

United States Department of the Interior
U.S. Fish and Wildlife Service
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 FAX: (602) 242-2513

In Reply Refer To:

AESO/SE
22410-2009-F-0462
22410-2008-I-0113
22410-2007-I-0221

January 8, 2010

Mr. Donal Luhrsen, District Ranger
Tonto Basin Ranger District
Tonto National Forest, U.S. Forest Service
28079 North Arizona Highway 188
Roosevelt, Arizona 85545

Dear Mr. Luhrsen:

Thank you for your September 18, 2009, letter received in our office the same day, requesting formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act (Act) of 1973 (16 U.S.C. 1531-1544), as amended. This consultation will address impacts that may result from the proposed "Forest Uses and Management of Springs on Gila Topminnow (*Poeciliopsis occidentalis*) and Desert Pupfish (*Cyprinidon macularius*)."

The Tonto National Forest (TNF), in partnership with Arizona Game and Fish Department (AGFD), plans to introduce these fish species into Walnut Spring, Mud Spring, and Cottonwood Artesian on the Tonto Basin Ranger District in Gila County, Arizona.

You concluded that the land management and maintenance of these habitats "may affect, likely to adversely affect" the Gila topminnow and desert pupfish.

This biological opinion is based on information provided in the September 18, 2009, biological assessment and evaluation, written correspondence between our agencies, telephone conversations between our staffs, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

CONSULTATION HISTORY

- September 18, 2009: We received the Tonto Basin Ranger District's Biological Assessment and Evaluation for this project.
- October 1, 2009: We responded to the TNF's request for consultation by sending a 30-day letter confirming receipt of request and initiation of consultation.
- October 6 and 27, 2009: We received clarification from the TNF on the length of the proposed action.
- December 3, 2009: We sent the Draft Biological Opinion to the TNF.
- December 9, 2009: We received comments on the Draft Biological Opinion from the Tonto Basin Ranger District.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

This biological opinion is to evaluate the impacts of ongoing TNF actions and planned Gila topminnow and desert pupfish management/conservation efforts. The Tonto Basin Ranger District has evaluated several ongoing actions and proposed conservation measures that could affect Gila topminnow and desert pupfish. These actions include ongoing forest uses (i.e. cattle grazing, recreation) and management of spring habitats (fencing, vegetation management, etc.).

Gila topminnow and desert pupfish are expected to be transported, stocked, and augmented, if needed, by Arizona Game and Fish Department (AGFD) at Walnut Spring, Mud Spring, and Cottonwood Artesian on the Tonto Basin Ranger District in Gila County, Arizona, under the authority of AGFD.

The length of time for this project is approximately 12 years, ending in 2022. Future analyses of the effects of ongoing actions associated with this project are anticipated to occur between 2011 and 2015 during allotment specific consultations (Armer Mountain, A-Cross, and Walnut allotments) and the next revision of the Tonto National Forest Plan. The TNF will evaluate effects associated with these allotments when they occur, but effects are not expected to differ from this analysis. It is anticipated this project will be re-evaluated again in 2022.

Ongoing and Future Cattle Grazing

The following grazing allotments, Walnut (Walnut Spring), Greenback (Mud Spring), A-Cross and Armer Mountain (Cottonwood Artesian Well), surround the locations where topminnow and pupfish will be placed (Figure 1). No cattle-grazing is proposed to occur within the fenced aquatic ponds/springs/wells where fish are being placed (Mud Spring, Walnut Spring, Cottonwood Artesian Well). The Greenback (USFWS 2007, 22410-2008-I-0113), Armer Mountain (USFWS 2008, 22410-2007-I-0221), and Walnut (USFWS 2009, 22410-2007-I-0221) allotments have recently been evaluated under section 7 of the Act for effects to threatened and

endangered species. The A-Cross Allotment has not been evaluated under ESA recently, and as described below, no cattle grazing is currently or has recently occurred.

Forage utilization by livestock will be managed at light to moderate intensity in uplands and some riparian areas. Consistent patterns of meeting conservative use guidelines of 30 to 40 percent on key species in key upland areas or meeting TNF guidelines for riparian areas will be used as a basis to modify management practices or take administrative actions necessary to reduce utilization in subsequent grazing seasons. Guidelines for riparian obligate tree species limit use to less than 50 percent of terminal leaders (top third of the plant) accessible to livestock (usually less than or equal to six feet tall). Also in riparian areas deer grass use will be limited to 40 percent of plant species biomass when total herbaceous canopy cover near the greenline is less than 50 percent. A six-to-eight inch stubble height of emergent species (sedges, rushes, cattails, horsetails) will be maintained during the grazing period.

An adaptive management approach will be adopted (as outlined in Chapter 90 of FSH 2209.13) to use the monitoring results to continually modify management in order to achieve specific objectives. Adaptive management is proposed to be implemented through Annual Operating Instructions, which would adjust livestock numbers and the timing of grazing so that use is consistent with current productivity and capacity and is meeting management objectives.

The monitoring strategies will include implementation and effectiveness monitoring. Implementation monitoring refers to strategies that guide adaptive management choices, while effectiveness monitoring evaluates whether management actions are having the expected on-the-ground resource management objectives. Monitoring will occur at “key areas” that are typically located on upland ranges, and will assess changes in ground cover and relative composition of perennial forage plants. The “critical areas” will be established primarily to monitor riparian habitat or locations where listed species occur. Critical areas will be monitored throughout the year (during the grazing season), and use will be adjusted if conservative use levels are exceeded.

