

To: Doug Duncan, U.S. Fish and Wildlife Service

From: Anthony Robinson, Arizona Game and Fish Department

Date: March 15, 2013

Re: Gila River Basin Native Fishes Conservation Program: Cooperative Agreement F09AC00084 Annual Report for the Period Nov. 1, 2011 thru October 31, 2012

COOPERATIVE AGREEMENT TITLE: Arizona CAP Gila River Basin Native Fishes Conservation Program

FUNDING: Approximately \$205,174 expended during 11/1/11 – 10/31/12.

Recovery of Natives (RPA 3): \$160,542

Control of Nonnatives (RPA 4): \$44,632

GENERAL ACTIVITIES:

Arizona Game and Fish Department's (Department) Gila River Basin Native Fish Conservation Program staff (program staff) administered and managed projects. Program staff managed data, added annual monitoring and survey datasets into the overall CAP Master Fish Survey dataset, and added data to the stocking dataset. The vacant Wildlife Specialist I (Program Biologist) was filled in March 2012. Program staff hired two interns for the 2012 field season, who ended up only working one month on program activities. Program staff attended the CAP Technical Committee meetings on January 17, 2012, and on October 26, 2012. Because of the inability of U. S. Fish and Wildlife Service (USFWS) to provide funding, all Department CAP-related work ceased on July 14, 2012, therefore all work reported herein was done during the period of November 1, 2011 thru July 14, 2012, with the exception of post-stocking monitoring at the Muleshoe Cooperative Management Area. Approximate expenditures on general administrative activities = \$18,640.

Comments: Clay Crowder promoted into the coordinator position vacated by David Boyarski. Drew Pearson was hired to fill the Program Biologist position vacated by Clay Crowder. Two interns were hired to help complete 2012 field work, both of which are no longer employed by the CAP Program. Because of the inability of USFWS to provide funding, the Department ceased doing any CAP-related work on July 14, 2012. The Department worked on CAP-related projects during April thru early July 2012, but had charged to other accounts, which were to be paid back once we received the next batch of funding. We received the second portion of the funding (\$110,000) on August 29, 2012 and those funds were used to pay back all of the expenditures from April thru June 2012 (June 30 is the end of the state fiscal year). After paying back the previous expenditures we did not have any money to continue any work. Therefore, the Department did not do any CAP related work during the period from July 14 thru October 31, 2013. The Department did complete the Muleshoe monitoring at the end of October under different funding, but then paid back that funding source, so that work is reported here.

PRIORITY ACTIONS IDENTIFIED IN COOPERATIVE AGREEMENT APPENDIX:

1. Acquire loach minnow and spikedace
2. Muleshoe Ecosystem stream and spring repatriations
3. Fossil Creek repatriations
4. Fresno Canyon repatriations
5. Bonita Creek renovation and repatriations
6. Arizona trout stream loach minnow repatriations
7. Gila topminnow stockings
8. Arnett Creek repatriations
9. Redrock Canyon/Sonoita Creek renovation and repatriations
10. Morgan City Wash and Chalky Spring repatriations
11. Turkey Creek and O'Donnell Creek repatriations
12. Post Canyon/Freeman Spring repatriations—project dropped in 2012
13. Spring Creek renovation and repatriations
14. Mineral Creek renovation and repatriations
15. Blue River repatriations

PRIORITY ACTIONS NOT IDENTIFIED IN COOPERATIVE AGREEMENT APPENDIX:

San Pedro Pond Stockings
Miscellaneous Stock Tank Surveys
Assess Potential Repatriation Waters
Bubbling Ponds O&M

TASK-SPECIFIC ACTIVITIES:

Old and new task numbers are given where known. Post-repatriation monitoring (task 3-84b) is included under each repatriation task, and not as a separate task. Sites where native fish were repatriated and subsequent monitoring information indicated that the species had established populations are reported in Appendix 1.

Acquire spikedace and loach minnow for propagation (Task 3-57 and 3-75g).

Description: The purpose of this task is to acquire spikedace *Meda fulgida* and loach minnow *Tiaroga cobitis* from all extant lineages and bring them to a facility for propagation and to establish refuge populations. Each population is likely genetically unique (Tibbets and Dowling 1996) and represents a significant remnant of the evolutionary legacy of these declining species. It thus is essential to acquire individuals from them as an assurance against extirpation of these distinctive lineages. Intensive, directed efforts to capture individuals, bring them into a holding and propagation facility, build up their numbers, augment source stocks, and replicate populations into streams, must occur immediately. The Department will also coordinate with tribes and the State of New Mexico to acquire spikedace or loach minnow from their jurisdictions. Fish will be transported alive to Bubbling Ponds Native Fish Conservation Facility (BPNFCF). An additional facility may be used if agreed upon by partners.

Status: Ongoing.

Expenditures: Approximately \$888.

Preliminary Results: The only work completed was periodic coordination with USFWS in Pinetop, AZ to see if they had made any progress in negotiations with the White Mountain Apache Tribe to provide the White River lineage of loach minnow to Bubbling Ponds Native Fish Conservation Facility (BPNFCF).

Obstacles: Lack of funding. The Department had planned to conduct surveys in the East Fork of the Black River to try to find and collect loach minnow, but the plans were postponed because of lack of funding. Had also planned to write report on the 2011 surveys in the upper Verde River for spokedace, but that was low priority and then was postponed because of lack of funding.

Comments: Status of lineages now at BPNFCF: the facility has spokedace from three (Aravaipa Creek, upper Gila River, and the Gila River forks) of the five supposedly extant populations. We have yet to find spokedace in the Verde River or Eagle Creek. The facility also has loach minnow from three (Aravaipa Creek, Blue River, and Gila River Forks) of the eight supposedly extant populations. We have yet to find them in Eagle Creek or the East Fork of the Black River tributaries, and we are still unsure if we will be able to acquire White River loach minnow from the White Mountain Apache Tribe. We have yet to acquire loach minnow from the San Francisco River and upper Gila River in New Mexico, but these populations are considered robust, and so are the lowest priorities for refuge.

Muleshoe ecosystem stream and spring repatriations (Task 3-47 and 3-75f).

Description: A high priority of the CAP Program is to replicate remaining populations of federally-threatened loach minnow and spokedace into suitable protected streams in the Gila River basin. Aravaipa Creek, a tributary to the lower San Pedro River, is host to sizeable populations of both species, and is thus a source for needed population replications. Hot Springs Canyon and Redfield Canyon are partly located on the Muleshoe Ranch Cooperative Management Area and are tributaries to the middle San Pedro River that retain native fish assemblages to the near exclusion of non-native forms. Attributes of these streams that help minimize invasions by non-natives include isolation from the mainstem San Pedro River by over 8 km of normally-dry streambed and a long reach of ephemeral discharge of the San Pedro River at and upstream from its confluence with Hot Springs Canyon. A barrier was built in Hot Springs Canyon in 2011 and one is scheduled to be built in Redfield Canyon in 2013 or 2014. Several other waters on the Muleshoe Ranch Cooperative Management Area were targeted for repatriations of Gila topminnow *Poeciliopsis occidentalis* and desert pupfish *Cyprinodon macularius*, including but not limited to Swamp Springs Canyon, Cherry Spring Canyon, and two unnamed springs near the Muleshoe Ranch Cooperative Management Area headquarters. The Department was tasked with completing necessary environmental compliance, development of translocation protocols (including post-translocation monitoring needs), repatriating spokedace and loach minnow to Hot Springs Canyon and Redfield Canyon and Gila topminnow and desert pupfish to suitable waters, and conducting post-repatriation monitoring to determine if the species establish. The Department will conduct augmentation stockings if necessary to establish populations.

Status: Ongoing.

Expenditures: Approximately \$26,629.

Preliminary Results: Program staff analyzed data from the 2011 monitoring and stocking, and wrote a report summarizing stocking and monitoring activities during 2011 (Robinson and Crowder 2012a).

Program staff collaborated with The Nature Conservancy (TNC) in removal of green sunfish *Lepomis cyanellus* from Redfield Canyon on March 19 and June 12. On March 19 no green sunfish were captured and only one was observed (not captured) above the Swamp Spring confluence. On June 12, 11 green sunfish were removed from the reach upstream of Swamp Springs Canyon, and near the Smallhouse private property boundary (downstream of where the trail reaches the valley floor) an additional 34 green sunfish were removed from a pool where about 100 were observed.

