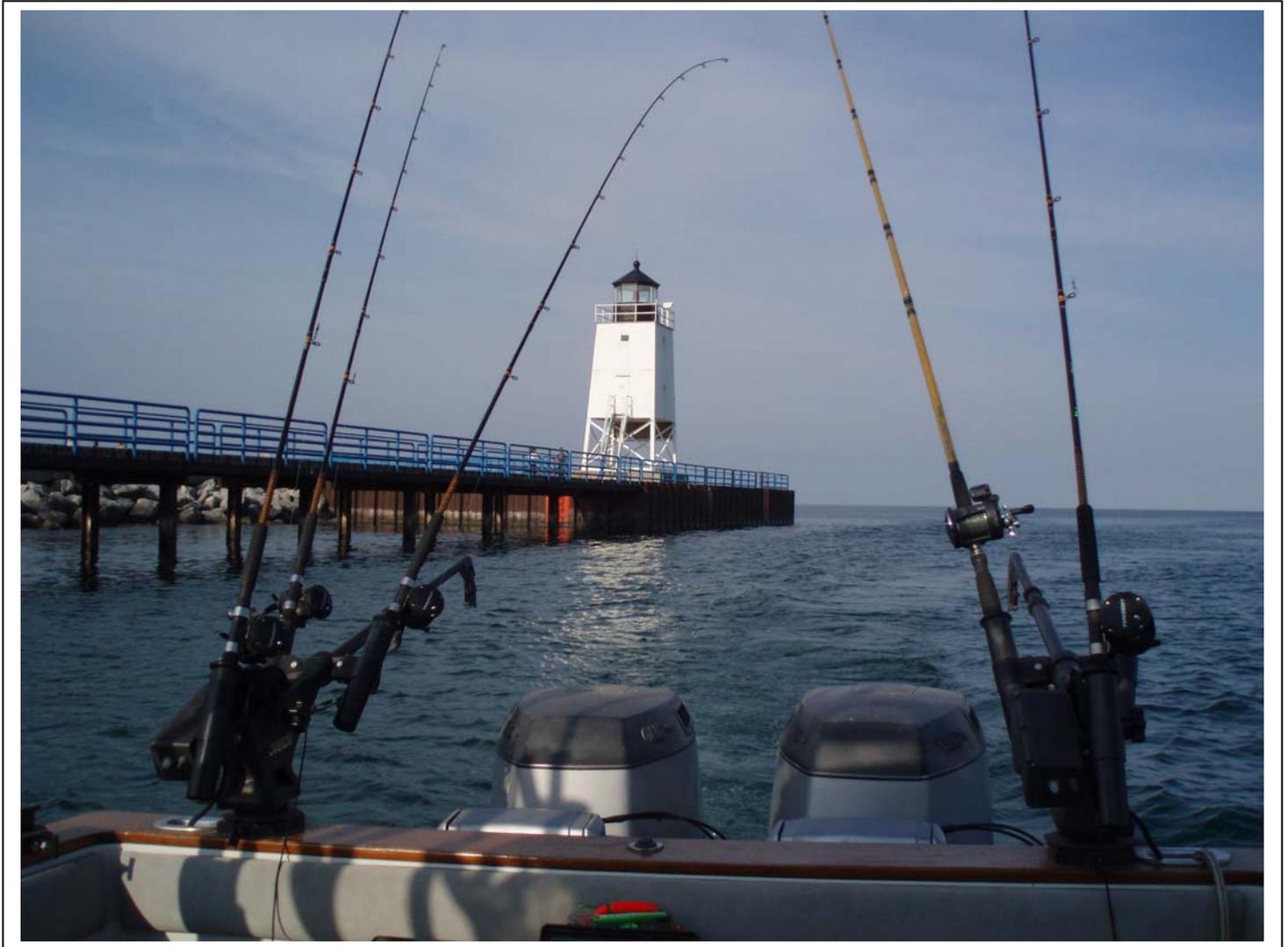


Charter Boat Effort and Fish Harvest from the Michigan Waters of the Great Lakes, 2008

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Introduction

The charter fishing industry provides Michigan with significant economic benefits. For example, 239,000 clients spent an estimated \$21 million in addition to charter fees in 1985, and the total statewide investment by charter boat firms in the same year was estimated to exceed \$30 million (Mahoney et al. 1986).

Michigan's charter boat industry increased from 250 operations in 1979 to nearly 900 in 1989. During the 1990s and through the early 2000s, the number of charter boats used for sport fishing excursions on Michigan's Great Lakes waters declined to approximately 500 operators. As of 2008, there were 582 operators; similar to the number (579) reporting in 2007.

