

2-21-02-F-014

BIOLOGICAL AND CONFERENCE OPINION SUMMARY
Effects of the proposed Gila topminnow reestablishment in Empire Gulch
in Pima County, Arizona

Date of opinion: October 19, 2001

Project: Effects of the proposed Gila topminnow reestablishment in Empire Gulch in Pima County, Arizona

Location: Pima County, Arizona

Listed species affected: Endangered Gila topminnow (*Poeciliopsis occidentalis occidentalis*) and the proposed threatened Chiricahua leopard frog (*Rana chiricahuensis*)

Biological and conference opinion: No Jeopardy

Incidental take statement:

Anticipated take: *Exceeding this level may require reinitiation of formal consultation.*

1. More than 250 dead Gila topminnow are found annually in the crossing lane, enclosure, and road crossing;
2. If livestock use the crossing more than 2 months any calendar year;
3. If livestock are found in the enclosure more than 15 days in any calendar year; and
4. More than five dead Chiricahua leopard frogs are found annually in the crossing lane, enclosure, and road crossing.

Conservation recommendations: *Implementation of conservation recommendations is discretionary.*

1. The Bureau should work with the Service and Arizona Game and Fish Department to reestablish the Gila topminnow and Chiricahua leopard frog to suitable habitats.
2. The Bureau and permittee should work with the Service and Arizona Game and Fish Department to begin an aggressive program to ensure that nonindigenous aquatic organisms are not introduced to the action area, and if they are, to support actions to remove them.

United States Department of the Interior

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In Reply Refer To:

AESO/SE

2-21-02-F-014

October 19, 2001

MEMORANDUM

To: Acting Field Manager, Tucson Field Office, Bureau of Land Management, Tucson, Arizona

From: Supervisor, Arizona Ecological Services Office

Subject: Biological Opinion, Gila topminnow reestablishment in Empire Gulch

This document transmits the U.S. Fish and Wildlife Service's (Service) biological and conference opinions based on the Service's review of the proposed fish community reestablishment at Empire Gulch, on the Las Cienegas National Conservation Area (File No. 1999-16307-RJD) in Pima County, Arizona, and its effects on the proposed threatened Chiricahua leopard frog (*Rana chiricahuensis*) and the endangered Gila topminnow (*Poeciliopsis occidentalis occidentalis*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*). Your October 5, 2001, request for formal consultation was received on October 9, 2001.

A telephone conversation with Jeff Simms of your office (October 11, 2001), confirmed that the proposed fencing would be done outside of the southwestern willow flycatcher (*Empidonax traillii extimus*) breeding season. The Bureau of Land Management (Bureau) determined the project would not affect the southwestern willow flycatcher. Our policy is that we do not comment on agency "no effect" determinations unless we believe the action would adversely affect a listed species or its critical habitat, in which case the Service would request that the agency enter into formal consultation on the species adversely affected [50 CFR 402.14(a)]. Information available to us does not warrant such a request in this instance. However, we recommend that the Bureau maintain a complete administrative record documenting the decision process and supporting information for "no effect" determinations.

These biological and conference opinions are based on information provided in the October 2001 biological assessments, the environmental assessment, information provided by the Bureau, telephone conversations, meetings, field investigations, and other sources of information. A complete administrative record of this consultation is on file in this office. We have assigned log number 2-21-02-F-014 to this consultation. Please refer to that number in future correspondence on this consultation.

BIOLOGICAL AND CONFERENCE OPINIONS

DESCRIPTION OF THE PROPOSED ACTION

The Tucson Field Office of the Bureau, in coordination with the Arizona Game and Fish Department (Department) and the Service, proposes to reestablish populations of Gila topminnow and longfin dace in Empire Spring and Gulch. The spring is in the upper portion of Empire Gulch, a tributary to Cienega Creek, which contains the source populations for the action. The project area is in the Las Cienegas National Conservation Area (NCA) north of Sonoita, Pima County, Arizona. The project area is located just to the northeast of the Empire Ranch complex (T.19S., R.17E., Sec. 17, NW1/4). The project proposal consists of establishing a fish community in Empire Gulch by moving up to 3,000 Gila topminnow and 1,000 longfin dace (*Agosia chrysogaster*) from Cienega Creek into Empire Gulch over a 3-year period. The initial stocking will be about 1,000 topminnow and 500 longfin dace, and is planned for October 2001. Over each of the next 2 years, about 1,000 additional topminnow and 500 longfin dace would be added to Empire Gulch (2002 and 2003), creating a small fish community which replicates the Cienega Creek genetic lineages. Fish will come from Cienega Creek near its confluence with Mattie Canyon, approximately 10 miles away from upper Empire Gulch. The Arizona Game and Fish Department and U.S. Fish and Wildlife Service will be responsible for collecting and moving native fish with the assistance of the Bureau.

