PERFORMANCE REPORT

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CAP Gila River Basin Native Fishes Conservation Program financial support for the maintenance of Gila and Yaqui topminnow refuge stocks at ASU

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Gila topminnow *Poeciliopsis occidentalis* and Yaqui topminnow *P. sonoriensis* are two, federally-listed endangered fish species that are native to Arizona. Several stocks have been held in protective custody by Arizona State University (ASU) for a number of years as part of on-going conservation and recovery actions in the species' behalf. Stocks are housed in facilities of the Department of Animal Care & Technologies (DACT) on the ASU Tempe campus, and DACT staff provides routine maintenance and care of these animals.

This report summarizes project activities for the period March 31, 2012 through June 2, 2014. All established project goals for the reporting period were successfully met.

The following stocks are currently being held: Gila topminnow: Bylas Springs, Cienega Creek, Monkey Spring, Redrock Canyon, Sharp Spring; Yaqui topminnow: North Pond and Tule Spring (SBNWR), combined.

The following augmentations from wild populations have taken place or are planned: Cienega Creek (July 29, 2013), Monkey Spring (planned summer 2014), and SBNWR (Yaqui) planned summer 2014. Other stocks are extirpated in the wild (Redrock Canyon, Sharp Spring) or have otherwise been unavailable (Bylas Springs; annual requests for augmentation stock have been made to US Fish and Wildlife Service).

The following transfers of Gila topminnow were made:

June 3, 2013. Approximately 250 Gila topminnow (Sharp Spring lineage, Tank 8) were removed by AZGFD (Lara Upton) for stocking the following day into Pasture 2 Tank, San Raphael Valley, Arizona (see AZGFD trip report).

July 24, 2013. AZGFD personnel removed 350 Gila topminnow (Redrock lineage, Tank 10) for transport and stocking the same day into Walnut Spring, Arizona (see AZGFD trip report).

Problems and solutions: Tank 10 (Redrock lineage) experienced unanticipated mortality of several dozen mostly small (ca 1 cm) topminnow the day of and the day after withdrawal of fish by AZGFD. No proximate cause was determined and the population appeared unaffected by these losses. No other issues other than minor matters arose during the reporting period and all were dealt with effectively and successfully.

A detailed account of project activities is provided in the accompany Table and comprehensive "Histories" narrative.

Current status of Gila topminnow (*Poeciliopsis occidentalis*) and Yaqui topminnow (*P. sonoriensis*) stocks held and maintained in protective captivity in the Animal Resources Center at Arizona State University, Tempe, as of June 2, 2014.

Wild Stock/Source	Original ASU Acquisition	Most Recent Augmentation	Next Augmentation	Location/Comment
Bylas Springs	June 24, 1994; N=20 Roper Lake State Park (via Bylas Springs in 1988) May 1997; N=17 Bylas Springs	May 23, 2006; N=150-175 Fish stocked in Tank 6. June 13, 2007; Unknown number of young-of-year fish moved from Tank 6 to Tank 9.	Inquiry with San Carlos Tribe (April Howard) 4-05-2013; no response. Follow-up inquiry with FWS.	**Tanks 6 and 9.** Tank 7 population was lost on November 19, 2007.
Cienega Creek	June 20, 1994; N=20	July 29, 2013; N=200; 100F, 100M	Spring 2015	**Tank 2.** New (7-29-13) fish quarantined 30-days the added to tank 2.
Monkey Spring	September 1993; N=10 (not confirmed) June 29, 1994; N=20	June 13, 2012; N=162; 104 F, 58M	Summer 2014	**Tank 5.** Fish added to tank 5. Plans underway to acquire augmentation stock Summer 2014.
Red Rock Canyon	May 25, 2006; N=166; 119F, 47M From Desert Harbor Elementary School (via Red Rock Canyon in February 2002)	None	Extirpated in the wild.	**Tank 10.** Tank 7 was used as a temporary holding facility for Desert Harbor topminnow. Those fish were returned on September 3, 2008.
Sharp Spring	July 20, 1994; N=18	None	Extirpated in the wild.	**Tanks 4 and 8.** Tank 8 stock split from Tank 4 (original) as insurance against catastrophic loss.
Super topminnow	November 6, 2000	None	Stock destroyed March 2009	A combination of Bylas, Cienega, Monkey and Sharp stocks.
Yaqui topminnow	June 1998; N=39 Tule Spring and North Pond (SBNWR)	May 23, 2012; N=145; 100 F, 45 M North Pond (SBNWR)	Summer 2014	**Tank 3.** New stock treated and added to tank 3. Plans underway to acquire augmentation stock Summer 2014

