

# **Arizona Game and Fish Department**

## **Region I Aquatic Wildlife Program**

### **West Fork Black River & Thompson Creek Brook Trout Management Actions 2024**

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## Executive Summary

During 2024 several management actions were taken as part of the ongoing effort to eradicate non-native Brook Trout *Salvelinus fontinalis* from the Apache Trout *Oncorhynchus apache* recovery section of the West Fork Black River (WFBR) and its tributary Thompson Creek (TC). Wild Brook Trout were collected for health testing by the Arizona Game and Fish Department Fish Pathology Lab on May 29 -30. Additionally, genetic material (pectoral fin clips) were collected ( $n=32$ ) to determine sex ratios of wild Brook Trout. During the week of June 3, a single pass mechanical removal effort via backpack electrofishing was completed resulting in the removal of 33 Brook Trout. During the week of July 8, a second single pass mechanical removal effort resulted in the removal of 66 Brook Trout. On July 17, 3,300 YY male Brook Trout marked with adipose fin clips were stocked at 100 m intervals throughout the recovery section of the WFBR and TC. During the week of August 5, a third single pass mechanical removal effort removed 242 Brook Trout. In total, 816 Brook Trout were captured during 2024. Of those fish, 475 were identified as YY males based on the absence of an adipose fin and released, while 336 were determined to be wild and removed. YY Brook Trout comprised 58 % of all Brook Trout captured during 2024. During these Brook Trout removal efforts, 401 Apache Trout were captured and a subset were measured and all Apache Trout released alive near the site of capture. Other fish species present were not actively captured when observed.

## Introduction

The Upper West Fork Black River (WFBR) and its headwater tributary Thompson Creek (TC) in Apache County, Arizona are managed for a recovery population of Apache Trout *Oncorhynchus apache* and to support robust populations of native Speckled Dace *Rhyinichthys osculus* and Desert Sucker *Catostomus clarkii*. However, a population of non-native Brook Trout *Salvelinus fontinalis* also persists in the headwaters of the WFBR and TC. The WFBR and TC were chemically treated with Antimycin A in September 1996 from the headwaters on Mt. Baldy downstream to two fish passage barriers below Forest Road 116, to remove non-native Brook Trout and Brown Trout *Salmo trutta*. The treatment initially appeared successful, and Apache trout, Speckled Dace, and Desert Sucker were repatriated in 1997 and 1998. Brook Trout were detected in the WFBR above the fish barriers in 2006 in very low numbers and later observed in much higher densities in WFBR and TC (Lopez et al. 2007). It was presumed that the 1996 treatment had missed a small number of Brook Trout in the headwaters that were not detected in the evaluation following the treatment, and the population reached a level and distribution where they were eventually discovered.

The Arizona Game and Fish Department's (Department) Region I Aquatic Wildlife Program and Native Trout and Chub Program have partnered with the US Fish and Wildlife Service (USFWS) and White Mountain Apache Tribe (WMAT) to eliminate Brook Trout as a threat to the established native fish populations in the Upper WFBR and TC. Mechanical removal efforts (i.e., Backpack electrofishing) of Brook Trout in the Upper WFBR and TC have been ongoing since 2013, but have so far been unsuccessful in eliminating Brook Trout. In 2022, the Department, along with the WMAT, and USFWS proposed a piscicide treatment using rotenone to remove non-native Brook Trout, but the project was canceled due to public opposition. Since the cancellation of the piscicide treatment, the focus of removal efforts has switched to the stocking of YY male Brook Trout in

conjunction with mechanical removals. YY Male Brook Trout are only able to produce male offspring due to the lack of a X chromosome. The goal of the introduction of YY Male Brook Trout into a system is to eventually drive the sex ratio of the wild population to 100% male, at which point the population would be unable to reproduce and would be completely eradicated once all male fish are mechanically removed using backpack electrofishing or die from natural causes (Teem and Gutierrez 2010). Recently, the Idaho Game and Fish Department and U.S. Forest Service partnered on a removal project using YY Male Brook Trout and reported the first example of successfully driving the sex ratio to 100% male and eliminating a Brook Trout population with the use of these methods (McIntosh 2024).

The Brook Trout eradication project using YY Male Brook Trout officially began in 2023 by the WMAT and USFWS when YY Male Brook Trout were stocked on the Fort Apache Indian Reservation (FAIR) in both the WFBR and TC. Additional YY Male Brook were stocked by the WMAT and USFWS in 2024, but this was the first year that the Department was able to stock on the sections of both streams on the Apache-Sitgreaves National Forest.

