



Tahquamenon River 2013 Survey Report

Prepared by Cory K. Kovacs

Introduction: On April 1, 2013, an experimental regulation for brook trout went into effect on five Upper Peninsula streams. This regulation allows anglers to keep an additional 5 brook trout in their daily possession limit. Fisheries Division worked with constituent groups to determine which streams received the experimental regulation for brook trout. In addition to the implementation of the experimental regulation, a study plan was developed to help evaluate the effects of the regulation on the opinions and fishing activities of anglers as well as on the brook trout populations in these streams. The study plan evaluation components include a postcard creel/internet survey, creel surveys, electrofishing surveys, and stream temperature monitoring. The study plan is scheduled to continue evaluating effect of the regulation on these streams brook trout populations through 2017.

For this survey report, only the Tahquamenon River electrofishing survey, creel survey, and stream temperature results will be discussed. At the time of this survey, the Tahquamenon River carried a Type-1 regulation.

Methods and Materials: On August 8, 2013 a fisheries survey was conducted on the Tahquamenon River, one of the control streams for the 10-fish bag limit evaluation. The survey was conducted at the Status and Trends (S&T) fixed site location off of Clark Trail. Eastern Lake Superior Unit (ELSMU) staff used a pulse-DC stream electrofishing unit (500V, 2A, two probes) to complete the survey. A brook trout population estimate (Chapman-Peterson mark-recapture) was conducted using a 2 pass sample; first pass for marking and the second pass for a recapture effort. The sampling station at this site was 1,000 feet. Scales were collected from 10 brook trout per inch group for age determination. Total length was recorded for all brook trout captured. For the purposes of this survey, only brook trout were captured.

An Onset[®] HOBO Pro V2 (temperature logger) was deployed on June 7, 2013 near the starting point of the S&T survey site. The logger was programmed to record water temperatures every hour and was retrieved on October 10, 2013.

A roving creel survey was conducted from the last Saturday in April through September 30th (full trout season) from the County Road 442 bridge to the Eagle Nest (County Road 421 bridge) using one creel clerk. The creel clerk was instructed to interview anglers for demographic information, catch data, and opinion questions and to also distribute angler opinion postcards. Biological samples were to be taken from all harvested brook trout the clerk encountered. All other inland creel instructions applied.

Results: A total of 611 unique brook trout were captured during the mark-recapture survey. Mean total length for these brook trout was 3.5 inches ranging from 2-10 inches with 3% greater than legal size (≥ 7 inches; Figure 1). A total of 516 young of year (age-0) brook trout (brook trout_{yoy}) comprised 91% of the catch (Figure 2). Age and growth as determined from scale samples found 4 year classes (ages 0-4). Mean lengths-at-age were below statewide averages (Figure 3). Relative abundance (catch per unit effort) of brook trout_{yoy} was 2724.5 per mile (Figure 4).

A population estimate for brook trout was calculated using the Chapman-Peterson formula. The estimated abundance of brook trout was 7,957.4 per mile (1,908 per acre). An estimate of total abundance was calculated at 1,507 brook trout.



The mean July water temperature recorded by the temperature logger was 64.2°F. The minimum temperature recorded was 46.4°F with the maximum temperature reaching 74.7°F.

Discussion: Brook trout were supplementally stocked in the Tahquamenon River until 1998. In addition, a large effort by ELSMU staff to improve the habitat conditions for brook trout in the upper river transpired in the early 2000's. Since these efforts, fisheries surveys have consistently found a static brook trout population with high recruitment, average growth, and a low number of legal sized fish. The 2013 sample was no exception to what has been previously found in the Tahquamenon River. Relative abundance for young of year brook trout was high, growth was near statewide average, and only 3% of the brook trout captured were of legal size. Considering the high relative abundance for young of year brook trout it is likely to be limiting the potential to achieve 7 inches. This scenario is consistent with density dependent characteristics with brook trout experiencing poor growth once they hit age-1. After reaching age-1, mortality increases dramatically due to the lack of forage and suitable habitat available for a high density of fish the same size. Other variables are factored into the density dependent equation, but fisheries surveys have shown the population to be static with a low relative abundance of brook trout greater than 7 inches.

