



United States Department of the Interior



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In Reply Refer to:
AESO/SE
22410-2009-F-0143

August 12, 2009

Memorandum

To: Supervisor, Coronado National Forest, Tucson, Arizona

From: Field Supervisor

Subject: Biological Opinion on Repatriation of Gila Topminnow into Sabino Creek

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 received by us on January 28, 2009. At issue are impacts that may result from the proposed repatriation of endangered Gila topminnow (*Poeciliopsis o. occidentalis*) in Sabino Creek, Pima County, Arizona. In addition, the issue of impacts of on-going recreation in Sabino Creek to the endangered Gila chub (*Gila intermedia*) is also included in this biological opinion (BO). The proposed action may affect the endangered Gila chub with designated critical habitat and the endangered Gila topminnow.

In your letter, you requested concurrence that the proposed action will have no effect on the threatened Mexican spotted owl (*Strix occidentalis lucida*) and its critical habitat, and the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*). We do not provide concurrence with determinations of no effect; but we recommend that you document fully for the administrative record why you made this determination.

This BO is based on information provided in your request, the biological assessment (BA) for the project (U.S. Forest Service 2009), Coronado National Forest Plan as amended (U.S. Forest Service 1986), telephone conversations, and other sources of information. Literature cited in this opinion is not a complete bibliography of all literature available on the species of concern, recreation and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

Consultation History

- November 11, 2008 We discussed scope of project with Coronado National Forest and Arizona Game and Fish Department.
- February 2, 2009 We received your request for consultation and the BA for the project
- April 30, 2009 Meeting to discuss changing effects determination based upon our draft effects analysis
- June 9, 2009 We requested a 60-day extension
- June 10, 2009 Rick Gerhart and Josh Taiz of your office responded positively via electronic mail to our request for a 60-day extension

BIOLOGICAL OPINION

Description of the Proposed Action

Species Repatriation

The Arizona Game and Fish Department (AGFD), in coordination with the Santa Catalina Ranger District (SCRD) of the Coronado National Forest (CNF), proposes to repatriate the federally endangered Gila topminnow into Sabino Creek over the next 5 to 10 years. The goal of the project is to reestablish Gila topminnow into historically occupied habitat within Sabino Creek to aid in recovery of the species.

Sabino Creek, of the Sabino Canyon watershed, flows through lands administered by the CNF, including the Pusch Ridge Wilderness and Sabino Canyon Recreation Area (SCRA), and empties into Tanque Verde Creek in northern Tucson, Arizona. For purposes of this consultation, we define the action area to include the Sabino Canyon watershed and the ephemeral portion of Sabino Creek below the Sabino Dam to the confluence with Tanque Verde Creek (Figure 1).

The AGFD would initially translocate Gila topminnow to perennial pools below the bridge that crosses Sabino Creek farthest downstream in the SCRA (Figure 2). These perennial pools at the lower end of Sabino Creek would likely dissipate flood energies so that Gila topminnow would be more likely to persist in them and spread out between flood events. This area is not occupied by the endangered Gila chub at this time.

The AGFD will conduct translocations under the authority of its existing Section 10(a)1(A) Endangered Species Permit with the FWS (TE-821577). The initial stocking would include an appropriate number of Gila topminnow collected from both wild and captive stock from Cienega Creek or from other local locations with large founding populations. The initial stocking may be augmented with additional Gila topminnow over the next ten years to ensure that they become established. Gila topminnow used for subsequent translocations would come from an appropriate source as determined by the FWS and AGFD. The exact quantity of individuals to be released and timing of the releases would be decided by AGFD and FWS.

Recreation

The proposed action occurs in Sabino Canyon, which includes the SCRA, a popular recreation site that garners more than 1.3 million visitors every year (U.S. Forest Service 2009). The SCRA is readily accessible due to its proximity to the city of Tucson, and recreation use is increasing. Visitors can access approximately four miles of Sabino Creek within the SCRA by traveling via foot, bicycle, or motorized tram along a paved road that follows the creek. All roads within the SCRA have been closed to private vehicles since 1981 (Quinn 2002). Recreational activities along Sabino Creek in the SCRA include hiking, picnicking, birding, wading, and swimming. March, April, September, October, and November are the peak months for visitation in the SCRA. Peak months for swimming, wading, and water play in Sabino Creek and its perennial pools are March and April (U.S. Forest Service 2009). The SCRA is regularly patrolled by CNF law enforcement personnel, and there is an expectation that patrons will minimize their impacts to the area by following rules outlined in CNF Special Service Closure Order 05-234 pursuant to 36 CFR § 261.50(a) and (b).

