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50 CFR Part 17

**Endangered and Threatened Wildlife and
Plants; Final Designation of Critical
Habitat for the Spikedace and the Loach
Minnow; Final Rule**

DEPARTMENT OF THE INTERIOR**Fish and Wildlife Service****50 CFR Part 17**

RIN 1018-AF76

Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Spikedace and the Loach Minnow**AGENCY:** Fish and Wildlife Service, Interior.**ACTION:** Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), designate critical habitat pursuant to the Endangered Species Act of 1973, as amended (Act), for the spikedace (*Meda fulgida*) and the loach minnow (*Tiaroga* (= *Rhinichthys cobitis*)).

We are designating occupied and unoccupied habitat that is essential for the recovery of these two species. We are designating as critical habitat a total of approximately 1,448 kilometers (km) (898 miles (mi)) of rivers and creeks for the two species. All of the total area is designated as critical habitat for the loach minnow, and approximately 1,302 km (807 mi) of that area is also designated as critical habitat for the spikedace. Critical habitat includes portions of the Gila, San Francisco, Blue, Black, Verde, and San Pedro Rivers, and some of their tributaries, in Apache, Cochise, Gila, Graham, Greenlee, Pima, Pinal, and Yavapai Counties in Arizona; and Catron, Grant, and Hidalgo Counties in New Mexico. Critical habitat includes the stream channels within the identified stream reaches and areas within these reaches potentially inundated by high flow events. These habitat areas provide for the physiological, behavioral, and ecological features (primary constituent elements) essential for the conservation of the spikedace and the loach minnow. Federal agencies proposing, authorizing, or funding actions that may affect the areas designated as critical habitat must consult with us on the effects of the proposed actions, pursuant to section 7(a)(2) of the Act.

DATES: The effective date of this rule is May 25, 2000.

ADDRESSES: You may inspect the complete file for this rule at the Arizona Ecological Services Office, U.S. Fish and Wildlife Service, 2321 W. Royal Palm Road, Suite 103, Phoenix, Arizona 85021, by appointment, during normal business hours.

FOR FURTHER INFORMATION CONTACT: Paul Barrett, Arizona Ecological Services

Office, at the above address; telephone 602/640-2720, facsimile 602/640-2730.

SUPPLEMENTARY INFORMATION:**Background***Spikedace*

The spikedace is a small, slim fish less than 80 millimeters (mm) (3 inches (in)) long. It is characterized by very silvery sides and by spines in the dorsal and pelvic fins (Minckley 1973). This species is found in moderate to large perennial streams, where it inhabits shallow riffles with sand, gravel, and rubble substrates, and moderate to swift currents and swift pools over sand or gravel substrates (Barber *et al.* 1970; Propst *et al.* 1986; Rinne 1991). Specific habitat for this species consists of shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars; and eddies at downstream riffle edges (Propst *et al.* 1986; Rinne and Kroeger 1988). Recurrent flooding and a natural hydrograph (physical conditions, boundaries, flow, and related characteristics of waters) are very important in maintaining the habitat of spikedace and in helping the species maintain a competitive edge over invading nonnative aquatic species (Propst *et al.* 1986; Minckley and Meffe 1987).

The spikedace was first collected in 1851 from the Rio San Pedro in Arizona and was described from those specimens in 1856 by Girard. It is the only species in the genus *Meda*. The spikedace was once common throughout much of the Gila River basin, including the mainstem Gila River upstream of Phoenix, and the Verde, Agua Fria, Salt, San Pedro, and San Francisco subbasins. It occupies suitable habitat in both the mainstream reaches and moderate-gradient perennial tributaries, up to about 2,000 meters (m) (6,500 feet(ft)) elevation (Miller 1960; Chamberlain 1904; Gilbert and Scofield 1898; Cope and Yarrow 1875).

Habitat destruction and competition and predation by nonnative aquatic species have severely reduced its range and abundance. It is now restricted to approximately 466 km (289 mi) of stream in portions of the upper Gila River (Grant, Catron, and Hidalgo Counties, NM); middle Gila River (Pinal County, AZ); lower San Pedro River (Pinal County, AZ); Aravaipa Creek (Graham and Pinal Counties, AZ); Eagle Creek (Graham and Greenlee Counties, AZ); and the Verde River (Yavapai County, AZ) (Anderson 1978; Bestgen, 1985; Bettaso *et al.* 1995; Jakle 1992; Marsh *et al.* 1990; Propst *et al.* 1985;

Propst *et al.* 1986; Stefferud and Rinne 1996; Sublette *et al.* 1990). Its present range is only about 10–15 percent of the historical range and the status of the species within occupied areas ranges from common to very rare. At present, the species is common only in Aravaipa Creek and some parts of the upper Gila River in New Mexico.

Loach Minnow

The loach minnow is a small, slender, elongated fish less than 80 mm (3 in) long. It is olivaceous in color and strongly blotched with darker pigment. The mouth is oblique (slanting) and terminal, and the eyes are markedly directed upward (Minckley 1973). This species is found in small to large perennial streams, and uses shallow, turbulent riffles with primarily cobble substrate and swift currents (Minckley 1973; Propst and Bestgen 1991; Rinne 1989; Propst *et al.* 1988). The loach minnow uses the spaces between, and in the lee of (sheltered side), larger substrate for resting and spawning. It is rare or absent from habitats where fine sediments fill the interstitial spaces (small, narrow spaces between rocks or other substrate) (Propst and Bestgen 1991). Recurrent flooding and a natural hydrograph are very important in maintaining the habitat of loach minnow and in helping the species maintain a competitive edge over invading nonnative aquatic species (Propst *et al.* 1986; Propst and Bestgen 1991).

The loach minnow was first collected in 1851 from the Rio San Pedro in Arizona and was described from those specimens in 1865 by Girard. The loach minnow was once locally common throughout much of the Gila River basin, including the mainstem Gila River upstream of Phoenix, and the Verde, Salt, San Pedro, and San Francisco subbasins. It occupies suitable habitat in both the mainstream reaches and moderate-gradient perennial tributaries, up to about 2,500 m (8,200 ft) elevation. Habitat destruction and competition and predation by nonnative aquatic species have severely reduced its range and abundance. It is now restricted to approximately 676 km (419 mi) of stream in portions of the upper Gila River (Grant, Catron, and Hidalgo Counties, NM); the San Francisco and Tularosa Rivers and their tributaries Negrito and Whitewater Creeks (Catron County, NM); the Blue River and its tributaries Dry Blue, Campbell Blue, Little Blue, Pace, and Frieborn Creeks (Greenlee County, AZ and Catron County, NM); Aravaipa Creek and its tributaries Turkey and Deer Creeks (Graham and Pinal Counties, AZ); Eagle

Creek (Graham and Greenlee Counties, AZ); the White River (Apache, Gila, and Navajo Counties, AZ); and the Black River (Apache and Greenlee Counties, AZ) (Bagley *et al.* 1998; Bagley *et al.* 1996; Barber and Minckley 1966; Bettaso *et al.* 1995; Britt 1982; Leon 1989; Marsh *et al.* 1990; Propst 1996; Propst and Bestgen 1991; Propst *et al.* 1985; Springer 1995). The present range is only 15–20 percent of its historical range, and the status of the species within occupied areas ranges from common to very rare. At present, the species is common only in Aravaipa Creek, the Blue River, and limited portions of the San Francisco, upper Gila, and Tularosa Rivers in New Mexico.

Previous Federal Actions

The spikedace was included as a Category 1 candidate species in our December 30, 1982, Vertebrate Notice of Review (47 FR 58454). Category 1 included those taxa for which we had substantial biological information to support listing the species as endangered or threatened. We were petitioned on March 14, 1985, by the American Fisheries Society (AFS) and on March 18, 1985, by the Desert Fishes Council (DFC) to list the spikedace as threatened. Because the species was already under active petition by AFS, the DFC petition was considered a letter of comment. Our evaluation of the AFS petition revealed that the petitioned action was warranted, and we published a proposed rule to list this species as threatened with critical habitat on June 18, 1985 (50 FR 25390). We published the final rule listing the spikedace as a threatened species on July 1, 1986 (51 FR 23769). We did not finalize the proposed critical habitat designation at the time of listing but postponed the designation to allow us to gather and analyze economic data, in compliance with section 4(b)(2) of the Act.

We included the loach minnow as a Category 1 candidate species in the December 30, 1982, Vertebrate Notice of Review (47 FR 58454). On June 18, 1985 (50 FR 25380) we published a proposed rule to list this species as threatened with critical habitat. We published the final rule listing the loach minnow as a threatened species on October 28, 1986 (51 FR 39468). We did not finalize the proposed critical habitat designation at the time of listing but postponed the designation to allow us to gather and analyze economic data.

Section 4(a)(3) of the Act requires that, to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time a species is determined to be endangered

or threatened. Our regulations (50 CFR 424.12(a)(2)) state that critical habitat is not determinable if information sufficient to perform required analyses of the impacts of the designation is lacking or if the biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat. At the time of listing of the spikedace and loach minnow, we found that critical habitat was not determinable because we had insufficient information to perform the required analyses of the impacts of the designation. As part of a settlement order of January 18, 1994, in *Greater Gila Biodiversity Project v. U.S. Fish and Wildlife Service*, CIV 93–1913 PHX/PGR, we finalized the critical habitat designations for both the spikedace and loach minnow on March 8, 1994 (59 FR 10906 and 10898 respectively).

Critical habitat for spikedace and loach minnow was set aside by court order in *Catron County Board of Commissioners, New Mexico v. U.S. Fish and Wildlife Service*, CIV No. 93–730 HB (D.N.M., 1994), *aff'd*, 75 F3d, 1429 (10th Cir. 1996). The court cited our failure to analyze the effects of critical habitat designation under the National Environmental Policy Act (NEPA) as its basis for setting aside critical habitat for the two species. The United States District Court for the District of Arizona recognized the effect of the *Catron County* ruling as a matter of comity (recognition given by the courts of one state or jurisdiction of the laws and judicial decisions of another) in the *Southwest Center for Biological Diversity v. Rogers*, CV 96–018–TUC–JMR (D. Ariz., Order of December 28, 1996). As a result of these court rulings, we removed the critical habitat description for spikedace and loach minnow from the Code of Federal Regulations on March 25, 1998 (63 FR 14378).

On September 20, 1999, the United States District Court for the District of New Mexico, *Southwest Center for Biological Diversity v. Clark*, CIV 98–0769 M/JHG, ordered us to complete designation of critical habitat for the spikedace and loach minnow by February 17, 2000. On October 6, 1999, the court amended the September 20, 1999 order to require us to make a critical habitat determination rather than requiring actual designation. We published our proposed rule to designate critical habitat in the **Federal Register** on December 10, 1999 (64 FR 69324).

On December 22, 1999, the court extended the deadline to complete our determination until April 21, 2000. Information regarding public

notifications on the extension and hearing are given in the Summary of Comments and Recommendations section later in this rule.

We completed final recovery plans for spikedace and loach minnow in 1991 (Service 1991a, 1991b). We developed those plans with the assistance of the Desert Fishes Recovery Team and other biologists familiar with the species. This rule is based, in part, on recommendations offered in those recovery plans.

Critical Habitat

Critical habitat is defined in section 3(5)(A) of the Act as—(i) the specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection and; (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. The term “conservation,” as defined in section 3(3) of the Act, means “to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary” (i.e., the species is recovered and removed from the list of endangered and threatened species).

Section 4(b)(2) of the Act requires that we base critical habitat proposals upon the best scientific and commercial data available, taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. We may exclude areas from critical habitat designation if we determine that the benefits of exclusion outweigh the benefits of including the areas as critical habitat, provided the exclusion will not result in the extinction of the species. A discussion of our analysis under 4(b)(2) of the Act is provided in the Exclusion for Economic and Other Relevant Impacts section of this final rule.

Critical Habitat Designation

In designating critical habitat for spikedace and loach minnow, we reviewed the overall approach to the conservation of the species since the species' listing in 1986. Additionally, we solicited information from knowledgeable biologists and recommendations from the Desert Fishes Recovery Team. We also

reviewed the available information pertaining to habitat requirements of the two species, including public comments and other material received during critical habitat proposals and previous designations.

We also considered the measures identified as necessary for recovery, as outlined in the species' recovery plans. Due to the need for additional information on the two species, habitats, threats, controllability of threats, restoration potentials, and other factors, no quantitative criteria for delisting spikedace and loach minnow were set forth in the recovery plans. However, the recovery plans recommend protection of existing populations, enhancement and restoration of habitats occupied by depleted populations, and reestablishment of the two species into selected streams within their historical ranges.

Both recovery plans recommend designation of critical habitat for all stream reaches proposed as critical habitat in 1985, plus consideration of additional stream reaches. Except for Eagle Creek, the recovery plans do not identify the specific stream reaches to be considered for critical habitat designation due to the lack of information available at that time to support such identifications. The recovery plans do identify potential areas for reestablishment of spikedace and loach minnow including the San Pedro River and its tributaries, the San Francisco River, Mescal Creek (a middle Gila River tributary), and Bonita Creek. The recovery plans also recommend evaluation and selection of other potential sites. Recovery Team discussions since 1991 identified the need for critical habitat designation in Hot Springs and Redfield Canyons; Aravaipa, Eagle, Bonita, Beaver, West Clear, Campbell Blue, and Dry Blue Creeks; and the Gila, Verde, San Pedro, San Francisco, Blue, Tularosa, and White Rivers.

The designated critical habitat described below constitutes our best assessment of areas needed for the conservation of spikedace and loach minnow and is based on the best scientific and commercial information available. The designated areas are essential to the conservation of the species because they either currently support populations of spikedace and/or loach minnow, or because they currently have, or have the potential for developing, the necessary requirements for survival, growth, and reproduction of the spikedace and/or loach minnow (see description of primary constituent elements, below). All of the designated areas require special management

consideration and protection to ensure their contribution to the species' recovery.

Because of these species' precarious status, mere stabilization of spikedace and loach minnow at their present levels will not achieve conservation. Recovery through protection and enhancement of the existing populations, plus reestablishment of populations in suitable areas of historical range, are necessary for their survival. The recovery plans for both species state, "One of the most critical goals to be achieved toward recovery is establishment of secure self-reproducing populations in habitats from which the species has been extirpated" (Service 1991a, 1991b). We, therefore, determine that the unoccupied areas designated as critical habitat are essential for the conservation of the species.

Important factors we considered in selecting areas designated in this rule include specific geographic area or complex of areas factors, such as size, connectivity, and habitat diversity, as well as rangewide recovery considerations such as genetic diversity and representation of all major portions of the species' historical ranges. We designated critical habitat complexes of sufficient size to provide habitat for spikedace and/or loach minnow populations large enough to be self-sustaining over time, despite fluctuations in local conditions so that recovery of these species is possible.

The ability of the fish to repopulate areas where they are depleted or extirpated is vital to recovery. Each complex contains interconnected waters so that spikedace and loach minnow can move between areas, at least during certain flows or seasons. Some complexes include stream reaches that do not have substantial spikedace- or loach minnow-specific habitat, but which provide migration corridors as well as play a vital role in the overall health of the aquatic ecosystem and, therefore, the integrity of upstream and downstream spikedace and loach minnow habitats. Each complex includes habitat with a moderate to high degree of complexity, thus providing suitable habitat for all life stages of spikedace and loach minnow under a wide range of habitat fluctuations.

The areas we selected for critical habitat designation include populations containing all known remaining genetic diversity within the two species, with the possible exception of the fish on certain tribal lands, which we believe are capable of persistence without critical habitat designation (see discussion under American Indian Tribal Rights, Federal-Tribal Trust

Responsibilities, and the Endangered Species Act later in this rule). Areas selected for critical habitat designation include a representation of each major subbasin in the historical ranges of the species.

The designation includes all currently known populations of spikedace and loach minnow, except those on tribal lands. Uncertainty on upstream and downstream distributional limits of some populations may result in small areas of occupied habitat being excluded from the designation. However, based on the best available scientific information, we believe the areas included in this designation will be sufficient to conserve both species.

In order to provide for genetic variability for the loach minnow, the designation includes at least one remnant population for each major subbasin except the Verde subbasin, from which it has been completely extirpated. For spikedace, no remnant populations exist in the Agua Fria, Salt, and San Francisco/Blue subbasins. In those subbasins where no populations of spikedace or loach minnow currently exist, designated critical habitat includes currently unoccupied areas that have the potential and are important for restoration of the species, with the exception of the Agua Fria subbasin where no suitable areas are known to remain.

The inclusion of both occupied and currently unoccupied areas in the designated critical habitat for spikedace and loach minnow is in accordance with section 3(5)(A)(i) of the Act, which provides that areas outside the geographical area currently occupied by the species may meet the definition of critical habitat upon a determination that they are essential for the conservation of the species. Both spikedace and loach minnow are in danger of extinction, and their status is declining. In 1994, we determined that reclassification of spikedace and loach minnow from threatened to endangered was warranted; however, reclassification was precluded by other higher priority listing actions (59 FR 35303-35304). Although additional populations of loach minnow have been found since that time, they are small and their contribution to the status of the species is offset by declines in other populations. It is essential to protect all designated occupied areas as well as designated unoccupied areas that will provide habitat for reestablishment of the two species.

Both of the 1986 listing rules for spikedace and loach minnow conservatively estimated about 2,600 km (1,600 mi) of stream within the

species' historical ranges. Using newer techniques, a more current estimate is approximately 3,000 km (1,800 mi). This critical habitat designation includes approximately half that amount for loach minnow and less than half for spikedace. Although this is less than the historical ranges for both species, we believe that maintenance of viable spikedace and loach minnow populations within the designated areas can achieve recovery of these species.

For each stream reach designated, the up- and downstream-boundaries are described below. Critical habitat includes the stream channels within the identified stream reaches and areas within these reaches potentially inundated during high flow events. Where delineated, this will be the 100-year floodplain of the designated waterways as defined by the U.S. Army Corps of Engineers (COE). In areas where the 100-year floodplain has not been delineated or it is in dispute, the presence of alluvial soils (soils deposited by streams), obligate and facultative riparian vegetation (requiring and usually occurring in wetlands, respectively), abandoned river channels, or known high water marks can be used to determine the extent of the floodplain. This proposal takes into account the naturally dynamic nature of riverine systems and recognizes that floodplains are an integral part of the stream ecosystem. A relatively intact floodplain, along with the periodic flooding in a relatively natural pattern, are important elements necessary for long-term survival and recovery of spikedace and loach minnow. Among other things, the floodplain and its riparian vegetation provide space for natural flooding patterns and latitude for necessary natural channel adjustments to maintain appropriate channel morphology and geometry, provide nutrient input and buffering from sediment and pollutants, store water for slow release to maintain base flows, and provide protected side channels and other protected areas for larval and juvenile spikedace and loach minnow.

Within the delineated critical habitat boundaries, only lands containing, or which have the potential to develop, those habitat components that are essential for the primary biological needs of the species are considered critical habitat. Existing human-constructed features and structures within this area, such as buildings, roads, railroads, and other features, do not contain, and do not have the potential to develop, those habitat components and are not considered critical habitat.

Unless otherwise indicated, the following areas are designated as critical habitat for both spikedace and loach minnow (see the Regulation Promulgation section of this rule for exact descriptions of boundaries). The designation includes portions of 24 and 36 streams for spikedace and loach minnow, respectively; however, individual streams are not isolated, but are connected with others to form areas or "complexes." The complexes include those that currently support populations of the fishes, as well as some currently unoccupied by the species, but which are considered essential for reestablishing populations to achieve recovery. The distances and conversions below are approximate; more precise estimates are provided in the Regulation Promulgation section of this rule.

1. Verde River complex, Yavapai County, Arizona. The Verde River complex is currently occupied by spikedace. Its tributary streams are believed to be currently unoccupied by either species. The Verde River complex is unusual in that a relatively stable thermal and hydrologic regime is found in the upper river and in Fossil Creek. Also, spikedace in the Verde River are genetically (Tibbets 1993) and morphologically (Anderson and Hendrickson 1994) distinct from all other spikedace populations. The continuing presence of spikedace and the existence of suitable habitat create a high potential for restoration of loach minnow to the Verde system.

a. Verde River—171 km (106 mi) of river extending from the confluence with Fossil Creek upstream to Sullivan Dam, but excluding lands belonging to the Yavapai Apache Tribe. Sullivan Dam is at the upstream limit of perennial flow in the mainstem Verde River. Perennial flow results from a series of river-channel springs and from Granite Creek. Below Fossil Creek, the Verde River has a larger flow and was thought at the time of the proposal to offer little suitable habitat for spikedace or loach minnow. However, this is historical range for both species and comments from the U.S. Forest Service (USFS) indicate this stretch of the river may offer substantial value for spikedace and loach minnow recovery. We will seek further information regarding the role of this portion of the Verde River for the species and may consider its designation in future potential revisions of the critical habitat.

b. Fossil Creek—8 km (5 mi) of creek extending from the confluence with the Verde River upstream to the confluence with an unnamed tributary. The lower portion of Fossil Creek contains all elements of spikedace and loach

minnow habitat at present, except sufficient discharge. Discharge is currently diverted for hydropower generation at the Childs/Irving Hydropower site. However, operators of the Childs/Irving Hydropower project have agreed to provide enhanced flows into lower Fossil Creek, although the amount of that flow restoration is still under negotiation.

c. West Clear Creek—12 km (7 mi) of creek extending from the confluence with the Verde River upstream to the confluence with Black Mountain Canyon. The lower portion of West Clear Creek was historically known to support the spikedace and contains suitable, although degraded, habitat for the fishes. Gradient and channel morphology changes above Black Mountain Canyon make the upstream area unsuitable for either species.

d. Beaver/Wet Beaver Creek—33 km (21 mi) of creek extending from the confluence with the Verde River upstream to the confluence with Casner Canyon. Beaver Creek, and its upstream extension in Wet Beaver Creek, historically supported spikedace and loach minnow and contains suitable, although degraded, habitat. Above Casner Canyon, gradient and channel morphology changes make the stream unsuitable for either species.

e. Oak Creek—54 km (34 mi) of creek extending from the confluence with the Verde River upstream to the confluence with an unnamed tributary (near the Yavapai/Coconino County boundary). The lower portion of Oak Creek is part of the historical range of the two species and contains suitable, although degraded, habitat. Above the unnamed tributary, the creek becomes unsuitable for either species due to urban and suburban development and to increasing gradient and substrate size.

f. Granite Creek—2.3 km (1.4 mi) of creek extending from the confluence with the Verde River upstream to a spring. Below the spring, which supplies much of the base flow of Granite Creek, there is suitable habitat for loach minnow. As a perennial tributary of the upper Verde River, Granite Creek is considered an important expansion area for spikedace recovery.

2. Black River complex, Apache and Greenlee Counties, Arizona. In response to comments received on the suitability of this complex, we have not designated any areas within the complex as critical habitat for spikedace. The basis for this deletion from the proposed rule is biological, given that spikedace are not known to historically occupy areas at this elevation. However, the data on maximum elevation for spikedace are

not definitive and if information becomes available that differs from that currently available, the Black River complex may be reevaluated for spikedace critical habitat designation. The Salt River subbasin is a significant portion of spikedace historical range and has no existing population of spikedace. Large areas of the subbasin are unsuitable, either because of topography or because of reservoirs, stream channel alteration by humans, or overwhelming nonnative species populations.

The Salt River subbasin is a significant portion of loach minnow historical range, but loach minnow have been extirpated from all but a small portion in the Black and White Rivers. As the only remaining population of loach minnow on public lands in the Salt River basin, the Black River complex is considered vital to survival and recovery of the species.

a. East Fork Black River—Loach minnow only: 8 km (5 mi) of river extending from the confluence with the West Fork Black River upstream to the confluence with Deer Creek. This area is occupied by loach minnow, although the downstream extent of the population is not well known. This population was only discovered in 1996.

b. North Fork of the East Fork Black River—Loach minnow only: 18 km (11 mi) of river extending from the confluence with Deer Creek upstream to the confluence with an unnamed tributary. This area is occupied by loach minnow, although the upstream portion of the population is not well known. Above the unnamed tributary, the river has finer substrate and lacks riffle habitat, making it unsuitable for loach minnow.

c. Beyond Creek—Loach minnow only: 2.3 km (1.4 mi) of creek extending from the confluence with the East Fork Black River upstream to the confluence with an unnamed tributary. Although no loach minnow have been found in Boneyard Creek, they are probably present based on the pattern of occupation of lower portions of small tributaries in other parts of the loach minnow range.

d. Coyote Creek—Loach minnow only: 3 km (2 mi) of creek extending from the confluence with the East Fork Black River upstream to the confluence with an unnamed tributary. Loach minnow are thought to use the lower portion of this creek as part of the population in the East Fork Black River.

e. West Fork Black River—Loach minnow only: 10 km (6 mi) of river extending from the confluence with the East Fork Black River upstream to the

confluence with Hay Creek. Above Hay Creek, the gradient and channel morphology are unsuitable for loach minnow. The West Fork Black River is not known to be occupied by loach minnow at present. However, it is considered important for conservation of the Black River remnant of the Salt River subbasin population.

3. Tonto Creek complex, Gila County, Arizona. Spikedace are known to have occupied Tonto Creek, and loach minnow are presumed to have done so although no records exist. Suitable habitat still exists, although degradation has occurred due to watershed uses, water diversion, agriculture, roads, and nonnative species introduction. The presence of substantial areas of USFS lands make this one of the most promising areas for reestablishment of spikedace and loach minnow in the Salt River subbasin.

a. Tonto Creek—

Spikedace: 47 km (29 mi) of creek extending from the confluence with Greenback Creek upstream to the confluence with Houston Creek. The influence of Roosevelt Lake below Greenback Creek, and gradient and substrate changes above Houston Creek, make these reaches unsuitable for spikedace.

