

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-81-R-8

Study No.: 230488

Title: Status of the Lake St. Clair fish community and sport fishery

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

Study Objectives: The objectives of this study are (1) to measure the relative abundance of yellow perch, forage fish, and juvenile gamefish species in Lake St. Clair, (2) to assess the status of adult gamefish populations in the lake, (3) to document the abundance, growth, mortality rates, and movements of smallmouth bass in the St. Clair system, (4) to document the abundance and distribution of aquatic plants in Lake St. Clair, (5) to monitor trends in sport fish catch rates for the Lake St. Clair sport fishery.

Summary: Fish populations were sampled with 10 m headrope bottom trawls and trap nets during 2006 and 2007. Data entry and analysis for all 2006 trawls and trap nets are completed. Walleye *Sander vitreus* and smallmouth bass *Micropterus dolomieu* were tagged and tag recovery data were compiled and analyzed. Sport fishing catch and effort information was collected with a voluntary angler diary program in 2006 and 2007. Data entry and analysis for all 2006 sport diaries are complete. About five weeks of survey time were spent continuing to develop effective and efficient aquatic plant survey techniques. Hydroacoustic techniques were again used along with intensive plant sampling at 75 square hectare plots in 2007. Plants were also sampled at Chief Lake, Manistee County, to compare techniques.

Findings: Jobs 1 through 8 were scheduled for 2006-07, and progress is reported below.

Job 1. Title: Sample fish community with index trawls in June and September.—During 2006 fish were collected at the Anchor Bay index site with a 10 m headrope bottom trawl with 3 tows in June and 13 tows in September. Alewives have been nearly absent from both spring and fall trawls since 2003. This coincides with the collapse of the alewife population in Lake Huron, suggesting alewives found in Lake St. Clair probably originate from southern Lake Huron.

Sampling continued on schedule in 2007.

Job 2. Title: Sample fish community with trap nets and tag walleye and smallmouth bass.—Trap nets were fished in Anchor Bay of Lake St. Clair to capture predator fish species and collect biological data on their populations. In 2007, trap nets were fished from May 1 to May 22. A total of 50 net lifts captured 65 northern pike, 56 muskellunge, 591 smallmouth bass, and 179 walleye. A total of 131 walleye and 553 smallmouth bass were tagged with monel metal jaw tags in 2007. Tagging data on individual walleye and smallmouth bass were entered into computer files and added to the MDNR tagging database.

Scale samples collected from predator species will be processed by March 2008.

Job 3. Title: Collect, summarize, and analyze tag recovery data.—A total of 26 walleye tags and 43 smallmouth bass tags from all Anchor Bay tagging have been recovered through September 2007 by anglers and reported to MDNR. Recovery data were collected from anglers; capture locations

were converted to geographic coordinates, and combined with appropriate tagging data. Information letters and shoulder patches were sent to each angler to thank them for their cooperation. All pertinent tag recovery data were placed in the Lake St. Clair tag recovery database. Recaptures of tagged walleye were more dispersed compared to smallmouth bass tag recaptures (Figure 1).

Job 4. Title: Survey aquatic plant community.—We continued to survey submerged aquatic plant growth in Lake St. Clair during 2007 with remote sensing (Biosonics©) split-beam hydroacoustic equipment and plant hook tosses. A total of 75 hectare plots were surveyed compared with 45 plots in 2006 (Figure 2).

In 2007, we also sampled a small inland lake, Chief Lake, in Manistee County using the hydroacoustic and plant hook techniques. Results will be compared to samples collected by a University of Michigan honors student and personnel from the Michigan Department of Environmental Quality (MDEQ) using the MDEQ plant sampling protocol.

Job 5. Title: Collect catch and effort data for sport fishery with angler diaries.—A voluntary angler diary program was used to collect catch and effort data for recreational fishing on Lake St. Clair. In 2006, the MDNR distributed 55 angler diaries to Michigan resident sport anglers interested in participating in the diary program. A total of 40 diaries were returned by cooperating Michigan resident anglers during fall and early winter. The Lake St. Clair Angler Diary Program provides annual estimates of catch rates for the major sport fish species in the lake. Ontario and Michigan angler diary data were pooled to produce the 2006 estimates (Table 1). Increased angler participation is needed if this program is to continue to provide reasonable estimates of catch rates for sport fish in Lake St. Clair.