Walnut Allotment - Walnut Spring & Walnut Creek

Grazing has not occurred within the Walnut Allotment since 2002 and the allotment is not currently stocked with cattle. However, cattle grazing at the Walnut Allotment is likely to start in the next year, including the area surrounding Walnut Spring (where topminnow/pupfish are proposed for stocking).

The Walnut Allotment covers 11,776 acres on the Tonto Basin Ranger District. The elevation ranges from 4,600 feet on the eastern side of the allotment to 2,300 feet near Tonto Creek. The maximum permitted numbers for this allotment are 2,800 AUMs. The soil condition is 27% satisfactory, 31% impaired, and 42% unsatisfactory. No data on range condition or trend are available.

Once grazing begins, the five pastures will be grazed under a rest-deferred grazing system. The management system was derived from the concept of spring-summer rest, two years out of three. This system provides spring-summer rest back-to-back two years out of four. However, it provides for summer growing season rest three years out of four and also provides growing

season rest three years out of four during the spring. This system is intended to improve the amount of annual growing season rest.

Greenback Allotment - Mud Spring & Greenback Creek

Cattle use of the Greenback Allotment is authorized yearlong or seasonally as resource conditions dictate. Grazing management ensures that pastures receive periodic growing season rest or deferment in order to provide for grazed plant recovery. The term grazing permit for the Greenback Allotment authorizes 285 adult cattle yearlong with 157 head of yearling cattle carry-over permitted from January through May each year. Numbers on the allotment could be increased over time, from approximately 14 head currently, based upon management practices, available forage and water, and other resource considerations. The Mud Spring topminnow/pupfish stocking site occurs on this allotment.

A-Cross and Armer Mountain Allotments - Cottonwood Artesian Well

Cottonwood Artesian Well (one of the topminnow/pupfish stocking sites) is on the A-Cross Allotment. There is no current cattle-grazing on the A-Cross Allotment which has been vacant for about the last 10 years. However, similar to the Walnut Allotment, it is likely that cattle will use it in the near future.

The Armer Mountain Allotment currently has eight horses grazing on it. The Armer Mountain Allotment permittee has access to the corral and associated water development on the A-Cross Allotment for shipping livestock as needed. This permittee will require continued access to the development. It is likely cattle will also use this allotment in the near future.

Ongoing Recreation Activities

Forest visitors (e.g., hunters, campers) occasionally walk or drive through the aquatic areas where topminnow and pupfish are proposed to be stocked.

Conservation Measures

Fence and Pipeline/Trough Installation and Maintenance

Mud Spring

TNF plans to surround the Mud Spring wetland and pond with a pipe-rail fence to exclude cattle to reduce impacts of grazing and vehicular recreation on spring and wetland resources. TNF will also install a pipeline and trough to provide water to cattle outside the enclosure and remove the existing barbed wire fence that divides the pond. All construction will take place before pupfish or topminnows are stocked.

Cottonwood Artesian Well

To reduce impacts on aquatic habitat at Cottonwood Artesian Well, the TNF will relocate the corral surrounding this area and replace the existing corral fence with a 2600-foot sucker rod fence. All construction will take place before pupfish or topminnows are stocked. Because this new fence will prevent cattle access to Cottonwood Artesian Well, plans include providing water to the new corral. The corral and associated water development will be relocated to the north of the current location to continue to meet permittee needs once the allotment permit is reissued.

Fencing Repair

Fencing repair and maintenance surrounding all three stocking sites will be performed by the TNF as needed to keep fences intact and functioning. Any broken fences will be repaired as soon as possible after discovery to minimize grazing effects within the enclosures. Repairs at Walnut Spring may include repairing wire and replacing vertical poles. Pipe-rail fences should require infrequent maintenance, but re-welding and straightening of poles are possible tasks.

Pipeline/Trough Maintenance

The TNF will develop and maintain pipelines/troughs at these stocking sites. At Mud and Walnut springs screens will help minimize topminnow or pupfish from entering pipelines. The water developments will be examined semi-annually for fish and transferred to the ponds if necessary and/or practicable.

Trespass Livestock Management

While this proposal identifies the exclusion of cattle grazing from these fishes primary habitat through fencing, fencing (especially barbed wire fences) can fail. It is reasonable to anticipate, that for short periods of time and at an unknown frequency, cattle can access the excluded aquatic areas where these fish occur. If livestock trespass within enclosures at Mud Spring, Walnut Spring, or Cottonwood Artesian Well, TNF personnel or the permittee will immediately remove them upon detection.

Kiosk Installation

Installation of a kiosk station at the Tonto Basin Ranger District Visitor Center can help inform visitors on the value of springs to wildlife, including topminnow and pupfish, as well as other animals such as bats and game animals. The TNF will seek to minimize the possibility of users driving through streams as much as possible through education of the public on proper travel within Forest Service lands and supported by law enforcement.

Cattail Maintenance

Because decomposing cattails can deplete oxygen levels from water sources which may affect topminnow and pupfish, the TNF will reduce cattail abundance by using fire and/or backhoe excavation (both of which have been used in the past) if topminnow/pupfish populations appear to decline. It is estimated that this maintenance may be required every three to five years.

Excavation would most likely occur during scheduled road crew activities. To reduce injury/mortality, no maintenance activities will be conducted during the primary breeding season, which starts when water temperatures exceed 20° C (Marsh and Sada 1993).

With the assistance of Arizona Game and Fish Department, a portion of the Gila topminnow and desert pupfish population will be salvaged and held in portable tanks during any excavation or burning, and then returned to the pond when the excavation is complete. Cattail piles generated from clearing will be inspected, and any attached fish will be placed in the fish holding tank. To minimize take during capture of fish, biologists will check the oxygen level in the holding tank to ensure it is satisfactory and will use an aerator if necessary.

