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**U.S. Fish and Wildlife Service**  
**Arizona Ecological Services Office**  
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In Reply Refer To:

AESO/SE  
22410-2008-F-0530-R001

June 27, 2013

Mr. Neil J. Bosworth, Forest Supervisor  
Tonto National Forest  
2324 East McDowell Road  
Phoenix, Arizona 85006

Dear Mr. Bosworth:

Thank you for your January 25, 2013 letter, received in our office on January 29, 2013, requesting re-initiation of consultation under section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(ESA). This re-initiated consultation concerns the possible effects of livestock grazing activities in the vicinity of Rock Spring, within the Diamond Allotment, Mesa Ranger District, Tonto National Forest (TNF) near Sunflower, Maricopa County, Arizona, on Gila topminnow (*Poeciliopsis occidentalis occidentalis*) (topminnow).

This biological opinion (BA) is based on information provided in the October 5, 2012 biological assessment, telephone conversations, email correspondence, field investigations, 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, livestock grazing and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office. The Fish and Wildlife Service (FWS) previously concurred, by letter of September 18, 2008, with TNF's determination that livestock grazing on the Diamond Allotment "may affect, is not likely to adversely affect" the Mexican spotted owl (*Strix occidentalis*)(MSO) in consultation 22410-2008-I-0530. The description of the livestock grazing activities within the Diamond Allotment remains unchanged from that analyzed in 2008 and our concurrence for MSO remains valid.

## Consultation History

|                   |   |
|-------------------|---|
| January 25, 2013  | Biological Assessment transmitted to FWS by TNF requesting re-initiation of consultation to evaluate effects on Gila topminnow in Rock Spring   |
| February 26, 2013 | Email correspondence received providing additional pictures of Rock Spring and a description of 2013 Annual Operating Instructions to update BA |
| June 13, 2013     | A draft BO was transmitted to TNF.  |
| June 26, 2013     | TNF completed the review of the draft BO and asked FWS to finalize the document.  |

## BIOLOGICAL OPINION

### Description of the Proposed Action

Tonto National Forest, in partnership with Arizona Game and Fish Department (AGFD), is proposing to introduce topminnow into Rock Spring in the Diamond Pasture of the Diamond Allotment, an active grazing allotment, on the Mesa Ranger District, TNF. This biological opinion examines the effect of current, ongoing, livestock grazing activities on the introduced population of topminnow. In 2008, in compliance with the National Environmental Policy Act, an environmental assessment was prepared on the Diamond Allotment and a Decision Notice and Finding of No Significant Impact issued by TNF on September 30, 2008. The selected alternative was to continue livestock grazing through implementation of a five pasture rest-rotation grazing using an adaptive management approach. This Decision is anticipated by the TNF to remain valid for 10 years from the Decision date, resulting in a term for the proposed action for this BO through September 30, 2018. A description of ongoing (through 2012) current stocking levels and rotation is included in the BA and was updated by TNF, with current annual operating instructions, for this analysis. A four strand barbed wire fence surrounds Rock Spring to exclude cattle from the spring. Actual stocking of topminnow will be conducted by AGFD under its ESA Section 10(a)(1)(A) permit authorizing handling and movement of topminnow. A complete description of the Forest Service action is contained in the BA.

For purposes of this consultation, the action area is described as the Diamond Allotment and immediately adjacent area. The Diamond Allotment consists of approximately 29,467 acres and is located in the northern portion of the Mesa Ranger District, approximately 45 miles northeast of Phoenix, Arizona (Figure 1). The Diamond Pasture (within the Diamond Allotment) includes 11,470 acres of semi-desert grassland, interior chaparral, and Sonoran desert scrub (Figure 2). Rock Spring, tributary to Sycamore creek, is located in the Diamond Pasture (Figure 2) and includes the perennial waters below the spring head.

### Status of the Species

#### **GILA TOPMINNOW (*Poeciliopsis o. occidentalis*)**

Gila topminnow was listed as endangered in 1967 without critical habitat (32 FR 4001). 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 nonnative 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 topminnow are highly vulnerable to adverse effects from nonnative aquatic species (Johnson and Hubbs 1989). Predation and competition from nonnative 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, Minckley and Marsh 2009). 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 the 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. Due to the introduction of many predatory and competitive nonnative 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) nonnative fish cause problems for Gila topminnow as can nonnative crayfish (Fernandez and Rosen 1996) and bullfrogs.