The annual post-stocking monitoring of native fishes in the Muleshoe Cooperative Management Area waters was conducted in the latter half of October 2012. On October 30, 2012 Program, Bureau of Land Management (BLM), and TNC staff surveyed Hot Springs Canyon by backpack electrofishing. Fifty five spikedace and 87 loach minnow were captured. Spikedace were captured in all three reaches, whereas loach minnow were not captured in the bottom reach. Also captured were 666 longfin dace *Agosia chrysogaster*, 619 speckled dace *Rhinichthys osculus*, 37 Gila chub *Gila intermedia*, 127 desert sucker *Catostomus clarki*, and 7 Sonora sucker *Catostomus insignis*. On October 31, Program and TNC staff surveyed Redfield Canyon and captured 13 longfin dace, 129 speckled dace, 248 Gila chub, 226 Sonora sucker, 213 Gila topminnow, and one green sunfish, the latter of which was removed from the stream. TNC and BLM staff monitored Secret Spring, Headquarters Spring, and Larry & Charlie Tank on October 21. At Secret Spring 1,884 Gila topminnow and two desert pupfish were captured. At Headquarters Spring near the road crossing, 119 Gila topminnow were captured, and at Larry & Charlie Tank 11 desert pupfish were captured.

Obstacles: Lack of funding.

Comments: Monitoring of fishes in Muleshoe CAM waters (except Cherry Spring Canyon and Swamp Spring Canyon) was completed in October 2012 by BLM, TNC, and the Department (using non-CAP funding). Desert pupfish were present and likely are established in Larry & Charlie Tank. Gila topminnow were present and are considered established in Headquarters Spring and Secret Spring. Only a few desert pupfish were captured in Secret Spring so it is unclear if they are established there. Spikedace and loach minnow were abundant in Hot Springs Canyon. No fish were stocked in 2012, so it will be a good sign if spikedace and loach minnow numbers remain high in Hot Springs Canyon in 2013. Neither spikedace or loach minnow were captured in Redfield Canyon; it is possible the two species will not establish populations in this stream.

Fossil Creek repatriation of listed fish species (Task 3-75I).

Description: In 1999, Arizona Public Service signed an Agreement in Principle to decommission the Childs-Irving Hydroelectric Project facilities and return full flows to Fossil Creek. A fish barrier was constructed in 2004 to prevent upstream movement of nonnative fishes. Later during 2004, native fish were salvaged and held while the stream above the fish barrier was treated with chemical piscicides to remove nonnative fishes. Early in 2005, salvaged native fish were returned to the stream, and then during June, full flows were returned to Fossil Creek. The objective of this task was to stock and establish several federally listed species into Fossil Creek. Highest priority species to stock were spikedace, loach minnow, and longfin dace. Lower priority species were desert pupfish, Gila topminnow, and razorback sucker *Xyrauchen texanus*.

Status: Ongoing.

Expenditures: Approximately \$8,876.

Preliminary Results: Program staff led the Fossil Creek Native Fish Management Working Group meeting on February 28, 2012. Program staff finalized the 2012 implementation plan in May 2012. A report summarizing the monitoring and stocking during 2011 was drafted in January and February and then finalized on March 15, 2012 (Robinson and Crowder 2012b).

Obstacles: Lack of funding.

Comments: Fossil Creek was renovated by the Department and its partners USFWS, U.S. Forest Service, and U.S. Bureau of Reclamation (Reclamation); no CAP funds were used. Spikedace were stocked into the renovated reach in October 2012, using non-CAP funds. Based on monitoring during 2011, three of the threatened and endangered species (Gila topminnow, spikedace, and loach minnow) stocked, have persisted in Fossil Creek for at least one year. Precipitation was mild during the winter of 2010-2011, and no major flood events occurred. However, no CAP monitoring was completed in 2012 because of lack of funding, so the status of the species is unknown. However, Gila topminnow were observed in numerous locations between Irving Falls and the temporary barrier by Department personnel during surveys for smallmouth bass before the renovation.

Fresno Canyon repatriations (Task 4-64b).

Description: Fresno Canyon is a major tributary to Sonoita Creek which is a major tributary of the Santa Cruz River about 24 km northeast of Nogales Arizona. Fresno Canyon is within the Sonoita Creek State Natural Area and is managed by Arizona State Parks. The canyon contains Gila topminnow, Sonora mud turtles *Kinosternon sonoriense*, and canyon treefrogs *Hyla arenicolor* in an approximately 600-m long perennial section. Non native species found within the canyon include green sunfish, bullfrogs *Rana catesbeiana* and crayfish. In an effort to remove non native aquatic species from the drainage, The Department was to chemically renovate Fresno Canyon, and if necessary stock Gila topminnow if they didn't naturally disperse from Coal Mine Canyon. If the renovated stream was deemed suitable for establishment of longfin dace

and Gila chub, these species also would be stocked.

Status: Ongoing.

Expenditures: \$4,438

Preliminary Results: A Department Environmental Assessment Checklist (EAC) to translocate Gila chub from Sheehy Spring to Fresno Canyon was drafted but is not yet finalized. Program staff coordinated with the landowner (San Rafael Cattle Company) at Sheehy Spring regarding collection and removal of Gila chub.

Obstacles: Lack of funding. In the EAC need to address Fisheries Branch concerns relative to Gila chub dispersal out of Fresno Canyon and into Sonoita Creek and any possible effects that may have on sport fish stocking in Patagonia Reservoir. Will likely have to reinitiate section 7 consultation.

Comments: Once funding comes in can finalize the EAC and get the translocation done in 2013.

Bonita Creek renovation and repatriations (Task 4-70b).

Description: Bonita Creek is a tributary to the Gila River, near Safford, Arizona. Bonita Creek drains south off of the San Carlos Reservation and the lower portion is within the Gila Box. Perennial flow begins about 29 km upstream from the mouth, although intermittency is common downstream. Safford has an infiltration gallery and associated transmission pipeline on Bonita Creek to supply municipal water for the city and the surrounding communities. The gallery system is located about 5.6 km above the mouth of Bonita Creek, and a small portion of the stream below the infiltration gallery dike is typically dry.

Except for fathead minnow, nonnative fishes are limited to downstream of the infiltration gallery. Nonnative species present include green sunfish, smallmouth bass *Micropterus dolomieu*, channel catfish *Ictalurus punctatus*, black bullhead *Ameiurus melas*, yellow bullhead *Ameiurus natalis*, fathead minnow *Pimephales promelas*, red shiner *Cyprinella lutrensis*, common carp *Cyprinus carpio*, and western mosquitofish *Gambusia affinis*. Native fish species present in Bonita Creek include Gila chub, longfin dace, speckled dace, Sonora sucker, and desert sucker. In addition, approximately 4,000 razorback sucker were stocked in 1987, but none have been observed since 1991.

In 2008, a Reclamation funded fish barrier was constructed in the lower reach of Bonita Creek, about 2.1 km upstream from the Gila River confluence. Tasks for the Department were to chemically treat (renovate) the 1.7 mile perennial reach between the barrier and the infiltration gallery dike to remove all fishes. Before treatment, individuals of each native species were to be salvaged from the stream and held on site or nearby in aerated tanks during the renovation. After determining the success of the renovation, salvaged native fishes were to be returned to the stream near their point of capture. Additional native species considered for repatriation included razorback sucker, spikedace, loach

minnow, desert pupfish, and Gila topminnow. Spikedace, loach minnow, Gila topminnow, and desert pupfish were also to be stocked into the perennial portion of Bonita Creek upstream of the infiltration gallery.

Status: Ongoing.

Expenditures: Approximately \$4,438.

Preliminary Results: Program staff collaborated with BLM staff to complete the annual monitoring in April 2012. In upper Bonita Creek (upstream of the City of Safford Infiltration Gallery), Gila chub, speckled dace, longfin dace, desert sucker and Sonora sucker were found at all four monitoring sites, Gila topminnow were found at one of the sites (Lee Trail), and fathead minnow were found at two of the monitoring sites (Red Knolls and Lee Trail). In Lower Bonita Creek in the treated reach, Gila chub, longfin dace, Sonora sucker, and Gila topminnow were captured in addition to nonnative mosquitofish, green sunfish, fathead minnow, and yellow bullhead. At the site below the treated reach, green sunfish, yellow bullhead, channel catfish, fathead minnow, red shiner and mosquitofish were captured as was one native species, Gila chub.

Obstacles: Potential public opposition to a second renovation.

Comments: BLM continues to lead efforts to remove green sunfish and other nonnative fish predators from treated reach, but eradication of green sunfish by mechanical means is unlikely. A second Bonita Creek renovation is high on the renovation projects priority list for the Department.

Arizona trout stream loach minnow repatriations (Task 3-38 and 3-75b).