Wetland Plantings

The TNF may manually plant wetland plants in small areas around the ponds or in the wetlands of these three sites and attempt to discourage fish away from the work area.

Crayfish Removal

If monitoring of topminnow and pupfish reveals declining populations and crayfish predation is suspected as the reason, TNF may attempt to remove crayfish via baited traps. To minimize take of listed fish, traps designed to catch crayfish but allow fish passage will be used. If these types of traps are unavailable, crayfish traps or minnow traps will be used, but will be monitored every hour to release fish and remove crayfish from the traps.

Pond/Fish Monitoring and Management

Any of these topminnow/pupfish sites could go dry, especially at Cottonwood Artesian Well on the Armer Mountain Allotment. TNF and AGFD will visit reestablishment sites at least twice a year. If pond drying appears to threaten any of these fish populations, TNF will work with AGFD to salvage and relocate the fish. The first choice for relocation would be to any of the other sites described in this proposal. The second option for relocating fish would be to other sites on the TNF with fish from the same lineage. The third option would be to sites off TNF with fish from the same lineage. Fish moved outside of the action area will not be addressed in this consultation. If Cottonwood Artesian Well goes dry, topminnow/pupfish will not be - stocked/augmented for at least two months after reestablishing water in pond.

Action Area

We consider the action area, for the purposes of this section 7 consultation, to be larger than the footprint of each spring/pond/well. We consider the indirect effects of how grazing or recreation may influence function of streams or associated sedimentation of ponds/springs within the watershed because these allotments are large sections of the landscape encompassing 10,000s of acres. Similarly, there are potential effects that may occur to Gila topminnow and desert pupfish if they are able to move out of these ponds and into troughs and/or adjacent streams. However, we do not anticipate, because of intermittent stream flow and/or isolated waters that fish would move and persist beyond the boundaries of these large allotments. Therefore, the action area for this proposal is the boundary of all four grazing allotments.

STATUS OF THE SPECIES

Desert Pupfish

In Arizona, the genus *Cyprinodon* is comprised of three species, desert pupfish (*Cyprinodon macularius*), Quitobaquito pupfish (*C. eremus*, Echelle *et al.* 2000), and an extinct form, the Santa Cruz pupfish (*C. arcuatus*, Minckley *et al.* 2002). The desert pupfish and Quitobaquito pupfish were listed as endangered species (as *C. macularius*) with critical habitat on April 30, 1986 (USFWS 1986 [51 FR 10842]). Critical habitat for the Quitobaquito pupfish was designated in Arizona at Quitobaquito Springs, Organ Pipe Cactus National Monument, Pima County. The Mexican government has also listed the desert pupfish as endangered [Secretaria de Desarrollo Urbano y Ecologia (SEDUE) 1991].

A small fish, the desert pupfish is less than 3 inches long (Minckley 1973). The body is thickened, chubby or strongly laterally compressed in males; coloration is a silvery background with narrow dark vertical bars on the sides. Males are larger than females and become bright blue during the breeding season. Spawning occurs from spring through autumn, but reproduction may occur year-round depending on conditions (Constanz 1981). The desert pupfish appears to go through cycles of expansion and contraction in response to natural weather patterns (USFWS 1986, 1993; Weedman and Young 1997). In very wet years, populations can rapidly expand into new habitats (Hendrickson and Varela 1989). In historical times, this scenario would have led to panmixia among populations over a very large geographic area (USFWS 1993).

Historical distribution of desert pupfish in Arizona included the Gila, San Pedro, Salt, and Santa Cruz rivers, and likely the Hassayampa, Verde, and Agua Fria rivers, although collections are lacking for the latter three drainages. The desert pupfish is also found in the lower Colorado River, Salton Sink basin, and Laguna Salada basin (Eigenmann and Eigenmann 1888, Garman 1895, Gilbert and Scofield 1898, Evermann 1916, Thompson 1920, Jordan 1924, Coleman 1929, Jaeger 1938, Miller 1943, Minckley 1973 and 1980, Black 1980, Turner 1983, Hendrickson and Varela 1989, Echelle *et al.* 2000). Historical collections occurred in Baja California and Sonora, Mexico, and in the United States in California and Arizona.

Since the 19th century, desert pupfish habitat has been impacted by streambank erosion, the construction of water impoundments that dewatered downstream habitat, excessive groundwater pumping, the application of pesticides to nearby agricultural areas, and the introduction of non-native fish species (Matsui 1981, Hendrickson and Minckley 1985, Minckley 1985, Schoenherr 1988). The non-native bullfrog may also prove problematic in the management of desert pupfish. The bullfrog is an opportunistic omnivore with a diet that includes fish (Frost 1935, Cohen and Howard 1958, Brooks 1964, McCoy 1967, Clarkson and deVos 1986). There is also a concern that introduced salt cedar (*Tamarisk* spp.) next to pupfish habitat may cause a lack of water at critical times (Bolster 1990, R. Bransfield, FWS, pers. comm. 1999). Evapotranspiration by luxuriant growths of this plant may impact smaller habitats where water supply is limited and woody vegetation is not naturally abundant. Recent scientific information contradicts the long-held belief that tamarisk consumes more water than native trees (Glenn and Nagler 2005).

