CONSERVATION OF NATIVE FISHES & MANAGEMENT

ACTIVITIES FOR FY 2019

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Tasks 1.1-1.4

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Figure 1. San Lorenzo Elementary students checking out Gila Trout from Mora National Fish Hatchery.

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Task 1.1 West Fork Nonnative Removal

Heart Bar Nonnative removal, June 2019

The West Fork Gila River near the confluence of the Middle, and East forks supports a largely intact native fish assemblage, including one of two surviving Spikedace populations in New Mexico. Nonnative fishes are the primary threat to persistence of native fishes in the Gila forks area. Since 2006, the GRBNFCP has provided funding to New Mexico Department of Game and Fish (NMDGF), USFS, and USFWS to remove nonnative fishes from approximately 4 km of the West Fork Gila River. Data collected from this project also aids in monitoring critical Spikedace and Loach Minnow populations, and contributes to repatriation efforts by providing an indicator of how many fish can safely be translocated in the wild or sent to the hatchery.

We remove nonnative fish from the 4 km reach annually. Personnel included people from NMDGF, USFS, MNFH, and Kansas State University. We also take advantage of the opportunity to collect native fishes and habitat data. We distinguish sample reaches by habitat type and only collected fish and data from each unique habitat type. Spikedace, Loach Minnow, and Roundtail Chub were detected during sampling. Nonnative Black Bullhead, Smallmouth Bass, Brown Trout, and Common Carp were also detected and removed from the river.

Figure 2. Nonnative removal crew on the West Fork Gila River.

Task 1.2 Threatened and Endangered Fish Repatriation & Monitoring

Loach minnow and Spikedace Surveys/ Broodstock Augmentation, June 2019

In cooperation with NMDGF, we surveyed the lower reaches of Little Creek near the confluence of the West Fork Gila River to evaluate Loach Minnow stocking efforts in 2017 and 2018. We sampled four reaches extending 2 miles up Little Creek from the confluence of the West Fork Gila River. We did not detect Loach Minnow in Little Creek. There are no plans to continue stocking Little Creek with additional Loach Minnow.

We are continuing Loach Minnow repatriations in the San Francisco River Drainage. We stocked approximately 300 Loach Minnow from the Arizona Research and Conservation Center (ARCC) into Saliz Canyon. Effects of a fire in 2018 decimated the Loach Minnow population in Saliz Canyon. During repatriation efforts we noted small fish, riffle habitat, and macroinvertebrates. Saliz Canyon appears to be recovering.

We also sampled the Gila River near the Gila Bird Area in an attempt to find Spikedace to augment ARCC's broodstock. ARCC's existing Spikedace broodstock originated from this reach of the Gila River. ARCC's Spikedace broodstock had not been augmented since the original collection of approximately 90 fish. We kept one out of every three Spikedace we collected and transferred approximately 91 young of year Spikedace to ARCC. All fish were approximately 20mm in size.

Task 1.3 Middle Fork (now East Fork) Inventory & Assessment

East Fork Gila River Remote Site Surveys, May 2019

We conducted fish community surveys in remote sections of the the East Fork Gila River in conjunction with the USFS, Mora NFH, and NMDGF. This project, funded by the Bureau of Reclamation as a part of the GRBNFCP, will aid biologists in determining distribution and abundance of Spikedace, Loach Minnow, and Roundtail Chub. Our crew sampled the lower wilderness section of the East Fork Gila River upstream of the confluence with the Gila River.

Previous surveys of the East Fork Gila River occurred in 2007. The 2007 surveys indicated that nonnative Smallmouth Bass, Yellow Bullhead, and Rainbow Trout existed at multiple sites. NMDGF personnel collected multiple age classes of Smallmouth Bass in 2007, indicating recruitment. No Spikedace or Loach Minnow detections occurred during the 2007 surveys, though suitable habitat existed throughout the system. Methods used during the 2007 surveys included electrofishing, seining, and kick-seining. A protocol developed by NMDGF to identify and sample various habitat types in streams was used in the 2007 surveys.

The 2019 East Fork Gila River surveys incorporated permanent monitoring sites established by NMDGF in 1988. In 2019, we also established new sites to bridge the distance between existing sites and to maneuver around private land. In addition to new sites on the East Fork Gila River, we also added sites in Black Canyon, a tributary to the East Fork Gila River. When surveying Black Canyon, we hiked up Apache Canyon because angler reports indicated trout occupied the stream. We found deep isolated pools, then continuous flow and surveyed the lower reach of Apache Creek. We used the same fish collection and habitat measurement methods and protocols established in 2007.