In addition, based on the temperature logger readings water temperature does not appear to be a significant limiting factor, but may be having a negative effect on brook trout success. Water temperatures are reaching the upper limits of the tolerance range for brook trout (74°F; Raleigh, 1982), however not sustaining for an extended period of time. Raleigh suggested that the temperature range for brook trout is 32-75°F with an optimal range for growth and survival of about 52- 61°F. Water temperatures are a concern and should continue to be monitored in the upper Tahquamenon River, but with the series of small lakes near the head waters, there is little that can be done to mitigate warmer water temperatures in this stretch of river.

Typically, another factor possibly limiting the number of legal sized brook trout is angler harvest. However, the creel survey conducted in 2013 found few anglers fishing the upper Tahquamenon River. Harvest was also low for the anglers in 2013. Based on the creel summary an estimated 49 fish were harvested for an estimated 349 angler trips. These results suggest extremely low angling pressure with few fish being harvested by anglers when trips are made. In the same number of trips an estimated 291 brook trout were released in 2013.

Management Recommendations: For this report any assumptions of trends in the brook trout population of the Tahquamenon River should be made based on the results from the 2013 survey. Following the completion of the brook trout 10-fish bag limit study (2017) more analyses can be conducted using all study streams. For now the Tahquamenon River will remain a control stream for the 10-fish bag limit study. Temperatures should continue to be monitored through the MDNR's S&T Program. No changes in management are recommended at this time.

References:

Raleigh, R. F. 1982. Habitat suitability index models: Brook trout. United States Department of Interior, Fish and Wildlife Services. FWS/OBS-82/10.24. 42 pages.



References (conti.)

Schneider, J. C., P.W. Laarman, and H. Gowing. 2000. Age and growth methods and state averages. Chapter 9 *in* Schneider, J. C. (editor). 2000. Manual of fisheries survey methods II: with periodic updates. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.