### **Brook Trout Management Activities**

In May 2024 the Department's Native Trout & Chub and Region I Aquatic Wildlife Program staff collected pectoral fin clips from 32 wild Brook Trout for genetic testing to determine the sex ratio of Brook Trout in the WFBR and TC. Those samples are awaiting analysis. In addition, Brook Trout were sent to the Department's Fish Pathology Lab and tested for an array of diseases and pathogens of concern to the Department.

On July 17, 2024, the Native Trout & Chub Program, along with Region I Aquatic Wildlife Program and Gila River Basin Native Fish Program staff stocked 3,300 YY male Brook Trout into the WFBR and TC. Fish were distributed evenly via buckets from the FAIR boundary downstream to the upper fish barrier downstream of Thompson Trailhead on Forest Road 116 (Figure 1). Bucket releases were spaced approximately every 100 meters. YY Brook Trout were marked by clipping the adipose fin, so that they could be later identified and released during subsequent mechanical removal efforts on the two streams.

Three mechanical removal efforts to eradicate Brook Trout were conducted in 2024 via single pass backpack electrofishing in accordance with the 100-Watt Method (Meyer et al. 2021). The first pass was completed on June 3 to 7 and resulted in the removal of 33 wild Brook Trout. A second pass was completed from July 8 to 12 and resulted in the removal of 66 wild Brook Trout. The third and final pass occurred from August 5 to 9 and resulted in the removal of 205 wild Brook Trout. In total, 811 Brook Trout were captured during 2024. Of those fish 470 were identified as YY males based on the absence of an adipose fin and released, while 341 were determined to be wild and removed (Figure 2). YY Brook Trout comprised 58% of all Brook Trout captured during 2024 (Table 1). Sizes of wild Brook Trout removed during 2024 varied from 40 to 237 mm in length (total length) with a mean length of 86 mm  $\pm$  0.14 (SEM).

## **Apache Trout**

During our 2024 Brook Trout removal efforts 401 Apache Trout were captured via backpack electrofishing (Table 1.). Not all Apache Trout were counted or measured during sampling events due to confusion in sampling protocols for Apache Trout among crews. A subsample of these were measured to the nearest mm and all were released alive in the area they were captured. Mean length of Apache Trout captured was 120 mm  $\pm$  0.58 (SEM)

## **Future Management Activities**

The Department's Region I Aquatic Wildlife and Native Trout and Chub Program staff plan to complete two tasks during this reporting cycle. First, Department staff, in coordination with the WMAT and USFWS, will complete a monitoring plan for Brook Trout (both YY and non-YY) and Apache Trout within the project area prior to the stocking of YY Male Brook Trout in 2025. Second, Department staff will complete three mechanical removal efforts in 2025 via backpack electrofishing to remove wild Brook Trout. Single pass efforts will occur in June and July, and a three-pass depletion effort will be completed in August. During the August depletion effort all wild Brook Trout removed will be dissected in order to determine their sex and reproductive status. Additionally, a population estimate of Apache Trout will be performed using depletion methods. YY Male Brook Trout will be stocked mid-June to July depending on maturation of fish in the hatchery. The number of YY Male Brook Trout stocked will depend on hatchery survival and availability. All YY Male Brook Trout stocked in 2025 will be marked with an adipose fin clip in order to identify them during subsequent removal efforts.