Description: Higher elevation cold-water streams in the Gila River basin in eastern Arizona historically were occupied by a suite of native fishes including Apache trout *Oncorhynchus gilae apache*, Gila trout *Oncorhynchus gilae* (also present in New Mexico), chubs of the genus *Gila*, speckled dace, loach minnow, spikedace, desert sucker and Sonora sucker. The native trouts were nearly eliminated by a combination of angler removal, stream renovation to enhance introduced trouts of several species, and hybridization with and genetic swamping by alien rainbow trout. As a result of contracting range and diminishing numbers, both native trouts were federally listed as endangered. A management strategy for the native kinds was developed that incorporated the placement of fish barriers on selected streams, renovation upstream to remove all fishes, and restocking with pure strains of the native trout. However, this approach did not always accommodate repatriation of other native species, which were largely extirpated by earlier human impacts or the combined prior stream management for non-native trouts and subsequent management for native trout. A fully restored native fish community upstream from barriers in these streams would include the native trout plus the native minnows and suckers. Repatriation and improved population status for the nongame native fishes will conserve these native species.

The Department will perform repatriation stockings of native non-game fishes into

eastern Arizona streams that are managed for Apache trout. Priority stream sites are those with fish barriers planned or in place, and which are occupied by or scheduled for stocking with native trout. Such streams already have been identified as part of the recovery planning and implementation programs for Apache and Gila trouts. Stocking into other suitable streams may be considered but should not interfere with repatriation to priority streams. Loach minnow is the priority species to stock. Other lower priority species to stock are non-listed and include chubs of the genus *Gila*, speckled dace, desert sucker and Sonora sucker. Source populations should be geographically nearest downstream neighbors to the repatriation stream, and number of individuals removed should not obviously deplete the source. Multiple stockings into each repatriation stream should be performed successively for at least three consecutive years or until the desired populations are established, and beyond that for genetics management.

Status: Ongoing.

Expenditures: None.

Preliminary Results: No work was completed on this task during the reporting period.

Obstacles: Same as previous report. Finding loach minnow in the Three Forks area. Agreement with Apache Sitgreaves National Forest regarding suitable streams to stock loach minnow into once we do find and propagate Three Forks loach minnow.

Comments: May be an opportunity to either partner with the Department CAMP or let them be fully responsible for repatriation of loach minnow to Black River drainage Apache trout streams (e.g., West Fork Black River and Bear Wallow Creek).

Gila topminnow stockings (Task 3-37 and 3-75a).

Description: A primary goal of the Gila topminnow recovery plan (Stefferd 1984) is to repatriate Gila topminnow into suitable sites throughout its historical range. Small isolated habitats still exist that have the potential for successful repatriation efforts that, with long-term management, may allow this species to persist to achieve recovery. Many sites were stocked in the 1980s, but most failed. Many sites were identified as suitable for repatriation efforts and are identified in the draft recovery plan (Weedman 1999) and in the 2003 Gila topminnow and desert pupfish status report (Voeltz and Bettaso 2003). The Department focus is on the sites recommended for stocking identified in the recovery plan and status report and will stock about six, but no less than four, sites with Gila topminnow each year. Gila topminnow stocks used will be in accordance with the draft revised recovery plan. Gila topminnow repatriation sites are often suitable for desert pupfish, because the two species utilize some of the same habitats. Desert pupfish will be stocked into some of the repatriation sites if habitat is judged suitable.

Status: Ongoing.

Expenditures: Approximately \$35,505.

Preliminary Results: Program staff coordinated with appropriate agency, nongovernmental organizations and private individuals relative to old and new Gila topminnow repatriation sites. Program staff also analyzed data from 2011 and wrote reports summarizing stocking and monitoring at seven sites (Robinson et al. 2012, Yarush et al. 2012a, Yarush et al. 2012b, Yarush et al. 2012c, Yarush et al. 2012d, Yarush et al. 2012e, Yarush et al. 2012f).

Gila topminnow were stocked into five new locations during the reporting period. On November 17, 2011 Program, the Department's Region VI, and BLM staff stocked 1,415 Gila topminnow in four locations within a 60-m reach below Buckhorn Spring (tributary to Buckhorn Wash and then Castle Creek in the Agua Fria drainage). An additional 51 Gila topminnow died during the translocation. Fish were Sharp Spring lineage and were acquired from Page Spring Hatchery SRP pond. The fish were transported in an aerated cooler filled with water from Page Springs well that was treated with Amquel® and salt. The cooler was transported in the bed of a truck until the Castle Hot Springs Road turned to dirt, and from there the cooler was transferred to the bed of a Polaris Ranger UTV to minimize sloshing within the cooler while traveling on the very rough Buckhorn Ranch Road. Nonetheless, as mentioned above, 51 fish still died during transportation. Region VI and Program staff used minnow traps and dip netting to monitor Gila topminnow in Buckhorn Spring on April 23, 2012. Seven collapsible minnow traps were deployed and only one Gila topminnow was captured. In 11 dip net sweeps seven Gila topminnow were captured. The sampling, which was the 6-month post-stocking monitoring, was in the spring before the topminnow likely began to spawn, which is likely why so few fish were captured. A second monitoring event (1-year post monitoring) was completed on October 10, 2012 by a Department Region VI wildlife manager. Four collapsible minnow traps were set and 54 Gila topminnow were captured (the number below 20 mm TL was not recorded). Number of Gila topminnow captured during each of the 2012 monitoring events was low, so an augmentation stocking is recommended.

On May 7, 2012, 974 Gila topminnow and 656 desert pupfish were stocked into Road Canyon Tank in the Las Cienegas National Conservation Area. An additional 494 Gila topminnow and seven desert pupfish died during the translocation. Desert pupfish were acquired from Twin Tanks and Cottonwood Tank at Robbins Butte Wildlife Area. Gila topminnow were acquired from Cienega Creek, and hence were Cienega Creek lineage. The reason for so many topminnow mortalities was because of an accident after fish were collected at Cienega Creek near Empire Ranch. Before traveling to Road Canyon Tank, the water in the cooler in the back of the UTV needed to be diluted, so the cooler was unstrapped. Our newest Program staff was unaware that it was unstrapped, and was trying to be helpful so drove the UTV back onto the trailer, and in the process the cooler rolled off and all water and fish spilled onto the ground. Everyone quickly scrambled to save the fish. Luckily we had lots of water with us, so were able to keep flushing the ground with water to keep the fish alive and retrieve them, but several hundred died. The Department's Nongame Branch and BLM staff visited Road Canyon Tank on July 9, 2012 and reported seeing hundreds of topminnow and about 20 desert pupfish.

On May 8, 2012 Program and BLM staff stocked 833 Gila topminnow into one pool in Nogales Spring and 910 into two pools in Little Nogales Spring. An additional 173 Gila topminnow died during the translocation process. Fish were collected from Cienega Creek (and hence were Cienega Creek lineage) earlier in the day and transported in aerated coolers in the bed of a truck to the gate on Empirita Ranch Road. From there the coolers were transferred to the bed of a UTV and then driven to Nogales and Little Nogales Spring. The dirt road to the springs was very rough, causing intensive sloshing of the water in the coolers, which likely caused mortality of the fish. Nongame Branch and BLM staff visited the two springs on July 10, 2012. Between 50-100 Gila topminnow, of which about 37 were <12 mm TL, were observed in Nogales Spring. In the upper stocking pool in Little Nogales Spring, about 100 Gila topminnow were observed, about half of which were juveniles. Adults and juveniles were also observed in the stream for several hundred meters below the upper stocking location. In the lower stocking pool over 100 Gila topminnow were observed.

On October 19, 2012, Program and Forest staff stocked 73 Gila topminnow into Walnut Spring (site #392) in the Tonto Basin Ranger District of Tonto National Forest. An additional three topminnow died during the transport. The topminnow were of Redrock Canyon lineage, and were collected from Desert Harbor Elementary School in Peoria, Arizona on October 18, and were held in an aerated cooler overnight.

Several sites we previously stocked were monitored during the reporting period. When minnow traps (collapsible Promar® or metal cylindrical) were used for monitoring, they were baited with dry dog food (Gravy Train) and set for at least two hours.

On May 9, 2012 Program and BLM staff monitored the three fish repatriation sites on San Pedro Riparian National Conservation Area. At Ben Spring, Program staff made 17 dip net sweeps and collected 10 Gila topminnow, all of which were female and greater than 15 mm TL. At Horse Thief Draw, nine collapsible minnow traps were set and one Gila topminnow and one desert pupfish were captured. Four other desert pupfish and six Gila topminnow were also observed. At Murray Spring, twenty-six minnow traps were set and 10 Gila topminnow and 20 desert pupfish were captured. In addition, staff made seven seine hauls in the pool below the small waterfall near where the pipeline crosses the stream and captured 26 longfin dace, one desert pupfish, and one desert sucker. The low catch rates at these three sites are likely because sampling was done before the fish began to spawn.