At the northern end of Sabino Canyon, the portion of Sabino Creek that flows through the Marshall Gulch Picnic Area and along the Marshall Gulch Trail experiences high recreation use in the spring and summer months. The picnic area is located on the CNF south of the community of Summerhaven, and is accessible to recreationists by vehicle. Sabino Creek wanders through the picnic area as it begins its drop into the upper reaches of Sabino Canyon, providing opportunities for wading to picnickers. From the picnic area, recreationists may hike on the Marshall Gulch trail and another unnamed trail that follow Sabino Creek into the Pusch Ridge Wilderness for about one mile. After this point, Sabino Creek is inaccessible to recreationists for about 10 miles because of surrounding steep terrain features.

Between the Marshall Gulch trailhead and the SCRA, Sabino Creek is within a portion of the Pusch Ridge Wilderness that is only accessible by foot. Except for the first mile of the unnamed trail near Marshall Gulch, dispersed recreation occurs at a significantly lower level in the wilderness than in the SCRA. Of the 35 miles of established hiking trails in the Sabino Canyon watershed, seven miles of trails are immediately adjacent to the creek and its major tributaries including the west and east forks of Sabino Creek. Along these trail sections, recreationists can cross the creeks while hiking and may use the creeks for wading, bathing, or as a source of drinking water.

Proposed conservation measures include the following:

The proposed action is a conservation measure designed to contribute toward the recovery of the Gila topminnow. Other conservation measures include:

- 1) Work with AGFD to verify that there are no nonindigenous aquatic species detrimental to Gila topminnow present in Sabino Creek before Gila topminnow are released;
- 2) Support AGFD's annual monitoring of native fish in Sabino Creek to evaluate success of Gila topminnow population reestablishment, as well as its effects on the Gila chub;
- 3) Develop and deliver interpretative information to the public via signage and presentations (i.e., guided hikes, visitor center talks) to promote awareness of stewardship of aquatic ecosystems in Sabino Canyon;

- 4) Continue to enforce existing rules and regulations IAW CNF Special Closure Order 05-234 that will help to minimize the effects of recreation on Gila topminnow, Gila chub and their habitats in Sabino Creek within the SCRA including the following:
- a. No use of motorized vehicles
 - b. No camping
 - c. No possessing, storing, or transport of any animal or plant
- 5) If invasive nonindigenous aquatic species become problematic in native fish habitat, work with AGFD and FWS to renovate Gila topminnow and Gila chub habitat by desiccation where possible, or by piscicide when necessary;
- 6) Support reestablishing populations in case of a catastrophic event, such as disease outbreak, flood, fire, water quality contamination, or other unforeseen circumstances.

Status of the Species and Critical Habitat

Gila chub (Gila intermedia)

The Gila chub was listed as endangered with critical habitat in 2005 (70 FR 66664). Historically, Gila chub have been recorded from rivers, streams, and spring-fed tributaries throughout the Gila River basin in southwestern New Mexico, central and southeastern Arizona, and northern Sonora, Mexico (Miller and Lowe 1967, Rinne and Minckley 1970, Minckley 1973, Rinne 1976, DeMarais 1986, Propst 1999, and Weedman *et al.* 1996). Today, the Gila chub has been restricted to small, isolated populations scattered throughout its historical range. Critical habitat includes about 160 miles of stream reaches in Arizona and New Mexico, organized into seven river units (70 FR 66664).

Decline of Gila chub is due to habitat loss from past and current dewatering of rivers, springs, and cienegas (e.g. from diversions, impoundments, and groundwater pumping), poor land management practices (e.g. excessive livestock grazing) resulting in erosion and arroyo formation, and the concomitant introduction of predacious and competing nonindigenous fish species (Miller 1961, Minckley 1985). Life history information can be found in the status review (Weedman *et al.* 1996), the final rule (70 FR 66664), and references cited there.

Critical habitat for Gila chub includes about 163 miles of stream reaches in Arizona and New Mexico (70 FR 66664). The primary constituent elements (PCEs) are described in the final rule and include perennial pools with varied velocities in between them, good water quality, food base of invertebrates and aquatic plants, sufficient cover and geomorphology, lack of nonindigenous aquatic species, and periodic flooding.

Our records indicate that, range wide, 18 formal conferences or consultations have been completed for actions affecting Gila chub.

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, not those in Mexico, are listed under the Act. The reasons for decline of this fish include past and current dewatering of rivers, springs and marshlands, impoundment, channelization, diversion, regulation of flow, land management practices that promote

erosion and arroyo formation, and the introduction of predacious and competing nonindigenous fishes (Miller 1961, Minckley 1985). Life history information can be found in the 1984 recovery plan (U.S. Fish and Wildlife Service 1984), the draft revised Gila topminnow recovery plan (Weedman 1999), and references cited in the plans.

