United States Department of the Interior

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In Reply Refer to:

AESO/SE
02-21-03-F-0083

September 27, 2006

Memorandum

To: Regional Director, Fish and Wildlife Service, Albuquerque, New Mexico (ARD-ES) (Attn: Luela Roberts-Stroebel)

From: Field Supervisor

Subject: Intra-Service Biological Opinion and Conference Opinion Regarding the Proposed Issuance of an Incidental Take Permit (TE-123062-0) and Approval of Arizona Game and Fish Department's Safe Harbor Agreement for the Chiricahua Leopard Frog in Arizona

This memorandum represents our Biological and Conference Opinion (BO), furnished under section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act), on the issuance of a permit authorizing the incidental take of the threatened Chiricahua leopard frog (*Rana chiricahuensis*) under the authority of section 10(a)(1)(A) of the Act to the Arizona Game and Fish Department (AGFD). Along with the permit application, AGFD submitted a draft of the Safe Harbor Agreement for the Chiricahua Leopard Frog in Arizona (Agreement) that was available for public review for 30 days beginning on August 2, 2006 (71 FR 43788). The Agreement covers non-Federal lands located within the historical range of Chiricahua leopard frog and selected captive refugia or breeding sites within Arizona (See Figure 1).

This BO analyzes the potential effects that issuance of this permit may have on the threatened Chiricahua leopard frog, threatened Apache trout (*Oncorhynchus apache*), endangered desert pupfish (*Cyprinodon macularius*) with critical habitat, endangered Gila chub (*Gila intermedia*) with critical habitat, endangered Gila topminnow (*Poeciliopsis occidentalis occidentalis*), threatened Gila trout (*O. gilae*), candidate headwater chub (*G. nigra*), endangered Little Colorado spinedace (*Lepidomeda vittata*) with critical habitat, threatened loach minnow (*Tiaroga cobitis*) with proposed critical habitat, endangered razorback sucker (*Xyrauchen texanus*) with critical habitat, threatened Sonora chub (*G. ditaenia*) with critical habitat, endangered Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*), threatened spikedace (*Meda fulgida*) with proposed critical habitat, candidate Stephan's riffle beetle (*Heterelmis stephani*), threatened beautiful shiner (*Cyprinella formosa*) with critical habitat, threatened Yaqui catfish (*Ictalurus pricei*) with critical habitat, endangered Yaqui chub (*G. purpurea*) with critical habitat, endangered Yaqui topminnow (*P. o. sonoriensis*), endangered Canelo Hills ladies' tresses (*Spiranthes delitescens*), endangered Huachuca water umbel (*Lilaeopsis schaffneriana* var. *recurva*) with critical habitat, endangered southwestern willow flycatcher (*Empidonax trailli*

extimus) with critical habitat, candidate Huachuca springsnail (*Pyrgulopsis thompsoni*), candidate Three Forks springsnail (*P. trivialis*), candidate western yellow-billed cuckoo (*Coccyzus americanus*), threatened Cochise pincushion cactus (*Coryphantha robbinsorum*), and endangered Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*).

We determined that this action may affect, but is not likely to adversely affect the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), endangered jaguar (*Panthera onca*), endangered masked bobwhite (*Colinus virginianus ridgewayi*), threatened Mexican spotted owl (*Strix occidentalis lucida*) with critical habitat, threatened bald eagle (*Haliaeetus leucocephalus* and endangered Mexican gray wolf (*Canis lupus*). Concurrences with the determinations on these species are in Appendix A. We further determined that this action will have no effect on the endangered Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*), endangered Arizona cliff rose (*Purshia subintegra*), endangered Kearney bluestar (*Amsonia kearneyana*), candidate Lemmon fleabane (*Erigeron lemmonii*), endangered Mount Graham red squirrel (*Tamiasciurus hudsonicus grahamensis*) with critical habitat, and threatened New Mexican ridge-nosed rattlesnake (*Crotalus willardi obscurus*) with critical habitat (Appendix B).

This biological and conference for candidate species opinion is based on information provided in the July 12, 2006, draft Agreement; the July 13, 2006, draft Environmental Assessment; telephone conversations; field investigations; U.S. Fish and Wildlife Service (FWS) files; and other sources of information. Literature cited in this BO is not a complete bibliography of all literature available on the species of concern, the activities covered in the Agreement and their effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file in the Arizona Ecological Services Office (AESO).

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CONSULTATION HISTORY

- May 6, 2005: We received the Agreement and an application for an Enhancement of Survival permit from the AGFD
- August 2, 2006: We published a Notice of Availability of the permit application and draft Agreement in the Federal Register (71 FR 43788).
- September 1, 2006: The 30-day public review period closed.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is our issuance of a section 10(a)(1)(A) permit to AGFD for the incidental take of the threatened Chiricahua leopard frog in association to the implementation of the Safe Harbor Agreement for Chiricahua Leopard Frog in Arizona (Agreement) within the historical range of Chiricahua leopard frog in Arizona. The action area covers the entire historical range of the Chiricahua leopard frog in Arizona, but the area covered by the Agreement only includes the non-federally owned lands within the action area. A complete description of the proposed action and associated conservation measures are included in the Agreement and are incorporated herein by reference (AGFD and USFWS 2006).

The AGFD is requesting a permit to allow non-Federal landowners to participate, through certificates of inclusion, in conservation activities ranging from creation and improvement of habitats to reestablishment of Chiricahua leopard frogs onto their properties within the historical range of this species. In addition, landowners could create isolated refugia and breeding facilities in appropriate locations within Arizona, also through certificates of inclusion. These conservation activities will aid in the recovery of the species on private lands, while providing regulatory assurances for landowners and their neighbors.

Beginning in spring of 2007, any willing landowners with properties in the covered area of the Agreement may have appropriate sites sampled and evaluated by AGFD, or the landowner's designated agent, to establish a baseline condition for the property (See Section 2.4 of the Agreement). Once the baseline is established, the landowner will need to decide whether to enroll their non-Federal land and at what level of participation. Landowners may enroll either as a Participating Landowner, and implement active conservation on their lands, or as a Participating Neighbor, and implement passive conservation on their lands (Section 2.0). All Participating Landowners and Neighbors will practice Required Conservation Measures (Section 2.5) at enrolled sites. Participating Landowners will choose from a list of Optional Conservation Measures (Section 2.6); activities range from preservation of existing habitat to creating new habitat or reestablishing Chiricahua leopard frogs at enrolled sites. Implementation of some of the Conservation Measures may include construction and habitat alteration; the potential effects of these activities are also addressed in this document.

The Agreement's Optional Conservation Measures include those activities that are likely to provide a long-term conservation benefit for Chiricahua leopard frogs:

- Translocating Chiricahua leopard frogs and reestablishing population sites;
- Constructing a double livestock tank system;
- Constructing small refugia sites at single tank systems;
- Fencing aquatic sites or portions of sites to prevent destruction, excessive deterioration, or trampling of Chiricahua leopard frog and their habitat;
- Deepening tanks or pools to increase the amount of water in a tank or pool to increase the aquatic sites persistence during drought;
- Drilling new water wells or renovating old wells to create permanent and reliable water sources;
- Constructing water distribution pipelines to improve aquatic site persistence;
- Removing nonnative aquatic predators and competitors from otherwise suitable sites;
- Maintaining existing habitat conditions;
- Enhancing travel corridors along drainage lines and across upland areas between suitable aquatic sites;
- Enhancing streams and ciénegas to provide suitable Chiricahua leopard frog habitats; and/or
- Enhancing vegetation in existing and new Chiricahua leopard frog habitats.

The Agreement's Optional Conservation Measures may be categorized based upon the type of activity associated with each measure and the potential effects implementation of these measures may have on listed species and their habitats. For the purpose of this document and the analysis under section 7 of the Act, we categorized these activities as Management, Construction, Nonnative Species Control, and Reestablishment of Population Sites.

Management:

Participating Landowners may modify the management of their properties to reduce impacts of the existing land use to Chiricahua leopard frogs. This may be accomplished through the development and implementation of a U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS) ranch management plan or similar ranch management plan that addresses vegetation and livestock management, if there is not an existing plan on the property.

Additionally, changes in the management of livestock tanks may occur, including but not limited to: timing of livestock presence at occupied sites, infrastructure maintenance schedules, infrastructure design, and management of emergent and shoreline vegetation.

Construction:

Construction of new or the renovation of existing infrastructure for the purpose of Chiricahua leopard frog conservation may include fences, pipelines, new tanks, water wells, and livestock tanks. These activities are all typical of construction associated with livestock ranching, but this type of infrastructure may also be constructed on lands not currently used for livestock production. This type of infrastructure is constructed using a variety of techniques from hand labor to heavy equipment as time, finances, and topography allow. Most of these are either narrow, linear projects, such as fences and pipelines, often associated with existing roads; or small non-linear disturbances, such as wells and livestock tanks, that are placed in areas where the water table is close to the surface or in drainages. The number of tanks constructed under this Agreement is expected to be relatively small, as most potential participants are expected to enroll existing habitat rather than create new habitat. In the past 10 years, in the southern part of the range of Chiricahua leopard frog, only one new livestock tank is known to have been built. It is anticipated that maybe one livestock tank a year, on average, would be constructed in association with this Agreement. These livestock tanks would be constructed to develop or improve Chiricahua leopard frog metapopulation dynamics between population sites, as well as meet the landowner's needs. The distribution of these livestock tanks would have to consider the known Chiricahua leopard frog dispersal pattern; five miles down drainage, 3 miles up drainage, and one mile between drainages. Construction projects and any ground disturbance will need to comply with all Federal, State, and local laws that regulate such activities, such as the Clean Water Act.

Nonnative Species Control:

Nonnative species control activities would include both prohibiting the establishment of and removing nonnative aquatic predators and competitors from otherwise suitable aquatic sites. The target nonnative species include, but are not limited to: American bullfrogs (*Rana catesbeiana*), tiger salamanders (*A. t. mavortium*), crayfish (*Orconectes virilis* and possibly others.), mosquito fish (*Gambusia* spp.), fishes in the family Centrarchidae (*Micropterus* spp., *Lepomis* spp.), and several other species of fishes, including catfishes (*Ictalurus* spp. and *Pylodictus oliveris*) and trout (*Salmo* spp., *Oncorhynchus* spp., and *Salvelinus* spp.). The process of renovating an aquatic site typically involves draining the site and/or the use of an approved piscicide.

Reestablishment of Population Sites:

The reestablishment of Chiricahua leopard frog population sites includes removing Chiricahua leopard frogs from existing population sites, transporting frogs, testing and treating translocated frogs for Chytridiomycosis and other diseases, introducing frogs into new habitats, eventual natural dispersal of these frogs, and returning enrolled properties back to their baseline condition. The establishment of isolated population sites and refugia populations for propagation or temporary captive holding may also be carried out under this Agreement.

Conservation Measures

The following measures will be implemented by all participants to minimize take of listed, proposed, and candidate species from implementation of the conservation activities included in the Agreement and associated section 10(a)(1)(A) enhancement of survival permit. These are provided in section 2.5 of the Agreement and referred to as the Required Conservation Measures.

- Protect streams and rivers occupied by Chiricahua leopard frogs, and manage these streams and rivers for Proper Functioning Condition (Prichard et al. 1998).

- Avoid excessive mortality or extirpation of Chiricahua leopard frogs during regularly scheduled maintenance activities through seasonal restrictions, design improvements, and development of on-site refugia.

- Dry or sterilize all equipment during maintenance activities before moving between livestock tanks.

- Manage landowner activities in and around occupied Chiricahua leopard frog habitats to avoid destruction or excessive deterioration of Chiricahua leopard frog habitat or egg masses.

- Prevent the introduction of nonnative predators and competitors, or potential disease vectors into Chiricahua leopard frog habitat.

- Assist in control of nonnative predators and competitors, or potential disease vectors when present.

- Work with the AGFD and the FWS to develop effective minimization measures on a case-by-case basis, where applicable, for prescribed fire, pesticide treatments, and other land treatments that may affect Chiricahua leopard frogs and their habitat.

- Provide a minimum of 60 days notice to the AGFD prior to any activity that may affect Chiricahua leopard frogs. The AGFD (or another program cooperator, as appropriate) may then have the opportunity to salvage Chiricahua leopard frogs from the site prior to disturbance or removal of the site and either return them to the site or move them to a new site.

- Alert the AGFD if any aquatic site on lands that support Chiricahua leopard frogs is in danger of drying as a result of drought or other conditions.

- Provide a minimum of 60 days notice to the AGFD prior to any potential sale or transfer to any other party of property owned by a participant and subject to the Agreement.

- Enroll for a minimum conservation period of 10 years to receive full assurances, but participants may voluntarily terminate participation early, as described in Section 3.3 of the Agreement.

- AGFD will conduct compliance and biological monitoring as described in Section 2.5.4 of the Agreement.

- AGFD will submit annual reports that summarize the prior year's activities and monitoring.

- Allow access to covered sites for AGFD, FWS, or a landowners' designated agent to implement this Agreement on enrolled properties.

STATUS OF THE SPECIES

Species analyzed in this document are grouped according to guilds based upon the ecological community with which they are associated, with the exception the Chiricahua leopard frog. This is done because the effects analysis on the species in each guild should be similar. If an individual species has specific effects not shared by others in the guild, those effects will be discussed separately. The Chiricahua leopard frog is analyzed separately as it is the species covered by the Agreement.

CHIRICAHUA LEOPARD FROG

The Chiricahua leopard frog was listed as a threatened species without critical habitat on June 13, 2002 (67 FR 40790). Included was a special rule under 4(d) of the Act to exempt operation and maintenance of livestock tanks on non-Federal lands from the section 9 take prohibitions of the Act.

The Chiricahua leopard frog is an inhabitant of ciénegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 1,000 to 2,710 meters (m) [3,281 to 8,890 feet (ft)] in central and southeastern Arizona; west-central and southwestern New Mexico; and northern Sonora, and the Sierra Madre Occidental of northern and central Chihuahua (Platz and Mecham 1984, Degenhardt et al. 1996, Sredl et al. 1997, Sredl and Jennings 2005) in Mexico. Reports of the species from the State of Aguascalientes (Diaz and Diaz 1997) are questionable. In New Mexico, of sites occupied by Chiricahua leopard frogs from 1994-1999, 67 percent were creeks or rivers, 17 percent were springs or spring runs, and 12 percent were stock tanks (Painter 2000). In Arizona, slightly more than half of all known historical localities are natural lotic systems, a little less than half are stock tanks, and the remaining sites are lakes and reservoirs (Sredl et al. 1997). Sixty-three percent of populations extant in Arizona from 1993-1996 were found in stock tanks (Sredl and Saylor 1998).

Based on Painter (2000) and the latest information for Arizona, the species is still extant in most major drainages in Arizona and New Mexico where it occurred historically; with the exception of the Little Colorado River drainage in Arizona and possibly the Yaqui drainage in New Mexico. It has also not been found recently in many rivers, valleys, and mountains ranges,

including the following in Arizona: White River, West Clear Creek, Tonto Creek, Verde River mainstem, San Francisco River, San Carlos River, upper San Pedro River mainstem, Santa Cruz River mainstem, Aravaipa Creek, Babocomari River mainstem, and Sonoita Creek mainstem. In many of these regions, Chiricahua leopard frogs were not found for a decade or more despite repeated surveys.

Threats to this species include predation by nonnative organisms, especially bullfrogs, fish, and crayfish; disease; drought; floods; degradation and loss of habitat as a result of water diversions and groundwater pumping, poor livestock management, altered fire regimes due to fire suppression and livestock grazing, mining, development, and other human activities; disruption of metapopulation dynamics; increased chance of extirpation or extinction resulting from small numbers of populations and individuals; and environmental contamination. Loss of Chiricahua leopard frog populations is part of a pattern of global amphibian decline, suggesting other regional or global causes of decline may be important as well (Carey et al. 2001). Numerous studies indicate that declines and extirpations of Chiricahua leopard frogs are, at least in part, caused by predation by and possibly competition with nonnative organisms, including fish in the family Centrarchidae, bullfrogs, tiger salamanders, crayfish, and several other species of fish (Fernandez and Rosen 1998, 1996; Rosen et al. 1996; 1994; Snyder et al. 1996; Fernandez and Bagnara 1995; Sredl and Howland 1994; Clarkson and Rorabaugh 1989). For instance, in the Chiricahua region of southeastern Arizona, Rosen et al. (1996) found that almost all perennial waters investigated that lacked introduced predatory vertebrates supported Chiricahua leopard frogs. All waters except three that supported introduced vertebrate predators no longer support Chiricahua leopard frogs. Sredl and Howland (1994) noted that Chiricahua leopard frogs were nearly always absent from sites supporting bullfrogs and nonnative predatory fish. Rosen et al. (1996) suggested further study was needed to evaluate the effects of mosquitofish, trout, and catfish on frog presence.

Additional information about the Chiricahua leopard frog can be found in Painter (2000), Sredl et al. (1997), Jennings (1995), Degenhardt et al. (1996), Rosen et al. (1994, 1996), Sredl and Howland (1994), Platz and Mecham (1979, 1984), and Sredl and Jennings (2005).

Detailed information on the threats and status of the Chiricahua leopard frog can be found in the Chiricahua Leopard Frog Draft Recovery Plan (USFWS 2006). The draft recovery plan further discusses the actions needed to reduce these threats and goals to be obtained to reach recovery of this species. These actions include: maintaining, restoring, and creating habitat that will be managed in the long term; translocating frogs to establish, reestablish, or augment populations; building support for the recovery effort through outreach and education; monitoring; conducting research needed to provide effective conservation and recovery; and applying research and monitoring through adaptive management. Recovery actions are recommended in each of eight recovery units throughout the range of the species. Management areas are also identified within recovery units where the potential for successful recovery actions is greatest.

AQUATIC SPECIES

Apache Trout

In 1966, Apache trout was considered endangered under the Federal Endangered Species Preservation Act of 1966 (32 FR 4001). Apache trout became federally protected with the passage of the Act in 1973. In 1975, the Apache trout was one of the first endangered species to be down-listed from endangered to threatened (40 FR 29864). As a result, Apache trout is currently listed as threatened, without critical habitat (40 FR 29864), and with a 4(d) rule that permits limited recreational fishing.

Apache trout is one of two salmonid species native to Arizona (the other is Gila trout). Additional information about the Apache trout can be found in the draft Recovery Plan (USFWS 1983).

Historical distribution of Apache trout is unclear. Once Apache trout were recognized as a species separate from Gila trout (Miller 1972), their original distribution was described as the upper Salt River drainage (Black and White Rivers) and headwaters of Little Colorado River in Arizona above 1,800 m (5,905 ft) in elevation (Miller 1972). Historical distribution has been estimated at approximately 965 km (603 miles [mi]) of stream in Arizona (Harper 1978).

Apache trout now exist primarily in headwater areas upstream from natural and artificial barriers (USFWS 1983). This environment is subject to extreme variations in both temperature and stream flow. Apache trout generally require water temperatures below 25°C (77°F) (USFWS 1983).

At least 20 unhybridized and uncompromised (i.e., no nonnative trout) populations exist within the historical range in Gila, Apache, and Greenlee counties of Arizona, on lands of the Fort Apache Indian Reservation (FAIR) and Apache-Sitgreaves National Forest. These 20 populations represent 13 discrete natural stocks (lineages) of pure Apache trout. An additional three populations contain pure Apache trout coexisting with brook trout (*Salvelinus fontinalis*) (Lee Valley Creek) or brown trout (*Salmo trutta*) (Hayground and Stinky creeks). Nine populations were introduced beyond what is now considered the historical range, however only one of those nine (Coleman Creek, on the Apache-Sitgreaves) was recently confirmed as pure (USFS 2004). North Canyon Creek is suspected as pure, but is unconfirmed. Seven streams within the historical range on Apache-Sitgreaves and four streams on FAIR have been confirmed as having introgressed populations of Apache trout [e.g., crossed with rainbow trout (*O. mykiss*) or cutthroat trout (*O. clarki*)].

Apache trout is endemic to high elevation streams in the upper Black, White, and Little Colorado River drainages in east-central Arizona. Apache trout evolved in low to moderate/high gradient mountain streams primarily above 1,800 m elevation (5,900 ft), within mixed conifer and ponderosa pine forests. Alcorn (1976) and Lee and Rinne (1980) studied temperature tolerances of Apache trout and found that critical upper limits were similar to data reported for other species of trout. Robinson and Tash (1979) reported on feeding habits of Apache trout in relation to light intensity and contrasted findings with brown trout, which were found to be more nocturnal.

Apache trout are largely opportunistic feeders and eat a variety of aquatic and terrestrial organisms (USFWS 1983). Prey is typically invertebrates, but varies depending on Apache trout size (Harper 1978). Fish 6 - 9 centimeters (cm) (2 - 4 inches [in.]) in length primarily feed on Ephemeroptera, whereas fish 15 cm (5.9 in.) and larger consumed more Trichoptera. Terrestrial insects are consumed by all size classes of Apache trout. Utilization of Diptera, Trichoptera, and terrestrial insects changed with the season (USFWS 1983). Clarkson and Dreyer (1996) found that Apache trout they examined from Lee Valley Reservoir (Apache-Sitgreaves NF) were omnivorous. Apache trout fed on organisms found at both the surface and bottom, including both aquatic and terrestrial insects, zooplankton, crustaceans, snails, leeches, nematodes and fish (Clarkson and Dreyer 1996).

According to the 1975 (40 FR 29863), major threats to this species at the time of listing included habitat alterations, competition, hybridization, and predation by non-indigenous fish. The final rule noted logging operations in the headwaters of the Salt and Little Colorado rivers in the White Mountains as causing destruction, modification, or curtailment of its habitat and range. The final rule also indicated that introduced rainbow trout hybridized with Apache trout in some streams, and that introductions presented a continued threat to the species. The 1983 Recovery Plan (USFWS 1983) concluded that hybridization between rainbow and Apache trout was the major factor limiting persistence of Apache trout. Other threats to Apache trout habitat include grazing, reservoir construction, and road construction (USFWS 1983).

Desert Pupfish

We listed the desert pupfish as an endangered species, with critical habitat, on April 30, 1986 (51 FR 10842). Designated critical habitat for desert pupfish in Arizona consists of Quitobaquito Spring and a 100-foot riparian buffer zone around the spring (51 FR 10842), located on Organ Pipe Cactus National Monument in western Pima County. Desert pupfish critical habitat is outside the action area and will not be addressed further in this BO. The Desert Pupfish Recovery Plan was finalized in 1993. The goal of the recovery plan is to reclassify the species as threatened, as delisting the species is not considered feasible in the foreseeable future. In order to attain this objective, the following actions are necessary: protection of natural populations, reestablishment of new populations, establishment and maintenance of refuge populations, development of protocols for the exchange of genetic material between stocked pupfish populations, determination of factors affecting population persistence, and information and education to foster recovery efforts (USFWS 1993c).

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 2-22-03-F-366) included a detailed Status of the Species for the Desert Pupfish. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

Thirteen natural populations of desert pupfish persist within the historical range; nine of these are in Mexico. Approximately 20 transplanted populations exist in the wild (USFWS 1993c),

though this number fluctuates widely due to climatic variation and the establishment (or failure) of refugium populations (Moyle 2002). Many natural and transplanted populations are imperiled by one or more threats. In 2005, desert pupfish were reestablished into three sites within Aravaipa Canyon watershed under a Safe Harbor Agreement with the Arizona Chapter of The Nature Conservancy (The Nature Conservancy and USFWS 2005) and a reestablishment project conducted by the Bureau of Land Management's Safford Field Office (AESO/SE 02-21-04-F-0022). The success of these reestablishments is still to be determined. Threats to the species include loss and degradation of habitat through groundwater pumping or diversion, contamination from agricultural return flows, predation and competition from nonnative fish species, populations outside of historical range, populations of questionable genetic purity, restricted range, small populations, and environmental contaminants (51 FR 10842, Moyle 2002).

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) included a detailed Status of the Species for the Apache Trout. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

Gila Chub

The Gila chub was listed as endangered with critical habitat on November 2, 2005 (70 FR 66664). Gila chub feed primarily on aquatic insects and algae. Gila chub commonly inhabit pools in smaller streams, springs, and ciénegas, and they can survive in small artificial impoundments (Miller 1946, Minckley 1973, Rinne 1975). Gila chub are highly secretive, preferring quiet, deeper waters, especially pools, or remaining near cover like terrestrial vegetation, boulders, and fallen logs (Rinne and Minckley 1991).

Historically, Gila chub have been recorded from rivers, streams, and spring-fed tributaries throughout the Gila River basin in southwestern New Mexico, central and southeastern Arizona, and northern Sonora, Mexico (Miller and Lowe 1967, Rinne and Minckley 1970, Minckley 1973, Rinne 1976, DeMarais 1986, Propst 1999, and Weedman et al. 1996). Today the Gila chub has been restricted to small, isolated populations scattered throughout its historical range.

Threats to Gila chub include predation by and competition with nonnative organisms, including fish in the family Centrarchidae, other fish species, bullfrogs, and crayfish; disease; and habitat alteration, destruction, and fragmentation resulting from water diversions, dredging, recreation, roads, livestock grazing, changes in the natural flow pattern, mining, degraded water quality (including contaminants from mining activities and excessive sedimentation), and groundwater pumping (67 FR 51948). The impacts of nonnative species have been well documented (Hubbs 1955, Miller 1961, Meffe 1985, Moyle et al.1986, Williams and Sada 1985, Minckley and Deacon 1968 and 1991, Ruppert et al. 1993). Dudley and Matter (2000) correlated green sunfish presence with Gila chub decline and found that even small green sunfish readily consume young-of-year Gila chub. Unmack et al. (2003) found that green sunfish presence was correlated with the absence of young-of-year Gila chub. Riparian and aquatic communities across the southwest

have been degraded or destroyed by human activities (Hastings 1959, Hastings and Turner 1965, Hendrickson and Minckley 1984, Turner et al. 2003). Humans have affected southwestern riparian systems over a period of several hundred years. Eighty-five to ninety percent of the Gila chub's habitat has been degraded or destroyed, and much of it is unrecoverable. Only 29 extant populations of Gila chub remain; all but one is small, isolated, and threatened. The current status of the Gila chub is poor and declining.

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (2-22-03-F-366) included a detailed Status of the Species for the Gila Chub. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

For additional information about the Gila chub see Desert Fishes Team (2003), Minckley and DeMaris (2000), Propst (1999), Weedman et al. (1996), Rinne and Minckley (1991), DeMaris (1986), and Minckely (1985, 1973).

Critical habitat for Gila chub includes approximately 333.6 km (207.8 mi) of stream reaches in Arizona and New Mexico, organized into seven river units. The stream segments within each of the seven units are defined longitudinally by upstream and downstream limits (67 FR 51948) and laterally by the area of bankfull width of the particular stream, plus 300 feet on either side of the stream's edge at bankfull (see Rosgen 1996 for a discussion of bankfull). The 7 units are the Upper Gila River Unit, which includes Turkey Creek in Grant County New Mexico, and Dix, Harden Ciénega, Eagle, and East Eagle Creeks in Graham and Greenlee counties, Arizona; the Middle Gila River Area, which includes Mineral Creek, Blue River and Bonita Creek in Gila and Maricopa counties, Arizona; the Babocomari River Area, which includes O'Donnell Canyon, and Turkey Creek/Post Canyon Creek in Cochise County, Arizona; the Lower San Pedro River Area, which includes Bass, Hot Springs, and Redfield canyons in Cochise, Graham, and Pima counties, Arizona; the Lower Santa Cruz River Area, which includes Ciénega Creek, Mattie Canyon, Empire Gulch, and Sabino Canyon in Pima County, Arizona; the Upper Verde River Area, which includes Walker Creek, Red Tank Draw, Spring Creek, and Williamson Valley Wash in Yavapai County, Arizona; and the Agua Fria River Area which includes Little Sycamore, Sycamore, Indian, Silver, and Larry creeks and Lousy Canyon in Yavapai County, Arizona.

Each stream segment contains at least one of the primary constituent elements or requires special management consideration. In the final rule, we discussed the biological needs of the species upon which the primary constituent elements are based, listed seven primary constituent elements for the species, and discussed the specific elements in each of the proposed stream segments (70 FR 66664). The seven primary constituent elements are summarized here:

- perennial pools, eddies, and higher velocity areas in headwaters, springs, and ciénegas of smaller tributaries;

- suitable water quality for spawning, including temperatures ranging from 20 to 26.5°C (68 to 79.7°F);

- suitable water quality, including low levels of contaminants and sedimentation, for all other aspects of Gila chub life history;

- adequate food base;

- sufficient cover for sheltering;

- a low enough level of nonnative species such that Gila chub are able to survive and reproduce; and

- streams that maintain a natural flow pattern sufficient to support Gila chub.

The constituent elements of Gila chub critical habitat are generalized descriptions and ranges of selected habitat factors that are critical for the survival and recovery of the species. The appropriate and desirable level of these factors may vary seasonally and is highly influenced by site-specific circumstances. Therefore, assessment of the presence/absence, level, or value of the constituent elements included consideration of the season of concern and the characteristics of the specific location. The constituent elements were not independent of each other and were assessed holistically, as a functioning system, rather than individually. In addition, the constituent elements were assessed in relation to larger habitat factors such as watershed, floodplain, and streambank conditions; stream channel morphology; riparian vegetation; hydrologic patterns; and overall aquatic faunal community structure.

Gila Topminnow

We listed the Gila topminnow as endangered on March 11, 1967, without critical habitat (32 FR 4001). The reasons for the decline of this fish include past dewatering of rivers, springs and marshlands, impoundment, channelization, diversion, regulation of flow, land management practices that promote erosion and arroyo formation, and the introduction of predacious and competing nonindigenous fishes (Miller 1961, Minckley 1985). Life history information can be found in the Gila and Yaqui Topminnow Recovery Plan (USFWS 1984), the draft Gila Topminnow Revised Recovery Plan (Weedman 1999), and references cited in the plans and in this BO.

The status of the species is poor and declining. Gila topminnow has gone from being one of the most common fishes of the Gila basin to one that exists at no more than 32 localities (12 natural and 20 stocked). Many of these localities are small and highly threatened, and Gila topminnow have not been found in some recent surveys at these sites. In 2005, Gila topminnow were reestablished into three sites within Aravaipa Canyon watershed under a Safe Harbor Agreement with the Arizona Chapter of The Nature Conservancy (The Nature Conservancy and USFWS 2005) and a reestablishment project conducted by the Bureau of Land Management's Safford Field Office (AESO/SE 02-21-04-F-0022). The success of these reestablishments is still to be determined.

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) included a detailed Status of the Species for the Gila topminnow. This biological opinion is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

Gila Trout

The Gila trout was originally recognized as endangered under the Federal Endangered Species Preservation Act of 1966 (32 FR 4001). Federal designated status of the fish as endangered was continued under the Act. On July 18, 2006, the FWS reclassified the Gila trout as threatened (71 FR 40657). No critical habitat has been designated.

Gila trout are a typical cold-water species requiring well-oxygenated water; coarse sand, gravel, and cobble substrate; stable stream bank conditions; and abundant overhanging banks, pools, and cover for optimal habitat. They are found in moderate to high gradient (from 1% to over 14% gradient) perennial streams above 1,660 m (5,400 ft) to over 2,838 m (9,200 ft) in elevation (McHenry 1986, Propst and Stefferud 1997). The species requires water temperatures below 25°C (77°F), adequate stream flow to maintain survivable conditions, and clean gravel substrates for spawning (USFWS 2003).

Gila trout are generally insectivorous; however, there is some evidence of piscivory (Van Eimeren 1988). Regan (1966) reported that the most abundant food items in Gila trout stomachs for Main Diamond Creek included adult dipterans, trichopteran larvae, ephermopteran nymphs, and aquatic coleopterans. Food items did not vary significantly for different size classes sampled. The 2003 Recovery Plan (USFWS 2003) notes that the same food items were predominant for other (nonnative) trout species in the Gila River drainage, indicating that there is potential for interspecific competition for food resources. Hanson (1971) noted that larger fish aggressively guarded their feeding stations, chasing away smaller fish in pools during a low flow period in Main Diamond Creek.

Currently there are 14 populations of Gila trout in the wild, including four relict populations (Main Diamond, South Diamond, Spruce, and Whiskey Creeks), which are secure, and 10 established replicates. Replication involves moving adults from each successfully reproducing relict population and releasing them into the nearest suitable renovated stream. The total population size in 1998 was estimated to be approximately 37,000 fish (USFWS 2003) and approximately 109.5 km (67.9 mi) of stream were occupied in January 2001, with the addition of the estimated length of the West Fork of the Gila River in Langstroth Canyon where the Whiskey Creek populations was replicated June 2006 (71 FR 40657).