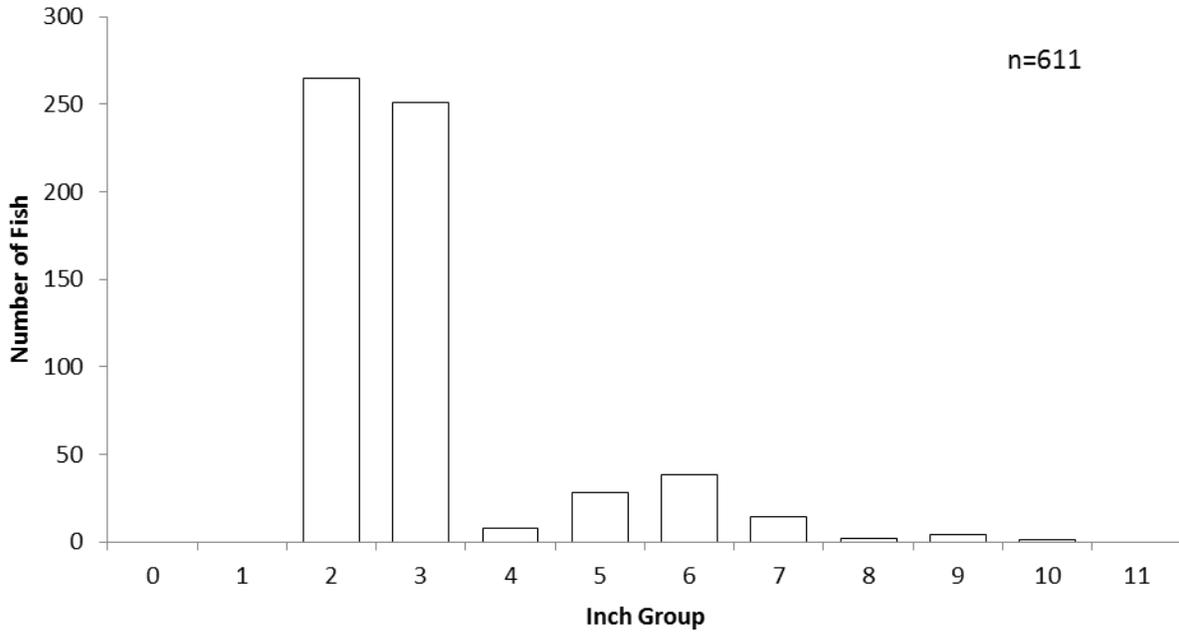


Figure 1.-Length frequency for brook trout captured during an electrofishing survey conducted on the Tahquamenon River on August 8, 2013.

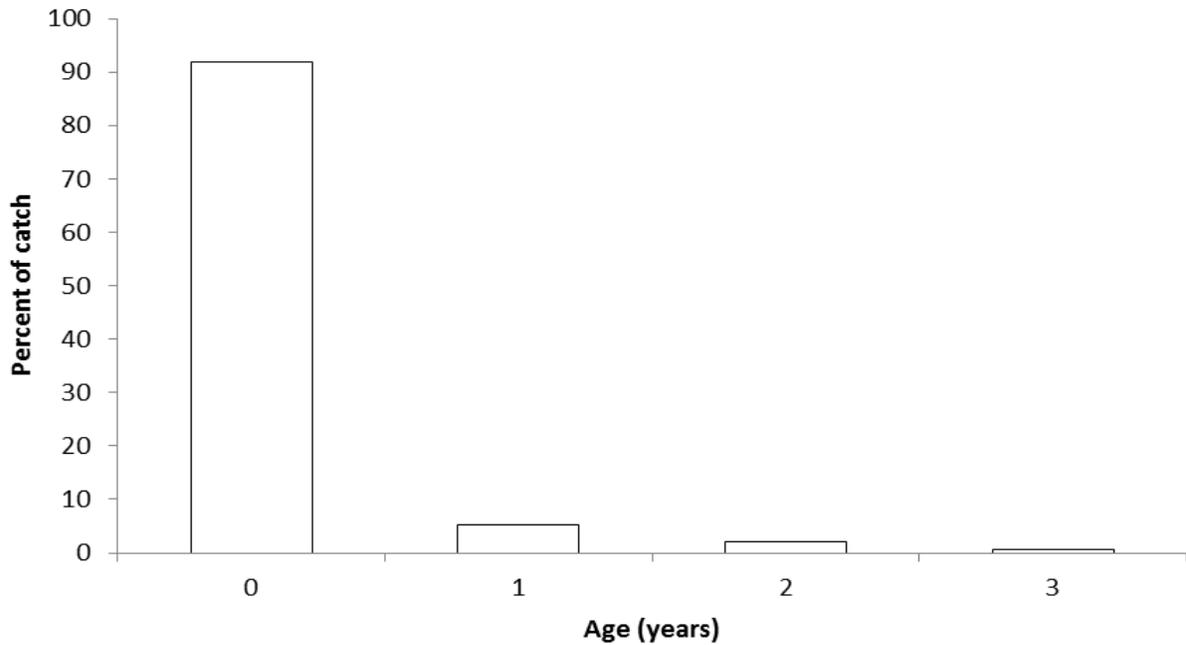


Figure 2.-Age frequency distribution for brook trout captured during an electrofishing survey conducted on the Tahquamenon River on August 8, 2013.