## Tables and Figures

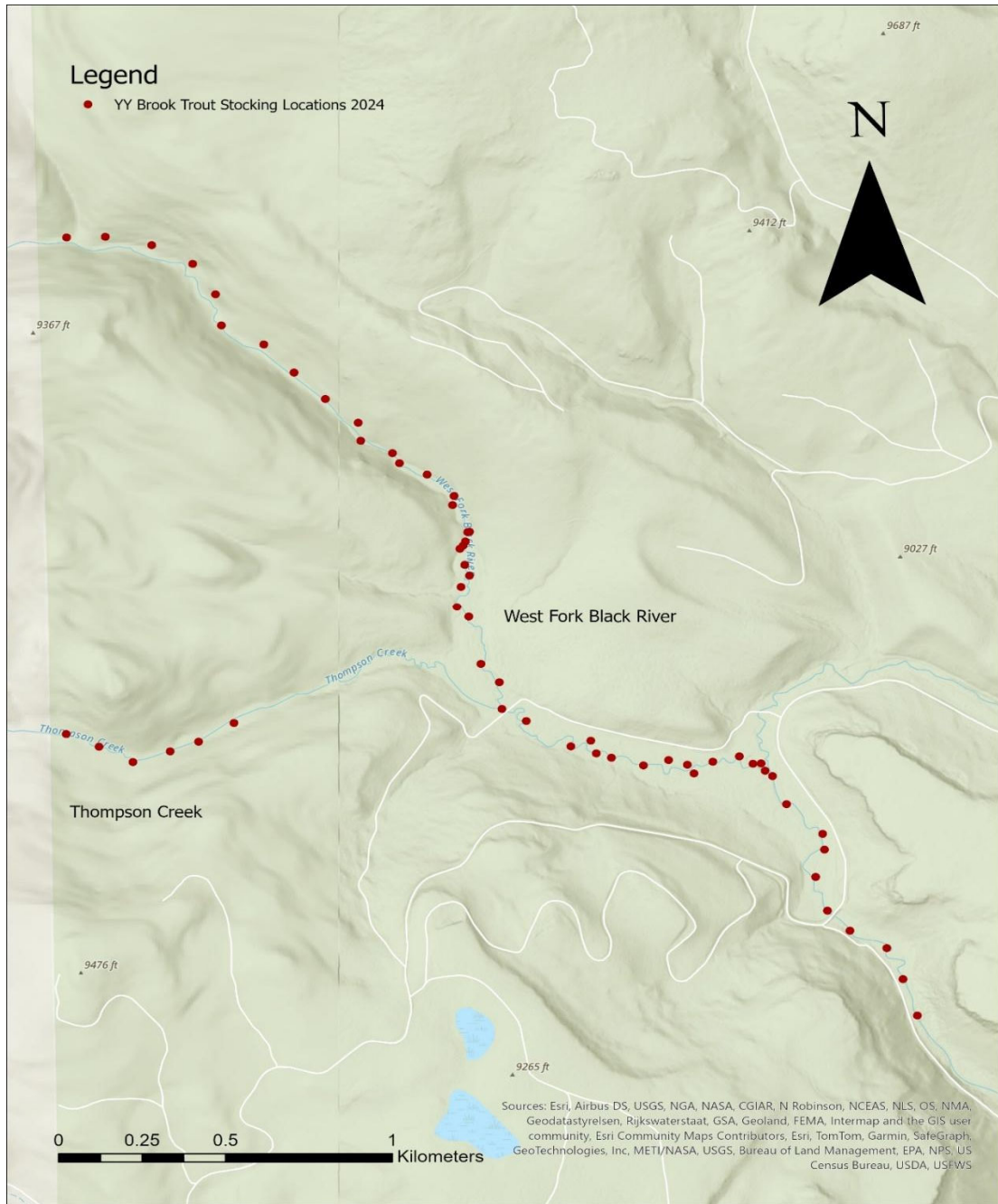


Figure 1. Map showing stocking locations of YY Brook Trout on the West Fork Black River and Thompson Creek