According to the 1987 Federal Register notice, major threats to this species include habitat alterations, competition, hybridization, and predation by non-indigenous fish. The decline in Gila trout populations and available habitat is due to a multitude of factors: 1) habitat degradation, including the impacts of grazing and logging; 2) uncontrolled angling; 3) predation

from and competition with nonnative trout, especially piscivory of brown trout; 4) inadequacy of legal protections up to 1967 when Federal listing occurred; and 5) introgressive hybridization with nonnative rainbow trout (USFWS 2003).

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) included a detailed Status of the Species for the Gila Trout. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

Headwater chub

The USFWS conducted a status review and published a 12-month petition finding on May 3, 2006 (71 FR 26007) that listing was warranted, but precluded by other agency priorities.

Headwater chub (as *G. robusta grahami*) was considered a threatened species by the American Fisheries Society on its list of fishes receiving legal protection and of special concern in 1987 (Johnson 1987). Since that time, declines of the headwater chub have been further noted both in the scientific peer reviewed literature (Bestgen and Propst 1989) and in State agency reports (Girmendonk and Young 1997; Brouder et al. 2000; Bezzerides and Bestgen 2002; Voeltz 2002).

The Headwater chub was first described from Ash Creek and the San Carlos River in east-central Arizona in 1874 (Cope and Yarrow 1875). The historical distribution of headwater chub in the lower Colorado River basin is poorly documented, due to the paucity of early collections and the widespread anthropogenic (manmade) changes (i.e., habitat alteration and nonnative species introductions [Girmendonk and Young 1997]) to aquatic ecosystems beginning in the mid 19th century. The headwater chub was historically considered common throughout its range (Minckley 1973; Holden and Stalnaker 1975; Propst 1999). Voeltz (2002), estimating historical distribution based on museum collection records, agency database searches, literature searches, and discussion with biologists, found that headwater chub likely occurred in a number of tributaries of the Verde River, most of the Tonto Creek drainage, much of the San Carlos River drainage, and parts of the upper Gila River in New Mexico. Voeltz (2002) estimated that headwater chub historically occupied approximately 500 km (312 mi) in Arizona and New Mexico. The species currently occurs in the same areas, but has a smaller distribution. In Arizona, four tributaries of the Verde River (Fossil Creek, the East Verde River, Wet Bottom Creek, and Deadman Creek), and Tonto Creek and seven of its tributaries (Buzzard Roost, Gordon, Gun, Haigler, Horton, Marsh, Rock, and Spring Creeks), are currently occupied; and in New Mexico, the upper East Fork, lower Middle Fork, and lower West Forks of the Gila River (Voeltz 2002; S. Stefferud, pers. comm. 2005) are currently occupied by headwater chub. Headwater chub may still occur in parts of the San Carlos River basin; however recent survey information for these streams is unavailable (Minckley and DeMarais 2000, Voeltz 2002).

Headwater chub occur in the middle to upper reaches of moderately-sized streams (Minckley and Demaris 2000). Bestgen and Propst (1989) examined status and life history in the Gila River drainage in New Mexico and found that headwater chub occupied tributary and mainstem

habitats in the upper Gila River at elevations of 1,325 m (4,347 ft) to 2,000 m (6,562 ft). Maximum water temperatures of headwater chub habitat varied between 20 to 27 °C, and minimum water temperatures were around 7 °C (Bestgen and Propst 1989; Barrett and Maughan 1995). Typical adult microhabitat consists of nearshore pools adjacent to swifter riffles and runs over sand and gravel substrate, with young of the year and juvenile headwater chub using smaller pools and areas with undercut banks and low current (Anderson and Turner 1978; Bestgen and Propst 1989). Spawning in Fossil Creek occurred in spring and was observed in March in pool-riffle areas with sandy-rocky substrates (Neve 1976). Neve (1976) reported that the diet of headwater chub included aquatic insects, ostracods (small crustaceans), and plant material.

The most comprehensive and recent of the status reports concerning headwater chub was completed by the Arizona Game and Fish Department in 2002, and peer-reviewed by Federal agency personnel, university researchers, and experts on the headwater chub (Voeltz 2002). Stream-specific distribution and status information for headwater chub populations in the lower Colorado River basin was gathered from published literature; unpublished agency reports, records, manuscripts, and files; scientific collecting permit reports; personal communications with knowledgeable biologists; and academic databases. Based on this comprehensive information of all available current and historical survey records, AGFD estimated historical and current ranges of the headwater chub and found that the species had declined significantly from historical levels.

Voeltz (2002) reviewed the 19 currently known populations of headwater chub and found that one was stable-secure, six were stable-threatened, six were unstable-threatened, three were extirpated, and three were unknown. Deadman Creek, the one population that Voeltz considered stable-secure, has since been invaded by nonnative green sunfish (*Lepomis cyanella*) (J. Voeltz, pers. comm. 2003), and should now be considered stable-threatened. Headwater chub are known to occupy only 40 percent of their former range, and they have an unknown distribution in another 10 percent of their former range. Based on the best available scientific information, the headwater chub occurs in 16 of 19 known populations, which occur in fragmented and isolated stream segments and represent only 40 to 50 percent of the species' former range (approximately 200 km (125 mi) of 500 km (312 mi)) in Arizona and New Mexico (Voeltz 2002).

Populations of headwater chub are found in four separate drainage basins that are isolated from one another (the Verde River, Tonto Creek, San Carlos River, and upper Gila River). Within these four basins, there is further fragmentation and isolation of some populations. We consider a particular basin to be at risk of extirpation if there are fewer than a minimum of two stable-secure populations because any single population can be eliminated by stochastic events or catastrophic disturbance, such as fire (see Meffe and Carroll 1994). According to information in Voeltz (2002), and survey information collected since that time (as described above), headwater chub cannot be considered secure in any drainage because there are no stable-secure populations in any drainage in which they occur.

In summary, the data show that the status of headwater chub is poor and declining. It has been extirpated from approximately 50 percent of its historical range; all 16 known populations are experiencing threats and it is no longer considered secure in any part of its historical range (Voeltz 2002; J. Voeltz, pers. comm. 2003). Although 6 of the 16 extant populations are

considered "stable" based on abundance and evidence of recruitment, we believe all six of these populations have a high likelihood of becoming extirpated in the foreseeable future, primarily because at least one, and in most cases several, nonnative aquatic species that have been implicated in the decline of headwater chub are present in these streams (Voeltz 2002).

Huachuca Springsnail

The USFWS conducted a status review and published a 12-month petition finding on September 19, 1997, as the Huachuca springsnails changed status from a category 2 species to a candidate species (62 FR 49398). The Huachuca springsnail is a small 1.7 - 3.2 mm (0.05-0.13 in) tall, aquatic snail with three to five somewhat convex whorls on the shell. Identification must be verified by characteristics of reproductive organs.

The Huachuca springsnail occurs in springs or ciénegas at 1,372 to 1,829 m (4,500 to 7,200 ft) elevation in southeastern Arizona and adjacent portions of Sonora, Mexico, including nine sites in the upper San Pedro River drainage (Huachuca Mountains, Canelo Hills, San Rafael Valley - Arizona/Sonora), and four in the upper Santa Cruz River drainage (Sonoita Creek drainage, San Rafael Valley, Santa Cruz River drainage - Sonora). Springs and ciénegas inhabited by the snail are typically marshy areas characterized by various aquatic and emergent plant species that occur within plains grassland, oak and pine-oak woodlands, and coniferous forest vegetation communities. The species is typically found in the shallower areas of springs or ciénegas, often in rocky seeps at the spring source. In Arizona, the species is found in Cochise and Santa Cruz counties. Many potentially suitable sites in the southern half of the Huachuca Mountains have not been surveyed for Huachuca springsnail.

The Huachuca springsnail is threatened by loss or degradation of spring and ciénega habitat due to overgrazing, timber harvest, altered fire regimes, drought, mining, water developments, recreation, and catastrophic fire resulting from human-caused alterations of fire regimes. Extirpation of a population could occur as a result of major storms, drought, fire, or other forms of environmental stochasticity. Because populations are isolated, once extirpated, sites are unlikely to be recolonized without active management. Small populations are also subject to genetic deterioration and demographic variability, which increases the likelihood of extinction.

Little Colorado spinedace

The Little Colorado spinedace (spinedace) was listed as threatened with critical habitat designated on October 16, 1987 (52 FR 25034). Threats include habitat alteration and destruction, predation by and competition with nonnative aquatic organisms, and recreational fishery management.

Forty-four stream miles of critical habitat were designated: 18 miles of East Clear Creek immediately upstream and 13 miles downstream from Blue Ridge Reservoir in Coconino County; eight miles of Chevelon Creek in Navajo County; and five miles of Nutrioso Creek in Apache County. Critical habitat constituent elements consist of clean, permanent flowing water, with pools and a fine gravel or silt-mud substrate.

The spinedace is a small, about 10 cm (4 in.), minnow native to the Little Colorado River (LCR) drainage. This fish occurs in disjunct populations throughout much of the LCR drainage in Apache, Coconino, and Navajo counties. Extensive collections summarized by Miller (1963) indicated that the spinedace had been extirpated from much of the historical range during the period 1939 to 1960. Although few collections were made of the species prior to 1939, the species is believed to have inhabited the northward flowing LCR tributaries of the Mogollon Rim, including the northern slopes of the White Mountains.

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

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) included a detailed Status of the Species for the Little Colorado Spinedace. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

Loach Minnow

The Loach minnow was listed as a threatened species on October 28, 1986 (51 FR 39468). Critical habitat was designated for loach minnow on April 25, 2000 (65 FR 24328), but was subsequently vacated in 2004. Critical habitat was reproposed on December 20, 2005 (71 FR 75546) and on June 6, 2006, we reopened the public comment period on the critical habitat proposal (71 FR 32496). We included the economic analysis, an environmental assessment, and made some modifications to the December 2005 proposal. A final determination is expected in fall 2006.

The Loach minnow is a small, slender, elongate fish with markedly upward-directed eyes (Minckley 1973). The historical range of the loach minnow included the basins of the Verde, Salt, San Pedro, San Francisco, and Gila rivers (Minckley 1973, Sublette et al. 1990). Habitat destruction plus competition and predation by nonnative species have reduced the range of the species by about 85 percent (Miller 1961, Williams et al. 1985, Marsh et al. 1989). Loach minnow remain in limited portions of the upper Gila, San Francisco, Blue, Black, Tularosa, and White rivers and Aravaipa, Turkey, Deer, Eagle, Campbell Blue, Dry Blue, Pace, Frieborn, Negrito, Whitewater and Coyote creeks in Arizona and New Mexico (Barber and Minckley 1966, Silvey and Thompson 1978, Propst et al. 1985, Propst et al. 1988, Marsh et al. 1990, Bagley et al. 1995, USBLM 1995, Bagley et al. 1996).

The status of the loach minnow is declining rangewide. As noted in the current proposed rule (70 FR 75546), as amended (71 FR 32496) designating critical habitat, loach minnow are

restricted to 642 km (371mi) of streams, and their current range represents approximately 15 percent of their historical range. In occupied areas, loach minnow may be common to very rare. Loach minnow are common only in Aravaipa Creek, the Blue River, and limited portions of the San Francisco, upper Gila, and Tularosa rivers in New Mexico (65 FR 24328). Although it is currently listed as threatened, the FWS has found that a petition to reclassify the species to endangered status is warranted. A reclassification proposal is pending; however, work on it is precluded due to work on other higher priority listing actions (59 FR 35303).

Proposed critical habitat for loach minnow includes: Aravaipa Creek in Pinal and Graham County, East Fork of the Black River with tributaries in Apache County, portions of Eagle Creek in Graham and Greenlee Counties, Blue and San Francisco rivers with tributaries in Greenlee County, Arizona and Catron County, New Mexico, and Upper Gila River in Catron, Grant, and Hidalgo Counties New Mexico (70 FR 75546 and 71 FR 32496).
The critical habitat primary constituent elements:

- permanent, flowing, unpolluted water with:

- living areas for adult loach minnow with slow to swift flow velocities in shallow water with gravel, cobble, and rubble substrates;

- living areas for juvenile loach minnow with moderate to swift flow velocities in shallow water with sand, gravel, and rubble substrates;

- living areas for larval loach minnow with slow to moderate flow velocities in shallow water with sand, gravel, and cobble substrates;

- Spawning areas with slow to swift flow velocities in shallow water where cobble and rubble and the spaces between them are not filled in by fine dirt or sand;

- Water with low levels of pollutants, such as copper, arsenic, mercury, cadmium, human and animal waste products, pesticides, suspended sediments, petroleum products, and with dissolved oxygen levels greater than 3 parts per million;

- Substrates of sand, gravel, and cobble with low to moderate amounts of fine sediment and substrate embeddedness; present in the aquatic habitat; a natural, unregulated hydrograph or, if the flows are modified or regulated, then a hydrograph that allows for adequate river functions, such as flows capable of transporting sediments;

- Streams with low gradients; water temperatures in the approximate range of 2° to 29° C (35° to 85° F); pool, riffle, run, and backwater components; abundant aquatic insect food base;

- Habitat devoid of nonnative aquatic species detrimental to loach minnow or habitat in which detrimental nonnative species are at levels that allow the persistence of loach minnow; and

- Areas within perennial interrupted stream courses that are periodically dewatered but serve as connective corridors between occupied habitat and through which species may move when habitat is wetted.

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) included a detailed Status of the Species for the Loach Minnow. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

Razorback Sucker

The razorback sucker was listed as an endangered species on October 23, 1991 (56 FR 54957). Critical habitat was designated in 15 river reaches in the historical range of the razorback sucker on March 21, 1994 (59 FR 13374). The Razorback Sucker Recovery Plan was released in 1998 (USFWS 1998b). Recovery Goals were approved in 2002 (USFWS 2002a).

The razorback sucker is a relatively large fish, reaching total length of up to 0.9 meters (3 feet) with a head flattened on top and a stout olive-brown color above to yellowish on the belly. A long, high, sharp-edged hump is found behind the head. It was once abundant in the Colorado River and its major tributaries throughout the Basin, occupying 5,640 km (3,500 mi) of river in the United States and Mexico (USFWS 1993b). Records from the late 1800s and early 1900s indicated the species was abundant in the lower Colorado and Gila river drainages (Kirsch 1889, Gilbert and Scofield 1898, Minckley 1983, Bestgen 1990).

Since 1997, significant new information on recruitment to the wild razorback sucker population in Lake Mead has been developed (Holden et al. 2000) that indicates some degree of successful recruitment is occurring. This degree of recruitment has not been documented elsewhere in the other remaining populations.

Adult razorback suckers use most of the available riverine habitats, although there may be an avoidance of whitewater type habitats. Main-channel habitats tend to be low-velocity ones such as pools, eddies, nearshore runs, and channels associated with sand or gravel bars (Bestgen 1990). Adjacent to the main channel, backwaters, oxbows, sloughs, and flooded bottomlands are also used by this species. From studies conducted in the upper Colorado River basin, habitat selection by adult razorback suckers changes seasonally. They move into pools and slow eddies from November through April; runs and pools from July through October; runs and backwaters during May; and backwaters, eddies, and flooded gravel pits during June. In early spring, adults move into flooded bottomlands. They use relatively shallow water (ca. 3 feet) during spring and deeper water (5-6 feet) during winter.

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

early summer depending upon local water temperatures. Various studies have presented a range of water temperatures at which spawning occurs. In general, temperatures between 10° to 20° C are appropriate (summarized in Bestgen 1990). They typically spawn over cobble substrates near shore in water 1-3 m (3-10 ft) deep (Minckley et al. 1991). There is an increased use of higher velocity waters in the spring, although this is countered by the movements into the warmer, shallower backwaters and inundated bottomlands in early summer (McAda and Wydoski 1980, Tyus and Karp 1989, Osmundson and Kaeding 1989). Spawning habitat is most commonly over mixed cobble and gravel bars on or adjacent to riffles (Minckley et al. 1991).

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

Razorback suckers are somewhat sedentary; however, considerable movement over a year has been noted in several studies (USFWS 1998b). Spawning migrations have been observed or inferred in several locales (Jordan 1891, Minckley 1973, Osmundson and Kaeding 1989, Bestgen 1990, Tyus and Karp 1990). During the spring spawning season, razorbacks may travel long distances in both lacustrine and riverine environments, and exhibit some fidelity to specific spawning areas (USFWS 1998b).

Range-wide, the status of razorback sucker is exceedingly poor due to lack of significant recruitment, ongoing habitat loss, and continuing pressure from nonnative species. The range-wide trend for the razorback sucker is a continued decrease in wild populations due to a lack of sufficient recruitment and the loss of old adults due to natural mortality. USFWS recovery efforts under the Recovery Implementation Program are working towards the goals of replacing the aging population in Lake Mohave, restoring the Lake Havasu population, and increasing the lower river populations.

Stocking efforts in the Upper Colorado River Basin, and in lakes Mohave and Havasu and the lower Colorado River Basin below Parker Dam are ongoing, with the 30,000-fish replacement for Lake Havasu completed in 2001. The most critical of these efforts is the replacement of the Lake Mohave population using wild-caught larvae from the lake. By the end of 2001, the initial goal to stock 50,000 sub-adult fish into Lake Mohave was reached (Tom Burke, Bureau of Reclamation, pers. comm.). The Lake Mohave efforts will continue to meet the second goal, which is to establish a population of 50,000 adults.

Critical habitat includes portions of the Colorado, Duchesne, Green, Gunnison, San Juan, White, and Yampa rivers in the Upper Colorado River Basin, and the Colorado, Gila, Salt, and Verde rivers in the Lower Colorado River Basin. Critical habitat primary constituent elements include water, physical habitat, and the biological environment (USFWS 1998b). The water element refers to water quality and quantity. Water quality is defined by parameters such as temperature, dissolved oxygen, environmental contaminants, nutrients, turbidity, and others. Water quantity refers to the amount of water that must reach specific locations at a given time of year to maintain biological processes and to support the various life stages of the species. The physical

habitat element includes areas of the Colorado River system that are or could be suitable habitat for spawning, nursery, rearing, and feeding, as well as corridors between such areas. Habitat types include bottomland, main and side channels, secondary channels, oxbows, backwaters, and other areas in the 100-year floodplain, which when inundated may provide habitat or corridors to habitat necessary for the feeding and nursery needs of the razorback sucker. The biological environment element includes living components of the food supply and interspecific interactions. Food supply is a function of nutrient supply, productivity, and availability to each life stage. Negative interactions include predation and competition with introduced nonnative fishes.

Sonora Chub

The Sonora chub was listed in the U.S. and Mexico as threatened on April 30, 1986, with critical habitat (51 FR 16042). Reasons for listing included possible introduction of exotic fishes and their parasites into its habitat, and potential mining activities. The Sonora chub is particularly sensitive to these threats because of its very limited range, and because of the intermittent nature of the streams it occupies. A recovery plan was finalized in 1992 (USFWS 1992).

The Sonora chub is a stream-dwelling member of the minnow family (Cyprinidae) endemic to streams of the Rio de la Concepcion drainage of Sonora, Mexico and Arizona. The Sonora chub is a tenacious, desert-adapted species that exploits small habitats (Hendrickson and Juarez-Romero 1990), and is able to survive under severe environmental conditions. This fish species can achieve total lengths of 20 cm (7.8 in.) (Hendrickson and Juarez-Romero 1990), but in the U.S. it typically does not exceed 12.8 cm (5.0 in.) in length (Minckley 1973).

According to the 1992 recovery plan for this species, distribution of Sonora chub in the U.S. is intact and should remain secure, barring major environmental change (C.O. Minckley 1983, Minckley 1985). The limited distribution of Sonora chub in the U.S. places inordinate importance on the quality of habitat in Sycamore Creek (USFWS 1992) and California Gulch. The Sycamore Creek drainage has been highly modified by human activities, including grazing, mining, recreation, and the introduction of nonnative taxa. It regularly sustains large floods and severe droughts. A series of environmental perturbations made worse by degraded watershed conditions could cumulatively result in extirpation of the species from the U.S.

Sycamore Creek is at the northern edge of the range of the species, is isolated from other populations of Sonora chub, and has marginal habitat (Hendrickson and Juarez-Romero 1990). Channel degradation, siltation, and water pollution caused primarily by livestock grazing, roads, and mining have probably affected the habitat of Sonora chub. In the past, cattle regularly gained access to Sycamore Canyon through an intermittently maintained section of fence along the international border (AESO/SE 02-21-98-F-0399), and degraded the riparian vegetation in the lower 4.0 km (2.5 mi) of the stream (Carpenter 1992). In 1981, exploration for uranium occurred along an approximate 12 km (7 mi) stretch of the upper eastern slopes of the Sycamore drainage. According to the 1992 Recovery Plan for the Sonora chub, uranium was found and claims are being maintained; however, no active mining was planned at that time.

Native fishes appear adept at maintaining populations during severe conditions so long as their habitats are unaltered (Minckley and Meffe 1987). Thus, a single catastrophic event, such as severe flood, fire or drought, is unlikely to eliminate Sonora chub from the U.S.

Predation by nonnative vertebrates is also a threat to populations of Sonora chub. The Green sunfish is a known predator on native fishes in Arizona (Minkley 1973) and has been found in Sycamore Creek below the entrance of Peñasco Canyon (Brooks 1982). Coincidental introductions of exotic parasites that infest native fauna are possible when nonnative fishes are brought into a drainage. Although little information is available on parasites and diseases of Sonora chub, the effects of exotic parasites that infest native fish fauna are often adverse (USFWS 1992).

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Critical habitat was designated at the time of Federal listing to include areas of land and water in the Coronado National Forest, consisting of the following:

- Sycamore Creek, extending downstream from and including Yank Spring (= Hank and Yank Spring), to the International Border;
- The lower 1.2 miles of Peñasco Creek; and
- The lower 0.25 mile of an unnamed stream entering Sycamore Creek from the west, about 1.5 miles downstream from Yank Spring.

In addition to the aquatic environment, critical habitat includes a 12 or 8-m (40 or 25-ft) wide strip of riparian area along each side of Sycamore and Peñasco creeks. Primary constituent elements were not identified in the 1986 final rule (51 FR 16042). However, habitat characteristics important to this species of chub include clean permanent water with pools and intermediate riffle areas and/or intermittent pools maintained by bedrock or by subsurface flow in areas shaded by canyon walls.

Sonora Tiger Salamander

The Sonora tiger salamander was listed as endangered on January 6, 1997 (62 FR 665). No critical habitat has been proposed or designated. A final recovery plan was finalized in September 2002. The Sonora tiger salamander is known from approximately 53 breeding localities, although not all are currently occupied (USFWS 2002b and files, Abbate 1998, Collins and Jones 1987, Collins 1996).

Larval salamanders are aquatic with plume-like gills and well-developed tail fins (Behler and King 1980). Larvae hatched in the spring are large enough to metamorphose into terrestrial salamanders from late July to early September, but only an estimated 17 to 40 percent metamorphose annually. Remaining larvae mature into branchiates (aquatic and larval-like, but sexually mature salamanders that remain in the breeding pond) or over-winter as larvae (Collins and Jones 1987; James Collins, Arizona State University, pers. comm. 1993).

During intensive surveys in 1997, from one to 150 Sonora tiger salamanders were found at 25 stock tanks (Abbate 1998). Populations and habitats are dynamic, thus the number and location of extant aquatic populations change over time, as exhibited by the differences between survey results in 1985 and 1993-1996 (Collins and Jones 1987; Collins 1996; James Collins, pers. comm. 1996). In 1999, the lab of Dr. James Collins, Arizona State University, found Sonora tiger salamanders at 17 localities (Collins 1999). All sites where Sonora tiger salamanders have been found are located in Arizona in the Santa Cruz and San Pedro river drainages, including sites in the San Rafael Valley and adjacent portions of the Patagonia and Huachuca mountains in Santa Cruz and Cochise counties. All confirmed historical and extant aquatic populations are found in cattle tanks or impounded ciénegas within 31 km (19 mi) of Lochiel, Arizona. A population of salamanders at Los Fresnos, a natural ciénega in the San Rafael Valley, Sonora, may be *A. t. stebbinsi* (Varela-Romero et al. 1992).

Historically, the Sonora tiger salamander probably inhabited springs, ciénegas, and possibly backwater pools of the Santa Cruz River and streams in the San Rafael Valley where permanent or nearly permanent water allowed survival of mature branchiates. The grassland community of the San Rafael Valley and adjacent montane slopes, where all extant populations of Sonora tiger salamander occur, may represent a relictual grassland and a refugium for grassland species. Tiger salamanders in this area became isolated and, over time, genetically distinct from ancestral *A. t. mavortium* and *A. t. nebulosum* (Jones et al. 1995, Storfer et al. 2004). The Sonora tiger salamander apparently has opportunistically taken advantage of available stock tank habitats as natural habitats disappeared (Hendrickson and Minckley 1984) or were invaded by nonnative predators with which the salamander cannot coexist (USFWS 2002b).

Primary threats to the salamander include predation by nonnative fish and bullfrogs, diseases, catastrophic floods and drought, illegal collecting, introduction of other subspecies of salamanders that could genetically swamp *A. t. stebbinsi* populations, and stochastic extirpations or extinction characteristic of small populations. Predation by catfish, bass, mosquito fish, and sunfish can eliminate stock tank populations of Sonora tiger salamander (Jonathan Snyder, Arizona State University, pers. comm. 1996; Collins et al. 1988). The salamanders can apparently coexist with bullfrogs, but bullfrogs prey on salamanders (J, Snyder, pers. comm. 1996) and perhaps if they are present in sufficient densities could reduce or eliminate salamander populations. Tadpoles of wood frogs (*R. sylvatica*), are known to feed on spotted salamander (*A. maculatum*) eggs (Petranka et al. 1998), but under experimental conditions bullfrog tadpoles do not feed on viable salamander eggs or hatchlings (Collins 1996, J. Collins, pers. comm. 1996). Recent genetic analysis confirmed that barred salamanders (*A. t. mavortium*) or hybrids between barred salamanders and Sonora tiger salamanders are present at 7 stock tanks along Highway 83 and near Parker Canyon Lake in the San Rafael Valley (Ziemba et al. 1998, Storfer et al.2004). A salamander population in Garden Canyon, Fort Huachuca, near the crest of the Huachuca

Mountains, may contain hybrids, as well (Storfer et al. 1999). Barred salamanders are likely present due to their use as fish bait in and around Parker Canyon Lake.

Tiger salamander populations exhibit frequent epizootics in the western United States and Canada, including populations of the Sonora tiger salamander (Collins et al. 2001). *Ambystoma tigrinum* virus (ATV) is the pathogen believed to be primarily responsible for die-offs (Jancovich et al. 1997). This, and possibly other iridoviruses, is also apparently the proximate cause of die-offs observed in other *Ambystoma* salamander populations in the United States and Canada (Collins et al. 2000, Docherty et al. 2003). Sonora tiger salamanders also contract chytridiomycosis, a fungal disease associated with global declines of frogs and toads (Davidson et al. 2003, Speare and Berger 2000, Longcore et al. 1999, Berger et al. 1998). However, compared to anurans, infected salamanders exhibit only minimal symptoms (Davidson et al. 2000). The effect of the disease on salamander populations needs further study.

Some die-offs might occur as a result of low pH (M. Pruss, AGFD, pers. comm.). A copper smelter at Cananea, Sonora, less than 40 km (25 mi) south of the border, may have released sulfur plumes resulting in acid precipitation (Platz 1993, Blanchard and Stromberg 1987), but currently there is no evidence to connect salamander die-offs with the copper smelter, and the smelter has not been operated since 1999.

With the exception of Bog Hole in the San Rafael Valley, a site on Fort Huachuca, and Rancho Los Fresnos, cattle grazing occurs throughout the range of the Sonora tiger salamander. Cattle can degrade habitat at stock tank breeding sites and overgrazing can cause loss of cover and erosion that can threaten the integrity of stock tanks used by the salamander. However, the salamander has coexisted for about 250 years with grazing, and because of its current use of livestock tanks for breeding, is now dependent upon maintenance of cattle waters by ranchers (USFWS 2002b).

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) included a detailed Status of the Species for the Sonora Tiger Salamander. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

For further information on the ecology, taxonomy, range, and threats to this subspecies, refer to U.S. Fish and Wildlife Service (2002), Collins (1981, 1996), Collins and Jones (1987), Collins et al. (1988, 2003), Gehlbach (1967), Jancovich et al. (1997, 1998, 2005), Jones et al. (1995, 1988), Lowe (1954), Snyder et al. (1996, 1998), and Storfer et al. (2003, 2004).

Spikedace

The Spikedace was listed as a threatened species on July 1, 1986 (51 FR 23769). Critical habitat was designated on April 25, 2000 (65 FR 24328), but was subsequently vacated in 2004. Critical habitat was reproposed on December 20, 2005 (71 FR 75546) and on June 6, 2006 we reopened the public comment period on the critical habitat proposal (71 FR 32496). We included the economic analysis, an environmental assessment, and made some modifications to the December 2005 proposal. A final determination is expected in fall 2006.

The Spikedace is a small silvery fish whose common name alludes to the well-developed spine in the dorsal fin (Minckley 1973). Spikedace historically occurred throughout the mid-elevations of the Gila River drainage, but is currently known only from the middle and upper Gila River, and Aravaipa and Eagle creeks (Barber and Minckley 1966, Minckley 1973, Anderson 1978, Marsh et al. 1990, Sublette et al. 1990, Jakle 1992, Knowles 1994, Rinne 1999). The species also occurs in the upper Verde River, but appears to be declining in numbers. It has not been documented in the Verde River since 1999 despite annual surveys, and additional survey work is needed to determine its current status. Habitat destruction along with competition and predation from introduced nonnative species are the primary causes of the species' decline (Miller 1961, Williams et al. 1985, Douglas et al. 1994).

The status of the spikedace is declining rangewide. As noted in the current proposed rule (70 FR 75546), as amended (71 FR 32496), designating critical habitat, spikedace are restricted to 592 km (368 mi) of streams, and their current range represents approximately 10 percent of their historical range. Within occupied areas, it is common to very rare, but is presently common only in Aravaipa Creek and some parts of the upper Gila River in New Mexico (65 FR 24328). Although it is currently listed as threatened, the FWS has found that a petition to reclassify the species to endangered status is warranted. A reclassification proposal is pending; however, work on it is precluded due to work on other higher priority listing actions (59 FR 35303).

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) included a detailed Status of the Species for the Spikedace. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

Proposed critical habitat for spikedace includes the Verde River in Yavapai County, Lower Gila River, and Aravaipa Creek in Pinal and Graham County, portions of Eagle Creek in Graham and Greenlee Counties, and Upper Gila River in Catron, Grant, and Hidalgo Counties New Mexico (70 FR 75546 and 71 FR 32496).

Critical habitat primary constituent elements include:

- Permanent, flowing, unpolluted water with:
  - living areas for adult spikedace with slow to swift flow velocities in shallow water with shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at downstream riffle edges;
  - living areas for juvenile spikedace with slow to moderate flow velocities in shallow water with moderate amounts of instream cover;
  - living areas for larval spikedace with slow to moderate flow velocities in shallow water with abundant instream cover;
  - low levels of pollutants, such as copper, arsenic, mercury, cadmium, human and animal waste products, pesticides, suspended sediments, petroleum products, and with dissolved oxygen levels greater than 3 parts per million;
- substrates of sand, gravel, and cobble with low to moderate amounts of fine sediment and substrate embeddedness; pool, riffle, run, and backwater components present in the aquatic habitat;
  - low gradients;
  - water temperatures in the approximate range of 2° C to 29° C (35° F to 85° F);
  - pool, riffle, run, and backwater components;
  - abundant aquatic insect food base;
- habitat devoid of nonnative aquatic species detrimental to spikedace or habitat in which detrimental nonnative species are at levels that allow the persistence of spikedace; and
- areas within perennial interrupted stream courses that are periodically dewatered but serve as connective corridors between occupied habitat and through which species may move when habitat is wetted.

Stephan's Riffle Beetle

The FWS assigned candidate status to the Stephan's riffle beetle in 2002 (67 FR 40657). The Stephan's riffle beetle is a member of the family Elmidae (Phylum Arthropoda; Class Insecta; Order Coleoptera). Beetles of the family Elmidae gain their common name "riffle beetle" from their propensity to be found living in shallow streams, rapids, or other comparable lotic situations. Firm substrates such as cobble, gravel, woody debris, and aquatic vegetation are essential. The most common habitat is a rheocrene - a spring emerging from the ground as a free flowing stream.

Elmid larvae are strictly aquatic and respiration occurs through rectractile cloacal tracheal gills. Adults attach their eggs to the underside of submerged rocks, woody debris, or aquatic plants. Life histories of elmids are quite variable with a short incubation period and a larval stage. Upon reaching maturity, riffle beetle larvae crawl out of the aquatic environment to pupate under cover of sand, rock, bark, or other debris. In temperate zones, pupation typically requires 1-2 weeks and occurs from late spring through summer. After emergence, adults commonly fly and may be attracted to lights during their sole dispersal flight. Upon reentering the aquatic environment, most elmid adults never again leave the water. Respiration for adults occurs through the use of a plastron. Riffle beetle diet consists of microorganisms and debris, such as diatoms and detritus, scraped from substrate surfaces.

