WEST FORK BLACK RIVER 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 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*, Gila Topminnow *Poeciliopsis occidentalis*, Roundtail Chub *Gila Robusta*, 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. Secondarily, 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. The first year of monitoring was conducted in 2017 (Ehlo 2017) and no monitoring was conducted in 2018. This report details the second year of monitoring on the West Fork Black River (WFB). Constructed in May 2016, the barrier on the WFB is located 0.6 kilometers above the confluence with the East Fork Black River. The purpose of the barrier is provide nonnative free habitat for native Apache Trout *Oncorhynchus apache* and Loach Minnow among other native species. The waters above the barrier have yet to be renovated of nonnative fish, but a baseline survey is important in establishing the fish community structure pre and post renovation both upstream and downstream of the barrier.

Methodology

West Fork Black River annual monitoring was conducted August 27-28th. Monitoring upstream and downstream of the barrier was conducted with a Smith-Root type 12 backpack electrofisher. Methods roughly followed Marsh (2014), in which 200 meters (m) of stream was sampled below each barrier and 200 m above each barrier with a single pass of backpack electrofishing. Mesohabitat (number of pools, riffles, and runs) was quantified for each sampling reach. All fish were measured (in millimeters [mm]) with the exception of Speckled Dace *Rhinichthys osculus* in which they were enumerated after measuring the first 50; nonnative fish found above barriers were enumerated and euthanized. Target nonnative species (those species large enough to receive PIT tags) below barriers were tagged with 134 kHz PIT tags, all nonnative fish captured will be scanned with a handheld scanner (BioMark HPRLite) and 0.91 m x 0.61 m remote PIT scanners will be deployed above barriers in subsequent years to detect upstream movement of fish past the barrier.

Results

Downstream efforts

Habitat from the downstream site was composed mostly of run habitat with short (less than 1 m) riffles interspersed. Near the upstream end of the site there were two pools separated by a short 10 m run. The lower pool was 1 m deep and 10 m long. The pool immediately below the barrier, at the most upstream end of the site, was approximately 2 m deep and 30 m long. Electrofishing efforts totaled 3,630 seconds with 22 Brown Trout *Salmo trutta*, 125 Speckled Dace, 46 Desert Sucker *Catostomus clarkii*, and 2 Roundtail Chub. All native fish were measured and returned to the water. Brown Trout were measured, implanted with a PIT tag (if large enough and in good condition), and returned to the water. One Brown Trout was released before the PIT tag was read.

Upstream efforts

The 200 m upstream transect began at the top of the large (100 m) pool immediately upstream of the barrier. The entire 200 m was comprised of run habitat. Electrofishing efforts totaled 2,200 seconds with a total of 5 Brown Trout, 84 Speckled Dace, and 9 Desert Sucker being captured (Table 1). All Brown Trout captured above the barrier were euthanized.

None of the Brown Trout captured upstream or downstream had PIT tags.

Table 1. Summary of fish captured in barrier monitoring efforts on the West Fork Black River, AZ. Site refers to downstream and upstream of the barrier.

Site	Species	Number Collected	CPUE (fish/sec)	Mean TL (range [mm])
Downstream	Desert Sucker	46	0.0126	177 (98-362)
	Speckled Dace	125	0.0344	62 (29-91)
	Roundtail Chub	2	0.0001	140 (132-146)
	Brown Trout	22	0.006	226 (80-474)
	Total	195	0.0537	-
Upstream	Desert Sucker	9	0.004	110 (40-156)
	Speckled Dace	84	0.0382	64 (32-89)
	Brown Trout	5	0.0022	147 (85-195)
	Total	98	0.0446	-

Discussion

Since there is an existing population of Brown Trout above the barrier and no Brown Trout captured during the survey had PIT tags, no conclusive statements can be made about the effectiveness of the fish barrier. No Apache Trout were captured during sampling efforts this year; however, all other native fish captured in 2017 were still present. The size class break down of the fish captured in 2019 was very similar to sampling efforts in 2017, except for Desert Suckers which were larger on average. This year Roundtail Chub were captured downstream of the barrier. Although not common, a population of Roundtail Chub exists in the Black River and are periodically captured in the West Fork Black River. Therefore, Roundtail Chub should be considered as a species for stocking upstream of the barrier once a renovation has been complete. Crayfish were extremely common above the barrier and common below the barrier. No other aquatic species were noted during surveys.