Loach minnow: 70 km (44 mi) of creek extending from the confluence with Greenback Creek upstream to the confluence with Haigler Creek. The influence of Roosevelt Lake above Greenback Creek and changes in channel morphology above Haigler Creek make those portions of the stream unsuitable for loach minnow.

b. Greenback Creek—(8 mi) of creek extending from the confluence with Tonto Creek upstream to Lime Springs.

c. Rye Creek—2.1 km (1.3 mi) of creek extending from the confluence with Tonto Creek upstream to the confluence with Brady Canyon. This area of Rye Creek still supports a native fish community indicating high potential for spikedace and loach minnow reestablishment.

4. Middle Gila/Lower San Pedro/Aravaipa Creek complex, Pinal and Graham Counties, Arizona. This complex is occupied by spikedace with its population status ranging from rare to common. Aravaipa Creek supports some of the best and most protected spikedace and loach minnow populations due to special use designations on Bureau of Land Management (BLM) land, substantial ownership by The Nature Conservancy, and planned construction of fish barriers to prevent invasion of nonnative fish species. Enhancement of downstream habitats in the San Pedro

and Gila Rivers would contribute substantially to recovery of these species.

a. Gila River—63 km (39 mi) of river extending from Ashurst-Hayden Dam upstream to the confluence with the San Pedro River. A small population of spikedace currently occupies this area. At Ashurst-Hayden Dam, all water is diverted into a canal. Above the confluence with the San Pedro River, flow in the Gila River is highly regulated by San Carlos Dam and becomes marginally suitable for either species. Below the confluence, the input of the San Pedro provides a sufficiently unregulated hydrograph which is a primary constituent element of loach minnow and spikedace critical habitat.

b. San Pedro River—21 km (13 mi) of river extending from the confluence with the Gila River upstream to the confluence with Aravaipa Creek. This area is currently occupied by spikedace. It provides an important connection between the existing population of loach minnow in Aravaipa Creek and the recovery habitat in the Gila River. Existing flow in the river comes primarily from surface and subsurface contributions from Aravaipa Creek.

c. Aravaipa Creek—45 km (28 mi) of creek extending from the confluence with the San Pedro River upstream to the confluence with Stowe Gulch. Aravaipa Creek supports a substantial population of spikedace and loach minnow. Stowe Gulch is the upstream limit of sufficient perennial flow for either species.

d. Turkey Creek—Loach minnow only: 4 km (3 mi) of creek extending from the confluence with Aravaipa Creek upstream to the confluence with Oak Grove Canyon. This creek is occupied by loach minnow. A substantial portion of the flow in Turkey Creek comes from the Oak Grove Canyon tributary.

e. Deer Creek—Loach minnow only: 4 km (3 mi) of creek extending from the confluence with Aravaipa Creek upstream to the boundary of the Aravaipa Wilderness. This stream is occupied by loach minnow. Suitable habitat extends to the Wilderness boundary.

5. Middle-Upper San Pedro River complex, Cochise, Graham, and Pima Counties, Arizona. None of the habitat in this complex is currently occupied by spikedace or loach minnow. However, the San Pedro River is the type locality of spikedace (locality where an individual of a new species is found that is chosen to serve as the basis for describing a new species or variety), and this complex contains important restoration areas.

a. San Pedro River—74 km (46 mi) of river extending from the confluence with Alder Wash (near Redfield) upstream to the confluence with Ash Creek (near the Narrows). This middle portion of the river is expected to have increasing surface flow due to restoration activities, including riparian and channel restoration, watershed improvements, and groundwater pumping reductions.

b. Redfield Canyon—22 km (14 mi) of creek extending from the confluence with the San Pedro River upstream to the confluence with Sycamore Canyon. Above Sycamore Canyon, permanent water becomes too scarce, and the habitat becomes unsuitable.

c. Hot Springs Canyon—19 km (12 mi) of creek extending from the confluence with the San Pedro River upstream to the confluence with Bass Canyon. Hot Springs Canyon is currently unoccupied but contains suitable habitat for restoration of spikedace and loach minnow.

d. Bass Canyon—5 km (3 mi) of creek extending from the confluence with Hot Springs Canyon upstream to the confluence with Pine Canyon. Bass Canyon is an extension of the Hot Springs Canyon habitat.

e. San Pedro River—60 km (37 mi) of river extending from the confluence with the Babocomari River upstream to the U.S./Mexico border. Although currently unoccupied, this area is identified in BLM (1993) planning documents as a restoration area for spikedace and loach minnow.

6. Gila Box/San Francisco River complex, Graham and Greenlee Counties, Arizona and Catron County, New Mexico. The only spikedace population remaining in the complex is in Eagle Creek. Substantial restoration potential for spikedace exists in the remainder of the complex. This complex has the largest area of habitat suitable for spikedace restoration.

Most of this complex is occupied by loach minnow, although the status varies substantially from one portion to another. Only Bonita Creek, Little Blue Creek, and the Gila River are currently unoccupied. The Blue River system and adjacent portions of the San Francisco River are the longest stretch of occupied loach minnow habitat unbroken by large areas of unsuitable habitat. Management of Federal lands and resources in the Gila Box, Bonita Creek, and the Blue River are highly compatible with recovery goals, giving restoration of spikedace and loach minnow in this complex a high likelihood of success.

a. Gila River—36 km (23 mi) of river extending from the Brown Canal diversion, at the head of the Safford

Valley, upstream to the confluence with Owl Canyon, at the upper end of the Gila Box. The Gila Box is not known to currently support spikedace, but is considered to have a high potential for restoration of both species. Both above and below the Gila Box, the Gila River is highly modified by agriculture, diversions, and urban development.

b. Bonita Creek—24 km (15 mi) of creek extending from the confluence with the Gila River upstream to the confluence with Martinez Wash. Bonita Creek has suitable habitat for spikedace and loach minnow. Bonita Creek above Martinez Wash lies on the San Carlos Apache Reservation, which is excluded from this designation.

c. Eagle Creek—73 km (45 mi) of creek extending from the Phelps-Dodge Diversion Dam upstream to the confluence of Dry Prong and East Eagle Creeks, but excluding lands of the San Carlos Apache Reservation. Because the creek repeatedly flows from private or USFS lands into the San Carlos Apache Reservation and back, it is difficult to separately calculate stream mileages on tribal lands. Therefore, the above mileage covers the entire stream segment and is not corrected for tribal exclusions. Eagle Creek supports a small population of spikedace. Below the Phelps-Dodge Diversion Dam the creek is often dry; however comments received on the proposed rule suggest the stretch of Eagle Creek below the dam may offer sufficient connective value and habitat value to justify its inclusion in critical habitat. This area may be considered for critical habitat in future revisions of this designation.

d. San Francisco River—
Spikedace: 182 km (113 mi) of river extending from the confluence with the Gila River upstream to the confluence with the Tularosa River. Habitat above the Tularosa River does not appear suitable for spikedace. The San Francisco River was historically occupied by spikedace and is important habitat for restoration of the species.

Loach minnow: 203 km (126 mi) of river extending from the confluence with the Gila River upstream to the mouth of The Box, a canyon above the town of Reserve. Loach minnow in the San Francisco River vary from common to rare throughout the length of the river.

e. Tularosa River—Loach minnow only: 30 km (19 mi) of river extending from the confluence with the San Francisco River upstream to the town of Cruzville. Above Cruzville, the habitat becomes unsuitable due to the small size of the stream and a predominance of fine substrates.

f. Negrito Creek—Loach minnow only: 7 km (4 mi) of creek extending from the confluence with the San Francisco River upstream to the confluence with Cerco Canyon. Above this area, gradient and channel morphology make the creek unsuitable for loach minnow.

g. Whitewater Creek—Loach minnow only: 2 km (1 mi) of creek extending from the confluence with the San Francisco River upstream to the confluence with Little Whitewater Creek. Upstream gradient and channel changes make the portion above Little Whitewater Creek unsuitable for loach minnow.

h. Blue River—82 km (51 mi) of river extending from the confluence with the San Francisco River upstream to the confluence of Campbell Blue and Dry Blue Creeks. The Blue River is currently occupied by loach minnow but not currently occupied by spikedace, but planning among several State and Federal agencies for restoration of native fishes in the Blue River is under way.

i. Campbell Blue Creek—13 km (8 mi) of creek extending from the confluence of Dry Blue and Campbell Blue Creeks upstream to the confluence with Coleman Canyon. Above Coleman Canyon, the creek changes and becomes steeper and rockier, making it unsuitable for spikedace or loach minnow.

j. Dry Blue Creek—Loach minnow only: 5 km (3 mi) of creek extending from the confluence with Campbell Blue Creek upstream to the confluence with Pace Creek.

k. Pace Creek—Loach minnow only: 1.2 km (0.8 mi) of creek extending from the confluence with Dry Blue Creek upstream to a barrier falls.

l. Frieborn Creek—Loach minnow only: 1.8 km (1.1 mi) of creek extending from the confluence with Dry Blue Creek upstream to an unnamed tributary.

m. Little Blue Creek—5 km (3 mi) of creek extending from the confluence with the Blue River upstream to the mouth of a box canyon. Little Blue Creek is not currently occupied by spikedace or loach minnow, but contains suitable habitat and is considered an important restoration area for both species.

7. Upper Gila River complex, Grant, Catron, and Hidalgo Counties, New Mexico. This complex is occupied throughout by spikedace and loach minnow and contains the largest remaining populations of both species. It is considered to represent the “core” of what remains of the species. Because of the remoteness of the area, there is a relatively low degree of habitat threats.

a. Gila River—164 km (102 mi) of river extending from the confluence with Moore Canyon (near the Arizona/New Mexico border) upstream to the confluence of the East and West Forks. Spikedace and loach minnow are known to occupy the river into the Duncan-Virden Valley (Rinne 1999b).

b. East Fork Gila River—42 km (26 mi) of river extending from the confluence with the West Fork Gila River upstream to the confluence of Beaver and Taylor Creeks.

c. Middle Fork Gila River—Spikedace: 12 km (8 mi) of river extending from the confluence with the West Fork Gila River upstream to the confluence with Big Bear Canyon.

Loach minnow: 19 km (12 mi) of river extending from the confluence with the West Fork Gila River upstream to the confluence with Brothers West Canyon.

d. West Fork Gila River—12 km (8 mi) of river extending from the confluence with the East Fork Gila River upstream to the confluence with EE Canyon. This lower portion of the West Fork is occupied by spikedace and loach minnow, but the river becomes unsuitable above EE Canyon due to gradient and channel morphology.

Primary Constituent Elements

The habitat features (primary constituent elements) that provide for the physiological, behavioral, and ecological requirements essential for the conservation of a species are described at 50 CFR 424.12 and include, but are not limited to, the following:

- Space for individual and population growth, and for normal behavior;
- Food, water, or other nutritional or physiological requirements;
- Cover or shelter;
- Sites for breeding, reproduction, or rearing of offspring; and
- Habitats that are protected from disturbance or are representative of the historical geographical and ecological distributions of a species.

Spikedace

We determined the primary constituent elements for spikedace from studies on their habitat requirements and population biology including, but not limited to, Barber *et al.* 1970; Minckley 1973; Anderson 1978; Barber and Minckley 1983; Turner and Taffanelli 1983; Barrett *et al.* 1985; Propst *et al.* 1986; Service 1989; Hardy *et al.* 1990; Douglas *et al.* 1994; Stefferud and Rinne 1996; Velasco 1997.

These primary constituent elements include:

1. Permanent, flowing, unpolluted water;
2. Living areas for adult spikedace with slow to swift flow velocities in shallow water with shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at downstream riffle edges;
3. Living areas for juvenile spikedace with slow to moderate flow velocities in shallow water with moderate amounts of instream cover;
4. Living areas for larval spikedace with slow to moderate flow velocities in shallow water with abundant instream cover;
5. Sand, gravel, and cobble substrates with low to moderate amounts of fine sediment and substrate embeddedness;
6. Pool, riffle, run, and backwater components present in the aquatic habitat;
7. Low stream gradient;
8. Water temperatures in the approximate range of 1–30 °C (35–85 °F), with natural diurnal and seasonal variation;
9. Abundant aquatic insect food base;
10. Periodic natural flooding;
11. A natural, unregulated hydrograph or, if the flows are modified or regulated, then a hydrograph that demonstrates an ability to support a native fish community; and
12. Habitat devoid of nonnative aquatic species detrimental to spikedace, or habitat in which detrimental nonnative species are at levels which allow persistence of spikedace.

The areas we are designating as critical habitat for spikedace provide the above primary constituent elements or will be capable, with restoration or removal of detrimental nonnative species, of providing them. All of the designated areas require special management considerations or protection to ensure their contribution to the species' recovery.

Loach minnow

We determined the primary constituent elements for loach minnow from studies on their habitat requirements and population biology including, but not limited to, Barber and Minckley 1966; Minckley 1973; Schreiber 1978; Britt 1982; Turner and Taffanelli 1983; Service 1988; Rinne 1989; Hardy *et al.* 1990; Vives and Minckley 1990; Propst and Bestgen 1991; Douglas *et al.* 1994; Velasco 1997.

These primary constituent elements include:

1. Permanent, flowing, unpolluted water;
2. Living areas for adult loach minnow with moderate to swift flow velocities in shallow water with gravel, cobble, and rubble substrates;
3. Living areas for juvenile loach minnow with moderate to swift flow velocities in shallow water with sand, gravel, cobble, and rubble substrates;
4. Living areas for larval loach minnow with slow to moderate velocities in shallow water with sand, gravel, and cobble substrates and abundant instream cover;
5. Spawning areas for loach minnow with slow to swift flow velocities in shallow water with uncemented cobble and rubble substrate;
6. Low amounts of fine sediment and substrate embeddedness;
7. Riffle, run, and backwater components present in the aquatic habitat;
9. Low to moderate stream gradient;
10. Water temperatures in the approximate range of 1–30°C (35–85°F), with natural diurnal and seasonal variation;
11. Abundant aquatic insect food base;
12. Periodic natural flooding;
13. A natural unregulated hydrograph or, if flows are modified or regulated, then a hydrograph that demonstrates an ability to support a native fish community; and
14. Habitat devoid of nonnative aquatic species detrimental to loach minnow, or habitat in which detrimental nonnative species are at levels which allow persistence of loach minnow.

The areas we are designating as critical habitat for loach minnow provide the above primary constituent elements or will be capable, with restoration or removal of detrimental nonnative species, of providing them. All of the designated areas require special management considerations or protection to ensure their contribution to the species' recovery.

Land Ownership

Table 1 shows land ownership for areas of critical habitat that are currently occupied by one or both species, and Table 2 shows land ownership for critical habitat that is unoccupied. A general description of land ownership in each complex follows.

TABLE 1.—STREAM DISTANCES IN KILOMETERS (MILES) OF CRITICAL HABITAT OCCUPIED BY EITHER LOACH MINNOW OR SPIKEDACE BY COUNTY AND OWNERSHIP

	Private	State	Federal	Other Gov.	Total
Apache Co., AZ	0	0	11.3 (7.0)	0	11.3 (7.0)
Cochise Co., AZ	0	0	0	0	0
Gila Co., AZ	0	0	0	0	0
Graham Co., AZ	10.3 (6.4)	0	4.7 (2.9)	26.1 (16.2)	41.1 (25.5)
Greenlee Co., AZ	45.0 (27.9)	2.6 (1.6)	109.5 (67.9)	0	157.1 (97.4)
Pima Co., AZ	0	0	0	0	0
Pinal Co., AZ	58.5 (36.3)	6.8 (4.2)	48.2 (29.9)	1.0 (0.6)	114.5 (71.0)
Yavapai Co., AZ	56.5 (35.0)	5.8 (3.6)	52.2 (32.4)	*1.6 (1.0)	116.1 (72)
AZ Total	170.0 (105.4)	15.2 (9.4)	225.9 (140.4)	28.7 (17.8)	440.1 (272.9)
Catron Co., NM	79.0 (49.0)	5.3 (3.3)	145.2 (90.0)	0.8 (0.5)	230.3 (142.8)
Grant Co., NM	53.2 (33.0)	2.1 (1.3)	72.9 (45.2)	0	128.2 (79.5)
Hidalgo Co., NM	10.6 (6.6)	0	7.3 (4.5)	0	17.9 (11.1)
NM Total	142.8 (88.6)	7.4 (4.6)	225.4 (139.7)	0.8 (0.5)	376.4 (233.4)
Total	312.8 (194.0)	22.6 (14.0)	451.3 (280.4)	29.5 (18.3)	816.5 (506.3)

*This area is included in the total critical habitat mileages, but is excluded by description.

TABLE 2.—STREAM DISTANCES IN KILOMETERS (MILES) OF CRITICAL HABITAT UNOCCUPIED BY EITHER LOACH MINNOW OR SPIKEDACE BY COUNTY AND OWNERSHIP

	Private	State	Federal	Other Gov.	Total
Apache Co., AZ	3.4 (2.1)	0	24.1 (15.0)	0	27.6 (17.1)
Cochise Co., AZ	17.3 (10.7)	5.6 (3.5)	61.2 (38.0)	0	84.1 (52.2)
Gila Co., AZ	12.0 (7.5)	0	81.6 (50.6)	0	93.6 (58.1)
Graham Co., AZ	21.1 (13.1)	13.9 (8.6)	50.1 (31.1)	5.5 (3.4)	90.6 (56.2)
Greenlee Co., AZ	30.6 (19.0)	3.9 (2.4)	18.9 (11.7)	0	53.4 (33.1)
Pima Co., AZ	70.6 (43.8)	3.2 (2.0)	0	0	73.9 (45.8)
Pinal Co., AZ	0	0	0	0	0
Yavapai Co., AZ	55.3 (34.3)	7.1 (4.4)	*95.2 (59.0)	0	*157.6 (97.7)
AZ Total	210.3 (130.5)	33.7 (20.9)	331.1 (205.4)	5.5 (3.4)	580.8 (360.2)
Catron Co., NM	0	0	0	0	0
Grant Co., NM	4.0 (2.5)	0	47.9 (29.7)	0	51.9 (32.2)
Hidalgo Co., NM	0	0	0	0	0
NM Total	4.0 (2.5)	0	47.9 (29.7)	0	51.9 (32.2)
Total	214.3 (133.0)	33.7 (20.9)	379.0 (235.1)	5.5 (3.4)	632.7 (392.4)

*Yavapai and Gila Counties share a border at Fossil Creek, the mileage for which is included in Gila County and not here.

1. Verde River complex—There are large blocks of USFS lands in the upper and lower reaches, with significant areas of private ownership in the Verde Valley and along the lower portions of Oak, Beaver, and West Clear Creeks. There are also lands belonging to the National Park Service (NPS), Arizona State Parks, and the Arizona Game and Fish Department (AGFD).

2. Black River complex—The ownership is predominantly USFS, with a few small areas of private land.

3. Tonto Creek complex—Land here is mostly USFS on the upper end, but significant areas of private ownership occur in the lower reaches.

4. Middle Gila/Lower San Pedro/Aravaipa Creek complex—This area includes extensive BLM land as well as extensive private land, some State of Arizona lands, and a small area of

allotted land used by the San Carlos Apache Tribe.

5. Middle-Upper San Pedro complex—The BLM is the largest landowner, and there are large areas of private ownership and smaller areas of State of Arizona lands.

6. Gila Box/San Francisco River complex—This complex contains extensive USFS land, some BLM land, and scattered private, State of Arizona, and New Mexico Department of Game and Fish (NMDGF) lands. A significant portion of Bonita Creek runs through the City of Safford.

7. Upper Gila River complex—The largest areas are on USFS land, with small private inholdings. There are large areas of private lands in the Cliff-Gila Valley, and the BLM administers significant stretches upstream of the Arizona/New Mexico border. There are

also small areas of NMDGF, NPS, and State of New Mexico lands.

Significant private owners, with lands scattered among several of the designated critical habitat complexes, include Phelps-Dodge Corporation and The Nature Conservancy. A large number of other private landowners hold lands within the designated areas. Private lands are primarily used for grazing and agriculture, but also include towns, small-lot residences, and industrial areas.

Effect of Critical Habitat Designation

The Act requires Federal agencies to ensure that actions they fund, authorize, or carry out do not destroy or adversely modify critical habitat to the extent that the action appreciably diminishes the value of the critical habitat for the survival and recovery of the species.

Individuals, organizations, States, local and Tribal governments, and other non-Federal entities are only affected by the designation of critical habitat if their actions occur on Federal lands, require a Federal permit, license, or other authorization, or involve Federal funding.

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its proposed or designated critical habitat. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act and regulations at 50 CFR 402.10 require Federal agencies to confer with us on any action that is likely to jeopardize the continued existence of a proposed species or to result in destruction or adverse modification of proposed critical habitat. If a species is subsequently listed or critical habitat is designated, then section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or destroy or adversely modify its critical habitat. To that end, if a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with us. Regulations at 50 CFR 402.16 also require Federal agencies to reinstate consultation in instances where we have already reviewed an action for its effects on a listed species if critical habitat is subsequently designated.

Section 4(b)(8) of the Act requires us, to the extent practicable, to include in any proposed or final regulation that designates critical habitat a description and evaluation of those activities involving a Federal action that may adversely modify such habitat or that may be affected by such designation. Activities that may destroy or adversely modify critical habitat include those that alter the primary constituent elements (defined above) to an extent that the value of critical habitat for both the survival and recovery of the spinedace or loach minnow is appreciably reduced.

To properly portray the effects of critical habitat designation, we must first compare the section 7 requirements for actions that may affect critical habitat with the requirements for actions that may affect a listed species. Section 7 prohibits actions funded, authorized, or carried out by Federal agencies from jeopardizing the continued existence of a listed species or destroying or adversely modifying the

listed species' critical habitat.

According to regulations at 50 CFR 402.02, actions likely to "jeopardize the continued existence" of a species are those that would appreciably reduce the likelihood of the species' survival and recovery. Actions likely to "destroy or adversely modify" critical habitat are those that would appreciably reduce the value of critical habitat for the survival and recovery of the listed species.

Common to both definitions is an appreciable detrimental effect on both survival and recovery of a listed species. Given the similarity of these definitions, actions likely to destroy or adversely modify critical habitat would almost always result in jeopardy to the species concerned, particularly when the area of the proposed action is occupied by the species. In those cases, it is highly unlikely that additional modifications to the action would be required as a result of designating critical habitat. However, critical habitat may provide benefits towards recovery when designated in areas currently unoccupied by the species.

Actions on Federal lands that we reviewed in past consultations on spinedace and loach minnow include land management plans; land acquisition and disposal; road and bridge construction, maintenance, and repair; water diversion and development; reservoir construction; off-road vehicle use; livestock grazing and management; fencing; prescribed burning; powerline construction and repair; recovery actions for spinedace and loach minnow; game fish stocking; timber harvest; access easements; flood repair and control; groundwater development; channelization; and canal and other water transport facility construction and operation. Federal agencies involved with these activities include the USFS, BLM, Service, and Bureau of Reclamation.

Federal actions taken on private, State, or tribal lands on which we consulted in the past for spinedace and loach minnow include irrigation diversion construction and maintenance; flood repair and control; game fish stocking; timber harvest; water diversion and development; reservoir construction; water quality standards; and riparian habitat restoration. Federal agencies involved with these activities include the Natural Resources Conservation Service, Bureau of Reclamation, Environmental Protection Agency, Bureau of Indian Affairs, Indian Health Services, Federal Emergency Management Agency, and the Service.

Federal actions involving issuance of permits to private parties on which we

consulted in the past for spinedace and loach minnow include issuance of National Pollution Discharge Elimination System permits by the Environmental Protection Agency and issuance of permits under section 404 of the Clean Water Act for dredging and filling in waterways by the COE. Private actions for which 404 permits were sought include road and bridge construction, repair and maintenance; flood control and repair; and water diversion construction and repair.

Since the original listing of spinedace and loach minnow in 1986, only three consultations ended in a finding that the proposed action would likely jeopardize the continued existence of spinedace and/or loach minnow. An additional four proposed actions received draft findings of jeopardy, but for three of those, the requests for consultation were withdrawn and the fourth is still in progress. For the three jeopardy findings, we developed reasonable and prudent alternatives that included changes to projects, and recommended or required measures to reduce or eliminate impacts to spinedace and loach minnow and to minimize the take of individuals. These alternatives removed the likelihood of jeopardy to the species.

As stated above, designation of critical habitat in areas occupied by spinedace or loach minnow is not expected to result in regulatory burden above that already in place due to the presence of the listed species. However, areas designated as critical habitat that are not currently occupied by the species may require protections similar to those provided to occupied areas under past consultations.

Any Federal activity that would significantly and detrimentally alter the minimum flow or the natural flow regime of any of the stream segments listed above could destroy or adversely modify the critical habitat of either or both species. Such activities include, but are not limited to, groundwater pumping, impoundment, water diversion, and hydropower generation.

Any Federal activity that would significantly and detrimentally alter watershed characteristics of any of the 41 stream segments listed above could destroy or adversely modify the critical habitat of either or both species. Such activities include, but are not limited to, vegetation manipulation, timber harvest, road construction and maintenance, human-ignited prescribed fire, livestock grazing, mining, and urban and suburban development.

Any Federal activity that would significantly and detrimentally alter the channel morphology of any of the 41

stream segments listed above could destroy or adversely modify the critical habitat of either or both species. Such activities include, but are not limited to, channelization, impoundment, road and bridge construction, deprivation of substrate source, destruction and alteration of riparian vegetation, reduction of available floodplain, removal of gravel or floodplain terrace materials, and excessive sedimentation from mining, livestock grazing, road construction, timber harvest, off-road vehicle use, and other watershed and floodplain disturbances.

Any Federal activity that would significantly and detrimentally alter the water chemistry in any of the 41 stream segments listed above could destroy or adversely modify the critical habitat of either or both species. Such activities include, but are not limited to, release of chemical or biological pollutants into the surface water or connected groundwater at a point source or by dispersed release (non-point).

Any Federal activity that would introduce, spread, or augment nonnative aquatic species could destroy or adversely modify the critical habitat of either or both species. Such activities include, but are not limited to, stocking for sport, aesthetics, biological control, or other purposes; construction and operation of canals; and interbasin water transfers.

