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

**From:** Anthony Robinson, Arizona Game and Fish Department

**Date:** January 31, 2011

**Re:** Gila River Basin Native Fishes Conservation Program: Cooperative Agreement 201819J853 Final Semi-Annual Report for the Period May 1, 2010--October 31, 2010

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

**FUNDING:** Approximately $121,750 expended during 05/1/10 – 10/31/10.
Recovery of Natives (RPA 3): $56,854
Control of Nonnatives (RPA 4): $64,896

**GENERAL ACTIVITIES:** Program administration and management. Data management including the combination of multiple monitoring and survey datasets into one large dataset. Approximate expenditures on general activities = $18,265.

**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
13. Spring Creek renovation and repatriations
14. Mineral Creek renovation and repatriations
15. Blue River repatriations

**TASK-SPECIFIC ACTIVITIES**:

Old and new task numbers are given where known.

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

Status: Ongoing.

Expenditures: Approximately $4,870.

Preliminary Results: Tony Robinson drafted a Department EAC to cover acquisition of spikedace and loach minnow from all known populations, and coordinated with the various involved agencies as part of the EAC. Tony Robinson, Jeff Sorensen, and David Ward attended an August 22, 2010 meeting with the CAP Tech Committee and interested parties to discuss Bubbling Ponds funding issues. The facility is now being referred to as the Bubbling Ponds Native Fish Conservation Facility (BPNFCF). David Ward picked up 100 loach minnow and 250 spikedace from West Fork Gila River in New Mexico and transported them to BPNFCF.

Obstacles: The Department's EAC process for the project was slowed because the Apache-Sitgreaves National Forest has not yet replied to a letter to determine their support of and concerns with the project. We are also waiting on approval from San Carlos Tribe to allow someone to survey and collect spikedace and loach minnow from Eagle Creek and transport them to Bubbling Ponds. We are also waiting on approval from White Mountain Apache tribe to acquire loach minnow from White River.

Comments: At BPNFCF we now have spikedace from three of the five supposedly extant populations (Aravaipa Creek, upper Gila River, and the Gila River forks). We have yet to find spikedace in the Verde River or Eagle Creek. We also now have 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)**.

Status: Ongoing.

Expenditures: Approximately $24,350.

Preliminary Results: Department staff Clay Crowder, Abby Medina, and Steve Prager assisted The Nature conservancy in their June 21-22, 2010 effort to remove green sunfish from Redfield Canyon.

Department staff coordinated the multi-agency September 13-14, 2010 efforts to monitor the repatriated fish in Muleshoe waters. In Redfield Canyon we only captured one loach minnow, and no spikedace; these are the lowest catches since we started monitoring in 2008. The loach minnow was likely a YOY (39 mm TL). In addition, 9 Gila topminnow were captured and around 100 observed downstream of the Swamp Springs confluence. In Hot Springs Canyon we captured 29 spikedace and 68 loach minnow; these are the

highest catches since we started monitoring in 2008. For the entire stream, 18 (62%) of the spikedace were < 40 mm TL, and 26 (38%) of the loach minnow were less than 40 mm TL, so it looks like both species are reproducing. In Swamp Springs Canyon 313 Gila topminnow and 255 longfin dace were captured near the upper stocking site; no pupfish were captured. At the lower stocking site 113 Gila topminnow and 223 longfin dace were captured but no desert pupfish. Gila topminnow is likely established in Swamp Springs Canyon but it is unclear if desert pupfish is even persisting. In Cherry Spring Canyon 33 Gila topminnow but only one desert pupfish were captured. This is fewer topminnow and pupfish than were captured last September. Nonetheless, topminnow is likely established but it is less clear if desert pupfish is established. In Secret Spring pond 4,269 Gila topminnow and 12 desert pupfish were captured. Both species are likely established in Secret Spring. In Headquarters Spring 33 Gila topminnow were captured (many more were observed), but no desert pupfish. Gila topminnow is likely established in Headquarters Spring, but it is unclear if desert pupfish even persist. In Larry & Charlie Tank (the connected ponds constructed up the hill from the Casitas) 148 desert pupfish were captured, all of which were >= 1 cm.