Histories of Captive Stocks of *Poeciliopsis occidentalis* and *P. sonoriensis* at Arizona State University -- June 2, 2014

Bylas Springs

Twenty (20) adult females were collected by Marsh et al. from Roper Lake State Park near Safford, AZ, on June 24, 1994 and transported alive to ASU (ASU Federal Endangered Species Permit report to USFWS, Albuquerque, MN; Marsh unpublished field notes). The source of the Roper Lake stock was 300 fish removed from Bylas Middle Spring (S2) on September 26, 1988 (Weedman 1998). Seventeen (17) fish were collected from Bylas Springs and moved to ASU via USFWS in May 1997 via San Carlos FAO (R. Scheffer [ASU], personal communication in Weedman 1998). It is unknown if these fish augmented or replaced those acquired in 1994.

Tank 6

A past Animal Resource Center tank label indicated the original captive Bylas Springs topminnow stock was potentially moved into Tank 6 on October 8, 2000 (ARC notes). Approximately 50-100 topminnow collected by Paul Marsh from Bylas Springs[1] were infused into Tank 6 on June 12, 2006 and again on July 25, 2006 (J. White-James email). Approximately 320-350 fish were removed from the tank on October 3, 2007 and stocked on the Muleshoe Ranch[2]. Fish in this tank are represented by adult male and females plus smaller individuals all in apparent good health and condition.

Tank 7

The origin of this tank is unknown, though it is thought to originate from some of the topminnows collected by Paul Marsh on May 23, 2006[1]. Approximately 320-350 fish were removed from Tank 7 on October 3, 2007 and stocked on the Muleshoe Ranch[2]. An extensive fish die-off due to unknown reasons occurred during October and November 2007. All fish in Tank 7 were dead by November 19, 2007.

Tank 9

Progeny of "20 F backup" were moved from Tank 6 into Tank 9 on July 23, 2005 as insurance against catastrophic loss of the original (Tank 9) Bylas Springs stock (White-James [ASU] email). Approximately 320-350 fish were removed from Tank 9 on October 3, 2007 and stocked on the Muleshoe Ranch[2]. Fish in this tank are represented by adult male and females plus smaller individuals all in apparent good health and condition.

Cienega Creek

Tank 2

Twenty-three (23) adult females were collected by Marsh et al. on June 29, 1994 from Cienega Creek near Mattie Canyon (ASU permit report; PCM unpublished). Weedman (1998) erroneously reports the date as July 1994. It is unknown if these fish augmented or replaced those reportedly acquired in 1993. There is a record of Carla Hurt moving 86 fish into Tank 2 on December 5, 2002 (C. Hurt email), but the history of these Cienega Creek topminnow is unknown. Eighty-one (81) individuals (72F and 9M) were collected from Cienega Creek by Abe Karam (via USFWS, Tucson) on June 1, 2006 (A. Karam memo).

[1] On May 23, 2006, 150-175 fish (mixed Bylas S1 and S2) from Dewey San Carlos Apache Tribe & M. Brouder USFWS Pinetop were used to augment the ASU captive fish stock (P. Marsh email). Fish were quarantined in three aquaria upon arrival at the ARC and later distributed into tanks.

[2] Fish were transported by vehicle to the TNC San Pedro Preserve, held overnight, then transported via helicopter on October 4, 2007 to several sites on the TNC Muleshoe Ranch (PCM field notes; Mary Richardson, USFWS, Phoenix)

