

Gila River Basin Native Fishes Conservation Program:
Bureau of Land Management – New Mexico
2020 Annual Report



Gila River Lower Box ACEC

Interagency Agreement (IAA) (R19PG00076)

between

Bureau of Reclamation and Bureau of Land Management

Submitted by

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Bureau of Land Management

Las Cruces District Office

Las Cruces, New Mexico

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Introduction

This report summarizes activities by the Bureau of Land Management – New Mexico (BLM-NM) during 2020 under the Interagency Agreement (IAA - R19PG00076) with the Bureau of Reclamation (BOR). Through this agreement, BLM surveyed permanent sites on the BLM portions of the Gila River mainstem in New Mexico under the Gila River Basin Native Fishes Conservation Program (GRBNFCP) formerly known as the CAP Fund Transfer Program. The GRBNFCP was established to minimize impacts on threatened and endangered fishes by the Central Arizona Project (CAP) canal and its subsequent operations which included the introduction of non-native aquatic species from the Colorado River into the Gila River basin. The United States Fish and Wildlife Service (USFWS) biological opinions (BO) in 1994, 2001, and 2008 concluded that operation of the CAP required mitigation for the negative effects on federally listed fish species within the entire Gila River Basin. The GRBNFCP is focused on conservation work for five federally listed fish species including Spikedace (*Meda fulgida*), Loach Minnow (*Tiaroga cobitis*), Gila Chub (*Gila intermedia*), Gila Topminnow (*Poeciliopsis occidentalis*), and Razorback Sucker (*Xyrauchen texanus*). It should be noted that two of the previously described chub species, Gila Chub (*Gila intermedia*) and Headwater Chub (*Gila nigra*) were recently re-described as belonging to the Roundtail Chub (*Gila robusta*) (Page et. al. 2016). Though this change in taxonomy may be warranted, for consistency with regulatory concerns, BLM will continue to recognize the federal ESA listing documents for naming conventions. Though Headwater Chub has not been captured on BLM managed waters in the Gila river basin in southern New Mexico, both the Roundtail and Gila chubs have historically been found there.

A systematic survey of the entire lower Gila River mainstem and its perennial tributaries on BLM managed lands is necessary to determine the presence and extent of target species (Loach Minnow, Spikedace, and Roundtail/Gila Chub) within this area. Initial survey priorities were the BLM's Gila River Lower Box ACEC and subsequently four permanent sites that are known to or may contain populations of the target species. Tributaries where target species are not known or not present may still have suitable habitat for possible repatriation of target species (e.g. Blue Creek, Apache Creek).

Under this agreement, the Bureau of Land Management Las Cruces District Office (BLM LCDO) conducted annual surveys at four permanent sites within the Gila River basin. Habitat and water quality data were also collected.

The strategic plan and recovery goals these tasks address are:

Strategic Plan Goals:

- Goal 5 - Survey poorly studied stream systems to document existing fish communities.
 - Objective 5 - Investigate fish distributions in the upper Gila River watershed in New Mexico that have not recently been surveyed.

Recovery Goals:

- Spikedace Recovery Plan (1991); Loach Minnow Recovery Plan (1991)

- Task 2.5 (priority 1): Monitor community composition including range of natural variation
- Gila Chub draft Recovery plan (2014)
 - Task 3.2 (priority 2) Conduct monitoring

Methods

Fisheries surveys were conducted to ascertain the current status (i.e. presence/absence) of native fish species and overall community composition of the fish fauna in this fairly remote reach. Surveys were conducted using a backpack electro-fisher (Smith-Root LR24 Electrofisher), dip nets and 2m x 3m (0.3cm mesh) seine net. All available mesohabitats were surveyed for targeted species. Habitat types (i.e. pool, run, riffle, etc.), substrate, velocity and water quality were collected. All captured fish were identified and enumerated with fishes >100mm also being measured and weighed.