To protect additional aquatic habitat along Empire Gulch, a crossing lane and enclosure will be created at the east boundary of the existing livestock enclosure (Karen's pasture). The lane would be about 60 feet long and 200 feet wide. A wing extending about 400 feet would run from the north east corner of the lane. This would funnel cattle going from the North Pasture area into the Orchard pasture and include a small area of aquatic habitat. Livestock would use the Orchard pasture and crossing in the fall only (October and November), when calves and mother cows are being separated as part of the shipping process. A new livestock enclosure extending from the eastern boundary of the new lane would run downstream about 2,400 ft. The existing enclosure is about 3,300 feet. This new enclosure would extend more than 2,000 feet beyond the furthest extent of current surface water at base flow. All fencing will meet Bureau standards and include wildlife friendly features. The crossing lane will be closed to livestock 10 months of the year.

The goal of the project is to create a self-sustaining population of each fish species while protecting the existing Chiricahua leopard frog population. In the case of fish population failure, the Bureau, Department, and Service will jointly determine whether the site is suitable for continuing reestablishment efforts of Gila topminnow or longfin dace. Biannual monitoring of reestablished fish populations to determine stocking success and evaluate the success of the project will be conducted as a cooperative effort between the Bureau and Department.

Recreational activities will continue to occur in the area, such activities include picnicking, hunting, and hiking. Empire Gulch has a small parking area and a well used hiking trail located

in the floodplain on the south side of the channel. This hiking trail may be realigned or used in the future for environmental interpretation. Parking and other amenities will stay in the floodplain and in the same location.

There is a single road crossing of Empire Gulch which protects surface water from contact with vehicles. The crossing is a cement slab with a channel through it that shunts base flows under a cast iron grate. The crossing has been in operation since 1996 without the need for maintenance. However, it is likely that the channel will need to be cleaned. It is also likely that approaches may need to be repaired following any large flood events and that aggradation of sediments in the stream will require the addition of a cement layer to raise the crossing to the new base level in the distant future.

All other uses of Bureau managed lands in the basin may be modified by implementation of the Las Cienegas Resource Management Plan and Environmental Impact Statement upon a final Record of Decision. A separate biological evaluation is being prepared for formal conference and consultation with the Service on this plan. The time-frame of this proposed action is considered to be until the end of 2003, or until consultation is completed on the Resource Management Plan.

The Bureau has included conservation measures as part of the proposed action. The following actions are designed to minimize mortality and handling stress to the Gila topminnow (and longfin dace):

- 1) fish will be held in aerated tanks and released after temperature acclimation at the new location in order to reduce mortality from handling and transportation stress;
- 2) fish identification to species will be conducted by using viewing receptacles filled with water instead of "in hand";
- 3) fish collected by seine should not be "beached" but rather "bagged" and left in the water and dipped out as necessary; and
- 4) collection of fish will be conducted by experienced fishery biologists.

Contamination of the new site with nonindigenous species will be avoided with the following measures:

- 1) fish will be carefully inspected and counted. Topminnow will be double screened for the presence of nonindigenous species such as mosquitofish (*Gambusia affinis*), which are similar in appearance but are effective predators on topminnow;
- 2) fish with visible signs of disease or parasites will be culled from the stock to be transplanted and returned to their source; and
- 3) exclosures will be monitored by Bureau staff (park ranger) for trespass livestock and livestock promptly removed by the permittee.

The following measures will limit or even prevent fish mortalities from road crossing repair activities and fence construction and maintenance:

- 1) the area that will be repaired will have topminnow removed from an area delineated with 1/8" block nets;
- 2) a biologist will be on site for all work involving aquatic habitat;
- 3) the grated channel that passes surface water through the concrete low water road crossing will be cleaned with hand tools with care not to injure fish or leopard frogs using the channel;
- 4) gravel will be used to plate the livestock crossing to minimize erosion and protect cattle from getting mired in deep mud;
- 5) all gravel used for the livestock crossing lane will be from a clean source and placed after nets that block off the area have been set (if water is present) and fish, leopard frogs and tadpoles have been removed;
- 6) surface water will be diverted away from areas where forms are built and cement is being poured;
- 7) vehicles with fencing supplies will be kept away from surface water and cross fencing will be built by hand.

