

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-80-R-8

Study No.: 230521

Title: Influence of lotic and nearshore habitats on fish populations in Great Lakes and inland lake ecosystems, with emphasis on walleye

Period Covered: October 1, 2006 to September 30, 2007

Study Objective: (1) to assess the extent of natural reproduction of walleye in the Michigan waters of Green Bay via marking stocked fish with oxytetracycline (OTC) and describing their contribution to walleye year classes; and (2) to assess the relative influence of river spawning habitat, estuary conditions, juvenile-adult growth habitat, and supplemental stocking on spawning runs of walleye (and estimates of percent natural reproduction) in various river-influenced systems in Michigan.

Summary: We attempted to estimate the size of the walleye spawning run in the Manistique River using boomshocking gear, but unusual spring weather conditions prevented us from successfully conducting the estimate. We tagged 800 walleye in Little Bay de Noc (LBDN) and processed 128 walleye tag returns. We used gill nets and trawls to conduct assessment surveys of adult and juvenile fish in June, July, August, and September in Big Bay de Noc (BBDN) and LBDN. We collected samples of juvenile walleye from BBDN and LBDN to examine for OTC marks on their otoliths. Analysis of LBDN walleye collected in 2006 for OTC analysis showed a substantial contribution of hatchery-reared fish despite relatively low numbers of age-0 walleyes being stocked. Considerably more age-0 walleyes were collected in BBDN than in a previous unstocked year (2004).

Findings: Jobs 1, 2, 4, 5, and 6 were scheduled for 2006-07, and progress is reported below.

Job 1. Title: Estimate size of walleye spawning runs in rivers.—We attempted to estimate the size of the walleye spawning run in the Manistique River using boomshocking gear. Unusual spring weather conditions prevented us from successfully conducting the estimate. Our initial sampling effort on March 28 proved to be too early as only one walleye was observed and the water temperature (38°F) was too cold for walleye spawning. Winter-like conditions ensued for the next two weeks, precluding any field work. Air temperatures at the Naubinway weather buoy (40 miles east of Manistique) during April 1-14 averaged 29.5°F and ranged from 14 to 45°F, and 38 inches of snow fell on Marquette. When sampling resumed on April 16, 89 walleye were collected. Seven of the 16 female walleye collected on this date were spent or partially spent, indicating that considerable spawning occurred during the first two weeks of April, despite the cold air and water temperatures. Similar catches the following day supported this conclusion, indicating that conducting a spawning run estimate could not occur because we missed much of the spawning run. We will attempt to estimate the spawning run in the Manistique River in a future year.

Job 2. Title: Tag walleyes in LBDN and process tag returns.—In April 2007, we used individually-numbered monel bands to jaw-tag 800 walleye collected from LBDN near the mouth of the Whitefish River. We processed tag returns for 128 sport caught walleyes during this study period, 60 of which were tagged in LBDN. Numbers of tag returns for other tagging locations were as follows BBDN (2), Cedar River (50), and Menominee River (16).

Job 4. Title: Sample estuaries.—Marquette Fisheries Research Station personnel collected samples of adult and juvenile fish in June, July, August, and September in BBDN and LBDN. Samples were obtained from 10-min bottom trawl hauls (typically 5 per bay per month) and overnight gill net sets (4 per bay per month). Gear dimensions and configurations were identical to those described by Schneeberger (2000). Data will be entered and proofed after the field season ends. We are considering gear and sample design changes for summer assessment sampling in future years. Field sampling of river estuary areas to determine their suitability for larval walleye was determined to be infeasible under Job 3 and was not conducted.

Job 5. Title: Collect OTC samples and summarize findings.—Walleye sampling in fall 2007 was successful in that all scheduled sites were sampled and substantial numbers of walleyes were collected from both bays. Results of this sampling will be reported next year. Walleye collected in fall 2006 were examined for OTC marks and the findings summarized (Table 1). Though lower numbers of walleye were stocked in LBDN in 2006 than prescribed, they still made up a large portion (86%) of the age-0 walleyes examined. This suggests relatively good survival of stocked fish or low levels of natural reproduction of walleyes in LBDN in 2006. More age-0 walleye were collected in BBDN in 2006 than in the previous unstocked year (2004), but the number collected was much lower than the 305 age-0 walleye collected in 2005 when stocking occurred. For LBDN, the percent contribution of naturally-reproduced fish has stayed relatively constant as year classes grow older. The situation for BBDN seemed to differ with the most striking example occurring for the 2005 year class that was very abundant as age-0 and dominated by hatchery-reared fish (71% of catch), but nearly absent by age-1 when only 25% of fish collected were of hatchery origin.

Job 6. Title: Write report.—This progress report was completed as scheduled.

Literature Cited:

Schneeberger, P. J. 2000. Population dynamics of contemporary yellow perch and walleye stocks in Michigan waters of Green Bay, Lake Michigan, 1988-96. Michigan Department of Natural Resources, Fisheries Research Report 2055, Ann Arbor.

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Date: September 30, 2007

Table 1.—Percent of walleye in Little Bay de Noc (LBDN) and Big Bay de Noc (BBDN) originating from natural reproduction. Sample sizes occur in parentheses. The number of walleye stocked in LBDN during 2006 was lower than planned due to an oxytetracycline-marking mishap.

Location	Year class	Number stocked	Percent wild			Composite for year class
			Age-0	Age-1	Age-2	
LBDN	2004	569,225	26 (62)	29 (99)	47 (90)	35 (251)
	2005	0	97 (157)	96 (118)		97 (275)
	2006	160,749	14 (119)			14 (119)
BBDN	2004	0	86 (7)	33 (3)		70 (10)
	2005	749,427	29 (305)	75 (8)		30 (313)
	2006	0	100 (46)			