Results

Location	Sunset Diversion (below)	Sunset Diversion (above)	Ash Canyon	Nichols Canyon	BLM/FS boundary
Date	19-Oct-20	19-Oct-20	20-Oct-20	20-Oct-20	21-Oct-20
longfin dace	0	93	271	104	43
spikedace	0	0	1	1	128
loach minnow	0	0	21	3	98
Sonora sucker	0	0	1	0	46
desert sucker	0	0	33	4	75
red shiner	0	3	265	172	11
common carp	0	0	1	0	0
fathead minnow	0	0	17	37	3
channel catfish	0	0	6	78	0
flathead catfish	0	0	0	3	0
western mosquitofish	24	0	5	67	0
northern crayfish	0	0	0	0	1
American bullfrog	15	0	0	0	1

Table 1 - Species captured at all sampling locations during 2020 permanent site monitoring

Individuals captured across all habitat types totaled 1631. Eleven different fish species were captured during the surveys including five native and six exotic species (Table 1). A single non-native crayfish and sixteen American bullfrogs were also captured.

Longfin dace (*Agosia chrysogaster*) was the most common native species with red shiner (*Cyprinella lutrensis*) the most common non-native species. Two native catostomids were captured, desert sucker (*Pantosteus clarkii*) and Sonora sucker (*Catostomus insignis*). In addition to red shiner, other non-native species captured included mosquito fish (*Gambusia affinis*), channel catfish (*Ictalurid punctatus*), flathead catfish (*Pylodictis olivaris*) and fathead

minnow (*Pimephales promelas*). A single crayfish specimen and sixteen American bullfrogs were also captured during the inventory (Figure 1). Notably at Ash Canyon, Nichols Canyon and the Cherokee Canyon site (i.e. BLM/FS boundary), native spikedace (*Meda fulgida*) were also captured. Notably absent from the survey effort were speckled dace (*Rhinichthys osculus*) as were Gila and Roundtail chubs, which was not unexpected.