Reporting of sport harvest and fishing effort by the charter fishing industry is required under Public Act 451 (Part 445) of 1994. Similar legislation was first enacted during 1989 (Act 22, Public Acts of 1989) and was supported by the Michigan Charter Boat Association (MCBA) and the Michigan Department of Natural Resources (MDNR). The law stipulates that charter operators keep an up-to-date daily log of their fishing activity onboard their vessel at all times.

The objective of the catch reporting system is to obtain a continuous annual record of (1) charter fishing effort and (2) number, type, and location of fish harvested by charter anglers. These data assist MDNR's Great Lakes fishery management efforts because they are used to track changes in fishing harvest and harvest rates over time. These changes in harvest help MDNR evaluate the status of fish stocks. Annual reports also provide a measure of the health and welfare of the charter industry.

Methods

In 1989, a committee of two members each from MDNR and MCBA developed the Michigan Charter Boat Daily Catch Report form (MDNR form PR8206). This form was revised slightly in January 2006 when the following changes were made: 1) a "total number of

anglers" column replaced the "resident and non-resident" angler columns, 2) recording columns for smallmouth bass and muskellunge harvest were added. In March of each year, all known charter operators are mailed a packet of information which includes an instructional letter, an annual supply of catch report forms, and copies of Great Lakes grid maps (for use in identifying fishing location).

In recent years, some charter operators expressed an interest in submitting their monthly reports using the internet. MDNR Fisheries Division and Michigan Department of Information Technology developed a program for online charter reporting; the prototype was completed in early summer 2007. In the late summer of 2007, seven charter operators were selected to test the prototype reporting system in preparation for having the online system available starting in 2008. The online reporting system is an option for charter operators to use, but is not mandatory. By the end of the 2008 reporting season, 77 operators (13%) were either using or had recently signed up to use the online system.

Charter operators are identified from (1) a list of operators who submitted catch reports the previous year, (2) review of MDNR Law Enforcement Division list of individuals who applied for and received a certificate of inspection for a fishing vessel, and (3) individuals who applied for and received a Sport Trolling License. It is up to new charter operators to inform Fisheries Division they are now an active charter fishing operation.

Charter operators are required by law to complete the paper version of the catch report form each time they fish, or use the alternate online reporting method. Regardless of method used, the completed monthly form is to be submitted to the MDNR Charlevoix Fisheries Research Station by the tenth of each month following the month of fishing. If a charter operator owns more than one boat, or fishes in multiple Great Lakes, he/she must fill out a monthly report for each boat and each lake fished. The report form requires the following information regardless of fishing success or method used to submit data (paper forms or

online version): a MDNR assigned reporting identification number for each boat, lake fished, date fished, port of origin, grid where a majority of the fishing occurred on that excursion, hours fished (dock to dock), total number of anglers (resident + non-resident anglers), catch (number harvested) of major species, and number of sea lamprey seen attached to Chinook salmon and lake trout. Space is provided at the bottom of the form for comments and observations. For those chartering in major rivers, river fished is used in lieu of lake fished, and grid fished is omitted.

Charlevoix Fisheries Research Station personnel organize and review forms as they are received. Incomplete forms are returned to the charter operator with an explanation of why the report was returned and a request that the operator correct/complete the report. Data is then entered into a database and summarized to describe port-specific and lake-wide trends in fishing effort and harvest of major sport fish.

The majority of charter businesses operate during late spring through early fall. If MDNR personnel do not receive a report for a given month, it is assumed an operator is delinquent, because one cannot distinguish those operators who did not fish from those who failed to submit a report. For months June through November, MDNR issues postcard notices to charter operators who do not file a catch report from the previous month. Prior to 2005, two notices were sent each month, the first after an operator was delinquent for 10 days and the second after 30 days. Starting with 2005, the frequency of the monthly postcard notices changed due to budget and staffing constraints; the first monthly (after 10 days) reminder was omitted. Late in the year, those operators who do not file reports for one or more months during the period April through October are sent a final postcard to notify them of all missing reports. If reports are not received, those operators with one delinquent report are sent one final letter via first class mail and those with two or more delinquent reports are sent letters via certified mail. These letters inform the operator that he or she is receiving the final request to submit their reports. If the recipient does not respond by the date indicated, his or her name may be submitted to MDNR

Law Enforcement Division, recommending non-issuance of an inspection certificate for the following season.