Monitoring of fish and aquatic habitat to identify factors related to the success and failure of the newly established population will occur in the spring and fall. Some of the factors that may be investigated are:

- Size of the founding population
- Temperature regime of higher elevation sites
- Hydraulic character of the channel
- Availability of open water
- Dissolved oxygen content of the water
- Environmental contaminants
- Number of predacious insects at time of stocking
- Handling stress and delayed mortality
- Temperature or pH shock upon release
- Presence of nonindigenous aquatic organisms
- Habitat size minima and other conditions during drought

Factors for monitoring will be determined jointly by the Bureau, Service, and Department. Those factors chosen will be measured using standard methods and analysis.

STATUS OF THE SPECIES (range-wide)

Chiricahua leopard frog

The Chiricahua leopard frog was proposed for listing as a threatened species without critical habitat on June 14, 2000 (USFWS 2000). This species is distinguished from other members of the *Rana pipiens* complex by a combination of characters, including a distinctive pattern on the rear of the thigh consisting of small, raised, cream-colored spots, or tubercles, on a dark background; dorsolateral folds that are interrupted and deflected medially; stocky body proportions; relatively rough skin on the back and sides; and often green coloration on the head and back (Platz and Mecham 1979). The species also has a distinctive call consisting of a relatively long snore of 1 to 2 seconds in duration (Davidson 1996, Platz and Mecham 1979).

The Chiricahua leopard frog is an inhabitant of cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,281 to 8,890 feet in central and southeastern Arizona; west-central and southwestern New Mexico; and in Mexico, northern Sonora, and the Sierra Madre Occidental of Chihuahua, northern Durango and northern Sinaloa (Platz and Mecham 1984, Degenhardt et al. 1996, Sredl et al. 1997). 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 known historic localities are natural lotic systems, a little less than half are stock tanks, and the remainder are lakes and reservoirs (Sredl et al. 1997). Sixty-three percent of extant populations in Arizona occupy stock tanks (Sredl and Saylor 1998).

Populations on the Mogollon Rim are disjunct from those in southeastern Arizona. Additional work is needed to clarify the genetic relationship among Chiricahua leopard frog populations.

Die-offs of Chiricahua leopard frogs were first noted in former habitats of the Tarahumara frog (*Rana tarahumarae*) in Arizona at Sycamore Canyon in the Pajarito Mountains (1974) and Gardner Canyon in the Santa Rita Mountains (1977-78)(Hale and May 1983). During extensive surveys from 1995-2000, Chiricahua leopard frogs were observed at 60 localities in Arizona (Rosen et al. 1996, Sredl et al. 1997, Service files). In New Mexico, the species was found at 41 sites from 1994 to 1999; 8 of 31 of those were verified extant during 1998 to 1999 (Painter 2000). During May to August 2000, the Chiricahua leopard frog was found extant at only 8 of 34 sites where the species occurred in New Mexico during 1994 to 1999 (C. Painter, pers. comm., 2000). The species has been extirpated from about 75 percent of its historic localities in Arizona and New Mexico. The status of the species in Mexico is unknown.

Based on Painter (2000) and the latest information for Arizona, the species is still extant in all major drainages in Arizona and New Mexico where it occurred historically; however, it has not been found recently in many rivers, valleys, and mountain ranges. In many of these regions, Chiricahua leopard frogs were not found for a decade or more despite repeated surveys. Recent surveys suggest the species may have recently disappeared from some major drainages in New Mexico (C. Painter, pers. comm., 2000).

Threats to this species include predation by nonindigenous organisms, especially bullfrogs, (*Rana catesbeiana*) fish, and crayfish; (*Orconectes virilis*) disease; drought; floods; degradation

and destruction of habitat; water diversions and groundwater pumping; disruption of metapopulation dynamics; increased chance of extirpation or extinction resulting from small numbers of populations and individuals; and environmental contamination. Numerous studies indicate that declines and extirpations of Chiricahua leopard frogs are at least in part caused by predation and possibly competition by nonindigenous organisms, including fish in the family Centrarchidae (*Micropterus* spp., *Lepomis* spp.), bullfrogs (*Rana catesbeiana*), tiger salamanders (*Ambystoma tigrinum mavortium*), crayfish (*Orconectes virilis* and possibly others), and several other species of fish (Clarkson and Rorabaugh 1989, Sredl and Howland 1994, Fernandez and Bagnara 1995, Rosen et al. 1994, 1996, Snyder et al. 1996, Fernandez and Rosen 1998). Sredl and Howland (1994) noted that Chiricahua leopard frogs were nearly always absent from sites supporting bullfrogs and nonindigenous predatory fish.

