

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-81-R-7

Study No.: 230488

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

Period Covered: October 1, 2005 to September 30, 2006

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 2005 and 2006. Data entry and analysis for all 2005 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 2005 and 2006. Data entry and analysis for all 2005 sport diaries are complete. About five weeks of survey time were spent continuing to developing effective and efficient aquatic plant survey techniques. Hydroacoustic techniques were again used along with intensive plant sampling at square hectare plots in 2006. In addition, cross-lake transects totaling 118 km were sampled for plant biomass with remote hydroacoustic equipment. These results will provide a basis for future descriptions of the Lake St. Clair plant community and for comparing it to the plant community in 1978 based on hook tosses. Analysis of the data collected will also aid in developing and improving sampling protocols for monitoring the plant community in other Michigan lakes and rivers.

Findings: Jobs 1, 3, 5, 6, 9, 10, and 11 were scheduled for 2005-06, and progress is reported below.

Job 1. Title: Sample yellow perch and forage with index trawls.—During 2005 fish were collected at the Anchor Bay index site with a 10 m headrope bottom trawl with 4 tows in June and 7 tows in September. In June, yellow perch, spottail shiner *Notropis hudsonius*, bluntnose minnow *Pimephales notatus*, trout-perch *Percopsis omiscomaycus*, and mimic shiner *N. volucellus* were most abundant. During September mimic shiner, spottail shiner, bluntnose minnow, white perch *Morone americana*, and logperch were most abundant. Comparison of spring and fall densities of fish for Anchor Bay index trawls since 1998 revealed some interesting seasonal patterns (Table 1). Yellow perch density was consistently higher during June than during the fall sampling period. We suspect that yellow perch catch rates were low in September due to yellow perch movement into macrophyte beds, which were abundant by September. Unfortunately, we were unable to effectively trawl in heavily vegetated areas of the lake. Conversely, alewife *Alosa pseudoharengus* and smallmouth bass abundances were generally higher in the fall sampling. This increase is likely related to recruitment of age 0 fish to the trawl gear by September.

While few trends in catch rates across the time period 1999–2005 were evident, several species appear to have lower catch rates in recent years. Alewives were nearly absent from both spring and fall trawls in 2003, 2004, and 2005. 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. Logperch and johnny darter *Etheostoma nigrum* both exhibited lower catch rates after round gobies *Neogobius melanostomus* colonized Lake St. Clair (Thomas and Haas 2004). While, logperch appear to have rebounded in 2004 and 2005, johnny darter abundance remained low.

Sampling continued on schedule in 2006.

Job 3. Title: Collect catch and effort data for the 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. The program was initiated by the Ontario Ministry of Natural Resources (OMNR) in 1985 to monitor trends in the muskellunge catch rate for Lake St. Clair. Five years later the program was expanded to include other species. The Michigan Department of Natural Resources (MDNR) became involved in the program in 1993. Since that time, the program has been a cooperative effort between the OMNR and MDNR. In 2004, the MDNR distributed 64 angler diaries to Michigan resident sport anglers interested in participating in the diary program. A total of 49 diaries were returned by cooperating 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 2005 estimates (Table 2). The walleye catch rate increased dramatically in 2005 from the low value observed in 2004. However, over 50% of the walleye caught were released, presumably because they were below the 13 in minimum size limit. Yellow perch catch rate also improved in 2005, but over 50% of the catch was released. We believe this was due to the small size of yellow perch available to anglers. Muskellunge catch rates in 2005 were within the range of values recorded since 1996. None of the 209 muskellunge caught by angler diary participants was kept. Fishing effort for muskellunge was the lowest since 1996. Anecdotal reports indicate muskellunge fishing activity has remained steady or even increased in recent years. This suggests angler diary participation by muskellunge anglers has declined. Efforts to recruit new muskellunge anglers to the diary program should be a priority in 2007. The smallmouth bass catch rate and number caught declined in 2005 for the second consecutive year. Diary program participants released 86% of the smallmouth bass they caught. 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. MDNR creel survey data collected from Lake St. Clair from 2002 to 2004 will be compared with angler diary program results. In particular, comparison of angler diary catch rates with creel survey catch rate estimates will be interesting.

New angler diaries were distributed in April 2006 and will be recalled in November 2006.

Job 5. Title: Analyze data and estimate growth rates for yellow perch.—Processing of yellow perch scale samples collected in 2005 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 (Table 3). The causes of this decline are not clear.

Evaluation of catch rates by age indicated the presence of strong and weak year classes in the population (Table 4). The 1992, 1999, 2000, 2002, and 2004 year classes appeared weak, while the 1993, 1994, and 1998, and 2003 year classes were comparatively strong. Variable recruitment is characteristic of yellow perch populations throughout the Great Lakes. The apparent decline in growth during recent years could be related to higher yellow perch densities produced by the strong 1998 and 2003 year classes.

Processing of scale samples collected in 2006 is underway.

Job 6. Title: Prepare annual performance 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.

Job 9. Title: Sample fish community with trap nets and tag predator species.—Trap nets were fished in Anchor Bay of Lake St. Clair to capture predator fish species and collect biological data on their populations. In 2005, trap nets were fished from May 11 to May 26. The time period, water temperatures, and water clarity were similar to those conditions during the trap net survey in 2002 and 2004, but water temperatures were cooler in 2005 (Table 5). A total of 34 net lifts captured 68 northern pike, 56 muskellunge, 113 smallmouth bass, and 187 walleye. Legal size walleye (196) and smallmouth bass (97) were tagged with monel metal jaw tags and released at the site of capture. In 2005, a total of 20 fish species were represented in the trap net catch with rock bass (38%), walleye (17%), and smallmouth bass the most numerically abundant species in the catch (Table 6). The age distribution for the predator species caught in 2005 is shown in Table 7. For smallmouth bass, the age-6 cohort (1999 year class) accounted for 24% of the total captured in the trap nets. Mean age was highest for muskellunge at 10.4 years. The large difference in mean age between muskellunge and northern pike could reflect higher mortality rates for northern pike. Alternatively, it could be a result of differences in the spatial distribution of older fish due to differences in the spawning temperatures for these two species.

The total trap net catch rate for smallmouth bass in 2005 (3.3) was the lowest recorded. In fact, catch rates have been very low for three of the four recent years of this trap net survey. We suspect this occurred because we sampled only during May. The survey often included sampling into June and later in the 1970's and 1980's. Similarly, in 2003, sampling continued into June and the catch rate was 3 or 4 times higher than in 2002, 2004, or 2005 when sampling was limited to May (Table 8). The 1998 and 1999 year classes dominated the catch in 2005. Age 9 and older fish were well represented in the trap net catch, despite the overall low catch rates. We believe this is an indication that survival rates are high or that a particularly strong year class is present in that age group. Additional years of survey data will help us discern the current status of the Anchor Bay smallmouth bass population.