Naturally occurring populations of desert pupfish are now restricted in the United States to California in two streams tributary to, and in shoreline pools and irrigation drains of, the Salton Sea (Lau and Boehm 1991). The species is found in Mexico at scattered localities along the Colorado River Delta and in the Laguna Salada basin (Hendrickson and Varela-Romero 1989, Minckley 2000). About 20 transplanted populations exist in the wild (USFWS 1993). The range-wide status of desert pupfish is poor but stable. The future of the species depends heavily upon future developments in water management of the Salton Sea and Santa Clara Cienega in Mexico. Additional life history information can be found in the recovery plan (USFWS 1993).

Recent completion of Safe Harbor Agreements for the pupfish with The Nature Conservancy and Arizona Game and Fish Department provide opportunities to expand desert pupfish distribution on non-Federal lands. Additional re-introduction and recovery projects have occurred and others are being planned for this species.

Several Federal actions affect this species every year. A complete list of all formal consultations affecting this species in Arizona can be found on our website (<http://www.fws.gov/southwest/es/arizona/>) by clicking on the “Document Library” tab and then on the “Section 7 Biological Opinions” tab. Survey work and recovery projects are summarized in the appropriate land-management agency or AGFD documents.

Gila Topminnow

Gila topminnow was listed as endangered in 1967 without critical habitat (USFWS 1967). 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, is collectively known as the Sonoran topminnow. Both subspecies are protected under the Act.

Only Gila topminnow populations in the United States, and not in Mexico, are listed under the ESA. 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 non-native fishes (Miller 1961, Minckley 1985). Other listed fish suffer from the same impacts (Moyle and Williams 1990). 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 topminnows are highly vulnerable to adverse effects from non-native aquatic species (Johnson and Hubbs 1989). The introduction of many predatory and competitive non-native fish, frogs, crayfish, and other species led to topminnow no longer surviving in many of their former habitats, or the small pieces of those habitats that had not been lost to human alteration (Meffe *et al.* 1983, Meffe 1985, Brooks 1986, Bestgen and Propst 1989, Marsh and Minckley 1990, Stefferud and Stefferud 1994, Fernandez and Rosen 1996, 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). In riverine backwater and side-channel habitats that formed the bulk of Gila topminnow natural habitat, predation and competition from other fishes was essentially absent. Thus Gila topminnow did not evolve mechanisms for protection against predation or competition and is predator-and-competitor-naive.

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 was reduced to only 15 naturally occurring populations. Only 12 of the 15 recent natural Gila topminnow populations are considered extant (Weedman and Young 1997).

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 not more than 30 localities (12 natural and 18 stocked). Many of these localities are small and vulnerable. Recent completion of Safe Harbor Agreements for the Gila topminnow with The Nature Conservancy and Arizona Game and Fish Department provide opportunities to expand its distribution on non-Federal lands. Several recovery and reintroduction projects have occurred and others are also being planned.

We concluded in our biological opinion for the Southwestern Regional Land Resource Management Plan (LRMP) (USFWS 2005, #2-22-03-F-366) that implementation of ongoing livestock grazing on the TNF would result in incidental take through harm and harassment of the Gila topminnow.

Several other Federal actions affect this species every year. Biological opinions resulting from formal consultations affecting this species in Arizona can be found on our website (<http://www.fws.gov/southwest/es/arizona/>) by clicking on the “Document Library” tab and then on the “Section 7 Biological Opinions” tab. Survey work and recovery projects are summarized in the appropriate land-management agency or AGFD documents as well as in the BA associated with this project.

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.

Native Fish Declines

Gila topminnow and desert pupfish used to inhabit the stream habitats of Tonto Creek and the Salt River in Tonto Basin, which now has been altered by the creation of Roosevelt Dam/Lake and are locations where non-native exotic fish have become established (Miller 1961, USFWS 2008). Drought has negatively affected water flow in creeks and may threaten introduced fish populations (Weedman and Young 1997).

Grazing Management

The accounts of overgrazing throughout the Southwest at the turn of the past century are well known. Hanes (1996) cites Luna Leopold in his book, *A View of the River* (1994) stating that the late 1800s are viewed by geomorphologists as a period of “arroyo cutting” throughout the west. The cause is generally attributed to overgrazing combined with climatic events (drought followed by rain events) (Hanes 1996). Watershed condition has been and continues to be a concern over most of the TNF, which was originally established for the purpose of watershed protection.

Reviews of grazing specifically on the TNF were published by Croxen (1926) and Alford (1993). Cattle were moved into the area that is now the Tonto Forest after the Civil War and the ranges were fully stocked by 1890. In 1900, an estimated 1.5 to 2.0 million cattle were on what is now

the Tonto Forest; which is more than 50 times the currently permitted stocking rate. Croxen (1926) documents extreme resource degradation at that time.

With establishment of the National Forest in 1905, resource management improved, but many years were needed to construct the livestock waters, fences, and other improvements necessary to adequately manage cattle (Alford 1993). Forest planning and increased interest in rangeland improvement in the 1970s initiated a series of changes that have resulted in dramatic improvement of overgrazed rangelands. Nevertheless, a long history of poor management has created long-term changes on the landscape that are still healing. Alford (1993) acknowledged that resource management problems remain, but positive results have been achieved in recent years.

Recently, cattle stocking levels on the Tonto NF are much lower than the levels that have caused watershed damage in the past. The Tonto NF has instituted a drought policy which reduces stocking during drought. Many allotments were de-stocked at some point over the past decade, while others had reduced numbers. This has provided protection or minimized further damage for many of the watersheds. Cattle are only recently being re-stocked on many of the allotments.

Walnut Allotment – Walnut Spring/Walnut Creek

The vegetation on the Walnut Spring Allotment is dominated by Sonoran Desert scrub. Semi-desert grasslands and open juniper woodlands occur at higher elevations. The allotment is entirely within the Gun Creek-Tonto Creek fifth-code watershed. The main drainages on the allotment are Lambing Creek and Walnut Creek, both of which flow into Tonto Creek.