The status of Gila topminnow has changed little since our February 11, 2008, Intra-Service Biological and Conference Opinion on Issuance of an Enhancement of Survival Permit (TE-083686-0) to the Arizona Game and Fish Department (file number 22410-2003-F-0022). We hereby incorporate by reference the Status of the Species section of that biological opinion (U.S. Fish and Wildlife Service 2008a). For additional information about the Gila topminnow see Desert Fishes Team (2003), Minckley (1999), Hedrick *et al.* (2001), and Voeltz and Bettaso 2003.

Our records indicate that, range wide, 77 formal conferences or consultations have been completed for actions affecting Gila topminnow.

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.

Description of the Action Area

The “action area” means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur (50 CFR 402.02).

Sabino Creek flows through Sabino Canyon in the Santa Catalina Mountains, draining 25.5 square miles (91.9 km²) of rugged terrain in the Sabino Canyon watershed and dropping 1.24 miles (2 km) over a 18.6 mile (30 km) reach before emptying into the Tucson basin (Desilets *et al.* 2008). The stream is perennial, but during low-flow it can be reduced to isolated pools. At the northern end of Sabino Canyon, Sabino Creek flows through the upper slopes of Mount Lemmon through the Marshall Gulch Picnic Area into the Pusch Ridge Wilderness. The majority of Sabino Creek and its ephemeral and intermittent tributaries are within the Pusch Ridge Wilderness. Below the Pusch Ridge Wilderness, Sabino Creek enters the SCRA. A paved road follows Sabino Creek for about 3.8 miles within the SCRA, intersecting the creek nine times. Stone bridges (1.5 to 2.5 m high) span the creek at these intersections and act as barriers (waterfalls) to upstream movement by fish (U.S. Forest Service 2009). Sabino Dam is located below bridge one and also acts as a barrier to fish movement. Below Sabino Dam, Sabino Creek flows off CNF lands, joins Bear Creek, and flows into Tanque Verde Creek. For this project, we define the action area as the Sabino Canyon watershed and the ephemeral portion of Sabino Creek below the Sabino to the confluence with Tanque Verde Creek. This includes the initial Gila topminnow release site in Sabino Creek below bridge 1 (Figure 2), as well as upstream and downstream of the release site. Fish cannot disperse upstream above a natural fish barrier located approximately 1 mile upstream of the northern boundary of the SCRA, nor can they survive in the ephemeral portions of Sabino Creek downstream of the CNF. However, recreational

activities throughout the Sabino Canyon watershed and along the ephemeral portion of Sabino Creek below the Sabino Dam may affect native fish located in Sabino Creek.

Status of the species and critical habitat and factors affecting species environment and critical habitat within the action area

Gila chub

Gila chub currently occur in Sabino Creek within the SCRA. Most Gila chub are above bridge 4, but there are fish in plunge pools just below bridges 1, 2, and 3 (U.S. Forest Service 2009, Josh Taiz, SCRD, personal communication). The population is unstable-threatened according to Weedman's status categories for the species, but is moving towards the stable-threatened category (70 FR 66669). Annual surveys conducted by AGFD since 2004 suggest that Gila chub are recolonizing the lower stretch of Sabino Creek within and just above the SCRA, all of which is designated critical habitat for the species. Designated critical habitat for Gila Chub within the action area includes 6.9 miles of Sabino Creek extending from the southern boundary of the CNF upstream to the confluence with the West Fork of Sabino Canyon in the CNF. This is 4.2% of all designated critical habitat for Gila chub.

Predation by and competition with aquatic nonindigenous organisms, including green sunfish (*Chaenobryttus cyanellus*), western mosquitofish (*Gambusia affinis*), and crayfish species (*Orconectes virilis* and possibly others), has likely been the primary cause for past declines of the Gila chub in Sabino Creek. Dudley and Matter (2000) correlated green sunfish presence with Gila chub declines in Sabino Creek, including predation by small green sunfish on young-of-the-year Gila chub. In 1999, CNF and AGFD removed most of the green sunfish from Sabino Creek, which subsequently increased viability of the Gila chub population. Western mosquitofish occupied Sabino Creek from at least 1982 through 1993 and were likely introduced to control mosquitoes. In the winter of 1992, a record flood displaced mosquitofish downstream and they have not been detected in Sabino Creek since this time. Gila chub moved downstream into habitat previously occupied only by Western mosquitofish after this flood (Dudley and Matter 1999). Mosquitofish are known to prey on eggs, larvae, and juveniles of the Gila chub. Crayfish may have also preyed on Gila chub in Sabino Creek historically; however, no crayfish have been detected in Sabino Creek since 2006.

