recruitment. Rainbow trout captured tend to be adults suggesting that these are the result of stocking rather than local reproduction. Additionally, the landowner plans to continue annual stocking of rainbow trout at the project site. Habitat enhancement for nonnatives coupled with an existing healthy nonnative trout population and supplemental stockings will result in large numbers of nonnative trout throughout the action 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. One of the primary goals of the improved riparian and aquatic communities is to enhance sport fishing opportunities.

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 Little Colorado spinedace and southwestern willow flycatcher, the environmental baseline for the action area, the effects of the proposed X Diamond Ranch Little Colorado River Riparian Enhancement Project and the cumulative effects, it is the FWS's biological opinion that the X Diamond Ranch Little Colorado River Riparian Enhancement Project, as proposed, is not likely to jeopardize the continued existence of the Little Colorado spinedace and southwestern willow flycatcher, and is not likely to destroy or adversely modify designated critical habitat for southwestern willow flycatcher. Critical habitat for Little Colorado spinedace has been designated in nearby Nutrioso Creek; however, this action does not affect that area and no destruction or adverse modification of that critical habitat is anticipated.

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

We present this conclusion for southwestern willow flycatcher for the following reasons:

1. Only about one mile of critical habitat on the Little Colorado River will be affected by the proposed action. This is a very small section of the Little Colorado Management Unit. The adverse effects should be short-term with a long-term beneficial effect to constituent elements in the project area.
2. The effects of the action on the primary constituent elements are not such that the value of critical habitat for conservation of willow flycatcher is significantly reduced.

We present this conclusion for Little Colorado spinedace 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, Rudd 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. The occupied spinedace habitat downstream of the renovation site is not trout habitat. Though we do believe that the likelihood exists for brown and rainbow trout to move through that area and prey upon spinedace, we do not believe that large numbers of trout will continually inhabit the occupied spinedace area due to a lack of habitat suitability. Therefore, the presence of the nonnative trout within the action area should not result in the loss of the downstream spinedace population.

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 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 Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The 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 (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

Southwestern willow flycatcher

The project area contains potential habitat that could develop into suitable habitat with proper management. Southwestern willow flycatchers are known to occur approximately four miles to the south of the renovation area (outside of the action area) and, for this reason, we believe that the use of this area in the future is possible. We do not anticipate take of individual flycatchers will result from the proposed action. The action area does not contain breeding habitat and the work will occur outside of the breeding season.

Little Colorado spinedace

The objective of the proposed project is to enhance riparian and aquatic habitats in order to achieve a functioning stream system, healthy wildlife habitat with native riparian vegetation, and a self-sustaining mixed trout fishery. If habitat improvements result in stocked rainbow trout or expanding brown trout populations which consume spinedace, it would be directly linked to the proposed action. There are no measures built into the proposed project to ensure that stocked

rainbow trout and self-sustaining brown trout will stay within the renovation area. Because of the inherent biological characteristics of aquatic species such as Little Colorado spinedace, the short timeframe of the proposed project (3 years) and the time necessary for habitat improvements the likelihood of discovering take attributable to these actions is very small. The anticipated level of incidental take cannot be quantified because of the unknown numbers of Little Colorado spinedace in the action area, the difficulty detecting Little Colorado spinedace due to eggs, fry, and fish being small, blending into their environment, and occurring underwater in a flowing river, and the uncertainty that trout from the proposed project will move into spinedace habitat, during the short three year life of the project. Therefore, we do not anticipate take of Little Colorado spinedace is reasonably certain to occur from the proposed action during the life of the project.

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. Conduct stream surveys, downstream of the renovation site, to determine whether brown trout and/or tagged rainbow trout are moving out of the project area.

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 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-0464, in future correspondence concerning this project.

Sincerely,

/s/ Steven L. Spangle
Field Supervisor

cc: Project Leader, Arizona Fishery Resources Office, Pinetop, AZ
Assistant Field Supervisor, US Fish and Wildlife Service, Flagstaff, AZ (Attn: Shaula Hedwall)

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

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APPENDIX A: TABLES**Table 1:** Formal consultations for actions affecting the 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-0167	March 30, 1998	Phoenix Resource Management Plan for the Bureau of Land Management	None anticipated
02-21-97-F-0343	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
02-21-96-F-0422 and 0423	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
02-21-01-F-0218	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-F-0220	October 4, 2002	Crayfish Study in Nutrioso Creek *	Yes, take of 10 Little Colorado spinedace anticipated
02-21-01-F-0101	April 19, 2002	Apache trout reintroduction	None anticipated
02-21-01-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-F-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, 2004	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	May 12, 2006	Eager South Wildland Urban Interface Project	Yes, take anticipated; not possible to quantify. FWS concludes that IT of LCS will be exceeded if there are declines or poor ratings in upland or stream state conditions measured by BMPs and/or the BMPs are inadequate in preventing sediment transport as determined by monitoring.