Stephan's riffle beetle is endemic to spring environments within the Santa Rita Mountains, Santa Cruz County. Stephan's riffle beetle was described from specimens collected from Bog Spring in Madera Canyon. The beetle is also known from Sylvester Spring in Madera Canyon, and based on relatively intensive surveys of the surrounding area, the entire range of this species is believed to be confined to this canyon. The species no longer occurs at the type locality. All lands encompassing the known range of the species are under the management authority of the Coconino National Forest.

Threats and vulnerability include the historical alteration of springs from boxing, capping, and piping; susceptibility of springs to recreational impacts; and the lack of State and/or local government programs structured to address the conservation of rare and imperiled insects.

Three Forks Springsnail

In 2001, the FWS listed the Three Forks springsnail as a candidate species (66 FR 54807). The Three Forks springsnail is listed under Arizona Game and Fish Commission Order 42, which establishes no open season for the species. The Order prohibits the direct taking of the springsnail, but does not prohibit spring modification or habitat destruction.

The information used to describe the Status of the Species and Environmental Baseline was gathered from the 2004 Candidate Assessment and Listing Priority Assignment Form for the Three Forks springsnail , unless otherwise referenced.

The Three Forks springsnail (*Pyrgulopsis trivialis*) is a freshwater gastropod limited to two spring complexes within the Apache-Sitgreaves NF in east central Arizona. The species inhabits the springs and spring outflows of Boneyard Bog Springs and Three Forks Springs within the North Fork East Fork Black River watershed (NFEFBR). Three Forks springsnails are approximately 1.5 - 4.5 mm in shell height (Taylor 1987).

Three Forks springsnail habitats are isolated, permanently saturated, spring fed aquatic communities. The most common habitat for the species is a rheocrene, or a spring emerging from the ground as a free-flowing stream. While observations during the winter at Three Forks Springs suggest water temperature at the spring heads are warmer than nearby waters not influenced by the springs, there is no indication of any temperature-related affinity of the species (U.S. Forest Service 2004). Three Forks springsnails are rarely found on or in soft sediment

typically associated with seeps, and low-gradient, low-flow springheads. Firm substrates such as cobble, gravel, woody debris, and aquatic vegetation are more typical of springsnail habitat. Aquatic vegetation within the Three Forks Springs habitat includes watercress (*Nasturtium* spp.), buttercup (*Ranunculus* sp.), and filamentous green algae.

Three Forks springsnails are entirely aquatic and little is known of their specific biology and natural history. Information relative to habitat requirements, such as water depth, velocity, chemistry, temperature, substrate type, and food base is minimal (USFWS 2000). The primary food source for the species is believed to be periphytic diatoms which are scraped from hard surfaces (Taylor 1987, USFWS 2004).

Three Forks springsnails and their associated spring habitats are threatened by multiple factors, including non-native aquatic species, ungulates, recreational use, and natural events. Interactions with non-native snails and other aquatic species may affect the distribution and abundance of Three Forks springsnails. Non-native crayfish have invaded spring complexes occupied by Three Forks springsnails and may pose a threat to the continued existence of the species. Crayfish are known to directly prey upon aquatic invertebrates such as springsnails. Crayfish are also known to consume aquatic macrophytes and algae that springsnails rely on for grazing and egg laying. Due to its geographic isolation, the Three Forks springsnail is not evolutionarily adapted to cope with crayfish, perhaps making the species particularly susceptible to crayfish predation.

Currently, livestock are restricted from occupied springsnail habitat. However, free-ranging elk have access to all spring areas containing Three Forks springsnails. Elk wallowing contributes to bank degradation of springs and changes in substrate composition. Specifically, wallowing may result in the filling of gravel substrates with fine sediments, which data suggests are less conducive to occupation by springsnails. Elk impacts appear benign at habitats in the Three Forks Springs complex, but they are known to congregate seasonally at Boneyard Bog Springs, resulting in soil disturbance that may alter substrate quality or directly impact springsnails.

Recreational activities affect springsnails through habitat degradation, introduction of pollutants or other contaminants, and introduction and spread of non-native aquatic organisms (USFS 2004). Catastrophic natural disasters such as wildfires, flooding, extreme drought, and changes in spring water chemistry may significantly alter watershed conditions within the Three Forks Creek or upper Boneyard Creek drainage systems, resulting in changes to springsnail habitats (USFS 2004).

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) included a detailed Status of the Species for the Three Forks springsnail. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

Yaqui Fish

The Yaqui fish include the beautiful shiner, Yaqui catfish, Yaqui chub, and Yaqui topminnow. On August 31, 1984, the beautiful shiner was listed as a threatened species, and the Yaqui catfish and Yaqui chub were listed as endangered species (49 FR 34490). Critical habitat was designated for these three species at the time of their listing (49 FR 34490).

We listed the Sonoran topminnow (*Poeciliopsis occidentalis*) as endangered only in the United States' portion of its range on March 11, 1967 (32 FR 4001). The Yaqui form was originally described as a full species by Girard (1859). Minckley (1969) recognized the Gila and the Yaqui forms as subspecies of *Poeciliopsis occidentalis*. A publication by Minckley (1999) considers the Gila topminnow and the Yaqui topminnow to be separate species, *P. occidentalis and P. sonoriensis*, respectively (Hedrick, et al. 2001). Critical habitat has not been designated for this species.

A final recovery plan for all four species was signed on March 29, 1995. Descriptions of these species and life history accounts are included in the Fishes of the Rio Yaqui Recovery Plan (USFWS 1995), and are included herein by reference.

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) included a detailed Status of the Species for the Yaqui catfish and Yaqui Chub. A detailed Status of the Species for Yaqui topminnow is included in the September 3, 2004 Biological and Conference Opinion for the Bureau of Land Management (BLM) Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management (AESO/SE 02-21-03-F-0210). The status of the beautiful shiner was documented in the January 23, 2006, Biological Opinion for the Implementation of the Fire Management Plan at the San Bernardino and Leslie Canyon National Wildlife Refuges (AESO/SE 02-21-05-F-0495). These BOs are available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate those status discussions by reference.

Critical habitat for the beautiful shiner, Yaqui catfish, and Yaqui chub includes all aquatic habitats of SBNWR, Cochise County, Arizona, excluding the Leslie Canyon complex. These areas provide habitat for one of the two existing populations of beautiful shiner. Additionally, the aquatic habitats on SBNWR may provide expansion habitat for these three species.

The critical habitat primary constituent elements for the beautiful shiner, Yaqui catfish, and Yaqui chub are:

- clean, small, permanent streams with riffles, or intermittent creeks with pools and riffles in the Rio Yaqui drainage (beautiful shiner),
- permanent streams of medium current with clear pools (Yaqui catfish),
- permanent water with deep pool and intermediate areas with riffles (Yaqui chub),

- areas of detritus or heavy overgrown cut banks (Yaqui chub),
- clean and unpolluted water, and
- water free of introduced nonnative fish.

RIPARIAN SPECIES

Canelo Hills Ladies' Tresses

On January 6, 1997, the FWS listed the Canelo Hills ladies' tresses as an endangered species; without critical habitat under the Act (62 FR 665). A recovery plan has not been drafted for this species.

The Canelo Hills ladies' tresses is a member of the orchid family. Flowering occurs in late July to early August, when temperatures range from 60° F (16° C) at night to 100° F (38° C) during the day. During that time, precipitation averages 38-79 cm (15 to 20 in.). Populations of this species are known to exist in only five ciénegas in southern Arizona. One population is found in Cochise County and four are found in Santa Cruz County. One population is found at the Arizona Nature Conservancy's Canelo Hills Ciénega. Three other populations are found on private land, one in the San Rafael Valley, one on the Babocomari Ranch, and one on private property near or in Turkey Creek. The fourth population is on USFS land in the Canelo Hills.

Estimating Canelo Hills ladies' tresses population size and stability is difficult because non-flowering plants are very hard to find in the dense herbaceous vegetation, and yearly counts underestimate the population because dormant plants are not counted. McClaran and Sundt (1992) monitored marked individuals in a Canelo Hills ladies' tresses population during two three-year periods. They concluded that the subpopulations at both monitored sites were stable between 1987 and 1989, although Newman (1991) later reported that one monitored site was reduced to one non-flowering plant in 1991.

All populations of Canelo Hills ladies' tresses occur in ciénega habitats where scouring floods are very unlikely (Newman 1991). Soils supporting the populations are finely grained, highly organic, and seasonally or perennially saturated. It is found intermixed with tall grasses and sedges at about 5,000 feet in elevation. Springs are the primary water source, but a creek near one locality contributes near-surface groundwater (McClaran and Sundt 1992).

The dominant vegetation associated with *Spiranthes* includes grasses, sedges (*Carex* spp.), rushes (*Juncus* spp.), spike rush (*Eleocharis* spp.), cattails (*Typha* spp.), and horsetails (*Equisetum* spp.)(Cross 1991, Warren et al. 1991). Associated grass species include bluegrass (*Poa pratensis*), Johnson grass (*Sorghum halepense*), and muhlys (*Muhlenbergia aspeifolia* and *M. utilis*) (Fishbein and Gori 1994). The surrounding vegetation is semidesert grassland or oak savannah.

As with most terrestrial orchids, successful seedling establishment probably depends on the successful formation of endomycorrhizae (a symbiotic association between plant root tissue and

fungi) (McClaran and Sundt 1992). The time needed for subterranean structures to produce aboveground growth is unknown. Plants may remain in a dormant, subterranean state or remain vegetative (non-flowering) for more than one consecutive year. Plants that flower one year can become dormant, vegetative, or reproductive the next year (McClaran and Sundt 1992, Newman 1991). The saprophytic/autotrophic state of orchid plants may be determined by climatic fluctuations and edaphic factors, such as pH, temperature, and soil moisture (Sheviak 1990).

Threats to the Canelo Hills ladies' tresses include groundwater pumping, water diversions, sand and gravel mining, recreation impacts, illegal collection, and invasion of ciénega habitats by nonnative plant species, such as Johnson grass and Bermuda grass (*Cynodon dactylon*) (62 FR 665). The orchid was federally listed as an Endangered species in 1997 (62 FR 665). Nonnative Johnson grass is invading one *Spiranthes* site (Fishbein and Gori 1994). This tall grass forms a dense monoculture, displacing less competitive native plants. If Johnson grass continues to spread, the Canelo Hills ladies' tresses population at this site may be lost (Dave Gori 1994). The effect of livestock grazing on the Canelo Hills ladies' tresses is unclear. A *Spiranthes* population growing at a site grazed for more than 100 years was found to be larger and more vigorous than a population growing at a site ungrazed since 1969 (McClaran and Sundt 1992, Newman 1991); however, this may no longer be the case as the management at the grazed site has changed dramatically in recent years. The Canelo Hills ladies' tresses, like many species in the genus, shows an affinity for habitats with sparse herbaceous cover (McClaran and Sundt 1992); which moderate livestock grazing can promote. The species would likely be adversely affected by heavy livestock grazing; however, maintenance of viable populations is probably compatible with well-managed grazing. Mowing of pastures, particularly when the species is flowering, can be very detrimental, may prevent seed set, and could result in mortality of plants. Limited numbers of populations and individuals threatens this taxon with demographic and environmental extinction as a result of stochastic events that are often exacerbated by habitat disturbance. For instance, restriction of the species to a relatively small area in southeastern Arizona increases the chance that a single environmental catastrophe, such as a severe tropical storm or drought, could eliminate populations or cause extinction.

Huachuca Water Umbel

On January 6, 1997, the FWS listed the Huachuca water umbel as an endangered species under the Act without critical habitat (62 FR 665). Critical habitat was designated on the upper San Pedro River; Garden Canyon on Fort Huachuca; and other areas of the Huachuca Mountains, San Rafael Valley, and Sonoita Creek on July 12, 1999 (64 FR 37441).

The Huachuca water umbel is an herbaceous, semiaquatic perennial plant with slender, erect leaves that grow from creeping rhizomes. The species reproduces sexually through flowering and asexually from rhizomes, the latter probably being the primary reproductive mode. An additional dispersal opportunity occurs as a result of the dislodging of clumps of plants which then may reroot in a different site along aquatic systems.

The Huachuca water umbel has been documented from 27 sites in Santa Cruz, Cochise, and Pima counties, Arizona, and in adjacent Sonora, Mexico, west of the continental divide (Haas and Frye 1997, Saucedo Monarque 1990, Warren et al. 1989, Warren et al. 1991, Warren and

Reichenbacher 1991, FWS files). The plant has been extirpated from 6 of the 27 sites. The 21 extant sites occur in four major watersheds - San Pedro River, Santa Cruz River, Río Yaqui, Río Magalena, and Río Sonora. All sites are 3,500 to 6,500 ft. in elevation. Overgrazing, mining, hay harvesting, timber harvest, fire suppression, and other activities in the nineteenth century led to widespread erosion and channel entrenchment in southeastern Arizona streams and ciénegas when above-average precipitation and flooding occurred in the late 1800's and early 1900's (Bryan 1925, Martin 1975, Hastings and Turner 1980, Dobyns 1981, Hendrickson and Minckley 1984, Sheridan 1986, Bahre 1991, Webb and Betancourt 1992, Hereford 1993). Wetland degradation and loss continues today. Human activities such as groundwater overdrafts, surface water diversions, impoundments, channelization, improper livestock grazing, chaining, agriculture, mining, sand and gravel operations, road building, nonnative species introductions, urbanization, wood cutting, and recreation all contribute to riparian and ciénega habitat loss and degradation in southern Arizona. The local and regional effects of these activities are expected to increase with the increasing human population.

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) included a detailed Status of the Species for the Huachuca water umbel. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

Critical habitat for Huachuca water umbel includes seven critical habitat units in Sonoita Creek, Santa Cruz River, Scotia Canyon, Sunnyside Canyon, Garden Canyon, the Verde River in Yavapai County, Lower Gila River, the San Pedro River, and Aravaipa Creek in Pinal and Graham County, portions of Eagle Creek in Graham and Greenlee Counties, and Upper Gila River in Catron, Grant, and Hidalgo counties New Mexico (70 FR 75546 and 71 FR 32496).

The critical habitat primary constituent elements are:

- Sufficient perennial base flows to provide a permanently or nearly permanently wetted substrate for growth and reproduction of Huachuca water umbel;

- A stream channel that is relatively stable, but subject to periodic flooding that provides for rejuvenation of the riparian plant community and produces open microsites for Huachuca water umbel expansion;

- A riparian plant community that is relatively stable over time and in which nonnative species do not exist or are at a density that has little or no adverse effect on resources available for Huachuca water umbel growth and reproduction; and

- In streams and rivers, refugial sites in each watershed and in each reach, including, but not limited to, springs or backwaters of mainstem rivers, that allow each population to survive catastrophic floods and recolonize larger areas.

Activities that may result in the destruction or adverse modification of critical habitat include those that alter the primary constituent elements ability to function properly and serve the intended conservation role for the species. Such activities may include, but are not limited to:

- Activities such as damming, water diversion, channelization, excess groundwater pumping, or other actions that appreciably decrease base flow and appreciably reduce the wetted surface area of rivers, streams, ciénegas, or springs;

- Activities that alter watershed characteristics in ways that would appreciably reduce groundwater recharge or alter natural flooding regimes needed to maintain natural, dynamic riparian communities. Such activities adverse to Huachuca water umbel critical habitat could include, but are not limited to: vegetation manipulation such as chaining or harvesting timber; maintaining an unnatural fire regime either through fire suppression, or too-frequent or poorly timed prescribed fires; mining; military maneuvers, including bombing and tank operations; residential and commercial development; road construction; and improper livestock grazing that reduces fire frequency or otherwise degrades watersheds;

- Activities that appreciably degrade or destroy native riparian communities, including but not limited to: improper livestock grazing, clearing, cutting of live trees, introducing or encouraging the spread of nonnative species, and heavy recreational use; and

- Activities that appreciably alter stream channel morphology such as sand and gravel mining, road construction, channelization, impoundment, improper livestock grazing, watershed disturbances, off-road vehicle use, heavy or poorly planned recreational use, and other uses.

Southwestern Willow Flycatcher

The southwestern willow flycatcher was listed as endangered, without critical habitat on February 27, 1995 (60 FR 10694). Critical habitat was later designated on July 22, 1997 (62 FR 39129). A correction notice was published in the Federal Register on August 20, 1997 to clarify the lateral extent of the designation (62 FR 44228). On May 11, 2001, the 10th Circuit Court of Appeals set aside designated critical habitat in those states under the 10th circuit's jurisdiction (New Mexico). The FWS decided to set aside critical habitat designated for the southwestern willow flycatcher in all other states (California and Arizona) until it re-assess the economic analysis. On October 19, 2005, we re-designated critical habitat for the southwestern willow flycatcher (70 FR 60886). A total of 737 river miles across southern California, Arizona, New Mexico, southern Nevada, and southern Utah were included in the final designation.

A final recovery plan for the southwestern willow flycatcher was released in 2002 (USFWS 2002c). The recovery plan describes the reasons for endangerment and the current status of the species, addresses important recovery actions, includes detailed issue papers on management issues, and provides recovery goals. Recovery is based on reaching numerical and habitat-related goals for each specific Management Unit established throughout the subspecies range and establishing long-term conservation plans (USFWS 2002c).

Rangewide, the population is comprised of extremely small, widely-separated breeding groups including unmated individuals. Rangewide, 83 percent of all sites from 1993 to 2004 had 0 to 5 flycatcher territories present (Durst et al. 2005). Removing the extirpated sites, the percentages are similar; 69 percent of all sites have between one and five territories. Conversely, across the southwestern willow flycatcher's range, there are only three percent of all sites with greater than 50 territories (Durst et al. 2005).

Historically, the southwestern willow flycatcher declined in extent of range occupied and population size as a result of habitat loss, modification, and fragmentation. Known numbers of southwestern willow flycatcher territories have increased to over 1200 pairs throughout its range since the bird was listed in 1995, surpassing the high end of the 1000 pairs estimated by Unitt (1987). About 40 percent of all the known breeding pairs are found at three locations throughout the subspecies range (Cliff/Gila Valley, New Mexico; and Roosevelt Lake and Gila/San Pedro river confluence, Arizona). Water diversions, agricultural return flows, groundwater pumping, habitat clearing, flood control projects, development, livestock grazing, dam operations, and changes in annual flows due to off stream uses of water have affected the ability of the aquatic and adjacent ecosystems to support native fish, plants, and wildlife. Riparian ecosystems by nature are dynamic, with their distribution in time and space governed mostly by flood events and flow patterns. Current conditions along southwestern rivers and streams are such that normal flow patterns have been greatly modified, flood events are more catastrophic as a result of degraded watershed conditions, stream channels are highly degraded, floodplains and riparian communities are reduced in extent, wildfires in riparian ecosystems are increasing, and the species composition of riparian communities are modified with exotic plant species. Southwestern willow flycatcher habitat loss and fragmentation can lead to increased brood parasitism and nest predation. These conditions have significantly diminished the potential for southwestern rivers and streams to develop suitable nesting habitat for the southwestern willow flycatcher and for those ecosystems to remain intact and productive for nesting southwestern willow flycatchers.

Our June 27, 2006, BO on the effects of the proposed construction of the Florence-Kelvin Bridge over the Gila River (22410-2006-F-0429) included a detailed Status of the Species for the Southwestern Willow Flycatcher. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

Critical habitat for southwestern willow flycatcher in Arizona includes portions of the Virgin River Gorge, Verde River, Gila River, Salt River, Tonto Creek, San Pedro River, Little Colorado River, and Big Sandy River. The primary constituent elements of critical habitat include:

- Riparian habitat in a dynamic successional riverine environment (for nesting, foraging, migration, dispersal, and shelter) that comprises:
  - Various species of native willow (*Salix* spp.), boxelder (*Acer negundo*), tamarisk (*Tamarix ramosissima*), Russian olive (*Eleagnus angustifolia*), buttonbush (*Cephalanthus occidentalis*), cottonwood (*Populus fremontii*), stinging nettle (*Urtica dioica*), alder (*Alnus* spp.), velvet ash (*Fraxinus velutina*), poison hemlock

(*Conium maculatum*), blackberry (*Rubus ursinus*), seep willows (*Baccharis* spp.), oaks (*Quercus* spp.), rose (*Rosa* spp.), sycamore (*Platinus wrightii*), false indigo (*Amorpha californica*), Pacific poison ivy (*Toxicodendron diversilobum*), grape (*Vitus arizonica*), Virginia creeper (*Parthenocissus quinquefolia*), Siberian elm (*Ulmus pumila*) and walnut (*Juglans hindsii*);

- Dense riparian vegetation with thickets of trees and shrubs ranging on height from 2 to 30 meters (6-98 feet). Lower-stature thickets (2 to 4 m or 6 to 13 ft tall) are found at higher elevation riparian forests, and tall stature thickets are found at middle- and lower elevation riparian forests;

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

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

- Dense patches of riparian forests that are interspersed with small openings of open water or marsh, or shorter/sparser vegetation that creates a mosaic that is not uniformly dense. Patch size may be as small as 0.1 hectare (ha) (0.25 acres [ac]) or as large as 70 ha (175 ac); and

- A variety of insect prey populations found within or adjacent to riparian floodplains or moist environments, including flying ants, wasps, and bees (Hymenoptera); dragonflies (Odonata); flies (Diptera); true bugs (Hemiptera); beetles (Coleoptera); butterflies/moths and their larvae (Lepidoptera); and spittlebugs (Homoptera) (70 FR 60886, FWS 2005).

Many activities continue to adversely affect the distribution and extent of all stages of flycatcher habitat throughout its range (development, urbanization, grazing, recreation, native and nonnative habitat removal, dam operations, river crossings, ground and surface water extraction, etc.). Stochastic events also continue to change the distribution, quality, and extent of southwestern willow flycatcher habitat.

Anticipated, actual, and/or temporary loss of flycatcher habitat due to Federal or federally-permitted projects (i.e. modification of Roosevelt Dam, operation of Lower Colorado River dams, etc.) has resulted in BOs and Habitat Conservation Plans (HCP) that led to acquisition, development, and protection of property specifically for the southwestern willow flycatcher to remove jeopardy, and mitigate, reduce, and/or minimize take or adverse affects. A small portion of the lower San Pedro River was acquired by the Bureau of Reclamation as a result of raising Roosevelt Dam and is now currently under the management of The Nature Conservancy. Commitments to acquire and manage unprotected habitat specifically for breeding southwestern willow flycatchers have been made for loss of habitat along the Lower Colorado River (Operations of Colorado River dams and 4.4 Plan/Change in Points of Diversion, Lower

Colorado River Multi-Species Conservation Plan (MSCP), Tonto Creek and Salt River (raising of Roosevelt Dam, operation of Roosevelt Dam) in AZ, and Lake Isabella, CA (operation of dams). The Roosevelt Lake HCP completed by Salt River Project (SRP) has resulted in acquisition of over 1,000 acres along the Verde River, San Pedro River, and Gila River. The Army Corps of Engineers has acquired approximately 1,000 acres along the South Fork Kern River to minimize the effects of operations of Isabella Dam. Various Regional HCPs have been developed in southern California that have protected southwestern willow flycatcher habitat (San Diego MSCP, Western Riverside County HCP, Carlsbad Habitat Management Plan).

Western Yellow-billed Cuckoo

The FWS assigned candidate status to the western continental United States distinct population segment of the yellow-billed cuckoo (western yellow-billed cuckoo) on July 25, 2001 (66 FR 38611). The Distinct Population Segment boundary includes all yellow-billed cuckoos west of the Continental Divide and west of the eastern edge of the Rio Grande drainage, excluding the Pecos River drainage, but including the Sangre de Cristo Mountains.

Historically, the western yellow-billed cuckoo occupied and bred in riparian zones from western Washington (possibly southwestern British Columbia) to northern Mexico, including Oregon, Washington, southwestern Idaho, California, Nevada, Utah, western Colorado, Arizona, New Mexico, and western Texas. Today, the species is absent from Washington, Oregon, and most of California, is likely extirpated in Nevada, is rare in Idaho and Colorado, and occurs in the balance of its range in riparian habitats that are much reduced from their previous extent and are heavily affected by human use (67 FR 40657).

The western yellow-billed cuckoo is associated primarily with cottonwood-willow dominated riparian habitats (Hamilton and Hamilton 1965, Gaines 1974, Gaines and Laymon 1984, Laymon and Halterman 1986, 1987, 1989; Halterman 1991; Halterman and Laymon 1994, 1995). Cottonwood-willow is the predominant and preferred habitat, but very tall screwbean-honey mesquite stands are also used. In addition, western yellow-billed cuckoos have been found to use a mixture of saltcedar and cottonwood/willows (Corman and Magill 2000). Gaines (1974) found that vegetation density, distance to water, and the length and width of the habitat area were important characteristics when surveying for western yellow-billed cuckoos. Western yellow-billed cuckoos breed in large blocks of riparian habitats (particularly woodlands with cottonwoods and willows). Dense understory foliage appears to be an important factor in nest site selection, and cottonwood trees are an important element of foraging habitat in areas where the species has been studied in California (Halterman 1991).

Principal causes of riparian habitat losses are conversion to agricultural and other uses, dams and river flow management, stream channelization and stabilization, and livestock grazing. Available breeding habitats for western yellow-billed cuckoos have also been substantially reduced in area and quality by groundwater pumping and the replacement of native riparian habitats by invasive non-native plants (particularly saltcedar) (Groschupf 1987; Rosenberg et al. 1991). Estimates of riparian habitat losses in the west as a result of the factors described above range from 90 to 99 percent in California, 90 percent in New Mexico, and 90 to 95 percent in Arizona (66 FR 38611). In Arizona, the greatest losses of riparian vegetation have occurred

along the lower Colorado River valley and its major tributaries at elevations below about 3,000 feet (66 FR 38611). Western yellow-billed cuckoo numbers appear to have declined substantially in Arizona. In 1976, an estimated 846 western yellow-billed cuckoo pairs occupied the lower Colorado River and five of its major tributaries (66 FR 38611), while in 1999, just 172 western yellow-billed cuckoo pairs and 81 unmated adults were located during surveys of 221 miles of riparian habitat (Corman and Magill 2000). Specific declines in western yellow-billed cuckoo numbers in Arizona have been documented along the lower Colorado River and the Bill Williams River delta (Rosenberg et al. 1991).

Nevertheless, Arizona is thought to contain the largest remaining western yellow-billed cuckoo population in the western States (67 FR 40657). Currently in Arizona, western yellow-billed cuckoos occur in a scattered fashion throughout the central, east-central, west central, and southeastern parts of the State, with the majority of known populations occurring along the San Pedro, Verde, and Agua Fria rivers and Ciénega Creek in Pima, Pinal, Cochise, and Yavapai counties, and Sonoita Creek in Santa Cruz County (Corman and Magill 2000).

Quantitative data on the decline of the western yellow-billed Cuckoo are lacking, but significant range data have been documented for the distinct population segment (USFS 2004:221). In addition to the species' absence and rarity in Washington, Oregon, Idaho, Colorado, and Nevada, the three remaining western yellow-billed cuckoo-inhabited states (Arizona, New Mexico, and California) demonstrate a decline in both range and abundance of the distinct population segment. However, New Mexico presently supports a relatively abundant population within its river systems. In 2002, Woodward et al. (2003) found 89 western yellow-billed cuckoos on private, state, and Federal lands in the upper Gila and Mimbres river drainages. Additionally, western yellow-billed cuckoos can be found in the Rio Grande river valley from the headwaters of Cochiti Dam to the headwaters of Elephant Butte reservoir. The western yellow-billed cuckoo is considered extirpated as a breeding bird in Washington, Oregon, and British Colombia.

Our June 10, 2005, Programmatic Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) included a detailed Status of the Species for the western yellow-billed Cuckoo. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

UPLAND SPECIES

Cochise Pincushion Cactus

The final rule listing the Cochise pincushion cactus as threatened was published on January 9, 1986 (51 FR 952). Critical habitat has not been designated. The Cochise pincushion cactus is a small, unbranched plant found in the transition zone between the Chihuahuan Desert Scrub and semidesert grassland (Brown and Lowe 1982). The plant is found exclusively on limestone hills in southeastern Cochise County, Arizona and northern Sonora, Mexico.

Threats to the species include collecting, potential mineral exploration and development, and habitat degradation from livestock use, wildlife, and feral animals. The following information is summarized from the recovery plan (USFWS 1993a).

Cochise pincushion cactus is very small 1.5-6.2 cm (0.6-2.4 in.) diameter at maturity. The plants shrink into the ground during dry periods. The populations in Arizona are found on several isolated hills within an area of four to six square miles. The plants are scattered throughout most of the area, with some dense clusters of 100 or more found in some areas. We do not have an estimate of the total number of individuals. All known populations in Arizona are on private land and Arizona State Trust lands.

Demographic monitoring plots have been in place since 1988. There are three plots that started with an overall number of approximately 150 plants. As of 2006, there were only approximately 65 plants in the plots. The only increase in plant numbers was observed in 1993, when there were over 160 plants found in the plots. There was high mortality in 1994 and the populations within the plots have been decreasing every year since then. Mortality was associated with herbivory on the plants. The populations have been affected by the on-going drought; from 2001-2006 there has been very little flower and fruit production. There have been virtually no seedlings detected in the plots for the last few years. A few seedlings were found in 2006, providing some hope that, the populations can potentially recover. Large plants seem to be stable in the population, while the smaller plants have not survived. This also provides some hope that when conditions are appropriate for germination, the reproductive potential of the larger plants will provide seed for new recruits.

Our information indicates that, rangewide; this is the only consultation that has involved this species. It is only located on State Trust Lands and private property, and no activities that would have a Federal nexus for section 7 consultation have occurred.

Pima Pineapple Cactus

The final rule listing Pima pineapple cactus as endangered was published on September 23, 1993 (58 FR 49875). No critical habitat has been designated. Pima pineapple cactus occurs south of Tucson, in Pima and Santa Cruz counties, Arizona and adjacent northern Sonora, Mexico. It is distributed at very low densities throughout both the Altar and Santa Cruz valleys, and in low-lying areas connecting the two valleys. Factors that contributed to the listing include habitat loss and degradation, habitat modification and fragmentation, limited geographic distribution and species rareness, illegal collection, and difficulties in protecting areas large enough to maintain functioning populations. The biological information below is summarized from the proposed and final rules and other sources.

Pima pineapple cactus is a low-growing, hemispherical cactus with adults varying in stem diameter from 5.0 cm (2.0") to 21.0 cm (8.3") and height from 4.5 cm (1.8") to 45.7 cm (18.0"). Habitat fragmentation and isolation may be an important factor limiting future seed set of this cactus. Recent data show that the species cannot successfully self pollinate *in situ* and is reliant on invertebrate pollinators. One hypothesis is that the spatial distribution pattern of individual Pima pineapple cacti within a given area may regulate pollinator visitations, thus affecting

successful cross-pollination and subsequent seed set over the population (Roller 1996). If the pollinators are small insects with limited ability to fly over large distances, habitat fragmentation may contribute to a decrease in pollinator effectiveness with a subsequent decrease in seed set and recruitment.

Most of the documented habitat loss has occurred south of Tucson through the Santa Cruz Valley to the town of Amado. This area surrounding developed parts of Green Valley and Sahuarita, Arizona (including adjacent areas of the San Xavier District of the Tohono O'odham Nation), may be important for the conservation of this species within its range. Analysis of surveys conducted from 1992 to 1995 with a multivariate statistical analysis documented a pattern of greater population densities, higher ranks of cactus vigor, and better reproduction occurring within the transition vegetation type found in this area of the northern Santa Cruz Valley (Roller and Halvorson 1997). This area could be defined as an ecotone boundary between semidesert grassland and Sonoran desert scrub. The primary threat to the status of this species throughout its range is the accelerated rate (since 1993) at which much of the prime habitat is being developed, fragmented, or modified. This is continuing with the expansion of urban centers, human population, and mining activities in this area.

Monitoring has shown that the range-wide status of the Pima pineapple cactus appears to have been recently affected by threats that have completely altered or considerably modified more than a third of the species' surveyed habitat, and have caused the elimination of nearly 60 percent of documented locations. Dispersed, patchy clusters of individuals are becoming increasingly isolated as urban development, mining, and other commercial activities continue to detrimentally impact the habitat. The remaining habitat also is subject to degradation or modification from current land-management practices, increased recreational use when adjacent to urban expansion (i.e., off-road vehicle use and illegal collection), and the continuing aggressive spread of nonnative grasses into habitat. Habitat fragmentation and degradation will likely continue into the foreseeable future based on historical data and growth projections produced by the Pima County Association of Governments (1996). There is very little Federal oversight on conservation measures that would protect or recover the majority of the potential habitat. Even some areas where section 7 consultations have been completed have been modified and may not be able to support viable populations of the Pima pineapple cactus over the long-term.