Charter data are used to summarize three types of fishing effort: angler hours, angler trips, and charter excursions. Angler hours are the total number of hours fished by all anglers in an excursion, dock to dock. An angler trip is one completed fishing outing by one individual (angler) on the boat. A charter excursion is one completed boat trip. For example, if a charter operator took four anglers out for a six hour fishing trip, total fishing effort is 24 angler hours (4 anglers each fishing 6 hours), 4 angler trips, and one charter excursion.

Charter data are also used to summarize the harvest and harvest rate of those sport-fish listed on the form. Harvest is the number of fish caught and kept by an angler. Harvest rate is the number of fish harvested in a given amount of time (e.g., number/hour). It is possible to separate fishing effort between "groups" of fish - such as salmonine (salmon and trout species) effort from percid plus other species (walleye, perch, smallmouth bass, muskellunge, and undefined) effort - since fishing trips usually target one or the other group. However, it is usually not possible to separate fishing effort between species within these groups (i.e., fishing trips often target more than one species within a group). Starting with 2004 reporting, an improved method to calculate targeted harvest rates was implemented; this method separates salmonine effort from percid effort and uses one of these two efforts to calculate the harvest rates of individual species within each group. In 2005, effort for the 'other' category was combined with percid effort. The improved methodology had the greatest effect on percid harvest rates when effort for "percids + other" was a small percent of the total effort. For Lakes Michigan, Huron, and Superior, a majority of the effort is targeted at salmonines, not percids + other; if this total effort is used to calculate the harvest rate of percids + other, the actual rates will in most cases be greatly underestimated. Both total and targeted harvest rate data are contained in this report.

Charter operators also record the number of sea lamprey observed attached on lake trout and Chinook salmon. These data (number of lamprey attached per 100 fish) are collected by request of the U.S. Fish and Wildlife Service's (USFWS) Sea Lamprey Control Station in Marquette, Michigan, and used with other data sets as an index of sea lamprey abundance in the Great Lakes.

Results

Compliance

During the 2008 fishing season, an average of 75% of all charter boat operators complied with the law by submitting their catch reports within 30 days of the due date. Overall monthly rate of compliance in 2008 increased 11% compared to 2007 and was 1% less than 2006 and 2005. In December 2008, at the time of sending final notification letters for one or more delinquent reports, 85% of the operators were in compliance; this compliance rate was unchanged from 2007, 3% less than in 2006, and 2% less than in 2005. By January 2009, 95% of all charter operators had complied with the law; this rate of compliance is equivalent to that observed in 2007, 3% greater than in 2006, and comparable to the 2005 rate.

Reporting of results

Starting with the 2004 charter fishing harvest and effort data, results are inclusive of any month of the year for which charter trips were reported. For reports prior to 2004, only fishing trips conducted in months April-October were included in results. Tables, graphs, and comparisons in this report include fishing harvest and effort from the Great Lakes, inclusive of tributaries.

Fishing effort

In 2008, charter anglers participated in 14,226 charter excursions on the Michigan waters of Lakes Michigan, Huron, Erie, Superior, and the St. Clair system, including major tributaries (Tables 1-6). From 2007 to 2008, there was a 12% decrease in the number

of total excursions; the number of excursions decreased on all lakes surveyed (Table 6). Lake Superior had a 32% decrease, the largest percent change in number of excursions, decreasing to 245 (2008) from 359 (2007). Excursions on Lake Erie decreased 16%, 870 (2008) from 1,039 (2007). Excursions on Lake Michigan, Lake Huron, and the St. Clair System each saw a decrease of 11-12%. The distribution of charter fishing excursions in 2008 by lake was: 80% Lake Michigan, 9% Lake Huron, 6% Lake Erie, 3% St. Clair System, and 2% Lake Superior. This distribution of effort is essentially unchanged from 2007, other than a 1% increase in excursions on Lake Michigan, and a 1% decrease in excursions on Lake Huron.

A total of 336,465 hours were spent fishing by 59,840 charter anglers in Michigan's waters and tributaries of the Great Lakes (Tables 1-5, Figures 1-2b). Angler hours and total number of charter anglers each decreased about 10% compared to 2007. This corresponds with the 12% decrease in excursions for 2008. Factors influencing decreased charter effort in 2008 included high gasoline prices for consumers (over \$4.00 per gallon for some of the year), in conjunction with high unemployment rates and a struggling economy in the state of Michigan.

Starting in 2006, due to a change in MDNR requirements, charter operators are no longer asked to record anglers in the categories resident and non-resident of Michigan; total anglers (resident + non-resident) are now recorded. Data collected over several years showed the overall percentage of non-resident anglers remained at 25-30%; Lake Superior charter operators consistently had the greatest percentage of non-resident clients.