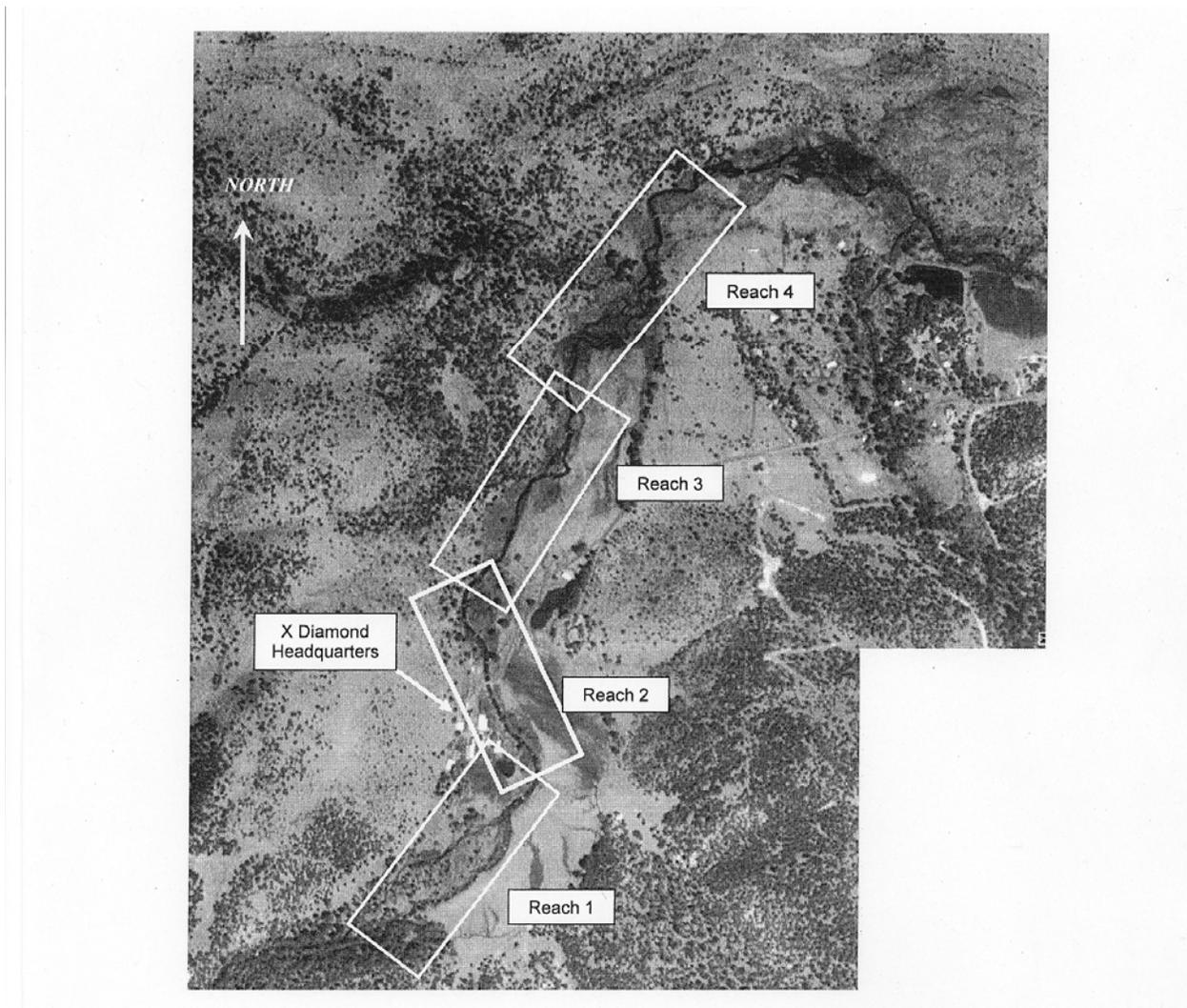
22410-2006-F-0222	May 22, 2006	Wilkin's Family Little Colorado River Riparian Enhancement Project	Yes, take anticipated; not able to quantify. FWS concludes that IT of LCS will be exceeded if channel width at bankfull stage increases in more than 20% of the project area and/or if channel bed elevations in riffle sections do not remain at current elevations as determined by monitoring data.
02-21-02-F-0206	June 1, 2006	East Clear Creek Watershed Health Project	None anticipated
02-21-05-F-0385	June 5, 2006	Nutriosio Wildland Urban Interface Project	Yes, take anticipated; not able to quantify. FWS concludes that IT of LCS will be exceeded if: there are declines in stream functioning conditions; effects to LCS are greater than those disclosed in the BAE; and/or, there is a decline in LCS constituent elements due to proposed action.
02-21-05-I-0316	Formal consultation not initiated yet	C.C. Cragin Reservoir	Formal consultation not yet initiated.
22410-2006-F-0464	In preparation	X Diamond Ranch Little Colorado River Riparian Enhancement Project	In preparation
02-21-03-F-0083	In preparation	Intra-Service Biological Opinion and Conference Opinion Regarding the Proposed Issuance of an Incidental Take Permit (TE-123062-0) and Approval of Arizona Game and Fish Department's Safe Harbor Agreement for the Chiricahua Leopard Frog in Arizona	In preparation

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

APPENDIX B: MAPS

PAGE HOLDER FOR MAP 1

PAGE HOLDER FOR MAP 2



MAP 3: Project site identified on 1998 aerial photo with project reaches designated. Project site is approximately 6,400 feet long. Little Colorado River flows from bottom to top in photo.