

DRAFT ENVIRONMENTAL ASSESSMENT

for the

DESIGNATION OF CRITICAL HABITAT

for the

SPIKEDACE AND LOACH MINNOW

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August 26, 2011

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## **Summary**

This Environmental Assessment (EA) is tiered to the December 20, 2006, *Environmental Assessment for the Designation of Critical Habitat for the Spikedace and Loach Minnow*. The purpose of this EA, prepared pursuant to the National Environmental Policy Act (NEPA), is to identify and disclose the environmental consequences resulting from the proposal to designate critical habitat for the spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*); each species is currently listed as threatened under the Endangered Species Act (ESA). The need for the critical habitat designation is to comply with Section 4(b) (2) of the ESA to designate critical habitat for listed species. Three alternatives are considered: Alternative A, Proposed Rule with Exclusion Areas; Alternative B, Proposed Rule without Exclusion Areas; and the No Action Alternative. Under Alternative A, critical habitat segments flowing through tribal and other lands could potentially be excluded in the final rule based on economic impact, national security, or other relevant impacts. The potential exclusion areas discussed in the 2010 proposed rule include stream segments that flow through Yavapai-Apache, White Mountain Apache, and San Carlos tribal lands and through lands owned by Freeport-McMoRan. The proposed critical habitat stream mileage has been modified slightly since publication of the proposed rule due to the addition of two stream segments. The critical habitat stream mileage for Alternative B (proposal without exclusion areas) is 726 miles for spikedace, 735 miles for loach minnow (formerly 709 miles in the proposed rule), and a total of 836 miles. The No Action Alternative is equivalent to the 2007 final rule designating critical habitat for spikedace and loach minnow. Impacts of the 2007 final rule were generally described under Alternative A in the December 2006 EA mentioned above. The No Action Alternative is required by NEPA for comparison to the other alternatives analyzed in the EA.

The areas proposed for critical habitat are designed to provide sufficient riverine and associated floodplain area for breeding, nonbreeding, and dispersing adult spinedace and loach minnow and for the habitat needs of the juvenile and larval stages of these fishes. Generally, the physical and biological features of critical habitat for spinedace and loach minnow are contained within the riverine ecosystem formed by the wetted channel and the adjacent floodplains within 300 lateral feet on either side of bankfull stage, except where bounded by canyon walls. This 300-foot width defines the lateral extent of each area of critical habitat that contains sufficient physical and biological features to provide for one or more of the life-history functions of the spinedace and loach minnow. This channel width is intended to accommodate stream meandering and high flows. Streams are not isolated but are connected with other streams to form "units." In this EA, eight units have been identified for critical habitat designation. The eight units in the proposed rule (Alternative B) include 26 stream segments for spinedace and loach minnow, 7 stream segments for spinedace only, and 12 stream segments for loach minnow only.

The environmental issues identified by federal agencies and the public during the public comment period for the proposed rule and during resource analysis included concerns regarding the impacts of critical habitat on water resources, wetlands and floodplains, natural resources (fish, wildlife and plants), land use and management, wildland fire management, recreation, socioeconomics, tribal trust resources, and environmental justice.

The designation for critical habitat for the spinedace and loach minnow would generally have negligible to minor impacts on the environment, and the designation is not expected to impose land use restrictions or prohibit land use activities. The exception may be those rare instances of adverse modification that could occur but that are not foreseeable. However, the action alternatives would (1) increase the number of additional Section 7 consultations for proposed projects within designated critical habitat, (2) maintain spinedace and loach minnow critical habitat physical and biological features, (3) indirectly increase the likelihood of greater expenditures of time and federal funds of government agencies to develop measures to prevent both adverse effects and adverse modification to maintain critical habitat, and (4) indirectly increase the likelihood of greater expenditure of nonfederal funds by project proponents to complete Section 7 consultations and to develop reasonable and prudent alternatives (as a result of adverse modifications) to maintain or avoid the destruction or adverse modification of designated critical habitat.

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## LIST OF ABBREVIATIONS

ADOT	Arizona Department of Transportation
ADWR	Arizona Department of Water Resources
AGFD	Arizona Game and Fish Department
ASLD	Arizona State Land Department
ASU	Arizona State University
AUM	animal unit month
AWSA	Arizona Water Settlements Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	best management practice
°C	degrees Celsius
CAP	Central Arizona Project
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CRBPA	Colorado River Basin Project Act of 1968
DOD	Department of Defense
DOI	Department of Interior
EA	environmental assessment
ESA	Endangered Species Act
°F	degrees Fahrenheit
FMP	fisheries management plan
FONSI	finding of no significant impact
FR	Federal Register
HCP	Habitat Conservation Plan
IEc	Industrial Economics, Inc.
ITP	incidental take permit
mi	miles
NEPA	National Environmental Policy Act
NMDGF	New Mexico Department of Game and Fish
OHV	off-highway vehicle
PBF	physical and biological feature
PCE	primary constituent element
Service	United States Fish and Wildlife Service
ROD	record of decision

SCIDD	San Carlos Irrigation and Drainage District
SRP	Salt River Project
TES	threatened, endangered, and sensitive species
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFS	United States Forest Service
USGS	United States Geological Survey
WUI	wildland-urban interface

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# CHAPTER 1

## PURPOSE OF AND NEED FOR ACTION

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### 1.1 Introduction

The United States Department of the Interior (USDI), Fish and Wildlife Service (Service) has prepared this Environmental Assessment (EA) to analyze the potential effects on physical and biological resources and social and economic conditions that may result from the designation of critical habitat for the spinedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*), each listed as threatened under the Endangered Species Act of 1973 (ESA), as amended. The current proposed rule to designate critical habitat for the spinedace and loach minnow was published in the *Federal Register* on October 28, 2010 (75 Federal Register [FR] 66482).

This chapter summarizes the issues and concerns from the public comments received on this proposed rule. The structure and detailed analysis of Chapter 3, Affected Environment and Environmental Consequences, is organized around those issues, as well as resources potentially affected by the proposed designation that have been identified by the Service. This EA is tiered to the Service's December 20, 2006, *Environmental Assessment for the Designation of Critical Habitat for the Spinedace and Loach Minnow* and generally follows that document's format.

Designating critical habitat provides regulatory benefits to the spinedace and loach minnow by identifying areas that contain the physical and biological features that are essential for the conservation of these species. This knowledge helps to focus conservation activities, helps to provide protection to areas where significant threats to the spinedace and loach minnow have been identified, and helps to avoid accidental damage to such areas. It is estimated that the spinedace has been eliminated from 85 to 90 percent of its historical range and that the loach minnow has been eliminated from 80 to 85 percent of its historical range (65 FR 24328, April 25, 2000). This EA will be used by the Service to decide whether critical habitat would be designated as proposed, whether the Proposed Action (Alternative B) requires refinement, or whether further analyses are needed through preparation of an environmental impact statement. If the Proposed Action is selected as described, or selected with minimal changes and no further environmental analyses are needed, the Service would issue a finding of no significant impact (FONSI). This EA has been prepared pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA) as implemented by the Council on Environmental Quality (CEQ) regulations 40 Code of Federal Regulations (CFR) Part 1500 et seq. and USDI NEPA procedures.

#### 1.1.1 Rule History

The spinedace and loach minnow were listed as threatened under the ESA on July 1, 1986 (51 FR 23769), and October 28, 1986 (51 FR 39458), respectively. Critical habitat was not designated when the spinedace and loach minnow were first listed because the Service needed additional time to collect

and analyze information to determine impacts (65 FR 24329). Additionally, time was needed to collect and analyze economic data as required under Section 4(b) (2) of the ESA (65 FR 24329).

The first critical habitat designations for both the spinedace and loach minnow were finalized on March 8, 1994 (59 FR 10898 and 10906, respectively). That critical habitat designation was set aside by a court order on October 13, 1994. The court cited the Service's failure to analyze the effects of critical habitat designation under NEPA. Therefore, the Service removed critical habitat designation for the spinedace and loach minnow on March 25, 1998 (63 FR 14378). A court order on September 20, 1999, required the Service to complete critical habitat designation for the spinedace and loach minnow by February 17, 2000. On October 6, 1999, the court amended the September 20 decision requiring the Service to make a critical habitat determination rather than a designation. The Service published a proposed rule to designate critical habitat on December 10, 1999 (64 FR 69324). The court extended the deadline for completing critical habitat designation to April 21, 2000. The Service published its second version of a final rule on critical habitat designation for the spinedace and loach minnow on April 25, 2000 (65 FR 24328). This designation was challenged because the economic analysis for critical habitat designation was held to be invalid by the Tenth Circuit Court. The Service agreed to voluntarily vacate critical habitat designation, except for the Tonto Creek Complex. On August 31, 2004, the United States District Court for the District of New Mexico set aside the April 25, 2000, critical habitat designation in its entirety and remanded it to the Service for preparation of a new proposed and final designation.

The Service published a proposed rule on critical habitat designation for the spinedace and loach minnow on December 20, 2005 (70 FR 75546) and published a final EA on the proposed designation on December 20, 2006. On March 21, 2007, the Service published the third version of a final rule on the critical habitat designation for both species (72 FR 13356). That final rule was challenged in two separate lawsuits: one by the New Mexico Cattle Growers' Association and the Coalition of Arizona/New Mexico Counties for Stable Economic Growth and a second by the Center for Biological Diversity. These lawsuits were consolidated into *Coalition of Arizona/New Mexico Counties for Stable Economic Growth et al. v. Salazar et al.* (September 6, 2007). The Service subsequently filed a motion for voluntary remand of the final rule on February 2, 2009, to reconsider the final rule within the context of the October 2008 Department of Interior Solicitor's Opinion (Bernhardt 2008) that discusses the Secretary of Interior's authority to exclude areas from critical habitat designation under Section 4(b)(2) of the ESA. On May 4, 2009, the United States District Court for the District of New Mexico issued a memorandum opinion and order on the Service's motion for voluntary remand; the district court granted the remand and retained the designation of critical habitat for spinedace and loach minnow in the 2007 final rule during the period of voluntary remand (Conway 2009). In its discussion, the court anticipated that the critical habitat designation in the 2010 proposed rule would be broader than the 2007 final rule. The 2010 proposed rule was published by the Service on October 28, 2010 (75 FR 66482).

### **1.1.2 Differences Between Past and Current Proposed Rules for Critical Habitat Designations**

The 2010 proposed rule for critical habitat designation of spokedace and loach minnow is different from previous critical habitat designations published in 1994 (59 FR 10898; 59 FR 10906), 2000 (64 FR 69324; 65 FR 24328), and 2007 (70 FR 75546; 72 FR 13356) in some of the areas that are designated. The Service has gained new information on the distribution of spokedace and loach minnow since the 1994 designation. The 2010 proposed regulation is most similar to the 2000 regulation, but in contrast to the 2000 designation, the current proposal does not include every complex (a grouping of connected streams) for spokedace and loach minnow. Instead, the 2010 proposed rule considers occupancy data and habitat parameters specific to each species, and identifies some areas that are suitable for one or the other species, but not both. Most areas in the current proposal are designated for both species, but now there are also areas proposed only for spokedace and areas proposed only for loach minnow. The stream segments have been grouped into “units” rather than complexes in the current proposed rule. The 2010 proposed rule includes areas occupied by spokedace and/or loach minnow that were not designated in the 2007 final rule.

The 2010 proposed rule also uses physical and biological features (PBFs) listed in 50 CFR 424.12(b) ESA regulations. The term *PBFs* replaces the term *primary constituent elements* (PCEs) used in previous rules to describe the habitat characteristics essential to the conservation of the species that may require special management considerations or protection. Specific PBFs are defined for the spokedace and for the loach minnow and are used in the analysis in this EA. All designated areas contain at least one PBF for the spokedace, or the loach minnow, or both species. This follows the methodology used in past critical habitat designations, in that the proposed designated areas contained *at least one* PCE for the spokedace and loach minnow.

## **1.2 Purpose of the Action**

Preservation of critical habitat for an endangered or threatened species is a crucial component of conservation. A primary purpose of the ESA is to “provide a means whereby the ecosystems upon which endangered species and threatened species may be conserved” (Section 2[b]). The critical habitat provisions of the ESA are intended to provide protection of habitat that is essential to the conservation of the listed species. The purpose of this action is to designate critical habitat for the spokedace and loach minnow, of which both are currently listed as threatened under the ESA. This critical habitat designation identifies geographic areas that have features essential for the conservation of these two fishes. It also describes those PBFs that constitute critical habitat.

## **1.3 Need for the Action**

Critical habitat designation for federally listed species is required by the ESA, except in very limited circumstances. Areas designated as critical habitat are subject to Section 7(a)(2) of the ESA, thereby requiring consultation for federal actions that may affect these areas in order to avoid destruction or adverse modification of this habitat. Most of the habitat for spokedace and loach minnow has been altered or degraded. Additional loss of habitat and further restriction of the spokedace and loach minnow

range would increase these species' vulnerability to catastrophic events, such as the introduction of nonnative predators or a prolonged period of low or no stream flow. The consultation requirement only applies to actions conducted by federal agencies or to actions that require a federal permit or receive federal funding. Private or state actions are not otherwise affected by the designation.

## **1.4 Background**

### **1.4.1 Critical Habitat**

#### **1.4.1.1 Provisions of the ESA**

Section 4(a)(3) of the ESA states that critical habitat shall be designated to the maximum extent prudent and determinable and that such designation may be revised periodically as appropriate. Section 4(b)(2) of the ESA requires that critical habitat designation be based on the best scientific information available and that economic and other impacts must be considered. Areas may be excluded from critical habitat designation if it is determined that the benefits of exclusion outweigh the benefits of inclusion, unless failure to include the areas in critical habitat would result in the extinction of the species. In Section 3(5)(A) of the ESA, critical habitat is defined as (i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the provisions of Section 4 of the ESA, on which are found those physical or biological features (1) essential to the conservation of the species and (2) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by a species at the time it is listed in accordance with the provisions of Section 4 of the Act, upon the determination by the Secretary of the Interior that such areas are essential for the conservation of the species.

Section 3(5)(C) also states that critical habitat "shall not include the entire geographic area which can be occupied by the threatened or endangered species," except when the Secretary of the Interior determines that the areas are essential for the conservation of the species.

#### **1.4.1.2 Section 4(b)(2) Exclusion Process**

Section 4(b)(2) of the ESA allows the Secretary of the Interior to exclude any area from the critical habitat designation after considering the economic, national security, or other relevant impacts of designating the area or if the Secretary determines that the benefit of excluding the area exceeds the benefit of designating it as critical habitat, unless the exclusion would result in the extinction of the species. After reviewing public comments on the critical habitat proposal in this EA and on the draft economic analysis, and after reviewing the final versions of this EA and the economic analysis, the Secretary could determine to exclude areas other than those addressed in this EA. This is provided for in ESA Section 4(b)(2) and in implementing regulations at 50 CFR Part 424.19.

In October 2008, the Department of Interior's Office of the Solicitor issued an opinion to guide the Secretary of Interior's authority to exclude areas from a critical habitat designation under Section 4(b)(2) of the ESA (Bernhardt 2008). As previously mentioned, the Service was granted a voluntary remand of the March 21, 2007, final rule (72 FR 13356) for critical habitat designation of the spikedace

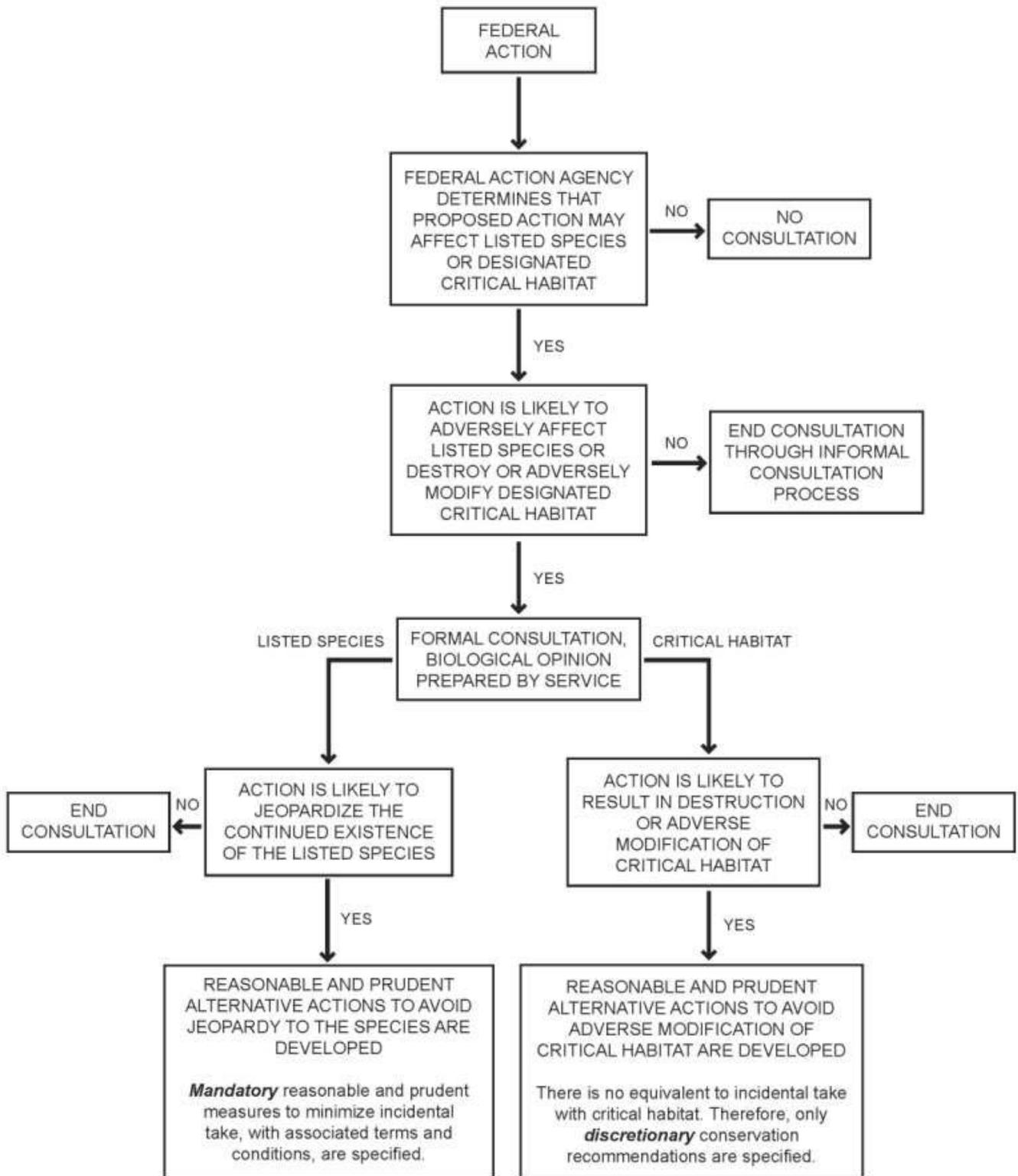
and loach minnow to reconsider the October 2008 Solicitor's Opinion (Bernhardt 2008) in relation to potential exclusions (as discussed in Alternative A of Chapter 2). The mileage proposed for critical habitat designation in the current proposed rule is all inclusive, in that it is without exclusions (see Alternative B in Chapter 2). The proposed rule does, however, describe specific areas that are being considered by the Secretary of Interior for potential exclusion in the final rule (see Alternative A in Chapter 2).

#### **1.4.1.3 Section 7 Consultation Process**

Section 7(a)(2) of the ESA requires federal agencies to consult with the Service to “insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species which is determined to be critical.” Each agency is required to use the best scientific and commercial data available. This consultation process is typically referred to as *Section 7 consultation*. Section 7 of the ESA does not apply to state, local, or private land unless there is a federal nexus (i.e., federal funding, authorization, or permitting).

Designation of critical habitat can help focus conservation efforts by identifying areas that are essential for the conservation of the species. Designation of critical habitat also serves to alert the public and land-managing agencies to the importance of an area for conservation of a listed species. As described above, critical habitat receives protection from destruction or adverse modification through required consultation under Section 7 of the ESA. Aside from outcomes of consultation with the Service under Section 7, the ESA does not automatically impose any restrictions on lands designated as critical habitat.

The Section 7 consultation process begins with a determination of the effects on a listed species and designated critical habitat by a federal action agency (Figure 1). If the federal action agency determines that there would be no effect on listed species or designated critical habitat, then the Section 7 process concludes at that point. If the federal action agency determines that listed species or designated critical habitat may be affected, then consultation with the Service is initiated. Once it is determined that the proposed federal action may affect a listed species or critical habitat, the federal action agency and the Service typically enter into informal Section 7 consultation. Informal consultation is an optional process for identifying affected species and critical habitat, determining potential effects, and exploring ways to modify the action to remove or reduce adverse effects on listed species or critical habitat (50 CFR 402.13). During this process the Service may make suggestions concerning project modifications, which then can be adopted by the action agency. If the action agency decides to further modify the project as suggested by the Service, the Service would then concur in writing if adverse effects can be avoided. Otherwise, the Service would recommend formal consultation. Formal consultation concludes with a biological opinion issued by the Service on whether the proposed federal action is likely to jeopardize the continued existence of a listed species or to destroy or adversely modify critical habitat (50 CFR 402.14[h]).



**Figure 1 Simplified Diagram of the ESA Section 7 Process**

Independent analyses are made under both the jeopardy and the adverse modification standards. The jeopardy analysis evaluates potential impacts on the species, while the adverse modifications analysis specifically evaluates potential impacts on designated critical habitat. In 2004, the Ninth Circuit Court determined that there is an additional difference between the two standards. In *Gifford Pinchot Task Force et al. v. United States Fish and Wildlife Service* (2004), the court held that while the jeopardy standard concerns the survival of a species or its risk of extinction, the adverse modification standard concerns the value of critical habitat for the recovery, or eventual delisting, of a species. As pointed out in the Ninth Circuit decision, survival of a species and recovery (or conservation) of a species are distinct concepts in the ESA. Implementation of the two standards, therefore, involves separate and distinct analyses based on these concepts.

In light of the *Gifford Pinchot* decision, the Service no longer relies on the regulatory definition of “destruction or adverse modification” of critical habitat at 50 CFR 402.02. Instead, the Service relies on the statutory provisions of the ESA to complete the analysis with respect to critical habitat. The potential for destruction or adverse modification of critical habitat by a federal action is assessed under the statutory provisions of the ESA by determining whether the effects of the implementation of the proposed federal action would allow the affected critical habitat to remain functional (or retain those PBFs that relate to the ability of the area to periodically support the species) to serve its intended conservation role for the species (75 FR 66519). This analysis provides the basis for determining the significance of anticipated effects of the proposed federal action on critical habitat. The threshold for destruction or adverse modification is evaluated in the context of whether the critical habitat would remain functional to serve the intended conservation role for the species.

Critical habitat is defined in Section 3(5)(A) of the ESA as those areas that are essential for conservation of the species, and the definition of conservation includes species recovery. In general, conservation and recovery of the spikedace and loach minnow would likely require sustaining existing populations, augmenting remnant or marginal aggregations of these species, and restoring these species to areas they formerly occupied. Thus, because the proposed critical habitat units are occupied by one or both species, the conservation value of proposed critical habitat for the spikedace and loach minnow would be to sustain or allow augmentation of existing populations. The threshold for destruction or adverse modification in proposed critical habitat units would likely be a reduction in the capability of the habitat to sustain existing populations or to allow augmentation of the population. In other words, in determining adverse modification, the Service would analyze the current condition of the critical habitat factors responsible for that condition, and the conservation role of the unit in order to maintain the quality of the PBFs and the existing spikedace and loach minnow populations.

A “nonjeopardy” or “no adverse modification” opinion concludes consultation, and the proposed action may proceed under the ESA. The Service may prepare an incidental take statement with reasonable and prudent measures to minimize take and associated mandatory terms and conditions that describe the methods for accomplishing the reasonable and prudent measures. Discretionary conservation recommendations may be included in a biological opinion based on the needs of the species. These recommendations may address minimizing adverse effects on listed species or critical habitat, identifying studies or monitoring, or suggesting how action agencies can assist species under their own

authorities and Section 7(a)(1) of the ESA. There are no ESA Section 9 prohibitions for critical habitat. Therefore, a biological opinion that concludes no destruction or adverse modification of critical habitat may contain conservation recommendations but would not include an incidental take statement, or terms and conditions for critical habitat.

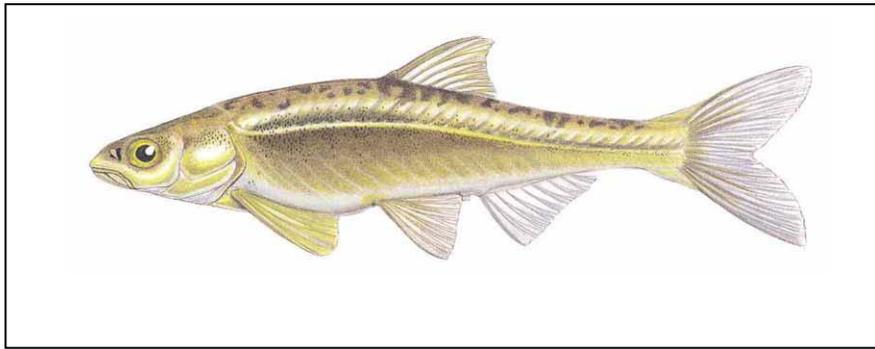
In a biological opinion that results in a jeopardy or adverse modification conclusion, the Service develops mandatory reasonable and prudent alternatives to the proposed action. Reasonable and prudent alternatives are actions that the federal agency can take to avoid jeopardizing the continued existence of the species or adversely modifying the critical habitat. Reasonable and prudent alternatives may vary from minimal project changes to extensive redesign or relocation of the project, depending on the situations involved. Reasonable and prudent alternatives must be consistent with the intended purpose of the proposed action, and they also must be consistent with the scope of the federal agency's legal authority. Furthermore, the reasonable and prudent alternatives must be economically and technically feasible. A biological opinion that results in a jeopardy finding, based on effects on the species, may also include an incidental take statement, reasonable and prudent measures terms and conditions, and conservation recommendations. A biological opinion that results in an adverse modification finding (but no jeopardy to the species) may include reasonable and prudent alternatives and conservation recommendations but no incidental take statement or associated reasonable and prudent measures and terms and conditions.

## **1.4.2 Spikedace**

Spikedace were first collected in 1851 from the San Pedro River in Arizona and was described from those specimens in 1856 by Girard. It is the only species in the genus *Meda*.

### **1.4.2.1 Description**

Spikedace are small, slim stream-dwelling fish of the minnow family (Cyprinidae) (Figure 2). The body is slender and slightly compressed laterally. Scales are prominent only as small plates deeply imbedded in the skin. There are two spines at the leading edge of the dorsal fin—the first being obviously the strongest, sharp-pointed, and nearly as long as the second. The eyes and mouth are large. Coloration is bright silvery on the sides of the body, with vertically elongated, black specks. The back is olive-gray to brownish and usually mottled with darker pigment, and the underside is white. Males in breeding condition become brightly golden or brassy, especially on the head and the base of the fins (Girard 1857; Miller and Hubbs 1960; and Minckley 1973).



**Figure 2 Spikedace**

### 1.4.2.2 Habitat and Life History

As described in the 2010 proposed rule (75 FR 66483), spikedace are found in moderate to large perennial streams, where they inhabit shallow riffles (those shallow portions of the stream with rougher, choppy water) with sand, gravel, and rubble substrates (Barber and Minckley 1966, p. 31; Propst et al. 1986, p. 12; Rinne and Kroeger 1988, p. 1; Rinne 1991, pp. 8–10). 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 or gravel bars; and eddies at downstream riffle edges (Rinne 1991, p. 11; Rinne and Kroeger 1988, pp. 1, 4). Recurrent flooding and a natural flow regime are very important in maintaining the habitat of spikedace and in helping maintain a competitive edge over invading nonnative aquatic species (Propst et al. 1986, pp. 76–81; Minckley and Meffe 1987, pp. 97, 103–104).

Habitat occupied by spikedace can be broken down into smaller, specialized habitats called microhabitats. These microhabitats vary by stream, by season, and by species' life stage. Studies on habitat use have been completed on the Gila River in New Mexico, and the Verde River and Aravaipa Creek in Arizona. More detailed information on the spikedace microhabitat is found in the 2010 proposed rule (75 FR 66497). Table 1 provides habitat parameters for the larval, juvenile, and adult life stages of the spikedace, as described in the 2010 proposed rule. The parameters include flow velocity, water depth, stream gradient, and substrate (cobbles on the stream bottom).

**Table 1 Habitat Parameters for Varying Life Stages of Spikedace**

	<b>Larvae</b>	<b>Juveniles</b>	<b>Adults</b>
Flow velocity in inches per second	3.3	6.6	9.2–27.6
Depth in inches	1.2–19.2	1.2–18.0	2.4–16.8
Gradient (%)	No data	No data	0.3 to <1.0
Substrate	Primarily sand, with some over gravel or cobble	Primarily gravel, with some sand and cobble	Sand, gravel, cobble, and low amounts of fine sediments

*Source:* Adapted from 75 FR 66482 (2010, p. 66497, Table 1)

Spikedace spawn in spring (April–June) and breeding is apparently initiated in response to a combination of stream discharge and water temperature; timing varies annually and geographically (Anderson 1978; Barber et al. 1970; Propst et al. 1986). Males patrol in shallow, sandy-gravelly riffles where the current is moderate. There is no indication of territoriality, although males generally remain evenly spaced within an occupied area. Females may be fractional spawners, which means they release eggs at intervals, usually over several days or weeks. Fecundity of individual females based on gonad examination ranges from 90 to 250 ova and is significantly correlated with both length and age. No specific information on incubation times or size at hatching is available (Service 1991a).

Spikedace are carnivores that feed mostly on aquatic and terrestrial insects within the stream drift (Anderson 1978; Barber and Minckley 1983; Propst et al. 1986). Kinds and quantities consumed vary with spatial and temporal availability of foods. Prey body size is small, typically ranging from 2 to 5 millimeters long. At times of emergence, all stages of benthic (found at the bottom of the stream) insects are consumed in large quantities. Other foods, including larval fishes, are occasionally eaten, but these constitute a minor component of the diet (Service 1991a; Schreiber 1978).

#### **1.4.2.3 Distribution**

As discussed in the 2010 proposed rule (75 FR 66482), 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. Habitat destruction and competition and predation by nonnative aquatic species reduced its range and abundance (Miller 1961, pp. 365, 377, 397–398; Lachner et al. 1970, p. 22; Ono et al. 1983, p. 90; Moyle 1986, pp. 28–34; Moyle et al. 1986, pp. 416–423; Propst et al. 1986, pp. 82–84).

Spikedace are now restricted to portions of the upper Gila River (Grant, Catron, and Hidalgo Counties, New Mexico); Aravaipa Creek (Graham and Pinal Counties, Arizona); Eagle Creek (Graham and Greenlee Counties, Arizona); and the Verde River (Yavapai County, Arizona) (Marsh et al. 1990, pp. 107–108, 111; M. Brouder, U.S. Fish and Wildlife Service (Service), pers. comm. 2002; Stefferud and Reinthal 2005, pp. 16–21; Paroz et al. 2006, pp. 62–67; Propst 2007, pp. 7–9, 11–14).

The spikedace is now common only in Aravaipa Creek in Arizona (AGFD 1994; Arizona State University (ASU) 2002; P. Reinthal, University of Arizona, pers. comm. 2008, Reinthal 2009, pp. 1–2) and one section of the Gila River south of Cliff, New Mexico (NMDGF 2008; Propst et al. 2009, pp. 14–17). The Verde River is presumed occupied; however, the last captured fish from this river was from a 1999 survey (M. Brouder, Service, pers. comm. 2002; AGFD 2004). Spikedace from the Eagle Creek population have not been seen for over a decade (Marsh 1996, p. 2), although they are still thought to exist in numbers too low for the sampling efforts to detect (Carter et al. 2007, p. 3; see Minckley and Marsh 2009). The Gila River forks population is thought to be very small (Paroz et al. 2009, p. 27).

## **Translocation and Repatriation**

As discussed in the 2010 proposed rule (75 FR 66482), the Service uses the term “translocate” to describe stocking fish into an area where suitable habitat exists but for which there are no documented collections. The term “repatriate” is used to describe stocking fish into an area where the Service has historical records of prior presence. In 2007, spinedace were translocated into Hot Springs Canyon, in Cochise County, Arizona, and Redfield Canyon, in Cochise and Pima Counties, Arizona, and these streams were subsequently augmented (Robinson 2008a, pp. 2, 6; T. Robinson, Arizona Game and Fish Department [AGFD], pers. comm. 2008b; D. Orabutt, AGFD, pers. comm. 2009; Robinson 2008a, pp. 2, 5–8). Both Hot Springs and Redfield canyons are tributaries to the San Pedro River. Spinedace were also translocated into Fossil Creek, a tributary to the Verde River in Gila County, Arizona, in 2007, and were subsequently augmented in 2008 (Carter 2007b, p. 1; Carter 2008a, p. 1; Robinson 2009a, p. 9; Boyarski et al. 2010, in draft, p. 7). In 2008, spinedace were translocated into Bonita Creek, a tributary to the Gila River in Graham County, Arizona (H. Blasius, U.S. Bureau of Land Management [BLM], pers. comm. 2008; D. Orabutt, AGFD, pers. comm. 2009; Robinson et al. 2009a, p. 209), and spinedace were translocated to upper Bonita Creek in 2009. In 2008, spinedace were also repatriated to the upper San Francisco River in Catron County, New Mexico (D. Propst, New Mexico Department of Game and Fish [NMDGF], pers. comm. 2010). Augmentations with additional fish will occur for the next several years at all sites, if adequate numbers of fish are available. Monitoring at each of these sites is ongoing to determine if populations ultimately become self-sustaining.

### **1.4.2.4 Population Estimates**

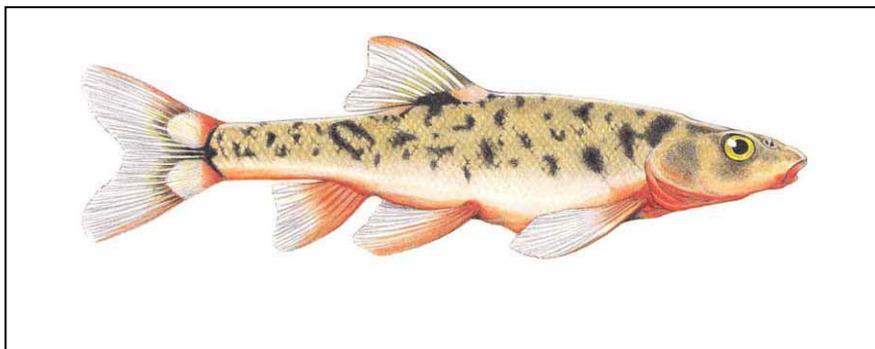
Population estimates have not been developed by the Service because of the difficulty in detecting the species, the sporadic nature of most surveys, and the difference in surveying techniques that have been applied over time (75 FR 66482). Based on the available maps and survey information, the Service estimates the spinedace’s present range to be approximately 10 percent or less of its historical range, and the status of the species within occupied areas to range from common to very rare. Available data indicate that the spinedace population in New Mexico has declined in recent years (Paroz et al. 2006, p. 56). Historical and current records for spinedace are summarized in three databases: the Lower Colorado Basin fish database (ASU 2002), the Heritage Database Management System (AGFD 2004), and the Gila Rare Species Collections database (NMDGF 2008).

### **1.4.3 Loach Minnow**

Loach minnow are an endemic species to the Gila River drainage of Arizona and New Mexico and Sonora, Mexico (Miller and Winn 1951). The loach minnow was first collected in 1851 from the San Pedro River in Arizona and was described from those specimens in 1856 by Girard. It is the only species in the genus *Tiaroga*.

### 1.4.3.1 Description

Loach minnow are a small, stream-dwelling member of the minnow family (Cyprinidae) (Figure 3). It has an elongated, compressed body that is flattened ventrally. There are eight rays in the dorsal fin and seven in the anal fin. The lateral line has about 65 scales. The mouth is small, terminal, and highly oblique; there are no barbels. The upper lip is nonprotractile, attached to the snout by a broad fold of tissue (the frenum). Openings to the gills are restricted. Coloration of the body is an olivaceous background, highly blotched with darker pigment. Whitish spots are present at the base of the dorsal fin and ventral portions of the caudal fin base. Breeding males have bright red-orange coloration at the bases of the paired fins, on the adjacent body, on the base of the caudal lobe, about the mouth, near the upper portions of the gill openings, and often on the abdomen. Females in breeding become yellowish on the fins and lower body (Girard 1857; Miller and Hubbs 1960; Minckley 1973).



**Figure 3 Loach Minnow**

### 1.4.3.2 Habitat and Life History

Loach minnow are a bottom dweller of small to large perennial creeks and rivers, typically in shallow turbulent riffles with cobble substrate, swift currents, and, in some places, filamentous algae. It is generally found below 8,000 feet (2,438 meters) elevation. Recurrent flooding is instrumental in maintenance of quality habitat (Minckley 1973; Propst et al. 1988; Rinne 1989; Propst and Bestgen 1991).

Loach minnow first spawn at age 1 in late winter–early spring in Aravaipa Creek (Minckley 1973) and from late March into early June in New Mexico (Propst et al. 1988). Spawning is in the same riffles occupied by adults during the nonreproductive season, where sex ratios appear approximately equal.

Adhesive eggs are deposited on the underside of flattened rocks and cavities usually open on the downstream side, while the upstream portion of the rock is embedded in the substrate. Fecundity of individual females ranges from about 150 to 250 ova and generally increases with increasing size (Minckley 1973).

Loach minnows are opportunistic, benthic insectivores, largely deriving their food supply from among riffle-dwelling larval insects. The array of food eaten is usually small compared with other stream fishes

(Schreiber and Minckley 1981). Loach minnow support themselves on their pectoral fins on the stream bottom, swimming in short bursts from place to place (Minckley 1973). Feeding habits parallel seasonal changes in relative abundance and thus availability of riffle-inhabiting invertebrates (Schreiber 1978).

Microhabitats used by loach minnow vary by life stage and stream. Adult loach minnow occupy a broad range of water velocities, with the majority of adults occurring in swift flows. Their eggs are adhesive, and are placed on the undersurfaces of rocks in the same riffles that they themselves occupy. After hatching, larval loach minnow move from the rocks under which they were spawned to areas with slower velocities than the main stream, typically remaining in areas with substantially slower velocities than juveniles and adults. Larval loach minnow occupy areas that are shallower and substantially slower than areas where eggs are found (Propst et al. 1988, p. 37; Propst and Bestgen 1991, p. 32). Juvenile loach minnow generally occur in areas where velocities are similar to those used by adults, and that have higher flow velocities than those occupied by larvae (Propst et al. 1988, pp. 36–37). More detailed information on the loach minnow microhabitat is found in the proposed rule (75 FR 66497). Table 2 provides habitat parameters for the larval, juvenile, and adult life stages of the loach minnow, as described in the 2010 proposed rule. The parameters include flow velocity, water depth, and substrate.

**Table 2 Habitat Parameters for Varying Life Stages of Loach Minnow**

	<b>Egg</b>	<b>Larvae</b>	<b>Juveniles</b>	<b>Adults</b>
Flow velocity in inches per second	1.2–36.0	0.0–19.2	1.2–33.6	0.0–31.2
Depth in inches (inches)	1.2–12	1.2–8.0	2.4–16.8	2.4–18.0
Substrate	Large gravel to rubble	No data	No data	Gravel to cobble

Source: Adapted from 75 FR 66482 (2010, p. 66499, Table 2)

### 1.4.3.3 Distribution

As discussed in the 2010 proposed rule (75 FR 66482), loach minnow are now restricted to portions of the Gila River and its tributaries, the West, Middle, and East Fork Gila River (Grant, Catron, and Hidalgo Counties, New Mexico) (Paroz and Propst 2007, p. 16; Propst 2007, pp. 7–8, 10–11, 13–14); the San Francisco and Tularosa Rivers and their tributaries Negrito and Whitewater Creeks (Catron County, New Mexico) (Propst et al. 1988, p. 15; ASU 2002; Paroz and Propst 2007, p. 16; Propst 2007, pp. 4–5); the Blue River and its tributaries Dry Blue, Campbell Blue, Pace, and Frieborn Creeks (Greenlee County, Arizona and Catron County, New Mexico) (Miller 1998, pp. 4–5; ASU 2002; Carter 2005, pp. 1–5; Carter, AGFD, pers. comm. 2008b; Clarkson et al. 2008, pp. 3–4; Robinson 2009b, p. 3); Aravaipa Creek and its tributaries Turkey and Deer Creeks (Graham and Pinal Counties, Arizona) (Stefferd and Reinthal 2005, pp. 16–21); Eagle Creek (Graham and Greenlee Counties, Arizona), (Knowles 1994, pp. 1–2, 5; Bagley and Marsh 1997, pp. 1–2; Marsh et al. 2003, pp. 666–668; Carter et al. 2007, p. 3; Bahm and Robinson 2009, p. 1); and the North Fork East Fork Black River (Apache and Greenlee Counties, Arizona) (Leon 1989, pp. 1–2; M. Lopez, AGFD, pers. comm. 2000; S. Gurtin, AGFD, pers. comm. 2004; Carter 2007b, p. 2; Robinson et al. 2009b, p. 4); and possibly the

White River and its tributaries, the East and North Fork White River (Apache, Gila, and Navajo Counties, Arizona). The present range is 15 to 20 percent of its historical range, and the status of the species within occupied areas ranges from common to very rare.

Loach minnow are now common only in Aravaipa Creek, and the Blue River in Arizona, and limited portions of the San Francisco, upper Gila, and Tularosa Rivers in New Mexico. Since listing, loach minnow have been found in small tributary streams, including Pace, Frieborn, Negrito, Turkey, and Deer Creeks (Stefferd and Reinthal 2005, pp. 16–21; Paroz and Propst 2007, p. 16; NMDGF 2008). In addition, two previously undocumented populations of loach minnow have been discovered, one in Eagle Creek (Knowles 1994, p. 1; Marsh et al. 2003, p. 666) and one in the North Fork East Fork Black River (Bagley et al. 1997, p. 8). However, following a wildfire in the Black River watershed, a salvage rescue operation in the area known to be occupied by loach minnow in 2004 resulted in the capture of only two loach minnow (S. Gurtin, AGFD, pers. comm. 2004). Both of these newly identified populations appear to be very small, but each represents a remnant portion of the historical range that was thought to be extirpated. Little information is available on the White River population due to the proprietary nature of tribal survey information. As with spikedeace, historical and current records for loach minnow are summarized in three databases (ASU 2002, AGFD 2004, and NMDGF 2008).

### **Translocation and Repatriation**

In 2007, loach minnow were translocated into Hot Springs and Redfield canyons in Cochise County, Arizona (Robinson 2008a, pp. 2, 6; T. Robinson, AGFD, pers. comm. 2008b; D. Orabutt, AGFD, pers. comm. 2009); both of these streams are tributaries to the San Pedro River. Fish were also translocated into Fossil Creek, a tributary to the Verde River in Gila County, Arizona (Carter 2007a, p. 1; Carter 2008a, p. 1; Robinson 2009a, p. 9; Orabutt and Robinson 2010, in draft, p. 12). In 2008, loach minnow were translocated into Bonita Creek, a tributary to the Gila River in Graham County, Arizona (H. Blasius, BLM, pers. comm. 2008; D. Orabutt, AGFD, pers. comm. 2009). Augmentations with additional fish will occur for the next several years. Monitoring will be conducted at each of these sites to determine if populations ultimately become established at these new locations.

#### **1.4.3.4 Population Estimates**

Population estimates were not been developed by the Service because of the difficulty in detecting the species, the sporadic nature of most surveys, and the difference in surveying techniques that have been applied over time (75 FR 66482). Based on the available maps and survey information, the Service estimates the loach minnow's present range to be approximately 15 to 20 percent of its historical range, and the status of the species within occupied areas to range from common to very rare. Historical and current records for loach minnow are summarized in three databases (ASU 2002, AGFD 2004, and NMDGF 2008).

## **1.5 Permits Required for Implementation**

No permits are required for critical habitat designation. Designation of critical habitat occurs through a rulemaking process under the Administrative Procedures Act (5 United States Code (USC) 551–59, 701–06, 1305, 3105, 3344, 5372, 7521) and the ESA.

## **1.6 Related Laws, Authorizations, and Plans**

Related provisions of the ESA require federal agencies to consult with the Service when there are potential effects to endangered or threatened species, independent of critical habitat. The ESA also prohibits any person from “taking” the species without a permit from the Service. Other federal laws address various aspects of conservation of fish and wildlife and their habitat, which apply to the spikedace and loach minnow. The Lacey Act (16 USC 3371 et seq.), as amended in 1982, prohibits the import, export, sale, receipt, acquisition, purchase, and engagement in interstate or foreign commerce of any species taken, possessed, or sold in violation of any law, treaty, or regulation of the United States, and tribal law, or any law or regulation of any state. The Federal Land Policy Management Act of 1976 (43 USC 1701 et seq.) and the National Forest Management Act of 1976 (16 USC 1600 et seq.) direct federal agencies to prepare programmatic-level management plans to guide long-term resource management decisions. In addition, the Forest Service (USFS) is required to manage habitat to maintain viable populations of existing native and desired nonnative vertebrate species in planning areas (36 Code of Federal Regulations (CFR) 219.19). These regulations have resulted in the preparation of a variety of land management plans by the USFS and the Bureau of Land Management (BLM) that address management and resource protection of areas that support, or in the past supported, populations of spikedace and loach minnow.

In addition, the Arizona Game and Fish Department (AGFD) considers these fish species as Species of Greatest Conservation Need, and state regulations prohibit collection of or fishing for these fish in Arizona except under special permit. In New Mexico, spikedace are listed as endangered and loach minnow are listed as threatened (NMDGF, BISON-M Species Database), and collecting is prohibited by New Mexico law except by special permit (19 New Mexico Administrative Code 33.6.2).

## **1.7 Cooperating Agencies**

The AGFD and NMDGF are cooperating agencies in the development of this EA.

## **1.8 Issues and Concerns from Public Comments**

A number of issues and concerns associated with the proposed designation of critical habitat for spikedace and loach minnow were identified through comments received during the public comment period (October 28, 2010, to 21 December 27, 2010) for the 2010 proposed rule (75 FR 66482). Eighteen Comment letters were received from the following government agencies, Native American tribes, organizations, and individuals:

### **1.8.1 Federal Government**

- Congresswoman Gabrielle Giffords
- U.S. Department of Agriculture, Forest Service
- U.S. Department of the Army, Fort Huachuca

### **1.8.2 State Government**

- Arizona Game and Fish Department
- New Mexico Department of Game and Fish
- New Mexico Interstate Stream Commission

### **1.8.3 Local Government and Districts**

- Catron County, New Mexico
- Cochise Country, Arizona
- Gila Basin Irrigation District
- Grant Soil and Water Conservation District
- Hereford Natural Resource Conservation District

### **1.8.4 Tribal Government**

- White Mountain Apache Tribe
- Yavapai-Apache Nation

### **1.8.5 Private Companies, Nonprofit Organizations, and Individuals**

- Almida Land and Cattle Company
- Mary Darling
- Freeport-McMoRan Corporation (2 letters received)
- Jerome and Sally Stefferud
- The Nature Conservancy
- Mary Vander Ploeg/Macnab

### **1.8.6 Tribal Comments**

In previous rule-making periods, interested tribes have stated that the Service is without authority to designate critical habitat on tribal lands, and designation of critical habitat on tribal lands is directly contrary to government-to-government relations. As noted above, the Service received comments from the Yavapai-Apache Nation (Montgomery 2010) and White Mountain Apache Tribe (Brauchli 2010) during the 2010 public comment period reiterating their concern on this and other issues. Both tribes believe that sufficient protection for spikedace and loach minnow already exist as a result of the tribal policies, plans and conservation measures they have in place. Additional information about tribal resources is provided in Section 3.9 of this document.

### **1.8.7 Need for Critical Habitat Designation Comments**

- Support designation of critical habitat
- Designation of critical habitat is vital to continued existence of spikedace and loach minnow.
- Designation of critical habitat is not merited.

### **1.8.8 Structure of Critical Habitat Designation Comments**

- All subbasins and tributaries included in the current proposal have potential to provide elements necessary for recovery, require special management and protection, and should be included in the critical habitat.
- Critical habitat provides additional protection to species by resulting in a higher level of resource protection by federal land management agencies.
- We support the designation of 300 lateral feet either side of the bank full stage as critical habitat.
- Man-made structures should not be excluded from critical habitat because including them will provide impetus for proper management.
- Management plans that have not been evaluated via NEPA and Section 7 reviews should not be used to determine exclusion of critical habitat.
- Designation of critical habitat should include a complete EIS involving state, tribal and local governments.
- Proposed critical habitat creates a conflict in management objectives between spikedace and loach minnow and Gila trout.
- The statement, page 66515, that the San Francisco River above the Tularosa River confluence does not provide suitable habitat for spikedace and loach minnow is incorrect, and this stream reach should be included in critical habitat.
- Proposed critical habitat outside of Unit 3 is more than adequate to recover the species.

- Fossil Creek should not be included as critical habitat because it is a translocation, not an historical stream.
- Inclusion of lower Oak Creek is not supported by data as there are no records of either species in Oak Creek.
- Fossil Creek should not be included in the designation, particularly the lower portion which is dominated by predacious nonnative fishes.
- The Service should consider including the lower portion of Sycamore Creek to the confluence with the Verde River as critical habitat.
- Critical habitat should include the Salt River within the Salt River Canyon Wilderness because Gleason Flat, Horseshoe Bend, and Redmond Flat likely have suitable habitat for spokedace.
- Spring Creek and Rock Creek should be removed from critical habitat until, and if, spokedace become established.
- Redfield Canyon and Hot Springs Canyon should not be designated until the multi-agency team determines that populations have established.
- Bass Canyon should be removed from critical habitat until after it is determined that the species have established populations.
- Bonita Creek should not be designated critical habitat until after it is determined that the species have established populations.
- The Blue River and its tributaries should not be critical habitat until after it is determined that the species have established populations.

### **1.8.9 Threats Comments**

- It should be noted that both existing and potential water withdrawals are one of the primary threats to spokedace and loach minnow.
- Ongoing and potential water diversions and ground water pumping are immediate threats.
- The total net effect of all combined efforts initiated by Fort Huachuca has been to reduce net groundwater consumption by approximately 2,272 acre-feet annually (71%) since 1989.
- There is no indication that projected warming in Arizona and New Mexico is either likely or necessarily expected, except from the climate models which have been shown to be unreliable predictive tools.
- Climatic variability cannot be directly attributed to warming or climate change on a global scale.
- There is no evidence that highways or roads would adversely impact native fish.
- There is no evidence that livestock grazing has affected spokedace or loach minnow.

- The proposed Unit 8 along the Gila River supports water temperatures needed by spikedace and loach minnow and should not be designated critical habitat.
- There is insufficient data to conclude that spikedace and loach minnow are threatened by disease, particularly parasites.
- Threats from mining and water quality impairments are more likely to occur in Arizona and not in New Mexico.
- Channelization is not an ongoing land management activity in New Mexico.
- The State of New Mexico has not committed to diverting water under the Arizona Water Settlements Act and this should not be the basis for designating critical habitat.
- There have been no significant modifications to the river channel or further commercial activities along the river from Mogollon Creek to the New Mexico/Arizona state line since listing in 1986.
- In regard to the inadequacy of New Mexico regulatory mechanisms, the State prohibits the use of nonnative baitfish except fathead minnow.
- The proposed rule does not consider current and future impacts of mining operations in Mexico, particularly copper mining in Cananea, Sonora.

#### **1.8.10 Socioeconomics Comments**

- Economic devastation to Cochise County and the City of Sierra Vista does not support uplisting or designation of critical habitat.
- Critical habitat on Tonto Creek will cause financial harm and loss of life and property due to flooding.
- The upper Gila River in the Cliff/Gila Valley and lower Mangas Creek do not require special management, and designation of critical habitat would have little regulatory effect while interfering with Freeport-McMoRan's land and water management.
- Portions of streams owned by Freeport-McMoRan should not be excluded unless they adopt comprehensive plans that protect and enhance the habitat.
- The designation of critical habitat on the Yavapai-Apache Reservation is not necessary to protect the habitat of spikedace and loach minnow, and offers no appreciable benefit for these species.
- The designation of critical habitat on the Yavapai-Apache Nation's lands will interfere with the Nation's ability to preserve itself in its tribal homeland and is contrary to the Apache Treaty of 1852 and the Constitution of the Yavapai-Apache Nation.
- The Secretary of the Interior lacks legal authority to designate critical habitat on the Yavapai-Apache Nation's lands.