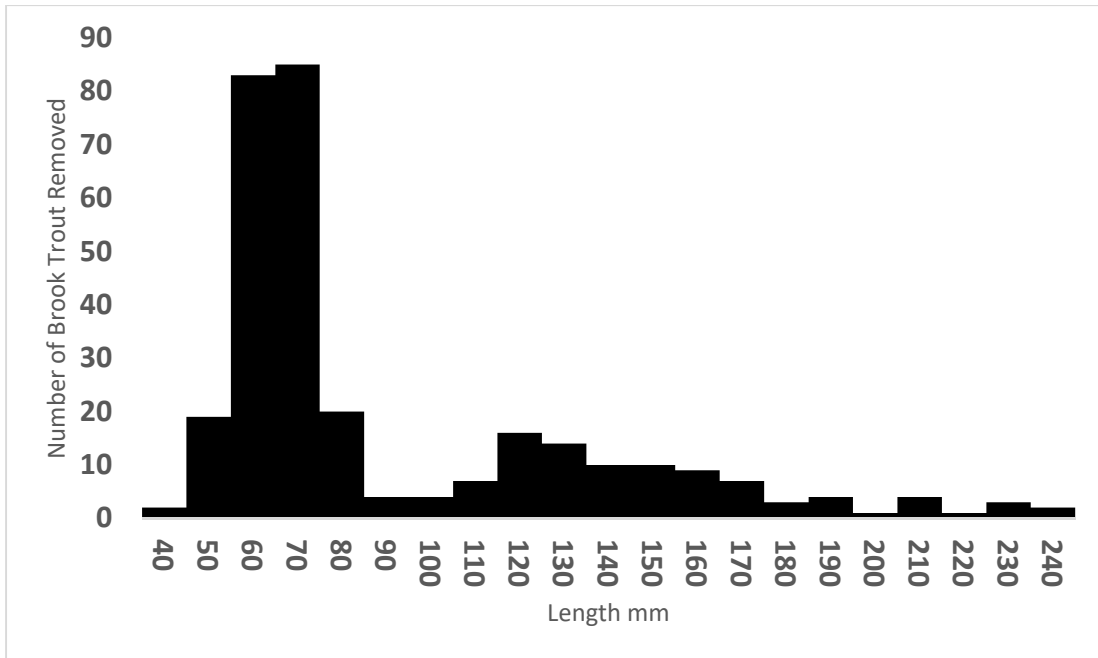


Figure 2. Length frequency histogram showing the number of Brook Trout removed in 10mm length bins.

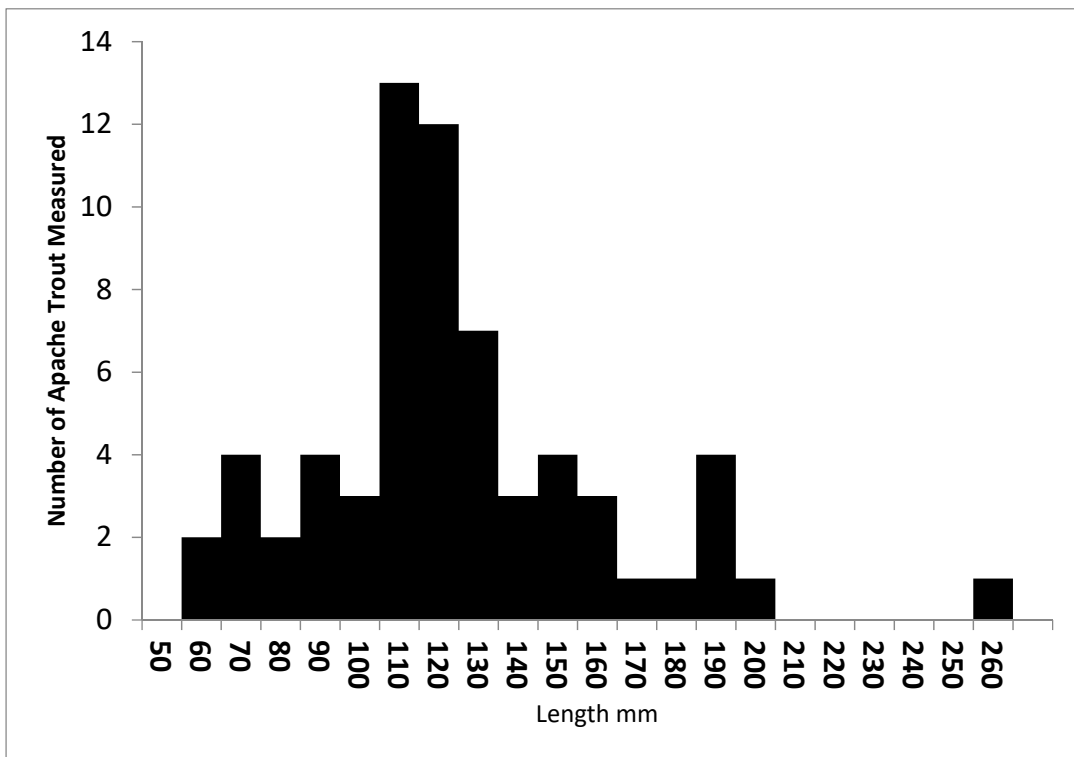


Figure 3. Length frequency histogram showing the number of Apache Trout measured in 10 mm length bins.

*Table 1. Summary of trout captured during completed removal passes in 2025 on the West Fork Black River and Thompson Creek.*

<b>Pass Number</b>	<b>Wild Brook Trout</b>	<b>YY Brook Trout</b>	<b>Apache Trout</b>
1	26	9	61
2	66	4	Not Counted
3	205	507	336

## References

Lopez, M., K. Meyer, and J. Meka. 2007. Apache trout enhancement project, 2006 Progress Report. Arizona Game and Fish Department. 11 pp.

McIntosh, Bruce Email to Members of the YY Consortium and Supporters. 06/30/2024.

Meyer, K. A., Chiaramonte, L. V., & Reynolds, J. B. (2021). The 100-watt method: A protocol for backpack electrofishing in small streams. *Fisheries*, 46(3), 125-130.

Teem, J. L., and J. B. Gutierrez. 2010. A theoretical strategy for eradication of Asian carps using a Trojan Y chromosome to shift the sex ratio of the population. American Fisheries Society Symposium 74, Bethesda, Maryland.