The protection of habitat and individuals is complicated by the varying land ownership within the range of this species. An estimated 10 percent of the potential habitat for Pima pineapple cactus is held in Federal ownership. The remaining 90 percent is on Tribal, State, and private lands. Most of the federally-owned land is either at the edge of the plant's range or in scattered parcels. The largest contiguous piece of federally-owned land is the BANWR, located at the southwestern edge of the plant's range at higher elevations and with lower plant densities.

Our February 3, 2006, BO for the Ocotillo Preserve Residential Subdivision (AESO/SE 02-21-02-F-0210 / 02-21-04-F-0160) included a detailed Status of the Species for the Pima Pineapple Cactus. This BO is available on our website at http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

ENVIRONMENTAL BASELINE

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

CHIRICAHUA LEOPARD FROG

A. Status of the Species within the Action Area

The action area includes the Arizona portion of the historical range of the Chiricahua leopard frog, but only the non-Federal lands are within the covered area of the Agreement. Currently, the species is likely extant at 33 sites in Arizona. Older or unconfirmed sightings suggest the species may occur at another 25 sites. Historically to the present, the species has been found at 272 localities in Arizona. As a result, the Chiricahua leopard frog is extirpated from 79-88 percent of historical localities (USFWS files, Phoenix). Many of the mountain ranges in southern Arizona no longer have a known site or have a single site, including: the Chiricahua, Santa Rita, Patagonia , Peloncillo, Galiuro, and Dragoon mountains. In the northern portion of the range there are 16 likely extant population sites, none of which occur on non-Federal lands. In the southern portion of the range, only one likely extant population occurs on non-Federal lands, which is covered by the Malpai Borderland Group's Safe Harbor Agreement. This does not include the seven populations of the closely related Ramsey Canyon leopard frogs, five of which are on private lands.

B. Factors Affecting the Species' Environment in the Action Area

The action area includes the entire range of the Chiricahua leopard frog in Arizona and therefore, all the factors listed in the draft recovery plan (USFWS 2006) as threats apply within the action area. These include: nonnative predators and competitors, disruption of metapopulation dynamics, poorly managed livestock grazing, degradation of water quality, degradation of cover vegetation, degraded watershed conditions, disease, wildfires and fire suppression activities, drought, global climate change, pesticide drift and run off, and groundwater pumping. A complete discussion of the factors affecting Chiricahua leopard frogs in the action area is included in the Programmatic Biological and Conference Opinion on the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) and the draft recovery plan (USFWS 2006).

AQUATIC SPECIES

Apache Trout

A. Status of the Species within the Action Area

All Apache trout locations within Arizona are within the action area except those on the Kaibab NF, but only those populations on private in holdings within the NFs and on the White Mountain Apache lands and the Fort Apache Indian Reservation are within the covered area of the Agreement. Presently, at least 14 known pure populations exist within Apache, Gila, and Greenlee counties, on lands administered by the Apache-Sitgreaves National Forest and by the White Mountain Apache Tribe (USFS 2004). These 14 populations represent 13 discrete natural stocks of Apache trout. One introduced population, established out of the historical range in the late 1960s, has been confirmed as un-hybridized through genetic analysis. Ten additional reintroduced populations currently await genetic testing to confirm their status.

Sixteen streams within the Apache-Sitgreaves NF (or shared with the Fort Apache Indian Reservation, which are Thompson Creek and the West Fork Black River) currently contain Apache trout. Six of these streams contain pure Apache trout and are protected by barriers. Soldier Creek is one of the 13 natural stocks and has been estimated to contain 200 adults (USFS 2004). Only the West Fork Black River is estimated to have over 500 adults. The remaining streams on the Apache-Sitgreaves NF are estimated to contain between zero and 300 adult Apache trout (USFS 2004).

There are three populations of Apache trout on the Coronado NF. The Coronado NF populations may eventually be replaced with Gila trout based on discussions of both the Apache trout and Gila trout recovery teams.

B. Factors Affecting the Species' Environment in the Action Area

Within the action area, one factor that could be affecting the Apache trout is the threat of hybridization with both native and nonnative fish. In addition, habitat alterations from ash flows and unsatisfactory watershed conditions could also be affecting Apache trout habitat. Competition from nonnative species is a possible limiting factor as well. Drought is most likely having an impact on this species where it exists on the Forests, particularly because of the species restriction to small streams that restrict population and individual fish growth.

The streams in which Apache trout are located run through active grazing allotments and are subjected to the typical impacts associated with livestock grazing, including: watershed alterations in vegetation, cover, and stream hydromorphology (AESO/SE 02-21-04-F-0355 and 02-22-03-F-0366) . Recreation activities on the NF and adjacent private and state land may include camping, hiking, fishing, hunting, and off-highway vehicle use.

Desert Pupfish

A. Status of the Species within the Action Area

The desert pupfish within the action area, and the covered area, are known from three introduced sites. These sites are composed of the fish present in two small ponds and a cement tank located near Elgin, Arizona. Access is relatively restricted, and these are considered secure refugia. Chiricahua leopard frogs are periodically observed in one of the small ponds.

B. Factors Affecting the Species' Environment in the Action Area

The populations of desert pupfish in the action area are very small and isolated, making them vulnerable to stochastic environmental events such as drought and floods. A significant potential threat to the populations is dispersal or placement of non-native predators and competitors into these ponds. The effects of increased illegal immigration and Border Patrol activities likely have little impact on these populations, because these ponds are relatively close to occupied ranch facilities and the potential for impacts from immigrants drinking or walking in the water are small and insignificant. The use of these ponds for bathing and personal hygiene may result in some decrease in water quality, but effects of this type have not been studied.

Gila Chub

A. Status of the Species within the Action Area

In the action area, small remnant populations remain in several tributaries of the upper Verde River, San Pedro River, San Carlos River, Blue River, San Francisco River, and the Gila River. In the Verde River basin, Walker and Spring creek populations are considered stable-threatened, and the Red Tank Draw population is considered unstable-threatened. In Santa Cruz River basin, Sheehy Spring has an introduced population that is considered unstable-threatened, Ciénega Creek is considered stable-threatened, and Ciénega Creek tributaries (Mattie Canyon and Empire Gulch) are considered unstable-threatened populations. The Babocomari River population is considered unstable-threatened, as is the tributary population in O'Donnell Creek. Three populations in tributaries lower in the San Pedro River basin are considered stable-threatened; Redfield, Hot Springs, and Bass Canyon. The populations in the San Carlos River and the Blue River are on the San Carlos Apache Indian Reservation. They are believed to have extant populations of Gila chub, but information is not available to us on the status of Gila chub in those drainages. The San Francisco River has two tributaries with extant populations, Harden Ciénega Creek and Dix Creek. The status of these two populations is considered stable-threatened. Two tributaries of the Gila River in Arizona have extant populations of Gila chub. Eagle Creek has an unstable-threatened population, and Bonita Creek has a stable-threatened population. This information is from the November 2, 2005 final rule (70 FR 66664).

Critical Habitat units in the action area include: the Arizona portion of the Upper Gila River Unit, which includes Dix, Harden Ciénega, Eagle, and East Eagle creeks in Graham and Greenlee counties, Arizona; all of the Babocomari River Unit, which includes O'Donnell Canyon, and Turkey Creek/Post Canyon Creek in Cochise County, Arizona; all of the Lower San

Pedro River Unit, which includes Bass, Hot Springs, and Redfield canyons in Cochise, and Graham, Arizona; and the portion of the Lower Santa Cruz River Unit that includes the Ciénega Creek south of Interstate 10, Mattie Canyon, and Empire Gulch in Pima County, Arizona.

B. Factors Affecting the Species' Environment in the Action Area

The action area includes all known populations except those in Mexico, New Mexico, Mineral Creek (Lower Gila River, Arizona), Williamson Valley Wash (Upper Verde River, Arizona), the Agua Fria River watershed (Arizona), and the Lower Santa Cruz watershed (Arizona). Threats in the action area are consistent with those discussed in detail in the final rule; including groundwater pumping, surface water diversion, impoundments, dams, channelization, improper grazing, wildfire, agriculture, mining, road building, residential development, and recreation (70 FR 66664).

Gila Topminnow

A. Status of the Species within the Action Area

The Gila topminnow occupies approximately 12 sites within the action area. These sites include isolated populations at Lower Mine Springs (Yavapai County), two ponds on the BANWR (Pima County), and Heron Springs (Santa Cruz County). The rest of the sites in the action area are along natural drainages and have the potential at high flows to be connected and function as metapopulations. These include a complex of sites on Las Ciénega National Conservation Area (Pima and Santa Cruz County), Red Rock Canyon (Santa Cruz County), and a complex of sites above Patagonia State Park along Sonoita Creek on state and private lands (Santa Cruz County). The BANWR, Las Ciénegas National Conservations Area, Heron Springs, and Sonoita Creek sites are also periodically occupied by Chiricahua leopard frogs

B. Factors Affecting the Species Environment in the Action Area

The Gila topminnow's status within the action area is not necessarily secure; the currently occupied sites have not demonstrated occupancy over a sufficiently long-term, and may lack the ability to survive the current drought. The reestablishment history of Gila topminnow illustrates that even sites that were thought to be secure may fail for various reasons.

Gila topminnow are widely dispersed, and in some cases vulnerable to stochastic events. These events would include invasions or unauthorized introductions of non-native fishes, drought, and stochastic events such as floods and wildfire. Outside the complex in Sonoita Creek and Las Ciénegas National Conservation Area, if a population site is extirpated, reestablishment will need to occur through translocations from other populations.

Continued and periodic drought impacts Gila topminnow through the loss of potential aquatic sites and the potential loss of existing sites. The concentration of fish in smaller and smaller pools results in increased predation, reduced water quality, and higher rates of disease transmission. However, Gila topminnow are live bearers and highly fecund, so populations can

rebound fairly quickly and this is probably part of this species' life history strategy for dealing with periodic droughts that are common in the Southwestern U.S.

Other factors that could negatively impact Gila topminnow within the action area include: nonnative predators and competitors, disruption of metapopulation dynamics, poorly managed livestock grazing, degradation of water quality, degradation of cover vegetation, degraded watershed conditions, disease and parasite infestations, wildfires and fire-suppression activities, drought, global climate change, pesticide drift and run off, and groundwater pumping.

Livestock grazing occurs within the action area and the covered area. On Federal lands, the effects of grazing activities are analyzed through section 7 consultations. Some recent grazing BOs include: AESO/SE 02-21-95-F-0303 R1, 02-21-98-F-0399 R1, and 02-21-98-F-0339 R2. Livestock grazing on non-Federal lands is not subject to section 7 consultation, but is subject to the section 9 prohibition against take of listed species. Livestock management on non-Federal lands is highly varied, ranging from allowing livestock to roam within the ranch to highly regimented rotational grazing plans. NRCS will assist ranchers in developing custom ranch management plans for private landowners, but implementation is at the discretion of the operator. Livestock grazing can result in reduction of vegetation in the uplands to the point that erosion of topsoil increases and sedimentation increases in aquatic sites. This can result in decreased water quality and burying of young Gila topminnows. Livestock use of occupied tanks can potentially result in a small number of dead and injured individuals from trampling as livestock move.

Gila Trout

A. Status of the Species within the Action Area

Inside the action area, there are creeks inhabited by Gila trout in Arizona. Dude Creek (Gila County) and Raspberry Creek (Greenlee County) are replicate populations of the Spruce Creek (Catron County, New Mexico) relict lineage. These were established as part of ongoing recovery actions. Recovery actions have included chemically treating streams within the historical range of the species to remove nonnative fish species, removing nonnative trout by electrofishing, and constructing physical barriers to prevent movement of nonnatives into renovated reaches (USFWS 2003).

Replicated populations in Arizona exist in Raspberry Creek. Young of the year were planted in Raspberry Creek in Arizona in 2000. In 2004, Gila trout in Raspberry Creek were found in mixed size classes, indicating that the fish spawned and successfully recruited. Although some fish were removed from Raspberry Creek due to the threat of wildfire, some of these fish were restocked in November 2004 into the uppermost portions of Raspberry Creek, which survived the impacts caused by the fire and which still support Gila trout. Spawning was not documented in Raspberry Creek in 2005. Young of the year were planted in Dude Creek in 1999; however, due to a lack of recruitment, Dude Creek is no longer considered a viable population.

B. Factors Affecting the Species' Environment in the Action Area

Threats to Gila trout habitat from grazing and timber harvest have been greatly reduced over time. AGFD seasonally stocks the East Verde River with rainbow trout, within 3 miles of Dude Creek. Dude Creek has one artificial and at least one natural barrier separating it from the East Verde River (K. Young, AGFD, pers. comm. 2006). The reclassification of Gila trout included a special 4(d) rule that exempts recreational fishing from the section 9 take prohibitions. While recreational fishing of Gila trout is not currently occurring, it is likely to start in the near future. This will allow AGFD to stock Gila trout into the East Verde River instead of rainbow trout (K. Young, AGFD, pers. comm. 2006). The result of this will lessen the potential for hybridization of stocks with rainbow trout. Rainbow trout have not been stocked into the Blue River (Raspberry is a tributary) since 1990 (K. Young, AGFD, pers. comm. 2006). There will also be some recreational fishing pressure applied to this species, but this has been analyzed as part of the effects of the 4(d) rule promulgation.

High-severity forest fires remain a threat to isolated populations because natural repopulation is not possible. However, populations have been reestablished after forest fires (Main Diamond and South Diamond creeks), there is an Emergency Evacuation Plan (USFWS 2004b) that outlines procedures to be taken in case of a high-severity forest fire, and most populations are sufficiently disjunct (e. g., separated by mountain ridges), thereby minimizing the likelihood that one fire would not affect all populations simultaneously. In recent times, fires have occurred in many areas occupied by Gila trout. Thus, the risk of fire in these areas, especially one that would affect all populations, is reduced due to an overall reduction in fuel loads. Populations may still be extirpated because of forest fires, but through management activities (rescue of fish, reestablishment of populations, hatchery management) populations can be, and have been, reestablished successfully once the habitat recovers.

Headwater Chub

A. Status of the Species within the Action Area

Habitat occupied by the headwater chub within the action area includes Fossil Creek, the East Verde River, Tonto Creek, and the following tributaries to Tonto Creek: Buzzard Roost, Gordon, Gun, Haigler, Marsh, Rock, and Spring creeks. Reaches of these creeks below 4,800 feet are likely not suitable or potential habitat for Chiricahua leopard frog, and thus are considered outside of the action area. The species is considered extirpated from Horton Creek, which is a tributary of Tonto Creek. The status of the species in the other occupied reaches are as follows: stable – Buzzard Roost, Gordon, Haigler, Marsh, Rock, and Spring creeks; and unstable/threatened – Gun, Fossil, and Tonto creeks, and East Verde River. The species is also known historically from Ash Creek on San Carlos Apache lands; however, the status of the species there is unknown. Non-Federal lands within these occupied reaches are within the covered area.

B. Factors Affecting the Species' Environment in the Action Area

At certain locations, activities such as groundwater pumping, surface water diversions, impoundments, dams, channelization (straightening of the natural watercourse, typically for flood control purposes), improperly managed livestock grazing, wildfire, agriculture, mining,

roads, logging, residential development, and recreation all contribute to riparian and ciénega habitat loss and degradation in Arizona and New Mexico (Minckley and Deacon 1991, Tellman et al. 1997, Propst 1999, Voeltz 2002).

Huachuca Springsnail

A. Status of the Species within the Action Area

The entire known range of the Huachuca springsnail is within the action area, except the two springs in Sonora, Mexico. Five springs are located on non-Federal land and are within the covered area of the Agreement.

B. Factors Affecting the Species Environment in the Action Area

The populations within the action area are subject to effects from all the threats discussed under the Status of the Species. The six populations on Fort Huachuca are by far the most secure, but are still subject to effects from altered fire regimes, drought, recreation, and catastrophic fire resulting from human-caused alterations of fire regimes. Populations on the Coronado National Forest are subjected to the additional effects of overgrazing, timber harvest, mining, and water developments, as well as those activities affecting populations on Fort Huachuca. These populations on Federal land receive some protection from threats through continued land and resource management planning. The populations within the covered area of the Agreement are not subject to public planning processes and are subject to all of these threats. In addition, because populations are isolated, once extirpated, sites are unlikely to be recolonized without active management. Small populations are also subject to genetic deterioration and demographic variability, which increases the likelihood of extinction.

Little Colorado Spinedace

A. Status of the Species within the Action Area

The Little Colorado spinedace is assumed to still occupy the streams it is known from historically (Chevelon, Silver, Nutrioso, East Clear Creek, and the LCR proper). However, populations are generally small and the true population size for any occupied stream is unknown due to the yearly fluctuations and difficulty in locating fish. Little Colorado spinedace have a tendency to disappear from sampling sites from one year to the next and may not be found for several years. For example, the Silver Creek population was considered extirpated until fish were collected from the creek again in 1997. Unfortunately, though AGFD surveyed Silver Creek in 2003 and 2004, we have been unable to locate any fish since 1997. This ephemeral nature makes management of the species difficult since responses of the population to changes within the watershed cannot be measured with certainty.

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

Surveys conducted in April 2006 in Nutrioso Creek located 128 Little Colorado spinedace, upstream of Nelson Reservoir. The largest concentration of Little Colorado spinedace was found on the EC Bar Ranch (private in-holding). No Little Colorado spinedace were located downstream of Nelson Reservoir (in Nutrioso Creek) or in Rudd Creek. However, in June 2006, AGFD located 415 Little Colorado spinedace in a drying pool in Nutrioso Creek, which were moved into a more permanent pool on the EC Bar Ranch, and 74 spinedace in Rudd Creek.

Little Colorado spinedace are currently considered rare in East Clear Creek (Denova and Abarca 1992). In order to try to increase the numbers of Little Colorado spinedace in the watershed, AGFD, FWS, and Forest Service are implementing the stocking strategy identified in the *East Clear Creek Watershed Recovery Strategy for the Little Colorado Spinedace and Other Aquatic Species*. Since 2000, the AGFD has stocked numerous sites with Little Colorado spinedace. Surveys conducted in 2006 located adult and young-of-the-year Little Colorado spinedace in both Dane and Bear canyons. These appear to be the only reintroduction sites where the species persists.

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

Critical habitat within the action area includes the 18 miles of East Clear Creek in Coconino County, Arizona, and the 5 miles of Nutrioso Creek in Apache County, Arizona. There is a mixed Federal and non-Federal land ownership pattern in the East Clear Creek drainage and a few parcels of non-Federal land in the Nutrioso Creek drainage. The Chevelon Creek critical habitat unit is not within the historical range of the Chiricahua leopard frog and is not within the action area.

B. Factors Affecting the Species' Environment in the Action Area

Little Colorado spinedace habitats in the East Clear Creek drainage and within the project area have been altered by the construction of dams on the mainstem and tributaries such as C.C. Cragin Reservoir, Knoll Lake, and Bear Lake. Other land-management activities that have altered the habitat include timber harvest, livestock grazing, road construction and maintenance, recreational development and usage, fire management, and inter-basin water diversions. These activities have affected watershed function, runoff patterns, peak flows, seasonal flows, riparian vegetation, wet meadow functions, bank erosion, siltation, and water quality. Wildlife and fisheries management largely associated with providing hunting or fishing opportunities has altered the faunal component of the habitat. Introduction of non-native trout, baitfish, and crayfish at C.C. Cragin and Knoll Lake Reservoirs have increased competition for available resources and possibly predation on spinedace. In addition, there is concern that elk (*Cervus elaphus*) are much more abundant in the East Clear Creek drainage than they were historically, and that they may have a significant effect on the existing riparian and aquatic habitats. The Forest Service is working with the AGFD to determine the carrying capacity for elk and the appropriate adjustment of elk numbers within the East Clear Creek watershed.

There are three range allotments within the Coconino National Forest portion of the East Clear Creek watershed. These three allotments, the Buck Springs, Bar-T-Bar, and Hackberry/Pivot Rock Allotments, include and/or border Little Colorado spinedace critical habitat. The Buck Springs Allotment Management Plan (AMP) was revised and consulted on in 2003. Though the revised AM significantly reduced impacts from livestock grazing, our BO on the action still anticipated take from implementation of continued grazing on the allotment. Impacts from the Bar-T-Bar allotment are low because livestock have rare/infrequent access to East Clear Creek (Jerry Gonzales pers. comm. 2003), the allotment does not include headwater meadows, and soil and watershed conditions are predominantly satisfactory. Fence construction eliminated livestock access to critical and suitable habitat within the Hackberry/Pivot Rock Allotment.

Permanent flowing water is a primary constituent element of critical habitat for the Little Colorado spinedace. Therefore, water currently being withdrawn from the area, and potentially lost to the watershed, will affect habitat for the species. Currently, there are several projects either on-going or planned that divert water from this watershed. The improvement list for the Buck Springs Allotment includes 115 tanks, 29 borrow pits, 17 springs, and 10 backhoe springs. There are also two reservoirs located within the project area (C.C. Cragin and Knoll Lake reservoirs). Currently, water from C.C. Cragin Reservoir is pumped into the East Verde River. Livestock tanks, reservoirs, and water rights all have the potential to reduce the quality of habitat for the spinedace. In addition, the C.C. Cragin Reservoir, Knoll Lake Reservoir, and ongoing water rights adjudication procedures all have the potential to affect spinedace habitat and critical habitat within the project area. These procedures may ultimately mean less water would be available for the Little Colorado spinedace within the East Clear Creek watershed, and habitat destruction from impoundment and de-watering of East Clear Creek will continue to impact the environmental baseline of this species.

A number of the upcoming WUI projects on the ASNF were consulted on under the 2001 Programmatic BO and in recent consultations (AESO/SE 02-21-05-F-0640 and 02-21-05-F-0385). Treatments include thinning and treatment of created and existing fuels on the ground using various methods (e.g., pile and burn, broadcast burning, chipping, removal, and re-occurring maintenance burns or fire use). Areas that cannot be treated mechanically (e.g., steep slopes) will receive low-intensity prescribed burning. These treatments will contribute sediment and ash inflow from prescribed fire and mechanical treatments to suitable Little Colorado spinedace habitat.

Within the perennial sections of Boneyard Creek, adjacent grassland/meadows do not have adequate ground cover to be considered high-quality buffers for minimizing suspended sediment inputs within the creek. These conditions may be due to the numerous roads, road crossings, past timber harvests, and Datil soils within the upper reaches.

The Arizona Department of Transportation (ADOT) plans to treat noxious plants (herbaceous and woody) and hazardous vegetation in the right-of-way along US Highway 180/191 utilizing herbicides. Treatments are scheduled along the highways (180/191) from the community of Nutrioso north to the Forest boundary, which encompasses 13.9 miles within the project area (7.7 miles within private land). However, herbicide application will be an ongoing treatment year to year. Other ongoing ADOT actions include the use of chemical de-icer on the highways

during winter and early spring months.

Ongoing livestock grazing on the national forest has been consulted on and is being implemented within the action area, and similar grazing is occurring on the private lands within the covered area. Based on recent Allotment Management Plan (AMP) analyses, range and soil conditions overall across these allotments are generally unsatisfactory relative to ASNF's standards. However, AMP decisions have included a number of measures to limit impacts to Little Colorado spinedace and their habitats. The livestock grazing exclusions applied within the Nutrioso WUI will limit impacts to spinedace within the Alpine Ranger District and Rudd Creek (and associated tributaries).

Loach Minnow

A. Status of the Species within the Action Area

Within the action area, the loach minnow is generally rare to uncommon where it is found in the following areas: limited reaches of the White River (Gila County) and the North and East forks of the White River (Navajo County); Three Forks area of the Black River; throughout the Blue River; Campbell Blue Creek; sporadically in Eagle Creek; and in the San Francisco River between Clifton and the New Mexico border (Greenlee County) (Marsh et al. 1990; Velasco 1994; Bagley et al. 1995, 1996).

Our information indicates that, rangewide, approximately 250 consultations have been completed or are underway for actions affecting loach minnow. The majority of these opinions concerned the effects of grazing, but also covered roads, bridges, and agency planning efforts. Approximately one third of the total consultations dealt with a variety of projects such as timber harvest, fire, flooding, recreation, realty, animal stocking, water development, recovery, and water quality issues.

Within the action area, critical habitat has been proposed for all of Complex 2 – Black River and its tributaries; and the Arizona portion of Complex 4 – San Francisco and Blue Rivers, Campbell Blue Creek, and Eagle Creek - excluding the portions on the San Carlos Indian Reservation (70 FR 75546).

B. Factors Affecting the Species' Environment in the Action Area

Loach minnow populations continue to decline in many areas in Arizona. Loach minnow have been extirpated from the Verde River, those portions of the Gila River in Arizona, the San Pedro River, and presumably Tonto Creek. More recently, populations in the North Fork East Fork Black River appear to have declined. Loach minnow have not been located in Eagle Creek since 1997.

Threats to these species within the action area include streamflow depletion from drought, riparian and stream habitat alteration, loss of instream cover, and non-native fish competition and predation. In addition, wildfires are most likely having impacts where the species occurs, particularly because the species is restricted to small streams. As stated in the Recovery Plan,

major threats to this species include dams, water diversion, watershed deterioration, channelization, and introduction of non-native predatory and competitive fishes. During the last century, both the distribution and abundance of the loach minnow have been greatly reduced throughout the species' range (Propst et al. 1988). Both historical and present landscapes surrounding loach minnow habitats have been impacted to varying degrees by domestic livestock grazing, mining, agriculture, timber harvest, recreation, development, or impoundments (Hendrickson and Minckley 1984, Belsky et al. 1999). These activities degrade loach minnow habitats by altering flow regimes, increasing watershed and channel erosion and thus sedimentation, and adding contaminants to streams and rivers (Belsky et al. 1999). As a result, these activities may affect loach minnow through direct mortality, interference with reproduction, and reduction of invertebrate food supplies.

Razorback Sucker

A. Status of the Species within the Action Area

The historical distribution of razorback sucker within the action area may have included the San Francisco River and portions of the lower Salt River, Verde River, and Tonto Creek (Bestgen 1990, Hubbs and Miller 1953, Kirsch 1889, Minckley 1973). Even though several reestablishment efforts have been attempted over the years, these efforts seem to have been unsuccessful (USFWS 1998b).

Some report that the razorback sucker is likely to have been extirpated from the Gila River despite massive reestablishment efforts from 1981-1990 (R. Clarkson, P. Marsh, J. Stefferud, and S. Stefferud, pers. comm.). Small numbers of released razorback suckers may survive in the Gila River and Bonita and Eagle creeks. Fish may have also moved upstream into the San Francisco River. The BLM reported a large razorback sucker found in Bonita Creek in 1991. Fishes occurring at exceedingly low abundance are difficult to detect (Marsh et al. 2003). Given this uncertainty, there is a small possibility that razorback suckers may occur intermittently and in small numbers in the project area up the San Francisco River or Eagle Creek.

The razorback sucker was historically found in the Verde River at least as far upstream as Perkinsville (Minckley and Alger 1968). Due to habitat alterations and spread of non-native species, razorback suckers were extirpated from the Verde River, with the last record at Peck's Lake in 1954 (Wagner 1954, Minckley 1973). Beginning in 1981 and continuing through the 1990s, razorback suckers have been reestablished into the upper Verde River. Predation from non-native species was believed to be a major cause of mortality from the initial stockings. This was later managed by placing larger fish, less susceptible to predation, in the river. Monitoring studies have shown that reestablished razorback suckers in the Verde River use pools, runs, and backwaters, with some use of eddies (Creef et. al 1992, Hendrickson 1993).

Designated critical habitat for razorback sucker in the action area includes a portion of the Verde and the Salt rivers. Along the Verde River, the action area includes designated critical habitat from about Camp Verde to approximately five miles downstream from the confluence with the East Verde River (Yavapai County), where the Verde River drops below the minimum elevation for Chiricahua leopard frog. Along the Salt River, Critical habitat within the action area is

located downstream from the US Highway 60/ State Route 77 bridge to approximately the confluence with Cherry Creek (Gila County), where the Verde River drops below the minimum elevation for Chiricahua leopard frog.

B. Factors Affecting the Species' Environment in the Action Area

The quality and quantity of suitable aquatic habitat for threatened and endangered fish in the action area has been affected through numerous past actions resulting in reduction of riparian habitat, altered species composition, increased presence of exotic fish, decreased surface water availability, changes in stream morphology, and other factors. A significant portion of the adverse impacts to the aquatic and riparian ecosystem come from the additive effect of small actions that individually may not threaten the system, but cumulatively result in continuing deterioration of the ecosystem.

River channels have been modified by removal or use of riparian vegetation, flood control, construction of diversion dams, roads and bridges, gravel mining, and agricultural/suburban development of the floodplain. Additionally, various non-native fish have been and continue to be introduced into these river systems that adversely affect threatened and endangered and other native fish through predation and competition (Marsh and Brooks 1989, Minckley et al. 1991, Hendrickson 1993, Rinne 1999)

Human disturbances of the watershed, floodplain, and stream channel change many of the factors determining channel configuration. Increased sediment off the watershed is a common result of human actions and sediment is a major determinant of channel shape (Leopold 1997). When the dynamic equilibrium has been disrupted, the channel begins a process of adjustment as it attempts to restore a dimension, pattern, and profile that are consistent with controlling hydraulic variables (Rosgen 1996). These adjustments may lead to dramatic changes in the stream channel width, depth, and geometry that encroach on human activities, such as has occurred on the Verde River. As human activities are affected, additional flood control and channelization measures may occur, which exacerbate the problems in adjacent areas (Pearthree and Baker 1987), and the channel will continue to become increasingly unstable.

Flood control, channelization, and bank-stabilization efforts usually take one of several forms: dikes, riprap, soil-cement, Kellner Jacks and/or gabions parallel to the channel; check dams across the channel; removal of woody debris from the channel and floodplain; and rerouting the channel. More rudimentary forms of bank stabilization can be found when old vehicles or other large objects are found stacked along a river bank. Removing trees, logs, and other woody debris from stream channels is a common form of flood control practiced by landowners and is seldom documented. Woody debris is very important in stream function and fish habitat (Minckley and Rinne 1985, Debano et al. 1996).

Sonora Chub

A. Status of the Species within the Action Area

The Arizona portion of the status of species section above describes the status of the species in the action area. Most of this is on Federal land, but there are some private inholdings in California Gulch and Sycamore Canyon that may have water during a portion of the year. In addition, the Sonora chub in Sycamore Canyon currently co-exist with Chiricahua leopard frogs.

Designated critical habitat is completely contained within the action area, but critical habitat is designated only on Federal land. Therefore, no critical habitat for the Sonora chub is within the covered area of the Agreement.

B. Factors Affecting the Species' Environment in the Action Area

The action area includes the entire range of the Sonora chub in Arizona, and therefore all the factors listed in the recovery plan (1992) as threats still apply within the action area. These may include: nonnative predators and competitors, disruption of metapopulation dynamics, poorly managed livestock grazing, degradation of water quality, degradation of cover vegetation, degraded watershed conditions, disease and parasite infestations, wildfires and fire suppression activities, drought, global climate change, pesticide drift and run off, and groundwater pumping. A complete discussion of the factors affecting Sonora chub in the action area is included in the Programmatic Biological and Conference Opinion on the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (USFWS 2005) and the Sonora Chub Recovery Plan (USFWS 1992).

Sonora Tiger Salamander

A. Status of the Species within the Action Area

Sonora tiger salamander status in the action area includes the entire Arizona distribution of the subspecies. The status of the Sonora tiger salamander in the action area is the same as that for Arizona described above. The San Rafael Valley includes a mixture of private, State Trust, and Federal lands. The Sonora tiger salamander co-exists with the Chiricahua leopard frog in this area.

B. Factors Affecting the Species Environment in the Action Area

Factors affecting the salamander in the action area are the same as those affecting the species throughout its range in the SRV (described in the Status of the Species). These include predation by introduced species and disease; introduction, spread, and introgression of barred tiger salamanders; drought and floods; the dynamic nature of small populations; and habitat degradation and loss. Drought is of particular concern; tanks can dry before the monsoons begin in July. If salamanders are present, aquatic forms could be eliminated.

Spikedace

A. Status of the Species within the Action Area

Within the action area, the spikedace is generally rare to uncommon where it is found in portions of Eagle Creek, the San Francisco River, and the Upper Verde River (Marsh et al. 1990; Velasco 1994; Bagley et al. 1995, 1996). The portion of the Verde River within the action area is the reach between Camp Verde to the confluence with the East Verde River. Within the action area, critical habitat has been proposed for the Arizona portion of Complex 1 – Verde River – from the confluence with Fossil Creek upstream to approximately Camp Verde; and all of Complex 4 – Eagle Creek - excluding the portions on the San Carlos Indian Reservation (70 FR 75546).

B. Factors Affecting the Species' Environment in the Action Area

The quality and quantity of suitable aquatic habitat for threatened and endangered fish in the action area has been affected through numerous past actions resulting in reduction of riparian habitat, altered species composition, increased presence of exotic fish, decreased surface water availability, changes in stream morphology, and other factors. A significant portion of the adverse impacts to the aquatic and riparian ecosystem come from the additive effect of small actions that individually may not threaten the system, but cumulatively result in continuing deterioration of the ecosystem.

