

SPRING CREEK BARRIER MONITORING, 2019



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Background

Native fishes are declining throughout Arizona, primarily due to deleterious interactions with nonnative aquatic species. One tool used to curtail the decline is the construction of physical stream barriers to impede upstream migration of nonnative fish species. The Bureau of Reclamation (Reclamation) has constructed several barriers on stream sites to protect and conserve endangered and candidate/proposed species including: Loach Minnow *Tiaroga cobitis*, Spikedace *Meda fulgida*, Roundtail Chub *Gila Robusta*, Gila Topminnow *Poeciliopsis occidentalis*, and Gila Chub *Gila Intermedia*, and other aquatic wildlife including amphibians and reptiles. Reclamation is committed to monitoring stream barriers constructed in accordance with requirements related to the Central Arizona Project for a minimum of five years post-construction. The primary purpose of the monitoring is to evaluate the effectiveness of the barriers. Secondly, monitoring will also provide information on the fish/aquatic community of each stream. Funding was provided to the Arizona Fish and Wildlife Conservation Office to monitor barrier effectiveness over a 5 year period. This report details the third year of monitoring on the Spring Creek Barrier (SCB). The Spring Creek Barrier was constructed in 2015. Nonnative Green Sunfish *Lepomis cyanellus* were eradicated from the stream by 2016. The purpose of the barrier is to provide nonnative free habitat for native Gila Chub, Spikedace, and Gila Topminnow.

Methodology

On April 9th, 2019 monitoring occurred in Spring Creek both upstream and downstream of the barrier was conducted using a Smith-Root model 12 backpack electrofisher and Promar collapsible baited hoopnets (12" x 12" x 24"). Methods roughly followed Marsh (2014), in which an area 200 m upstream and downstream of each barrier is monitored. However, due to private land boundaries only 120 m downstream of the barrier could be accessed. Mesohabitat (number of pools, riffles, and runs) was quantified for each sampling reach. All fish were measured (in millimeters [mm]). Presence of other native aquatic wildlife such as Lowland Leopard Frog *Lithobates yavapaiensis* or Mexican Garter Snake *Thamnophis eques* were also noted.

Results

Downstream efforts

Mesohabitat downstream of the barrier was compromised of approximately 40 meter of riffle/plunge pool habitat and 80 m of pool habitat located between a diversion structure and immediately downstream of the barrier. Electrofishing efforts totaled 1,063 seconds with a total of 20 individuals captured that comprised 13 Gila Chub, 6 Speckled Dace, and 1 Gila Topminnow (Table 1) No fish were captured in baited hoopnets, and no nonnative fish or other aquatic species were captured or observed.

Upstream efforts

Mesohabitat upstream of the barrier was compromised of approximately 125 m of pool habitat, 25 m of run habitat, and 50 m of riffle habitat. Electrofishing efforts totaled 1,530 seconds with a total of 137 individuals captured that comprised 16 Gila Chub, 12 Desert Sucker, 7 unidentified Catostomid larvae, 7 Gila Topminnow, and 94 Speckled Dace (Table 1). One Sonora Mud Turtle *Kinosternon sonoriense* was

captured in a baited hoopnet and released alive. No nonnative fish or other aquatic species were captured or observed.

Table 1. Summary of fish captured in barrier monitoring efforts on Spring Creek, AZ. Site refers to downstream and upstream of the barrier. CPUE refers to Catch Per Second of Electrofishing in 1,063 and 1,530 seconds for downstream and upstream, respectively. Numbers and parentheses represent the minimum and maximum total lengths (TL) for each species.

	Species	Number Collected	CPUE	Mean TL (mm)
Downstream	Gila Chub	13	0.01	84.5 (67-113)
	Gila Topminnow	1	0.00	23
	Speckled Dace	6	0.01	87.33 (62-118)
	<i>TOTAL</i>	<i>20</i>	<i>0.02</i>	
Upstream	Gila Chub	16	0.01	99.64 (42-212)
	Gila Topminnow	7	0.00	37.71 (56-25)
	Speckled Dace	94	0.06	44.41 (22-87)
	Desert Sucker	12	0.01	94 (32-170)
	Sucker larvae	26	0.03	54.73 (40-84)
	<i>TOTAL</i>	<i>46</i>	<i>0.05</i>	

Population Structure

Mean total length of Gila Chub was 84.79 mm with the majority of individuals (93%) between 50 and 110 mm (Figure 1). Mean total length of Gila Topminnow was 35.88 mm and the majority of the individuals (75%) were between 30 and 40 mm. Mean total length of Desert Sucker was 94 mm with the majority of individuals (58%) Between 100 and 120 mm (Figure 1). Mean Total Length of Speckled Dace was 53.61 mm with the majority of the individuals (96%) being between 30 and 100 mm (Figure 1).

