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In Reply Refer To:
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02-21-96-F-0160

November 1, 2007

Memorandum

To: Field Office Manager, Bureau of Land Management, Safford Field Office, Safford, Arizona

From: Field Supervisor

Subject: Request for Formal Consultation Pursuant to Section 7 of the Endangered Species Act for the Effects of Continuing and Future Actions on the Proposed Reestablishment of Desert Pupfish and Gila Topminnow into Howard and Posey Wells Wildlife Water Development Exclosures Within the San Simon Valley

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request was dated February 15, 2007, and received by us on February 20, 2007. At issue are effects that may result from continuing and future management actions on populations of endangered Gila topminnow (*Poeciliopsis occidentalis occidentalis*) and endangered desert pupfish (*Cyprinodon macularius*) proposed to be established in the Howard and Posey wells, near Bowie, Graham County, Arizona. The proposed action may affect, and is likely to adversely affect, the endangered Gila topminnow and the endangered desert pupfish. This biological opinion is also a reinitiation of the Safford District Resource Management Plan (#02-21-88-F-0114, #02-21-05-F-0086) and the Safford and Tucson Field Offices' Livestock Grazing Program (#02-21-96-F-0160).

This biological opinion is based on information provided in the February 15, 2007, biological evaluation and other sources of information as detailed in the consultation history and literature cited. 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.

As part of the proposed action, you have requested formal consultation on the actions associated with moving, stocking, and monitoring the fish. The effects of all actions associated with moving, stocking, and extracting fish from Howard and Posey wells have been analyzed as part of the section 10(a)(1)(A) research and recovery permit held by AGFD (TE-821577), and will not be included in this analysis. The effects of all actions associated with surveying or monitoring the fish at Howard and Posey wells have been analyzed as part of the section 10(a)(1)(A) research and recovery permit held by your office (TE030115-0), and will not be included in this analysis.

CONSULTATION HISTORY

- February 26, 2007 – We received the Biological Assessment and request to initiate consultation on the effects of continuing and future actions on the proposed reestablishment of Gila topminnow and desert pupfish into Howard and Posey wells.

- March 26, 2007 – We sent you a memorandum stating that we received sufficient information to begin formal consultation.

- July 31, 2007 – We sent you a memorandum requesting a 60-day extension to complete formal consultation.

- August 7, 2007 – We received an e-mail from you agreeing to the 60-day extension we requested on July 31, 2007.

- September 5, 2007 – We sent a memorandum to you requesting an additional 30-day extension to complete formal consultation.

- September 10, 2007 – We received an e-mail from your office agreeing to the additional 30-day extension we requested on September 5, 2007.

- October 22, 2007 – We sent the draft biological opinion to you for your comments and a request for an additional 30-day extension.

- October 30, 2007 – We received an e-mail with your comments on the draft biological opinion that we sent to you on October 22, 2007, and your concurrence with our request for a 30-day extension.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

An evaluation of the water delivery system will be conducted at Posey Well in 2007 or 2008 prior to stocking the fish and lowland leopard frogs to determine water availability potential. If necessary before stocking, the well and distribution systems will be further developed in order to provide water for the Posey Well aquatic systems and livestock. If, after evaluation and

development, it is determined that water supply cannot support fish, they will not be stocked. Consultation is not necessary for this action because it will be implemented before fish are stocked. In addition, the use and maintenance of the water system will be documented by an agreement between your office and the grazing permittee. Consultation on the water system agreement, if necessary, is not covered through this Biological Opinion because the specifics of that agreement are not available at this time.

Description of the Action Area

The wells are located in the San Simon Valley (Figure 1). The action area includes Howard and Posey wells, and approximately a one-mile radius from these wells. This is the extent of the possible effects from activities associated with maintaining the wells and possible effects from continuing activities in the area to listed fish that are proposed to be introduced to the wells.

Continuing and Future Management

A. Livestock Management

Howard and Posey Well habitat development exclosures are located in the San Simon Valley on the Fan Allotment, which the Bureau of Land Management (BLM) permits for livestock grazing. Livestock are excluded from the exclosures by wildlife friendly fencing. If livestock trespass within the exclosures, either BLM personnel or the permittee will immediately remove them upon detection. Fencing repair and maintenance is performed by BLM as needed to keep the fence intact and functioning.

B. Recreation Management

The exclosures are used only marginally and seasonally for recreational activities. The main use is during the hunting season when hunters enter the exclosures to hunt for dove, quail, and javelina (*Tayassu tajacu*). Both exclosures have gates to allow for both vehicular and foot access. Most access is via foot traffic, with the potential for a gate to be left open, allowing livestock to enter. This has not been a problem to date, but to reduce the likelihood of gates being left open, new fencing and access points that will only allow foot traffic entrance/exit will be installed in 2007.