In some cases designation of critical habitat may assist in focusing conservation activities by identifying areas that contain essential habitat features (primary constituent elements), regardless of whether they are currently occupied by the listed species. This identification alerts the public and land management agencies to the importance of an area in the conservation of that species. Critical habitat also identifies areas that may require special management considerations or protection.

If you have questions regarding whether specific activities are likely to constitute destruction or adverse modification of critical habitat, contact the Field Supervisor, Arizona Ecological Services Office (see **ADDRESSES** section). Requests for copies of the regulations on listed wildlife and inquiries about prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Division of Endangered Species, P.O. Box 1306, Albuquerque, New Mexico 87103 (telephone 505-248-6920; facsimile 505-248-6788).

Economic Analysis

Section 4(b)(2) of the Act requires that we designate critical habitat on the basis of the best scientific and commercial

information available and consider the economic and other relevant impacts of designating a particular area as critical habitat. We based this designation on the best available scientific information, including the recommendations in the species' recovery plans. We utilized the economic analysis, and took into consideration comments and information submitted during the public hearing and comment period, to make this final critical habitat designation. We may exclude areas from critical habitat upon a determination that the benefits of such exclusions outweigh the benefits of specifying such areas as critical habitat. We cannot exclude such areas from critical habitat when such exclusion will result in the extinction of the species. We completed an economic analysis, which is available for public review. Send your requests for copies of the economic analysis to the Arizona Ecological Services Office (see **ADDRESSES** section) or visit our website at <http://ifw2es.fws.gov/arizona>.

Exclusion for Economic and Other Relevant Impacts

Based on comments provided by the BLM, our Economic Analysis identified Bonita Creek as an area with potential for high economic impacts associated with the designation of critical habitat for the spokedace and loach minnow. The analysis concluded that "Immediate action is required in case of flood control damage to [the City of Safford's] water supply in order to minimize the cost of repair. The cost of a stable, alternative water supply is prohibitive. There is a high probability of substantial cost to the City of Safford from the inability to repair storm damage to their water supply in a timely manner due to the requirement of a section 7 consultation if the Creek is designated critical habitat."

Bonita Creek is an area that is necessary for the recovery of the probable unique spokedace gene pool presently occupying Eagle Creek. Furthermore, 50 CFR section 402.05 of our regulations provides for expedited consultation pursuant to section 7 of the Act during emergencies. Finally, Bonita Creek is occupied by the razorback sucker (*Xyrauchen texanus*), a species listed as endangered pursuant to the Act. Thus, consultation on water supply repair has and will occur regardless of the designation of critical habitat for the spokedace and loach minnow. In fact, in 1994, the Federal Emergency Management Agency consulted with us pursuant to section 7 of the Act regarding repairs to the City of Safford's water supply system in Bonita Creek. We concluded that repairs to the water

system were not likely to jeopardize the continued existence of the razorback sucker. Impacts to the razorback sucker would be very similar to the impacts to the spokedace and thus, including Bonita Creek as critical habitat is not likely to change our section 7 consultation conclusions. For these reasons we conclude the benefits of designating Bonita Creek outweigh the benefits of excluding it from critical habitat designation.

Based on comments provided by Arizona Game and Fish Department (AGFD), our Economic Analysis identified the possible discontinuation of trout stocking programs as a potential for high economic loss to affected county economies. We are presently consulting on the stocking program, but because trout are not known to conflict with the recovery of either spokedace or loach minnow, we do not expect any impacts to the trout stocking program or county economies. Therefore, we conclude the benefits of designating critical habitat for the spokedace and loach minnow outweigh the benefits of excluding all areas where trout stocking occurs.

No tribal reservation lands are included in this designation, as discussed in more detail below. Nor are we including the Black River as critical habitat for spokedace in this final determination because information received during the comment period leads us to conclude that it is not suitable for spokedace recovery. The Black River is, however, designated as critical habitat for the loach minnow. After gathering economic data and conducting an analysis of the lands proposed for critical habitat designation, we determined that no other areas should be excluded from this designation for economic or other relevant considerations.

American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act

In accordance with the Presidential Memorandum of April 29, 1994, we believe that, to the maximum extent possible, fish, wildlife, and other natural resources on tribal lands are better managed under tribal authorities, policies, and programs than through Federal regulation wherever possible and practicable. Based on this philosophy, we believe that, in most cases, designation of tribal lands as critical habitat provides very little benefit to threatened and endangered species. This is especially true where the habitat is occupied by the species and is therefore already subject to protection under the Act. Conversely,

such designation is often viewed by tribes as unwarranted and unwanted intrusion into tribal self governance, thus compromising the government-to-government relationship essential to achieving our mutual goals of managing for healthy ecosystems upon which the viability of threatened and endangered species populations depend.

As stated previously, section 4(b)(2) of the Act requires us to consider the economic and other relevant impacts of critical habitat designation, and authorizes us to exclude areas from designation upon finding that the benefits of exclusion outweigh the benefits of including the areas as critical habitat, so long as excluding those areas will not result in the extinction of the species concerned. In the proposed rule for this critical habitat designation we solicited information from interested parties on the anticipated economic and other relevant impacts of designation.

We identified stream reaches on the Fort Apache Indian Reservation (home of the White Mountain Apache Tribe), the San Carlos Apache Reservation, and the Yavapai Apache Reservation as possibly appropriate biologically for the designation of critical habitat, i.e., they contain the primary constituent elements of the species' critical habitat. The San Carlos, Tonto, White Mountain, and Yavapai Apache tribes all addressed this issue in their comments on the proposed rule. Below we evaluate the benefits of excluding these tribal lands from critical habitat and the benefits of including these areas. In addition, we assess the anticipated effects that designation of non-tribal lands can be expected to have on tribal trust resources, such as water deliveries.

1. Designation of Critical Habitat on Indian Reservations

The White Mountain Apache Tribe, which has currently occupied loach minnow habitat and potential loach minnow and potential spikedace habitat within its reservation boundaries, produced a Native Fishes Management Plan. After reviewing this plan, we determined that the tribe's management of the species will provide substantial protection for the relevant habitat areas, and that designation of critical habitat will provide little or no additional benefit to the species, particularly since the areas are occupied by the loach minnow.

Conversely, designation of critical habitat would be expected to adversely impact our working relationship with the Tribe, the maintenance of which has been extremely beneficial in implementing natural resource programs of mutual interest. In 1994 the

Fish and Wildlife Service and White Mountain Apache Tribe signed a Statement of Relationship which formalized our commitment to work cooperatively with the tribe in promoting healthy ecosystems. Since that agreement we have worked cooperatively with the tribe to the significant benefit of threatened and endangered species. In addition to managing the habitats of the spikedace and loach minnow, these programs include management of the threatened Mexican spotted owl, management of healthy populations of threatened Apache trout, and other natural resource programs. After weighing the benefits of critical habitat designation on the Fort Apache Indian Reservation against the adverse impact on our cooperative natural resource programs, we find that the benefits of excluding Fort Apache Indian Reservation lands, in terms of the spikedace and loach minnow, as well as ecosystems in general, outweigh the benefits of including those areas as critical habitat.

In the case of the San Carlos Indian Reservation, we again believe that the principle of tribal self-governance is the overriding consideration and believe that Federal regulation through critical habitat designation will be viewed as an unwarranted and unwanted intrusion into tribal natural resource programs. This, in turn, will likely hamper our ability to continue important programs upon which endangered and threatened species depend. For example, we are currently cooperating with the San Carlos Apache Tribe on a very important spring restoration program for the benefit of the severely imperiled Gila topminnow. We also are cooperating on programs to benefit the endangered southwestern willow flycatcher, the Gila chub (a candidate for listing under the Act), and the Mexican spotted owl, among others. Given our belief that they are the entity best able to manage habitat for the spikedace and loach minnow, the fact that the areas considered for designation are already occupied by listed species and therefore receive protection under the Act, and the anticipated adverse impacts to our cooperative relationship that may result from critical habitat designation, we believe that the benefits of excluding areas of the San Carlos Apache Reservation from critical habitat outweigh the negligible benefits of designating those areas.

The Yavapai Apache Tribe holds approximately one river-mile of potential critical habitat on the Verde River, other parts of which are designated as critical habitat. We believe that current management is

adequate as evidenced by the fact that the spikedace still occurs there, and that little benefit would accrue from critical habitat designation since the species is already protected under the Act. We further believe that tribal management of this reservation land would ultimately be of greater benefit to spikedace and loach minnow than would the designation of this small segment, since we hope to maintain a cooperative working relationship with the Yavapai Apache.

After carefully balancing the considerations involved in determining whether lands should be included or excluded from the designation of critical habitat, we determined that the benefits of promoting self-determination, allowing the tribes to develop conservation management on their lands, and the continued cooperative relationship in managing threatened and endangered species and their habitats, outweigh the benefits to be obtained from designating critical habitat for these two species. Exclusion of these lands from the designation will not result in extinction of either species.

These decisions were made in compliance with Public Law 106-113, which prohibits us from using any of our appropriated funds to implement two provisions of Secretarial Order 3206 (Secretarial Order)—(1) Principle 3(C)(ii), which prohibits the imposition of conservation restrictions involving incidental take if the conservation purposes of the restriction can be achieved by reasonable regulation of non-Indian activities, and (2) Appendix section 3(B)(4), which concerns the designation of critical habitat and includes the requirement that we consult with affected tribes. The Presidential Memorandum of April 29, 1994 also requires that we consult with tribes when contemplating regulations that may affect them, and the Act requires that we consider the relative benefits versus potential adverse consequences of critical habitat designations on all lands. Thus, our consultation with the tribes and our assessment of the ability to achieve conservation of spikedace and loach minnow without regulation of tribal lands were undertaken independently of the provisions of Secretarial 3206.

2. Possible Effects on Tribal Trust Resources From Critical Habitat Designation on Non-tribal Lands

We recognized that the Salt River Reservation, Fort McDowell Reservation, and Gila River Indian Reservation are all located downstream from designated critical habitat and depend on water deliveries from

upstream sources. We do not anticipate that designation of critical habitat on non-tribal lands will result in any impact on tribal trust resources or the exercise of tribal rights. Many of the tribal lands either have major impoundments on their reservations or lie below major impoundments, and the release of water from the impoundments is regulated by court decree or other actions which may be non-discretionary. Since non-discretionary actions are not subject to consultation under the Act, designation of critical habitat is unlikely to have any effect on water deliveries to the reservations. However, in complying with our responsibility to communicate with all tribes potentially affected by the designation, we solicited information during the comment period on potential effects to tribes or tribal resources that might result from this critical habitat designation. The comments are discussed below; none pointed out specific effects not considered in developing this rule.

Summary of Comments and Recommendations

In the December 10, 1999, proposed rule, all interested parties were requested to submit comments or information that might bear on the designation of critical habitat for the spikedace and loach minnow (64 FR 69324). The comment period was initially scheduled to close on January 14, 2000. Subsequently, the courts allowed us additional time in which to prepare and publish this final designation of critical habitat. Therefore on January 12, 2000, we announced in the **Federal Register** (65 FR 1845) extension of the comment period to February 14, 2000, and scheduling of an additional public hearing. In addition, we notified 525 interested parties of the comment period extension and additional public hearing by letter.

We contacted all appropriate State and Federal agencies, Tribes, county governments, scientific organizations, and other interested parties by mail and invited them to comment on the proposed rule as well as the draft economic analysis and Environmental Assessment. In addition, newspaper notices inviting public comment were published in the following newspapers in Arizona and New Mexico: The Arizona Republic, Tucson Citizen, Arizona Daily Star (Tucson), Albuquerque Tribune, Albuquerque Journal, Sierra Vista Herald, Eastern Arizona Courier, Santa Fe New Mexican, Silver City Daily Press, White Mountain Independent, The Verde Independent, Sedona Red Rock News,

Cottonwood Journal Extra, and Camp Verde Journal. The inclusive dates of these publications were December 4–15, 1999, for the initial comment period and announcement of the first three public hearings.

We posted copies of the proposed rule, draft environmental assessment, and draft economic analysis on our Internet site and distributed them for display and inspection at public libraries in Prescott, Chinó Valley, Camp Verde, City Of Cottonwood, Sedona, Sierra Vista, Huachuca City, Safford City and Graham County, Clifton-Greenlee County, Kearny, Tucson, Alpine, Greer, Mammoth, and San Manuel in Arizona; and Silver City and Reserve Village Hall in New Mexico.

We held hearings in Silver City, New Mexico, and Thatcher, Arizona, on December 15, 1999, and Camp Verde, Arizona, on December 16, 1999. Notices appeared in the previously named newspapers between January 13 and 19, 2000 to announce the extension of the public comment period until February 14, 2000, and the scheduling of an additional public hearing in Sierra Vista, Arizona on January 31, 2000. The December 10, 1999 (64 CFR 69324), and January 12, 2000 (65 CFR 1845), notices also announced the time and location of the four public hearings. A total of 495 people registered at the public hearings including 32 in Silver City, 111 in Thatcher, 24 in Camp Verde, and 328 in Sierra Vista. Transcripts of these hearings are available for inspection (see **ADDRESSES** section).

We requested four ichthyologists familiar with the species to peer review the proposed critical habitat designation. However, only two responded by the close of the comment period. One responded that as a member of the Desert Fishes Recovery Team he has provided data, advice, and general counsel and supports the proposal on biological grounds. The second also generally supported the proposed critical habitat, but cited a few areas he suggested be added to the proposal as well as some technical corrections to the document.

We received a total of 126 oral and 315 written comments during the comment period. Of those oral comments, 15 supported critical habitat designation and 111 were opposed to designation. Of the written comments, 35 supported designation, 263 were opposed to it, and 17 provided additional information only, or were nonsubstantive or not relevant to the proposed designation. Oral and written comments were received from the government of Mexico, one

Congressional representative, two state legislators, two Federal agencies, three State agencies, nine local governments, five Tribal governments, and 297 private organizations, companies, or individuals.

All comments received were reviewed for substantive issues and new data regarding critical habitat and the biology and status of spikedace and loach minnow. Comments of similar nature are grouped into 7 issues relating specifically to critical habitat. These are addressed in the following summary.

Issue 1: Procedural and Legal-Compliance

The following comments and responses involve issues related to public involvement in the designation process and compliance with the Act and other laws, regulations, and policies. These comments do not include those addressing economic issues nor compliance with the NEPA, which are addressed under Issues 3 and 5, respectively.

Comment 1a: The comment period was unreasonably short for the public to fully evaluate the proposed rule and associated documents; more public hearings were needed.

Our Response: The initial public comment period was shorter than the 60 days required under our regulations (50 CFR 424.16(c)(2)). However, the initial schedule we developed to complete this designation was the result of a court-ordered deadline. The court originally ordered us to publish this final designation by February 17, 2000. To meet this deadline and allow time for analysis of public comments and preparation of the final rule, we needed to close the public comment period on January 14, 2000, resulting in an initial comment period of 36 days. Fortunately, both the plaintiffs and the court agreed to a 60-day extension of the deadline. As a result, we announced in the **Federal Register** (65 FR 1845) on January 12, 2000, as well as local newspapers, that we were extending the comment period until February 14, 2000, resulting in a total comment period of 65 days, thus exceeding the 60-day regulatory requirement.

The Act requires that at least one public hearing be held if requested. We held four hearings; thus we exceeded the statutory requirements.

Comment 1b: The Service should prepare additional drafts of various documents and provide them to the public for review.

Our Response: Drafts of both the economic analysis and Environmental Assessment associated with this designation were made available to the

public for review and comment. The final versions of those documents are available to the public (see **ADDRESSES**).

Comment 1c: The public should have the opportunity to review comments provided by selected experts during the peer review process.

Our Response: All comments submitted are part of the administrative record and, as such, are open to public review. It is also important to note that oral testimony at the public hearings, written comments from the general public, and comments received during the peer review process are considered equally in making our final determination.

Comment 1d: Designation of portions of the rivers unoccupied by either of these fish species is outside the Service's authority and contrary to the requirements of the Act.

Our Response: The definition of critical habitat in section 3(5)(A) of the Act includes "specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species." The term "conservation", as defined in section 3(3) of the Act, means "to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary" (i.e., the species is recovered and removed from the list of endangered and threatened species).

After weighing the best available information, including the species' recovery plans (U.S. Fish and Wildlife Service 1991a, 1991b), we conclude that the areas designated by this final rule that lie outside the geographical area occupied by the species at the time they were listed are essential for the recovery of the species and subsequent removal from the list of endangered and threatened species. We also note that the total area designated only represents approximately 45 and 50 percent of the areas believed historically occupied by the spinedace and loach minnow, respectively.

Comment 1e: The Act states that areas outside the area occupied at the time of listing can be designated only if those areas are determined essential to the conservation of the species. The Service instead considered whether areas were occupied at the time of critical habitat designation. Therefore, some areas currently occupied, but that were not occupied at the time of listing, were not subject to the higher standard required of for unoccupied habitat (i.e., that those

areas are essential for the conservation of the species).

Our Response: The issue is moot since we determined that all areas designated as critical habitat are essential for conservation of these two species.

Comment 1f: The critical habitat proposal represents virtually all suitable or potentially suitable habitat within the species' historical ranges. The Act prohibits such broad designation.

Our Response: Section 3(5)(C) of the Act states that, except in those circumstances determined by the Secretary, critical habitat shall not include the entire geographical area which can be occupied by an endangered or threatened species. In this case critical habitat is designated in an estimated 45 and 50 percent of spinedace and loach minnow historical ranges, respectively. With proper restoration and management, much of the historical range would be suitable. The Secretary of the Interior has determined that the areas designated are essential to conserve these species.

Comment 1g: Private lands should be excluded from critical habitat designation.

Our Response: Section 4(b)(2) of the Act states "The Secretary shall designate critical habitat, and make revisions thereto, under subsection (a)(3) on the basis of the best scientific data available and after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat." The Act does not require nor suggest that private lands should be excluded from designation, unless we find that the economic or other relevant impacts outweigh the benefit of critical habitat designation. For further information please see our discussion under Issue 3: Economic Comments. Designation of critical habitat on private lands would only have an effect in cases where Federal funding or a Federal permit is required for a project. For further information please see our discussion under Issue 7: Effects of Designation.

Comment 1h: The critical habitat designation is based on insufficient data.

Our Response: Section 4(b)(2) of the Act states "The Secretary shall designate critical habitat, and make revisions thereto, under subsection (a)(3) on the basis of the best scientific data available . . ." Our recommendation is based on a considerable body of information on the biology and status of the species, as well as the effects of land-use practices on their continued existence. We agree that much remains to be learned about these species, and should credible, new

information become available which contradicts the basis for this designation, we will reevaluate our analysis and, if appropriate, propose to modify this critical habitat designation. We have considered the best scientific information available at this time, as required by the Act. Please see more specific information in our response to comment 4i.

Comment 1i: We should not designate critical habitat until specific recovery goals are set.

Our Response: The Act does not allow the indefinite suspension of the determination of critical habitat. Thus, in general, we cannot delay the determination of critical habitat until final recovery plans are produced. However, in the cases of the spinedace and loach minnow, recovery plans were finalized in 1991. These plans recommend that critical habitat be designated for these species. The plans also recommend maintenance of occupied habitat and establishment of new populations within the species' historical ranges. In addition, we have continued working with the Desert Fishes Recovery Team since the plans were finalized, and believe this critical habitat designation is consistent with the recommendations of those scientists. We have thus met the requirement that the designation be based on the best scientific information available.

Comment 1j: In relying on the Desert Fishes Recovery Team to identify which streams and rivers should be designated as critical habitat, the Service violated both the ESA and the Federal Advisory Committee Act (FACA). The ESA exempts Recovery Teams from FACA only for the purpose of developing and implementing recovery plans, not advising on critical habitat designation. *Alabama-Tombigbee Rivers Coalition v. Department of Interior*, 26 F.3d 1103 (11th Cir. 1994).

Our Response: Section 4(f)(2) of the Endangered Species Act provides the Fish and Wildlife Service the authority to appoint recovery teams, which may consist of non-Federal personnel, for the purpose of assisting in the development and implementation of recovery plans. That section also exempts recovery teams from the provisions of FACA.

In the case of the spinedace and loach minnow, the Desert Fishes Recovery Team (Recovery Team) oversaw development of recovery plans for the two species, and suggested mechanisms to facilitate plan implementation in order to achieve the plans' conservation goals. Both recovery plans recommend designating critical habitat for the two species as a mechanism for recovery, and the Recovery Team has provided

suggestions on which areas should be included in such designation. The Recovery Team was acting appropriately within its role in advising on recovery plan implementation, and our consideration of Recovery Team recommendations is consistent with the Act's requirement that critical habitat determination be based on the best scientific information available.

This commenter cited *Alabama-Tombigbee Rivers Coalition v. Department of Interior*, 26 F.3d 1103 (11th Cir. 1994), as authority for its assertion that the Recovery Team's FACA exemption was limited. However, *Alabama-Tombigbee* did not involve a Recovery Team; it involved an "Advisory Team" assembled to advise the Service on whether listing of a species was warranted. The "Advisory Team" was never referred to as a Recovery Team nor was there any indication in the opinion that anyone asserted that the Advisory Team was exempt from FACA under the Act.

Comment 1k: Contrary to statements in the proposed rule, the Service was not ordered to designate critical habitat. Rather, the amended court order of October 6, 1999, stated that the Service was to publish a final determination with respect to whether and to what extent critical habitat shall be designated. Thus, the Service should reconsider whether and to what extent critical habitat should be designated.

Our Response: The commenter is correct that we cited the original court order of September 20, 1999, which ordered us to designate critical habitat, and that a subsequent court order amended the original order to require us to make a critical habitat determination rather than requiring actual designation. In complying with the amended court order, we made the determination that critical habitat designation is prudent for these two species, and that the areas proposed are essential for the species' conservation and thus the appropriate extent of critical habitat. The language in this final rule clarifies the distinction mentioned by the commenter, although such a correction has no material effect on the designation.

Comment 1l: We failed to comply with the Farm Land Protection Act of 1981.

Our Response: The stated purpose of the Farmland Protection Act of 1981, Public Law 97-98, 95 Stat. 1343, 7 USC 4201 *et seq.*, was "to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses * * *"; however, the Farmland Protection Act recognized that there might be instances where

other national interests could override this provision. While Federal statutes may frequently appear to have conflicting provisions, it is the presumed intent of Congress that, to the extent possible, all laws be read in a way which allows them to be applied together. We do not read the Farmland Protection Act and the Endangered Species Act to be incompatible since this designation will not result in conversion of farmland to nonagricultural uses and nor any significant restrictions on agricultural uses.

Issue 2: Biological Concerns

The following comments and responses involve issues related to the biological basis for the designation.

Comment 2a: The proposed critical habitat designation is substantially greater than critical habitat designated in 1994 and is thus excessive.

Our Response: The 1994 designations of critical habitat were based on proposals published in 1985. Since 1985 there have been substantial additions to the information on spikedace and loach minnow, their habitat needs, and the existing condition and potential of most of the streams in the Gila River basin. In addition, in 1985 the concept of critical habitat was less developed than it is now, 15 years later. Evolution of thinking, along with a number of court decisions regarding the definition and uses of critical habitat, have led to the recognition that critical habitat may provide the most benefits to listed species when it is applied to unoccupied areas essential for recovery.

Of the areas included in this critical habitat designation for spikedace that were not included in the 1994 designation, 20 percent are based on new information about the species, its distribution, abundance, and habitat; 10 percent are to include sparsely occupied areas omitted from the 1985 proposal; 69 percent are currently unoccupied recovery areas and connecting corridors; and, 1 percent is an adjustment due to the increased accuracy of mileage calculations using Geographic Information System (GIS) capability. Of the areas included in this critical habitat designation for loach minnow that were not included in the 1994 designation, 15 percent are based on new information; 18 percent are sparsely occupied areas omitted from the 1985 proposal; 65 percent are currently unoccupied recovery areas and connecting corridors; and, 2 percent are an adjustment for GIS figures.

Comment 2b: Neither spikedace nor loach minnow require the protection of the Act. The discovery of new

populations since their listing should cause both species to be delisted or at least negate the need for critical habitat designation.

Our Response: Both spikedace and loach minnow are listed as threatened. Recovery plans were finalized for both species in 1991. In 1994, we reevaluated the threats to the species and determined the status of the species was even more precarious than we had previously concluded, even with the discovery of new populations, and that they warranted listing as endangered. However, higher listing priorities, e.g., reviewing and listing imperiled species that are afforded no protection under the Act, have precluded us from reclassifying the spikedace and loach minnow as endangered. The status of both spikedace and loach minnow are declining.

Comment 2c: The Service should limit critical habitat to aquatic and riparian zones.

Our Response: In this final rule we have further clarified the areas within designated reaches as the stream channels and areas potentially inundated by high flow events. Where delineated, this is the 100-year floodplain of the designated waterways. This constitutes the present and reasonable future aquatic and riparian zones of the designated rivers and streams. Furthermore, within the delineated critical habitat boundaries, only lands containing, or which are likely to develop, those habitat components that are essential for the primary biological needs of the species are considered critical habitat. Existing human-constructed features and structures within this area, such as buildings, roads, railroads, and other features, do not contain, and do not have the potential to develop, those habitat components and are not considered critical habitat.

Comment 2e: One commenter questioned the validity of designating sufficient critical habitat to protect all known remaining genetic diversity within the two species with the exception of fish on certain tribal lands.

Our Response: The exclusion of tribal lands is discussed in the section titled American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act, and in section 6 of these responses to comments.

The range, numbers, and presumably genetic diversity of the species have already been much reduced. The remaining populations exhibit distinct genetic differences (Tibbets 1992, Tibbets 1993, A. Tibbets, pers. com., March 2000). Noss and Cooperrider (1994) identified reduced genetic

diversity as one of the factors which predispose small populations to extinction. Therefore, to conserve and recover the fishes to the point where they no longer require the protection of the Act and may be delisted, it is important to maintain and protect all remaining genetically diverse populations of these two species.