In 2003, the Aspen Fire burned 84,750 acres in the upper elevations of the Santa Catalina Mountains, including most of the Sabino Canyon watershed. Occupied Gila chub habitat was not burned. Following the fire, the CNF and AGFD salvaged 900 Gila chub from Sabino Creek before subsequent rains brought ash and debris downstream into designated critical habitat and scoured Sabino Canyon. Primary constituent elements of critical habitat, including perennial pools, water quality, and invertebrate food base, were negatively affected by the ash and sediment flows. Sediment and ash reduced the amount of pool habitat and limited the depth of ordinary surface flows. Few, if any, Gila chub or nonindigenous fish remained in the creek in the fall of 2003. Salvaged Gila chub were successfully bred in captivity and their progeny were released into Sabino Creek and nearby Bear and Romero creeks in 2005. The Sabino Creek Gila chub population has grown from 350 individuals released in 2005 to over 2000 fish in 2009 (Suzy Ehret, AGFD, personal communication).

Heavy rainfall over the Santa Catalina Mountains in July 2006 led to record flooding and triggered an historically unprecedented number of debris flows in the Sabino Creek watershed. At least 18 debris flows damaged roads, bridges, and other structures in the SCRA (Macgill *et al.* 2007). Effects to Gila chub from the Mt. Lemmon Emergency Flood Stabilization project to repair and rehabilitate areas damaged by these floods are currently being addressed in another consultation (22410-2006-IE-0608).

Anticipated effects include a temporary decrease in water quality and food availability due to increased sedimentation from soil disturbance during construction. The CNF implemented conservation measures to minimize these effects.

Within Sabino Creek, past recreational activities, such as wading, swimming, and walking up and down the creek, may have displaced Gila chub and affected critical habitat. Recreationists have also likely contributed to past introductions of aquatic nonindigenous organisms to Sabino Creek. Green sunfish were stocked into the small lake created by Sabino Dam soon after the dam's completion in 1938. However, this species was not present upstream from the bridges until about 1982 (Dudley and Matter 2000). Recreational use may have resulted in transport of green sunfish upstream from these bridges. Recent monitoring of the Gila chub population in Sabino Creek apparently shows that the population is able to persist in the presence of current levels of recreation with no reintroductions of green sunfish (U.S. Forest Service 2009). Effects of recreation on the Gila chub have not been addressed in another consultation since the listing of the species in 2005.

We believe that aggregate effects of past nonindigenous species introductions, catastrophic wildfires upstream in the watershed, and recreational activities are responsible for the unstable-threatened status of Gila chub in the action area. However, this status is improving due to the active management of Gila chub in the action area by AGFD, CNF, and FWS.

Gila topminnow

The Gila topminnow does not currently occur in or near the action area. Collection records indicate the presence of Gila topminnow within Sabino Creek as early as 1894 by W. W. Price (Weedman 1999). In June 1982, AGFD released 2000 Gila topminnow into Sabino Creek, but only two individuals were observed in the creek six months later (Weedman 1999). Flooding, recreational impacts, cold water temperatures and the presence of green sunfish may have caused this release effort to fail (Voeltz and Betasso 2003). No one has attempted to reestablish Gila topminnow in Sabino Creek since this time. The likelihood of this species naturally dispersing to the action area during the expected life of the project is non-existent. Stocking efforts are intended to establish the species in 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 or 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 the proposed action and are later in time, but are still reasonably certain to occur.

Repatriation

Reestablishment of a population of Gila topminnow in Sabino Creek would help meet conservation and recovery goals for the species, as well as implement term and condition 2.1 for Gila topminnow in the BO for the Forest Service Southwestern Region LRMPs (U.S. Fish and Wildlife Service 2005). In accordance with the draft revised recovery plan, the population would contribute to recovery of the species as a level 2 population if it persists with minor human intervention for 10 years (Weedman 1999). However, the transfer of Gila topminnow from the wild population in Cienega Creek would

likely result in some level of injury and mortality to fish depending on stress level at time of release and prevailing habitat conditions. Because these actions would be implemented by the AGFD, the effects of all actions associated with moving, stocking, and monitoring are covered under a section 10(a)(1)(A) research and recovery permit held by the AGFD. Restrictions in the permit will protect the integrity of source populations in the context of the recovery programs for both the Gila topminnow and Gila chub. In addition, topminnow are highly fecund, and fish removed from a population are highly likely to be replaced within a matter of months or even weeks.