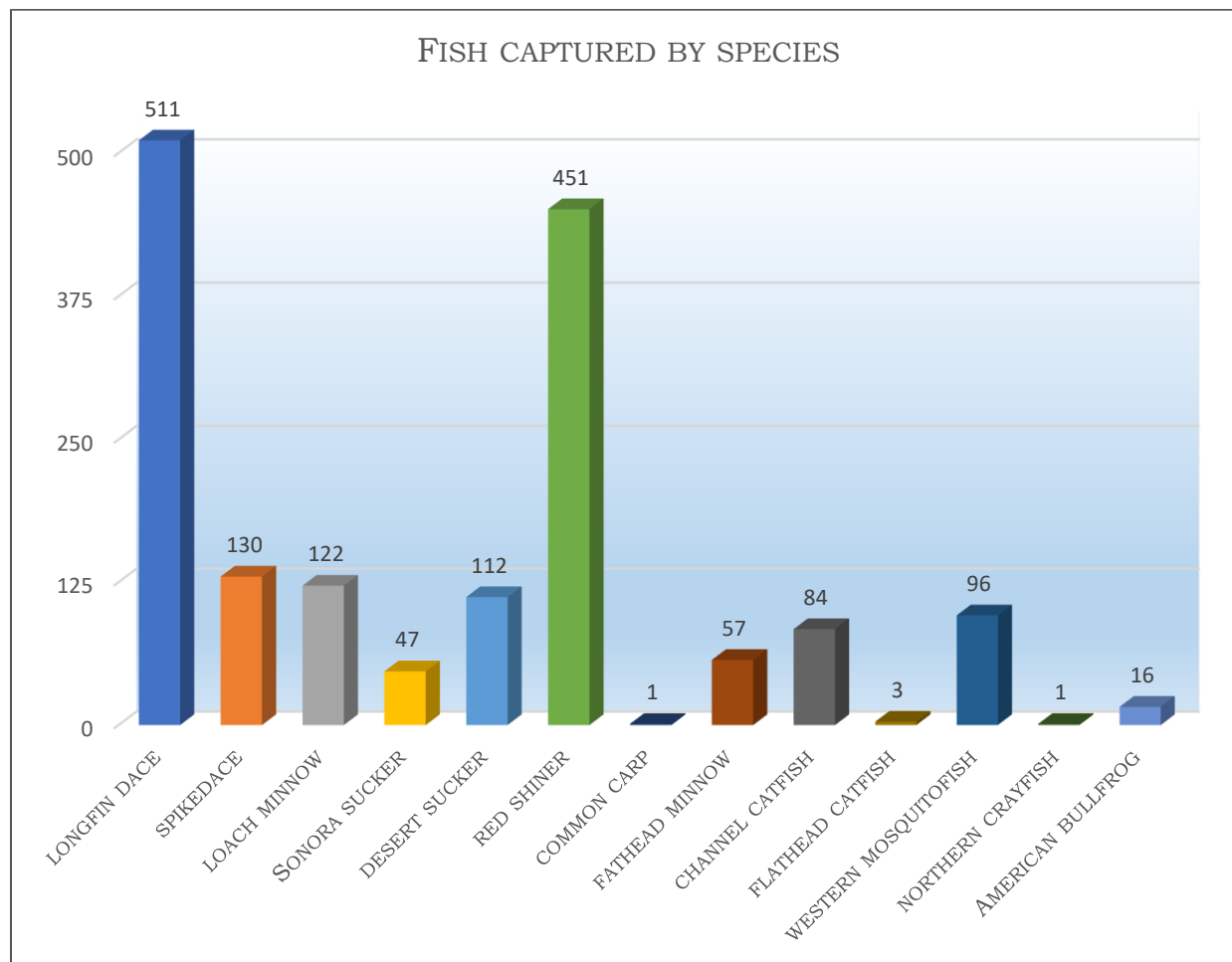


Figure 1 - Species abundance across all sites during 2020 monitoring

Of the eleven fish species captured during the survey, the Ash Canyon site supported the greatest number of species (n=10). All five native species were represented and with the exception of flathead catfish, five of the six non-natives species were as well. All five native fish species and five of six exotic species were present at the Nichol's Canyon site. We captured all five native and two non-native fishes, as well as, both a single American bullfrog and the single crayfish species at the Cherokee Canyon site at the BLM/FS boundary. Finally, Below the Sunset Diversion site, we captured mosquito fish and the remaining 15 bullfrogs and above the dam there were longfin dace and red shiner (Figure 2).

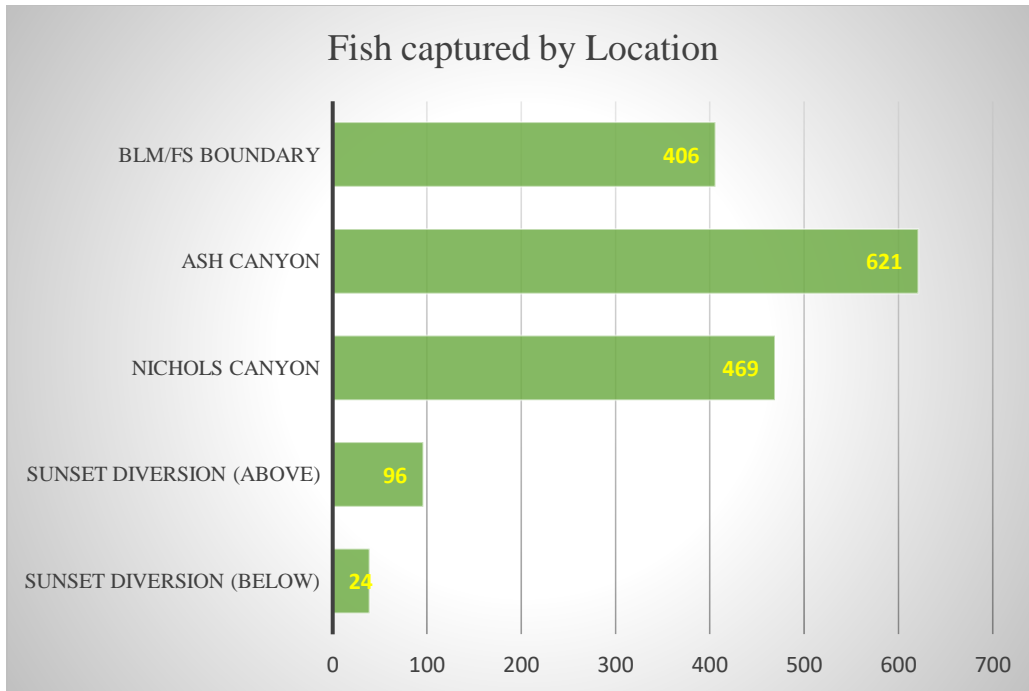


Figure 2 - Total individuals captured at each site

Though we captured more individuals at Ash Canyon (n=621), the Cherokee Canyon site had more native individuals (n=390), and 25 times more natives than non-natives captured. Only Sunset Diversion (above) had a greater ratio of native to nonnative (33:1) (Figure 3).