Comment 2f: The Service did not provide sufficient information on the criteria used for including or omitting certain reaches in the critical habitat designation.

Our Response: Please see the "Critical Habitat Designation" section of this Final Rule. As described in the section titled "B. Primary Constituent Elements", we identified the habitat features (primary constituent elements) that provide for the physiological, behavioral, and ecological requirements essential for the conservation of each species. Within the historical range of the species, we identified areas which either provide the primary constituent elements or will be capable, with restoration, of providing them and which met the criteria discussed under Critical Habitat Designation in this rule. Then, based in part on recommendations from species experts including those on the Desert Fishes Recovery Team, we selected qualifying reaches within these areas necessary for the conservation of the fishes.

Comment 2g: The definition of the lateral extent of critical habitat is undefined. The vague description of lateral extent, along with the discussion of what activities might adversely affect critical habitat, could be interpreted as including the entire watershed of the streams designated as critical habitat. In addition, there are areas within what appears to be the designation that do not contain the constituent elements, such as buildings or parking lots, that should not be included in the critical habitat.

Our Response: We have clarified the lateral extent of the critical habitat in this rule. Although activities within the watershed may affect the critical habitat, it is not our intent to designate areas outside of the floodplain as critical habitat. We have also clarified that existing human-constructed features that do not meet the constituent elements are excluded by definition from the critical habitat designation.

Issue 3: Economic Analysis.

There were numerous comments that addressed economic issues.

Issue 3a: Will critical habitat designation result in more consultations than would have occurred without the critical habitat designation?

Our Response: We expect that the designation of critical habitat will result in more consultations, especially for activities which may affect unoccupied habitat. If these consultations result in any increased costs to the applicant, these costs will be attributable to critical habitat designation. However, consultations are only required of Federal agencies for those projects with a Federal nexus.

Issue 3b: Are private lands affected by critical habitat designation if there is no Federal nexus?

Our Response: Under Section 7 of the Endangered Species Act, private lands are not impacted by the designation of critical habitat unless there is a Federal nexus.

Issue 3c: If permit requirements from a Federal agency change, is that a critical habitat impact?

Our Response: There are many reasons why a permit requirement may change. Each Federal agency has enabling legislation that determines its mission and, consequently, what activities can occur on the land it manages, or for what activities the agency can otherwise issue permits. As more information becomes available about the environment, public activities on Federal land, or activities for which Federal agencies otherwise issue permits, may require changes to permit requirements. These may be due to the Federal agency's own legislation. In those cases, we have attributed any impact to the legislation requiring the change and not the Endangered Species Act. If permit requirements change on unoccupied habitat as a result of a consultation with us, then the impact would be attributable to critical habitat designation.

Issue 3d: Critical habitat designation will drive away current and future businesses.

Our Response: There is a common misconception that critical habitat designation will reduce business activity. Without a Federal nexus, there is no direct impact of critical habitat designation on private activities or businesses. In addition, restrictions resulting from the listing of the species are not attributable to critical habitat designation. In areas currently occupied by the species, little or no economic impact is expected to result from critical habitat designation. In unoccupied areas, some economic impacts may result. Our economic analysis considers those anticipated impacts, including effects on businesses. However, we believe that the benefits of designating critical habitat outweigh the benefits of excluding areas from designation.

Issue 3e: Impacts on land uses next to the river were not evaluated in the economic analysis.

Our Response: At the time of releasing the economic analysis of critical habitat designation, very little information was available to us on land uses next to the rivers. Subsequently, some Federal and State agencies have provided us with their management activities and expected changes relative to critical habitat. This new information is reflected in the final economic analysis.

Issue 3f: The draft economic analysis only addresses 5 of the streams when the proposal includes many more streams.

Our Response: The table with the analysis of 5 streams comes from study of the previous critical habitat designation. It was included in the draft economic analysis to illustrate the kinds of economic impacts for which we were seeking additional information. All streams in the final designation have been evaluated in the final economic analysis.

Issue 3g: The Service must prepare an economic analysis that considers the total effect of listing and critical habitat.

Our Response: Congress has stated that the listing of a species be based solely on biological considerations. As a result, an economic analysis of the listing of a species is not undertaken as part of the listing process. The current rule being considered is the designation of critical habitat and thus only economic and other relevant impacts of specifying any particular area as critical habitat are considered. A recent court decision on designation of critical habitat for the southwestern willow flycatcher (*Empidonax extimus traillii*) *New Mexico Cattle Growers et al. v. USFWS et al.*, CIV 98-0275 LH/DJs—ACE (D. Ariz. 1999) (on appeal) affirmed our approach of considering only the economic and other relevant impacts of critical habitat designation above and beyond those associated with listing the species.

Issue 3h: The Regulatory Flexibility Act and the Small Business Regulatory Enforcement Fairness Act analyses were inadequate.

Our Response: There were substantial data gaps that precluded a full analysis of the impact on small entities. A more complete analysis is in the administrative record for this designation, and is available for public review (see **ADDRESSES**).

Issue 3i: There needs to be a takings implication assessment completed.

Our Response: A taking implications assessment is in the administrative record for this designation, and is

TABLE 3.—EXCLUSION OF REMOVAL RECOMMENDATIONS IN COMMENTS—Continued

Stream reach	Not suitable for species	Not occupied by species	Conflict with economic, social, or other uses	Insufficient information	Nonnative species conflict	Not essential or no benefit to species	Special mgmt. consideration not needed	Detrimental to species mgmt.
Complex 6								
Gila River at Box	X		X		X	X		
Bonita Creek	X	X	X	X	X	X	X	X
Eagle Creek	X	X	X	X	X	X		X
Blue River	X		X	X	X			X
Little Blue Creek		X		X				
Campbell Blue Creek				X	X			
Dry Blue, Frieborn, & Pace Creeks				X		X		
San Francisco River in AZ	X	X	X		X	X	X	
San Francisco River in NM			X			X		
Tularosa River						X	X	
Negrito and Whitewater Creeks						X		
Complex 7								
Upper Gila River below Mogollon Creek	X	X ¹	X		X	X	X	X
Upper Gila River above Mogollon Creek	X	X ¹			X	X	X	X
West Fork Gila River	X				X	X	X	X
East Fork Gila River	X				X	X	X	X
Middle Fork Gila River	X	X			X	X	X	X

¹ In part.

Our Response: We carefully considered the information provided in the comments regarding requested exclusions and removals. Two streams were removed from the spikedace designation, as described previously. Areas suggested for exclusion that were retained, and our rationales, are provided in responses 4b1 through 4b19.

Comment 4b1: There are no records of occurrence of spikedace and loach minnow in the Little Blue River, Redfield, Bass, and Hot Springs Canyons; Granite, Boneyard, Coyote, Greenback, Rye, Oak, and Bonita Creeks; the East, West, and Main Forks of the Black River; and the Gila Box. Therefore, these areas are not part of the historical range.

Our Response: Because early collections of fishes from the Gila Basin were rare and occurred mostly along primary exploration and settlement travel routes, the complete distribution of most of our native fishes cannot be documented with specific museum specimens and records. By the time sampling of native fish became common in the 1960's and 1970's many of the streams had been modified or subjected to temporary adverse circumstances (such as total diversion of water or mine spills resulting in water-quality problems) to the point that many of the

native fishes had already been extirpated. Thus, we can never know precisely what we have lost. Therefore, we must use the best available information to reconstruct the most probable composition of the historical ranges of spikedace and loach minnow. If a stream is (1) within the Gila basin; and (2) contains suitable or potential habitat for the species, or historical records indicate it once sustained such habitat, and there are records of those species from nearby areas, and there is no other reason to believe that the two species could not have occurred there (i.e. an impassable natural barrier); then those areas are considered to be part of the historical range of the species.

Comment 4b2: Deer, Turkey, Wet Beaver/Beaver, and West Clear Creeks have no records of spikedace and/or loach minnow.

Our Response: Deer and Turkey Creeks, tributaries of Aravaipa Creek, have recent records of loach minnow (USBLM 1995, University of Arizona museum specimens No. ASU 13517). The Beaver Creek complex has historical records of both spikedace and loach minnow from 1938 (Minckley 1993). West Clear Creek has historical records of spikedace from 1937 (Minckley 1993).

Comment 4b3: Spikedace are extirpated from the middle Gila River

and any spikedace found there were displaced by flooding from Aravaipa Creek.

Our Response: Spikedace were recorded from the middle Gila River historically (Minckley 1973) and as recently as 1991 (Jakle 1992) and are not considered extirpated. Some commenters believe the 1991 record of one spikedace in the middle Gila River near Florence represents a fish displaced during some unspecified flood event from Aravaipa Creek, 50 miles upstream, and does not represent a population in the Gila River. However, in the year preceding the October sampling, there was only one marginally significant flood, which occurred in March (USGS discharge records). It is unlikely that such a relatively minor flood would displace spikedace 50 miles downstream and that the displaced fish would be surviving 6 months later in what the commenters assume is habitat unsuitable to support a resident population of spikedace. In addition, it is even more unlikely that, at the precise time of the only sampling conducted that year, the displaced fish would be present at one of the 7 sites sampled, totaling less than 1 mile of the 50 mile reach. Given the sparse sampling in the middle Gila, it is far more likely that the 1991 spikedace represents a small population of

spikedace either permanently resident in that area or which occupy the area in a periodically fluctuating pattern dependent upon conditions.

Documentation of such small populations is very difficult and often results in false declarations of extirpation (Mayden and Kuhajda 1996).

Comment 4b4: Spikedace are extirpated from the Middle Fork Gila River.

Our Response: Spikedace have not been recorded at a long-term study site on the middle Fork Gila River since 1995 (Propst and Stefferud, unpub. data). No surveys of the rest of the stream have been conducted recently and the present status of the spikedace in the Middle Fork is uncertain. Failure to record spikedace for four years at a fixed sampling station may indicate a low population level but does not support a declaration of extirpation from the entire stream.

Comment 4b5: Spikedace are extirpated from the Verde River.

Our Response: Spikedace continue to be recorded from the Verde River, although since 1996 they have been very rare, with none found in 1997 and 1998 (Rinne et al. 1999a) and only two found in 1999. This dramatic fluctuation is similar to earlier fluctuations, although better documented.

Comment 4b6: Loach minnow are extirpated from Eagle Creek; loach minnow found there since 1995 were stocked from elsewhere by organizations known to have programs for planting endangered species, and the 1994 records of loach minnow in Eagle Creek are not valid because they have not yet been published in a peer-reviewed journal.

Our Response: Loach minnow were first recorded from Eagle Creek in 1950 (Univ. of Michigan museum specimens No. UMMZ 162744). Despite frequent sampling (Marsh et al. 1990), they were not again recorded until 1994 (Knowles 1994, Knowles 1995). This illustrates the need for caution in concluding that a population has been extirpated. Fish, particularly small species with relatively cryptic habits, are often very difficult to locate when population levels are very low.

Loach minnow had been presumed, incorrectly, to be extirpated from Eagle Creek. Loach minnow were not stocked into Eagle Creek by any agency or governmental entity. We are not aware of, nor have we permitted, any nongovernmental groups to plant listed fish in Arizona. Genetic testing has shown the loach minnow in Eagle Creek to be a probable unique lineage differing from all other loach minnow. We have no evidence that these fish could have

been planted from any other population (A. Tibbets, pers. comm. March, 2000). Sampling records from 1994 are considered valid records. Much of the monitoring of populations of endangered and threatened species is conducted by agencies and is placed into agency reports, such as the one in which these records are found. The 1995 Eagle Creek loach minnow records have also been vouchered with specimens in the Arizona State University Collection of Fishes (No. ASU165).

Comment 4b7: Both spikedace and loach minnow have been extirpated from the upper Gila River below the Middle Box (below Redrock, New Mexico) and any spikedace or loach minnow found in that area were displaced by flooding from the Cliff-Gila Valley.

Our Response: Spikedace and loach minnow continue to be found in the Gila River below the Middle Box, and depending upon conditions may be found from the mouth of the Box downstream to about the Arizona/New Mexico boundary. They were recorded near the Middle Box mouth and in the Lower Box at Fisherman's Point in 1998 (Propst and Stefferud unpub. data, Propst 1998) and at the Virden diversion in 1999 (Rinne et al. 1999b).

Comment 4b8: The San Francisco River is not occupied by spikedace and is occupied by loach minnow only above the confluence with the Blue River.

Our Response: The San Francisco River is currently occupied by loach minnow downstream from the mouth of the Blue River (Anderson and Turner 1977, J.M. Montgomery Consulting Engineers 1985, Bagley et al. 1995). The downstream extent of this population is not known precisely and likely fluctuates over time depending upon water and sediment levels, flooding, and other factors. However, it is known to extend at least 10–15 miles downstream from the confluence with the Blue River. Historical records of spikedace downstream (Minckley 1973) and upstream (Minckley 1973, Anderson 1978) from the lower San Francisco River, and the presence of apparently suitable habitat in that area, support the presumption of historical presence of spikedace. Past pollution events from the mines in the Clifton area, along with other human-caused alterations, caused the lower San Francisco River to be barren of fish at one time (Chamberlain 1904), have resulted in fish kills since that time (Rathbun 1969 as cited in Minckley and Sommerfeld 1979), and likely were a significant factor in the loss of spikedace and loach minnow

from the lower San Francisco River and adjacent Gila River. The amelioration of these pollution events through modern management and regulation has eliminated them as a limiting factor to restoration of spikedace and other native species in the lower San Francisco River.

Comment 4b9: The San Pedro River is not now and has never been occupied by either spikedace or loach minnow.

Our Response: The San Pedro River is the type locality for spikedace and loach minnow. They were first collected there in 1840 and again in 1846 (Miller 1961), and were described from specimens taken there in 1851 (Girard 1856). They were taken periodically over the years; loach minnow were last recorded from the San Pedro in 1961 (University of Arizona museum No. UAZ95–190), and spikedace were last recorded there in 1966 (Arizona State University museum No. ASU 2282). See also responses to comments 4b16(c) and 4b16(j).

Comment 4b10: It was suggested that areas which are occupied by spikedace or loach minnow only under certain conditions or which are colonized during periods when streamflows are higher than average should not be considered essential to the species and should be omitted from the critical habitat.

Our Response: Spikedace and loach minnow, like many southwestern fishes, have a life history pattern of expansion and retraction of occupied areas in response to flow and other habitat conditions. To ensure the survival and recovery of species with this type of pattern it is essential to conserve not only the core habitat into which the species shrinks in times of poor conditions, but also the habitat into which it expands during times of good conditions (Moyle and Sato 1991, Meffe and Carroll 1994). The absence of spikedace and/or loach minnow from an area during certain periods or under certain conditions does not mean it is in unoccupied habitat.

Comment 4b11: Several commenters suggested that, since several of the proposed streams have portions that dry either seasonally, during drought conditions, or for other periodic reasons, therefore those streams do not meet the proposed constituent elements description of permanent flowing water and so do not qualify as critical habitat for spikedace and loach minnow.

Our Response: Spikedace and loach minnow, along with most of the native fishes of the southwest, evolved in stream systems that had portions which periodically lost flow. The species are adapted to this phenomenon and persist in flowing areas that remain and

recolonize the dewatered areas once flow resumes. Over the past 150 years, the extent of areas in the Gila basin that periodically lose flow has increased due to human alterations of the watersheds and stream channels and diversion of the streamflows.

Hydrology-based definitions of streams as "perennial," "intermittent" (both spatially and temporally), or "ephemeral" are confusing, often misused, and may not relate to fish needs. Although a stream may be characterized by some as "intermittent," it may still have substantial areas where flow is permanent, although those areas may not always be in precisely the same location. If sufficient areas of flow persist, and if all other habitat needs are met, then the stream is suitable for the two fish species whether or not there is flow throughout all areas at all times. Aravaipa Creek, one of the best remaining habitats for these two species, is an "intermittent" stream, which seldom flows in the upper half of its course, and often does not flow for several miles above its confluence with the San Pedro River (Minckley 1981). However, approximately 20–25 mi of stream presently flow at all times and support healthy populations of spikedace and loach minnow (Bettaso et al. 1995).

The critical habitat designation also specifically includes many areas that lose flow periodically, and some which may be dry during most times. Maintenance of those areas in a natural, or only slightly modified, state is essential to spikedace and loach minnow. During high flows they serve as connecting corridors for movement between the areas of permanent flow and because they are important in maintenance of natural channel geomorphology. Criteria for what might constitute adverse modification of critical habitat may be different for these stream reaches than for occupied or perennial flow areas; however, their maintenance is essential to the long-term survival and recovery of spikedace and loach minnow.

There are many areas in the critical habitat where flows are artificially altered by human diversion and uses, up to and including complete loss of flow. In some of these areas, changes in management may potentially increase duration of flows and the length of stream channel with permanent water, thus making them valuable for recovery and survival of spikedace and loach minnow. A good example of this is Fossil Creek, where the proposed relicensing of the Childs-Irving hydropower plant would involve

restoration of some level of flow to the lower stream channel.

Comment 4b12: All streams proposed for designation of critical habitat contain some nonnative aquatic species, raising comments from many parties that none of the streams proposed meet the proposed constituent elements description of few or no predatory or competitive nonnative species present, and therefore do not qualify for designation as critical habitat. Several commenters went further to state that no stream that contains nonnative fish could be considered essential to the conservation of spikedace and/or loach minnow.

Our Response: The constituent elements have been rewritten to clarify the role of nonnative aquatic species in the suitability of habitat for designation as critical for spikedace and loach minnow. The level of nonnative species that may be present in habitat considered to be suitable varies depending upon the circumstances. Some nonnative species, such as rainbow trout, appear to have little effect on spikedace or loach minnow (see response to comment 7b, below). Others, such as flathead catfish (*Pylodictis olivaris*) have serious adverse effects. In some streams, the habitat complexity and distribution may allow spikedace and loach minnow to coexist with nonnative aquatic species when, under other circumstances, that nonnative may eliminate the two natives. Some unoccupied streams designated for critical habitat may have nonnative species present that will be controlled or removed before reestablishment of the two native fishes. Although the fewer nonnative aquatic species that are present, the better the situation for spikedace and loach minnow, the presence of nonnative aquatic species does not eliminate an area from consideration as critical habitat.

Comment 4b13: The upper end of Oak Creek and the Gila River in the Duncan-Virden and Safford valleys were not included in the proposed critical habitat, in part because of urban development. Therefore, the San Francisco River in and below Clifton, the Gila Box, and portions of the San Pedro and Verde Rivers do not qualify as critical habitat because of urban and other human uses of those areas.

Our Response: Urban and suburban development alone do not necessarily cause a stream to become unsuitable for spikedace or loach minnow. For the upper end of Oak Creek, the substantial urban development is not the only factor considered in the omission of that area from the proposed designation.

Habitat in the portions of upper Oak Creek omitted from the proposed designation rapidly becomes increasingly unsuitable due to stream gradient, substrate, and other inherent ecological factors. Because the adjacent designated habitat is unoccupied, and since upper Oak Creek has no value as a movement corridor to other suitable or occupied habitat, there are no overriding reasons for extending the critical habitat designation to include the small additional area that is in the urban zone.

The Duncan-Virden Valley is substantially altered by agricultural, and, to a small extent, urban development, but still supports spikedace and loach minnow in its upper portion (Rinne et al. 1996b). Information received during the comment period indicates that more of this reach of the Gila River may have been appropriate for consideration as critical habitat, and its inclusion will be re-evaluated during future revision of the critical habitat for spikedace and loach minnow.

The Safford Valley was historically suitable habitat for spikedace and loach minnow, but is now highly altered, primarily by agricultural practices, and provides only partially suitable habitat with potential for improvement with management. Since it is adjacent to unoccupied habitat and provides no movement corridor between more suitable areas, the added value of including the valley portion of the stream was considered low.

The lower San Francisco River, on the other hand, may be occupied and is adjacent to documented occupied habitat. Although altered, it still contains substantial areas of suitable habitat, and it provides a connection between the occupied area and the unoccupied recovery area in the Gila Box. The small amount of urbanization and the alterations due to flood control and mining are not significant enough to negate the value of the stretch for spikedace and loach minnow survival and recovery. The Gila Box is in a National Riparian Conservation Area and does not have urban or suburban development. There are no heavily urbanized areas along the San Pedro River within the area proposed for critical habitat. The Cottonwood-to-Camp Verde stretch of the Verde Valley is heavily urbanized but still contains substantial suitable, occupied habitat which, if appropriate diversion management takes place, could be significantly improved. The area is also a connecting corridor between occupied upstream areas and important unoccupied downstream recovery areas.

Comment 4b14: The habitat in Oak Creek is not suitable for spikedace or loach minnow due to heavy recreation use.

Our Response: We agree that heavy recreation use in Oak Creek may be adversely impacting the stream and its fish habitat. However, we believe that suitable habitat still exists for spikedace and loach minnow and, with proper management, recreation and recovery of these two fishes can be compatible.

Comment 4b15: Some comments contend that the San Francisco River below its confluence with the Blue River and the Gila River in the Gila Box are too large to be suitable for either spikedace or loach minnow because they are larger than the Verde River below Fossil Creek, which was not included in the designation. In addition, concern was expressed that the Gila Box contains too much sediment to support spikedace and loach minnow.

Our Response: The San Francisco River below its confluence with the Blue River and the Gila River below its confluence with the San Francisco are well within the historical range of both species and contain suitable habitat. Median flows (discharge) at the gauging station near Clifton on the San Francisco River are similar to those for the Verde River near Clarkdale, within occupied spikedace habitat (Pope et al. 1998). Median flows at the gauging station at the head of the Safford Valley are about 25 percent less than those in the Verde River below Fossil Creek (Pope et al. 1998). In addition, the Verde River below Fossil Creek is well within the historical range of spikedace and loach minnow and, as some commenters have pointed out, has sufficient suitable habitat to meet critical habitat criteria.

Comment 4b16: Many commenters contend the San Pedro River does not have suitable habitat for spikedace and loach minnow based on a number of factors. These include—(a) The river was changed dramatically by a late 1800's earthquake and no longer has permanent flowing water; (b) toxic mine waste spills from Mexico occur periodically and are not within our control; (c) the extirpation of spikedace and loach minnow from the San Pedro 30 years ago is conclusive evidence that the habitat is not suitable; (d) the gradient in the river is too high or too low; (e) the substrate is not the appropriate size; (f) the San Pedro River does not have a snowmelt hydrograph; (g) recent reestablishment of beaver precludes spikedace and loach minnow occupation; (h) there is too much water depletion by humans; (i) riparian vegetation is destroying the aquatic habitat and increasing nonnative fish;

and (j) the statement that this is the "type" locality is inappropriate because it is not the right type of habitat.

Our Response: (a) The fish of the upper San Pedro River are sampled twice yearly, once by the BLM and once by the Bureau of Reclamation (Stefferd and Stefferud 1989, 1990, 1998, Girmendonk et al. 1997, Clarkson 1998, Marsh 1999). The Middle San Pedro is sampled annually by the Bureau of Reclamation. Other, irregular samplings occur. This work has confirmed that there is permanent water in the river, that flow supports three native and several nonnative fish species, and that there is suitable or potentially suitable habitat for spikedace and loach minnow in both the upper and middle San Pedro River. Whatever the effects of the 1887 earthquake on the habitat and flow of the San Pedro River, spikedace and loach minnow were present prior to the earthquake and for almost 100 years after the earthquake. Therefore, it is unlikely that the earthquake was a definitive factor in the presence or absence of habitat for spikedace and loach minnow.

(b) Toxic flow events in the past from mines near Cananea, Sonora, Mexico, have had highly adverse effects to the fauna of the San Pedro River (Eberhardt 1981). In fact, it is likely that such events in the late 1960's and early 1970's were responsible for extirpating spikedace and loach minnow from the San Pedro River. Other human activities in the upper San Pedro River in Mexico can potentially adversely affect the use of the U.S. portion by spikedace and loach minnow. However, we intend to work with the governments of Mexico and Sonora to minimize adverse effects.

(c) The overall gradient of a river doesn't change over 100 years, barring serious geologic events. Although there was a substantial earthquake in southeastern Arizona in 1887, there is no evidence that it altered the overall gradient of the river (DuBois and Smith 1980, Hereford 1993). The San Pedro River is the type locality of both spikedace and loach minnow and supported both species when first sampled in 1840 and for 120 years after that, demonstrating its suitability for the two species. Please also see our response to comment 4b9.

(d) Although fine substrate is predominant in most reaches of the San Pedro River, the upper river in the Riparian National Conservation area has significant areas of riffle habitat with gravel and cobble substrates that are capable of supporting spikedace and loach minnow (Stefferd and Stefferud 1989, Velasco 1993). The middle San Pedro River, at present, has little

substrate of suitable size for spikedace and loach minnow. However, substrate size is a function of many other river variables, such as velocity, flow volume, bank structure, and sediment source. Personal observations by our biologists, along with discussion with biologists from The Nature Conservancy, AGFD, BLM, and the Desert Fishes Recovery Team support a conclusion that this portion of the San Pedro River has a strong potential for enhancement to the point where it may once again support healthy populations of spikedace and loach minnow. One commenter compared average substrate particle sizes in the San Pedro River with those in Aravaipa Creek and concluded that since the latter were larger, the San Pedro River does not have suitable substrate for spikedace and loach minnow. However, fish use microhabitats within the overall stream and those microhabitats may have substrates, or other constituents, that differ from the "average." For example, a mile of stream may be primarily a shallow, sandy run, but it may also contain deep pools at rock bends and root wad overhangs. A fish which requires pools could not survive in the average shallow depth and sandy substrate, but may still be present because it uses the "nonaverage" habitat of pools.

(f) The role of snowmelt in the hydrograph of the San Pedro River has not changed over the past 160 years, and spikedace and loach minnow occupied the San Pedro River during at least 120 of those years. This information supports a conclusion that a snowmelt hydrograph is not a determining factor in suitability of a stream system for spikedace and loach minnow.