- Designation of critical habitat will be particularly burdensome to private landowners.
- The White Mountain Apache Tribe opposes designation of critical habitat within lands of the Tribe.
- The benefits of excluding White Mountain Apache Tribal lands from critical habitat will continue to: (1) advance the Service's Indian Trust obligations; (2) maintain the effective working relationship to promote conservation of the loach minnow; (3) perpetuate cooperation and loach minnow management; and (4) enhance conservation benefits to riparian ecosystems.
- There is no viable scientific or legal reason to designate critical habitat on White Mountain Apache Tribal lands.
- Fort Huachuca believes there would be significant economic impacts from the proposed critical habitat designation because funds expended to mitigate impacts under the ESA are not available to support troops in the field in the Global War on Terrorism.
- The potential adverse effects to the Fort's mission from designating critical habitat in Unit 3, and the economic impacts to the Fort and surrounding community, outweigh the benefit.

#### **1.8.11 Areas Requested for Exclusion by Commenters**

Several of the comment letters requested exclusion of specific stream segments from the proposed critical habitat designation. Exclusion areas are proposed as part of Alternative A. Some of these areas were excluded in the 2007 final rule, which is the No Action Alternative.

- Exclude segments on the Verde River and Beaver Creek/Wet Beaver Creek (Unit 1) that flow through Yavapai-Apache Nation lands.
- Exclude the 37.2-mile section of the upper San Pedro River (Unit 3) from the international border with Mexico downstream to the confluence with the Babocomari River.
- Exclude Units 5 and 6, including lower Eagle Creek and lower San Francisco River, because they have not been occupied by either fish species for the past 10 years and these areas do not satisfy the "proposed critical habitat rule."
- Exclude a portion of Unit 8 (Cliff/Gila Valley – Upper Gila River, Gila River Subbasin, and Mangus Creek) from critical habitat designation because the available information regarding the status and trends of the riparian resource and existing management actions support previous determinations by the Service that special management is not required on these streams to achieve recovery goals.
- Exclude White Mountain Apache tribal lands from designation.

## **1.9 Topics Analyzed in Detail in this Environmental Assessment**

Based on issues raised during the comment period for the 2010 proposed rule to designate critical habitat for the spokedace and loach minnow, as well as during internal scoping within the Service, several resources were identified as potentially affected by the proposed designation. These resources, were analyzed in Chapter 3, Affected Environment and Environmental Consequences, of the 2006 EA, and are updated in this document:

- Water Resources (including water management projects and groundwater pumping)
- Wetlands and Floodplains (including flood control)
- Fish, Wildlife, and Plants (including other special-status species)
- Land Management
- Wildland Fire Management
- Recreation (including sport fishing)
- Socioeconomics
- Livestock Grazing
- Tribal Trust Resources
- Environmental Justice

### **1.9.1 Topics Dismissed from Detailed Analysis**

Federal regulations (40 CFR 1500 et seq.) require that certain topics be addressed as part of a NEPA analysis. The Service reviewed the mandatory topics listed below and determined in the 2006 EA and again in this 2011 EA that the Proposed Action has no potential to affect them. These topics have been dismissed from detailed analysis in this document because designation of critical habitat for the spokedace and loach minnow is likely to have no or, at most, negligible effect on them.

- Energy requirements and conservation potential (1502.16). Additional Section 7 consultations resulting from critical habitat designation of the spokedace and loach minnow may require a very small increase in energy consumption in the form of fuel for vehicles used for fence construction and other conservation actions. Relative to energy requirements for the overall management of the affected federal, state, and county lands, this increase is anticipated to be negligible.
- Natural or depletable resource requirements and conservation potential (1502.16). No natural or depletable resources (e.g., oil, gas, coal, or other minerals) would be lost as a result of designating critical habitat for the spokedace and loach minnow.
- Urban quality, and design of the built environment (1502.16). The proposed critical habitat segments are not located in urban or other built environments and would not affect the quality of such environments.

- Prime and unique agricultural lands (1508.27). Prime agricultural land is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. Unique agricultural land is defined as land other than prime farmland that is used for the production of specific high-value food and fiber crops (e.g., citrus, tree nuts, olive, cranberries, fruits, and vegetables). Proposed designated critical habitat areas include areas that are irrigated for croplands; however, these areas do not qualify as prime or unique agricultural lands. Therefore, no prime or unique agricultural lands are included within the proposed critical habitat segments.
- Important scientific, archeological, and other cultural resources, including historic properties listed in or eligible for the National Register of Historic Places (1508.27). The proposed designation would not result in any ground-disturbing activities that have the potential to affect archeological or other cultural resources. Potential conservation measures to protect critical habitat PCEs also would not modify any historic properties listed in or eligible for the National Register of Historic Places.
- Ecologically critical areas, Wild and Scenic Rivers, or other unique natural resources (1508.27). Approximately 40.5 miles of the Verde River were designated as Wild and Scenic in 1984. There are 8.3 miles designated as Wild that are within proposed critical habitat; however, designation of critical habitat for the spokedace and loach minnow would not affect the outstanding and remarkable values of the Verde River. Additionally, the designation of critical habitat for the spokedace and loach minnow would not affect the eligibility of other streams for Wild and Scenic River status.

## **1.10 Decision to be Made**

Critical habitat is designated in a federal rule-making process that includes publication of notices for the draft and final rule in the *Federal Register*. The draft rule notice solicits public comment. The final rule will include responses to comments received. The decision to be made by the Assistant Secretary of the Department of the Interior, is whether to designate critical habitat for the spokedace and loach minnow. The stream segment mileage listed in the 2010 proposed rule pertains to Alternative B, the Proposed Action without exclusion areas.

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## CHAPTER 2

### ALTERNATIVES, INCLUDING THE NO ACTION ALTERNATIVE

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#### 2.1 Development of Alternatives

In developing the action alternatives, the Service based their decisions on the best scientific and commercial information available. When defining the proposed geographic range (the total area that encompasses all known locations of the species) for the spikedace and loach minnow, the Service solicited information from knowledgeable biologists; considered recommendations contained in wildlife resource reports; and reviewed available literature pertaining to habitat requirements, historical distribution, and current localities of species (Minckley 1973; Rinne 1989; Minckley and Somerfeld 1979; Sublette et al. 1990; Rinne and Minckley 1991).

The Service developed three alternatives for impact analysis:

- No Action Alternative (the 2007 final rule)
- Alternative A, Proposed Rule with Exclusion Areas
- Alternative B, Proposed Rule without Exclusion Areas

The Service also considered additional alternatives that were not carried forward for further analysis. These are described later in Section 2.2 of this EA.

#### 2.1.1 No Action Alternative

The No Action Alternative is defined as a decision to forego the designation of additional critical habitat for spikedace and loach minnow. This alternative describes the existing environment and consequences that are anticipated as a result of the current listing status of both species, without a change in the designation of critical habitat from the 2007 final rule.

This alternative would have no substantial impacts beyond those impacts already existing as a result of 2007 final rule listing of spikedace and loach minnow as threatened (72 FR 13356) and associated requirements of Section 7 of the ESA. As discussed in the previous chapter, the existing critical habitat designation from the 2007 final rule (72 FR 13356) remains in effect per the May 4, 2009, District Court Order (Conway 2009). The impacts of the 2007 final rule are generally discussed under Alternative A in the December 2006 EA that evaluated spikedace and loach minnow critical habitat designation (Service 2006a).

A total of 522 miles are designated for spikedace and loach minnow critical habitat in the 2007 final rule. The specific critical habitat areas designated in that rule (72 FR 13385 to 13389) and included in the No Action Alternative follow:

### **Verde River Complex, Yavapai County, Arizona**

- For spinedace only, 43.0 miles of the Verde River between the Prescott and Coconino National Forest boundary upstream to Sullivan Dam

### **Black River Complex, Apache and Greenlee Counties, Arizona**

- For loach minnow only, 12.2 miles of the East Fork Black River from the confluence with the West Fork Black River upstream to the confluence with an unnamed tributary 0.51 miles downstream of the Boneyard Creek confluence
- For loach minnow only, 4.4 miles of the North Fork East Fork Black River from the confluence with the East Fork Black River upstream to the confluence with an unnamed tributary
- For loach minnow only, 1.4 miles of Boneyard Creek extending from the confluence with the East Fork Black River upstream to the confluence with an unnamed tributary

### **Middle Gila/Lower San Pedro/Aravaipa Creek Complex, Pinal and Graham Counties, Arizona**

- For spinedace only, 39.0 miles of the Gila River from Ashurst-Hayden Dam upstream to the confluence with the San Pedro River
- For spinedace only, 13.4 miles of the lower San Pedro River from the confluence with the Gila River to the confluence with Aravaipa Creek
- For spinedace and loach minnow, 28.1 miles of Aravaipa Creek from the confluence with the San Pedro River to the confluence with Stowe Gulch
- For loach minnow only, 2.7 miles of Turkey Creek from the confluence with Aravaipa Creek to the confluence with Oak Grove Canyon
- For loach minnow only, 2.3 miles of Deer Creek from the confluence with Aravaipa Creek to the boundary of the Aravaipa Wilderness

### **San Francisco and Blue Rivers Complex, Graham and Greenlee Counties, Arizona and Catron County, New Mexico**

- For loach minnow only, 16.6 miles of Eagle Creek from the Phelps-Dodge (now Freeport-McMoRan) Diversion Dam upstream to the confluence of Dry Prong and East Eagle Creeks
- For loach minnow only, 126.5 miles of the San Francisco River from the confluence with the Gila River upstream to the mouth of The Box, a canyon above the town of Reserve, New Mexico
- For loach minnow only, 18.6 miles of the Tularosa River from the confluence with the San Francisco River upstream to the town of Cruzville, New Mexico

- For loach minnow only, 4.2 miles of Negrito Creek from the confluence with the Tularosa River upstream to the confluence with Cerco Canyon
- For loach minnow only, 1.1 miles of Whitewater Creek from the confluence with the San Francisco River upstream to the confluence with the Little Whitewater Creek
- For loach minnow only, 51.1 miles of the Blue River from the confluence with the San Francisco River upstream to the confluence of Campbell Blue and Dry Blue Creeks
- For loach minnow only, 8.1 miles of Campbell Blue Creek from the confluence of Dry Blue and Campbell Blue Creeks upstream to the confluence with Coleman Canyon
- For loach minnow only, 3.0 miles of Dry Blue Creek from the confluence with Campbell Blue Creek upstream to the confluence with Pace Creek
- For loach minnow only, 0.8 mile of Pace Creek from the confluence with Dry Blue Creek upstream to a barrier falls
- For loach minnow only, 1.1 miles of Frieborn Creek from the confluence with Dry Blue Creek upstream to an unnamed tributary
- For loach minnow only, 2.8 miles of Little Blue Creek from the confluence with the Blue River upstream to the mouth of a canyon

### **Upper Gila River Complex**

- For spinedace and loach minnow, 94.9 miles of the upper Gila River from the confluence with Moore Canyon (near the Arizona-New Mexico state line) upstream to the confluence of the East and West Forks Gila River
- For spinedace and loach minnow, 26.1 miles of the East Fork Gila River from the confluence with the West Fork Gila River upstream to the confluence with Beaver and Taylor Creeks
- For spinedace only, 7.7 miles of the Middle Fork Gila River from the confluence with the West Fork Gila River upstream to the confluence with Big Bear Canyon
- For loach minnow only, 11.9 miles of the Middle Fork Gila River from the confluence with the West Fork Gila River upstream to the confluence with Brothers West Canyon
- For spinedace and loach minnow, 7.7 miles of the West Fork Gila River from the confluence with the East Fork Gila River upstream to the confluence with EE Canyon

#### **2.1.1.1 Exclusion Areas in the 2007 Final Rule**

The Service excluded six stream areas from critical habitat designation in the 2007 final rule (72 FR 13393 to 13400) pursuant to Section 4(b)(2) of the ESA. The 2007 final rule excluded three stream segments that flow through tribal lands. It also excluded three stream segments because of the potential for significant economic impact from critical habitat designation. The exclusion areas from the 2007 final rule that are included in the No Action Alternative include:

- portions of the Verde River below (south of) the Prescott and Coconino National Forest boundary with private lands
- the Verde River that flows through Yavapai-Apache tribal lands. This exclusion area is included in the Verde River exclusion area previously described.
- the East Fork White River that flows through White Mountain Apache tribal lands
- Eagle Creek that flows through San Carlos Apache tribal lands
- Eagle Creek that flows through lands owned by Phelps Dodge (now Freeport-McMoRan)
- the upper Gila River that flows through lands owned by Phelps Dodge (now Freeport-McMoRan)

### **2.1.2 Alternative A, Proposed Rule with Exclusion Areas**

Under Alternative A, the Service is proposing to exclude areas from the critical habitat designations for spikedace and loach minnow described in the 2010 proposed rule (75 FR 66482). The 2010 proposed rule with exclusions discussed in the rule includes eight units as critical habitat for the spikedace, totaling 681 miles of stream segments and eight units as critical habitat for the loach minnow, totaling 661 miles of stream segments. The total proposed mileage for Alternative A, not including areas being considered for exclusion, is 761 miles.

The proposed critical habitat includes the stream channel at bankfull width, plus 300 feet on either side of bankfull widths except in areas where rock canyons border the stream. The bankfull width is the width of the stream or river at bankfull discharge, that is, the flow at which water begins to leave the channel and move into the floodplain.

Existing paved roads; bridges; railroad tracks and trestles; water control and diversion structures; water diversion canals outside of natural stream channels; active gravel pits; cultivated agricultural land; and residential, commercial, and industrial developments within the boundaries of delineated critical habitat are excluded from critical habitat. Such human-made features do not provide habitat or biological features essential to the conservation of the spikedace and loach minnow and generally would not contribute to the species' recovery.

### **2.1.3 Potential Exclusion Areas in Alternative A**

The Service has excluded areas from designation of critical habitat in other rules based on land use designation or land use plans. As described in the 2010 proposed rule (75 FR 66482), Section 4(b)(2) of the ESA states that the Secretary of Interior must designate and revise critical habitat on the basis of the best available scientific data after considering: (1) the economic impacts, (2) national security impacts, and (3) other relevant impacts of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based

on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species.

As discussed in Chapter 1, Purpose of and Need for Action, an October 3, 2008, DOI Solicitor's Opinion (Bernhardt 2008) clearly states that areas which are under consideration for exclusion from critical habitat under Section 4(b)(2) of the Act should be included in the proposed rule and excluded from the final rule. As such, the areas that were excluded from the 2007 final rule designation are not automatically excluded from the 2010 proposed rule. Such areas must be reconsidered for exclusion during the current final designation process. The Service will consider these materials and any other relevant information pertaining to economic impacts, national security impacts, and other relevant impacts during the development of the final rule to determine if any of these areas should be excluded from the final critical habitat designation under Section 4(b)(2) of the Act.

#### **2.1.3.1 Exclusions Based on Economic Impacts**

An economic analysis is being completed for the 2010 proposed rule. The Service will announce the availability of the draft economic analysis and will seek public review and comment. Alternative A, as proposed in this draft EA, may include exclusions for economic purposes.

#### **2.1.3.2 Exclusions Based on National Security Impacts**

Concerning potential exclusions based on national security, the Service considers whether there are lands owned or managed by the Department of Defense (DOD) where a national security impact might exist and determined that the lands within the proposed designation are not owned or managed by the DOD. Accordingly, the Service did not identify any areas for exclusion from critical habitat designation based on impacts on national security. Alternative A, as proposed in this draft EA, does not currently include exclusions for national security purposes. The United States Department of Defense, Fort Huachuca, requested a 37.2-mile exclusion area on the upper San Pedro River (Unit 3) in their comment letter (Faulkner 2010). The Service is considering additional requests during the comment period.

#### **2.1.3.3 Exclusions Based on Other Relevant Impacts**

When considering potential exclusions based on other relevant impacts, the Service considers whether the landowners have developed any habitat conservation plans (HCPs) or other management plans for the area, or whether there are existing conservation partnerships that would be encouraged by designation of, or exclusion from, critical habitat. The Service also evaluates relevant tribal issues, and considers the government-to-government relationships between the United States and affected tribal entities. Any social impacts that might occur because of this designation also fall under this category of exclusions.

The types of areas that may be potentially excluded in the final rule in relation to this category include:

- approved Habitat Conservation Plans (HCP) that cover the species and provide assurances that the conservation measure for the species would be implemented and effective;
- draft HCPs that cover the species, have undergone public review and comment, and provide assurances that the conservation measures for the species would be implemented and effective;
- Tribal management plans that cover the species and provide assurances that the conservation measures for the species would be implemented and effective.

### **Exclusions Considered in the Proposed Rule**

In the 2010 proposed rule (75 FR 66482), the areas listed below are being considered for exclusion.

- Approximately 1.6 miles of the Verde River and 0.1 mile of Beaver Creek/Wet Beaver Creek. This segment occurs on lands owned by the Yavapai-Apache Nation. These are located in Unit 1: Verde River Subbasin. The Yavapai-Apache Nation requested that the Service consider these tribal exclusion areas in its comment letter regarding the 2010 proposed rule .
- Approximately 18.0 miles of the White River from the confluence with the Black River upstream to the confluence with the North and East Forks of the White River. This segment occurs on lands owned by the White Mountain Apache Tribe and is located in Unit 2: Salt River Subbasin.
- Approximately 10.7 miles of the East Fork White River from the confluence with the North Fork White River upstream to the confluence with Bones Canyon. This segment occurs on lands owned by the White Mountain Apache Tribe and is located in Unit 2: Salt River Subbasin.
- Approximately 17.1 miles of Eagle Creek in Graham County. This segment occurs on lands owned by the San Carlos Apache Reservation. Also, 12.4 miles of Eagle Creek flows through private land belonging to Freeport-McMoRan. These segments are located in Unit 5: Eagle Creek Subbasin. Freeport-McMoRan requested that the Service consider these exclusion areas in its comment letter regarding the 2010 proposed rule .
- Approximately 19.8 miles of the San Francisco River in Greenlee County. This segment occurs on private and BLM lands. Freeport-McMoRan requested that the Service consider these exclusion areas in its comment letter regarding the 2010 proposed rule.
- Approximately 7.2 miles of streams on the Gila River mainstem and 5.7 miles of Mangas Creek. These stream segments occur on land owned by Freeport-McMoRan. These segments are located in Unit 8: Gila River Subbasin. Freeport-McMoRan requested that the Service consider these exclusion areas in its comment letter regarding the 2010 proposed rule.

The complete list of units and stream segments proposed for critical habitat designation are described in detail in the proposed rule and summarized in Section 2.4.3 of this Chapter.

## 2.1.4 Alternative B, Proposed Rule without Exclusions

Alternative B is the 2010 proposed rule as presented in 75 FR 66482 without exclusions. This includes eight units as critical habitat for the loach minnow, totaling 735 miles of stream segments (75 FR 66482). The 2010 proposed rule also includes eight units as critical habitat for the spikedace, totaling 726 miles of stream segments (75 FR 66482). There is an overlap of 625 miles of proposed designated critical habitat for both these species. All potential areas that could be excluded are described in Alternative A. A total of approximately 836 miles of stream segments would be included as critical habitat (Table 3). The physical and biological features considered in identifying proposed critical habitat are the same as those listed under Alternative A.

**Table 3 Areas Determined to Meet the Definition of Critical Habitat for the Spikedace and Loach Minnow (Alternative B) and the Areas Being Considered for Exclusion in the Proposed Rule**

State	Meets Definition of Critical Habitat (miles)	Considered for Exclusion from Critical Habitat (miles)
<b>Arizona</b>		
Loach minnow	451.5	62.4
Spikedace	503.4	34.2
<b>New Mexico</b>		
Loach minnow	284.0	11.6
Spikedace	222.5	10.4
<b>Loach Minnow Total</b>	<b>735.5</b>	<b>74.0</b>
<b>Spikedace Total</b>	<b>725.9</b>	<b>44.6</b>

## 2.2 Alternatives Considered but Not Advanced for Further Analysis

### 2.2.1 Development of Conservation Agreements

As discussed in the 2006 EA (Service 2006a), the development of conservation agreements with agencies and private landowners to gain similar protection to that afforded by designation of critical habitat would preclude the need to designate critical habitat. Such conservation agreements would have to be negotiated with numerous federal and state agencies, local governments, Native American tribes, and private landowners in two states, and conservation efforts would have to be implemented or in progress. The development of a multistate, multiagency, multi-watershed conservation agreement(s) involving a large number of private landowners would be difficult to develop, costly to implement, and subject to litigation. No such efforts were underway across the species' range during the 2010 proposed rule development nor are any proposed in the foreseeable future. It is unlikely that such a conservation agreement could be developed or implemented before the statutory time frame for completing the designation process or completing the NEPA process. Therefore, this alternative was rejected, as it was in 2006, because it is deemed to be impractical.

### **2.2.2 Land Acquisition or Conservation Easements**

As discussed in the 2006 EA (Service 2006a), the time required and the cost of acquiring lands in fee title or obtaining conservation easements for approximately 726 miles of streams for spinedace and 735 miles of streams loach minnow habitat protection would exceed the time and current funding available for this action. Therefore, this alternative was rejected, as it was in 2006, because it is deemed to be impractical.

### **2.3 Comparison of Alternatives**

Table 4 summarizes the potential effects of the critical habitat designation alternatives. The existing environmental conditions and potential environmental consequences for designation of critical habitat for the spinedace and loach minnow are addressed in Chapter 3.

**Table 4 Comparison of Potential Effect of Spikedace and Loach Minnow Proposed Critical Habitat Designation Alternatives**

<b>No Action Alternative (2007 Final Rule)</b>	<b>Alternative A (Proposed Rule with Exclusions)</b>	<b>Alternative B (Proposed Rule without Exclusions)</b>
<b>Water Resources</b>		
<ul style="list-style-type: none"> <li>Impacts are generally described under Alternative A in the 2006 <i>Environmental Assessment for the Designation of Critical Habitat for Spikedace and Loach Minnow</i> (Service 2006a). Conservation measures resulting from the current listing (2007 final rule) for spikedace and loach minnow and associated consultation requirements of Section 7 ESA apply.</li> <li>Existing exclusion areas would remain in effect on Yavapai-Apache, White Mountain Apache, and San Carlos Apache tribal lands, some private lands on the middle Verde, and on Freeport-McMoRan (formerly Phelps Dodge) lands.</li> <li>The No Action Alternative includes 3 stream segments (middle Gila River, lower San Pedro River, and middle Verde River) not proposed for designation under Alternatives A and B because the Service now considers the segments to be highly degraded and likely not occupied by spikedace or loach minnow. These stream segments would maintain critical habitat designation and Section 7 consultations could occur. This would result in negligible impacts to water resources.</li> </ul>	<ul style="list-style-type: none"> <li>Compared with No Action Alternative, a small, unknown increase in the number of new and reinitiated Section 7 consultations inclusive of associated outcomes and costs based on the presence of additional designated critical habitat.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> <li>Minor to moderate, adverse impacts, e.g., delays, increased project costs, for proposed or ongoing water management projects with a federal nexus due to additional Section 7 consultations for critical habitat and resulting conservation measures (i.e., surveying, monitoring, implementation of Best Management Practices [BMPs]).</li> <li>Minor, beneficial impacts on water resources due to increased conservation measures to help conserve PBFs and natural stream hydrology and geomorphology.</li> <li>Compared with Alternative B, critical habitat considerations would not be incorporated into Section 7 consultations for water management projects in excluded areas. The Service is considering exclusions for stream segments on White Mountain Apache, Yavapai-Apache, and San Carlos Apache tribal lands and Freeport-McMoRan lands. Potential effects would be analyzed under the jeopardy standard but not the adverse modification standard in excluded areas.</li> <li>Tribal and private management plans would cover spikedace and loach minnow habitat and provide assurances that conservation measures would be implemented and effective in excluded areas.</li> </ul>	<ul style="list-style-type: none"> <li>Effects similar to Alternative A but would also include areas that are being considered for exclusion under Alternative A.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> </ul>

(Continued)

**Table 4 Comparison of Potential Effect of Spikedace and Loach Minnow Proposed Critical Habitat Designation Alternatives**

<b>No Action Alternative (2007 Final Rule)</b>	<b>Alternative A (Proposed Rule with Exclusions)</b>	<b>Alternative B (Proposed Rule without Exclusions)</b>
<b>Wetlands and Floodplains</b>		
<ul style="list-style-type: none"> <li>Impacts are generally described under Alternative A in the 2006 <i>Environmental Assessment for the Designation of Critical Habitat for Spikedace and Loach Minnow</i> (Service 2006a). Conservation measures resulting from the current listing (2007 final rule) for spikedace and loach minnow and associated consultation requirements of Section 7 ESA apply.</li> <li>Existing exclusion areas would remain in effect on Yavapai-Apache, White Mountain Apache, and San Carlos Apache tribal lands, some private lands on the middle Verde, and on Freeport-McMoRan (formerly Phelps Dodge) lands.</li> <li>The No Action Alternative includes 3 stream segments (middle Gila River, lower San Pedro River, and middle Verde River) not proposed for designation under Alternatives A and B because the Service now considers the segments to be highly degraded and likely not occupied by spikedace or loach minnow. Section 7 consultations could continue on these stream segments under this alternative resulting in minor, beneficial impacts to wetlands and floodplains associated with these stream segments.</li> </ul>	<ul style="list-style-type: none"> <li>Compared with No Action Alternative, a small, unknown increase in the number of new and reinitiated Section 7 consultations inclusive of associated outcomes and costs based on the presence of additional designated critical habitat.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> <li>Minor, beneficial impacts on wetland and floodplain resources due to increased conservation measures to help conserve PBFs and integrity of riparian ecosystems, including wetland and floodplain resources.</li> <li>Compared with Alternative B, critical habitat considerations would not be incorporated into Section 7 consultations for flood management projects in excluded areas. The Service is considering exclusions for stream segments on White Mountain Apache, Yavapai-Apache, and San Carlos Apache tribal lands and Freeport-McMoRan lands. Potential effects would be analyzed under the jeopardy standard but not the adverse modification standard in excluded areas.</li> <li>Tribal and private management plans would cover spikedace and loach minnow habitat and provide assurances that the conservation measures would be implemented and effective in excluded areas.</li> </ul>	<ul style="list-style-type: none"> <li>Effects similar to Alternative A but would also include areas that are being considered for exclusion under Alternative A.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> </ul>

(Continued)

**Table 4 Comparison of Potential Effect of Spikedace and Loach Minnow Proposed Critical Habitat Designation Alternatives**

<b>No Action Alternative (2007 Final Rule)</b>	<b>Alternative A (Proposed Rule with Exclusions)</b>	<b>Alternative B (Proposed Rule without Exclusions)</b>
<b>Natural Resources—Fish, Wildlife, Plants, and Biological Communities</b>		
<ul style="list-style-type: none"> <li>Impacts are generally described under Alternative A in the 2006 <i>Environmental Assessment for the Designation of Critical Habitat for Spikedace and Loach Minnow</i> (Service 2006a). Conservation measures resulting from the current listing (2007 final rule) for spikedace and loach minnow and associated consultation requirements of Section 7 ESA apply.</li> <li>Existing exclusion areas would remain in effect on Yavapai-Apache, White Mountain Apache, and San Carlos Apache tribal lands, some private lands on the middle Verde, and on Freeport-McMoRan (formerly Phelps Dodge) lands.</li> <li>The No Action Alternative includes 3 stream segments (middle Gila River, lower San Pedro River, and middle Verde River) not proposed for designation under Alternatives A and B because the Service now considers the segments to be highly degraded and likely not occupied by spikedace or loach minnow. Section 7 consultations could continue on these stream segments under this alternative resulting in minor beneficial impacts to natural resources in these areas.</li> </ul>	<ul style="list-style-type: none"> <li>Compared with No Action Alternative, a small, unknown increase in the number of new and reinitiated Section 7 consultations inclusive of associated outcomes and costs based on the presence of additional designated critical habitat.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> <li>Minor beneficial impacts on native fish and other aquatic species, wildlife and plants, including listed, proposed/candidate, and sensitive species due to increased conservation measures to help conserve PBFs for spikedace and loach minnow and natural riparian and aquatic ecosystems.</li> <li>Compared with Alternative B, critical habitat considerations would not be incorporated into Section 7 consultations for natural resource management projects in excluded areas. The Service is considering exclusions on White Mountain Apache, Yavapai-Apache, and San Carlos Apache tribal lands and on Freeport-McMoRan lands. Potential effects would be analyzed under the jeopardy standard but not the adverse modification standard in excluded areas.</li> <li>Service-approved tribal and private management plans would cover spikedace and loach minnow habitat and provide assurances that the conservation measures would be implemented and effective in excluded areas.</li> </ul>	<ul style="list-style-type: none"> <li>Effects similar to Alternative A but would also include areas that are being considered for exclusion under Alternative A.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species</li> </ul>

(Continued)

**Table 4 Comparison of Potential Effect of Spikedace and Loach Minnow Proposed Critical Habitat Designation Alternatives**

<b>No Action Alternative (2007 Final Rule)</b>	<b>Alternative A (Proposed Rule with Exclusions)</b>	<b>Alternative B (Proposed Rule without Exclusions)</b>
<b>Land Use and Management</b>		
<ul style="list-style-type: none"> <li>Impacts are generally described under Alternative A in the 2006 <i>Environmental Assessment for the Designation of Critical Habitat for Spikedace and Loach Minnow</i> (Service 2006a). Conservation measures resulting from the current listing (2007 final rule) for spikedace and loach minnow and associated consultation requirements of Section 7 ESA apply.</li> <li>Existing exclusion areas would remain in effect on Yavapai-Apache, White Mountain Apache, and San Carlos Apache tribal lands, some private lands on the middle Verde, and on Freeport-McMoRan (formerly Phelps Dodge) lands.</li> <li>The No Action Alternative includes 3 stream segments (middle Gila River, lower San Pedro River, and middle Verde River) not proposed for designation under Alternatives A and B because the Service now considers the segments to be highly degraded and likely not occupied by spikedace or loach minnow. Section 7 consultations could continue on these stream segments under this alternative resulting in negligible adverse impacts to land management in these areas.</li> </ul>	<ul style="list-style-type: none"> <li>Compared with the No Action Alternative, a small, unknown increase in the number of new and reinitiated Section 7 consultations, inclusive of associated outcomes and costs, based on the presence of additional designated critical habitat.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> <li>Minor adverse impacts (e.g., delays, increased costs, project alterations to incorporate conservation features or actions) on proposed and ongoing land management projects with a federal nexus due to additional Section 7 consultations for critical habitat (revising resource management plans, mapping, surveying, and monitoring of spikedace and loach minnow habitat).</li> <li>Compared with Alternative B, critical habitat considerations would not be incorporated into Section 7 consultations for natural resource management projects in excluded areas. The Service is considering exclusions on White Mountain Apache, Yavapai-Apache, and San Carlos Apache tribal lands and on Freeport-McMoRan lands. Potential effects would be analyzed under the jeopardy standard but not the adverse modification standard.</li> <li>Tribal and private management plans would cover spikedace and loach minnow habitat and provide assurances that the conservation measures would be implemented and effective in excluded areas.</li> </ul>	<ul style="list-style-type: none"> <li>Effects similar to Alternative A but would also include areas that are being considered for exclusion under Alternative A.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether designated as critical habitat or not; however, the focus is on the relation to the actual species itself. The adverse modification determination that could affect land use management is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> </ul>

(Continued)

**Table 4 Comparison of Potential Effect of Spikedace and Loach Minnow Proposed Critical Habitat Designation Alternatives**

No Action Alternative (2007 Final Rule)	Alternative A (Proposed Rule with Exclusions)	Alternative B (Proposed Rule without Exclusions)
<b>Wildland Fire Management</b>		
<ul style="list-style-type: none"> <li>Impacts are generally described under Alternative A in the 2006 <i>Environmental Assessment for the Designation of Critical Habitat for Spikedace and Loach Minnow</i> (Service 2006a). Conservation measures resulting from the current listing (2007 final rule) for spikedace and loach minnow and associated consultation requirements of Section 7 ESA apply.</li> <li>Existing exclusion areas would remain in effect on Yavapai-Apache, White Mountain Apache, and San Carlos Apache tribal lands, some private lands on the middle Verde, and on Freeport-McMoRan (formerly Phelps Dodge) lands.</li> <li>The No Action Alternative includes 3 stream segments (middle Gila River, lower San Pedro River, and middle Verde River) not proposed for designation under Alternatives A and B because the Service now considers the segments to be highly degraded and likely not occupied by spikedace or loach minnow. Section 7 consultations could continue on these stream segments under this alternative resulting in negligible adverse impacts on wildland fire management in these areas.</li> </ul>	<ul style="list-style-type: none"> <li>Compared with the No Action Alternative, a small, unknown increase in the number of new and reinitiated Section 7 consultations inclusive of associated outcomes and costs based on the presence of additional designated critical habitat.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> <li>Negligible adverse impacts (e.g., delays, increased costs, project alterations) on proposed and ongoing fire management projects with a federal nexus due to additional Section 7 consultations for critical habitat and resulting conservation measures (e.g., low- or minimum-impact practices, preclusion of herbicide applications). Potential delays would be mitigated by emergency Section 7 regulations for fire management that limit the delays allowed for completing consultations.</li> <li>Compared with Alternative B, critical habitat considerations would not be incorporated into Section 7 consultations for natural resource management projects in excluded areas. The Service is considering exclusions on White Mountain Apache, Yavapai-Apache, and San Carlos Apache tribal lands and on Freeport-McMoRan lands. Potential effects would be analyzed under the jeopardy standard but not the adverse modification standard.</li> <li>Tribal and private management plans would cover spikedace and loach minnow habitat and provide assurances that the conservation measures would be implemented and effective in excluded areas.</li> </ul>	<ul style="list-style-type: none"> <li>Effects similar to Alternative A but would also include areas that are being considered for exclusion under Alternative A.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination that could affect wildfire management is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> </ul>

(Continued)

**Table 4 Comparison of Potential Effect of Spikedace and Loach Minnow Proposed Critical Habitat Designation Alternatives**

<b>No Action Alternative (2007 Final Rule)</b>	<b>Alternative A (Proposed Rule with Exclusions)</b>	<b>Alternative B (Proposed Rule without Exclusions)</b>
<b>Recreation</b>		
<ul style="list-style-type: none"> <li>Impacts are generally described under Alternative A in the 2006 <i>Environmental Assessment for the Designation of Critical Habitat for Spikedace and Loach Minnow</i> (Service 2006a). Conservation measures resulting from the current listing (2007 final rule) for spikedace and loach minnow and associated consultation requirements of Section 7 ESA apply.</li> <li>Existing exclusion areas would remain in effect on Yavapai-Apache, White Mountain Apache, and San Carlos Apache tribal lands, some private lands on the middle Verde, and on Freeport-McMoRan (formerly Phelps Dodge) lands.</li> <li>The No Action Alternative includes 3 stream segments (middle Gila River, lower San Pedro River, and middle Verde River) not proposed for designation under Alternatives A and B because the Service now considers the segments to be highly degraded and likely not occupied by spikedace or loach minnow. Section 7 consultations could continue on these stream segments under this alternative resulting in no impact on recreation resources in these areas. This would result in negligible impacts in these areas.</li> </ul>	<ul style="list-style-type: none"> <li>Compared with the No Action Alternative, a small, unknown increase in the number of new and reinitiated Section 7 consultations related to recreation, which could modify recreation opportunities.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> <li>Minor adverse impacts (e.g., delays, increased costs, project alterations to incorporate conservation features or actions) on some recreation-related activities due to additional Section 7 consultations for critical habitat (e.g., limiting higher-impact activities such as OHV [off-highway vehicle] use, modifying angling opportunities based on fish stocking restrictions, restricting camping, restricting construction of recreational facilities in or near critical habitat.)</li> <li>Negligible beneficial impacts on some recreational activities such as birding, wildlife viewing, photography, and day hiking due to increased conservation measures that help conserve PBFs for spikedace and loach minnow related to the integrity of riparian ecosystems.</li> <li>Compared with Alternative B, critical habitat considerations would not be incorporated into Section 7 consultations for recreation projects in excluded areas. The Service is considering exclusions on White Mountain Apache, Yavapai-Apache, and San Carlos Apache tribal lands and Freeport-McMoRan lands. Potential effects would be analyzed under the jeopardy standard but not the adverse modification standard.</li> <li>Tribal and private management plans would cover spikedace and loach minnow habitat and provide assurances that the conservation measures would be implemented and effective in excluded areas.</li> </ul>	<ul style="list-style-type: none"> <li>Effects similar to Alternative A but would also include areas that are being considered for exclusion under Alternative A.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether designated as critical habitat or not; however, the focus is on the relation to the actual species itself. The adverse modification determination is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> </ul>

(Continued)

**Table 4 Comparison of Potential Effect of Spikedace and Loach Minnow Proposed Critical Habitat Designation Alternatives**

<b>No Action Alternative (2007 Final Rule)</b>	<b>Alternative A (Proposed Rule with Exclusions)</b>	<b>Alternative B (Proposed Rule without Exclusions)</b>
<b>Socioeconomics</b>		
<ul style="list-style-type: none"> <li>Impacts are generally described under Alternative A in the 2006 <i>Environmental Assessment for the Designation of Critical Habitat for Spikedace and Loach Minnow</i> (Service 2006a). Conservation measures resulting from the current listing (2007 final rule) for spikedace and loach minnow and associated consultation requirements of Section 7 ESA apply.</li> <li>Existing exclusion areas would remain in effect on Yavapai-Apache, White Mountain Apache, and San Carlos Apache tribal lands, some private lands on the middle Verde, and on Freeport-McMoRan (formerly Phelps Dodge) lands.</li> <li>The No Action Alternative includes 3 stream segments (middle Gila River, lower San Pedro River, and middle Verde River) not proposed for designation under Alternatives A and B because the Service now considers the segments to be highly degraded and likely not occupied by spikedace or loach minnow. Section 7 consultations could continue on these stream segments under this alternative resulting in negligible impacts on socioeconomic conditions in these areas.</li> </ul>	<ul style="list-style-type: none"> <li>Compared with the No Action Alternative, a small, unknown increase in the number of new and reinitiated Section 7 consultations inclusive of associated outcomes and costs based on the presence of additional designated critical habitat.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> <li>Minor adverse impacts (e.g., project delays, increased costs, and project modifications to incorporate conservation features or actions on projects with a federal nexus) due to additional Section 7 consultations for critical habitat and resulting conservation measures.</li> <li>Compared with Alternative B, critical habitat considerations would not be incorporated into Section 7 consultations in excluded areas. The Service is considering exclusions on White Mountain Apache, Yavapai-Apache, and San Carlos Apache tribal lands and Freeport-McMoRan lands. Potential effects would be analyzed under the jeopardy standard but not the adverse modification standard.</li> <li>Tribal and private management plans would cover spikedace and loach minnow habitat and provide assurances that the conservation measures would be implemented and effective in excluded areas.</li> </ul>	<ul style="list-style-type: none"> <li>Effects similar to Alternative A but would also include areas that are being considered for exclusion under Alternative A.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination that could affect socioeconomic resources is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> </ul>

(Continued)

**Table 4 Comparison of Potential Effect of Spikedace and Loach Minnow Proposed Critical Habitat Designation Alternatives**

<b>No Action Alternative (2007 Final Rule)</b>	<b>Alternative A (Proposed Rule with Exclusions)</b>	<b>Alternative B (Proposed Rule without Exclusions)</b>
<b>Tribal Trust Resources</b>		
<ul style="list-style-type: none"> <li>Impacts are generally described under Alternative A in the 2006 <i>Environmental Assessment for the Designation of Critical Habitat for Spikedace and Loach Minnow</i> (Service 2006a). Conservation measures resulting from the current listing (2007 final rule) for spikedace and loach minnow and associated consultation requirements of Section 7 ESA apply.</li> <li>Existing exclusion areas would remain in effect on Yavapai-Apache, White Mountain Apache, and San Carlos Apache tribal lands, some private lands on the middle Verde, and on Freeport-McMoRan (formerly Phelps Dodge) lands.</li> <li>No impacts to Tribal Trust resources due to existing exclusions.</li> </ul>	<ul style="list-style-type: none"> <li>Compared with No Action Alternative, a small, unknown increase in the number of new and reinitiated Section 7 consultations inclusive of associated outcomes and costs based on the presence of critical habitat in areas currently excluded. All proposed critical habitat segments that flow through Yavapai-Apache, White Mountain Apache, and San Carlos Apache tribal lands are being considered for exclusion under the proposed rule. Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in new designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> <li>No impacts to Tribal Trust resources from due to additional Section 7 consultation for critical habitat and resulting conservation measures if tribal lands continue to be excluded from critical habitat designation.</li> <li>Compared with Alternative B, critical habitat considerations would not be incorporated into White Mountain Apache, Yavapai-Apache, and San Carlos Apache tribal land Section 7 consultations if these areas are excluded from designation. Potential effects to spikedace and loach minnow on tribal lands would be analyzed under the jeopardy standard but not the adverse modification standard.</li> <li>Tribal management plans cover spikedace and loach minnow habitat and provides assurances that the conservation measures would be implemented and effective.</li> </ul>	<ul style="list-style-type: none"> <li>Effects similar to Alternative A but would also include areas that are being considered for exclusion under Alternative A.</li> <li>Critical habitat designation would result in the addition of adverse modification analyses to the Section 7 consultation process for spikedace and loach minnow in designated areas. The jeopardy standard may include an evaluation of all habitats including migratory or temporary habitat, whether or not designated as critical habitat; however, the focus is on the relation to the actual species itself. The adverse modification determination that could affect tribal trust resources is limited to the areas designated as critical habitat and instead must evaluate the ability of those designated areas to remain functional and serve the conservation role for the species.</li> <li>Minor adverse impacts (e.g., increased costs) on tribal trust resources due to additional Section 7 consultation for critical habitat and resulting conservation measures (e.g., fencing of critical habitat areas).</li> </ul>

(Continued)

**Table 4 Comparison of Potential Effect of Spikedace and Loach Minnow Proposed Critical Habitat Designation Alternatives**

No Action Alternative (2007 Final Rule)	Alternative A (Proposed Rule with Exclusions)	Alternative B (Proposed Rule without Exclusions)
<b>Environmental Justice</b>		
<ul style="list-style-type: none"> <li>Impacts are generally described under Alternative A in the 2006 <i>Environmental Assessment for the Designation of Critical Habitat for Spikedace and Loach Minnow</i> (Service 2006a). Conservation measures resulting from the current listing (2007 final rule) for spikedace and loach minnow and associated consultation requirements of Section 7 ESA apply.</li> <li>Existing exclusion areas would remain in effect on Yavapai-Apache, White Mountain Apache, and San Carlos Apache tribal lands, some private lands on the middle Verde, and on Freeport-McMoRan (formerly Phelps Dodge) lands.</li> <li>The No Action Alternative includes 3 stream segments (middle Gila River, lower San Pedro River, and middle Verde River) not proposed for designation under Alternatives A and B because the Service now considers the segments to be highly degraded and likely not occupied by spikedace or loach minnow. Section 7 consultations could continue on these stream segments.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts to minority or low-income populations cannot be predicted due to lack of site-specific outcomes and impacts of Section 7 consultations for critical habitat. Further investigations would provide no useful information for evaluating the potential for disproportionate impacts on minority or low-income populations.</li> </ul>	<ul style="list-style-type: none"> <li>Effect similar to Alternative A but would also include areas that are being considered for exclusion under Alternative A.</li> </ul>

## **2.4 Proposed Physical and Biological Features**

As discussed in the 2010 proposed rule (75 FR 66482), the Service relies upon Section 3(5)(A)(i) and 4(b)(1)(A) of the ESA and the regulations at 50 CFR 424.12 to determine which areas within the geographical area occupied at the time of listing to propose as critical habitat. The agency considers the PBFs essential to the conservation of the species that may require special management considerations or protection. These include, but are not limited to:

- 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 offspring;
- habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species

When assessing the biological basis for determining critical habitat for the spokedace and loach minnow, the Service considered the specific PBFs essential to the conservation of the species and in the appropriate quantity and spatial arrangement for the conservation of the species. These specific PBFs were derived from the unique biological needs of spokedace and loach minnow to identify the units proposed for designation. These PBFs are described in more detail in the 2010 proposed rule, and in the following sections below.

### **2.4.1 PBFs for Spikedace**

- (1) Habitat to support all egg, larval, juvenile, and adult spokedace. This habitat includes perennial flows with a stream depth generally less than 3.3 feet, and with slow to swift flow velocities between 1.9 and 31.5 in. per second. Appropriate stream microhabitat types include glides, runs, riffles, the margins of pools and eddies, and backwater components over sand, gravel, and cobble substrates with low or moderate amounts of fine sediment and substrate embeddedness. Appropriate habitat will have a low gradient of less than approximately 1.0 percent, at elevations below 6,890 feet. Water temperatures should be in the general range of 46.4 to 82.4 °F;
- (2) An abundant aquatic insect food base consisting of mayflies, true flies, black flies, caddisflies, stoneflies, and dragonflies;
- (3) Streams with no or no more than low levels of pollutants;
- (4) Perennial flows, or interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted;

- (5) No nonnative aquatic species, or levels of nonnative aquatic species that are sufficiently low as to allow persistence of spikedace; and
- (6) Streams with a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of transporting sediments.

#### **2.4.2 PBFs for Loach Minnow**

- (1) Habitat to support all egg, larval, juvenile, and adult loach minnow. This habitat includes perennial flows with a stream depth of generally less than 3.3 feet, and with slow to swift flow velocities between 0.0 and 31.5 in. per second. Appropriate microhabitat types include pools, runs, riffles, and rapids over sand, gravel, cobble, and rubble substrates with low or moderate amounts of fine sediment and substrate embeddedness. Appropriate habitats have a low stream gradient of less than 2.5 percent, are at elevations below 8,202 feet. Water temperatures should be in the general range of 46.4 to 77 °F;
- (2) An abundant aquatic insect food base consisting of mayflies, true flies, black flies, caddisflies, stoneflies, and dragonflies;
- (3) Streams with no or no more than low levels of pollutants;
- (4) Perennial flows, or interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted;
- (5) No nonnative aquatic species, or levels of nonnative aquatic species that are sufficiently low to allow persistence of loach minnow; and
- (6) Streams with a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of transporting sediments.

#### **2.4.3 Proposed Critical Habitat Units and Stream Segments**

As discussed in the proposed rule, the Service is proposing eight units as critical habitat for the spikedace and loach minnow based on the PBFs described above. The proposed critical habitat includes the stream channel at bankfull width, plus 300 feet on either side of the banks except in areas where rock canyons border the stream. The bankfull width is the width of the stream or river at bankfull discharge, that is, the flow at which water begins to leave the channel and move into the floodplain.

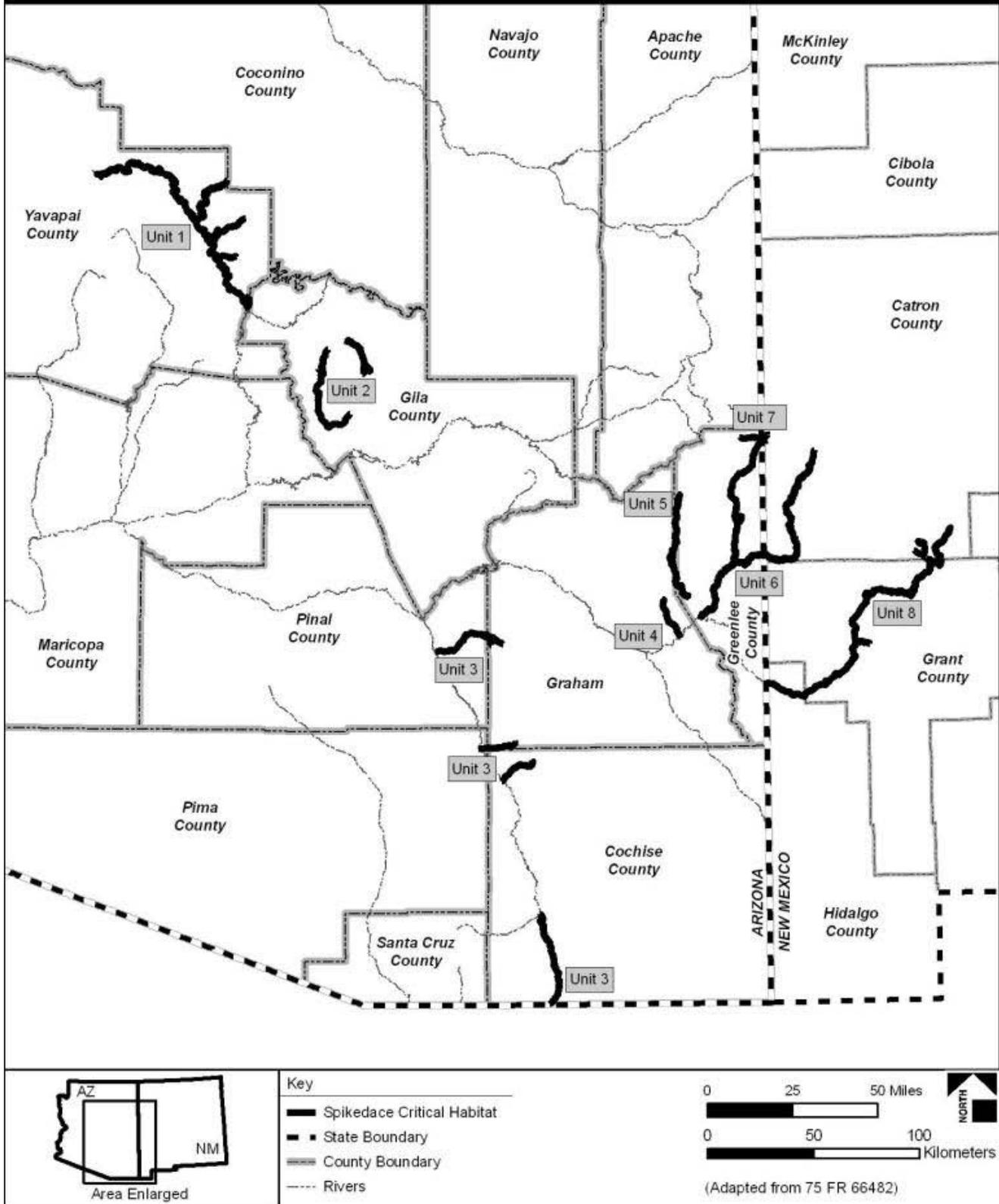
Figure 4 provides an overview of all critical habitat units proposed for the spikedace, and Table 5 provides information concerning historic and current spikedace occupancy for each stream segment proposed for listing and translocation history. See Figures 6, 8, 10, 12, 14, 16, 18, and 20 for maps of individual spikedace units.

Figure 5 provides an overview of all critical habitat units proposed for the loach minnow, and Table 6 provides information concerning historic and current loach minnow occupancy for each stream segment proposed for listing and translocation history. See Figures 7, 9, 11, 13, 15, 17, 19, and 21 for maps of individual loach minnow units.

Land ownership of the proposed critical habitat includes 3 federal agencies (USFS, BLM and NPS); 2 states (Arizona and New Mexico); 12 counties (Apache, Cochise, Gila, Graham, Greenlee, Navajo, Pima, Pinal, and Yavapai in Arizona and Catron, Grant, and Hidalgo in New Mexico); 3 tribes (Yavapai-Apache, San Carlos Apache, and White Mountain Apache), and numerous private landowners. The approximate length of critical habitat for spinedace and loach minnow by landownership is provided in Tables 7 and 8, respectively.

All of the proposed stream segments are considered essential for reestablishing populations to achieve recovery of the species. Every stream segment contains one or more of the PBFs listed in Section 2.4 of this document. The upstream and downstream boundaries of each stream segment and land ownership are described for the loach minnow and spinedace in Appendix A of this document.