The Walnut Spring grazing allotment was last stocked with cattle in 2002. The soil condition is 27% satisfactory, 31% impaired, and 42% unsatisfactory. No data on range condition or trend are available.

Walnut Spring fills a small developed pond and is accessed from Forest Road 71. Fruit trees and blackberry plants grow and the site is an old homestead where the pond's initial purpose was to provide water to cattle. The pond overflows into a wetland which eventually forms a small channel that drains into Walnut Creek. Exact discharge is unknown, but the pond maintains high water levels year round.

Other past management activities at the pond include cattail and blackberry burning, cattail excavation, and crayfish trapping. A fence currently excludes cattle from the pond and wetland. The pond has floating cattail mats and is 7-10 feet deep at its greatest depth. While there is no TNF record of this pond going dry (within the last decade or so), it is possible that extreme drought could dewater the pond. Despite trapping efforts, invasive crayfish remain in Walnut Spring and Walnut Creek.

Greenback Allotment – Mud Spring/Greenback Creek

Greenback Creek is part of the Greenback Creek-Tonto Creek fifth-code watershed, originating from the Sierra Anchas and flowing towards Roosevelt Lake/Tonto Creek. Trend monitoring data (2000-2006) from the Gila County Cooperative Extension indicated that the Greenback Creek Allotment range conditions are meeting Forest Plan standards (soil and forage conditions are generally stable or upward) (USFS 2007 Greenback Allotment Environmental Assessment).

Mud Spring empties into a small developed pond that overflows into a wetland which eventually drains into Greenback Creek. The pond's initial purpose was to provide water to cattle on the Greenback Allotment. Several emergent wetland plant species grow around the pond, and several submergent plant species grow within the pond. The pond does not appear to have crayfish in it.

Mud Spring discharge is unknown, but the pond did not go completely dry in the most recent drought (past \pm 10 years), although it did decrease in volume. Therefore, it is possible that extreme drought could dewater the pond.

A-Cross/Armer Mountain Allotments- Cottonwood Artesian Well

While an official assessment of these allotments has not occurred in several years, current range conditions are likely poor and soils are unsatisfactory due to past management. The A-Cross Allotment is currently vacant, and has been for about 10 years. The Armer Mountain Allotment currently has eight horses grazing on it. TNF plans to relocate the corral and replace the existing fence with a pipe-rail fence and provide water to cattle.

Cottonwood Artesian is a well. Water from the well first enters a cattle trough. The well also supplies water to a circular tank that is subdivided by a fence. After entering the trough, the water flows into a small, narrow, shallow pond. The shallow pond contains trees on its upper end and emergent vegetation (e.g., sedges) at its lower end. Water flowed into a large pond in the past via a canal, but the water no longer flows between the small and large pond. Thus, the large pond is currently dry and could go dry again after re-establishment. Both ponds exist within a corral intended for use by permittees on the A-Cross and Armer Mountain allotments.

No crayfish occupy this system. Past management included trimming and removal of upland tree species surrounding the ponds and trimming of trees in the upper end of the pond. TNF has also partially burned the dead cattails in the large pond and piles of vegetation generated by the above-mentioned tree trimming.

Recreation

Forest visitors (e.g., hunters, campers) use the springs, their associated creeks, and the artesian site. Occasionally users will walk or drive through these areas. Forest Road 71 crosses Walnut Creek and Greenback Creek, which receive water from Walnut and Mud Springs, respectively, and vehicles can cross the stream when it is flowing.

Status of the Gila Topminnow and the Desert Pupfish in the Action Area

Gila topminnow and desert pupfish do not currently occur at Walnut Spring/ Walnut Creek, Mud Spring/Greenback Creek, or Cottonwood Artesian Well.

Gila topminnow were released into Cottonwood Artesian Well on two occasions and extirpated both times. Gila topminnow (n = 200) were released into the cement trough in 1982 and persisted until 1991. Reasons for the extirpation are uncertain, but the trough appeared to have been cleaned (water was cleaner and no aquatic vegetation was present) when visited in 1992 (Voeltz and Bettaso 2003). A small pond at the cottonwood Artesian Well was stocked with an

ASU Bylas lineage (n=12) in 2001 (Voeltz and Bettaso 2003), but these individuals are not longer present.

EFFECTS OF THE ACTION

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

Gila Topminnow and Desert Pupfish

Ongoing and Future Cattle Grazing

Cattle grazing

The management goal to prevent cattle from entering the ponds/springs/wells where Gila topminnow and desert pupfish are to be placed is anticipated to reduce and minimize, but not eliminate adverse effects from cattle and cattle grazing. Considering the long-term (12 years) nature of the evaluation period of this ongoing action, it is reasonable to anticipate that fences will fail and cattle will temporarily have access to topminnow/pupfish ponds/springs/wells. Additionally, Gila topminnow and desert pupfish may not remain contained within these ponds and move into connected stream/wetland habitats (Walnut Creek or Greenback Creek) outside of fenced areas where cattle have access. Due to similar life histories (except topminnow bear live young and pupfish lay eggs) and habitat use, we describe the effects to both fish together.

Gila topminnow and desert pupfish locations at Walnut Spring/Walnut Creek, Mud Spring/Greenback Creek, and Cottonwood Artesian Well will be relatively restricted to small areas of habitat that increase the likelihood of cattle causing adverse effects. These fish are small and can exist in small amounts of water and in a wide variety of extreme habitat and water quality conditions. Due to the scarcity of water in the Sonoran Desert and tendency for cattle to congregate in watered areas, cattle will be attracted to topminnow/pupfish habitats that can lead to local impacts in a fairly short amount of time.