C. Prescribed Fire

Prescribed burns within the Howard and Posey well exclosures would be used to remove invasive grasses, shrubs, trees, and to lessen fuel loads. The fire prescriptions are expected to be cool-season, low-burning ground fires, with a very short flame length (one to one and one-half feet), and strip burning techniques to reduce the risk of uncontrolled burning at the water development edge. Any fire, natural or prescribed, that burns out of prescription would be immediately suppressed. Fire would be carefully administered and not allowed to run parallel to the aquatic and riparian habitats. Prescribed fires include using prescribed fire units (both natural and ignited) on an experimental basis in riparian areas and pre-and-post burn monitoring by BLM. Prescribed burns in riparian areas will only be used when necessary and during higher

soil and vegetative moisture conditions to minimize soil heating and organic matter loss, and to aid vegetative recovery.

D. Tamarisk Removal and Control

1. Herbicide treatment:

Herbicide treatments are part of the Posey Well Habitat Restoration and Improvement Project for Aquatic and Terrestrial Wildlife. The treatment is to remove invasive plant species within the riparian zone and adjacent areas by a combination of chemical, mechanical, and/or burning treatments. By removing tamarisk, native vegetation will have the opportunity to re-sprout without competition through existing seed sources present on-site or by actively re-seeding the sites. The Pesticide Use Proposals (PUP) for Posey Well Habitat, proposal # AZ-410-2006-001 (Garlon 4) and AZ-410-2006-001 (Habitat), approved August 2006 specify the amounts and application methods to be followed in using Garlon 4 and Habitat. All herbicide applications will follow the PUP requirements. The remaining tamarisk that may be treated with herbicide are approximately ¼ mile from the water's edge. Even though the likelihood of herbicides entering the aquatic habitat is remote, vegetation buffers are currently being developed at both exclosures to capture and retain sediments and pollutants that could enter the aquatic habitats and affect water quality, aquatic/riparian vegetation, and any aquatic organisms present.

No herbicide treatment is planned for Howard Well at this time. If treatments are considered, then an evaluation of the effects to the stocked fish will be analyzed, and consultation will be requested if necessary. It is unlikely at this time that herbicide treatments will be used to remove tamarisk at Howard Well since very few tamarisk are present and most if not all can likely be removed using mechanical treatments.

2. Mechanical treatment:

A variety of mechanical methods (*e.g.*, cutting, back hoe, and bulldozing) will be used to remove tamarisk from the Posey and Howard well exclosures. Tamarisks are not prevalent or widely dispersed within the Howard Well exclosure, and removal is usually of individual trees. No tamarisks are located at or near the aquatic habitats at Posey or Howard Well. Mechanical removal of tamarisk from both exclosures will be an on-going management action until all are removed.

D. Pond Maintenance

While the ponds were constructed in a manner to reduce regrowth of cattails and planted with less invasive aquatic and riparian species to replace cattails, pond maintenance activities will be required to maintain the habitat for the fish and frogs. Pond maintenance activities, which include the removal of cattails and any other invasive aquatic and/or riparian vegetation, will be conducted at least bi-annually to prevent their spread. Mechanical harvesting (cutting, digging, and/or pulling) by hand will occur as needed. To minimize injury and/or mortality, vegetation will be gently moved up and down through the water column and then checked for eggs and fish prior to removal. To reduce injury/mortality, no maintenance activities will be conducted during

the primary breeding season, which starts when water temperatures exceed 20º C (U.S. Fish and Wildlife Service 1993). Additionally, sediment removal using a bulldozer or backhoe will be used as needed to maintain open water and appropriate depths for fish populations. It is estimated that this maintenance may be required every three to five years.

Conservation Measures

As part of the proposed reestablishment of these fish and ongoing actions, your office has committed to implementing certain measures devised to reduce effects of the proposed actions on desert pupfish and Gila topminnow. You will:

- Monitor all stocked populations of desert pupfish and Gila topminnow at least annually with the AGFD and us.

- Repair and maintain the fences as needed to prevent livestock from entering the exclosures.

- Delineate and maintain buffer zones around the wildlife water developments to stabilize soils and decrease sedimentation into the water during prescribed burns.

- Monitor the water levels at least bi-annually, and take corrective actions, if necessary, to maintain appropriate water depths.

- Evaluate, monitor, and modify, as needed, activities that may result in take of desert pupfish and Gila topminnow or destruction of pupfish and topminnow habitat to reduce potential adverse effects to pupfish and topminnow.

- Conduct informational and environmental education programs pertaining to native fish and their habitats.