# Spikedace Critical Habitat Index Map



**Figure 4 Overview of Proposed Critical Habitat Units for Spikedace**

**Table 5 Occupancy of Proposed Critical Habitat Units by Spikedace**

<b>Stream Segment</b>	<b>Occupied at Time of Listing or Detected After Listing</b>	<b>Currently Occupied</b>	<b>Translocated Population</b>
<b>Unit 1—Verde River Subbasin</b>			
Verde River	Yes	Yes	No
Granite Creek	No	No	No
Oak Creek	No	No	No
Beaver and Wet Beaver Creek	No	No	No
West Clear Creek	No	No	No
Fossil Creek	No	Yes	Yes
<b>Unit 2—Salt River Subbasin</b>			
Salt River Mainstem	No	No	
Tonto Creek	No	No	No
Greenback Creek	No	No	No
Rye Creek	No	No	No
Spring Creek	No	No	No
Rock Creek	No	No	No
<b>Unit 3—San Pedro River Subbasin</b>			
San Pedro	No	No	No
Hot Springs Canyon	No	Yes	Yes
Bass Canyon	No	No	No
Redfield Canyon	No	Yes	Yes
Aravaipa Creek	Yes	Yes	No
Deer Creek	No	No	No
Turkey Creek	No	No	No
<b>Unit 4—Bonita Creek Subbasin</b>			
Bonita Creek	No	Yes	Yes
<b>Unit 5—Eagle Creek Subbasin</b>			
Eagle Creek	Yes	Yes	No
<b>Unit 6—San Francisco River Subbasin</b>			
San Francisco River	No	Yes	Yes
<b>Unit 7—Blue River Subbasin</b>			
Blue River	No	No	No
Campbell Blue Creek	No	No	No
Dry Blue Creek	No	No	No
Little Blue Creek	No	No	No
Pace Creek	No	No	No
Frieborn Creek	No	No	No

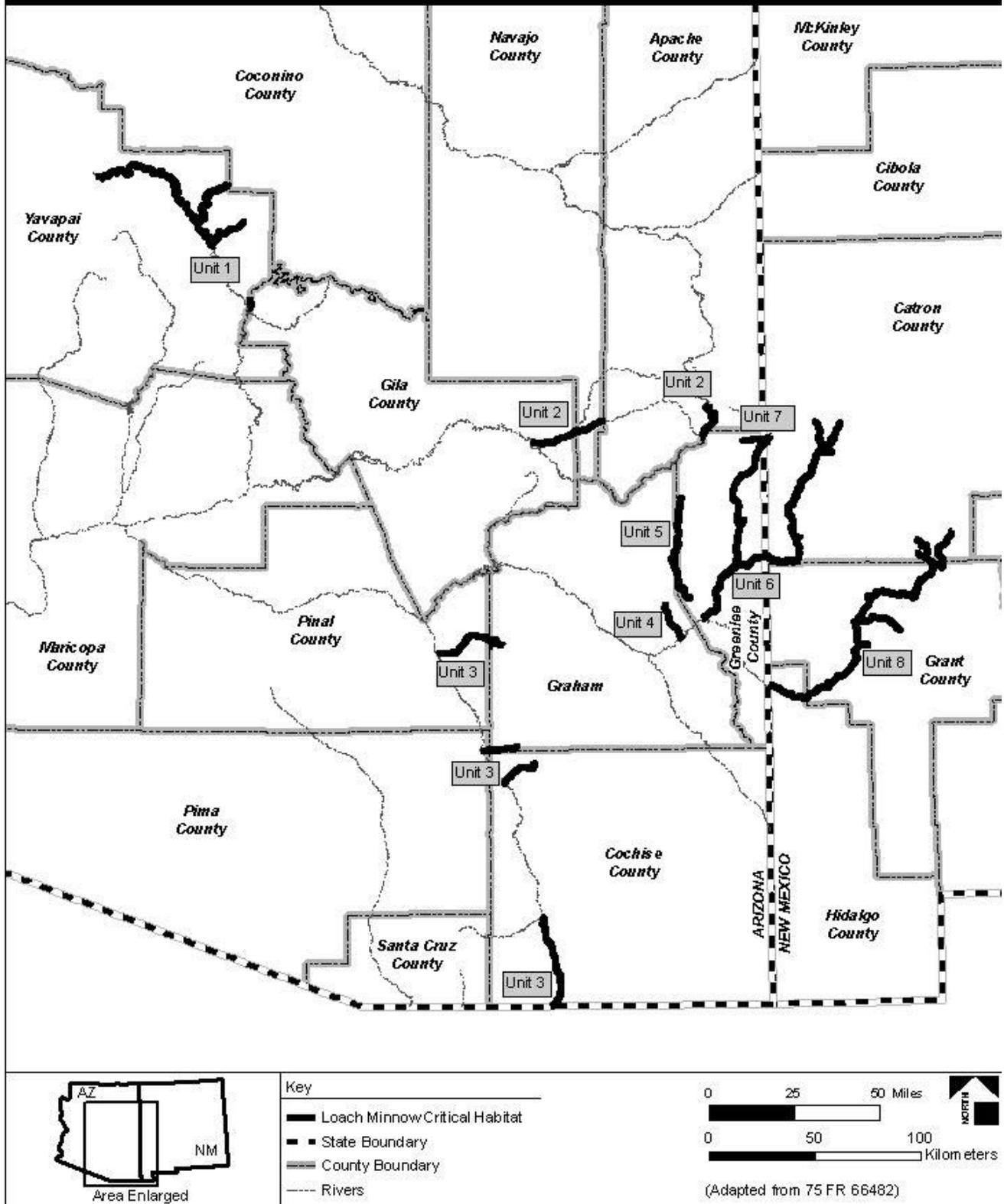
*(continued)*

**Table 5 Occupancy of Proposed Critical Habitat Units by Spikedace**

<b>Stream Segment</b>	<b>Occupied at Time of Listing or Detected After Listing</b>	<b>Currently Occupied</b>	<b>Translocated Population</b>
<b>Unit 8—Gila River Subbasin</b>			
Gila River	Yes	Yes	No
West Fork Gila River	Yes	Yes	No
Middle Fork Gila River	Yes	Yes	No
East Fork Gila River	Yes	Yes	No
Mangus Creek	Yes*	No	No

\*Discovered after 1986 listing, as follows: Mangus Creek in 1999.

# Loach Minnow Critical Habitat Index Map



**Figure 5 Overview of Proposed Loach Minnow Critical Habitat Units**

**Table 6 Occupancy of Proposed Critical Habitat Units by Loach Minnow**

<b>Stream Segment</b>	<b>Occupied at Time of Listing or Detected After Listing</b>	<b>Currently Occupied</b>	<b>Translocated Population</b>
<b>Unit 1—Verde River Subbasin</b>			
Verde River	No	No	No
Granite Creek	No	No	No
Oak Creek	No	No	No
Beaver and Wet Beaver Creek	No	No	No
Fossil Creek	No	Yes	Yes
<b>Unit 2—Salt River Subbasin</b>			
White River Mainstem	Yes	Uncertain	No
East Fork White River	Yes	Uncertain	No
East Fork Black River	No	No	No
North Fork East Fork Black River	Yes*	Yes	No
Boneyard Creek	No	No	No
Coyote Creek	Yes*	Yes	No
<b>Unit 3—San Pedro River Subbasin</b>			
San Pedro	No	No	No
Hot Springs Canyon	No	Yes	Yes
Bass Canyon	No	No	No
Redfield Canyon	No	Yes	Yes
Aravaipa Creek	Yes	Yes	No
Deer Creek	Yes*	Yes	No
Turkey Creek	Yes*	Yes	No
<b>Unit 4—Bonita Creek Subbasin</b>			
Bonita Creek	No	Yes	Yes
<b>Unit 5—Eagle Creek Subbasin</b>			
Eagle Creek	No	Yes	No
<b>Unit 6—San Francisco River Subbasin</b>			
San Francisco River	Yes	Yes	No
Tularosa River	Yes	Yes	No
Negrito River	No	Yes	No
Whitewater Creek	Yes	No	No
<b>Unit 7—Blue River Subbasin</b>			
Blue River	Yes	Yes	No
Campbell Blue Creek	No	Yes	No
Dry Blue Creek	No	Yes	No
Little Blue Creek	No	No	No
Pace Creek	Yes*	Yes	No
Frieborn Creek	Yes*	Yes	No

*(Continued)*

**Table 6 Occupancy of Proposed Critical Habitat Units by Loach Minnow**

<b>Stream Segment</b>	<b>Occupied at Time of Listing or Detected After Listing</b>	<b>Currently Occupied</b>	<b>Translocated Population</b>
<b>Unit 8—Gila River Subbasin</b>			
Bear Creek	Yes	No	No
Gila River	Yes	Yes	No
West Fork Gila River	Yes	Yes	No
Middle Fork Gila River	Yes	Yes	No
East Fork Gila River	Yes	Yes	No
Mangas Creek	Yes*	Yes	No

\*Discovered after 1986 listing, as follows: North Fork East Fork Black in 1996; Coyote Creek in 1996; Deer Creek in 1996; Turkey Creek in 1995; Frieborn Creek in 1998; Pace Creek in 1998; Mangus Creek in 1999.

**Table 7 Proposed Critical Habitat for Spikedace, Arizona and New Mexico**

		Federal (mi)	State (mi)	Local (mi)	Tribal (mi)	Private (mi)	Total (mi)
<b>Unit 1</b>	Arizona	94.8	2.3	1.5	2.2	74.0	174.8
	New Mexico	0.0	0.0	0.0	0.0	0.0	0.0
	Combined	94.8	2.3	1.5	2.2	74.0	174.8
<b>Unit 2</b>	Arizona	53.9	0.0	0.0	0.0	7.4	61.3
	New Mexico	0.0	0.0	0.0	0.0	0.0	0.0
	Combined	53.9	0.0	0.0	0.0	7.4	61.3
<b>Unit 3</b>	Arizona	54.3	10.6	0.0	2.4	31.3	98.6
	New Mexico	0.0	0.0	0.0	0.0	0.0	0.0
	Combined	54.3	10.6	0.0	2.4	31.3	98.6
<b>Unit 4</b>	Arizona	11.4	0.0	0.0	0.1	3.3	14.8
	New Mexico	0.0	0.0	0.0	0.0	0.0	0.0
	Combined	11.4	0.0	0.0	0.1	3.3	14.8
<b>Unit 5</b>	Arizona	12.8	0.0	0.0	17.1	17.0	47.0
	New Mexico	0.0	0.0	0.0	0.0	0.0	0.0
	Combined	12.8	0.0	0.0	17.1	17.0	47.0
<b>Unit 6</b>	Arizona	30.7	1.8	0.0	0.0	12.5	44.9
	New Mexico	48.3	0.0	0.0	0.0	19.2	67.5
	Combined	78.9	1.8	0.0	0.0	31.7	112.4
<b>Unit 7</b>	Arizona	52.8	0.0	0.0	0.0	8.6	61.4
	New Mexico	4.9	0.0	0.0	0.0	0.0	4.9
	Combined	57.7	0.0	0.0	0.0	8.6	66.3
<b>Unit 8</b>	Arizona	0.0	0.0	0.0	0.0	0.0	0.0
	New Mexico	98.1	1.5	0.0	0.0	50.7	150.3
	Combined	98.1	1.5	0.0	0.0	50.7	150.3

Source: Adapted from 75 FR 66482 (2010, p. 66508, Table 5)

**Table 8 Proposed Critical Habitat for Loach Minnow, Arizona and New Mexico**

		Federal (mi)	State (mi)	Local (mi)	Tribal (mi)	Private (mi)	Total (mi)
<b>Unit 1</b>	Arizona	68.0	2.3	1.4	1.7	62.4	135.7
	New Mexico	0.0	0.0	0.0	0.0	0.0	0.0
	Combined	68.0	2.3	1.4	1.7	62.4	135.7
<b>Unit 2</b>	Arizona	19.9	0.0	0.0	28.7	0.0	48.6
	New Mexico	0.0	0.0	0.0	0.0	0.0	0.0
	Combined	19.9	0.0	0.0	28.7	0.0	48.6
<b>Unit 3</b>	Arizona	54.3	10.6	0.0	2.4	31.3	98.6
	New Mexico	0.0	0.0	0.0	0.0	0.0	0.0
	Combined	54.3	10.6	0.0	2.4	31.3	98.6
<b>Unit 4</b>	Arizona	11.4	0.0	0.0	0.1	3.3	14.8
	New Mexico	0.0	0.0	0.0	0.0	0.0	0.0
	Combined	11.4	0.0	0.0	0.1	3.3	14.8
<b>Unit 5</b>	Arizona	12.8	0.0	0.0	17.1	17.0	47.0
	New Mexico	0.0	0.0	0.0	0.0	0.0	0.0
	Combined	12.8	0.0	0.0	17.1	17.0	47.0
<b>Unit 6</b>	Arizona	30.7	1.8	0.0	0.0	12.5	44.9
	New Mexico	67.7	0.0	0.0	0.0	37.4	105.1
	Combined	98.4	1.8	0.0	0.0	49.9	150.0
<b>Unit 7</b>	Arizona	52.8	0.0	0.0	0.0	8.6	61.4
	New Mexico	4.9	0.0	0.0	0.0	0.0	4.9
	Combined	57.7	0.0	0.0	0.0	8.6	66.3
<b>Unit 8</b>	Arizona	0.0	0.0	0.0	0.0	0.0	0.0
	New Mexico	104.4	6.3	0.0	0.0	63.3	174.0
	Combined	104.4	6.3	0.0	0.0	63.3	174.0

Source: Adapted from 75 FR 66482 (2010, p. 66508, Table 5)

### **2.4.3.1 Unit 1: Verde River Subbasin, Yavapai and Gila Counties, Arizona**

The 2010 proposed rule (75 FR 66482) includes the Verde River Subbasin, Unit 1 (Figures 6 and 7). This unit encompasses 174.8 miles on the Verde River and its tributaries Granite Creek, Oak Creek, Beaver and Wet Beaver Creek, West Clear Creek, and Fossil Creek for spikedace. For loach minnow, the proposal includes 135.6 miles on the Verde River and its tributaries Granite Creek, Oak Creek, Beaver and Wet Beaver Creek, and Fossil Creek. All of the mileage included in the proposed designation for loach minnow is included within the proposed designation for spikedace. The Service is considering a 0.8-mile segment of the Verde River and a 0.1-mile segment of Beaver Creek/Wet Beaver Creek for exclusion from designation because the segments occur on land owned by the Yavapai-Apache Nation. The Verde River and its tributaries included within the proposed designation are in Yavapai and Gila Counties, Arizona.

#### **Granite Creek**

The 2010 proposed designation for Unit 1 includes 2.0 miles of Granite Creek from the confluence with the Verde River upstream to an unnamed spring.

Granite Creek occurs predominantly on lands managed by the AGFD in their Upper Verde Wildlife Area.

#### **Oak Creek**

The 2010 proposed designation for Unit 1 includes 33.7 miles of Oak Creek from the confluence with the Verde River upstream to the confluence with an unnamed tributary near the Yavapai and Coconino County boundary.

Oak Creek occurs on a mix of private and Coconino National Forest lands.

#### **Beaver and Wet Beaver Creek**

The 2010 proposed designation for Unit 1 includes 20.8 miles of Beaver and Wet Beaver Creek from the confluence with the Verde River upstream to the confluence with Casner Canyon.

Beaver and Wet Beaver Creeks occur on a mix of private, National Park, and Coconino National Forest lands.

#### **Fossil Creek**

The 2010 proposed designation for Unit 1 includes 4.7 miles of Fossil Creek extending from the confluence with the Verde River upstream to the confluence with an unnamed tributary.

Fossil Creek occurs primarily on federal lands, forming the boundary between the Coconino and Tonto National Forests.

## **Proposed Critical Habitat Verde River Subbasin—Spikedace Only**

### *Verde River*

For spikedace only, the 2010 proposed rule for Unit 1 includes 106.7 of the Verde River from Sullivan Lake downstream to the confluence with Fossil Creek.

### *West Clear Creek*

For spikedace only, the 2010 proposed rule for Unit 1 includes 6.8 miles of West Clear Creek from the confluence with the Verde River upstream to the confluence with Black Mountain Canyon.

West Clear Creek is on private and Coconino National Forest lands. The stream runs through private land for several miles in the vicinity of the Town of Camp Verde.

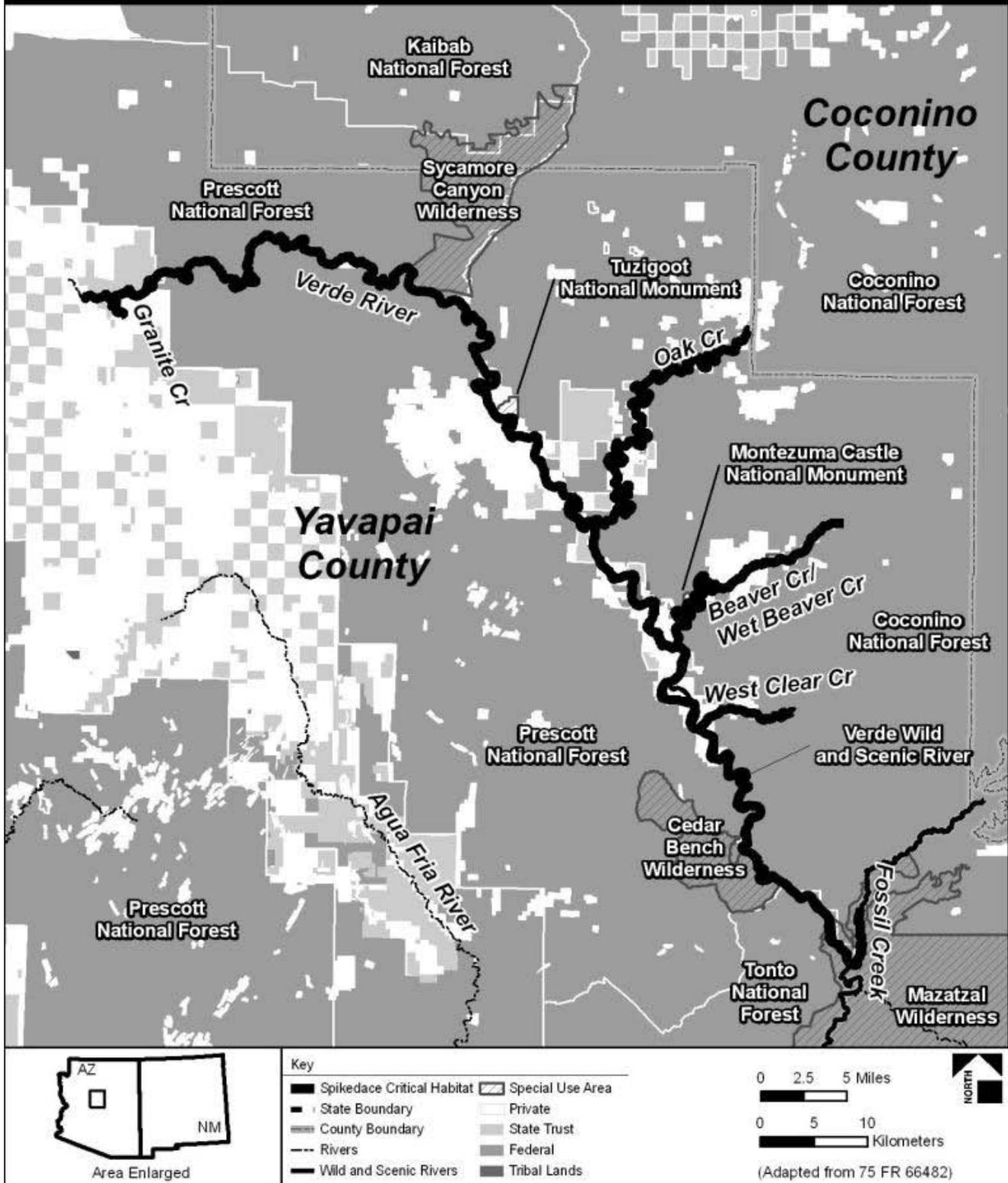
## **Proposed Critical Habitat Verde River Subbasin—Loach Minnow Only**

### *Verde River*

For loach minnow only, the 2010 proposed rule for Unit 1 includes 74.4 miles of the Verde River from Sullivan Lake downstream to the confluence with Wet Beaver Creek.

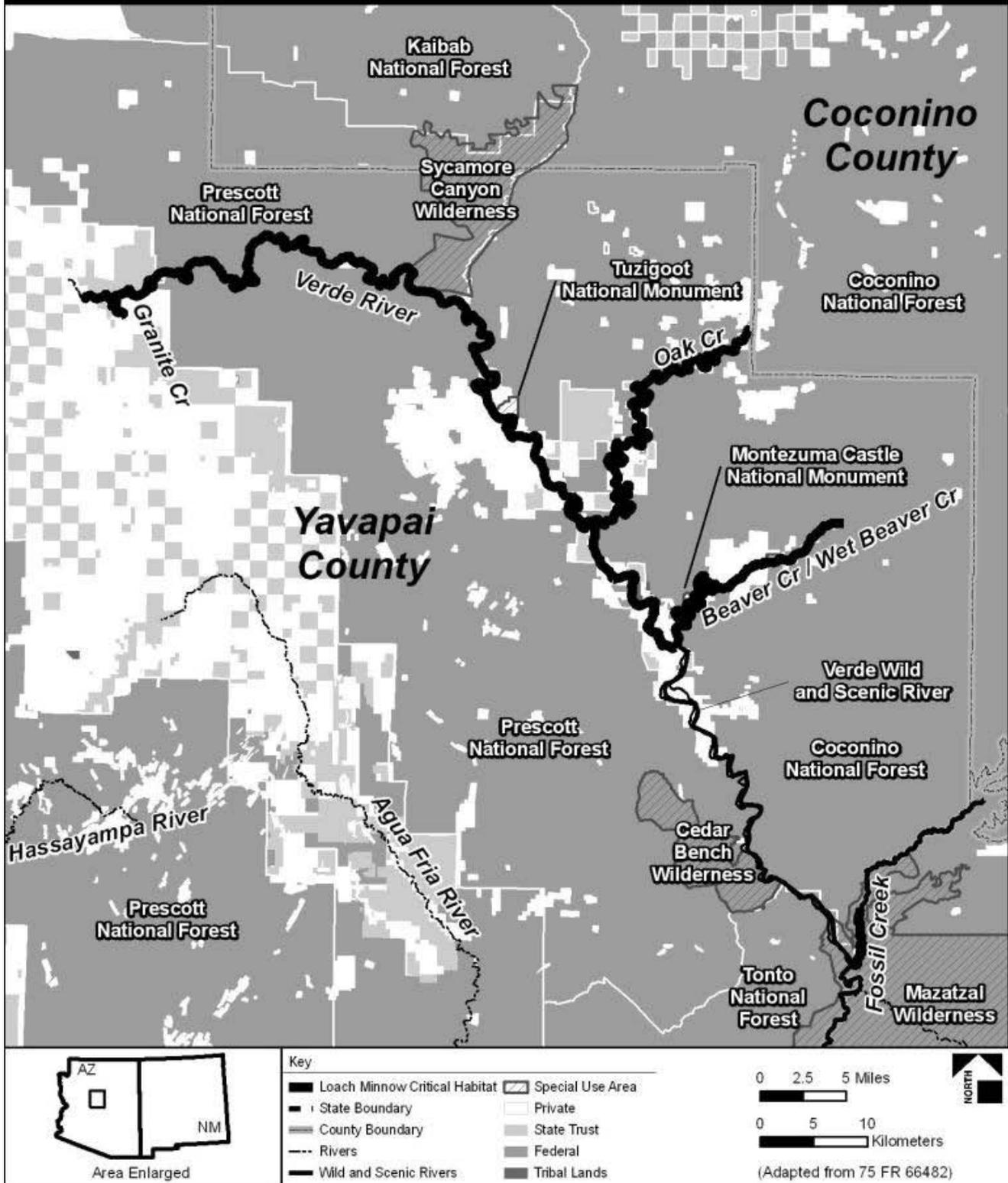
Land ownership is the same as what is summarized in the previous description of the Verde River for spikedace.

# Spikedace Critical Habitat Unit 1 - Verde River Subbasin



**Figure 6 Proposed Spikedace Critical Habitat—Unit 1, Verde River Subbasin**

# Loach Minnow Critical Habitat Unit 1 - Verde River Subbasin



**Figure 7 Proposed Loach Minnow Critical Habitat—Unit 1, Verde River Subbasin**

### **2.4.3.2 Unit 2: Salt River Subbasin, Gila County, Arizona**

The 2010 proposed rule (75 FR 66482) includes the Salt River Subbasin, Unit 2 (Figures 8 and 9).

#### **Proposed Critical Habitat for Spikedace Only**

For spikedace only, the Service is proposing to designate 61.3 miles of river on Tonto Creek and its tributaries Greenback, Rye, and Spring Creeks, as well as Rock Creek, a tributary to Spring Creek, in Gila County, Arizona. The Salt River tributaries included in this proposal, Tonto Creek, Greenback Creek, Rye Creek, Spring Creek, and Rock Creek, occur almost entirely on the Tonto National Forest, with a few parcels of private land interspersed among National Forest lands.

##### *Tonto Creek*

The 2010 proposed designation for Unit 2 includes 29.7 miles of Tonto Creek from the confluence with Greenback Creek upstream to the confluence with Houston Creek.

##### *Greenback Creek*

The 2010 proposed designation for Unit 2 includes 9.4 miles of Greenback Creek beginning at the confluence with Tonto Creek and continuing upstream to the confluence with Lime Springs.

##### *Rye Creek*

The 2010 proposed designation for Unit 2 includes 1.8 miles of Rye Creek from the confluence with Tonto Creek upstream to the confluence with Brady Canyon.

##### *Spring Creek*

The 2010 proposed designation for Unit 2 includes 16.9 miles of Spring Creek from the confluence with Tonto Creek upstream to its confluence with Sevenmile Canyon.

##### *Rock Creek*

The 2010 proposed designation for Unit 2 includes 3.6 miles of Rock Creek from its confluence with Spring Creek upstream to its confluence with Buzzard Roost Canyon.

#### **Proposed Critical Habitat for Loach Minnow Only**

For loach minnow only, the Service is proposing to designate 32.2 miles of the White River and its tributary East Fork White River; and East Fork Black River, North Fork East Fork Black River, and Coyote and Boneyard Creeks in Gila, Navajo, and Apache Counties, Arizona.

### *White River*

The 2010 proposed designation for Unit 2 includes 18.0 miles of the White River from the confluence with the Black River upstream to the confluence with the North and East Forks of the White River.

The proposed designation on the White River is entirely within lands owned by the White Mountain Apache Tribe. This area will be considered for exclusion from the final critical habitat designation under Section 4(b)(2) of the ESA.

### *East Fork White River*

The 2010 proposed designation includes 10.7 miles of the East Fork White River from the confluence with North Fork White River upstream to the confluence with Bones Canyon.

The proposed designation on East Fork White River is entirely within lands owned by the White Mountain Apache Tribe. This area will be considered for exclusion from the final critical habitat designation under Section 4(b)(2) of the ESA.

### *East Fork Black River*

The 2010 proposed designation includes 11.9 miles of the East Fork Black River extending from the confluence with the West Fork Black River upstream to the confluence with Boneyard Creek.

The portion of the East Fork Black River proposed for designation is located entirely within the Apache-Sitgreaves National Forest.

### *North Fork East Fork Black River*

The 2010 proposed designation includes 4.4 miles of the North Fork East Fork Black River extending from the confluence with East Fork Black River upstream to the confluence with an unnamed tributary.

The portion of the North Fork East Fork Black River proposed for designation is located entirely within the Apache-Sitgreaves National Forest.

### *Boneyard Creek*

The 2010 proposed designation includes 1.4 miles of Boneyard Creek extending from the confluence with the East Fork Black River upstream to the confluence with an unnamed tributary.

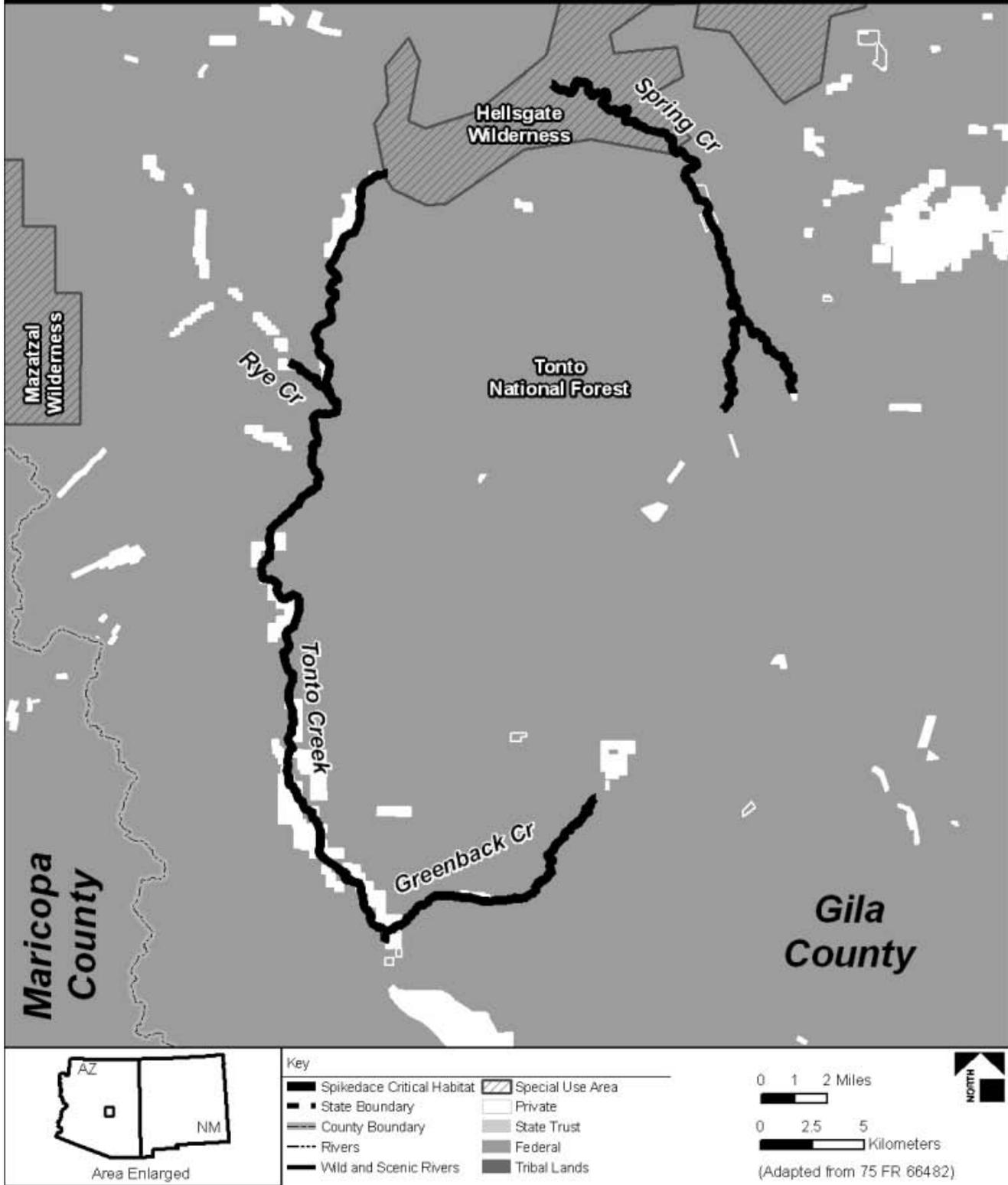
The portion of Boneyard Creek proposed for designation is located entirely within the Apache-Sitgreaves National Forest.

### *Coyote Creek*

The 2010 proposed designation includes 2.1 miles of Coyote Creek, extending from the confluence with East Fork Black River upstream to the confluence with an unnamed tributary.

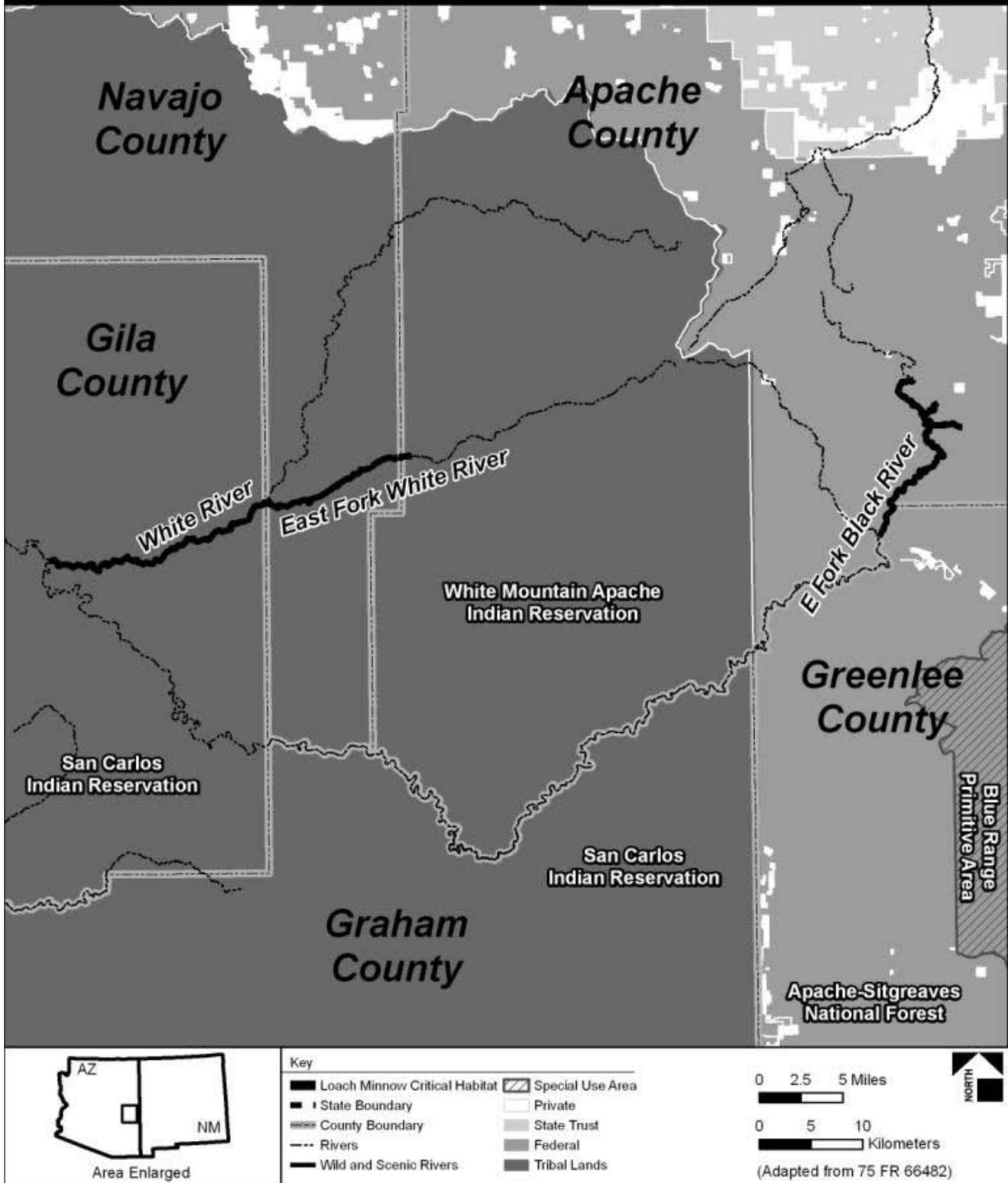
The portion of Coyote Creek proposed for designation is located entirely within the Apache-Sitgreaves National Forest.

# Spikedace Critical Habitat Unit 2 - Salt River Subbasin



**Figure 8 Proposed Spikedace Critical Habitat—Unit 2, Salt River Subbasin**

# Loach Minnow Critical Habitat Unit 2 - Salt River Subbasin



**Figure 9 Proposed Loach Minnow Critical Habitat—Unit 2, Salt River Subbasin**

### **2.4.3.3 Unit 3: San Pedro River Subbasin, Cochise, Graham, Pima and Pinal Counties, Arizona**

The 2010 proposed rule (75 FR 66482) includes the San Pedro River Subbasin, Unit 3 (Figures 10 and 11). The Service is proposing to designate 99.3 miles of habitat on the upper San Pedro River, Aravaipa Creek and its tributaries Deer and Turkey Creeks, Redfield and Hot Springs canyons, as well as Bass Canyon, tributary to Hot Springs Canyon, in Cochise, Pima, Pinal, and Graham Counties, Arizona.

The majority of this area is on lands managed by the BLM, with small portions of private and ASLD lands.

#### **Aravaipa Canyon**

The 2010 proposed designation for Unit 3 includes 27.91 miles of Aravaipa Creek from the confluence with the San Pedro River upstream to the confluence with Stowe Gulch.

Aravaipa Creek flows predominantly through federal (BLM) land, with large parcels of private and Arizona state land on each end of the river.

#### **Deer and Turkey Creeks**

The 2010 proposed designation for Unit 3 includes 2.3 miles of Deer Creek from the confluence with Aravaipa Creek upstream to the boundary of the Aravaipa Wilderness.

Both Deer and Turkey Creeks occur on federal lands managed by the BLM.

#### **Hot Springs Canyon**

The 2010 proposed designation for Unit 3 includes 11.8 miles of stream in Hot Springs Canyon from the confluence with the San Pedro River upstream to the confluence with Bass Canyon. (The stream in Hot Springs Canyon is not named and is known only as Hot Springs Canyon.)

Hot Springs Canyon occurs on a mix of state, private, and BLM lands.

#### **Redfield Canyon**

The 2010 proposed designation for Unit 3 includes 14.0 miles of stream in Redfield Canyon from the confluence with the San Pedro River upstream to the confluence with Sycamore Canyon. (The stream in Redfield Canyon is not named and is known only as Redfield Canyon.)

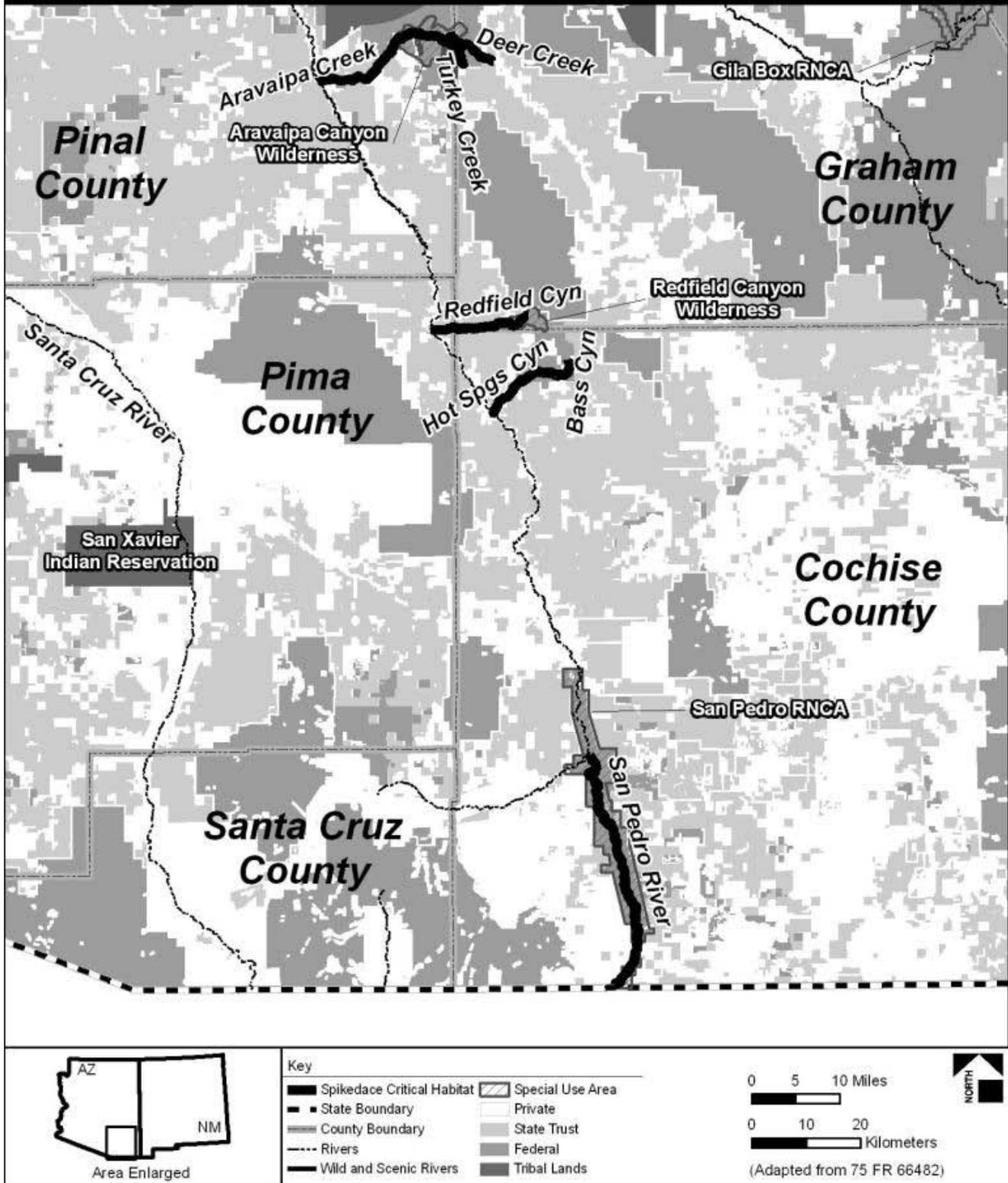
Redfield Canyon occurs on primarily on Arizona state lands, with small areas of private and BLM lands.

## **Bass Canyon**

The 2010 proposed designation for Unit 3 includes 3.4 miles of stream in Bass Canyon from the confluence with Hot Springs Canyon upstream to the confluence with Pine Canyon. (The stream in Bass Canyon is not named and is known only as Hot Springs Canyon.)

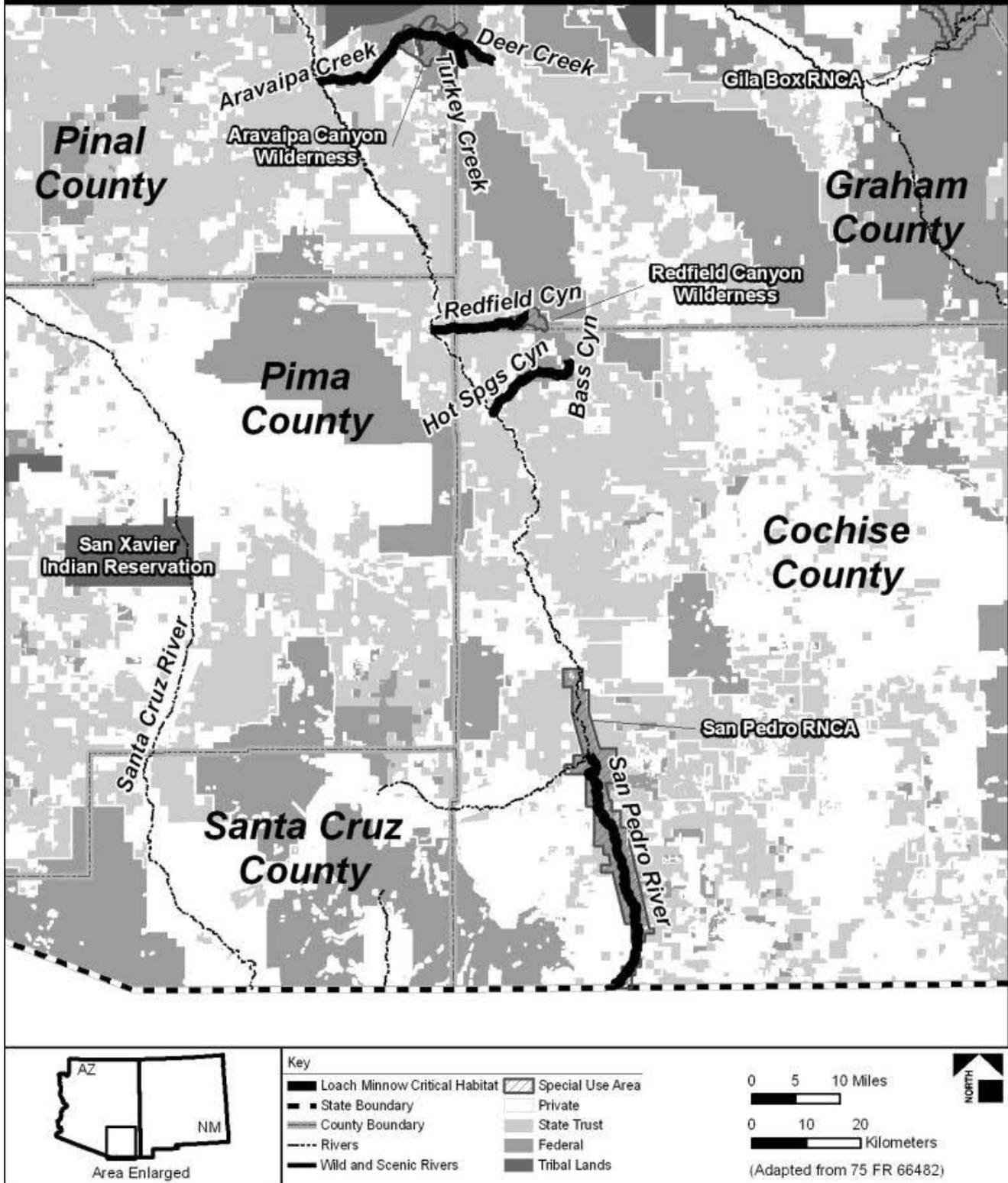
Bass Canyon flows through BLM and private lands.

# Spikedace Critical Habitat Unit 3 - San Pedro River Subbasin



**Figure 10 Proposed Spikedace Critical Habitat—Unit 3, San Pedro River Subbasin**

# Loach Minnow Critical Habitat Unit 3 - San Pedro River Subbasin



**Figure 11 Proposed Loach Minnow Critical Habitat—Unit 3, San Pedro River Subbasin**

#### **2.4.3.4 Unit 4: Bonita Creek Subbasin, Graham County, Arizona**

The 2010 proposed rule (75 FR 66482) includes the Bonita Creek Subbasin, Unit 4 (Figures 12 and 13). The Service is proposing to designate 14.8 miles of Bonita Creek from the confluence with the Gila River upstream to the confluence with Martinez Wash in Graham County, Arizona.

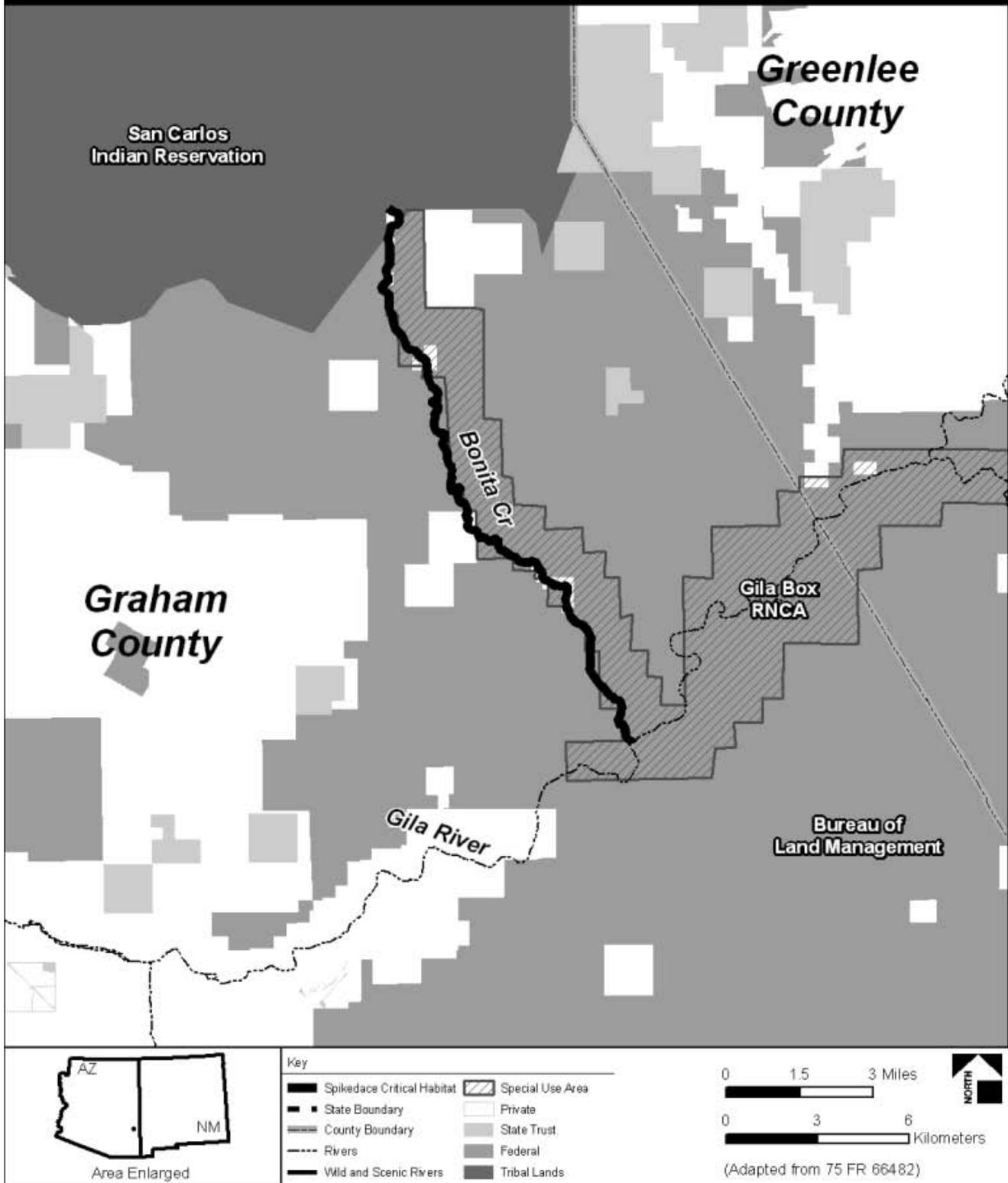
Bonita Creek is almost entirely located within BLM land, with the exception of a few small privately owned parcels. The proposed designation ends at the San Carlos Indian Reservation boundary.

#### **2.4.3.5 Unit 5: Eagle Creek Subbasin, Greenlee and Graham Counties, Arizona**

The 2010 proposed rule (75 FR 66482) includes the Eagle Creek Subbasin, Unit 5 (Figures 14 and 15). The Service is proposing to designate 46.9 miles of Eagle Creek from the Freeport-McMoRan diversion dam upstream to the confluence with East Eagle Creek in Greenlee and Graham Counties, Arizona. Freeport-McMoRan is a copper mining company formerly known as Phelps Dodge.