On June 7, 2012, Program staff monitored the Gila topminnow and desert pupfish populations at Spur Cross Conservation Area's Solar Oasis pond. Eight minnow traps were set and 2,488 Gila topminnow, 588 desert pupfish, and 13 longfin dace were captured. Forty four percent of the topminnow captured were < 10 mm TL, and 41% of the desert pupfish captured were < 10 mm TL, indicating that both species were reproducing and recruiting. These populations are considered establish and so future monitoring will be done by Department staff other than Program staff.

Program staff monitored the desert pupfish populations in the McDowell Mountain Regional Park ponds on June 5, 2012. At Nursery Tank 10 collapsible minnow traps were set and 1,578 desert pupfish were captured, 309 of which were <20 mm TL. At Pemberton Pond eight collapsible minnow traps were set and 98 desert pupfish were captured, 18 of which were <20 mm TL. Based on this and previous year's catch, desert pupfish are considered established at both Nursery Tank and Pemberton Pond, so future monitoring will be done by Department personnel other than Program staff. Pemberton Pond continues to support a seemingly small population of desert pupfish, and continues to have some water issues (high pH, and evaporation often exceeds input in the summer because the delivery system gets clogged with debris). It is recommended that the pond be deepened and the delivery system be improved.

Program staff monitored populations of Gila topminnow and desert pupfish at four ponds in Robbins Butte Wildlife Area on June 4, 2012. Nine collapsible minnow traps were set in Cottonwood Tank and 310 desert pupfish were captured, 22 of which were <20 mm TL. At Twin Tanks, 10 collapsible minnow traps were set and 1,432 Gila topminnow were captured, 256 of which were < 20 mm TL. At Swimming Pool Tank, eight collapsible minnow traps were set and 5,600 Gila topminnow were captured, 2,283 of which were < 20 mm TL. At Stop Sign Pond, 10 collapsible minnow traps were set and 4,906 Gila topminnow were captured, 1,284 of which were <20 mm TL. No fish died during handling at any of the ponds. Based on this and previous years of monitoring, the Gila topminnow and desert pupfish are considered established in each of the ponds at Robbins Butte Wildlife Area, so future monitoring will be done by Department personnel other than Program staff.

Obstacles: Conflicting commitments continue to prevent Tonto National Forest personnel from completing the BA for release of Gila topminnow and desert pupfish to Rock Spring near Sunflower. The Forest Service has dropped support of stocking Gila topminnow and desert pupfish into Cottonwood Artesian (Tonto Basin Ranger District) because the grazing allotment permittee communicated to them that he did not support the project.

Lack of funding prevented implementation of augmentation stockings and one-year post-stocking monitoring at the San Pedro River sites. Lack of funding also prevented stocking of new sites (Sheepshead Spring on the Coconino National Forest).

Comments: During the next reporting period we hope to stock Gila topminnow into at least five new sites: Sheepshead Spring in Coconino National Forest, Rock Spring in Tonto National Forest, Sabino Canyon in Coronado National Forest, Cieneguita Wetland in Las Cienegas National Conservation Area, and several private ponds in the San Rafael Valley. The NEPA compliance and Departmental EAC are already completed for the Sabino Canyon and Cieneguita Wetland projects. The Coconino National Forest indicated that it would likely consider ongoing actions to be categorically excluded for Sheepshead Spring, because the spring and stream are within an enclosure. The Tonto National Forest is completing a BA for the ongoing actions in the vicinity of the Rock Spring site.

Arnett Creek repatriations (Task 3-41 and 3-75d).

Description: Arnett Creek and its tributary Telegraph Canyon are located on the Tonto National Forest in Pinal County near Superior, Arizona. Arnett Creek has been the subject of efforts to make it suitable for repatriation of native fishes. A barrier was constructed by the Forest Service, using Reclamation and other funds, and was improved to remedy some design weaknesses. Arnett Creek was renovated in 1997 to remove nonnative fish and surveys in summer 2001 found no nonnative fish present. Original plans for the stream included repatriation of longfin dace, desert sucker, Gila chub, Gila topminnow, and possibly other native fish species. However, during the drought of the mid 1990s thru mid-2000s, much of the streams dried leaving only about 100 m of wetted habitat in each stream, so only longfin dace and Gila topminnow will be stocked. The Department will obtain stocks of the species and transport and stock those fish into Arnett Creek. Choice of lineage of Gila topminnow will be based on the draft revised recovery plan (Weedman 1999) and those of other species will be based on any existing genetic information or on use of stocks from the closest population to Arnett Creek.

Status: Ongoing.

Expenditures: Approximately \$888.

Preliminary Results: Some sporadic coordination with the Tonto National Forest Service Fish Biologist to assess the status of the Forest's section 7 consultation.

Obstacles: Forest Service staff had other priorities.

Comments: Bob Calamusso (Tonto National Forest Fish Biologist, who is now retired) indicated that he had sent necessary section 7 paperwork (BAE) to USFWS. However, after talking with USFWS Cathy Robertson, it appears that what Bob sent was insufficient. Since Bob is now retired, we will try to get Andre Silva (Tonto National Forest) to revise the BAE as necessary and resubmit to USFWS. As mentioned in the last report, there is another short section of perennial water in Arnett Creek, about 8 km upstream of where longfin dace were stocked and just upstream of a section of private property near Highway 177. This upper section apparently has never been surveyed, so it probably should be surveyed before topminnow are stocked. There is also an ephemeral pond at the southeastern edge of the Perlite Mine that may need to be surveyed, although fish were not observed along the shore during several previous visits to Arnett Creek.

Redrock Canyon/Sonoita Creek renovation and repatriations (Task 4-70a, and 3-40, 3-75c).

Description: Redrock Canyon is a tributary to Harshaw Creek, tributary to Sonoita Creek east of Patagonia, Arizona. Redrock Canyon and tributaries support or supported an important wild population of Gila topminnow. Other native fishes recorded from the drainage include desert sucker, longfin dace, and speckled dace. By 2005 desert sucker and longfin dace were extirpated from Redrock Canyon above the natural waterfall about two-thirds of the way from the top of the watershed to the confluence of Redrock Canyon with Sonoita Creek. Speckled dace were only recorded from Redrock Canyon once, in

2001, and have not been recorded since. During the past two decades there have been significant efforts in Redrock Canyon to minimize adverse impacts to Gila topminnow and to increase the distribution and size of its population. Future efforts will attempt to restore Gila topminnow and other native fish species previously found in Redrock Canyon.

Nonnative western mosquitofish invaded the system in the late 20th century, and this nonnative fish in combination with drought has resulted in the near elimination of Gila topminnow (Duncan and Garfin 2006). Several other nonnative species have been recorded in Redrock Canyon, including largemouth bass and bluegill *Lepomis macrochirus*, but have been eliminated by drought and failure of an upstream stock tank dam. By eliminating western mosquitofish from the drainage, nearly 22 km of drainage suitable for Gila topminnow in the Redrock Canyon drainage can be reclaimed for the native fishes, and possibly Gila chub, which was likely an historical component of the assemblage.

A lengthy dry segment in the lower end of Redrock and Harshaw canyons prevents upstream movement of nonnative species during most times. A fish barrier was planned to further prevent upstream invasion, but was eventually not supported by state and federal partners because of local opposition to it and a chemical renovation. As a result a barrier location was sought and found on Sonoita Creek, which was supported by the Department. If a Sonoita Creek barrier was constructed, nonnative fish located upstream would have to be eradicated.

Funds were provided to the Department to complete environmental compliance and other necessary actions to eradicate western mosquitofish and other nonnative fish from Redrock Canyon or if a Sonoita Creek barrier is constructed, to eradicate nonnative fish upstream of the barrier. After eradication of nonnative fish, native fish would be stocked. Replicates of the Redrock Canyon lineage of Gila topminnow are available to provide stock for reestablishment of the population. The Department was to obtain stock of desert sucker, longfin dace, and possibly speckled dace from lower Redrock Canyon or Sonoita Creek, and possibly Gila chub from Sheehy Spring and transport and stock those fish into appropriate areas of Redrock Canyon.

Status: Ongoing.

Expenditures: None

Preliminary Results: No work completed on this project during the reporting period.

Obstacles: Public concerns about piscicide use and public health.