Trap-net sampling in 2006 occurred from May 4 to May 24. A total of 345 smallmouth bass and 215 walleye were captured in the trap nets. Scale samples collected from predator species will be processed by March 2007.

Job 10. Title: Collect, summarize, and analyze tag recovery data.—A total of 214 walleye and 305 smallmouth bass were tagged with monel metal jaw tags in 2006. Tagging data on individual walleye and smallmouth bass were entered into computer files and added to the MDNR tagging database.

A total of 128 walleye tags and 49 smallmouth bass tags have been recovered through September 2006 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.

There was a large difference in tag reporting rate between walleye (13.6%) and smallmouth bass (3.8%) during all five years (Table 9). We think this is substantial evidence that angler exploitation was significantly higher on walleye. However, behavioral differences between walleye anglers (primarily catch and harvest) and smallmouth bass anglers (primarily catch and release) may also be involved. Smallmouth bass tag reporting continues to be too low to support

mortality estimation. We need to develop a rapport with the bass tournament anglers so that tagging, and other methodologies, can be effective in estimating mortality parameters for smallmouth bass in Lake St. Clair.

Recaptures of tagged walleye were more dispersed compared to smallmouth bass tag recaptures (Figure 1). The average distance from tagging site to recapture site was 23.7 km for walleye and 8.0 km for smallmouth bass. The distribution of walleye tags also shows strong connections with Lake Erie populations compared to local dispersal in northern Lake St. Clair for the tagged smallmouth bass population.

Job 11. Title: Survey aquatic plant community.—We continued to survey submerged aquatic plant growth in Lake St. Clair during 2006 with remote sensing (Biosonics©) split-beam hydroacoustic equipment and plant hook tosses. A total of 43 hectare plots were surveyed compared with 56 plots in 2005, 26 plots in 2004, and 68 plots in 2003 (Figure 2). We analyzed acoustic data for the 11 plots sampled in all four years to look for changes in plant biomass.

In 2006, we continued to modify our sampling protocol utilizing Biosonics© hydroacoustic equipment by adding 118 km of across-lake transects (Figure 2). We hope these transects will allow expansion of the plant data from hectare plots leading to a better understanding of the whole-lake plant community. Twelve of the hectare sample sites were sampled acoustically during all four years of the program. We looked specifically at submerged plant height and percent plant coverage at four of those stations (stations 247, 278, 313, and 319) to determine if significant change had occurred over that time period (figures 3–6). As we determined last year from hydroacoustic echograms at station 313, it appears that a dramatic increase in plant coverage and biomass occurred between 2003 and 2004. The data show that in 2005 and 2006, the plant communities at these stations were similar to those in 2004 with possibly a slight increase.

Literature cited:

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- 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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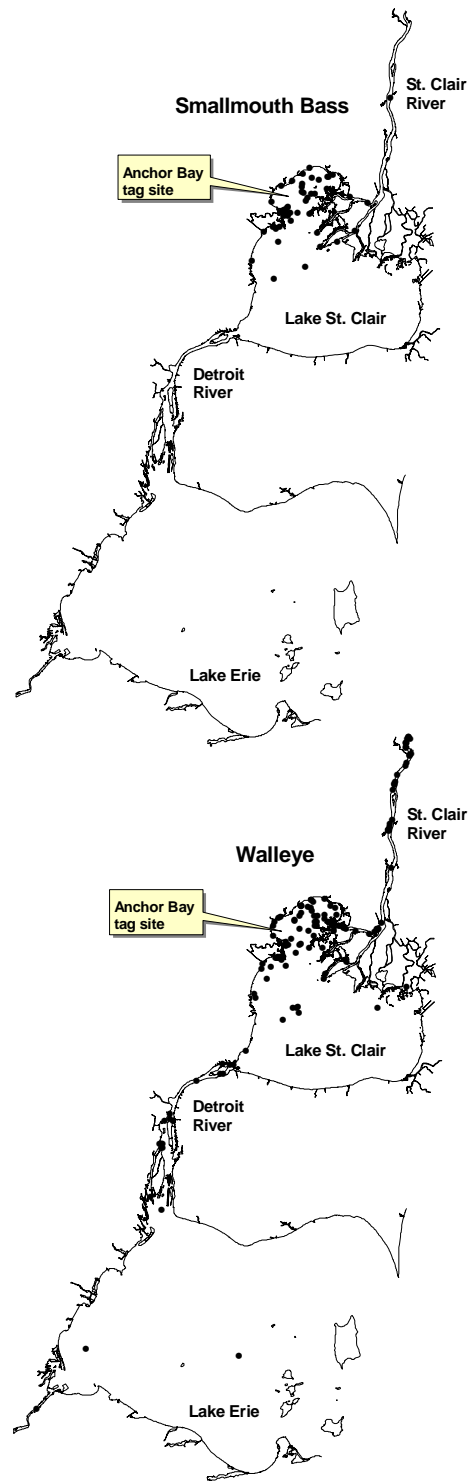


Figure 1.—Maps of 2003–2006 tag recovery locations for smallmouth bass (top, 50 tags) and walleye (bottom, 133 tags). All fish were tagged during spring at the Anchor Bay, Lake St. Clair tag site.