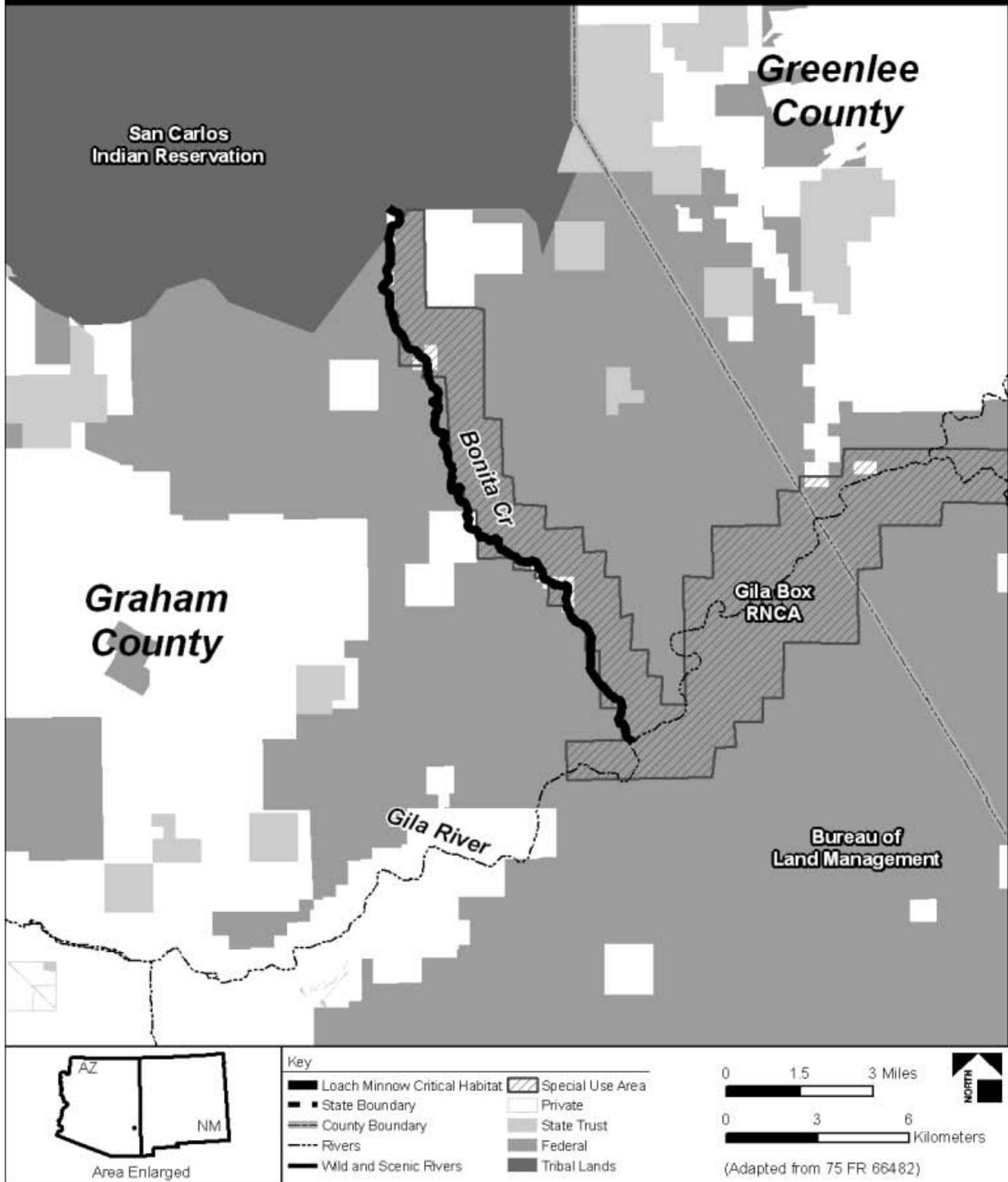
Eagle Creek occurs primarily on San Carlos Apache tribal and Apache-Sitgreaves National Forest lands, along with small parcels of state, private, and BLM lands. Those portions of Eagle Creek in Graham County are on the San Carlos Apache Reservation. Additionally, portions of Eagle Creek also flow through private lands belonging to Freeport-McMoRan. These areas are being considered for exclusion from the final critical habitat designation under Section 4(b)(2) of the ESA.

# Spikedace Critical Habitat Unit 4 - Bonita Creek Subbasin



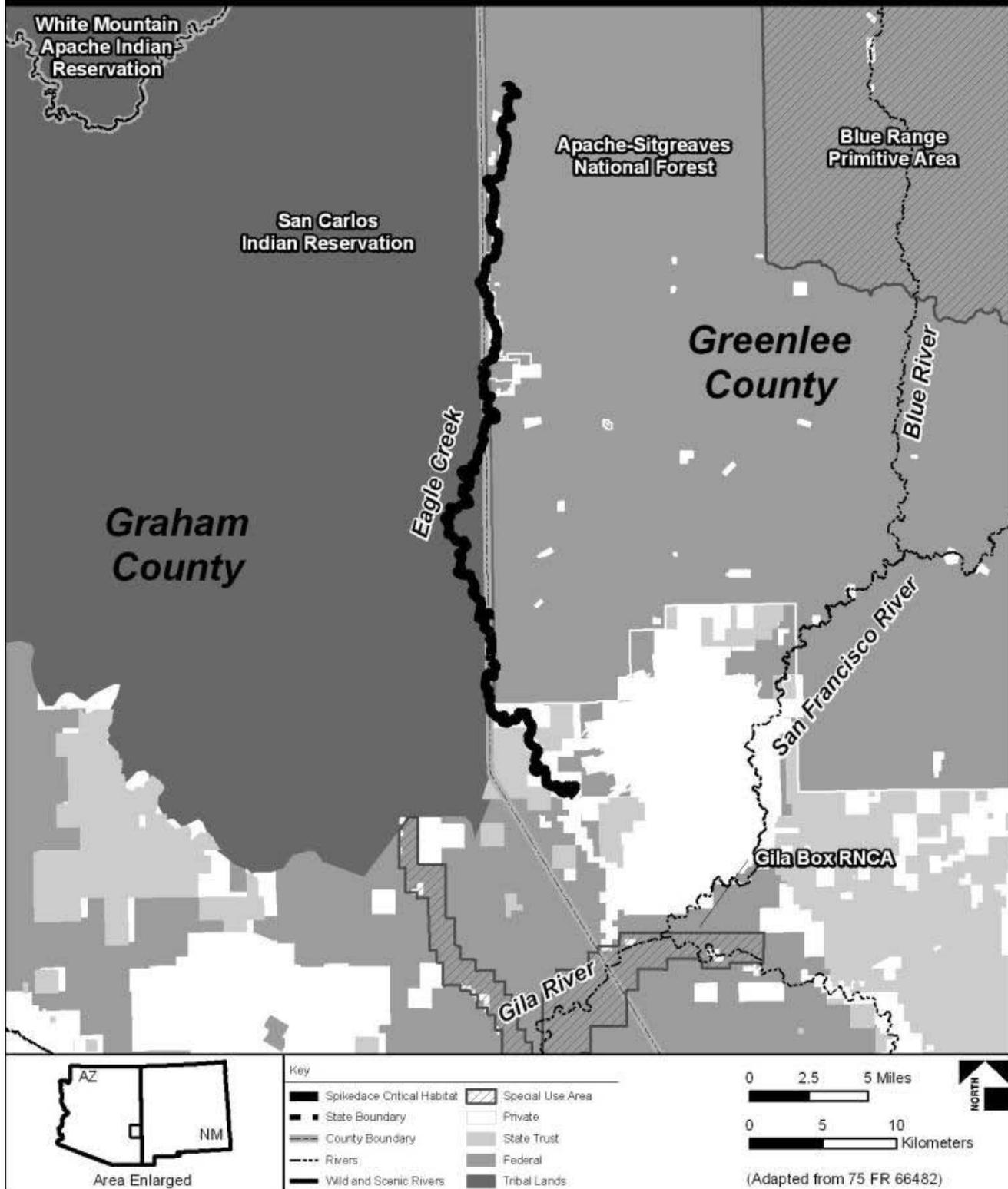
**Figure 12 Proposed Spikedace Critical Habitat—Unit 4, Bonita Creek Subbasin**

# Loach Minnow Critical Habitat Unit 4 - Bonita Creek Subbasin



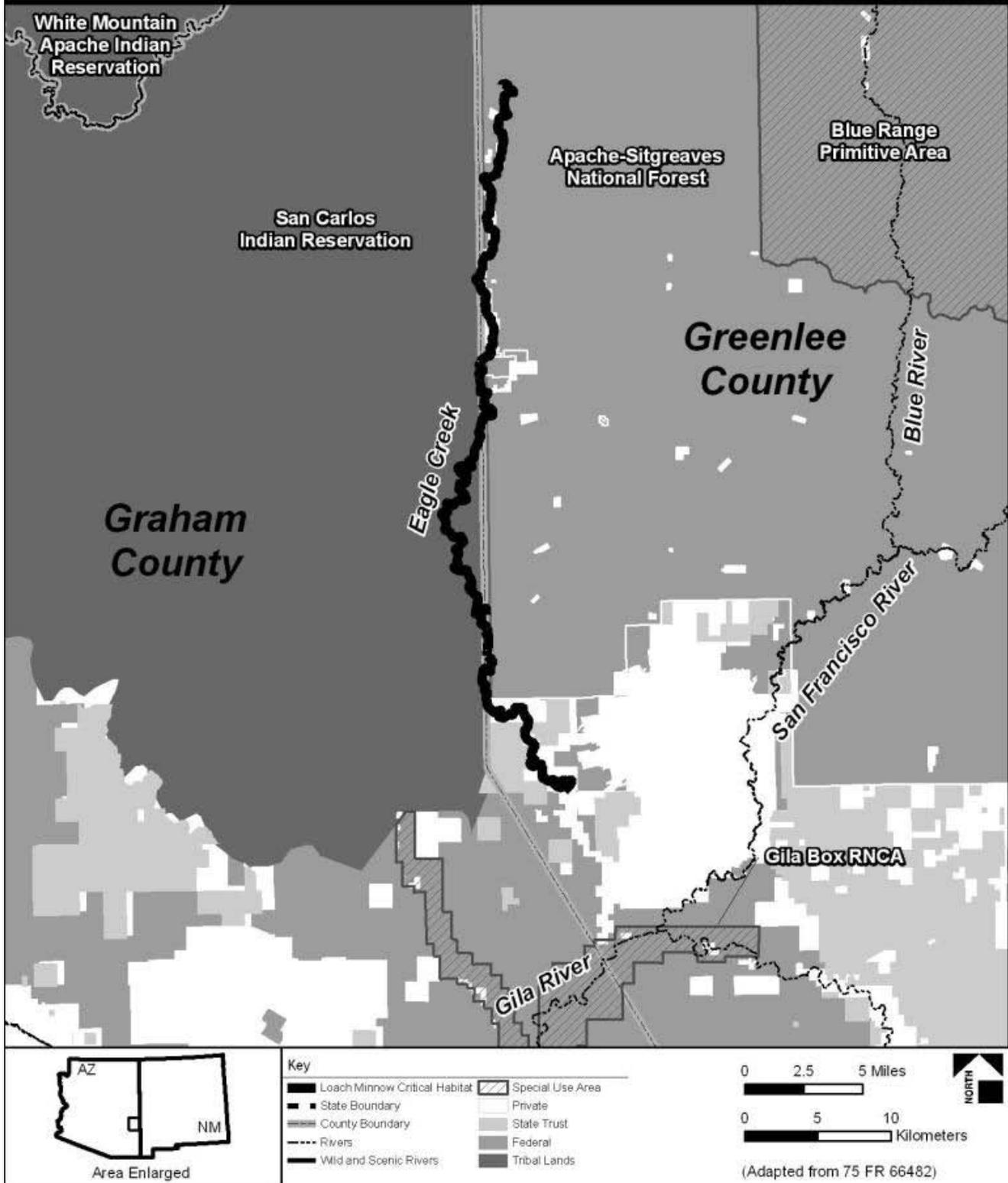
**Figure 13 Proposed Loach Minnow Critical Habitat—Unit 4, Bonita Creek Subbasin**

# Spikedace Critical Habitat Unit 5 - Eagle Creek Subbasin



**Figure 14 Proposed Spikedace Critical Habitat—Unit 5, Eagle Creek Subbasin**

# Loach Minnow Critical Habitat Unit 5 - Eagle Creek Subbasin



**Figure 15 Proposed Loach Minnow Critical Habitat—Unit 5, Eagle Creek Subbasin**

#### **2.4.3.6 Unit 6: San Francisco River Subbasin, Greenlee County, Arizona and Catron County, New Mexico**

The 2010 proposed rule (75 FR 66482) includes the San Francisco River Subbasin, Unit 6 (Figures 16 and 17). The Service is proposing to designate 112.3 miles of the San Francisco River for spikedace and loach minnow extending from the confluence with the Gila River in Greenlee County, Arizona upstream to the confluence with the Tularosa River in Catron County, New Mexico.

##### **Proposed Critical Habitat for Loach Minnow Only**

The 2010 proposed rule also includes stream segments being considered for critical habitat designation for the loach minnow only. These include portions of the Tularosa River, Negrito Creek, and Whitewater Creek, and they are each described below.

###### *San Francisco River*

Proposed for loach minnow critical habitat designation only is a 13.6-mile segment of the San Francisco River from the confluence with the Tularosa River in Catron County, New Mexico upstream to the mouth of the Box, a canyon above the town of Reserve, New Mexico.

Land ownership on the San Francisco River includes primarily BLM and Apache-Sitgreaves National Forest with small parcels of private and State lands in Arizona, and the Gila National Forest with small parcels of private lands in New Mexico.

###### *Tularosa River*

Proposed for loach minnow critical habitat designation only is an 18.6-mile segment of the Tularosa River from the confluence with the San Francisco River upstream to the town of Cruzville, New Mexico.

The Tularosa River flows through Gila National Forest and private lands.

###### *Negrito Creek*

Proposed for loach minnow critical habitat designation only is a 4.2-mile segment of Negrito Creek extending from the confluence with the Tularosa River upstream to the confluence with Cerco Canyon.

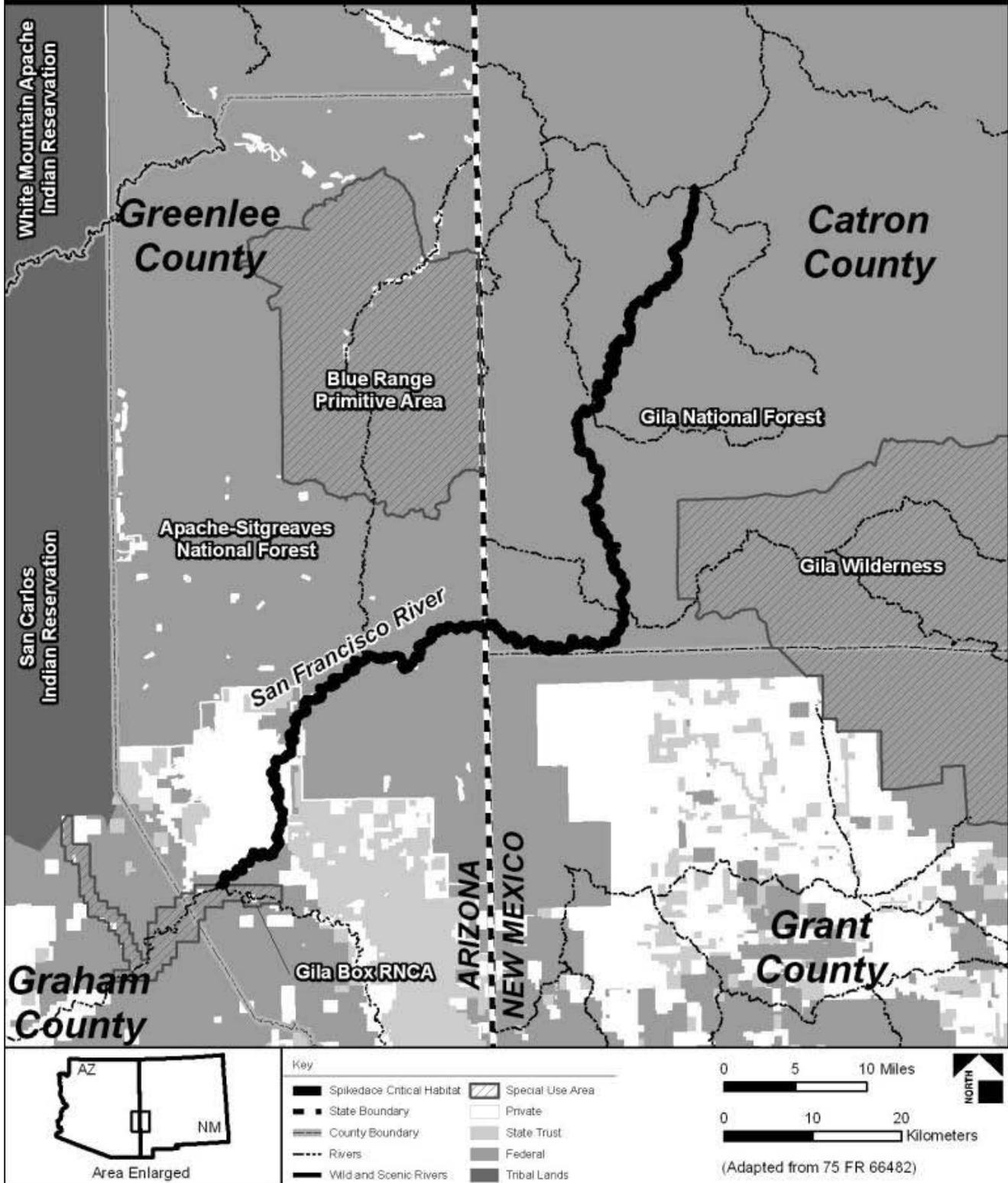
Negrito Creek occurs primarily on the Gila National Forest, with a few parcels of private land interspersed with the Forest lands.

###### *Whitewater Creek*

Proposed for loach minnow critical habitat designation only is 1.2 miles of Whitewater Creek from the confluence with the San Francisco River upstream to the confluence with Little Whitewater Creek.

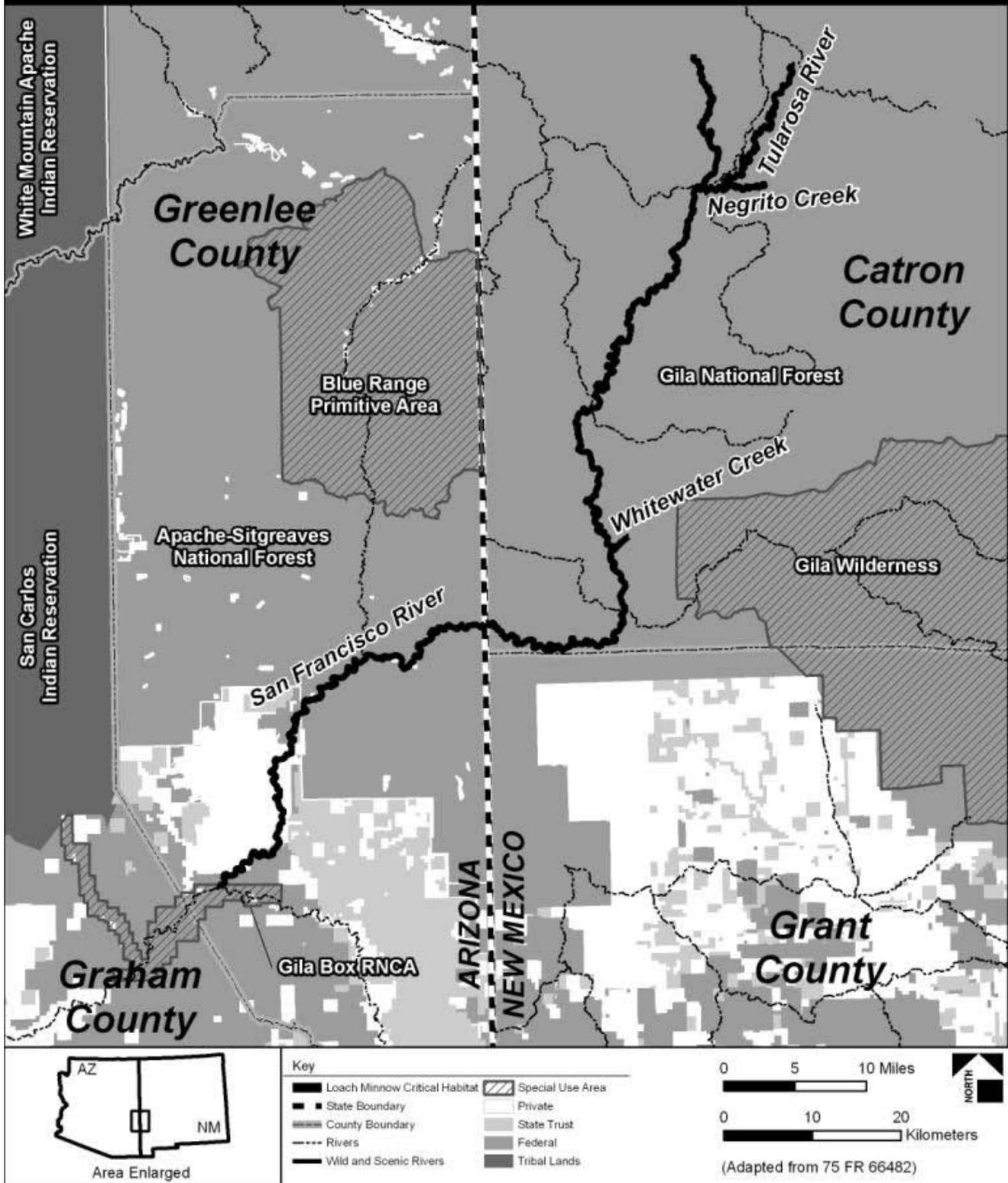
Whitewater Creek occurs entirely on private lands.

# Spikedace Critical Habitat Unit 6 - San Francisco River Subbasin



**Figure 16 Proposed Spikedace Critical Habitat—Unit 6, San Francisco River Subbasin**

# Loach Minnow Critical Habitat Unit 6 - San Francisco River Subbasin



**Figure 17 Proposed Loach Minnow Critical Habitat—Unit 6, San Francisco River Subbasin**

### **2.4.3.7 Unit 7: Blue River Subbasin, Greenlee County, Arizona and Catron County, New Mexico**

The 2010 proposed rule (75 FR 66482) includes the Blue River Subbasin, Unit 7 (Figures 18 and 19). The Service is proposing to designate 66.3 miles of the Blue River, Campbell Blue Creek, and Little Blue Creek in Greenlee County, Arizona, and portions of Campbell Blue, Pace, Frieborn, and Dry Blue Creeks in Catron County, New Mexico. The tributaries Campbell Blue Creek and Little Blue Creek occur primarily on federal lands on the Apache-Sitgreaves National Forests, along with a few parcels of private lands. The tributaries Pace Creek and Frieborn Creek occur entirely on the Gila National Forest in New Mexico.

#### **Blue River**

The 2010 proposed designation for Unit 7 includes 50.6 miles of the Blue River from the confluence with the San Francisco River upstream to the confluence of Campbell Blue and Dry Blue Creeks.

#### **Campbell Blue Creek**

The 2010 proposed designation for Unit 7 includes 7.7 miles of Campbell Blue Creek extending from the confluence of Dry Blue and Campbell Blue Creeks upstream to the confluence with Coleman Canyon.

#### **Little Blue Creek**

The 2010 proposed designation for Unit 7 includes 3.1 miles of Little Blue Creek. This includes the lower, perennial portions of Little Blue Creek extending from the confluence with the Blue River upstream to the confluence with a canyon.

#### **Pace Creek**

The 2010 proposed designation for Unit 7 includes 0.8 miles of Pace Creek from the confluence with Dry Blue Creek upstream to a barrier falls.

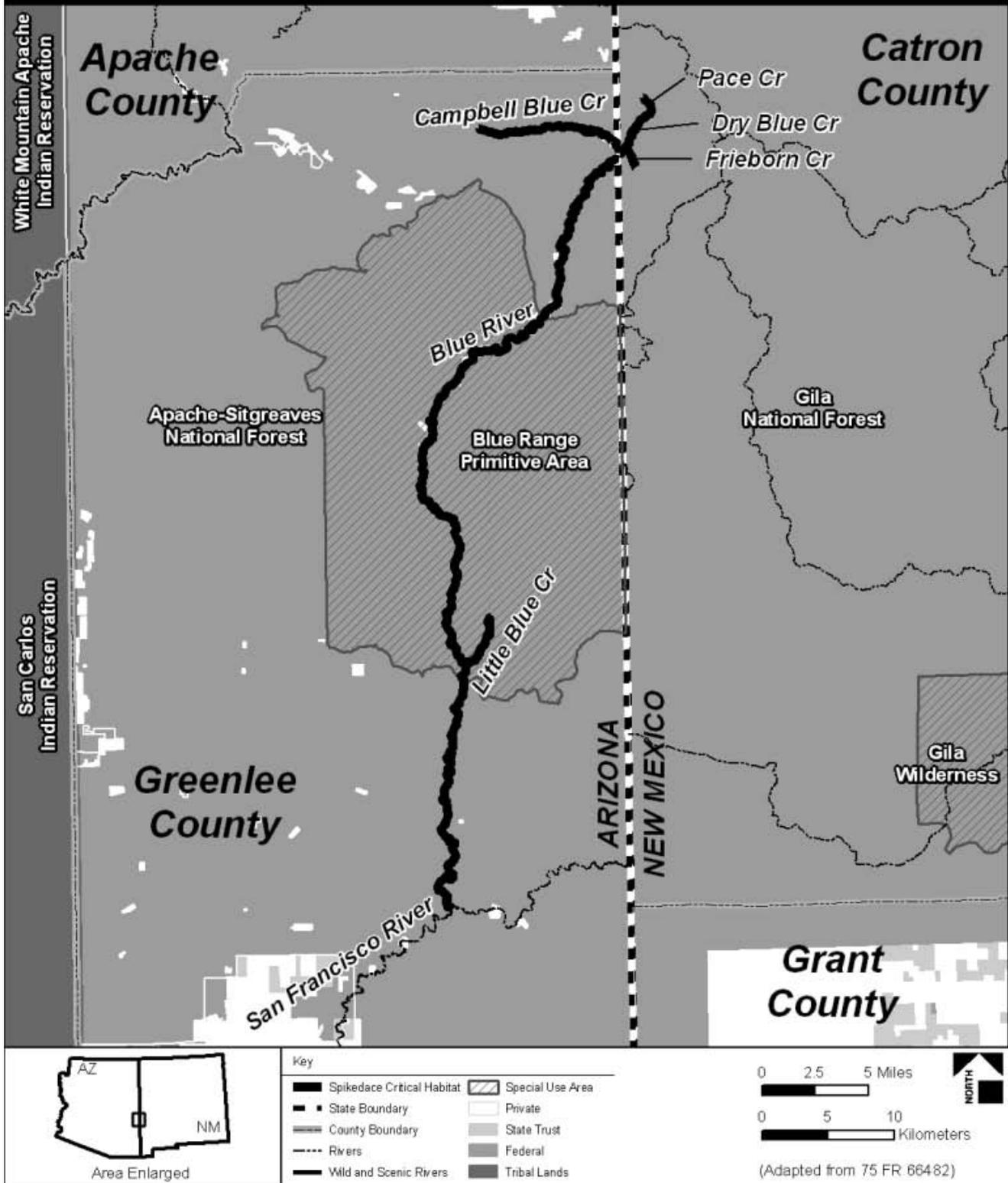
#### **Frieborn Creek**

The 2010 proposed designation for Unit 7 includes 1.1 miles of Frieborn Creek from the confluence with Dry Blue Creek upstream to an unnamed tributary.

#### **Dry Blue Creek**

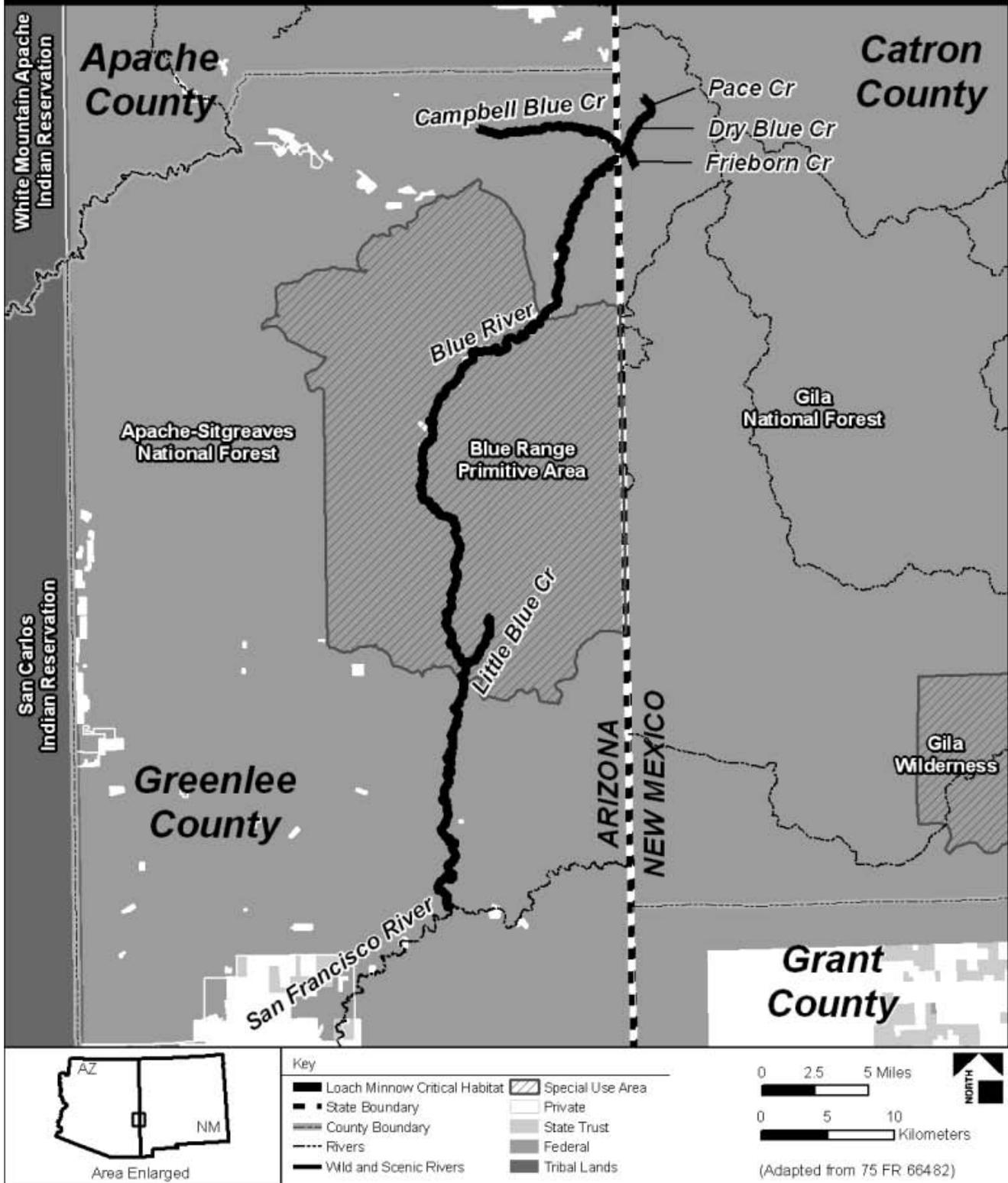
The 2010 proposed designation for Unit 7 includes 3.0 miles of Dry Blue Creek from the confluence with Campbell Blue Creek upstream to the confluence with Pace Creek.

# Spikedace Critical Habitat Unit 7 - Blue River Subbasin



**Figure 18 Proposed Spikedace Critical Habitat—Unit 7, Blue River Subbasin**

# Loach Minnow Critical Habitat Unit 7 - Blue River Subbasin



**Figure 19 Proposed Loach Minnow Critical Habitat—Unit 7, Blue River Subbasin**

#### **2.4.3.8 Unit 8: Gila River Subbasin, Greenlee, Graham, Maricopa, and Pinal Counties, Arizona and Catron, Grant, and Hidalgo Counties, New Mexico**

The 2010 proposed rule (75 FR 66482) includes the Gila River Subbasin, Unit 8 (Figures 20 and 21). The Service is proposing to designate for spikedace and loach minnow portions of the mainstem Gila River and four tributaries including West Fork Gila River, Middle Fork Gila River, East Fork Gila River, and Mangas Creek in Hidalgo, Grant, and Catron Counties, New Mexico. The Gila River Subbasin also includes the Gila River in Greenlee, Graham, Maricopa, and Pinal Counties in Arizona.

##### **Gila River**

The 2010 proposed designation for Unit 8 includes 102.6 miles of the Gila River 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 on the Gila River mainstem occur primarily on federal lands managed by the BLM and the Gila National Forest, interspersed with private and State lands. Portions of streams on the Gila River mainstem within Unit 8 are owned and managed by Freeport-McMoRan. This area may be considered for exclusion from the final critical habitat designation under Section 4(b)(2) of the ESA.

##### **West Fork Gila River**

The 2010 proposed designation for Unit 8 includes 8.1 miles of the West Fork Gila River from the confluence with the East Fork Gila River upstream to the confluence with EE Canyon.

The West Fork Gila River occurs primarily on a mix of federal lands on the Gila National Forest, the National Park Service, and private lands.

##### **East Fork Gila River**

The 2010 proposed designation for Unit 8 includes 26.2 miles of the East Fork Gila River from the confluence with the West Fork Gila River upstream to the confluence of Beaver and Taylor Creeks.

The East Fork Gila River occurs primarily on federal lands on the Gila National Forest, with small parcels of private lands interspersed.

##### **Mangas Creek**

The 2010 proposed designation for Unit 8 includes 5.7 miles of Mangas Creek from the confluence with the Gila River upstream to the confluence with Willow Creek.

Those portions of Mangas Creek within the proposed designation occur primarily on private lands, occasionally crossing BLM lands.

Most of Mangas Creek proposed for inclusion as critical habitat within Unit 8 are owned and managed by Freeport-McMoRan. These areas may be considered for exclusion from the final critical habitat designation under Section 4(b)(2) of the ESA.

### **Proposed Critical Habitat for Spikedace Only**

The 2010 proposed rule also includes stream segments being considered for critical habitat designation for the spikedace only.

#### *Middle Fork Gila River*

The 2010 proposed designation for Unit 8 includes 7.7 miles of the Middle Fork Gila River extending from the confluence with West Fork Gila River upstream to the confluence with Big Bear Canyon.

The Middle Fork Gila River occurs primarily on federal lands managed by the Gila National Forest, with small parcels of private lands interspersed with federal lands.

### **Proposed Critical Habitat for Loach Minnow Only**

The 2010 proposed rule also includes two stream segments within Unit 8 being considered for critical habitat designation for the loach minnow only.

#### *Bear Creek*

The proposed designation for Unit 8 includes 19.5 miles of Bear Creek extending from the confluence with the Gila River. This stream segment was added subsequent to the 2010 proposed rule. Bear Creek flows through BLM, USFS, State and private lands.

#### *Middle Fork Gila River*

The 2010 proposed designation for Unit 8 includes 11.9 miles of the Middle Fork Gila River extending from the confluence with West Fork Gila River upstream to the confluence with Brothers West Canyon.

The land ownership patterns for the Middle Fork Gila River are similar to what is discussed above for spikedace for the West and Middle Forks of the Gila River.

# Spikedace Critical Habitat Unit 8 - Gila River Subbasin

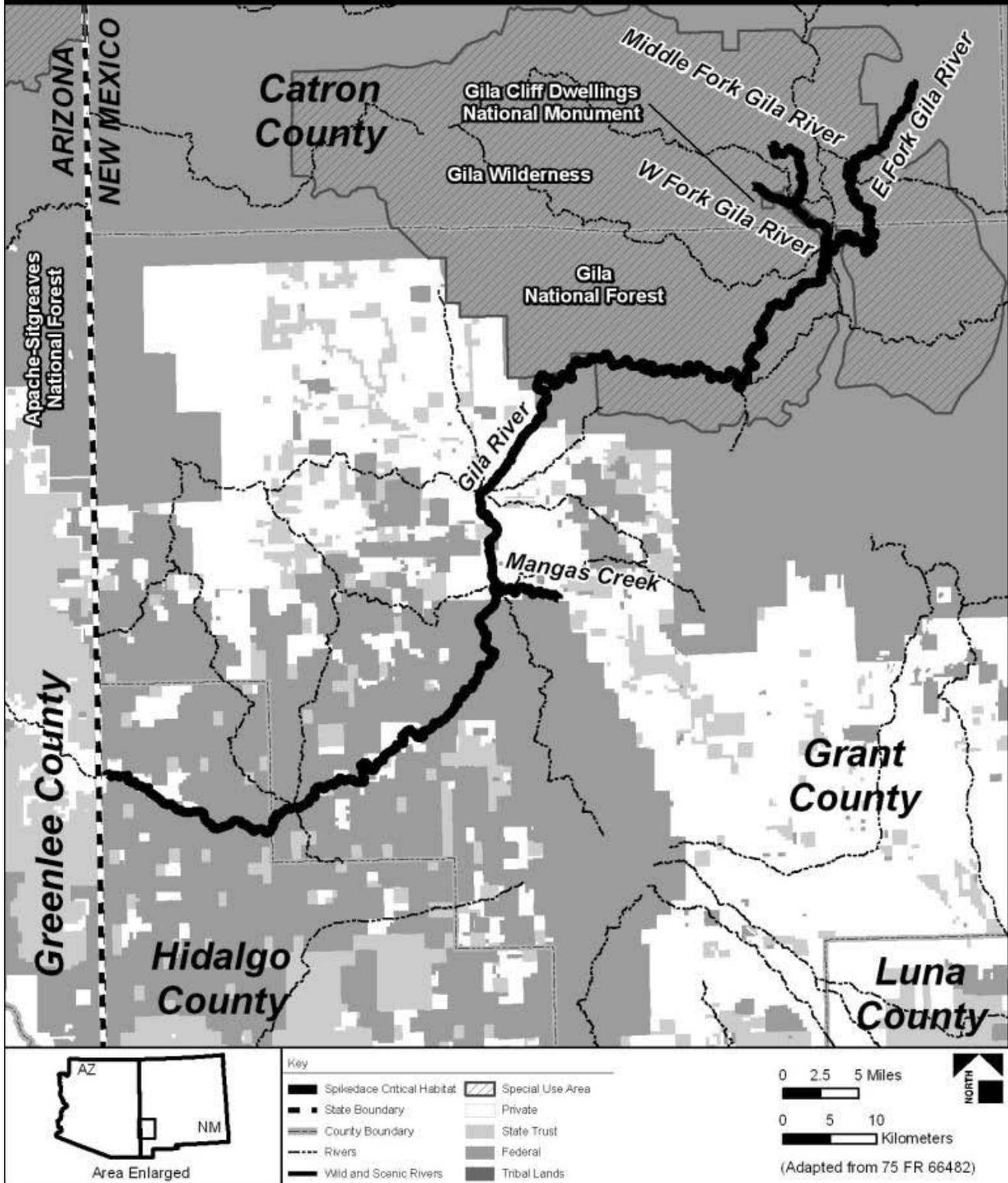


Figure 20 Proposed Spikedace Critical Habitat—Unit 8, Gila River Subbasin

# Loach Minnow Critical Habitat Unit 8 - Gila River Subbasin

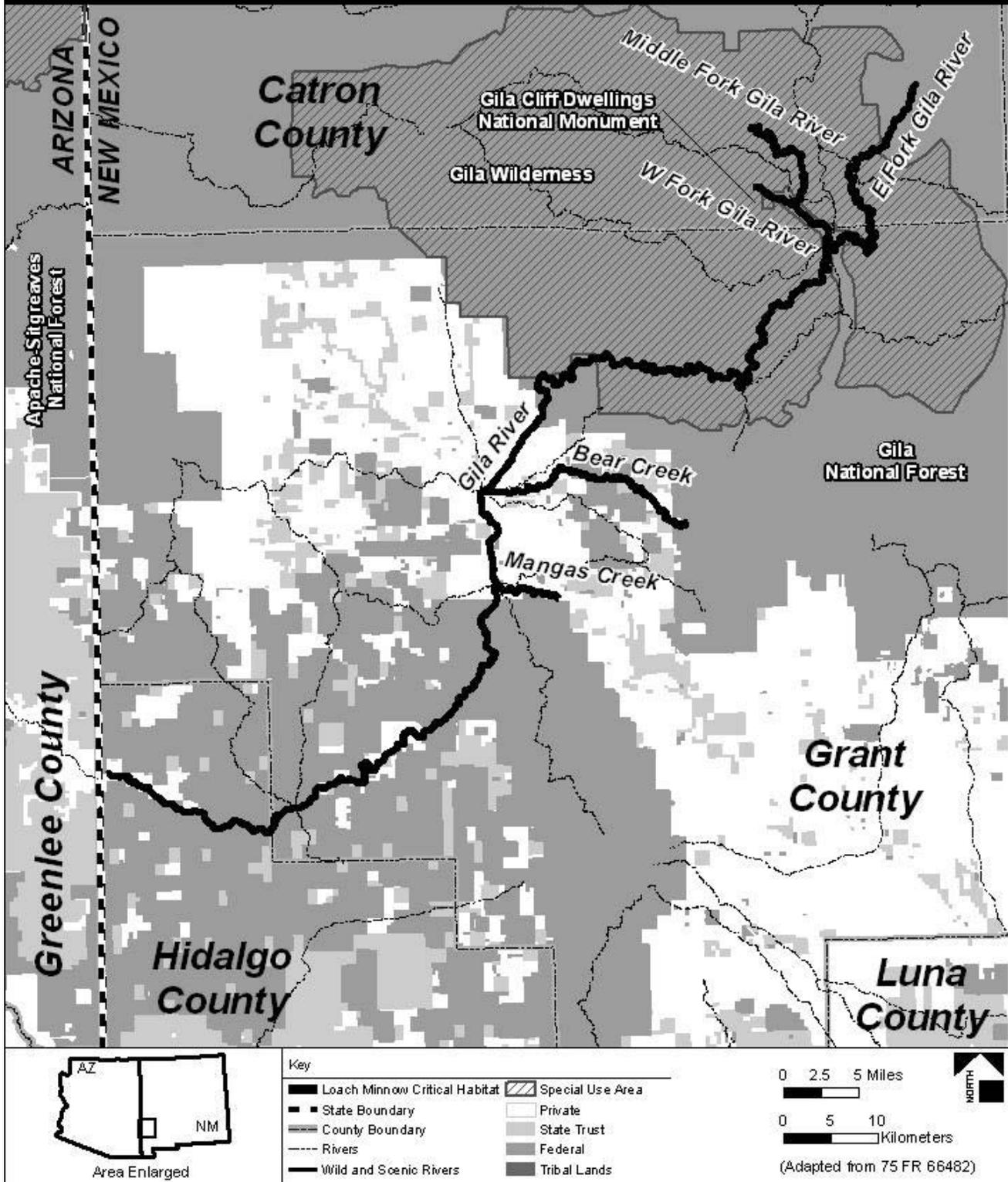


Figure 21 Proposed Loach Minnow Critical Habitat—Unit 8, Gila River Subbasin

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## CHAPTER 3

# AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

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### 3.1 Introduction

This chapter is organized by resource categories that may potentially be affected by designating critical habitat for the spokedace and loach minnow. These resource categories were selected based on issues and concerns identified by the Service for the 2006 EA and are updated for this 2011 EA where necessary. Within each resource category, a description of the existing condition and threats is followed by an evaluation of potential environmental consequences resulting from the designation of critical habitat. Potential effects are evaluated for each alternative described in Chapter 2, Alternatives Including the No Action Alternative.

The No Action Alternative includes the critical habitat segments designated and excluded in the 2007 final rule (72 FR13356). Under the No Action Alternative, no additional critical habitat would be designated for the spokedace and loach minnow.

Alternative B is the Proposed Action as described in the 2010 proposed rule (75 FR 66482). It does not include the stream segments being considered for exclusion. Under Alternative B, 726 miles of streams are proposed as critical habitat for spokedace and 709 miles are proposed as critical habitat for loach minnow, with 543 miles overlapping for both species. The eight units include 43 stream segments: 26 stream segments designated for both spokedace and loach minnow, 7 stream segments for spokedace only, and 10 stream segments for loach minnow only. The total stream mileage proposed for critical habitat designation under Alternative B is 801 miles.

Alternative A is the Proposed Action with exclusion areas. Under this alternative, the potential exclusion areas discussed in the proposed rule include Yavapai-Apache, White Mountain Apache, and San Carlos Apache tribal lands and lands owned by Freeport-McMoRan on Eagle Creek, the San Francisco River, the Gila River, and Mangas Creek.

### Methodology

Descriptions of the affected environment presented in Sections 3.2 through 3.11 of this document are based on a number of sources. These include:

- published literature,
- available state and federal agency reports and management plans,
- previous critical habitat designations for the spokedace and loach minnow (1994 to 1998, 2000 to 2004, and 2005 to 2007 [64 FR 69324, 65 FR 24329, and 72 FR 13356, respectively]),
- the current proposed rule for designating critical habitat for the spokedace and loach minnow (75 FR 66482),

- formal conference opinions issued by the Service relative to potential impacts on the spikedace and loach minnow,
- formal Section 7 consultations conducted on spikedace and loach minnow since these species were listed,
- Service-issued biological opinions for other fish species in small southwestern streams, and
- the 2011 draft economic analysis for the proposed designation of critical habitat (Industrial Economics [IEc] 2011a).

The designation of critical habitat imposes no universal rules or restrictions on land use, nor does it automatically prohibit or alter any land use or water development activity. With respect to critical habitat, the purpose of Section 7 consultation is to ensure that federal actions do not destroy or adversely modify critical habitat. Individuals, organizations, local governments, states, and other nonfederal entities are potentially affected by the designation of critical habitat only if their actions have a connection or nexus to federal actions that is, only if those actions occur on federal lands, require a federal permit or license, or involve federal funding.

Critical habitat designation generally increases the potential for more Section 7 consultations, both reinitiated and new, with their associated costs and outcomes. Designating critical habitat is likely to result in formal consultations over and above those required for a listed species with no designated critical habitat. Federal action agencies may consult on project activities they otherwise would not have consulted on because the affected habitat was thought to be unoccupied by or unsuitable for the listed species. Also, additional consultations may result from new information, guidance, or clarification provided in the critical habitat proposal. However, some of the areas proposed for designation of critical habitat for the spikedace and loach minnow are currently occupied and would therefore require little additional Section 7 consultation because of the critical habitat designation.

The Service cannot predict with certainty or detail what the effects of additional Section 7 consultations would be. However, the record of past conservation measures and consultations provides some basis for predicting what kinds of actions would be subject to consultation and the outcome of those consultations. Because the spikedace and loach minnow were listed in 1986, consultation numbers are high. Therefore, it is assumed that future consultations would be near the same magnitude as past consultations, with an increase in consultations in areas not currently designated or occupied by spikedace or loach minnow.

The evaluation of impacts in this chapter focuses on costs and outcomes of the potential increase in Section 7 consultations resulting from the designation of critical habitat for the spikedace and loach minnow. Impacts of increased consultations may include the following:

- Additional expenditures of time and money by federal agencies, including the Service, and nonfederal proponents to complete the consultations.

- A slight increase in probability that the PBFs identified in the proposed rule would be maintained. The requirement to consult on activities that may adversely affect designated critical habitat may cause action agencies and project proponents to alter their proposals to reduce, minimize, or avoid impacts on PBFs. Such alterations may obviate the need for consultation. If a consultation is initiated, then the outcome of critical habitat designation could be the modification of the proposal to limit the impacts on PBFs (i.e., when the Service has determined the initial proposal is likely to adversely modify critical habitat and issues reasonable and prudent alternatives to avoid the likelihood of adverse modification of critical habitat) or the imposition of reasonable and prudent measures that would reduce impacts on PBFs (i.e., when the Service has determined the proposed project is not likely to adversely modify critical habitat).

For the purposes of this evaluation, it is assumed that designation of critical habitat protects PBFs for the spikedace and loach minnow (e.g., natural stream flows, adequate water quality, cover, prey base) as a result of Section 7 consultation or project modification in anticipation of or to avoid Section 7 consultation. Benefits of these protections extend indirectly to other components of interconnected ecosystems. Critical habitat exclusion areas (e.g., tribal lands) may also be protective of PBFs. In some cases the resource discussion generally applies to all of the proposed units, in other cases, more specificity may be warranted and the discussion and impact assessment is specifically tied to proposed units or stream segments.

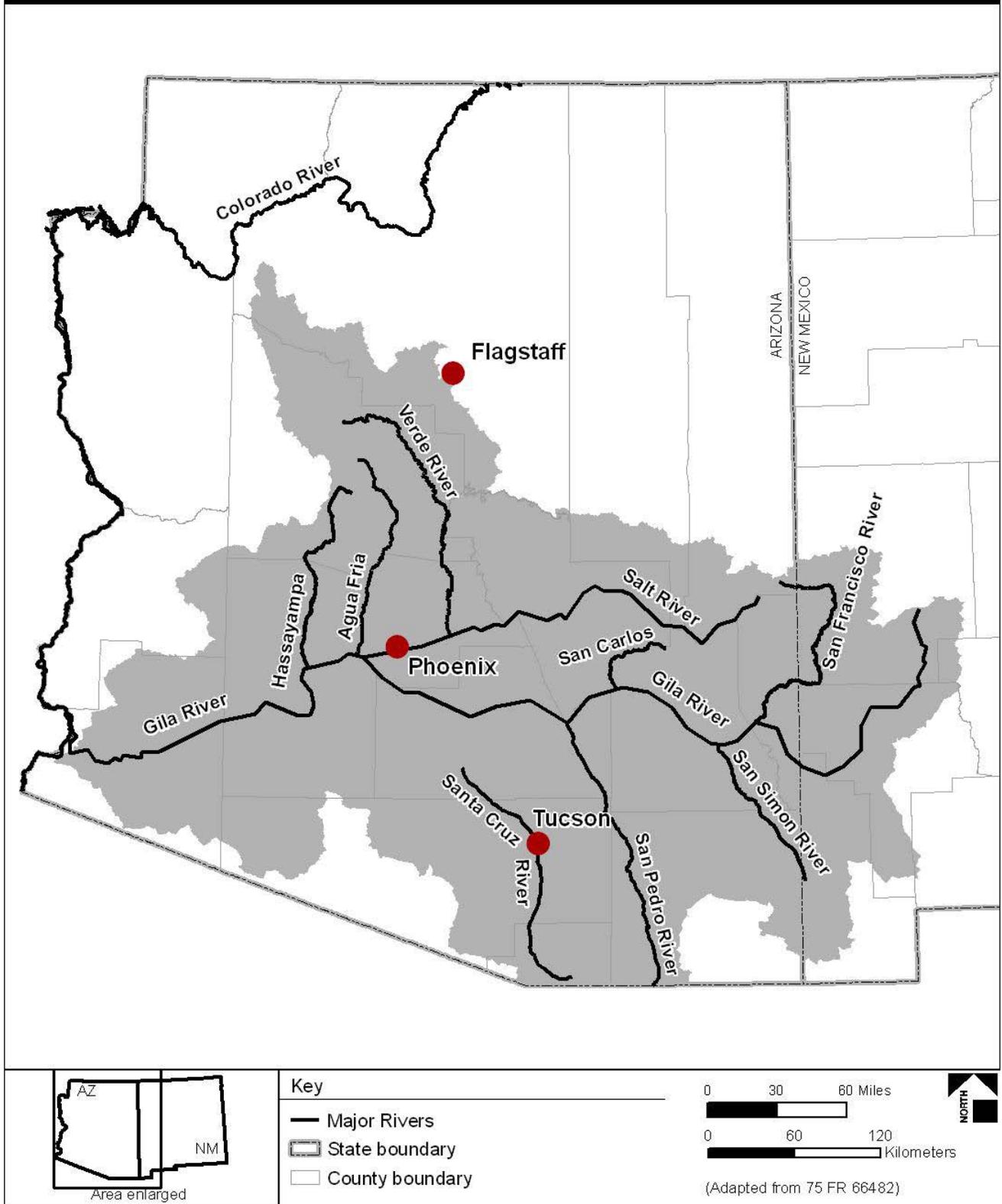
## **3.2 Water Resources**

### **3.2.1 Existing Conditions**

As discussed in the 2006 EA, all stream segments proposed for spikedace and loach minnow critical habitat designation fall within the Gila River Basin, which encompasses about 60,000 square miles (Service 2000). Originating in the Mogollon Mountains of western New Mexico, the Gila River flows in a southwesterly direction across Arizona to join the Colorado River near Yuma, Arizona on the Arizona-California border. Major streams include the San Francisco, Salt, Verde, San Simon, San Pedro, Santa Cruz, Agua Fria, and Hassayampa Rivers (Figure 22).

Precipitation varies greatly from the upper portions of the basin to the lower portions, but the area is generally hot and arid with a bi-seasonal (winter–summer) rain pattern (Sheppard et al. 1999). Hydrograph patterns in the upper reaches reflect snowmelt, but overall the basin depends on precipitation events. Stream flow is flashy, and the 2-year flood event is usually over an order of magnitude greater than the base flow (Shreve and Wiggins 1964).

# GILA RIVER BASIN



**Figure 22 Gila River Basin**

Surface water resources in the Gila River are fully appropriated and subject to ongoing adjudication. Consumptive uses in the Gila River Basin total over 3 million acre-feet per year, with about 72 percent for irrigation and livestock uses, 25 percent for municipal and industrial uses, and 3 percent for mining operations (U.S. Bureau of Reclamation 2004). To facilitate consumptive use, numerous water storage and diversion structures have been constructed in the mainstem Gila River and its major tributaries.

