Conservation of Native Fishes & Management

Accomplishments for FY 2020

Funded through FY 2022

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION & TASKS

The concept of landscape scale conservation is reflected in the recovery activities occurring in the Gila River Basin through diverse partnerships and range-wide management approaches in dealing with environmental threats such as wildfires, climate change, and nonnative aquatic species. Central Arizona Project (CAP) mitigation funding is provided by Bureau of Reclamation to the Gila River Basin Native Fish Conservation Program (Conservation Program) for collaborative projects. The U.S. Fish and Wildlife Service's New Mexico Fish and Wildlife Conservation Office (FWCO) in Albuquerque, along with the U.S. Forest Service's Gila National Forest (USFS), assists the New Mexico Department of Game and Fish (NMDGF) with implementing many of its Gila River Basin Native Fish Conservation Program (Conservation Program) tasks within the New Mexico portion of the Gila River basin. In fiscal year (FY) 2018 funding was provided to New Mexico FWCO to continue implementing the following tasks: West Fork nonnative species removal, threatened and endangered fish repatriation & monitoring, and Middle Fork inventory & assessment. In FY 2019, the Native Fish in the Classroom Program was added. The tasks are geared towards conservation of endangered Spikedace *Meda fulgida*, Loach Minnow *Tiaroga cobitis*, and Gila Chub *Gila intermedia* (now classified as Roundtail Chub *Gila robusta*) in the Gila River Basin.

Task 1.1 West Fork Nonnative Species Removal

The West Fork Gila River near the confluence of Middle Fork and East Fork 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 Conservation Program has provided funding to remove nonnative fishes from a reach of approximately 4 km along the West Fork Gila River. The 4-km reach extends from the confluence of the West Fork Gila River and Little Creek upstream to the bridge of NM-15, and is referred to as the Heart Bar reach. Nonnative fish removal occurs on an annual basis, generally during June.

For FY 2020, nonnative removal efforts included personnel from NMDGF, New Mexico FWCO, and Kansas State University. Beginning from Little Creek, crews moved upstream working the reach in segments defined by the mesohabitats of riffles, runs, and pools. Habitat data collected generally includes length and width of habitat, depth, and substrate. However, due to reduced crew size to meet COVID-19 restrictions, only length and width were collected to calculate area sampled. Fish collection comprised of a single sampling pass, in an upstream direction, using a backpack electrofisher, seine, or a combination of both depending on the habitat. Fish were identified to species, weighed (g), and measured (mm) for total length (TL) and standard length (SL). Six nonnative fish species were collected (Table 1). All nonnative species were processed and removed from the river.

Table 1. Total number of nonnative fish species captured and density of all fishes in the West Fork Gila River nonnative removal in 2020. Data provided by Bryan Ferguson, NMGDF.

Nonnative Fish Species	Number Captured	Density (fish/100 m2)
Black Bullhead	5	0.03
Brown Trout	2	0.01
Common Carp	2	0.01
Smallmouth Bass	21	0.12
Western Mosquitofish	123	0.72
Yellow Bullhead	89	0.52

Task 1.2 Threatened and Endangered Fish Repatriation & Monitoring

Funding was provided to New Mexico FWCO to assist NMDGF in undertaking repatriations and monitoring of threatened and endangered fishes within the Gila River basin in New Mexico. Potential repatriation sites are to be evaluated for habitat, water quality, and fish diseases, and National Environmental Policy Act and Endangered Species Act compliance must be completed before stocking. Multiple stockings into each repatriation stream will be performed successively for three to five consecutive years or until the desired populations are established or are considered unsustainable. Monitoring of repatriated streams will continue annually until it can be determined that the population is established or should be considered unsustainable. Established streams will be surveyed at least once every five years.