Comments: The Department's Region V Fisheries Program Manager still thinks that a renovation of Redrock Canyon is possible in the future, plus still thinks that construction of a fish barrier on Sonoita Creek would be a worthwhile conservation action. However, the Region has no plans for either action in the immediate future.

Repatriation of native fishes to Morgan City Wash and Chalky Spring (Task 3-84a).

Description: Morgan City Wash is a tributary to the Agua Fria River just downstream of New Waddell Dam (Lake Pleasant), and Chalky Spring is a tributary to Morgan City Wash about 4.2 km upstream of the confluence with the Agua Fria River. Approximately 600 m upstream of the Morgan City Wash confluence with the Agua Fria River is a meter-high weir that has prevented nonnative fishes from moving upstream; only longfin dace is found above the weir. Instream habitat in Morgan City Wash is thought suitable for repatriation of Gila chub, desert pupfish, Gila topminnow, and possibly loach minnow and spikedace (Robinson and Carter 2007). Chalky Spring has habitat suitable for Gila topminnow. Repatriation of native fishes was identified in Phase 1, Task #7, of an April 2003 Riparian Habitat Restoration Plan for portions of Lake Pleasant Regional Park. Morgan City Wash was also recommended for stocking of Gila topminnow by Voeltz and Bettaso (2003). Choice of stocks will be based on recovery plans, current genetic information, or nearest geographic neighbor criteria. The Department was to complete their internal environmental compliance checklist, acquire suitable stocks to serve as sources for the repatriations, and stock listed native fishes to both Morgan City Wash and Chalky Spring.

USFWS personnel visited Morgan City Wash in February 2008 and determined that not enough habitat was available upstream of the weir for Gila chub. Therefore, Gila chub were removed from the list of species to stock upstream of the weir.

Status: Ongoing.

Expenditures: \$2,663.

Preliminary Results: Program staff monitored fishes in Morgan City Wash and Chalky Spring on June 6, 2012. In Morgan City Wash, 14 collapsible minnow traps were set upstream of the weir and 1,093 Gila topminnow and 991 longfin dace were captured. Four hundred and forty six of the Gila topminnow were <20 mm TL. Downstream of the weir, 16 collapsible minnow traps were set and six green sunfish, six yellow bullhead were captured. In addition, all habitat downstream of the weir to the road bridge that could be electrofished was electrofished. In 1,494 seconds of shocking, Program staff captured five smallmouth bass, 15 green sunfish, and four yellow bullhead. At Chalky Spring Program staff made five seine hauls and captured 307 Gila topminnow and 17 lowland leopard frog tadpoles. One hundred and fifty seven of the topminnow were <20 mm TL. Based on this and previous year's monitoring, Gila topminnow are considered established in both Chalky Spring and Morgan City Wash, and therefore future monitoring will be done by Department personnel other than Program staff.

Obstacles: None at this time.

Comments: Gila topminnow are established in Chalky Spring and in Morgan City Wash, and barring any unforeseen environmental events should persist. It does not appear that desert pupfish established a population in Morgan City Wash, and future

stockings are not recommended. Because Gila topminnow were successfully established in Morgan City Wash and Chalky Spring, this project is considered completed and can be removed from the Department's list of projects.

Turkey Creek and O'Donnell Creek repatriations (Task 3-60).

Description: Turkey Creek, tributary to O'Donnell Canyon (Babocomari River drainage) in southeastern Arizona, represents historical habitat for longfin dace (last found in 1993), Gila chub (last encountered in 1991), and likely Sonora sucker and desert sucker. However, during 1994 through 2006 (a severe drought occurred during this period) no fish were captured and the stream was considered fishless. The dace and suckers are declining range-wide but are still relatively widespread and common, while Gila chub has been listed as an endangered species. O'Donnell Creek upstream from the Turkey Creek confluence was renovated in 2002 to remove green sunfish and restore its population of Gila chub. The O'Donnell Creek population of Gila chub could be replicated in Turkey Creek. This opportunity was especially attractive because non-native fishes were considered absent from Turkey Creek and a native fish assemblage thus could be restored without threats of alien fishes. Attributes that help reduce the chance of reinvasions by non-natives include relative isolation from O'Donnell Creek and Babocomari River by many kilometers of normally dry streambed. Tasks for the Department were to survey to confirm fishless status, evaluate for the potential emplacement of a fish barrier, complete environmental compliance, and then capture appropriate numbers of Gila chub from O'Donnell Creek and translocate them to Turkey Creek. It also was recommended that longfin dace, Sonora sucker, and desert sucker from suitable source populations be repatriated to the stream.

Several additions to the planned tasks occurred. After the repatriations of longfin dace and Gila chub in 2006, nonnative fish were found in Turkey Creek and Gila chub did not establish, but only nine were stocked. Therefore a renovation and constructed fish barrier were deemed necessary to secure the stream for native fishes. The Department will communicate with all private landowners in Turkey Creek drainage and attempt to acquire permission to eradicate (likely via chemical renovation) nonnative fishes in all tanks and perennial stream sections. If landowners are agreeable to a renovation and if a barrier is constructed, then the Department will renovate the tanks and stream, before repatriating native fishes.

Status: Ongoing.

Expenditures: None.

Preliminary Results: No work was completed on this project during the reporting period.

Obstacles: The owner of Canelo Springs Ranch never replied whether he would allow us to remove nonnative fish from the pond on his land. Therefore, the Department will be unable to remove nonnative fish from the drainage above the proposed stocking site.

Comments: Reclamation plans to repair the existing barrier in O'Donnell Creek. In addition, the Department never got approval from the private land owner to remove nonnative fish from his pond. Therefore the Turkey Creek repatriation project should be dropped from the Department's list of projects. If any Gila topminnow or Gila chub repatriations are planned for O'Donnell Creek after the barrier improvement, then that project should be added to the Department's list.

Spring Creek renovation and repatriations.

Description: Spring Creek is a 27.1 km tributary of Tonto Creek that begins at the confluence of Dinner Creek and Sevenmile Canyon southwest of Young, AZ. Perennial tributary and sub-tributary streams within the Spring Creek drainage include Rock, Turkey, Buzzard Roost, Walnut, and Dinner creeks. A variety of fish species have been identified during fish surveys within the Spring Creek drainage including native headwater chub *Gila nigra*, desert sucker, and speckled dace, and non-native fathead minnow, mosquitofish, yellow bullhead, green sunfish, rainbow trout *Oncorhynchus mykiss*, and brown trout *Salmo trutta*. The Department and Reclamation personnel visited the stream in 2007 and considered the physical habitat suitable for spikedace and loach minnow. Spikedace historically occurred in the Tonto Creek drainage, and Tonto Creek was included in the first critical habitat designation for spikedace in 2000. Reclamation subsequently investigated barrier sites in Rock and Spring Creeks, and selected one in Spring Creek as the preferred location.

After a barrier is constructed, the Department was to salvage native fish species, eradicate nonnative fishes upstream of the barrier, and restock the native species. In addition, spikedace and possibly loach minnow and a native trout (Apache or Gila) would be stocked to provide continuing fishing opportunity for the local community (Young and Spring Valley). After stocking the fish would be monitored annually to evaluate if they successfully established populations. Augmentation stockings would occur as necessary. The preferred lineage of loach minnow to stock would be the White River lineage, but if that was unavailable the East Fork Black River lineage could be used if it was available. If neither were available, another lineage agreed upon by the recovery team would be used. The preferred lineage for spikedace would be the Aravaipa Creek lineage, as the Verde River lineage may be extirpated.

Status: Ongoing.

Expenditures: None.

Preliminary Results: No work was completed on this task by CAP-funded personnel during the reporting period.

Obstacles: Local public support for the project. The Department has a higher priority renovation project in the area (Haigler Creek) so the Spring Creek project will get postponed 2-3 years until after the Haigler Creek project is implemented.

Comments: The Department's Region VI Fisheries program staff are going to try mechanical removal of nonnative fishes for a couple of years, and then assess if the removal efforts are benefiting native fish. The Department's Region VI Fisheries program is doing the removal efforts under the CAMP program. Therefore, the BOR barrier construction will also be postponed until after the Region VI assessment.

Repatriate Gila Chub to Mineral Creek (Task 3-78a).

Description: Until very recently, Mineral Creek supported a population of Gila chub and longfin dace. Devils Canyon, its tributary, also supported longfin dace in the portion immediately upstream from the confluence of the two streams. Gila chub were first detected in Mineral Creek in 1993, and the last time they were detected was 2000. No fish were detected in the upper portion of the stream (upstream of Box Dam reservoir) during two surveys in 2002 and one in 2006. The reasons for the disappearance of the fish are undetermined. The Department was tasked to complete its internal EAC, acquire suitable stocks to serve as sources for the repatriations, and stock Gila chub and longfin dace to Mineral Creek. In addition, opportunity for repatriation of additional native species such as loach minnow, Gila topminnow, desert pupfish, spikedace, desert sucker, Sonora sucker, and speckled dace should be pursued as appropriate. All sources of stock should adhere to the "closest geographic neighbor" criterion whenever possible.