(g) The BLM and the AGFD have assured us that the reestablishment of beaver can be controlled and managed to prevent severe loss of potential recovery for the two fishes. Beaver were native to the San Pedro River and historically coexisted with spikedace and loach minnow, both here and elsewhere. Given careful management, we believe that beaver, spikedace, and loach minnow reestablishments can all succeed in the San Pedro River.

(h) We are working closely with a number of Federal, State, and local entities to ensure that flows in the San Pedro River continue.

(i) Although riparian vegetation does remove a certain portion of the surface and subsurface flow of a river through evapotranspiration, (the movement through, use of, and evaporation from the surface of water by plants) it also provides many irreplaceable benefits to the aquatic ecosystem (Auble *et al.*

1994, Bagley *et al.* 1998, Osborne and Kovacic 1997, USBLM 1990). Without healthy riparian vegetation a stream is subject to, among other things, increased erosion, increased water temperatures, and a decrease in instream community diversity formed by streambanks and large woody debris. Under some circumstances increased riparian vegetation may increase nonnative fish species by increasing the types of habitats favored by those species. However, a healthy riparian system will provide a higher diversity of aquatic community types, thus allowing a greater degree of coexistence between native and nonnative fishes.

(j) The San Pedro River is the "type locality" for spikedace and loach minnow. The type locality of a species is simply the area from which the "type specimens" were taken. Type specimens are those preserved specimens that were used to first describe the species. Please also see our response to comment 4b9.

Comment 4b17: There were many comments which contended that Eagle Creek does not have suitable habitat for spikedace and loach minnow based on a number of factors. These included—(a) it is an artificial system with flows coming from a transbasin diversion and groundwater pumping; (b) there are several distinct topographic stretches and spikedace and loach minnow could not occupy all of those different topographic areas; (c) the historical presence of beaver in Eagle Creek make the system unsuitable to have ever supported spikedace and loach minnow and the continued presence of beaver make the habitat presently unsuitable for the two fish species; and (d) neither spikedace nor loach minnow were ever present above Sheep Wash due to unsuitable habitat historically and any suitable habitat there now will become unsuitable as Eagle Creek in that area reverts to a more natural system.

Our Response: (a) Spikedace and loach minnow are both known to have historically occurred in Eagle Creek. Although the stream has been modified by human augmentation of the flows, that modification has not been sufficient to eliminate either species. The continued survival of both species in the artificially modified stream supports the position that the habitat is suitable. Modification of the stream does not automatically disqualify an area from designation as critical habitat and consideration as essential to the conservation of the species. The artificial augmentation of Eagle Creek flows may help mitigate other habitat alterations that have decreased natural flows in the system, thus resulting in a system that is more "natural" than it

would be without the artificial augmentation.

(b) It is true that Eagle Creek has distinct topographic areas, including canyon reaches and valley reaches. However, all of the topographic areas within the proposed section of Eagle Creek contain riffle habitats suitable for spikedace and loach minnow, although in varying proportions. As stated in this rule, it is important to protect areas of large enough size and connectivity to allow for fluctuations in habitat over time and movement of fish between areas.

(c) Spikedace and loach minnow historically coexisted with beaver in most, if not all, of their historical range. There is no evidence to indicate that the presence of beaver preclude spikedace and loach minnow presence.

(d) In 1950, Miller recorded loach minnow from near Sheep Wash (Marsh *et al.* 1990). In 1994 and again in 1995, Arizona State University personnel recorded loach minnow near Honeymoon Campground, about 15 miles upstream from Sheep Wash (Knowles 1994, 1995). Spikedace were first collected in 1985 (Bestgen 1985) in lower Eagle Creek. They were collected near Sheep Wash through 1987, and have not been collected since that time. There is presently suitable habitat for both species throughout the upper area of Eagle Creek above Sheep Wash. Although upper Eagle Creek has been substantially modified by human activities, the topography, geology, and stream geomorphology indicate that it is likely the stream in that area historically supported suitable habitat for spikedace and loach minnow and that "reversion" to a more natural state will not prevent the presence of those two species.

Comment 4b18: We received comments that no suitable habitat exists on Fossil Creek for spikedace and loach minnow. This was based on a 1998 USFS NEPA compliance review on an adjacent livestock grazing allotment. Commenters also felt the hydropower diversion of Fossil Creek is favorable to spikedace and loach minnow because it prevents upstream migration of nonnative fish, and believe it is premature to assume flows in Fossil Creek will be enhanced as a result of hydropower relicensing.

Our Response: The information on which the USFS finding was based was not provided or available, therefore we cannot assess why it differs from information in our files and that we have received from other sources, including USFS documents regarding the Childs/Irving hydropower relicensing.

The diversion of almost all flow from lower Fossil Creek for hydropower does inhibit upstream migration of nonnative fish. However, we believe there are more effective ways to prevent nonnative incursion than flow diversion. The application of the hydropower licensee to the Federal Energy Regulatory Commission includes a proposal to return some flow to lower Fossil Creek. In addition, negotiations are ongoing that may result in even larger flows in lower Fossil Creek. Either way, the stream is expected to recover suitability for spikedace and loach minnow.

Comment 4b19: One commenter felt that Rye Creek did not provide suitable habitat for spikedace and loach minnow and that the statement in the rule regarding the presence of a native fish community was in error.

Our Response: Rye Creek is poorly sampled, but Abarca and Weedman (1993) reported a fish community dominated by two native fishes—longfin dace (*Agosia chrysogaster*) and desert sucker (*Pantosteus clarki*), and Bancroft *et al.* (1980) also reported Sonora sucker (*Catostomus insignis*), speckled dace (*Rhinichthys osculus*), and Gila chub (*Gila intermedia*). In 1995, a sampling recorded all five of those native species (Weedman *et al.* 1996), which is a large number of native species remaining compared to most streams in the Gila Basin. Of the seventeen native fishes of the Gila River basin, only one stream (Eagle Creek) has eight species remaining, three others have seven (upper Gila River in New Mexico, upper Verde River, and Aravaipa Creek), and the San Francisco and Blue Rivers each have six species remaining. Two nonnative species were also reported in Rye Creek in 1980, three in 1993, and three again in 1995, which composed less than 10 percent of the fish present. The presence of this native fish community, plus the presence of what is reported by biologists with expertise in spikedace and loach minnow to be suitable habitat (J. Stefferud, USFS, pers. com. February 2000) is sufficient evidence to include Rye Creek in the designation. Suitable areas to recover spikedace and loach minnow in the Salt River Basin are very limited and we believe it is important that the Tonto Creek complex include more than just the mainstem. Information on other suitable tributaries was provided by USFS comments on the proposed rule. These tributaries may also provide recovery habitat that may be considered for possible designation in a future revision of the critical habitat for spikedace and loach minnow.

Comment 4c: Several commenters recommended additional areas be included in the designation of critical habitat. Those areas are listed in Table 4.

Our Response: Because of the requirement for all proposed

designation to undergo public review and comments, areas normally are not added to the designation without an additional proposal. We will consider all information provided on additional areas in future revision of the critical habitat for spikedace and loach

minnow. Based on the best available science at this time, we determine that the areas designated by this rule are sufficient to conserve the species. Our responses on individual areas suggested for addition are given in Table 4.

TABLE 4.—REQUESTS FOR ADDITIONS TO CRITICAL HABITAT AND RESPONSE

Complex number	Stream reach	Reason for recommended addition	Fish and Wildlife Service response
1	Sycamore Creek (upper Verde basin) ...	Why other Verde tributaries but not Sycamore Creek?	Except at mouth, gradient too high and habitat not suitable.
1	Verde River from Fossil Ck to Sheep Bridge.	Believe is suitable for recovery of spikedace and loach minnow.	Will seek additional information.
1	Lower East Verde River	Believe is suitable for recovery of spikedace and loach minnow.	Believe unsuitable—will seek additional information.
1	Red Creek	Believe it suitable for recovery of spikedace and loach minnow.	Will seek additional information.
1	Lower Tangle and Sycamore Creeks (middle Verde basin).	Believe is suitable for recovery of spikedace and loach minnow.	Will seek additional information.
3	Slate and Gun Creek	May meet criteria for critical habitat	No information on these creeks—will seek information.
4	Mescal Creek	In spikedace recovery plan as possible reintroduction site.	Could contribute to diversity and complexity in complex.
5	Babocomari River	May meet criteria for critical habitat	Lower and upper ends not suitable habitat, no information on middle portion—will seek further information.
6	Bonita Creek above Martinez Wash	Has suitable habitat	Information from San Carlos Dept. of Nat. Resources is that no suitable habitat exists.
6	Eagle Creek below Phelps Dodge dam	Omission is inconsistent with emphasis on continuity in critical habitat.	Would contribute to connectivity, but has little habitat due to water diversion.
7	Mangas Creek	Believed to have spikedace population	Channel is highly eroded and no significant surface flow during most times—will seek information.
None	Salome Creek	May meet criteria for critical habitat	Will seek additional information.
None	Cherry Creek	May meet criteria for critical habitat	Believe too little low to moderate gradient areas are present—will seek additional information.
None	White River	Occupied and considered biologically important.	See section on Tribal issues.
None	Gila River “as it flows through Phoenix”	Has similar potential to areas proposed	Assuming commenter meant Gila River south of Phoenix, river is diverted and dry most of time, channel highly degraded, not suitable for these fish.

Comment 4d: Several commenters identified areas they believe have no need for critical habitat designation.

Comment 4d1: Designation of critical habitat on Federal and State lands is not needed, according to a number of commenters, because it is already protected by a number of laws, regulations, policies, and plans. Designation of critical habitat on private lands is also not needed because they are privately owned and critical habitat designation does not provide any protection.

Our Response: Although there is management ongoing on most Federal lands, and to a limited extent on State and private lands, there continue to be many threats to these two fishes. Critical habitat may enhance management on Federal lands, and may help prevent

adverse impacts on private lands due to Federal actions.

Comment 4f2: Some comments suggested that critical habitat designation is not necessary because the threats to the species are from native and nonnative fish rather than habitat alteration or loss. In support of this a report by Propst et al. (1986) was cited as reporting that a nonnative fish, red shiner (*Cyprinella lutrensis*), and two native fish, longfin dace, and speckled dace, are competitive species known or observed to displace spikedace and loach minnow. One comment also contends that three other native fish, Gila chub, Sonora sucker, and desert sucker are predatory, with the implication they consume spikedace and loach minnow to the detriment of those species.

Our Response: Both habitat alteration and loss and nonnative competition, predation, and other effects have contributed substantially to the threatened status of spikedace and loach minnow. Furthermore, these factors are inextricably intertwined. Habitat alteration has been a significant contributor to nonnative fish invasion, spread, and adverse effect. In turn, nonnative species have been a significant contribution to the inability of native fish to thrive in altered habitats. There is no information to indicate that either longfin dace or speckled dace adversely affect spikedace or loach minnow and the 1986 report does not make those claims (D. Propst, New Mexico Dept. of Game and Fish; pers. com. March, 2000). All four species are native to the Gila River basin and longfin dace and speckled

dace were part of the community of species in which spikedace and loach minnow evolved. Differences in their habitat requirements enable the four species to coexist in the same stretch of stream. Their relative abundance may change due to habitat changes, but is not known to change due to interspecific interactions.

Gila chub, although partly predatory, feeds mostly on organic debris and invertebrates and occupies habitat quite different from that of spikedace and loach minnow, thus making direct predation of Gila chub on either spikedace, loach minnow, or any fish, an unlikely occurrence (Weedman et al. 1996). Gila chub distribution has declined substantially in the past 100 years and it shares few stream reaches with either spikedace or loach minnow. Neither Sonora sucker nor desert sucker are known to be predatory; they consume organic debris from the substrate (Minckley 1973).

Comment 4d3: Some of the areas proposed are already included in designated critical habitat for other species, such as the southwestern willow flycatcher, razorback sucker (*Xyrauchen texanus*), Huachuca water umbel (*Lilaeopsis schaffneriana* var. *recurva*), and cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*). Therefore, some commenters felt the additional protection for spikedace and loach minnow is unnecessary and might lead to adverse effects on the species for which the area was already designated as critical habitat.

Our Response: The habitat needs of spikedace and loach minnow are not identical to those of the other four species whose designated critical habitat overlaps that designated for the two fish. Therefore, protection of the habitat of those species will not necessarily suffice for spikedace and loach minnow, although we expect that protection of the habitat of one species will often result in at least partial or total protection for the other species in the same area. Also, the critical habitat designation for other species would be removed upon the delisting of those species. Thus, the protection provided from the one species' designation does not assure the long-term protection for others.

We do not anticipate protection of one of the species for which the area is designated as critical habitat as being adverse to any of the others. However, during section 7 consultation, we would consider the interaction and possible conflict of requirements for different listed species. The purpose of the Act is protection of ecosystems and we

encourage management of areas with listed species on ecosystem principles which will ensure benefits to all the species in the area.

Comment 4e: Some comments compared the critical habitat to the recovery plans for spikedace and loach minnow. In particular, a concern was raised that some areas proposed for critical habitat were not specifically identified in the recovery plans as recovery areas.

Our Response: Although the recovery plans for the two fishes identify some areas specifically as having a strong recovery potential, they also call for identification of other reaches with recovery potential. That process has been ongoing in the nine years since the recovery plans were prepared and discussions among experts on the species have assisted us in identifying the areas in the designated critical habitat.

Comment 4f: A number of comments were received that expressed concern that designation of critical habitat would have adverse effects on spikedace and loach minnow.

Comment 4f1: The Blue River was not occupied by loach minnow in 1904 but they became common by 1995 as a result of livestock grazing management. Critical habitat designation will change grazing management with adverse impacts to loach minnow.

Our Response: There are no known records of native fish from the Blue River prior to 1904. In 1904, Chamberlain conducted a brief survey of fishes of the Blue River from its mouth to the confluence with K.P. Creek (Chamberlain 1904, Minckley 1999). He did not find loach minnow; he found only one native fish, the longfin dace. The reason for the scarcity of all other native fish is unknown, but probably relates to the human alterations of the stream channel and watershed that led Aldo Leopold to call the Blue River "ruined" (Leopold 1921, Leopold 1946). Although Chamberlain's survey indicated that loach minnow were clearly not common in that portion of the Blue River in 1904, it does not provide evidence regarding historical occupation of spikedace and loach minnow in the Blue River, nor does it alone support a conclusion that either species was extirpated from the river. The next records of a native fish survey in the Blue River are from 1977, when Anderson and Turner found five species of native fish, including loach minnow. In the mid-1990's, loach minnow were relatively common in the Blue River, although they were the rarest of the five remaining native species (AGFD 1994, Bagley et al. 1995).

We have no data to indicate that grazing management is responsible for introducing or enhancing loach minnow in the Blue River. Caution must be used in interpreting data from a point-in-time sample such as Chamberlain's. Both spikedace and loach minnow exhibit the strong fluctuations in population levels typical of small, short-lived species, and 1904 may have been a low-point in their population cycles for many reasons related or unrelated to livestock grazing or other human influences.

Comment 4f2: A number of commenters alleged that designation of critical habitat will be detrimental to spikedace and loach minnow by removing human-caused disturbance (particularly livestock grazing) of the aquatic ecosystem which will cause the habitat to change into an unsuitable condition for spikedace and loach minnow. They believe the altered habitat will be highly suitable for nonnative fish, thus allowing them to expand and severely reduce or eliminate spikedace and loach minnow. They cite the recent Verde River work of John Rinne, of the USFS Rocky Mountain Research Station, which they believe was overlooked in the proposed rule.

Our Response: It is correct that spikedace and loach minnow, along with all of the native fish community of the Gila River basin, require a certain level and type of disturbance in their habitat. The primary factor in its natural disturbance regime is periodic flooding, although other natural processes such as fire and erosion also contribute to the natural disturbances influencing aquatic systems. These processes are a characteristic of healthy dynamic river systems and natural flooding and hydrographs are part of the constituent elements described above.

It is also true that under certain circumstances human-caused disturbance may provide benefits to the species, such as rejuvenation of spawning gravels or removal of nonnative species. However, there is no information that indicates human-caused disturbance can mimic the complex natural disturbance processes, with the possible exception of prescribed burning.

We are aware of Dr. Rinne's work in the Verde River and did not overlook the papers discussing his work (see our response to comment 4(g)) Dr. Rinne's work provides speculation on the potential connection between the low population levels of spikedace in the Verde River that have occurred concurrently with the removal of livestock from the riparian corridor (Rinne 1999a, 1999b). Disturbance created by livestock grazing or

bulldozing the stream channel are far different from that caused by flooding.

Comment 4f3: Designation of critical habitat on private lands will result in loss of access to those lands and therefore such designation cannot be essential to the conservation (recovery) of the spikedace and loach minnow.

Our Response: We will continue to work with any private landowners whose lands support habitat occupied by, or presently or potentially suitable for, spikedace and loach minnow, and who would like to voluntarily cooperate in conservation activities. This would be the case with or without critical habitat designation.

Comment 4f4: One commenter believes that exclusion of San Carlos Tribal lands will preclude management of native fish in the middle Gila River below the confluence with the San Pedro River due to incompatible goals of the San Carlos Apache Tribe.

Our Response: We are not aware of any provision of the critical habitat that would preclude management of native fish in the middle Gila River. Furthermore, we do not believe self-management of San Carlos Apache Tribal lands will negate the conservation of native fishes in the middle Gila River.

Comment 4f5: Some commenters contend that the designation of critical habitat for spikedace and loach minnow will prevent flood control and human management of riparian vegetation, floodplain, and streambank structure. This will prevent or complicate use of best management practices and result in a loss of natural river functioning and an increase in flooding and flood damage. Other commenters assert that designation of critical habitat will hinder proper management of native fishes and will prevent or inhibit removal or control of undesirable nonnative species.

Our Response: We do not believe that natural river function precludes flood control and human management of riparian vegetation, floodplain, and streambank structure. Designation of critical habitat will not prevent such human alterations of the ecosystem, but may result in modifications of those human actions to ameliorate or avoid the most serious of the adverse consequences of those actions to spikedace and loach minnow. Designation of critical habitat will not increase flooding, although it is hoped that through section 7 consultation we can ensure watershed management practices that will alter flood patterns toward a more natural regime. A more natural regime will have lower flood peaks and higher low flows. Increased

upland, riparian, and stream channel conditions should lead to greater infiltration and bank storage, thus lowering flood peaks and increasing base flows.

Critical habitat is not expected to hinder management of native fishes. Such a result would be contrary to the purpose of the designation. Since recovery of spikedace and loach minnow depends upon some control and removal of undesirable nonnative species, we anticipate that critical habitat designation will assist that effort by identifying areas in need of such management and inhibiting actions that increase nonnative introduction and distribution.

Comment 4f6: Many commenters were concerned about the role of nonnative aquatic species, particularly fish, in the recovery of spikedace and loach minnow. They believe that rivers within the Gila basin cannot be restored for recovery of spikedace and loach minnow due to the presence of nonnative species which some suggest cannot be removed or controlled. They believe removal of adverse impacts or improvement of habitat conditions will always favor nonnative species. "Restoration" will always result in increases in pools and loss of riffles, runs and glides. Therefore, no areas of stream needing restoration or habitat enhancement should be included in the critical habitat.

Our Response: While restoration may provide enhanced opportunities for nonnative species as well as for native species, this problem must be dealt with on a site-specific basis. Restoration or enhancement plans must consider this issue and provide for mechanisms to prevent unacceptable adverse impacts from nonnative species. Nonnative species in many cases can be completely removed using a variety of techniques. In other cases, control measures can reduce nonnative populations to acceptable levels.

Comment 4g: Several commenters felt that designation of critical habitat should be delayed because they believe more information or studies are needed for a valid decision. Others felt that the best available scientific and commercial information was either not used or was not sufficient and that the designation was based on faulty information and "bad science." The most commonly cited evidence of this was what the commenters felt was failure to consider a body of literature by Dr. John Rinne, of the U.S. Forest Service Rocky Mountain Research Station. According to the commenters, Dr. Rinne has information indicating that the accepted knowledge on spikedace and loach

minnow and their habitat is incorrect, that there is not clear understanding of what spikedace and loach minnow habitat management requires, that spikedace have been extirpated from the Verde River due to removal of livestock grazing, that human disturbance is necessary to the survival of these two fish, and that aquatic vegetation is harmful to spikedace.

Our Response: The Act requires designation of critical habitat using the best available information. Delaying designation to obtain more information is not legally justified. If significant new information arises that calls this designation into question, we can revise it through a new proposal and final rule.

Dr. Rinne is the author of a number of papers, in peer reviewed journals and other outlets, on spikedace, loach minnow, and other Gila basin native fishes. All of Dr. Rinne's work was considered in our analysis leading to the proposed designation (see also comment response 4f2). Dr. Rinne is a consultant on the Desert Fishes Recovery Team and has participated extensively in our work on conservation of spikedace and loach minnow. We are not aware of any statement in print by Dr. Rinne that spikedace are extirpated from the Verde River, although he has stated that spikedace is "absent" from the Verde (Rinne et al. 1999b) and that they are "rare" there (Rinne et al. 1999a). Spikedace were collected from the Verde River in spring 1999 by AGFD (AGFD unpub. data) and there is no information to support a finding of extirpation.

Dr. Rinne's work does not contain any significant new information on distribution, biology, ecology, or other aspects of spikedace and loach minnow that contradicts what has been found in earlier work by him and other researchers. Dr. Rinne's conclusions regarding the role of disturbance in spikedace habitat and the balance between nonnative and native fishes has been primarily oriented toward natural flooding and low flows (Stefferd and Rinne 1996, Rinne and Stefferud 1997, Neary and Rinne 1998). We do not find any conclusion regarding the necessity for human-caused disturbance in spikedace or loach minnow habitat in any of Dr. Rinne's work. He has speculated on the role of livestock grazing in stream habitat conditions and noted the downturn in spikedace population that coincided with removal of livestock grazing from the riparian corridor (Rinne 1999a). He has stated that he believes we do not know enough about livestock grazing impacts on fish and their habitat to make valid management decisions (Rinne 1999). Dr.

Rinne's views on some of these subjects do not necessarily reflect all views in the scientific community working on desert fishes (Brooks *et al.* 2000).

Comment 4h: Some commenters objected to use of any information not in the peer-reviewed literature. Some also objected to use of survey or study information that was not directly obtained by us. They believe it is inappropriate for us to rely on the work of other entities.

Our Response: Much of the information regarding native fish distribution and management is in agency documents and other non-peer reviewed literature. This forms part of the best available information on the species and it would be biologically unsupported to make decisions which ignore that information. Most of the surveys and studies on native fish are conducted by entities other than us. We rely heavily on information about these species and their habitats from agencies such as the state game and fish agencies and universities.

Comment 4i: One commenter believes the Service overlooked important information that spikedace can bury underground and survive extensive periods without water. This person states that spikedace have been found by local residents in rainwater puddles in upland areas, such as the parking lot at the Duncan, Arizona, high school.

Our Response: There is no information in the scientific literature or within the expertise of biologists working on spikedace to indicate that spikedace can either bury underground or survive without water. Available evidence indicates that spikedace die only minutes after being removed from water. They can, however, survive in only small amounts of water. In a streambed, there may be small pockets of water between rocks and under overhanging banks or rocks that fish can use to survive short periods of no flow. There have been no valid reports of which we are aware of spikedace appearing in rainwater puddles in upland areas.

Comment 4j: Some comments addressed the issues of continuity and fragmentation. Because certain stretches of the San Pedro were not included in the critical habitat designation, thus violating the principles of habitat continuity expressed in the draft rule, one commenter felt that no portion of the San Pedro River should be included in the critical habitat designation. Other commenters believe that the designated critical habitat should be broken up into small, isolated segments without connecting corridors to help prevent nonnative species from invading the

critical habitat. They believe designation of connecting areas as critical habitat will increase nonnative fish movement and adverse effects to spikedace and loach minnow.

Our Response: Although we attempted to designate critical habitat areas that were large and diverse enough to provide for connections between habitat areas, we omitted certain areas of the San Pedro River. The upper San Pedro River in the Riparian National Conservation Area is to some extent hydrologically disjunct from the middle San Pedro River (see USGS hydrologic data). This, plus the significant areas of no flow and no permanent water and the level of channel alteration and ongoing disturbance, led us to omit that area. The exclusion of those areas in the critical habitat designation will not, *per se*, prevent nonnative species from using those corridors and inclusion will not provide any opportunities for nonnative movement that do not exit without the designation. The middle San Pedro River and its tributaries of Redfield and Hot Springs canyons form a complex that we think is of sufficient size and complexity to justify a unit. The lower San Pedro receives most of its flow from Aravaipa Creek and forms a unit more closely aligned to Aravaipa Creek and the middle Gila River than to the middle San Pedro River, at least under present conditions. If additional information becomes available that indicates the omitted areas in the San Pedro River should be included in the critical habitat, it may be considered in any later revisions of the designation.

The designation of connecting areas in the critical habitat is, in part, to provide the opportunity for spikedace and loach minnow to move between stream sections, thus maintaining natural fluctuation patterns and providing for recolonization of areas which have become depopulated due to temporary conditions. The designation will also help keep those areas in a condition where natural hydrographs and channel geomorphology are maintained relatively intact.

Comment 4k: Commenters mentioned a number of pieces of information which they felt were omitted from the proposed rule that should be provided before any final decision on critical habitat. These included the qualifications of Charles Girard to identify the type specimens of spikedace and loach minnow from the San Pedro River in 1851; the special management considerations or protections which would be needed for each stream segment; the restoration measures that would be taken to make each segment capable of providing the

constituent elements; streamflow data on all streams proposed for designation and analyses of those data and their relationship to the habitat needs of spikedace and loach minnow; an explanation of the science supporting the importance of the floodplain in stream ecology; the recent science on "river pooling"; a discussion of fishery-livestock grazing dynamics; and detailed genetic data to support the differentiation between populations of spikedace and loach minnow.

Our Response: The proposed rule is a summary of the information used to formulate the proposal for critical habitat designation, as required by the Act. Detailed information can be obtained from the literature cited in the proposed and final rules, the recovery plans for these two species, as well as in many other literature sources. We can provide assistance in obtaining literature on any of the above subjects (see **ADDRESSES** section).