- Coordinate with AGFD and us on any desert pupfish and Gila topminnow locations that no longer support the species, and any recommendations on habitat suitability and extant/extirpated population status.

- Limit excavation of either pond to a maximum of 25% of the original pond size in order to minimize harm to fish.

- Continue to develop vegetation buffers to capture and retain sediments and pollutants that could enter the aquatic habitats and affect water quality, aquatic/riparian vegetation, and any aquatic organisms present.

- To minimize harm during maintenance and non-native vegetation removal activities at the ponds:

    - Mechanical harvesting (cutting, digging, and/or pulling) to remove invasive plant species will be by hand. Vegetation will be gently moved up and down through the water column and then checked for eggs and fish prior to removal.

    - Pond maintenance activities will not be conducted during the primary breeding season, which starts when water temperatures exceed 20º C.

STATUS OF THE SPECIES

Gila Topminnow

We listed the Gila topminnow as endangered on March 11, 1967, without critical habitat (U.S. Fish and Wildlife Service 1967). The reasons for decline of this fish include past dewatering of rivers, springs, and marshlands; impoundments, channelization, diversions, regulation of flow, land management practices that promote erosion and arroyo formation, and the introduction of predacious and competing nonindigenous fishes (Miller 1961, Minckley 1985). Life history information can be found in the 1984 recovery plan (U.S. Fish And Wildlife Service 1984), the draft revised Gila topminnow recovery plan (Weedman 1999), and references cited in the plans and in this biological opinion.

Gila topminnow was listed in 1967 as *Poeciliopsis occidentalis*. The species was later revised to include two subspecies, *P. o. occidentalis* and *P. o. sonoriensis* (Minckley 1969, 1973). *Poeciliopsis o. occidentalis* is known as the Gila topminnow, and *P. o. sonoriensis* is known as the Yaqui topminnow. *Poeciliopsis occidentalis*, including both subspecies, are collectively known as the Sonoran topminnow. Both subspecies are protected under the Act. Recent information presented by Minckley (1999) and others (Minckley 1973, Quattro *et al.* 1996), considers the two subspecies to be separate species. Regardless of their taxonomy, both taxa are protected under the Act.

Male Gila topminnows are smaller than females, rarely greater than one inch [25 millimeters (mm)] in total length, while females are larger, reaching two inches (50mm total length). Body coloration is tan to olivaceous, darker above, lighter below, and often white on the belly. Breeding males are usually darkly blackened, with some golden coloration of the midline, and with orange or yellow at base of the dorsal fins. Fertilization is internal and sperm packets are stored, which may fertilize subsequent broods. The brood development time is 24 to 28 days. Two to three broods in different stages develop simultaneously in a process known as superfetation. Gila topminnows give birth to one to 31 young per brood (Schoenherr 1974). Larger females exhibit greater fecundity and produce more offspring (Minckley 1973).

Gila topminnows mature from a few weeks to many months after birth depending on when they are born and water temperature. They breed primarily from March to August, but some pregnant females occur throughout the year (Schoenherr 1974). Some young are produced in the winter

months. Minckley (1973) and Constantz (1980) reported that Gila topminnow eat bottom debris, vegetation, amphipods, and insect larvae when available.

Gila topminnow and many other poeciliids can tolerate a wide variety of physical and chemical conditions. They are successful colonizers in part because of this tolerance and in part because one gravid female can start a population (Meffe and Snelson 1989). Minckley (1969, 1973) described their habitat as edges of shallow aquatic habitats, especially where abundant aquatic vegetation exists. Gila topminnows rarely co-occur with mosquitofish (*Gambusia affinis*), as the latter is aggressive and preys upon young topminnow and harasses adults (Schoenherr 1974, Minckley *et al.* 1977).

Gila topminnows are known to occur in streams fluctuating from 43 to 97^{o} F, pH from 6.6 to 8.9, dissolved oxygen levels of 2.2 to 11 milligrams/liter, and can tolerate salinities approaching those of sea-water (Meffe *et al.* 1983). Topminnow can burrow under mud or aquatic vegetation when water levels decline (Deacon and Minckley 1974, Meffe *et al*. 1983). Sonoran topminnows, *Poeciliopsis occidentalis*, regularly inhabit springheads with high loads of dissolved carbonates and low pH (Minckley *et al.* 1977, Meffe 1983, Meffe and Snelson 1989). This trait has helped protect small populations of topminnows from mosquitofish, which are usually rare or absent under these conditions.