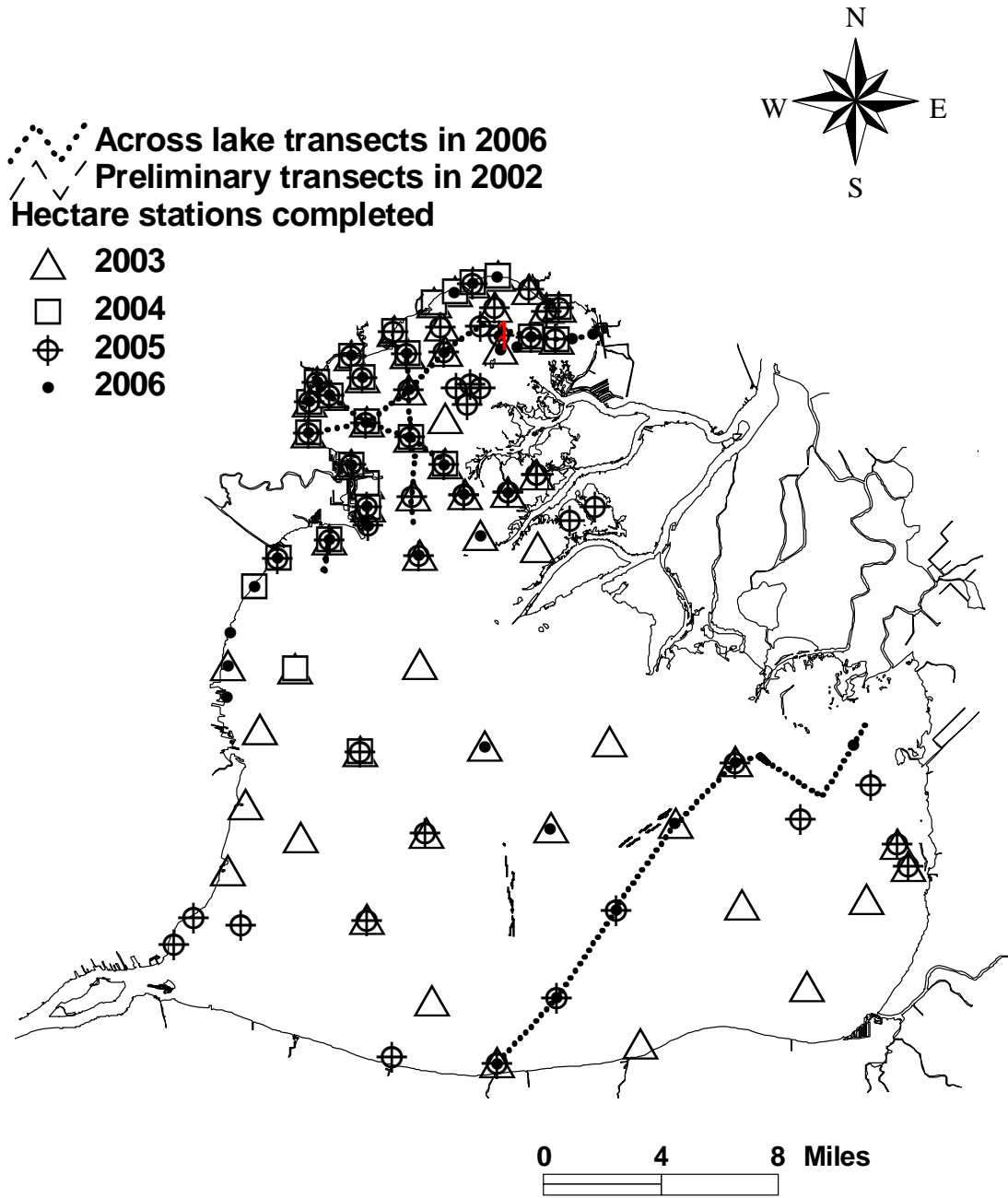


Figure 2.—Map of hydroacoustic transects and plant sampling locations in 2003 (triangles), 2004 (squares), 2005 (crosshairs), and 2006 (dots). Each station had square hectare plot sampling with hydroacoustic gear and plant hook tosses during all years. All but two of the 2004 sites were positioned at locations sampled in 2003. Eighteen of the 2005 sites were positioned at locations sampled in 2003 and 2004. Twelve of the 2006 sites were sampled during all four years.

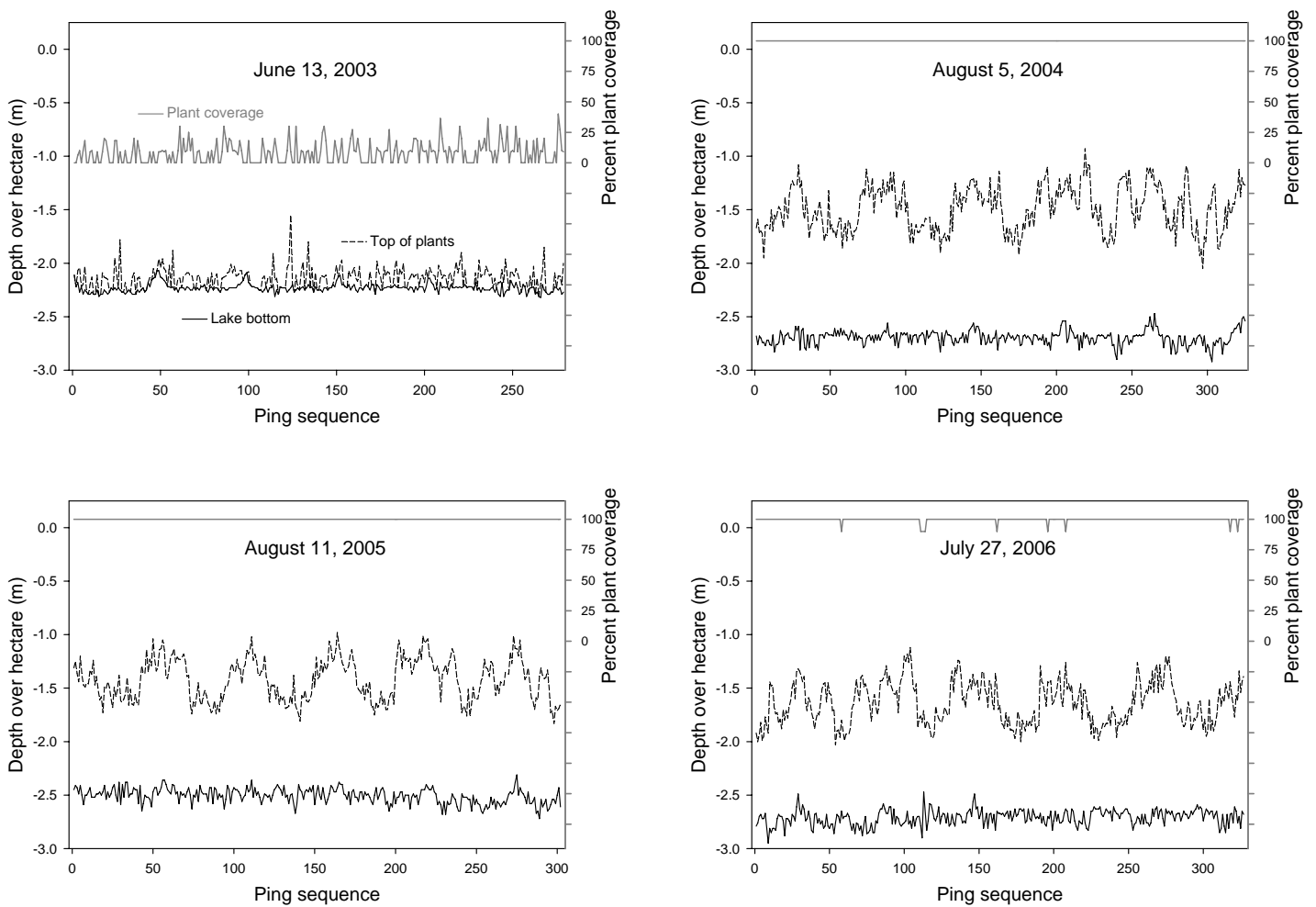
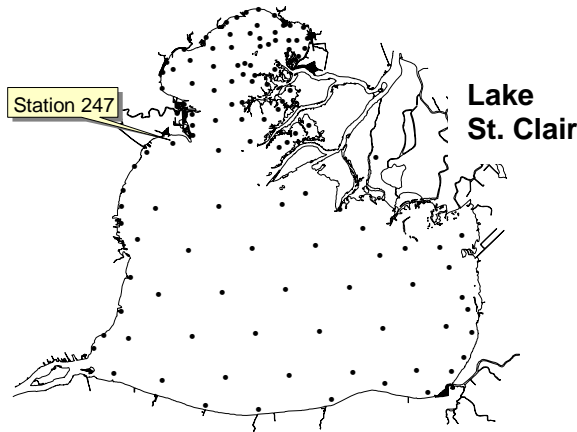