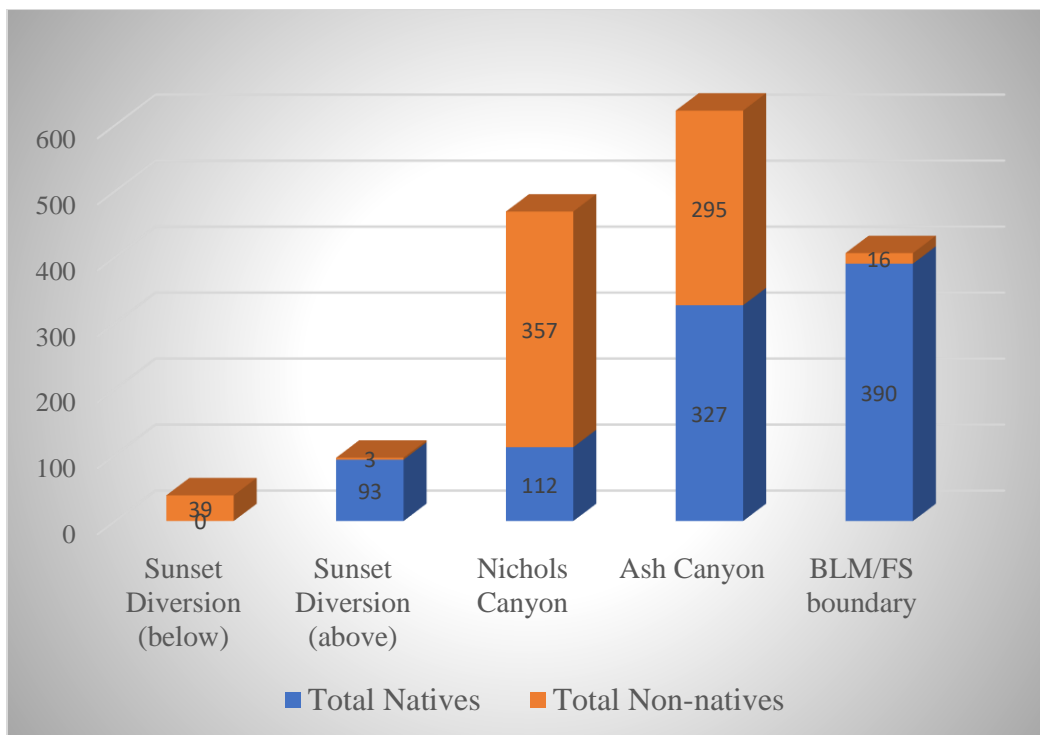


Figure 3 - Individual natives vs nonnatives captured at each site

Water quality variables did not vary significantly among sites including the most downstream site at Sunset Diversion through the upper most site at Cherokee Canyon (Figure 4; Table 2). Velocity ranged from 0.02 m/s to 0.55 m/s with a mean of 0.33 m/s. There were ten different habitat types among the four sites with 8-10 surveyed at each site. Sampled habitats were chosen to represent the proportion of types at each site. For example, if the proportion of pools at a site was 50% and riffles were 30%, etc., then 50% of habitats surveyed were pools, 30% were riffles, etc. Lengths per habitat type per site ranged from 4.6 m to 53.6 m and averaged about 33 meters. Mean width for all habitats was 5.38 m with a range from 1.3 to 6.7 m. Depths ranged from 0.09 to 0.64 meters with an average depth of 0.45 m. Mean area sampled per site was 93 m² with a total area sampled across sites equaling just under 1630 m². Substrates consisted mainly of gravels, silts and cobbles evenly spread (Appendix A).