To summarize, Gila topminnow habitat requirements include: 1) unpolluted water that can have wide variation in temperature, pH, and salinity; 2) shallow water with abundant aquatic plants, including algae that provides cover and habitat for invertebrate prey; 3) channel morphology that prevents habitats from scouring severely, which otherwise may remove this weak swimmer from its habitat; 4) habitat areas free of nonnative competitors and predators; and 5) areas with slow currents and soft bottoms.

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

Historically, Gila topminnow were abundant in the Gila River drainage and the species was once referred to as "…one of the commonest fishes in the southern part of the Colorado River drainage basins" (Hubbs and Miller 1941). Gila topminnow eventually declined to only 15 naturally occurring populations. Bagley *et al.* (1991) reported only nine remaining natural topminnow sites. More recently, 15 natural Gila topminnow populations were reported, with 12 considered extant (Table 3, Weedman and Young 1997). Only three (Cienega Creek, Monkey

Spring, and Cottonwood Spring) have no nonindigenous fish present and therefore can currently be considered secure from nonindigenous fish threats (Abarca *et al.* 1994). There have been at least 178 wild sites stocked (sometimes on multiple occasions) with Gila topminnow; however, topminnows persist at only 20 of these localities. Of the 20, one site is outside topminnow historical range and four now contain nonindigenous fish (Weedman and Young 1997).

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

The status of the species is poor and declining. Gila topminnow has gone from being one of the most common fishes of the Gila basin to one that exists at no more than 32 localities (12 natural and 20 stocked). Many of these localities are small and highly threatened, and topminnow have not been found in some recent surveys at these sites.

Gila topminnows historically occupied larger streams and rivers including the Gila, Salt, Santa Cruz, San Pedro, San Carlos, and many of their tributaries. Although not documented from the Verde, Hassayampa, or Agua Fria rivers, they likely occurred in the lower elevation [<4900 feet (ft) (<1500 m)] reaches of those rivers. BLM lands support a large proportion of the Gila topminnow's former range, several of the currently occupied sites, and much of the remaining suitable, but unoccupied habitat.

Currently, there are 14 remaining natural topminnow sites (Weedman 1999). In addition, 21 stocked populations persist and cooperative efforts by the BLM, FWS, and AGFD to reestablish topminnow into historical habitats are on-going.

Our information indicates that, rangewide, more than 64 formal consultations have been completed or are underway for actions affecting both Gila topminnow. The majority of these opinions concerned the effects of grazing (approximately 11 percent), roads and bridges (approximately 6 percent), agency planning (approximately 16 percent), or recovery (approximately 23 percent). The remaining 44 percent of consultations dealt with, fire, flooding, recreation, realty, animal stocking, water development, border security, and water quality issues.

Desert Pupfish

We listed the desert pupfish as an endangered species, with critical habitat, on April 30, 1986 (U.S. Fish and Wildlife Service 1986a). The desert pupfish recovery plan was finalized in 1993. The objective of the recovery plan is to downlist the species, as delisting the species is not considered feasible in the foreseeable future. In order to attain this objective the following actions are necessary: protection of natural populations, reestablishment of new populations,

establishment and maintenance of refuge populations, development of protocols for the exchange of genetic material between stocked pupfish populations, determination of factors affecting population persistence, and information and education to foster recovery efforts (U.S. Fish And Wildlife Service 1993). The name desert pupfish is often incorrectly applied to all 10 pupfish species in the American Southwest (Williams *et al.* 1989, Pister 1996). In Arizona, there are currently three identified pupfish 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). Both the desert pupfish and Quitobaquito pupfish, which were considered the same species (*C. macularius*) at the time of listing in 1986, are endangered. Critical habitat has been designated in Arizona at Quitobaquito Spring and in California along parts of San Felipe Creek, Carrizo Wash, and Fish Creek Wash (U.S. Fish and Wildlife Service 1986a) in the vicinity of the Salton Sea (Moyle 2002). Critical habitat for desert pupfish is not located within the action area.

The desert pupfish is a member of the family Cyprinodontidae. Desert pupfish are usually less than 3.0 inches (7.6 cm) in total length (TL); adults are more often 1.6-2.0 inches (4.1-5.1 cm) TL. Males are larger than females and become bright blue during the breeding season.

Under the proper conditions, desert pupfish may begin breeding as early as six weeks of age, but most breeding does not occur until their second summer (Moyle 2002). Male pupfish are intensely territorial during the breeding season. The males patrol and defend individual territories that are 5.4 to 22 square feet (0.8-3.4 square meter) and in water less than 3 feet (0.8 meters) deep (Barlow 1961, Minckley 1973, Moyle 2002).