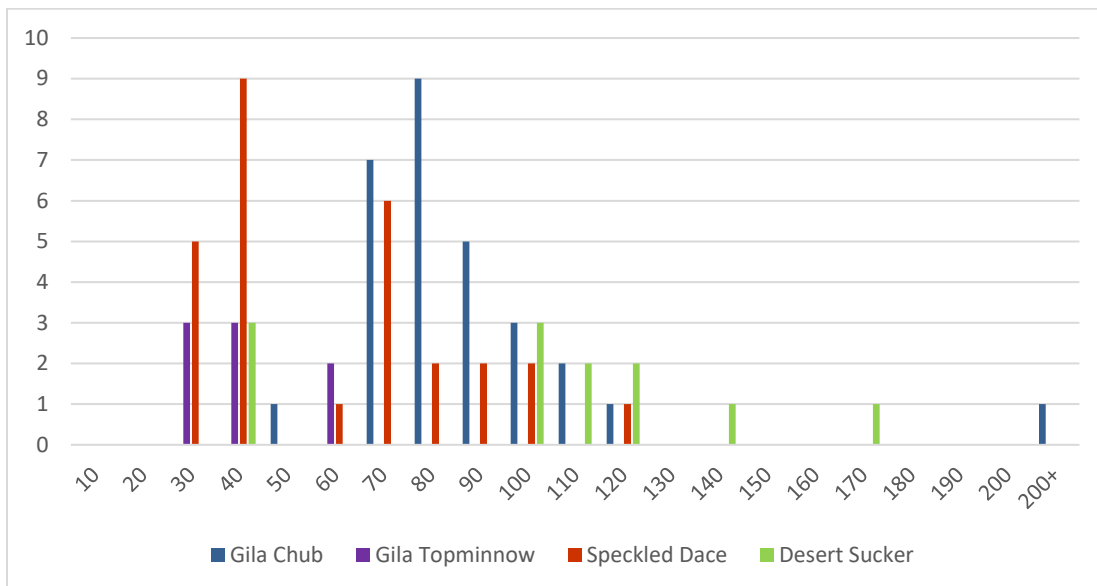


Figure 1. Length-frequency histogram of three fish species captured in barrier monitoring efforts on Spring Creek, AZ.

Discussion

No nonnative fish were captured during this year's sampling indicating that the barrier is being effective in preventing upstream movement of fish. During the month of September 2019, a peak flow of close to 2,000 cfs was likely to have occurred in Spring Creek (based on the difference between Oak Creek USGS Gauges at Sedona and Cornville). During this period of high water, there was concern about nonnative fish moving above the barrier, however it looks like due to the combination of water velocity and the barrier being present fish were unable to move upstream.

This year at least two size classes of Gila Topminnow were captured in Spring Creek, with two fish measuring less than 30 mm. The smaller size class could indicate recruitment as the last stocking was conducted in 2016 by Arizona Game and Fish Department (Robinson & Mosher, 2018). We also caught multiple size classes of three other native species present in the stream indicating continued reproduction and recruitment into the system.

Acknowledgements

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Literature Cited

- Marsh, P.C., B.R. Kesner & J.C.G. Marsh. 2014. Blue River fish barrier monitoring. Report, Reclamation Order No. R12PB32035 under BPA No. R10PA32064, Marsh & Associates, Tempe, Arizona. 14 pages.
- Robinson, A.T., K.R. Mosher. 2018. Gila River Basin Native Fishes Conservation Program: Arizona Game and Fish Department's native fish conservation efforts during 2017. Arizona Game and Fish Department, Phoenix, Arizona, 108 pages.