Recent evidence suggests a chytridiomycete skin fungi is responsible for observed declines of frogs, toads, and salamanders in portions of Central America (Panama and Costa Rica), South America (Atlantic coast of Brazil, Ecuador, and Uruguay), Australia (eastern and western States), New Zealand (South Island), Europe (Spain and Germany), Africa (South Africa, “western Africa,” and Kenya), Mexico (Sonora), and United States (8 States)(Berger et al. 1998, S. Hale pers. comm. 2000, Longcore et al. 1999, Speare and Berger 2000). Ninety-four species of amphibians have been diagnosed as infected with the chytrid *Batrachochytrium dendrobatidis*. In Arizona, chytrid infections have been reported from four populations of Chiricahua leopard frogs (M. Sredl, pers. comm., 2000), as well as populations of Rio Grande leopard frog (*Rana berlandieri*), Plains leopard frog (*Rana blairi*), lowland leopard frog (*Rana yavapaiensis*), Tarahumara frog (*Rana tarahumarae*), canyon treefrog (*Hyla arenicolor*), and Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*)(Morell 1999, Davidson et al. 2000, S. Hale pers. comm., 2000, Sredl and Caldwell 2000). The proximal cause of extinctions of two species, the Australian gastric brooding frogs and the golden toad (*Bufo periglenes*) in Costa Rica, was likely chytridiomycosis.

The origin of the disease is unknown, but epizootiological data from Central America and Australia (high mortality rates, wave-like spread of declines, wide host range) suggest introduction of the disease into naive populations and the disease subsequently becoming enzootic in some areas. Alternatively, the fungus may be a widespread organism that has emerged as a pathogen because of either higher virulence or an increased host susceptibility caused by other factors such as environmental changes (Berger et al. 1998), including global climate change (Pounds and Crump 1994, Daszak 2000). If it is a new introduction, its rapid colonization could be attributable to humans. The fungus does not have an airborne spore, so it must spread via other means. Chytrids could also be spread by tourists or fieldworkers sampling aquatic habitats (Halliday 1998). The fungus can exist in water or mud and thus could be spread by wet or muddy boots, vehicles, cattle, and other animals moving among aquatic sites, or during scientific sampling of fish, amphibians, or other aquatic organisms. The Service and Department are employing preventive measures to ensure the disease is not spread by aquatic sampling. Additional information about the Chiricahua leopard frog can be found in 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 Painter (2000).

Gila topminnow

The Gila topminnow was listed as endangered in 1967 without critical habitat (USFWS 1967). The reasons for 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 1984 recovery plan (USFWS 1984), the draft revised Gila topminnow recovery plan (Weedman 1999), and references cited in the plans.

Gila topminnow was listed in 1967 as *Poeciliopsis occidentalis*. The species was later revised to include two subspecies, *P. o. occidentalis* and *P. o. sonoriensis* (Minckley 1969, 1973). *P. o. occidentalis* is known as the Gila topminnow, and *P. o. sonoriensis* is known as the Yaqui topminnow. *Poeciliopsis occidentalis*, including both subspecies, are collectively known as the Sonoran topminnow. Both subspecies are protected under the ESA. Recent information presented by Minckley (1999), considers the two subspecies to be separate species, *P. occidentalis* and *P. sonoriensis*. Regardless of their taxonomy, both species or subspecies are protected under the Act.

Gila topminnow are highly vulnerable to adverse effects from nonindigenous aquatic species (Johnson and Hubbs 1989). Predation and competition from nonindigenous fishes have been a major factor in their decline and continue to be a major threat to the remaining populations (Meffe et al. 1983, Meffe 1985, Brooks 1986, Marsh and Minckley 1990, Stefferud and Stefferud 1994, Weedman and Young 1997). The native fish fauna of the Gila basin and of the Colorado basin overall, was naturally depauperate and contained few fish that were predatory on or competitive with Gila topminnow (Carlson and Muth 1989). With the introduction of many predatory and competitive nonindigenous fish, frogs, crayfish, and other species, Gila topminnow could no longer survive in many of their former habitats, or the small pieces of those habitats that had not been lost to human alteration. Both large (Bestgen and Propst 1989) and small (Meffe et al. 1983) nonindigenous fish cause problems for Gila topminnow as can nonindigenous crayfish (Fernandez and Rosen 1996) and bullfrogs.

Historically, the Gila topminnow was abundant in the Gila River drainage and was one of the most common fishes of the Colorado River basin, particularly in the Santa Cruz system (Hubbs and Miller 1941). This has been reduced to only 15 naturally occurring populations. Presently, only 12 of the 15 recent natural Gila topminnow populations are considered extant (Table 1) (Weedman and Young 1997). Only three (Cienega Creek, Monkey Spring, and Cottonwood Spring) have no nonindigenous fish present and therefore can be considered secure from nonindigenous fish threats. There have been at least 175 wild sites stocked with Gila topminnow, however, topminnow persist at only 17 of these localities. Of the 17, 1 site is outside topminnow historic range and 4 now contain nonindigenous fish (Weedman and Young 1997).