The distribution and numbers of the spikedace have been severely reduced by habitat destruction due to damming and channel alteration, riparian destruction, channel downcutting, water diversion, and groundwater pumping (51 FR 23769). The listing rule also stated that survival of the species is threatened by the introduction and spread of exotic predatory and competitive aquatic species (51 FR 23769). Currently, habitat destruction and competition and predation from introduced non-native fish are the primary causes of the species' decline (Miller 1961, Williams et al. 1985, Douglas et al. 1994). These threats are common to many of the listed fish and are detailed above under the loach minnow and razorback sucker.

Stephan's Riffle Beetle

A. Status of the Species within the Action Area

The entire range of the species is within the action area of the Agreement, but is outside the covered area. All current threats are therefore part of the environmental baseline.

B. Factors Affecting the Species Environment in the Action Area

Factors affecting the Stephan's riffle beetle within the action area are the same as discussed under the Status of Species section above.

Three Forks Springsnail

A. Status of the Species within the Action Area

The entire range of the Three Forks springsnail is within the action area on the Apache-Sitgreaves NF, but is outside the covered area (non-Federal lands). Past and current surveys have shown springsnails to be more abundant at Boneyard Bog Springs than at Three Forks Springs. Recently, the populations of springsnails known from the Three Forks Springs complex

have declined. Chiricahua leopard frogs are also known to occupy this same spring complex (AESO/SE 02-22-03-F-0366).

B. Factors Affecting the Species' Environment in the Action Area

Non-native crayfish have invaded several spring heads within the Three Forks Springs complex. In May 2000, field investigations at Three Forks Springs revealed the Three Forks springsnail to be entirely absent from at least two boxed spring heads, where they were previously abundant. The extirpation of the species from these spring boxes seems to coincide with the invasion of crayfish. The indirect effects of crayfish on the integrity and structure of aquatic habitats are well documented and have the potential to threaten the habitat of Three Forks springsnails (Olsen et al. 1991, Biota Information System of New Mexico 2000). Also, springsnails are directly threatened by the crayfish predation. Crayfish do not occur in large numbers at Boneyard Springs.

Presently, livestock grazing is restricted from the Three Forks and Boneyard Bog Springs complexes. However, since the summers of 1999 and 2000, potential impacts of elk at Boneyard Bog Springs have become a concern for Forest Service and FWS biologists. Observations of elk within the Boneyard Bog Springs complex correlate with elk wallows, heavy grazing, and soil disturbance within the livestock exclosure. Elk impacts at the Three Forks Springs complex appear to be less damaging to riparian and aquatic habitats than those at Boneyard Bog Springs.

The North Forks/East Fork of the Black River watershed is a popular area for public recreation such as fishing, hiking, hunting, and wildlife viewing. Recreational activities have the potential to affect populations of Three Forks springsnails, particularly at the Three Forks Springs complex. This complex lies adjacent to Forest Service Road 249, and a large vehicle "pull off". The aesthetics of the area, in conjunction with such access roads, make the area well suited for recreationists (USFS 2004). To minimize the negative effects of recreation, the Apache-Sitgreaves NF closed the Three Forks Springs area to public access in 2000. Boneyard Bog Springs is less susceptible to recreational threats due to its isolation and restricted access.

Yaqui Fish

A. Status of the Species within the Action Area

The distribution of the Yaqui fish in the action area is limited to the San Bernardino watershed. The SBNWR currently contains all four species: beautiful shiner, Yaqui catfish, Yaqui chub, and Yaqui topminnow. Yaqui chub are also in Leslie Creek on the Leslie Creek National Wildlife Refuge (LCNWR). Outside of the SBNWR and LCNWR, Yaqui topminnow and chub occasionally disperse during high water to Astin Spring on the Malpai Ranch, but this is occupied ephemerally. Yaqui catfish, chub, and topminnow are in House Pond on the Slaughter Ranch which is under a conservation easement held by the SBNWR. In west Turkey Creek, Yaqui catfish and chub were introduced on the El Coronado Ranch. The sites occupied by all these species, except West Turkey Creek, are also occupied by Chiricahua leopard frogs.

Diseased native fishes (including Yaqui topminnow, Yaqui chub, and/or longfin dace) were found in over half of the native fish populations surveyed, including the North Fork Enclosure. The House Pond population at the Slaughter Ranch had the highest percentage of native fish (18 percent) infected with trematodes that cause black grub (the appearances of black spots in the skin of fishes), and Leslie Creek had the highest percentage of fish (27 percent) infected with yellow grub caused by the trematode, *Clinostomum marginatum*.

All units of designated critical habitat for beautiful shiner, Yaqui catfish and Yaqui chub are included in the action area; but as they are all on Federal lands, no critical habitat for these species is within the covered area.

B. Factors Affecting the Species' Environment in the Action Area

The populations of Río Yaqui fishes are very small and isolated, making them vulnerable to stochastic environmental events such as drought and floods. A significant potential threat to the populations is illegal introduction of non-native predators and competitors to these ponds. The effects of increased illegal immigration and Border Patrol activities likely have little impact on the Río Yaqui fish populations, because the ponds in which they occur are relatively large and the potential for impacts from immigrants drinking or walking in the water are insignificant. The use of these ponds for bathing and personal hygiene may result in some decrease in water quality, but effects of this type have not been studied or documented.

Activities on surrounding lands that lower the groundwater level and cause decreased water flow from springs on San Bernardino NWR would adversely impact the species and critical habitat. Such activities include, but are not limited to, pumping of groundwater for agricultural purposes and drilling activities associated with geothermal exploration. Any activity that would significantly alter the water chemistry of springs on San Bernardino NWR could adversely impact the critical habitat. Such activities include, but are not limited to, release of chemical or biological pollutants into surface or underground waters at a point source or by dispersal release. In 2003, development of extensive pistachio (*Pistacia* spp.) orchards occurred in Sonora, south of San Bernardino NWR. Water use in these agricultural developments may threaten wetlands and fish habitat on the Refuge (USFWS 2004c).

Prior section 7 consultations with Federal agencies have influenced the environmental baseline within and in close proximity to the action area. There have been eleven formal consultations involving Yaqui chub and Yaqui topminnow since 1991. These consultations included spring restoration, livestock grazing, fire management planning, habitat renovation and reestablishment of these fishes, and changes to the Arizona Water Quality Standards. The consultations involving livestock grazing and fire-management each included measures to reduce adverse effects and minimize take of Yaqui topminnow and resulted in non-jeopardy determinations. Several actions have also resulted in meaningful improvements in the environmental baseline of the respective Yaqui fishes. In particular, the Coronado National Forest's 1999 West Turkey Creek Native Fish Habitat Renovation Project (AESO/SE 02-21-99-F-0130) and the San Bernardino and Leslie Canyon NWRs' 2003 Tule Spring Restoration (AESO/SE 02-21-03-F-0261) improved and expanded habitat for these species and, thus, contributed to recovery.

Additionally, a Habitat Conservation Plan (HCP) is currently being developed for the private lands surrounding San Bernardino NWR. A working group consisting of representatives from Federal (including the Refuges) and state agencies and the Malpai Borderlands Group have been developing guidelines for activities in the Malpai area. One of these activities is prescribed fire. The goal of using prescribed fire in the HCP is similar to that of the Refuges: to return fire as an integral, natural process on the landscape encompassed by the Malpai borderlands. To minimize the effects of fire on aquatic species within the Malpai area, the working group has developed guidelines for prescribed fire that are based on watersheds, in which no more than 25 percent of any one watershed will be burned within a one-year period, and no more than 50 percent of any one watershed will be burned within a five-year period. Additionally, an area may not be burned more frequently than once in 5 years.

RIPARIAN SPECIES

Canelo Hills Ladies' tresses

A. Status of the Species within the Action Area

The entire range of this species is within the action area; thus, the status of the species in the action area is the same as described in the Status of Species section above.

B. Factors Affecting the Species' Environment in the Action Area

Conservation of the species is considered and managed for at the two sites on Nature Conservancy property and the Coronado National Forest. The three populations on private lands have very little protection from the Endangered Species Act or State law.

The populations of Canelo Hills Ladies' tresses in the action area are small and localized, making them vulnerable to stochastic environmental events such as drought, floods, and fire. Fires have become more common in recent years as the current drought cycle continues. Catastrophic fires can increase run-off and sedimentation, which bury plants and change the soil chemistry down slope. Trampling impacts can occur from illegal immigrant camps near water sources, and Border Patrol activities may also result in localized loss of plants and habitat damage. The same type of impact can occur from recreation in these areas, but these impacts are typically smaller and more limited in time. Livestock grazing, if not managed properly, can impact ciénega plants like Canelo Hills Ladies' tresses, especially if grazing occurs during the growing season.

Huachuca Water Umbel

A. Status of the Species within the Action Area

The entire current range of Huachuca water umbel as described above in the Status of the Species is included within the action area. While most of the occupied Huachuca water umbel habitat is on federally-owned lands and not within the covered area of the Agreement, there may be impacts that occur downstream from covered properties.

All the designated critical habitat units for Huachuca water umbel are within the action area: Unit 1: portion of Sonoita Creek (Santa Cruz County), Unit 2: portion of the upper Santa Cruz River (Santa Cruz County), Unit 3: portion of Scotia Canyon (Cochise County), Unit 4: portion of Sunnyside Canyon (Cochise County), Unit 5: portion of Garden Canyon (Cochise County), Unit 6: portions of Bear, an unnamed tributary of Bear Canyon, Lone Mountain Canyon, and Rattlesnake Canyon (Cochise County), and Unit 7: portions of the San Pedro River (Cochise County). Only critical habitat units 1, 2, and portions of 3, 6, and 7 are designated on non-Federal lands and are within the covered area.

B. Factors Affecting the Species' Environment in the Action Area

Limited numbers of populations and the small size of populations make the Huachuca water umbel vulnerable to extinction as a result of stochastic events that are often exacerbated by habitat disturbance. For instance, the restriction of this taxon to a relatively small area in southeastern Arizona and adjacent Sonora increases the chance that a single environmental catastrophe, such as a severe tropical storm or drought, could eliminate populations or cause extinction. In addition, populations are almost always isolated, which makes the chance of natural recolonization after extirpation less likely. Small populations are also subject to demographic and genetic stochasticity, which increases the probability of population extirpation (Wilcox and Murphy 1985, Shafer 1990).

A suite of non-native plant species has invaded wetland habitats in southern Arizona (Stromberg and Chew 1997), including those occupied by the Huachuca water umbel (Arizona Department of Water Resources 1994). In some cases, their effect on the Huachuca water umbel is unclear. On SBNWR, reestablished Huachuca water umbel patches in managed wetland ponds were all quickly outcompeted and essentially eliminated by other wetland species. Huachuca water umbel seems to do best along the stream courses where flooding and scouring periodically remove competing vegetation while the Huachuca water umbel persists due to its rhizomes. Bermuda grass (*Cynodon dactylon*) grows at SBNWR and outcompetes Huachuca water umbel, but does not appear to be a problem at Leslie Canyon NWR. Watercress is another non-native plant now abundant along perennial streams in Arizona. Huachuca water umbel grows together with watercress at Leslie Canyon, but watercress does not appear to stress the Huachuca water umbel.

Previous Federal actions that have been consulted on in the action area include those listed in the Status of Species section above.

Southwestern Willow Flycatcher

A. Status of the Species within the Action Area

Southwestern willow flycatchers in the action area are known to breed along portions of the Verde River (Yavapai County), upper reaches of the Little Colorado River watershed (Apache County), portions of the San Francisco River (Apache and Greenlee Counties), portions of the Salt River (Gila County), Tonto Creek (Gila County), and the portions of the San Pedro River in

the San Pedro Riparian National Conservation Area (Cochise County). Historical breeding sites within the action area include Babocomari River and Sonoita Creek. A complete description of all monitored sites is available in the Arizona Game and Fish Department's Southwestern Willow Flycatcher 2005 Survey and Nesting Monitoring Report (English et al. 2005, available at http://www.usgs.nau.edu/swwf/reports.htm), the contents of which are incorporated herein by reference.

Migrant southwestern willow flycatcher habitat is not well understood, but has been recorded on major southwestern river drainages. Migrant birds have been detected in riparian ecosystems both suitable and unsuitable for nesting and may occur in non-riparian areas. Such migration stopover areas are critically important resources affecting productivity and survival (USFWS 2002c).

Critical habitat for the southwestern willow flycatcher within the action area in Arizona includes all of the Little Colorado Management Unit (MU), portions of the Roosevelt MU - the upper ½ of Tonto Creek and upstream tip of the Salt River at Cherry Creek sections, and portions of the Verde River MU – a section of the upper segment along the Verde River south of Camp Verde and a section of the middle segment that includes few miles of the Verde River downstream of the East Verde River Confluence. Non-federally owned lands are found along the Little Colorado River MU, along and upstream from the section of the Roosevelt MU, and along the section in the action area just south of Camp Verde. These non-federally-owned lands are within the covered area of the Agreement.

B. Factors Affecting the Species' Environment in the Action Area

Information regarding the status of southwestern willow flycatchers on non-Federal lands (including tribal lands) within the action area is not well documented, unless active nest monitoring is occurring or a Federal action has occurred in the area. It is assumed that threats to southwestern willow flycatchers are similar on non-Federal lands to those that occur on Federal lands, though the non-Federal activities are implemented without the protections and enhancements that occur through the section 7 consultation process. Therefore, habitat disturbances from dams, reservoir operations, water diversions, ground water pumping, channelization, bank stabilization, phreatophyte control, livestock grazing, recreation, fire, agricultural development, urbanization, and exotic species are as described in the Plan (USFWS 2002c).

Within the Action area, section 7 consultations have been conducted on ongoing grazing activities (AESO/SE 02-21-04-F-0355), land use management plans (02-22-03-F-0366), bridges (AESO/SE 02-21-97-F-0229 R1 and 02-21-03-M-0207), fire management (AESO/SE 02-21-05-F-0582 and 02-21-03-F-0210), recovery and research activities (AESO/SE 02-21-05-F-0331), and reservoir operations (AESO/SE 02-02-04-F-0001 and 02-21-04-F-0077). Through these consultations there has been a general reduction in effects of these activities on the southwestern willow flycatcher and its habitat. In addition, several gains have been made in improving hydrological function of stream and river systems.

Western Yellow-billed Cuckoo

A. Status of the Species within the Action Area

In Arizona, the western yellow-billed cuckoo occurs on the Apache-Sitgreaves, Coconino, Coronado, Prescott, and Tonto NFs. Surveys performed throughout Arizona in 1998 and 1999 by the AGFD and the U.S. Geological Survey Colorado Plateau Field Station allow cuckoo abundance to be extracted from major drainages occurring on National Forest System lands (USFS 2004:228). The surveys performed in 1998 and 1999 were conducted mostly on public lands, but some information was reported from private lands. Western yellow-billed cuckoos were most abundant in the Agua Fria, Verde, Hassayampa, and Altar Valley River systems (Corman and Magill 2000). Corman (2005) reported that western yellow-billed cuckoos were encountered by survey crews and individuals conducting breeding bird atlas surveys in central and southeastern Arizona perennial drainages below 1,524 m (5,000 ft) elevation. This would include the Verde, Salt, San Pedro, and Santa Cruz rivers. A few pairs nested near Springerville, along the Little Colorado River, at 2,118 m (6,950 ft) elevation. They are likely to be found in appropriate habitat within the action area, including in the Agreement's covered area. The declines seen in the action area are related to the impacts occurring to the riparian vegetation they use for nesting habitat.

B. Factors Affecting the Species' Environment in the Action Area

Loss of riparian habitat occurring through river-flow management, stream channelization and stabilization, and livestock grazing is the primary threat to the cuckoo. Activities that directly affect riparian areas are water diversions and withdrawals, recreation, livestock grazing, fuels reduction, and enhancements of habitat and watershed condition. Diversions and water authorizations also contribute to the loss of cuckoo populations within the action area. Grazing continues to have direct effects on cuckoo habitat and indirect upland effects. Due to the invasion of riparian habitats by exotic plant species, the southwest is experiencing considerable changes to the dynamics of its riparian ecosystems. Therefore, invasive plants will have direct effects on cuckoo habitat. Human-induced destruction of available cuckoo habitat occurring in the action area remains prevalent, with recreational activities directly affecting riparian conditions. Off-highway vehicle use can destroy riparian habitats, and can degrade watershed condition in upland habitats.

UPLAND SPECIES

Cochise Pincushion Cactus

A. Status of the Species within the Action Area

The entire range of this species within the United States is within the action area, and the status of the species in the action area is the same as described in the Status of Species section above.

B. Factors Affecting the Species' Environment in the Action Area

There have been no developments or other activities in the areas that support Cochise pincushion cactus. Livestock grazing, associated with the State grazing permit, is the only activity that is currently on-going in the action area. There have been no direct effects on the plants from the livestock grazing activities, and the rancher is aware of the plant and its status. The decline in the species' number in the monitoring plots seems to be associated with regional rainfall patterns, rather than on-going activities in the area. Little impact has been seen from illegal immigration and border security work. However, the potential for damage due to large-scale foot and vehicular traffic related to illegal immigration and interdiction does exist.

Pima Pineapple Cactus

A. Status of the Species within the Action Area

It is difficult to accurately describe the current status of the species within the action area because of the difficulties in tracking the status of the species in general due to the dispersed distribution, differing land ownerships, differential survey efforts, and the lack of a Federal nexus on projects that would result in more thorough project reviews. In addition, in many of the areas that surveys were previously conducted, those plants, and their habitat, have since been destroyed during construction of commercial and residential developments and their associated infrastructure. The area of overlap in habitat of Pima pineapple cactus and Chiricahua leopard frog is at the upper end of the cactus' elevation range, from approximately 3,250 to 3,800 ft; and within this area it is reasonable to assume the cactus will be present.

B. Factors Affecting the Species' Environment in the Action Area

Dispersed, patchy clusters of individual Pima pineapple cactus are becoming increasingly isolated as a result of current land-management practices, increased recreational use in habitat that is adjacent to urban areas, and the continuing aggressive spread of non-native grasses. Also, the illegal collection of Pima pineapple cactus has been documented on several occasions throughout the range of the species. Hobbyists and commercial collectors are the two groups most likely to collect this species (58 FR 49875).

Improper livestock grazing during the mid-to-late 1800s and continuing improper livestock-grazing practices may have significantly altered the ecosystem. Effects of improper livestock grazing include: erosion, changes in hydrology and microclimate, invasion of weedy exotic plant species, and shifts in density, relative abundance, and vigor of native species (58 FR 49875). Also, some modern range-management practices, such as imprinting, chaining, and ripping can directly damage or destroy plants, as well as reduce the shrub component of the plant community.

The seeding of non-native grasses, predominately Lehman lovegrass (*Eragrostis lehmanniana*), usually follows mechanical manipulation. This aggressive exotic species is introduced to provide cattle forage and soil stabilization. The exotic Mediterranean grass (*Schismus barbatus*) is also common in Sonoran desert-scrub grassland transition habitats. Mediterranean grass contributes dense, fine fuels that are readily flammable and carries fires in fire-intolerant habitat. Thus, the invasion of exotic plant species alters the fire regime, resulting in the destruction of

Pima pineapple cactus by fire (USFS 2004). Under these altered community conditions, the elimination of grazing may do more damage than its presence. Although trampled plants have been seen in grazed areas, grazing removes much of the grass that is competing for space, water, and nutrients, and removes the standing dead grass thus reducing the fire hazard (58 FR 49875).

Off-road vehicle use can cause problems for Pima pineapple cactus. The cacti are small and can be covered by grass, making them difficult to see. Cacti occur in relatively flat areas that are very popular for off-road vehicle use. This results in loss of individuals and disturbance of soils that may support Pima pineapple cactus. While most land-management agencies do not authorize this activity, it is hard to control due to the widespread nature of off-road vehicle use.

EFFECTS OF THE ACTION

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

Direct and Indirect Effects

The proposed action is the issuance of a section 10(a)(1)(A) Enhancement of Survival Permit to AGFD for the incidental take of the threatened Chiricahua leopard frog in association with the implementation of their Safe Harbor Agreement for the Chiricahua Leopard Frog in Arizona. No direct effects are expected from the issuance of the permit on any listed species. Indirect effects of this action will be from the implementation of the Agreement. Because of the scope of this action and the similarity of effects on similar groups of species, this section is organized, for the most part, according to guilds of species: Chiricahua leopard frog, Aquatic species, Riparian species, and Upland species. The Chiricahua leopard frog is analyzed separately because it is the species covered in the Agreement and the one likely to be affected the most. Effects unique to specific species within a guild will be discussed specifically, and the effects to designated critical habitat will be discussed separately.

CHIRICAHUA LEOPARD FROG

The normal operation and maintenance of livestock tanks are currently exempt from the section 9 prohibitions of take under the section 4(d) rule published as part of the final listing for Chiricahua leopard frog (67 FR 40790). These activities include the use of tanks by livestock, occasional dredging of tanks, repair of berms, and other maintenance, and are consistent with the effects of management and construction, respectively. Coverage of these activities in this document is to address the possibility of a future reclassification of the frog to endangered status or other events causing the 4(d) rule to be vacated. The amount of take from these sources will be minimized through the required conservation measures identified in the Agreement for all participants.

Management:

The potential changes in land management practices that are part of the proposed action are to improve Chiricahua leopard frog habitat quality and complexity, and reduce the amount of disturbance to frogs and their habitat. These changes are primarily directed toward the management of livestock, but other types of land-use practices, e.g., agriculture and forestry, could also be modified to improve upland and riparian vegetation. Changes in livestock management are not necessarily required under the agreement, but may include such actions as reducing the number of livestock or the number of days they would be present in an occupied site. It is anticipated that there would still be loss of egg masses, tadpoles, metamorphs, and adults from disturbance and crushing by livestock and siltation from eroding uplands. However, proposed changes in livestock management would likely reduce the current mortality of eggs, tadpoles, metamorphs, and adults through regulating cattle numbers and movements during critical time periods, excluding portions of aquatic sites from cattle access, providing additional shoreline vegetation, and/or the capturing and holding of frogs during activities that could result in incidental take of Chiricahua leopard frogs.

Construction:

The construction activities that are proposed as part of the Agreement are those that would either improve Chiricahua leopard frog habitat quality and persistence, or reduce direct effects of other land uses on this species. Construction of new livestock tanks, water wells, and pipelines typically do not occur within existing habitat for Chiricahua leopard frogs, so any negative effects are expected to be minimal. Construction of fences, pipelines, and modification to or maintenance of existing livestock tanks could result in impacts to Chiricahua leopard frogs (if present) from crushing individuals under heavy equipment, inadvertent burying of individuals while moving soil, and increased siltation in adjacent aquatic sites. However, long-term effects of these activities are anticipated to be beneficial by improving the number, quality, and persistence of aquatic sites. The long-term beneficial effects would out weigh the short-term negative effects.

Nonnative Species Control:

The presence of nonnative predators and competitors exclude Chiricahua leopard frogs, as well as many other native species, from otherwise suitable aquatic sites. The process of removing these nonnative species can result in short-term unavailability of aquatic sites for use by Chiricahua leopard frogs through fencing, draining, or the use of EPA-approved piscicides. These activities are typically done during the drier portions of the year when dispersal is less likely to occur. Chiricahua leopard frogs occupying a site to be renovated will be salvaged under this Agreement and reestablished into the same site once the piscicide is neutralized or the tank is refilled. These renovations, however, may result in the direct mortality of eggs, tadpoles, metamorphs, and adult Chiricahua leopard frogs that may be accidentally killed in the process. However, the long-term effects of these actions will be to make these sites available for natural colonization or the active reestablishment of Chiricahua leopard frog population sites, and would be overall beneficial to the species.

Reestablishment & Monitoring:

The capture, translocation, disease testing and treatment, release of Chiricahua leopard frogs at a reestablishment site, and the subsequent monitoring are covered under a section 10(a)(1)(A) Research and Recovery Permit held by AGFD, the USFWS, or their designated agents that will carry out these activities. The effects of those activities are analyzed under a separate process and not further evaluated herein.

Individuals translocated to new sites will be released primarily within the same metapopulation identified within the Agreement. While the source location may be directly impacted by the loss of individuals, the new population sites within the metapopulation will provide additional localities from which frogs may emigrate to extirpated sites within the metapopulation. It is anticipated that a reduction in competition among remaining individuals in a population would result in increased reproduction and survival rates. A similar effect is expected in the new population site where frogs are released. An overall increase in the number of population sites within a metapopulation should improve the stability of the metapopulation.

Reestablishing population sites within the historical range of the Chiricahua leopard frog increases the number of sites within each metapopulation, which will help improve the stability and persistence of the affected metapopulations. Due to the sporadic nature of precipitation in the desert southwest, the more population sites within a metapopulation the more likely a number of them will receive rain and remain occupied. In this way, there is an increased chance of recolonization of population sites that become extirpated due to drought or other reasons. This increases the probability that the metapopulation will persist through time and meet recovery objectives for the number of metapopulations and their persistence in Arizona (USFWS 2006).

While not functioning as part of metapopulations, the reestablishment of isolated refugia populations is important in each of the Recovery Units. These isolated population sites are to be refugia for the local gene pools in a Recovery Unit and the source of individuals to reestablish functioning metapopulations should disease or other catastrophic factors result in the extirpation or reduction of metapopulations within the Recovery Unit (USFWS 2006).

The reestablishment of Chiricahua leopard frogs may indirectly result in mortality from native and nonnative predators feeding on Chiricahua leopard frogs at the reestablishment site or at sites the Chiricahua leopard frogs disperse to, and from unsuccessful attempts at dispersal. While such predation may result in the loss of individuals, the effect of these sources of mortality and morbidity are well within the population dynamics of this species. Chiricahua leopard frog life history is characterized by high reproductive output and high rates of egg and immature frog mortality (USFWS 2006). Therefore, normal population dynamics would include these types of mortality and would typically replace lost individuals during the next breeding season. The long-term impacts of these losses would be negligible on the population site, metapopulation, or at the species level.

Return to Baseline Condition:

The proposed action provides for participants to return enrolled properties to baseline condition. This provision has the potential to impact all reestablished population sites and any habitat created through this Agreement. It will not affect those population sites or habitats that are developed during the term of the Agreement on Federal lands or non-Federal lands that are not enrolled under the Agreement. Furthermore, any population site or habitat that is part of the baseline condition of an enrolled property will not be affected. In addition, it is expected that not all landowners enrolled in the Agreement will return their property to the baseline condition.

The Agreement provides for the salvage of frogs from all sites being returned to baseline condition, so while individuals will be lost, not all gains from the conservation activities will be lost with the return to baseline. It is anticipated that many enrolled sites will be renewed indefinitely throughout the 50-year duration of the permit and the permit is likely to be renewed as well. However, potentially all sites that are enhanced or have frogs established through the Agreement may be lost as the landowner assurances are exercised. Frogs from sites that will be returned to baseline can be salvaged and translocated to new sites within the metapopulation on other non-Federal or Federal lands, if possible and appropriate. In summary, the execution of this SHA will beneficial to the species.

AQUATIC SPECIES

The Aquatic Species that may be affected through the implementation of this Agreement include Apache trout, desert pupfish, Gila chub, Gila topminnow, Gila trout, headwater chub, Huachuca springsnail, Little Colorado spinedace, loach minnow, razorback, Sonora chub, Sonora tiger salamander, spikedace, Stephan's riffle beetle, Three Forks springsnail, and the four Yaqui fish (beautiful shiner, Yaqui chub, Yaqui topminnow, and Yaqui catfish). Effects of this action on the designated critical habitat of Gila chub, Little Colorado spinedace, loach minnow, razorback, Sonora chub, spikedace, beautiful shiner, Yaqui chub, Yaqui topminnow, and Yaqui catfish is analyzed separately below.

Management:

The potential changes in land-management practices that are beneficial to Chiricahua leopard frogs should also reduce the effects of ongoing land-use activities on all aquatic species. These management actions would reduce the mortality of eggs, larvae, and adults through regulating cattle numbers and movements during critical time periods, excluding portions of aquatic sites, providing additional emergent and submergent vegetation, and/or through planning appropriate minimization measures for the implementation of large-scale land treatments that may impact aquatic species. In addition, improving management of upland vegetation and rivers or streams on non-Federal lands should have beneficial effects on Federal lands lower in the watershed through reduced sedimentation and improved hydrological function.

Construction:

The construction activities that are proposed as part of the Agreement are those that would improve aquatic site quality and/or persistence, or reduce direct effects of other land uses on aquatic species. Construction of new livestock tanks, water wells, and pipelines typically do not occur within existing aquatic sites and are anticipated to have minimal negative effects on aquatic species. There may be some short-term negative effects from increased siltation from the ground disturbance related to the construction. However, all standard best management practices to reduce erosion and siltation will be used in compliance of the Clean Water Act and Arizona Water Quality Standards. Long-term effects of these activities are anticipated to be beneficial by improving the number, quality, and persistence of aquatic sites. Construction of fences and pipelines, and modification to or maintenance of existing livestock tanks could result in direct impacts to aquatic species from crushing individuals during use of heavy equipment , inadvertent burying of individuals while moving soil, and increasing siltation of adjacent aquatic sites. However, these effects are short-term, and the long-term beneficial effects would outweigh the short-term adverse effects.

Nonnative Species Control:

The presence of nonnative predators and competitors of Chiricahua leopard frogs also tend to exclude other native aquatic species from otherwise suitable habitats. The process of removing these nonnative species can result in the short-term unavailability of aquatic sites for use by Aquatic Species by fencing, draining, and/or the use of EPA-approved piscicides. Such activities may result in the direct mortality of the eggs, larvae, juveniles, and adult Aquatic Species. However, the long-term effects of these actions will be beneficial to all Aquatic Species, as nonnative predators and/or competitors are considered threats to all the listed aquatic species discussed in this BO.

Reestablishment:

The effects of reestablishing Chiricahua leopard frog populations may indirectly affect Aquatic Species, which could include an increase in predation of aquatic species by Chiricahua leopard frogs and of Chiricahua leopard frogs by aquatic species present in the aquatic sites that are used to reestablish Chiricahua leopard frogs. In addition, Chiricahua leopard frogs may disperse up to five miles in perennial waterways, three miles along drainages, and a mile between drainages (USFWS 2006). Therefore, it is likely that Chiricahua leopard frogs could disperse into almost any aquatic site within its historical range as a result of the implementation of this Agreement.

Therefore, Aquatic Species within the historical range of Chiricahua leopard frogs may be subjected to an increased level of predation at some life stages, but it is anticipated to be insignificant because with the Aquatic Species and the Chiricahua leopard frog are all native and are part of the natural ecosystem in which these species evolved. Many of these species currently co-exist in the same ecosystems with Chiricahua leopard frogs, including desert pupfish, Gila chub, Gila topminnow, Little Colorado spinedace, loach minnow, Sonora chub, Sonora tiger salamander, spikedace, Three Forks springsnail, and the four Yaqui fish (Beautiful shiner, Yaqui chub, Yaqui topminnow, and Yaqui catfish).

The level of predation of frogs on listed fish species should be relatively minor and undetectable against the background mortality of these species. These species generally have life histories characterized by high fecundity and high juvenile mortality. Therefore, the additional predation resulting from the reestablishment of Chiricahua leopard frogs should be undetectable against the background mortality in the populations of these listed species.

Return to Baseline Condition:

The direct and indirect effects on Aquatic Species related to disturbance when returning a covered property back to baseline condition would be similar to the affects discussed above for nonnative species control. The effects of returning Chiricahua leopard frog habitat back to baseline condition would likely have permanent adverse effect on the habitat of Aquatic Species. If an area along a stream has been fenced and, in the absence of repeated disturbance, i.e. livestock grazing, stream morphology and Aquatic Species habitat structure should show improvements, a return to baseline condition would remove this habitat. This is only likely to affect Aquatic species if they are present in a lotic system and can colonize the improved aquatic sites; or if they are present in a stock tank, disperse into the livestock tank (Sonora tiger salamander), or actively establish through additional agreements with the landowner. This potential loss of Aquatic Species habitat is not a reduction of the current environmental baseline for these species, but a potential habitat enhancement that results from approval and implementation of this Agreement.

Aquatic Species' Critical Habitat

Gila chub critical habitat:

Primary constituent elements essential to the conservation of the Gila chub and that may require special management considerations and protection were listed and discussed in the Status of the Species. These constituent elements include 1) perennial pools, eddies, and higher velocity areas in headwaters, springs, and ciénegas of smaller tributaries; 2) suitable water quality for spawning, including temperatures ranging from 20 to 26.5°C (68 to 79.7°F); 3) suitable water quality, including low levels of contaminants and sedimentation, for all other aspects of Gila chub life history; 4) adequate food base; 5) sufficient cover for sheltering; 6) a low enough level of nonnative species such that Gila chub are able to survive and reproduce; and 7) streams that maintain a natural flow pattern sufficient to support Gila chub.

