STUDY PERFORMANCE REPORT

State: Michigan **Project No.:** F-35-R-22

Study No.: 665 **Title:** Investigation of causes of declines in Au Sable River brown trout populations

Period Covered: April 1, 1996 to March 31, 1997

Study Objective: To continue to conduct annual trout population surveys at index stations on the Au Sable River. These data will be analyzed in relation to environmental and food web variables to determine mechanisms causing declines in abundance of larger trout. They will also be used to evaluate the effectiveness of large woody debris enhancement in the North Branch Au Sable River and carbon enhancement experiments in the Mainstem Au Sable River (management actions that will be funded by the private sector).

Summary: We estimated trout populations in three reaches of the North Branch Au Sable River and in two reaches on both the Mainstem Au Sable River and South Branch Au Sable River. Scale samples collected from subsamples of trout were read to determine trout ages and used to derive age-specific population estimates in all reaches. We used electronic thermometers to collect water temperature data in all three branches of the Au Sable River where trout populations were estimated .

Job 1. Title: Estimate trout populations and age scales.

Findings: District fisheries management biologists and technicians conducted mark-and-recapture estimates of trout populations in seven river reaches distributed among three branches of the Au Sable River during late summer and early fall 1996. District fisheries personnel determined the ages of trout from scale samples collected from subsamples of the trout collected. I used these data to compute both size- and age-specific trout population estimates for each river reach. Estimated numbers of brown trout per hectare by age during fall 1996 are shown in Table 1.

Job 2. Title: Monitor water temperatures and summarize data.

Findings: We have used electronic thermometers to record water temperatures at a minimum of one location at each of the three study branches of the Au Sable River every year since 1989. Thermometers were deployed at or near river reaches where we estimate trout populations. Temperatures were typically recorded hourly throughout the year. Data were recovered from electronic thermometers each spring and fall. Temperature data collected prior to summer 1996 were gathered by other investigators. I am presently collecting temperature data files from other investigators and converting them to formats compatible with my computer software. Hence, I have not completely summarized water temperature data collected during 1996.

Table 1.–Number of brown trout per hectare by age for fall 1996 populations in the Mainstem, North Branch, and South Branch Au Sable River. Confidence bounds for the 95% level of significance are in parentheses.

River branch	Age						
River reach	0	1	2	3	4	5	6
Mainstem							
Stephan Bridge	711.9 (±73.0)	258.5 (±44.2)	147.4 (±35.9)	59.3 (±22.6)	7.5 (±6.8	7.5 (±6.2)	3.3 (±2.7)
Wa Wa Sum	345.0 (±183.1)	118.1 (±23.4)	63.4 (±13.3)	10.0 (±3.9)	0.0	0.0	0.0
North Branch							
Twin Bridges	751.5 (±56.8)	62.4 (±11.1)	17.1 (±4.6)	1.5 (±0.0)	0.0	0.0	0.0
Eamons Landing	321.0 (±43.5)	96.0 (±30.9)	3.0 (±0.0)	3.0 (±0.0)	0.0	1.0 (±0.0)	0.0
Dam - 4	895.5 (±80.6)	79.0 (±15.4)	17.0 (±6.9)	3.2 (±0.0)	0.0	0.0	0.0
South Branch							
Chase Bridge	396.1 (±134.1)	218.5 (±91.5)	55.1 (±23.0)	30.2 (±10.2)	7.2 (±5.2)	0.0	0.0
Smith Bridge	223.4 (±57.4)	71.8 (±31.7)	13.2 (±4.0)	3.3 (±0.0)	0.0	0.0	0.0

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