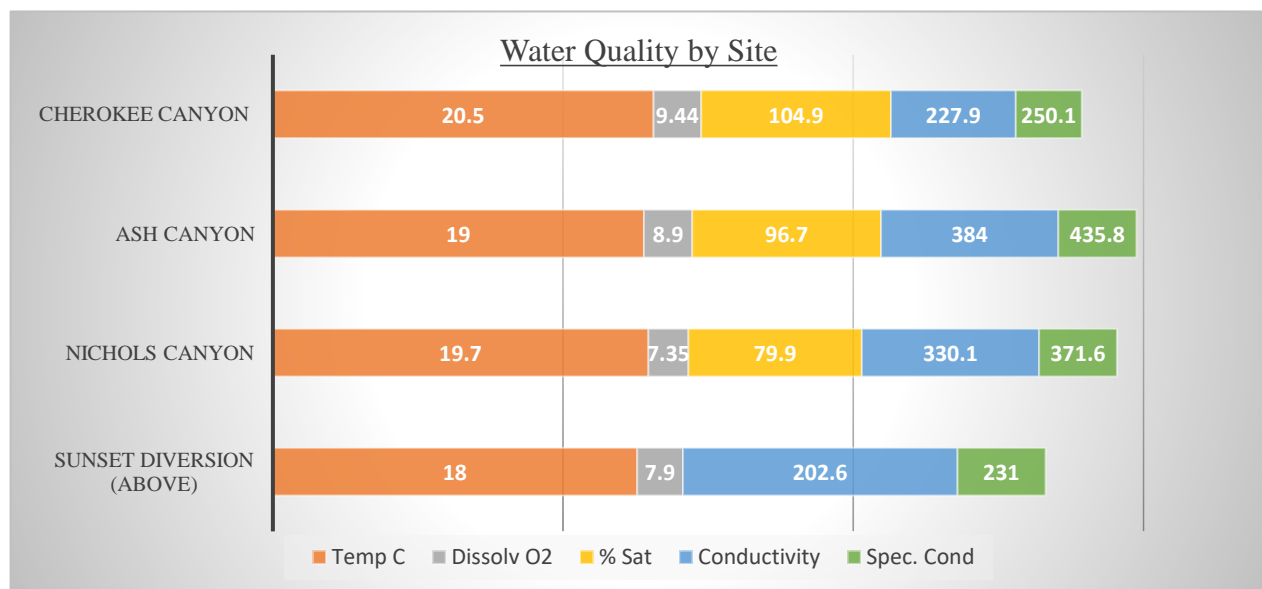


Figure 4 – Graphical representation of selected water quality variables

Site	Temp C	Dissolv O2	% Sat	Conductivity	Spec. Cond	pH	Width	Avg Depth	Discharge (cfs)
Sunset Diversion (above)	18	7.9		202.6	231	8.2	1.6	0.06	0.13
Nichols Canyon	19.7	7.35	79.9	330.1	371.6	8.05	3.48	0.26	8.65
Ash Canyon	19	8.9	96.7	384	435.8	7.6	15.6	0.137	4.62
CherokeeCanyon(FS/BLM)	20.5	9.44	104.9	227.9	250.1	8.26	11.2	0.19	16.35

Table 2 - Water quality data by location

The purpose of this project is to continue long-term monitoring of spikedace, loach minnow and Gila/Roundtail chub on BLM managed reaches of the Gila River mainstem in NM. Continued monitoring should document any new locations as well as detect trends in composition and abundance of the fish community, and specifically of the target species. Surveys at four permanent sites across ca. 20 miles of river, were performed with an emphasis placed on three

target species - loach minnow, spinedace and Gila chub. Similar to our 2019 survey of the entire Lower Box ACEC, we captured several loach minnows in the Nichol's Canyon reach. But, unlike that survey, both loach minnow and spinedace were captured. Gila chubs were absent. Continued monitoring will hopefully elucidate possible reasons for the presence or absence of these unique and imperiled species.

Further summation of results will be included in the BLM contractor's final report as an amendment to this report when it becomes available in late spring 2021.

