

## STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-80-R-16

Study No.: 230773

Title: Effects of protective stream regulations in rehabilitating adfluvial Brook Trout.

Period Covered: October 1, 2014 to September 30, 2015

**Study Objective:** The objectives of this study are to: (1) Quantify changes in relative abundance and age and size structure of Brook Trout *Salvelinus fontinalis* populations in response to at least 10 years of more protective fishing regulations; (2) Document temporal changes in relative abundance of large Brook Trout through angler catch diary and observation data; and (3) Describe associations between characteristics of streams (e.g., hydrology, gradient, geographic factors, etc.) and Brook Trout population responses to protective regulations.

**Summary:** In April 2015, the Michigan Natural Resources Commission approved a measure to enact a 20-inch minimum size limit and one fish daily possession limit for adfluvial Brook Trout on eight stream reaches that are the focus of this study. I initiated a volunteer angler log program to obtain data on Brook Trout catches from cooperative anglers that fish for Brook Trout in Lake Superior or the waters included in this study. During the second and third full weeks of October, we conducted electrofishing assessments on the Big Huron, Little Huron, Pilgrim, and Ravine rivers, and control reaches on the West Branch Big Huron and upper Ravine rivers. Numbers of Brook Trout caught in the 2014 surveys were generally low, except for the Pilgrim River where 146 Brook Trout were captured. Average July water temperatures for the study reaches in 2014 indicated conditions suitably cold for Brook Trout, but may be biased since the average July air temperature was well below average.

**Findings:** Jobs 1–6 were scheduled for 2014-15, and progress is reported below.

**Job 1. Identify reaches and sampling protocols.**—I identified six study reaches for sampling during this period. Treatment (i.e., with protective regulation) reaches occurred on the Big Huron, Little Huron, Pilgrim, and Ravine rivers, and control reaches occurred on the West Branch Big Huron and upper Ravine rivers. In April 2015, the Michigan Natural Resources Commission approved, Michigan Department of Natural Resources (MDNR) Fisheries Division proposal to enact a 20-inch minimum size limit and one fish daily bag limit for adfluvial Brook Trout on the eight reaches that are the focus of this study.

I initiated a volunteer angler log program to obtain data on Brook Trout catches from cooperative anglers that fish for Brook Trout in Lake Superior or the waters included in this study. In addition to providing their contact information, I asked anglers to record the following information for each trip: date and hours fished; stream and location (access site), which are confidential; fishing method (i.e., bait, fly or lure, or both); and number of fish caught by species and inch group. I also requested photos of potential coaster Brook Trout caught by these anglers.

**Job 2. Conduct surveys and process samples.**—During the second and third full weeks of October 2014, we conducted electrofishing assessments on a 1,500 foot reach in each of the six reaches mentioned. We obtained 1-pass electrofishing catch-per-effort (CPE) data on all species, measured all salmonids to 0.1 inch, obtained scales from (and aged) all Brook Trout greater than 2 inches, and tissue samples from Brook Trout greater than 4 inches. Scale samples were aged

and all data were entered into a MS-Access database designed for this study and the MDNR's Fish Collection System (FCS) database. Habitat surveys were conducted using MDNR's Status and Trends protocols (Wills et al. 2006) at these sites and five sites electrofished the previous year for this study. Habitat data were entered into the FCS. Stream temperature data loggers were deployed in May 2015 and will be recovered in October.

Two volunteer anglers provided usable information for the 2014 open water season, and one angler dropped out of the survey. Three additional anglers volunteered to keep logs for the 2015 season. Angler logs will be requested after the Brook Trout harvest season concludes on September 30. The number of volunteer anglers for this study may be limited by the relative remoteness of many of these waters, relative to population centers in the Upper Peninsula.

**Job 3. Manage data and maintain database.**—I developed a MS Access database to house and serve summaries of the fish survey data for this study. Stream fish, habitat, and temperature survey data from 2014 were entered there and into the FCS.

**Job 4. Analyze data.**—Numbers of Brook Trout caught in the 2014 surveys were generally low, ranging from zero to 11 fish in a 1,500-foot electrofishing reach, except for the Pilgrim River, where 146 Brook Trout were sampled. Though the Brook Trout numbers seem modest, they compare favorably with Minnesota's North Shore tributaries where adfluvial Brook Trout rehabilitation is occurring. There, average densities of Brook Trout from electrofishing surveys ranged from 3.1 to 5.6 Brook Trout per 1,500-foot reach (Blankenheim 2013).

Average July water temperatures for the study reaches (Figure 1) suggested suitably cold conditions for Brook Trout, though the Iron River (mean July temperature of 69.5°F) was marginally warm (Zorn et al. 2009). These water temperatures likely do not reflect typical conditions, since the average July air temperature at the Marquette National Weather Service Station was 3.1°F below the 30-year average.