The desert pupfish breeding system includes consort-pair breeding and territoriality (U.S. Fish And Wildlife Service 1993). Territoriality develops in large habitats with high primary productivity, limited breeding substrates, and high population densities. Consort-pair breeding usually occurs in habitat with low primary productivity, low population density, or abundant breeding habitat (Kodric-Brown 1981). Female desert pupfish lay only one egg at a time (Constantz 1981). One female may produce 50-800 eggs in one season (Crear and Haydock 1971). The life span of an individual is one to three years in the wild (Minckley 1973, Moyle 2002, Kynard and Garrett 1979).

Larval desert pupfish feed on invertebrates (Crear and Haydock 1971). Adult pupfish are omnivorous and may feed on algae, invertebrates, detritus, and plants (Cox 1966, 1972; Naiman 1979). Pupfish are active during the day. Desert pupfish have been found in a variety of habitats, from the margins of large rivers to springs and cienegas. Pupfish can survive extremely harsh conditions that are lethal to most other fishes. They can survive temperatures up to 113^{o}F (Lowe *et al*. 1967), dissolved oxygen concentrations to 0.1-0.4 mg/l (Barlow 1958), and high salt concentrations of 68 g/l (Lowe *et al*. 1967). Pupfish can also tolerate sudden changes in both temperature and salinity (Kinne 1960, Lowe and Heath 1969).

Historical distribution of desert pupfish included the Gila River basin, lower Colorado River, Rio Sonoyta basin, 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, 1980; Black 1980, Turner 1983,

Miller and Fuiman 1987). Historical collection localities occurred in Mexico in Baja California and Sonora and in the United States in California and Arizona. Populations and distribution probably expanded and contracted historically as regional and local climatic conditions varied.

Thirteen natural populations persist; nine of these are in Mexico. Approximately 20 transplanted populations exist in the wild (U.S. Fish and Wildlife Service 1993a), though this number fluctuates widely due to climatic variation and the establishment (and failure) of refugium populations (Moyle 2002). Many natural and transplanted populations are imperiled by one or more threats. Threats to the species include loss and degradation of habitat through groundwater pumping or diversion, contamination of agricultural return flows, predation, and competition from nonnative fish species, populations outside of historical range, populations of questionable genetic purity, restricted range, small populations, and environmental contaminants (U.S. Fish And Wildlife Service 1986a, Moyle 2002).

Aspects of the natural history and habitat of desert pupfish in Arizona are similar to those of the Gila topminnow. In Arizona, desert pupfish and Gila topminnow were historically known from similar habitats, though the former was not as widespread, and the two species are managed together by the AGFD (Weedman and Young 1997, Voeltz and Bettaso 2003). The primary difference in life history between these fish is that desert pupfish lay eggs and Gila topminnows are live-bearers.

Our information indicates that, rangewide, more than 63 formal and informal consultations have been completed or are underway for actions affecting desert pupfish. The majority of these opinions concerned the effects of grazing (approximately 11 percent), roads and bridges (approximately 1 percent), agency planning (approximately 15 percent), or recovery (approximately 25 percent). The remaining 47 percent of consultations dealt with timber harvest, fire, flooding, recreation, realty, animal stocking, water development, recovery, and water quality issues.

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.

Historically, the San Simon Valley was once a broad grassy plain that extended for miles and was bisected by the San Simon River. The San Simon River was known as Rio de Sauz (River of Willows) and flowed through braided channels that created riverine marshland habitat and cienegas that supported several species of native fishes including the endangered Gila chub (*Gila intermedia*). Wildlife was abundant and included such species as mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), mourning dove (*Zenaida macroura*), white-winged dove (*Zenaida asiatica*), scaled quail (*Callipepla squamata*), and Gambel's quail (*Callipepla gambelii*).

Starting in the mid 1800s, and extending into the early 1900s, thousands of livestock were brought to the San Simon valley to provide a readily available food source for the mining camps, settlers, and army posts. Livestock grazed the river bottoms and the grasslands, which greatly reduced and, in most areas, removed the fragile vegetation cover and compacted the soils, leaving them vulnerable to erosion. In addition to the overuse and poor livestock management, periods of drought followed by heavy rains contributed to the extensive erosion and loss of productive grasslands. Today, the San Simon Valley is generally a barren, unproductive valley with vast cutting and arroyo formation still occurring.

The aquatic habitat at Howard Well consists of a pond that is approximately 124 feet (37.8 meters) long with an average width of 35 feet (10.7 meters). The south end of the pond supports a four-foot-deep pool with a tapering depth towards a cottonwood island located in the middle of the pond. At Posey Well, the pond is approximately 30 feet (9.1 meters) long with an average width of 8.6 feet (2.6 meters). It too has a deep pool of four feet with a tapering depth towards the well-head. At both exclosures, native aquatic and riparian vegetation, native grasses, flowers, forbs, shrubs, and trees were planted in the aquatic, riparian, and terrestrial habitats to restore diversity that had been lost or reduced to the point where it could not recover on its own.