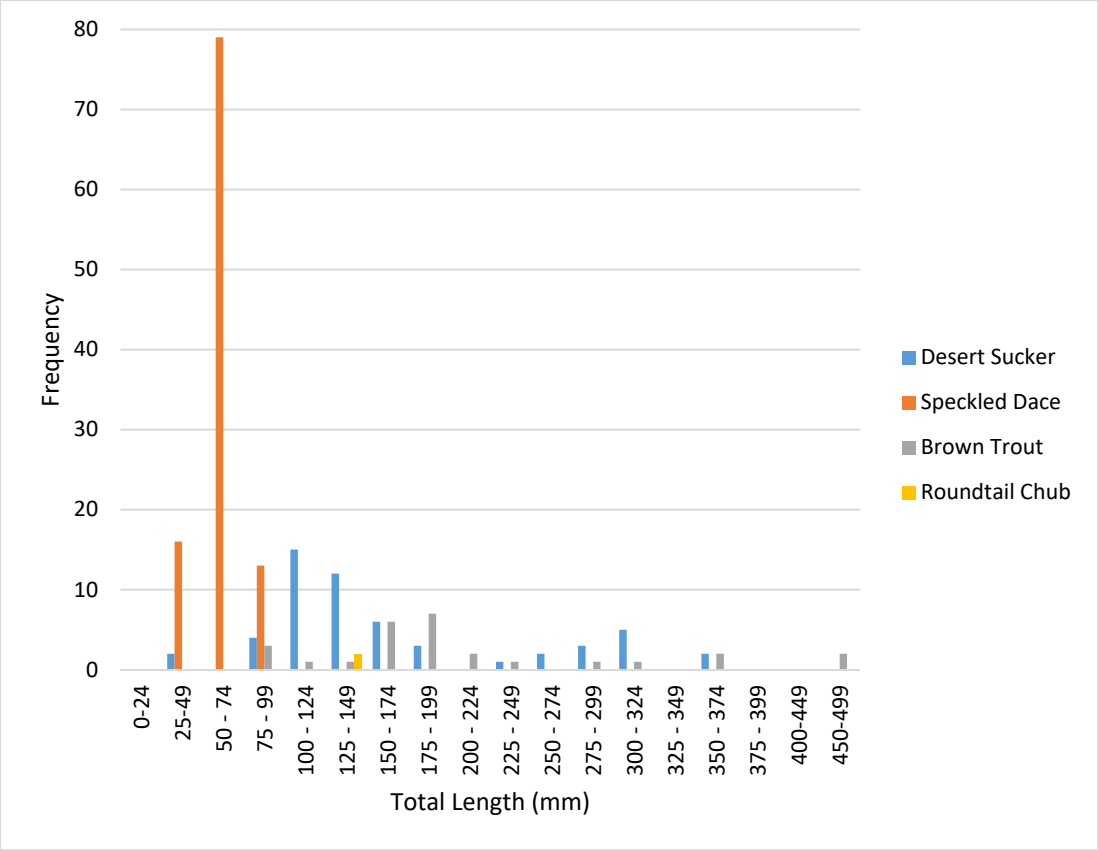

Figure 1. Length-frequency histogram of fish species captured during barrier monitoring on West Fork Black River, AZ.

Appendix. List of PIT Tags inserted into Brown Trout *Salmo trutta* below the West Fork Black River Barrier.

Year	TL (mm)	PIT Tag Number
2017	262	3DD.003C0228C0
	282	3DD.003C0228D9
	260	3DD.003C0228C3
	233	3DD.003C0228BC
	208	3DD.003C022895
	171	3DD.003C0228C1
	202	3DD.003C0228D6
	204	3DD.003C0228A7
	180	3DD.003C02288E
	180	3DD.003C022885
	204	3DD.003C02289A
	120	3DD.003C0228CF
	178	3DD.003C0228B8
	112	3DD.003C0228C9
	115	3DD.003C0228E0
	137	3DD.003C0228BD
	120	3DD.003C0228BA
	305	3DD.003C0228CB
	385	3DD.003C0228B2
	208	3DD.003C0228AB
	288	3DD.003C0228D5
	260	3DD.003C022886
	410	3DD.003C0228B9
	256	3DD.003C0228B5
2018	365	3DD.003C0228F2
	233	3DD.003C0228F4
	474	3DD.003C0228F5
	193	3DD.003C02290B
	282	3DD.003C02291F
	178	3DD.003C022927
	172	3DD.003C02292A
	156	3DD.003C02292C
	217	3DD.003C022930
	142	3DD.003C022936
	361	3DD.003C022938
	169	3DD.003C02293C
	175	3DD.003C022943
	455	3DD.003C022949
	202	3DD.003C02294A
	310	3DD.003C02293B
	158	Not Scanned

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, Temp, Arizona. 14 pages.