The entire drainage above Big Box Dam reservoir could be managed as a native fishery, or certain portions of the drainage could be managed for native fish. If the entire drainage is targeted for native fish management, then Big Box Dam reservoir, Devils Canyon, and the portion of Mineral Creek inhabited by green sunfish would need to be renovated. A step-wise approach could also be taken. A first and probably easiest step would be to re-establish Gila chub into upper Mineral Creek, as no renovation would be required because a series of small waterfalls currently limit the upstream movement of green sunfish and fathead minnow, and only longfin dace are found upstream of the waterfalls.

Status: Ongoing.

Expenditures: \$8,876.

Preliminary Results: Program staff analyzed data and wrote a report summarizing the stock tank surveys in the Devils Canyon drainage during 2011 (Crowder and Robinson 2011).

Obstacles: Support of all stakeholders, primarily the Government Springs Ranch owner and Arizona State Land Department. Lack of funding to do tank surveys in the drainage and to draft environmental compliance paperwork.

Comments: Program staff plan to survey tanks in the Mineral Creek drainage during 2013. Program staff will also draft necessary environmental compliance paperwork to stock Gila chub and possibly native suckers into upper Mineral Creek.

Native fish repatriations into Blue River (Task 3-42 and 3-75e).

Description: The Blue River drainage in Arizona and New Mexico currently supports loach minnow, speckled dace, longfin dace, desert sucker, and Sonora sucker. The connectedness, size, and complexity of the system suggests that other species such as spikedace, Gila chub, roundtail chub, Gila trout, razorback sucker, flannelmouth sucker *Catostomus latipinnis*, Gila topminnow, woundfin *Plagopterus argentissimus*, desert pupfish, and Colorado pikeminnow *Ptychocheilus lucius* also possibly occurred in Blue River but were extirpated by the same factors that eliminated them from many other habitats in the Gila River basin. Threats to the continued existence of these species have not been alleviated, and with the possible exception of Gila trout, reductions in abundance and range continue. Repatriation of fish to suitable habitat is among alternatives available for management of imperiled native fishes. Several fish barriers are planned for the drainage that will assist these efforts. Wild fish from nearby sites are available to support such stockings, which are a high priority for species recovery.

The objective of this task was to repatriate roundtail chub and spikedace into the Blue River. These activities involve coordination and communication with partners (USFWS, NMDGF, and ASNF), determination of numbers to be stocked, identification of source populations, transporting to the stocking sites, stocking fish, and reporting. Source populations should be nearest neighbors to Blue River or hatchery stock, and number of individuals removed should not obviously deplete the source. Multiple stockings should be performed at annual or shorter intervals at least three times, or until the desired populations are established, with subsequent augmentations for genetics management. Populations will be monitored for at least three years following the last stocking event to evaluate if the species have established populations.

Status: ongoing.

Expenditures: Approximately \$21,191.

Preliminary Results: Program staff drafted a post-stocking monitoring plan and distributed it to partners.

Program staff completed a habitat mapping and reconnaissance trip during April 9-10, 2012. The reach from the constructed fish barrier to Fritz Ranch was surveyed and all mesohabitats were recorded on a GPS. In addition, helicopter landing sites were chosen as were sites for stocking of spikedace and roundtail chub.

During June 18 thru 21 Program staff conducted mechanical removal of nonnative piscivores in the lower Blue River from the fish barrier to Fritz Ranch. A total of nine channel catfish and one green sunfish were removed. One channel catfish was removed from the fish barrier to Pat Mesa reach, two from the Pat Mesa to Cienega Creek reach, one from the Cienega Creek to Mud Springs reach, four from the Mud Spring to Juan Miller Crossing reach, one from the Juan Miller Crossing to Fritz Canyon reach, and one from the Fritz Canyon to Fritz Ranch reach. The green sunfish was removed from the fish barrier to Pat Mesa reach. The flow in the Blue River was very low (flows at the

USGS gage on June 20 ranged from 0.88 to 1.7 cfs), and most of reach from the barrier to Pat Mesa was dry (the reach is about 4.9 km long and it was dry from the barrier up about 4.5 km, but most of the previously identified pools still had water). The water clarity in a few of the pools was no more than a foot, so Program staff may have missed some catfish. However, for those turbid pools Program staff also pulled a gill net through the pool (essentially seined it with a gill net), and did not capture any fish. Crayfish and longfin dace were observed throughout the river from Fritz Ranch downstream.

On June 20, 2012 Program staff stocked spikedace, loach minnow, and roundtail chub into the Blue River. None of the fish transported from the Bubbling Ponds Native Fish Conservation Facility to the Blue River died. Additional roundtail chub were collected from Eagle Creek by Rob Clarkson (Reclamation) and Marsh & Associates for direct translocation to the Blue River. The direct translocation of Eagle Creek roundtail chub also went well, but one fish, the smallest one (about 25 mm TL) died. Fish were stocked into three areas. At Fritz Ranch 244 spikedace were stocked into two locations. At Juan Miller Crossing 187 loach minnow and 295 spikedace were stocked. At the Cienega Creek confluence 222 roundtail chub and 30 loach minnow were stocked into two locations. One speckled dace was found in the barrel of fish from Eagle Creek; the speckled dace was sacrificed. We had not planned to stock loach minnow at the Cienega Creek location. There was only room for two coolers in the helicopter, and the spikedace were all in one cooler and the chub and loach minnow in the second cooler. The loach minnow were placed into two net pens to separate them from the chub. The net pens top frame was sealed PVC pipe that floated. Unfortunately the live net pens did not have net lids, and with water sloshing around, some loach minnow ended up escaping into the main part of the cooler. A few of the chub also ended up in the net pens, but these were observed at the Juan Miller Crossing landing site and all were put back into the main part of the cooler. The loach minnow in the cooler were not noticed until after fish were unloaded from the helicopter at Cienega Creek.

Stock tanks within the Blue River drainage were also surveyed in 2012, but are summarized below under Miscellaneous Stock Tank Surveys (Task 4-51).

Obstacles: None at this time.

Comments: The one green sunfish found and removed in June caused concern because green sunfish had not been recorded (based on examination of Department and SONFISHES records) in the Blue River. Annual post-stocking monitoring was not completed until after the reporting period, but when it was done in November 2012, green sunfish were found throughout the entire project area from the barrier to Fritz Ranch. The distribution of green sunfish distribution must be determined so that control efforts can be focused and implemented. The remaining ponds and stock tanks that have not been surveyed must be surveyed to ensure that none have green sunfish or other nonnative fish. Additional repatriation attempts will be postponed until after the distribution of the green sunfish is determined and control measures implemented.

San Pedro Pond Stockings (Task 3-64 and 3-75j).

Description: Reclamation rehabilitated two groundwater-supplied ponds on The Nature Conservancy's Lower San Pedro River Preserve for use as native fish and waterfowl habitat. Beginning in 2000, Reclamation used the larger pond (~1.2 ha) as a grow-out and refuge facility for razorback sucker. The large pond had further potential as a refuge for Gila chub, and both ponds could be used similarly for desert pupfish and Gila topminnow. The purpose of this project was to acquire and stock individuals of Gila chub, desert pupfish, and Gila topminnow into the refuge ponds. The Department was tasked with completing the necessary environmental compliance, identifying appropriate stock, acquiring, and stocking Gila chub, desert pupfish, and Gila topminnow into ponds on the Lower San Pedro River Preserve. Gila chub were to come from extant San Pedro River basin populations, while suitable source stocks of pupfish and topminnow had not been specifically determined.

The ponds were stocked with razorback sucker and desert pupfish before the Department & USFWS cooperative agreement. Razorback sucker were stocked into the larger, west pond by Reclamation in 2000. On May 3, 2005, Department, Reclamation, TNC, and Arizona State University personnel stocked approximately 750 desert pupfish (from USFWS Cibola National Wildlife Refuge Headquarters refuge pond) into the west pond. Reclamation drained and modified the ponds in 2009, before which razorback sucker were removed. Razorback sucker were not returned to the ponds after they were refilled.

Status: Ongoing.

Expenditures: None

Preliminary Results: No work was completed on this task during the reporting period.

Obstacles: We had planned to write an annual report and conduct annual monitoring, but lack of funding prevented us from completing that work.