Comment 4l: A few commenters suggested that, rather than trying to restore spikedace and loach minnow in the unoccupied areas proposed for critical habitat, recovery for the species should be accomplished by raising the two fish in captivity and selling them commercially for aquarium fish and in private ponds.

Our Response: The purpose of the Act is to conserve listed species and the ecosystems on which they depend. Relegating a species to captivity does not conserve the ecosystem on which they depend. In addition, spikedace and loach minnow require flowing streams, so are not easily raised in captivity and do not survive well in aquaria or ponds.

Comment 4m: Some commenters pointed out that spikedace and loach minnow were unsuccessfully introduced in Sonoita Creek and Seven Springs Wash. They believe this proves they cannot be successfully established in any areas other than where they currently exist and therefore no unoccupied areas should be included in the critical habitat designation as there is no probability they can be used for recovery.

Our Response: The 1968 stocking of spikedace and loach minnow into Sonoita Creek and 1970 stocking of both into Seven-Springs Wash failed (Minckley and Brooks 1985). The reasons for these failures are unknown; however, repatriation techniques and information on these two species and their habitat needs has increased substantially since 1970. Neither Sonoita Creek nor Seven-Springs Wash have been proposed for critical habitat for the two fish. We do not believe the failure of these stockings discourages

future attempts to reestablish the species in areas where they have been extirpated.

Issue 5: NEPA Compliance

Several commenters questioned the adequacy of our Environmental Assessment (EA) and other aspects of our compliance with NEPA.

Comment 5a: The Fish and Wildlife Service should prepare an Environmental Impact Statement (EIS) on this action.

Our Response: An EIS is required only in instances where a proposed Federal action is expected to have a significant impact on the human environment. In order to determine whether designation of critical habitat would have such an effect, we prepared an EA of the effects of the proposed designation. The draft EA was made available for public comment on the day the proposed critical habitat rule was published in the **Federal Register**. Following consideration of public comments, we prepared a final EA and determined that critical habitat designation does not constitute a major Federal action having a significant impact on the human environment. That determination is documented in our Finding of No Significant Impact (FONSI). Both the final EA and FONSI are available for public review (see **ADDRESSES**).

Comment 5b: Several counties requested Joint Lead Agency or Cooperating Agency status in preparation of an EIS for this critical habitat designation. Why were those requests denied?

Our Response: Catron and Hidalgo Counties, New Mexico, each requested Joint Lead Agency status to assist us in preparation of an EIS on the critical habitat designation. In addition, Cochise County, Arizona, requested either Joint Lead Agency or Cooperating Agency status. When preparing an EIS, a Joint Lead Agency may be a Federal, State, or local agency; however, a cooperating agency may only be another Federal agency (40 CFR 1501.5 and 1501.6). In December, 1999, we responded to those requests, stating that we were preparing an EA on the proposed action and that, should the EA result in a determination that an EIS was necessary, we would consider the counties' requests. However, since the EA resulted in a FONSI (see response to comment 5a, above), the issue of Joint Lead Agency or Cooperating Agency status on preparation of an EIS became moot.

Comment 5c: The Service's range of alternatives considered in the draft EA was inadequate.

Our Response: We reassessed and modified our analysis and believe we considered sufficient alternatives in the Final Environmental Assessment.

Issue 6: Tribal Issues

The following comments and responses involve issues related to our treatment of Native American lands and properties during the designation process.

Comment 6a: The exclusion of tribal lands places an unfair burden on non-tribal lands designated as critical habitat.

Our Response: We do not agree with this commenter's assessment that the exclusion of tribal lands places an unfair burden on non-tribal lands within the designation. We are committed to working cooperatively with all willing parties—private land owners as well as Federal and State land managing agencies and Native American Indian Tribes in developing conservation agreements, partnerships, and habitat conservation plans which can make further Federal management of those lands unnecessary.

In this case we concluded that the benefits of excluding Tribal land from the designation outweighed the benefits of including the land. Additionally, the White Mountain Apache Indian Tribe's native fishes management plan will provide conservation for the species and further Federal management under the critical habitat designation is not needed for the species on the reservation. Furthermore, tribal management of these native fish resources will also benefit native fish management of adjacent non-tribal lands. Although neither the San Carlos Apache nor Yavapai Apache tribes have developed conservation plans for these species at this time, we believe that the benefits from encouraging conservation through tribal self-governance outweighs the benefits of inclusion in the critical habitat designation. See the section titled "American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act" for additional discussion concerning the Service's decision regarding tribal lands.

Comment 6b: When referring to excluding tribal lands from critical habitat designation, does this apply to lands owned by the Tribe, or only to lands identified as being within the reservation boundary?

Our Response: All tribal lands containing potential critical habitat for the spikedace or loach minnow that were ultimately excluded from the designation are within reservation boundaries.

Issue 7: Effects of Designation

The following comments and responses involve issues related to the effects of critical habitat designation on land management or other activities.

Comment 7a: The Service should clarify how critical habitat designation will affect specific land uses or management practices.

Our Response: We intended that the portion of this final rule titled "Effect of Critical Habitat Designation" serve as a general guide to clarify activities that may affect or destroy or adversely modify critical habitat. However, specific Federal actions will still need to be reviewed by the action agency. If the agency determines the activity may affect critical habitat, they will consult with us under section 7 of the Act. If it is determined that the activity is likely to adversely modify critical habitat, we will work with the agency to modify the activity to minimize negative impacts to critical habitat. We will work with the agencies and affected public early in the consultation process to avoid or minimize potential conflicts and, whenever possible, find a solution which protects listed species and their habitat while allowing the action to go forward in a manner consistent with its intended purpose.

Comment 7b: The Service should clarify how critical habitat will affect management of nonnative fish. Will stocking of trout and other nonnative fish species be affected by the designation of critical habitat on several creeks and streams in Arizona?

Our Response: We previously consulted on the winter rainbow trout fishery in the middle Verde River and on trout stocking in the upper Gila River. Trout stocking in those areas has proceeded. While each situation must be evaluated on a case by case basis, we anticipate that trout stocking may be compatible with recovery of the spikedace and loach minnow in most situations because trout are not as predacious as are many other nonnative fish, they only persist in the upper reaches of these streams, and they do not survive the summer if they move downstream into warmer waters. The stocking of nonnative fish species other than trout, particularly in areas near, or connected to, habitat for these listed species, regardless of critical habitat designation, may require additional consultation when a Federal nexus exists and a combination of techniques may be necessary to reduce the impacts.

Comment 7c: The designation of critical habitat will impose section 9 restrictions against taking of individuals

of these two species in areas that do not currently have those restrictions.

Our Response: Section 9 of the Endangered Species Act prohibits the harm or harassment of individuals of listed species. Prohibitions against take would be present regardless of whether or not critical habitat has been designated. If areas designated as critical habitat do not have individuals of the listed species present, no take in the form of harm or harassment would occur from activities on these areas and no section 9 prohibitions would be in force. However, effects from activities in unoccupied habitat that extend downstream to areas occupied by a listed species could result in take, regardless of whether or not critical habitat has been designated.

Summary of Changes From the Proposed Rule

There have been a number of minor changes from the text of the proposed rule. We corrected errors in mileages and locations and made other minor technical changes, additions, and deletions. We incorporated information from comments into the text and have made clarifications in response to comments.

In response to several comments, we clarified the lateral extent of critical

habitat designation. Where delineated, this will be the 100-year floodplain of the designated waterways as defined by the U.S. Army Corps of Engineers. In areas where the 100-year floodplain has not been delineated or it is in dispute, the presence of alluvial soils (soils deposited by streams), obligate and facultative riparian vegetation (requiring and usually occurring in wetlands, respectively), abandoned river channels, or known high water marks can be used to determine the extent of the floodplain. We have also clarified that existing human-constructed features and structures within the critical habitat boundaries are not considered part of the critical habitat.

In response to a comment, we incorporated references to the October 6, 1999 amendment to the September 20, 1999 court order into this Final Rule.

We added a section titled "Exclusion for Economic and Other Relevant Impacts" to this Final Rule. We excluded the Fort Apache, San Carlos Apache, and Yavapai Apache Indian Reservation lands under the provisions of section 4(b)(2) of the Act.

We removed all stream reaches in complex 2, the Black River forks, from the critical habitat designation for spikedace for biological reasons.

Comments received pointed out that the area is too high in elevation to have sufficient recovery potential for spikedace.

Required Determinations

Regulatory Planning and Review

In accordance with Executive Order 12866, this document is a significant rule and has been reviewed by the Office of Management and Budget (OMB), under Executive Order 12866. We prepared an economic analysis of the proposed action to determine the economic consequences of designating the specific areas as critical habitat. Table 5 summarizes the expected impacts of designating critical habitat for spikedace and loach minnow. The draft economic analysis was available for public review and comment during the comment period on the proposed rule. The final economic analysis is available for public review (see **ADDRESSES** section of this rule). We determined that this rule will not significantly impact entitlements, grants, user fees, loan programs, or the rights and obligations of their recipients (see Exclusion for Economic and Other Relevant Impacts section of this final rule). This rule will not raise novel legal or policy issues.

TABLE 5.—IMPACTS OF DESIGNATING CRITICAL HABITAT FOR SPIKEDACE AND LOACH MINNOW

Categories of activities	Activities potentially affected by the designation of critical habitat in areas occupied by the species (above those from listing the species)	Activities potentially affected by the designation of critical habitat in unoccupied areas
Federal Activities Potentially Affected ¹ .	None	Activities such as those affecting waters of the United States by the Army Corps of Engineers under section 404 of the Clean Water Act; road construction and maintenance, right-of-way designation, and regulation of agricultural activities; construction of roads and fences along the international border with Mexico and associated immigration enforcement activities by the Immigration and Naturalization Service; construction of communication sites licensed by the Federal Communications Commission; and activities funded by any Federal agency.
Private or other non-Federal Activities Potentially Affected ² .	None	Activities that require a Federal action (permit, authorization, or funding) and that involve such activities as removing or destroying spikedace or loach minnow habitat (as defined in the primary constituent elements discussion) whether by mechanical, chemical, or other means (e.g., water diversions, grading, etc.); and that appreciably decrease habitat value or quality through indirect effects (e.g., edge effects, invasion of exotic plants or animals, or fragmentation).

¹ Activities initiated by a Federal agency.

² Activities initiated by a private or other non-Federal entity that may need Federal authorization or funding.

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

In the economic analysis (under section 4 of the Act), we determined that designation of critical habitat will not have a significant effect on a substantial number of small entities (see

also our discussion in the Exclusion for Economic and Other Relevant Impacts section of this final rule). We determined that the designation of critical habitat will not have any additional effects on these activities in areas of critical habitat occupied by the

species. We also determined that there would be some, but not a significant, additional effect for the unoccupied area of critical habitat.

Small Business Regulatory Enforcement Fairness Act (5 U.S.C. 804(2))

In our economic analysis, we determined that designation of critical habitat will not cause (a) Any effect on the economy of \$100 million or more, (b) any increases in costs or prices for consumers; individual industries; Federal, State, or local government agencies; or geographic regions, or (c) any significant adverse effects on competition, employment, investment, productivity, innovation, or the ability of U.S.-based enterprises to compete with foreign-based enterprises.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

As outlined in our economic analysis, this rule does not impose an unfunded mandate on State, local or tribal governments or the private sector of more than \$100 million or greater in any year. The designation does not have a significant or unique effect on State, local, or tribal governments, or the private sector. It is not necessary to provide a statement of the information required by the Unfunded Mandates Reform Act (2 U.S.C. 1531 et seq.). Small governments will be affected only to the extent that any programs having Federal funds, permits or other authorized activities must ensure that their actions will not destroy or adversely modify the critical habitat. However, as discussed above, these actions are currently subject to equivalent restrictions through the listing protections of the species, and no further restrictions are anticipated in areas of occupied proposed critical habitat. We expect little additional effect for the unoccupied areas of critical habitat, since unoccupied habitat that occurs on State or other governmental land (other than Federal) is only 40 km (24 mi) of stream, or only 6 percent of the unoccupied habitat we designated. There is no effect on Tribal land since we are not designating any Tribal land as critical habitat.

Takings

In accordance with Executive Order 12630, this rule does not have significant takings implications, and a takings implication assessment is not required. This designation will not "take" private property. Critical habitat designation is only applicable to Federal lands and to private lands if a Federal nexus exists. We do not designate lands as critical habitat unless the areas are essential to the conservation of a species. The rule will not increase or decrease the current restrictions on private property concerning take of

spikedace or loach minnow. Due to current public knowledge of the species protection, the prohibition against take of these species both within and outside of the designated areas, and the fact that critical habitat provides no incremental restrictions in areas of occupied critical habitat, we do not anticipate that property values will be affected by the critical habitat designation. We expect little additional effect for the unoccupied area of critical habitat since the land on which we might expect some additional effect due to critical habitat designation, should a Federal nexus exist (unoccupied non-Federal land), is only approximately 17 percent of the total area designated. Additionally, critical habitat designation does not preclude development of habitat conservation plans and issuance of incidental take permits. Landowners in areas that are included in the designated critical habitat will continue to have opportunity to utilize their property in ways consistent with the survival of the spikedace and loach minnow.

Federalism

In accordance with Executive Order 13132, this designation will not affect the structure or role of States, and will not have direct, substantial, or significant effects on States. A Federalism assessment is not required. As previously stated, critical habitat is applicable to Federal lands and to non-Federal lands only when a Federal nexus exists. In keeping with Department of the Interior policy, we requested information from and coordinated development of this critical habitat designation with appropriate State resource agencies in Arizona and New Mexico. In addition, both States have representatives on our recovery team for these species. We will continue to coordinate any future designation of critical habitat for spikedace and loach minnow with the appropriate State agencies. The designation of critical habitat in areas currently occupied by the spikedace and loach minnow imposes no additional restrictions to those currently in place and, therefore, has little incremental impact on State and local governments and their activities. The designation of critical habitat in areas unoccupied by the spikedace and loach minnow may have some incremental impact on State and local governments and their activities that have Federal funding, permits, or authorization. The incremental impact would come from the need to consult with us under section 7 of the Act to ensure that these actions will not destroy or adversely modify the critical

habitat. The designation may have some benefit to these governments in that the areas essential to the conservation of the species are more clearly defined, and the primary constituent elements of the habitat necessary to the survival of the species are specifically identified. While making this definition and identification does not alter where and what federally sponsored activities may occur, it may assist these local governments in long-range planning (rather than waiting for case-by-case section 7 consultations to occur).

Civil Justice Reform

In accordance with Executive Order 12988, the Department of the Interior's Office of the Solicitor determined that this rule does not unduly burden the judicial system and meets the requirements of sections 3(a) and 3(b)(2) of the Order. We designate critical habitat in accordance with the provisions of the Act. We have made every effort to ensure that this final determination contains no drafting errors, provides clear standards, simplifies procedures, reduces burden, and is clearly written such that litigation risk is minimized.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain any information collection requirements for which Office of Management and Budget approval under the Paperwork Reduction Act is required.

National Environmental Policy Act

It is our position that, outside the Tenth Circuit, we do not need to prepare environmental analyses as defined by NEPA in connection with designating critical habitat under the Endangered Species Act of 1973, as amended. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This assertion was upheld by the Ninth Circuit (*Douglas County v. Babbitt*, 48 F.3d 1495 (9th Cir. 1995), cert. denied 116 S. Ct. 698 (1996)). However, when the ranges of the species include States within the Tenth Circuit, such as those of the spikedace and loach minnow, pursuant to the Tenth Circuit ruling in *Catron County Board of Commissioners v. U.S. Fish and Wildlife Service*, 75 F.3d 1429 (10th Cir. 1996), we must undertake a NEPA analysis for critical habitat designation. We have prepared a final Environmental Assessment on this action as required by NEPA. As a result of that analysis, we found that the designation of critical habitat for the spikedace and loach

minnow does not constitute a major Federal action significantly affecting the quality of the human environment under the meaning of section 102(2)(c) of NEPA. As such, an environmental impact statement is not required. Send your requests for copies of the final EA and FONSI for this designation to the Arizona Ecological Services Office (see ADDRESSES section).

References Cited

A complete list of all references cited in this final rule is available upon request from the Arizona Ecological Services Office (see ADDRESSES section).

Authors. The primary authors of this final rule are Paul J. Barrett and Sally E. Stefferud (see ADDRESSES section).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.11(h), by revising the entry for “minnow, loach” and “spikedace” under “FISHES” to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *
(h) * * *

Species		Historical range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
* * * * *							
FISHES							
* * * * *							
Minnow, loach	<i>Tiaroga (=Rhinichthys cobitis).</i>	U.S.A. (AZ, NM) Mexico.	entire	T	247	§ 17.95(e)	NA
* * * * *							
Spikedace	<i>Meda fulgida</i>	U.S.A. (AZ, NM), Mexico.	entire	T	236	§ 17.95(e)	NA
* * * * *							

3. Amend section 17.95(e) by adding critical habitat for the spikedace (*Meda fulgida*) in the same alphabetical order as this species occurs in 17.11(h).

§ 17.95 Critical habitat—fish and wildlife.

* * * * *
(e) Fishes.
* * * * *

Spikedace (*Meda fulgida*)
1. Critical habitat units are depicted for Cochise, Gila, Graham, Greenlee, Pima, Pinal, and Yavapai Counties, Arizona; and Catron, Grant, and Hidalgo Counties, New Mexico, on the maps and as described below.
2. Critical habitat includes the stream channels within the identified stream reaches described below and areas within these reaches potentially inundated by high flow events. Where delineated, this is the 100-year floodplain of the designated waterways as defined by the U.S. Army Corps of Engineers. In areas where the 100-year floodplain has not been delineated or it is in dispute, the presence of alluvial soils (soils deposited by streams), obligate and facultative riparian vegetation (requiring and usually occurring in wetlands respectively), abandoned river

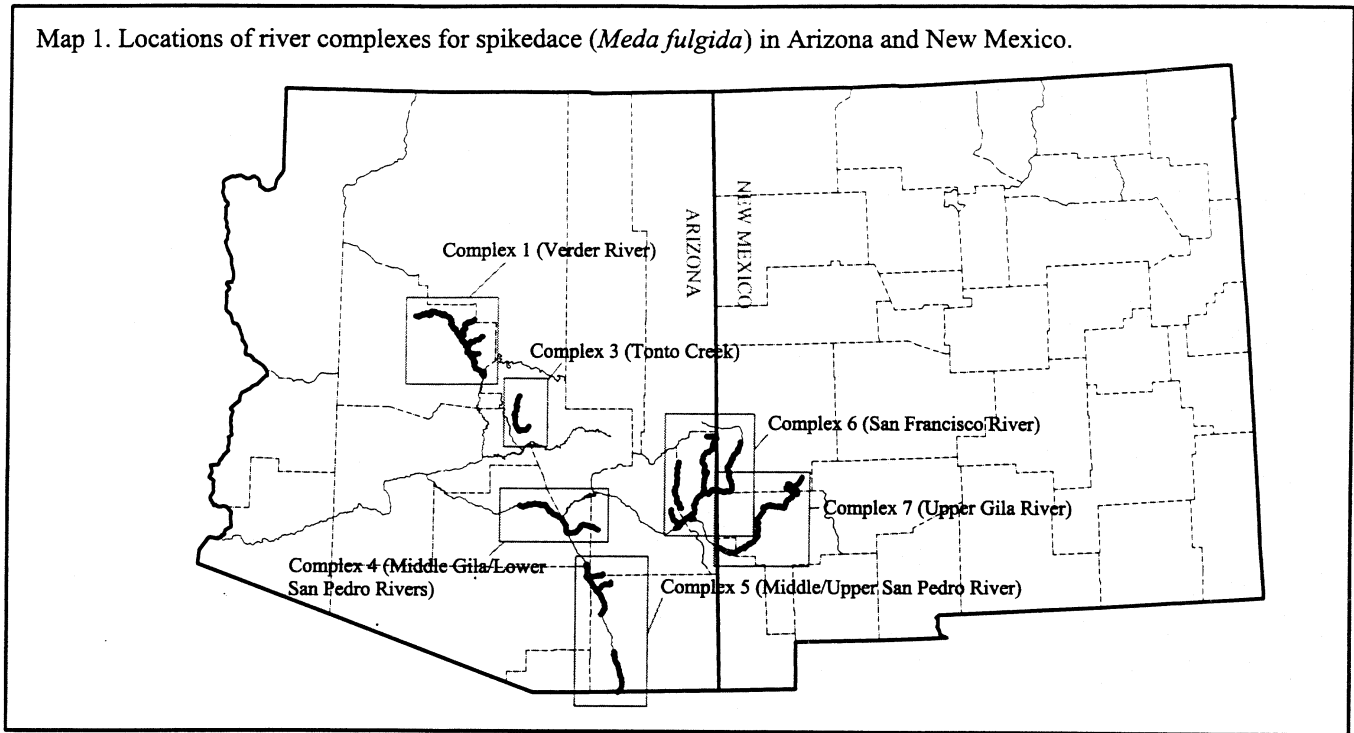
channels, or known high water marks can be used to determine the extent of the floodplain. Within these areas, only lands which provide the primary constituent elements or which will be capable, with restoration, of providing them, are considered critical habitat. Existing human-constructed features and structures such as buildings, roads, etc., are not considered critical habitat.

3. Within these areas, the primary constituent elements include, but are not limited to, those habitat components that are essential for the primary biological needs of foraging, sheltering, dispersal, and reproduction. These elements include the following: (1) Permanent, flowing, unpolluted water; (2) living areas for adult spikedace with slow to swift flow velocities in shallow water with shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at downstream riffle edges; (3) living areas for juveniles with slow to moderate water velocities in shallow water with moderate amounts of instream cover; (4) living areas for the larval stage with slow to moderate flow velocities in shallow water with abundant instream cover; (5) sand,

gravel, and cobble substrates with low to moderate amounts of fine sediment and substrate embeddedness; (6) pool, riffle, run, and backwater components of the streams; (7) low stream gradient; (8) water temperatures in the approximate range of 1–30° C (35–85° F) with natural diurnal and seasonal variation; (9) abundant aquatic insect food base; (10) periodic natural flooding; (11) a natural, unregulated hydrograph, or if flows are modified or regulated, then a hydrograph that demonstrates an ability to support a native fish community; and (12) habitat devoid of nonnative aquatic species detrimental to spikedace, or habitat in which detrimental nonnative species are at levels which allow persistence of spikedace.

4. Arizona (Gila and Salt River Meridian (GSRM) and New Mexico (New Mexico Principal Meridian (NMPM)): Areas of land and water as follows (physical features were identified using USGS 7.5' quadrangle maps; river reach distances were derived from digital data obtained from Arizona Land Resources Information System (ALRIS) and New Mexico Resource Geographic Information System (RGIS)):

Map 1. Locations of river complexes for spikedace (*Meda fulgida*) in Arizona and New Mexico.



Spikedace (*Meda fulgida*)

Complex 1. Yavapai and Gila Counties, Arizona

a. Verde River for approximately 171.3 km (106.5 mi), extending from the confluence with Fossil Creek in GSRM, T.11N., R.6E., NE $\frac{1}{4}$ Sec. 25 upstream to Sullivan Dam in GSRM, T.17N., R.2W., NW $\frac{1}{4}$ Sec. 15.

b. Fossil Creek for approximately 7.6 km (4.7 mi), extending from the confluence with the Verde River in GSRM, T.11.N., R.6E., NE $\frac{1}{4}$ Sec. 25 upstream to the confluence with an unnamed tributary from the

northwest in GSRM, T.11 $\frac{1}{2}$ N., R.7E., center Sec. 29.

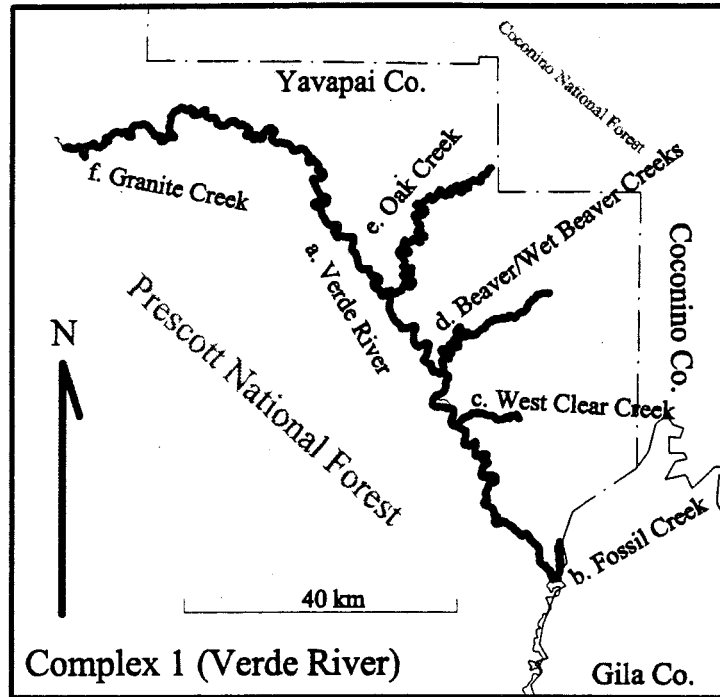
c. West Clear Creek for approximately 11.6 km (7.2 mi), extending from the confluence with the Verde River in GSRM, T.13N., R.5E., center Sec. 21, upstream to the confluence with Black Mountain Canyon in GSRM, T.13N., R.6E., SE $\frac{1}{4}$ Sec. 17.

d. Beaver Creek/Wet Beaver Creek for approximately 33.4 km (20.8mi), extending from the confluence with the Verde River in GSRM, T.14N., R.5E., SE $\frac{1}{4}$ Sec. 30 upstream

to the confluence with Casner Canyon in GSRM, T.15N., R.6E., NW $\frac{1}{4}$ Sec. 23.

e. Oak Creek for approximately 54.4 km (33.8 mi), extending from the confluence with the Verde River in GSRM, T.15N., R.4E., SE $\frac{1}{4}$ Sec. 20 upstream to the confluence with an unnamed tributary from the south in GSRM, T.17N., R.5E., SE $\frac{1}{4}$, NE $\frac{1}{4}$ Sec. 24.

f. Granite Creek for approximately 2.3 km (1.4 mi), extending from the confluence with the Verde River in GSRM, T.17N., R.2W., NE $\frac{1}{4}$ Sec. 14 upstream to a spring in GSRM, T.17N., R.2W., SW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 13.