It has long been known and thoroughly documented, that, *Gambusia affinis* western mosquitofish (mosquitofish) has major deleterious effects on individual Gila topminnow and their populations (Minckley et al. 1977, Meffe et al. 1983, Minckley et al. 1991, Minckley 1999, Voeltz and Bettaso 2003). These publications and others (Meffe et al. 1982, Miller 1961, Duncan *in press*) have summarized mosquitofish negatively impacting topminnow, and documented the likely mechanisms responsible (Meffe 1984, 1985; Schoenherr 1974).

The Sonoran topminnow (*Poeciliopsis occidentalis*) was listed in 1967. The species was later revised to include two subspecies, *P. o. occidentalis* and *P. o. sonoriensis* (Minckley 1969, 1973). *P. o. occidentalis* was known as the Gila topminnow, and *P. o. sonoriensis* was known as the Yaqui topminnow. *P. occidentalis*, including both subspecies, was collectively known as the Sonoran topminnow. Both subspecies are protected under the ESA. Minckley (1999) stated that the Yaqui topminnow and Gila topminnow are separate species named *P. sonoriensis* and *P. occidentalis*, respectively (Nelson et al. 2004). Other researchers make the same argument (Quattro et al. 1996, Hedrick et al. 2001, Hedrick and Hurt 2012).

Historically, the Gila topminnow was abundant in the Gila River drainage in Arizona and was one of the most common fishes of the Colorado River basin, particularly in the Santa Cruz system (Hubbs and Miller 1941). Gila topminnow were also recorded from the Gila River basin

in New Mexico (Minckley and Marsh 2009). In the last 50 years, this was reduced to only 16 naturally occurring populations. Presently, only 9 of the 16 known natural Gila topminnow populations are considered extant (Table 1) (Weedman and Young 1997, Voeltz and Bettaso 2003, USFWS files). Only eight have no nonnative fish present and therefore can be considered secure from nonnative fish threats. There have been at least 200 wild sites stocked with Gila topminnow, however, topminnow persist at only 33 of these localities (Table 2). Of these, two sites are outside topminnow historical range and one contains nonnative fish (Voeltz and Bettaso 2003). All of these sites except two are in New Mexico. Many of the reestablished sites are very small and may not contain viable populations, as defined in the draft revised recovery plan (Weedman 1999). In addition several of the 33 sites have been reestablished in the last few years, and their eventual disposition is unknown.

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. The Yaqui topminnow is now included within the “Yaqui Fishes Recovery Plan” (USFWS 1995). 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 US and reestablish it into suitable habitat within historical range.

The status of the species is mixed. A recovery program actively stocks Gila topminnow in Arizona and New Mexico, reestablishing topminnow in “new” sites (Robinson 2011, 2012, 2013). However, natural sites continue to slowly decline. Gila topminnow has gone from being one of the most common fishes of the Gila basin to one that exists at about 42 localities (9 natural and 33 stocked). Many of these localities are small and highly threatened. The theory of island biogeography can be applied to these isolated habitat remnants, as they function similarly (Meffe 1983, Laurenson and Hocutt 1985). Species on islands are more prone to extinctions than continental areas that are similar in size (MacArthur and Wilson 1967). Meffe (1983) considered extinction of Gila topminnow populations almost as critical as recognized species extinctions. Moyle and Williams (1990) noted that fish in California that are in trouble tend to be endemic, restricted to a small area, part of fish communities with fewer than five species, and found in isolated springs or streams. Gila topminnow has most of these characteristics.

### **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 and Recovery Measures

Gila topminnow 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). Drought has negatively

affected water flow in creeks and may threaten introduced fish populations (Weedman and Young 1997). AGFD conducted a fish habitat survey at Rock Spring and found that the spring pond supports aquatic conditions for a healthy population of topminnow (Carter and Bahm 2007). AGFD, in collaboration with TNF, will stock topminnow into Rock Spring and monitor the population. Cattle are excluded from Rock Spring by a four strand barbed wire fence.

### Grazing Management

The accounts of overgrazing throughout the Southwest at the turn of the past century are well known. The late 1800s are viewed by geomorphologists as a period of “arroyo cutting” throughout the west (Leopold 1994). 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 National 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 remained, but positive results have been achieved in recent years.