Gila topminnow and Gila chub historically coexisted in Arizona waters such as the Agua Fria River in Lousy Canyon (Yavapai County), Sheehy Spring (Santa Cruz County), and Cienega Creek (Pima and Santa Cruz Counties) (Voeltz and Bettaso 2003). Cienega Creek is one of the last places in Arizona that supports an intact native fish fauna including both Gila topminnow and Gila chub as well as longfin dace (*Agosia chrysogaster*) (Bagley et al. 1991, Simms and Simms 1992). The reestablishment of Gila topminnow may indirectly result in mortality from native Gila chub that reside in Sabino Creek. Gila chub may prey on topminnow eggs, young, and adults, which would restore the natural predator/prey relationship of these species. While such predation may result in the loss of individuals, the effect of these sources of mortality and morbidity are well within the population dynamic of both species. The life history of this native fish is characterized by high reproductive output and high rates of egg and juvenile mortality. Therefore, normal population dynamics would include these types of mortality and would typically replace lost individuals quickly. The long-term impacts of these losses would be negligible. Gila topminnow may predate upon Gila chub eggs, although this has not been documented (U.S. Forest Service 2009). Gila topminnow may also compete with early life stages of Gila chub for food and space. To minimize these effects to Gila topminnow, Gila chub and its critical habitat, the AGFD will initially release Gila topminnow in an area that is currently occupied by few Gila chub.

The reestablishment history of Gila topminnow illustrates that even sites that were thought secure may fail for various reasons (Voeltz and Bettaso 2003). Many reestablished sites have not demonstrated occupancy for a long enough time period, are not very large, and may lack the ability to survive the current, potentially long-term drought (Sheller *et al.* 2006). Active management of repatriated Gila topminnow in Sabino Canyon, including those actions specified in the conservation measures, will increase the potential for successfully establishing Gila topminnow in Sabino Creek.

Recreation

Dispersed recreation in the form of picnicking, hiking, wading, water play, and bird watching occur within Sabino Creek to various degrees. These activities have the potential to affect wildlife species and their habitats, including Gila chub and Gila topminnow. Concentrated recreation activity, such as wading, splashing, and hiking up and down the creek and wetted sections, can injure fish if contact is made or fish are displaced, as well as increase the stress levels in fishes sensitive to frequent disturbances. In the months of March and April, the level of disturbance in Sabino Creek has the potential to reach levels leading indirectly to mortality through stress, which predisposes fish to disease and predation. It is possible that streambanks and spawning areas may be damaged by excessive use from hikers and sightseers; however, these effects would be limited due to the rocky nature of and lack of accessibility to most of the streambanks. If recreationists use the creek for cleaning and bathing, soap or other such products could degrade water quality, which may affect native fish and aquatic invertebrates, a primary prey base for both the Gila topminnow and Gila chub, reducing habitat quality for fishes. It is possible, but unlikely, that recreation in Sabino Creek upstream of the SCRA would

degrade water quality to the point that it negatively affects native fish downstream. These effects are much less likely to occur due to limited access to Sabino Creek outside the SCRA.

Due to the level of recreation in the SCRA and Marshall Gulch Picnic Area, there is high potential for surreptitious introduction of nonindigenous aquatic species into Sabino Creek that could reduce or eliminate native aquatic species populations. The USFS specifically prohibits release of animals into Sabino Creek through CNF Special Closure Order 05-234. To decrease the potential for release of illegal fish and live bait, Arizona Game and Fish Commission Order 40 prohibits fishing from the confluence of the east and west forks of Sabino Creek, downstream to the CNF boundary and also prohibits possession of live bait fish on any waters in Pima County. There have been no introductions of green sunfish or mosquitofish to Sabino Creek since the creek was renovated in 2003.

Nonindigenous aquatic species released in Sabino Creek near the Marshall Gulch Picnic Area would have a smaller chance of reaching occupied native fish habitat due to intermittent flow, but could be washed downstream to the lower reach of Sabino Creek during flooding events. Crayfish occur in lower Sabino Creek and will predate on Gila topminnow and Gila chub. Crayfish density in Sabino Creek is very low, and Gila topminnow and Gila chub can persist in water with low crayfish density. Refer to our May 15, 2008, BO on the Central Arizona Project for a discussion on the pathways and impacts of nonindigenous aquatic species to native fish and their habitats (file number 22410-2007-0081). We incorporate by reference that discussion (U.S. Fish and Wildlife Service 2008*b*). CNF will work with AGFD and FWS to immediately renovate native fish habitats when necessary to remove invasive aquatic species.