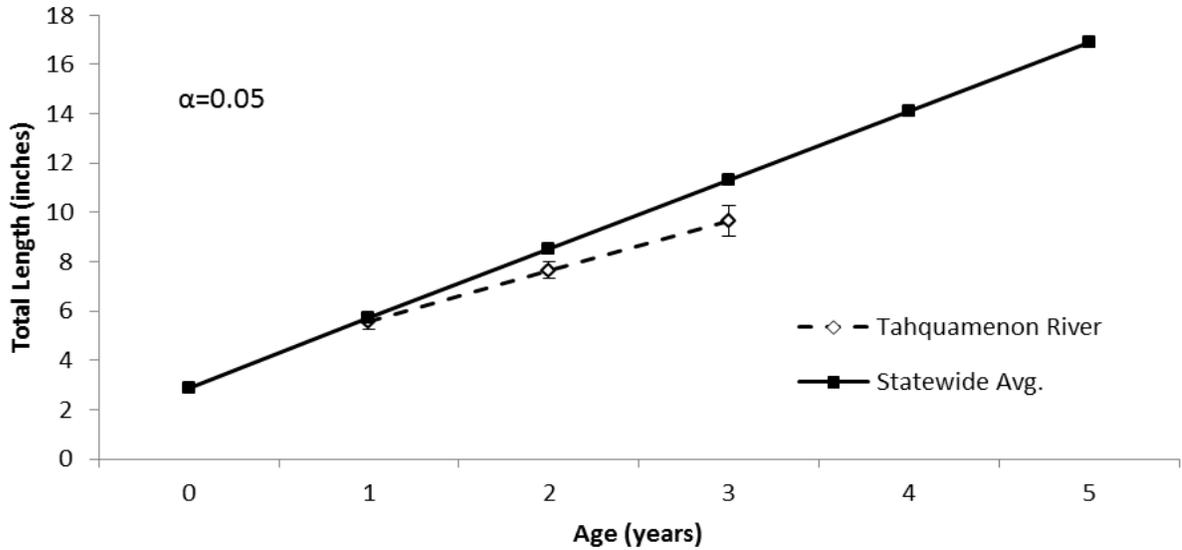


Figure 3.-Growth for brook trout in the Tahquamenon River, as determined from scale samples collected during the electrofishing survey conducted on August 8, 2013. Statewide average lengths for August-September are from Schneider et al. (2000).

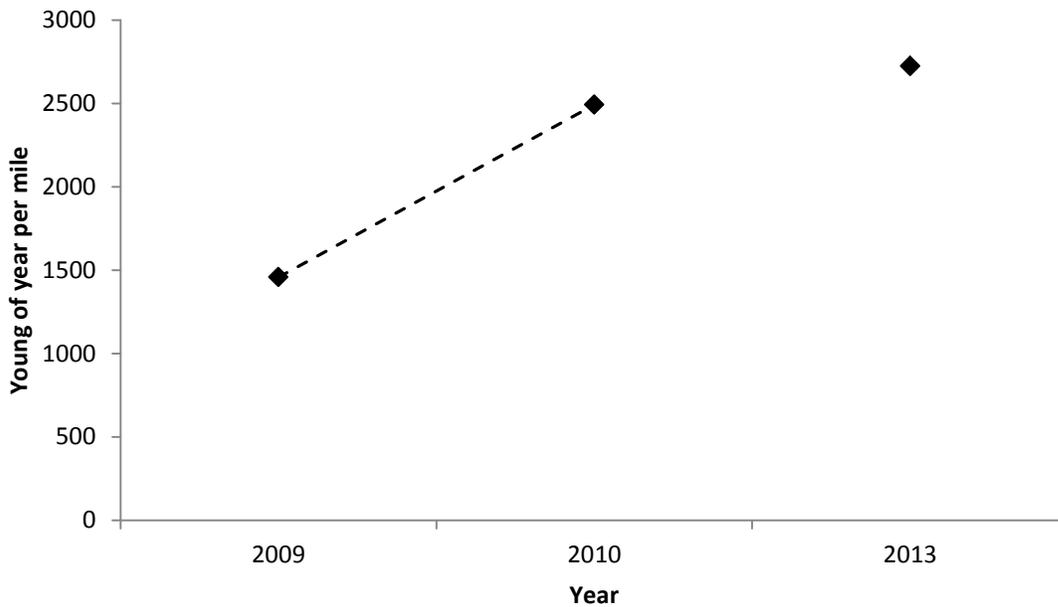


Figure 4.-Relative abundance trends for young of year brook trout caught during electrofishing surveys conducted on the Tahquamenon River starting 2009. The same 1,000 ft. sampling reach was used in each year.