Figure 3.—Four graphs of water depth, submerged plant height, and percent plant coverage generated from plant hydroacoustic data collected at the same location (hectare station 247; see map) in Lake St. Clair in 2003, 2004, 2005, and 2006. Top most line in each graph shows percent coverage and is associated with the right vertical axis. Lower lines are associated with the left vertical axis and show bottom (solid) and top of plant community (dashed).

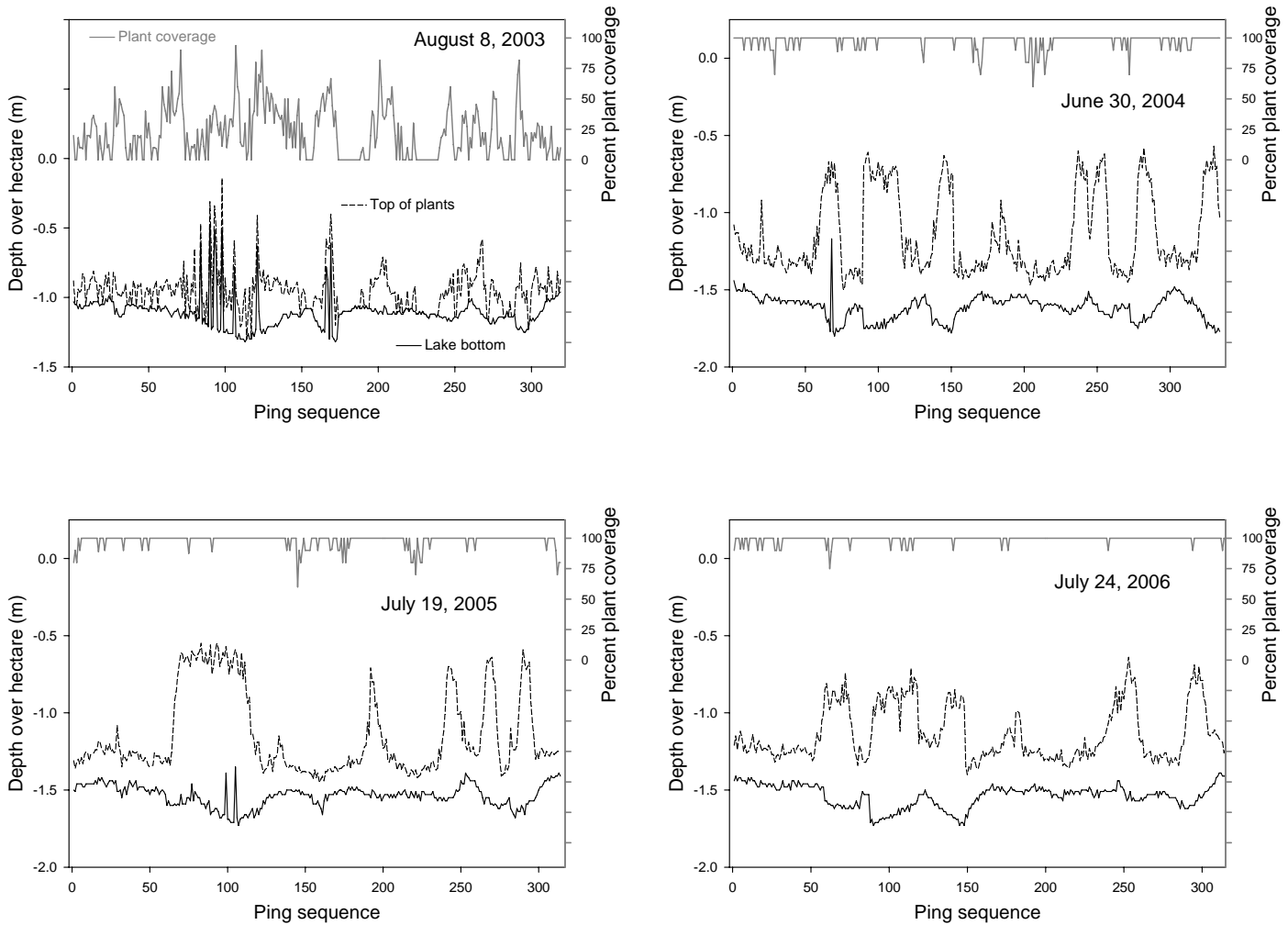
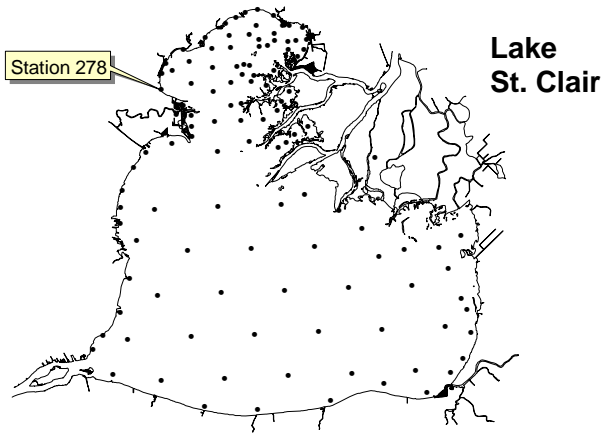


Figure 4.—Four graphs of water depth, submerged plant height, and percent plant coverage generated from plant hydroacoustic data collected at the same location (hectare station 278; see map) in Lake St. Clair in 2003, 2004, 2005, and 2006. Top most line in each graph shows percent coverage and is associated with the right vertical axis. Lower lines are associated with the left vertical axis and show bottom (solid) and top of plant community (dashed).