Almost all of designated critical habitat for Gila chub in Sabino Canyon is accessible to recreationists by foot, bicycle or by tram via the paved road that follows Sabino Creek in the SCRA. Concentrated and continuous recreational activities in the stream channel as described above could potentially degrade the condition of three primary constituent elements of designated critical habitat: water quality, prey base, and habitat free of nonindigenous predators. CNF Special Closure Order 05-234 would minimize these effects by prohibiting possession and transport of animals and camping in the SCRA. High levels of recreation in the creek are limited to two months of the year, and terrain features limit access. Despite the potential for effects to primary constituent elements, Gila chub have persisted with current levels of recreation (U.S. Forest Service 2009). Furthermore, there is value in the opportunity to promote native fish conservation to the local and national visitors that recreate in the SCRA. No other effects to critical habitat are expected.

Monitoring of the Gila chub in Sabino Creek reveals that the population of Gila chub is able to persist in the presence of current levels of recreation (U.S. Forest Service 2009). The Gila chub is more secretive and thus more sensitive to disturbance than the Gila topminnow, so the Gila topminnow should persist in the presence of current levels of recreation also. It is likely that the current recreation activity level within and adjacent to Sabino Creek will increase due to Tucson's forecasted growth. If this occurs, Sabino Creek will likely experience more recreational traffic, and, if not monitored and managed, native fish species may decrease and aquatic and riparian habitat may be damaged or destroyed. To minimize effects of recreation on the Gila topminnow, Gila chub and its critical habitat, CNF will place educational signs at locations with high visitation to discourage activity that disrupts native fish conservation efforts in Sabino Creek and promote a sense of stewardship. CNF will also continue to incorporate this type of information into guided hikes and visitor center presentations.

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.

Flooding that occurred in 2003 after the Aspen Fire appears to have eradicated nonindigenous fish from Sabino Creek downstream of CNF lands. However, the potential still exists for introduction of nonindigenous aquatic organisms into Sabino Creek by the public from private lands downstream of the CNF. Nonindigenous sunfish currently exist in artificial lotic developments adjacent to the Tanque Verde Creek, but are below a fish barrier at the confluence of Sabino Creek and Tanque Verde Creek. It is highly unlikely that these sunfish or other nonindigenous aquatic organisms could move above the fish barrier on their own. However, it is possible that the public could release nonindigenous aquatic organisms above this fish barrier. Sabino Creek flows intermittently above this fish barrier, but could allow for movement of nonindigenous aquatic organisms upstream during periods of continuous low flow.

The long-term maintenance of native fish populations in Sabino Creek may be compromised by drought and climate change, as both will affect how ecosystems and watersheds function. These changes will cause a cascade of ecosystem changes, which may be hard to predict and are likely to occur non-linearly (Seager *et al.* 2007). For example, Desilets *et al.* (2008) hypothesize that runoff in Sabino Creek is particularly sensitive to increases in the intensity and duration of large-scale weather patterns, and that these storms are lasting longer or becoming more frequent. This could be one manifestation of broader climate change in which storms are drawing upon increased supplies of tropical moisture, creating the excess soil water conditions required to generate extreme floods in Sabino Creek. Another event similar to the July 2006 flood would likely wash Gila topminnow downstream into an area that does not support Gila topminnow, resulting in the loss of the population. Refer to our December 31, 2008, BO on Aquatic Species Conservation for a discussion on impacts of drought and climate change in southeastern Arizona (file number 22410-2008-F-0103). We incorporate by reference that discussion (U.S. Fish and Wildlife Service 2008c).

Conclusion

After reviewing the current status of the Gila topminnow, Gila chub, and critical habitat for Gila chub, the environmental baseline for the action area, the effects of the proposed repatriation of Gila topminnow in Sabino Creek, the effects of recreation on Gila topminnow and Gila chub, and the cumulative effects, it is the FWS's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Gila chub and Gila topminnow, and is not likely to destroy or adversely modify designated critical habitat for Gila chub. This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

Our rationale for our conclusions is summarized here:

1. The proposed action is designed to promote the conservation and recovery of the listed species;
2. Adherence to AGFD's Section 10(a)(1)(A) permit will minimize the effects to translocated Gila topminnow and the source populations.

3. The inter-specific impacts of two native fish species being present at a site should not preclude the establishment of viable populations of either species;
4. The conservation measures proposed by the CNF will minimize the chance for nonindigenous species to invade and establish, and minimize loss of individuals;
5. The Gila chub population continues to persist under current levels of recreation in Sabino Creek;
6. Critical habitat for the Gila chub will remain functional under current levels of recreation in Sabino Creek.