Department staff coordinated the multi-agency stocking efforts on October 28, 2010. One crew stocked 374 desert pupfish into Headquarters Spring; an additional 3 pupfish died during the transportation/tempering process. A second crew stocked 311 desert pupfish into Secret Spring; an additional 5 pupfish died during the transportation and tempering process. Cooperators stocked 750 spikedace and 514 loach minnow into Hot Springs Canyon in the reach between Bass Canyon and Wildcat Canyon; only one spikedace died during the process. A third crew stocked a total of 1282 fish into Redfield Canyon: 730 spikedace, 273 loach minnow, and 279 other fish that were not identified to one or the other species, but were likely mostly loach minnow. An additional 9 spikedace and one loach minnow suffered mortality during the transportation and tempering process.

Obstacles: None at this time.

Comments:

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

Status: Ongoing.

Expenditures: Approximately $24,350.

Preliminary Results: During June 29 through July 1 Department staff conducted snorkel surveys for razorback sucker between the falls at Irving and the constructed fish barrier. No razorback sucker were observed. It is unclear if razorback sucker still persists in Fossil Creek. During August and September 2010, Department staff used minnow traps, dip nets, and seines to monitored areas encompassing all past Gila topminnow stocking sites; no topminnow were captured. It is unclear if Gila topminnow still persists in Fossil Creek. During August 2010 Department staff snorkeled through every fourth100-m reach from High Falls up to Fossil Springs, surveying approximately 1,100 m of the 4,400 m. No loach minnow or spikedace were observed. It is unclear if spikedace or

loach minnow persist in Fossil Creek.

More spikedace, loach minnow, and Gila topminnow were stocked on October 28, 2010. Department and Forest Service personnel and volunteers stocked 575 loach minnow upstream of Fossil Springs Dam; two additional loach minnow died during the transportation/tempering process. We stocked 2,447 spikedace within the 500 m immediately downstream of Fossil Springs Dam; an additional 55 died during transportation/tempering. For topminnow we stocked 2,099 approximately 1 km below Fossil Springs Dam and another 4,420 between the falls at Irving and approximately 400 m downstream; an additional 50 died during transportation/tempering.

Obstacles: None at this point.

Comments: It is still unclear whether habitat in Fossil Creek is suitable for the establishment and persistence of Gila topminnow, razorback sucker, loach minnow, or spikedace. A flood event during the winter of 2009-2010 may have displaced or removed most or all of the individuals of these species that were stocked or any of their progeny. It may be that the combination of gradient, the constricted nature of the canyon, and the large size of the watershed result in high current velocities during large floods that most individuals of these species are unable to withstand.

**Fresno Canyon repatriations (Task 4-64b).**

Status: Ongoing.

Expenditures: None

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

Obstacles: The repatriation site is on State Park property. Because of large cutbacks in State Park funding, acquiring landowner access and approval may become problematic.

Comments: EAC was drafted but is still waiting approval. After EAC is signed, the Department will move forward with stocking Gila chub (Sheehy Spring lineage) into Fresno Canyon.

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

Status: Ongoing.

Expenditures: Approximately $3,780.

Preliminary Results: Coordination with BLM, BOR, and USFWS personnel regarding monitoring and stocking of fishes in Bonita Creek. During June 2010, Department personnel assisted BLM personnel with a fish survey to monitor the fish populations in Bonita Creek.

Obstacles: The environmental compliance to fill in the area behind the barrier needs to be completed and that action taken before another renovation occurs. Green sunfish and

mosquitofish are obstacles for the establishment of populations for some of the native species.

Comments: During August 2010, the Department's Nongame Branch surveyed for turtles through the treated reach; green sunfish were found near the infiltration gallery, indicating that they have dispersed throughout the treated reach. A small-scale flood (mean daily discharge = 156 cfs at USGS gage) occurred during the end of the turtle survey. The flood was sufficient to remove beaver dams and modify aquatic habitat.

Spikedace, loach minnow, desert pupfish, and Gila topminnow are scheduled to be stocked into upper Bonita Creek (upstream of the treated reach) during November 2010, early next reporting period.

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

Status: Ongoing.

Expenditures: None.

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

Obstacles: Finding loach minnow in the Three Forks area. Identifying suitable streams to stock loach minnow into once we do find and propagate Three Forks loach minnow.

Comments:

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

Status: Ongoing.

Expenditures: Approximately $18,265.