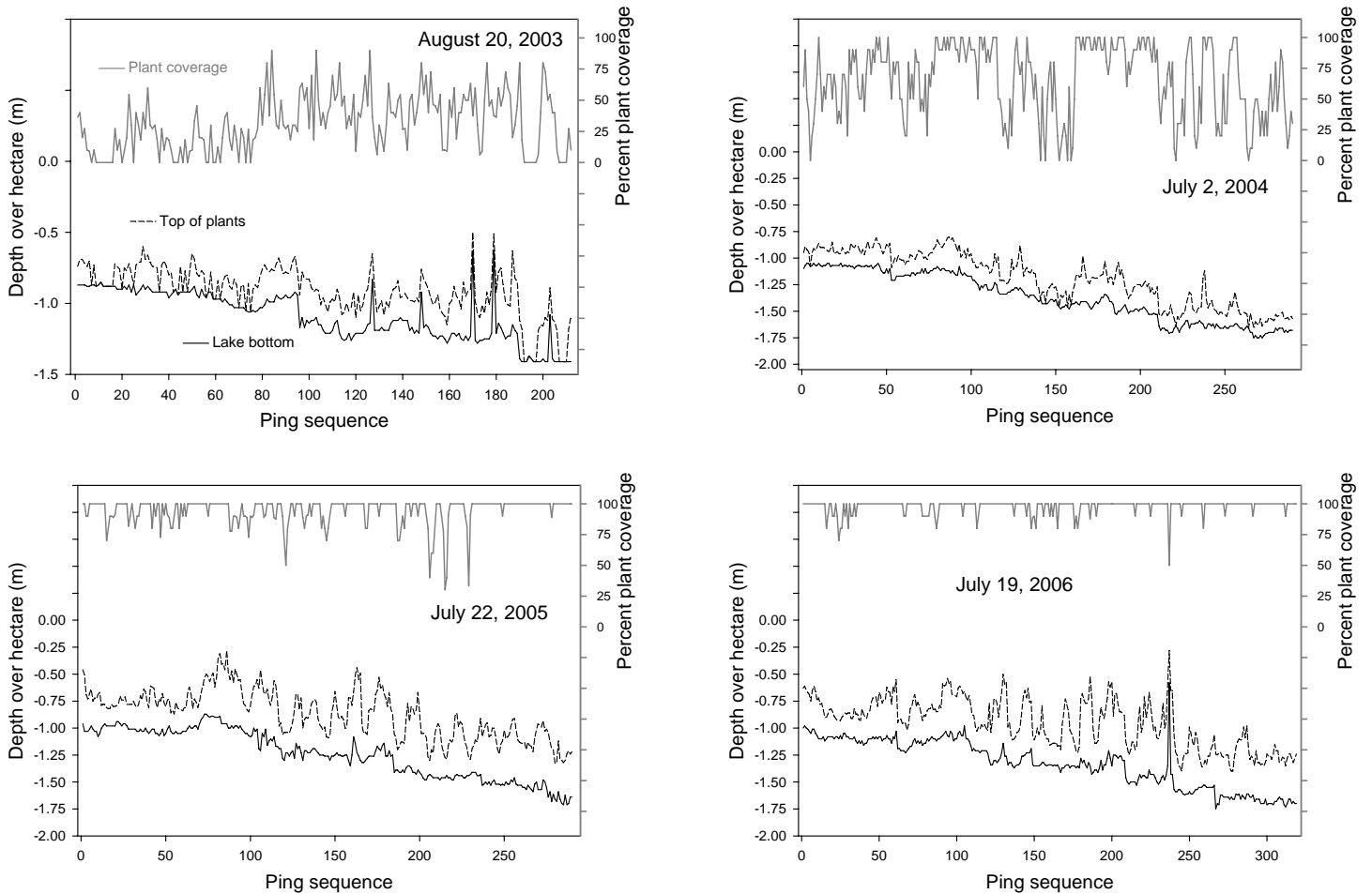
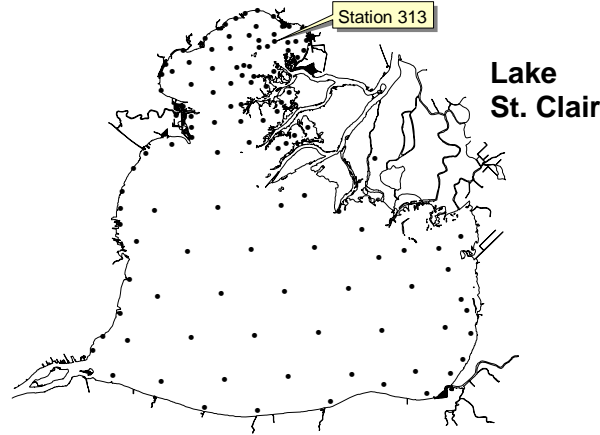


Figure 5.—Four graphs of water depth, submerged plant height, and percent plant coverage generated from plant hydroacoustic data collected at the same location (hectare station 313; see map) in Lake St. Clair in 2003, 2004, 2005, and 2006. Top most line in each graph shows percent coverage and is associated with the right vertical axis. Lower lines are associated with the left vertical axis and show bottom (solid) and top of plant community (dashed).