The TNF 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. The Diamond Allotment was destocked in 2003 and restocked in 2004 at a level from prior to 2003. Some recreation, including off-highway vehicle use, occurs in the action area.

### **Diamond Allotment**

The Diamond Allotment consists of approximately 29,467 acres and is located in the northern portion of the Mesa Ranger District, approximately 45 miles northeast of Phoenix, Arizona (Figure 1). The Diamond Pasture (within the Diamond Allotment) includes 11,470 acres of semi-desert grassland, interior chaparral, and Sonoran desert scrub (Figure 2). As described in the BA and updated information, in the past 14 years stocking rates have ranged from 34% to 65% of allotted numbers.

### **Status of the Species in the Action Area**

Gila topminnow do not currently occur at Rock Spring or the Rock Spring drainage. However, the species will be stocked into Rock Spring in the Rock Spring drainage. This area is believed

to be suitable habitat based on a habitat survey by AGFD (Carter and Bahm 2007). The spring is approximately 3 meters long and 1.5 meters wide. The spring provides a stable water source for topminnow. Only longfin dace (*Agosia chrysogaster*) are currently known to occur in Rock Spring.

## **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**

#### Ongoing and Future Cattle Grazing

##### *Cattle grazing*

The Diamond Allotment presents an example of collaborative grazing and native fish management. The grazing permittee provided a letter indicating support for the stocking of topminnow into Rock Spring to AGFD. The management goal to prevent cattle from entering the springs where Gila topminnow are to be placed is anticipated to reduce and minimize, but not eliminate adverse effects from cattle and cattle grazing. Considering the long-term (5 years) nature of the evaluation period of this ongoing action, it is reasonable to anticipate that fences may fail and cattle will temporarily have access to spring pond habitat occupied by topminnow. It is not known to what extent trampling of soil and vegetation will adversely impact aquatic habitat conditions and the rate of recovery of habitat may depend on spring recharge rates which may vary with climatic conditions. Additionally, during floods, Gila topminnow may not remain contained within these ponds and move into the connected stream outside of the fenced area where cattle have access. Stream habitat downstream from Rock Spring is ephemeral and subject to drying. Topminnow may become stranded and perish as ephemeral pools dry up.

Gila topminnow at Rock Spring 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 habitats that can lead to local impacts in a fairly short amount of time.

Stocking topminnow 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 at Rock Spring will be restricted to a 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 (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 the small enclosed area, which may be delayed based on the time of discovery, could cause cattle congregations to increase their hoof action and/or cause movement into less suitable fish habitat. As a result we anticipate that cattle will cause disturbance, a decline in water quality, and/or mortality of fish, particularly at the perimeter of Rock Spring and shallow areas of the nearby stream bed, by reducing the distribution and abundance of water and isolating fish into inhospitable areas.

We do not anticipate that grazing at the landscape level across this allotment 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 rest from grazing should also facilitate conditions that would prevent indirect watershed effects and protect topminnow in a measurable manner.

### **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 ESA.

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**

After reviewing the current status of Gila topminnow, 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. 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 at Rock Spring, where they currently do not exist.
- Fencing will be in place and surround topminnow primary habitat. The fencing is intended to reduce, minimize, and possibly prevent adverse effects from cattle.

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 ESA and Federal regulations pursuant to section 4(d) of ESA 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 ESA 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 Diamond pasture of the Diamond Allotment will result in incidental take of Gila topminnow. The incidental take anticipated will be in the form of harm, harassment, wound, and kill. Livestock will continue to have access the Rock Spring drainage (outside of the primary fish habitat) and periodic access to Rock Spring (primary fish habitat). As a result of cattle congregating in these aquatic habitats, we anticipate that incidental take of Gila topminnow from cattle movement and the subsequent physiological effects from the degradation of water quality/quantity from hoof action.

As a result, we anticipate that incidental take of Gila topminnow would be primarily in the form of harassment and wound/kill.

We anticipate that any take of Gila topminnow 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 disperse dead individuals, and poor water clarity/visibility and scavengers/predators can reduce the ability to detect dead fishes. Therefore, we believe it is not possible to provide precise numbers of fish 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

### Gila Topminnow

We will consider the amount or extent of take to be exceeded if Gila topminnow are extirpated from Rock Spring 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. This is primarily due to the proposed measures to introduce and manage for this new populations/location of topminnow. While incidental take is reasonably likely to occur, it is occurring primarily as a result of implementing species and habitat management actions with a goal of recovery.