Preliminary Results: CAP staff assisted with the stockings of Gila topminnow and desert pupfish into the Nina Mason Pulliam Rio Salado Audubon Center ponds in south Phoenix on August 31, September 28, and October 15, 2010. CAP staff also assisted with the renovation of the ponds during August.

Department and Maricopa County Park personnel conducted the 1-year post-stocking monitoring of the Gila topminnow and desert pupfish populations in Pemberton Pond on June 17, 2010. We captured 104 desert pupfish (both juveniles and adults) and 82 Gila topminnow (all adults). The pupfish population seems to be in the process of or is established, but it is unclear if the topminnow is established.

Department and Maricopa County Park personnel and a volunteer conducted the 1-year post-stocking monitoring of the Gila topminnow and desert pupfish populations in Spur Cross Solar Oasis at Spur Cross Conservation Area on June 23, 2010. We captured 1,610 Gila topminnow (1,214 adults and 396 juveniles), 325 desert pupfish (231 adults and 94

juveniles), and 72 longfin dace (62 adults and 10 juveniles). Both topminnow and pupfish are tentatively considered to have established populations in the pond.

On July 26, 2010 CAP staff conducted monitoring (1-year post stocking and annual) of desert pupfish and Gila topminnow populations in the five waters at Mud Springs #18 on the Tonto National Forest (TNF). We caught fish in all four ponds and the cement trough. In minnow traps we captured: South Pond—48 Gila topminnow (7 of which were juveniles) and 12 desert pupfish (1 juvenile) in 4 minnow trap sets. Catch is down quite a bit from last year. Middle-South Pond—23 Gila topminnow (16 juveniles) and 25 desert pupfish (all adults) in 4 minnow trap sets. Similar pupfish catch to last two year's (topminnow were stocked last year). Middle-North Pond—1 adult desert pupfish in one minnow trap set. North Pond—25 Gila topminnow (18 juveniles) and 10 desert pupfish (all adults) in 4 trap sets. More pupfish caught than last two years (topminnow were stocked last year). Cement tank—331 Gila topminnow (33 juveniles) in two trap sets. For dip netting we captured 16 Gila topminnow in the South Pond, and 7 Gila topminnow in the Middle-South pond; 10 dip net sweeps in each pond.

Emergent aquatic vegetation has encroached tremendously in each of the Mud Springs #18 ponds; I recommend that vegetation be removed or the ponds dredged. The water level in the Middle-North Pond was also very low (less than 6 inches deep), and as a result of the shallowness and the thick vegetation, we could not adequately sample the pond with traps, dip nets, or seines. This pond may need to be deepened. The Middle-South pond was also relatively shallow; it could also be deepened. Conductivity was higher in all ponds this year compared to last, and dissolved oxygen was lower.

On July 27, 2010 CAP staff conducted monitoring (2-year post stocking) of desert pupfish (stocked two years previously) and the existing Gila topminnow populations in Walnut Spring #20 in the Mesa Ranger District TNF. Department staff captured 612 Gila topminnow (13% were < 1 cm TL) in three seine hauls. No desert pupfish were seen or observed. No desert pupfish were observed during monitoring last year either, so this may end up being a failed site for desert pupfish. Cattails covered much of the pond surface, so Department staff pulled out about a fourth of the cattails to create more open water.

On September 1, 2010, Department and Bureau of Land Management personnel conducted monitoring of desert pupfish (stocked August 2009) and Gila topminnow populations in Tule Creek. Twelve collapsible minnow traps were set for a minimum of two hours and 915 Gila topminnow were captured. Four Sonoran mud turtles were also captured. No desert pupfish were captured. Desert pupfish were first stocked in September 2007. No pupfish were captured or observed during monitoring in November 2007, November 2008, February 2008, or October 2009. On October 14, 2009 an additional 129 desert pupfish were stocked. It is unclear if desert pupfish will establish a population in this site.

On September 10, 2010 CAP staff conducted annual monitoring of the Gila topminnow population (stocked in 2008) in Cottonwood Spring in the Goldfield Mountains, Mesa

Ranger District TNF. Department staff set four collapsible minnow traps for a minimum of 2 hours and captured 768 Gila topminnow. Topminnow, which were originally stocked in August 2008, appear to have established a population in the spring. The cement livestock tank downstream of the spring was also surveyed using a dip net, making six sweeps. Three Gila topminnow were captured. Approximately 20 larval topminnow were also observed. The topminnow in the cement tank were stocked in November 2009, when 40 were transferred from the spring to the tank.

