

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-81-R-1

Study No.: 490

Title: Assessment of steelhead and brown trout populations in eastern Lake Michigan.

Period Covered: October 1, 1999 to September 30, 2000

Study Objectives: To evaluate the status and health of steelhead and brown trout stocks by assessing growth, abundance, diet composition, general health, and incidence of disease.

Summary: Small numbers of steelhead and brown trout were collected in assessment netting operations in 1999 (13 steelhead and 26 brown trout were collected from all nets set in Michigan's waters of Lake Michigan from April through September in 1999). Only one north-south sampling transect of Lake Michigan occurred in 2000. These collections are complete, and we are entering data into standard databases. A literature database is being compiled and continually updated with articles related to steelhead physiology, behavior, and habitat preferences. It was difficult to distinguish distributional anomalies from density and abundance factors with the small number of brown trout and steelhead observed in our surveys. The largest steelhead and brown trout catch rates occurred in the southernmost districts. We captured most steelhead and brown trout in surface gill nets when compared to catch rates in suspended or bottom gill nets. Brown trout have never tested positive for bacterial kidney disease (BKD) in assessment gill nets, and levels of infection in steelhead have remained relatively low when compared to those of lake trout or chinook salmon.

Job 1. Title: Evaluate relevant literature on steelhead.

Findings: Literature on steelhead physiology, behavior, and habitats is being collected and catalogued in an "Endnote" bibliographic software library. We conducted "Current Contents" searches twice a month on relevant fisheries journals to identify journal articles and publications that might be of interest.

Job 2. Title: Establish the distribution pattern and origin of steelhead trout and brown trout during spring and summer in eastern Lake Michigan.

Findings: We have much to learn regarding the movement patterns and distributions of steelhead and brown trout within Lake Michigan. It was difficult to distinguish distributional anomalies from density and abundance factors with the small number of steelhead and brown trout observed in our surveys. In 2000, we conducted standard netting efforts in only the spring season on Lake Michigan and we are in the process of entering this information into standardized databases. Throughout the previous years sampled (1994-1999), we observed few steelhead or brown trout in the northernmost statistical district MM-3 (Table 1). Brown trout catch rates were evenly distributed across statistical districts MM-5 through MM-8 (Table 1), while the largest steelhead catch rates occurred in the southernmost district (MM-8; Table 1). In 1999, the catch rates of both species were similar in statistical districts MM-6 and MM-8. Prior to 1999, most steelhead

and brown trout were captured in surface gill nets (65-100%), as compared to catch rates in suspended (10-35%) or bottom gill nets (0-15%; Table 2). In 1999, brown trout catch rates were again higher in surface gill nets (85%). However, steelhead catch rates were approximately equal between the two net types (54% in surface gill nets and 46% in suspended gill nets).

Job 3. Title: Determine relative abundance and survival rates of steelhead and brown trout in eastern Lake Michigan.

Findings: For steelhead and brown trout the sample sizes from gill net assessments were very limited and highly variable from year to year. It will be difficult to establish mortality estimates or attribute catch rates to abundance until multi-state lake-wide assessments are implemented. Members of the Great Lakes Fishery Commissions' Lake Michigan Technical Committee are still in the process of designing a lakewide assessment plan for trout and salmon populations.

Job 4. Title: Obtain data on diets of steelhead and brown trout in eastern Lake Michigan.

Findings: We took stomachs from all steelhead and brown trout collected in 2000. We have archived stomach samples, but have not yet evaluated the stomach contents. Laboratory analysis is complete for stomachs collected in 1995; stomach samples from 1996 to the present have yet to be evaluated.

Job 5. Title: Monitor the general health and prevalence of BKD in populations of steelhead and brown trout in eastern Lake Michigan.

Findings: We conducted FELISA testing for BKD on steelhead (N=13) and brown trout (N=24) collected in 1999 lake-wide assessments, and all fish tested negative for the BKD antigen. Since 1995, brown trout collected in annual surveys have never tested positive for BKD. During the same period, steelhead have tested positive at levels ranging from 0 to 25 percent of the fish tested (Table 3). In the last two years (1998 and 1999), no steelhead have tested positive for BKD.

Job 6. Title: Coordinate with other studies, process and analyze data, write reports.

Findings: Data collection for this project is closely coordinated with studies 486 and 485. We will also use information collected for this study (490) in study 487. This progress report was prepared.

Prepared by: Jory Jonas.

Date: September 30, 2000

Table 1.—Total catch of steelhead and brown in trout statistical districts (MM-3 through MM-8) in Lake Michigan listed from north to south. An "X" indicates that we did not collect any data for the specified year, species, and location.

	1994		1995		1996		1997		1998		1999		TOTAL	
	Brown		Brown		Brown		Brown		Brown		Brown		Brown	
	Trout	Steelhead	Trout	Steelhead	Trout	Steelhead	Trout	Steelhead	Trout	Steelhead	Trout	Steelhead	Trout	Steelhead
MM-3	2	1	1	1	2	1	0	1	0	4	0	0	5(5%)	8(1%)
MM-4	0	0	0	0	0	0	0	1	X	X	X	X	0(0%)	1(0%)
MM-5	1	0	1	7	8	41	18	1	X	X	X	X	28(27%)	49(8%)
MM-6	4	13	2	31	1	44	5	3	4	5	14	8	30(29%)	104(17%)
MM-7	0	9	1	16	8	85	6	4	X	X	X	X	15(14%)	114(19%)
MM-8	0	19	0	50	2	240	10	5	2	8	12	5	26(25%)	329(55%)

Table 2.—Number of steelhead and brown trout captured in surface, suspended, and bottom gill nets in Lake Michigan. From 1994-1996, we did not separate catches in surface and suspended nets in our records and since we only collected one fish in a bottom gill net during this period, we have combined years. Numbers in parentheses represent the percent captured in each gear.

	1994-96		1997			1998			1999		
	Bottom Net	Surface Net	Bottom Net	Suspended Net	Surface Net	Bottom Net	Suspended Net	Surface Net	Bottom Net	Suspended Net	Surface Net
Brown Trout	1(3%)	32(97%)	6(15%)	4(10%)	29(75%)	0(0%)	1(12%)	7(88%)	1(4%)	3(11%)	22(85%)
Steelhead	0(0%)	558(100%)	0(0%)	4(27%)	11(73%)	0(0%)	6(35%)	11(65%)	0(0%)	6(46%)	7(54%)

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Table 3.—Incidence of bacterial kidney disease (positive or negative) in Lake Michigan steelhead and brown trout captured in assessment netting for 1995-1999. The percent frequency is given in parentheses.

	1995		1996		1997		1998		1999	
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg
Steelhead	30(23%)	103(77%)	41(9%)	411(91%)	5(25%)	15(75%)	0(0%)	17(100%)	0(0%)	13(100%)
Brown trout	0(0%)	5(100%)	0(0%)	20(100%)	0(0%)	35(100%)	0(0%)	5(100%)	0(0%)	24(100%)