In order to understand current surface water issues for the Gila River, it is necessary to explain several historical events. In 1952, Arizona sued California over water supplied by the Colorado River. The dispute grew to include the settlement of water rights of and between New Mexico and Arizona on the Gila River system. In 1964, the U.S. Supreme Court (*Arizona v. California*) allocated water to California and Arizona based on future growth projections, but limited New Mexico's allocation to its "present use" developed as of 1957. New Mexico protested this allocation, and its State Engineer entered into negotiations with Arizona to improve its position. The State Engineer saw an opportunity to secure water for New Mexico as part of the Central Arizona Project (CAP).

The Colorado River Basin Project Act of 1968 (CRBPA) authorized the CAP. The CAP delivers water from the Colorado River near Lake Havasu across Arizona through Phoenix and Tucson. Section 304(f) of the original CRBPA authorized an exchange of waters from the Gila River and its tributaries and underground water sources for CAP water in amounts that permit consumptive use of water in New Mexico not to exceed an annual average in any period of 10 consecutive years of 18,000 acre-feet over and above the consumptive uses provided for by Article IV of the decree of the U.S. Supreme Court in *Arizona v. California*.

The Arizona Water Settlements Act (AWSA) of 2004, in addition to settling several outstanding Indian water claims, authorizes water exchanges between the Gila River Indian Community and various parties in the State of Arizona, including mining companies and several municipalities in the upper Gila River watershed. Section 212(d) of the AWSA modified Section 304(f) of the CRBPA to allow the Secretary of Interior to contract with New Mexico water users or the State of New Mexico, with the approval of its Interstate Stream Commission, for water from the Gila River, its tributaries, and underground water sources in amounts that will permit consumptive use of water in New Mexico not to exceed an annual average in any period of 10 consecutive years of 14,000 acre-feet, over and above the consumptive uses provided for by Article IV of the decree of the U.S. Supreme Court in *Arizona v. California*. Such increased consumptive uses shall continue only so long as delivery of Colorado River water to downstream Gila River users in Arizona is being accomplished in accordance with the AWSA, in quantities sufficient to replace any diminution of their supply resulting from such diversion from the Gila River, its tributaries, and underground water sources.

Title I Section 107 and Title II Section 212 of the AWSA (Public Law 108-451) provides between \$66 and \$128 million in non-reimbursable funds for New Mexico to develop water supply alternatives, including a New Mexico Unit of the CAP if desired to accomplish the exchange. Funds will be deposited into the New Mexico Unit Fund, a State of New Mexico Fund established and administered by the New Mexico Interstate Stream Commission. Beginning in 2012, \$66 million, indexed to reflect changes since 2004 in the construction cost indices, will be deposited into the New Mexico Unit Fund in 10 equal

annual payments. Following notification by December 31, 2014 that the State of New Mexico intends to have the New Mexico Unit constructed or developed, an additional \$34 to \$62 million may be available. A Record of Decision is to be issued in the *Federal Register* by the Secretary of Interior no later than the end of 2019 (unless extended by the Secretary for reasons outside the control of the State of New Mexico) regarding the decision.

Past modifications to water supply and diversion projects in the proposed critical habitat designation areas have generally not involved water quantity issues. Instead, they involved minimal changes to a few projects, primarily involving water diversion repair.

While no Salt River Project (SRP) facilities fall within proposed critical habitat areas, SRP has water rights to a large portion of the flow of the Verde River and has developed an HCP in the Verde River Watershed for Horseshoe and Bartlett reservoirs, which are located downstream of proposed critical habitat for the spikedace and the loach minnow (ERO Resources Corp. and Salt River Project 2008). The HCP covers many species, including: razorback sucker (*Xyrauchen texanus*), Colorado pikeminnow (*Ptychocheilus lucius*), Gila topminnow (*Poeciliopsis o. occidentalis*), spikedace, loach minnow, roundtail chub (*Gila robusta*), desert sucker (*Pantosteus [Catostomus] clarki*), Sonora sucker (*Catostomus insignis*), longfin dace (*Agosia chrysogaster*), and speckled dace (*Rhinichthys osculus*).

In the 12 counties containing stream segments proposed for critical habitat designation, surface water is only used for public water supplies in Pinal County, Arizona, and Grant County, New Mexico. Surface water withdrawals in Pinal County dominate withdrawals among affected counties. However, much of the surface water supply in Pinal County is derived from Lower Colorado River water that is provided by the CAP and which lies outside of proposed critical habitat for the spikedace and loach minnow (IEc 2011a). As discussed in the proposed rule (75 FR 66487), there are numerous surface water diversions in spikedace and loach minnow habitats, including the Verde River (Unit 1), Eagle Creek (Unit 5), San Francisco River (Unit 6), Blue River (Unit 7), and Gila River (Unit 8). Larger dams may prevent movement of fish between populations and dramatically alter the flow regime of streams through the impoundment of water (Ligon et al. 1995, pp. 184–189). These diversions also require periodic maintenance and re-construction, resulting in potential habitat damages and inputs of sediment into the active stream. Irrigation is the primary use (98% of withdrawals) of surface water in counties containing proposed critical habitat (IEc 2011a).

Total groundwater withdrawals in the counties proposed for designation exceed surface water withdrawals. Groundwater use is also dominated by irrigation, which represents approximately 72 percent of groundwater withdrawals in affected counties. Pinal County, which has the largest agricultural production in Arizona, also dominates groundwater use in the 12 counties (IEc 2011a).

Within the 12 counties included in the proposed rule, there are approximately 1,116 groundwater wells that appear to fall within the 300-foot wide corridor proposed for critical habitat designation. Most of these wells are used for domestic purposes (85%) (IEc 2011a) and are considered “exempt” wells in Arizona (pumping less than 35 gallons per minute per the Arizona Groundwater Management Act of 1980). Exempt wells are not required to report how much water they pump. Impacts to surface flows in

streams may also result from pumping of groundwater wells located outside of the proposed 300-foot critical habitat corridor. The groundwater–surface water interactions of each hydrologic system are unique and require site-specific analysis to fully understand potential interactions and impacts.

As discussed in the proposed rule (75 FR 66487), channelization is an existing and continuing threat to many Gila Basin rivers and streams. Channelization for flood control disrupts natural channel dynamics (sediment scouring and deposition) and promotes the loss of riparian plant communities (75 FR 66487). It also changes the stream gradient above and below the channelized stream segment. Water velocity increases in the channelized section, resulting in increased rates of erosion of the stream and its tributaries, accompanied by gradual deposits of sediment in downstream reaches that may increase the risk of flooding (Emerson 1971, p. 326; Simpson 1982, p. 122). Channelization can affect spikedace and loach minnow habitat by reducing its complexity, eliminating cover, reducing nutrient input, improving habitat for nonnative species, changing sediment transport, altering substrate size, increasing flow velocities, and reducing the length of the stream (and therefore the amount of aquatic habitat available) (Gorman and Karr 1978, pp. 512–513; Simpson 1982, p. 122; Schmetterling et al. 2001, pp. 7–10). Historical and ongoing channelization will continue to contribute to riparian and aquatic habitat decline most notably eliminating cover and reducing nutrient input.

Water quality is also discussed as an existing and continuing threat to several stream segments in the proposed rule. In the past, the threat from water pollution was due primarily to catastrophic pollution events (Rathbun 1969, pp. 1–5; Eberhardt 1981, pp. 3–6, 8–10) or chronic leakage (Eberhardt 1981, pp. 2, 16) from large mining operations. Although this is not as large a problem today as it was historically, some damage to spikedace and loach minnow populations still occurs from occasional spills or chronic inability to meet water quality standards (*United States v. ASARCO*, No. 98–0137 PHX–ROS (D. Ariz. June 2, 1998)). Mine tailings from a number of past and present facilities throughout the Gila Basin would threaten spikedace populations if catastrophic spills occur (Arizona Department of Health Services 2010, p. 3). Spills or discharges have occurred in the Gila River and affected streams within the watersheds of spikedace and loach minnow, including the Gila River, San Francisco River, San Pedro River, and some of their tributaries (Environmental Protection Agency 1997, pp. 24–67; Arizona Department of Environmental Quality 2000, p. 6; Church et al. 2005, p. 40; Arizona Department of Environmental Quality 2007, p. 1).

### **3.2.1.1 Verde River Subbasin (Unit 1)**

As discussed in Chapter 2, Alternatives, stream segments proposed for critical habitat designation in the Verde River Subbasin include portions of the Verde River and its tributaries: Granite Creek, Oak Creek, Beaver and Wet Beaver Creek, West Clear Creek, and Fossil Creek. In 2000, the Arizona Department of Water Resources (ADWR) (2000, p. 1–1) reported that the populations of major cities and towns within the Verde River watershed had more than doubled in the last 20 years, resulting in more than a 39 percent increase in municipal water usage. The ADWR (2000, p. 1–1) anticipated that human populations in the Verde River watershed are expected to double again before 2040, resulting in more than a 400 percent increase over the 2000 water usage. Stream flow in the middle and lower Verde River has been extensively altered due to agricultural diversion and upstream impoundments,

and has several impoundments in its middle reaches, which could expand the area of impacted spikedace and loach minnow habitat. The Little Chino Basin within the Verde River watershed has already experienced significant groundwater declines that have reduced flow in Del Rio Springs (ADWR 2000, pp. 1–1, 1–2). Blasch et al. (2006, p. 2) suggests that groundwater storage in the Verde River watershed has already declined due to groundwater pumping and reductions in natural channel recharge resulting from streamflow diversions.

The Verde River segment has the largest number of domestic wells (646), with nearly half located on unoccupied reaches of Oak Creek and Beaver/Wet Beaver Creek (IEc 2011a). The segment of the Verde River proposed as critical habitat has perennial average flow of approximately 25 to 30 cubic feet per second. As discussed above, most of the surface water rights to the water in the Verde River are held by SRP, which impounds water downstream of the proposed stream segment for water delivery purposes. The only substantial upstream impoundment is Sullivan Dam, a heavily silted dam that serves little current use (IEc 2011a). Other surface water rights are primarily held by irrigators, who divert water for agricultural purposes. Some surface water rights are held by mining interests, though they are not currently used for mining activities. Residential and commercial users in this area rely on groundwater suppliers, either through private or municipal supplies.

The relatively large number of groundwater wells (722) that appear to fall within 300-foot proposed critical habitat corridor on the Verde River represents 65 percent of all ground water wells that fall within proposed critical habitat (IEc 2011a). Of these wells, most are small, exempt wells that are used for domestic purposes. Of these, 352 wells (49%) occur on unoccupied Beaver/Wet Beaver and Oak Creek stream segments. (As discussed above, groundwater wells outside of the 300-foot corridor may also have the potential to impact surface water flows).

Economies in these Verde River communities have traditionally been agricultural, but residential populations have grown quickly in recent years, and continued growth is expected in the future (IEc 2011a). The Verde Natural Resources Conservation District has observed a recent trend of conversion of croplands to residential development. Eighty-nine percent of the groundwater wells that fall in proposed critical habitat are small wells used for domestic purposes. Thirty-six wells that pump more than 35 gallons per minute occur on Oak and Beaver/Wet Beaver Creeks, with about half designated for domestic purposes and half designated for irrigation.

Crop irrigation in the Verde Valley consists mostly of alfalfa or other forage (IEc 2011a). At least nine ditch companies utilize Verde surface water. An estimated 433 acres of irrigated lands occur within proposed critical habitat for spikedace and loach minnow, with 27 of these acres located along unoccupied reaches.

The Salt River Project operates six reservoirs and dams on the Verde and Salt Rivers. Together, these reservoirs provide 40 percent of the water supply to the Phoenix Active Management Area, an area of approximately 5,600 square miles (IEc 2011a). The Salt River Project diverts about 900,000 acre-feet of surface water annually for use by the City of Phoenix, Salt River Pima-Maricopa Indian Community, Fort McDowell Yavapai Nation, Freeport-McMoRan (formerly Phelps Dodge), irrigation users, and other

communities in the Phoenix area, including Chandler, Glendale, Mesa, Scottsdale, and Tempe. The system serves 240,000 acres over an area of 375 square miles (IEc 2011a).

The City of Prescott is located in the Verde River Subbasin and in the Prescott Active Management Area, where water is scarce. As discussed in the proposed rule (75 FR 66487), between 2000 and 2005, the City of Prescott, Arizona, experienced a 22 percent increase in population (U.S. Census Bureau 2010, p. 1), averaging around 4 percent growth per year (City of Prescott 2010, p. 1). In addition, the Towns of Prescott Valley and Chino Valley experienced growth rates of 66 and 67 percent, respectively (Arizona Department of Commerce 2009a, p. 1; 2009b, p. 1). This growth is facilitated by groundwater pumping in the Verde River Basin. In 2004, the Cities of Prescott and Prescott Valley purchased a ranch in the Big Chino Basin in the headwaters of the Verde River, with the intent of drilling new wells to supply up to approximately 48,000 acre-feet of groundwater annually for domestic use. The Cities plan to develop a pipeline to deliver the water to residents (IEc 2011a). This project has been held up by litigation with SRP and others. Scientific studies by the United States Geological Survey (USGS) have shown a link between the Big Chino aquifer and spring flows that form the headwaters of the Verde River. The USGS has estimated that 80 to 86 percent of base flow in the upper Verde River comes from the Big Chino aquifer (Wirt 2005, p. G8), and it is believed that the withdrawals could potentially dewater the upper 26 miles of the Verde River (Wirt and Hjalmarson 2000, p. 4).

While the impacts of the groundwater pumping on surface flows in the Verde River could be substantial, it is uncertain that this project will occur given the legal and administrative challenges it faces. These challenges include appeals concerning the ADWR decision on the application for groundwater withdrawals, as well as other legal hurdles and logistical issues. The Center for Biological Diversity, among others, filed appeals on ADWR's decision for the project, which have yet to be resolved. In addition, there are unresolved legal challenges. Some of the legal challenges were resolved when SRP, the City of Prescott, and the Town of Prescott Valley signed an Agreement in Principle in February 2010 (City of Prescott 2010, pp. 2–3). In addition, Governor Jan Brewer of Arizona signed Senate Bill 1445 in April 2010, which will continue to allow for the interbasin transfer of groundwater and for Prescott and Prescott Valley to import water from outside the Active Management Areas, among other things. However, other entities not party to the Agreement in Principle, such as the Center for Biological Diversity, have indicated that they do not intend to dismiss their lawsuits. In addition to legal complications, there are additional logistical difficulties that may delay the project including the acquisition of rights-of-way for pipelines across private property, building 20 to 30 miles of pipeline, and generating the funds to pay for this work.

The administrative, legal, and logistical hurdles facing the Big Chino Water Ranch Project make determining the final action, and especially the timeline for its implementation, difficult if not impossible. In addition, it is not possible to determine, without a final proposed action, if a federal nexus would exist for the project. The actual site for groundwater pumping and infrastructure would be on the Big Chino Ranch Water Project, which is privately owned, and the construction of a pipeline may or may not require federal permitting. Without a federal nexus, Section 7 consultation on spikedace and loach minnow critical habitat on the upper Verde River would likely not occur. Therefore, because there are

no specific plans, the potential impacts of spikedace and loach minnow critical habitat designation on the Big Chino project is unknown, and further study of the issue during the time frame for completion of the decisions regarding the critical habitat designation would not provide any useful information.

### **3.2.1.2 Salt River Subbasin (Unit 2)**

Proposed critical habitat designation areas in the Salt River Subbasin include portions of Tonto Creek and its tributaries: Greenback, Rye and Spring Creeks, as well as Rock Creek, a tributary to Spring Creek. Total groundwater use in the Salt River Subbasin has decreased since 1971 from an average of 20,000 acre-feet per year (1971 to 1975) to an average of 12,600 acre-feet per year (2001 to 2005) (ADWR 2010a). Municipal groundwater use has averaged 4,000 acre-feet per year (1991 to 2005), while industrial groundwater use has decreased from 10,500 acre-feet per year (1991 to 1995) to 8,100 acre-feet per year (2001 to 2005). Groundwater use for irrigation has remained constant at less than 1,000 acre-feet per year. Surface water diversions for municipal and irrigation uses are assumed to have remained constant between 1991 and 2005, averaging less than 300 acre-feet per year and 6,400 acre-feet per year for each use, respectively. Surface water diversions for industrial use have decreased from an average of 6,300 acre-feet per year (1991 to 1995) to 4,900 acre-feet per year (2001 to 2005).

### **3.2.1.3 San Pedro Subbasin (Unit 3)**

The San Pedro Subbasin includes the upper San Pedro and six additional stream segments: Aravaipa Creek and its tributaries, Turkey Creek and Deer Creek, Redfield Canyon, Hotsprings Canyon and Bass Canyon. The sources of surface water in the San Pedro River include precipitation, snowmelt runoff, and base flow from groundwater from the regional aquifer. The Department of Defense United States Army Garrison Fort Huachuca has made claims to groundwater rights from the regional aquifer since the Fort's establishment in the 1880s. All potable water used by the Fort is pumped from the regional aquifer. The Fort has undertaken many Section 7 consultations on its water use for federally listed species other than the spikedace and loach minnow. As a result the Fort has reduced its water usage from 3,300 acre-feet per year (20 years ago) to 1,142 acre-feet currently.

In the Upper San Pedro Basin, total groundwater use increased from 1971 to 1985, and has remained generally constant since 1986, with an average use of 29,100 acre-feet per year from 2001 to 2005 (ADWR 2010a). Groundwater for municipal use comprises over half of the total groundwater use from 1996 to 2005. Total current surface water diversions are comparable to historic volumes, estimated at 4,500 acre-feet diverted per year between 1991 and 2005. Over 90 percent of diversions are for agriculture, but over 75 percent of the agriculture water supply comes from groundwater. As of 2005, there were 5,021 registered groundwater wells with a pumping capacity of up to 35 gallons per minute and 1,106 wells with a pumping capacity exceeding 35 gallons per minute. In Sonora Mexico, the Cananea Mine is the single largest source of water consumption in the Region (Browning-Aiken et al. 2003, p. 4). Expansion and modernization of the Cananea Mine occurred in 1978 to 1986, and again between 1992 and 1997. These expansions were followed by increased water extraction from 16.9 million cubic yards in 1980 to 26.4 million cubic yards in 1989, and 23.5 million cubic yards in 1990

(Browning-Aiken et al. 2003, p. 22). The ADWR reports that water quality standards were exceeded in three reaches of the San Pedro River, with each reach being exceeded by a different parameter: *E. coli*, nitrates, and copper.

As discussed in the proposed rule, Aravaipa Creek is relatively protected from further habitat loss because it is within a BLM Wilderness Area and a preserve managed by The Nature Conservancy (75 FR 66486). However, Aravaipa Creek is affected by upstream uses in the watershed, including groundwater pumping for irrigation. Irrigation can reduce creek flows, as crop irrigation uses large amounts of water, especially during the summer months when the creek flows are already at their lowest. Increased groundwater pumping from wells is known to be linked to reduced creek flows (Fuller 2000, pp. 4–8). Groundwater pumping in Aravaipa Canyon is decreasing with an average of less than 1,300 acre-feet pumped per year (2001 to 2005), with municipal and industrial demand at less than 300 acre-feet per year. Between 1991 and 2005, all surface water diversions were for agriculture and were less than 1,000 acre-feet per year. As of 2005, there were 192 registered groundwater wells with a pumping capacity of up to 35 gallons per minute and 50 wells with a pumping capacity exceeding 35 gallons per minute.

The proposed rule also discusses water quality as a threat to Aravaipa Creek.(75 FR 66487). In January of 2006, the ADEQ announced that it had been conducting a remedial investigation at the Klondyke Tailings site on Aravaipa Creek, which currently supports one of the two remaining populations where spikedace and loach minnow are considered common. The Klondyke tailings site was a mill that processed ore to recover lead, zinc, copper, silver, and gold between the 1920s and the 1970s. There are eight contaminants in the tailings and soil at the Klondyke tailings site that are at levels above regulatory limits. These contaminants include antimony, arsenic, beryllium, cadmium, copper, lead, manganese, and zinc. Samples of shallow groundwater collected at the site contained arsenic, beryllium, cadmium, chromium, lead, and nickel above regulatory limits (Arizona Department of Environmental Quality 2006, p. 2). A preliminary study in Aravaipa Creek has found high levels of lead in two other native fish species, Sonora sucker and roundtail chub, as well as in the sediment and in some of the invertebrates. These lead levels are high enough that they could negatively impact reproduction (P. Reinthal, University of Arizona, pers. comm. 2010). The Service does not know with certainty whether these levels of lead would affect spikedace or loach minnow, but assumes that the same negative effects would occur.

#### **3.2.1.4 Bonita Creek Subbasin (Unit 4)**

Only one stream segment, Bonita Creek, is proposed for critical habitat designation in Unit 4, as discussed in Chapter 2. The 457-square-mile Bonita Creek Subbasin drains to the Gila River and is characterized by medium-high elevation plains and mountain ranges. Bonita Creek is perennial. Elevation ranges from 7,292 feet at Nantac Rim to the north to 3,800 feet where Bonita Creek exits the basin. Average annual precipitation ranges from 24 inches along the Nantac Rim to 10 inches to the south. Surface water is stored or could be stored in one large and 16 small reservoirs. There are 24 registered stockponds. Average annual runoff is 0.5 inches per year. Natural recharge to groundwater is estimated at 9,000 acre-feet per year. Groundwater pumping has been relatively constant between

1971 and 2005 with an average of 3,200 acre-feet per year between 2001 and 2005. Almost all of the groundwater demand is collected in an infiltration gallery owned by the City of Safford near Bonita Creek and delivered to the Safford Basin for municipal water use. There are no recorded surface water diversions. As of 2005, there were 12 registered groundwater wells with a pumping capacity of up to 35 gallons per minute and 15 wells with a pumping capacity exceeding 35 gallons per minute. The City of Safford owns full rights to the groundwater from the infiltration gallery, allowing for an increase from its existing diverted flow of 3,876 acre-feet per year up to a maximum flow of 5,310 acre-feet per year (IEc 2011a). The United States, as trustee for the San Carlos Apache Tribe, and the San Carlos Apache Tribe have filed water rights claims to all surface waters in Bonita Creek. There are no water quality data for the Bonita Creek Basin in the ADWR Water Atlas (2010b).

### **3.2.1.5 Eagle Creek Subbasin (Unit 5)**

Only one stream segment, Eagle Creek, is proposed for critical habitat designation in Unit 5, as discussed in Chapter 2. Eagle Creek, a tributary to the Gila River, is described as part of the 1,599-square-mile Morenci Basin in the ADWR Water Atlas (2010b). The Morenci Basin is characterized by high elevation mountain ranges. Eagle Creek, a perennial stream, generally flows from north to south along the boundary between Graham and Greenlee Counties in Arizona. The primary water users along Eagle Creek include the San Carlos Apache Tribe (IEc 2011a) and the Morenci Mine, which is owned by Freeport-McMoRan. The ADWR Water Atlas (2010b) has no reported exceedance of water quality standards for Eagle Creek.

### **3.2.1.6 San Francisco Subbasin (Unit 6)**

In addition to the mainstem of the San Francisco River, three tributary stream segments (Tularosa River, Negrito Creek, and Whitewater Creek) in the San Francisco Subbasin are proposed for critical habitat designation, as discussed in Chapter 2. The lower portion of the San Francisco River is located in Arizona, but the upper portion of the river and the remainder of the stream segments are in New Mexico. The 2,790-square-mile San Francisco River Basin is the major tributary to the upper Gila River (Hawley, Kambhammettu, and Creel 2010). Located in west-central New Mexico and east-central Arizona, the San Francisco River is the only perennial tributary to the upper Gila River in the headwaters region. Surface waters of the San Francisco and Blue Rivers in New Mexico are primarily used for agriculture. Agriculture along the San Francisco consists of irrigated pasture and ranching activities.

In June 2010, the New Mexico Water Resources Research Institute published the first hydrogeological model of the basin aquifer systems for multiple purposes including water resource management planning (Hawley et al. 2010).

### **3.2.1.7 Blue River Subbasin (Unit 7)**

In addition to the mainstem of the Blue River, five tributaries (Pace Creek, Dry Blue Creek, Frieborn Creek, Campbell Blue Creek, and Little Blue Creek) are proposed for critical habitat designation, as

discussed in Chapter 2. The Blue River, Little Blue Creek, and most of Campbell Blue Creek are in Arizona, while Pace, Dry Blue, and Frieborn Creeks and the mouth of Campbell Blue Creek are in New Mexico. The 617-square-mile Blue River Basin is primarily in Arizona, with 44 square miles in New Mexico (Hawley, Kambhammettu, and Creel 2010). The Blue River runs through forestlands and rural in-holdings of the Apache-Sitgreaves and Gila National Forests. The Blue River is a perennial tributary to the San Francisco River discussed above. Flow rates on the Blue River vary greatly, depending on winter and summer rains, and the snow pack conditions (Service 2009a). There are several minor diversions on private lands.

### **3.2.1.8 Gila River Subbasin (Unit 8)**

In addition to the mainstem of the upper Gila River, five stream segments (East Fork Gila, Middle Fork Gila, West Fork Gila, Bear, and Mangas Creek) in the Gila River Subbasin are proposed for critical habitat designation. All of these stream segments are in New Mexico. Within New Mexico, the Gila River Subbasin covers about 3,590 square miles, excluding the San Francisco watershed (New Mexico Water Resources Research Institute et al. 2000).

The proposed rule lists water diversions as a threat to the upper Gila River. Surface waters of the Gila River in New Mexico are primarily used for agriculture and mining uses. Major cities in southwestern New Mexico do not rely on surface water for domestic supply purposes. In addition to smaller water diversions, discussions have been ongoing since the 1980s about constructing a dam on the Gila River to allow New Mexico to utilize up to 14,000 annual acre-feet of Gila River water as part of the AWSA. To date, New Mexico has not evaluated proposals for a New Mexico Unit of the CAP or committed to diverting or storing water available under the AWSA.

## **3.2.2 Environmental Consequences**

### **3.2.2.1 No Action Alternative**

Under the No Action Alternative, 522 miles of stream segments would remain designated as critical habitat for spikedace and/or loach minnow, and no additional spikedace and loach minnow critical habitat would be designated under the ESA. Existing exclusion areas would remain in effect. Section 7 consultations would continue for proposed actions with a federal nexus, including water management activities, based solely on the presence of designated critical habitat. Stream segments occupied by the spikedace and loach minnow would be subject to Section 7 consultations regardless of the area's status as critical habitat. The analyses are distinct, however, in that the standard for determining jeopardy concerns only the survival of the species, while the standard for determining adverse modification must take into account habitat values (PBFs) essential for the recovery of the species.<sup>1</sup> The Conservation measures implemented as a result of Section 7 consultation under the No Action Alternative may require specific modifications to water management activities. These modifications may

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<sup>1</sup> See Section 1.4.1.3, Section 7 Consultation Process, for a discussion of the implications of the Ninth Circuit Court in *Gifford Pinchot Task Force et al.* (2004).

require adjustments to project plans, schedules, and operations, limit water withdrawals, and/or increase costs to project proponents. Therefore, the No Action Alternative is anticipated to have minor, beneficial impacts on water resources related to required conservation measures benefiting the habitat values for spokedace or loach minnow. Additionally, under the No Action Alternative, some required Section 7 conservation measures could have minor adverse impacts on water management activities (e.g., groundwater pumping, surface water diversion, channelization etc.) that could negatively impact the habitat values of spokedace or loach minnow.

In comparison to Alternatives A and B, the No Action Alternative includes three stream segments not in the 2010 proposed rule. These stream segments are now considered by the Service to be highly degraded and likely not occupied by spokedace or loach minnow. Under the No Action Alternative, these stream segments would maintain critical habitat designation and Section 7 consultation could occur. Because the streams are considered to be highly degraded and likely not occupied, this would result in negligible beneficial impacts to the water resources in these areas.

### **3.2.2.2 Alternative A**

Compared to the No Action Alternative, Alternative A would result in an increase of up to 239 miles of designated critical habitat. This would result in (1) a small but unknown increase in the number of new and reinitiated Section 7 consultations for proposed actions with a federal nexus, including water management activities, based solely on the presence of designated critical habitat and (2) the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spokedace and loach minnow critical habitat. The Economic Analysis projects approximately 47 formal and informal Section 7 consultations on water management and water diversions over the next 20 years at a similar rate and in similar units as in the past (IEc 2011a).

The outcome of future consultations would depend on the details of water project proposals and the analysis of effects, which are unknowable at this time. Conservation of the spokedace and loach minnow would likely require, at a minimum, maintenance of existing populations. Therefore, the conservation value of proposed critical habitat must sustain existing populations found within those segments.

The additional consultations (those based solely on the presence of designated habitat) would moderately increase administrative costs to the Service, the action agencies, and any project proponent involved in the consultation process. Outcomes of consultations for critical habitat may also include reasonable and prudent alternatives, and other conservation measures designed to maintain spokedace and loach minnow PBFs. These conservation measures may result in minor to moderate adverse impacts on water management projects and minor beneficial impact on water resources by requiring adjustment to project plans, schedules, and operations; by limiting water withdrawals; and by increasing costs to action agencies and project proponents.

As discussed in the Economic Analysis (IEc 2011a), Fort Huachuca has estimated potential administrative costs associated with designation of critical habitat on the San Pedro River to include

between \$100,000 and \$200,000 annually for monitoring and surveying of spikedace and loach minnow and an additional \$250,000 to \$350,000 for a biological assessment and supporting studies. The Service does not believe that additional monitoring costs would be generated since monitoring for spikedace and loach minnow is already being conducted by the Bureau of Reclamation in this area.

The specific modifications to water management activities that may result from critical habitat designation, the effects of those modifications on beneficial water uses, and the costs attributable solely to designating critical habitat as opposed to listing the species cannot be predicted with precision, but most of the past water management consultations involving critical habitat of listed fish in small southwestern streams provide some indication of what can be expected (Service 2005, p. 39). The proposed actions prompting these consultations have tended to be infrequent and minor in scope. Past consultations involving critical habitat areas have resulted in relatively minor changes to proposed projects. Typical project modifications have included minimizing activities within the wetted channel, ensuring no pollutants enter surface waters, replanting riparian vegetation, monitoring for up to 10 years, and conducting research studies. These modifications have been recommended for approximately 10 diversion repair and bank stabilization-type projects.

Conservation measures related to habitat protection have required the use of best management practices (BMPs), which are mandated by the Clean Water Act permitting requirements. It is likely that the outcomes and impacts of future Section 7 consultations for the spikedace and loach minnow critical habitat would be similarly minor in scope. It is not expected, based on past consultations in the Southwest that designation of critical habitat would result in the infringement of any existing water rights.

Potential impacts on municipal, agricultural, tribal, and industrial water use and water development projects that could result from spikedace and loach minnow conservation are mostly uncertain. There may be impacts on water users if critical habitat designation results in incremental changes in or restrictions on water use. However, there are currently no data indicating whether existing or future diversions of water (or groundwater pumping) reduce stream flow or modify hydrology to a degree that adversely modifies spikedace and loach minnow habitat (IEc 2011a). Few impacts on water use have occurred in the past. In fact, the only known example is related to use of water in the San Pedro basin by a federal entity on federal lands (Fort Huachuca). The Fort believes that additional requirements or changes to its groundwater pumping regime from designation of the spikedace and loach minnow could be cost prohibitive; however, the Service has stated that it anticipates requesting few additional changes. Concern about the potential impact of designation on water use has also been expressed by Freeport-McMoRan (IEc 2011a). The company is concerned that potential ore reserves may not be exploitable if critical habitat leads to unavailability of water supplies, large mitigation costs, or project delays. The Service points out that curtailment of water supplies has not occurred under previous designations of critical habitat for either species (IEc 2011a). Similarly, agricultural irrigation activity has generally not been affected by spikedace and loach minnow conservation activities since their federal listing in 1986 (IEc 2011a).

Under the current proposal, the section of the Verde River downstream of the Prescott and Coconino National Forests that flows through private lands is proposed for critical habitat designation. This stream segment was excluded in 2007 final rule (No Action Alternative) but is not being considered for exclusion in the current proposal. Under Alternative A, this segment of the Verde River would be subject to Section 7 consultations for proposed actions with a federal nexus, including water management activities.

Under Alternative A, stream segments excluded from critical habitat designation would not be subject to Section 7 consultation. The impact of excluding an area with a potential for future water management and water development activities due to economic, national security, or other needs would depend on whether the exclusion area had sufficient conservation measures in place to protect the water resources.

Threats to water resources from water development pressures on the Verde River are discussed in the 2007 final rule and in the proposed rule. The segment of the Verde River that flows through lands owned by the Yavapai-Apache Nation was excluded in the No Action Alternative (2007 final rule) and is being considered for exclusion in the proposed rule, along with portions of Beaver/Wet Beaver Creeks. The tribe prepared a management plan for the Southwestern Willow Flycatcher in 2005 and issued a resolution to protect a 300-foot riparian conservation corridor in 2006. Should the Service decide to exclude this area because of these and other conservation measures being in place, no impacts to water resources are anticipated for the segment of the Verde River that flows through Yavapai-Apache tribal lands.

The previous proposed rule listed water diversions as a threat to the East Fork White River. This river segment is within the boundaries of lands owned by the White Mountain Apache Tribe, was excluded in the 2007 final rule (No Action Alternative), and is being considered for exclusion in the proposed rule under Alternative A. A management plan was prepared by the tribe in 2000. Should the Service decide to exclude this area and use the management plan in lieu of critical habitat designation, no impacts to water resources are anticipated for the segment of the East Fork White River that flows through White Mountain Apache tribal lands.

During the 2005–2007 critical habitat designation period, the San Carlos Apache Tribe expressed concern that the designation of critical habitat for the spinedace and loach minnow would further complicate the procedure for getting the New Mexico Unit of the CAP project approved (Service 2006b). The San Carlos Apache tribe did not submit comments on the 2010 proposed spinedace and loach minnow critical habitat designation, so we are not certain if this is still a concern for them. The Bureau of Reclamation has stated that this project would be reevaluated before an exchange could occur and a new consultation is likely. The segment of Eagle Creek that flows through San Carlos Apache tribal lands was excluded from designation in the No Action Alternative (2007 final rule), and is being considered for exclusion in the proposed rule. A management plan was prepared by the tribe in 2005 and was the basis for exclusion from the 2007 critical habitat designation. Should the San Carlos Apache Tribe submit a management plan for the current rule making process, the Service may again consider excluding stream segments that flow through tribal lands. As such, under Alternative A,

impacts to water resources cannot be determined for the segment of Eagle Creek that flows through San Carlos Apache tribal lands.

Stream segments on Eagle Creek and on the upper Gila River that are predominantly owned by Freeport-McMoRan (formerly Phelps Dodge Company) were excluded from designation in the No Action Alternative (2007 final rule). These stream segments and portions of the San Francisco and Mangas Creek are again being considered for exclusion in the 2010 proposed rule because of submitted action plans. Phelps-Dodge had prepared a management plan for these areas, and Freeport-McMoRan updated those plans for the above stream segments.

Designation of spikedace and loach minnow critical habitat may affect water use and management in New Mexico relative to the proposed New Mexico Unit of the CAP. It is not clear how water will be delivered; however, the New Mexico Interstate Stream Commission states that building a dam on the Gila River is not foreseeable. In its 2010 comment letter on the proposed critical habitat rule for spikedace and loach minnow, the New Mexico Interstate Stream Commission noted that the State of New Mexico may divert but has not committed to diverting water, and that its planning process to date has not evaluated proposals for a New Mexico Unit of the CAP. At this point, no additional studies are planned to address the type of storage facility needed to complete the New Mexico Unit of the CAP. Therefore, because there are no specific plans, the potential impacts of spikedace and loach minnow habitat on the New Mexico CAP unit are unknown, and further study of the issue during the time frame for completion of the decisions regarding the critical habitat designation would not provide any useful information.

In addition to the site-specific areas and reasons discussed above, the effects on future water management activities and water resources from critical habitat designation are expected to be minor and are not anticipated to constrain any proposed water management activities because (1) most of the previously completed Section 7 consultations involving critical habitat for these fish species in small southwestern streams have resulted only in minor project alterations to proposed projects; (2) the number of consultations is not expected to change; few projects and operations would be subject to consultation based solely on the presence of designated critical habitat because most all of the proposed segments are occupied by the spikedace and loach minnow; (3) if the outcome of those few consultations were based solely on critical habitat that do not reach the threshold of adverse modification they would only result in discretionary conservation recommendations to reduce impacts on PBFs because there is no incidental take statement or reasonable and prudent measures for adverse modification of critical habitat; and (4) the small likelihood that reasonable and prudent alternatives developed under the jeopardy standard would be changed substantially with the addition of critical habitat designation and application of the adverse modification standard.

### **3.2.2.3 Alternative B**

Compared to the No Action Alternative, impacts associated with the designation of additional critical habitat would be similar to those identified for Alternative A. However, compared to Alternative A, no stream reaches would be excluded under Alternative B, resulting in a potential increase of 313 miles.

Accordingly, Alternative B would result in a small but unknown increase in the number of additional new and reinitiated Section 7 consultations based solely on the presence of designated critical habitat on areas being considered for exclusion under Alternative A, and on the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spinedace and loach minnow in critical habitat on areas being considered for exclusion under Alternative A. Similar to Alternative A, the impact of the additional Section 7 consultations is anticipated to result in minor, beneficial impacts on water resources related to required conservation measures benefiting the habitat values for spinedace or loach minnow. Some required Section 7 conservation measures could have minor to moderate adverse impacts on water management activities (e.g., groundwater pumping, surface water diversion, channelization) for the reasons described under Alternative A.

### **3.3 Wetlands and Floodplains**

#### **3.3.1 Existing Conditions**

Within the 300-foot buffer (smaller where bounded by canyon walls) along stream segments, the proposed spinedace and loach minnow critical habitat includes riparian areas containing floodplains and wetland habitats. Quality fish habitat is intrinsically linked to the quality of the existing adjacent upland habitat that provides key habitat components (e.g., large woody debris) crucial for fish species. Streams regularly submerge portions of the riparian zone via floods and channel migration, and portions of the riparian zone may contain off-channel rearing habitats used by juvenile fishes. Healthy riparian zones help ensure water quality essential to native fishes as well as the forage some species depend on (Reiser and Bjornn, 1979; Meehan 1991; Forest Ecosystem Management Assessment Team [FEMAT] 1993; Spence et. al. 1996).

Both wetlands and floodplains are valuable components of healthy riparian ecosystems. Wetlands, in addition to providing habitat for native fish, are valued for their ability to purify water, to help regulate natural flooding cycles, and to prevent erosion. Floodplains can interact with streams during flood events to supply nutrients, debris, and organic material back into the main channel; allow fish passage during high flow; and provide spawning sites and food supply for native fish species.

Currently, there is no definite quantification of the amount of wetlands and floodplains within proposed critical habitat areas. However, it can be assumed that all of the 801 stream miles of proposed critical habitat, where not confined by canyon walls, are within floodplains.

Sections of many Gila Basin rivers and streams have been, and continue to be, channelized for flood control, which has disrupted natural channel dynamics (sediment scouring and deposition). Water velocity increases in the channelized section, which results in increased rates of erosion of the stream and its tributaries, accompanied by gradual deposits of sediment in downstream reaches that may increase the risk of flooding (Emerson 1971; Simpson 1982).

Flood control programs occur throughout the counties where critical habitat is proposed. These programs involve plans and structures designed to reduce floods and property damage as a result of

floods. It is unknown how many structures or plans occur within the areas proposed for critical habitat designation. In general, where flooding is a risk, development is discouraged. Additionally, the Federal Emergency Management Agency (FEMA) does not prohibit all construction in floodways, but does require developers to obtain a “No Rise Certificate” by demonstrating that there would be no increase in water level as a result of construction. This development regulation may require special engineering, often making development in floodways impractical and prohibitively expensive.

Federal guidelines govern real estate development in floodplains for jurisdictions in flood-prone areas that choose to participate in the National Flood Insurance Program (NFIP), managed by FEMA. Communities in this program adopt FEMA’s floodplain management ordinances in exchange for federally backed flood insurance. FEMA defines the floodplain lands as Special Flood Hazard Areas and places special requirements on development within these areas. The lowest floor of all new residential buildings in the floodplain must be at or above the level of the 100-year flood, in order to qualify for FEMA-backed insurance. Non-residential buildings must be at or above the level of the 100-year flood, or be flood-proofed to that level. Using these guidelines, construction in a floodplain is possible in lower-risk locations, such as areas where the floodplain is wide. As a result, we anticipate that these regulations will mostly likely prevent or minimize the number of projects that would occur within the proposed designation so that Section 7 consultation is not requested or necessary.

Many flood control projects are developed within city limits to reduce the risk of flooding residences and businesses. These projects may consist of constructing bank protection and channelization, additional drains, catchment basins, and placing pipes to convey stormwater from flood-prone areas to the catchment basins.

Most Section 7 consultations related to flooding and flood control methods are a result of emergency situations. During a flooding event, the responsible agency contacts the Service and emergency consultation is conducted to shore up banks, put in erosion control structures, or allow for emergency repair work. When conducting emergency consultations, the Service may recommend efforts that can be taken, but are not required, by the action agency to minimize impacts on federally listed species. Emphasis is placed upon protecting human life and property. For emergency consultations, the Service does not develop reasonable and prudent measures or alternatives.

Other consultations relative to flooding include road repairs. This is usually covered under emergency consultations conducted by the affected county and results from access to private property being cut off.

### **3.3.2 Environmental Consequences**

#### **3.3.2.1 No Action Alternative**

Under the No Action Alternative, 522 miles of stream segments would remain designated as critical habitat for spinedace and/or loach minnow, and no additional spinedace and loach minnow critical habitat would be designated under the ESA. Existing exclusion areas would remain in effect. Section 7

consultations would continue for proposed actions with a federal nexus, including activities that could affect wetlands and floodplains, based solely on the presence of designated critical habitat. Stream segments occupied by the spikedace and loach minnow would be subject to Section 7 consultations regardless of the area's status as critical habitat. The conservation measures implemented as a result of Section 7 consultation under the No Action Alternative may require specific modifications to proposed activities. These modifications may require adjustments to flood control project plans specifically in developed areas involving construction of structural, hard surface bank protection, channelization or catchment basins. Therefore, the No Action Alternative is anticipated to have minor adverse impacts on flood control activities in developed areas related to required conservation measures from consultations. The majority of the designated stream segments in the No Action Alternative are located in more rural or natural areas that provide flood control through expanded floodplains and braided channels. Section 7 conservation measures would maintain wetland and floodplain values and functions and therefore the No Action Alternative would have a minor beneficial impact on the wetlands and floodplain resources themselves.

In comparison to Alternatives A and B, the No Action Alternative includes three stream segments not in the 2010 proposed rule. These stream segments are now considered by the Service to be highly degraded and likely not occupied by spikedace or loach minnow. Under the No Action Alternative, these stream segments would maintain critical habitat designation and Section 7 consultation could occur. Although the streams are considered to be highly degraded and likely not occupied, the impact of the existing critical habitat designation would be anticipated to result in minor, beneficial impacts to wetlands and floodplains due to increased conservation measures to help conserve PBFs and the integrity of riparian ecosystems, including wetland and floodplain resources .

### **3.3.2.2 Alternative A**

Compared to the No Action Alternative, Alternative A would result in an increase of up to 239 miles of designated critical habitat. This would result in (1) an increase in the number of new and reinitiated Section 7 consultations for proposed actions with a federal nexus, including activities that could affect wetlands and floodplains, based solely on the presence of designated critical habitat and (2) the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spikedace and loach minnow critical habitat. The outcome of future consultations would depend on the details of project proposals and the analysis of effects, which are unknowable at this time. Conservation of the spikedace and loach minnow would likely require, at a minimum, maintenance of existing populations. Therefore, the conservation value of proposed critical habitat must sustain existing populations found within those segments.

The additional consultations (those based solely on the presence of designated habitat) would moderately increase administrative costs to the Service, the action agencies, and any project proponent involved in the consultation process. Outcomes of consultations for critical habitat may also include reasonable and prudent alternatives, and other conservation measures designed to maintain spikedace and loach minnow PBFs. The specific modifications to flood control activities that may result from critical habitat designation, the beneficial effects of those modifications to wetlands and floodplains, and

the costs attributable solely to designating critical habitat as opposed to listing the species cannot be predicted with precision. Past consultations involving critical habitat areas have resulted in relatively minor changes to proposed projects. Conservation measures related to habitat protection have required the use of BMPs, which are mandated by the Clean Water Act permitting requirements. It is likely that the outcomes and impacts of future Section 7 consultations for spikedace and loach minnow critical habitat would be similarly minor in scope.

Flood control projects are basically designed to protect residences and businesses from stormwater runoff. Most of the stream segments proposed for critical habitat designation are located in areas removed from higher density human populations, and are in areas that naturally provide flood control through expanded floodplains and braided channels or restricted canyons. Therefore, future flood control methods and plans are not expected to be impacted by the designation of critical habitat in areas not previously designated. Most flood control consultations are conducted under the emergency consultation process and do not include reasonable and prudent measures or alternatives. Therefore, consultations conducted for flood control methods would experience minor modification from the designation of critical habitat.

Under the current proposal, the section of the Verde River downstream of the Prescott and Coconino National Forests that flows through private lands is proposed for critical habitat designation. This stream segment was excluded in 2007 final rule (No Action Alternative) but is not being considered for exclusion in the current proposal. Under Alternative A, this segment of the Verde River would be subject to Section 7 consultations for proposed actions with a federal nexus, including activities that could affect wetlands and floodplains.

Under Alternative A, stream segments excluded from critical habitat designation would not be subject to Section 7 consultation. The impact on the wetlands and floodplains associated with the excluded stream segments would depend on whether a management plan was in place, and the conservation measures included in that management plan. The impact of excluding an area with a potential for future project activities due to economic, national security, or other needs would depend on whether the exclusion area had sufficient conservation measures in place to protect wetlands and floodplains.

The segment of the Verde River that flows through lands owned by the Yavapai-Apache Nation was excluded in the No Action Alternative (2007 final rule) and is being considered for exclusion in the proposed rule, along with portions of Beaver/Wet Beaver Creeks. The tribe prepared a management plan for the Southwestern Willow Flycatcher in 2005 and issued a resolution to protect a 300-foot riparian conservation corridor in 2006. Should the Service decide to exclude this area because of these and other conservation measures being in place, no impacts to wetlands and floodplains are anticipated for the segment of the Verde River that flows through Yavapai-Apache tribal lands.

The East Fork White River is within the boundaries of lands owned by the White Mountain Apache Tribe. It was excluded in the No Action Alternative (2007 final rule), and is being considered for exclusion in the proposed rule under Alternative A. A management plan was prepared by the tribe in 2000. Should the Service decide to exclude this area and use the management plan in lieu of critical

habitat designation, no impacts to wetlands and floodplains are anticipated for the segment of the East Fork White River that flows through White Mountain Apache tribal lands.

During the 2005–2007 critical habitat designation period, the San Carlos Apache Tribe expressed concern that the designation of critical habitat for the spikedace and loach minnow would further complicate the procedure for getting the New Mexico Unit of the CAP project approved (Service 2006b). The Bureau of Reclamation has stated that this project would be reevaluated before an exchange could occur and a new consultation is likely. The segment of Eagle Creek that flows through San Carlos Apache tribal lands was excluded from designation in the No Action Alternative (2007 final rule), and is being considered for exclusion in the proposed rule. A management plan was prepared by the tribe in 2005 and was the basis for exclusion from the 2007 critical habitat designation. Should the San Carlos Apache Tribe submit a management plan for the current rule making process, the Service may again consider excluding stream segments that flow through tribal lands. As such, under Alternative A, impacts to wetlands and floodplains cannot be determined for the segment of Eagle Creek that flows through San Carlos Apache tribal lands.

Stream segments on Eagle Creek and on the upper Gila River that are predominantly owned by Freeport-McMoRan (formerly Phelps Dodge Company) were excluded from designation in the No Action Alternative (2007 final rule). These stream segments and portions of the San Francisco and Mangas Creek are again being considered for exclusion in the 2010 proposed rule because of submitted action plans. Phelps-Dodge had prepared a management plan for these areas, and Freeport-McMoRan updated those plans for the above stream segments. Designation of spikedace and loach minnow critical habitat may affect water use and management in New Mexico relative to the proposed New Mexico Unit of the CAP. Because the future of this project is uncertain, potential impacts of spikedace and loach minnow critical habitat designation or exclusion on wetlands and floodplains are not estimated.

### **3.3.2.3 Alternative B**

Compared to the No Action Alternative, impacts associated with the designation of additional critical habitat would be similar to those identified for Alternative A. However, compared to Alternative A, no stream reaches would be excluded under Alternative B, resulting in a potential increase of 313 miles. Accordingly, Alternative B would result in a small but unknown increase in the number of additional new and reinitiated Section 7 consultations based solely on the presence of designated critical habitat on areas being considered for exclusion under Alternative A, and on the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spikedace and loach minnow in critical habitat on areas being considered for exclusion under Alternative A. Similar to Alternative A, the impact of the additional Section 7 consultations is anticipated to result in minor, beneficial impacts on wetlands and floodplains related to required conservation measures benefiting the habitat values for spikedace or loach minnow. Some required Section 7 conservation measures could have minor, adverse impacts on activities (e.g., flood control projects, catchment basins, hard bank stabilization, channelization etc.) that could negatively impact the habitat values of spikedace or loach minnow.

## 3.4 Natural Resources—Fish, Wildlife, Plants, and Biological Communities

### 3.4.1 Existing Conditions

Several hundred species of fish, wildlife, and plants, including threatened, endangered, and sensitive (TES) species occupy the aquatic and terrestrial biological communities within the proposed critical habitat areas (Rea 1983; McNamee 1994). This value is evidenced by the disproportionately large number of species that utilize riparian habitat for all or part of their life history requirements compared to the area of other habitats (Hubbard 1977; Ohmart and Anderson 1982).

Proposed critical habitat areas include one or more of the PBFs for spikedace and loach minnow described in Section 2.4 or can be restored to provide those elements. The presence of these elements and the potential to restore them indicate the proposed areas contain a relatively intact riparian habitat that is of great importance to wildlife species. The occurrence of any given species, whether fish, wildlife, or plant within the proposed critical habitat varies widely and depends on local and regional environmental conditions such as elevation, climate, stream type, water management activities, proximity to land development or other human-induced disturbances, and grazing practices (Ffolliott et al. 2004).

#### 3.4.1.1 Fish

The native fish community is an important component of the biological environment of the critical habitat areas. While the native fish fauna of the Gila River Basin originally included 17 species, one of those is extinct and several have become extirpated from the basin. Remaining or reestablished native species in the proposed critical habitat areas range from two to eight and include spikedace, loach minnow, desert sucker, Sonora sucker, razorback sucker, roundtail chub, Gila chub (*Gila intermedia*), Gila topminnow, headwater chub (*Gila nigra*), speckled dace, longfin dace, and Apache trout (*Onchorhynchus gilae apache*). See Section 3.4.1.4 in this document for a description of TES fish species that occur in the proposed critical habitat areas.

#### Nonnative Aquatic Species

Numerous nonnative aquatic species also occur within the proposed critical habitat areas, notably fish in the family Centrarchidae, which includes bluegill (*Lepomis macrochirus*), green sunfish (*Lepomis cyanellus*), largemouth bass (*Micropterus salmoides*), and smallmouth bass (*Micropterus dolomieu*). Other nonnative fish include the red shiner (*Cyprinella lutrensis*), flathead catfish (*Pylodictis olivaris*), channel catfish (*Ictalurus punctatus*), rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), yellow bullhead (*Ameiurus natalis*), and black bullhead (*Ictalurus melas*) (Service 2005). Most nonnative fish species were introduced into Arizona streams as sport fish, and sport fish stocking is an ongoing activity. Another particularly invasive species, mosquitofish (*Gambusia affinis*), was widely introduced to control mosquitoes (Courtenay and Meffe 1989). Nonnative fish have also been introduced into some streams through the use as live bait by anglers. Current Arizona fishing

regulations prohibit the use of live bait fish in any waters within Coconino, Navajo, Apache, Pima, and Cochise Counties. All other Arizona counties have specific baitfish regulations by body of water or area (AGFD 2011 and 2012 Fishing Regulations). New State regulations prohibit the use of nonnative bait fish, except that fathead minnow (*Pimephales promelas*) is allowed to be used as a bait fish in the Gila and San Francisco river drainages (Stevenson 2010). Additionally stock tanks can be a potential source of nonnative fish being released into a stream if they are beached or during periods of overflow. Several of these species have demonstrated an ability to displace native fish populations within a short period of time (Courtney and Meffe 1989). Introduced crayfish (*Orconectes* spp. and *Procambarus* spp.) and bullfrogs (*Rana catesbeiana*) may also be found in proposed critical habitat areas and have a profound adverse impact on native fish communities and aquatic habitat structure (Bury and Whelan 1984; Hayes and Jennings 1986; Lodge et al. 2000).