New angler diaries were distributed in April 2007 and will be recalled in November 2007.

Job 6. Title: Process and analyze data.—Processing of yellow perch scale samples collected in 2006 was completed. Although the data set covers a limited time period, it appears that growth rates, based on mean length at age, have declined and are now consistently below state average for all ages. Evaluation of catch rates by age indicated the presence of strong and weak year classes in the population (Table 2). The 1992, 1999, 2000, 2002, and 2004 year classes appeared weak, while the 1993, 1994, and 1998, and 2003 year classes were comparatively strong.

Processing of scale samples collected in 2007 is underway.

Job 7. Title: Prepare annual performance report and other reports.—In addition to this study performance report, findings of work conducted under this study were summarized in an annual fisheries status report prepared for the Lake Erie Committee of the Great Lakes Council of Lake Committees, which is provided with the F-81-R-8, Study 230460 annual performance report.

Thomas, M. V., and R. C. Haas. 2007. Status of the fisheries in Michigan waters of Lake Erie and Lake St. Clair 2006. Report to the Lake Erie Committee of the Great Lakes Fisheries Commission. Michigan Department of Natural Resources, Mt. Clemens.

Job 8. Title: Prepare manuscript for field sampling through October 2006.—Preparation of a manuscript for submission as a fisheries research report summarizing the results of field work and lab analyses from 2002 through 2006 is underway and will be submitted to research administration for publication by January 10, 2008.

Literature cited:

Bryant, W. C., and K. D. Smith. 1988. Distribution and population dynamics of smallmouth bass in Anchor Bay, Lake St. Clair. Michigan Department of Natural Resources, Fisheries Research Report 1944, Ann Arbor.

Lillie, R. A. 1990. A quantitative survey of the submersed macrophytes in Devil's Lake, Sauk County, with a historical review of the invasion of Eurasian watermilfoil, *Myriophyllum spicatum* L. Transactions of the Wisconsin Academy of Sciences, Arts and Letters. Vol. 78.1–20.

Thomas, M.V., and R. C. Haas. 2004. Status of the Lake St. Clair fish community and sport fishery, 1996–2001. Michigan Department of Natural Resources, Fisheries Research Report 2067, Ann Arbor.

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Date: September 30, 2007

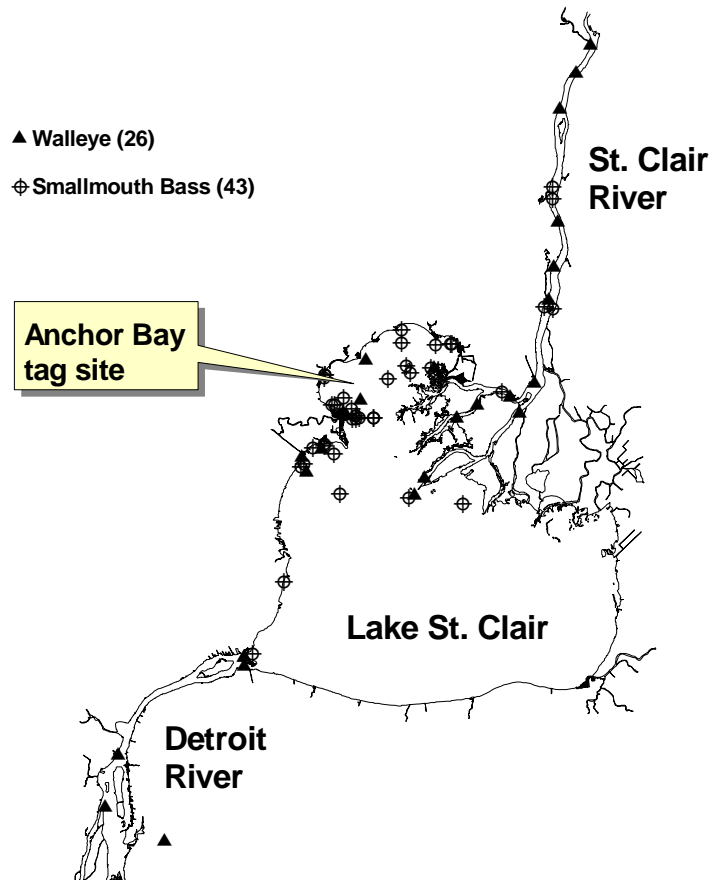


Figure 1.—Map of 2007 tag recovery locations for smallmouth bass and walleye. All fish were tagged during spring at the Anchor Bay, Lake St. Clair tag site.