The Sonoran Topminnow Recovery Plan (USFWS 1984) established criteria for down- and de-listing. Criteria for down-listing were met for a short period. However, due to concerns regarding the status of several populations, down-listing was delayed. Subsequently, the number of reestablished populations dropped below that required for down-listing, where it has remained. A draft revised recovery plan for the Gila topminnow is available (Weedman 1999). The plan's short-term goal is to prevent extirpation of the species from its natural range in the U.S. and reestablish it into suitable habitat within historic range. Downlisting criteria require a minimum of 82 reestablished populations, some of which must persist at least 10 years.

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 less than 30 localities (12 natural and 17 stocked). Many of these localities are small and highly threatened, and topminnow has not been found in some recent surveys at some.

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.

Most land in the area is owned by the Arizona State Land Department and the Bureau. Several Bureau actions at Las Cienegas NCA have undergone section 7 consultation. The Cienega Creek diversion flood damage emergency (2-21-90-F-196) underwent formal consultation in 1990. The Cienega Creek permanent canal control structure was consulted on in 1991 (2-21-91-F-160). The Cienega Creek headcut repair and fencing completed consultation in 1994 (2-21-93-F-430). Cienega Creek interim grazing plan was consulted on in 1994 (2-21-95-F-177). Finally, the Cienega Creek stream restoration project was formally consulted on in 1998 (2-21-98-F-430). Several of the formal consultations have been reinitiated, and there have also been several informal consultations. The August 2001 draft Las Cienegas Resource Management Plan and Environmental Impact Statement is out for public comment now. The Bureau expects to request formal consultation and conference on the Plan soon.

The Bureau holds the grazing lease for State Trust Lands in the area. Grazing on the State Trust Land and Bureau land is managed as one grazing allotment. Because of this, most actions associated with grazing on the allotment could be subject to section 7 consultation. There are no non-federal actions that are likely to occur that would impact the proposed project or the immediate action area.

Status of the species within the action area

The range of the Chiricahua leopard frog in Arizona can be divided into two general areas: (1) the southeastern part of the state and (2) centered along the Mogollon Rim. Threats to the species occur throughout its range, but the populations above the Mogollon Rim in Arizona appear to have relatively poor persistence (J. Rorabaugh, Service, pers. comm., 2001). The leopard frog is found in Empire Gulch and Cienega Creek, but is uncommon.

Cienega Creek is one of the last places in Arizona supporting an intact native fish fauna which is uncontaminated by nonindigenous fish, though bullfrogs are now present (Jeff Simms, BLM, and Dennis Caldwell, pers. comm., 2001). Cienega Creek provides habitat essential for the survival of the Gila topminnow (Weedman 1999). It is one of nine extant natural topminnow sites (Bagley et al. 1991), and one of only three natural sites not contaminated by mosquitofish.

In addition, Cienega Creek supports by far the largest population of topminnow in the U.S. A fall population estimate for Cienega Creek was about 2.5 million topminnow, conservatively, for 6.5 miles of perennial habitat sampled. Another 1.1 miles of topminnow habitat in Mattie Canyon and 0.9 mile in Empire Gulch, tributaries to Cienega Creek, were not included in this estimate. Some areas of warmer groundwater discharge held extremely high densities of topminnow (Simms and Simms 1992). No Gila topminnow or any other species of fish has been found in the upstream end of Empire Gulch where the transplant will occur.

Effects of the Action

The proposed project will have both positive and negative effects for Gila topminnow and the Chiricahua leopard frog. The project will benefit the Gila topminnow by creating an additional population of the Cienega Creek lineage. Further riparian improvement of the Empire Gulch drainage may allow for periodic connections and exchange of individuals between Cienega Creek and Empire Gulch, and the fish communities which reside there. The proposed action is consistent with Tasks 1, 2, and 3 from the draft revised Gila topminnow recovery plan (Weedman 1999). The Chiricahua leopard frog may also benefit from the proposed action since additional riparian and aquatic habitat will be removed from livestock grazing.

A new Gila topminnow population would become established in a 0.7 mile reach of upper Empire Gulch. The reestablishment of a Gila topminnow population will help insure the persistence of the genetic lineage in Cienega Creek. We anticipate this will improve the security of the species.

The removal of 3,000 Gila topminnow from Cienega Creek over 3 years will have a minimal effect on this population. This population inhabits miles of stream, is very prolific, and probably numbers in the millions (Simms and Simms 1992). Capture, holding, handling, and transporting the fish will result in limited mortality. The short movement distance and the mitigating measures included in the proposed action should minimize this impact.