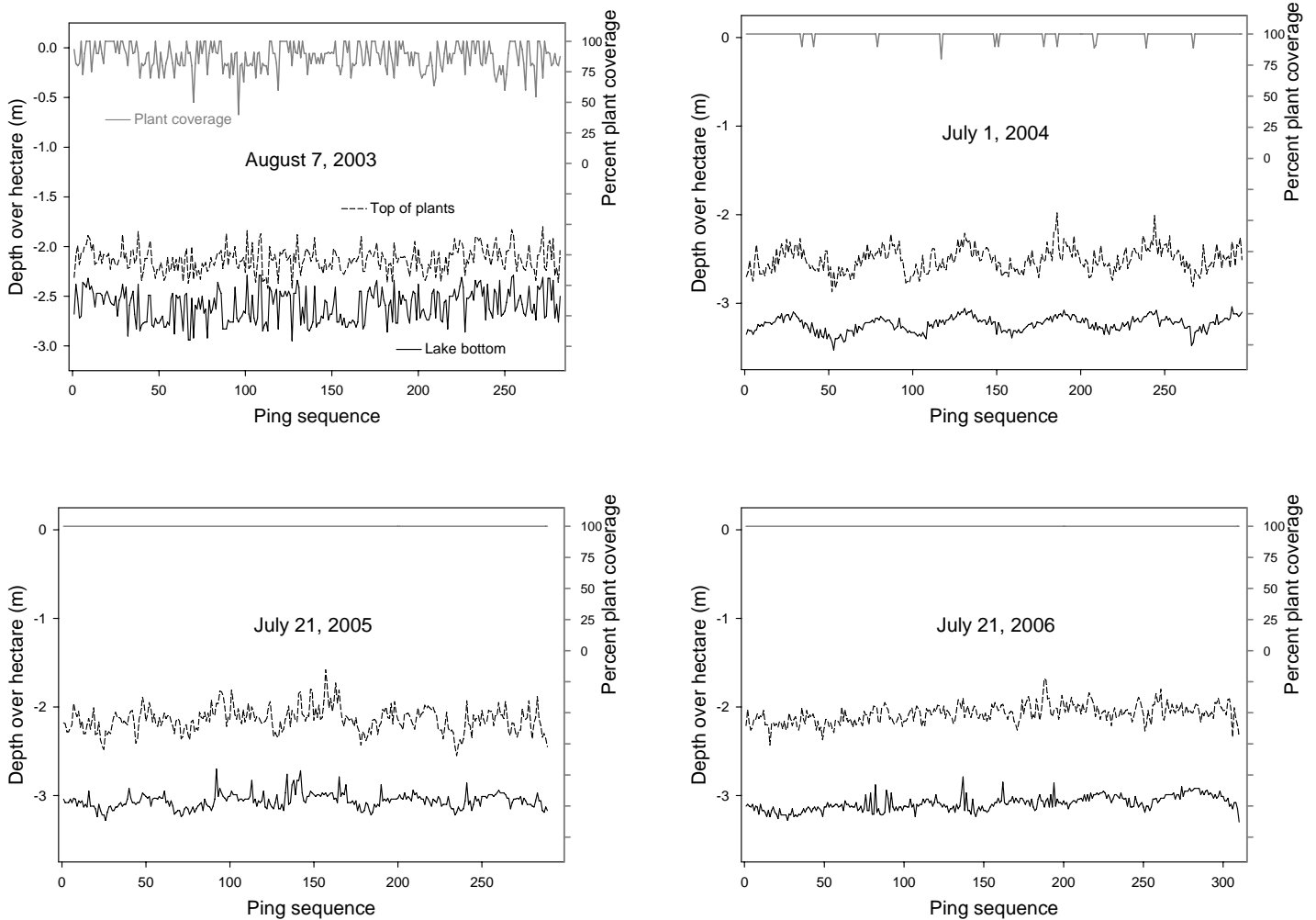
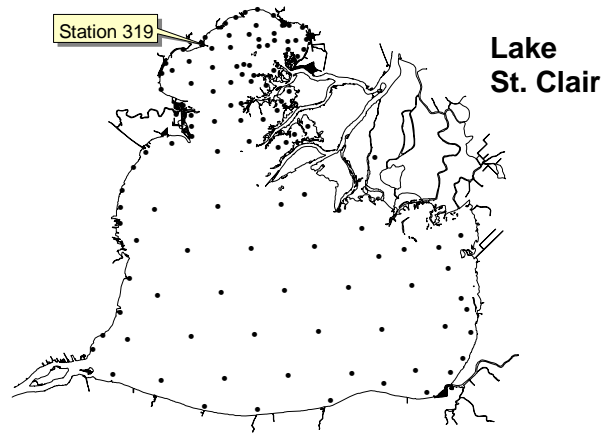


Figure 6.—Four graphs of water depth, submerged plant height, and percent plant coverage generated from plant hydroacoustic data collected at the same location (hectare station 319; see map) in Lake St. Clair in 2003, 2004, 2005, and 2006. Top most line in each graph shows percent coverage and is associated with the right vertical axis. Lower lines are associated with the left vertical axis and show bottom (solid) and top of plant community (dashed).

Table 1.—Mean density (number per hectare) for all fish species caught during spring (June) and fall (September or October) with 10 m headrope index trawls in Anchor Bay, Lake St. Clair.

Species	Spring							Fall						
	1999	2000	2001	2002	2003	2004	2005	1999	2000	2001	2002	2003	2004	2005
Alewife	1.9	3.9	2.9	3.0	0.0	0.0	0.0	1.6	2.8	32.3	0.0	0.0	0.0	0.6
Bluntnose minnow	0.0	11.1	10.0	6.8	0.9	6.0	118.3	9.4	14.8	53.8	32.7	12.5	42.6	237.5
Common carp	0.0	0.2	0.0	0.0	0.0	0.5	0.0	0.1	0.0	1.1	2.1	0.0	0.3	1.3
Emerald shiner	0.0	5.1	0.0	10.6	0.0	1.5	0.0	0.0	0.0	0.0	0.6	0.0	41.2	36.4
Freshwater drum	2.3	0.7	4.5	0.8	3.6	3.0	5.7	1.4	1.0	2.3	0.2	0.6	5.1	1.5
Johnny darter	0.0	0.2	0.3	0.0	0.0	2.5	1.7	0.0	0.1	0.0	0.2	7.2	0.4	0.0
Lake sturgeon	0.1	0.2	0.0	0.8	0.5	0.0	0.0	0.0	0.1	0.0	0.0	0.0	38.0	0.0
Largemouth bass	0.0	0.1	0.6	0.0	0.0	0.0	0.0	3.0	1.8	16.4	35.5	13.2	12.6	29.0
Logperch	7.6	0.2	1.6	7.5	0.0	42.3	5.7	1.3	5.2	17.5	5.9	13.6	38.0	112.7
Mimic shiner	0.0	13.5	20.4	362.3	0.0	118.2	45.3	29.8	14.8	9.6	44.1	507.2	8,908.9	3,071.7
Muskellunge	0.1	0.0	0.6	0.8	0.0	0.0	0.0	0.0	0.1	1.1	0.0	0.4	0.0	0.0
Northern pike	0.0	0.1	1.3	0.0	1.4	0.0	0.6	0.1	0.3	0.6	0.6	0.6	0.0	0.0
Shorthead redhorse	6.9	2.5	3.6	6.8	4.1	2.0	5.7	0.4	0.7	2.3	0.3	0.0	0.2	1.4
Pumpkinseed	0.0	0.0	1.9	0.0	0.0	0.0	0.0	1.6	0.4	5.1	5.4	3.2	0.5	0.0
Quillback	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	1.7	0.8	1.0	0.3
Rainbow smelt	4.0	3.8	61.1	0.0	14.0	0.0	10.8	0.0	1.0	0.0	0.0	4.0	26.3	0.0
Rock bass	1.0	12.8	29.8	38.5	18.1	5.0	10.2	89.0	92.8	39.6	40.8	34.9	25.4	77.3
Round goby	6.0	10.8	1.3	30.2	5.9	53.3	9.6	9.6	10.0	10.2	99.3	1.8	28.0	14.0
Silver lamprey	0.9	0.3	0.0	0.0	0.5	0.5	0.0	0.2	0.0	0.3	0.0	0.4	0.4	0.3
Silver redhorse	0.4	0.9	0.0	2.3	4.5	2.0	0.6	0.0	0.4	1.1	5.7	0.0	4.1	4.5
Smallmouth bass	0.0	0.8	2.9	3.8	1.8	1.5	2.8	10.7	6.1	0.0	51.4	6.8	3.3	41.1
Spottail shiner	68.9	935.4	7.4	5,729.6	210.6	1,777.1	524.1	200.0	50.5	878.5	2,406.5	1,068.0	544.6	2,410.0
Trout-perch	154.0	34.3	11.0	264.9	13.1	107.7	64.5	2.9	0.2	0.0	9.7	5.7	58.5	2.5
Walleye	1.7	1.2	0.6	0.8	0.9	0.0	1.7	0.9	0.8	0.0	11.3	0.0	2.2	8.5
White perch	0.4	13.3	0.6	0.8	0.5	2.0	0.6	0.1	0.1	0.0	13.2	8.4	6.2	146.1
White sucker	0.0	2.5	1.3	61.1	2.3	67.9	21.5	0.3	1.0	0.6	8.0	0.7	1.2	4.2
Yellow perch	866.9	157.8	1,131.7	724.5	306.1	887.5	1,107.1	21.7	40.9	113.8	73.3	181.2	47.8	52.1