Harvest

Charter operators reported a total of 151,612 fish harvested from the Michigan waters of the Great Lakes and its major tributaries in 2008 (Tables 1-5); this is a 19% decrease compared to 2007 total harvest (187,178). Most of these fish were harvested from Lake Michigan (69%), followed by Lake Erie (13%), Lake Huron (10%), the St. Clair system (6%), and Lake Superior (2%). In comparison to 2007 total

harvest, Lake Michigan harvest decreased 14%, Lake Erie decreased 33%, Lake Huron decreased 2%, the St. Clair system decreased 6%, and Lake Superior decreased 29%.

Historically, the most abundant species in the harvest has been yellow perch; however over the last several years, the number of Chinook salmon harvested increased as harvest of yellow perch decreased. Since 2003, Chinook salmon has been the most abundant species in the harvest. In 2008, Chinook salmon accounted for 45% of the total harvest. Percent of total harvest for other species were as follows: walleye 15%, lake trout 15%, yellow perch 11%, rainbow trout 5%, coho salmon 4%, and brown trout <1%. The "other" species category accounted for 3% of the harvest. The species composition of this category is not fully known because MDNR does not require it to be identified; it includes smallmouth bass and muskellunge, in addition to other species not defined on the report form.

Charter anglers harvested 68,906 Chinook salmon in 2008, which is a 20% decrease relative to 2007 (86,523). Total harvest (all lakes combined) in 2008 decreased for all species recorded other than lake trout, which increased 13%. Harvest numbers for these species in 2008 were: 23,065 walleye, 22,811 lake trout, 17,092 yellow perch, 7,707 rainbow trout, 6,643 coho salmon, and 580 brown trout (Tables 1-5).

The St. Clair system has the highest number of "other" species in the charter harvest. In general, species categorized as "other" are not differentiated. However, starting with 2006, two species targeted in the St. Clair system, smallmouth bass and muskellunge, are now listed individually on the charter form. Due to low harvest of these two species, compiled harvest results group these species into the "other" fish category as in past years. While harvest of smallmouth bass and muskellunge is small in number, the St. Clair system supports a popular "catch and release" fishery for these species. Currently, released fish of any species are not reported by charter operators.

The total number of salmonines (Chinook salmon, coho salmon, lake trout, rainbow trout, and brown trout) harvested from Michigan's

Great Lakes waters in 2008 was 106,647, which is a 15% decrease (19,157 fish) from 2007 harvest (125,804).

Harvest rates

In 2008, charter anglers harvested 0.45 fish (all species from all lakes combined) per hour; almost the same as for 2007 (0.5 fish). Total harvest rates (Tables 1-5) are lake-specific rates per hour and per excursion for all species in the charter harvest based on total fishing effort in that lake, regardless of species targeted. The following discussion will focus on targeted harvest rates (Tables 7-11 and Figures 3-11).

Most charter excursions that took place on Michigan's Great Lakes waters during 2008 targeted the various species of salmonines. Comparing targeted harvest rates (fish per 5 angler hours) to 2007 data, Lake Michigan angler harvest rates increased for lake trout (Figure 4) and rainbow trout (Figure 6). Brown trout harvest rates remained unchanged (Figure 7), while coho salmon (Figure 5), Chinook salmon (Figure 3), and yellow perch (Figure 8) harvest rates decreased. The targeted harvest rate reported in 2008 for Chinook salmon in Lake Michigan (1.23 fish per 5 hours of angler fishing) decreased to the rate last seen in 2004; however, the harvest rate remains high in relation to the average for the 1990-2008 data series (Figure 3).

Targeted harvest rates (fish per 5 angler hours) for Lake Huron in 2008 increased compared to 2007 for coho salmon, rainbow trout, yellow perch, and walleye while rates decreased for Chinook salmon, lake trout, and brown trout (Figures 3-7 and Figure 9). The harvest rate for walleye (3.28 fish per 5 angler hours) increased to the highest rate observed in Lake Huron during the 1990-2008 data series (Figure 9).

Lake trout continues to be the most important salmonine in the charter harvest from Lake Superior. Targeted harvest rates for coho salmon (Figure 5) increased and lake trout rates (Figure 4) decreased in Lake Superior during 2008 (compared to 2007). Other salmonine species such as Chinook salmon, rainbow trout,

and brown trout continue to be a minor portion of the Lake Superior charter harvest (Table 10).