Broodstock collection and augmentation did not occur for Loach Minnow and Spikedace in FY 2020, however, some repatriation monitoring did occur. Three streams repatriated with Loach Minnow were scheduled to be completed for the 2020 Gila Basin native fish activities; San Francisco River, Little Creek, and Saliz Canyon. Surveys of Little Creek were postponed. Due to staff limitations and COVID-19 travel restrictions, our office did not assist with the San Francisco River and Saliz Canyon monitoring efforts for FY 2020. The monitoring efforts were completed by NMDGF and USFS. Information regarding the results of these survey efforts can be found in the *New Mexico Department of Game and Fish Native Fish Conservation Efforts 2020 Annual Report* by Bryan Ferguson and Matthew Zigler, NMDGF.

As previously mentioned in Task 1.1, New Mexico FWCO assisted with West Fork Gila River nonnative removal efforts. In addition, to removing nonnative aquatic species, data was also collected to support monitoring of Spikedace, Loach Minnow, and Roundtail Chub (Figure 1) populations found within the Heart Bar reach. All native fish species (Table 2) were processed and returned to their respective habitat segments after completing the sample pass. For FY 2020, Spikedace and Loach Minnow were collected along with Roundtail Chub. The data is used as an indicator of how many fish can safely be translocated in the wild or sent to the hatchery to support repatriation efforts.

Figure 1. Roundtail Chub collected during nonnative species and fish monitoring efforts in June 2020 on the West Fork Gila River. Photo Credit: Bryan Ferguson/NMDGF

Table 2. Total number of native fish species captured and density of all fishes in the West Fork Gila River nonnative removal in 2020. Data provided by Bryan Ferguson, NMGDF.

Native Fish Species	Number Captured	Density (fish/100 m2)
Desert Sucker	643	6.78
Loach Minnow	349	2.05
Longfin Dace	463	2.72
Roundtail Chub	25	0.15
Sonora Sucker	1062	6.24
Speckled Dace	114	0.67
Spikedace	220	1.29

New Mexico FWCO (Figure 2) also assisted NMDGF and USFS personnel with annual Gila River fish community monitoring in fall 2019. Long term monitoring provides data used to support recovery actions while tracking changes in presence/absence and density of native and nonnative fishes throughout the Gila River Basin.

Each of the following tributaries has one long term monitoring site: San Francisco, Tularosa, East Fork Gila, West Fork Gila, and Middle Fork Gila rivers. Four sites are located on the mainstem Gila River spanning from Cliff, New Mexico to near the Arizona border: Ash Canyon, Cherokee Canyon, Iron Bridge, and Sunset Diversion. Crews moved upstream working the reach in segments defined by the mesohabitats of riffles, runs, and pools. Habitat data collected included length, width, depth, and at least 3 flow measurements. Fish collection was done in a single sampling pass, in an upstream direction, using a backpack electrofisher, seine, or a combination of both depending on the habitat. Fish were identified to species, weighed (g), and measured (mm) for total length (TL) and standard length (SL). Loach Minnow were collected at five sites. Spikedace were collected at four sites. All data was collected and maintained by NMDGF. Information regarding the results of these survey efforts can be found in the *New Mexico Department of Game and Fish Native Fish Conservation Efforts 2020 Annual Report*.

Figure 2. New Mexico FWCO Fish Biologist, Andy Dean, showing off his dip net, where gravel froze to it due to freezing temperatures during fall monitoring.

Task 1.3 Remote Sites (formerly Middle Fork) Inventory & Assessment

Much of the Gila River Drainage in New Mexico is extremely remote and thus difficult and costly to sample. The system is also dynamic and there have been significant changes in the Gila and San Francisco rivers since the Conservation Program funded an inventory of the Gila River forks from 2005-2008. The most significant change was the Whitewater-Baldy Fire that burned large portions of the upper Gila and upper San Francisco watershed in 2012 and the resultant post-fire flooding. This fire and flooding eliminated nonnative fishes from at least one tributary (Willow Creek) of the Middle Fork Gila River and may have created opportunities for native fish protection in other locations.