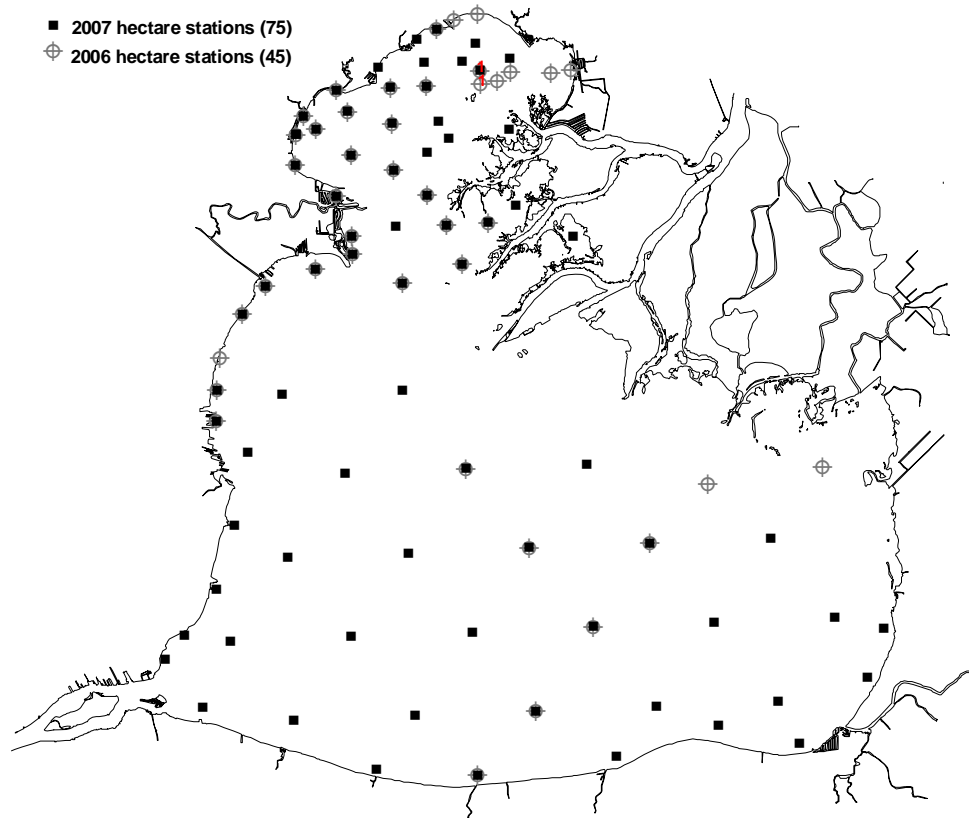


Figure 2.—Map of 75 hydroacoustic sampling stations (hectare plots) visited in 2007, along with 45 sampling locations visited in 2006.

Table 1.—Angler effort, catch, and catch rates for the Lake St. Clair sport fishing diary program.