Those fish were quarantined in aquaria for a month, and then transferred to Tank 2 on July 25, 2006 (J. White-James email). During October 2007 approximately 77 individuals were found dead due to unknown causes and the remaining fish from Tank 2 were quarantined in aquaria (J. White-James emails). On January 23, 2008, the 18 remaining healthy individuals were returned to Tank 2. Abe Karam (via USFWS, Tucson) collected 166 individuals (99F and 67 M) from lower Cienega Creek on June 4, 2008 (A. Karam memo). These fish were quarantined in aquaria, and over the following days, approximately 32 individuals were found dead due to unknown causes. After one month in quarantine and no further mortalities, 134 fish were added to Tank 2, which contained 18 individuals (J. White-James email). On April 19, 2011, A. Karam and K. Patterson collected 165 individuals (112 F 53 M) from Cienega Creek. Those fish remained under quarantine for the next 90 days (A. Karam memo), then were infused into the Tank 2 population. On July 29, 2013, P.C. Marsh and J.C.G. Marsh collected about 200 individuals (equal numbers of male and female) from upper Cienega Creek on the Empire Ranch, Pima Co., Arizona (approximate UTM 12R 538985, 3516964 NAD83) and transported them to ASU where they were transferred in approximately equal numbers into quarantine aquaria (see trip report transmitted August 12, 2013) where they remained quarantined for 30 days before infusion into the stock in raceway 2. Fish in this tank are represented by abundant adult male and females plus smaller individuals all in apparent good health and condition.

Monkey Spring

Tank 5

During September 1993, 10 individuals were collected from Monkey Spring and brought into captivity, though this stock acquisition could not be validated from collection and permit reporting records available at ASU (P. Marsh, personal communication). Approximately 25 individuals were collected by Marsh et al. on June 29, 1994 at Monkey Spring (ASU permit report; PCM unpublished). Carla Hurt moved 168 fish derived from the original stock in aquaria to Tank 5 on November 1, 2002 (C. Hurt email). The email implies there was already a population of Monkey Spring topminnows established in Tank 5 when these additional fish were added, so the exact inception date of Tank 5 is unknown. Marsh et al. augmented the population with 100 individuals collected from Monkey Spring on May 30, 2007 (P. Marsh email). Karam and Adelsberger augmented the population with 115 individuals (45 females, 47 males, 23 juveniles) collected from Monkey Spring on February 3, 2010 (A. Karam memo). Those individuals were quarantined at ASU, and then infused into the Tank 5 population. Karam, Massure, and Koebele augmented the population with 162 individuals (104 F, 58M) collected from Monkey Spring on June 13, 2012 (A. Karam memo). Those fish were quarantined at ASU then infused into the stock in raceway 5. Plans currently are underway to acquire approximately 200 wild fish from this site during summer 2014 to augment the captive stock. Fish in this tank are represented by abundant adult male and females plus smaller individuals all in apparent good health and condition.

Red Rock Canyon

Eighty (80) topminnow were collected by AZGFD from Redrock Canyon (Falls exclosure & Cott Tank drainage) on February 19 and 20, 2002 and held in aquaria, awaiting completion of a refuge pond at Desert Harbor Elementary School (J. Voeltz email). On June 13, 2002 AZGFD released 60 (54 F, 6 M) of those individuals into the refuge pond at Desert Harbor Elementary School (J. Voeltz email).

Tank 10

Arizona Game and Fish Department collected 166 individuals (119 F, 47 M) from Desert Harbor Elementary School on May 25, 2006 and transported those fish to ASU where they were quarantined in aquaria (J. Voeltz email). All individuals were moved into Tank 10 on June 12, 2006 (J. White-James email). Approximately 447 fish died of unknown causes between November 14 and December 2, 2007 (J. White-James emails). One hundred individuals (79 F, 21 M) were collected via AZGFD from Desert Harbor Elementary School on January 29, 2008 and were quarantined in aquaria at ASU for 30-d (P. Marsh email). Those fish were added to Tank 10 on February 29, 2008. The wild stock of topminnow in Redrock Canyon has since been extirpated. On October 15, 2010, approximately 1,500 topminnow were removed from Tank 10 by Jeff Sorenson (AZGFD) and Abe Karam (M&A). Those fish were transported by AZGFD to a pond at The Audubon Center at Rio Salado in Phoenix. On July 24, 2013 AZGFD personnel removed 350 fish from this tank for transport and stocking into Walnut Spring, Arizona the same day. Fish in this tank are represented by abundant adult male and females plus smaller individuals all in apparent good health and condition.

Tank 7

Tank 7 was set up as a temporary topminnow holding facility while infrastructure repairs were made to the refuge facility at Desert Harbor Elementary School (R. Timmons email). Approximately 340 topminnow were collected by AZGFD from Desert Harbor Elementary School during March 2008. Those fish were added to Tank 7 on March 28, 2008, but 40-45 individuals had jumped out of the tank or died by the next morning (J. White-James email). Ross Timmons removed 200 individuals from Tank 7 on July 3, 2008, and 100 individuals on August 8, 2008 and transported them back to the repaired refuge facility at Desert Harbor School (P. Marsh emails). The remaining fish (N=259) were collected by AZGFD employees on September 3, 2008 and were stocked into a private pond in Amado, AZ (A. Karam email). Tank 7 was subsequently drained, cleaned, and remains fishless.