No, or low levels (sufficiently low to allow persistence of spinedace and loach minnow), of nonnative aquatic species are present in Aravaipa Creek (Unit 3), Redfield Canyon (Unit 3), Hot Springs Canyon (Unit 3), and Bass Canyon (Unit 3). Nonnative trout are very abundant in the upper Blue River (Unit 7), and Campbell Blue Creek (Unit 7). Most of Bonita Creek (Unit 4) in the proposed critical habitat section has nonnative species. A portion of the Blue River and a small portion of Bonita Creek will be restored to levels of nonnative aquatic species low enough to sustain populations after the implementation of conservation and rehabilitation efforts (Service 2010).

### **3.4.1.2 Wildlife**

Hundreds of species of mammals, birds, amphibians, reptiles, and invertebrates depend on riparian and aquatic habitats that are likely to occur in the proposed critical habitat areas (Omhart and Anderson 1982). Wildlife species commonly found in southwestern riparian habitats are listed in Brown's *Biotic Communities* (1994). These species include small rodents; furbearers such as beaver (*Castor canadensis*) and muskrats (*Ondatra zibethicus*); small carnivores such as raccoon (*Procyon lotor*), otter (*Lontra canadensis*), and bobcat (*Lynx rufus*), and larger carnivores such as mountain lion (*Felis concolor*), black bear (*Ursus americanus*), and coyote (*Canis latrans*); and wide-ranging mammals such as deer (*Odocoileus* spp.) and javelina (*Pecari tajacu*). Migratory and resident birds such as gray hawk (*Asturina nitida*), common black-hawk (*Buteogallus anthracinus*), marsh wren (*Cistothorus palustris*), summer tanager (*Piranga rubra*), and turkey (*Meleagris* spp.) also depend on riparian habitats. Amphibians such as tree frogs (*Pternohyla* spp.) and salamanders (*Ambystoma* spp.) and reptiles such as garter snakes (*Thamnophis* spp.), Sonoran mud turtle (*Kinosternon sonoriense sonoriense*), and leopard frogs (*Lithobates* spp.) depend on riparian and aquatic habitats for all or most of their life cycles. Hundreds of species of invertebrates also utilize southwestern riparian and aquatic habitats and depend on these habitats for all or most of their life cycles (Merritt and Cummins 1984). See Section 3.4.1.4 of this document for a description of threatened and endangered wildlife species that are likely to occur in the critical habitat areas.

### 3.4.1.3 Plants

Riparian vegetation along the proposed critical habitat streams is primarily cottonwood (*Populus fremontii*, *P. angustifolia*) and willow (*Salix* spp.). At higher elevations there is also extensive alder (*Alnus oblongifolia*) and boxelder (*Acer negundo*). At middle elevations sycamore (*Platanus wrightii*), velvet ash (*Fraxinus velutina*), and walnut (*Juglans major*) are major components, and at lower elevations mesquite (*Prosopis juliflora*), seepwillow (*Baccharis* sp.), and hackberry (*Celtis reticulata*) are prominent (Brown 1994).

Sections of many Gila Basin rivers and streams have been, and continue to be, channelized for flood control, which has disrupted natural channel dynamics (sediment scouring and deposition) and has promoted the loss of riparian plant communities. Channelization can affect aquatic and riparian habitats by reducing habitat complexity, eliminating cover, reducing nutrient input, improving habitat for nonnative species, changing sediment transport, altering substrate size, increasing flow velocities, and reducing the length of the stream (and therefore the amount of aquatic habitat available) (Gorman and Karr 1978, pp. 512–513; Simpson 1982, p. 122; Schmetterling et al. 2001, pp. 7–10). Historical channelization has contributed to riparian and aquatic habitat decline, most notably eliminating cover and reducing nutrient input (Service 2010).

### 3.4.1.4 Threatened, Endangered, and Sensitive Species

There are a number of other endangered and threatened species in the proposed critical habitat areas for spikedace and loach minnow. The endangered razorback sucker was historically stocked in the Gila Box Riparian National Conservation Area (RNCA), which includes the Gila River, Bonita Creek, Eagle Creek and the San Francisco River. Additionally, the razorback sucker has been stocked in the Blue and Verde Rivers (56 FR 54957). Critical habitat for razorback sucker includes the Verde River and its 100-year floodplain from Perkinsville, Arizona, to Horseshoe Reservoir (59 FR 13374), a portion of which overlaps proposed critical habitat for spikedace and loach minnow (Unit 1). The endangered Colorado pikeminnow, formerly Colorado squawfish, (*Ptychocheilus lucius*) has also been stocked into the Verde River, as a nonessential experimental population (56 FR 54957). The nonessential designation indicates the loss of the population would not be likely to appreciably reduce the likelihood of survival of the species in the wild. The threatened Apache trout has been stocked into the North Fork East Fork Black River, and is being considered for stocking in other portions of proposed critical habitat for spikedace and loach minnow in the future (Service 2009b). Critical habitat for the endangered Gila chub overlaps proposed critical habitat for spikedace and loach minnow, including portions of the Verde River Subbasin (Unit 1), the San Pedro River Subbasin (Unit 3), and the Eagle Creek Subbasin (Unit 5).

The endangered southwestern willow flycatcher (*Empidonax traillii extimus*) is found in many of the same critical habitat areas proposed for spikedace and loach minnow. Critical habitat for the flycatcher overlaps proposed critical habitat for spikedace in the Salt River Subbasin (Unit 2), and for spikedace and loach minnow in the Verde River Subbasin (Unit 1) and the Gila River Subbasin (Unit 8) (62 FR 39129).

The endangered Huachuca water umbel, a semi-aquatic perennial plant, occurs in the San Pedro Subbasin (Unit 3), and overlaps proposed critical habitat for spikedace and loach minnow in the San Pedro River.

Within the proposed critical habitat areas, the bald eagle (*Haliaeetus leucocephalus*), which has been removed from the list of species protected under the ESA but is currently a USFS and BLM sensitive species, nests along the Verde River and on the San Francisco River. Wintering bald eagles use many of the streams included in the proposed critical habitat designation for spikedace and loach minnow.

### **3.4.2 Environmental Consequences**

#### **3.4.2.1 No Action Alternative**

Under the No Action Alternative, 522 miles of stream segments would remain designated as critical habitat for spikedace and/or loach minnow, and no additional spikedace and loach minnow critical habitat would be designated under the ESA. Existing exclusion areas would remain in effect. Section 7 consultations would continue for proposed actions with a federal nexus, including activities, based solely on the presence of designated critical habitat. Stream segments occupied by the spikedace and loach minnow would be subject to Section 7 consultations regardless of the area's status as critical habitat. The conservation measures implemented as a result of Section 7 consultation under the No Action Alternative may require specific modifications to project proposals. These modifications may require adjustments to project plans and schedules that may have a negligible to minor, indirect adverse impact to natural resource management agency activities. In addition, the No Action Alternative is anticipated to have minor beneficial impacts on natural resources, i.e., wildlife, plants, and biological communities, benefitting from required conservation measures for spikedace or loach minnow.

In comparison to Alternatives A and B, the No Action Alternative includes three stream segments not in the 2010 proposed rule. These stream segments are now considered by the Service to be highly degraded and likely not occupied by spikedace or loach minnow. Under the No Action Alternative, these stream segments would maintain critical habitat designation and Section 7 consultation could occur. Although the streams are considered to be highly degraded and likely not occupied by spikedace or loach minnow, the critical habitat designation could lead to requirements for conservation measures that could have minor beneficial impacts on natural resources in these areas.

#### **3.4.2.2 Alternative A**

Compared to the No Action Alternative, Alternative A would result in an increase of up to 239 miles of designated critical habitat for spikedace and loach minnow. This increase in designated critical habitat is anticipated to result in (1) an increase in the number of additional new and reinitiated Section 7 consultations based solely on the presence of designated critical habitat and (2) the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spikedace and loach minnow in critical habitat.

The outcome of future consultations would depend on the details of natural resource management project proposals and the analysis of effects, which are unknowable at this time. Conservation of the spikedace and loach minnow would likely require, at a minimum, maintenance of existing populations. Therefore, the conservation value of proposed critical habitat must sustain existing populations found within those segments. The additional consultations (those based solely on the presence of designated critical habitat) would moderately increase administrative costs to the Service, the action agencies, and any project proponent involved in the consultation process. Outcomes of consultations for critical habitat may also include reasonable and prudent alternatives, reasonable and prudent measures, and other conservation measures designed to maintain spikedace and loach minnow PBFs.

The specific modifications to natural resource management activities that may result from critical habitat designation, the beneficial effects of those modifications to natural resources, and the costs attributable solely to designating critical habitat as opposed to listing the species cannot be predicted with precision. Past consultations involving critical habitat areas have resulted in relatively minor changes to proposed projects. Conservation measures related to habitat protection have required the use of BMPs, which are mandated by the Clean Water Act permitting requirements. It is likely that the outcomes and impacts of future Section 7 consultations for spikedace and loach minnow critical habitat would be similarly minor in scope.

Conservation actions that might be performed for a variety of fish species include, but are not limited to (1) translocations, repatriations, and augmentations, (2) construction of barriers to fish migration, (3) modification of barriers to allow fish passage, (4) modification of instream habitat to benefit target species, (5) alteration of riparian habitat to benefit target species, (6) mechanical removal of nonnative predators and competitors, (7) application of chemicals to eradicate fishes, etc. These types of action would require Section 7 consultations. If Alternative A is implemented, Section 7 consultations will be required for conservation actions in those stream segments that are unoccupied by spikedace and loach minnow but are considered critical habitat.

Generally speaking, the effects on future natural resource management agency activities are expected to be minor because (1) most of the previously completed Section 7 consultations involving critical habitat for these fish species in small southwestern streams have resulted only in minor project alterations to proposed projects; (2) the number of consultations is not expected to change; few projects and operations would be subject to consultation based solely on the presence of designated critical habitat because most of the proposed segments are occupied by the spikedace and loach minnow; (3) if the outcome of those few consultations were based solely on critical habitat that do not reach the threshold of adverse modification they could only result in discretionary conservation recommendations to reduce impacts on PBFs because there is no incidental take statement or reasonable and prudent measures for adverse effects to critical habitat; and (4) the small likelihood that reasonable and prudent alternatives developed under the jeopardy standard would be changed substantially with the addition of critical habitat designation and application of the adverse modification standard.

Compared to the No Action Alternative, Alternative A would result in minor beneficial impacts on native fish and other aquatic species, wildlife and plants, including listed, proposed/candidate, and sensitive species due to increased conservation measures to help conserve PBFs for spikédace and loach minnow, and natural riparian and aquatic ecosystems. Conservation measures would likely serve to maintain water quality, natural stream flow characteristics, and stream morphology, as well as other PBFs that sustain aquatic and riparian ecosystem integrity. As a result, all native fish, wildlife, and plants, including federal candidate, proposed, or listed species, that are components of those ecosystems, would benefit. Minor direct and indirect, beneficial impacts are anticipated because the outcomes of consultations for critical habitat are not likely to change substantially management practices or various uses of proposed critical habitat segments. Moderate direct and indirect, beneficial impacts may occur if proposed natural resource projects are substantially altered because of the proposed critical habitat.

In addition to the spikédace and loach minnow, there are other aquatic species that are likely to benefit from the proposed critical habitat designation. These include roundtail chub, headwater chub, desert sucker, Sonora sucker, speckled dace, longfin dace, leopard frogs and other amphibians, snails and other aquatic invertebrates, and aquatic mammals and plants. Riparian vegetation would benefit through conservation measures that ensure natural streamflow patterns, as well as conservation measures to anchor soils and reduce erosion and excessive sedimentation into critical habitat stream segments. Maintenance of riparian vegetation would benefit all wildlife dependent on riparian habitats, including threatened and endangered species such as the southwestern willow flycatcher.

Critical habitat has already been designated for other species in some of the areas proposed for designation as spikédace and/or loach minnow critical habitat, and thus already receives some degree of protection from Section 7 consultations. Portions of the Verde River Subbasin (Unit 1), the Salt River Subbasin (Unit 2), and the Gila River Subbasin (Unit 8) have been designated for southwestern willow flycatcher. Portions of the Verde River Subbasin (Unit 1) and the Gila River Subbasin (Unit 8) have been designated for the razorback sucker. Portions of the Verde River Subbasin (Unit 1), the San Pedro River Subbasin (Unit 3), the Eagle Creek Subbasin (Unit 5), and the Gila River Subbasin (Unit 8) have been designated for the Gila chub. A portion of the San Pedro River Subbasin (Unit 3) has been designated for the Huachuca water umbel.

Nonnative fish, such as the red shiner, that are considered harmful to the spikédace and loach minnow would likely be adversely affected if agency managers implement a program to remove them from critical habitat. Such a program would likely be instituted prior to reintroducing the spikédace and loach minnow into critical habitat areas. The adverse impacts on nonnative fish populations throughout the Gila River Basin would be negligible because of their large numbers and invasive nature. Sport fish populations and AGFD's management of sport fish populations in critical habitat areas may require additional coordination with the Service.

If one or more exclusion areas are adopted by the Service as part of Alternative A, the impact on the natural resources of the excluded stream segment would depend on the whether a management plan were implemented, and the conservation measures included in that plan. The potential impact to

natural resources from excluding an area due to economic, national security, or other needs would depend on whether the exclusion area had sufficient conservation measures in place to protect the natural resources.

The segment of the Verde River that flows through lands owned by the Yavapai-Apache Nation was excluded in the No Action Alternative (2007 final rule) and is being considered for exclusion in the 2010 proposed rule, along with portions of Beaver/Wet Beaver Creeks. The Nation prepared a management plan for the southwestern willow flycatcher in 2005 and issued a resolution to protect a 300-foot riparian conservation corridor in 2006. Should the Service decide to exclude this area because of these and other conservation measures being in place, no impacts to natural resources are anticipated for the segment of the Verde River that flows through Yavapai-Apache tribal lands.

The East Fork White River segment is within the boundaries of lands owned by the White Mountain Apache Tribe, was excluded in the No Action Alternative (2007 final rule), and is being considered for exclusion in the 2010 proposed rule. A management plan was prepared by the tribe in 2000. Should the Service decide to exclude this area and use the management plan in lieu of critical habitat designation, no impacts to natural resources are anticipated for the segment of the East Fork White River that flows through White Mountain Apache tribal lands.

During the 2005–2007 critical habitat designation period, the San Carlos Apache Tribe expressed concern that the designation of critical habitat for the spikedace and loach minnow would further complicate the procedure for getting the New Mexico Unit of the CAP project approved (Service 2006b). The Bureau of Reclamation has stated that this project would be reevaluated before an exchange could occur and a new consultation is likely. The segment of Eagle Creek that flows through San Carlos Apache tribal lands was excluded from designation in the No Action Alternative (2007 final rule), and is being considered for exclusion in the proposed rule. A management plan was prepared by the tribe in 2005 and was the basis for exclusion from the 2007 critical habitat designation. Should the San Carlos Apache Tribe submit a management plan for the current rule making process, the Service may again consider excluding stream segments that flow through tribal lands. As such, under Alternative A, impacts to natural resources cannot be determined for the segment of Eagle Creek that flows through San Carlos Apache tribal lands.

Stream segments on Eagle Creek and on the upper Gila River that are predominantly owned by Freeport-McMoRan (formerly Phelps Dodge Company) were excluded from designation in the No Action Alternative (2007 final rule). These stream segments and portions of the San Francisco and Mangas Creek are again being considered for exclusion in the 2010 proposed rule because of submitted action plans. Phelps-Dodge had prepared a management plan for these areas, and Freeport-McMoRan updated those plans for the above stream segments. Designation of spikedace and loach minnow critical habitat may affect water use and management in New Mexico relative to the proposed New Mexico Unit of the CAP. Because the future of the New Mexico Unit of the CAP project is uncertain, potential impacts of spikedace and loach minnow critical habitat designation or exclusion on natural resources are not estimated.

### **3.4.2.3 Alternative B**

Compared to the No Action Alternative, impacts associated with the designation of an additional critical habitat for spikedace and/or loach minnow would be similar to those identified for Alternative A. However, compared to Alternative A, no stream reaches would be excluded under Alternative B, resulting in a potential increase of 313 miles. Accordingly, Alternative B would result in a small but unknown increase in the number of additional new and reinitiated Section 7 consultations based solely on the presence of designated critical habitat on areas being considered for exclusion under Alternative A, and on the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spikedace and loach minnow in critical habitat on areas being considered for exclusion under Alternative A. Similar to Alternative A, the impact of the additional Section 7 consultations is anticipated to result in minor beneficial impacts on natural resources benefitting from required conservation measures for spikedace or loach minnow.

## **3.5 Land Use and Management**

### **3.5.1 Existing Conditions**

Federal, state, county, and tribal governments that have management authority for the proposed spikedace and loach minnow critical habitat stream segments are listed in Tables 7 and 8 and displayed in Figures 4–21. In some cases different governments may have management responsibility for different portions of a given proposed critical habitat segment. Just over half of the proposed critical habitat is on federal land. These public lands are managed according to the pertinent management plan for each Forest Service district office and BLM field office.

#### **3.5.1.1 Federal Lands**

There is a wide diversity of human activities and land uses throughout the proposed critical habitat areas. On the Upper Gila, Verde, Blue, San Francisco, Tularosa, and Black Rivers and their tributaries and Eagle and Tonto Creeks, the predominant land ownership is Forest Service. Uses of National Forest lands include timber harvest, grazing, recreation, roads, mining, and other activities.

On the San Pedro River, and Aravaipa and Bonita Creeks, the BLM is a primary manager. Livestock grazing, recreation, roads, and mining are major uses of those lands.

On both Forest Service and BLM managed lands, there are also a number of special use areas designated that offer some level of protection to the streams from adverse impacts of human use. Table 9 lists these special use areas and identifies in which proposed critical habitat unit(s) each special use area is located. These special use areas are shown in the figures included in this EA.

National Park Service lands include the Gila Cliff Dwellings National Monument on the West Fork Gila River, Tuzigoot National Monument on the Verde River, and Montezuma's Castle National Monument on Beaver Creek.

**Table 9 Special Use Areas Within Proposed Critical Habitat for Spikedace and Loach Minnow**

<b>Special Use Area<sup>a</sup></b>	<b>Spikedace Critical Habitat Unit</b>	<b>Loach Minnow Critical Habitat Unit</b>
Cedar Bench Wilderness	1	—
Sycamore Canyon Wilderness	1	1
Mazatzal Wilderness	1	1
Verde Wild and Scenic River	1	—
Fossil Creek Wild and Scenic River	1	1
Hellsgate Wilderness	2	—
Aravaipa Wilderness	3	3
San Pedro RNCA	3	3
Redfield Canyon Wilderness	3	3
Gila Box RNCA	4, 6	4, 6
Blue Range Primitive Area	7	7
Gila Wilderness	8	8

*Source:* Unpublished maps (Logan Simpson Design 2011); maps based on shape-file data from USDA Forest Service Recreation Solutions (2009; for wild and scenic rivers only) and Arizona State Land Department, Arizona Land Resources Information System (1990; for all other special use areas).

<sup>a</sup> A Wild and Scenic River Suitability Study was completed by the USFS for the Blue River in October 2010.

### 3.5.1.2 Private Lands

Private lands are scattered throughout the proposed critical habitat areas with large areas of private land on the Verde River, in the Cliff/Gila Valley on the upper Gila River and the middle and lower San Pedro River. Uses on the private lands are primarily agricultural, including livestock grazing, pasture, and irrigated cropland. Significant numbers of irrigation diversions exist in these areas. In the Verde Valley and upper San Pedro there is extensive urban and suburban development along the rivers. Small towns and small-lot residential and summer-home developments exist in many other areas. Substantial areas of land are owned by large mining companies, such as Freeport-McMoRan Corporation (formerly Phelps Dodge), with concentrations in the Cliff/Gila Valley, and the lower San Francisco River and Eagle Creek. Some of these lands are presently used for agriculture and water rights and others are used for large open-pit mining, milling, and tailings disposal. The Nature Conservancy, a nonprofit international environmental organization, also owns substantial areas of land within the proposed critical habitat areas, including areas on the upper Gila River, Aravaipa Creek, San Pedro River, Hotsprings and Redfield Canyons, and the Verde River. The Nature Conservancy's lands are managed for ecological values with recreational use as a secondary activity.

### **3.5.1.3 Tribal Lands**

Tribal lands exist in the vicinity of the proposed critical habitat areas. Tribal lands were excluded from the 2007 final rule and are being considered under Alternative A for exclusion from critical habitat designation. As discussed in Chapter 2, Alternatives, portions of the Verde River and Beaver Creek/Wet Beaver Creek flow through Yavapai-Apache tribal lands. Portion of the White River and East Fork White River that flow through White Mountain Apache lands are included in the proposal, as is a portion of Eagle Creek, which flows through the San Carlos Apache lands. These tribal lands are primarily used for livestock grazing, fuelwood cutting, roads, and recreation.

### **3.5.1.4 State and Local Lands**

There are small portions of the Gila, Verde, San Pedro, and San Francisco Rivers and/or their tributaries and Eagle, Granite, and Aravaipa Creeks owned by state land departments.

Granite Creek occurs on lands managed by the AGFD in their Upper Verde Wildlife Area. These lands are primarily managed for riparian habitat and native fish diversity. Sand and gravel operations and livestock grazing are the major uses on adjacent lands.

Proposed utility projects, livestock grazing, mining, road and bridge construction and maintenance, and water developments are major uses of those lands on the Verde, Gila, San Pedro, and San Francisco Rivers; Aravaipa and Eagle Creeks; and Hot Springs, Bass, and Redfield Canyons.

As discussed in Chapter 2, Alternatives Including the No Action Alternative, the proposed critical habitat segments in Alternatives A and B fall into 9 counties in Arizona and 3 counties in New Mexico.

## **3.5.2 Environmental Consequences**

### **3.5.2.1 No Action Alternative**

Under the No Action Alternative, 522 miles of stream segments would remain designated as critical habitat for spikedace and/or loach minnow, and no additional spikedace and loach minnow critical habitat would be designated under the ESA. Existing exclusion areas would remain in effect. Section 7 consultations would continue for proposed actions with a federal nexus, including land use activities, based solely on the presence of designated critical habitat for spikedace or loach minnow. Stream segments occupied by the spikedace and loach minnow would be subject to Section 7 consultations regardless of the area's status as critical habitat. The conservation measures implemented as a result of Section 7 consultation under the No Action Alternative may require specific modifications to land use activities such as resource management plans that may require adjustments to project plans, schedules, and operations. Therefore, under the No Action Alternative, some required Section 7 conservation measures could have minor adverse impacts on land use and management activities with a federal nexus (e.g., land development, grazing on public lands, and mining) that could negatively impact the habitat values of spikedace or loach minnow.

In comparison to Alternatives A and B, the No Action Alternative includes three stream segments not in the 2010 proposed rule. These stream segments are now considered by the Service to be highly degraded and likely not occupied by spinedace or loach minnow. Under the No Action Alternative, these stream segments would maintain critical habitat designation and Section 7 consultation could occur. Because the streams are considered to be highly degraded and likely not occupied, this would result in negligible adverse impacts to land use and management in these areas.

### **3.5.2.2 Alternative A**

Compared to the No Action Alternative, Alternative A would result in an increase of up to 239 miles of designated critical habitat. This would result in (1) an increase in the number of new and reinitiated Section 7 consultations for proposed actions with a federal nexus, including land management activities, based solely on the presence of designated critical habitat and (2) the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spinedace and loach minnow critical habitat.

The outcome of future consultations would depend on the details of land use project proposals and the analysis of effects, which are unknowable at this time. Conservation of the spinedace and loach minnow would likely require, at a minimum, maintenance of existing populations. Therefore, the conservation value of proposed critical habitat must sustain existing populations found within those segments. The additional consultations (those based solely on the presence of designated habitat) would moderately increase administrative costs to the Service, the action agencies, and any project proponent involved in the consultation process. Outcomes of consultations for critical habitat may also include reasonable and prudent alternatives and other conservation measures designed to maintain spinedace and loach minnow PBFs. These conservation measures may result in a minor adverse impacts on land use and management projects with a federal nexus by requiring adjustment to project plans, schedules, and operations; and by increasing costs to action agencies and project proponents.

The specific modifications to land use management activities that may result from critical habitat designation, and the costs attributable solely to designating critical habitat as opposed to listing the species, cannot be predicted with precision. Past consultations involving critical habitat areas have resulted in relatively minor changes to proposed land use management projects. Conservation measures related to habitat protection have required the use of BMPs, which are mandated by the Clean Water Act permitting requirements. It is likely that the outcomes and impacts of future Section 7 consultations for spinedace and loach minnow critical habitat would be similarly minor in scope. Based on past consultations, the types of additional management actions that may be required include, but are not limited to revising resource management plans; mapping, surveying and monitoring the spinedace and loach minnow habitats and preparing survey and monitoring reports; restoring stream habitats; removing nonnative fish and other nonnative aquatic species; removing invasive, nonnative plants; implementing and monitoring grazing restrictions; implementing and monitoring recreation restrictions; and realigning roads and trails. Implementing conservation measures for spinedace and loach minnow may affect how action agencies meet other management objectives. For example, use of pesticides and herbicides may be precluded in critical habitat.

For most areas proposed for critical habitat designation, the effects on future land use management activities from critical habitat designation are expected to be minor and would not preclude any intended land use management activities because (1) most of the previously completed Section 7 consultations involving critical habitat for these fish species in small southwestern streams have resulted only in minor project alterations to proposed projects; (2) the number of consultations is not expected to change; few projects and operations would be subject to consultation based solely on the presence of designated critical habitat because most all of the proposed segments are occupied by the spinedace and loach minnow; (3) if the outcome of those few consultations were based solely on critical habitat that do not reach the threshold of adverse modification they could only result in discretionary conservation recommendations to reduce impacts on PBFs because there is no incidental take statement or reasonable prudent measures for adverse effects to critical habitat; and (4) the small likelihood that reasonable and prudent alternatives developed under the jeopardy standard would be changed substantially with the addition of critical habitat designation and application of the adverse modification standard.

The most likely locations for new development activities in occupied spinedace and loach minnow critical habitat areas are along Oak and Beaver/Wet Beaver Creeks due to the presence of a relatively large amount of private land, a relatively large current population, and the proximity of existing residential and commercial development in unoccupied critical habitat (IEc 2011a). Consultations related to development activities in critical habitat areas are relatively rare and the Service does not anticipate consultations or conservation efforts related to future development.

Concerning transportation, the Service has conducted about 12 formal consultations on transportation projects related to spinedace and loach minnow (IEc 2011a). These have primarily been for bridge and road construction and maintenance projects. The project modifications that have resulted from these consultations include exclusionary netting, monitoring, water quality testing, and reporting. Formal consultations are anticipated for the unoccupied segments of the West Clear Creek (State Route 260) and San Pedro River (State Route 92) road crossings. Additionally, major roads crossing critical habitat reaches will likely undergo maintenance activity over the next 20 years that could result in Section 7 consultation (IEc 2011a). The New Mexico Department of Transportation (District 1) has indicated that critical habitat designation could influence the priority of transportation projects for repair in New Mexico (IEc 2011a).

The Arizona Department of Transportation (ADOT) has responsibility for road and bridge construction and maintenance. The agency uses best management practices to avoid detrimental impacts from transportation activities. Transportation activities can impact spinedace and loach minnow habitat through soil disturbance, leading to increased sediment loads in streams if not properly managed through best management practices. Increases in surface water runoff to streams can also result from increases in impervious surfaces that prevent or impeded water infiltration into soils. ADOT is currently planning one transportation project in occupied proposed critical habitat (Aravaipa Creek) and nine road projects that cross unoccupied reaches in the Verde River (State Routes 89A and 260 and Interstate 17), Aravaipa (State Route 77), San Francisco River (US 191 and 180), and Gila River (US 180, 92,

and 211) (IEc 2011a). ADOT also has a new bridge planned for Tonto Creek and a bridge replacement planned for the San Pedro River.

If one or more exclusion areas are adopted by the Service as part of Alternative A, the impact on land management in the vicinity of the excluded stream segment would depend on the whether a management plan were implemented, and the conservation measures included in that plan.

The segment of the Verde River that flows through lands owned by the Yavapai-Apache Nation was excluded in the No Action Alternative (2007 final rule) and is being considered for exclusion in the 2010 proposed rule, along with portions of Beaver/Wet Beaver Creeks. The tribe prepared a management plan for the Southwestern Willow Flycatcher in 2005 and issued a resolution to protect a 300-foot riparian conservation corridor in 2006. Should the Service decide to exclude this area because of these and other conservation measures being in place, no impacts to land use management are anticipated for the segment of the Verde River that flows through Yavapai-Apache tribal lands.

The East Fork White River segment is within the boundaries of lands owned by the White Mountain Apache Tribe, was excluded in the No Action Alternative (2007 final rule), and is being considered for exclusion in the 2010 proposed rule. A management plan was prepared by the tribe in 2000. Should the Service decide to exclude this area and use the management plan in lieu of critical habitat designation, no impacts to land use management are anticipated for the segment of the East Fork White River that flows through White Mountain Apache tribal lands.

During the 2005–2007 critical habitat designation period, the San Carlos Apache Tribe expressed concern that the designation of critical habitat for the spikedace and loach minnow would further complicate the procedure for getting the New Mexico Unit of the CAP project approved (Service 2006b). The Bureau of Reclamation has stated that this project would be reevaluated before an exchange could occur and a new consultation is likely. The segment of Eagle Creek that flows through San Carlos Apache tribal lands was excluded from designation in the No Action Alternative (2007 final rule), and is being considered for exclusion in the proposed rule. A management plan was prepared by the tribe in 2005 and was the basis for exclusion from the 2007 critical habitat designation. Should the San Carlos Apache Tribe submit a management plan for the current rule making process, the Service may again consider excluding stream segments that flow through tribal lands. As such, under Alternative A, impacts to land use management cannot be determined for the segment of Eagle Creek that flows through San Carlos Apache tribal lands.

Stream segments on Eagle Creek and on the upper Gila River that are predominantly owned by Freeport-McMoRan (formerly Phelps Dodge Company) were excluded from designation in the No Action Alternative (2007 final rule). These stream segments and portions of the San Francisco and Mangas Creek are again being considered for exclusion in the 2010 proposed rule because of submitted action plans. Phelps-Dodge had prepared a management plan for these areas, and Freeport-McMoRan updated those plans for the above stream segments. Designation of spikedace and loach minnow critical habitat may affect water use and management in New Mexico relative to the proposed New Mexico Unit of the CAP. Because the future of the New Mexico Unit of the CAP project is

uncertain, potential impacts of spikedace and loach minnow critical habitat designation or exclusion are not estimated.

### **3.5.2.3 Alternative B**

Compared to the No Action Alternative, impacts associated with the designation of additional critical habitat would be similar to those identified for Alternative A. However, compared to Alternative A, no stream reaches would be excluded under Alternative B, resulting in a potential increase of 313 miles. Accordingly, Alternative B would result in a small but unknown increase in the number of additional new and reinitiated Section 7 consultations based solely on the presence of designated critical habitat on areas being considered for exclusion under Alternative A, and on the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spikedace and loach minnow in critical habitat on areas being considered for exclusion under Alternative A. Similar to Alternative A, the impact of the additional Section 7 consultations is anticipated to result in minor adverse impacts on land use and management activities with a federal nexus (e.g., land development, grazing, mining, etc.) that could negatively impact the habitat values of spikedace or loach minnow.

## **3.6 Wildland Fire Management**

### **3.6.1 Existing Conditions**

Wildland fires and fire management activities increasingly affect southwest riparian areas in general, and the spikedace and loach minnow habitat in particular. Native riparian vegetation is not generally fire adapted, and evidence suggests that, historically, fire has not been a major disturbance in the vegetation communities that border southwestern streams. Wildland fire, however, is becoming a more common form of disturbance in riparian habitats throughout the Southwest. The increased prevalence of fire disturbance is attributed to increased fuel loads resulting from control of floods that historically swept away dead vegetation, litter, and woody debris; replacement of native vegetation by exotic species, many of which are highly flammable (e.g., tamarisk); river dewatering; and increased ignitions associated with increased human activity (Service 2002). The top seven fires in Arizona history have occurred since 2002, the largest being the 2011 Wallow fire, which burned 538,049 acres (<http://ktar.com/category/wildfires>; accessed July 15, 2011). The Wallow fire burned through the Black River area, including the North Fork East Fork Black River, East Fork Black River, Coyote Creek, and Boneyard Creek—all of which are proposed as critical habitat for loach minnow.

Current federal fire management practices conform to the National Fire Plan, which was developed by federal agencies in 2001 to address the causes of changing fire regimes and to guide wildland fire management (*FY 2001 Interior and Related Agencies Appropriations Act* [Public Law 106–291]). The implementation plan for this collaborative effort, called the *10-year Comprehensive Strategy*, outlines a comprehensive approach to the management of wildland fire, hazardous fuels, and ecosystem restoration and rehabilitation on federal and adjacent state, tribal, and private forest and range lands in the United States. The four primary goals of this strategy are to (1) improve prevention and

suppression, (2) reduce hazardous fuels, (3) restore fire-adapted ecosystems, and (4) promote community assistance. Possible fire management actions depend on specific circumstances and may include

- reduction of hazardous fuel loads by mechanical, chemical, or biological means;
- reduction of hazardous fuel loads or habitat restoration with prescribed fire, which is any fire ignited by management actions to meet specific objectives;
- wildland fire use, which is the management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas;
- wildland fire suppression.

Consistent with national policy, the focus of fire management has increasingly been on the wildland-urban interface (WUI), which comprises areas where flammable wildland fuels meet or intermingle with structures and other human development. Very little (approximately 2%) of the proposed critical habitat for the spikedace and loach minnow overlaps WUI areas (IEc 2011a).

The WUI areas are closer to developed areas and may be more vulnerable to human-caused fires and consequent fire suppression efforts. In general, however, riparian habitats, areas occupied by federally protected species, and designated or proposed critical habitat areas are primarily managed to protect their resource values.

Section 7 consultations regarding fire management are often programmatic in nature, covering broad-based fire management plans and programs, but consultations may be required for individual burn and rehabilitation plans. Emergency Section 7 consultations for wildland fire suppression are typically conducted after the fact. Subsequent to listing the spikedace and loach minnow on the endangered species list in 1986, two Section 7 consultations have been completed for actions involving fire management planning and potential effects on the spikedace and loach minnow. The first consultation was for a BLM Arizona *Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management* (Service 2004a). The second was completed for prescribed burning efforts on the Robinson Mesa Fire project (Service 2004b).

Conservation measures listed in the *Biological and Conference Opinion for the BLM Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management* (Service 2004a) and the *Formal Conference on the Robinson Mesa Prescribed Fire Project on the Clifton Ranger District of the Apache-Sitgreaves National Forests* (Service 2004b), exemplify the kinds of conservation measures that might be expected for future Section 7 consultations for the spikedace and loach minnow. These measures are designed to minimize adverse effects of all fire management activities on federally protected species and their habitat. Several measures are specifically designed to protect and enhance the ecological values and functions of riparian areas and a few target species like the spikedace and loach minnow. Conservation efforts for protecting sensitive species and habitats generally include using Minimum Impact Suppression Tactics in sensitive habitats; excluding fire retardant and wildland fire use

fires from riparian and wetland areas; and incorporating consideration of sensitive species and habitat into all fire management and rehabilitation plans, programs, and implementation efforts.

In the proposed critical habitat areas for spikedace and loach minnow, and in many areas across the United States, the Department of Agriculture and the Department of the Interior are jointly implementing the National Fire Plan, which grew out of a report to the President called *Managing the Impacts of Wildfire on Communities and the Environment: A Report to the President in Response to the Wildfires of 2000*. The National Fire Plan calls for a substantial increase in the number of forested acres treated annually to reduce hazardous fuels. Under the plan, WUI areas are defined by each agency “where human life, property, and natural resources are in imminent danger from catastrophic wildfire” (USFS 2001). This makes the WUI a focal area for human environment conflicts such as wildland fires (University of Wisconsin 2004).

In proposed critical habitat, the West, East, and Middle Forks of the Gila River watersheds (spikedace and loach minnow Unit 8) are known to have been impacted by past wildfires (Service 2010), in addition to the more recent impacts to the Salt River watershed from the 2011 Wallow fire (IEc 2011a).

### **3.6.2 Environmental Consequences**

#### **3.6.2.1 No Action Alternative**

Under the No Action Alternative, 522 miles of stream segments would remain designated as critical habitat for spikedace and/or loach minnow, and no additional spikedace and loach minnow critical habitat would be designated under the ESA. Existing exclusion areas would remain in effect. Section 7 consultations would continue for proposed actions with a federal nexus, including wildland fire management activities, based solely on the presence of designated critical habitat. Stream segments occupied by the spikedace and loach minnow would be subject to Section 7 consultations regardless of the area’s status as critical habitat. The conservation measures implemented as a result of Section 7 consultation under the No Action Alternative may require specific modifications to wildland fire management activities. These modifications are unlikely to appreciably constrain wildfire management activities in the field. The primary impact would be increased administrative costs to the Service and action agencies. Therefore, under the No Action Alternative, some required Section 7 conservation measures could have negligible, adverse impacts on wildland fire management activities (e.g., use of herbicides and mechanical measures to reduce fuels, post-event (emergency) consultations for wildland fire suppression etc.) that could negatively impact the habitat values of spikedace or loach minnow.

In comparison to Alternatives A and B, the No Action Alternative includes three stream segments not in the 2010 proposed rule. These stream segments are now considered by the Service to be highly degraded and likely not occupied by spikedace or loach minnow. Under the No Action Alternative, these stream segments would maintain critical habitat designation and Section 7 consultation could occur. The maintenance of critical habitat designation in these areas is anticipated to have negligible adverse impacts on wildland fire management.

### 3.6.2.2 Alternative A

Compared to the No Action Alternative, Alternative A would result in an increase of up to 239 miles of designated critical habitat for spikedace and loach minnow. This increase in designated critical habitat is anticipated to result in (1) a small but unknown increase in the number of additional new and reinitiated Section 7 consultations based solely on the presence of designated critical habitat and (2) the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spikedace and loach minnow in critical habitat. Most of the proposed critical habitat areas are occupied by the spikedace and loach minnow; therefore, wildland fire management projects in those areas would be subject to Section 7 consultations regardless of the area's status as critical habitat. The analyses are distinct, however, in that the standard for determining jeopardy concerns only the survival of the species, while the standard for determining adverse modification must take into account habitat values essential for the recovery of the species.

Consultations for critical habitat may result in the establishment of reasonable and prudent alternatives and other conservation measures designed to maintain the spikedace and loach minnow PBFs. These conservation measures, however, are unlikely to appreciably constrain wildfire management activities in the field. Land management agencies generally preclude wildland fires from riparian areas whether or not designated critical habitat is present. This is common practice because native riparian vegetation is not fire adapted, and fires of all but the lowest intensity tend to be destructive to those habitats. Prescribed fire is used only judiciously in riparian habitat for the same reason. Designation of critical habitat may discourage the use of herbicides to reduce fuels (e.g., tamarisk) and would encourage low-impact methods to mechanically reduce fuels. Agencies generally employ low- or minimum-impact practices in riparian areas; therefore, designation of critical habitat would have no to negligible adverse impacts on fire management activities.

Some fuels reduction projects, however, do occur in riparian habitats, particularly in WUI areas, and it is possible that Section 7 consultations resulting from designation of the spikedace and loach minnow critical habitat could cause delays in implementing these projects. This potential impact is mitigated by alternative Section 7 regulations for fire management that limit the delays allowed for completing Section 7 consultations on fire management actions. Consequently, the effects of critical habitat designation on public safety would be negligible.

Generally speaking, the effects on future wildland fire management activities from critical habitat designation are expected to have negligible adverse impacts and would not constrain any intended wildland fire management activities because (1) most of the previously completed Section 7 consultations involving critical habitat for these fish species in small southwestern streams have resulted only in minor project alterations to proposed projects; (2) the number of consultations is not expected to change; few projects and operations would be subject to consultation based solely on the presence of designated critical habitat because most all of the proposed segments are occupied by the spikedace and loach minnow; (3) if the outcome of those few consultations were based solely on critical habitat that do not reach the threshold of adverse modification they could only result in discretionary conservation recommendations to reduce impacts on PBFs because there is no incidental take statement or reasonable prudent measures for adverse effects to critical habitat; and (4) the small

likelihood that reasonable and prudent alternatives developed under the jeopardy standard would be changed substantially with the addition of critical habitat designation and application of the adverse modification standard.

As discussed in the 2006 EA, wildland fire within the natural range of variability may have beneficial effects on fish habitat through restoration and maintenance of watershed functions. For example, a multi-year prescribed burn program enacted in the Muleshoe Ranch Cooperative Management Area by The Nature Conservancy has improved watershed condition, aquatic habitat, and native fish populations. In contrast, high-intensity wildfire in and near riparian habitat can result in severe adverse impacts on fish. These impacts include increased water temperatures, fire-induced changes in pH, and increased ammonium and phosphate levels leached from smoke and ash. Post-fire effects include increased runoff and heavy sediment loads due to loss of groundcover and subsequent erosion in the watershed; loss of streamside vegetation that provides nutrients, shade, bank stabilization, and habitat among roots; altered channel morphology; degraded water quality; and altered food web. These adverse effects of high-intensity wildfire are well documented (Brown 1989; Gresswell 1999; Minshall et al. 1990; Newcombe and MacDonald 1991; Norris et al. 1991; Rieman and Clayton 1997; Rinne 1996; Spencer and Hauer 1991). Fire suppression activities can adversely affect aquatic habitats. Impacts include the construction of fire lines, foot traffic, and vehicle use that can destroy riparian vegetation, destabilize soils, and increase sedimentation in streams. Fire retardants can contaminate streams with chemicals toxic to fish and other aquatic ecosystem components (Service 2004a).

Designating additional critical habitat for spikedace and loach minnow is expected to have minimal impacts on fire risk reduction projects and wildfire suppression. This is because of the benefits to spikedace and loach minnow from reducing the risk of wildfire and the expectation that few fire management projects would be subject to Section 7 consultation solely because of the presence of critical habitat.

If one or more exclusion areas are adopted by the Service as part of Alternative A, the impact on the wildland fire management in the area of the excluded stream segment would depend on whether a management plan were implemented, and the conservation measures included in that plan for fire management.

The segment of the Verde River that flows through lands owned by the Yavapai-Apache Nation was excluded in the No Action Alternative (2007 final rule) and is being considered for exclusion in the proposed rule, along with portions of Beaver/Wet Beaver Creeks. The tribe prepared a management plan for the Southwestern Willow Flycatcher in 2005 and issued a resolution to protect a 300-foot riparian conservation corridor in 2006. Should the Service decide to exclude this area because of these and other conservation measures being in place, no impacts to wildland fire management are anticipated for the segment of the Verde River that flows through Yavapai-Apache tribal lands.

The East Fork White River segment is within the boundaries of lands owned by the White Mountain Apache Tribe, was excluded in the No Action Alternative (2007 final rule), and is being considered for exclusion in the proposed rule. A management plan was prepared by the tribe in 2000. Should the

Service decide to exclude this area and use the management plan in lieu of critical habitat designation, no impacts to wildland fire management are anticipated for the segment of the East Fork White River that flows through White Mountain Apache tribal lands.

The segment of Eagle Creek that flows through San Carlos Apache tribal lands was excluded from designation in the No Action Alternative (2007 final rule), and is being considered for exclusion in the proposed rule. A management plan was prepared by the tribe in 2005 and was the basis for exclusion from the 2007 critical habitat designation. Should the San Carlos Apache Tribe submit a management plan for the current rule making process, the Service may again consider excluding stream segments that flow through tribal lands. As such, under Alternative A, impacts to wildland fire management cannot be determined for the segment of Eagle Creek that flows through San Carlos Apache tribal lands.

Stream segments on Eagle Creek and on the upper Gila River that are predominantly owned by Freeport-McMoRan (formerly Phelps Dodge Company) were excluded from designation in the No Action Alternative (2007 final rule). These stream segments and portions of the San Francisco and Mangas Creek are again being considered for exclusion in the 2010 proposed rule because of submitted action plans. Phelps-Dodge had prepared a management plan for these areas, and Freeport-McMoRan updated those plans for the above stream segments. Should the Service decide to exclude this area and use the management plan in lieu of critical habitat designation, no impacts to wildland fire management are anticipated.

### **3.6.2.3 Alternative B**

Compared to the No Action Alternative, impacts associated with the designation of additional critical habitat for spikedace and/or loach minnow would be similar to those identified for Alternative A. However, compared to Alternative A, no stream reaches would be excluded under Alternative B, resulting in a potential increase of 313.5 miles. Accordingly, Alternative B would result in a small but unknown increase in the number of additional new and reinitiated Section 7 consultations based solely on the presence of designated critical habitat on areas being considered for exclusion under Alternative A, and on the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spikedace and loach minnow in critical habitat on areas being considered for exclusion under Alternative A. Similar to Alternative A, the impact of the additional Section 7 consultations is anticipated to result in negligible, adverse impacts on wildland fire management.

## **3.7 Recreation**

### **3.7.1 Existing Conditions**

Several types of dispersed recreational activities take place in or near proposed critical habitat areas for the spikedace and loach minnow. Recreational opportunities include hiking, wading, boating, swimming, birding, wildlife viewing, photography, angling, hunting, camping, horseback riding, and off

highway vehicle (OHV) use (Service 2002; Southwest Paddler, The Rivers of Arizona). Level of use and type of activity vary by site characteristics, landownership, management policy, and accessibility.

Most of the proposed habitat segments receive only low-level recreational use because of their remoteness, difficult terrain, or landownership status (IEc 2011a). In the proposed rule to list the spikedace and loach minnow, numerous road crossings were cited as a threat to the species and their habitats (Service 2002).

### **3.7.1.1 OHVs**

As a general policy, the BLM does not allow OHV use up and down any of the stream reaches within proposed critical habitat on BLM-administered lands, and stream crossings are limited to established roads (IEc 2006). Use of OHVs is prohibited in the Gila Box RNCA and in the Aravaipa Canyon Wilderness (both managed by the BLM).

The proposed critical habitat areas where OHV use is most prevalent are within the Apache-Sitgreaves National Forests, which contain several reaches in proposed critical habitat in spikedace Units 5, 6, and 7, and loach minnow Units 2, 5, 6, and 7. Representatives of two OHV groups have expressed concern that OHV use could be curtailed as a result of proposed critical habitat for the spikedace and loach minnow (Public Hearing, Thatcher, Arizona, December 15, 1999). Within proposed critical habitat, Oak Creek and the Verde River (spikedace and loach minnow Unit 1) are known to have been impacted by OHV use (i.e., stream damage has occurred) (Service 2010).

### **3.7.1.2 Fishing**

Fishing is allowed in all units proposed as critical habitat for spikedace and loach minnow. According to a 2001 statewide survey sent to anglers by the AGFD (Pringle 2004), an estimated 198,300 angler use days are within or near areas that are designated critical habitat. The most popular area is Big Lake in the White Mountains, generating approximately 124,576 angler days a year. Big Lake drains into the North Fork East Fork Black River, which is proposed for critical habitat designation in loach minnow critical habitat Unit 2, downstream of Big Lake. Crescent Lake, which provides approximately 19,981 angler use days, also drains into the North Fork East Fork Black River. The 2001 survey includes areas within proposed critical habitat, including the East Fork Black River (in loach minnow Unit 2), which provides approximately 33,334 angler use days, Eagle Creek (in spikedace and loach minnow Unit 5), which provides approximately 1,317 angler use days, the Blue River (in spikedace and loach minnow Unit 7), which provides approximately 159 angler use days, the San Francisco River (spikedace and loach minnow Unit 6) which provides 1,068 angler use days, Oak Creek (spikedace and loach minnow Unit 1) which provides 15,632 angler use days, Wet Beaver Creek (spikedace and loach minnow Unit 1), which provides 5,992 angler use days, West Clear Creek (spikedace Unit 1), which provides 2,834 angler use days, Tonto Creek (spikedace Unit 2) which provides 10,110 angler use days, Spring Creek (spikedace Unit 2) which provides 159 angler use days, and the upper Verde River (in spikedace and loach minnow Unit 1), which provides approximately 191 angler use days. The 2001 survey also included areas near proposed critical habitat, other than Big Lake and Crescent Lake mentioned above,

including the Verde River in the Cottonwood area (near spikedace and loach minnow Unit 1), which provides approximately 22,971 angler use days, Haigler Creek (1,777 angler use days) and Christopher Creek (10,865 angler use days) which are tributaries to Tonto Creek in spikedace Unit 2, the West Fork Black River (near loach minnow Unit 2, this river joins the East Fork Black River to form the Black River), which provides approximately 14,573 angler use days, and Luna Lake (near spikedace and loach minnow Unit 6, this lake flows into the San Francisco River), which provides approximately 24,600 angler use days.

To support fishing opportunities, AGFD stocks sport fish into waters throughout the state. AGFD has stocking plans to continue to stock sport fish into many of the streams now proposed as critical habitat for spikedace and loach minnow. Continued stocking of sport fish into streams proposed for critical habitat include: Verde River, Oak Creek, Beaver/Wet Beaver Creek, West Clear Creek, Tonto Creek, and East Fork Black River, with the latter five creeks being currently unoccupied by spikedace or loach minnow. However, AGFD, has recently cooperated with USFWS in a Section 7 consultation relative to statewide stocking of sport fish, and the proposed spikedace and loach minnow critical habitat was included in that consultation. AGFD has agreed to implement conservation and mitigation measures relative to the sport fish stocking consultation. In general the types of potential mitigation measures include monitoring of populations, identification and removal of stressors, repatriations and augmentations, information and education outreach, and potentially modifying guidelines or regulations. In addition, over the last few decades, AGFD has modified its stocking strategy to minimize potential effects to listed-fish species in some locations. Some of the changes included (1) cessation of stocking into some locations, (2) stocking sterile fish, (3) changing the species stocked, and (4) altering the season in which fish were stocked. For example, in the late 1990s, AGFD ceased to stock sport fish in Eagle Creek and the Blue River in Apache-Sitgreaves National Forests due to native fish considerations; spikedace and loach minnow were two of the species of concern, The AGFD operates on the principle of no statewide net loss of sport fishing opportunities. The agency estimates that cessation of stocking on Eagle Creek and the Blue River did not affect the overall amount of fish stocking in Arizona, or the overall level of fishing in the state (IEc 2006). However, localized impacts did occur. Several citizens at a public hearing held in Thatcher, Arizona, in 1999, voiced disappointment regarding sites that are no longer stocked.

## **3.7.2 Environmental Consequences**

### **3.7.2.1 No Action Alternative**

Under the No Action Alternative, 522 miles of stream segments would remain designated as critical habitat for spikedace and/or loach minnow, and no additional spikedace and loach minnow critical habitat would be designated under the ESA. Existing exclusion areas would remain in effect. Section 7 consultations would continue for proposed actions with a federal nexus, including water management activities, based solely on the presence of designated critical habitat. Stream segments occupied by the spikedace and loach minnow would be subject to Section 7 consultations regardless of the area's status as critical habitat. The conservation measures implemented as a result of Section 7 consultation

under the No Action Alternative may require specific modifications to recreation opportunities. These modifications may limit some types of recreation activities, restrict construction and maintenance of recreational facilities in or near critical habitat, and/or increase administrative costs to recreation agencies. The No Action Alternative is anticipated to have minor adverse impacts to some higher-impact recreation opportunities related to required conservation measures benefiting the habitat values for spikedace or loach minnow. Additionally, under the No Action Alternative, some required Section 7 conservation measures could have minor beneficial impact on other lower-impact recreation activities (e.g., birding, wildlife viewing, day hiking) resulting from an increase in the habitat values of spikedace or loach minnow.

In comparison to Alternatives A and B, the No Action Alternative includes three stream segments not in the 2010 proposed rule. These stream segments are now considered by the Service to be highly degraded and likely not occupied by spikedace or loach minnow. Under the No Action Alternative, these stream segments would maintain critical habitat designation and Section 7 consultation could occur. Because the streams are considered to be highly degraded and likely not occupied, this would result in negligible impacts to the recreation resources in these areas.