## REASONABLE AND PRUDENT MEASURES and TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of ESA, 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.

1. Conduct proposed actions in a manner that will minimize take of Gila topminnow.
  - a. The TNF shall inspect and repair appropriate fencing surrounding topminnow habitat to reduce and minimize adverse effects to these fish and their habitat.
  - b. The Tonto NF shall coordinate/work with the permittee to monitor the distribution of cattle, and shall as quickly as possible, remove cattle that have gained access to the fenced area at Rock Spring.
  
2. Monitor topminnow at Rock Spring and downstream perennial are to document amount or extent of incidental take, and report the findings to our office.
  - a. The TNF shall coordinate with AGFD to describe annually the presence/absence of topminnow and a visual estimate of species and habitat conditions.
  - 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, 4901 Paseo del Norte NE, Suite D, Albuquerque, New Mexico, 87113, telephone (505) 248-7889, 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 ESA directs Federal agencies to utilize their authorities to further the purposes of ESA 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:

#### Gila Topminnow

1. We recommend that your agency continue to implement recovery actions described in Recovery Plans for this fish.
2. We recommend that your agency continue to work with AGFD and FWS in re-introducing Gila topminnow.
3. We recommend that your agency work with AGFD and FWS in controlling and/or eradicating exotic aquatic species that predate upon native fishes.

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 TNF'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 Bill Werner (x217) or Debra Bills (x239). Please refer to consultation number 22410-2008-F-0530-R001 in future correspondence concerning this project.

Sincerely,

/s/ Mike Martinez for

Steven L. Spangle  
Field Supervisor

cc:

(electronic copies)

Doug Duncan, Wildlife Biologist, Fish and Wildlife Service, Tucson, AZ  
Kathy Robertson, Wildlife Biologist, Fish and Wildlife Service, Phoenix, AZ  
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Fred Wong, Forest Biologist, Tonto National Forest, Phoenix, AZ

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**Tables and Figures**  
**(See pages 17-21)**

| Table 1. Status of natural Gila topminnow populations in the US. |                           |                                   |                         |                 |                           |                      |
|--|---------------------------|-----------------------------------|-------------------------|-----------------|---------------------------|----------------------|
| Site   | Ownership                 | Extant? <sup>1</sup> <sub>8</sub> | Nonnatives?             | Mosquitofish?   | Habitat Size <sup>2</sup> | Threats <sup>3</sup> |
| Bylas Spring <sup>5</sup>  | San Carlos                | YES                               | NO <sup>4</sup>         | NO <sup>4</sup> | S D                       | M/ N G               |
| Cienega Creek  | BLM/County                | YES                               | NO                      | NO              | L                         | H/ R N W U M         |
| Coal Mine Spring   | AGFD                      | YES                               | NO                      | NO              | S                         | L/ G                 |
| Cocio Wash   | BLM                       | NO 1982                           | DRY                     | DRY             | S                         | H/ M                 |
| Cottonwood Spring  | Private                   | YES                               | NO                      | NO              | S                         | M/ N W               |
| Fresno Canyon <sup>7</sup>                                       | State Parks               | YES                               | NO <sup>9</sup>         | NO <sup>4</sup> | M                         | H/ N U               |
| Middle Spring <sup>5</sup>                                       | San Carlos                | YES                               | NO <sup>4</sup>         | NO <sup>4</sup> | S                         | H/ N G               |
| Monkey Spring  | Private                   | YES                               | NO                      | NO              | S                         | L/ W U               |
| Redrock Canyon   | USFS                      | NO 2008 <sup>10</sup>             | YES                     | YES             | M D                       | H/ W R G N           |
| Salt Creek <sup>5</sup>  | San Carlos                | YES                               | NO <sup>4</sup>         | NO <sup>4</sup> | S                         | M/ N G               |
| San Pedro River  | Private                   | NO 1976                           | YES                     | YES             | -                         | H/ W N G R           |
| Santa Cruz River<br>San Rafael<br>Tumacacori                     | Private, State Parks, TNC | NO <sup>6</sup><br>NO 2003        | YES<br>YES <sup>4</sup> | YES<br>YES      | L D                       | H/ W N R G C<br>U    |
| Sharp Spring   | State Parks               | NO 2004                           | YES                     | YES             | M                         | H/ N G               |
| Sheehy Spring  | TNC                       | NO 1987                           | YES                     | YES             | S                         | H/ N G               |
| Sonoita Creek  | Private, TNC, State Parks | YES                               | YES                     | YES             | L D                       | H/ W N G             |

