

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-35-R-23

Study No.: 665

Title: Investigation of causes of declines in Au Sable River brown trout populations

Period Covered: April 1, 1997 to March 31, 1998

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 six river reaches distributed among three branches of the Au Sable River during late summer and early fall 1997. 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 1997 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 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. Data are summarized in formats to facilitate analyses such as effects of temperature on incubation time and growth rates of trout.

Table 1.—Estimated^a number (± 2 SE) of brown trout per hectare by age for fall 1997 populations in the Mainstem, North Branch, and South Branch Au Sable River.

River branch	Age						
	0	1	2	3	4	5	6
Mainstem							
Stephan Bridge	1479 (± 154)	289 (± 64)	99 (± 34)	76 (± 21)	18 (± 11)	2 (± 4)	0
Wa Wa Sum	484 (± 132)	138 (± 31)	30 (± 13)	13 (± 2)	0	0	0
North Branch							
Eamons Landing	222 (± 79)	37 (± 4)	7 (± 2)	2 (± 2)	0	0	0
Dam - 4	775 (± 99)	52 (± 9)	8 (± 3)	5 (± 2)	2 (± 1)		
South Branch							
Chase Bridge	619 (± 191)	114 (± 41)	37 (± 5)	22 (± 9)	20 (± 9)	3 (± 5)	0
Smith Bridge	225 (± 74)	39 (± 26)	12 (± 9)	12 (± 9)	3 (± 0)	0	0

^a Petersen (Bailey modification) single-census mark-and-recapture population estimate.

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