Stocking topminnow/pupfish will improve the species' on-the-ground status; however, there is a reasonable certainty that cattle will cause some adverse effects to these fish. The distribution of topminnow/pupfish at the ponds/wells/springs and shallow areas of Greenback/Walnut Creek will be restricted to small areas where cattle are also expected to occur. Low water conditions combined with congregations of cattle activity (grazing, watering, hoof action) can lead to additional reductions in water, physiological effects of reduced water quality, bank trampling, fragmentation of contiguous water, isolation/stranding and trampling of fish/eggs (Roberts and White 1992), and loss of habitat through de-watering. Long-term or seasonal drought can also exacerbate these conditions. Round-up of trespass cattle within these small enclosed areas could cause cattle congregations to increase their hoof action and/or cause movement into unanticipated fish habitat. As a result we anticipate that cattle will cause disturbance, a decline

in water quality, and/or mortality of fish and pupfish eggs, particularly at the perimeter of these ponds/springs/wells and shallow areas of the nearby wetlands/creeks, by reducing the distribution and abundance of water and isolating fish/eggs into inhospitable areas.

We do not anticipate that grazing at the landscape level across these four allotments will adversely affect these fish and their habitat. Helping to reduce/minimize watershed effects, such as a decline in water abundance or quality in these ponds, is the implementation of the conservative-use standard and associated monitoring. Plus, the conservative grazing standard combined with the satisfactory condition and significant recent rest from grazing should also facilitate conditions that would prevent indirect watershed effect that could adversely affect topminnow/pupfish in a measurable manner. The proposed action of excluding cattle from these ponds/springs/wells could also assist in buffering potential unanticipated watershed impacts resulting from cattle grazing on the allotments.

Cattle management

Construction of new fences, pipelines, and troughs (and removal of old fence) at Mud Spring and Cottonwood Artesian Well are proposed to occur prior to placing topminnow/pupfish in these areas. The construction and fence removal will not occur within any aquatic habitat. Therefore we do not anticipate that there will be any adverse direct or indirect effects to fish from the development of fences, pipelines/troughs, or removal of old fences.

Operation and maintenance of new and existing troughs and pipelines at Mud Spring, Walnut Spring, and Cottonwood Artesian Well could result in adverse impacts to some individual Gila topminnow or desert pupfish. It is reasonable to anticipate that screens designed to prevent fish movement could fail, degrade, or become ineffective. If small fish entered pipelines and troughs they could be impacted from trough/pipeline maintenance and use by being stranded, water leakage onto the ground, cattle drinking, trough/pipeline cleaning, and an additional variety of other incidents associated with pipeline/trough operation and maintenance.

Ongoing Recreation Activities/Kiosk Installation

We do not anticipate there is a likelihood that passenger or off-road vehicles (traveling on Forest Road 71) will adversely impact topminnow/pupfish or their habitats. Fences around all three ponds/springs/wells will prevent vehicles from entering the prime aquatic habitats where these fish will reside. Even if a fence fails, the locations are remote, the fences will be repaired, and the aquatic nature of these areas is not likely to attract vehicles. Forest Road 71 crosses Walnut and Greenback creeks outside and downstream of these fenced pond areas; however, they cross at typically dry locations (USFS 2009). During times of high precipitation, these dry crossings can become areas with stream flow (USFS 2009). However, we do not anticipate there is a reasonable certainty that the combination of vehicle traffic, fish presence, and weather will likely occur together that would result in any fish mortality. Similarly, because the crossings are typically dry and fish are anticipated to most often be found in pond/spring/well habitats, we do not anticipate Forest Road 71 vehicle traffic to impact fish habitat.

Development of a new recreation information kiosk at the Tonto Basin Ranger District Visitor Center will not occur in the habitat of any threatened or endangered species. As a result, we do not anticipate there will be any direct or indirect effects from the development of this kiosk.

Additionally, because these ponds/wells/springs are effectively fenced and located away from recreation or human activity centers, we do not anticipate other recreational activities (hiking, etc.) causing adverse effects to these fish or their habitat.

Pond/Fish Management

If pond/well/spring drying appears to threaten any of the proposed fish populations, TNF will work with AGFD to salvage, hold, and relocate the fish. This action can typically be categorized as a recovery action, and as such, permitted by FWS Recovery Permits held by AGFD or TNF. However, it is uncertain with the length of this project, the potential immediacy of necessary salvage actions, and/or what permits may or may not authorize in the future, that those permits will be in place and cover these specific activities. As a result, we will evaluate effects in the action area as defined above associated with salvage, holding, and relocating fish in this biological opinion. However, because it is unknown if and where fish might be moved outside of the three locations described within, we are not able to evaluate land management actions at areas other than those evaluated in this biological opinion.

There is the possibility that these wells/ponds/springs, for reasons beyond the TNF's control and this proposed action (i.e. drought), will become dry. The result of losing surface area can lead to mortality of fish and/or eggs depending on factors such as: how fast the water subsides; timing of water loss; the amount of vegetation attracting fish to the water's perimeter; and/or the topography on the bottom of the water body. We do not consider these occurrences products of the proposed action or due to the effects of TNF management.

As a result of the need to salvage fish, we anticipate that the collection, holding, and transportation of fish (within the action area) could lead to some mortality. Collection of fish through nets and/or other means can lead to death or injury through the simple process of trying to capture fish, contact with fish, removing them from water, and placing them into a holding facility or tank. Similarly, holding and transporting fish can also lead to injury or mortality of fish by being placed in unusual conditions, water chemistry, transportation, etc.