<sup>1</sup> if no, last year recorded  
<sup>2</sup> Size L = large M= medium S = small D = disjunct  
<sup>3</sup> Immediacy H = high M = moderate L = low  
Type W = water withdrawal C = contaminants R = recreation N = nonnatives  
G = grazing M = mining U = urbanization  
<sup>4</sup> none recently, they have been recorded  
<sup>5</sup> renovated  
<sup>6</sup> in Mexico 2006, US in 1993  
<sup>7</sup> includes Sonoita Creek below Patagonia Lake  
<sup>8</sup> Recent records are those less than 10 years old  
<sup>9</sup> Fresno Canyon renovated in 2007 and is free of nonnatives- Sonoita Creek has many nonnatives  
<sup>10</sup> Stefferud and Stefferud 2008

| Table 2. Reestablished wild populations of Gila topminnow that are likely extant. In Arizona unless noted otherwise (Voeltz and Bettaso 2007, Service files). |   |            |  |                          |
|---|---|------------|--|--------------------------|
| Site Name   | Year stocked (discovered)               | Mixed/pure | Lineage(s)   | Fish From:               |
| AD Wash   | 1993                                    | Pure       | Sharp Spring   | Dexter NFH               |
| Ben Spring  | 2011                                    | Pure       | Cottonwood Springs                                     |                          |
| Bleak Spring  | 2005                                    | Pure       | Bylas  | San Carlos               |
| Bonita Creek (upper)  | 2010                                    | Pure       | Bylas Spring   | Dudleyville pond         |
| Buckhorn Spring   | 2011                                    | Pure       | Sharp Spring   |                          |
| Burro Cienega, NM   | 2008                                    | Pure       | Bylas Spring   | Dudleyville pond         |
| Campaign Creek  | 1983 - <b>Failed</b>                    | Mixed      | Monkey/Bylas/Cocio                                     | BTA                      |
|   | 2001                                    | Mixed      | Sharp/Cienega  | ASU ARC                  |
| Cement Spring   | 2005                                    | Pure       | Bylas  | San Carlos               |
| Chalky Spring   | 2009                                    | Pure       | Sharp Spring   |                          |
| Charlebois Spring   | 1983                                    | Mixed      | Monkey/Bylas/Cocio                                     | BTA                      |
| Cherry Spring (Muleshoe)  | 2007-2008                               | Pure       | Bylas Spring   | Dudleyville pond         |
| Cold Spring (#85)   | 1985                                    | Pure       | Monkey Springs   |                          |
| Cottonwood Spring (Goldfield Mountains)   | 2008                                    | Mixed      | Monkey Springs   | Boyce Thompson Arboretum |
| Cottonwood Artesian   | 1982 - <b>Failed</b>                    | Mixed      | Monkey/Bylas/Cocio                                     | BTA                      |
|   | 2001                                    | Pure       | Bylas Springs  | ASU ARC                  |
| Dutchman Grave Spring   | 1983- <b>Failed</b>                     | Mixed      | Monkey/Bylas/Cocio                                     | BTA                      |
|   | 2006                                    | Mixed      | Monkey/Bylas/Cocio                                     | BTA                      |
| Fossil Creek (#280)   | 2007-2010                               | Pure       | Sharp Spring   |                          |
| Headquarters Spring (Muleshoe)  | 2008                                    | Pure       | Bylas Spring   | Dudleyville pond         |
| Horse Thief Draw  | 2011                                    | Pure       | Cottonwood Springs                                     |                          |
| Howard Well   | 2008                                    | Pure       | Bylas Spring   | Dudleyville pond         |
| Larry Creek trib  | 2005                                    | Pure       | Coalmine Spring  | Coalmine Spring          |
| Lime Creek  | Dispersal from Lime Cabin Spring (1996) | Mixed      | Monkey/Bylas/Cocio (Lime Cabin Spring stocked in 1982) | BTA                      |
| Lousy Canyon  | 1999, 2006                              | Pure       | Coalmine Spring  | Coalmine Spring          |

