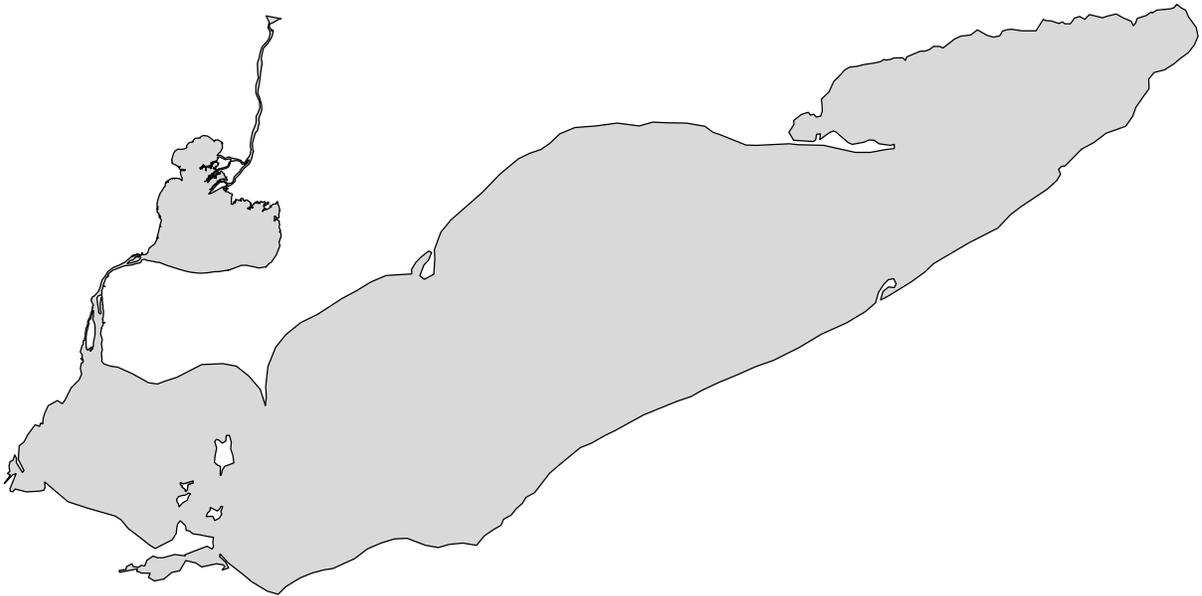


MICHIGAN DEPARTMENT OF NATURAL RESOURCES
FISHERIES DIVISION

**STATUS OF THE FISHERIES
IN MICHIGAN WATERS OF
LAKE ERIE AND LAKE ST. CLAIR**

1995



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Sport fisheries

An on-site creel survey conducted by the Michigan Department of Natural Resources (MDNR), produced a total harvest estimate for Michigan's 1995 Lake Erie sport fishery (non-charter) of 442,695 fish (Table 1). Walleye (16%) and yellow perch (78%) accounted for 94% of the total catch. Estimated angler effort declined about 60% from 1994 to 1995 (Table 2), to reach the lowest estimated annual effort total since before 1986. Since catch rates for walleye remained about the same in 1995, and yellow perch catch rates improved, we suspect fishing success was not a contributing factor to the change in effort. Weather may have played a role in the decrease in fishing effort in Michigan waters. In particular, July and August were extremely warm months, and anglers may have opted to remain indoors (with air conditioning), rather than fishing in uncomfortable conditions. Late October was extremely windy, and effort likely was limited by rough water conditions. In addition, the large public access ramp at Bolles Harbor was closed for paving during most of October.

Biological samples were collected from walleye and yellow perch during the 1995 on-site creel survey (Tables 3 and 4). Age 2 fish (1993 year class) dominated the walleye harvest, comprising 43% of the catch. Harvested age 2 walleye averaged 353 mm (13.9 in.) total length. Age 4 fish (1991 year class) accounted for 18% of the total walleye harvest. Harvested age 4 walleye averaged 451 mm (17.8 in.) total length. As expected, the extremely weak 1992 walleye year class contributed little to the fishery (4%).

Yellow perch harvest was dominated by age 2 fish (1993 year class), which represented 64% of the total. The 1992 year class contributed 19% of the total. Average lengths of harvested age 2 and 3 were 193 mm (7.6 in.) and 212 mm (8.3 in.). The observed mean length at age for yellow perch taken in the Michigan sport fishery has increased quite dramatically since 1989 (Table 5). This suggests that yellow perch growth in the Michigan waters of Lake Erie has improved substantially over the last six years.