Comments: Gila topminnow and desert pupfish are established in the ponds and should persist barring any environmental catastrophe. Gila chub are likely in the process of establishing a population in the larger pond, but occasionally more individuals from O'Donnell Creek, IWM, or T4 Spring should be stocked to maintain genetic variability similar to the other populations.

Miscellaneous Stock Tank Surveys (Task 4-51).

Description: All stock tanks within stream systems that have been or are planned to be protected against upstream invasions of nonnative fishes by emplacement of low-head fish barriers need to be surveyed because they may be sources of nonnative fishes into the streams. It is important to eliminate this potential avenue of nonnative fish contamination and secure the drainages for native fish recovery purposes. The Department was provided funds to locate stock tanks in these drainages, determine which tanks are perennial, and then conduct fish and amphibian surveys of the perennial tanks using

appropriate gear. A report detailing all methods and results will be provided which will include the list of tanks recommended for removal of nonnative aquatic vertebrates.

Status: Ongoing.

Expenditures: Approximately \$13,314.

Preliminary Results: Fifty two wetted tanks were identified in a report by Marsh & Associates (2010), but an additional seven were not flown over during aerial reconnaissance so were not evaluated. Program, the Department's Region I, and the Department's Nongame Branch staff surveyed identified wetted stock tanks and ponds in the Blue River drainage during May 17-19 and June 25-27. Fifty tanks were surveyed, twenty three of which were wet. Four of the wet tanks had fish present, three of which had nonnative fish: Mesa Tank (Pipestem_Mountain_03 in Marsh & Associates 2010) had mosquitofish, Tank 30 (Strayhorse_04) had fathead minnow, and Tank 31 (Bear_Mountain_10) had fathead minnow. One of the tanks with fish, Lazy YJ Ranch Tank (Maness_Peak_03 in Marsh & Associates 2010), had native fish in addition to the nonnatives. Native fish captured included longfin dace, Sonora sucker, and hybrids of Sonora sucker and razorback sucker. One of the seven tanks not evaluated during Marsh & Associates (2010) aerial survey was dry in 2012.

Obstacles: Landowner contact information was not obtained in time before the surveys for two sites, and one site was very remote so was not visited.

Comments: Nine locations still need to be surveyed in the Blue River drainage, four of which are on private land and one of which (Joy's Hatchery) contains several ponds.

Assess Potential Repatriation Waters (Task 3-84c).

Description: As conservation or control projects under the Department's portion of the Gila River Basin Native Fishes Conservation Program are finished, new projects must be added to implement actions that will help recover the five endangered fish species identified in the CAP Biological Assessment and subsequent USFWS biological opinions: Gila topminnow, Gila chub, spikedace, loach minnow, and razorback sucker. The Department was provided funds evaluate new or previously identified sites (i.e., potential Gila topminnow repatriation sites identified in the draft recovery plan or in Voeltz and Bettaso 2003) that might be suitable for conservation and recovery efforts for the five species. The Department will coordinate with federal and state agencies and private land owners and evaluate waters there if given access. If the sites are deemed suitable for conservation efforts, then project descriptions will be written if necessary and submitted to the CAP technical committee for approval. Project descriptions will not be written for projects that are only targeted at Gila topminnow repatriations, because these will simply be added to the Gila topminnow stocking task (3-37).

Status: Ongoing.

Expenditures: \$1,775

Preliminary Results: Program staff communicated with a private landowner in the Thatcher area who wanted to stock native fish in his newly created pond (about 1.25 surface acres with maximum depth of 4 m). Program staff visited the pond in March 2012 and set 16 minnow traps and one gill net. Forty red shiner were captured in four minnow traps and one mosquito fish in one minnow trap. One common carp was captured in the gill net. Upon eradication of the nonnative fish, the pond is considered suitable for Gila topminnow, desert pupfish, and roundtail chub (Eagle Creek lineage). Gila topminnow and desert pupfish would likely be stocked under the species safe harbor agreement.

Obstacles: None. A low priority task.

Comments: During the rating period we focused on existing projects or newly started Gila topminnow projects, so did not spend much time evaluating new repatriation sites.

Bubbling Ponds O&M (Task 3-86).

Description: Bubbling Ponds Native Fish Conservation Facility development filled the need to acquire and hold samples of rare populations of loach minnow, spikedace, and other native fishes of special concern for maintenance and propagation within a suitable facility. This would mitigate catastrophic losses of wild populations and provide fish for repatriation. The purpose of this task is to provide for facility costs of the new native fish facility, which has continued to expand in size, complexity, and importance. In addition to the original 12 circular raceways, multiple stream raceways and two large holding ponds have been added to better accommodate the Program's holding and propagation needs. Funding will be provided to the Department to support facility operations and for one full-time and one half-time technician to clean tanks, feed fish, and propagate/maintain brood stock and progeny.

Status: Ongoing.

Expenditures: Approximately \$48,952.

Preliminary Results: Bubbling Ponds Native Fish Conservation Facility (BPNFCF) staff continued to care for spikedace, loach minnow, Gila topminnow, woundfin, and Eagle Creek roundtail chub. Facility staff set up outdoor tanks and raceways for the spawning of spikedace and loach minnow and set up larval fish collection systems for all outdoor artificial streams used to spawn spikedace. In conjunction with ASU researchers, staff monitored genetic diversity and adult representation to Eagle Creek roundtail chub offspring, and staff continued to develop new spawning techniques for roundtail chub to improve number of offspring and adult contribution. Staff also continued to develop techniques for holding and spawning spikedace and loach minnow indoors. Facility staff reported that on July 14, 2012 fish counts at the facility were: 1221 Gila River spikedace; 1525 Aravaipa spikedace, 950 West fork Gila spikedace, 550 Aravaipa loach minnow, 750 Blue River loach minnow, 115 West Fork Gila loach minnow, 900 Eagle Creek roundtail chub, and 85 woundfin. Facility staff acquired roundtail chub from Eagle Creek on June 20, 2012 for brood stock augmentation.

Obstacles: NEPA compliance on the various projects being conducted at the facility. Expanding existing tank systems to increase spawning capacity and holding space for larval fish. Completing work on other contracts because the facility is not 100% funded by CAP monies.

Comments: The facility continues to maintain populations of spokedace (Aravaipa, Gila River, and Gila Forks lineages), loach minnow (Aravaipa, Blue River, and Gila Forks lineages), woundfin, roundtail chub (Eagle Creek and Little Colorado River lineages), and Gila topminnow (Sharp Spring lineage).

MISCELLANEOUS ACTIONS

Transfer Gila Chub and Gila Topminnow to New Mexico

Description: Only one population of Gila chub, and no populations of Gila topminnow, exists in New Mexico. Stocking Gila chub and Gila topminnow within historical range are recovery actions. New Mexico Department of Game and Fish (NMDGF) requested the Department provide them with Gila chub and Gila topminnow to be stocked into several locations in New Mexico. Locations included Burro Cienega, a fishless stream that drains south out of the Big Burro Mountains into a closed basin near Lordsburg, TNC Gila River Farm near Cliff, Redrock Wildlife Area north of Lordsburg, and Mule Creek a tributary to the San Francisco River near the Arizona border. The Department agreed to provide New Mexico with the Gila chub and Gila topminnow after completing the necessary compliance. Funding was provided to the Department to complete the necessary compliance, collect the fish, prophylactically treat them to remove parasites if necessary, and then transfer them to NMDGF.

Status: Ongoing

Expenditures: Approximately \$7,101.

Preliminary Results: On April 25-26 Program staff sampled Harden Cienega Creek to collect Gila chub for stocking into Mule Creek, New Mexico. Beginning about 1 km upstream of the mouth, Program staff surveyed upstream about 1.5 km (about 1.2 km in the canyon-bound section). Program staff set 10 collapsible hoop net sets, three minnow trap sets, made 65 seine hauls, and four kick seining efforts. Fish captured included 291 Gila chub, 15 speckled dace, 33 desert sucker, 19 Sonora sucker, and one sucker unidentified to species. Two hundred and forty three of the Gila chub were removed from the stream and transported to BPNFCF to undergo prophylactic treatments to remove parasites before being translocated to Mule Creek, NM; all fish survived the transport and appeared in good condition upon deliver to BPNFCF. One hundred and twenty three fish died while they were being held and treated at BPNFCF. The deaths were attributed to stress related to the prophylactic treatments, and to an outbreak of ich and bacteria in one of the tanks where fish were held between periods of prophylactic treatments. On June 27, 2012, the remaining 120 chub were transported in a vehicle from BPNFCF to a staging area near Mule Creek and transferred to New Mexico Department of Game and Fish (NMDGF) staff. Staff from NMDGF, BPNFCF, and the Forest

Service Glenwood Ranger District participated in the final leg of fish transport and stocking. Fish were put into another cooler and transported via ATV down the San Francisco River to the mouth of Mule Creek. Fish were then put in aerated buckets, packed into Mule Creek, and stocked into three locations (about 2.9, 4.5 and 4.8 km upstream from the confluence with the San Francisco River). A total of 118 Gila chub were stocked into Mule Creek, and an additional two died during transport.