Cattail Maintenance

The need to reduce the abundance of cattails in these relatively isolated ponds/springs/wells is important to maintain appropriate oxygen conditions for the long-term persistence of fish in these environments. However, this process requires relatively aggressive management actions requiring fish capture, and the use of heavy machinery (i.e. backhoes) and possibly fire to reduce vegetation abundance. Similar to salvaging fish, the collection and holding of fish prior to cattail excavation (or use of fire) can lead to injury or mortality through efforts to try and capture fish, contact with fish, removing them from the water, and/or placement in a holding tank. Because not all fish can be captured, the use of heavy machinery in these habitats (or fire) to reduce/remove cattails can also lead to adverse effects to fish remaining in these habitats. While some fish will be lost from these actions, this short-term loss of some fish and impacts to their habitat is needed for long-term fish persistence at these locations.

Wetland Plantings

The TNF may plant wetland vegetation in small areas around these aquatic water bodies or in the wetlands where topminnow/pupfish are expected to be present. These planting efforts are intended to enhance habitat conditions and installation would involve using hand tools and likely standing in shallow water. The result of this effort could disrupt fish behavior when in close proximity to the plantings or create temporary increases in sediment in the water. Because of the low impact of these activities and anticipated infrequent occurrence, we do not believe these plantings will be reasonably certain to cause direct or indirect effects to fish habitat or individual fish leading to reduced survivorship/fecundity.

Crayfish Removal

In order to reduce crayfish impacts on topminnow/pupfish, the TNF may attempt to remove crayfish via baited traps. It is reasonable to anticipate, because these are not target-specific traps that adverse effects to topminnow/pupfish will occur. Some crayfish traps are designed to allow fish passage, while others can result in capture of small fish (the size of topminnow/pupfish) and crayfish. Regardless of which trap is used, topminnow/pupfish could enter traps and be injured or killed from entrapment or crayfish. By reducing potential non-native predators from topminnow/pupfish habitat, the anticipated overall effect of these traps is expected to be beneficial.

CUMULATIVE EFFECTS

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

Since nearly all lands within the action area are managed by the TNF, most activities that could potentially affect listed species are Federal activities and subject to additional section 7 consultation. Periodic drought and possibly flooding could compromise the success of these proposed recovery actions.

CONCLUSION

Gila topminnow and Desert pupfish

After reviewing the current status of Gila topminnow and desert pupfish, the environmental baseline for the action area, the effects of the proposed land management actions and the potential for cumulative effects it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the topminnow or pupfish. No critical habitat has been designated for this species within the action area or nearby; therefore, none will be affected by the proposed action.

We base these conclusions on the following:

- The proposed action is intended to establish and manage for the persistence of Gila topminnow and desert pupfish at these three locations, where they currently do not exist.
- Fencing will be in place and surround topminnow/pupfish primary habitat. The fencing is intended to reduce, minimize, and possibly prevent adverse effects from cattle and off-road vehicles.
- The proposed action proposes land management (roads, range, aquatic predators, aquatic vegetation) needed to help maintain topminnow at these three locations.
- The adverse effects associated with the proposed actions are primarily associated with short-term impacts necessary in order to improve conditions at these ponds for the long-term persistence of topminnow/pupfish.

The conclusions of this biological opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document.

INCIDENTAL TAKE STATEMENT

Section 9 of Act and Federal regulations pursuant to section 4(d) of 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 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 Forest Service so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Forest Service has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest Service (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Forest Service or applicant must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement (50 CFR 402.14(i)(3)).

We anticipate that there is a reasonable likelihood that continued livestock grazing and management on the Armer Mountain, A Cross, Walnut and Greenback Creek allotments will result in incidental take of Gila topminnow and desert pupfish. The incidental take anticipated will be in the form of harm, harassment, wound, and kill. Livestock will continue to have access to Walnut and Greenback creeks (outside of the primary fish habitat) and periodic access to Walnut Spring, Mud Springs, and Cottonwood Artesian Well (primary fish habitat). As a result of cattle congregating in these aquatic habitats, we anticipate that incidental take of Gila topminnow and desert pupfish (and pupfish eggs) from cattle movement and the subsequent physiological effects from the degradation of water quality/quantity from hoof action.

Over the life of the project there is a reasonable likelihood that pipeline screens will fail and/or fish/eggs will bypass screens and enter pipelines and troughs at Mud Spring (Greenback Creek Allotment) and Cottonwood Artesian Well (A Cross/Armer Mountain allotments). As a result, we anticipate that incidental take of Gila topminnow and desert pupfish would be primarily in the form of harassment and wound/kill to the both species (and pupfish eggs) from trough/pipeline maintenance, being stranded in ponds/troughs, water (and thus fish) leakage onto the ground, cattle drinking, trough/pipeline cleaning, and other unpredictable trough/pipeline operation/maintenance tasks.

To maintain appropriate oxygen levels for topminnow/pupfish at Mud/Walnut Spring and Cottonwood Artesian Well, it may be necessary to use heavy machinery (i.e. backhoes) (and possibly fire) to reduce the abundance of cattails. As many fish as possible will be captured and held prior to vegetation management. We anticipate the capture of fish and placement into a separated holding area will harass, wound and/or kill fish/eggs due to physiological stress, contact, and injury related to capture, removal from the water, and holding. Use of heavy machinery (such as backhoes) and fire to remove cattails would also likely harass, wound, and/or kill remaining fish/eggs due to physiological stress and contact.