Sharp Spring

Tank 4

Eighteen (18) adult females were collected by P. Marsh on July 20, 1994 (ASU permit report; PCM unpublished). The wild stock of fish in Sharp Spring has since been extirpated. Fish in this tank are represented by adult males and females plus smaller individuals.

Tank 8

Carla Hurt (ASU) moved 20 fish derived from the original stock of Sharp Spring fish in Tank 4 to Tank 8 on December 10, 2002 (C. Hurt email). These fish were split off as insurance against catastrophic loss of the original stock because of concerns about viability of the wild source, which is now extirpated. On June 3, 2013 approximately 250 fish were removed from this tank by AZGFD (Lara Upton) for stocking the following day into Pasture 2 Tank, San Rafael Valley, Arizona. Fish in this tank are represented by adult male and females plus smaller individuals.

Super Topminnow

Topminnow in Tank 1 consisted of a combination of Bylas, Cienega, Monkey and Sharp stocks which were acquired for graduate student research under Phil Hedrick. During November 13-16, 2007, approximately 132 individuals died of unknown causes. The stock in its entirety was destroyed on March 24, 2009 because it had no practical value and its research purpose had expired.

Yaqui Topminnow

Tank 3

Original acquisition of this stock took place during June 1998 when 39 mixed sized individuals were collected from North Pond and Tule Spring (genetically identical) on the USFWS San Bernardino National Wildlife Refuge (SBNWR) near Douglas, Arizona. Fish were transferred alive by Kevin Cobble (USFWS), less one mortality, to ASU (ASU permit report). Marsh et al. collected 100 individuals from Twin Pond on San Bernardino NWR on June 27, 2007 (P. Marsh email) to augment Tank 3. Those fish were quarantined in aquaria for ~45-d during which time 60 individuals died of unknown causes. The remaining 40 individuals were infused into Tank 3 on August 15, 2007. Karam and Behrstock (via SBNWR) collected 178 individuals (78 F, 100 M) from North Pond and Tule Spring (A. Karam memo) on June 25, 2008 to augment Tank 3. Some of the fish were infected with yellow grub. Fish were quarantined in aquaria for 30-d during which ~ 40 individuals died due to unknown causes. On April 21, 2011 A. Karam and K. Patterson collected 104 Yaqui topminnow from SBNWR. Collections were made with the help of FWS staff. 50 males and 23 females were collected from North Pond, and 19 males and 12 females were collected from Hay Hollow. All fish were transported to ASU and remained under quarantine for the 90 days. In a post-collection email from Bill Radke (refuge manager at SBNWR), it was determined that the Hay Hollow fish had undergone a genetic bottleneck and the entire April 21, 2011 collection should be euthanized (A. Karam memo). Before their destruction, 25 females were removed from quarantine and frozen in the ultra-cold -80℃ freezer at ASU. That sample was transferred to Dr. Nathaniel Jue at the University of Connecticut for genetic analysis. The remaining 79 fish were euthanized on June 21, 2011. On May 23, 2012 A. Karam and G. Ley collected 145 Yaqui topminnow from SBNWR (A. Karam memo). One hundred (100) females and 45 males were collected from North Pond. Most fish were infested with yellow grub (infestations ranged from mild to severe). Before transport fish were sorted to insure infested topminnow were not included in the collection. Fish were quarantined at ASU, treated for parasites, and infused into the captive population. Plans currently are underway to acquire approximately 200 wild fish from this site during summer 2014 to augment the captive stock. Fish in this tank are represented by adult male and females plus smaller individuals all in apparent good health and condition.

References

Marsh, P. C. 1994. Report for 1994 activities and 1995 permit application for U.S. Fish and Wildlife Service Endangered Species Subpermit PRT 67681. Report, in part, to U.S. Fish and Wildlife Service, Albuquerque, NM.

Weedman, D. A. 1999. Gila topminnow, *Poeciliopsis occidentalis occidentalis*, revised recovery plan. U.S. Fish and Wildlife Service, Albuquerque, NM. 86 pages. Draft document.