Figure 3. Scott Mullner (NMFWCO) and Zach Foster (USFS) collect habitat data on the East Fork Gila River.

Figure 4. Scott Mullner (NMFWCO) with a Gila Trout collected in Black Canyon.

We detected multiple age classes of Smallmouth Bass, Rainbow Trout, and Yellow Bullhead at the sites on the East Fork Gila River. Desert and Sonora Suckers dominated the native fish assemblage. No Spikedace, Loach Minnow, or Roundtail Chub were detected on the East Fork Gila River sites. In Black Canyon, we detected nonnative Brown Trout and collected several trout from the Onchorynchus genus (Rainbow Trout, Gila Trout, or hybrid Rainbow x Gila). We did detect Gila Trout in Black Canyon and one Roundtail Chub. Speckled Dace, Longfin Dace, and Desert Sucker composed most of the native fish assemblage. Spikedace and Loach Minnow were not detected in Black Canyon. We detected Speckled Dace and one Brown Trout in Apache Canyon.

Task 1.4 Native Fish in the Classroom (NFIC) – Gila & Mimbres Drainage

Native Fish in the Classroom (NFIC) is an environmental education program based at the New Mexico FWCO. The program provides elementary students the opportunity to learn stewardship skills while caring for native fish from local river basins in their classrooms. The students learn to manage their aquarium to provide optimum rearing conditions, and at the end of the program, students release their fish into their native habitat. By allowing youth to release their native fish, we are effectively engaging them in conservation management activities. Students are actively investing time in a living being that is now living in a water body within their community. The program seeks to connect youth to their natural world and we expect that once they have taken care of the native fish in their classes, they will be inclined to care of their local stream, lake, or river.

A partnership between U.S Forest Service - Gila National Forest (USFS), Mora National Fish Hatchery (NFH), and New Mexico Fish and Wildlife Conservation Office (NMFWCO) allowed for the expansion of the NFIC Program into schools within the Mimbres and Gila River Basins in FY 2017. During the 2016-2017 school year (FY 2017), San Lorenzo and Jose Barrios Elementary Schools were the first to host Gila Trout in the schools. During the 2018-2019 school year (FY 2019, Table 1.), a third school was added in Quemado, New Mexico. In Fiscal Year 2019, additional funding was provided by the Gila River Basin Native Fishes Conservation Program (GRBNFCP).

Table 1. School and student NFIC participation for FY 2019.

School	Location	Grade	Number of Students
San Lorenzo Elementary	San Lorenzo, NM	K-6th	55
Harrison H. Schmitt Elementary	Silver City, NM	5th	32
Quemado Elementary	Quemado, NM	4th/5th	12
		Total Students	**104**

Funding provided by GRBNFCP for the NFIC program aided in covering costs for classroom tank supplies (filter media, bacteria, water quality test kits, replacement parts), time for completing the NFIC Manual and Activities Guide to Fishes of the Gila & Mimbres Rivers, time and travel for classroom visits (tank set ups, presentations, and activities), and fish releases.

New Mexico FWCO staff developed a manual to guide teachers with implementation of the NFIC program in the class. The NFIC Manual and Activities Guide to Fishes of the

Gila & Mimbres Rivers was completed in FY 2019. The curriculum incorporated New Mexico science content standards, benchmarks, and performance standards, making it a practical tool for elementary school teachers. The manual was modeled after the NFIC Manual and Activities Guide to Fishes of the Rio Grande and focuses on species specific to the Gila River basin including Gila Trout, Roundtail Chub, Spikedace, Loach Minnow, and Gila Topminnow. Teachers are able to lead lessons at their own pace in their classrooms. In addition to teacher-led activities, New Mexico FWCO staff provided in-class activities as schedules permitted. The following identifies the activity and schools that were completed by NMFWCO staff in FY 2019.

- NFIC Introduction with Fish Feeding Calculation Activity while delivering the Gila Trout to the school. While tempering the fish, we weighed and measured them to demonstrate how hatcheries gather data to calculate daily feed rates for fish they raise. Students then determined the feed rate for their fish.
    - Quemado Elementary
    - USFS completed activity with Harrison Schmitt & San Lorenzo.
- Anatomy activity (Figures 5 & 6) discussed fish anatomy as an insight into the habitat of a species, an examination of anatomical features, and comparing and contrasting various fish species from the Rio Grande and the Gila/Mimbres river systems. Fish specimens were provided by Mora National Fish Hatchery and the University of New Mexico – Southwestern Museum of Biology - Fisheries Division.
    - Harrison Schmitt, San Lorenzo, and Quemado Elementary

Figure 5. Gila Trout and Desert Sucker specimens of the Gila River.