Chiricahua leopard frogs and their tadpoles are not likely to be affected directly by the addition of longfin dace or Gila topminnow (Phil Rosen, pers. comm., 2001). Neither species is a predator of amphibians and generally consume much smaller prey items such as aquatic invertebrates (Minckley 1973). Garter snakes (*Thamnophis* spp.), belted kingfishers (*Ceryle alcyon*), and great blue herons (*Ardea herodias*) may respond to the increase in forage due to the addition of fish. An increase in piscivorous predators could increase predation losses of Chiricahua leopard frogs. There is little evidence that this may be serious problem for leopard frogs in this case (Mike Sredl, pers. comm., 2001).

The construction of fencing along and across aquatic habitat may result in topminnow or leopard frog mortalities, even though vehicles will be located away from surface water and banks. Chiricahua leopard frogs and Gila topminnow could also be disturbed. Where cross fencing would be placed in the water, it will be built by hand. Fence building activities may disturb normal activities of frogs for a few hours during construction at any particular location along the spring. Fence maintenance should have even lesser impacts than fence construction.

Livestock grazing activities in the newly constructed crossing lane will likely result in mortality to Gila topminnow and Chiricahua leopard frog tadpoles from trampling by livestock. Adult frogs are likely to be mobile enough to avoid cattle as they cross and graze in the lane. Habitat modification is anticipated to be so modest and transitory as to present virtually no measurable effect on fish populations. The loss of topminnow is not likely to have any lasting effect on the population in Empire Gulch as topminnow reproduce prolifically (Schoenherr 1974).

During the term of the proposed action it is likely that livestock will get into the livestock enclosure. Livestock in the enclosure could lead to direct and indirect impacts to Gila topminnow and Chiricahua leopard frog. This level of impact is not likely to negatively affect either species' population in Empire Gulch but could cause incidental take. The Bureau will notify the permittee of trespass livestock and the permittee will be responsible for removing them.

Recreation activity is likely be light and limited to higher banks because the spring is muddy and wading and crossing on foot is problematic for hikers. However, gates to enclosures have been left open in the past by people trying to water horses and dogs. Fencing can also come down from flooding, wind, and other disturbances. This can lead to direct mortality, as described above, from livestock that drift into occupied fish habitat. This problem should decrease due to regular patrols and monitoring by NCA staff. It is also likely that topminnow will shy away from livestock and slow moving vehicles to avoid being hit.

The Empire Gulch crossing has a channel that passes water beneath a set of cast iron gates; this permits fish and water to avoid vehicle contact and any associated risk of injury or mortality. Vehicles crossing Empire Gulch may hit frogs that remain on the concrete pad. Should maintenance of the concrete crossing become necessary, topminnow, tadpoles, and frogs may be injured or killed by heavy equipment as earth is moved around eroded crossing approaches. In

addition, the channel may need to be cleaned out should the passage of water become obstructed. This may injure or kill fish and tadpoles if not done with care, as topminnow are weak swimmers and topminnow and tadpoles may attempt to hide in cover in the channel. If a new layer of concrete is needed to elevate the crossing to match any increase in channel elevation, it should be accomplished with a minimal contamination of surface water with lime. However, the activity of setting and removing forms could result in injury or mortality.

Part of the proposed action is interrelated to livestock grazing and recreation. These two activities and many others will be addressed soon through formal consultation on the Draft Las Cienegas Resource Management Plan and Environmental Impact Statement.

Cumulative Effects

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

The State Trust Land in the area is likely to remain as grazing lands in the near-term. The grazing lease will continue to be managed with the grazing on the NCA. Recreation is likely to continue and increase on State Trust Lands. Designation of the NCA has focused greater attention on the area and will result in more visitation and use.

CONCLUSION

After reviewing the current status of the Gila topminnow, the environmental baseline for the action area, the effects of the proposed Gila topminnow reestablishment in Empire Gulch, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the endangered Gila topminnow. No critical habitat has been designated; thus, none would be affected. We base this conclusion on the following:

1. A new site and population of Gila topminnow are likely to be reestablished;
2. The proposed action implements tasks in the draft revised Gila Topminnow Recovery Plan (Weedman 1999); and
3. The mitigating measures proposed by the Bureau will minimize impacts to and take of the species.