Volunteer anglers reported 51.5 hours of fishing Lake Superior in 2014. The volunteer angler catch rate for all sizes of Brook Trout in Lake Superior was 0.25 fish per hour, and the catch rate of Brook Trout 20 inches or longer was 0.04 fish per hour. No Brook Trout were reported as harvested. One river was fished by a volunteer angler, and no Brook Trout were caught for 80 angler hours of fishing in 2014.

**Job 5. Write annual performance report.**—This progress report was completed as scheduled. In addition, a study summary was prepared (Attachment 1).

**Job 6. Write other reports as needed.**—No additional reports were needed.

**Literature cited:**

Blankenheim, J. 2013. Status of Coaster Brook Trout in the Minnesota Waters of Lake Superior 2013. Report for reimbursement under Federal Aid by the Sport Fish Restoration Act to Minnesota. F-29-R(P)-31(Year 1).

Wills, T. C., T. G. Zorn, and A. J. Nuhfer. 2006. Stream Status and Trends Program sampling protocols. Chapter 26 *in* Schneider, James C. (ed.) 2000. Manual of fisheries survey methods II: with periodic updates. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.

Zorn, T. G., P. W. Seelbach, and M. J. Wiley. 2009. Relationships between habitat and fish density in Michigan streams. Michigan Department of Natural Resources, Fisheries Research Report 2091, Ann Arbor.

**Prepared by:** Troy G. Zorn  
**Date:** September 30, 2015

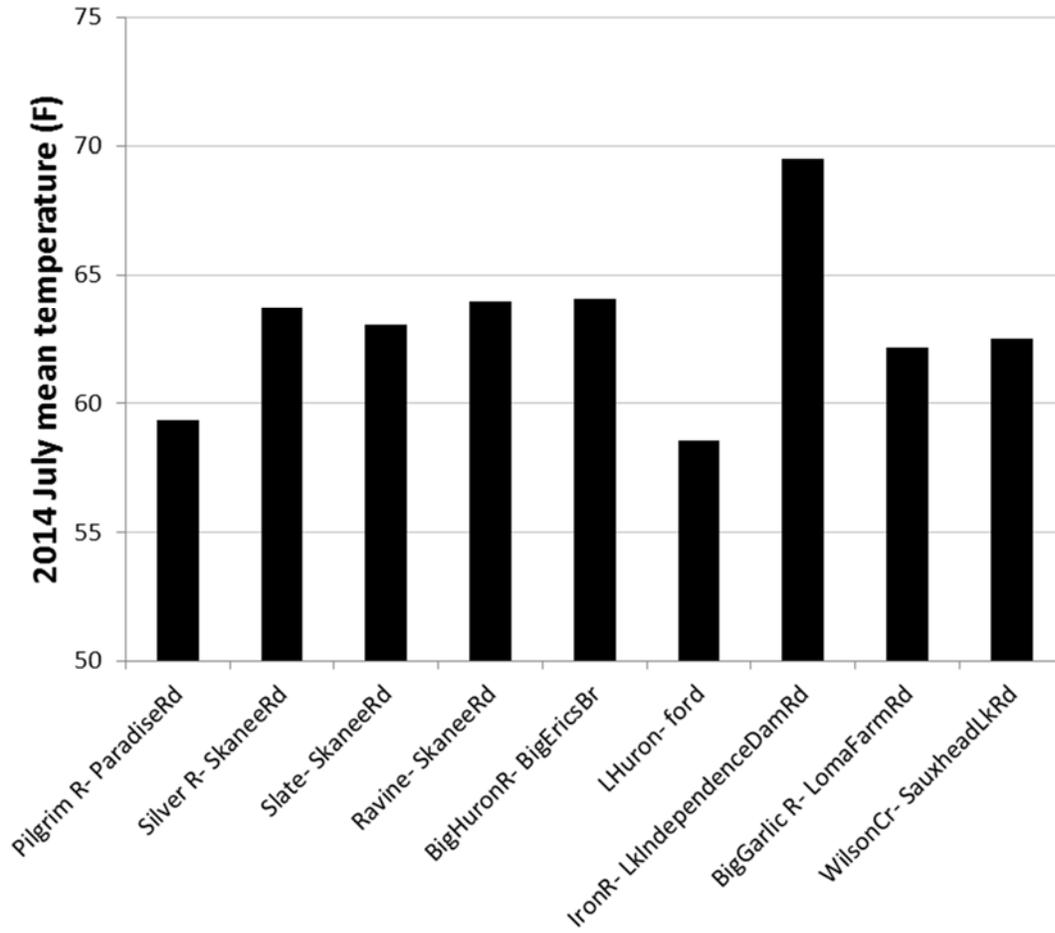


Figure 1.—Mean July water temperature in reaches of study rivers in 2014.