|                                |  |       |  |                  |
|--------------------------------|--|-------|--|------------------|
| Morgan City Wash               | 2009                                   | Pure  | Sharp Spring   |                  |
| Mud Springs                    | 1982                                   | Mixed | Monkey/Bylas/Cocio                                   | BTA              |
| Murray Spring                  | 2011                                   | Pure  | Cottonwood Springs                                   |                  |
| O'Donnell Creek                | 1974                                   | Pure  | Monkey   | Monkey           |
| Redrock Wildlife Area NM       | 2010                                   | Pure  | Bylas Spring   | Dudleyville pond |
| Secret Spring (#331, Muleshoe) | 2007                                   | Pure  | Bylas Spring   | Dudleyville pond |
| Swamp Spring (Muleshoe)        | 2007-2008                              | Pure  | Bylas Spring   | Dudleyville pond |
| Tule Creek                     | 1981                                   | Mixed | Monkey/Bylas/Cocio                                   | BTA              |
| Unnamed Drainage 68b           | Dispersal from Mesquite Tank #2 (1985) | Mixed | Monkey/Bylas/Cocio (Mesquite Tank @ stocked in 1982) | BTA              |
| Walnut Spring                  | 1982                                   | Mixed | Monkey/Bylas/Cocio                                   | BTA              |
| Usery Park                     | 2011                                   | Pure  | Cottonwood Springs                                   |                  |