After reviewing the current status of Chiricahua leopard frog, the environmental baseline for the action area, the effects of the proposed Gila topminnow reestablishment in Empire Gulch, and the cumulative effects, it is the Service's conference opinion that the action, as proposed, is not

likely to jeopardize the continued existence of the proposed threatened Chiricahua leopard frog. No critical habitat has been proposed. Thus, none would be affected. We base this conclusion on the following:

1. Habitat at Empire Gulch will be maintained and enhanced;
2. Livestock grazing in Empire Gulch will be reduced; and
3. Gila topminnow and longfin dace do not prey on leopard frogs.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations following section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service 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 by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral 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 nondiscretionary, and must be undertaken by the Bureau so that they become binding conditions of any grant or permit issued to the permittee, as appropriate, for the exemption in section 7(o)(2) to apply. The Bureau has a continuing duty to regulate the activity covered by this incidental take statement. If the Bureau (1) fails to assume and implement the terms and conditions or (2) fails to require the permittee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Bureau or permittee must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OF EXTENT OF TAKE ANTICIPATED

The Service anticipates incidental take of the Gila topminnow will be difficult to detect for the following reasons: dead fish are difficult to find, cause of death may be difficult to determine, and losses may be masked by seasonal fluctuations in numbers or other causes. However, take of

Gila topminnow may occur from livestock use of the crossing lane; livestock in the enclosure; use and maintenance of the road crossing; and construction and maintenance of the fence. However, take of this species will be considered to be exceeded if:

1. more than 250 dead Gila topminnow are found annually in the crossing lane, enclosure, and road crossing;
2. livestock use the crossing more than two months any calendar year; or
3. livestock are found in the enclosure more than 15 days in any calendar year.

The Service anticipates incidental take of the Chiricahua leopard frog will be difficult to detect for the following reasons: dead aquatic animals are difficult to find, cause of death may be difficult to determine, and losses may be masked by seasonal fluctuations in numbers or other causes. However, take of Chiricahua leopard frog may occur from livestock use of the crossing lane; livestock in the enclosure; use and maintenance of the road crossing; and construction and maintenance of the fence. However, take of this species will be considered to be exceeded if:

1. more than five dead Chiricahua leopard frogs are found annually in the crossing lane, enclosure, and road crossing;
2. livestock use the crossing more than 2 months any calendar year; or
3. livestock are found in the enclosure more than 15 days in any calendar year.

EFFECT OF TAKE

In this biological opinion, the Service finds the anticipated level of take is not likely to jeopardize the continued existence of the endangered Gila topminnow. No critical habitat has been designated; thus, none would be affected.

In this conference opinion, the Service finds the anticipated level of take is not likely to jeopardize the continued existence of the proposed threatened Chiricahua leopard frog. No critical habitat has been proposed; thus, none would be affected.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the take of Gila topminnow and Chiricahua leopard frog. The prohibitions against taking a species found in section 9 of the Act do not apply until the species is listed. However, the reasonable and prudent measures are for both the Gila topminnow and Chiricahua leopard frog.

1. The Bureau shall continue to monitor the Gila topminnow and Chiricahua leopard frog and their habitat to document levels of take and determine effectiveness of the proposed action and report this to the Service along with the monitoring results;
2. Measures shall be implemented to minimize trampling of egg masses, tadpoles, and metamorph frogs and Gila topminnow from livestock; use and maintenance of the road crossing; and use and maintenance of fences.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the Bureau must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and monitoring requirements. These terms and conditions will be non-discretionary.

1. The following term and condition implements reasonable and prudent measure number one:
 - 1.1. Determine by December 31, 2001, in consultation and coordination with the Department and the Service, which parameters will be monitored. Gila topminnow monitoring will follow established protocols for reestablished populations.
 - 1.2. Inspect the livestock crossing lane within one week after use is completed to monitor for take of Gila topminnow and Chiricahua leopard frogs.
 - 1.3. Provide an annual report on the implementation of the project to our office. Include an analysis of the effectiveness of the mitigation measures and any take that has occurred. Annual reports required under this and previous section 7 consultations will be combined into one report and reporting date, which will be determined during the consultation on the Las Cienegas Resource Management Plan. If the Las Cienegas RMP consultation is not completed by December 31, 2002, the Bureau will report on actions taken, any incidental take, and effectiveness of mitigation measures and terms and conditions annually on December 31 until the RMP consultation is complete.
2. The following terms and conditions implement reasonable and prudent measure number two:
 - 2.1. Implement all mitigating measures identified in the proposed action.
 - 2.2. Maintain the enclosure fence.
 - 2.3. Build and maintain all fence within the active channel by hand.

The Service believes that no more than 250 Gila topminnow and 5 Chiricahua leopard frogs will be incidentally taken annually as a result of the proposed action. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Bureau must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Disposition of Dead or Injured Listed Animals

Upon finding a dead or injured threatened or endangered animal, initial notification must be made to the Service's Division of Law Enforcement, Federal Building, Room 8, 26 North McDonald, Mesa, Arizona (602-261-6443) 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, and any other pertinent information. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animal species shall be submitted as soon as possible to the nearest Service or Department office, educational, or research institutions (e.g., University of Arizona) holding appropriate State and Federal permits.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution before implementation of the action. A qualified biologist should transport injured animals to a qualified veterinarian. Should any treated listed animal survive, the Service should be contacted regarding the final disposition of the animal.