Obstacles: Conflicting commitments have prevented Tonto National Forest personnel from completing the BA for stocking of Gila topminnow and desert pupfish to Rock Spring near Sunflower.

Comments:

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

Status: Ongoing.

Expenditures: Approximately $1215.

Preliminary Results: Some coordination with Tonto National Forest.

Obstacles: Conflicting commitments have prevented the Tonto National Forest fisheries biologist from revising the BAE so that the project can move forward. Some personnel at Globe Ranger District had concerns about the BAE and subsequent BO.

Comments: The USFWS completed a Biological Opinion on the Forest's Biological Assessment and Evaluation (BAE), and sent it to the Forest Service. The Forest Service needs to develop a Record of Decision regarding the Biological Opinion and BAE.

We may start volunteering to write the Forest Service BAs to speed up the process on other repatriation sites.

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

Status: Ongoing.

Expenditures: None

Preliminary Results: Regional staff coordinated with Coronado National Forest staff regarding the EA and BO (no CAP expenditures).

Obstacles: Addressing comments on the draft EA. Public support for the renovations and a barrier on Sonoita Creek.

Comments: The remaining 65 tanks in the Sonoita Creek drainage need to be surveyed to determine which have fish present. Due to lack of personnel and other priorities, these surveys were not completed in 2010.

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

Status: Ongoing.

Expenditures: Approximately $4,870.

Preliminary Results: On July 14, 2010 Department staff monitored the fish populations in Morgan City Wash and Chalky Spring. Over 1,300 longfin dace, 440 Gila topminnow (358 in collapsible minnow traps and 82 by seining), but no desert pupfish were captured. In the pool immediately downstream of the weir nine green sunfish were captured in a minnow trap set in this pool. On September 9, 2010, 751 desert pupfish were stocked into 4 locations within Morgan City Wash. The pupfish originated from Scott L. Libby Elementary School, and were of the Santa Clara Slough lineage. No pupfish died during the transportation and tempering process. However, on the hike out, two dead pupfish were noted on the bottom of one of the pools where they were stocked. On October 12, 2010 Department staff conducted the 1-month post-stocking monitoring via visual observations and dip netting. One desert pupfish was captured at each of the three upstream stocking locations, but none were captured in the furthest downstream stocking location. A few Gila topminnow and plenty of longfin dace were captured at each of the four stocking locations.

Obstacles: None at this time.

Comments: A couple dead desert pupfish were noted at the bottom of the pool after stocking on both June 30, 2009 and September 9, 2010. It is unclear why these fish died after stocking. Some possible reasons: 1) poor water quality; but longfin dace thrive; 2) observed harassment by longfin dace; 3) cumulative stressors.

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

Status: Ongoing.

Expenditures: Approximately 1,215.

Preliminary Results: Some coordination with Audubon Research Ranch regarding communications with rancher. Some communication with the Steen's.

Obstacles: Still need to find out if the owner of Canelo Springs Ranch will allow us to remove nonnative fish from the pond on his land, and if permittees in the O'Donnell drainage have any concerns with renovating O'Donnell Creek and the few tanks that have mosquitofish.

Comments: Brooke Gebow has not made any headway convincing the Canelo Springs Ranch owner to become a cooperator in the project.

**Post Canyon/Welch Spring repatriations (Task 3-61 and 3-75h).**

Status: Ongoing.

Expenditures: None

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

Obstacles: None during this quarter.

Comments:

**Spring Creek renovation and repatriations**

Status: Ongoing.

Expenditures: None.

Preliminary Results: No work was completed on this task by CAP funded personnel during the reporting period. Regional staff coordinated with Tonto National Forest staff regarding the project.

Obstacles: Local public support for the project.

Comments:

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

Status: Ongoing.

Expenditures: Approximately $7,305.