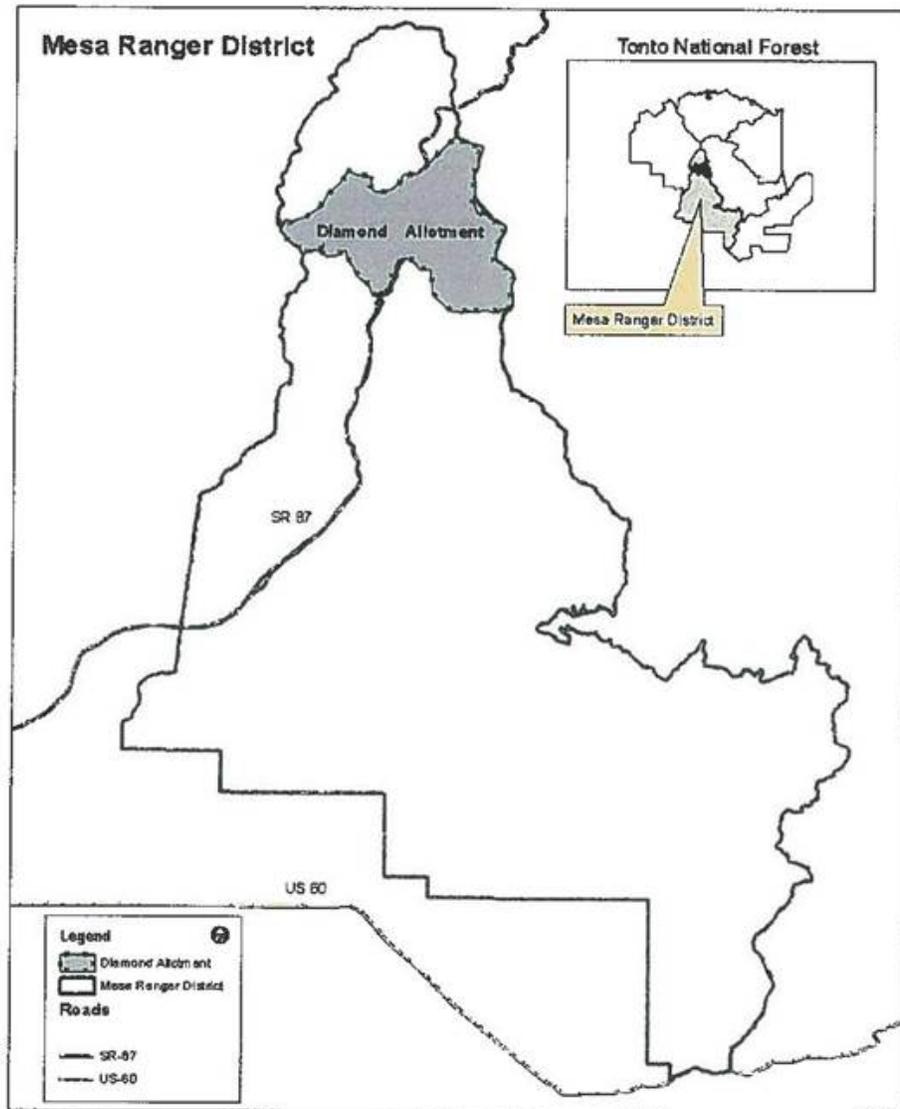


Figure 1. Diamond Allotment Location Map

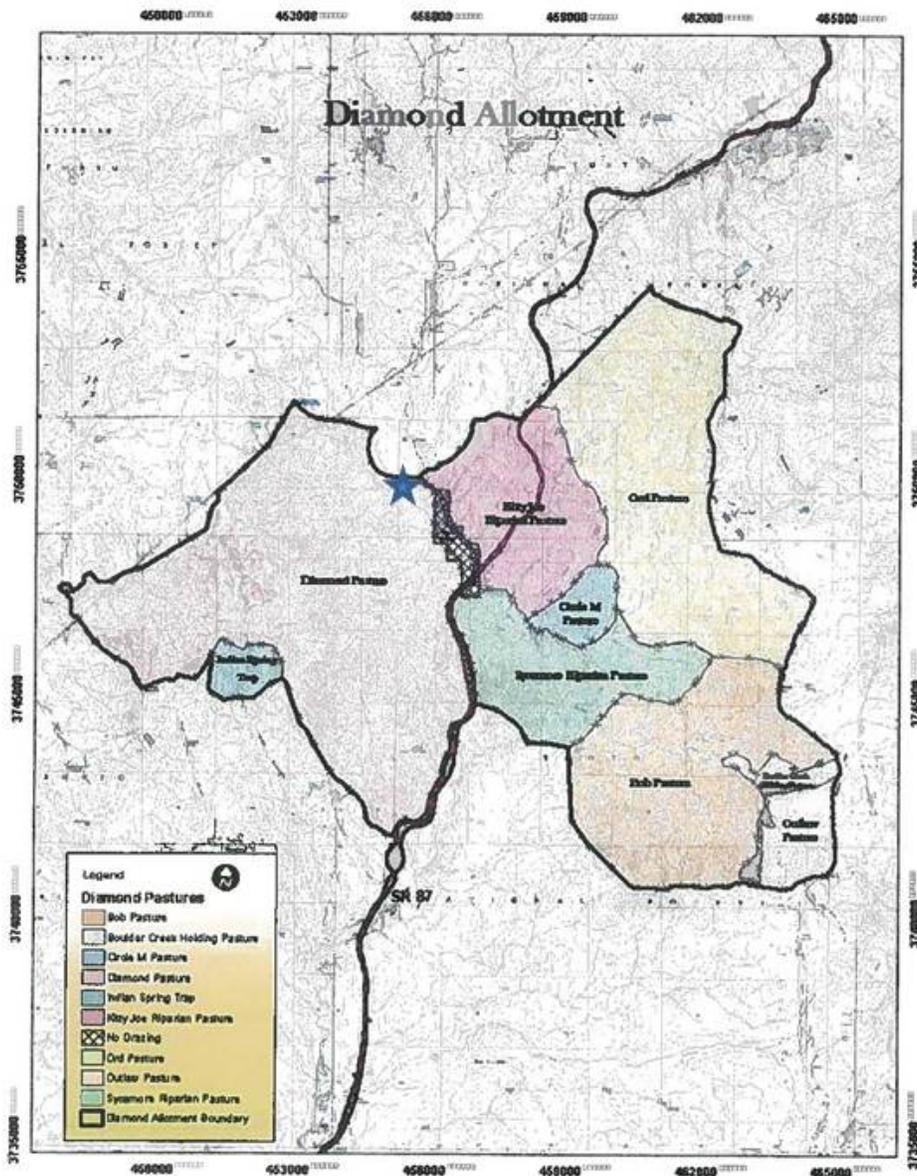


Figure 2. Diamond Allotment Pasture Map. Rock Spring marked with blue star.