Year	Trips seeking	Effort (rod-hours)	Number caught	Number kept	Catch per rod-hour	% released
Walleye						
1998	510	5,599	2,481	1,947	0.44	22
1999	625	5,850	2,610	2,239	0.44	14
2000	444	4,672	1,753	1,646	0.37	6
2001	342	4,051	1,893	1,681	0.47	11
2002	425	4,475	1,357	1,298	0.30	4
2003	543	5,533	2,536	2,280	0.46	10
2004	393	3,740	1,048	862	0.28	18
2005	526	4,845	4,036	1,906	0.83	53
2006	436	4,204	2,373	2,046	0.56	14
Yellow perch						
1998	305	3,520	7,134	5,048	2.03	29
1999	226	2,087	6,142	3,654	2.94	41
2000	235	2,892	10,436	5,660	3.61	46
2001	164	2,047	5,862	4,350	2.86	26
2002	412	4,658	12,841	9,091	2.87	29
2003	335	3,829	9,694	6,149	2.53	37
2004	293	3,917	7,910	5,119	2.02	35
2005	232	2,798	8,470	4,141	3.03	51
2006	231	2,456	13,261	6,785	5.40	49
Smallmouth bass						
1998	127	1,248	495	94	0.40	81
1999	222	1,841	1,112	204	0.60	82
2000	190	1,126	1,484	126	1.22	92
2001	74	512	280	48	0.55	83
2002	153	1,207	954	110	0.79	88
2003	179	1,586	1,466	135	0.92	91
2004	126	999	845	54	0.84	94
2005	82	556	286	41	0.52	86
2006	84	828	564	72	0.68	87
Muskellunge						
1997	425	15,199	1,573	11	0.103	99
1998	383	11,336	1,075	8	0.094	99
1999	318	9,370	645	5	0.069	99
2000	269	8,874	749	16	0.084	98
2001	241	7,248	851	2	0.117	100
2002	156	3,953	277	4	0.070	99
2003	141	3,731	341	10	0.091	97
2004	114	2,510	236	1	0.094	100
2005	109	2,468	209	0	0.085	100
2006	89	1,838	130	0	0.071	100

Table 2.–Catch rate by age for yellow perch in June index trawl tows on Lake St. Clair.

Year class	Total CPUE	Survey year												
		1994 ^a	1995 ^a	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
1984	0.5	0.1	0.3	–	–	–	–	–	–	–	–	–	–	–
1985	0.2	0.2	0.0	–	–	–	–	–	–	–	–	–	–	–
1986	0.3	0.1	0.0	–	–	–	–	–	–	–	–	–	–	–
1987	1.0	0.6	0.3	0.1	–	–	–	–	–	–	–	–	–	–
1988	4.1	1.6	0.9	0.3	0.3	–	–	–	–	–	–	–	–	–
1989	10.2	3.7	2.2	1.2	0.3	–	–	–	–	–	–	–	–	–
1990	30.1	4.1	13.4	5.2	1.3	–	–	–	–	–	–	–	–	–
1991	167.9	47.0	32.1	18.7	12.9	5.3	0.6	–	–	–	–	–	–	–
1992	52.1	3.4	5.8	11.5	9.6	18.4	1.1	0.1	0.5	–	0.7	–	–	–
1993	581.3	56.3	125.8	171.4	113.7	53.7	54.3	1.5	3.3	–	1.3	–	–	–
1994	903.0	–	166.2	293.2	348.2	53.2	20.6	8.3	10.6	1.3	0.7	–	0.7	–
1995	148.1	–	–	21.4	40.7	6.7	32.2	12.3	21.1	10.4	2.7	0.6	0.0	–
1996	279.7	–	–	–	33.3	108.5	70.3	11.3	35.3	9.7	9.4	0.6	1.3	–
1997	217.7	–	–	–	–	3.8	37.6	5.5	52.8	61.3	44.4	3.6	7.9	0.8
1998	1,354.9	–	–	–	–	–	650.2	114.1	347.7	83.7	118.4	22.7	17.7	0.4
1999	102.2	–	–	–	–	–	–	4.8	25.8	17.6	24.9	22.7	3.9	2.5
2000	77.8	–	–	–	–	–	–	–	2.7	4.6	5.4	43.0	20.5	1.6
2001	308.0	–	–	–	–	–	–	–	–	131.3	89.5	50.2	25.3	11.7
2002	37.9	–	–	–	–	–	–	–	–	–	8.7	11.4	6.1	11.7
2003	1,276.7	–	–	–	–	–	–	–	–	–	–	705.3	396.6	174.8
2004	167.3	–	–	–	–	–	–	–	–	–	–	–	9.0	158.3
2005	33.6	–	–	–	–	–	–	–	–	–	–	–	–	33.6

^a Data from previous studies.