### **3.7.2.2 Alternative A**

Compared to the No Action Alternative, Alternative A would result in an increase of up to 239 miles of designated critical habitat. This would result in (1) an increase in the number of new and reinitiated Section 7 consultations for proposed actions with a federal nexus, including recreation management activities, based solely on the presence of designated critical habitat and (2) the addition of an adverse modification of critical habitat analyses to Section 7 consultations for the spikedace and loach minnow critical habitat.

The outcome of future Section 7 consultations would depend on the details of recreation-related project proposals and the analysis of effects, which are unknowable at this time. Conservation of the spikedace and loach minnow would likely require, at a minimum, maintenance of existing populations. Therefore, the conservation value of proposed critical habitat must sustain existing populations found within those segments. The additional consultations (those based solely on the presence of designated critical habitat) would moderately increase administrative costs to the Service, the action agencies, and any project proponent involved in the consultation process. Outcomes of consultations for critical habitat may also include reasonable and prudent alternatives and other conservation measures designed to maintain spikedace and loach minnow PBFs. These conservation measures may result in minor, adverse impacts on recreation-related projects by limiting the higher-impact activities such as OHV use and camping in critical habitat. Conservation measures may also include restrictions on constructing recreational facilities in or near critical habitat to reduce impacts from construction, maintenance, and use by recreationists.

The specific modifications to recreation-related projects that may result from critical habitat designation, and the costs attributable solely to designating critical habitat as opposed to listing the species, cannot be predicted with precision. Past consultations involving critical habitat areas have resulted in relatively

minor changes to proposed recreation-related projects. Conservation measures related to habitat protection have required the use of BMPs, which are mandated by the Clean Water Act permitting requirements. It is likely that the outcomes and impacts of future Section 7 consultations for spinedace and loach minnow critical habitat would be similarly minor in scope.

A potential beneficial outcome of increasing Section 7 consultations for recreation-related activities would be maintenance of spinedace and loach minnow PBFs through conservation measures within designated critical habitat. The conservation of riparian habitat values that would result may benefit such recreational activities as birding, wildlife viewing, photography, and day hiking.

Generally speaking, the effects on future recreation-related activities from critical habitat designation are expected to be negligible to minor and would not constrain any intended recreation-related activities because (1) most of the previously completed Section 7 consultations involving critical habitat for these fish species in small southwestern streams have resulted only in minor project alterations to proposed projects; (2) the number of consultations is expected to increase only minimally; few projects and operations would be subject to consultation based solely on the presence of designated critical habitat because most all of the proposed segments are occupied by the spinedace and loach minnow; (3) if the outcome of those few consultations were based solely on critical habitat that do not reach the threshold of adverse modification they could only result in discretionary conservation recommendations to reduce impacts on PBFs because there is no incidental take statement or reasonable prudent measures for adverse effects to critical habitat; and (4) the small likelihood that reasonable and prudent alternatives developed under the jeopardy standard would be changed substantially with the addition of critical habitat designation and application of the adverse modification standard.

Proposed activities analyzed through the Section 7 process could require mitigation to conserve designated critical habitat PBFs. However, the additional incremental benefit to spinedace and loach minnow and impacts on recreational opportunities from critical habitat designation beyond that resulting from listing is expected to be small—in terms of potential modification to or restrictions on recreational activities. This is because impacts to habitat from recreational activities are currently being assessed in Section 7 consultations on effects to these species. Based on past impacts to recreational opportunities within the areas of proposed designated critical habitat, there would potentially be minor adverse impacts from critical habitat designation on some recreational opportunities and activities within designated critical habitat (e.g., fishing, overnight camping) from the limitations and restrictions imposed on recreational activities to preserve PBFs. However, other recreational activities and opportunities would be enhanced, and could experience negligible benefits from critical habitat designation (e.g., birdwatching, wildlife viewing, day hiking), because of increased riparian habitat conservation or maintenance. The potential for minor adverse impacts on some forms of recreation would be similar to those past impacts described above: some recreational restrictions in designated critical habitat or potential closure of designated critical habitat to some forms of recreation.

Most of the additional stream segments proposed in the 2010 rule are in locations where fishing occurs and many of them are actively stocked for sport fishing opportunities. AGFD has recently cooperated in a Section 7 consultation with USFWS regarding statewide sport fish stocking; the consultation is

scheduled to be completed in 2011. All of the streams identified in the 2010 proposed critical habitat for spinedace and loach minnow were included in the sport fish stocking Section 7 consultation and EA. Therefore, relatively little additional Section 7 consultations related to sport fish stocking would have to occur if Alternative A was implemented. However, AGFD has agreed to implement conservation and mitigation measures for the sport fish stockings. Section 7 consultations and NEPA compliance may be required for each sport fish stocking conservation and mitigation measure implemented by AGFD, which may be costly. Because of the measures that AGFD is taking to ensure native fish are not detrimentally impacted from the stocking of streams with nonnative fish, impacts on the spinedace and loach minnow from fish stocking activities are expected to be minimal. Additionally there are no expected impacts on recreational fishing and the amount of angler use days from the designation of critical habitat because fish stocking activities are expected to continue.

If one or more exclusion areas are adopted by the Service as part of Alternative A, the impact on the recreation resources associated with the excluded stream segment would depend on whether a management plan were implemented, and the conservation measures included in that plan for recreation.

The segment of the Verde River that flows through lands owned by the Yavapai-Apache Nation was excluded in the No Action Alternative (2007 final rule) and is being considered for exclusion in the proposed rule, along with portions of Beaver/Wet Beaver Creeks. The tribe prepared a management plan for the Southwestern Willow Flycatcher in 2005 and issued a resolution to protect a 300-foot riparian conservation corridor in 2006. Should the Service decide to exclude this area because of these and other conservation measures being in place, no impacts to recreation resources and activities are anticipated for the segment of the Verde River that flows through Yavapai-Apache tribal lands.

The East Fork White River segment is within the boundaries of lands owned by the White Mountain Apache Tribe, was excluded in the 2007 final rule (No Action Alternative), and is being considered for exclusion in the proposed rule. A management plan was prepared by the tribe in 2000. Should the Service decide to exclude this area and use the management plan in lieu of critical habitat designation, no impacts to recreation resources are anticipated for the segment of the East Fork White River that flows through White Mountain Apache tribal lands.

During the 2005–2007 critical habitat designation period, the San Carlos Apache Tribe expressed concern that the designation of critical habitat for the spinedace and loach minnow would further complicate the procedure for getting the New Mexico Unit of the CAP project approved (Service 2006b). The Bureau of Reclamation has stated that this project would be reevaluated before an exchange could occur and a new consultation is likely. The segment of Eagle Creek that flows through San Carlos Apache tribal lands was excluded from designation in the No Action Alternative (2007 final rule), and is being considered for exclusion in the proposed rule. A management plan was prepared by the tribe in 2005 and was the basis for exclusion from the 2007 critical habitat designation. Should the San Carlos Apache Tribe submit a management plan for the current rule making process, the Service may again consider excluding stream segments that flow through tribal lands. As such, under

Alternative A, impacts to recreation resources cannot be determined for the segment of Eagle Creek that flows through San Carlos Apache tribal lands.

Stream segments on Eagle Creek and on the upper Gila River that are predominantly owned by Freeport-McMoRan (formerly Phelps Dodge Company) were excluded from designation in the No Action Alternative (2007 final rule). These stream segments and portions of the San Francisco and Mangas Creek are again being considered for exclusion in the 2010 proposed rule because of submitted action plans. Phelps-Dodge had prepared a management plan for these areas, and Freeport-McMoRan updated those plans for the above stream segments. Should the Service decide to exclude these stream segments and use the management plan in lieu of critical habitat designation, no impacts to recreation resources are anticipated.

### **3.7.2.3 Alternative B**

Compared to the No Action Alternative, impacts associated with the designation of an additional critical habitat would be similar to those identified for Alternative A. However, compared to Alternative A, no stream reaches would be excluded under Alternative B, resulting in a potential increase of 313 miles. Accordingly, Alternative B would result in a small but unknown increase in the number of additional new and reinitiated Section 7 consultations based solely on the presence of designated critical habitat on areas being considered for exclusion under Alternative A, and on the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spikedace and loach minnow in critical habitat on areas being considered for exclusion under Alternative A. Similar to Alternative A, the impact of the additional Section 7 consultations is anticipated to result in negligible to minor, beneficial and adverse impacts on recreation activities and opportunities related to required conservation measures benefiting the habitat values for spikedace or loach minnow. Some required Section 7 conservation measures could have minor, adverse impacts on constructing recreational facilities in or near critical habitat to reduce impacts from construction, maintenance, and use by recreationists that could negatively impact the habitat values of spikedace or loach minnow.

## **3.8 Socioeconomics**

A separate economic analysis of critical habitat designation for the spinedace and loach minnow has been conducted (IEc 2011a) in response to the 2010 proposed rule (75 FR 66482). The analysis evaluates the potential economic impacts on ongoing and future activities associated with the designation of critical habitat for the spinedace and loach minnow, including water use and management, livestock grazing, recreation, species management, residential and commercial development, transportation, and fire management. The analysis focuses on the incremental costs of this rulemaking and provides information on expected costs of conservation efforts with the regulatory baseline as context. All potential future spinedace and loach minnow conservation is characterized as either baseline (expected to occur absent the designation of critical habitat) or incremental (expected to occur as a result of critical habitat designation). Some potential impacts remain unquantified, primarily in relation to water use issues. The analysis considers and estimates the impacts of the 2010 proposed rule as if the existing 2007 critical habitat designation does not exist. Costs incurred as a result of the 2007 designation (No Action Alternative) are not separately documented in the 2011 Economic Analysis. The summary of the present value and annualized incremental impacts by stream reach discounted by 7 percent and 3 percent are included in Appendixes B and C, respectively, of this document.

This incremental approach to the economic analysis is fundamentally different than the approach that was used in the 2006 Economic Analysis (IEc 2006) to analyze the 2005 proposed rule. The 2006 Economic Analysis evaluated all “co-extensive” costs of all spinedace and loach minnow conservation collectively regardless of whether the costs resulted specifically from critical habitat designation (IEc 2011a).

The scope of this EA is limited to the potential impacts that would result from the designation of critical habitat; therefore, not all of the conclusions of the economic analysis are germane. Following is a description of the economic setting in the proposed designated critical habitat area.

### **3.8.1 Existing Conditions**

#### **3.8.1.1 Population Characteristics**

Table 10 presents the population size, population density, population growth, and per capita income for the states of Arizona and New Mexico as a whole, as well as for the twelve counties that have proposed critical habitat within their boundaries. The Proposed Action area is largely rural and sparsely populated. In summary, all 10 of the 12 counties have a lower population density than the statewide averages. Eight of the twelve counties experienced an increase in population between 2000 and 2009.

In Arizona, the nine counties containing proposed critical habitat account for about 30.3 percent of the state population, with Pima County contributing 15.5 percent of the state’s total population. Pinal and Yavapai counties are the fastest growing counties with 89.7 percent and 28.8 percent increase in

population between 2000 and 2009, respectively. The statewide average for population growth during this time period was 28.6 percent.

For New Mexico, the three counties that contain critical habitat designation represent approximately 2.0 percent of the state's population. All three of the New Mexico counties experienced a decrease in population between 2000 and 2009, with Hidalgo County experiencing the largest decrease of 14.8 percent.

**Table 10 Socioeconomic Profile of Counties Containing Critical Habitat for the Spikedace and Loach Minnow**

County	Population Density (persons/sq mi) <sup>a</sup>	Population (2009 estimate)	% of Statewide Population	% Change in Population (2000–2009)	Per Capita Income (1999)	Poverty Rate (2008)
<b>Arizona</b>						
<b>State Total</b>	<b>58.0</b>	<b>6,595,778</b>	<b>100.0</b>	<b>28.6</b>	<b>\$20,275</b>	<b>14.7</b>
Apache	6.3	70,591	1.1	1.7	\$8,986	33.2
Cochise	21.0	129,518	2.0	10.0	\$15,988	16.0
Gila	10.9	52,199	0.8	1.7	\$16,315	16.1
Graham	8.0	37,045	0.6	10.6	\$12,139	21.4
Greenlee	4.4	8,041	0.1	-5.9	\$15,814	11.3
Navajo	11.4	112,975	1.7	15.9	\$11,609	23.1
Pima	111.1	1,020,200	15.5	20.9	\$19,785	15.4
Pinal	63.5	340,962	5.2	89.7	\$16,025	14.0
Yavapai	26.6	215,686	3.3	28.8	\$19,727	12.9
<b>New Mexico</b>						
<b>State Total</b>	<b>16.6</b>	<b>2,009,671</b>	<b>100.0</b>	<b>10.5</b>	<b>\$17,261</b>	<b>17.0</b>
Catron	0.5	3,443	0.2	-2.8	\$13,951	20.7
Grant	7.5	29,903	1.5	-3.5	\$14,597	19.0
Hidalgo	1.5	5,057	0.3	-14.8	\$12,431	21.3

Source: IEC 2011b.

<sup>a</sup> Calculated based on square miles and 2009 estimated population.

### 3.8.1.2 Economic Activity

In 2008, the nine Arizona counties contained 37,766 business establishments, employing 520,139 individuals. During that same time period, the three New Mexico counties contained 887 establishments, employing 11,379 employees. As shown in Tables 11 and 12, the largest employment sectors in the Arizona counties are “other services,” retail trade, and construction and in the New Mexico counties are “services and other industries,” mining, and retail trade. In the fast-growing Arizona counties of Pinal and Yavapai, other services and retail trade are the largest employment industries.

Tables 13 and 14 depicts economic activity within the nine Arizona counties and three New Mexico counties that contain proposed critical habitat, as measured by annual payroll in 2008.

The significance of specific industries within the counties follows a similar pattern to the state-level figures. The “services and other” industry has the largest number of employees, establishments, and highest amount of payroll in all counties except for Hidalgo County New Mexico where retail trade dominates in payroll. In most of these counties, retail trade is the second most prevalent industry. The exceptions to this trend are Gila County and Pima County, Arizona, where mining and manufacturing are second-most prevalent. In New Mexico, construction is second-most prevalent in Catron and Grant Counties. Activities that have the potential to be economically affected by designation of critical habitat for the spikedace and loach minnow are described below. If the activity is described elsewhere in this document, a cross-reference is provided.

The system of federal grazing permits in the American West was established on USFS lands in the early twentieth century and on BLM lands by the Taylor Grazing Act of 1934 (Cody 1996). In most areas, qualifying ranches (“base properties”) were assigned an exclusive amount of AUM based on the carrying capacity of the grazing allotment (Kerr 1998). These allotments were connected to private holdings through the establishment of renewable leases that were both inheritable and transferable with the sale of the land or, in the case of USFS permits, the transfer of the livestock (pending the approval of the USFS or the BLM).

In the proposed rule, the Service states that adverse effects of livestock grazing has been one of the most widespread and long-term adverse impacts to native fishes and their habitat (Miller 1961, pp. 394-395, 399). However, they note livestock grazing is one of the few threats to spikedace and loach minnow that is decreasing due to improved management on federal lands (Service 1997b; Service 2001). Improvement has occurred through discontinuing grazing in riparian and stream corridors. There are continued adverse effects within watersheds where spikedace and loach minnow occur. These effects occur through watershed alteration and subsequent changes in the natural flow regime, sediment production, and stream channel morphology (Platts 1990, Belsky et al. 1999, Service 2001).

The Service notes that, when conducted improperly, livestock grazing can destabilize stream channels and disturb riparian ecosystem functions (Platts 1990; Armour et al. 1991; Tellman et al. 1997). Improper livestock grazing can negatively affect spikedace and loach minnow through removal of riparian vegetation (Propst et al. 1986; Clary and Webster 1989; Clary and Medin 1990; Schulz and Leininger 1990; Fleishner 1994), which can result in reduced bank stability and higher water temperatures (Kauffman and Krueger 1984; Platts and Nelson 1989; Fleishner 1994; Belsky et al. 1999). Livestock grazing can also cause increased sediment in the stream channel, due to streambank trampling and riparian vegetation loss (Weltz and Wood 1986; Pearce et al. 1998; Belsky et al. 1999). Livestock can physically alter the streambank through trampling and shearing, leading to bank erosion (Trimble and Mendel 1995; Belsky et al. 1999). In combination, loss of riparian vegetation and bank erosion can alter channel morphology, including increased erosion and deposition, increased sediment loads, downcutting, and an increased width-to-depth ratio, all of which lead to a loss of spikedace and loach minnow habitat components. Livestock grazing management also continues to include construction and maintenance of open stock tanks, which are often stocked with nonnative aquatic

species harmful to spikedace and loach minnow (Service 1997a) if they escape or are transported to waters where these native fish occur.

Exclusion of riparian areas from livestock grazing can result in a reduction in the number of permitted animal unit months (AUMs) on the allotment. (One animal unit month provides forage for one cow and calf for one month on the allotment.) The greatest past economic impact of spikedace and loach minnow conservation on livestock grazing activities has occurred when restrictions on the use of riparian areas for livestock grazing were implemented and reductions in the level of grazing activity have occurred. On federal lands, AUM reductions can take the form of reductions in the number of authorized or permitted AUMs by USFS or BLM range members. On many allotments that contain spikedace and loach minnow habitat, riparian areas have already been excluded from grazing either year-round or seasonally.

In 1998, USFS Region 3 (New Mexico and Arizona) conducted a regionwide consultation on all of their grazing actions, resulting in the allotment-by-allotment review of 962 allotments. This review was the result of two lawsuits filed against the USFS by the Forest Guardians and the Center for Biological Diversity in 1997 (U.S. District Court, Phoenix, Arizona, Case No. CIV 97-2562 PHX SMM).

The Forest Guardians' initial lawsuit focused on four endangered and threatened species: the southwestern willow flycatcher, the loach minnow, the spikedace, and the Mexican spotted owl (MSO). Their lawsuit challenged the issuance of grazing permits on allotments located in the Apache-Sitgreaves, Carson, Cibola, Gila, Prescott, and Santa Fe National Forests.

The Center for Biological Diversity's initial lawsuit did not focus on any specific endangered or threatened species but challenged the issuance of grazing permits on allotments in six National Forests: Apache-Sitgreaves, Coconino, Coronado, Gila, Prescott, and Tonto.

**Table 11 Economic Activity Within Arizona Counties Containing Spikedace and Loach Minnow CHD Number of Establishments and Employees by Industry (2008)**

	Apache	Cochise	Gila	Graham	Greenlee	Navajo	Pima	Pinal	Yavapai	Total (9 Counties)	% of State Total
<b>Agriculture, Forestry, Hunting, and Fishing Support<sup>a</sup></b>											
Employees	33	24	19	99	—	35	249	164	99	<b>722</b>	<b>52.8</b>
Establishments	6	6	2	2	—	8	24	10	6	<b>64</b>	<b>33.0</b>
<b>Mining</b>											
Employees	60	249	1,611	4,999	—	999	2,151	366	2,499	<b>12,934</b>	<b>117.8</b>
Establishments	3	11	11	5	—	8	36	26	20	<b>120</b>	<b>48.6</b>
<b>Utilities</b>											
Employees	499	467	99	99	41	499	2,499	266	499	<b>4,968</b>	<b>19.9</b>
Establishments	7	23	4	5	4	15	27	15	25	<b>125</b>	<b>48.4</b>
<b>Construction</b>											
Employees	370	2,129	1,049	603	27	1,757	26,424	3,311	6,614	<b>42,284</b>	<b>20.3</b>
Establishments	67	297	186	81	4	375	2,166	458	1,115	<b>4,749</b>	<b>30.4</b>
<b>Manufacturing</b>											
Employees	249	569	148	235	—	563	29,095	3,514	3,550	<b>37,923</b>	<b>22.9</b>
Establishments	13	53	20	16	—	48	745	127	233	<b>1,255</b>	<b>25.3</b>
<b>Wholesale Trade</b>											
Employees	53	444	151	228	99	317	8,983	1,297	1,650	<b>13,222</b>	<b>13.2</b>
Establishments	15	64	30	18	1	38	843	130	197	<b>1,336</b>	<b>19.3</b>
<b>Retail Trade</b>											
Employees	1,242	6,283	2,433	1,708	172	4,747	52,123	8,890	11,774	<b>89,372</b>	<b>26.0</b>
Establishments	104	433	170	102	18	334	2,963	541	920	<b>5,585</b>	<b>29.2</b>

(Continued)

**Table 11 Economic Activity Within Arizona Counties Containing Spikedace and Loach Minnow CHD Number of Establishments and Employees by Industry (2008)**

	Apache	Cochise	Gila	Graham	Greenlee	Navajo	Pima	Pinal	Yavapai	Total (9 Counties)	% of State Total
<b>Transportation/Warehousing</b>											
Employees	82	535	499	196	16	335	8,223	1,471	871	<b>12,228</b>	<b>14.9</b>
Establishments	11	81	27	24	4	51	420	124	148	<b>890</b>	<b>27.0</b>
<b>Information</b>											
Employees	249	445	138	121	19	499	7,200	468	919	<b>10,058</b>	<b>18.5</b>
Establishments	12	38	25	11	6	29	311	42	77	<b>551</b>	<b>24.0</b>
<b>Finance and Insurance</b>											
Employees	88	675	246	103	99	501	13,214	1,193	1,607	<b>17,726</b>	<b>12.8</b>
Establishments	17	116	58	20	6	88	1,378	205	338	<b>2,226</b>	<b>21.6</b>
<b>Real Estate</b>											
Employees	64	463	176	150	19	425	7,829	690	1,559	<b>11,375</b>	<b>22.4</b>
Establishments	18	137	62	32	3	129	1,371	186	392	<b>2,330</b>	<b>26.8</b>
<b>Unclassified</b>											
Employees	19	19	19	19	—	1	99	—	19	<b>194</b>	<b>100.0</b>
Establishments	1	4	1	2	—	3	37	—	9	<b>57</b>	<b>33.7</b>
<b>Other services</b>											
Employees	4,686	17,624	7,094	4,593	445	9,965	171,764	20,643	30,319	<b>267,133</b>	<b>23.0</b>
Establishments	236	1,200	548	238	30	881	10,944	1,514	2,887	<b>18,478</b>	<b>27.2</b>

Source: IEc 2011b.

Note: In some cases, only a range of employees was available. In these cases, the high end of the range is presented. Possible ranges included: 0–19 employees; 20–99 employees; 100–249 employees; 250–499 employees; 500–999 employees; 1,000–2,499 employees; and 2,500–4,999 employees.

<sup>a</sup> This information was provided by the census which uses NAICS code 11 to define Agriculture, Forestry, Hunting, and Fishing Support. NAICS code definitions are available through <http://www.census.gov/epcd/naics02/naicod02.htm>.

**Table 12 Economic Activity Within New Mexico Counties Containing Spikedace and Loach Minnow CHD Number of Establishments and Employees by Industry (2008)**

	Catron	Grant	Hidalgo	Total (3 Counties)	% of State Total
<b>Agriculture, Forestry, Hunting, and Fishing Support <sup>a</sup></b>					
Employees	19	19	19	<b>57</b>	<b>9.5</b>
Establishments	2	3	1	<b>6</b>	<b>5.7</b>
<b>Mining</b>					
Employees	99	2,499	19	<b>2,617</b>	<b>14.1</b>
Establishments	3	8	1	<b>12</b>	<b>1.7</b>
<b>Utilities</b>					
Employees	19	99	19	<b>137</b>	<b>2.7</b>
Establishments	3	5	3	<b>11</b>	<b>4.9</b>
<b>Construction</b>					
Employees	23	1,179	19	<b>1,221</b>	<b>2.2</b>
Establishments	8	108	6	<b>122</b>	<b>2.2</b>
<b>Manufacturing</b>					
Employees	99	138	99	<b>336</b>	<b>1.0</b>
Establishments	5	10	1	<b>16</b>	<b>1.0</b>
<b>Wholesale Trade</b>					
Employees	19	140	19	<b>178</b>	<b>0.8</b>
Establishments	1	20	1	<b>22</b>	<b>1.1</b>
<b>Retail Trade</b>					
Employees	34	1,313	373	<b>1,720</b>	<b>1.7</b>
Establishments	12	126	36	<b>174</b>	<b>2.4</b>

(Continued)

**Table 12 Economic Activity Within New Mexico Counties Containing Spikedace and Loach Minnow CHD Number of Establishments and Employees by Industry (2008)**

	Catron	Grant	Hidalgo	Total (3 Counties)	% of State Total
<b>Transportation/Warehousing</b>					
Employees	19	128	33	<b>180</b>	<b>1.0</b>
Establishments	3	18	12	<b>33</b>	<b>2.3</b>
<b>Information</b>					
Employees	—	249	19	<b>268</b>	<b>1.9</b>
Establishments	—	20	3	<b>23</b>	<b>2.7</b>
<b>Finance and Insurance</b>					
Employees	19	221	99	<b>339</b>	<b>1.4</b>
Establishments	1	36	3	<b>40</b>	<b>1.4</b>
<b>Real Estate</b>					
Employees	19	137	19	<b>175</b>	<b>1.6</b>
Establishments	2	43	1	<b>46</b>	<b>1.9</b>
<b>Unclassified</b>					
Employees	—	19	—	<b>19</b>	<b>38.0</b>
Establishments	—	2	—	<b>2</b>	<b>4.5</b>
<b>Services and Other Industries</b>					
Employees	268	3,319	545	<b>4,132</b>	<b>10.0</b>
Establishments	28	312	40	<b>380</b>	<b>14.8</b>

Source: IEC 2011b.

Note: In some cases, only a range of employees was available. In these cases, the high end of the range is presented. Possible ranges included: 0–19 employees; 20–99 employees; 100–249 employees; 250–499 employees; 500–999 employees; 1,000–2,499 employees; and 2,500–4,999 employees.

<sup>a</sup> This information was provided by the census which uses NAICS code 11 to define Agriculture, Forestry, Hunting, and Fishing Support. NAICS code definitions are available through <http://www.census.gov/epcd/naics02/naicod02.htm>

**Table 13 Economic Activity Within Arizona Counties Containing Spikedace and Loach Minnow Critical Habitat Annual Payroll by Industry (2008)**

<b>Industry</b>	<b>Apache (\$)</b>	<b>Cochise (\$)</b>	<b>Gila (\$)</b>	<b>Graham (\$)</b>	<b>Greenlee (\$)</b>	<b>Navajo (\$)</b>	<b>Pima (\$)</b>	<b>Pinal (\$)</b>	<b>Yavapai (\$)</b>	<b>Total for 9 Counties (\$)</b>	<b>% of State Total</b>
Agriculture, Forestry, Hunting, and Fishing Support	789	462	N/A	N/A	—	1,335	4,204	4,225	526	11,541	31.0
Mining	4,431	N/A	116,928	N/A	—	N/A	139,703	22,256	N/A	283,318	37.3
Utilities	N/A	34,788	N/A	N/A	2,178	N/A	N/A	17,685	N/A	54,651	N/A
Construction	13,815	62,605	31,747	17,340	690	48,971	1,019,403	105,750	192,434	1,492,755	17.9
Manufacturing	N/A	21,250	5,218	5,681	—	46,110	1,919,681	144,119	141,116	2,283,175	26.3
Wholesale Trade	1,443	12,609	4,861	9,283	N/A	11,818	407,404	76,691	62,278	586,387	11.1
Retail Trade	26,328	125,221	52,710	37,609	3,319	106,531	1,178,925	181,538	262,146	1,974,327	25.0
Transportation/ Warehousing	2,399	16,966	10,835	7,228	460	13,323	331,899	49,035	25,898	458,043	14.5
Information	N/A	17,579	6,311	2,561	N/A	N/A	371,237	16,337	32,168	446,193	14.0
Finance and Insurance	2,455	21,601	9,496	3,896	N/A	15,577	571,301	51,205	63,719	739,250	9.9
Real Estate	942	10,596	4,783	2,887	N/A	10,644	242,723	16,115	49,635	338,325	17.6
Unclassified	N/A	130	N/A	N/A	—	62	754	—	83	1,029	29.6
Services and Other Industries	139,913	582,500	164,426	78,683	7,638	266,356	4,779,901	412,230	745,364	7,177,011	17.1

Source: IEC 2011b.

Note: N/A indicates that data were not available and withheld by the Census to avoid revealing information for individual companies.

**Table 14 Economic Activity Within New Mexico Counties Containing Spikedace and Loach Minnow Critical Habitat Annual Payroll by Industry 2008)**

<b>Industry</b>	<b>Catron (\$)</b>	<b>Grant (\$)</b>	<b>Hidalgo (\$)</b>	<b>Total for 3 Counties (\$)</b>	<b>% of Total State</b>
Agriculture, Forestry, Hunting, and Fishing Support	N/A	178	N/A	178	1.0
Mining	N/A	N/A	N/A	—	0.0
Utilities	N/A	N/A	767	767	0.2
Construction	721	36,956	182	37,859	1.8
Manufacturing	N/A	3,780	N/A	3,780	0.2
Wholesale Trade	N/A	5,124	N/A	5,124	0.5
Retail Trade	699	25,845	6,009	32,553	1.4
Transportation/ Warehousing	N/A	3,579	1,739	5,318	0.9
Information	—	4,481	N/A	4,481	0.8
Finance and Insurance	N/A	7,020	N/A	7,020	0.6
Real Estate	N/A	2,509	N/A	2,509	0.7
Unclassified	—	N/A	—	—	0.0
Services and Other Industries	1,787	88,510	4,910	95,207	0.9

Source: IEC 2011b).

Note: N/A indicates that data were not available and withheld by the Census to avoid revealing information for individual companies.

Because the complaints shared common issues and challenged many of the same allotments, the cases were consolidated. In response to the lawsuit, the USFS initiated informal consultation with the Service in February 1998 on the 158 allotments named in the complaints, as well as hundreds of other allotments (962 in total) in the National Forests of Arizona and New Mexico (USFS Region 3). The purpose of the consultation was to determine the potential effects of livestock grazing on endangered and threatened species on the allotments and therefore whether formal consultation between USFS and the Service was necessary.

As part of the informal consultation process, the Forest Service also developed *Grazing Guidance Criteria for Preliminary Effects Determinations for Species Listed as Threatened, Endangered or Proposed for Listing*, (Guidance Criteria) dated February 13, 1998.

Of the 962 allotments under consultation, 619 “No Effect,” 321 “NLAA” (not likely to adversely affect) findings, and 22 “LAA” (likely to adversely affect) determinations were made. The “No Effect” findings concluded the Forest Service’s obligations under the ESA and did not require Service concurrence. The USFS received concurrence from the Service for the 321 “NLAA” determinations and thus no further action was necessary on those allotments.

This left 22 allotments where the USFS made LAA determinations with regards to the loach minnow. In February 1999, the Service released a biological opinion in which it concluded that the impacts of grazing on 21 of the 22 allotments would not jeopardize the continued existence of the loach minnow.

The 962-allotment review prompted both Plaintiffs to amend their complaints in September 1999. The Forest Guardians narrowed their complaint to the loach minnow, the spikedace, and the MSO on allotments in the Apache-Sitgreaves, Gila and Cibola National Forests while the Center for Biological Diversity refocused their complaint to the loach minnow and spikedace on allotments in the Apache-Sitgreaves and Gila National Forests (United States District Court of Arizona 1999). The result of this process was the exclusion of the majority of the riparian corridor on grazing allotments in USFS Region 3.

## **3.8.2 Environmental Consequences**

### **3.8.2.1 No Action Alternative**

Under the No Action Alternative, 522 miles of stream segments would remain designated as critical habitat for spikedace and/or loach minnow, and no additional spikedace and loach minnow critical habitat would be designated under the ESA. Existing exclusion areas would remain in effect. Section 7 consultations would continue for proposed actions with a federal nexus based solely on the presence of designated critical habitat. Stream segments occupied by the spikedace and loach minnow would be subject to Section 7 consultations regardless of the area’s status as critical habitat. The analyses are distinct, however, in that the standard for determining jeopardy concerns only the survival of the species, while the standard for determining adverse modification must take into account habitat values

(PCEs) essential for the recovery of the species.<sup>2</sup> The Conservation measures implemented as a result of Section 7 consultation under the No Action Alternative may require specific modifications to project proposals that could, in turn, have an impact on socioeconomic conditions. These modifications may require adjustments to project plans, schedules, and operations, limit water withdrawals, and/or increase costs to project proponents. Therefore, the No Action Alternative is generally anticipated to have minor, adverse impacts on socioeconomic conditions related to required conservation measures benefiting the habitat values for spokedace or loach minnow.

In comparison to Alternatives A and B, the No Action Alternative includes three stream segments not in the 2010 proposed rule. These stream segments are now considered by the Service to be highly degraded and likely not occupied by spokedace or loach minnow. Under the No Action Alternative, these stream segments would maintain critical habitat designation and Section 7 consultation could occur. Because the streams are considered to be highly degraded and likely not occupied, this is anticipated to result in negligible impacts to the socioeconomic conditions in these areas.

### **3.8.2.2 Alternative A**

Compared to the No Action Alternative, Alternative A would result in an increase of up to 239 miles of designated critical habitat. As previously discussed, an economic analysis of the proposed critical habitat designation for the spokedace and loach minnow was conducted for the 2010 proposed rule (IEc 2011a). The summary of the present value and annualized incremental impacts by stream reach discounted by 7 percent and 3 percent are included in Appendixes B and C, respectively, of this document. For the 20-year time horizon (2011–2030) at a 7 percent discount rate, the total present value incremental impacts range from \$2,200,000 to \$8,790,000 and are annualized to range from \$194,000 to \$776,000 (Appendix B). With a 3 percent discount rate, the total present value incremental impacts range from \$2,770,000 to \$11,200,000 and are annualized to range from \$181,000 to \$728,000 (Appendix C). Incremental impacts associated with water use account for the largest segment of costs (estimated at 34.1% and 71.1%), followed by grazing (estimated at 15.2% and 39.1%) (IEc 2011a). These impacts do not reflect potential unquantified costs, such as potential impacts on water use (discussed previously in Section 3.2).

Additionally, the proposed designation would result in (1) a small but unknown increase in the number of additional new and reinitiated Section 7 consultations for livestock grazing based solely on the presence of designated critical habitat and (2) the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spokedace and loach minnow in critical habitat. The areas most likely to be affected are those not occupied by the spokedace and loach minnow but designated as the spokedace and loach minnow critical habitat. The additional consultations would increase administrative costs to the Service, the action agencies, and any project proponent involved in the consultation process. Additional consultations may also result in the establishment of reasonable and prudent alternatives and other conservation measures designed to maintain the spokedace and loach minnow PBFs. These conservation measures may adversely affect livestock grazing, primarily by

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<sup>2</sup> See Section 1.4.1.3, Section 7 Consultation Process, for a discussion of the implications of the Ninth Circuit Court in *Gifford Pinchot Task Force et al.* (2004)

requiring critical habitat to be fenced to prevent livestock use and by modifying AUMs or grazing seasons.

Under Alternative A, the section of the Verde River downstream of the Prescott and Coconino National Forests that flows through private lands is proposed for critical habitat designation. This stream segment was excluded in 2007 final rule (No Action Alternative) but is not being considered for exclusion in the current proposal. Under Alternative A, this area of the Verde River would be subject to Section 7 consultation requirements should a land or water development project with a federal nexus be proposed. The impacts to socioeconomic conditions cannot be determined outside of the context of a specific project proposal.

The specific effects on livestock grazing that may result from critical habitat designation and the costs attributable solely to designating critical habitat as opposed to listing the species cannot be predicted with precision. The adverse impacts of critical habitat designation on livestock grazing, however, are expected to be generally minor in part because livestock grazing operations typically occur on a large scale, and designated critical habitat within any one allotment is likely to be small; therefore, few grazing allotments are likely to be subject to consultation requirements based solely on the presence of the spikedace and loach minnow designated critical habitat. The Service estimates that 104 allotments are located in or in close proximity to the critical habitat designation on the Apache-Sitgreaves, Coconino, Gila, Prescott, and Tonto National Forests in Arizona and New Mexico. The economic analysis assumes that additional riparian fencing would be needed in four grazing allotments on the San Pedro River, San Francisco River, Gila River, and Mangas Creek that currently do have riparian exclusions (IEc 2011a). Administrative efforts to consider potential adverse modification of habitat as part of Section 7 consultations would potentially occur in these and other allotments in critical habitat areas. When assessing incremental economic impacts, it was assumed that fencing would be needed on both sides of streams for all potentially grazed areas in critical habitat and would require maintenance for 20 years. The Service believes that in some cases, alternative management scenarios, such as seasonal rest combined with grazing rotation, can help to reduce impacts on spikedace and loach minnow and to reduce the need for additional riparian fencing (IEc 2011a).

The impacts of designation on livestock grazing are also expected to be generally minor because (1) most of the previously completed Section 7 consultations involving critical habitat for these fish species in small southwestern streams have resulted only in minor project alterations to proposed projects; (2) the number of consultations is not expected to change (past consultation history is approximately 1.67 formal consultations per year) ; few projects and operations would be subject to consultation based solely on the presence of designated critical habitat because most all of the proposed segments are occupied by the spikedace and loach minnow; (3) if the outcome of those few consultations were based solely on critical habitat that do not reach the threshold of adverse modification they could only result in discretionary conservation recommendations to reduce impacts on PBFs because there is no incidental take statement or reasonable prudent alternatives for adverse effects to critical habitat; and (4) the small likelihood that reasonable and prudent alternatives developed under the jeopardy standard would be changed substantially with the addition of critical habitat designation and application of the adverse modification standard.

As stated earlier, previous lawsuits have resulted in the exclusion of cattle from much of the riparian corridor in proposed critical habitat. Thus, it is not anticipated that spikedace and loach minnow conservation activities would result in further reductions in permitted or authorized AUMs on federal lands.

Impacts on grazing activities from critical habitat designation would be similar to current conditions. It should also be noted that there are impacts on grazing that cannot be separated from the impacts caused by critical habitat designation. Impacts such as drought, current and future market trends and fluctuations, and supplemental forage availability contribute to the cumulative impacts on livestock grazing. While the impacts from critical habitat designation are expected to have generally minor adverse effects on current livestock grazing conditions, an acknowledgment must be given to other factors that contribute to the cumulative impacts on grazing.

If one or more exclusion areas are adopted by the Service as part of Alternative A, the impact on the socioeconomic conditions associated with the excluded stream segment would depend on whether a management plan were implemented, and the conservation measures included in that plan. Exclusion areas would not be subject to Section 7 consultation requirements. The impact of exclusion on socioeconomic conditions from future development projects would depend on the management plan in place and the specifics of project proposals.

The segment of the Verde River that flows through lands owned by the Yavapai-Apache Nation was excluded in the 2007 final rule (No Action Alternative) and is being considered for exclusion in the proposed rule, along with portions of Beaver/Wet Beaver Creeks. The tribe prepared a management plan for the Southwestern Willow Flycatcher in 2005 and issued a resolution to protect a 300-foot riparian conservation corridor in 2006. Should the Service decide to exclude this area because of these and other conservation measures being in place, no impacts to socioeconomic conditions are anticipated for the segment of the Verde River that flows through Yavapai-Apache tribal lands. The previous proposed rule listed water diversions as a threat to the East Fork White River.

This river segment is within the boundaries of lands owned by the White Mountain Apache Tribe, was excluded in the 2007 final rule (No Action Alternative), and is being considered for exclusion in the proposed rule. A management plan was prepared by the tribe in 2000. Should the Service decide to exclude this area and use the management plan in lieu of critical habitat designation, no impacts to socioeconomic conditions are anticipated for the segment of the East Fork White River that flows through White Mountain Apache tribal lands.

During the 2005–2007 critical habitat designation period, the San Carlos Apache Tribe expressed concern that the designation of critical habitat for the spikedace and loach minnow would further complicate the procedure for getting the New Mexico Unit of the CAP project approved (Service 2006b). The Bureau of Reclamation has stated that this project would be reevaluated before an exchange could occur and a new consultation is likely. The segment of Eagle Creek that flows through San Carlos Apache tribal lands was excluded from designation in the No Action Alternative (2007 final rule), and is being considered for exclusion in the proposed rule. A management plan was prepared by

the tribe in 2005 and was the basis for exclusion from the 2007 critical habitat designation. Should the San Carlos Apache Tribe submit a management plan for the current rule making process, the Service may again consider excluding stream segments that flow through tribal lands. As such, under Alternative A, impacts to socioeconomic conditions cannot be determined for the segment of Eagle Creek that flows through San Carlos Apache tribal lands.

Stream segments on Eagle Creek and on the upper Gila River that are predominantly owned by Freeport-McMoRan (formerly Phelps Dodge Company) were excluded from designation in the No Action Alternative (2007 final rule). These stream segments and portions of the San Francisco and Mangas Creek are again being considered for exclusion in the 2010 proposed rule because of submitted action plans. Phelps-Dodge had prepared a management plan for these areas, and Freeport-McMoRan updated those plans for the above stream segments. Designation of spikedace and loach minnow critical habitat may affect water use and management in New Mexico relative to the proposed New Mexico Unit of the CAP. Because the future of the New Mexico Unit of the CAP project is uncertain, potential impacts of spikedace and loach minnow critical habitat designation or exclusion are not estimated.

### **3.8.2.3 Alternative B**

Compared to the No Action Alternative, impacts associated with the designation of additional critical habitat would be similar to those identified for Alternative A. However, compared to Alternative A, no stream reaches would be excluded under Alternative B, resulting in a potential increase of 313 miles. Accordingly, Alternative B would result in a small but unknown increase in the number of additional new and reinitiated Section 7 consultations based solely on the presence of designated critical habitat on areas being considered for exclusion under Alternative A, and on the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spikedace and loach minnow in critical habitat on areas being considered for exclusion under Alternative A. Similar to Alternative A, the impact of the additional Section 7 consultations is anticipated to result in minor, adverse impacts on socioeconomic conditions related to required conservation measures benefiting the habitat values for spikedace or loach minnow.

## **3.9 Tribal Trust Resources**

### **3.9.1 Existing Conditions**

The USDI, Office of the Special Trustee for American Indians defines Indian trust resources as “lands and interests in lands, minerals, natural resources, or other physical assets held in trust by the federal government for beneficial owners, and natural resources in which Indian tribes have federally protected or reserved interests (e.g., water, fish, wildlife, vegetation).” American Indian lands are not federal public lands or part of the public domain and thus are not subject to general federal land laws. American Indian tribes are sovereign entities that manage their land and resources in accordance with

tribal goals and objectives, within the framework of applicable laws; however, the United States is entrusted with Tribal Trust resources for the benefit of American Indian tribes.

The tribes with lands in proposed critical habitat are sovereign nations. Secretarial Order 3206 recognizes that tribes have governmental authority and the desire to protect and manage their resources in the manner that is most beneficial to them. The tribes have their own natural resource programs and staff and have enacted or are in the process of developing resource management plans. In addition, as trustee for land held by the United States for Indian tribes, the Bureau of Indian Affairs (BIA) provides technical assistance to the tribes on forest management planning and oversees a variety of programs on tribal lands.

The Service determined that the Yavapai-Apache Nation, the San Carlos Apache Tribe, and the White Mountain Apache Tribe have lands containing features essential to the conservation of the spikedace and loach minnow. However, in designating critical habitat with regard to tribal lands, the Service considered several factors including its relationship with the tribe or nation and whether a management plan has been developed for the conservation of the spikedace and loach minnow on their lands.

#### **3.9.1.1 Yavapai-Apache Nation**

The Yavapai-Apache Nation is located on a collection of land parcels known as Camp Verde Reservation. The reservation encompasses approximately 1,800 acres distributed in parcels located near Clarkdale, Middle Verde, Camp Verde, and Rim Rock, Arizona, and near the Interstate 17 interchange for the Montezuma Castle National Monument. As described in Chapter 2, approximately 1.6 miles of the Verde River and 0.1 mile of Beaver Creek/Wet Beaver Creek (both in Unit 1) flow through Yavapai-Apache tribal lands. Approximately 5 percent of the Camp Verde Reservation along the Verde River and Beaver and Wet Beaver Creeks are included in the proposed spikedace and loach minnow critical habitat. Both stream segments are known to be occupied by spikedace and loach minnow. The Service is proposing these river segments for designation because it has found the stream to be essential to the survival and recovery of the spikedace and loach minnow. The Service has notified the tribe that a new (2010) critical habitat proposal is underway and has provided them with information on the timeline for designation. These stream segments may be considered for exclusion from the final critical habitat designation under Section 4(b)(2) of the ESA. In its December 27, 2010 comment letter to the Service on the 2010 proposed rule, the Yavapai-Apache Nation restated its position from previous filings with the Service that “the Secretary of the Interior...lacks legal authority to designate critical habitat on the Nation’s lands” (Montgomery 2010).

As described in the 2006 EA (Service 2006a), the Yavapai-Apache Nation has long worked to protect the Verde River and its surrounding habitat as it flows on the lands of the Nation. The Yavapai-Apache Nation is implementing strong conservation measures designed to preserve the Verde River and its riparian corridor for the benefit of all species, and in order to protect the traditional and cultural practices of the tribe. The Yavapai-Apache Nation’s continued efforts to work cooperatively with the Service to protect federally listed species have previously been demonstrated through adoption of a Southwestern Willow Flycatcher Management Plan, dated May 25, 2005. This document provides realistic and

practicable objectives for protection of the riparian community on tribal lands. This habitat is coextensive with the habitat currently being proposed for the spikedace. Because the existing Management Plan requires that the habitat of the Verde River be protected and preserved for the Flycatcher, its protections similarly extend to the spikedace. In addition, the Tribal Council passed Resolution 46-2006 on June 15, 2006, confirming and declaring a riparian conservation corridor along the Verde River including 300 feet on either side of the river. Within the conservation corridor stocking of non-native fishes is prohibited; livestock grazing, construction and other activities would be minimized to assure that no net loss of habitat for federally listed species such as the spikedace and loach minnow would occur; and no permanent modification of habitat essential to listed species would be allowed. The Yavapai-Apache Nation would also take all reasonable steps to coordinate with the Service regarding recreational activities, habitat restoration activities, or other activities that may impact the habitat essential to the spikedace and loach minnow. The tribe would monitor habitat, including surveys for these fish and conduct research or other activities to provide a conservation benefit.

The Yavapai-Apache Nation has approximately 2,290 enrolled members as of December 2010. As reported by the Arizona Statistics Program, the unemployment rate was 23.1 percent in 2010, more than double the average of 9.5 percent for Arizona. Per capita income was \$8,347 in 2000, less than half the average for Arizona. In addition, approximately 33.4 percent of the Tribe's population lives below the poverty line (IEc 2011a).

### **3.9.1.2 White Mountain Apache Tribe**

The White Mountain Apache Reservation encompasses 1.67 million acres in east central Arizona (White Mountain Apache Tribe). As described in Chapter 2, approximately 18 miles of the White River and 10.7 miles of the East Fork White River (both in Unit 2) flow through White Mountain Apache tribal lands. Both stream segments are known to be occupied by spikedace and loach minnow. The Service is proposing these river segments for designation because it has found the stream to be essential to the survival and recovery of the loach minnow. The Service has notified the tribe that a new (2010) critical habitat proposal is underway and has provided them with information on the timeline for designation. These stream segments may be considered for exclusion from the final critical habitat designation under Section 4(b)(2) of the ESA. In its December 27, 2010 comment letter to the Service, the tribe provided its preliminary comments on the proposed rule, including its opposition to designation of critical habitat on tribal lands (Brauchli 2010).

As discussed in the 2006 EA (Service 2006a), the White Mountain Apache Tribe has a management plan for loach minnow. The plan was completed in 2000 and provides for, among other conservation measures, inventory and monitoring, water quality protection ordinance, captive propagation, and relocation to minimize loss from catastrophic events such as fire and drought. Prior to and since the plan was developed, the tribe has actively managed for loach minnow. In this exclusion, the Service considered several factors, including our relationship with the White Mountain Apache Tribe, and the degree to which the tribe's management plan provides specific management for the loach minnow. Tribal governments protect and manage their resources in the manner that is most beneficial to them. The White Mountain Apache Tribe exercises legislative, administrative, and judicial control over

activities within the boundaries of its lands. Additionally, the tribe has natural resource programs and staff and has been managing for the conservation of the loach minnow. In addition, as trustee for land held in trust by the United States for Indian tribes, the BIA provides technical assistance to the White Mountain Apache Tribe on management planning and oversees a variety of programs on their lands. The development and implementation of the efforts formalized in the management plan will continue with or without critical habitat designation.

The White Mountain Apache Tribe highly values its wildlife and natural resources, and is charged to preserve and protect these resources under the Tribal Constitution. Consequently, the tribe has long worked to manage the habitat of wildlife on its tribal lands, including the habitat of endangered and threatened species. The Service understands that it is the tribe's position that a designation of critical habitat on its lands improperly infringes upon its tribal sovereignty and the right to self-government.

The United States Census estimates that Fort Apache Reservation, home to the White Mountain Apache Tribe, had a population of 13,652 enrolled members residing on the reservation in 2005. The unemployment rate was reported by the Arizona Department of Economic Security to be 39.1 percent in 2010, but the tribe states that it believes that this estimate is low; their records indicate unemployment between 60 and 67 percent in 2004 (IEc 2011a). Per capita income was \$6,358 in 2010, less than half the average for Arizona. In addition, approximately 48.8 percent of the tribe's population lives below the poverty line (IEc 2011a).

### **3.9.1.3 San Carlos Apache Tribe**

The San Carlos Apache Reservation encompasses over 1.8 million acres in southeast Arizona. As described in Chapter 2, approximately 17.1 miles of Eagle Creek (Unit 5) flow through San Carlos Apache tribal lands. Eagle Creek is known to be occupied by spikedace and loach minnow. During the 2005–2007 critical habitat designation period, the San Carlos Apache Tribe expressed concern that the designation of critical habitat for the spikedace and loach minnow would further complicate the procedure for getting the New Mexico Unit of the CAP project approved (Service 2006b). The Bureau of Reclamation has stated that this project would be reevaluated before an exchange could occur and a new consultation is likely. The segment of Eagle Creek that flows through San Carlos Apache tribal lands was excluded from designation in the No Action Alternative (2007 final rule), and is being considered for exclusion in the proposed rule. A management plan was prepared by the tribe in 2005 and was the basis for exclusion from the 2007 critical habitat designation. Should the San Carlos Apache Tribe submit a management plan for the current rule making process, the Service may again consider excluding stream segments that flow through tribal lands. The San Carlos Apache Tribe has not provided the Service with comments on the 2010 proposed rule.

The San Carlos Apache Tribe completed a Fisheries Management Plan (FMP) in 2005 that includes specific management actions for the spikedace and loach minnow. In designating the existing exclusion, the Service considered several factors, including the agency's relationship with San Carlos Apache Tribe, and the degree to which the tribe's FMP provides specific management for the spikedace and loach minnow. Tribal governments protect and manage their resources in the manner

that is most beneficial to them. The San Carlos Apache Tribe exercises legislative, administrative, and judicial control over activities within the boundaries of its lands; has natural resource programs and staff; and has enacted the FMP. In addition, as trustee for land held in trust by the United States for Indian tribes, the Bureau of Indian Affairs (BIA) provides technical assistance to the San Carlos Apache Tribe on management planning and oversees a variety of programs on their lands. Spikedace and loach minnow conservation activities have been ongoing on San Carlos Apache tribal lands, and, prior to the completion of their existing FMP, their natural resource management was consistent with management of habitat for this species. The development and implementation of the efforts formalized in the San Carlos Apache Tribe's existing FMP will continue with or without critical habitat designation.

The San Carlos Apache Tribe highly values its wildlife and natural resources, and is charged to preserve and protect these resources under the Tribal Constitution. Consequently, the tribe has long worked to manage the habitat of wildlife on its tribal lands, including the habitat of endangered and threatened species. The Service understands that it is the tribe's position that a designation of critical habitat on its lands improperly infringes upon its tribal sovereignty and the right to self-government.