APPENDIX A

Date	Site	Habitat #	Habitat Type	LN (m)	W (m)	Area Sample	D (m)	Vel (m/s)	Sub	Cover
19-Oct-20	Sunset Diversion--belo	1	shoal	9.7	3.3	32.01	0.115	0.025	S	
19-Oct-20	Sunset Diversion--belo	2	pool run	13.2	2.5	33	0.14	0.066	S	
19-Oct-20	Sunset Diversion--belo	3	run	13.5	1.2	16.2	0.102	0.126	S	debris
19-Oct-20	Sunset Diversion--belo	4	shore run	17.9	1.5	26.85	0.216	0.02	Silt	
19-Oct-20	Sunset Diversion--belo	5	run	21	2.2	46.2	0.094	0.072	S	
19-Oct-20	Sunset Diversion--belo	6	run	53.6	1.8	96.48	0.086	0.066	S	
19-Oct-20	Sunset Diversion--belo	7	pool run	13.4	1.8	24.12	0.228	0.034	S	boulder, debr
19-Oct-20	Sunset Diversion--belo	8	pool run	35.6	2.6	92.56	0.33	0.02	S	debris, under
19-Oct-20	Sunset Diversion (abov	1	pool run	28.8	2.7	77.76			C	veg
20-Oct-20	Nichols Canyon	1	pool run	13.7	2.4	32.88	0.556	0.096	S	boulder
20-Oct-20	Nichols Canyon	2	riffle	7.5	3.3	24.75	0.144	0.496	C	
20-Oct-20	Nichols Canyon	3	riffle run	8.8	6.7	58.96	0.188	0.25	C	
20-Oct-20	Nichols Canyon	4	shoal	13.5	3.3	44.55	0.15	0.026	S	
20-Oct-20	Nichols Canyon	5	shore run	16	1.8	28.8	0.344	0.108	S	
20-Oct-20	Nichols Canyon	6	riffle	11	3.3	36.3	0.116	0.248	G	
20-Oct-20	Nichols Canyon	7	pool run	13.4	2.5	33.5	0.644	0.036	S	
20-Oct-20	Ash Canyon	1	riffle run	37.7	7.2	271.44	0.142	0.174	C	
20-Oct-20	Ash Canyon	2	shoal	14.1	3.3	46.53	0.156	0.04	G	
20-Oct-20	Ash Canyon	3	pool run	13.2	1.5	19.8	0.268	0.218	G	
20-Oct-20	Ash Canyon	4	rffle run	26.7	3.3	88.11	0.082	0.272	G	
20-Oct-20	Ash Canyon	5	riffle run	14.8	1.8	26.64	0.104	0.274	G	
20-Oct-20	Ash Canyon	6	shoal	28.8	3.3	95.04	0.116	0.082	silt	
20-Oct-20	Ash Canyon	7	shore run	34.5	2.2	75.9	0.212	0.072	Silt	
20-Oct-20	Ash Canyon	8	pool	28.1	1.5	42.15	0.154	0.026	Silt	
21-Oct-20	BLM/FS boundary	1	pool run	14.5	2	29	0.42	0.162	S	boulder
21-Oct-20	BLM/FS boundary	2	chute	7.9	2	15.8	0.41	0.354	C	boulder
21-Oct-20	BLM/FS boundary	3	riffle	9.3	3.3	30.69	0.188	0.496	G	
21-Oct-20	BLM/FS boundary	4	shoal	9	3.3	29.7	0.192	0.25	S	
21-Oct-20	BLM/FS boundary	5	pool run	16.5	2	33	0.514	0.122	S	boulder
21-Oct-20	BLM/FS boundary	6	riffle	9.3	3.3	30.69	0.136	0.392	G	
21-Oct-20	BLM/FS boundary	7	run	9	3.3	29.7	0.298	0.206	G	
21-Oct-20	BLM/FS boundary	8	shore run	9.7	1.3	12.61	0.256	0.188	G	
21-Oct-20	BLM/FS boundary	9	riffle	9.9	3.3	32.67	0.162	0.506	G	
21-Oct-20	BLM/FS boundary	10	eddy	4.6	3.3	15.18	0.368	0.042	S	

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20-Oct-20	Nichols Canyon	3	riffle run	8.8	6.7	58.96	0.188	0.25	C	
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20-Oct-20	Ash Canyon	2	shoal	14.1	3.3	46.53	0.156	0.04	G	
20-Oct-20	Ash Canyon	3	pool run	13.2	1.5	19.8	0.268	0.218	G	
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20-Oct-20	Ash Canyon	5	riffle run	14.8	1.8	26.64	0.104	0.274	G	
20-Oct-20	Ash Canyon	6	shoal	28.8	3.3	95.04	0.116	0.082	silt	
20-Oct-20	Ash Canyon	7	shore run	34.5	2.2	75.9	0.212	0.072	Silt	
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21-Oct-20	BLM/FS boundary	9	riffle	9.9	3.3	32.67	0.162	0.506	G	
21-Oct-20	BLM/FS boundary	10	eddy	4.6	3.3	15.18	0.368	0.042	S	

Appendix B



Monitoring Gila River Fish Assemblages
on or near US Bureau of Land Management Administered Lands
October 2020 Trip Report

Submitted to

Timothy C Frey

Las Cruces District Office US Bureau of Land Management

Las Cruces, New Mexico

Submitted by

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Albuquerque, New Mexico October 2020