Preliminary Results: During July 6-8, 2010 Department staff surveyed half of the tanks in the Devils Canyon drainage; no fish were found in any of the 15 tanks surveyed. The tank surveys are necessary to identify potential sources of nonnative fishes to Devils Canyon and Mineral Creek, so that they can be chemically treated during the renovation of the drainage. In August 2010, Department staff Tony Robinson and Natalie Robb met with personnel from Resolution Mine to discuss the Mineral Creek drainage native fish restoration project; the mine might be able to fund a portion of the project as possible environmental mitigation. The mine indicated that it would likely be two years before their EIS was completed.

Obstacles: Need to talk to all landowners in the Devils Canyon drainage, and find out if they would have concerns about renovating the system and stocking native fish.

Comments: May be able to get some mitigation money to help with the project if the Resolution Mine gets approved. Given that it will likely be over two years before any potential mitigation occurs, we may want to move forward with repatriation of Gila chub to upper Mineral Creek.

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

Status: ongoing.

Expenditures: Approximately $1,220.

Preliminary Results: Department staff coordinated with various agencies regarding the project, and continued to draft an EAC for the restoration of native fish to the Blue River. On October 15, 2010, project staff sent a letter to Apache-Sitgreaves National Forest requesting confirmation of support for the project.

Obstacles: Waiting on documented support from Apache-Sitgreaves National Forest regarding the plan to restore native fish to the Blue River. We may seek approval to finalize the EAC without a letter of support, because the Forest was already listed as a cooperating agency in BOR's Environmental Assessment.

Comments:

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

Status: Ongoing.

Expenditures: Approximately $6,090.

Preliminary Results: On August 2-3, 2010 Department, USFWS, and TNC personnel collected 30 Gila chub from O'Donnell Creek. Department, USFWS, and International Wildlife Museum (IWM) personnel also collected 38 Gila chub from the IWM pond. The chub were transported to Bubbling Ponds Native Fish Conservation Facility to undergo prophylactic treatments before being stocked into the TNC Lower San Pedro River Preserve pond. On September 10, the 68 Gila chub were stocked into the larger pond at the TNC Lower San Pedro River Preserve.

Obstacles: Finding enough chub in O'Donnell Creek to augment the TNC population.

Comments:

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

Status: Ongoing.

Expenditures: Approximately $1215.

Preliminary Results: Same as last reporting period. Periodic coordination with Tonto National Forest Tonto Basin Ranger District Wildlife Biologist and Tonto Forest Fisheries Biologist regarding Mud Spring, Walnut Spring, and Cottonwood Artesian (see Gila topminnow stockings). Also, periodic conversations with Tonto National Forest personnel regarding potential native fish repatriations to Lime Creek, Seven Springs Wash, and Grapevine Canyon (tributary to New River).

Program staff met with Coconino National Forest staff on October 19, 2010 and traveled to and evaluated two potential native fish repatriation sites on the Forest.

Obstacles: None at this time.

Comments:

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

Status: Ongoing.

Expenditures: Approximately $4,740 (RPA3).

Preliminary Results: Bubbling Ponds Native Fish Conservation Facility staff continued to care for spikedace, loach minnow, Gila topminnow, desert pupfish, and Eagle Creek roundtail chub. Facility staff set up four new artificial stream systems inside the spikedace and loach minnow cage for spawning of loach minnow. Facility staff also set up four new large artificial streams on the west side of the cage for spawning spikedace. Aravaipa lineage spikedace were placed into one of the small concrete ponds (constructed for roundtail chub) in May to see if they would spawn in the ponds but after several weeks no larvae had been seen and the fish were put into the newly constructed artificial streams where they began to spawn immediately. The artificial stream systems provide a more natural stream environment which seems to be the key to spawning spikedace and loach minnow in captivity. The round circular tanks work well for rearing small fish and holding broodstock during the winter period, but the fish appear to produce more offspring in the linear, flowing systems. Facility staff counted offspring during August and reported the following numbers of offspring: Gila River spikedace = 2555; Aravaipa spikedace = 5993; Aravaipa loach minnow = 1323 plus approximately 300 additional fish that were spawned later; West fork Gila spikedace = 379 ( all from a single female; a portion will go to Sonora Desert Museum, and the rest will be sacrificed); Blue River loach minnow = 164.

Facility staff also conducted the second round of the topminnow and pupfish stocking strategies experiment.

Obstacles: NEPA compliance on the various projects being conducted at the facility. Completing work on other contracts because the facility is not 100% funded by CAP monies.

Comments: