MICHIGAN DEPARTMENT OF NATURAL RESOURCES
FISHERIES DIVISION

STATUS OF THE FISHERIES

IN MICHIGAN WATERS OF

LAKE ERIE AND LAKE ST. CLAIR

1998

A 10-minute trawl catch of lake sturgeon on Lake St. Clair

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DNR

Highlights for 1998

The purpose of this report is to provide an update on the status of the fisheries in the Great Lakes and connecting waters of southeast Michigan. Sources of information used in compiling this report include creel surveys, charter boat reports, an angler diary program, the Master Angler program, and commercial fishery records, as well as fisheries research studies. Some of the 1998 highlights described in further detail in this report include:

- Lake Erie yellow perch abundance has increased, however growth has declined since 1995.
- Lake Erie walleye experienced good reproduction in 1994, 1996, and 1997, but suffered poor reproduction in 1995.
- Angler effort for the Lake Erie sport fishery decreased slightly in 1998, remaining well below the levels observed prior to 1991.
- Non-charter catch rates for walleye in 1998 were the lowest observed since prior to 1986, while catch rates for yellow perch in 1998 were the highest observed since prior to 1986.
- Lake Erie charter boat catch rates for walleye were over eight times higher than those estimated for non-charter anglers, but non-charter anglers enjoyed a higher yellow perch catch rate.
- Charter boat yellow perch catch rates for Lake Erie have more than doubled since 1994.
- It is apparent that the muskellunge fishery exceeds that of any other period in modern history.
- Although round gobies are now abundant throughout Lake St. Clair, ruffe have not yet been collected.
- Long-term walleye tagging studies on Lake Erie illustrate the important contribution of Lake Erie walleye to the Michigan Great Lakes sport fishery from Port Huron to Toledo.
- Since 1996, a total of 510 lake sturgeon have been tagged and released in Lake St. Clair and the St. Clair River. To date, 13 tag recoveries have been reported.

Sport Fishery Summary

An on-site creel survey conducted by the Michigan Department of Natural Resources (MDNR) for Michigan's 1998 Lake Erie sport fishery (non-charter) produced a total harvest estimate of 621,448 fish (Table 1). Estimated angler effort in 1998 decreased slightly from 1997 (Figure 1), and remained well below the high levels observed prior to 1991. The non-charter walleye catch rate declined in 1998 to the lowest point observed in the 1990's. We suspect fishing success has not been a major contributing factor to the lower levels of effort, since catch rates for walleye have remained relatively stable throughout this time period, and yellow perch catch rates in recent years are the highest for the period (Figure 2). Other factors, including weather, fishing success on other Great Lakes waters, and economic conditions have likely contributed to the decreased level of fishing effort since 1991.

Biological samples were collected from walleye and yellow perch during the 1998 on-site creel survey. Age 2 and 4 fish (1996 and 1994 year classes) dominated the walleye harvest, comprising 72% of the catch (Figure 3). Harvested age 2 walleye averaged 341 mm (13.4 in.) total length. Age 4 fish (1994 year class) averaged 473 mm (18.6 in.) total length. The contribution from the weak 1995 walleye year class (age 3) was considerably lower at 15% of the catch.

Yellow perch harvest was dominated by age 2, 3 and 4 fish (1996, 1995, and 1994 year-classes), which combined for 93% of the total harvest (Figure 3). Average lengths of harvested age 2, 3, and 4 yellow perch were 182 mm (7.2 in.), 202 mm (7.9 in.), and 218 mm (8.6 in.), respectively. The observed mean length at age for yellow perch taken in the Michigan sport fishery in 1998 remained below the levels of the mid-1990's, but similar to those of the early 1990's (Figure 4). We suspect that increased abundance in recent years has resulted in slower growth for perch in western Lake Erie.

Since 1989, Michigan charter boat operators have been required to report their charter fishing catch and effort to the MDNR. In 1998, Michigan charter boat anglers harvested 80,569 fish from Lake Erie (Table 2). Walleye (60%) and yellow perch (39%) were the major species harvested, accounting for 99% of the catch. While charter boat catch rates for walleye were over eight times higher than those estimated for non-charter anglers in 1998, perch catch rates were higher for non-charter anglers.

On Lake St. Clair and the St. Clair River, charter boat anglers harvested 5,787 fish (Table 3). Yellow perch (48%), "other" species (27%), and walleye (24%) made up the bulk of the catch, accounting for about 99% of the total harvest. The "other" species category is thought to consist mainly of smallmouth bass and muskellunge.

During the period since 1990, walleye catch rates have remained relatively high for Lake Erie charter boat anglers (Figure 5), but declined markedly after 1990 for Lake St. Clair charters (Figure 6). In 1998, the charter catch rate for Lake Erie walleye was the highest observed since the charter boat reporting program started in 1989. The Lake St. Clair walleye catch rate also increased, but the improved walleye fishing was not reflected in charter excursions on Lake Erie or Lake St. Clair, with both waterbodies supporting about the same number of excursions as in recent years (Figure 7).

Charter boat catch rates for yellow perch remained about the same for Lake Erie, but declined sharply for Lake St. Clair in 1998 (Figures 5 and 6). Strangely, non-charter angler reports for yellow perch fishing during the summer of 1998 on Lake St. Clair indicated fishing was very good. Contacts with several Lake St. Clair charter boat captains indicate that the yellow perch charter boat fishery mainly occurs in September and early October. However, charter boat captains found that the fishery was very late to develop in 1998, with the best fishing occurring in late October and November, after most charter businesses have closed for the season.

Despite the lack of creel survey data for Lake St. Clair, it is apparent that the muskellunge fishery exceeds that of any other period in modern history. Angler reports indicate that catch rates in the 1990's are spectacular. Muskellunge catch rates derived from the Angler Diary Program on Lake St. Clair verify these reports (Figure 8). We believe that the quality of the Lake St. Clair muskellunge fishery is also reflected in the MDNR's Master Angler Program. The total number of muskellunge from Lake St. Clair entered for Master Angler Awards in 1998 was the second highest since 1986 (Figure 9). The number of fish over 30 pounds remained well above the numbers recorded prior to 1992. We believe that factors contributing to the dramatic improvement in this fishery include: 1) a positive response to increased minimum size limits on both sides of the lake since the mid-1980's; 2) physical and biological changes in the lake such as clearer water and increased aquatic plant growth resulting in improved habitat for Great Lakes muskellunge; and, 3) increased voluntary catch and release fishing for muskies in Lake St. Clair by both sport and charter anglers.

Commercial Fishery Summary

State licensed commercial seine operations in the shallow embayments along Michigan's Lake Erie shoreline harvested 11 species of fish for a total of 721,580 pounds (Table 4), a 21% increase from the total harvest of 511,765 pounds in 1997. In combination, common carp (86%), freshwater drum (3%) and quillback (3%) accounted for 92% of the total harvest by weight. The total value of the 1998 Lake Erie commercial harvest from Michigan waters was estimated at $117,280.

Summary of Netting Surveys

The Michigan waters of the western basin of Lake Erie have been monitored with spring trap net surveys since 1978. In 1998, total catch per net lift (CPUE) for all species combined was near the average for the 1990's (Table 5). Smallmouth bass, channel catfish, white sucker, redhorse suckers, freshwater drum, and quillback exhibited CPUE values above the 21-year mean CPUE. Yellow perch and walleye CPUE was similar to that of the past six years, but remained below the 21-year mean. Comparison of yellow perch mean CPUE for the 1978-89 period (254.6/lift) with the 1990-98 period (39.3/lift) clearly illustrates the dramatic change in yellow perch catches at the spring trap net sites. This change is likely the result of a substantial decline in yellow perch abundance since 1990. In addition, we also suspect increased net avoidance due to improved water clarity has contributed to low total CPUE since 1990.

Age 2 walleye (1996 year class) accounted for 32% of the trap net walleye catch (Figure 10). The 1994 and 1993 year classes were also well represented, accounting for 23% and 14% of the total catch respectively. Conversely, the weak 1995 (age 3) and 1992 (age 6) year classes were poorly represented in the trap net catch in 1998. Based on mean length at age, no trend is evident for Lake Erie walleye growth rates. A total of 1,278 walleye captured in trap nets were tagged and released as part of the ongoing interagency tagging project.

Age 3 (1995 year class) yellow perch were the most abundant year class in the trap net yellow perch catch, accounting for 38% of the total catch (Figure 11). The 1994 year class (age 4) was nearly as abundant, contributing 28% of the total catch. Age specific catch rates for yellow perch from the trap nets, suggest that these two year classes (1993 and 1994) are the two strongest yellow perch year classes since the late 1980's. Growth for yellow perch of most ages has apparently slowed again, after a period of several years in the early and mid-1990's of improving growth rates (Figure 12). This most recent slow-down may be a result of increased yellow perch abundance and competition for food.

Since 1978, the MDNR has fished variable mesh multi-filament gill nets at two locations in western Lake Erie each fall, as part of the interagency yearling walleye assessment program. During 1998, a total of 1,036 walleye were caught in eight net lifts. The total walleye catch-per-effort for the index sites in 1998 increased after two years of lower total catch rates in 1996 and 1997 (Table 6). The age 1 catch rate of 54.3 suggests that the 1997 year class is at least average. The 1996 (age 2) year class , which accounted for 55% of the total catch in 1997 and 56% of the total catch in 1998 is clearly the strongest cohort in the population at this time, and probably the strongest since the 1986 year class. The very low catch rate for age 3 fish indicates that the 1995 year class is quite weak, similar to the 1992 year class. No trend in walleye growth is obvious from the mean length at age data for walleye taken in the fall index gill net survey.

The fish community of Lake St. Clair was surveyed with bottom trawls in 1998 by the MDNR. Over 200 trawl tows were conducted at locations randomly selected across the lake. The diversity of the Lake St. Clair fish community was obvious during the sampling, with 46 fish species represented among the total of 25,000 fish collected. The most abundant species were trout-perch (29%), yellow perch (22%), spottail shiner (12%), mimic shiner (9%) and round goby (6%). These abundant forage species provide a healthy forage base for the lake's predator populations, including smallmouth bass, walleye, northern pike, and muskellunge. While round gobies are now quite abundant throughout the lake, the tubenose goby remains uncommon. No ruffe have been collected from Lake St. Clair.

A total of 244 lake sturgeon were collected during assessment surveys on the St. Clair River and Lake St. Clair in 1998. All were released back into these waters. Sturgeon captured in 1998 averaged 44.4 inches in total length, with a range from 17 inches to 67 inches. A total of 237 sturgeon were aged with pectoral fin ray sections. Thirty-nine year-classes were represented with ages ranging from 2 to 43

years. Combined age samples from 1997 and 1998 indicate that survival of lake sturgeon spawned in the 1970's and 1980's has been consistent and higher than that of the 1960's (Figure 14). This may be a result of improved water quality after the Clean Water Act of 1972 or could be related to more restrictive lake sturgeon sport fishing regulations implemented in 1983. A total of 242 sturgeon were tagged on the opercle with numbered metal tags and released.

Fish Tagging Studies

In 1998, a total of 2,127 walleye were tagged by Ontario, New York, and Michigan at 3 different Lake Erie sites. A total of 32 of those tags were recovered by fishermen for a single season reporting rate of 1.5%. The 1998 site-specific reporting rate varied from a low of 1.1% at the Van Buren Bay site in New York, to a high of 1.7% for the Raisin River tag site in Michigan.

The Livonia District Office conducted a walleye tagging study in the Huron River near Flat Rock from 1992 to 1994. A total of 1,469 walleye were tagged and released during the spring spawning run in the river. Since no walleye were tagged at the site after 1994, recoveries of Huron River site fish declined considerably. However, this project continues to produce some interesting results. A comparison of the areal distribution of all tag recoveries from the Huron River and the Monroe tag site is shown in Figure 15. It is quite evident that Huron River fish have a stronger tendency than Monroe-tagged fish to move north out of Lake Erie. In fact, since 1992 over 56% of all Huron River site tag returns have come from the Detroit River or waters further north. In comparison, only 23% of the Raisin River site tag returns have come from the Detroit River or northward for the same time period. The contribution of small walleye stocks to the walleye fishery in the Great Lakes waters of southeast Michigan is unclear at this time. However, it is clear from these tagging studies that walleye populations in these waters frequently travel long distances and readily move between the various water bodies.

In 1996 and 1997, a total of 3,083 yellow perch were tagged and released in Anchor Bay, Lake St. Clair to document yellow perch movements and exploitation. A total of 114 tags have been reported by anglers through February, 1999. The geographical distribution of the tag recoveries (Figure 16), reveals little difference between the two main tag sites. Further, the distribution of recoveries does not indicate any substantial movement outside of Lake St. Clair. This tagging project has been discontinued.

A total of 510 lake sturgeon have been tagged and released on the St. Clair River and Lake St. Clair since 1996. To date, thirteen tagged lake sturgeon have been recaptured. Twelve were originally caught with setlines, tagged, and released in the North Channel of the St. Clair River. Four have been recovered with survey setlines in the North Channel. Five recoveries were reported in 1998 and 1999 by sport anglers in the North Channel. Four recoveries have been reported from the Ontario commercial trap-net fishery in southern Lake Huron, approximately 70 kilometers from the tag site (Figure 17). All other recaptures have occurred within 10 km of the tag sites. Although trawling has accounted for 62% of the 510 sturgeon tagged and released during this study, only one recovery, 8% of the total, has been from a fish originally caught in a trawl on Lake St. Clair. This may be an indication that fish that reside year around in the St. Clair River or move north into southern Lake Huron experience a much higher level of fishing exploitation.

Sport Fishing Regulations

Fisheries biologists with the Ontario Ministry of Natural Resources (OMNR) are concerned about the status of the walleye spawning stock in the Thames River, the major walleye spawning site for Lake St. Clair. Their concerns are based on an apparent decline in spawning success for walleye in the Thames River. As a result, the OMNR implemented a 17 inch maximum size limit (with one fish over 25 inches) for walleye in Ontario waters of Lake St. Clair and the St. Clair River in 1997. This regulation remains in effect indefinitely. The Michigan DNR, however, did not recommend or implement this regulation for the Michigan portion of these water bodies. We believe the extensive movements of walleye throughout this system, combined with uncertainties of changing environmental conditions affecting index survey programs, and no evidence of excessive exploitation, prevent us from recommending such a radical regulation change. Michigan will continue to enforce a 13 inch minimum size limit for these waters. We also recommend no change in the present daily bag limit of six walleye for Lake St. Clair and the St. Clair River.

Walleye in Lake Erie are managed cooperatively with other jurisdictions under a harvest quota system. Michigan's sport fishery has consistently harvested below the quota since 1991. This underutilization of the available resource appears to be mainly a result of reduced fishing effort in Michigan waters. Therefore, the daily walleye bag limit in Michigan's waters of Lake Erie will once again include the statewide 5 fish daily limit and an additional 5 fish, for a total daily limit of 10 fish per day for 1998. If harvest exceeds the quota in the future, the daily bag limit will be adjusted downward.

Lake sturgeon fishing regulations have been substantially modified statewide. Effective, April 1, 1999, there will be no harvest of lake sturgeon from Great Lakes and connecting waters, except for the St. Clair River and Lake St. Clair. On the St. Clair River and Lake St. Clair, the hook and line season is open from July 16 to September 30. The bag limit is one lake sturgeon per season, with a minimimum size limit of 42 inches and a maximum size limit of 50 inches. The new regulations for southeast Michigan's Great Lakes waters are designed to minimize exploitation of breeding age female sturgeon, while allowing a limited sport fishery to continue in the waters of the St. Clair River and Lake St. Clair, where our survey data indicate a substantial lake sturgeon population exists.

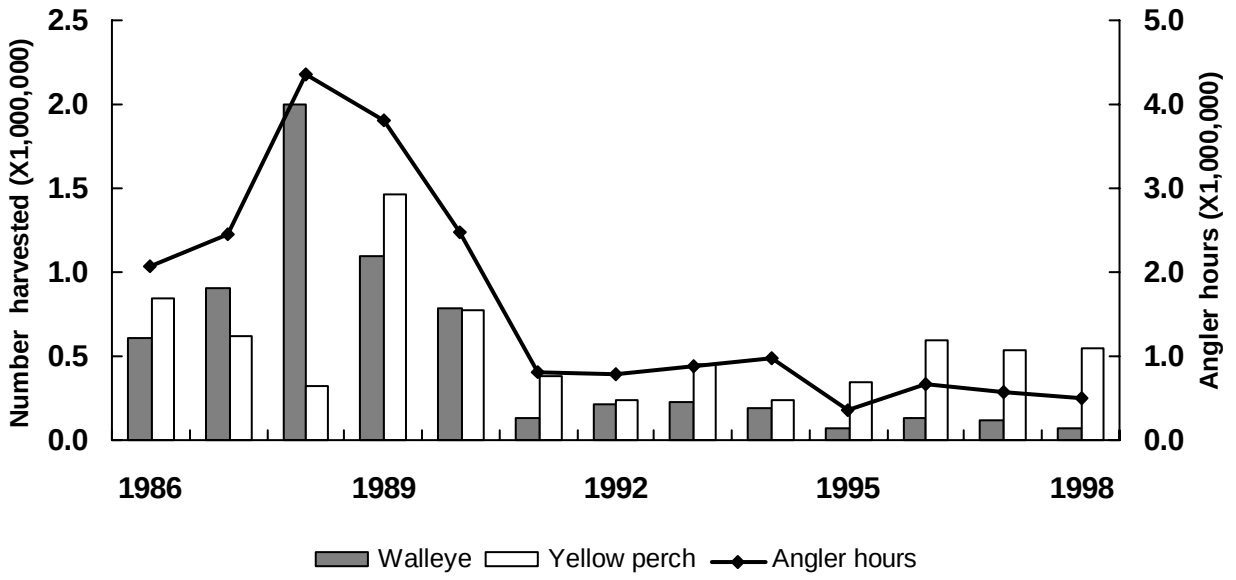

Figure 1.—Estimated harvest and effort for Michigan's Lake Erie sport fishery, 1986-1998.

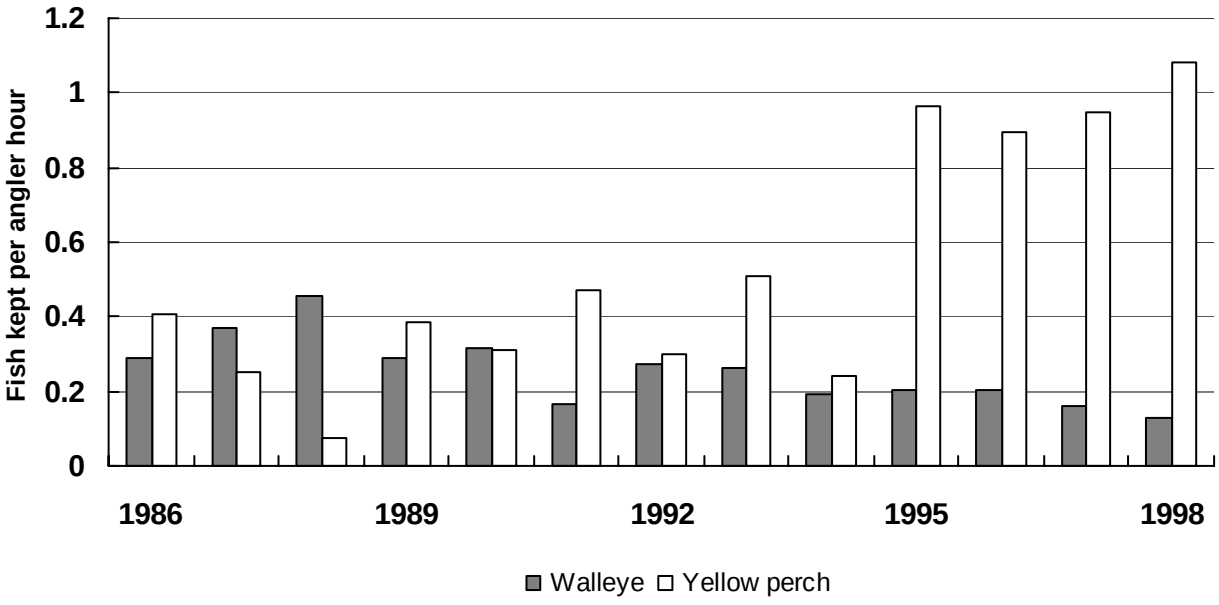

Figure 2.—Walleye and yellow perch catch per effort for Michigan's Lake Erie sport fishery, 1986-1998.

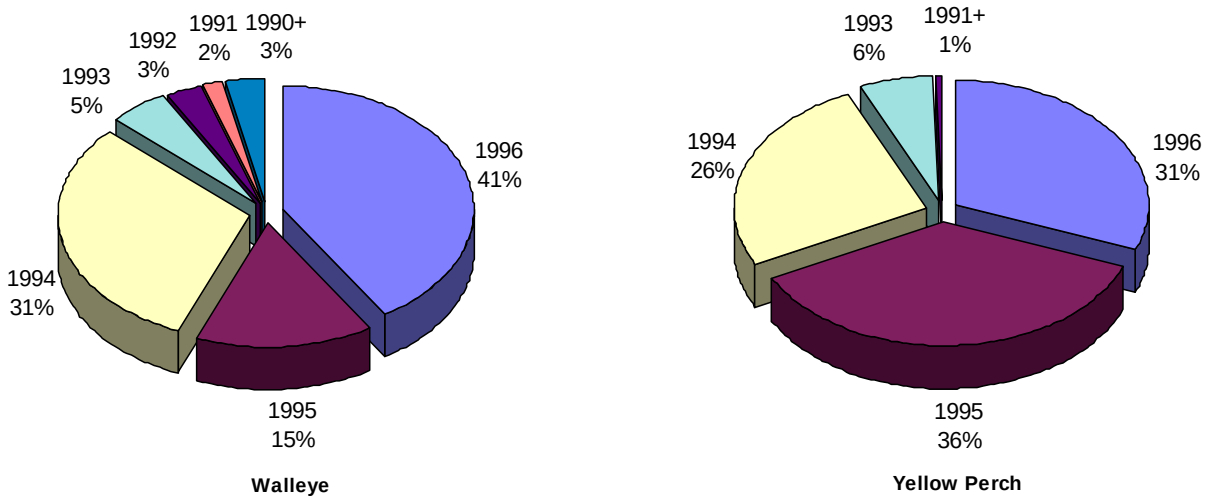

Figure 3. —Year-class contribution to Michigan sport harvest for walleye and yellow perch from Lake Erie in 1998.

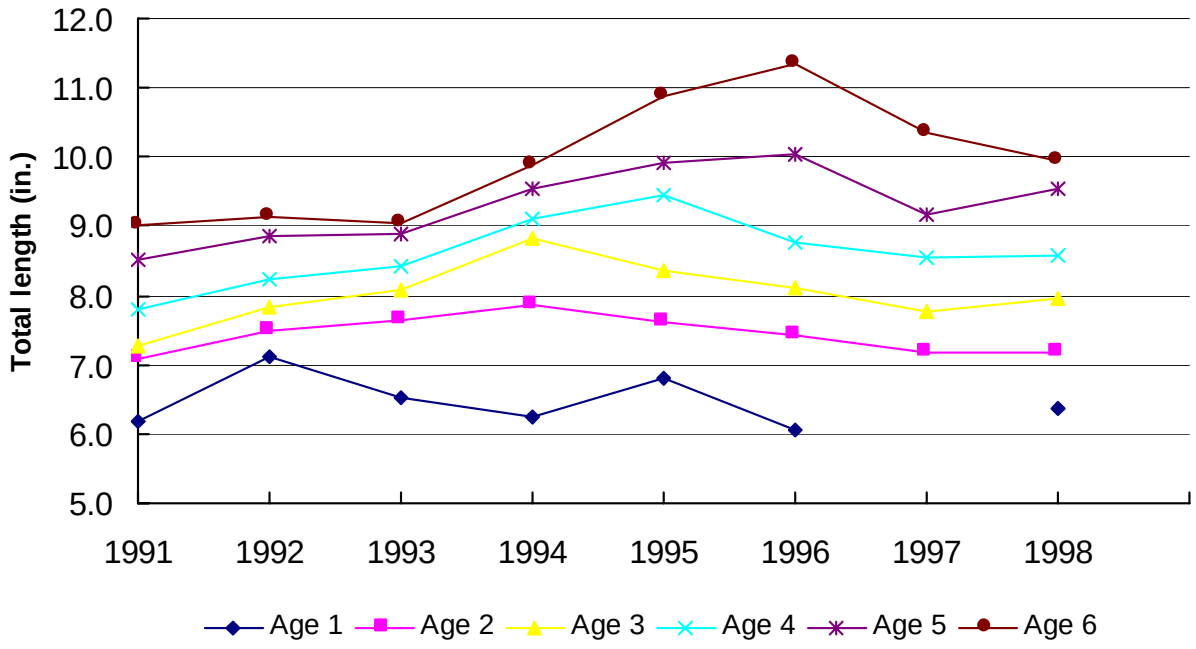

Figure 4. —Mean length at age for sport caught yellow perch from Michigan's waters of Lake Erie, 1991-1998.

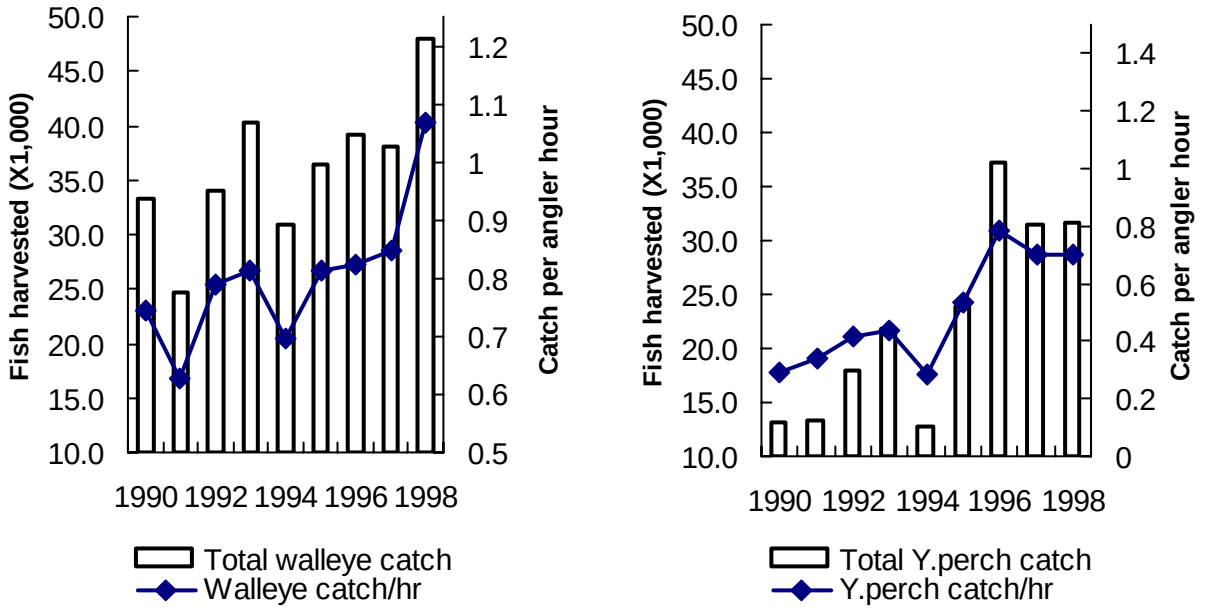

Figure 5. —Michigan charter boat harvest and catch rates for Lake Erie, 1990-1998.

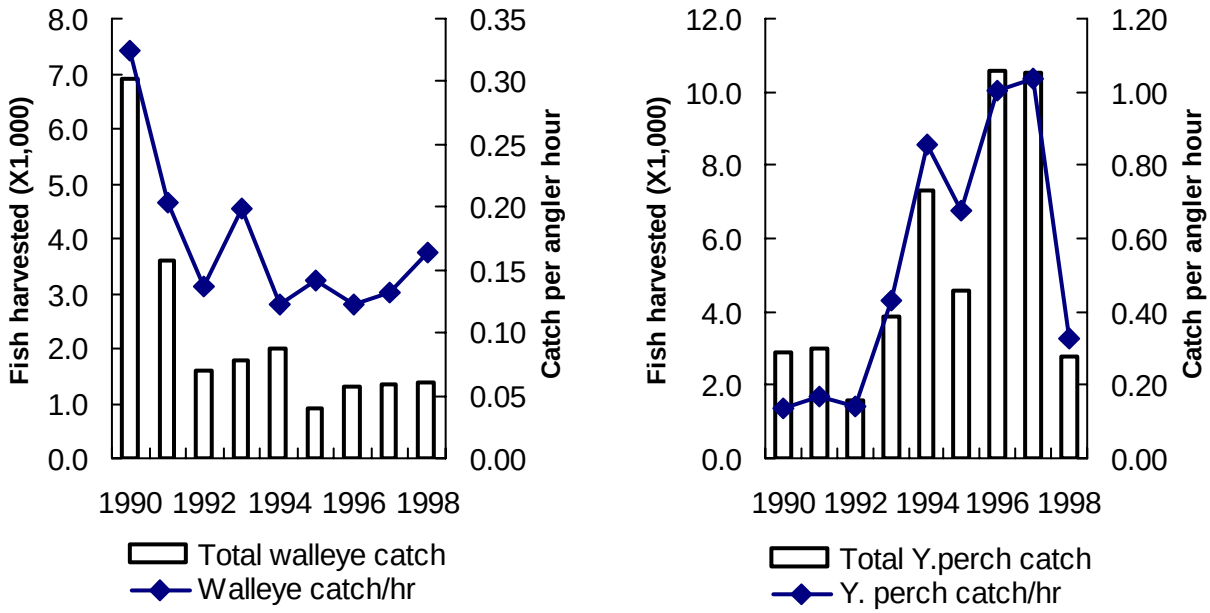

Figure 6. —Michigan charter boat harvest and catch rates for Lake St. Clair, 1990-1998.

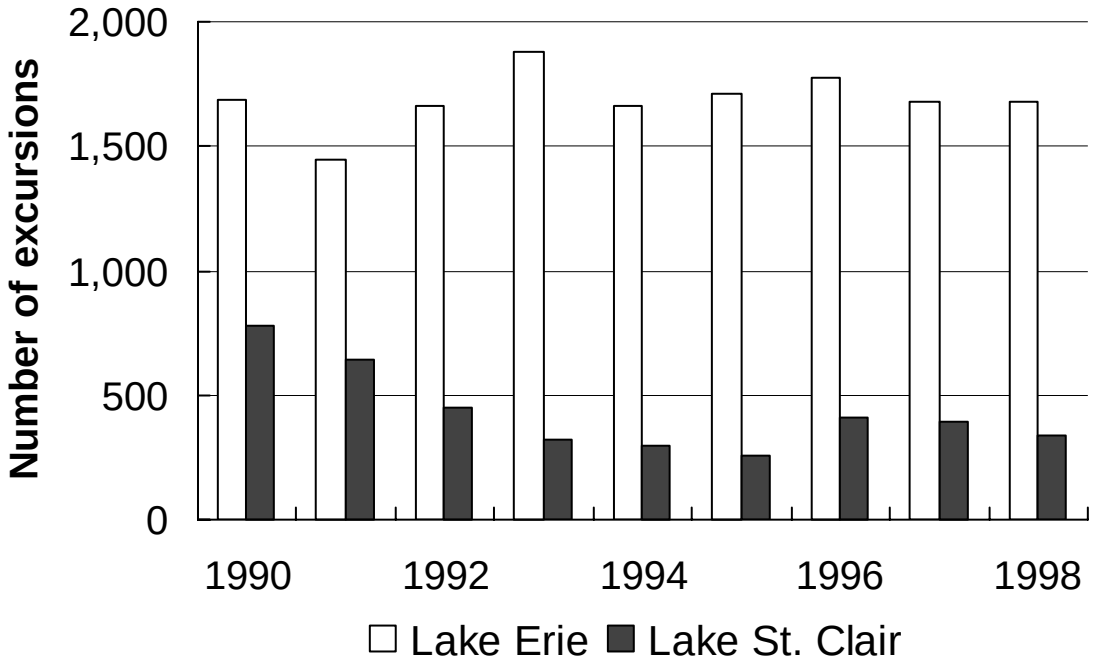

Figure 7. —Reported charter boat excursions on Lake Erie and Lake St. Clair, 1990-98.

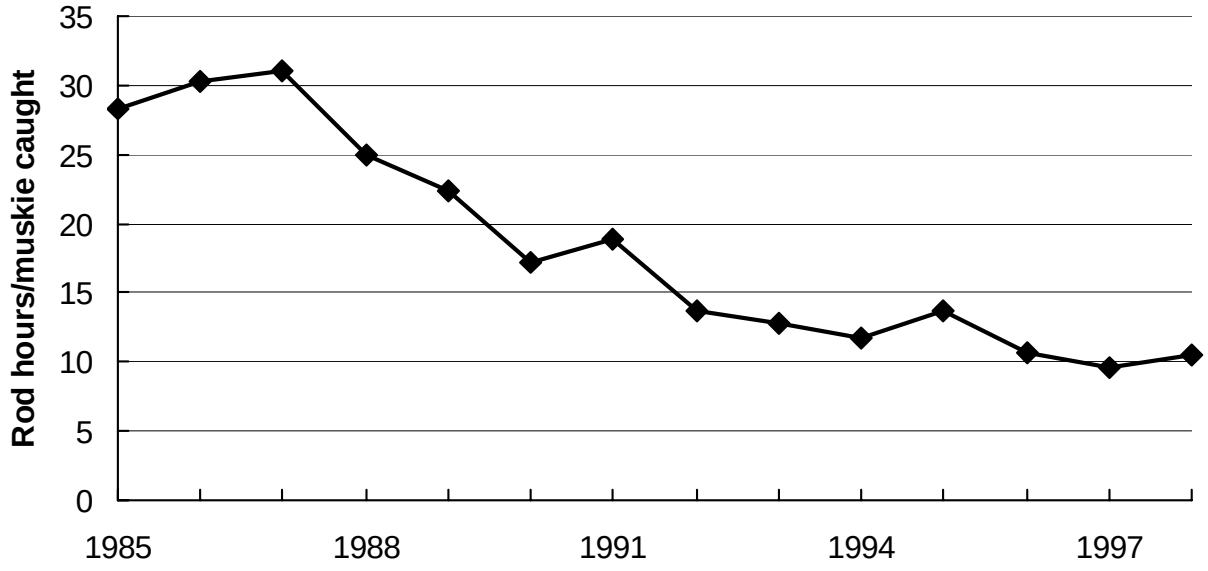

Figure 8. —Lake St. Clair great lakes muskellunge catch rate from Angler Diary Program, 1985-98.

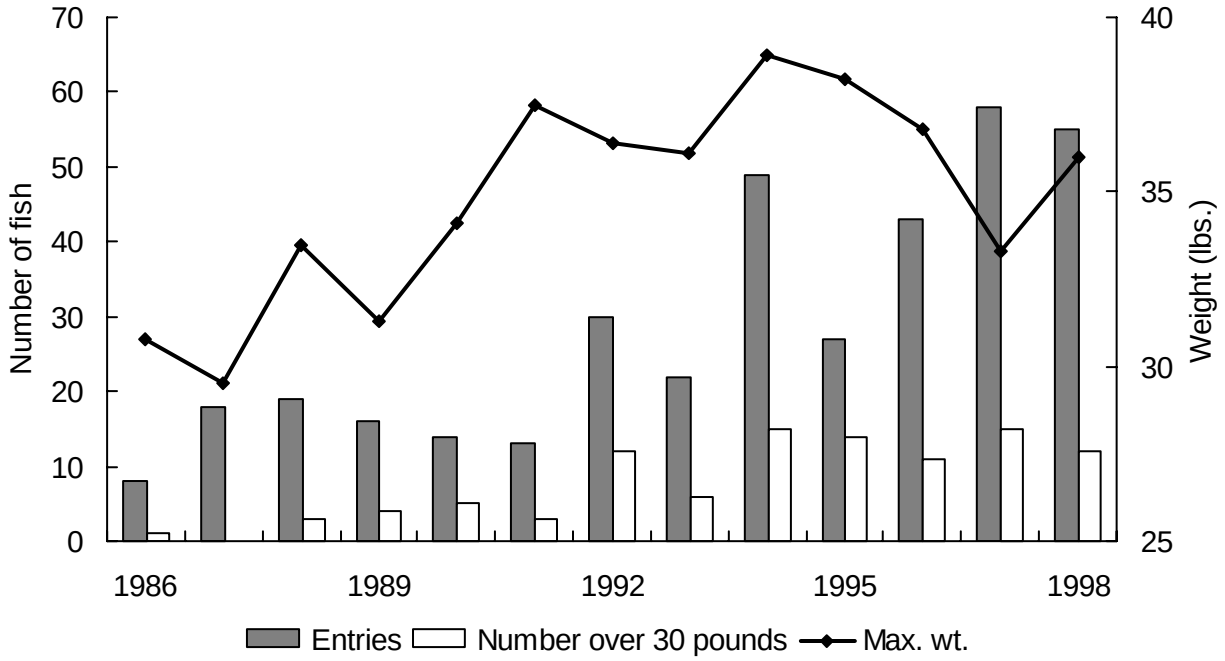

Figure 9. —Lake St. Clair great lakes muskellunge entered in the Michigan DNR Master Angler Program, 1986-1998. Values for 1992-98 represent combined regular and catch-and-release Master Angler categories.

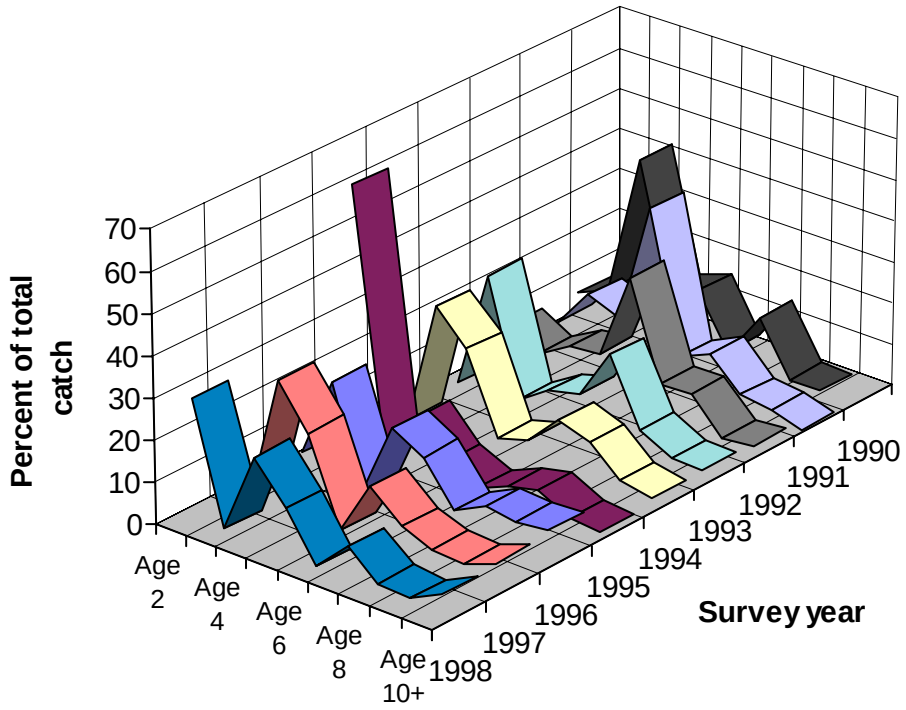

Figure 10. —Age composition of walleye from survey trap nets on Lake Erie, 1990-1998.

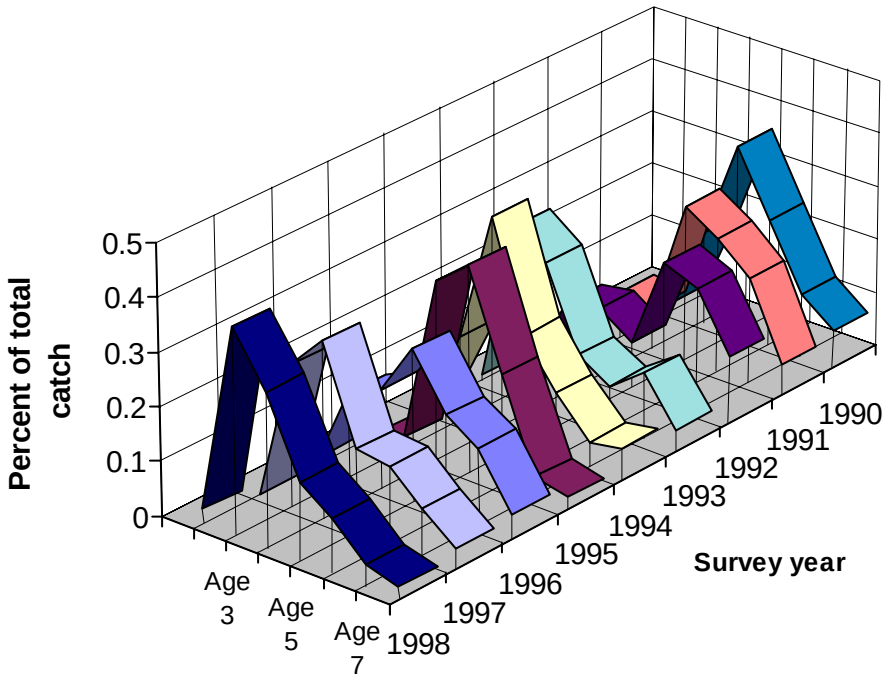

Figure 11. —Age composition of yellow perch from survey trap nets on Lake Erie, 1990-1998.

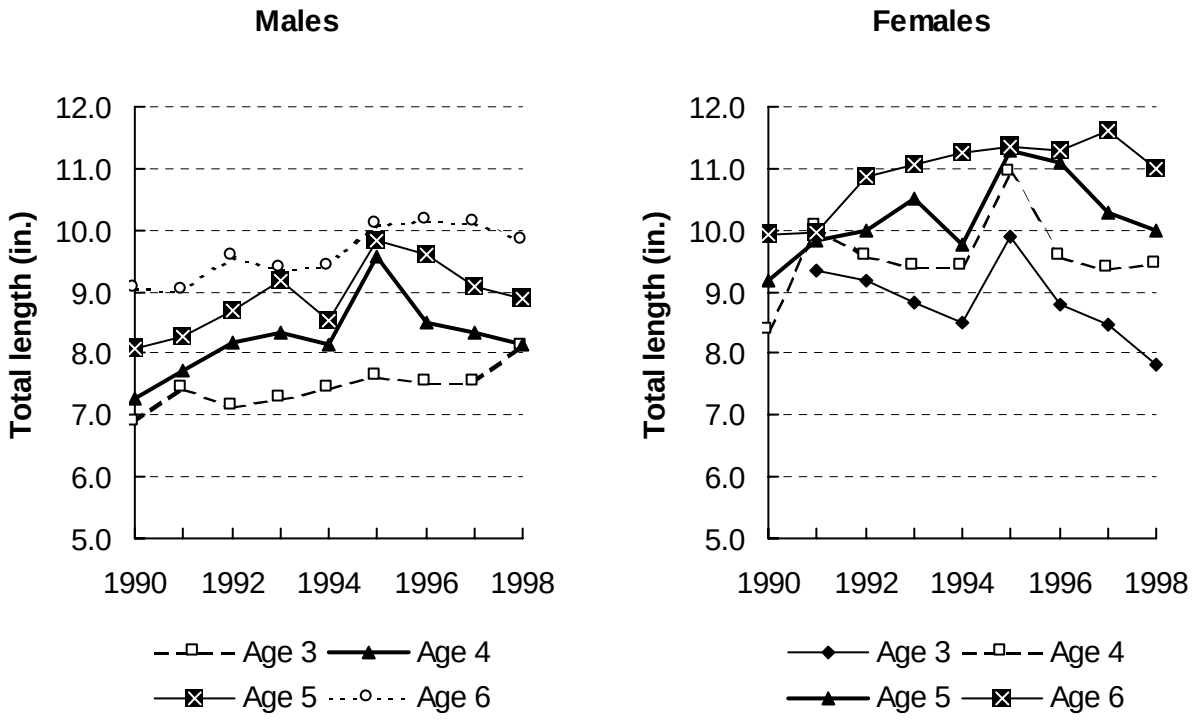

Figure 12. —Mean length-at-age for yellow perch from index trap nets, Lake Erie, 1990-98.

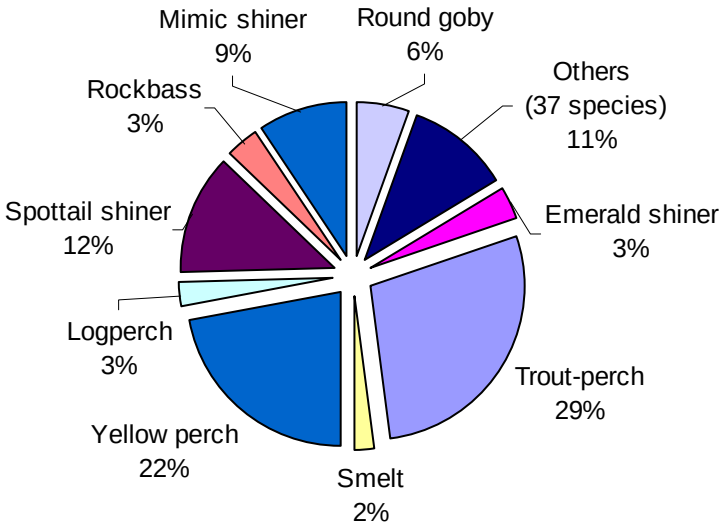

Figure 13. —Catch composition for all trawls on Lake St. Clair in 1998.

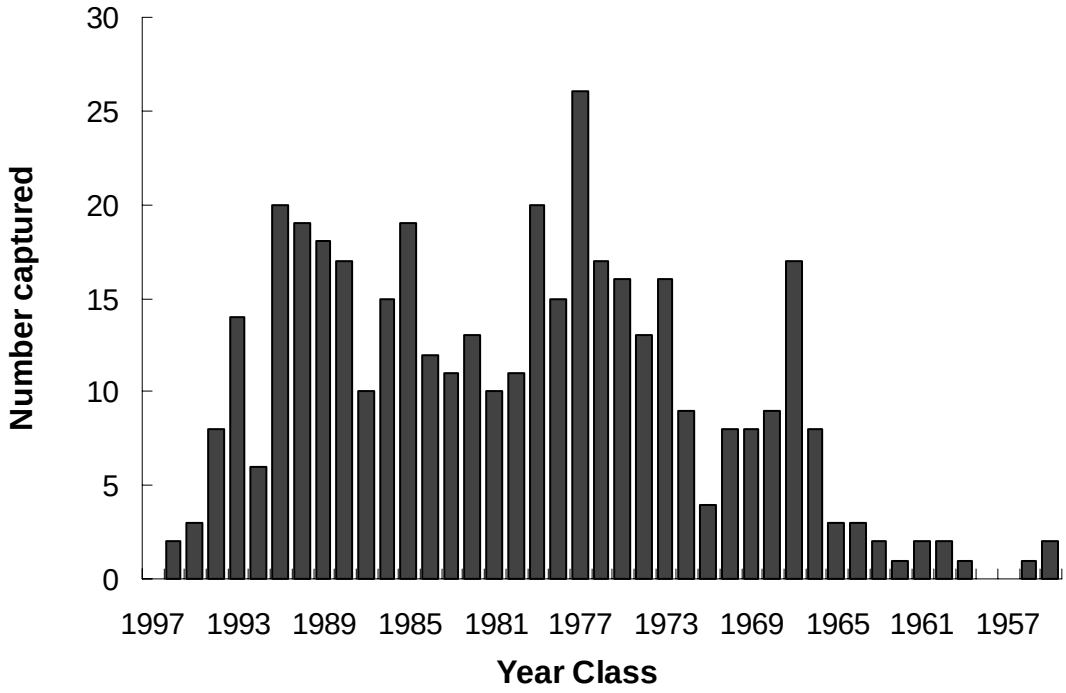

Figure 14. —Age distribution of lake sturgeon sampled from Lake St. Clair and St. Clair River in 1997 and 1998 by Mt. Clemens Research Station.

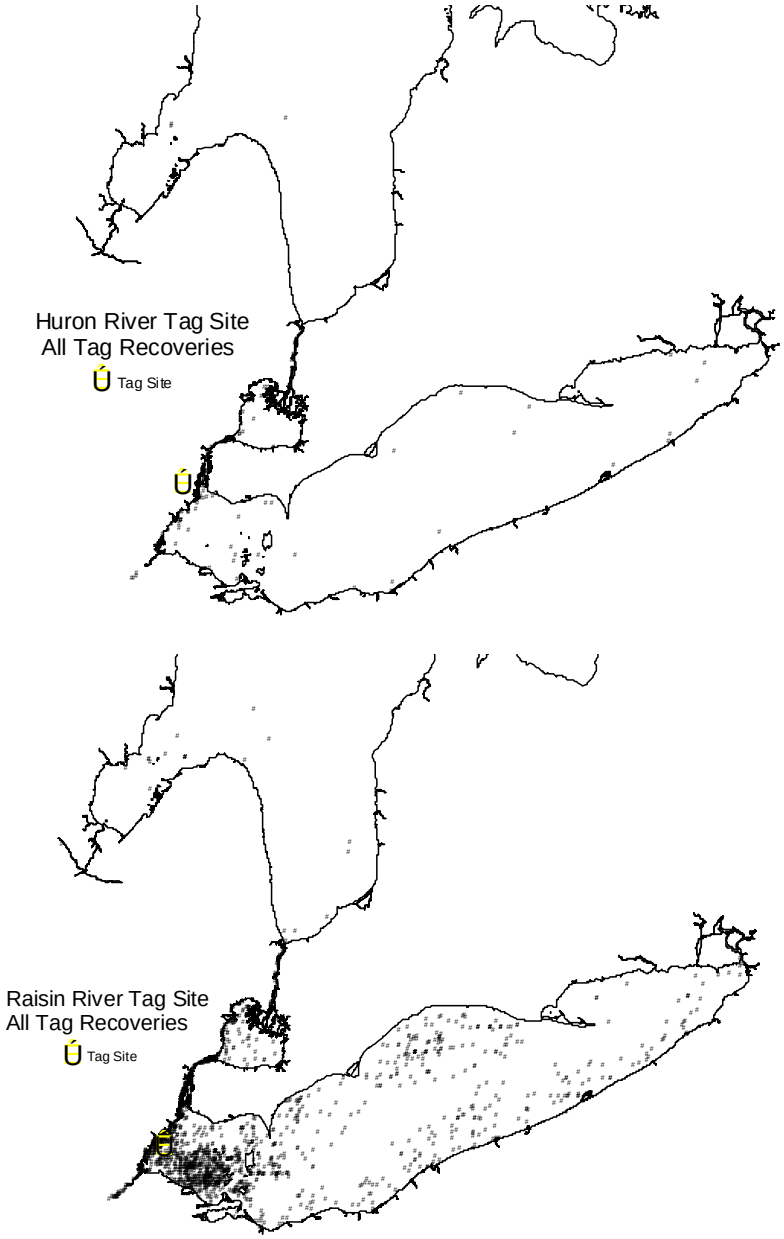

Figure 15. —Geographical distribution of walleye tag recoveries from fish tagged during all years at the Huron River, and during 1998 at the Monroe, Lake Erie tag sites.

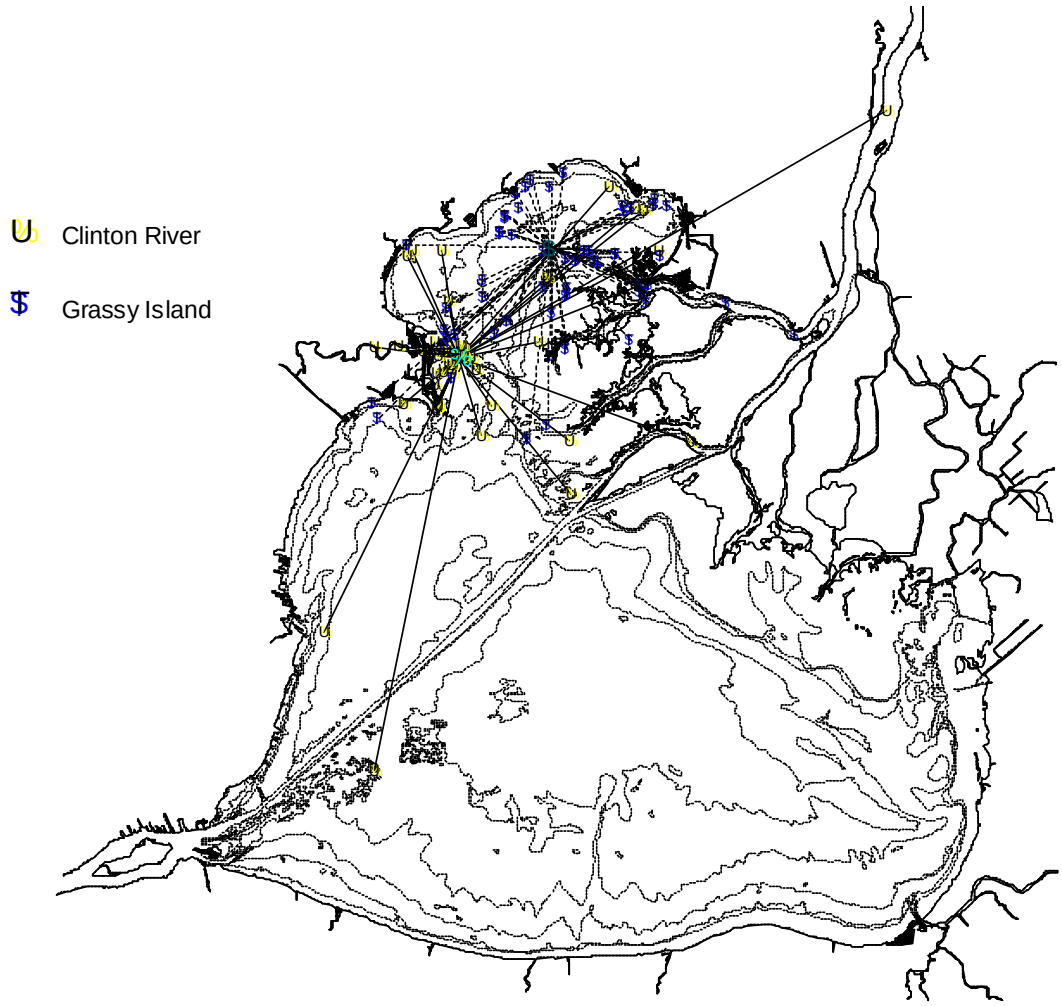

Figure 16. —Geographical distribution of yellow perch tag recoveries from fish tagged during the spring of 1996 and 1997 at the Clinton River and Grassy Island tag sites on Lake St. Clair.

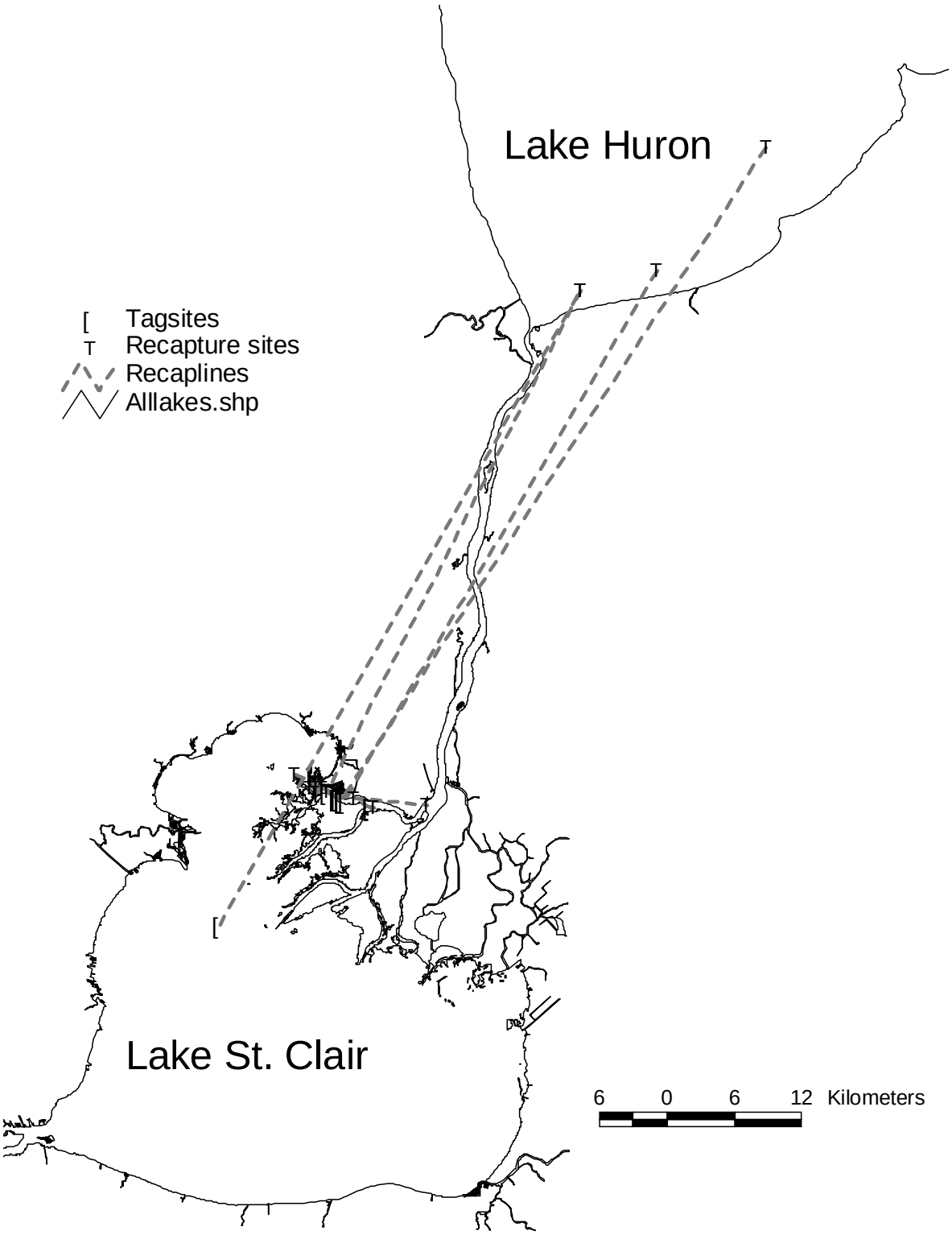

Figure 17. —Geographical distribution of sturgeon tag recoveries from fish tagged in the St. Clair River and Lake St. Clair from 1996 to 1998.

Table 1. —Estimated sport harvest, catch rate, and effort for Michigan's 1998 Lake Erie non-charter boat fishery. Two standard errors in parentheses.

Species	Total C/H	Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Rainbow trout	0.0000	0	6	10	0	0	0	0	16
	(---)	(---)	(20)	(11)	(9)	(---)	(---)	(---)	(25)
Smallmouth bass	0.0006	0	0	13	95	123	6	47	284
	(0.0005	(---)	(---)	(20)	(70)	(226)	(12)	(79)	(251)
Yellow perch	1.0809	60	4,916	5,285	43,079	166,787	243,336	91,115	554,578
	(0.2664)	(105)	(2,538)	(2,451)	(20,432)	(36,999)	(77,992)	(51,524)	(102,647)
Walleye	0.1297	651	15,352	26,142	23,261	907	183	74	66,570
	(0.0403)	(730)	(5,825)	(11,828)	(13,685)	(724)	(161)	(151)	(17,636)
Total	1.2112	711	20,274	31,450	66,435	167,817	243,525	91,236	621,448
	(0.2830)	(738)	(6,354)	(9,732)	(24,592)	(37,007)	(77,992)	(51,524)	(104,151)
Angler hours		9,677	93,020	81,066	135,318	81,380	74,636	37,971	513,068
		(4,999)	(23,763)	(23,843)	(67,970)	(16,835)	(22,898)	(19,680)	(83,505)
Angler trips		2,400	18,115	16,658	27,578	18,406	15,527	8,399	107,083
		(1,196)	(4,676)	(4,721)	(13,316)	(3,687)	(4,687)	(4,270)	(16,634)
Angler days		2,373	17,456	15,936	26,642	17,966	15,108	8,210	103,691
		(1,196)	(4,500)	(4,488)	(13,251)	(3,589)	(4,552)	(4,160)	(16,380)

Table 2. —Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake Erie, 1998.

Species	Total catch per hour	Total catch per excursion	Month							
			Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Coho salmon	0.000	0.001	0	0	1	0	0	0	0	1
Chinook salmon	0.000	0.001	0	0	1	0	0	0	0	1
Rainbow trout	0.000	0.010	0	10	6	1	0	0	0	17
Yellow perch	0.704	18.880	0	185	300	2,380	11,485	13,370	3,979	31,699
Walleye	1.067	28.610	298	7,392	28,127	10,646	69	1,415	90	48,037
Other	0.018	0.485	11	130	388	137	15	69	64	814
Angler hours			435	8,785	21,105	8,898	2,415	2,635	758	45,031
Angler trips			79	1,507	3,798	1,620	489	524	150	8,167
Anglers										
Resident			58	1,413	3,438	1,510	473	487	148	7,527
Nonresident			21	94	360	157	16	37	2	687
Charter excursions			20	311	750	348	103	114	33	1,679

Table 3. —Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake St. Clair and the St. Clair River, 1998.

Species	Total catch per hour	Total catch per excursion	Month							
			Apr	May	Jun	Jul	Aug	Sep	Oct	Season
Coho salmon	0.001	0.018	0	0	0	0	0	0	6	6
Chinook salmon	0.000	0.009	0	0	1	0	2	0	0	3
Yellow perch	0.326	8.218	0	3	334	469	490	650	848	2,794
Walleye	0.164	4.126	42	180	243	593	283	62	0	1,403
Other	0.018	0.485	0	56	425	535	366	181	18	1,581
Angler hours			94	969	1,733	2,441	1,680	1,170	492	8,579
Angler trips			17	193	274	396	263	172	78	1,393
Anglers										
Resident			13	186	262	349	244	163	78	1,295
Nonresident			4	7	12	47	24	9	0	103
Charter excursions			6	40	69	94	72	42	17	340

Table 4. —Commercial harvest from Michigan waters of Lake Erie in 1998.

	Carp	Freshwater drum	Quillback	Channel catfish	Buffalo	Other[1]	Total
Harvest (lbs.)	620,015	24,507	22,990	16,573	15,721	21,774	721,580
% of total	86	3	3	2	2	3	100
Economic value	$41,981	$41,344	$13,915	$3,846	$10,762	$10,926	$122,773

[1] Others category includes freshwater drum, gar, goldfish, sucker, white bass, white perch

Table 5. —Mean catch per trap net lift for all species commonly taken during spring trap net surveys in Michigan waters of Lake Erie.

	Survey year											
Species	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Walleye	28.1	49.0	18.1	20.6	38.8	26.1	36.6	75.5	61.7	33.9	83.1	35.9
Smallmouth bass	0.1	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.3
Yellow perch	377.0	320.0	669.0	512.0	146.0	257.0	129.0	156.0	40.3	174.0	22.9	251.5
Rock bass	1.2	0.8	1.9	0.9	1.5	1.3	1.0	1.5	0.7	1.5	0.9	0.8
White bass	1.5	1.5	3.7	1.4	10.5	4.9	2.5	2.8	7.6	0.4	5.3	4.7
White perch	0.0	0.1	0.3	0.5	24.6	35.0	10.9	38.9	30.3	43.5	63.1	233.0
Pumpkinseed	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.1
Bluegill	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Black crappie	0.2	0.0	0.2	0.0	0.1	0.0	0.1	0.1	0.2	0.2	0.4	0.2
Channel catfish	3.5	9.7	5.4	5.8	4.9	10.6	4.6	5.5	5.4	2.7	3.5	4.1
Brown bullhead	0.2	1.1	1.6	1.9	1.7	4.2	2.5	1.5	4.1	0.9	9.2	3.9
White sucker	7.8	8.3	7.9	12.2	8.7	6.7	10.2	33.0	10.2	7.0	6.7	2.8
Redhorse sp.	2.4	1.2	0.6	1.0	0.8	1.5	1.7	1.4	1.3	1.7	1.8	0.6
Freshwater drum	37.4	66.8	14.0	42.9	13.4	23.5	25.1	30.6	25.3	9.1	15.6	6.4
Common carp	5.1	26.1	4.7	8.2	6.9	14.9	3.5	2.0	1.9	0.6	6.0	0.6
Goldfish	4.8	2.4	0.3	0.4	0.4	2.5	0.6	0.2	0.1	0.0	0.2	0.1
Gizzard shad	4.4	4.7	2.3	3.9	17.8	28.4	18.1	17.4	2.7	2.3	15.9	0.3
Longnose gar	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Bowfin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Quillback	4.0	18.6	1.8	2.0	2.4	5.6	2.0	1.9	1.7	1.8	1.5	0.7
Stonecat	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Total	477.9	510.3	731.8	613.9	278.8	422.4	248.7	368.5	193.6	279.7	236.4	546.2
% yellow perch	78.9	62.7	91.4	83.4	52.4	60.8	51.9	42.3	20.8	62.2	9.7	46.0
% white perch	0.0	0.0	0.0	0.1	8.8	8.3	4.4	10.6	15.7	15.6	26.7	42.7
Net lifts	50	46	48	36	37	53	57	51	49	55	51	55

Table 5.–Continued.

Species	Survey year									78-89 Mean	90-98 Mean	Overall Mean
	1990	1991	1992	1993	1994	1995[1]	1996	1997	1998			
Walleye	23.8	95.9	37.7	39.2	53.0	26.2	52.0	30.2	34.8	42.3	43.6	42.9
Smallmouth bass	0.1	0.2	0.1	0.2	0.8	2.2	2.1	1.2	1.9	0.1	1.0	0.5
Yellow perch	41.7	94.6	35.0	50.2	23.2	10.3	36.6	30.7	33.3	254.6	39.3	162.3
Rock bass	0.3	0.8	0.5	1.2	1.0	4.1	1.1	0.9	1.0	1.2	1.2	1.2
White bass	0.9	1.6	0.5	0.1	1.1	2.1	0.6	2.6	1.3	3.9	1.2	2.7
White perch	40.5	56.8	5.1	0.0	14.7	72.8	5.9	10.2	8.7	40.0	23.9	33.1
Pumpkinseed	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Bluegill	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Black crappie	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.1
Channel catfish	9.0	6.0	4.6	4.6	5.4	3.7	8.8	4.4	11.4	5.5	6.4	5.9
Brown bullhead	13.1	4.3	4.0	1.6	1.1	0.2	1.1	0.4	0.0	2.7	2.9	2.8
White sucker	4.3	13.5	14.6	9.0	5.8	7.4	14.0	4.7	15.0	10.1	9.8	10.0
Redhorse sp.	0.4	0.6	3.1	3.6	1.8	1.0	5.5	1.9	3.3	1.3	2.4	1.8
Freshwater drum	5.1	25.6	8.9	20.7	8.8	13.0	15.4	6.8	28.3	25.8	14.7	21.1
Common carp	2.3	2.3	1.3	1.4	3.7	2.9	8.2	0.6	3.1	6.7	2.9	5.1
Goldfish	0.1	0.1	0.1	0.0	4.4	0.1	0.5	0.1	0.0	1.0	0.6	0.8
Gizzard shad	2.3	0.0	0.6	0.3	0.3	1.7	0.3	0.0	0.0	9.9	0.6	5.9
Longnose gar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bowfin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Quillback	1.9	2.9	4.4	3.2	4.6	6.7	8.9	2.2	7.9	3.7	4.7	4.1
Stonecat	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	145.8	305.5	120.5	135.2	129.6	155.2	161.2	96.9	150.0	409.0	155.3	300.3
% yellow perch	28.6	31.0	29.0	37.1	17.9	6.2	22.7	31.7	22.2	55.2	25.1	42.3
% white perch	27.8	18.6	4.2	0.0	11.3	46.9	3.6	10.5	5.8	11.1	14.3	12.5
Net lifts	82	29	55	40	45	39	45	57	44	49	49	49

[1]Sampling period delayed two weeks.

Table 6.–Walleye CPUE (number per net lift) in multi-filament gill nets during fall surveys on Michigan waters of Lake Erie.

Year class	Total CPUE	Survey year																	
		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
1972	1.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1973	1.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1974	13.6	1.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1975	42.8	2.0	0.5	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
1976	18.4	1.0	1.5	0.3	0.0	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–
1977	171.0	9.0	5.0	2.5	3.0	0.5	0.3	–	–	–	–	–	–	–	–	–	–	–	–
1978	61.6	6.0	5.5	2.5	1.8	0.5	1.3	–	–	–	–	–	–	–	–	–	–	–	–
1979	72.4	13.5	5.0	4.3	2.3	2.0	0.5	0.5	0.3	–	–	–	–	–	–	–	–	–	–
1980	92.7	43.0	21.5	14.5	5.0	5.3	2.3	0.5	0.3	0.0	0.3	–	–	–	–	–	–	–	–
1981	72.3	–	33.5	21.3	7.8	3.8	2.8	2.3	0.5	0.3	0.0	–	–	–	–	–	–	–	–
1982	306.2	–	–	29.0	91.8	95.8	44.3	28.5	5.3	7.5	3.5	0.5	–	–	–	–	–	–	–
1983	34.6	–	–	–	4.5	12.0	4.0	5.0	3.5	1.8	1.8	2.0	–	–	–	–	–	–	–
1984	147.7	–	–	–	–	69.8	34.3	20.5	3.5	8.0	8.3	2.0	0.5	0.3	0.5	–	–	–	–
1985	177.2	–	–	–	–	–	98.0	42.5	9.3	14.3	8.5	1.5	1.3	0.8	1.0	–	–	–	–
1986	297.5	–	–	–	–	–	–	96.8	30.3	90.3	43.5	19.5	11.0	3.8	2.0	0.3	–	–	–
1987	127.5	–	–	–	–	–	–	–	4.5	53.8	26.8	20.0	13.8	2.5	3.8	1.0	0.5	0.8	–
1988	125.0	–	–	–	–	–	–	–	–	61.5	35.8	9.3	7.3	4.5	4.5	0.5	0.8	0.8	–
1989	52.3	–	–	–	–	–	–	–	–	–	16.0	17.0	10.0	2.8	3.3	1.3	0.8	0.8	0.3
1990	136.1	–	–	–	–	–	–	–	–	–	–	54.5	48.0	13.0	16.5	1.5	1.3	1.3	0.0
1991	194.0	–	–	–	–	–	–	–	–	–	–	–	63.0	47.3	61.5	11.3	6.8	2.8	1.3
1992	15.4	–	–	–	–	–	–	–	–	–	–	–	–	2.0	7.3	2.0	0.3	1.5	2.3
1993	167.4	–	–	–	–	–	–	–	–	–	–	–	–	–	73.3	71.0	11.8	8.08	3.3
1994	125.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	63.3	43.0	14.0	4.8
1995	5.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.3	1.3	0.8
1996	121.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	37.5	84.3
1997	54.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	54.3
Total Net lifts		76.0 2	72.5 4	74.9 4	116.2 4	190.2 4	187.8 4	196.6 4	57.5 4	237.5 4	144.5 4	126.3 4	154.9 4	77.0 4	173.7 4	152.2 4	68.6 4	68.8 4	151.4 4


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