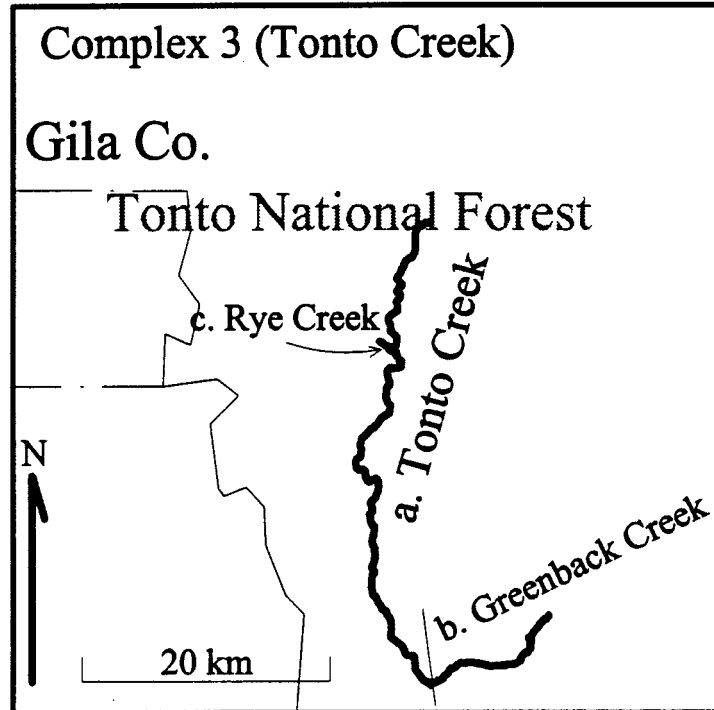
Complex 3. Gila County, Arizona

a. Tonto Creek for approximately 47.0 km (29.2 mi), extending from the confluence with Greenback Creek in GSRM, T.5N., R.11E., NW¼ Sec. 8 upstream to the

confluence with Houston Creek in GSRM, T.9N., R.11E., NE¼ Sec. 18.

b. Greenback Creek for approximately 13.5 km (8.4 mi), extending from the confluence with Tonto Creek in GSRM, T.5N., R.11E., NW¼ Sec. 8 upstream to Lime Springs in GSRM, T.6N., R.12E., SW¼ Sec. 20.

c. Rye Creek for approximately 2.1 km (1.3 mi), extending from the confluence with Tonto Creek in GSRM, T.8N., R.10E., SW¼ Sec. 13 upstream to the confluence with Brady Canyon in GSRM, T.8N., R.10E., NE¼ Sec. 14.



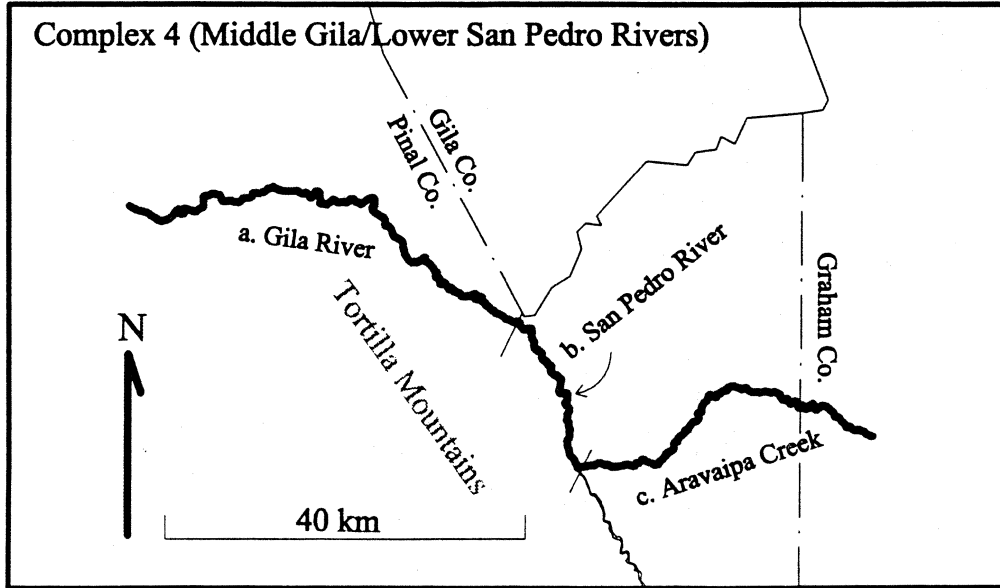
Complex 4. Graham, and Pinal Counties, Arizona

a. Gila River for approximately 62.8 km (39.0 mi), extending from Ashurst-Hayden Dam in GSRM, T.4S., R.11E., NW¼ Sec. 8 upstream to the confluence with the San

Pedro River in GSRM, T.5S., R.15E., center Sec. 23.

b. San Pedro River for approximately 21.4 km (13.3 mi), extending from the confluence with the Gila River in GSRM, T.5S., R.15E., center Sec. 23 upstream to the confluence with Aravaipa Creek in GSRM, T.7S., R.16E., center Sec. 9.

c. Aravaipa Creek for approximately 45.3 km (28.1 mi), extending from the confluence with the San Pedro River in GSRM, T.7S., R.16E., center Sec. 9 upstream to the confluence with Stowe Gulch in GSRM, T.6S., R.19E., SE¼ of the NE¼ Sec. 35.



Complex 5. Cochise, Graham, and Pima Counties, Arizona

a. San Pedro River for approximately 73.6 km (45.8 mi), extending from the confluence with Alder Wash in GSRM, T.10S., R.18E., SW¹/₄ Sec.22 upstream to the confluence with Ash Creek in GSRM, T.16S., R.20E., SE¹/₄ Sec. 6.

b. Redfield Canyon for approximately 22.3 km (13.9 mi), extending from the confluence with the San Pedro River in GSRM, T.11S.,

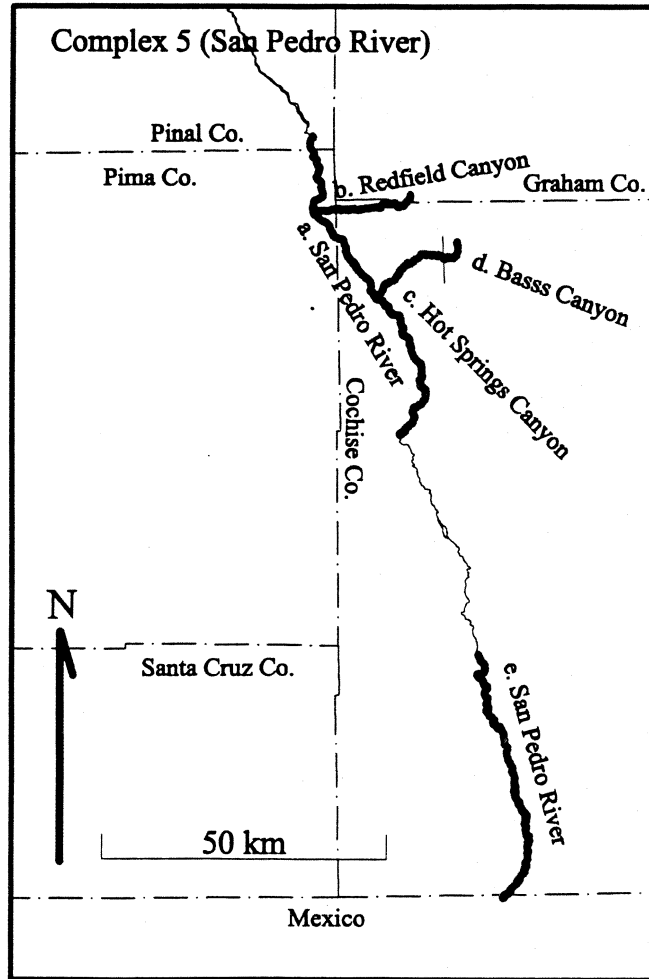
R.18E., SW¹/₄ Sec. 34 upstream to the confluence with Sycamore Canyon in GSRM, T.11S., R.20E., NW¹/₄ Sec. 28.

c. Hot Springs Canyon for approximately 19.1 km (11.8 mi), extending from the confluence with the San Pedro River in GSRM, T.13S., R.19E., west center Sec.23 upstream to the confluence with Bass Canyon in GSRM, T.12S., R.20E., NE¹/₄ Sec. 36.

d. Bass Canyon for approximately 5.1 km (3.2 mi), extending from the confluence with

Hot Springs Canyon in GSRM, T.12S., R.20E., NE¹/₄ Sec. 36 upstream to the confluence with Pine Canyon in GSRM, T.12S., R.21E., center Sec. 20.

e. San Pedro River for approximately 60.0 km (37.2 mi), extending from the confluence with the Babocomari River in the San Juan de las Boquillas y Nogales land grant upstream to the U.S. border with Mexico in GSRM, T.24S., R.22E., Sec. 19.



Complex 6. Graham and Greenlee Counties, Arizona and Catron County, New Mexico

a. Gila River for approximately 36.3 km (22.6 mi), extending from the Brown Canal diversion at the head of the Safford Valley in GSRM, T.6S., R.28E., SE¹/₄ Sec. 30 upstream to the confluence with Owl Canyon in GSRM, T.5S., R.30E., SW¹/₄ Sec. 30.

b. Bonita Creek for approximately 23.5 km (14.6 mi), extending from the confluence with the Gila River in GSRM, T.6S., R.28E., SE¹/₄ Sec. 21 upstream to the confluence with Martinez Wash in GSRM, T.4S., R.27E., SE¹/₄ Sec.27.

c. Eagle Creek for approximately 72.8 km (45.2 mi), extending from the Phelps-Dodge diversion dam in GSRM, T.4S., R.28E., NW¹/₄ Sec. 23 upstream to the confluence of Dry Prong and East Eagle Creeks in GSRM, T.2N., R.28E., SW¹/₄ Sec. 20, excluding lands on the San Carlos Apache Indian Reservation.

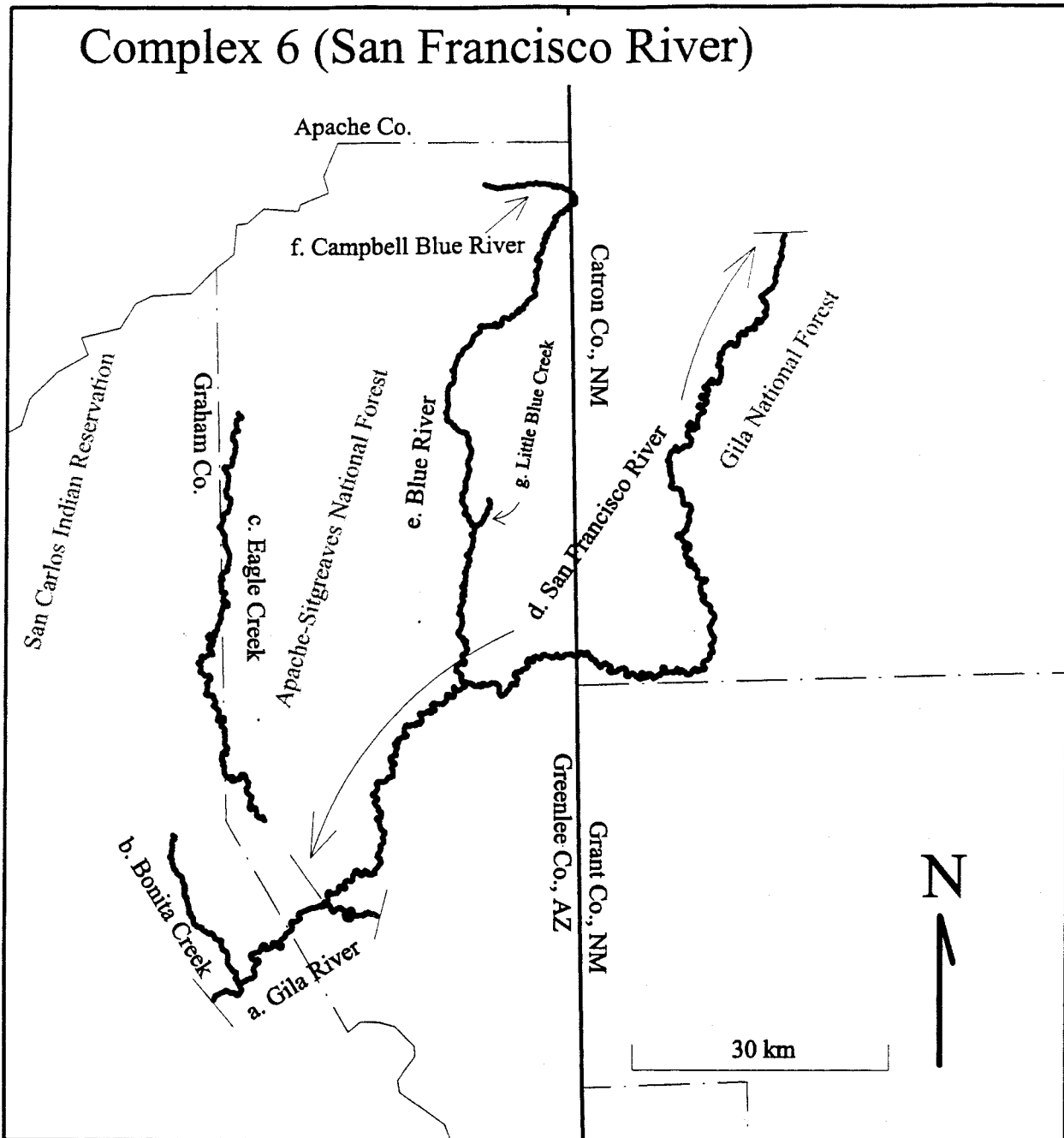
d. San Francisco River for approximately 181.5 km (113.2 mi), extending from the confluence with the Gila River in GSRM, T.5S., R.29E., SE¹/₄ Sec. 21 upstream to the confluence with the Tularosa River in the NMPM, T.7S., R.19W., SW¹/₄ Sec. 23.

e. Blue River for approximately 81.9 km (51.0 mi), extending from the confluence with the San Francisco River in GSRM, T.2S.,

R.31E., SE¹/₄ Sec. 31 upstream to the confluence of Campbell and Dry Blue Creeks in NMPM, T.7S., R.21W., SE¹/₄ Sec. 6.

f. Campbell Blue Creek for approximately 13.1 km (8.2 mi), extending from the confluence with Dry Blue Creek in NMPM, T.7S., R.21W., SE¹/₄ Sec. 6 upstream to the confluence with Coleman Creek in GSRM, T.4 1/2 N., R.31E., SW¹/₄ of the NE¹/₄ Sec. 32.

g. Little Blue Creek for approximately 4.5 km (2.8 mi), extending from the confluence with the Blue River in GSRM, T.1S., R.31E., center Sec. 5 upstream to the mouth of a box canyon in GSRM, T.1N., R.31E., NE¹/₄ SE¹/₄ Sec. 29.



Complex 7. Grant and Catron Counties, New Mexico

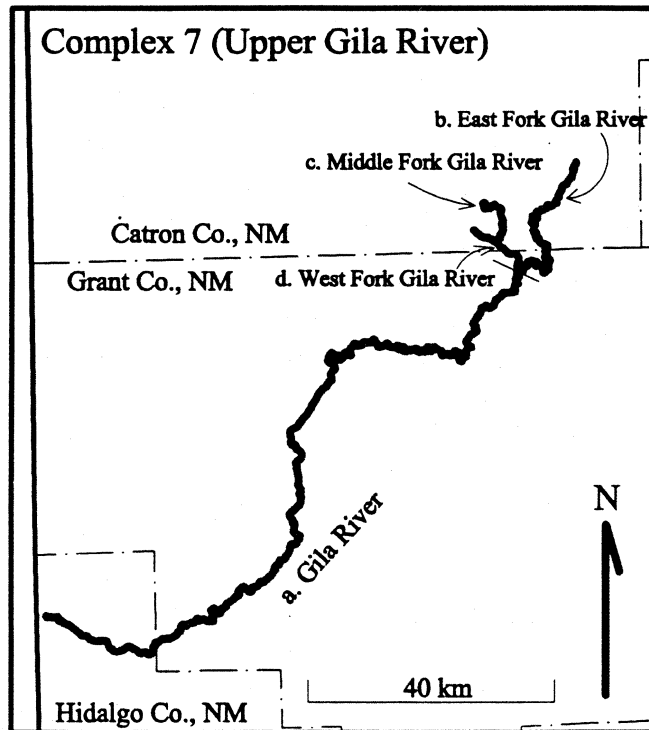
a. Gila River for approximately 164.4 km (102.2 mi), extending from the confluence with Moore Canyon in NMPM, T.18S., R.21W., SE¼ SW¼ Sec. 31 upstream to the confluence of the East and West Forks of the Gila River in NMPM, T.13S., R.13W., center Sec. 8.

b. East Fork Gila River for approximately 42.1 km (26.1 mi), extending from the confluence with the West Fork Gila River in NMPM, T.13S., R.13W., center Sec. 8 upstream to the confluence of Beaver and Taylor Creeks in NMPM, T.11S., R.12W., NE¼ Sec. 17.

c. Middle Fork Gila River for approximately 12.3 km (7.7 mi), extending from the confluence with the West Fork Gila River in NMPM, T.12S., R.14W., SW¼ Sec.

25 upstream to the confluence with Big Bear Canyon in NMPM, T.12S., R.14W., NW¼ Sec. 2.

d. West Fork Gila River for approximately 12.4 km (7.7 mi), extending from the confluence with the East Fork Gila River in NMPM, T.13S., R.13W., center Sec. 8 upstream to the confluence with EE Canyon in NMPM, T.12S., R.14W., east boundary of Sec. 21.



* * * * *

4. Amend section 17.95(e) by adding critical habitat for the loach minnow (*Tiaroga* (= *Rhinichthys*) *cobitis*) in the same alphabetical order as this species occurs in 17.11(h):

§ 17.95 Critical habitat—fish and wildlife.

* * * * *

(e) Fishes.

* * * * *

LOACH MINNOW (*Tiaroga* (= *Rhinichthys*) *cobitis*)

1. Critical habitat units are depicted for Apache, Cochise, Gila, Graham, Greenlee, Pima, Pinal, and Yavapai Counties, Arizona; and Catron and Grant Counties, New Mexico on the maps and as described below.

2. Critical habitat includes the stream channels within the identified stream reaches described below and areas within these reaches potentially inundated by high flow events. Where delineated, this is the 100-year floodplain of the designated waterways as defined by the U.S. Army Corps of Engineers. In areas where the 100-year floodplain has not been delineated or it is in dispute, the presence of alluvial soils (soils deposited by

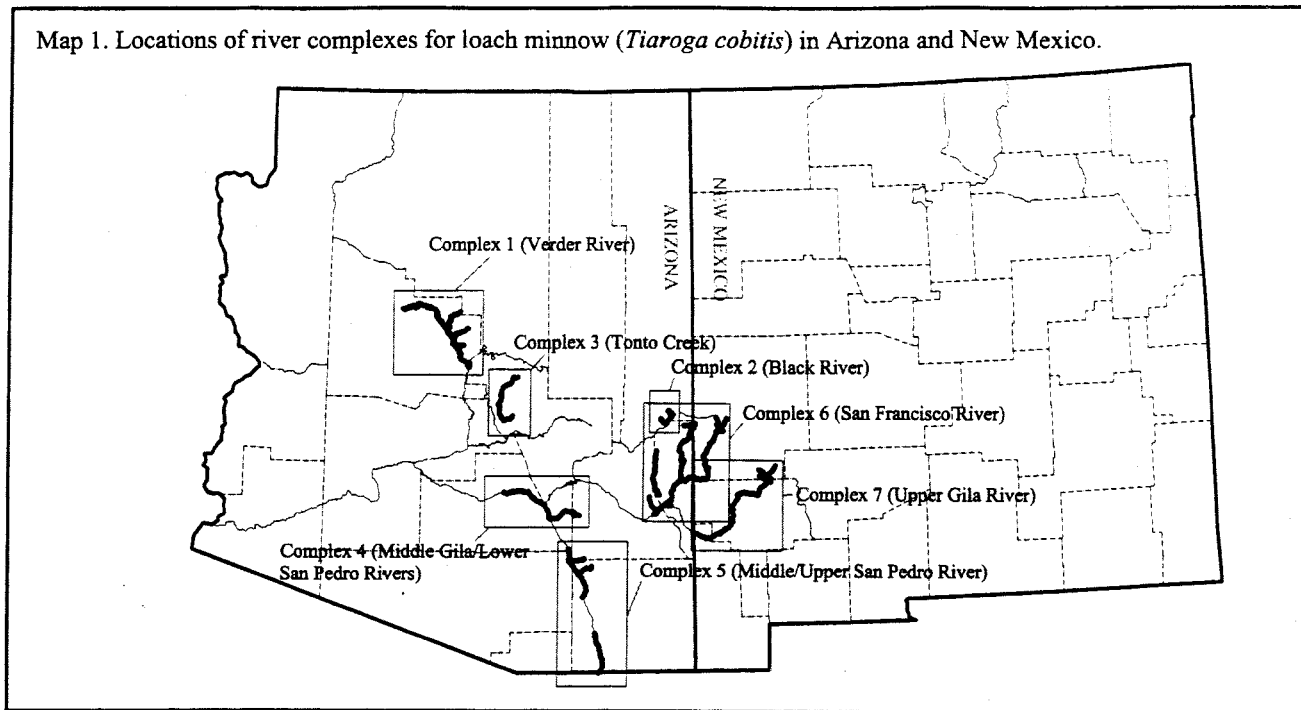
streams), obligate and facultative riparian vegetation (requiring and usually occurring in wetlands respectively), abandoned river channels, or known high water marks can be used to determine the extent of the floodplain. Within these areas, only lands which provide the primary constituent elements or which will be capable, with restoration, of providing them, are considered critical habitat. Existing human-constructed features and structures such as buildings, roads, etc., are not considered critical habitat.

3. Within these areas, the primary constituent elements include, but are not limited to, those habitat components that are essential for the primary biological needs of foraging, sheltering, dispersal, and reproduction. These elements include the following: (1) Permanent flowing, unpolluted water; (2) living areas for adult loach minnow with moderate to swift flow velocities in shallow water with gravel, cobble, and rubble substrates; (3) living areas for juvenile loach minnow with moderate to swift flow velocities in shallow water with sand, gravel, cobble, and rubble substrates; (4) living areas for larval loach minnow with slow to moderate velocities in shallow water with sand, gravel, and cobble substrates and

abundant instream cover; (5) spawning areas with slow to swift flow velocities in shallow water with uncemented cobble and rubble substrate; (6) low amounts of fine sediment and substrate embeddedness; (7) riffle, run, and backwater components present in the aquatic habitat; (8) low to moderate stream gradient; (9) water temperatures in the approximate range of 1–30 °C (35–85 °F) with natural diurnal and seasonal variation; (10) abundant aquatic insect food base; (11) periodic natural flooding; (12) a natural, unregulated hydrograph, or if flows are modified or regulated, then a hydrograph that demonstrates a retained ability to support a native fish community; and (13) habitat devoid of nonnative aquatic species detrimental to loach minnow, or habitat in which detrimental nonnative species are at levels which allow persistence of loach minnow.

4. Arizona (Gila and Salt River Meridian (GSRM)) and New Mexico (New Mexico Principal Meridian (NMPM)): Areas of land and water as follows (physical features were identified using USGS 7.5' quadrangle maps; river reach distances were derived from digital data obtained from Arizona Land Resources Information System (ALRIS) and

New Mexico Resource Geographic Information System (RGIS):



LOACH MINNOW (*Tiaroga (=Rhinichthys) cobitis*)

Complex 1. Yavapai, and Gila Counties, Arizona

a. Verde River for approximately 171.3 km (106.5 mi), extending from the confluence with Fossil Creek in GSRM, T.11N., R.6E., NE $\frac{1}{4}$ Sec. 25 upstream to Sullivan Dam in GSRM, T.17N., R.2W., NW $\frac{1}{4}$ Sec. 15, excluding lands on the Yavapai Apache Indian Reservation.

b. Fossil Creek for approximately 7.6 km (4.7 mi), extending from the confluence with the Verde River in GSRM, T.11N., R.6E., NE $\frac{1}{4}$ Sec. 25 upstream to the confluence

with an unnamed tributary from the northwest in GSRM, T.11 $\frac{1}{2}$ N., R.7E., center Sec. 29.