A. STATUS OF THE SPECIES WITHIN THE ACTION AREA

Gila Topminnow and Desert Pupfish

No populations of either species are currently known in the action area. Historically, these species may have existed in the San Simon River when flows were more consistent. Desert pupfish were known from Howard Well until recently. Habitat conditions had deteriorated sufficiently that surveys conducted in the 1990's and early 2000's failed to document the presence of pupfish. While it was not declared extirpated from the site, it is highly unlikely that any individuals persisted past the 1990's. Although neither species likely occurs in the action area at present, both are scheduled to be introduced to Howard and Posey wells in the near future.

B. FACTORS AFFECTING SPECIES ENVIRONMENT WITHIN THE ACTION AREA

Gila Topminnow and Desert Pupfish

The action area as described above includes only BLM-managed lands. There are no other actions in addition to those described in the proposed action that would affect the species within the action area.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, which will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent

actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

Gila Topminnow and Desert Pupfish

Livestock Grazing

Effects to Gila topminnow and desert pupfish can be segregated into direct and indirect effects. Direct effects include trampling of and ingestion of fish eggs and larvae by cattle (Roberts and White 1992), which could occur if livestock trespass into the exclosures if a gate is left open, if a fence is damaged and knocked down during a weather event, or from livestock rubbing and/or pushing against it. Livestock can injure or kill eggs or larvae by stepping on them (Roberts and White, 1992), or through ingestion, however, most effects are indirect and related to changes in habitat. Livestock grazing and trampling can affect fish by altering the shape and form of the aquatic habitat, riparian soils and vegetation composition, density, and structure; and by altering water quality, quantity, and flow patterns (Kauffman and Krueger 1984, Fleischner 1994, Trimble and Mendel 1995, Belsky *et al.* 1999).

If livestock trespass into the exclosures they would graze the aquatic and riparian plants and trample the vegetation and soil. Trespass livestock can also impair water quality. Cattle waste products can deteriorate water quality resulting in alteration of fish communities or fish kills. The impact generally comes from increased levels of ammonia (NH_3) and Nitrite (NO_2) and decreased levels of dissolved oxygen (O_2) (Taylor *et al*. 1991, Cross 1971). The effects of this type of pollution are increased under conditions of limited water supply such as in small ponds and springs. Sedimentation from erosion caused by livestock can impair spawning areas and reduce aquatic productivity, which can affect food production (Ward 1992, Meehan 1991). These actions could harm fish that are in the ponds. However, the exclosures at Howard and Posey wells should preclude these effects.

Wetlands can also be affected by grazing in the watershed. Effects of cattle grazing on watersheds include alterations of vegetation communities, increased soil erosion and runoff, decreased infiltration rates, damage to cryptobiotic crusts, and increased soil compaction. Degradation of watersheds can cause downcutting, loss of perennial flow, loss of riparian vegetation, increased sedimentation, and higher peak flows in streams and rivers fed by degraded watersheds. Howard Well is not in a drainage, does not collect stream or stormwater runoff, and is fed by an artesian well. Thus, watershed effects of grazing (if any) are unlikely to adversely affect pupfish or topminnow habitat at this site. See our 1996 biological opinion on the effects of the Safford/Tucson livestock grazing program for further information about effects of ongoing grazing.

Recreation

Recreational activities (*e.g.* hunting, bird watching, rock collecting) occurring near the aquatic and riparian habitats within both exclosures are rare with the exception of hunting, which is seasonal and usually spread throughout the exclosures. Activities occurring near or in the

aquatic and riparian habitats have the potential to erode banks and damage spawning habitats. This has not occurred in the past and is not anticipated in the foreseeable future due to the remoteness of the area and minimal visitor traffic. Currently the activity level in the area is so light that no trampling damage is detectable. The level of disturbance from the above-mentioned recreational activities is not likely to reach levels resulting in harm to Gila topminnow or desert pupfish.

Prescribed Fires

The effects of implementing prescribed fires are as described in the Statewide Programmatic Land Use Plan Amendment for Fire, Fuels, and Air Management (Statewide BO) (consultation number 2-21-02-F-0210). The conservation measures in this BO, along with the conservation measures under the Statewide BO, will be implemented to avoid or minimize adverse effects to Gila topminnow and desert pupfish. Prescribed burns may result in short-term influxes of sediments, should heavy rains fall immediately after burning. This may result in decreasing habitat suitability in the short-term. The long-term effects of prescribed burns would improve watershed function by producing more ground cover to protect the soils and facilitate groundwater infiltration.

