

Crow Creek Tributary Trout Population Estimate

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On May 31, 2023, estimates of the wild brook trout population at two sites on T-1 of T-6A of Crow Creek were conducted to evaluate the effects of a culvert replacement project designed to allow for improved fish and other aquatic organism passage. Crow Creek, located above the Village of Attica water supply reservoir #3, was recognized in a 1959 survey as having an outstanding density of wild brook trout. Subsequent surveys in 2005 and 2011 showed brook trout to still be present, but in lower abundance than in 1959. The stream also appeared to have a much higher silt load. In 2011, a survey on the stream below Krotz Road showed a moderate density of adult wild brook trout. An additional survey conducted in 2015 to collect fin clips for genetic analysis also found a lower abundance of adult brook trout along with a high abundance of creek chubs. The 2011 survey of the stream noted that the culvert at Krotz Road was vastly undersized and a likely barrier to fish passage. This was later confirmed by a culvert analysis conducted by USFWS staff. Buffalo Niagara Waterkeeper, a local conservation organization, subsequently developed a plan to design and fund a project to replace this culvert with one that would both allow for aquatic organism passage as well as greatly increased flood resiliency. This replacement was completed in the late spring of 2022. In addition to the culvert replacement, the area immediately upstream of the culvert, which was heavily silted in due to the ponding affect above the undersized culvert, had the channel restored and adult trout habitat enhanced with 56 feet of LUNKER structures. These structures mimic natural undercut stream banks. Prior to the culvert replacement, sites were surveyed to estimate the brook trout population (see survey 922001). This survey found an abundant population of both adult and young-of-year (YOY) brook trout below the old culvert, but very fish above the culvert. All adult brook trout captured below the culvert in that survey were given an upper caudal fin clip so that future sampling upstream of the new culvert could determine if fish are moving upstream through it. In September 2022, preliminary fish sampling by USFWS showed that several adult brook trout had moved upstream of the culvert. At that time, a number of adult brook trout from below the culvert were marked with VIE tags so sampling in 2023 could verify movement upstream through the culvert.

In this survey, the adult brook trout populations at sites both below and above the Krotz Road culvert were estimated by making one electrofishing pass at each site. Stream flow was very low for late May due to an ongoing drought. The site below the culvert was 500 feet in length and the site starting just above the culvert was 280 feet long. Estimated capture efficiency for adult trout was very high at both sites (90%). At the lower site, we captured 34 yearling and older (adult) wild brook trout, ranging in length from 4.3 to 6.5 inches. The abundance of adult wild brook trout for this site was 400 fish/mile, a substantial decline from last spring (780 fish/mile) (Table 1). At the site above the culvert, 44 adult wild brook trout were captured (4.6 to 7.5 inches), yielding an abundance of 925 fish/mile which was substantially higher than last spring's estimate of 75 fish/mile (Table 1). Most of the adult trout captured at the site above the culvert were utilizing the LUNKER structures with the remainder in a pool at the upper end of the site that had several cover logs added last fall. Eleven of the 44 adult trout captured (25%) in the site above the culvert had VIE tags, indicating these fish had moved up through the culvert since last September.

In addition to the two population estimate sites, which duplicated last year's survey work, another site farther upstream of the culvert was sampled where logs were installed in the creek last September to create additional cover for adult trout. In this section, covering 200 total feet of stream, a total of 13 adult brook trout were captured where none had been found in past sampling by USFWS. Overall, for all three sites, in 2023 we found an average of 543 adult brook trout per mile in contrast to 2022 when we found 441 fish/mile (Table 1).

In 2023, substantially fewer YOY brook trout were captured at the site below the culvert than in 2022 (15 verses 60). However, at the site above the culvert, where only four YOY were captured in 2022, we found 52 in 2023. This seems to indicate a substantial number of adult fish had moved up through the new culvert to spawn in the less silted gravel upstream of the culvert. These numbers of YOY brook trout captured are substantially lower than the actual number present since the YOY were still very small at the time of sampling (+/-1 inch) and our efficiency was likely not more than 50%. Using this efficiency, there were an estimated 316 YOY/mile below the culvert and 1,962/mile above it (Table 1). Interestingly, no YOY were found farther upstream where we had installed extra cover logs, likely due to the very diminished groundwater flow in this section. For all three sites combined, the average estimated number of YOY brook trout was the same in 2022 and 2023 (Table 1).

The 2023 survey confirmed that brook trout were moving through the new culvert, and it appears they spawned very successfully upstream of the culvert in the fall of 2022. It will likely take at least two years for us to be able to measure the full increase in the adult brook trout population that this project produces.

Table 1. Abundance (# per mile) of adult and YOY brook trout at three sites on T-1 of T-6A of Crow Creek in 2022 and 2023.

	<u>2022</u>	<u>2023</u>
#/mile of adult brook trout below the culvert	780	400
#/mile of YOY brook trout below the culvert	1,200	316
#/mile of adult brook trout just above the culvert	75	925
#/mile of YOY brook trout just above the culvert	340	1,962
#/mile of adult brook trout in wood added section above the culvert	0	368
#/mile of YOY brook trout in wood added section above the culvert	0	0
Average #/mile of adult brook trout at all sites combined	441	543
Average #/mile of YOY brook trout at all sites combined	723	720