Walleye and yellow perch play an important role in charter fisheries on Lake Erie and the St. Clair system. MDNR Fisheries Division management objectives led to a change in the walleye harvest season for Lake Erie in 2004 and 2005; walleye harvest was not permitted during the months of April and May. Regulation changes in 2006 allowed for walleye harvest for the entire year in Lake Erie; this regulation remained in place through 2008. Targeted harvest rates for walleye (2.89 fish per 5 angler hours) and yellow perch (1.61 fish per 5 angler hours; Figure 10), and fishing effort (4,063 anglers; Figure 2b) decreased in Lake Erie for 2008, in comparison to 2007. Targeted harvest rates for walleye (1.10 fish per 5 angler hours) and yellow perch (1.96 fish per 5 angler hours; Figure 11) also decreased on the St. Clair system in 2008, compared to 2007.

Sea Lamprey Incidence

For 2008, sea lamprey incidence on Chinook salmon decreased in Lake Michigan, compared to 2007 levels. While Lake Huron's incidence of 9.6 lampreys per 100 fish is less than 2006 levels of 12.5, lamprey incidence remains higher than levels observed in years 1993-2005 and 2007 (Figure 12).

Sea lamprey incidence on lake trout decreased on Lake Michigan but increased slightly on Lake Huron. The occurrence of lamprey on lake trout in Lake Superior (1.1 lamprey/100 fish) decreased compared to 2007 (Figure 13).

Online Information

Previous years' annual reports and information on charter fishing effort and harvest at individual fishing ports can be found on the MDNR website <http://www.michigan.gov/dnr>. Click on the following links to find the data: 'Fishing' link, then 'Angler Information' link, then 'Charter Fishing'.

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References

Mahoney, E. M., M. Brunke, and C. Pistis. 1986. 1985 Michigan charter fishing study. Michigan State University, Department of Parks and Recreation Resources, East Lansing.

Acknowledgments

Table 1.— Total harvest per hour, harvest per excursion, number of fish harvested, and fishing effort (angler hours, anglers, and charter excursions) for charter boats fishing Michigan waters of Lake Michigan, 2008.

Species	Total harvest per hour	Total harvest per excursion	Month												Season
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Coho salmon	0.023	0.560	0	0	0	451	1,271	1,193	822	1,992	565	44	7	0	6,345
Chinook salmon	0.250	5.967	1	0	0	30	3,208	4,772	14,634	36,503	8,123	303	9	0	67,583
Rainbow trout	0.027	0.646	93	153	478	212	799	878	1,549	1,743	599	229	555	26	7,314
Brown trout	0.002	0.050	0	0	4	90	82	46	112	178	44	2	5	0	563
Lake trout	0.060	1.421	0	0	0	3	2,552	2,997	4,711	4,727	1,084	2	7	9	16,092
Yellow perch	0.019	0.448	0	0	0	86	519	963	1,276	1,799	386	49	0	0	5,078
Walleye	0.007	0.172	8	29	21	3	197	359	198	384	344	286	104	15	1,948
Other	0.000	0.009	0	1	0	5	9	19	22	15	25	5	3	0	104
Lamprey on:															
Chinook salmon			0	0	0	0	21	38	166	283	43	0	0	0	551
Lake trout			0	0	0	0	27	35	71	58	8	0	0	0	199
Angler hours			404	835	2,276	2,473	21,774	25,801	63,283	116,238	29,757	3,679	3,074	753	270,347
Anglers			55	118	324	388	3,565	4,455	11,433	21,120	5,403	562	446	108	47,977
Charter excursions			19	44	102	107	791	1,029	2,661	4,881	1,335	184	142	31	11,326

Table 2.— Total harvest per hour, harvest per excursion, number of fish harvested, and fishing effort (angler hours, anglers, and charter excursions) for charter boats fishing Michigan waters of Lake Huron, 2008.

Species	Total harvest per hour	Total harvest per excursion	Month												Season
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Coho salmon	0.005	0.105	0	0	0	8	24	13	11	30	53	2	0	0	141
Chinook salmon	0.048	0.943	0	0	0	0	47	97	421	467	229	8	0	0	1,269
Rainbow trout	0.012	0.236	0	0	7	35	6	38	97	76	59	0	0	0	318
Brown trout	0.000	0.007	0	0	0	0	7	2	1	0	0	0	0	0	10
Lake trout	0.166	3.286	0	0	0	0	239	852	1,522	1,403	404	0	0	0	4,420
Yellow perch	0.049	0.972	0	0	0	0	150	60	292	232	363	210	0	0	1,307
Walleye	0.240	4.745	0	0	0	0	413	2,232	2,521	1,006	203	7	0	0	6,382
Other	0.026	0.513	0	0	0	0	37	146	215	103	176	13	0	0	690
Lamprey on:															
Chinook salmon			0	0	0	0	6	15	49	36	15	0	0	0	121
Lake trout			0	0	0	0	2	8	35	38	7	0	0	0	90
Angler hours			0	0	37	221	1,826	5,987	9,139	6,894	2,258	202	0	0	26,564
Anglers			0	0	5	32	325	1,102	1,739	1,280	433	35	0	0	4,951
Charter excursions			0	0	3	16	89	289	468	342	128	10	0	0	1,345