Table 2.—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						
1997	408	4,681	1,479	1,311	0.32	11
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
Yellow perch						
1997	252	2,701	9,661	5,773	3.58	40
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
Smallmouth bass						
1997	143	1,375	687	148	0.50	78
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
Muskellunge						
1996	494	15,629	1,458	12	0.093	99
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

Table 3.—Mean length at age (mm) for yellow perch from Lake St. Clair trawls in June. Sample size in parentheses. SWAVg is the Michigan statewide average growth value.

Age	2000		2001		2002		2003		2004		2005		SWAVg
Males													
1	109	(6)	109	(3)	103	(5)	100	(7)	109	(7)			(0)
2	129	(110)	126	(8)	139	(6)	131	(43)	139	(11)	125		(52)
3	158	(17)	142	(56)	153	(16)	147	(3)	160	(32)	164		(6)
4	171	(60)	175	(12)	169	(43)	180	(11)	184	(3)	173		(25)
5	189	(57)	193	(23)	189	(13)	181	(38)	188	(16)	188		(14)
6	200	(47)	206	(18)	213	(7)	196	(6)	198	(21)	196		(2)
7	209	(4)	207	(6)	215	(7)	216	(4)	216	(9)	190		(14)
Females													
1	108	(2)	114	(2)	106	(24)	104	(6)	106	(7)	107		(1)
2	138	(147)	126	(1)	161	(1)	149	(50)	145	(4)	136		(67)
3	171	(18)	160	(59)	168	(4)	155	(1)	167	(16)	178		(2)
4	194	(35)	181	(25)	198	(34)	203	(4)	181	(36)	192		(7)
5	206	(46)	230	(25)	189	(42)	208	(39)	211	(5)	198		(16)
6	229	(24)	241	(15)	219	(11)	208	(24)	214	(4)	217		(4)
7	234	(14)	263	(12)	227	(2)	232	(5)	241	(36)	240		(13)
Sexes combined													
1	109	(8)	111	(5)	105	(29)	102	(13)	107	(14)	107	(1)	102
2	134	(257)	126	(9)	142	(7)	140	(93)	140	(15)	131	(119)	145
3	164	(35)	151	(115)	156	(20)	149	(4)	162	(48)	168	(8)	173
4	180	(95)	179	(37)	182	(77)	186	(15)	182	(39)	177	(32)	198
5	197	(103)	212	(48)	189	(56)	195	(77)	208	(23)	194	(30)	221
6	210	(71)	221	(33)	219	(11)	205	(30)	201	(25)	210	(6)	246
7	228	(18)	245	(18)	227	(10)	225	(9)	236	(45)	214	(27)	267

Table 4.—Catch rate by age for yellow perch in June index trawl tows on Lake St. Clair.

Year class	Total CPUE	Survey year											
		1994 ¹	1995 ¹	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
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	30.4	4.1	13.4	5.2	1.3	0.3	—	—	—	—	—	—	—
1991	164.4	47.0	32.1	18.7	12.9	1.8	0.6	—	—	—	—	—	—
1992	52.1	3.4	5.8	11.5	9.6	10.4	1.1	0.1	0.5	—	0.7	—	—
1993	581.2	56.3	125.8	171.4	113.7	43.0	54.3	1.5	3.3	—	1.3	0.0	—
1994	938.5	—	166.2	293.2	348.2	88.1	20.6	8.3	10.6	1.3	0.7	0.6	0.7
1995	167.8	—	—	21.4	40.7	26.4	32.2	12.3	21.1	10.4	2.7	0.6	0.0
1996	251.3	—	—	—	33.3	77.1	70.3	11.3	35.3	9.7	9.4	3.6	1.3
1997	239.7	—	—	—	—	2.7	37.6	5.5	52.8	61.3	44.4	27.5	7.9
1998	1,354.5	—	—	—	—	—	650.2	114.1	347.7	83.7	118.4	22.7	17.7
1999	99.7	—	—	—	—	—	—	4.8	25.8	17.6	24.9	22.7	3.9
2000	76.2	—	—	—	—	—	—	—	2.7	4.6	5.4	43.0	20.5
2001	296.3	—	—	—	—	—	—	—	—	131.3	89.5	50.2	25.3
2002	26.2	—	—	—	—	—	—	—	—	—	8.7	11.4	6.1
2003	1,101.8	—	—	—	—	—	—	—	—	—	—	705.2	396.6
2004	9.0	—	—	—	—	—	—	—	—	—	—	—	9.0

¹ Data from previous studies.

Table 5.—Effort and physical data for trap net surveys in Lake St. Clair at the Anchor Bay index site.

	Survey year			
	2002	2003	2004	2005
Number of net lifts	64	50	55	34
Hours fished	2,748	2,839	3,080	1,773
Starting date	5/3	5/28	5/3	5/11
Ending date	5/30	6/20	5/26	5/26
Starting water temperature (°C)	9	12	8	9
Ending water temperature (°C)	15	16	15	13
Average secchi depth (m)	1.75	2.17	1.23	2.2

Table 6.—Catch rate, total catch, and percent of annual catch for all species caught in Lake St. Clair trap nets in 2002, 2003, and 2004. Trap nets fished in May and June at Anchor Bay index site.