If pond/well/spring drying appears to threaten any of the proposed Gila topminnow/desert pupfish populations, TNF will work with AGFD to salvage, hold, and relocate the fish. Capturing, holding, and relocating fish is likely to result in incidental take of fish and/or pupfish eggs. We anticipate that the capture of fish, placement into a separate holding area, and transportation to a new area for release within the action area will harass, wound and/or kill fish/eggs due to physiological stress, contact, and injury related to capture, removal from the water, holding, and transportation.

Non-target crayfish management/trapping efforts are anticipated to cause incidental take of Gila topminnow and desert pupfish. It is reasonable to conclude that entrapment of topminnow and pupfish in crayfish traps can wound and/or cause the deaths of topminnow and pupfish.

We note that the incidental take as a result of weed, pond, and crayfish management are all efforts being taken to conserve these populations by creating suitable habitat conditions for their long-term persistence.

We anticipate that any take of Gila topminnow or desert pupfish (or pupfish eggs) will be difficult to detect and quantify because they have a small body size and they are highly fecund; thus rapid reproduction may mask population decline resulting from the incidental take. Also,

stream flow can send dead individuals or eggs downstream, eggs are difficult to detect, and/or poor water clarity/visibility and scavengers/predators can reduce the ability to detect dead fishes/eggs. Therefore, we believe it is not possible to provide precise numbers of fish and/or eggs that could be harmed, injured, or killed from the proposed action. In such instances where take is otherwise difficult to detect and/or quantify, we may quantify take in terms of some aspect of the species' habitat that may be diminished or removed by the action.

AMOUNT OR EXTENT OF TAKE

Desert Pupfish and Gila Topminnow

Out of the three proposed locations (Walnut Spring/Walnut Allotment, Mud Spring/Greenback Allotment and Cottonwood Artesian Well/A Cross and Armer Mountain allotments), topminnow have only previously existed at Cottonwood Artesian Well. Desert pupfish have not been placed in any of these locations. At Cottonwood Artesian Well, topminnow were introduced and extirpated on two occasions. The proposal strives to manage for thriving topminnow/pupfish populations at all three locations while accommodating minor, temporary management actions that may lead to incidental take of individual fish/eggs. However, the past extirpations of topminnow at the Cottonwood Artesian Well and unknown success of introduction to Mud and Walnut springs leaves us uncertain to the likelihood of long-term success. As a result, we will consider the amount or extent of take to be exceeded if Gila topminnow and desert pupfish are extirpated from all three ponds at the same time and it is due to the implementation of Forest Service proposed land management actions.

EFFECT OF TAKE

In this biological opinion, we determined that this level of anticipated incidental take is not likely to result in jeopardy to the Gila topminnow or desert pupfish. This is primarily due to the proposed measures to introduce and manage for these new populations/locations of topminnow/pupfish. While incidental take is reasonably likely to occur, it is occurring primarily as a result of implementing species and habitat management actions.

REASONABLE AND PRUDENT MEASURES and TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of Act, the Forest Service must comply with the following, which implement the reasonable and prudent measures, terms and conditions, and required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following reasonable and prudent measures and terms and conditions are necessary and appropriate to minimize the effects of take of Gila topminnow and desert pupfish.

1. Conduct proposed actions in a manner that will minimize take of Gila topminnow and desert pupfish.

- a. The Tonto NF shall inspect and repair appropriate fencing surrounding topminnow/pupfish habitat to reduce and minimize adverse effects to these fish and their habitat.
 - b. The Tonto NF shall coordinate/work with the permittees to monitor the distribution of cattle, and shall as quickly as possible, remove cattle that have gained access to fenced areas (i.e. Cottonwood Artesian Well, Mud and Walnut springs).
2. Monitor topminnow/pupfish at Walnut Spring, Mud Spring, and Cottonwood Artesian Well and the surrounding area to document amount or extent of incidental take, and report the findings to our office.
 - a. The Tonto NF shall coordinate with AGFD to describe annually the presence/absence of topminnow/pupfish and a visual estimate of abundance and distribution.
 - b. Copies of the information described above shall be reported annually to AESO by September 1.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's 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, 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 Act directs Federal agencies to utilize their authorities to further the purposes of 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. We provide the following recommendations for your consideration:

Desert Pupfish/Gila Topminnow

1. We recommend that your agency continue to implement recovery actions described in Recovery Plans for these fishes.
2. We recommend that your agency continue to work with AGFD and FWS in re-introducing these fishes.

3. We recommend that your agency work with AGFD and FWS in controlling and/or eradicating exotic aquatic species that predate upon native fishes and eggs.

For the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action outlined herein. 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.

We appreciate the Tonto NF's efforts to identify and minimize effects to listed species from this project. We encourage you to coordinate review of this project with the Arizona Game and Fish Department. For further information please contact Greg Beatty (x247) or Debra Bills (x239). Please refer to consultation number 22410-2009-F-0462 in future correspondence concerning this project.

Sincerely,

/s/Debra Bills for

Steven L. Spangle
Field Supervisor

cc:

(electronic copies)

Doug Duncan, Fish and Wildlife Service, Tucson, AZ

Tony Robinson, CAP Program, Arizona Game and Fish Department, Phoenix, AZ

(hard copies)

Fred Wong, Forest Biologist, Tonto National Forest, Phoenix, AZ

Habitat Branch Chief, Arizona Game and Fish Department, Phoenix, AZ

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Figure 1. Location of Proposed Gila Topminnow and Desert Pupfish Introductions, Tonto Basin Ranger District, Tonto National Forest, Gila County, Arizona.