Table 3.— Total harvest per hour, harvest per excursion, number of fish harvested, and fishing effort (angler hours, anglers, and charter excursions) for charter boats fishing Michigan waters of Lake Erie (Grids 500, 702, 703, 801, 802), 2008. (Other species= smallmouth bass, muskellunge, and unknown species).

Species	Total harvest per hour	Total harvest per excursion	Month												Season
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Coho salmon	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Chinook salmon	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainbow trout	0.000	0.002	0	0	0	0	0	1	1	0	0	0	0	0	2
Brown trout	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow perch	0.321	8.129	0	0	0	0	29	121	232	2,671	3,557	377	85	0	7,072
Walleye	0.577	14.589	0	0	0	144	2,681	6,836	2,677	353	1	0	0	0	12,692
Other	0.005	0.123	0	0	0	3	37	47	6	11	3	0	0	0	107
Lamprey on:															
Chinook salmon			0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	0	0	0	0	0	0	0	0	0
Angler hours			0	0	0	410	4,226	10,584	3,863	1,679	1,064	148	24	0	21,998
Anglers			0	0	0	68	769	1,960	727	301	205	29	4	0	4,063
Charter excursions			0	0	0	20	166	414	157	63	43	6	1	0	870

Table 4.— Total harvest per hour, harvest per excursion, number of fish harvested, and fishing effort (angler hours, anglers, and charter excursions) for charter boats fishing Michigan waters of Lake Superior, 2008.

Species	Total harvest per hour	Total harvest per excursion	Month												Season
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Coho salmon	0.019	0.641	0	0	0	0	3	82	29	34	9	0	0	0	157
Chinook salmon	0.006	0.212	0	0	0	0	8	21	9	13	1	0	0	0	52
Rainbow trout	0.009	0.294	0	0	0	0	1	35	16	16	4	0	0	0	72
Brown trout	0.001	0.029	0	0	0	0	0	2	3	1	1	0	0	0	7
Lake trout	0.279	9.384	0	0	0	0	99	691	672	740	97	0	0	0	2,299
Yellow perch	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Walleye	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0.000	0.008	0	0	0	0	0	0	0	1	1	0	0	0	2
Lamprey on:															
Chinook salmon			0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	0	9	5	11	1	0	0	0	26
Angler hours			0	0	0	0	344	2,902	2,428	2,251	329	0	0	0	8,254
Anglers			0	0	0	0	54	395	359	331	52	0	0	0	1,191
Charter excursions			0	0	0	0	13	75	73	72	12	0	0	0	245

Table 5.— Total harvest per hour, harvest per excursion, number of fish harvested, and fishing effort (angler hours, anglers, and charter excursions) for charter boats fishing Michigan waters of the St. Clair System (Lake St. Clair, St. Clair River, and Detroit River), 2008.

Species	Total harvest per hour	Total harvest per excursion	Month												Season
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Coho salmon	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Chinook salmon	0.000	0.005	0	0	0	0	2	0	0	0	0	0	0	0	2
Rainbow trout	0.000	0.002	0	0	0	0	1	0	0	0	0	0	0	0	1
Brown trout	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow perch	0.391	8.261	0	0	0	13	47	440	457	806	1,024	638	210	0	3,635
Walleye	0.220	4.643	0	0	0	893	820	64	110	140	16	0	0	0	2,043
Other	0.420	8.875	0	0	0	133	1,787	408	648	739	171	19	0	0	3,905
Lamprey on:															
Chinook salmon			0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	0	0	0	0	0	0	0	0	0
Angler hours			0	0	16	2,329	2,146	964	1,286	1,451	638	398	74	0	9,302
Anglers			0	0	2	393	427	173	227	235	113	72	16	0	1,658
Charter excursions			0	0	1	115	121	42	61	56	24	16	4	0	440

Table 6.—Number of charter excursions on the Michigan waters of the Great Lakes (including tributaries); April – October for years 1990-2003 and January – December for years 2004-2008.