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, including any Conservation Measures that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

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

The measures described below are non-discretionary, and must be undertaken by the CNF 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 CNF has a continuing duty to regulate the activity covered by this incidental take statement. If the CNF (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. To monitor the impact of incidental take, the CNF must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

Amount of Extent of Take

Gila topminnow and Gila chub

The FWS anticipates that the proposed action may result in incidental take of Gila topminnow and Gila chub. Incidental take will be difficult to detect for the following reasons: dead animals are difficult to find, cause of death may be difficult to determine, and losses may be masked by seasonal fluctuations in numbers or other causes (e.g., oxygen depletions for aquatic species). The incidental take is expected to be in the form of harm, harassment, kill, and pursuit from:

1. Predation by nonindigenous aquatic species;
2. Mechanical removal (i.e., seines, nets, electrofishing) of nonindigenous aquatic species;
3. Either species preying on the other; and
4. Recreation.

Because this is a reestablishment project, we do not know how well Gila topminnow will respond to habitat conditions and effects of the action in this new environment. Given that, we expect that the proposed action could result in take of the entire population. However, if extirpation occurs, FS will reinitiate consultation with us to determine the potential causes of extirpation, possible changes in the proposed action, and need for any future re-establishment efforts.

We consider incidental take for Gila chub to have been exceeded if more than 5 injured or dead Gila chub are observed during monitoring or nonnative removal activities.

Effect of Take

In this biological opinion, the FWS determines that this level of take is not likely to jeopardize the continued existence of the endangered Gila chub or Gila topminnow or destruction or adverse modification of critical habitat for Gila chub for the reasons stated in the Conclusions section.

Reasonable and Prudent Measures and Terms and Conditions

The following reasonable and prudent measures are necessary and appropriate to minimize take Gila topminnow and Gila chub. In order to be exempt from the prohibitions of section 9 of the Act, the CNF must comply with the following terms and conditions, which implement the reasonable and prudent measures and outline required reporting and monitoring requirements. These terms and conditions are non-discretionary.

Gila topminnow and Gila chub

The following reasonable and prudent measures and terms and conditions are necessary and appropriate to minimize take of Gila topminnow and Gila chub:

1. The CNF shall implement measures to reduce the impacts of recreation in Sabino Creek:
 - a. As part of the interpretive program to increase awareness and support for native aquatic species conservation, include information on listed species present in Sabino Creek and activities that may negatively affect them, as well as impacts from human-aided bait bucket transfers of nonnative aquatic species, pet-dumping, and other private avenues of nonnative aquatic species introductions and translocations.
2. The CNF shall monitor implementation of the proposed action and any resulting incidental take and report to the FWS and AGFD the findings of that monitoring.
 - a. A brief written report shall be prepared by CNF summarizing project implementation, observed take, and monitoring results. This report shall be submitted annually to the FWS for five years after initial repatriation of Gila topminnow. The report shall also make recommendations, as needed, for modifying or refining these terms and conditions to enhance protection of the Gila topminnow and Gila chub or more efficiently use the limited monitoring resources of the CNF.
 - b. The CNF shall provide us copies of any other reports regarding implementation of the proposed action.

Reporting Requirements/Disposition of Dead or Injured Listed Animals

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

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. We recommend you implement the following conservation recommendations for the Gila chub and Gila topminnow:

- 1) Continue to assist FWS and AGFD in conserving and recovering the Gila chub and Gila topminnow;

- 2) Assist the FWS in drafting and implementing a recovery plan for the Gila chub;
- 3) Work with AGFD and FWS to develop a plan to monitor the effects of recreation on native fish populations in Sabino Creek. Some of the factors that may be investigated include the following:
 - Number, types, duration, and locations of recreational activities in Sabino Creek
 - Size of the existing or founding population(s)
 - Location of native fish populations
 - Hydraulic character and condition of channels
 - Character and condition of riparian and aquatic vegetation
 - Availability of open water (effective habitat size)
 - Dissolved oxygen content of the water
 - CO₂ content of the water
 - Environmental contaminants
 - Number and types of invertebrates that make up prey base
 - Presence of nonindigenous aquatic organisms

Those factors chosen would be measured using standard methods and analysis.

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

REINITIATION AND CLOSING STATEMENT

This concludes formal consultation on the actions 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.

The FWS appreciates the Coronado National Forest's efforts to conserve and recover the Gila topminnow and Gila chub. For further information please contact Cat Crawford (520) 670-6150 (x232) or Jim Rorabaugh (520) 670-6150 (x230). Please refer to consultation number, 22410-2009-F-0143, in future correspondence concerning this project.