Critical habitat units within the action area are described in the Environmental Baseline. Non-Federal parcels of critical habitat located within the action area could be affected by activities implementing the Agreement, including modifications to land-management activities, construction of ranch infrastructure to implement management activities or to improve habitat for Chiricahua leopard frogs, control of non-natives, and reestablishment of Chiricahua leopard frog population sites may result in some short-term adverse effects to Gila chub critical habitat. Changes in land use practices through this Agreement are expected to improve hydrological function of aquatic systems and reduce ongoing effects of livestock management on aquatic species. While this will not eliminate existing adverse effects to primary consistent elements on

non-Federal land, it should benefit Gila chub habitat by improving conditions in upland and riparian vegetation, improving hydrological function, and reducing adverse effects of livestock use on aquatic ecosystems.

Construction projects will primarily be sited in upland or xeroriparian communities. Temporary increases in erosion and sedimentation may result from soil disturbance, which could raise turbidity and sedimentation in portions of streams designated as critical habitat. The only activity that would directly impact a stream reach designated as critical habitat would be clearing riparian vegetation for a pipeline or fence that is crossing a stream. However, it would typically be a small footprint and be adjacent to an existing road or fence line. Pipelines would be suspended above the stream or river, as would the fences in a water gap. If a fence post is placed in the stream, it would create a localized and temporary adverse effect to primary constituent elements through disturbance of the stream bed and sediments. Fence posts are not likely to impact the hydrological function of a stream or river. These actions would be undertaken to improve the existing condition of the aquatic and riparian sites for Chiricahua leopard frogs, and would result in long-term improvements to the primary constituent elements through reduction of access by livestock and recreationists to riparian and stream ecosystems and long-term reduction in the amount of sediments that erode into the stream. Therefore, the temporary adverse effects would be more than offset by the long-term beneficial effects of the action to the primary constituent elements.

The species that are non-native predators or competitors of Chiricahua leopard frogs are very similar to those of Gila chub and other native species. The control or removal of these species could result in temporary adverse effects to several constituent elements of designated Gila chub critical habitat. The use of piscicides would temporarily result in adverse effects to water quality and reduce the food base. Physical control of non-native species could result in adverse effects on all primary constituent elements as seines are dragged through habitat features in designated critical habitat; however, none of these effects would be long-term. In addition, the long-term effects of these activities would be to manage or eliminate the nonnative species within critical habitat for Gila chub, enhancing one of the primary constituent elements.

The reestablishment of Chiricahua leopard frogs within critical habitat units, either directly or indirectly through dispersal, is not expected to effect any of the primary constituent elements of Gila chub critical habitat. The only exception is that Gila chub may prey on the eggs, tadpoles, and metamorphs of Chiricahua leopard frogs, which would restore the natural predator/prey relationship of these species.

The return to baseline condition could result in some of the same short-term effects to primary constituent elements as the control of nonnative predators and competitors discussed above. It may also result in a long-term loss of any improvements to primary constituent elements of Gila chub critical habitat that have resulted from Agreement-related activities. This could occur from removal or stopping any management activities, ranch infrastructure, and future control of nonnative predators and competitors of Chiricahua leopard frogs that occurred during Agreement participation. This should only affect improvements to primary constituent elements related to Agreement participation and not degrade the condition of primary constituent elements of Gila chub critical habitat existing at the time of enrollment.

Overall, the Agreement activities that may occur within critical habitat for the Gila chub are not likely to result in adverse effects to the conditions of any primary constituent elements present at the time of enrollment, except on a short-term basis, and they are anticipated to result in either short-term or long-term improvement of any affected constituent elements, depending on whether or when areas are returned to their baseline conditions.

Little Colorado spinedace critical habitat:

The primary constituent elements of critical habitat for the Little Colorado spinedace include clean permanent flowing water, with pools and a fine gravel or silt-mud substrate. The effects of the proposed action on these constituent elements are similar as those described above for Gila chub critical habitat. Overall, the Agreement activities that may occur within critical habitat for the Little Colorado spinedace are not expected to result in adverse effects to the condition of any primary constituent elements present at the time of enrollment, except on a short-term basis, and they are anticipated to result in either short-term or long-term improvement of any affected constituent element depending on whether or when areas are returned to their baseline conditions.

Loach Minnow

The primary constituent elements of proposed critical habitat for the loach minnow include permanent, flowing water with living areas for all live stages; water with low levels of pollutants; substrates of sand, gravel, and cobble with low to moderate amounts of fine sediment and substrate embeddedness; a natural, unregulated hydrograph or, if the flows are modified or regulated, then a hydrograph that allows for adequate river functions; streams with low gradients; water temperatures in the approximate range of 2° to 29° C (35° to 85° F); pool, riffle, run, and backwater components; abundant aquatic insect food base; habitat devoid of nonnative aquatic species detrimental to loach minnow or habitat in which detrimental nonnative species are at levels that allow the persistence of loach minnow; and areas within perennial interrupted stream courses that are periodically dewatered but serve as connective corridors between occupied habitat and through which species may move when habitat is wetted. The effects of the action on these constituent elements are similar as those described above for Gila chub critical habitat. Overall, the Agreement activities that may occur within critical habitat for the Loach Minnow are not expected to result in adverse effects to the condition of any primary constituent elements present at the time of enrollment, except on a short-term basis, and they are anticipated to result in either short-term or long-term improvement of any affected constituent element depending on whether or when areas are returned to their baseline conditions.

Razorback Sucker

In the designation of critical habitat for razorback sucker, the primary constituent elements were grouped in three general categories: water, physical habitat, and the biological environment (USFWS 1998b). The water element refers to water quality and quantity. Water quality is defined by parameters such as temperature, dissolved oxygen, environmental contaminants, nutrients, turbidity, and others. Water quantity refers to the amount of water that must reach

specific locations at a given time of year to maintain biological processes and to support the various life stages of the species. The physical habitat element includes areas of the Colorado River system that are or could be suitable habitat for spawning, nursery, rearing, and feeding, as well as corridors between such areas. Habitat types include bottomland, main and side channels, secondary channels, oxbows, backwaters, and other areas in the 100-year floodplain, which when inundated may provide habitat or corridors to habitat necessary for the feeding and nursery needs of the razorback sucker. The biological environment element includes living components of the food supply and interspecific interactions. Food supply is a function of nutrient supply, productivity, and availability to each life stage. Negative interactions include predation and competition with introduced nonnative fishes. While the values for oxygen, temperature, substrate requirements, etc. are different than the primary constituent elements for critical habitat of those species already discussed, the actions associated with this Agreement will have similar adverse and beneficial effects as described for Gila chub critical habitat. Overall, the Agreement activities that may occur within critical habitat for the Razorback Sucker are not expected to result in adverse effects to the condition of any primary constituent elements present at the time of enrollment, except on a short-term basis, and they are anticipated to result in either short-term or long-term improvement of any affected constituent element depending on whether or when areas are returned to their baseline conditions.

Sonora chub critical habitat:

Primary constituent elements of Sonora chub critical habitat were not identified in the 1986 final rule (USFWS 1986). However, habitat characteristics important to this species of chub include clean permanent water with pools and intermediate riffle areas and/or intermittent pools maintained by bedrock or by subsurface flow in areas shaded by canyon walls. These are generally similar to constituent elements of critical habitat of the other Aquatic Species discussed above. However, because no critical habitat for this species is designated on non-Federal lands, no direct effects of actions implemented under the Agreement will occur. Downstream effects would be of short duration and therefore insignificant.

Spikedace critical habitat:

The primary constituent elements of proposed critical habitat for the spikedace include permanent, flowing water with living areas for all life stages; water with low levels of pollutants; substrates of sand, gravel, and cobble with low to moderate amounts of fine sediment and substrate embeddedness; a natural, unregulated hydrograph or, if the flows are modified or regulated, then a hydrograph that allows for adequate river functions; streams with low gradients; water temperatures in the approximate range of 2° to 29° C (35° to 85° F), pool, riffle, run, and backwater components; and abundant aquatic insect food base; pool, riffle, run, and backwater components; abundant aquatic insect food base; habitat devoid of nonnative aquatic species detrimental to spikedace or habitat in which detrimental nonnative species are at levels that allow the persistence of spikedace; and areas within perennial interrupted stream courses that are periodically dewatered but serve as connective corridors between occupied habitat and through which species may move when habitat is wetted. The effects of the action on these constituent elements are similar as those described above for Gila chub critical habitat. Overall, the Agreement activities that may occur within critical habitat for the spikedace are not expected to

result in adverse effects to the condition of any primary constituent elements present at the time of enrollment, except on a short-term basis, and they are anticipated to result in either short-term or long-term improvement of any affected constituent element depending on whether or when areas are returned to their baseline conditions.

Yaqui fish critical habitat:

Primary constituent elements essential to the conservation of the Yaqui fishes and that may require special management considerations and protection were listed and discussed in the Status of the Species. These constituent elements include 1) clean, small, permanent streams with riffles, or intermittent creeks with pools and riffles in the Río Yaqui drainage (beautiful shiner), 2) permanent streams of medium current with clear pools (Yaqui catfish), 3) permanent water with deep pool and intermediate areas with riffles (Yaqui chub), 4) areas of detritus or heavy overgrown cut banks (Yaqui chub), 5) clean and unpolluted water, and 6) water free of introduced nonnative fish. Critical habitat within the action area is described in the Environmental Baseline.

No actions related to the implementation of this Agreement will occur in designated critical habitat for the beautiful shiner, Yaqui catfish, and Yaqui chub, because critical habitat is only designated on Federal lands of the SBNWR. So, direct effects of improvements in management, construction, nonnative control and removal, and reestablishments will not occur within critical habitat for the Yaqui fish. However, downstream effects of these actions may still occur. These downstream effects are not likely to result in significant adverse effects to any primary constituent elements, except on a short-term basis.

RIPARIAN SPECIES

The Riparian Species that may be affected through the implementation of this Agreement include: Canelo Hills ladies' tresses, Huachuca water umbel, southwestern willow flycatcher, and western yellow-billed cuckoo. Effects of this action on the designated critical habitat of Huachuca water umbel and southwestern willow flycatcher are analyzed separately below.

Management:

The potential changes in land management practices that are beneficial to Chiricahua leopard frogs should reduce the effects of ongoing land-use activities or result in no change to the existing status of Riparian Species. Any reduction in the effects on Riparian Species of ongoing land uses would be accomplished through the same actions that would reduce direct mortality and disturbance described above for Chiricahua leopard frog. These actions would reduce the disturbance of nests, nest sites, individual plants, and soils through regulating cattle numbers and movements during critical time periods, excluding portions of riparian ecosystems from livestock, and planning appropriate minimization measures into the implementation of large-scale land treatments that may impact riparian species. In general, management that improves or protects riparian habitat will benefit riparian species.

Construction:

The construction activities that are proposed as part of the Agreement are those that would either improve riparian site quality and persistence, or reduce direct effects of other land uses on species that are associated with riparian vegetation. New livestock tanks and water wells are not typically constructed within existing mesoriparian areas, but rather they are constructed in more xeric riparian sites. Fences and pipelines may be constructed adjacent or through mesoriparian sites, but the disturbance from these actions would be minimal and temporary. Therefore, these actions are anticipated to have minimal negative effects on riparian species. There may be some short-term negative effects from the removal or trimming of vegetation, crushing of individual plants, and disturbance of soil, nesting adults, and potential nest sites during construction activities. Long-term effects of these activities are anticipated to be beneficial in reducing disturbance of riparian vegetation and improving the amount of riparian vegetation over the long term. Livestock tanks often develop mesoriparian vegetation around their shoreline, which could provide additional habitat for migrating southwestern willow flycatchers and yellow-billed cuckoos, but they are typically not a suitable size for establishment of breeding territories. Construction of fences and pipelines, and modification to or maintenance of existing livestock tanks could result in direct impacts to riparian species from crushing individual plants under the heavy equipment, inadvertent burying of individual plants while moving soil, and disturbance of nests and nesting individual birds. However, these facilities often result in alternative water sources for livestock which can reduce or eliminate the need for livestock to use water in streams and rivers. Alternative water sources combined with fences to exclude livestock, partially, seasonally, or completely from using the riparian vegetation for forage or shade would provide a long-term beneficial effect to riparian species and their habitat.

Nonnative Species Control:

The process of removing nonnative species is not anticipated to impact riparian plant species, except possibly through the trampling of plants underfoot during implementation of control measures. Disturbance of nesting southwestern willow flycatchers and western yellow-billed cuckoos could occur if control measures are implemented during the breeding season in appropriate habitat. The short-term removal of aquatic sites through draining and/or the use of EPA-approved piscicide, could result in a temporary loss of prey base for southwestern willow flycatchers and western yellow-billed cuckoos if implemented in appropriate habitat. These effects are short-term and should be more than compensated for by the long-term beneficial effects of improved land-management and construction activities discussed above.

Reestablishment:

The effects of reestablishing Chiricahua leopard frog population sites may result in disturbance of southwestern willow flycatchers and western yellow-billed cuckoos from the short-term increase in human activity. If this occurs in critical periods during courtship, incubation, or nesting, it could result in nestling mortality or abandonment of nests. Some trampling of Huachuca water umbel and Canelo Hills' ladies' tresses is possible as crews move through riparian areas within the range of these species during these activities. However, long-term effects should be small to non-existent.

Return to Baseline Condition:

The effects on Riparian Species from human disturbance while returning a covered property back to baseline condition would be similar to the effects discussed above for nonnative species control. The effects of returning Chiricahua leopard frog habitat back to baseline condition may have an adverse effect on the habitat of all the riparian species considered in this BO. If an area along a stream has been fenced and, in the absence of repeated disturbance, suitable habitat features for these species have become established, a return to baseline condition would remove this habitat. For southwestern willow flycatchers, western yellow-billed cuckoos, and Huachuca water umbel, this is only likely along lotic aquatic sites. Riparian areas around livestock tanks are typically not large enough to support breeding habitat for southwestern willow flycatcher and western yellow-billed cuckoo. This potential loss of riparian vegetation, however, would not be a reduction of the current environmental baseline for these species, but a reduction of potential habitat enhancement that resulted from approval and implementation of this Agreement.

Riparian Species' Critical Habitat

Huachuca water umbel critical habitat:

Primary constituent elements essential to the conservation of the Huachuca water umbel that may require special management considerations and protection were listed and discussed in the Status of the Species. These constituent elements include 1) sufficient perennial base flows to provide a permanently or nearly permanently wetted substrate for growth and reproduction of Huachuca water umbel; 2) a stream channel that is relatively stable, but subject to periodic flooding that provides for rejuvenation of the riparian plant community and produces open microsites for Huachuca water umbel expansion; 3) a riparian plant community that is relatively stable over time and in which nonnative species do not exist or are at a density that has little or no adverse effect on resources available for Huachuca water umbel growth and reproduction; and 4) in streams and rivers, refugial sites in each watershed and in each reach, including, but not limited to, springs or backwaters of mainstem rivers, that allow each population to survive catastrophic floods and recolonize larger areas.

Critical habitat within the action area is described in the Environmental Baseline. Activities implemented under the Agreement on non-Federal parcels within critical habitat or upstream of critical habitat may affect constituent elements. Such non-Federal parcels occur within or near critical habitat units 1, 2, 3, 6, and 7.

The implementation of this Agreement may result in some short-term adverse effects to Huachuca water umbel habitat. Changes in land-use practices through this Agreement are expected to improve hydrological function of aquatic systems and reduce effects of ongoing livestock management on riparian species and their habitat. While this will not eliminate existing adverse effects to primary consistent elements on non-Federal land, it should result in beneficial effects from improved status of upland and riparian vegetation, improved hydrological function, and reduction of adverse effects of livestock use on aquatic ecosystems.

Construction projects will primarily be sited in upland or xeroriparian communities. Temporary increases in erosion and sedimentation may occur with any soil disturbance, which could increase sedimentation in portions of designated critical habitat downstream from non-Federal lands, until disturbed soils are stabilized around a construction site. Water developments, such as stock tanks and wells, are not likely to be sited in Huachuca water umbel critical habitat, as these areas already provide adequate habitat for Chiricahua leopard frogs. However, they may occur upstream of occupied critical habitat. Based upon observations on the Coronado National Forest, water withdrawal for agricultural uses related to livestock management has not been observed to diminish water output of natural springs or flow in aquatic systems (USFS 1999 and 2000). The construction and operation of a livestock tank that catches surface runoff is not expected to impact hydrology of a watershed and is not expected to adversely affect constituent elements of Huachuca water umbel critical habitat. The only construction that would directly impact designated critical habitat for Huachuca water umbel would be if riparian vegetation is cleared for a water pipeline or fence that is crossing a stream. However, it would typically be a small footprint and be adjacent to an existing road or fence line. Pipelines may be buried or laid on the surface, but they are more likely to be suspended above any stream or river that they may cross, as are the fences in a water gap. The effects from placement of fence posts and pipelines placed in the critical habitat would be localized and temporary. These disturbances would be insignificant related to the long-term beneficial effects of excluding or controlling livestock use of these riparian areas. These actions would be undertaken to improve the existing condition of the aquatic and riparian sites for Chiricahua leopard frogs, and they would not be implemented under this Agreement if they would degrade or deteriorate hydrological function of the aquatic and riparian system. Therefore, the long-term effects of these actions will result in improvements to the primary constituent elements for Huachuca water umbel critical habitat.

Non-native predators and competitors of Chiricahua leopard frogs are not an impact to Huachuca water umbel critical habitat. Likewise, the control measures, both physical and chemical, for these species will not have a significant effect on any primary constituent element of critical habitat.

The reestablishment of Chiricahua leopard frogs within critical habitat units, either directly or indirectly through dispersal is not expected to affect any of the primary constituent elements of Huachuca water umbel critical habitat.

The return to baseline condition could result in short-term effects to primary constituent elements similar to control of nonnative predators and competitors of Chiricahua leopard frogs discussed above. It may also result in a long-term loss of any improvements to primary constituent elements of Huachuca water umbel critical habitat that have resulted from Agreement related activities. This should only affect improvements to primary constituent elements related to Agreement participation and not degrade the condition of primary constituent elements of Huachuca water umbel critical habitat existing at the time of enrollment.

Overall, the Agreement activities that may occur within critical habitat for the Huachuca water umbel are not likely to result in significant adverse effects to any primary constituent elements, except on a short-term basis, and they are anticipated to result in a long-term improvement of any affected constituent element.

Southwestern willow flycatcher critical habitat:

Primary constituent elements essential to the conservation of the Southwestern willow flycatcher that may require special management considerations and protection were listed and discussed in the Status of the Species. These constituent elements include 1) riparian habitat in a dynamic successional riverine environment (for nesting, foraging, migration, dispersal, and shelter) that comprises: Various species of native willow, boxelder, tamarisk, Russian olive, buttonbush, cottonwood, stinging nettle, alder, velvet ash, poison hemlock, blackberry, seep willows, oaks, rose, sycamore, false indigo, Pacific poison ivy, grape, Virginia creeper, Siberian elm, and walnut; 2) dense riparian vegetation with thickets of trees and shrubs ranging on height from 2 to 30 meters (6-98 feet). Lower-stature thickets (2 to 4 m or 6 to 13 ft tall) are found at higher elevation riparian forests, and tall stature thickets are found at middle- and lower elevation riparian forests; 3) areas of dense riparian foliage at least from the ground level up to approximately 4 m (13 ft) above ground or dense foliage only at the shrub level, or as a low, dense tree canopy; 4) sites for nesting that contain a dense tree and/or shrub canopy (the amount of cover provided by tree and shrub branches measured from the ground) (i.e., tree or shrub canopy densities ranging from 50 to 100 percent); 5) dense patches of riparian forests that are interspersed with small openings of open water or marsh, or shorter/sparser vegetation that creates a mosaic that is not uniformly dense. Patch size may be as small as 0.1 hectare (ha) (0.25 acres [ac]) or as large as 70 ha (175 ac); and 6) a variety of insect prey populations found within or adjacent to riparian floodplains or moist environments, including flying ants, wasps, and bees; dragonflies; flies; true bugs; beetles; butterflies/moths and their larvae; and spittlebugs (70 FR 60886, USFWS 2005).

Critical habitat within the action area is described in the Environmental Baseline. Activities implemented under the Agreement on non-Federal parcels within critical habitat or upstream of critical habitat may affect constituent elements. However, there is very little overlap between critical habitat areas for flycatchers and areas occupied by Chiricahua leopard frogs or likely to be targeted for frog recovery actions, particularly on non-Federal lands. Most flycatcher territories and nests are found on major river systems or reservoirs (e.g. the San Pedro and Gila rivers, Roosevelt and Alamo lakes) that are not suitable for Chiricahua leopard frogs due to low elevation and/or presence of non-native predators.

Where conservation activities for the frog may occur on private lands in or near critical habitat, changes in existing land-use practices through this Agreement are expected to improve the hydrological function of aquatic systems and reduce effects of ongoing livestock management on riparian species and their habitat. While this may not eliminate all existing adverse effects to primary consistent elements on non-Federal land, it should reduce disturbances that set back the natural succession of riparian ecosystems. Mesoriparian vegetation should attain a more natural mosaic of seral stages that provide habitat used by southwestern willow flycatchers. This should result in an increase in abundance and diversity of invertebrate prey items within the riparian areas inside critical habitat.

Construction projects will primarily be sited in upland or xeroriparian communities. Water developments, such as stock tanks and wells, are not likely to be sited in critical habitat, as these areas are already wetted. However, they may occur upstream of occupied critical habitat. Based

upon observations on the Coronado National Forest, water withdrawal for agricultural uses related to livestock management has not been observed to diminish water output of natural springs or flow in aquatic systems (USFS 1999 and 2000). The construction and operation of livestock tanks that catch surface runoff are not expected to impact the hydrology of a watershed and are not expected to adversely affect constituent elements of southwestern willow flycatcher critical habitat. The only construction activity that would directly impact critical habitat for southwestern willow flycatcher would be if riparian vegetation is cleared for a water pipeline or a fence line that is crossing a stream. These would typically have a small footprint and be adjacent to an existing road or fence line. Pipelines may be buried or laid on the surface in the riparian area, but they are more likely to be suspended above any stream or river that they may cross, as are the fences in a water gap. The effects from placement of fence posts and pipelines in the critical habitat would be localized and temporary. These temporary disturbances would be insignificant related to the long-term beneficial effects of excluding or controlling livestock use inside critical habitat for southwestern willow flycatcher. These actions would be undertaken to improve the existing condition of the aquatic and riparian sites for Chiricahua leopard frogs, and they would not be implemented under this Agreement if they would degrade or deteriorate hydrological function of the aquatic and riparian system. Therefore, the long-term effects of these actions will result in improvements to the primary constituent elements of southwestern willow flycatcher critical habitat.

The control or removal of non-native predators and competitors of Chiricahua leopard frogs will have no effect on the successional stage of the riparian vegetation community. Mechanical control methods will not affect the prey base or invertebrate diversity. The use of piscicides will temporarily remove aquatic insects from the ecosystem. However, aquatic insects quickly recolonize their habitats, and no permanent adverse effects are likely from the use of piscicides on primary constituent elements of southwestern willow flycatcher habitat.

The reestablishment of Chiricahua leopard frogs within critical habitat units, either directly or indirectly through dispersal, is not expected to affect any of the primary constituent elements of southwestern willow flycatcher critical habitat.

The return to baseline condition could result in a long-term loss of any improvements to primary constituent elements of southwestern willow flycatcher critical habitat that have resulted from Agreement-related activities. This should only affect improvements to primary constituent elements related to Agreement participation and not degrade the condition of primary constituent elements of southwestern willow flycatcher critical habitat existing at the time of enrollment. Overall, the Agreement activities that may occur within critical habitat for the southwestern willow flycatcher are not likely to result in significant adverse effects to any primary constituent elements, except on a short-term basis, and they are anticipated to result in a long-term improvement of any affected constituent element.

UPLAND SPECIES

The Upland Species that may be affected through the implementation of this Agreement include Cochise pincushion cactus and Pima pineapple cactus.

Management:

The focus of any changes to existing land-use practices under this Agreement is to improve habitat of Chiricahua leopard frogs and reduce impacts to this species. Therefore, most modifications to land-use practices would be focused on improvements of aquatic and riparian areas on the covered properties. As a consequence of potential changes in livestock distribution, livestock may spend more time in upland habitats and around alternative water sources, such as drinking troughs, placed in new locations in the upland vegetation communities. This should help distribute existing impacts more evenly and, combined with a ranch management plan that includes established rotational grazing and other management practices, should reduce localized impacts.

Changes in land-use management practices could result in livestock spending more time in upland communities, if temporary or seasonal exclusion from natural riparian and aquatic communities occurs. This increase in upland grazing activity could increase the potential for death or injury of Cochise pincushion and Pima pineapple cacti from livestock trampling. Such effects would not result from construction or management of livestock tanks, as the Agreement only recommends partial exclusion of them for the benefit of Chiricahua leopard frogs. Within the range of these species in the action area, very few aquatic and riparian sites exist that are not associated with livestock tanks. The emphasis in the Agreement of enrolled properties with livestock operations is to develop and implement ranch management plans, like those developed with NRCS. These are intended to improve the management of upland, riparian, and aquatic communities in the covered area. The indirect result will be the overall improvement of the vegetation in the upland ecosystem. This beneficial effect should more-than-compensate over the long-term for any potential increase in mortality or injury of Cochise pincushion and Pima pineapple cacti.

Construction:

Construction activities implemented under the Agreement may result in direct mortality and injury to Cochise pincushion cactus and Pima pineapple cactus. The cactus species would generally be easy to avoid during the planning and constructing of livestock tanks, water wells, distribution pipelines, and fences. In addition, Cochise pincushion cactus is found in rocky soils that are not likely to be appropriate for livestock tanks.

Habitat disturbance from pipelines and fences would be small, linear, and anticipated to be temporary. Most fences and pipelines are constructed along existing roads or in existing roads (pipelines only). There would be only minor loss of upland species habitat associated with construction in or along existing roads. The construction of water wells and livestock tanks may result in the permanent loss of upland habitat of less than an acre at each site. Water wells would not be clustered, and the habitat loss would be scattered across the covered area to the point of having a minor effect on habitat of these species.

Nonnative Species Control:

The presence of nonnative predators and competitors of Chiricahua leopard frogs are not known to affect Upland Species, and their removal should have neither a negative nor a beneficial affect on these species.

Reestablishment:

No effects to these cacti species are expected.

Return to Baseline Condition:

No effects to these cacti species are expected.

CUMULATIVE EFFECTS

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

The lands within the action area are primarily Federal and non-Federal ranchland. During the 50 years of this permit, the land-use patterns on non-Federal lands within the action area are likely to change significantly, as more grazing land is converted to urban land uses. Activities related to grazing livestock and range management would include the presence of livestock on the range, use of aquatic sites as water holes, use of forage in upland sites surrounding aquatic sites, maintenance of stock tanks, and land treatments (herbicide treatment and prescribed fire). Livestock grazing results in variable removal of ground cover. During periods of drought and in areas where grazing management is slow in reacting to deteriorating range conditions, increased erosion may result in increased sedimentation into stock tanks and other aquatic habitats. This could result in an increase in the frequency of maintenance activities in stock tanks and impact dispersal corridors between aquatic sites. Land treatments to maintain or restore rangelands include the use of herbicides and prescribed fire to reduce shrubs and increase perennial grasses.

Many of these land treatments would be consulted on through cooperative efforts with NRCS or the USFS; however, small treatments could occur without the assistance of a Federal agency or funding. Aquatic sites are not likely to be impacted directly, but may be inadvertently affected by run off of sediment, ash, or herbicide. The addition of sediment and ash could bury egg masses and suffocate tadpoles. Some herbicides have been shown to cause developmental defects in frogs (Davidson et al. 2002 and Hayes et al. 2002). While these effects are substantial, the area covered by land treatments, without a Federal nexus, is likely to be small and infrequent. In addition, any Participating Landowner or Neighbor in the Agreement would be required to notify and allow salvage of frogs prior to any land treatment. This further limits the impact of these activities within the action area.

The transportation system through the action area includes a combination of improved state highways, minor arterials and unimproved rural roads. All of these roads will require periodic maintenance during the duration of the permit. It is also reasonable to assume that many of the roads that connect urbanized areas to each other or to recreational opportunities will be improved and possibly widened in the next 50 years. These activities could potentially increase traffic speeds, allow for increased traffic, and potentially impact sites near improved roads. It could further increase visitation to occupied sites, resulting in impacts from illegal collection and illegal stocking of nonnative predators. Increases in traffic volume and speed would result in greater fragmentation of habitat, and the rate of road kill would increase for individuals dispersing across the roadways.

Development of private lands and the conversion of rural land uses to urban land use is continuing across the action area. It is no longer only concentrated near the metropolitan areas, but in such areas such as Rio Rico, Patagonia, Sonoita, Sierra Vista, Portal, Wilcox, Safford, Camp Verde, and Springerville. Impacts of urban development will likely include increased traffic on roads, more recreational visitation to State and Federal lands within the action area, and increased use of ground water.

CONCLUSION

CHIRICAHUA LEOPARD FROG

After reviewing the current status of Chiricahua leopard frog, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the proposed issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Chiricahua leopard frog. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- The status of Chiricahua leopard frog has been documented to be in decline throughout its range over the past 15 years. This decline has been accelerated in some parts of the range due to continued drought. In addition, nonnative aquatic competitors/predators have displaced the Chiricahua leopard frog throughout much of its range. Chytrid fungus infections continue to exist and have resulted in the loss of many populations.

- The current distribution within the action area includes populations on Federal and non-Federal lands. Many stable sites continue to be threatened by continued drought throughout the range.

- While livestock grazing may have some impact on this species, the operation and maintenance of stock tanks as part of livestock management has been determined to be beneficial beyond the impacts of grazing. Land treatments on private land are likely to be small due to the expense associated with the use of treatments such as prescribed fire and herbicide application. Impacts from these activities are expected to be small and localized. The improvement and maintenance of roads within the action area are likely to

occur and could result in increased road mortality of dispersing frogs with increased traffic volumes and speeds.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Existing population sites would only be impacted initially by removal of subadult frogs (eggs, tadpoles, and metamorphs) for translocation into new population sites or to repopulate extirpated sites. In subsequent years, frogs for translocations would be moved from population sites that are not part of the baseline.

2. Ranid frogs have a high reproductive rate that reduces the effects of removing individuals from existing populations. Effects of the removal would be short-term and, as a result of decreased competition, may result in increased survival and reproduction in remaining frogs.

3. Translocation of subadults would have less impact on existing populations than translocation of adult frogs due to the inherent higher mortality rate of subadult life stages.

4. Participants in this Agreement will implement minimization measures to reduce the impacts of ongoing activities within the action area.

5. Spread of disease will be minimized by using best management practices for handling, monitoring, and translocation of frogs, as well as the required minimization measures in the Agreement. In addition, a formalized Disease Prevention Protocol will be drafted within the first year of the implementation of the Agreement.

6. The conservation benefits of the Agreement will increase the number of population sites, which should result in increased stability of metapopulations within e.g. the action area. Stable metapopulations will be less susceptible to stochastic events such as drought.

7. The duration of the permit and individual landowner participation is long enough to provide long-term conservation benefits to this species, both in habitat availability and in the ability of this species to reproduce and disperse.

8. All activities that could result in take of frogs at participating sites will be preceded with adequate notification and access to provide a chance to salvage frogs for later return to the site or translocation to another site as appropriate. Salvage of Chiricahua leopard frogs will also occur, as appropriate, prior to returning an enrolled property to baseline condition.

9. Returning a property to baseline condition will not impact Chiricahua leopard frogs or their habitat that are part of a property's baseline condition at the time of enrollment.

10. An annual report will be submitted that documents the number of aquatic sites covered by the agreement, status of each metapopulation under the agreement, new Participants that have signed certificates of inclusion in the last year, any leopard frog management activities, funding sources that were used, any incidental take, biological monitoring activities, and any other pertinent information regarding the status of the Agreement.

11. All actions in the Agreement are included in the draft Chiricahua Leopard Frog Recovery Plan as those that are needed to meet the recovery criteria (USFWS 2006).

AQUATIC SPECIES

Apache Trout

After reviewing the current status of Apache trout, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Apache trout. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- The status of Apache trout has been improving through recovery actions.

- Currently 14 populations, representing all 13 discrete lineages, of Apache trout are within the action area. The majority of the populations are outside the covered area on Federal lands and would not be directly affected by the proposed actions.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial or neutral for Apache trout.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for Apache trout.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse affect on Apache trout, but as these are also nonnative competitors and predators of Apache trout, the long-term benefits should compensate for any short-term effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in the predation on eggs, fry, and young-of-year life stages of Apache trout, but predation of fish by Chiricahua leopard frogs, while possible, is rare and is not likely to be detected

against baseline levels of mortality for young life stages of Apache trout. Apache trout may also feed on Chiricahua leopard frogs. This would reestablish or maintain the natural predator-prey relationship between the species.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of Apache trout habitat. This would only affect improvements to Apache trout habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of Apache trout habitat that currently exists in the action area.