Figure 6. Harrison Schmitt Elementary students exploring anatomy of native fishes of the Gila River.

As a means to provide a summative assessment and provide students the opportunity to reflect on what they have learned, NMFWCO encouraged students to participate in the “Time to Say Good-bye” writing contest. Students were expected to include use of native species terminology, species names, and concepts in their good-bye poems,

while demonstrating a sense of stewardship. Winners from each school had their poems read by all of the students just after releasing their fish.

New Mexico FWCO closed out the third year of the NFIC Gila Program with two field days (Table 2, Figures 7 and 8). The field days serve as the culmination of the NFIC Program. They provided students the opportunity to see first-hand where their fish will live. The students see the connection between their experience with fish in classroom aquaria and the rivers the fish will call home.

Table 2. NFIC Field Day Host Sites and School Participation FY 2019.

Site	School	Grade	# of Students
Lake Roberts, Silver City, NM	San Lorenzo Elementary	K-6th	55
Catwalk Recreation Area	Harrison Schmitt Elementary	5th	32
	Quemado Independent School	3rd & 4th	12

San Lorenzo students released about 15 juvenile Gila Trout provided by Mora National Fish Hatchery into Lake Roberts and Sapillo Creek near Mimbres, New Mexico. In addition, students were able to release Gila Trout fry hatched from eggs provided by Mora NFH. Each school was provided ~300 eggs to hatch during the program. The students also assisted Mora NFH with a scheduled stocking of 211 retired broodstock Gila Trout in preparation for the Aldo Leopold Kids Fishing Derby at Lake Roberts. An additional 50 Gila Trout supplemented the Harrison-Schmidt ES and Quemado ES Field Day at the Catwalk Recreation area.

Upon releasing the fish, students participated in various learning stations led by partner agencies. The USFS presented on Mules, Wildlife, and Fisheries. The Natural Resources Conservation Service presented a stream table activity. The New Mexico Environment Department presented on water quality. Marilyn Markel provided an interactive archeology activity. And lastly, the NMFWCO provided an activity involving macroinvertebrates as indicators of water quality and food base.

New Mexico FWCO successfully closed out its third year of the Gila NFIC program for FY 2019. Core sets of tasks were completed that included direct work with the schools and our collaborative partner, the USFS (Table 3). Items not completed included proposed items such as fish collection of non-protected fish species not yet included in the classrooms. However, the concept is still in development. New Mexico FWCO staff are still working to determine whether outreach materials referred to as “promotional items” can be purchased due to policy restrictions.

Work for FY 2020 will be similar to FY 2019. We anticipate additional schools participating in the Gila NFIC Program for FY 2020. Although the NFIC Manual and Activities Guide to Fishes of the Gila & Mimbres Rivers was completed, recent changes in New Mexico state science standards will require modifications to the guide in FY 2020-2021 to maintain its relevance in the schools.

Figure 7. San Lorenzo Elementary students releasing Gila Trout fry raised in the classroom at Lake Roberts.

Figure 8. A student releases a Gila Trout into Lake Roberts.

Table 3. NFIC Statement of work breakdown for FY 2019.

Presentation: 1 Biologist / 1 Night Trip (x3)	**Items accomplished**	**Comments**
San Lorenzo & Harrison Schmitt	1 overnight trip	1 presentation for each school completed
Quemado	2 day trips	2 presentations for school completed
Field Day (Fish Collection): 2 Biologists / 1 Night Trip	Not completed	field collection for small, native, non-protected, may occur in FY 2020
Field Day (Fish Release): 1 Biologist / 1 Night Trip		
Lake Roberts Field Day	2 night trip	Completed as a two night trip with Field Days scheduled back-to-back.
Catwalk Recreation Area Field Day		
Supplies		
Equipment and consumable items	Completed	Provided to USFS for use in NFIC Gila
Outreach materials		
NFIC Manual and Guide	Completed	Will need to update to include new State Science standards in Fy2020-2021.
Outreach materials/promotional items	Not completed	Pending - researching policy for purchase of education items for distribution
Other		
Bus Rentals	Not utilized in FY 2019	Schools secured funding to cover bus costs for Field Day
NMFWCO Overhead @ 22%	Completed	