The Middle Fork inventory task was expanded to include additional remote sites that hadn't been recently surveyed to include East Fork and West Fork Gila River drainages. New Mexico FWCO, NMDGF and USFS completed surveys of the Middle Fork Gila River drainage in 2018. The original goal was to sample at least 14 sites. Crews completed 20 sites between 2017 and 2018. During FY 2019, in collaboration with USFS, Mora National Fish Hatchery (NFH), and NMDGF, New Mexico FWCO began remote surveys within the East Fork Gila River drainage. In FY 2020, New Mexico FWCO assisted NMDGF and USFS to complete remote surveys at five sites within Black Canyon, completing efforts within the East Fork Gila River drainage. Information regarding the results of these survey efforts can be found in the *New Mexico Department of Game and Fish Native Fish Conservation Efforts 2020 Annual Report.*

West Fork Gila River drainage remote sites are scheduled to start in FY 2021. As in other sites, sampling will be conducted using backpack electrofishers and seines appropriate to habitat type. All fish collected will be identified and enumerated by habitat. The inventory will indicate what additional measures may be needed to remove nonnative fishes, show the current status of native fishes, and identify potential repatriation sites.

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

The NFIC Program is an environmental education program developed by New Mexico FWCO in Albuquerque, New Mexico. The program provides students the opportunity to learn about native fish found within their local communities. Students learn stewardship skills while providing care for native fish from local river basins in their classrooms. They manage their aquariums and learn to provide optimal rearing conditions. At the end of the program, students release their fish into their native habitat. By allowing youth to release their native fish species, we are effectively engaging them in conservation management activities. Students are actively investing time into a fish specie's recovery, within a water body found 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 for the stream, lake, or river in their community.

In FY 2017, a partnership between USFS - Gila National Forest, Mora NFH, and New Mexico FWCO allowed for the expansion of the NFIC Program into schools within the Mimbres and Gila River Basins. During the 2016-2017 school year (FY 2017), San Lorenzo and Jose Barrios Elementary Schools were the first to host Gila Trout *Oncorhynchus gilae* in the schools. During the 2018-2019 school year (FY 2019), a third school was added from Quemado, New Mexico. Through community networking, USFS was able to bring on schools within the Gila community, including Datil Elementary and Aldo Leopold Charter schools in FY 2020. With five schools now involved, we had 202 students participating in FY 2020 (Table 3).

Table 3. School and student NFIC participation for FY 2020.

School	Location	Grade	Number of Students
San Lorenzo Elementary	San Lorenzo, NM	K-6th	60
Harrison H. Schmitt Elementary	Silver City, NM	5th	87
Quemado Independent Elementary	Quemado, NM	4th/5th	12
Datil Elementary School	Datil, NM		20
Aldo Leopold Charter School	Silver City, NM	11th	23

All five schools were outfitted with aquariums and equipment necessary to hold fish. In coordination with Mora NFH, four of the schools received Gila Trout fingerlings. The 5th school sought a challenge. High school students from Aldo Leopold Charter School accepted the trial of working with other native, non-protected fish species of the Gila to include Sonora Sucker *Catostomus insignus*, Desert Sucker *Pantosteus clarki*, Speckled Dace *Rhinichthys osculus*, and Longfin Dace *Agosia chrysogaster*. For the first three years of the program, we worked solely with Gila Trout sourced from Mora NFH. Not only did the students do a fantastic job with the new species, a couple of their students also participated in the 8th Natural History of the Gila Symposium presenting their work with the NFIC Program (Figure 3).

Figure 3. Aldo Leopold Charter students presenting on their participation with the NFIC program at the 8th Natural History of the Gila Symposium.

In addition to teacher-led activities, New Mexico FWCO and USFS staff were prepared to provide in-class activities. However, presentations scheduled after delivery of fish to the schools were cancelled as the COVID-19 pandemic took hold. Under New Mexico Public Health Orders, schools were relegated to remote learning and all scheduled presentations were cancelled. Unfortunately, our staff and project partners were not prepared to take the program online as teachers and schools adjusted to the new online learning environment.

New Mexico FWCO closed out the fourth year of the NFIC Program working with partners to pull fish from the schools. The fish were released at designated locations in accordance with Federal and State permits. New Mexico FWCO developed a fish release video that included videos, photos, and messages of encouragement from our partners releasing their fish. The video can be found on the U.S. Fish and Wildlife Service YouTube channel (New Mexico Fish and Wildlife Conservation Office: Native Fish in the Classroom 2019-2020).

Funding provided by the Conservation Program for the NFIC Program was to complete tasks highlighted in Table 4. Funds covered costs for classroom tank supplies (filter media, bacteria, water quality test kits, replacement parts), salary for completing the NFIC Manual and Activities Guide to Fishes of the Gila & Mimbres Rivers, salary/ travel for classroom visits (tank set ups, presentations, and activities), and fish releases. However, for FY 2020 many of the tasks were altered or ultimately cancelled.

Table 4. NFIC Statement of work breakdown for FY 2020.

Task	Location	Item Status	Comments
Presentation: 1 Biologist / 1 Night Trip (x3)	Aldo Leopold Charter, Datil Elementary, San Lorenzo Elementary, Quemado Elementary & Harrison Schmitt Elementary schools	Cancelled	Presentations were cancelled due to Covid-19 Public Health Orders.
Fish Collection: 2 Biologists / 1 Night Trip		Completed	Completed by USFS. Provided fish to Aldo Leopold Charter School.
NFIC Field Day (Fish Release): 1 Biologist / 1 Night Trip	Lake Roberts Field Day & Catwalk Recreation Area Field Day	Cancelled	Cancellation of fish releases due to Covid-19 Public Health Orders.
Supplies: Equipment and consumable items	Aldo Leopold Charter, Datil Elementary, San Lorenzo Elementary, Quemado Elementary & Harrison Schmitt Elementary schools	Completed	Supplies ordered and provided to USFS in time for aquarium set-ups at all five schools.
Outreach Materials: NFIC Manual and Guide	New Mexico FWCO	Completed Priority Pending	Finalized guide. Need to update for 508 Compliance. Need to update to include new State science standards.
Educational/Promotional Materials: Gila River Native Fishes Bandana	New Mexico FWCO	Pending	Justification of Purchase submitted
Other: Bus Rentals	Aldo Leopold Charter, Datil Elementary, San Lorenzo Elementary, Quemado Elementary & Harrison Schmitt Elementary schools	Not utilized in FY 2020	Cancellation of fish releases due to Covid-19 Public Health Orders.
Overhead	NMFWCO @ 22%	Completed	

Wrapping up FY 2020 on a positive note, we are proud to announce that Dustin Myers (USFS), Angela Palacios (New Mexico FWCO), and the NFIC Gila Program were recipients of the 2019 National Rise to the Future Public Awareness Award from the USFS. While accepting their award, Angela was able to present on their accomplishments during a virtual award ceremony in October 2020.

> ***Public Awareness Award -*** *Angela Palacios and Dustin Myers of the Gila National Forest are this year's recipients of the Public Awareness Award. The Native Fish in the Classroom Program (NFIC) is an environmental education program in which students learn about natural resource conservation through a hands-on approach of raising fish in the classroom and subsequently releasing the native fish into their native habitat. This amazing program has been very successful in the Albuquerque area for eight years. The program continues to expand and has been going and growing for three years on the Gila National Forest. The NFIC program on the Gila National Forest is especially unique since it focuses on federally listed Gila Trout and their habitats in rural schools within the native range of the species. The NFIC Project provides children an opportunity to learn the value of aquatic ecosystems by developing personal connections to native fish. Gila National Forest in cooperation with U.S. Fish and Wildlife Service oversee the NFIC program for schools in the local Silver City, Quemado and Cobre School Districts, and Forest staff provide technical assistance through classroom presentations and activities. (USFS, March 2, 2020)*