Since 1989, Michigan charter boat operators have been required to report their charter fishing catch and effort to the MDNR. In 1995, Michigan charter boat anglers harvested 61,027 fish from Lake Erie (Table 6). Walleye (60%) and yellow perch (39%) were the major species in the charter boat harvest, accounting for 99% of the catch. While charter boat catch rates for walleye were over 3 times higher than those estimated for non-charter anglers in 1995, yellow perch catch rates were about the same for charter and non-charter anglers.

On Lake St. Clair and the St. Clair River, charter boat anglers harvested 7,707 fish (Table 7). Yellow perch (59%) and "other" species (28%) made up the bulk of the catch, accounting for about 87% of the total harvest. The "other" species category is thought to consist mainly of smallmouth bass and muskellunge. Walleye accounted for about 12% of the 1994 charter boat harvest on Lake St. Clair.

During the period since 1989, walleye catch rates have remained relatively stable for Lake Erie charters, but declined markedly after 1990 for Lake St. Clair charters (Table 8). In 1995, the charter catch rate for Lake St. Clair walleye improved slightly over the low rate observed in 1994, but remained over 50% lower than the rate in 1990. Concurrently, the number of charter excursions reported for Lake St. Clair has declined by over 60% since 1990. We suspect that the decline in walleye catch rates for charter fishing on Lake St. Clair is a major factor in the decline of charter excursions on the lake.

The charter boat catch rate for Lake St. Clair yellow perch was high in 1995. Yellow perch catch rates for Lake St. Clair charter boats have increased over 4-fold since 1989. The charter boat catch rate for yellow perch on Lake St. Clair was higher than that for Lake Erie charter boats in both 1994 and 1995. This is likely a result of increased targeting of yellow perch by charters in Lake St. Clair.

The 1995 charter boat catch rate for "other" fish species on Lake St. Clair, primarily smallmouth bass and muskellunge, was the second highest since reporting began in 1989. However, since these catch rates are not based on targeted effort, it is possible that shifts in fishing effort from walleye to "other" species and yellow perch have affected the catch rates for the all species reported. Anecdotal fishing reports from Lake St. Clair anglers indicate that yellow perch, smallmouth bass, and muskellunge fishing remained excellent, while walleye fishing improved slightly during the 1995 fishing season.

Despite the lack of creel survey data for Lake St. Clair, it is apparent that the muskellunge fishery is better now than during any other period in modern history. Angler reports indicate that catch rates in the 1990's are spectacular. 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 1995 was the third highest since 1986 (Table 9). The number of fish over 30 pounds in weight that were entered was also the third highest for the same period. 1995 was also the second consecutive year in which the heaviest Master Angler muskellunge entry from Lake St. Clair exceeded 38 pounds. 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

In 1995 three licensed commercial seine operations in the shallow embayments along Michigan's Lake Erie shoreline harvested eleven species for a total of 436,821 pounds (Table 10). In combination, common carp (72%), quillback (14%), and freshwater drum (9%) accounted for 95% of the total harvest by weight. The total value of the 1995 Lake Erie commercial harvest from Michigan waters was estimated at \$74,272.

Netting surveys

The Michigan waters of the western basin of Lake Erie have been monitored with spring trap net surveys since 1978. Unfortunately, the survey time frame in 1995 was about 2 weeks later than in most recent years. Due to engine repairs on the SV Channel Cat, trap nets were not set until April 24, and were fished until May 22. We expected the later survey period to result in lower catches of yellow perch and walleye and higher catches of white perch due to water temperature differences and spawning activity. As a result, we suggest that comparison of survey trap net catch rates and age composition in 1995 with previous years should be carefully considered.

In 1995, total catch per net lift (CPUE) for all species combined was highest since 1991 (Table 11). However, only smallmouth bass, rock bass, white perch, and quillback exhibited CPUE values above the 18 year means. Yellow perch CPUE was the lowest recorded since 1978. Comparison of mean yellow perch CPUE for the 1978-89 period (254.6/lift) with the 1990-95 period (42.5/lift) clearly illustrates the dramatic change in yellow perch catches at the spring trap net sites. This change is probably the result of a substantial decline in yellow perch abundance since 1990. In addition, we also suspect that increased net avoidance due to improved water clarity has contributed to low total CPUE since 1990.

Age 2 walleye made up 63% of the trap net walleye catch, reflecting the strength of the 1993 year class. The 1991 year class was also well represented, accounting for 13% of the total catch. Based on mean length at age (Table 12), no trend in walleye growth rates for Lake Erie is evident. A total of 969 walleye captured in the trap nets were tagged and released as part of the ongoing interagency tagging project.

Based on mean length at age from trap net samples, growth of Lake Erie yellow perch continues to improve (Table 13). This improvement is most notable for males age 3 to age 6, and females age 4 to age 7. In fact, the appearance of age 2 males in the trap nets in recent years may be due to improved growth and subsequent earlier recruitment to our index trap nets. Improved growth for yellow perch in western Lake Erie is likely a result of a major decline in yellow perch abundance and improved forage.

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 1995, a total of 1,080 walleye were caught in eight net lifts. The yearling catch per net lift of 63.3 in index multi-filament gill nets suggests that the 1994 year class is average or better (Table 14). The 1993 year class' contribution of 71.0 fish per net lift is the second highest on record for age 2 fish. Only the extremely large 1982 year class exhibited higher CPUE's in the multi-filament gill nets at age 2. In combination, the 1993 and 1994 year classes should support good walleye fishing in Michigan's waters of Lake Erie for the next several years. No trend in growth is obvious from the mean length at age data for walleye taken in the fall index gill net survey (Table 15).

Walleye tagging studies

In 1995, a total of 7,156 walleye were tagged by Ontario, Ohio, New York, and Michigan at 9 different Lake Erie sites. A total of 199 of those tags were recovered by fishermen for a single season reporting rate of 2.8%. The 1995 site-specific reporting rate varied from a low of 1.1% for the Ontario Chicken and Hen Island tag site, to a high of 4.6% for the Grand River tag site in Ohio. Other sites with reporting rates over 3.0% were Sandusky Bay site (4.4%), Maumee River (3.7%), and Sugar Rock (3.6%) in Ohio. The Monroe tag site in Michigan waters experienced a lower reporting rate (1.8%).

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 in 1995, recoveries of Huron River site fish declined considerably. However, this project continues to produce some interesting results. A comparison of the areal distribution of 1995 tag recoveries from the Huron River and Monroe tag sites is shown in Figure 1. 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, of the 13 Huron River recoveries in 1995, only three came from Lake Erie. This difference indicates that the Huron River walleye spawning run, estimated to number around 5,000 fish, is not composed of random strays each year, but rather represents a distinct group of walleye. The importance of small discrete walleye stocks to the walleye fishery in the Great Lakes waters of southeast Michigan is unclear at this time. Continued tagging efforts targeting relatively small walleye spawning runs, such as the Huron River run, can help us gain further insight into their importance.

Sport fishing regulations

In light of the concerns of the Ontario Ministry of Natural Resources over the status of the Thames River walleye stock, we have recommended that the Michigan sport fishing regulations for walleye in Lake St. Clair and the St. Clair River be modified. We are proposing an increase in the MSL from 13 inches to 15 inches for walleye from these waters, beginning in 1997. Of course, this change could be reversed at a later date if the OMNR believes that the Thames River stock has recovered. We recommend no change in the present daily bag limit of 6 walleye for Lake St. Clair and the St. Clair River.

Walleye in Lake Erie are managed cooperatively with the 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 function of reduced fishing effort in Michigan waters. Therefore, we propose to increase the daily walleye bag limit for walleye in Michigan's waters of Lake Erie from 6 fish per day, to 10 fish per day, beginning in 1997. If harvest exceeds the harvest quota in the future, the daily bag limit should be adjusted downward.

Table 1. Estimated sport harvest, catch rate, and effort for Michigan's 1995 Lake Erie non-charter boat fishery. Two standard errors in parentheses.

Species	Total C/H	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Yellow perch	0.9651 (0.3170)	0 (---)	1,968 (1,147)	5,519 (2,946)	2,876 (1,350)	16,912 (9,410)	245,346 (87,410)	70,619 (50,228)	343,240 (101,310)
Walleye	0.2011 (0.0511)	1,130 (842)	8,968 (3,103)	30,316 (9,133)	27,300 (11,319)	3,594 (1,509)	140 (147)	68 (113)	71,516 (14,973)
White bass	0.0343 (0.0179)	730 (700)	7,627 (5,733)	753 (684)	519 (682)	72 (61)	1,999 (1,497)	507 (1,055)	12,207 (6,136)
White perch	0.0139 (0.0087)	0 (---)	277 (185)	352 (233)	542 (366)	628 (451)	3,085 (2,954)	61 (83)	4,945 (3,026)
Channel catfish	0.0135 (0.0046)	336 (349)	925 (736)	1,090 (725)	1,249 (708)	425 (313)	719 (654)	50 (76)	4,794 (1,491)
Freshwater drum	0.0127 (0.0062)	179 (240)	1,842 (1,851)	746 (470)	571 (374)	327 (230)	823 (667)	15 (25)	4,503 (2,084)
Rock bass	0.0014 (0.0007)	2 (3)	13 (21)	41 (50)	102 (99)	192 (201)	99 (84)	60 (72)	509 (256)
Smallmouth bass	0.0013 (0.0006)	1 (2)	64 (77)	80 (72)	138 (107)	83 (67)	108 (110)	0 (---)	474 (198)
Bluegill	0.0004 (0.0003)	6 (10)	7 (11)	8 (16)	12 (19)	0 (---)	120 (125)	0 (---)	153 (128)
Largemouth bass	0.0004 (0.0004)	0 (---)	0 (---)	98 (133)	0 (---)	29 (63)	5 (8)	0 (---)	132 (147)
Black crappie	0.0001 (0.0002)	0 (---)	0 (---)	0 (---)	0 (---)	0 (---)	43 (93)	0 (---)	43 (93)
Rainbow trout	0.0000 (---)	0 (---)	8 (11)	0 (---)	7 (14)	0 (---)	0 (---)	0 (---)	15 (18)
Black bullhead	0.0001 (0.0002)	21 (44)	0 (---)	0 (---)	0 (---)	0 (---)	0 (---)	0 (---)	21 (44)
Northern pike	0.0000 (---)	0 (---)	0 (---)	0 (---)	4 (8)	0 (---)	0 (---)	0 (---)	4 (8)
Other	0.0004 (0.0003)	15 (16)	86 (105)	5 (11)	8 (10)	0 (---)	0 (---)	21 (45)	135 (116)
Total	1.2447 (0.3399)	2,420 (1,175)	21,783 (6,916)	39,008 (9,664)	33,332 (11,454)	22,262 (9,552)	252,487 (87,478)	71,401 (50,239)	442,695 (102,671)
Angler hours		18,713 (9,867)	51,701 (16,024)	92,600 (22,273)	77,457 (35,057)	32,429 (8,070)	63,248 (18,077)	19,519 (12,527)	355,667 (51,264)
Angler trips		3,872 (1,883)	9,343 (2,959)	16,961 (4,167)	13,510 (6,250)	6,549 (1,668)	11,990 (3,471)	4,096 (2,619)	66,321 (9,509)
Angler days		3,811 (1,859)	9,343 (2,959)	16,961 (4,167)	13,497 (6,249)	6,549 (1,668)	11,965 (3,465)	4,096 (2,619)	66,222 (9,501)

Table 2.—Estimated sport harvest, catch rate (fish per hour), and angler effort for walleye and yellow perch from Michigan's Lake Erie sport fishery (including both charter and non-charter anglers), April 15 - October 31, 1986-1995. Two standard errors in parentheses.

	1986	1987	1988 ¹	1989	1990	1991 ²	1992	1993	1994	1995
Walleye harvest	605,666 (110,365)	902,378 (151,024)	1,996,824 (419,055)	1,106,510 (205,068)	780,508 (145,900)	132,427 (22,873)	249,616 (44,354)	270,376 (47,319)	216,040 (36,667)	107,909 (14,973)
Walleye catch rate	.291 (.064)	.367 (.077)	.458 (.121)	.290 (.068)	.314 (.071)	.164 (.037)	.299 (.069)	.289 (.066)	.213 (.047)	.269 (.051)
Yellow perch harvest	844,294 (220,555)	619,112 (385,740)	318,786 (205,749)	1,467,002 (242,822)	770,507 (368,162)	378,654 (80,078)	254,809 (72,114)	473,508 (126,436)	246,327 (64,150)	367,157 (101,310)
Yellow perch catch rate	.406 (.117)	.252 (.160)	.073 (.049)	.385 (.084)	.310 (.156)	.470 (.129)	.305 (.102)	.506 (.162)	.243 (.075)	.917 (.317)
Angler hours	2,079,668 (252,852)	2,455,903 (308,709)	4,362,452 (702,522)	3,813,628 (545,688)	2,482,242 (298,193)	805,388 (120,402)	835,896 (120,008)	935,252 (134,495)	1,012,595 (139,623)	400,467 (51,264)

¹Sample period, May through September.

²Sample period for creel survey from May through October.

Table 3.—Mean length (mm), weight (g), and age distribution of walleye sampled from angler catch during 1995.

Year class	Age	Number	Percent	Mean length	Mean weight (kg)
1993	2	330	42.8	352	0.36
1992	3	34	4.4	418	0.62
1991	4	250	32.4	451	0.78
1990	5	62	8.0	487	1.02
1989	6	14	1.8	513	1.20
1988	7	20	2.6	544	1.52
1987	8	22	2.9	556	1.66
1986	9	24	3.1	614	2.24
1985	10	7	0.9	658	2.68
1984	11	6	0.8	684	3.10
1983	12	2	0.3	664	2.87
All fish		771		425	0.75

Table 4.—Mean length (mm), weight (g), and age distribution of yellow perch sampled from angler catch during 1995.

Year class	Age	Number	Percent	Mean length	Mean weight (g)
1994	1	21	3.3	173	64
1993	2	414	64.1	193	84
1992	3	121	18.7	212	116
1991	4	41	6.3	240	171
1990	5	40	6.2	252	199
1989	6	6	.9	276	266
1988	7	2	.3	282	269
1987	8	—	—	—	—
1986	9	1	.2	315	482
1985	10	—	—	—	—
All fish		646		204	105

Table 5.—Mean length (mm) of yellow perch from Michigan's Lake Erie sport fishery. Sample size in parentheses.

Age	Survey Year											
	1989		1991		1992		1993		1994		1995	
1	—	—	157	(2)	181	(3)	166	(7)	159	(21)	173	(21)
2	165	(2)	180	(74)	190	(310)	194	(120)	200	(202)	193	(414)
3	191	(124)	185	(285)	199	(246)	205	(369)	224	(88)	212	(121)
4	208	(168)	198	(223)	209	(74)	214	(113)	231	(125)	240	(41)
5	216	(88)	216	(189)	225	(29)	226	(32)	242	(40)	252	(40)
6	234	(15)	229	(162)	232	(47)	230	(3)	251	(7)	276	(6)
7	236	(8)	241	(67)	255	(17)	244	(5)	248	(9)	282	(2)
8	262	(1)	264	(22)	250	(15)	267	(2)	269	(5)	—	—
9	—	—	300	(6)	281	(3)	246	(1)	302	(1)	315	(1)
10	—	—	—	—	318	(1)	323	(1)	287	(1)	—	—
Mean	206	(407)	206	(1,030)	202	(745)	206	(653)	216	(499)	204	(646)

Table 6.—Total catch per hour, catch per excursion, number caught, and fishing effort (angler hours, trips, and charter excursions) for charter boats on Lake Erie, 1995.

Species	Total catch per hour	Total catch per excursion	Month							Season Total
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Rainbow trout	0.0001	0.0035	0	5	1	0	0	0	0	6
Yellow perch	0.5339	13.9539	9	124	981	424	1,856	18,313	2,210	23,917
Walleye	0.8124	21.2345	157	5,255	20,327	9,839	759	59	0	36,396
Other	0.0158	0.4131	0	78	409	160	13	48	0	708
Angler hours			407	7,964	21,812	9,862	1,458	2,840	457	44,800
Angler trips			64	1,435	4,139	1,879	282	526	89	8,414
Anglers										
Resident			58	1,269	3,654	1,676	252	470	89	7,468
Nonresident			6	166	485	203	30	56	0	946
Charter excursions			12	304	814	387	66	113	18	1,714

Table 7.—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, 1995.

Species	Total catch per hour	Total catch per excursion	Month							Season Total
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Yellow perch	0.6745	17.9961	0	421	587	990	546	711	1,306	4,571
Walleye	0.1408	3.7559	73	66	318	370	123	4	0	954
Other	0.3220	8.5906	3	23	752	884	346	149	25	2,182
Angler hours			220	481	1,582	2,324	1,115	598	457	6,777
Angler trips			36	99	238	365	167	86	73	1,064
Anglers										
Resident			32	99	235	351	144	86	73	1,020
Nonresident			4	0	3	14	23	0	0	44
Charter excursions			9	21	55	89	41	20	19	254

Table 8.—Michigan charter boat catch and effort for Lake Erie and Lake St. Clair, 1989 - 1995.

	1989	1990	1991	1992	1993	1994	1995
<u>Lake Erie</u>							
Walleye Catch/hr	0.7561	0.7449	0.6276	0.7882	0.8135	0.6964	0.8124
Total Walleye Catch	14,868	33,379	24,640	34,017	40,302	30,880	36,396
Y.perch Catch/hr	1.3105	0.2941	0.3410	0.4148	0.4391	0.2874	0.5339
Total Y.perch Catch	25,769	13,177	13,389	17,901	21,764	12,742	23,917
Charter Excursions	818	1,684	1,445	1,666	1,881	1,661	1,714
<u>Lake St. Clair</u>							
Walleye Catch/hr	0.3446	0.3242	0.2040	0.1369	0.1992	0.1231	0.1408
Total Walleye Catch	3,892	6,881	3,607	1,550	1,786	2,028	954
Yellow perch Catch/hr	0.1427	0.1375	0.1678	0.1410	0.4326	0.8547	0.6745
Total Y.perch Catch	1,612	2,919	2,968	1,597	3,880	7,281	4,571
Other species Catch/hr	0.2103	0.2043	0.2577	0.4155	0.1598	0.2381	0.3220
Total "other" catch	2,375	4,336	4,558	4,705	1,433	2,028	2,182
Charter Excursions	412	779	643	448	319	299	254

Table 9.—Summary of Lake St. Clair Great Lakes Muskellunge entered in the Michigan Department of Natural Resources Master Angler Program, 1986 - 1995.

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Entries	8	18	19	16	14	13	25	15	34	23
Max. wt.	30.8	29.5	33.5	31.3	34.1	37.5	36.4	36.1	38.9	38.2
Number over 30 pounds	1	0	3	4	5	3	11	4	12	10

Table 10.—Commercial harvest (expressed as weight in pounds) from Michigan waters of Lake Erie in 1995.

	Carp	Quillback	Drum	Channel catfish	Buffalo	Other ¹	Total
Harvest	320,342	55,102	39,673	14,378	3,724	3,602	436,821
% of total	72%	14%	9%	4%	>1%	>1%	
Economic value	\$34,280	\$20,314	\$8,216	\$7,518	\$1,665	\$2,279	\$74,272

¹ Others category includes bullhead, gizzard shad, sucker, goldfish, white bass, and white perch

Table 11.—Mean catch per trap net lift for all species commonly taken during spring trap net surveys in Michigan waters of Lake Erie.

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

Table 11 contd.—Mean catch per trap net lift for all species commonly taken during spring trap net surveys in Michigan waters of Lake Erie.

Species	Survey year							78-89	90-95	Overall
	1989	1990	1991	1992	1993	1994	1995 ¹	mean	mean	mean
Walleye	35.9	23.8	95.9	37.7	39.2	53.0	26.2	42.3	46.0	43.5
Smallmouth bass	0.3	0.1	0.2	0.1	0.2	0.8	2.2	0.1	0.6	0.3
Yellow perch	251.5	41.7	94.6	35.0	50.2	23.2	10.3	254.6	42.5	183.8
Rock bass	0.8	0.3	0.8	0.5	1.2	1.0	4.1	1.2	1.3	1.2
White bass	4.7	0.9	1.6	0.5	0.1	1.1	2.1	3.9	1.0	2.9
White perch	233.0	40.5	56.8	5.1	0.0	14.7	72.8	40.0	31.7	37.2
Pumpkinseed	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Bluegill	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Black crappie	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1
Channel catfish	4.1	9.0	6.0	4.6	4.6	5.4	3.7	5.5	5.6	5.5
Brown bullhead	3.9	13.1	4.3	4.0	1.6	1.1	0.2	2.7	4.0	3.2
White sucker	2.8	4.3	13.5	14.6	9.0	5.8	7.4	10.1	9.1	9.8
Redhorse sp.	0.6	0.4	0.6	3.1	3.6	1.8	1.0	1.3	1.8	1.5
Freshwater drum	6.4	5.1	25.6	8.9	20.7	8.8	13.0	25.8	13.7	21.8
Common carp	0.6	2.3	2.3	1.3	1.4	3.7	2.9	6.7	2.3	5.2
Goldfish	0.1	0.1	0.1	0.1	0.0	4.4	0.1	1.0	0.8	0.9
Gizzard shad	0.3	2.3	0.0	0.6	0.3	0.3	1.7	9.9	0.9	6.9
Longnose gar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bowfin	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Quillback	0.7	1.9	2.9	4.4	3.2	4.6	6.7	3.7	3.9	3.8
Stonecat	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	546.2	145.8	305.5	120.5	135.2	129.6	155.2	409.0	165.3	327.8
% yellow perch	46.0	28.6	31.0	29.0	37.1	17.9	6.2	55.2	25.0	45.1
% white perch	42.7	27.8	18.6	4.2	0.0	11.3	46.9	11.1	18.1	13.4
Net lifts	55	82	29	55	40	45	39	49	48	49

¹Sampling period delayed two weeks.

Table 12. —Mean length (mm) of walleye caught in trap nets during spring surveys. Sample size in parentheses.

Age	1990		1991		1992		1993		1994		1995	
	Mean	SE	Mean	SE								
Males												
0	246 (45)	0.1	258 (145)	1.5	265 (207)	1.0	224 (31)	1.5	252 (6)	6.7	240 (57)	0.0
2	400 (117)	0.0	412 (379)	1.0	422 (135)	0.0	418 (460)	1.0	400 (621)	0.0	400 (2)	1.5
4	440 (674)	0.0	448 (280)	1.6	460 (200)	1.7	468 (57)	2.1	464 (365)	1.5	450 (81)	0.6
5	478 (214)	1.0	480 (933)	0.0	482 (215)	1.0	485 (127)	0.8	484 (80)	2.1	488 (35)	2.6
6	501 (263)	1.0	500 (183)	0.1	514 (614)	1.0	517 (151)	0.5	500 (127)	0.5	518 (13)	7.1
7	521 (49)	5.6	541 (254)	1.8	546 (184)	0.0	520 (270)	0.0	526 (291)	1.8	527 (40)	5.2
8	540 (215)	0.1	566 (84)	0.0	562 (190)	0.0	564 (89)	0.5	551 (212)	0.0	560 (51)	5.1
9	570 (14)	10.0	561 (43)	5.0	570 (37)	1.0	578 (34)	5.5	560 (85)	2.0	560 (18)	5.1
10	580 (6)	10.5	—	—	588 (35)	5.1	586 (13)	7.5	584 (27)	6.1	580 (9)	8.5
11	—	—	—	—	—	—	570 (16)	6.6	507 (14)	8.0	600 (2)	—
Females												
0	—	—	—	—	—	—	217 (3)	5.2	240 (6)	0.8	—	—
2	425 (6)	10.7	401 (6)	7.8	—	—	420 (3)	20.0	416 (66)	2.6	—	—
4	404 (103)	0.8	406 (32)	1.1	501 (23)	5.6	515 (4)	11.6	511 (172)	0.0	501 (17)	6.0
5	500 (27)	01.6	524 (160)	1.0	526 (21)	6.5	550 (12)	11.0	527 (19)	7.8	500 (4)	05.2
6	577 (25)	8.0	584 (28)	1.0	577 (57)	1.7	560 (14)	0.6	578 (24)	7.1	—	—
7	—	—	600 (36)	6.1	607 (17)	6.2	588 (67)	2.0	612 (34)	7.1	—	—
8	600 (48)	7.1	647 (12)	12.1	654 (19)	8.5	620 (25)	10.1	611 (56)	6.8	626 (7)	01.1
9	651 (4)	06.0	654 (28)	5.8	671 (7)	10.2	660 (23)	6.7	646 (35)	7.5	662 (3)	20.0
10	670 (5)	15.0	670 (3)	10.0	681 (16)	8.5	667 (12)	10.7	670 (24)	0.2	680 (3)	12.1
11	707 (3)	02.5	—	—	—	—	700 (14)	7.7	644 (6)	01.6	600 (1)	—
12	700 (3)	02.8	—	—	—	—	—	—	682 (8)	14.1	685 (1)	—

Table 13.—Mean length and standard error (SE) in mm for yellow perch caught in trap nets during spring surveys. Sample size in parentheses.

Age	1990		1991		1992		1993		1994		1995	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Males												
2	—	—	—	—	159 (7)	9.7	177 (4)	2.5	168 (11)	3.5	187 (1)	—
3	175 (3)	6.7	189 (12)	4.7	181 (31)	2.3	185 (48)	2.1	189 (24)	3.9	194 (4)	0.7
4	185 (38)	3.4	196 (11)	6.6	208 (16)	7.0	212 (25)	3.6	207 (45)	2.8	243 (11)	4.6
5	205 (29)	3.3	210 (31)	4.7	221 (8)	6.7	233 (10)	7.2	217 (26)	5.7	250 (12)	2.4
6	230 (25)	4.9	229 (21)	4.8	243 (34)	4.1	238 (8)	3.9	239 (8)	6.2	256 (7)	5.0
7	233 (10)	5.7	244 (21)	5.0	238 (25)	4.2	250 (23)	5.4	252 (8)	3.4	265 (2)	13.5
8	252 (22)	2.7	258 (8)	5.5	247 (13)	7.2	258 (6)	7.5	277 (1)	—	273 (1)	—
9	266 (4)	9.8	255 (6)	4.4	278 (4)	12.9	260 (10)	4.2	257 (3)	4.1	286 (2)	7.0
10	—	—	—	—	—	—	248 (3)	14.4	250 (1)	—	—	—
Females												
3	—	—	237 (4)	13.0	233 (13)	6.8	224 (31)	4.4	216 (25)	3.7	251 (1)	—
4	213 (17)	7.1	255 (3)	10.2	243 (22)	6.7	239 (32)	3.8	239 (47)	3.4	278 (31)	4.2
5	233 (36)	3.3	250 (21)	5.8	254 (14)	6.8	267 (24)	5.7	248 (19)	5.6	287 (39)	3.0
6	252 (28)	5.5	253 (18)	5.5	276 (23)	4.3	281 (14)	5.0	286 (16)	5.8	288 (20)	5.6
7	278 (22)	6.7	272 (24)	4.4	283 (23)	5.8	290 (12)	6.8	297 (3)	8.0	290 (3)	4.2
8	290 (17)	3.9	279 (7)	13.4	296 (21)	6.0	311 (13)	6.6	306 (4)	8.0	—	—
9	292 (15)	6.2	300 (6)	8.8	294 (3)	8.1	307 (10)	5.8	308 (3)	20.0	—	—
10	279 (3)	28.	—	—	—	—	305 (5)	4.8	—	—	—	—

Table 15. —Mean total length (mm) at age for walleye caught during fall in survey index gill nets (sample size in parentheses).

Age	Survey year				
	1991	1992	1993	1994	1995
Sexes combined					
1	345 (218)	309 (252)	331 (13)	328 (415)	318 (444)
2	434 (68)	414 (192)	389 (246)	407 (32)	401 (480)
3	463 (37)	459 (40)	445 (62)	440 (340)	443 (19)
4	489 (40)	487 (29)	462 (11)	476 (83)	478 (96)
5	500 (78)	504 (55)	501 (23)	505 (17)	513 (21)
6	520 (6)	530 (44)	510 (13)	523 (31)	536 (7)
7	544 (8)	542 (5)	548 (22)	545 (20)	563 (7)
8	570 (8)	627 (2)	539 (3)	556 (15)	566 (4)
9	— —	— —	541 (2)	548 (4)	550 (2)
10	— —	— —	— —	578 (2)	— —
Mean	415 (463)	395 (619)	418 (399)	402 (959)	380 (1080)
Males					
1	342 (97)	305 (153)	337 (5)	324 (220)	314 (213)
2	418 (26)	408 (139)	385 (161)	402 (24)	394 (292)
3	444 (17)	449 (27)	429 (39)	434 (277)	436 (15)
4	472 (27)	477 (22)	447 (9)	469 (72)	463 (67)
5	489 (63)	492 (46)	487 (18)	498 (15)	494 (14)
6	504 (4)	511 (26)	510 (13)	523 (31)	513 (5)
7	542 (7)	542 (5)	529 (16)	536 (18)	534 (5)
8	550 (6)	556 (1)	539 (3)	553 (14)	548 (2)
9	— —	— —	541 (2)	548 (4)	550 (2)
Mean	422 (247)	394 (419)	416 (268)	413 (677)	380 (615)
Females					
1	348 (121)	316 (98)	328 (8)	333 (194)	322 (230)
2	444 (42)	430 (52)	398 (85)	421 (8)	412 (188)
3	479 (20)	478 (12)	472 (23)	468 (63)	472 (4)
4	525 (13)	518 (5)	532 (2)	517 (11)	515 (28)
5	550 (15)	577 (7)	550 (5)	564 (2)	551 (7)
6	552 (2)	558 (18)	— —	— —	595 (2)
7	560 (1)	— —	599 (6)	629 (2)	637 (2)
8	629 (2)	698 (1)	— —	610 (1)	584 (2)
10	— —	— —	— —	— —	— —
Mean	408 (216)	396 (193)	422 (129)	378 (281)	379 (463)