Lake	Year									
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Michigan	13,467	13,604	10,995	10,298	10,116	9,996	10,344	10,627	12,333	11,382
Huron	4,010	3,442	2,521	2,307	2,182	2,599	2,592	2,684	3,210	3,123
Erie	1,684	1,445	1,679	1,881	1,661	1,781	1,775	1,727	1,679	2,380
Superior	755	791	743	618	455	515	524	497	517	607
St. Clair	779	643	509	414	299	336	407	394	432	389
Total	20,695	19,925	16,447	15,518	14,713	15,227	15,642	15,929	18,171	17,881

Table 6 (continued)

Lake	Year								
	2000	2001	2002	2003	2004	2005	2006	2007	2008
Michigan	11,714	11,224	11,924	12,094	11,966	12,526	12,064	12,704	11,326
Huron	2,760	2,867	2,874	2,771	2,622	2,085	1,765	1,537	1,345
Erie	1,836	1,947	1,870	1,695	718	694	1,554	1,039	870
Superior	482	477	430	505	455	479	398	359	245
St. Clair	348	433	246	466	339	319	366	493	440
Total	17,140	16,948	17,344	17,531	16,100	16,103	16,147	16,132	14,226

Table 7.— Targeted harvest per hour, harvest per excursion and number fish harvested by species with total fishing effort (angler hours, anglers, and charter excursions) for charter boats fishing Michigan waters of Lake Michigan and its tributaries, 2008. Targeted harvest based on total salmonine effort (salmon and trout species) or total percid + other effort (perch, walleye, plus other= smallmouth bass, muskellunge, and unknown species).

Species	Targeted harvest per hour	Targeted harvest per excursion	Month												Season
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Coho salmon	0.024	0.577	0	0	0	451	1,271	1,193	822	1,992	565	44	7	0	6,345
Chinook salmon	0.255	6.140	1	0	0	30	3,208	4,772	14,634	36,490	8,118	303	9	0	67,565
Rainbow trout	0.028	0.663	93	145	475	212	799	878	1,548	1,743	599	229	553	24	7,298
Brown trout	0.002	0.051	0	0	4	90	82	46	112	178	44	2	5	0	563
Lake trout	0.061	1.462	0	0	0	3	2,552	2,997	4,711	4,722	1,084	2	7	8	16,086
Yellow perch	0.851	15.556	0	0	0	86	519	963	1,274	1,737	383	47	0	0	5,009
Walleye	0.323	5.898	1	25	12	3	196	359	198	372	344	283	93	13	1,899
Other	0.007	0.124	0	0	0	0	6	12	18	1	0	0	3	0	40
Lamprey on:															
Chinook salmon			0	0	0	0	21	38	166	283	43	0	0	0	551
Lake trout			0	0	0	0	27	35	71	58	8	0	0	0	199
Angler hours			404	835	2,276	2,473	21,774	25,801	63,283	116,238	29,757	3,679	3,074	753	270,347
Anglers			55	118	324	388	3,565	4,455	11,433	21,120	5,403	562	446	108	47,977
Charter excursions			19	44	102	107	791	1,029	2,661	4,881	1,335	184	142	31	11,326

Table 8.— Targeted harvest per hour, harvest per excursion and number fish harvested by species with total fishing effort (angler hours, anglers, and charter excursions) for charter boats fishing Michigan waters of Lake Huron and its tributaries, 2008. Targeted harvest based on total salmonine effort (salmon and trout species) or total percid + other effort (perch, walleye, plus other= smallmouth bass, muskellunge, and unknown species).

Species	Targeted harvest per hour	Targeted harvest per excursion	Month												Season
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Coho salmon	0.008	0.157	0	0	0	8	24	13	9	30	53	2	0	0	139
Chinook salmon	0.074	1.419	0	0	0	0	47	97	420	462	219	8	0	0	1,253
Rainbow trout	0.018	0.354	0	0	7	35	6	37	93	76	59	0	0	0	313
Brown trout	0.000	0.009	0	0	0	0	7	0	1	0	0	0	0	0	8
Lake trout	0.258	4.973	0	0	0	0	239	852	1,498	1,398	404	0	0	0	4,391
Yellow perch	0.129	2.677	0	0	0	0	150	60	292	232	293	210	0	0	1,237
Walleye	0.655	13.574	0	0	0	0	409	2,229	2,452	974	200	7	0	0	6,271
Other	0.041	0.840	0	0	0	0	8	60	84	59	164	13	0	0	388
Lamprey on:															
Chinook salmon			0	0	0	0	6	15	49	36	15	0	0	0	121
Lake trout			0	0	0	0	2	8	35	38	7	0	0	0	90
Angler hours			0	0	37	221	1,826	5,987	9,139	6,894	2,258	202	0	0	26,564
Anglers			0	0	5	32	325	1,102	1,739	1,280	433	35	0	0	4,951
Charter excursions			0	0	3	16	89	289	468	342	128	10	0	0	1,345

Table 9.— Targeted harvest per hour, harvest per excursion and number fish harvested by species with total fishing effort (angler hours, anglers, and charter excursions) for charter boats fishing Michigan waters of Lake Erie (Grids 500, 702, 703, 801, 802), 2008. Targeted harvest based on total salmonine effort (salmon and trout species) or total percid + other effort (perch, walleye, plus other= smallmouth bass, muskellunge, and unknown species).