Desert Pupfish

After reviewing the current status of desert pupfish, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the desert pupfish. Critical habitat for this species has been designated at Quitobaquito in Organ Pipe Cactus National Monument (Pima County); however, this action does not affect that area and no destruction or adverse modification of that critical habitat is anticipated. In making our determination, we considered the following:

- The status of desert pupfish is stable, but only 13 natural populations currently exist.

- Through active management and reestablishment efforts, this species' status has the potential for improvement in the near future.

- Currently, three populations exist in the action area, and one co-exists with Chiricahua leopard frogs. These populations are all in the covered area of the Agreement.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial or neutral for desert pupfish.

2. The construction of livestock tanks, water wells, pipelines, and fences is unlikely to occur where it would affect existing populations of desert pupfish. However, if future reestablishment efforts for desert pupfish are undertaken, the effects of construction may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for desert pupfish in conjunction with future reestablishment efforts.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse affect on desert pupfish, but as these are also nonnative competitors and predators of desert pupfish, the long-term benefits should compensate for any short-term effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in predation on all life stages of desert pupfish, but predation of fish by Chiricahua leopard frogs, while possible, is rare and is not likely to be detected against baseline levels of mortality for desert pupfish.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of desert pupfish habitat. This would only affect improvements to desert pupfish habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of desert pupfish habitat that currently exists in the action area.

Gila Chub

After reviewing the current status of Gila chub, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Gila chub, and it is not likely to destroy or adversely modify designated critical habitat. In making our determination, we considered the following:

- The Gila chub has declined to a point where it is restricted to small, isolated populations scattered throughout its historical range.

- Gila chub are threatened by the presence of nonnative predators and competitors, and habitat destruction and alteration from water diversions, dredging, recreation, livestock grazing, etc.

- Designated critical habitat in the action area includes part or all of four critical habitat units identified in the previous section of the document.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial for Gila chub.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features

would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for Gila chub.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse effect on Gila chub, but as these are also nonnative competitors and predators of Gila chub, the long-term benefits should compensate for any short-term effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in predation on eggs, fry, and young-of-year life stages of Gila chub, but predation of fish by Chiricahua leopard frogs, while possible, is rare and would not be noticed against baseline levels of mortality for young life stages of Gila chub. Gila chub may also feed on Chiricahua leopard frogs. This would reestablish or maintain the natural predator-prey relationship between the species.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of Gila chub habitat. This would only affect improvements to Gila chub habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of Gila chub habitat that currently exists in the action area.

6. The potential adverse effects on primary constituent elements in Gila chub critical habitat units within the action area are localized and short-term. The potential beneficial effects are long-term and are likely to improve the existing condition of the primary constituent elements within these critical habitat units. Some of the long-term benefits may be lost if and when a Participant chooses to return a property to baseline condition, but this will not degrade the existing condition of the primary constituent elements of Gila chub critical habitat.

Gila Topminnow

After reviewing the current status of Gila topminnow, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Gila topminnow. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- The status of Gila topminnow is declining with populations in 12 natural sites and 20 reestablished sites.

- The action area contains 12 of these 32 sites, some of which are also occasionally occupied by Chiricahua leopard frogs.

- Gila topminnow is threatened by the presence of nonnative predators and competitors, and habitat destruction and alteration from water diversions, dredging, recreation, livestock grazing, etc.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial or neutral for Gila topminnow.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for Gila topminnow.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse affect on Gila topminnow, but as these are also nonnative competitors and predators of Gila topminnow, the long-term benefits should compensate for any short-term effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in the predation on eggs, fry, and young-of-year life stages of Gila topminnow, but predation of fish by Chiricahua leopard frogs, while possible, is rare and would not be noticed against baseline levels of mortality for young life stages of desert pupfish.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of Gila topminnow. This would only affect improvements to Gila topminnow habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of Gila topminnow habitat that currently exists in the action area.

Gila Trout

After reviewing the current status of Gila trout, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Gila trout. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- The status of Gila trout has been improving through active reestablishment to the point where a reclassification from endangered to threatened occurred in July 2006 (71 FR 40657).

- Two populations of Gila trout are within the action area, Dude and Raspberry creeks.

- Existing threats to Gila trout from grazing and timber harvesting are being reduced, as well as the potential for hybridization with rainbow trout, and AGFD is planning to start reestablishing Gila trout in these watersheds for sport fishing under the section 4(d) rule in the reclassification.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications of existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial to Gila trout.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for Gila trout.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse effect on Gila trout, but as these are also nonnative competitors and predators of Gila trout, the long-term benefits should compensate for any short-term effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in predation on eggs, fry, and young-of-year life stages of Gila trout, but predation of fish by Chiricahua leopard frogs, while possible, is rare and would not be noticed against baseline levels of mortality for young life stages of Gila trout. Gila trout may also feed on Chiricahua leopard frogs. This would reestablish or maintain the natural predator-prey relationship between the species.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of Gila trout habitat. This would only affect improvements to Gila trout habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of Gila trout habitat that currently exists in the action area.

Headwater Chub

After reviewing the current status of headwater chub, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the headwater chub. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- The status of headwater chub has declined to a point where it is restricted to small, isolated populations scattered throughout its historical range.

- The status of headwater chub is threatened by the presence of nonnative predators and competitors, and habitat destruction and alteration from water diversions, dredging, recreation, livestock grazing, etc.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial for headwater chub.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for headwater chub.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse effect on headwater chub, but as these are also nonnative competitors and predators of headwater chub, the long-term benefits should compensate for any short-term effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in the predation on eggs, fry, and young-of-year life stages of headwater chub, but predation of fish by Chiricahua leopard frogs, while possible, is rare and would not be noticed against baseline levels of mortality for young life stages of headwater chub. Headwater chub may also feed on Chiricahua leopard frogs. This would reestablish or maintain the natural predator-prey relationship between the species.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of headwater chub habitat. This would only affect improvements to headwater chub habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of headwater chub habitat that currently exists in the action area.

Huachuca Springsnail

After reviewing the current status of the Huachuca springsnail, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Huachuca springsnail. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- The status of the Huachuca springsnail has been stable on Federal lands, but is largely unknown on non-Federal lands.

- The Agreement is likely to provide additional protection to Huachuca Springsnail habitat in the covered area.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land use practices that are beneficial to Chiricahua leopard frogs should also be beneficial for Huachuca springsnails.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for Huachuca springsnails.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse effect on Huachuca springsnails, but as these could also be nonnative competitors and predators of Huachuca springsnails, the long-term benefits should compensate for any short-term effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in predation on Huachuca springsnails, but snails do not make up the majority of a frog's diet, and springsnail habitat is complex, with adequate cover, and population level effects are not anticipated.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of Huachuca springsnail habitat. This would only affect improvements to Huachuca springsnail habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of Huachuca springsnail habitat that currently exists in the action area.

Little Colorado spinedace

After reviewing the current status of Little Colorado spinedace, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Little Colorado spinedace, and are not likely to destroy or adversely modify designated critical habitat. In making our determination, we considered the following:

- The status of Little Colorado spinedace is difficult to determine due to its seemingly ephemeral life history, but it appears to be declining. Threats from drought and non-native species seem to be increasing in East Clear Creek, Chevelon Creek, and the Upper Little Colorado River (including Nutrioso and Rudd creeks) within the action area.

- The status within the covered area is equally difficult to determine and the species is under the same increase in threats.

- Critical habitat is designated along 23 miles of stream with mixed Federal and non-Federal ownership.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial by reducing existing threats to the Little Colorado spinedace.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for Little Colorado spinedace.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have short-term adverse effects on Little Colorado spinedace, but as these are also nonnative competitors and predators of Little Colorado spinedace, the long-term benefits should compensate for any short-term adverse effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in the predation on Little Colorado spinedace, but predation of fish by Chiricahua leopard frogs, while possible, is rare and would not be noticed against baseline levels of mortality for Little Colorado spinedace. Little Colorado spinedace may also feed on eggs and young tadpoles of Chiricahua leopard frogs. This would reestablish or maintain the natural predator-prey relationship between the species.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of Little Colorado spinedace habitat. This would only affect improvements to Little Colorado spinedace habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of Little Colorado spinedace habitat that currently exists in the action area.

6. The potential adverse effects on primary constituent elements in critical habitat units within the action area are localized and short-term. The potential beneficial effects are long-term and are likely to improve the existing condition of the primary constituent

elements of critical habitat for the Little Colorado spinedace. Some of the long-term benefits may be lost if and when a Participant chooses to return a property to baseline condition, but this will not degrade the existing condition of the primary constituent elements of Little Colorado spinedace critical habitat.

Loach Minnow

After reviewing the current status of the loach minnow, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of associated Agreement, as proposed, are not likely to jeopardize the continued existence of the loach minnow, and are not likely to destroy or adversely modify proposed critical habitat. In making our determination, we considered the following:

- The status of loach minnow has been declining rangewide and is found in only 15% of its former range. In occupied areas, it is common to very rare.

- The action area contains seven watersheds with streams occupied by loach minnow that are of mixed ownership, Federal and non-Federal.

- Proposed critical habitat is both in the action area and in the covered area of the Agreement. This includes all of Complex 2 and the Arizona portion of Complex 4 (70 FR 75546 and 71 FR 32496).

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land-use practices that are beneficial to Chiricahua leopard frogs should be beneficial or neutral for loach minnow.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for loach minnow.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse effect on loach minnow, but as these are also nonnative competitors and predators of loach minnow, the long-term benefits should compensate for any short-term effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in predation on eggs, fry, and young-of-year life stages of loach minnow, but predation of fish by Chiricahua leopard frogs, while possible, is rare and would not be noticed against baseline levels of mortality for young life stages of loach minnow. Loach minnow may

also feed on Chiricahua leopard frogs. This would reestablish or maintain the natural predator-prey relationship between the species.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of loach minnow habitat. This would only affect improvements to loach minnow habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of loach minnow habitat that currently exists in the action area.

6. The potential adverse effects on primary constituent elements in proposed critical habitat units within the action area are localized and short-term. The potential beneficial effects are long-term and are likely to improve on the existing condition of the primary constituent elements within proposed critical habitat for the loach minnow. Some of the long-term benefits may be lost if and when a Participant chooses to return a property to baseline condition, but this will not degrade the existing condition of the primary constituent elements of proposed loach minnow critical habitat.

Razorback Sucker

After reviewing the current status of the razorback sucker, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of associated Agreement, as proposed, are not likely to jeopardize the continued existence of the razorback sucker, and are not likely to destroy or adversely modify designated critical habitat. In making our determination, we considered the following:

- The status of the razorback sucker is declining in the lower Colorado River basin as the existing adult population ages in the reservoir habitats it now occupies. Through management of water levels, intense efforts to promote successful reproduction, and augmentation of existing populations, it is hoped that recruitment into the aging adult population will be successful.

- Despite reestablishment efforts in the Gila River watershed, razorback suckers are considered likely extirpated from this portion of the action area. In the Verde River watershed, efforts are ongoing in hope of reestablishing a viable population outside of the Colorado River within Arizona.

- Designated critical habitat for the razorback sucker within the action area includes the reach along the Verde River from Camp Verde south to approximately five miles south of the East Verde River, and along the Salt River from Cherry Creek to the US Highway 60/ State Route 77 Bridge. The land ownership within these critical habitat reaches includes both Federal and non-Federal ownership.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial or neutral for razorback sucker.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for razorback suckers in conjunction with ongoing and future reestablishment efforts.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse effect on razorback suckers, but as these are also nonnative competitors and predators of razorback suckers, the long-term benefits should compensate for any short-term adverse effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in the predation on eggs, fry, and young-of-year life stages of razorback suckers, but predation of fish by Chiricahua leopard frogs, while possible, is rare and would not be noticed against baseline levels of mortality for young life stages of razorback suckers.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of razorback sucker habitat. This would only affect improvements to razorback sucker habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of razorback sucker habitat that currently exists in the action area.

6. The potential adverse effects on primary constituent elements in razorback sucker critical habitat units within the action area are localized and short-term. The potential beneficial effects are long-term and are likely to improve the existing condition of the primary constituent elements. Some of the long-term benefits may be lost if and when a Participant chooses to return a property to baseline condition, but this will not degrade the existing condition of the primary constituent elements of razorback sucker critical habitat.

Sonora Chub

After reviewing the current status of Sonora chub, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Sonora chub, and are not likely to destroy or adversely modify designated critical habitat. In making our determination, we considered the following:

- Sonora chub have an extremely limited range in Arizona. The streams in which they occur are intermittent, but the population remains intact and secure.

- The Arizona range of the Sonora chub is all within the action area, and ephemeral sections of California Gulch are within the Agreement's covered area.

- Critical habitat for this species is only designated on Federal lands; therefore, there is no critical habitat within the covered area of the Agreement.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land-use practices that are beneficial to Chiricahua leopard frogs should be beneficial or neutral for Sonora chub.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for Sonora chub.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse effect on Sonora chub, but as these are also nonnative competitors and predators of Sonora chub the long-term benefits should compensate for any short-term effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in predation on eggs, fry, and young-of -year life stages of Sonora chub, but predation of fish by Chiricahua leopard frogs, while possible, is rare and would not be noticed against baseline levels of mortality for young life stages of Sonora chub. Furthermore, Sonora chub in Sycamore Canyon continue to co-exist with Chiricahua leopard frogs, and any effect of this Agreement on Sonora chub will be inconsequential. Sonora chub may also feed on Chiricahua leopard frogs.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of Sonora chub habitat. This would only affect improvements to Sonora chub habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of Sonora chub habitat that currently exists in the action area.

6. The potential adverse effects on primary constituent elements in Sonora chub critical habitat units within the action area are localized and short-term. The potential beneficial effects are long-term and are likely to improve on the existing condition of the primary constituent elements of Sonora chub critical habitat units. Some of the long-term benefits may be lost if and when a Participant chooses to return a property to baseline condition,

but this will not degrade the existing condition of the primary constituent elements of Sonora chub.

Sonora Tiger Salamander

After reviewing the current status of the Sonora tiger salamander, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Sonora tiger salamander. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- The Sonora tiger salamander's status appears to be stable, but threats have not been reduced and the subspecies remains at risk throughout its range.

- In the action area, recovery efforts on private lands are expected to reduce existing threats, and threats on Federal lands do not seem to be increasing. Disease and non-native predators and competitors are still threats within the action area.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial for Sonora tiger salamanders.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for Sonora tiger salamanders.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse effect on Sonora tiger salamanders, but as these are also nonnative competitors and predators of Sonora tiger salamanders, the long-term benefits should compensate for any short-term adverse effects to Sonora tiger salamanders.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in the predation on all life stages of Sonora tiger salamanders, but the two species currently coexist throughout the range of the Sonora tiger salamander. Sonora tiger salamanders may also feed on Chiricahua leopard frog eggs and tadpoles. However, this predation is assumed to be at naturally sustainable levels that both species, on a population level, can tolerate, as these species were part of the historical aquatic and riparian community within this portion of their ranges.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of Sonora tiger salamander habitat. This would only affect improvements to

Sonora tiger salamander habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of Sonora tiger salamander habitat that currently exists in the action area.

Spikedace

After reviewing the current status of spikedace, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the spikedace, and are not likely to destroy or adversely modify proposed critical habitat. In making our determination, we considered the following:

- The status of spikedace throughout its range has continued to decline. It is currently found in only 10% of its historical range, and a proposal to reclassify spikedace as endangered is pending; however, it has been precluded by higher priority listing actions (USFWS 1994).

- In the action area, spikedace are rare to uncommon in portions of Eagle Creek, the San Francisco River, and the upper Verde River where it is found.

- Critical habitat for the spikedace has been proposed in the Verde River, lower and upper reaches of the Gila River, Aravaipa Creek, and portions of Eagle Creek. The portion of the Verde River that is within the action area is part of proposed critical habitat Complex 1 and all of proposed Complex 4, along Eagle Creek, is within the action area. In the action area, both complexes contain a mix of Federal and non-Federal ownership, the latter of which would be within the covered area of the Agreement.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial for spikedace.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for spikedace.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse effect on spikedace, but as these are also nonnative competitors and predators of spikedace, the long-term benefits should compensate for any short-term effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in predation on all life stages of spikedace, but predation of fish by Chiricahua leopard frogs, while possible, is rare and would not be noticed against baseline levels of mortality for spikedace. Spikedace may also feed on eggs and small tadpoles of Chiricahua leopard frogs. This would reestablish or maintain the natural predator-prey relationship between the species.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of spikedace habitat. This would only affect improvements to spikedace habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of spikedace habitat that currently exists in the action area.

6. The potential adverse effects on primary constituent elements in proposed spikedace critical habitat within the action area are localized and short-term. The potential beneficial effects are long-term and are likely to improve the existing condition of the primary constituent elements of spikedace critical habitat units. Some of the long-term benefits may be lost if and when a Participant chooses to return a property to baseline condition, but this will not degrade the existing condition of the primary constituent elements of proposed spikedace critical habitat.

Stephan's Riffle Beetle

After reviewing the current status of the Stephan's riffle beetle, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Stephan's riffle beetle. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- Stephan's riffle beetle populations appear to be stable on Federal lands, but it has an extremely small distribution.

- The status of this species is dependent on limited aquatic resources within one canyon.

- Stephan's riffle beetles are highly vulnerable to stochastic events like wildland fire and floods.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. There are no anticipated effects to the Stephan's riffle beetle from management improvements, construction of water related facilities, control of nonnative species, or direct effects from reestablishment of Chiricahua leopard frogs, as the only known sites are on Federal lands and are not within the covered area of the permit.

2. Indirect effects form reestablishment of Chiricahua leopard frogs may occur from frogs dispersing into the known habitat of the Stephan's riffle beetle. Such dispersal may result in an increase in predation on Stephan's riffle beetle, but the aquatic habitats of Stephan's riffle beetle are complex, with adequate cover, and population-level effects are not anticipated.

Three Forks Springsnail

After reviewing the current status of the Three Forks springsnail, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Three Forks springsnail. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- Three Forks springsnails are within the action area in two aquatic sites on Federal land.
- Chiricahua leopard frogs already co-exist with this species.
- The largest impact to this species seems to be drought, degradation of habitat by wildlife, and potential recreational impacts.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. There are no anticipated effects to the Three Forks springsnail from management improvements, construction of water related facilities, control of nonnative species, or direct effects from reestablishment of Chiricahua leopard frogs, as the only known sites are on Federal lands and are not within the covered area of the permit.

2. Indirect effects from reestablishment of Chiricahua leopard frogs may occur from frogs dispersing into the known habitat of the Three Forks springsnail. Such dispersal may result in an increase in predation on Three Forks springsnails, but snails do not make up the majority of a frog's diet, Chiricahua leopard frogs are not a novel predator of Three Forks springsnails, and springsnail habitat is complex, with adequate cover, and population-level effects are not anticipated.

Yaqui Fishes

After reviewing the current status of the Yaqui Fishes - beautiful shiner, Yaqui catfish, Yaqui chub and Yaqui topminnow, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of associated Agreement, as proposed, are not likely to jeopardize the continued existence of the beautiful shiner, Yaqui catfish, Yaqui chub and Yaqui

topminnow, and are not likely to destroy or adversely modify designated critical habitat of beautiful shiner, Yaqui catfish, and Yaqui chub. No critical habitat has been designated for Yaqui topminnow; therefore, none will be affected. In making our determination, we considered the following:

- The status of the Yaqui fishes is stable, but they are at risk because of the general condition of the watershed within the United States. These fish are also in the Rio Yaqui drainage in Mexico, but the status in Mexico is unknown. Based upon current land-management practices and development in the drainage, it is assumed that these species are declining and are at further risk in Mexico.

- Inside the action area, these fish are primarily located on the SBNWR. Yaqui chub are also in Leslie Creek on the LCNWR. Occasionally, Yaqui topminnow and chub are found in Astin Spring on the Malpai Ranch, but it is occupied only periodically. Yaqui catfish and chub were reestablished in West Turkey Creek on the El Coronado Ranch. These last two locations are on non-Federal land and within the covered area of the Agreement. Chiricahua leopard frogs are found in all of these sites, except West Turkey Creek.

- Critical habitat for beautiful shiner, Yaqui catfish and Yaqui chub is designated on the SBNWR within the action area, but no critical habitat is designated within the covered area of the Agreement.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications of existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial the Yaqui fish.

2. The construction of livestock tanks, water wells, pipelines, and fences may have adverse effects, but they will be highly localized and temporary. Construction of such features would further provide for improved management of livestock in aquatic and riparian habitats, thus providing a long-term benefit for Yaqui fish.

3. The control of nonnative competitors and predators of Chiricahua leopard frogs could have a short-term adverse effect to Yaqui fishes, but as these are also nonnative competitors and predators of Yaqui fish, the long-term benefits should compensate for any short-term effects.

4. The reestablishment of Chiricahua leopard frogs may result in an increase in the predation on eggs, fry, young-of-year, and adult life stages of some or all Yaqui fish, but predation of fish by Chiricahua leopard frogs, while possible, is rare and would not be noticed against baseline levels of mortality for the Yaqui fishes. Yaqui fishes, particularly the Yaqui catfish and Yaqui chub, may also feed on Chiricahua leopard

frogs. Furthermore, Chiricahua leopard frogs already co-exist in all the known locations of these fish within the action area, except West Turkey Creek.

5. The return of an enrolled property to baseline condition could result in the loss or degradation of Yaqui fishes' habitat. This would only affect improvements to Yaqui fishes' habitat that occurred as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the amount or quality of Yaqui fishes' habitat that currently exists in the action area.

6. The potential adverse effects on primary constituent elements in beautiful shiner, Yaqui catfish and Yaqui chub critical habitat units within the action area are localized and short-term. The potential beneficial effects are long-term and are likely to improve the existing condition of the primary constituent elements within these critical habitat units. Some of the long-term benefits may be lost if and when a Participant chooses to return a property to baseline condition, but this will not degrade the existing condition of the primary constituent elements of beautiful shiner, Yaqui catfish and Yaqui chub critical habitat.

RIPARIAN SPECIES

Canelo Hills Ladies' tresses

After reviewing the current status of Canelo Hills ladies' tresses, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Canelo Hills ladies' tresses. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- Canelo Hills ladies' tresses are located in five ciénegas, one of which occurs on Federal land and the others on non-Federal lands. One of these latter populations is on land owned by The Nature Conservancy. The remaining three populations on private land may be subjected to a number of potential threats to ciénega vegetation that is legal under state law without section 7 consultation under the Act.

- All populations are within the action area, and the four populations on non-Federal land are within the covered area.

- All populations are threatened by stochastic events, such as flooding and catastrophic fire.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications of existing land-use practices that are beneficial to Chiricahua leopard frogs should be beneficial to Canelo Hills ladies' tresses.

2. The construction of livestock tanks, water wells, pipelines, and fences is unlikely to occur where it would directly affect existing populations of Canelo Hills ladies' tresses. There may be some short-term downstream effects from increased sedimentation, but this should be compensated for through long-term improvements in management of livestock and other land-use practices in the ciénegas were this species is found.

3. The control of nonnative competitors and predators and reestablishment of Chiricahua leopard frogs could have short-term adverse effects from human trampling of Canelo Hills ladies' tresses and associated habitat. There should be no long-term negative effects of these activities on the Canelo Hills ladies'-tresses.

Huachuca Water Umbel

After reviewing the current status of the Huachuca water umbel, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Huachuca water umbel, and are not likely to destroy or adversely modify designated critical habitat. In making our determination, we considered the following:

- The Huachuca water umbel is currently known from the San Pedro, Santa Cruz, Rio Yaqui, and Rio Sonora drainages. It has been extirpated from six of 27 known localities.

- The action area contains all of the locations of Huachuca water umbel in Arizona. Threats include residential and municipal ground water withdrawal, invasion of nonnative plant species, degradation of hydrological function, and direct impacts from land uses like grazing and recreation.

- All or part of each Huachuca water umbel critical habitat unit(s) is located within the action area. Portions of the Sonoita Creek (Unit 1), upper Santa Cruz River (Unit 2), Scotia Canyon (Unit 3), Bear Canyon, an unnamed tributary, Lone Mountain Canyon, and Rattlesnake Canyon (Unit 6), and San Pedro River (Unit 7) units contain non-Federal lands and are within the covered area of the Agreement.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to the management of existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial to Huachuca water umbel.

2. The construction of livestock tanks, water wells, pipelines, and fences is unlikely to occur where it would directly affect existing populations of Huachuca water umbel. There may be some short-term downstream effects from increased sedimentation, but this should be compensated for through long-term improvements in management of livestock and other land-use practices in areas where this species is found.

3. The control of nonnative competitors and predators and reestablishment of Chiricahua leopard frogs could have short-term adverse effects from human trampling of Huachuca water umbels and their habitat. There should be no long-term negative effects of these activities on the Huachuca water umbel.

4. Construction activities that could adversely affect primary constituent elements of Huachuca water umbel critical habitat are not expected to occur in wetted soil that is habitat for this species. Some short-term effects could occur from construction of fences and water pipelines, but these would not result in long-term effects to primary constituent elements. The improvements in management of livestock as a result of this type of construction should result in long-term improvements to critical habitat.

5. The return to baseline may, in some circumstances, reduce the improvements to primary constituent elements of Huachuca water umbel critical habitat. However, any loss or degradation to primary constituent elements will be limited to those improvements gained through Agreement participation and implementation. Therefore, returning a property to baseline will not degrade the existing condition of the primary constituent elements of Huachuca water umbel critical habitat

Southwestern Willow Flycatcher

After reviewing the current status of southwestern willow flycatcher, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the southwestern willow flycatcher, and are not likely to destroy or adversely modify designated critical habitat. In making our determination, we considered the following:

- Southwestern willow flycatchers are widely distributed in small isolated breeding groups. Only three percent of known breeding groups are made up of more than 50 territories. Since listing, the number of known territories has increased to over 1,200 pairs throughout its range. Water withdrawal, water diversions, livestock grazing, dam operations, and impoundments are still threats to this riparian species.

- In the action area, southwestern willow flycatchers breed along the Verde River, Upper reaches of the Little Colorado River watershed, portions of the San Francisco and Salt rivers, Tonto Creek, and the San Pedro River. Migratory southwestern willow flycatchers can be found along any southwestern river drainage with a riparian gallery forest.

- Critical habitat includes portions of the Virgin River, Verde River, Gila River, Salt River, Tonto Creek, San Pedro River, Little Colorado River, and Big Sandy River. The action area includes all of the Little Colorado Management Unit, the upper half of Tonto Creek and the upstream portion of the Salt River at Cherry Creek in the Roosevelt MU, and the portion of the Verde River MU along the Verde River from approximately Fossil Creek to Camp Verde. All the portions of MUs in the action area are on non-federally owned land, and are, therefore, also within the covered area of the Agreement. Primary constituent elements of southwestern willow flycatcher critical habitat include riparian habitat in a dynamic successional riverine environment and a variety of insect prey populations in or near riparian floodplains or moist environments.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications to existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial to southwestern willow flycatchers and their habitat. They should also further improve the primary constituent elements of designated southwestern willow flycatcher critical habitat.

2. Livestock tanks and water wells are not likely to be constructed within southwestern willow flycatcher habitat. Water distribution pipelines and fences may cross or parallel existing southwestern willow flycatcher habitat. Disturbance of southwestern willow flycatchers may occur if construction occurs in or adjacent to existing habitat. During the nesting season, this may result in disrupting incubation or feeding, or it could result in nest abandonment. Disturbance of habitat would be short-term and localized. Construction may result in short-term adverse effects to the primary constituent elements of southwestern willow flycatcher critical habitat, but as livestock tanks, water wells, pipelines, and fences would be constructed to reduce impacts to aquatic and riparian communities, these activities should result in long-term improvement to the primary constituent elements of critical habitat.

3. Human disturbance from activities related to the control of nonnative competitors and predators of Chiricahua leopard frogs and the return to baseline condition could have a short-term adverse effect on southwestern willow flycatchers during the breeding season from increased human disturbance and diminished aquatic insect densities if piscicides are used. These are both short-term impacts and should no have long-term effects on individuals or primary constituent elements of critical habitat.

4. The return of an enrolled property to baseline condition could result in the loss of riparian forest that could provide breeding habitat for southwestern willow flycatcher. This would only affect riparian forests that have developed as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the available southwestern willow flycatcher habitat that currently exists in the action area.

5. The reestablishment of Chiricahua leopard frogs could have a short-term adverse effect on southwestern willow flycatchers during the breeding season from increased human disturbance. Competition for invertebrate prey items is not likely since invertebrates are rarely a limiting food resource. Frogs are limited to feeding on prey within a few inches of the ground or water, which should be adequate niche separation to avoid competition between Chiricahua leopard frogs and southwestern willow flycatchers.

6. The return to baseline may, in some circumstances, reduce the improvements to primary constituent elements of southwestern willow flycatcher critical habitat. However, any loss or degradation to primary constituent elements will be limited to those improvements gained through Agreement participation and implementation. Therefore, returning a property to baseline will not degrade the existing condition of the primary constituent elements of southwestern willow flycatcher critical habitat.

Western Yellow-billed Cuckoo

After reviewing the current status of the Western yellow-billed cuckoo, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the western yellow-billed cuckoo. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- The status of western yellow-billed cuckoo is declining. However, the species is still present in all watersheds in its historical range.

- Documented declines in riparian vegetation due to river-flow management, stream channelization, livestock grazing, and prolonged drought have affected the status of the western yellow-billed cuckoo.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications of existing land-use practices that are beneficial to Chiricahua leopard frogs should also be beneficial for western yellow-billed cuckoos and riparian vegetation.

2. Livestock tanks and water wells are not likely to be constructed within yellow-billed cuckoo habitat. Water distribution pipelines and fences may cross or parallel existing western yellow-billed cuckoo habitat. Disturbance of western yellow-billed cuckoos may occur if construction occurs in or adjacent to existing habitat. During the nesting season, this may result in disrupting incubation or feeding, or it could result in nest abandonment. Disturbance of habitat would be short-term and localized.

3. Human disturbance from activities related to the control of nonnative competitors and predators of Chiricahua leopard frogs and the return to baseline condition could have a

short-term adverse effect on western yellow-billed cuckoos during the breeding season from increased human disturbance and diminished aquatic insect densities if piscicides are used. These are both short-term impacts and should no have long-term effects on individuals or primary constituent elements of critical habitat.

4. The return of an enrolled property to baseline condition could result in the loss of riparian gallery forest that could provide breeding habitat for western yellow-billed cuckoos. This would only be of riparian forest that has developed as the result of Agreement-related activities and would be habitat enhancements above the pre-enrolled condition on the property. Therefore, it would not reduce the available western yellow-billed cuckoo habitat that currently exists in the action area.

5. The reestablishment of Chiricahua leopard frogs could have short-term adverse effects on western yellow billed-cuckoos during the breeding season as a result of increased human disturbance. Competition for invertebrate prey items is not likely since invertebrates are rarely a limiting food resource. Frogs are limited to feeding on prey within a few inches of the ground or water, which should be adequate niche separation to avoid competition between Chiricahua leopard frogs and western yellow billed-cuckoos.

UPLAND SPECIES

Cochise Pincushion Cactus

After reviewing the current status of the Cochise pincushion cactus, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of the associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Cochise pincushion cactus. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- The range of the Cochise pincushion cactus is entirely within the action area and the covered area of the Agreement. The number of plants has been declining since plant numbers have been monitored, with the exception of 1993. A decrease in plant numbers and reproductive effort has been observed since 1994.

- Numbers of large plants within monitoring plots appear stable, and these plants produce the largest number of flowers and fruits.

- Impacts from livestock grazing have been observed related to occasional trampling of individuals on the monitoring plots. Loss of individuals also been observed related to illegal border activities and collection by cactus collectors. However, observed declines seem to be primarily associated with regional rainfall patterns.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications of existing land-use practices that are beneficial to Chiricahua leopard frogs should not have an impact on the Cochise pincushion cactus.

2. The construction of livestock tanks, water wells, pipelines, and fences is unlikely to occur where it would affect this species. Cochise pincushion cacti occur in areas where the soil is well drained and rocky. Fences and pipelines may be constructed in this area, which could have adverse effects on this species through livestock trailing along the new fences and the potential introduction of nonnative invasive weeds along new fences and pipelines.

3. The control of nonnative competitors and predators and reestablishment of Chiricahua leopard frogs would not occur near this species and should have no affect on the Cochise pincushion cactus.