If a prescribed fire becomes a wildfire, the fire and suppression actions may result in damage or loss of riparian vegetation, which would result in decreased bank stability, increased erosion, sediment, and ash levels within and adjacent to the water, increased water temperature, degraded water quality, reduced riparian and in-water habitat cover and woody debris necessary for properly functioning riparian areas and aquatic habitat, and decreased and altered composition and abundance of aquatic and terrestrial invertebrates. These impacts have the potential to stress, injure, or kill Gila topminnow or desert pupfish.

While the effects of a prescribed fire or suppression actions of a wildfire could result in loss of habitat or injury or mortality of fish and eggs, the likelihood of harm is low because of the limited use of fire, and establishment of buffer zones around the developments.

Tamarisk Removal And Control

1. Herbicide Treatment

Garlon-4 has low mobility in desert areas and has a short half-life (30 days). Habitat has low toxicity to fish and invertebrates. Because Garlon-4 and Habitat will only be used to treat tamarisk approximately ¼ mile from the water, mobility of the herbicides through soil is unlikely to reach the water and affect the fish. Additionally, herbicide treatments are not implemented if winds are over 10 miles per hour. This reduces the potential of airborne particulates from the herbicide entering the aquatic habitat at Posey Well. Even though the likelihood of herbicides entering the aquatic habitat is remote, vegetation buffers are currently being developed at both exclosures to capture and retain sediments and pollutants that could enter the aquatic habitats and affect water quality, aquatic/riparian vegetation, and any aquatic organisms present. The likelihood of chemical treatments resulting in harm to the species is low because treatments will occur approximately ¼ mile and farther from the Posey well development, vegetation buffers

will be developed around the well, and herbicide will not be used if wind speeds exceed 10 miles per hour.

2. Mechanical Treatment

No tamarisks are located at or near the aquatic habitats at Posey or Howard wells at present, so mechanical treatments in the immediate future will not adversely affect water quality, aquatic/riparian vegetation, or any aquatic organisms (*i.e.*, fish and frogs). Mechanical treatments may be used to remove tamarisk that establish in the future at or near the aquatic habitats. Fish eggs and larvae, which are largely undetected by the human eye, may be killed while removing tamarisks. To minimize injury and/or mortality, vegetation will be gently moved up and down through the water column and then checked for eggs and fish prior to removal. It is anticipated that adult desert pupfish will shy away from these actions occurring near or in the aquatic habitat and avoid injury or death. However, during the breeding season, adult males become territorial and may resist vacating their nest. To reduce injury/mortality no treatment activities will be conducted during the primary breeding season, which occurs when water temperatures are greater than 68^{o} F (20^{o} C) (U.S. Fish And Wildlife Service 1993).

Pond Maintenance

The aquatic and riparian habitats at Howard and Posey wells will require routine maintenance to maintain open water habitat and vegetation enhancements for native fish and frogs. To prevent the spread of invasive aquatic weeds such as cattails, mechanical harvesting (cutting, digging, and/or pulling) by hand will occur as needed and at a minimum bi-annually. Fish eggs and larvae, which are largely undetected by the human eye, may be killed while harvesting vegetation. To minimize injury and/or mortality, vegetation will be gently moved up and down through the water column and then checked for eggs and fish prior to removal. It is anticipated that adult desert pupfish will shy away from maintenance activities located near or in the aquatic habitat and avoid injury or death. However, during the breeding season, adult males become territorial and may resist vacating their nest. To reduce injury/mortality no maintenance activities will be conducted during the primary breeding season, which occurs when water temperatures are greater than 20^{o} C (U.S. Fish And Wildlife Service 1993).

To reduce sediment build-up within the ponds, native grasses, forbs, shrubs, and trees have been planted along the banks and in the riparian /upland transition zone. The vegetation buffer created will protect and support the pond banks, filter out pollutants, capture and retain sediments, and will slow the flow of runoff into the aquatic habitats.

Although sedimentation will be reduced with vegetation buffers, sedimentation buildup is inevitable in lotic systems. Removal will focus on areas that are no longer inundated by water and no longer providing habitat for fish. Fish or eggs may incidentally be killed or harmed from excavating the pond. To reduce fish and frog mortality during sediment removal, only small sections will be excavated at any one time. A maximum of 25% of the original pond size will be excavated as required to maintain habitat for fish populations.

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 the Act.

No cumulative effects are identified in the action area.