Sincerely,

/ s / Scott Richardson for
Steven L. Spangle

cc (hard copy):

Assistant Field Supervisor, Fish and Wildlife Service, Tucson, Arizona

cc (electronic copy):

Wildlife Biologist, Fish and Wildlife Service, Tucson AZ (Attn: Doug Duncan)

Wildlife Biologist, Fish and Wildlife Service, Tucson AZ (Attn: Glen Knowles)

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

(Attn: Josh Avey)

Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ

(Attn: Leonard Ordway)

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Figure 1. Action area for reestablishment of Gila topminnow in Sabino Creek, Pima County, Arizona.

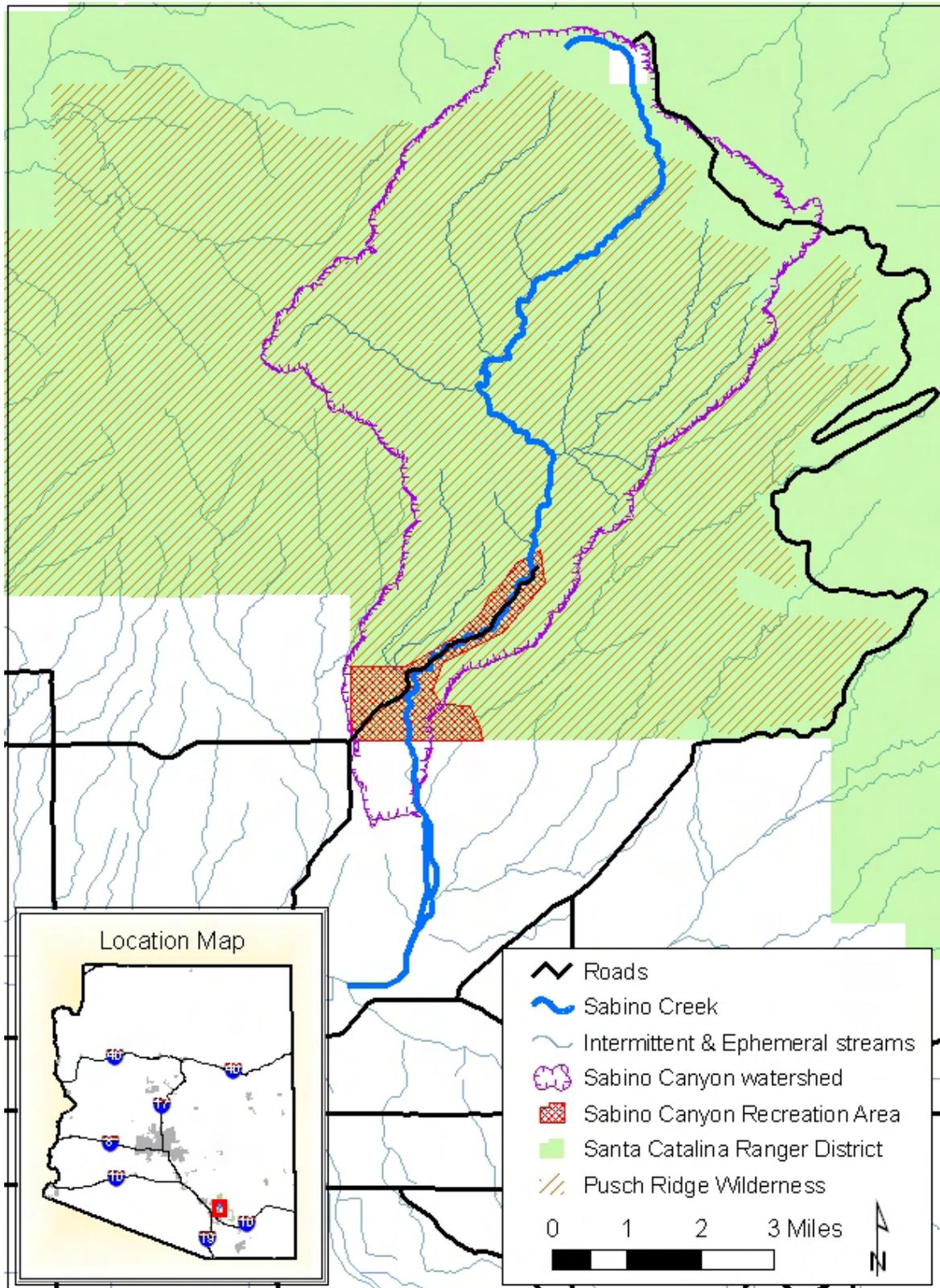


Figure 2. Gila topminnow release site in Sabino Creek, Pima County, Arizona.