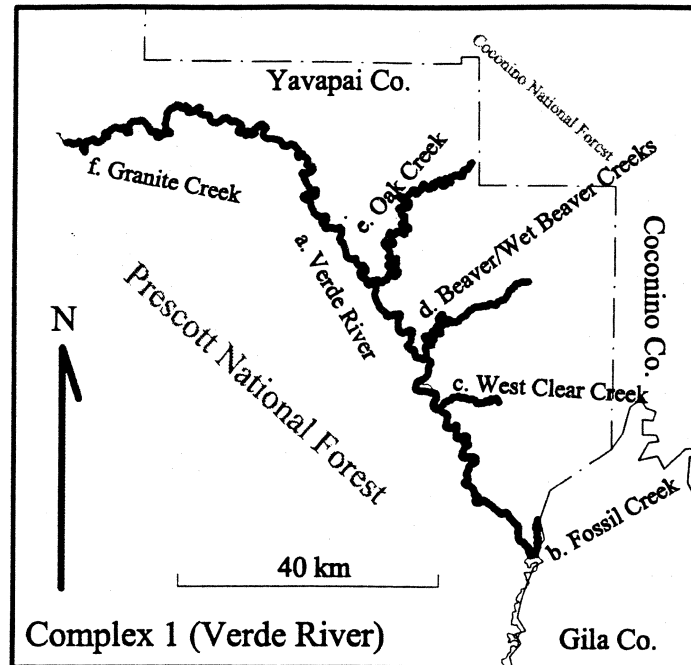
c. West Clear Creek for approximately 11.6 km (7.2 mi), extending from the confluence with the Verde River in GSRM, T.13N., R.5E., center Sec. 21, upstream to the confluence with Black Mountain Canyon in GSRM, T.13N., R.6E., SE $\frac{1}{4}$ Sec. 17.

d. Beaver Creek/Wet Beaver Creek for approximately 33.4 km (20.8mi), extending from the confluence with the Verde River in GSRM, T.14N., R.5E., SE $\frac{1}{4}$ Sec. 30 upstream

to the confluence with Casner Canyon in GSRM, T.15N., R.6E., NW $\frac{1}{4}$ Sec. 23.

e. Oak Creek for approximately 54.4 km (33.8 mi), extending from the confluence with the Verde River in GSRM, T.15N., R.4E., SE $\frac{1}{4}$ Sec. 20 upstream to the confluence with an unnamed tributary from the south in GSRM, T.17N., R.5E., SE $\frac{1}{4}$, NE $\frac{1}{4}$ Sec. 24.

f. Granite Creek for approximately 2.3 km (1.4 mi), extending from the confluence with the Verde River in GSRM, T.17N., R.2W., NE $\frac{1}{4}$ Sec. 14 upstream to a spring in GSRM, T.17N., R.2W., SW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 13.



Complex 2. Apache and Greenlee Counties, Arizona

a. East Fork Black River for approximately 8.2 km (5.1 mi), extending from the confluence with the West Fork Black River in GSRM, T.4N., R.28E., SE $\frac{1}{4}$ Sec. 11 upstream to the confluence with Deer Creek in GSRM, T.5N., R.29E., NW $\frac{1}{4}$ Sec. 30.

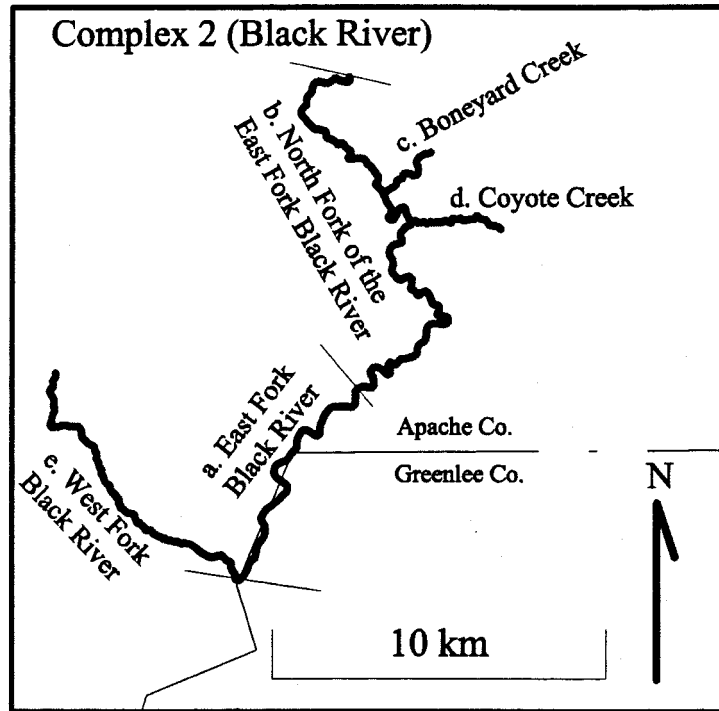
b. North Fork of the East Fork Black River for approximately 18.0 km (11.2 mi), extending from the confluence of the East Fork Black River and Deer Creek in GSRM,

T.5N., R.29E., NW $\frac{1}{4}$ Sec. 30 upstream to the confluence with an unnamed tributary flowing from the east in GSRM, T.6N., R.29E., center Sec. 30.

c. Boneyard Creek for approximately 2.3 km (1.4 mi), extending from the confluence with the North Fork of the East Fork Black River in GSRM, T.5N, R.29E., SW $\frac{1}{4}$ Sec. 5 upstream to the confluence with an unnamed tributary flowing from the east near Clabber City in GSRM, T.6N., R.29E., SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 32.

d. Coyote Creek for approximately 3.1 km (2.0 mi), extending from the confluence with the North Fork of the East Fork Black River in GSRM, T.5N., R.29E., NE $\frac{1}{4}$ Sec. 8 upstream to the confluence with an unnamed tributary flowing from the south in GSRM, T.5N., R.19E., NW $\frac{1}{4}$ Sec. 10.

e. West Fork Black River for approximately 10.3 km (6.4 mi), extending from the confluence with the East Fork Black River in GSRM, T.4N, R.28E., SE $\frac{1}{4}$ Sec. 11 upstream to the confluence with Hay Creek in GSRM, T.5N., R.28E., SE $\frac{1}{4}$, Sec. 19.



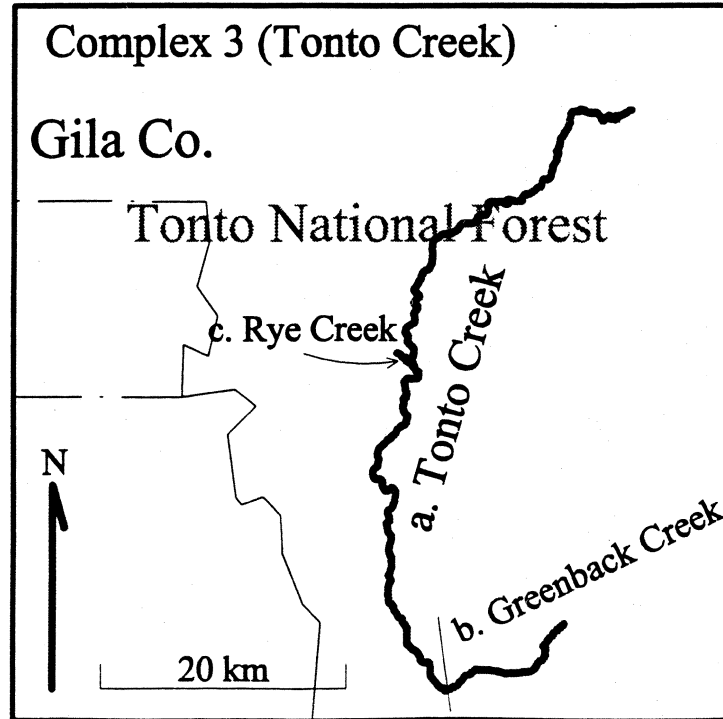
Complex 3. Gila County, Arizona

a. Tonto Creek for approximately 70.3 km (43.7 mi), extending from the confluence with Greenback Creek in GSRM, T.5N., R.11E., NW $\frac{1}{4}$ Sec. 8 upstream to the

confluence with Haigler Creek in GSRM, T.10N., R.12E., NW $\frac{1}{4}$ Sec. 14.

b. Greenback Creek for approximately 13.5 km (8.4 mi), extending from the confluence with Tonto Creek in GSRM, T.5N., R.11E., NW $\frac{1}{4}$ Sec. 8 upstream to Lime Springs in GSRM, T.6N., R.12E., SW $\frac{1}{4}$ Sec. 20.

c. Rye Creek for approximately 2.1 km (1.3 mi), extending from the confluence with Tonto Creek in GSRM, T.8N., R.10E., SW $\frac{1}{4}$ Sec. 13 upstream to the confluence with Brady Canyon in GSRM, T.8N., R.10E., NE $\frac{1}{4}$ Sec. 14.



Complex 4. Graham and Pinal Counties, Arizona

a. Gila River for approximately 62.8 km (39.0 mi), extending from Ashurst-Hayden Dam in GSRM, T.4S., R.11E., NW $\frac{1}{4}$ Sec. 8 upstream to the confluence with the San Pedro River in GSRM, T.5S., R.15E., center Sec. 23.

b. San Pedro River for approximately 21.4 km (13.3 mi), extending from the confluence with the Gila River in GSRM, T.5S., R.15E.,

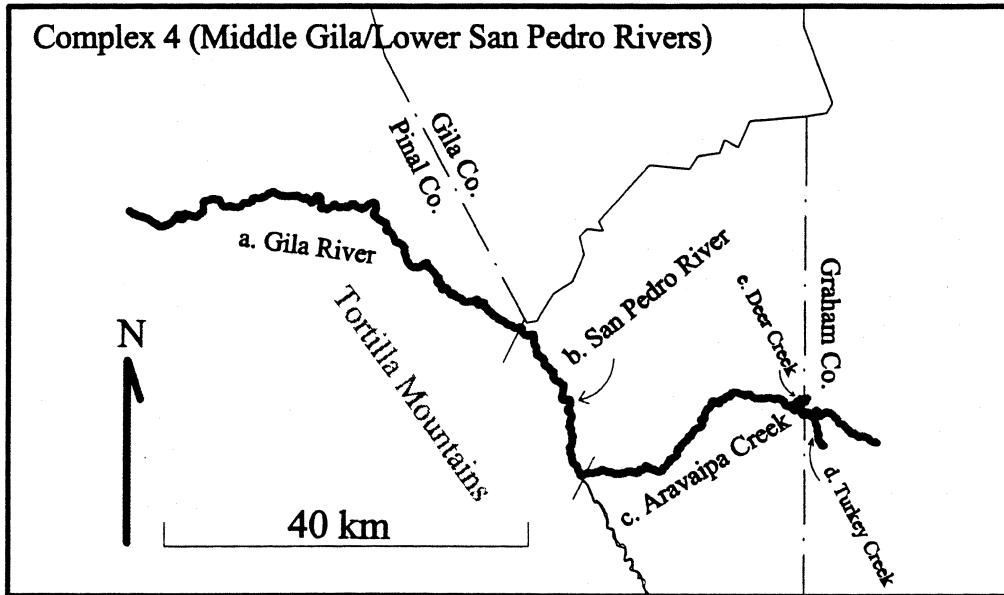
center Sec. 23 upstream to the confluence with Aravaipa Creek in GSRM, T.7S., R.16E., center Sec. 9.

c. Aravaipa Creek for approximately 45.3 km (28.1 mi), extending from the confluence with the San Pedro River in GSRM, T.7S., R.16E., center Sec. 9 upstream to the confluence with Stowe Gulch in GSRM, T.6S., R.19E., SE $\frac{1}{4}$ of the NE $\frac{1}{4}$ Sec. 35.

d. Turkey Creek for approximately 4.3 km (2.7 mi), extending from the confluence with

Aravaipa Creek in GSRM, T.6S., R.19E., center Sec. 19 upstream to the confluence with Oak Grove Canyon in GSRM, T.6S., R.19E., SW $\frac{1}{4}$ Sec. 32.

f. Deer Creek for approximately 3.6 km (2.3 mi), extending from the confluence with Aravaipa Creek in GSRM, T.6S., R.18E., SE $\frac{1}{4}$ of the SE $\frac{1}{4}$ Sec. 14 upstream to the boundary of the Aravaipa Wilderness at GSRM, T.6S., R.18E., east boundary Sec. 13.



Complex 5. Cochise, Graham, and Pima Counties, Arizona

a. San Pedro River for approximately 73.6 km (45.8 mi), extending from the confluence with Alder Wash in GSRM, T.10S., R.18E., SW $\frac{1}{4}$ Sec. 22 upstream to the confluence with Ash Creek in GSRM, T.16S., R.20E., SE $\frac{1}{4}$ Sec. 6.

b. Redfield Canyon for approximately 22.3 km (13.9 mi), extending from the confluence with the San Pedro River in GSRM, T.11S.,

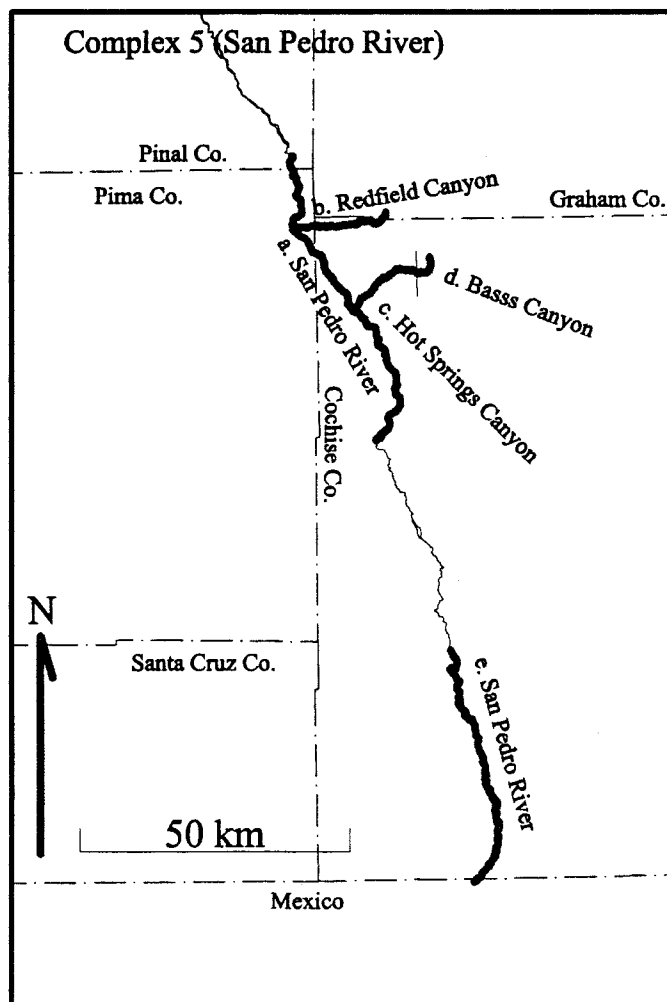
R.18E., SW $\frac{1}{4}$ Sec. 34 upstream to the confluence with Sycamore Canyon in GSRM, T.11S., R.20E., NW $\frac{1}{4}$ Sec. 28.

c. Hot Springs Canyon for approximately 19.1 km (11.8 mi), extending from the confluence with the San Pedro River in GSRM, T.13S., R.19E., west center Sec. 23 upstream to the confluence with Bass Canyon in GSRM, T.12S., R.20E., NE $\frac{1}{4}$ Sec. 36.

d. Bass Canyon for approximately 5.1 km (3.2 mi), extending from the confluence with

Hot Springs Canyon in GSRM, T.12S., R.20E., NE $\frac{1}{4}$ Sec. 36 upstream to the confluence with Pine Canyon in GSRM, T.12S., R.21E., center Sec. 20.

e. San Pedro River for approximately 60.0 km (37.2 mi), extending from the confluence with the Babocomari River in the San Juan de las Boquillas y Nogales land grant upstream to the U.S. border with Mexico in GSRM, T.24S., R.22E., Sec. 19.



Complex 6. Graham and Greenlee Counties, Arizona and Catron County, New Mexico

a. Gila River for approximately 36.3 km (22.6 mi), extending from the Brown Canal diversion at the head of the Safford Valley in GSRM, T.6S., R.28E., SE $\frac{1}{4}$ Sec. 30 upstream to the confluence with Owl Canyon in GSRM, T.5S., R.30E., SW $\frac{1}{4}$ Sec. 30.

b. Bonita Creek for approximately 23.5 km (14.6 mi), extending from the confluence with the Gila River in GSRM, T.6S., R.28E., SE $\frac{1}{4}$ Sec. 21 upstream to the confluence with Martinez Wash in GSRM, T.4S., R.27E., SE $\frac{1}{4}$ Sec. 27.

c. Eagle Creek for approximately 72.8 km (45.2 mi), extending from the Phelps-Dodge diversion dam in GSRM, T.4S., R.28E., NW $\frac{1}{4}$ Sec. 23 upstream to the confluence of Dry Prong and East Eagle Creeks in GSRM, T.2N., R.28E., SW $\frac{1}{4}$ Sec. 20, excluding lands on the San Carlos Apache Indian Reservation.

d. San Francisco River for approximately 203.3 km (126.3 mi), extending from the confluence with the Gila River in GSRM, T.5S., R.29E., SE $\frac{1}{4}$ Sec. 21 upstream to the mouth of The Box canyon in NMPM, T.6S., R.19W., SW $\frac{1}{4}$ of the NW $\frac{1}{4}$ Sec. 2.

e. Tularosa River for approximately 30.0 km (18.6 mi), extending from the confluence with the San Francisco River in NMPM, T.7S., R.19W., SW $\frac{1}{4}$ Sec. 23 upstream to NMPM, T.6S., R.18W., south boundary Sec. 1.

f. Negrito Creek for approximately 6.8 km (4.2 mi), extending from the confluence with the Tularosa River in NMPM, T.7S., R.18W., SW $\frac{1}{4}$ of the NW $\frac{1}{4}$ Sec. 19 upstream to the confluence with Cerco Canyon in NMPM, T.7S., R.18W., west boundary Sec. 22.

g. Whitewater Creek for approximately 1.8 km (1.2 mi), extending from the confluence with the San Francisco River in NMPM, T.11S., R.20W., SE $\frac{1}{4}$ Sec. 27 upstream to the confluence with Little Whitewater Creek in NMPM, T.11S., R.20W., SE $\frac{1}{4}$ Sec. 23.

h. Blue River for approximately 81.9 km (51.0 mi), extending from the confluence with the San Francisco River in GSRM, T.2S., R.31E., SE $\frac{1}{4}$ Sec. 31 upstream to the confluence of Campbell and Dry Blue Creeks in NMPM, T.7S., R.21W., SE $\frac{1}{4}$ Sec. 6.

i. Campbell Blue Creek for approximately 13.1 km (8.2 mi), extending from the confluence with Dry Blue Creek in NMPM, T.7S., R.21W., SE $\frac{1}{4}$ Sec. 6 upstream to the

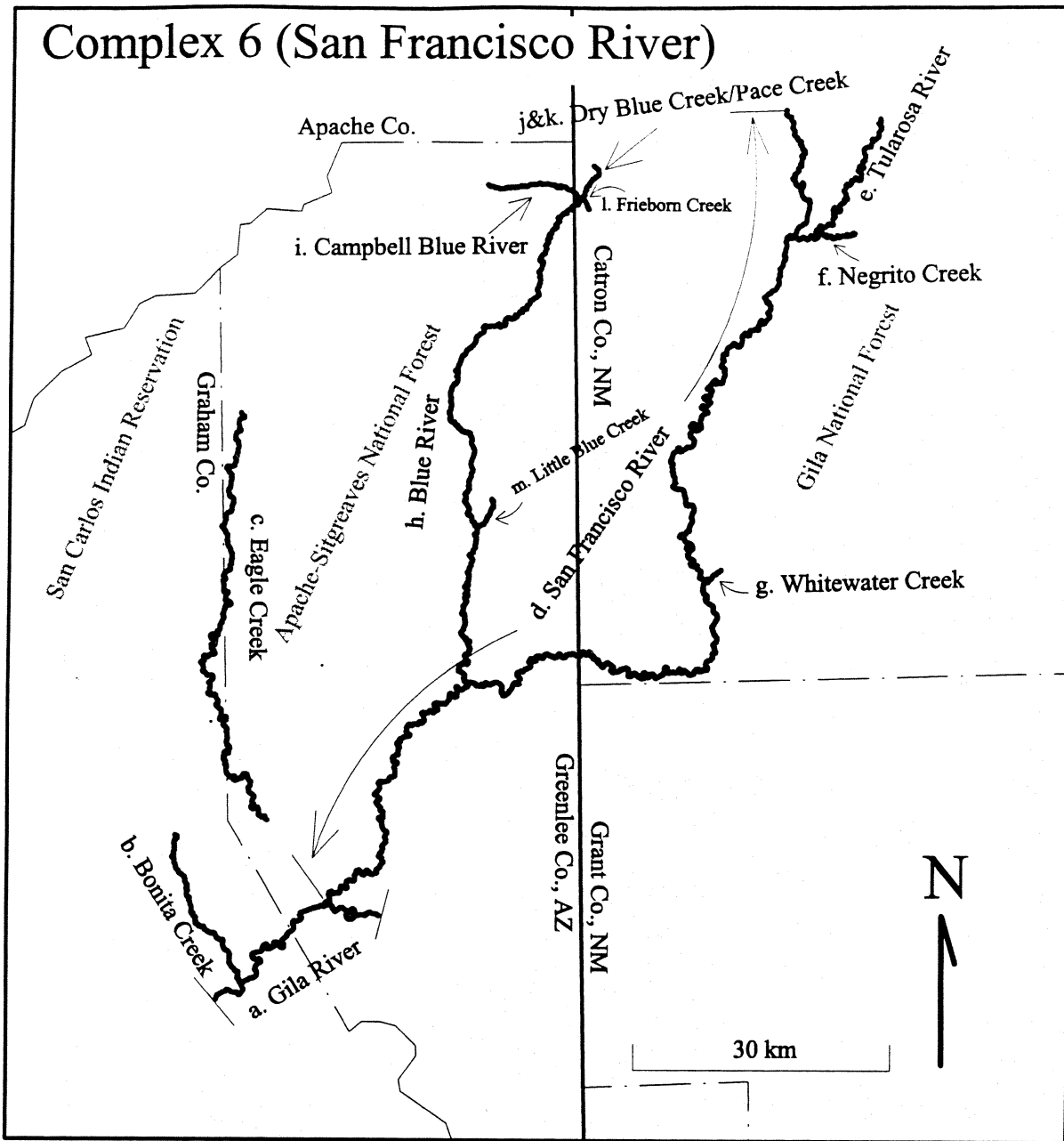
confluence with Coleman Creek in GSRM, T.4 $\frac{1}{2}$ N., R.31E., SW $\frac{1}{4}$ of the NE $\frac{1}{4}$ Sec. 32.

j. Dry Blue Creek for approximately 4.7 km (3.0 mi), extending from the confluence with Campbell Blue Creek in NMPM, T.7S., R.21W., SE $\frac{1}{4}$ Sec. 6 upstream to the confluence with Pace Creek in NMPM, T.6S., R.21W., SW $\frac{1}{4}$ Sec. 28.

k. Pace Creek for approximately 1.2 km (0.8 mi), extending from the confluence with Dry Blue Creek in NMPM, T.6S., R.21W., SW $\frac{1}{4}$ Sec. 28 upstream to the barrier falls in NMPM, T.6S., R.21W., SW $\frac{1}{4}$ Sec. 28.

l. Frieborn Creek for approximately 1.8 km (1.2 mi), extending from the confluence with Dry Blue Creek in NMPM, T.7S., R.21W., SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 5 upstream to the confluence with an unnamed tributary flowing from the south in NMPM, T.7S., R.21W., NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 8.

m. Little Blue Creek for approximately 4.5 km (2.8 mi), extending from the confluence with the Blue River in GSRM, T.1S., R.31E., center Sec. 5 upstream to the mouth of a box canyon in GSRM, T.1N., R.31E., NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 29.



Complex 7. Grant and Catron Counties, New Mexico.

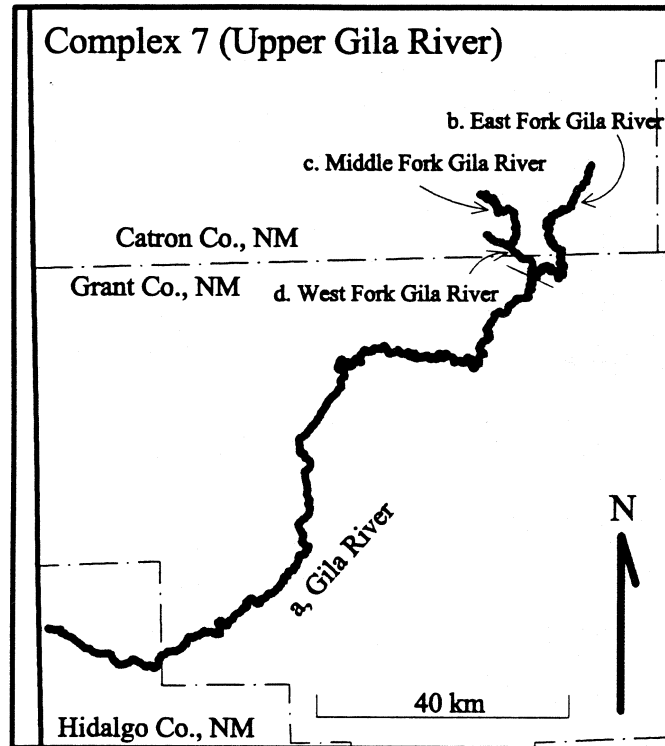
a. Gila River for approximately 164.4 km (102.2 mi), extending from the confluence with Moore Canyon in NMPM, T.18S., R.21W., SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 31 upstream to the confluence of the East and West Forks of the Gila River in NMPM, T.13S., R.13W., center Sec. 8.

b. East Fork Gila River for approximately 42.1 km (26.1 mi), extending from the confluence with the West Fork Gila River in NMPM, T.13S., R.13W., center Sec. 8 upstream to the confluence of Beaver and Taylor Creeks in NMPM, T.11S., R.12W., NE $\frac{1}{4}$ Sec. 17.

c. Middle Fork Gila River for approximately 19.1 km (11.8 mi), extending from the confluence with the West Fork Gila River in NMPM, T.12S., R.14W., SW $\frac{1}{4}$ Sec.

25 upstream to the confluence with Brothers West Canyon in NMPM, T.11S., R.14W., NE $\frac{1}{4}$ Sec. 33.

d. West Fork Gila River for approximately 12.4 km (7.7 mi), extending from the confluence with the East Fork Gila River in NMPM, T.13S., R.13W., center Sec. 8 upstream to the confluence with EE Canyon in NMPM, T.12S., R.14W., east boundary of Sec. 21.



Dated: April 18, 2000.

Stephen C. Saunders,
*Acting Assistant Secretary for Fish and
Wildlife and Parks.*

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