CONCLUSION

Gila topminnow and desert pupfish

After reviewing the current status of the Gila topminnow and desert pupfish, the environmental baseline for the action area, the effects of ongoing management activities, and the cumulative effects, it is our biological opinion that the continuing actions and site maintenance at the Howard and Posey wells, as proposed, are not likely to jeopardize the continued existence of the Gila topminnow or desert pupfish once they are established. No critical habitat is designated for Gila topminnow and there is no critical habitat for the desert pupfish within the action area; therefore, none will be affected. We base this conclusion on the following:

- The effects of the continuing and future actions, including the conservation measures, are unlikely to harm the species, or, if harm is likely, are unlikely to result in the long-term reductions of the species from either well.
- The current status of Gila topminnow and desert pupfish is poor and declining. Although short-term impacts are anticipated, pond maintenance will enhance the long-term likelihood of survival of these species at the wells, and contribute to recovery.
- Cattle are excluded from Howard and Posey wells.
- Recreation is minimal with no discernable impacts to fish habitat.

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

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which

include, but are not limited to, breeding, feeding or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measure described below is non-discretionary, and must be undertaken by you so that it becomes binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. You have a continuing duty to regulate the activity covered by this incidental take statement. If you (1) fail to assume and implement the terms and conditions or (2) fail 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, you must report the progress of the action and its impact on the species to us as specified in the incidental take statement. [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Gila topminnow and desert pupfish

The only reasonably certain incidental take to occur would be from pond maintenance. Consistent with our conclusions in our 1996 Safford/Tucson grazing program opinion, no incidental take is anticipated at Howard Well due to the livestock grazing program. For the same reasoning (livestock are excluded), no incidental take as a result of the grazing program is anticipated at Posey Well. The incidental take is expected to be in the form of direct mortality, harm, and harassment. Take in the form of direct mortality could occur from excavating that could kill fish or eggs, and from removing vegetation that could kill eggs. Take in the form of harm could occur due to short-term changes in fish habitat from excavating and vegetation removal that are likely to cause death or injury of Gila topminnow and desert pupfish eggs. Take in the form of harassment could also occur from disturbance of fish or their habitat by excavating and vegetation removal associated with pond maintenance. We anticipate that any take that occurs will be at levels below that which would result in extirpation of either species from either site. We anticipate that incidental take will be difficult to detect as these species have a small body size, finding a dead or impaired specimen is unlikely, losses may be masked by seasonal fluctuations in numbers from other causes, scavenging of dead animals is likely to occur, and other reasons. We will consider incidental take to be exceeded if the following occurs:

> Gila topminnow and desert pupfish monitoring shows an effect or effects to the populations or their habitat attributable to the proposed action that results in the extirpation of either species from Howard Well or Posey Well.

EFFECT OF THE TAKE

In this biological opinion, we determined that this level of anticipated take is not likely to result in jeopardy to the Gila topminnow or desert pupfish. The implementation of the proposed

action, along with the conservation measures, will ensure that, while incidental take may still occur, it is minimized to the extent that habitat quality and quantity will be maintained in the planning area and species will be conserved.

REASONABLE AND PRUDENT MEASURE AND TERMS AND CONDITIONS

Due to the conservation measures that are part of the proposed action, no reasonable or prudent measures are necessary to further minimize incidental take. However, to adequately assess the effectiveness of the conservation measures in minimizing incidental take, you shall monitor the species and actions and report to us the finding of that monitoring. You shall submit a report to the Arizona Ecological Services Office within one year after stocking begins, and annually as long as monitoring occurs. This report will briefly document the portions of the proposed actions that have been implemented, the effectiveness of the conservation measures, status of the species in each stocked well, and, if any fish are found dead, the suspected cause of mortality. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information, and you must immediately provide an explanation of the causes of the taking and review with us the need for the possible provision of reasonable and prudent measure(s).

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

CONSERVATION RECOMMENDATIONS

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

1. We recommend that you work with AGFD to verify presence or absence of nonnative aquatic species on all BLM lands in the San Simon watershed. If nonnative aquatic species are found, we recommend that you work with AGFD and our office to develop a plan or outline to remove nonnative aquatic species from the BLM lands in this watershed.

2. We recommend that you coordinate with AGFD and our office in efforts to work with private landowners to renovate any source populations of nonnative aquatic species from their lands in the San Simon watershed.

In order for us 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(s) outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect 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 your efforts to identify and minimize effects to listed species from this project. For further information please contact Mark Crites (520) 670-6150 (x229) or Jim Rorabaugh (520) 670-6150 (x230). Please refer to the consultation number, 22410-2007-F-0225, in future correspondence concerning this project.

/s/ Steven L. Spangle

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

Bob Broscheid, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ (Attn: Joan Scott)

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Figure 1. Howard and Posey Wells.