Species	Mean Catch/lift				Total catch				% of catch			
	2002	2003	2004	2005	2002	2003	2004	2005	2002	2003	2004	2005
Black crappie	0.0	0.0	0.3	0.0	0	1	19	0	0.0	0.0	0.5	0.0
Bluegill	0.1	0.0	0.1	0.0	5	0	6	1	0.1	0.0	0.2	0.1
Bowfin	0.0	0.0	0.1	0.0	0	2	3	0	0.0	0.1	0.1	0.0
Brown bullhead	0.0	0.0	0.0	0.0	2	1	2	0	0.0	0.0	0.1	0.0
Channel catfish	3.8	4.1	3.9	2.5	244	207	216	85	4.6	5.2	5.8	7.6
Common carp	0.5	0.6	1.3	0.32	33	31	72	11	0.6	0.8	1.9	1.0
Freshwater drum	2.1	10.8	3.6	0.7	133	543	201	24	2.5	13.6	5.4	2.2
Gizzard shad	0.0	0.1	0.0	0.1	3	4	1	2	0.1	0.1	0.0	0.2
Golden redhorse	0.0	0.0	0.0	0.1	1	2	2	2	0.0	0.1	0.1	0.2
Lake sturgeon	0.0	0.1	0.1	0.0	2	7	4	1	0.0	0.2	0.1	0.1
Largemouth bass	0.4	0.1	0.2	0.1	23	5	14	2	0.4	0.1	0.4	0.2
Muskellunge	0.6	0.6	1.4	1.6	41	28	78	56	0.8	0.7	2.1	5.0
Northern pike	1.9	0.3	1.3	2.0	120	15	72	68	2.3	0.4	1.9	6.1
Pumpkinseed	5.0	1.5	1.1	0.1	318	77	62	2	6.0	1.9	1.7	0.2
Quillback carpsucker	0.4	0.3	0.6	0.2	24	15	33	5	0.5	0.4	0.9	0.4
Rock bass	49.5	32.0	33.8	12.3	3,172	1,603	1,861	421	60.3	40.1	49.9	37.7
Shorthead redhorse	1.8	4.1	1.5	1.4	118	204	84	49	2.2	5.1	2.3	4.4
Silver redhorse	0.5	0.7	1.3	1.3	32	33	71	43	0.6	0.8	1.9	3.9
Smallmouth bass	6.2	19.2	5.5	3.3	399	962	302	113	7.6	24.1	8.1	10.1
Walleye	3.8	3.6	2.7	5.5	243	180	147	187	4.6	4.5	3.9	16.8
White bass	0.0	0.1	0.1	0.0	2	5	4	0	0.0	0.1	0.1	0.0
White perch	0.2	0.1	0.8	0.1	13	5	44	4	0.2	0.1	1.2	0.4
White sucker	0.3	0.2	0.3	0.2	18	10	15	7	0.3	0.3	0.4	0.6
Yellow perch	4.9	1.1	5.0	1.0	313	57	276	33	6.0	1.4	7.4	3.0

Table 7.—Age distribution (percentage) and mean age (years) for predator species captured in Anchor Bay assessment trap nets in 2005.

Age	Species			
	Muskellunge N=48	Northern pike N=46	Smallmouth bass N=108	Walleye N=184
1	0	0	0	0
2	0	2	1	35
3	0	26	5	1
4	0	22	22	23
5	4	24	11	2
6	10	11	24	12
7	17	4	22	7
8	6	4	7	9
9	4	4	6	6
10	4	2	2	3
11	15	0	0	2
12	15	0	0	0
13	8	0	0	0
14	4	0	0	0
15	4	0	0	0
16	2	0	0	0
17	2	0	0	0
18	2	0	0	0
19	2	0	0	0
Mean age	10.4	4.8	5.9	5.7

Table 8.—Age specific catch per net lift for smallmouth bass in Anchor Bay assessment trap net surveys. Total CPUE represents the combined Age 2 through Age 13 catch per net lift values. Age 9+ is the catch per net lift for age groups 9, 10, 11, 12, and 13. Data from 1974 to 1985 is from Bryant and Smith (1988).

Age	Survey year													
	1974	1975	1977	1978	1979	1980	1981	1983	1984	1985	2002	2003	2004	2005
2	–	0.01	0.07	0.09	0.05	–	0.07	0.04	0.15	0.07	–	–	0.02	0.03
3	1.62	0.16	0.48	3.09	4.55	20.64	2.87	3.12	8.16	2.93	0.16	0.42	0.26	0.15
4	3.66	3.21	7.96	7.44	5.89	14.34	24.12	5.19	10.19	16.91	4.42	4.68	0.24	0.74
5	2.64	2.43	1.31	12.76	2.11	5.20	6.80	2.19	4.35	6.33	0.52	10.89	1.47	0.37
6	0.81	0.90	1.85	0.94	3.12	1.71	1.53	3.60	2.00	2.21	0.25	1.54	2.23	0.80
7	0.36	0.42	0.99	0.59	0.49	2.12	0.34	0.68	1.67	0.81	0.16	0.69	0.46	0.74
8	0.06	0.08	0.19	0.24	0.26	0.97	0.37	0.02	0.19	0.59	0.17	0.33	0.35	0.25
9	0.02	0.07	0.13	–	0.18	0.11	0.10	0.07	0.11	0.18	0.16	0.13	0.13	0.19
10	–	0.03	0.03	–	0.02	0.11	–	0.01	0.08	0.11	0.19	0.19	0.08	0.06
11	–	0.02	–	–	–	–	–	–	0.00	–	0.10	0.21	0.17	–
12	–	–	–	–	–	–	–	–	0.01	–	0.06	0.10	0.04	–
13	–	–	–	–	–	–	–	–	–	–	0.03	0.02	0.04	–
9+	0.02	0.12	0.16	0.00	0.20	0.22	0.10	0.08	0.20	0.29	0.54	0.65	0.46	0.25
Total CPUE	9.17	7.33	13.01	25.15	16.67	45.20	36.20	14.92	26.91	30.14	6.23	19.20	5.50	3.32
Mean age	4.44	4.86	4.69	4.56	4.43	4.02	4.27	4.58	4.24	4.47	4.87	5.12	6.09	5.88

Table 9.-Walleye and smallmouth bass tag recoveries from Lake St. Clair during 2002, 2003, 2004, 2005, and 2006.

Year	Number tagged	Tags recovered					Total	Percent recovered
		2002	2003	2004	2005	2006		
Walleye								
2002	241	30	15	8	2		55	22.8
2003	173		25	6			32	18.5
2004	147			18	2		21	14.3
2005	166				5		7	4.2
2006	214					13	13	6.1
Total	941	30	40	32	9	17	128	13.6
Smallmouth bass								
2002	270	11	7			1	19	7.0
2003	831		5	2		1	8	1.0
2004	267			2			2	0.7
2005	97				1	6	7	7.2
2006	305					13	13	4.3
Total	1770	11	12	4	1	21	49	2.8