Work for FY 2021 will be modified to accommodate a virtual learning environment brought on by the COVID-19 pandemic. Although the NFIC Manual and Activities Guide to Fishes of the Gila & Mimbres Rivers was completed in FY 2019, changes were started in FY 2020 to bring the document into 508 compliance. Section 508 is part of the Rehabilitation Act of 1973 that requires information and communication technology developed by Federal agencies to be accessible to people with disabilities. In addition, changes in New Mexico state science standards will eventually require modifications to the

guide during FY 2021-2022. However, priority will be given to ensuring the document is 508 compliant to make it accessible online during the 2020-2021 NFIC season. We anticipate schools that participated in FY 2020, will continue participating in the Gila NFIC Program for FY 2021.

Since we do not anticipate delivering fish to classrooms for FY 2021, an additional virtual component to complement the NFIC Manual and Activities Guide is necessary to provide a suitable alternative to observation activities. With this in mind, we plan to develop a video series that will provide an opportunity to complete observation activities previously completed in the classroom. It is our hope that it will be a suitable alternative that will still provide a means to connect students to fish found within their communities, as well as, provide accessibility to other schools interested in participating in our program. The videos will be made available on the Service's YouTube page.

In addition to funding provided for the NFIC Program, the Conservation Program also provided funding to develop and procure educational materials specific to the Gila River basin in FY 2019. New Mexico FWCO's goal for the educational items is to provide a visually appealing, multifunctional item that serves as a useful reference to students and community members. In FY 2020, New Mexico FWCO staff designed artwork (Figure 4) for a bandana featuring Gila River Basin fishes including Spikedace, Longfin Dace, Loach Minnow, Desert Sucker, Sonora Sucker, Gila Topminnow *Poeciliopsis occidentalis*, Roundtail Chub, Speckled Dace, and Gila Trout. A *Justification for Purchase of Promotional Items* was submitted to the Service's Regional Office for approval. Upon approval, New Mexico FWCO plans to purchase bandanas with funds from FY 2019 and 2020.

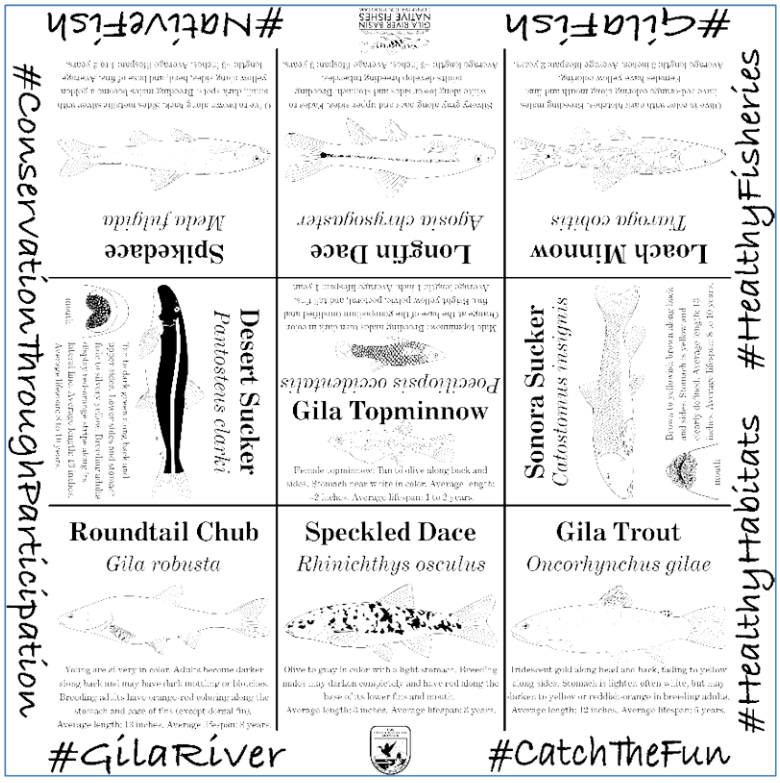

Figure 4. Layout of bandana highlighting native fishes of the Gila River Basin.

REFERENCES

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