During 19-21 October 2020, Gila River fish assemblages were sampled at five locations in Grant and Hidalgo counties, New Mexico (Figure 1). Three collections were at existing permanent sites, a fourth was a newly established permanent site, and the fifth was an opportunistic collection. Fish collection methods and habitat characterization followed previously established protocols. All captured fish were identified, total length (TL) determined of all native fishes, mass was determined for all native fishes >80 mm TL, mass and TL for all predatory nonnative fishes, and all non-predatory nonnatives were enumerated. Water depth, water velocity, substrate, and cover were determined at five randomly selected points within each sampled mesohabitat. Water quality and stream discharge were determined at each site. Relevant data were recorded on an electronic flat file (fish data, habitat data, and water quality data).



Figure 1. US BLM Gila River fish sampling sites, Grant and Hidalgo counties, New Mexico

Sunset Diversion

When sampled on 19 October 2020, all surface water in the river channel above the diversion was being directed into an irrigation canal. Downstream of the diversion and within the permanent sampling site surface water was maintained by seepage below the diversion structure. During summer 2020, the

channel below the diversion was dry (fide TC Frey). A single species, nonnative western mosquitofish was captured (Table 1). In addition, 15 nonnative American bullfrog tadpoles were captured. Habitat consisted mainly of low-velocity and shallow runs, but a large pool-run was present at the base of Sunset Diversion. Discharge at the site was about 0.13 cubic feet/second (cfs).

An opportunistic fish collection was made just upstream of the diversion in an 18 m riffle-run mesohabitat. Native longfin dace and nonnative red shiner were captured.

Table 1. Fishes captured at BLM sampling sites, Gila River, Grant and Hildago counties, New Mexico, October 2020.

	Species	Site				
		<u>Sunset (below)</u>	<u>Sunset (above)</u>	<u>Nichols</u>	<u>Ash</u>	<u>Cherokee</u>
<u>Native</u>						
longfin dace	<i>Agosia chrysogaster</i>		93	104	269	37
spikedace	<i>Meda fulgida</i>			1	1	128
loach minnow	<i>Tiaroga cobitis</i>			3	21	100
Sonora sucker	<i>Catostomus insignis</i>				1	41
<u>desert sucker</u>	<u><i>Pantosteus clarkii</i></u>			<u>4</u>	<u>33</u>	<u>76</u>
<u>Nonnative</u>						
red shiner	<i>Cyprinella lutrensis</i>		3	172	265	14
common carp	<i>Cyprinus carpio</i>				1	
fathead minnow	<i>Pimephales promelas</i>			37	17	3
channel catfish	<i>Ictalurus punctatus</i>			41	6	
flathead catfish	<i>Pylodictus olivaris</i>			3		
western mosquitofish	<i>Gambusia affinis</i>	24		67	5	
American bullfrog	<i>Lithobates catesbeiana</i>	15				1
<u>northern crayfish</u>	<u><i>Orconectes virilis</i></u>					<u>1</u>

Nichols Canyon

Four native species and five nonnative species were captured at Nichols Canyon on 20 October. Longfin dace was the most common native fish and red shiner was the most common nonnative species. A

single spinedace and 3 loach minnows were collected. Nonnative piscivorous channel catfish were comparatively common. Habitat was moderately diverse with riffles, shoals, runs, and pools present. Discharge at the USGS Gila River below Blue Creek, near Virden gage was 8.65 cfs.

Ash Canyon

Five native species and five nonnative species were collected at Ash Canyon on 20 October. As at Nichols Canyon, longfin dace was the most common native fish and red shiner the most common nonnative. Only one spinedace was found at Ash Canyon, but 21 loach minnows were captured. Comparatively few channel catfish were collected. Habitat diversity was moderately high with pools, shoals, runs, and riffles present. Stream discharge when measured on 20 October was 4.62 cfs.

Cherokee Canyon

Moderately large numbers of all native species present ($n = 5$) were found at Cherokee Canyon, with spinedace and loach minnow being particularly common. Only two nonnative fishes, red shiner and fathead minnow were collected, and neither was common. Habitat diversity was comparatively high with pools, shoals, eddies, runs, riffles, and chutes present. On 21 October, stream discharge was 16.35 cfs at the sample site and 33.3 cfs at the USGS Gila River near Gila gage, about 30 km upstream.