The San Carlos Apache Tribe's existing FMP provides assurances and a conservation benefit to the spikedace and loach minnow. Implementation of the FMP would result in protecting all known spikedace and loach minnow habitat on San Carlos tribal land and assures no net habitat loss or permanent modification would occur in the future. The purpose of the FMP includes the long-term conservation of native fishes, including the spikedace and loach minnow, on tribal lands. The FMP outlines actions to conserve, enhance, and restore spikedace and loach minnow habitat, including efforts to eliminate nonnative fishes from spikedace and loach minnow habitat. All habitat restoration activities (whether it is to rehabilitate or restore native plants) would be conducted under reasonable coordination with the Service. All reasonable measures would be taken to ensure that recreational activities do not result in a net habitat loss or permanent modification of the habitat. All reasonable measures would be taken to conduct livestock grazing activities in a manner that will ensure the conservation of spikedace and loach minnow habitat. Within funding limitations and under confidentiality guidelines established by the tribe, the tribe will cooperate with the Service to monitor and survey spikedace and loach minnow habitat, conduct research, perform habitat restoration, remove nonnative fish species, or conduct other beneficial spikedace and loach minnow management activities.

Based on United States Census data, the San Carlos Apache Tribe's population was 9,385 in 2000; current population is estimated at more than 12,000. The unemployment rate was 39.1 percent in 2010. However, a recent study by the tribe found that the unemployment rate is much higher, at 76 percent, indicating that at least seven out of ten people in the tribe's labor force were unemployed (IEc 2011a). San Carlos Apache per capita income was \$5,200 in 2000, or about one-fifth of the Arizona average. In addition, the poverty rate on the San Carlos Apache Reservation is 48 percent (IEc 2011a). These data illustrate the vulnerability of the San Carlos Apache Tribe to economic impact or regulatory burden.

The San Carlos Apache Tribe's economy includes cattle operations, forestry operations, a small service sector, and tourism and recreation. The tribe has five cattle associations and operates two tribal ranches, although livestock numbers have decreased in recent years. The San Carlos Apache

operated the Cutter sawmill outside of Globe, Arizona, but in 2000 the mill was leased to a private company, Precision Pine.

## **3.9.2 Environmental Consequences**

### **3.9.2.1 No Action Alternative**

Under the No Action Alternative, 522 miles of stream segments would remain designated as critical habitat for spikedace and/or loach minnow, and no additional spikedace and loach minnow critical habitat would be designated under the ESA. Existing exclusion areas would remain in effect, including tribal exclusion areas for the Yavapai-Apache, White Mountain Apache, and San Carlos Apache. Section 7 consultations would continue for proposed actions with a federal nexus based solely on the presence of designated critical habitat. Stream segments occupied by the spikedace and loach minnow would be subject to Section 7 consultations regardless of the area's status as critical habitat. Because all stream reaches that flow through tribal lands are excluded from designation under the No Action Alternative, no impacts to Tribal Trust resources are anticipated in the existing tribal exclusion areas.

### **3.9.2.2 Alternative A**

Alternative A is the 2010 proposed rule with tribal and other exclusion areas. All proposed critical habitat stream segments that flow through Yavapai-Apache, White Mountain Apache, and San Carlos Apache tribal lands are again being considered for exclusion by the Service. Section 7 consultations would continue for proposed actions with a federal nexus based solely on the presence of designated critical habitat. Stream segments occupied by the spikedace and loach minnow would be subject to Section 7 consultations regardless of the area's status as critical habitat. Because all stream reaches that flow through tribal lands would be excluded from designation under Alternative A, no impacts to Tribal Trust resources are anticipated if the tribal exclusion areas are maintained.

### **3.9.2.3 Alternative B**

Compared to the No Action Alternative and Alternative A, no stream reaches would be excluded under Alternative B. Accordingly, Alternative B would result in a small but unknown increase in the number of additional new and reinitiated Section 7 consultations based solely on the presence of designated critical habitat on tribal lands, and on the addition of an adverse modification of critical habitat analysis to Section 7 consultations for the spikedace and loach minnow in critical habitat on tribal lands.

Under Alternative B, most of the impacts of designation on tribal lands are expected to be minor because (1) most of the previously completed Section 7 consultations involving critical habitat for these fish species in small southwestern streams have resulted only in minor project alterations to proposed projects; (2) the number of consultations is not expected to change; few projects and operations would be subject to consultation based solely on the presence of designated critical habitat because most all of the proposed segments are occupied by the spikedace and loach minnow; (3) if the outcome of those few consultations were based solely on critical habitat that do not reach the threshold of adverse

modification they could only result in discretionary conservation recommendations to reduce impacts on PBFs because there is no incidental take statement or reasonable prudent measures for adverse effects to critical habitat; and (4) the small likelihood that reasonable and prudent alternatives developed under the jeopardy standard would be changed substantially with the addition of critical habitat designation and application of the adverse modification standard.

Future impacts resulting from spikedace and loach minnow conservation efforts on tribal lands include administrative costs of Section 7 consultations, surveys and monitoring of habitat, and development of fish management plans. The 2011 Economic Analysis estimated the present value of quantified incremental impacts to tribal activities at \$123,000, with an annualized impact of approximately \$10,800 (IEc 2011a). Total baseline impacts are estimated at \$368,000 (present value) and \$32,500 annualized. These costs reflect only administrative effort related to future Section 7 consultations. A summary of the quantifiable incremental and baseline impacts to the Tribes is shown below in Table 15.

There is some possibility that project modifications to development activities, restoration activities and development and water projects may result in more significant impacts to Tribes. As noted in the 2011 Economic Analysis, all three Tribes are concerned that there are potential effects to their water rights and their ability to use the natural resources on their lands if their Tribal lands are not excluded. These potential impacts are discussed more fully in section 8 of the 2011 Economic Analysis. Concerning water rights, both the Yavapai-Apache Nation and White Mountain Apache Tribe have pending water exchange projects with CAP water that have the potential to be affected by critical habitat designation. These impacts are qualitatively discussed but not quantified in the 2011 Economic Analysis (IEc 2011a).

Additionally, as stated in the 2011 Economic Analysis, available data demonstrate the economic vulnerability of the tribes affected by this proposal; their economies are characterized by high unemployment, low income, low education levels, and high poverty rates, making these communities particularly vulnerable to economic impacts associated with increased regulatory burden. Future impacts resulting from spikedace and loach minnow conservation efforts on tribal lands include administrative costs of Section 7 consultations, surveys and monitoring of habitat, development of fish management plans, modifications to development activities, and potential project modifications to restoration activities and development and water projects.

## Environmental Justice

Executive Order 12898 (*Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*) requires that federal programs and actions be evaluated to identify and address disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. Designating critical habitat for the spikedace and loach minnow is a federal action; therefore, the alternatives identified in Chapter 2 of this EA must be analyzed for their potential effects on such populations.

The geographic area for this analysis comprises the twelve counties in two states that include the proposed critical habitat stream segments. These counties are Apache, Cochise, Gila, Graham, Greenlee, Navajo, Pima, Pinal, and Yavapai counties in Arizona and Catron, Grant, and Hidalgo counties in New Mexico. Designation would affect portions of all twelve counties. In 2009, the estimated population of the analysis area totaled approximately 2,025,620 (see Table 10). Approximately 15 percent of the Arizona state population resides in Pima County. Most of the analysis area is rural and sparsely populated.

**Table 15 Summary of Incremental and Baseline Impacts to Tribes (2011\$, Discounted at 7%)**

Unit	Reach	Incremental		Baseline		Unquantified Impacts
		Present Value	Annualized	Present Value	Annualized	
1	Verde River	\$44,600	\$3,930	\$134,000	\$11,800	<ul style="list-style-type: none"> <li>• Housing development</li> <li>• CAP project and other water rights</li> <li>• Other economic development</li> <li>• Traditional uses of land</li> </ul>
	Beaver and West Beaver Creek	\$0	\$0	\$0	\$0	
2	White River	\$17,300	\$1,530	\$51,800	\$4,570	<ul style="list-style-type: none"> <li>• Water rights settlement and dam project</li> <li>• Tourism and outdoor recreation industry</li> <li>• Housing and agricultural development</li> <li>• Traditional uses of land</li> <li>• Prescribed burns and other fire management activities</li> </ul>
	East Fork White River	\$17,300	\$1,530	\$51,800	\$4,570	
4	Bonita Creek	\$0	\$0	\$0	\$0	<ul style="list-style-type: none"> <li>• Water use, as well as potential water exchanges</li> <li>• Livestock use of proposed critical habitat for grazing and water</li> <li>• Fire management activities</li> </ul>
5	Eagle Creek	\$43,700	\$3,860	\$131,000	\$11,600	
<b>Total</b>		<b>\$123,000</b>	<b>\$10,800</b>	<b>\$368,000</b>	<b>\$32,500</b>	

*Note:* Totals may not sum due to rounding. Tribal lands are considered for exclusion from critical habitat designation in the Proposed Critical Habitat rule.

### 3.9.3 Minority Populations

Table 16 provides 2000 census data by race and Hispanic or Latino populations within the analysis area compared to statewide percentages for Arizona and New Mexico. As shown by these data, in Arizona, the percentage of racial (nonwhite) minorities in the nine-county analysis area is greater than that within the state (25.8% vs. 22.3%), while a somewhat higher percentage of Hispanic persons reside in the state than in the analysis area as a whole (25.3% vs. 24.6%). In New Mexico more racial minorities reside in the state than in the three-county analysis area as a whole (30.7% vs. 19.6%), while a lower percentage of Hispanic persons reside in the analysis area than in the state as a whole (25.2% vs. 42.1%).

The largest single racial minority in both Arizona and New Mexico is American Indian (Table 16). The percentage of the general population represented by American Indian groups within the analysis area is 10.3 percent in Arizona and 1.4 percent in New Mexico. The percentage in the analysis area is much greater than the state percentage for Arizona (10.3% vs. 5.1%) but is lower than the state percentage for New Mexico (1.4% vs. 9.9%).

Because Alternative A proposes the exclusion of tribal lands from critical habitat designation, these numbers may reflect higher impacts than would be realized.

**Table 16 Racial Minority (Nonwhite), American Indian, and Hispanic Populations Within the Analysis Area (2000)**

State	Racial Minority		American Indian		Hispanic	
	Analysis Area (%)	Statewide (%)	Analysis Area (%)	Statewide (%)	Analysis Area (%)	Statewide (%)
Arizona	25.8	22.3	10.3	5.1	24.6	25.3
New Mexico	19.6	30.7	1.4	9.9	25.2	42.1

Source: U.S. Census Bureau, State and County QuicksFacts (<http://quickfacts.census.gov/qfd>, accessed July 14, 2011).

### 3.9.4 Low-Income Populations

The estimated percentage of the population below the poverty level in the analysis area by state is depicted in Table 10. In Arizona, the percentage of individuals below the poverty level in the analysis area is larger in six of the nine counties than it is for the state as a whole (14.7%). In New Mexico, the percentage of individuals below the poverty level in the analysis area is larger for all three counties than it is for the state as a whole (17.0%).

Additionally, as stated in the 2011 Economic Analysis, available data demonstrate the economic vulnerability of the Tribes affected by this proposal; their economies are characterized by high unemployment, low income, low education levels, and high poverty rates, making these communities particularly vulnerable to economic impacts associated with increased regulatory burden.

### 3.9.5 Environmental Consequences

Implementation of the proposed rule (Alternative B) is without exclusion areas. This includes areas that are excluded in the No Action Alternative, and that are being considered for exclusion under Alternative A, that may have high populations of minority and low-income populations. As discussed in the 2006 EA, the potential for disproportionate impacts on minority and low-income populations from designating critical habitat is unknown. This is because

- site specific riparian-associated human demographics in the majority of affected areas outside tribal lands are unknown;

- critical habitat designation does not directly restrict land management or land use activities;
- Section 7 consultation outcomes and the subsequent impacts on these populations could not be predicted even if a detailed, site-specific demographic study or characterization were conducted. Therefore, further investigations would provide no useful information for evaluating the potential for disproportionate impacts of critical habitat designation on minority and low-income populations.

### **3.10 Cumulative Impacts**

A cumulative impact is the effect on the environment that results from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal) or individual undertakes such actions. Cumulative impacts can result from individually minor but collectively noteworthy actions taking place over a period of time. The past, present, and reasonably foreseeable future actions in the proposed critical habitat analysis area that, when combined with the proposed action, could contribute to cumulative effects include (1) Section 7 consultations conducted for other species and other designated critical habitat and (2) existing land management policies and plans.

Compared to the No Action Alternative (2007 final rule), Alternative A and B are both expected to result in an unknown increase in the number of Section 7 consultations by the Service due to an increase in the total mileage of stream segments designated as critical habitat. The increase in the number of Section 7 consultations is not expected to change substantially because many of the segments proposed for critical habitat designation are currently occupied by the spikedace and loach minnow and therefore already subject to the ESA. Implementation of Alternative A would result in an increase of designated critical habitat for spikedace and loach minnow from approximately 522 miles to 761 miles; a difference of 239 miles. Implementation of Alternative B would result in an increase of designated critical habitat for spikedace and loach minnow from approximately 522 miles to 835 miles; a difference of 313 miles. Alternative A excludes select stream segments from designation, while Alternative B does not. The proposed streams under Alternatives A and B that are not currently occupied by either spikedace or loach minnow would be subject to new Section 7 consultation requirements as they are not currently subject to the ESA. Beaver/Wet Beaver Creek are the only unoccupied stream segments included in Alternative B that are not in Alternative A; these streams are being considered for exclusion under Alternative A because they flow through Yavapai-Apache tribal lands.

Designating critical habitat for the spikedace and loach minnow is generally expected to have minor, adverse impacts on proposed and ongoing projects with a federal nexus, socioeconomic conditions, land uses, and resource management, although the three Tribes whose lands are included in the proposed designation believe that their Tribe would incur more substantial adverse impacts. Minor beneficial impacts are expected on the PBFs associated with the spikedace and loach minnow and, by extension, on the integrity of the riparian and aquatic ecosystems in the proposed critical habitat analysis area. Impacts from other past, present and reasonably foreseeable future actions in the analysis area are similar in type and intensity.

When comparing Alternatives A and B to the No Action Alternative, the total increase in proposed critical habitat for the spinedace and loach minnow is relatively small and widespread—much of it is relatively isolated, in public rather than private ownership, in special management areas already managed primarily to preserve resource values, and overlaps proposed or designated critical habitat for spinedace, loach minnow and other federally listed species. Human use of the analysis area is relatively low, except for a few areas (e.g., portions of the upper Verde River and upper San Pedro River). These factors collectively tend to conserve high-value natural resources like aquatic and riparian habitats, which are rare in the Southwest, and to constrain consumptive and utilitarian uses of such resources that eliminate or degrade the PBFs essential to the spinedace and loach minnow.

Therefore, the incremental impact of designating additional critical habitat for the spinedace and loach minnow when added to other past, present, and reasonably foreseeable future actions in the analysis area would be minor on water resources, wetlands and floodplains, natural resources, land use and management (including livestock grazing), wildland fire management, recreation. Tribal socioeconomics, Tribal Trust resources, and Tribal environmental justice may incur additional impacts if Alternative B is selected.

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## CHAPTER 4

### ANALYSIS OF SIGNIFICANCE

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The primary purpose of preparing an environmental assessment under NEPA is to determine whether a proposed action would have significant impacts on the human environment. If significant impacts may result from a proposed action, then an environmental impact statement is required (40 CFR 1502.3). Whether a proposed action exceeds a threshold of significance is determined by analyzing the context and the intensity of the proposed action (40 CFR 1508.27). *Context* refers to the setting of the proposed action and potential impacts of that action. The context of a significance determination may be society as a whole (human, national), the affected region, the affected interests, or the locality. *Intensity* refers to the severity of the impacts.

Under Council of Environmental Quality (CEQ) regulations, which is responsible for ensuring compliance with NEPA, intensity is determined by considering 10 criteria (CFR 40 1508.27[b]): (1) beneficial and adverse impacts; (2) the degree of impacts on health and safety; (3) impacts on the unique characteristics of the area; (4) the degree to which the impacts would likely be highly controversial; (5) the degree to which the proposed action would impose unique, unknown, or uncertain risks; (6) the degree to which the proposed action might establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration; (7) whether the proposed action is related to other actions, which cumulatively could produce significant impacts; (8) the degree to which the proposed action might adversely affect locales, objects, or structures eligible for listing in the National Register of Historic Places; (9) the degree to which the proposed action might adversely affect an endangered or threatened species or its habitat, as determined to be critical under the ESA of 1973; and (10) whether the proposed action threatens a violation of federal, state, or local law.

With the No Action Alternative, the context of short- and long-term impacts of the 2007 final rule, the current designation of critical habitat for spinedace and loach minnow includes 5 critical habitat complexes affecting a 9-county area in 2 states. A total of approximately 522 miles are currently designated for spinedace and loach minnow, and there are several exclusion areas on tribal and privately owned land. With Alternative A, the context of short- and long-term impacts of the 2010 proposed rule, the designation of critical habitat for spinedace and loach minnow includes 8 critical habitat units affecting a 12-county area in 2 states. Under Alternative A, a total of 761 miles are proposed for designation (not including potential exclusion areas on tribal and on privately owned land that are discussed in the proposed rule). With Alternative B, the context of short- and long-term impacts of the 2010 proposed rule, the designation of critical habitat for spinedace and loach minnow includes 8 critical habitat units affecting a 12-county area in 2 states. Under Alternative B, a total of 836 miles are proposed for designation. No lands are excluded under Alternative B. The impacts of additional critical habitat designation under Alternative A are not anticipated to be significant. The impacts of additional critical habitat designation under Alternative B may have effects on tribal lands.

Potential impacts on environmental resources, both beneficial and adverse, would generally be minor. Analyses of impacts of critical habitat designation on sensitive resources within stream segments proposed as spikedace and/or loach minnow critical habitat are discussed in Chapter 3 of this EA. The analyses determined that the designation of critical habitat would have both adverse and beneficial impacts on those resources. These analyses concluded that the adverse impacts of critical habitat designation would not be significant.

There would be negligible to minor impacts on public health or safety from the proposed designation of critical habitat.

The increased risk of wildland fire was analyzed within the context of critical habitat designation. Impacts of wildland fire on public health and safety were determined to be negligible because wildland fire suppression and wildland fire management within WUI areas would not be significantly impeded by the designation of critical habitat.

The increased risk to flood control was also analyzed within the context of critical habitat designation. Impacts of flood control on public health and safety were determined to be minor since flood control methods and plans would not be significantly impeded by the designation of critical habitat.

Potential impacts on the quality of the environment are not likely to be highly controversial. Impacts are not likely to be highly controversial because, as the analyses of impacts of critical habitat designation has concluded, the quality of the environment would not be significantly modified from current conditions. This analysis is based on past consultations, past impacts of spikedace and loach minnow conservation on activities within spikedace and loach minnow recovery areas, and the likely future impacts from spikedace and loach minnow conservation. Past Section 7 consultations within proposed designated critical habitat would likely be reinitiated. New activities would result in Section 7 consultations. A number of activities, including livestock grazing, transportation projects, wildland fire, recreation, and vegetation management (i.e., timber management) would likely have some spikedace and loach minnow conservation-related constraints or limitations imposed on them in select locations. There would likely be administrative costs borne by federal agencies to develop measures to prevent both adverse effects and adverse modification to maintain critical habitat, as well as administrative costs borne by project proponents to complete Section 7 consultations and to develop reasonable and prudent alternatives to maintain or avoid the destruction or adverse modification of designated critical habitat. These administrative costs are not considered to be significant when annualized over the 20-year time horizon discussed in the economic analysis (IEc 2011a).

Overall, with the possible exception of tribal lands, the impacts on water management and water resource activities are not expected to be controversial because, as discussed in the analysis of impacts on water resources, the constraints on current and future water management activities are expected to be limited. Because the spikedace and loach minnow have been listed as threatened since 1986 and critical habitat has been designated for both species since passage of the 2007 final rule except on lands that were excluded in the 2007 final rule, federal activities impacting water resources and water management activities on the majority of the designation have been through the Section 7

consultation process, and mitigating measures and conservation activities have been developed for these activities to protect the spikedace and loach minnow. Conservation constraints or limitations related to proposed designated critical habitat would be similar to those imposed from species-related constraints.

With respect to the Big Chino Water Ranch Project, the project will likely go forward; however, there is uncertainty as to what the project will involve and as to the timeline associated with the project due to significant administrative and legal hurdles that must first be overcome. In addition, it is unclear that there will be a federal nexus that would require Section 7 consultation for spikedace, loach minnow, or their critical habitat.

With respect to the New Mexico CAP project, there is not enough information to determine what form the project will take, or if there will be a project.

Therefore, the preparation of an EIS to address the issues surrounding the Big Chino Project and the New Mexico CAP would be futile. Further study of these issues would not provide useful information to resolve any environmental concerns because these projects are not yet developed, and will not have developed to the point that the designation's impact, if any, can be determined by the deadline for designating critical habitat for the spikedace and loach minnow.

The designation of additional critical habitat by the Service for the conservation of threatened species is not a precedent-setting action with significant effects. The agency designated critical habitat for spikedace and loach minnow in 2007 and has designated critical habitat for numerous other species. There would not be any significant cumulative impacts because as described in Section 3.12 of this EA, the cumulative impacts would be limited to Section 7 consultation outcomes and subsequent effects on other species, the effects of designated critical habitat for other species, and the effects of land management plans.

Critical habitat designation is not likely to affect sites, objects, or structures of historical, scientific, or cultural significance because federal and state laws enacted to protect and preserve these resources would address any such potential impacts.

The proposal to designate additional critical habitat for the spikedace and loach minnow would have long-term, beneficial impacts on these fish species. The purpose of the proposed rule is to designate additional critical habitat for the spikedace and loach minnow, both federally listed under the ESA. Critical habitat designation would have long-term, beneficial, conservation-related impacts on the survival and recovery of the spikedace and loach minnow through the maintenance of PBFs.

The proposed critical habitat designation would not violate any federal, state, or local laws. The designation of critical habitat is required by law in order to comply with the ESA.

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## **CHAPTER 5**

### **PREPARERS**

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This EA was prepared by Logan Simpson Design Inc., an environmental planning and landscape architecture firm headquartered in Tempe, Arizona, under contract to the Service's Southwest Regional Ecological Services Office, Albuquerque, New Mexico. The socioeconomic analysis was prepared by Industrial Economics, Inc. of Cambridge, Massachusetts.

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## CHAPTER 6

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## APPENDIX A

# LEGAL DESCRIPTIONS OF 2010 PROPOSED CRITICAL HABITAT FOR THE SPIKEDACE AND LOACH MINNOW

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The legal descriptions for the designated critical habitat units for spikedace and loach minnow are described in the 2010 proposed rule (75 FR 66482) and presented below. They align with the figures depicting the designated critical habitat maps shown in the proposed rule (75 FR 66482, pp. 66526–66551) and in this EA (Figures 4–21). Legal descriptions for New Mexico and Arizona are based on the Public Lands Survey System. Within this system, all coordinates reported for New Mexico are in the New Mexico Principal Meridian, while those in Arizona are in the Gila and Salt River Meridian. Where possible, the ending or starting points have been described to the nearest quarter section, abbreviated as “1/4.” All mileage calculations were performed using GIS. Each stream segment includes a lateral component that consists of 300 feet on either side of the stream channel measured from the stream edge at bankfull discharge. This lateral component of critical habitat is intended as a surrogate for the 100-year floodplain.

### Spikedace

#### ***Unit 1—Verde River Subbasin, Yavapai County, Arizona (Figure 6)***

*Verde River* for approximately 106.7 mi, extending from the confluence with Fossil Creek in Township 11 North, Range 6 East, northeast quarter of Section 25 upstream to Sullivan Dam in Township 17 North, Range 2 West, northwest quarter of Section 15.

*Granite Creek* for approximately 2.0 mi, extending from the confluence with the Verde River in Township 17 North, Range 2 West, northeast quarter Section 14 upstream to a spring in Township 17 North, Range 2 West, southwest quarter of the southwest quarter of Section 13.

*Oak Creek* for approximately 33.7 mi, extending from the confluence with the Verde River in Township 15 North, Range 4 East, southeast quarter Section 20 upstream to the confluence with an unnamed tributary from the south in Township 17 North, Range 5 East, southeast quarter of the northeast quarter of Section 24.

*Beaver Creek/Wet Beaver Creek* for approximately 20.8 mi, extending from the confluence with the Verde River in Township 14 North, Range 5 East, southeast quarter of Section 30 upstream to the confluence with Casner Canyon in Township 15 North, Range 6 East, northwest quarter of Section 23.

*West Clear Creek* for approximately 6.8 mi, extending from the confluence with the Verde River in Township 13 North, Range 5 East, center Section 21, upstream to the confluence with Black Mountain Canyon in Township 13 North, Range 6 East, southeast quarter of Section 17.

*Fossil Creek* for approximately 4.7 mi extending from the confluence with the Verde River in Township 11 North, Range 5 East, northeast quarter of Section 25 upstream to the confluence with an unnamed tributary from the northwest in Township 11.5 North, Range 7 East, center of Section 29.

**Unit 2—Salt River Subbasin, Gila County, Arizona (Figure 8)**

*Tonto Creek* for approximately 29.7 mi extending from the confluence with Greenback Creek in Township 5 North, Range 11 East, northwest quarter of Section 8 upstream to the confluence with Houston Creek in Township 9 North, Range 11 East, northeast quarter of Section 18.

*Greenback Creek* for approximately 9.4 mi from the confluence with Tonto Creek in Township 5 North, Range 11 East, northwest quarter of Section 8 upstream to Lime Springs in Township 6 North, Range 12 East, southwest quarter of Section 20.

*Rye Creek* for approximately 1.8 mi extending from the confluence with Tonto Creek in Township 8 North, Range 10 East, northeast quarter of Section 24 upstream to the confluence with Brady Canyon in Township 8 North, Range 10 East, northwest quarter of Section 14.

*Spring Creek* for approximately 16.9 mi extending from the confluence with the Tonto River at Township 10 North, Range 11 East, southeast quarter of Section 36 upstream to the confluence with Sevenmile Canyon at Township 8 North, Range 13 East, northern boundary of Section 20.

*Rock Creek* for approximately 3.6 mi extending from the confluence with Spring Creek at Township 8 North, Range 12 East, southeast quarter of Section 1 upstream to the confluence with Buzzard Roost Canyon at Township 8 North, Range 12 East, center of Section 24.

**Unit 3—San Pedro River Subbasin, Cochise, Graham, Pima and Pinal Counties, Arizona (Figure 10)**

*San Pedro River* for approximately 37.2 mi extending from the International Boundary with Mexico in Township 24 South, Range 22 East, Section 19 downstream to the confluence with the Babocomari River in the San Juan de las Boquillas y Nogales land grant.

*Aravaipa Creek* for approximately 27.9 mi extending from the confluence with the San Pedro River in Township 7 South, Range 16 East, center of Section 9 upstream to the confluence with Stowe Gulch in Township 6 South, Range 19 East, southeast quarter of the northeast quarter of Section 35.

*Deer Creek* for approximately 2.3 mi extending from the confluence with Aravaipa Creek in Township 6 South, Range 18 East, Section 14 upstream to the boundary of the Aravaipa Wilderness in Township 6 South, Range 19 East, Section 18.

*Turkey Creek* for approximately 2.7 mi extending from the confluence with Aravaipa Creek in Township 6 South, Range 19 East, Section 19 upstream to the confluence with Oak Grove Canyon in Township 6 South, Range 19 East, Section 32.

*Hot Springs Canyon* for approximately 11.8 mi extending from the confluence with the San Pedro River in Township 13 South, Range 19 East, center of Section 23 upstream to the confluence with Bass Canyon in Township 12 South, Range 20 East, northeast quarter of Section 36.

*Redfield Canyon* for approximately 14.0 mi extending from the confluence with the San Pedro River in Township 11 South, Range 18 East, southwest quarter of Section 34 upstream to the confluence with Sycamore Canyon in Township 11 South, Range 20 East, northwest quarter of Section 28.

*Bass Canyon* for approximately 3.4 mi from the confluence with Hot Springs Canyon in Township 12 South, Range 20 East, northeast quarter of Section 36 upstream to the confluence with Pine Canyon in Township 12 South, Range 21 East, center of Section 20.

**Unit 4—Bonita Creek Subbasin, Graham County, Arizona (Figure 12)**

*Bonita Creek* for approximately 14.8 mi from the confluence with the Gila River in Township 6 South, Range 28 East, southeast quarter of Section 21 upstream to the confluence with Martinez Wash in Township 4 South, Range 27 East, southeast quarter of Section 27.

**Unit 5—Eagle Creek Subbasin, Graham and Greenlee Counties, Arizona (Figure 14)**

*Eagle Creek* for approximately 46.9 mi from the Freeport-McMoRan diversion dam at Township 4 South, Range 28 East, southwest quarter of Section 23 upstream to the confluence of East Eagle Creek in Township 2 North, Range 28 East, southwest quarter of Section 20.

**Unit 6—San Francisco River Subbasin, Greenlee County, Arizona, and Catron County, New Mexico (Figure 16)**

*San Francisco River* for approximately 112.3 mi of the San Francisco River extending from the confluence with the Gila River in Township 5 South, Range 29 East, southeast quarter of Section 21 upstream to the confluence with the Tularosa River in Township 7 South, Range 19 West, southwest quarter of Section 23.

**Unit 7—Blue River Subbasin, Greenlee County, Arizona, and Catron County, New Mexico (Figure 18)**

*Blue River* for approximately 50.6 mi from the confluence with the San Francisco River at Township 2S., Range 31 East, southeast quarter of Section 31 upstream to the confluence of Campbell Blue and Dry Blue Creeks at Township 7 South, Range 21 West, southeast quarter of Section 6.

*Campbell Blue Creek* for approximately 7.7 mi from the confluence of Dry Blue and Campbell Blue Creeks at Township 7 South, Range 21 West, southeast quarter of Section 6 to the confluence

with Coleman Canyon in Township 4.5 North, Range 31 East, southwest quarter of the northeast quarter of Section 32.

*Little Blue Creek* for approximately 3.1 mi from the confluence with the Blue River at Township 1 South, Range 31 East, center Section 5 upstream to the mouth of a canyon at Township 1 North, Range 31 East, northeast quarter of Section 29.

*Pace Creek* for approximately 0.8 mi from the confluence with Dry Blue Creek at Township 6 South, Range 21 West, southwest quarter of Section 28 upstream to a barrier falls at Township 6 South, Range 21 West, northeast quarter of Section 29.

*Frieborn Creek* for approximately 1.1 mi from the confluence with Dry Blue Creek at Township 7 South, Range 21 West, southwest quarter of the northwest quarter of Section 5 upstream to an unnamed tributary flowing from the south in Township 7 South, Range 21 West, northeast quarter of southwest quarter of Section 8.

*Dry Blue Creek* for approximately 3.0 mi from the confluence with Campbell Blue Creek at Township 7 South, Range 21 West, southeast quarter of Section 6 upstream to the confluence with Pace Creek in Township 6 South, Range 21 West, southwest quarter of Section 28.

#### **Unit 8—Gila River Subbasin, Catron, Grant, and Hidalgo Counties, New Mexico (Figure 20)**

*Gila River* for approximately 102.6 mi from the confluence with Moore Canyon at Township 18 South, Range 21 West, southeast quarter of the southwest quarter of Section 32 upstream to the confluence of the East and West Forks of the Gila River at Township 13 South, Range 13 West, center of Section 8.

*West Fork Gila River* for approximately 8.1 mi from the confluence with the East Fork Gila River at Township 13 South, Range 13 West, center of Section 8 upstream to the confluence with EE Canyon at Township 12 South, Range 14 West, east boundary of Section 21.

*Middle Fork Gila River* for approximately 7.7 mi of the Middle Fork Gila River extending from the confluence with West Fork Gila River at Township 12 South, Range 14 West, southwest quarter of Section 25 upstream to the confluence of Big Bear Canyon in Township 12 South, Range 14 West, southwest quarter of Section 2.

*East Fork Gila River* for approximately 26.2 mi extending from the confluence with West Fork Gila River at Township 13 South, Range 13 West, center of Section 8 upstream to the confluence of Beaver and Taylor Creeks in Township 11 South, Range 12 West, northeast quarter of Section 17.

*Mangas Creek* for approximately 5.7 mi extending from the confluence with the Gila River at Township 17 South, Range 16 West, southwest quarter of Section 5 upstream to the confluence with Blacksmith Canyon at Township 17 South, Range 17 West, northwest quarter of Section 3.

## **Loach Minnow**

### ***Unit 1—Verde River Subbasin, Yavapai County, Arizona (Figure 7)***

*Verde River* for approximately 74.4 mi, extending from the confluence with Beaver and Wet Beaver Creek in Township 14 North, Range 5 East, southeast quarter of Section 30 upstream to Sullivan Dam in Township 17 North, Range 2 West, northwest quarter of Section 15.

*Granite Creek* for approximately 2.0 mi, extending from the confluence with the Verde River in Township 17 North, Range 2 West, northeast quarter of Section 14 upstream to a spring in Township 17 North, Range 2 West, southwest quarter of the southwest quarter of Section 13.

*Oak Creek* for approximately 33.7 mi, extending from the confluence with the Verde River in Township 15 North, Range 4 East, southeast quarter of Section 20 upstream to the confluence with an unnamed North, Range 5 East, southeast quarter of the northeast quarter of Section 24.

*Beaver Creek and Wet Beaver Creek* for approximately 20.8 mi, extending from the confluence with the Verde River in Township 14 North, Range 5 East, southeast quarter of Section 30 upstream to the confluence with Casner Canyon in Township 15 North, Range 6 East, northwest quarter of Section 23.

*Fossil Creek* for approximately 4.7 mi extending from the confluence with the Verde River in Township 11 North, Range 5 East, northeast quarter of Section 25 upstream to the confluence with an unnamed tributary from the northwest in Township 11.5 North, Range 7 East, center of Section 29.

### ***Unit 2—Salt River Subbasin, Apache, Gila, and Navajo Counties, Arizona (Figure 9)***

*White River* for approximately 18.0 mi from the confluence with the Black River at Township 4.5 North, Range 20 East, northeast quarter of Section 35 upstream to the confluence with the North and East Forks of the White River at Township 5 North, Range 22 East, northwest quarter of Section 35.

*East Fork White River* for approximately 10.7 mi from the confluence with North Fork White River at Township 5 North, Range 22 East, northeast quarter of Section 35 upstream to the confluence with Bones Canyon at Township 5 North, Range 24 East, southwest quarter of Section 18.

*East Fork Black River* for approximately 11.9 mi from the confluence with the West Fork Black River at Township 4 North, Range 28 East, southeast quarter of Section 11 upstream to the confluence with an unnamed tributary approximately 0.51 mi downstream of the Boneyard Creek confluence at Township 5 North, Range 29 East, northwest quarter of Section 5.

*North Fork East Fork Black River* for approximately 4.4 mi of the North Fork East Fork Black River extending from the confluence with East Fork Black River at Township 5 North, Range 29 East,

northwest quarter of Section 5 upstream to the confluence with an unnamed tributary at Township 6 North, Range 29 East, center of Section 30.

*Boneyard Creek* for approximately 1.4 mi extending from the confluence with the East Fork Black River at Township 5 North, Range 29 East, SW quarter of Section 5 upstream to the confluence with an unnamed tributary at Township 6 North, Range 29 East, southeast quarter of Section 32.

*Coyote Creek* for approximately 2.1 mi from the confluence with East Fork Black River at Township 5 North, Range 29 East, northeast quarter of Section 8 upstream to an unnamed confluence at Township 5 North, Range 29 East, northwest quarter of Section 10.

### **Unit 3—San Pedro Subbasin, Cochise, Pinal, and Graham Counties, Arizona (Figure 11)**

*San Pedro River* for approximately 37.2 mi extending from the International Boundary with Mexico in Township 24 South, Range 22 East, Section 19 downstream to the confluence with the Babocomari River in the San Juan de las Boquillas y Nogales land grant.

*Aravaipa Creek* for approximately 27.9 mi extending from the confluence with the San Pedro River in Township 7 South, Range 16 East, center of Section 9 upstream to the confluence with Stowe Gulch in Township 6 South, Range 19 East, southeast quarter of the northeast quarter of Section 35.

*Deer Creek* for approximately 2.3 mi extending from the confluence with Aravaipa Creek in Township 6 South, Range 18 East, Section 14 upstream to the boundary of the Aravaipa Wilderness in Township 6 South, Range 19 East, Section 18.

*Turkey Creek* for approximately 2.7 mi extending from the confluence with Aravaipa Creek in Township 6 South, Range 19 East, Section 19 upstream to the confluence with Oak Grove Canyon in Township 6 South, Range 19 East, Section 32.

*Hot Springs Canyon* for approximately 11.8 mi extending from the confluence with the San Pedro River in Township 13 South, Range 19 East, center of Section 23 upstream to the confluence with Bass Canyon in Township 12 South, Range 20 East, northeast quarter of Section 36.

*Redfield Canyon* for approximately 14.0 mi extending from the confluence with the San Pedro River in Township 11 South, Range 18 East, southwest quarter of Section 34 upstream to the confluence with Sycamore Canyon in Township 11 South, Range 20 East, northwest quarter of Section 28.

*Bass Canyon* for approximately 3.4 mi from the confluence with Hot Springs Canyon in Township 12 South, Range 20 East, northeast quarter of Section 36 upstream to the confluence with Pine Canyon in Township 12 South, Range 21 East, center of Section 20.

**Unit 4—Bonita Creek Subbasin, Graham County, Arizona (Figure 13)**

*Bonita Creek* for approximately 14.8 mi from the confluence with the Gila River in Township 6 South, Range 28 East, southeast quarter of Section 21 upstream to the confluence with Martinez Wash in Township 4 South, Range 27 East, southeast quarter of Section 27.

**Unit 5—Eagle Creek Subbasin, Graham and Greenlee Counties, Arizona (Figure 15)**

*Eagle Creek* for approximately 46.9 mi from the Freeport-McMoRan diversion dam at Township 4 South, Range 28 East, southwest quarter of the northwest quarter of Section 23 upstream to the confluence of East Eagle Creek in Township 2 North, Range 28 East, southwest quarter of Section 20.

**Unit 6—San Francisco River Subbasin, Greenlee County, Arizona, and Catron County, New Mexico (Figure 17) (revised since publication of the proposed rule)**

*San Francisco River* for approximately 125.9 mi of the San Francisco River extending from the confluence with the Gila River in Township 5 South, Range 29 East, southeast quarter of Section 21 upstream to Township 6 South, Range 19 West, Section 2.

*Tularosa River* for approximately 18.6 mi from the confluence with the San Francisco River at Township 7 South, Range 19 West, southwest quarter of Section 23 upstream to the town of Cruzville at Township 6 South, Range 18 West, southern boundary of Section 1.

*Negrito Creek* for approximately 4.2 mi extending from the confluence with the Tularosa River at Township 7 South, Range 18 West, southwest quarter of the northwest quarter of Section 19 upstream to the confluence with Cerco Canyon at Township 7 South, Range 18 West, west boundary of Section 22.

*Whitewater Creek* for approximately 1.2 mi from the confluence with the San Francisco River at Township 11 South, Range 20 West, Section 27 upstream to the confluence with Little Whitewater Creek at Township 11 South, Range 20 West, southeast quarter of Section 23.

**Unit 7—Blue River Subbasin, Greenlee County, Arizona, and Catron County, New Mexico (Figure 19)**

*Blue River* for approximately 50.6 mi from the confluence with the San Francisco River at Township 2 South, Range 31 East, southeast quarter of Section 31 upstream to the confluence of Campbell Blue and Dry Blue Creeks at Township 7 South, Range 21 West, southeast quarter of Section 6.

*Campbell Blue Creek* for approximately 7.7 mi from the confluence of Dry Blue and Campbell Blue Creeks at Township 7 South, Range 21 West, southeast quarter of Section 6 to the confluence with Coleman Canyon in Township 4.5 North, Range 31 East, southwest quarter of the northeast quarter of Section 32.

*Little Blue Creek* for approximately 3.1 mi from the confluence with the Blue River at Township 1 South, Range 31 East, center of Section 5 upstream to the mouth of a canyon at Township 1 North, Range 31 East, northeast quarter of Section 29.

*Pace Creek* for approximately 0.8 mi from the confluence with Dry Blue Creek at Township 6 South, Range 21 West, southwest quarter of Section 28 upstream to a barrier falls at Township 6 South, Range 21 West, northeast quarter of Section 29.

*Frieborn Creek* for approximately 1.1 mi from the confluence with Dry Blue Creek at Township 7 South, Range 21 West, southwest quarter of the northwest quarter of Section 5 upstream to an unnamed tributary flowing from the south in Township 7 South, Range 21 West, northeast quarter of the southwest quarter of Section 8.

*Dry Blue Creek* for approximately 3.0 mi from the confluence with Campbell Blue Creek at Township 7 South, Range 21 West, southeast quarter of Section 6 upstream to the confluence with Pace Creek in Township 6 South, Range 21 West, southwest quarter of Section 28.

***Unit 8—Gila River Subbasin, Catron, Grant, and Hidalgo Counties, New Mexico (Figure 21) (new since publication of the proposed rule)***

*Bear Creek* for approximately 19.5 mi extending from the confluence with the Gila River at Township 15 South, Range 17 West, center of Section 33 upstream to the confluence with Sycamore and North Fork Walnut Creeks at Township 16 South, Range 15 West, northeast quarter of Section 15.

*Gila River* for approximately 102.6 mi from the confluence with Moore Canyon at Township 18 South, Range 21 West, southeast quarter of the southwest quarter of Section 32 upstream to the confluence of the East and West Forks of the Gila River at Township 13 South, Range 13 West, center of Section 8.

*West Fork Gila River* for approximately 8.1 mi from the confluence with the East Fork Gila River at Township 13 South, Range 13 West, center of Section 8 upstream to the confluence with EE Canyon at Township 12 South, Range 14 West, east boundary of Section 21.

*Middle Fork Gila River* for approximately 11.9 mi of the Middle Fork Gila River extending from the confluence with West Fork Gila River at Township 12 South, Range 14 West, southwest quarter of Section 25 upstream to the confluence of Brothers West Canyon in Township 11 South, Range 14 West, northeast quarter of Section 33.

*East Fork Gila River* for approximately 26.2 mi extending from the confluence with West Fork Gila River at Township 13 South, Range 13 West, center of Section 8 upstream to the confluence of Beaver and Taylor Creeks in Township 11 South, Range 12 West, northeast quarter of Section 17.

*Mangas Creek* for approximately 5.7 mi extending from the confluence with the Gila River at Township 17 South, Range 16 West, southwest quarter of Section 5 upstream to the confluence with Blacksmith Canyon at Township 17 South, Range 17 West, northwest quarter of Section 3.

## APPENDIX B

### INCREMENTAL IMPACTS BY REACH, 2011–2030 (2011\$, DISCOUNTED AT 7%)

The following summary data is from IEC's draft economic analysis (2011a, pp. ES-4, ES-5).

EXHIBIT ES-1. INCREMENTAL IMPACTS BY REACH, 2011-2030(2011\$, DISCOUNTED AT 7%)

UNIT	REACH	PRESENT VALUE		ANNUALIZED COSTS		POTENTIAL UNQUANTIFIED IMPACTS
		LOW	HIGH	LOW	HIGH	
1	Verde River	\$78,700	\$81,600	\$6,950	\$7,200	City of Prescott water supply; Yavapai-Apache Nation water exchange/water development project; NRCS Funding <sup>1</sup>
	Granite Creek	\$61,600	\$61,600	\$5,430	\$5,430	
	Oak Creek	\$1,090	\$1,010,000	\$96	\$89,300	
	Beaver and Wet Beaver Creek	\$1,090	\$346,000	\$96	\$30,500	
	West Clear Creek	\$25,900	\$188,000	\$2,290	\$16,600	
	Fossil Creek	\$606	\$606	\$54	\$54	
2	Tonto Creek	\$32,100	\$277,000	\$2,830	\$24,500	NRCS FUNDING White Mountain Apache (Fort Apache Reservation) <ul style="list-style-type: none"> <li>• Water rights settlement and dam project.</li> <li>• Tourism and outdoor recreation industry.</li> <li>• Housing and agricultural development.</li> <li>• Traditional uses of land.</li> <li>• Prescribed burns and other fire management activities.</li> </ul>
	Greenback Creek	\$3,640	\$3,640	\$321	\$321	
	Rye Creek	\$689	\$689	\$61	\$61	
	Spring Creek	\$35,300	\$35,300	\$3,120	\$3,120	
	Rock Creek	\$15,600	\$15,600	\$1,380	\$1,380	
	White River	\$17,300	\$17,300	\$1,530	\$1,530	
	East Fork White River	\$17,300	\$17,300	\$1,530	\$1,530	
	North Fork East Fork Black River	\$3,410	\$3,410	\$301	\$301	
	East Fork Black River	\$5,710	\$5,710	\$504	\$504	
	Boneyard Creek	\$562	\$562	\$50	\$50	
	Coyote Creek	\$274	\$274	\$24	\$24	
3	San Pedro River	\$1,470,000	\$3,240,000	\$129,000	\$286,000	Fort Huachuca water supply impacts
	Hot Springs Canyon	\$6,980	\$6,980	\$616	\$616	
	Bass Canyon	\$1,340	\$1,340	\$118	\$118	
	Redfield Canyon	\$14,100	\$14,100	\$1,240	\$1,240	
	Aravaipa Creek	\$12,600	\$12,600	\$1,110	\$1,110	
	Deer Creek	\$5,740	\$5,740	\$507	\$507	
	Turkey Creek	\$5,800	\$5,800	\$511	\$511	
4	Bonita Creek	\$12,400	\$12,400	\$1,090	\$1,090	San Carlos Apache water use

UNIT	REACH	PRESENT VALUE		ANNUALIZED COSTS		POTENTIAL UNQUANTIFIED IMPACTS
		LOW	HIGH	LOW	HIGH	
5	Eagle Creek	\$52,600	\$52,600	\$4,640	\$4,640	Mining activities; White Mountain Apache and San Carlos Apache: <ul style="list-style-type: none"> <li>• Water use.</li> <li>• Water use, as well as potential water exchanges.</li> <li>• Livestock use of proposed critical habitat for grazing and water.</li> <li>• Fire management activities.</li> </ul>
6	San Francisco River	\$70,000	\$459,000	\$6,170	\$40,500	-
	Tularosa River	\$2,410	\$2,410	\$213	\$213	
	Negrito Creek	\$549	\$549	\$49	\$49	
	Whitewater Creek	\$0	\$0	\$0	\$0	
7	Blue River	\$23,900	\$23,900	\$2,110	\$2,110	-
	Campbell Blue Creek	\$998	\$998	\$88	\$88	
	Dry Blue Creek	\$383	\$383	\$34	\$34	
	Little Blue Creek	\$0	\$0	\$0	\$0	
	Pace Creek	\$100	\$100	\$9	\$9	
	Frieborn Creek	\$143	\$143	\$13	\$13	
8	Gila River	\$179,000	\$2,360,000	\$15,800	\$208,000	-
	West Fork Gila River	\$1,050	\$1,050	\$92	\$92	
	Middle Fork Gila River	\$1,540	\$1,540	\$136	\$136	
	East Fork Gila River	\$3,400	\$3,400	\$300	\$300	
	Mangas Creek	\$33,300	\$518,000	\$2,940	\$45,700	
	Bear Creek	\$2,530	\$2,530	\$223	\$223	
<b>Total</b>		<b>\$2,200,000</b>	<b>\$8,790,000</b>	<b>\$194,000</b>	<b>\$776,000</b>	<b>N/A</b>
<p><b>Note:</b> Totals may not sum due to rounding.  <sup>1</sup>It is possible that some farmers may choose not to participate in NRCS programs after critical habitat is designated.</p>						

## APPENDIX C

### QUANTIFIED INCREMENTAL IMPACTS BY REACH, 2011–2030 (2011\$, DISCOUNTED AT 3%)

The following summary data is from IEC's draft economic analysis (2011a, pp. ES-6, ES-7).

EXHIBIT ES-2. QUANTIFIED INCREMENTAL IMPACTS BY REACH, 2011-2030 (2011\$, DISCOUNTED AT 3%)

UNIT	REACH	PRESENT VALUE		ANNUALIZED COSTS		POTENTIAL UNQUANTIFIED IMPACTS
		LOW	HIGH	LOW	HIGH	
1	Verde River	\$98,500	\$102,000	\$6,430	\$6,680	City of Prescott water supply; Yavapai-Apache Nation water exchange/water development project; NRCS FUNDING <sup>1</sup>
	Granite Creek	\$68,300	\$68,300	\$4,460	\$4,460	
	Oak Creek	\$1,590	\$1,360,000	\$104	\$88,900	
	Beaver and Wet Beaver Creek	\$1,590	\$463,000	\$104	\$30,200	
	West Clear Creek	\$35,200	\$247,000	\$2,290	\$16,100	
	Fossil Creek	\$820	\$820	\$54	\$54	
2	Tonto Creek	\$38,100	\$300,000	\$2,490	\$19,600	NRCS FUNDING White Mountain Apache (Fort Apache Reservation) <ul style="list-style-type: none"> <li>• Water rights settlement and dam project.</li> <li>• Tourism and outdoor recreation industry.</li> <li>• Housing and agricultural development.</li> <li>• Traditional uses of land.</li> <li>• Prescribed burns and other fire management activities.</li> </ul>
	Greenback Creek	\$4,920	\$4,920	\$321	\$321	
	Rye Creek	\$931	\$931	\$61	\$61	
	Spring Creek	\$40,600	\$40,600	\$2,650	\$2,650	
	Rock Creek	\$17,600	\$17,600	\$1,150	\$1,150	
	White River	\$22,000	\$22,000	\$1,440	\$1,440	
	East Fork White River	\$22,000	\$22,000	\$1,440	\$1,440	
	North Fork East Fork Black River	\$4,610	\$4,610	\$301	\$301	
	East Fork Black River	\$7,850	\$7,850	\$512	\$512	
	Boneyard Creek	\$760	\$760	\$50	\$50	
Coyote Creek	\$370	\$370	\$24	\$24		
3	San Pedro River	\$1,880,000	\$4,140,000	\$123,000	\$270,000	Fort Huachuca water supply impacts
	Hot Springs Canyon	\$9,440	\$9,440	\$616	\$616	
	Bass Canyon	\$1,810	\$1,810	\$118	\$118	
	Redfield Canyon	\$14,700	\$14,700	\$960	\$960	
	Aravaipa Creek	\$16,400	\$16,400	\$1,070	\$1,070	
	Deer Creek	\$7,770	\$7,770	\$507	\$507	
	Turkey Creek	\$7,840	\$7,840	\$511	\$511	
4	Bonita Creek	\$15,000	\$15,000	\$976	\$976	San Carlos Apache water use
5	Eagle Creek	\$67,800	\$67,800	\$4,430	\$4,430	Mining activities; White Mountain Apache and San Carlos Apache:

UNIT	REACH	PRESENT VALUE		ANNUALIZED COSTS		POTENTIAL UNQUANTIFIED IMPACTS
		LOW	HIGH	LOW	HIGH	
						<ul style="list-style-type: none"> <li>• water use</li> <li>• Water use, as well as potential water exchanges.</li> <li>• Livestock use of proposed critical habitat for grazing and water.</li> <li>• Fire management activities.</li> </ul>
6	San Francisco River	\$89,700	\$578,000	\$5,850	\$37,700	-
	Tularosa River	\$3,260	\$3,260	\$213	\$213	
	Negrito Creek	\$743	\$743	\$49	\$49	
	Whitewater Creek	\$0	\$0	\$0	\$0	
7	Blue River	\$28,300	\$28,300	\$1,850	\$1,850	-
	Campbell Blue Creek	\$1,350	\$1,350	\$88	\$88	
	Dry Blue Creek	\$517	\$517	\$34	\$34	
	Little Blue Creek	\$0	\$0	\$0	\$0	
	Pace Creek	\$136	\$136	\$9	\$9	
	Frieborn Creek	\$193	\$193	\$13	\$13	
8	Gila River	\$213,000	\$2,940,000	\$13,900	\$192,000	-
	West Fork Gila River	\$1,410	\$1,410	\$92	\$92	
	Middle Fork Gila River	\$2,090	\$2,090	\$136	\$136	
	East Fork Gila River	\$4,590	\$4,590	\$300	\$300	
	Mangas Creek	\$39,000	\$647,000	\$2,550	\$42,200	
	Bear Creek	\$3,420	\$3,420	\$223	\$223	
<b>Total</b>		<b>\$2,770,000</b>	<b>\$11,200,000</b>	<b>\$181,000</b>	<b>\$728,000</b>	<b>N/A</b>
<b>Note:</b> Totals may not sum due to rounding.						