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 effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 7(a)(1) responsibilities for the Chiricahua leopard frog and Gila topminnow. To further the purposes of the Act, we recommend implementing the following discretionary actions:

1. The Bureau should work with the Service and Department to reestablish the Gila topminnow and Chiricahua leopard frog to suitable habitats.

2. The Bureau and permittee should work with the Service and Department to begin an aggressive program to ensure that nonindigenous aquatic organisms are not introduced to the action area, and if they are, to support actions to remove them.

For the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation and conference on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect the 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 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.

You may ask the Service to confirm the conference opinion as a biological opinion issued through formal consultation if the Chiricahua leopard frog is listed. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the conference opinion as the biological opinion on the project and no further section 7 consultation will be necessary.

After listing of the Chiricahua leopard frog as threatened and any subsequent adoption of this conference opinion, the Federal agency shall request reinitiation of consultation if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect the species or critical habitat in a manner or to an extent not considered in this conference opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the species or critical habitat that was not considered in this conference opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

The incidental take statement provided for the Chiricahua leopard frog in this conference opinion does not become effective until the species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation. At that time, the project will be reviewed to determine whether any take of the Chiricahua leopard frog has occurred. Modifications of the opinion and incidental take statement may be appropriate to reflect that take. No take of the Chiricahua leopard frog may occur between the listing of the Chiricahua leopard frog and the adoption of the conference opinion through formal consultation, or the completion of a

subsequent formal consultation. The reasonable and prudent measures and terms and conditions in this opinion are effective immediately, as they also cover the listed Gila topminnow.

Thank you for your action on behalf of Arizona's native fishes and the conservation and recovery of the Gila topminnow. We look forward to working with you on the subsequent recovery actions for the Gila topminnow and other species of concern associated with the Las Cienegas National Conservation Area. If you have questions regarding this biological and conference opinion or the consultation process, please contact Doug Duncan (520) 670-4860, or Sherry Barrett (520) 670-4617 of our Tucson Ecological Services Suboffice.

Sincerely,

/s/ David L. Harlow
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)

John Kennedy, Arizona Game & Fish Department, Phoenix, AZ
Arizona Game and Fish Department, Region 5, Tucson, AZ

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Table 1. Status of natural Gila topminnow populations in the US.

Site	Ownership	Extant? ¹	Nonindigenous?	Mosquitofish?	Habitat Size ²	Threats ³
Bylas Spring ⁵	San Carlos	YES	NO ⁴	NO ⁴	S D	M/ N G
Cienega Creek	Bureau	YES	NO	NO	L	M/ R N
Cocio Wash	Bureau	NO 1982	UNKNOWN	UNKNOWN	S	H/ M
Cottonwood Spring	Private	YES	NO	NO ⁴	S	M/ N
Fresno Canyon	State Parks	YES	YES	NO ⁴	M	H/ N G U
Middle Spring ⁵	San Carlos	YES	NO ⁴	NO ⁴	S	H/ N G
Monkey Spring	Private	YES	NO	NO	S	L/ W U
Redrock Canyon	USFS	YES	YES	YES	M D	H/ W R G N
Sabino Canyon	USFS	NO 1943	YES	NO	M	H/ R N
Salt Creek ⁵	San Carlos	YES	NO ⁴	NO ⁴	S	M/ N G
San Pedro River	Private	NO 1976	YES	YES	-	H/ W N G R
Santa Cruz River San Rafael Tumacacori Tucson	Private, State Parks, TNC	YES ⁶ YES NO 1943	YES YES YES	YES YES YES	L D	H/ W N R G C U
Sharp Spring	State Parks	YES	YES	YES	M	H/ N G U
Sheehy Spring	TNC	NO 1987	YES	YES	S	H/ N G U
Sonoita Creek	Private, TNC, State Parks	YES	YES	YES	L D	H/ W N G
Tonto Creek	Private, USFS	NO 1941	YES	YES	L	H/ N R G W

¹ if no, last year recorded

² L = large M= medium S = small D = disjunct

³ Immediacy H = high M = moderate L = low

Type W = water withdrawal C = contaminants R = recreation N = nonindigenous G = grazing M = mining
U = urbanization

⁴ none recently, they have been recorded multiple times

⁵ recently renovated

⁶ in Mexico, US in 1993