Pima Pineapple Cactus

After reviewing the current status of the Pima pineapple cactus, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the issuance of the section 10(a)(1)(A) permit and approval of associated Agreement, as proposed, are not likely to jeopardize the continued existence of the Pima pineapple cactus. No critical habitat has been designated for this species; therefore, none will be affected. In making our determination, we considered the following:

- The Pima pineapple cactus is declining within its range, primarily due to the conversion of native plant communities to urban communities.

- The action area and Agreement's covered area include a minor portion of the range of the Pima pineapple cactus, primarily at the upper extent of the cactus' elevational range.

In summary, our conclusions are based on the record of this consultation, including the Agreement, correspondence and meetings with AGFD, the information outlined in this BO, and the following:

1. Modifications of existing land-use practices that are beneficial to Chiricahua leopard frogs should not have an impact on the Pima pineapple cactus.

2. The construction of livestock tanks, water wells, pipelines, and fences may adversely affect the Pima pineapple cactus through the possible loss of individuals and temporary disturbance of Pima pineapple cactus habitat. Construction of new livestock tanks and water wells would also result in permanent loss of Pima pineapple cactus individuals and habitat, but it is expected that there would be fewer than three of these features constructed per square mile. Fences and pipelines may be constructed in this area, which could have adverse effects on this species through livestock trailing along the new fences and the potential introduction of nonnative invasive weeds along new fences and pipelines. The effect of the permanent loss of Pima pineapple cactus habitat would be

reduced through management improvements, specifically livestock grazing, that this infrastructure and ranch-management plans would promote.

3. The control of nonnative competitors and predators and reestablishment of Chiricahua leopard frogs would not occur near this species and should have no affect on Pima pineapple cactus.

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

INCIDENTAL TAKE STATEMENT

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

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

AMOUNT OR EXTENT OF INCIDENTAL TAKE

CHIRICAHUA LEOPARD FROG

The actual levels of incidental take of Chiricahua leopard frogs that will occur under the Agreement are difficult to quantify. Due to the explosive reproductive potential of this species, it is difficult to know specific leopard frog population levels at any given time, both throughout the covered area and within individual sites enrolled in the Agreement. Therefore, it is more

appropriate to discuss incidental take in terms of population sites. In addition, the number of landowners and the degree to which they elect to participate in the Agreement over the 50-year term of the Agreement and associated section 10(a)(1)(A) permit are not known. In particular, it is unclear how many Participating Landowners and Neighbors will elect to return lands enrolled under the Agreement to their baseline conditions over the life of the Agreement. AGFD and the USFWS believe, in most cases, that Participating Landowners and Neighbors will not elect to return enrolled lands to baseline conditions, because livestock tanks and other aquatic sites are essential features to livestock ranching, which is the primary land-use activity occurring in the covered area, and because the conservation measures are designed to be compatible with livestock ranching. In any case, the conservation benefits to Chiricahua leopard frogs anticipated as a result of the Agreement are expected to more than balance the relatively minimal levels of take anticipated as a result of the activities described above. Therefore, the level of take anticipated is:

- Up to all individuals at all population sites established under the Agreement that are above the baseline condition of all life stages captured, held, and released as part of conservation measures to minimize mortality during stock tank maintenance, operation, and implementation of conservation actions as part of the Agreement.

- Up to all individuals in all population sites established under the Agreement through implementation of conservation activities under this Agreement, ongoing and pre-existing land-use activities, and land treatment activities on an enrolled property that are above the baseline condition.

- All frogs, above baseline condition, at enrolled sites that are returned to baseline condition.

The Agreement and its associated section 10(a)(1)(A) permit will authorize incidental take of leopard frogs on non-Federal lands as a result of the following specific landowner activities:

1. "Routine" stock tank repair and maintenance or "emergency" stock tank repair and maintenance;

2. Construction of any stock-tank improvement projects or facilities needed for frog management purposes and specifically described in the landowner's Certificate of Inclusion, including water wells, fences, pipelines, or any supporting construction activities associated with such projects;

3. Capture, translocation, and/or temporary holding of leopard frogs during tank maintenance and improvement activities, if necessary to minimize mortality or injury to frogs, or to implement the Agreement's conservation program;

4. Livestock grazing and use either in the immediate vicinity of any stock tanks that support leopard frogs (e.g., resulting in destruction of egg masses or tadpoles) or at other non-Federal ranch locations (e.g., resulting in take of migrating frogs);

5. Livestock grazing and land use where such use results in take of leopard frogs as a result of inadvertent disease transmission, provided that the landowner has undertaken necessary measures to minimize such take as described in the Agreement;

6. Any normal day-to-day ranch management activity, such as operation of cars and trucks, if such activities result in occasional and inadvertent taking of frogs moving across roads or other ranch properties;

7. Management actions to remove nonnative aquatic competitors and predators of Chiricahua leopard frogs, which may cause harassment and possibly mortality through bi-catch, trampling, and use of piscicides;

8. Returning an enrolled property to baseline conditions;

9. Land treatments, such as prescribed fire, mechanical shrub removal, and herbicide use;

10. Wildlife-related and outdoor recreational activities; and

11. Land uses, other than ranching, that occur on an enrolled property.

Under the current listing of the Chiricahua leopard frog as a threatened species, operation and maintenance of stock tanks (1 and 4 above) are covered on non-Federal lands by the 4(d) rule included in the final rule to list this species (65 FR 37343). Take as defined in section 3 (18) of the Act, as a result of these activities is authorized under the 4(d) rule, unless the Chiricahua leopard frog is reclassified to endangered or the 4(d) rule is invalidated. Typical ways in which leopard frogs might be taken during these activities is described in the Agreement, as are the measures that will be undertaken under this Agreement to minimize take of leopard frogs during these activities. Except with respect to numbers 8 through 11 above, these measures are designed specifically to ensure that leopard frog populations inhabiting affected stock tanks and other sites continue to survive. This Agreement and the associated section 10(a)(1)(A) permit do not authorize deliberate direct take of Chiricahua leopard frogs, e.g. capture (not directly related to implementation of the Agreement), collection, or hunting.

Take of Chiricahua leopard frogs may also occur related to the capture, transport, release, and additional monitoring. The effects of this source of take will be analyzed separately under the issuance of section 10(a)(1)(A) research and recovery permits to qualified individuals and agencies conducting such work.

Take authorizations are contingent on adequate implementation of all commitments in the Agreement. The Agreement does not authorize take below the established baseline for any activity, except for those activities associated with translocation, salvage and holding, and habitat enhancement, which are expected to have short-term effects. Additional incidental take authority below established baseline for a property would need to be obtained through another permitting process such as a permit and habitat conservation plan under section 10(a)(1)(B) of the Act.

AQUATIC SPECIES

We anticipate that incidental take of Apache trout, beautiful shiner, desert pupfish, Gila chub, Gila topminnow, Gila trout, headwater chub, Huachuca springsnail, Little Colorado spinedace, loach minnow, razorback sucker, Sonora chub, Sonora tiger salamander, spikedace, Stephan's riffle beetle, Three Forks springsnail, Yaqui topminnow, Yaqui catfish, and Yaqui chub will be difficult to detect for the following reasons: incidental take may not be obvious during or immediately after actions are conducted because these species have small body sizes during at least part of their life history, finding a dead or impaired specimen is unlikely, and losses may be masked by seasonal fluctuations in numbers or other causes (e.g., oxygen depletions). Therefore, the levels of incidental take discussed below will be considered to have been exceeded for any Aquatic Species at a given site if 10 dead individuals of any Aquatic Species, are found at or immediately downstream from an enrolled property on which an Agreement-related construction project is underway or recently completed, and such mortality can be reasonably attributable to such construction. We anticipate the following levels of incidental take:

- 5 adult Sonora tiger salamanders, on average annually, from any Agreement-related construction in an occupied livestock tank. This level of incidental take assumes that most livestock tank maintenance will occur when the livestock tank is dry and any construction in wet sites will have a reduced impact area.

- Individuals of immature stages (eggs, larvae, fry, metamorphs, and pupae) of the Aquatic Species within and immediately downstream of any Agreement-related construction project.

- Individuals of any listed Aquatic Species present within an occupied aquatic site, on a single covered property from using mechanical methods or piscicides to control nonnative predators or competitors of Chiricahua leopard frogs.

- Individuals of a size class, cohort, or life stage within a population of any Aquatic Species as a result of predation by Chiricahua leopard frogs that have been reestablished in a covered site or have dispersed from a covered site. Take will be exceeded at the point when a size class, cohort, or life stage is missing from population monitoring of Aquatic Species after Chiricahua leopard frogs are placed or disperse into the habitat of one or more Aquatic Species. The total amount of take, from Chiricahua leopard frog predation, on these species is anticipated to be extremely small, as vertebrates are a minor portion of the Chiricahua leopard frog diet. Population-level effects on these Aquatic Species are not anticipated.

- In regard to Aquatic Species that colonize enrolled properties after enrollment, all individuals of said Aquatic Species present from activities related to the return of an enrolled property to baseline conditions for Chiricahua leopard frogs.

With the exception of the Sonora tiger salamander, we do not anticipate Agreement-related incidental take of any Aquatic Species present on covered properties to a level that would cause or is likely to cause the loss of a population of said species. We make this finding

because: 1) these species are unlikely to colonize isolated aquatic sites on enrolled properties, and 2) in streams or rivers, the enrolled property will almost certainly be part of a larger aquatic system, and the Aquatic Species present on the enrolled property would be part of a larger population. The Sonora tiger salamander is the only Aquatic Species likely to colonize isolated enrolled aquatic sites, owing to its ability to move overland among ponds within its limited range in the San Rafael Valley. If an enrolled property is taken back to baseline for the Chiricahua leopard frog in the San Rafael Valley, we would anticipate that any a co-occurring population of Sonora tiger salamanders could be eliminated, as well. If any Aquatic Species are purposely introduced to enrolled sites, or occur at those sites prior to enrollment, incidental take of those species will be addressed in separate 10(a)(1)(A) or 10(a)(1)(B) permits, as appropriate. If incidental take appears as if it is likely to cause loss of an Aquatic Species population other than the Sonora tiger salamander, we would evaluate the need and potentially reinitiate consultation, as well as work with AGFD and the enrolled property owner to avoid or minimize such incidental take in accordance with the Permit terms and conditions, or recommend that enrolled property owners seek authorization for such take through section 10(a)(1)(B). A separate section 10(a)(1)(A) permit will authorize incidental take of Aquatic Species as a result of capture, translocation, and/or temporary holding of Aquatic Species to reduce the level of incidental take from a Chiricahua leopard frog conservation activity under this Agreement.

RIPARIAN SPECIES

The FWS anticipates incidental take of southwestern willow flycatchers and western yellow-billed cuckoos in the form of harm and harassment as a result of this proposed action. The level of incidental take anticipated is:

- Up to 20 nesting and/or migrant southwestern willow flycatchers, for the duration of the Agreement may be taken as a result of disturbance during Agreement-related construction, nonnative species control, reestablishment, monitoring activities, loss of prey species during and immediately after control of nonnative aquatic predators or competitors of Chiricahua leopard frogs, and during return to baseline conditions.

- Up to 10 southwestern willow flycatcher nests, for the duration of the Agreement including all eggs, hatchlings, or fledglings as a result of Agreement-related construction, nonnative species control, reestablishment, return to baseline conditions, and monitoring activities.

- Up to 20 nesting western yellow-billed cuckoos, for the duration of the Agreement, may be taken as a result of disturbance during Agreement-related construction, nonnative species control, reestablishment, monitoring activities, loss of prey species during and immediately after control of nonnative aquatic predators or competitors of Chiricahua leopard frogs, and return to baseline conditions.

- Up to 10 western yellow-billed cuckoo nests, for the duration of the Agreement including all eggs, hatchlings, or fledglings may be taken indirectly as a result of Agreement-

related construction, nonnative species control, reestablishment, return to baseline, and monitoring activities.

We do not anticipate Agreement-related incidental take of any Riparian Species present on covered properties to a level that would cause or is likely to cause the loss of a population of said species. Southwestern willow flycatchers and yellow-billed cuckoos both require extensive tracts of riparian woodland; thus they are unlikely to colonize an enrolled site, which will likely be too small to support these species, or if colonization occurred, the individual birds would almost certainly be part of a larger population that inhabits riparian woodland adjacent to or contiguous with the enrolled site. Nonetheless, if incidental take appears as if it is likely to result in population loss, we would evaluate the need and potentially reinitiate consultation, as well as work with AGFD and the enrolled property owner to avoid or minimize such incidental take in accordance with the Permit terms and conditions, or recommend that enrolled property owners seek authorization for such take through section 10(a)(1)(B). If Riparian Species occur at sites prior to enrollment, incidental take of those species will be addressed in separate 10(a)(1)(A) or 10(a)(1)(B) permits, as appropriate.

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

UPLAND SPECIES

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants is provided to the extent that the Act prohibits the removal and possession of federally-listed endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State law or in the course of any violation of a State criminal trespass law.

EFFECT OF THE TAKE

In this BO, the FWS determines that the level of anticipated take of any species analyzed above is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat. We base this upon the following:

- The overall effects to species will be generally beneficial, and any adverse effects will be minimal and localized;

- Return of properties to baseline conditions would only affect improvements in habitat or population numbers over the species' current environmental baseline;

- Any adverse affects to primary constituent elements of designated or proposed critical habitat is anticipated to be temporary or to improve conditions over the species' current environmental baseline; and

- The overall effect of permit issuance and implementation of the Agreement will contribute to the recovery of the Chiricahua leopard frog and other listed species within its historical range.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

The Agreement clearly identifies the management activities that will be implemented to provide a net conservation benefit and contribute to recovery of Chiricahua leopard frogs covered by the section 10(a)(1)(A) permit. The anticipated impacts to Chiricahua leopard frogs likely to result from the proposed actions and the return to baseline conditions by participants under the Agreement have been identified in the Agreement. All management activities described in the Agreement and any section 10(a)(1)(A) permit are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this incidental take statement pursuant to 50 CFR §402.14(i). The terms of the Agreement and the terms and conditions of the 10(a)(1)(A) permit are adequate to minimize the effect of incidental take and thus serve as reasonable and prudent measures/terms and conditions for purposes of this BO. Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(A) and section 7(o)(2) of the Act to apply. If the AGFD and the participants fail to adhere to these terms and conditions, the protective coverage of the Section 10(a)(1)(A) permit and section 7(o)(2) may lapse. However, the FWS and AGFD may agree that modifications to the management activities are needed. The process for modifications in management activities to be incorporated is described within the Agreement. These new modifications will be incorporated as reasonable and prudent measures, superceding the former management activities.

The prohibitions against taking listed species under section 9 of the Act do not apply to candidate species (Headwater chub, Huachuca springsnail, Stephan's riffle beetle, Three Forks springsnail, and western yellow-billed cuckoo). However, the FWS and AGFD will implement the provisions of the Agreement and terms and conditions of the 10(a)(1)(A) permit that will minimize the effects to these species. If this conference opinion is adopted as a BO following a listing or designation, these measures will be nondiscretionary.

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

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species, initial notification must be made to the FWS Law Enforcement Office, 2450 W. Broadway Rd, Suite 113, Mesa, Arizona, 85202, telephone: 480/967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if

possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

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

1. We recommend that AGFD evaluate all implementation sites within the known range of Canelo Hills ladies' tresses, Huachuca water umbel, Cochise pincushion cactus, and Pima pineapple cactus to avoid trampling or destroying individual plants and unnecessary habitat destruction.

2. We recommend that AGFD consider reestablishment of appropriate listed Aquatic Species in conjunction with Agreement activities where a willing landowner consents to such actions.

3. We recommend that AGFD discuss other conservation activities with landowners to improve ecosystem management and avoid the need to list other species in the future, and pursue other types of agreements to further conservation on a landscape level.

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

REINITIATION NOTICE

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

If you have questions regarding this Biological Opinion or the Safe Harbor Agreement, please contact me at (602) 242-0210 (x244), Marty Tuegel at (520) 670-6150 (x232), or Sherry Barrett

at (520) 670-6150 (x223). Please refer to consultation number 02-21-03-F-0083, in future correspondence concerning this project.

Field Supervisor — Date 9/27/06

Deputy Regional Director — Date 9.89.06

cc: Bob Broscheid, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ (Attn: Joan Scott)
Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
(Attn: Sarah Rinkevich)

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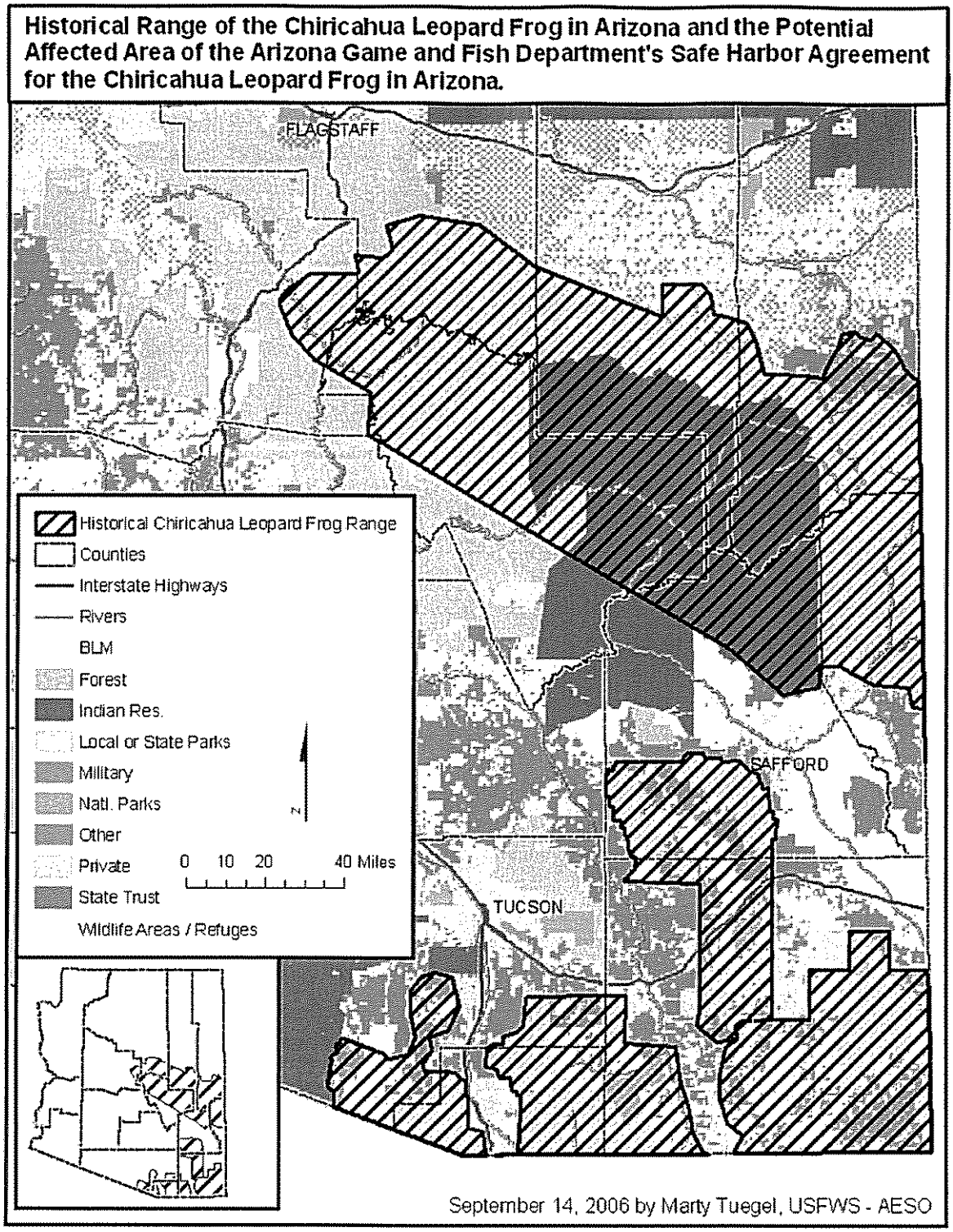
FIGURE 1. Historical Range of the Chiricahua Leopard Frog



APPENDIX A

Concurrences

This section contains all concurrences with "may affect, not likely to adversely affect" determinations.

Jaguar (*Panthera onca*)

The non-U.S. population was listed as endangered in March 1972 (37 FR 6476). The geographic of the listing was expanded to include jaguars in the U.S. on July 22, 1997 (62 FR 39147). It is the largest species of cat native to the Western Hemisphere. It is found typically near water in warm tropical climates in savannah and forests. It is rarely found in extensive arid areas. Individuals in Arizona have been found in Sonoran desertscrub up through subalpine conifer forest. The loss and modification of habitat, shooting, and predator control have contributed to its decline

Conclusion

After reviewing the status of the jaguar, the environmental baseline for the action area, and the effects of the proposed action, the Service concurs that the proposed action may affect, but is not likely to adversely affect the jaguar, based upon the following:

- Impacts from the construction of water wells, distribution pipelines, livestock tanks, and fences are expected to be relatively small compared to the home range of a jaguar given its mobility and its ability to cover large areas in its normal activities.

- Long-term benefits to jaguars of the conservation activities through this Agreement are possible.

Masked Bobwhite

The masked bobwhite was listed as endangered with the original passage of the Endangered Species Conservation Act of 1969 (Public Law 91-135; 83 Stat.275); and also under the Act in 1973. Shortly after specimens were first collected in 1884, the masked bobwhite was essentially extirpated from Arizona (and the U.S.). Critical habitat has not been designated for this species. A recovery plan for the masked bobwhite exists and has been revised several times (USFWS 1995a).

The masked bobwhite was historically restricted to level plains and river valleys in Sonora, Mexico, and in extreme south-central Arizona at elevations ranging between 149 and 1,201 m (490 and 3,940 ft) (USFWS 1995a). The reestablished individuals on the Buenos Aires National Wildlife Refuge (BANWR) in the Altar Valley make up the only known population in the U.S., which is located in the action area. BANWR stopped releasing birds in 2003 and started focusing efforts on habitat management. Some success has been realized, but a viable, wild quail population remains to be achieved.

Masked bobwhite are located primarily on the BANWR. Masked bobwhite have periodically been reported along roadways through adjacent private and state trust land, but their status on these lands has not been determined. These seem to be transient or dispersing individual birds; however, since coveys on the BANWR are not large and tend to be rather localized, it is not likely that coveys on adjacent lands would be detected easily.

There is some potential for Chiricahua leopard frog recovery activities to occur on covered lands in the Altar Valley where masked bobwhite either currently occur or may colonize in the future. However, most of the Altar Valley is outside of the current and historical range of the frog due to low elevations. If activities under the Agreement occurred in occupied masked bobwhite habitat, such activities would either cause no significant disturbance or effects to bobwhite, or such effects may be beneficial (e.g. supplying waters that could be used by both frogs and masked bobwhite).

Conclusion

After reviewing the status of the masked bobwhite, the environmental baseline for the action area, and the effects of the proposed action, the Service concurs that the proposed action may affect, but is not likely to adversely affect masked bobwhite, based upon the following:

- The only known observations of masked bobwhite in the covered area are individuals along the road ways.

- The effects from changes in management of existing land-use practices, non-native aquatic species control, and reestablishment of Chiricahua leopard frogs on masked bobwhite will be insignificant and discountable or beneficial.

- The effects from the construction of water wells, distribution pipelines, livestock tanks, and fences will not occur where coveys of masked bobwhite have been observed.

Mexican Spotted Owl and its Critical Habitat

The Mexican spotted owl was listed as a threatened species in 1993 (58 FR 14248). The FWS appointed the Mexican Spotted Owl Recovery Team in 1993, which produced the Recovery Plan for the Mexican Spotted Owl (Recovery Plan) in 1995 (USFWS 1995b). The final Mexican spotted owl critical habitat rule designated approximately 8.6 million acres of critical habitat in Arizona, Colorado, New Mexico, and Utah, mostly on Federal lands (69 FR 53182). The primary threats to the species were cited as even-aged timber harvest and catastrophic wildfire, although grazing, recreation, and other land uses were also mentioned as possible factors affecting the Mexican spotted owl.

The action area contains the western portion of the Upper Gila Mountains Recovery Unit (RU) and the Basin and Range - West RU. In the northern portion of the Chiricahua leopard frog's range, the action area includes portions of these RUs that are east of Camp Verde, Arizona, above 1,220 m (4,000 ft) and runs along the Mogollon Rim east into the White Mountains to the New Mexico State line. In the southern Arizona, the portion of the Basin and Range - West RU

within the action area includes the Atascosa, Chiricahua, Galiuro, Huachuca, Pajarito, Patagonia, Pinaleno, Tumacacori, Whetstone, Winchester, and portions of the Patagonia and Santa Rita mountains. Mexican spotted owls are widely distributed and use a variety of habitats within these RUs. Land ownership within these RUs is a mosaic of public and private lands, with the Mexican spotted owl primarily occupying National Forest System lands. National Forests within this RU in the action area include portions of the Apache-Sitgreaves, Coconino, Coronado, and Tonto National Forests.

No significant adverse effects to the Mexican spotted owl or its critical habitat as a result of implementing the Agreement are anticipated because 1) no PACs are known on the covered lands, and 2) if Mexican spotted owls are present, habitat improvements, establishment or reestablishment of frog populations, and other management activities under the Agreement should have no adverse effect, and could be beneficial to any owls present.

Conclusion

After reviewing the status of the Mexican spotted owl, the environmental baseline for the action area, and the effects of the proposed action, the Service concurs that the proposed action may affect, but is not likely to adversely affect Mexican spotted owl or its critical habitat, based upon the following:

- There are no known Mexican spotted owl locations or PACs within the covered area.
- The effects from changes in management of existing land-use practices, non-native aquatic species control, and reestablishment of Chiricahua leopard frogs on Mexican spotted owl will be insignificant and discountable or beneficial.
- Effects from the construction of water wells, distribution pipelines, livestock tanks, and fences will not occur within Protected Activity Centers.

Bald Eagle

On February 14, 1978, the bald eagle was listed as an endangered species in 43 states, and threatened in five others (43 FR 6233). Bald eagles were not listed in Alaska, and they are not found in Hawaii. A recovery plan was developed in 1982 for bald eagles in the Southwest recovery region. No critical habitat has been designated. On July 12, 1995, the FWS reclassified the bald eagle from endangered to threatened in the lower 48 states; while it remained threatened in the five states in which it was originally listed as threatened. On July 6, 1999, the FWS proposed to remove the bald eagle from the List of Endangered and Threatened Wildlife in the lower 48 states of the U.S., including the Southwest recovery region (64 FR 26453). The public comment period was reopened on February 16, 2006, and closed on May 17, 2006 (71 FR 8238). The final ruling on the listing status of the bald eagle is currently pending.

The bald eagle occurs in association with aquatic ecosystems, frequenting estuaries, lakes, reservoirs, major rivers systems, and some seacoast habitats. Generally, suitable habitat for bald eagles includes those areas that provide an adequate food base of fish, waterfowl, and/or carrion,

with large trees for perches and nest sites. In winter, bald eagles often congregate at specific wintering sites that are generally close to open water and offer good perch trees and night roosts (60 FR 35999).

The key bald eagle areas in Arizona are generally outside of occupied Chiricahua leopard frog habitats and areas where recovery actions are likely to occur. The most important bald eagle nesting area in Arizona is on the Verde River outside of the current and historical range of the frog. In addition, the large river systems, lakes, and reservoirs frequented by bald eagles are almost all unsuitable as habitat for Chiricahua leopard frog because of predation by non-native species. Non-native species control, which would be needed for Chiricahua leopard frog recovery, is not feasible in these large and complex systems. If bald eagles did occur in areas where activities under the Agreement may occur, effects would be insignificant due to the localized and temporary nature of project activities likely to disturb eagles.

Conclusion

After reviewing the status of the bald eagle, the environmental baseline for the action area, and the effects of the proposed action, the Service concurs that the proposed action may affect, but is not likely to adversely affect bald eagle, based upon the following:

- The effects from changes in management of existing land-use practices, non-native aquatic species control, and reestablishment of Chiricahua leopard frogs on bald eagle will be insignificant and discountable to beneficial.

- Impacts from the construction of water wells, distribution pipelines, livestock tanks, and fences are expected to be relatively small compared to the home range of a bald eagle.

- The range of the Chiricahua leopard frog and sites currently occupied or likely to be targeted for recovery actions are largely outside of key areas for bald eagles.

- Furthermore, habitats frequented by bald eagles have little potential as Chiricahua leopard frog habitat due to non-native predators.

- Long-term benefits to bald eagles from the conservation activities through this Agreement are possible.

- The mobility of the species and its ability to cover large areas in its normal behavior lessen the impact of Agreement-related activities on the species.

Lesser Long-nosed Bat

Our June 10, 2005, Programmatic BO for the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (AESO/SE 02-22-03-F-0366) included a detailed Status of the Species for the Lesser Long-nosed Bat. This BO is available on our website at

http://www.fws.gov/arizonaes, under Document Library; Section 7 Biological Opinions. Herein, we incorporate that status discussion by reference.

This species is known from grasslands and arid scrublands below 5500 ft in elevation. In Arizona, they arrive in mid- April, roosting in caves, abandoned mine shafts and tunnels. Young are typically born in maternity colonies in mid-May. Females and young remain in maternity roosts and forage below about 3500 ft until approximately mid-July. At this time the range expands and bats are found up to about 5500 ft in areas of semi-desert grassland and lower oak woodland. These bats typically leave southern Arizona by late September to early October.

Conclusion

The USFWS concurs with the determination that the action may affect, but is not likely to adversely affect the lesser long-nosed bat, based upon the following:

- No roosts or potential roost sites will be impacted by Agreement-related activities.
- Impacts from the construction of water wells, distribution pipelines, livestock tanks, and fences are expected to be relatively small compared to the availability of foraging resources for this species within the action area.
- There is a lack of known ecological interactions between Chiricahua leopard frogs and lesser long-nosed bats.

Mexican Gray Wolf

Mexican gray wolves were extirpated from the wild in the U.S. by private and government control campaigns, but were later listed as an endangered species in 1976 (41 FR 17736). A recovery plan was developed by the USFWS in 1982 and wolves were reintroduced on the Apache National Forest in March 1998. The Mexican gray wolf is the southernmost occurring and most endangered subspecies of gray wolf in North America. It inhabits oak and pine/juniper savannah in the foothills and mixed conifer woodlands above 1,200 m (4,000 ft) elevation. In March 1998, the first 11 Mexican gray wolves from captive stock were reintroduced into the wild as an experimental nonessential population in the Apache National Forest in southeastern Arizona under a program to reestablish the subspecies to a portion of its historical range. These wolves are allowed to disperse into and colonize the entire Apache National Forest and adjacent Gila National Forest in western New Mexico, an area of about 18,000 square kilometers (7,000 square miles). This area is referred to as the "Blue Range Wolf Recovery Area." A full discussion of it biology and status is in the 1982 recovery plan and current status is online at http://www.fws.gov/ifw2es/mexicanwolf/.

Because of the wolves' status as an experimental, non-essential population, wolves found in Arizona are treated as though they are proposed for listing for section 7 consultation purposes. By definition, an experimental non-essential population is not essential to the continued existence of the species. Thus, no proposed action impacting a population so designated could lead to a jeopardy determination for the entire species.

Conclusion

The USFWS concurs with the determination that the action may affect, but is not likely to adversely affect the Mexican gray wolf, based upon the following:

- Impacts from the construction of water wells, distribution pipelines, livestock tanks, and fences are expected to be insignificant and discountable.
- The species is highly mobile and able to cover large areas in its normal activities.
- Long-term benefits to Mexican gray wolves from the conservation activities is possible through this Agreement.

APPENDIX B

No Effect

Arizona cliff rose (*Purshia subintegra*)
- No Agreement activities will occur in occupied habitat
- No plants will be impacted or their habitat
- Known distribution is outside the historical range of the Chiricahua leopard frog

Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*)
- No Agreement activities will occur within suitable habitat
- No plants will be impacted or their habitat
- Dispersing frogs will have no impact on this species

Lemmon Fleabane (*Erigeron lemmonii*) – Candidate species
- No Agreement activities will occur within suitable habitat
- No plants will be impacted or their habitat
- Dispersing frogs will have no impact on this species

Kearney bluestar (*Amsonia kearneyana*)
- No Agreement activities will occur within suitable habitat
- No plants will be impacted or their habitat
- Dispersing frogs will have no impact on this species

Mount Graham red squirrel (*Tamiasciurus hudsonicus grahamensis*)
- Only known from Federal Land.
- No Agreement activities will occur within the suitable habitat in the historical range of this species.
- No Agreement activities will occur within designated critical habitat.

- No predator/prey relationship is known between Mount Graham red squirrel and Chiricahua leopard frog.

New Mexican ridge-nosed rattlesnake (*Crotalus willardi obscurus*)

- Only known from Federal Land within the covered area.
- No Agreement activities will occur within suitable habitat.
- No critical habitat within the covered area.
- No predator/prey relationship is known between New Mexico ridge-nosed rattlesnake and Chiricahua leopard frogs.