Obstacles: None at this time.

Comments: The Gila chub stocked into Mule Creek were supposed to be transported to the stocking sites via helicopter, but the flights were cancelled due to wildfires in New Mexico. Nonetheless, NMDGF, BPNFCF, and USFS came up with a solution and were able to stock the fish into Mule Creek.

Because only 118 Gila chub were stocked, it is recommended that several hundred more fish are stocked, over one or more years such that more than 500 individuals summed over all stocking events are stocked.

LITERATURE CITED

- Bagley, B. 2002. Survey of Verde River drainage, Arizona for loach minnow (*Tiaroga cobitis*). Final Report for Contract #22410-0-M525 submitted to U.S. Fish and Wildlife Service, Arizona Ecological Services Office, Phoenix.
- Crowder, C.D. and A.T. Robinson. 2011. Devils Canyon drainage stock tank surveys during 2010 and 2011. Arizona Game and Fish Department, Phoenix. 9pp.
- Duncan, D., and G. Garfin. 2006. Native fish conservation and climate variability in southeastern Arizona. Pages 41-43 in Halvorson, B., editor. Borders, boundaries, and time scales: proceedings of the 6th conference on research and resource management in the Southwestern deserts; extended abstracts. U.S. Geological Services Southwest Biological Science Center, Sonoran Desert Research Station, Tucson, AZ.
- Robinson, A. T., and C. Carter. 2007. Morgan City Wash fish survey, August 14, 2007. Research Branch, Arizona Game and Fish Department, Phoenix.
- Robinson, A., and C. Crowder. 2012a. Muleshoe Cooperative Management Area native fish restoration: monitoring and stocking during 2011. A Gila River Basin Native Fishes Conservation Program Progress Report for Task 3-75f; U.S. Fish and Wildlife Service Cooperative Agreement No. 201819J853. Arizona Game and Fish Department, Nongame Branch, Phoenix. 23 pp.
- Robinson, A. T. and C. D. Crowder. 2012b. Repatriation of native fishes to Fossil Creek: summary of monitoring and stocking during 2011. A Gila River Basin Native Fishes Conservation Program progress report for task 3-75l, U.S. Fish and Wildlife Service Cooperative Agreement No. 201819J853. Arizona Game and Fish Department, Phoenix.

- Robinson, A., H. Blasius, and R. Timmons. 2012. Establishment of desert pupfish and Gila topminnow at Howard Well. Final Report to Gila River Basin Native Fishes Conservation Program, under Task 3-75a; U.S. Fish and Wildlife Service Cooperative Agreement No. 201819J853. Arizona Game and Fish Department, Phoenix, and U.S. Bureau of Land Management, Safford.
- Stefferd, S. E. 1984. Sonoran topminnow (Gila and Yaqui) recovery plan. U.S. Fish and Wildlife Service, Region 2 Office, Albuquerque, NM.
- Tibbets, C. A., and T. E. Dowling. 1996. Effects of intrinsic and extrinsic factors on population fragmentation in three species of North American minnows (Teleostei: Cyprinidae). *Evolution* 50:1280-1292.
- Voeltz, J. B., and R. H. Bettaso. 2003. 2003 status of the Gila topminnow and desert pupfish in Arizona. Nongame and Endangered Wildlife Program Technical Report 226. Arizona Game and Fish Department, Phoenix, Arizona.
- Weedman, D. A. 1999. Draft Gila topminnow, *Poeciliopsis occidentalis occidentalis*, revised recovery plan. Prepared by Arizona Game and Fish Department for U. S. Fish and Wildlife Service, Albuquerque, New Mexico, 83 pp.
- Yarush, K. P., A. T. Robinson, and C. D. Crowder. 2012a. Repatriation of Gila topminnow and desert pupfish at McDowell Mountain Park, Arizona: monitoring during 2011. A Gila River Basin Native Fishes Conservation Program progress report for task 3-37a; U. S. Fish and Wildlife Service Cooperative Agreement No. 201819J853. Arizona Game and Fish Department, Nongame Branch, Phoenix. 8 pp.
- Yarush, K. P., A. T. Robinson, and C. D. Crowder. 2012b. Stocking and monitoring of Gila topminnow and desert pupfish in Spur Cross Ranch Conservation Area's Solar Oasis Pond, 2009-2011. A Gila River Basin Native Fishes Conservation Program progress report for Task 3-75a; U.S. Fish and Wildlife Service Cooperative Agreement No. 201819J853. Arizona Game and Fish Department, Phoenix. 8 pp.
- Yarush, K. P., A. T. Robinson, and C. D. Crowder. 2012c. Monitoring of repatriated desert pupfish and Gila topminnow at Robbins Butte Wildlife Area, Arizona, 2011. A Gila River Basin Native Fishes Conservation Program Progress Report for Task 3-75a; U.S. Fish and Wildlife Service Cooperative Agreement No. 201819J853. Arizona Game and Fish Department, Nongame Branch, Phoenix. 7 pp.
- Yarush, K. P., A. T. Robinson, and C. D. Crowder. 2012d. Attempted establishment of desert pupfish in Walnut Springs, Mazatzal Mountains Arizona, 2008-2011. Final Report to Gila River Basin Native Fishes Conservation Program, Under Task 3-75a; U.S. Fish and Wildlife Service Cooperative Agreement No. 201819J853. Arizona Game and Fish Department, Phoenix. 8 pp.
- Yarush, K. P., A. T. Robinson, and C. D. Crowder. 2012e. Establishment of Gila topminnow in

Cottonwood Spring, Arizona, 2008-2011. Arizona Game and Fish Department, Nongame Branch, Phoenix. 8 pp.

Yarush, K. P., A. T. Robinson, and C. D. Crowder. 2012f. Attempted establishment of desert pupfish in Tule Creek, Arizona, 2007-2011. Arizona Game and Fish Department, Nongame Branch, Phoenix. 10pp.

Appendix 1. Populations of threatened and endangered species established under the Gila River Basin Native Fishes Conservation Program, as of December 31, 2012. Gila topminnow and desert pupfish site numbers are given where known.

Species	Metapopulation	Lineage	Replicated Locations	Year replicated
Gila topminnow	Bylas Spring Complex	Bylas Spring	Swamp Spring (#406; Muleshoe Ranch CMA)	2007-2008
			Cherry Spring (#405; Muleshoe Ranch CMA)	2007-2008
			Secret Spring (#331, Muleshoe Ranch CMA)	2007
			Headquarters Spring (#407; Muleshoe Ranch CMA)	2008
			Cement Tank (#381, Aravaipa Creek south rim)	2005
			Burro Cienega, NM	2008
			TNC Lower San Pedro Preserve's west pond	2006
			Howard Well (#83)	2008
	Upper Santa Cruz	Sharp Spring	Fossil Creek (#280)	2007-2010
			Morgan City Wash (#383)	2009
			Chalky Spring (#310)	2009
			Robbins Butte Swimming Pool Tank	2009
	Monkey & Cottonwood Springs	Monkey Spring	Cottonwood Spring (#415; Goldfield Mountains)	2008
			Spur Cross Ranch Conservation Area's Solar Oasis pond (#413)	2009
	Mixed Lineage Stock	Redrock Canyon & Bylas Spring	Robbin's Butte Stop Sign Pond	2010
Desert pupfish	Santa Clara/El Doctor	Howard Well (#83)	2008-2009	
		Mud Spring (#18; Tonto NF Mesa Ranger District)	2007-2009	
		Larry & Charlie Tank (#408; Muleshoe Ranch CMA)	2009	
		Nursery Tank (#398; McDowell Mountain Regional Park)	2010	
		Pemberton Pond (McDowell Mountain Regional Park)	2009	
		Robbins Butte Cottonwood Tank	2010	
		Robbins Butte Twin Tanks	2009	
		Spur Cross Ranch Conservation Area's Solar Oasis pond (#413)	2009	
		TNC Lower San Pedro Preserve's east pond (#390)	2009	
Longfin dace	Hassayampa River	Arnett Creek	2007	
		Tangle Creek	2008-2009	
		Coal Mine Canyon	2008	