Species	Targeted harvest per hour	Targeted harvest per excursion	Month												Season
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Coho salmon	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Chinook salmon	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainbow trout	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown trout	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow perch	0.321	8.129	0	0	0	0	29	121	232	2,671	3,557	377	85	0	7,072
Walleye	0.577	14.589	0	0	0	144	2,681	6,836	2,677	353	1	0	0	0	12,692
Other	0.005	0.123	0	0	0	3	37	47	6	11	3	0	0	0	107
Lamprey on:															
Chinook salmon			0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	0	0	0	0	0	0	0	0	0
Angler hours			0	0	0	410	4,226	10,584	3,863	1,679	1,064	148	24	0	21,998
Anglers			0	0	0	68	769	1,960	727	301	205	29	4	0	4,063
Charter excursions			0	0	0	20	166	414	157	63	43	6	1	0	870

Table 10.— Targeted harvest per hour, harvest per excursion and number fish harvested by species with total fishing effort (angler hours, anglers, and charter excursions) for charter boats fishing Michigan waters of Lake Superior and its tributaries, 2008. Targeted harvest based on total salmonine effort (salmon and trout species) or total percid + other effort (perch, walleye, plus other= smallmouth bass, muskellunge, and unknown species).

Species	Targeted harvest per hour	Targeted harvest per excursion	Month												Season
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Coho salmon	0.019	0.641	0	0	0	0	3	82	29	34	9	0	0	0	157
Chinook salmon	0.006	0.212	0	0	0	0	8	21	9	13	1	0	0	0	52
Rainbow trout	0.009	0.294	0	0	0	0	1	35	16	16	4	0	0	0	72
Brown trout	0.001	0.029	0	0	0	0	0	2	3	1	1	0	0	0	7
Lake trout	0.279	9.384	0	0	0	0	99	691	672	740	97	0	0	0	2,299
Yellow perch	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Walleye	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Lamprey on:															
Chinook salmon			0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	0	9	5	11	1	0	0	0	26
Angler hours			0	0	0	0	344	2,902	2,428	2,251	329	0	0	0	8,254
Anglers			0	0	0	0	54	395	359	331	52	0	0	0	1,191
Charter excursions			0	0	0	0	13	75	73	72	12	0	0	0	245

Table 11.— Targeted harvest per hour, harvest per excursion and number fish harvested by species with total fishing effort (angler hours, anglers, and charter excursions) for charter boats fishing Michigan waters of the St. Clair System (Lake St. Clair, St. Clair River, and Detroit River), 2008. Targeted harvest based on total salmonine effort (salmon and trout species) or total percid + other effort (perch, walleye, plus other= smallmouth bass, muskellunge, and unknown species).

Species	Targeted harvest per hour	Targeted harvest per excursion	Month												Season
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Coho salmon	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Chinook salmon	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainbow trout	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown trout	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow perch	0.391	8.261	0	0	0	13	47	440	457	806	1,024	638	210	0	3,635
Walleye	0.220	4.643	0	0	0	893	820	64	110	140	16	0	0	0	2,043
Other	0.420	8.875	0	0	0	133	1,787	408	648	739	171	19	0	0	3,905
Lamprey on:															
Chinook salmon			0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	0	0	0	0	0	0	0	0	0
Angler hours			0	0	16	2,329	2,146	964	1,286	1,451	638	398	74	0	9,302
Anglers			0	0	2	393	427	173	227	235	113	72	16	0	1,658
Charter excursions			0	0	1	115	121	42	61	56	24	16	4	0	440

Figure 1.—Total number of charter anglers (trips) on the Michigan waters of the Great Lakes (including tributaries), 1990-2008.

Year	Number of anglers (trips)
1990	85,079
1991	85,902
1992	68,545
1993	67,615
1994	66,047
1995	72,427
1996	74,864
1997	74,431
1998	83,862
1999	82,181
2000	81,940
2001	79,083
2002	76,352
2003	76,151
2004	66,845
2005	67,224
2006	68,572
2007	67,513
2008	59,840

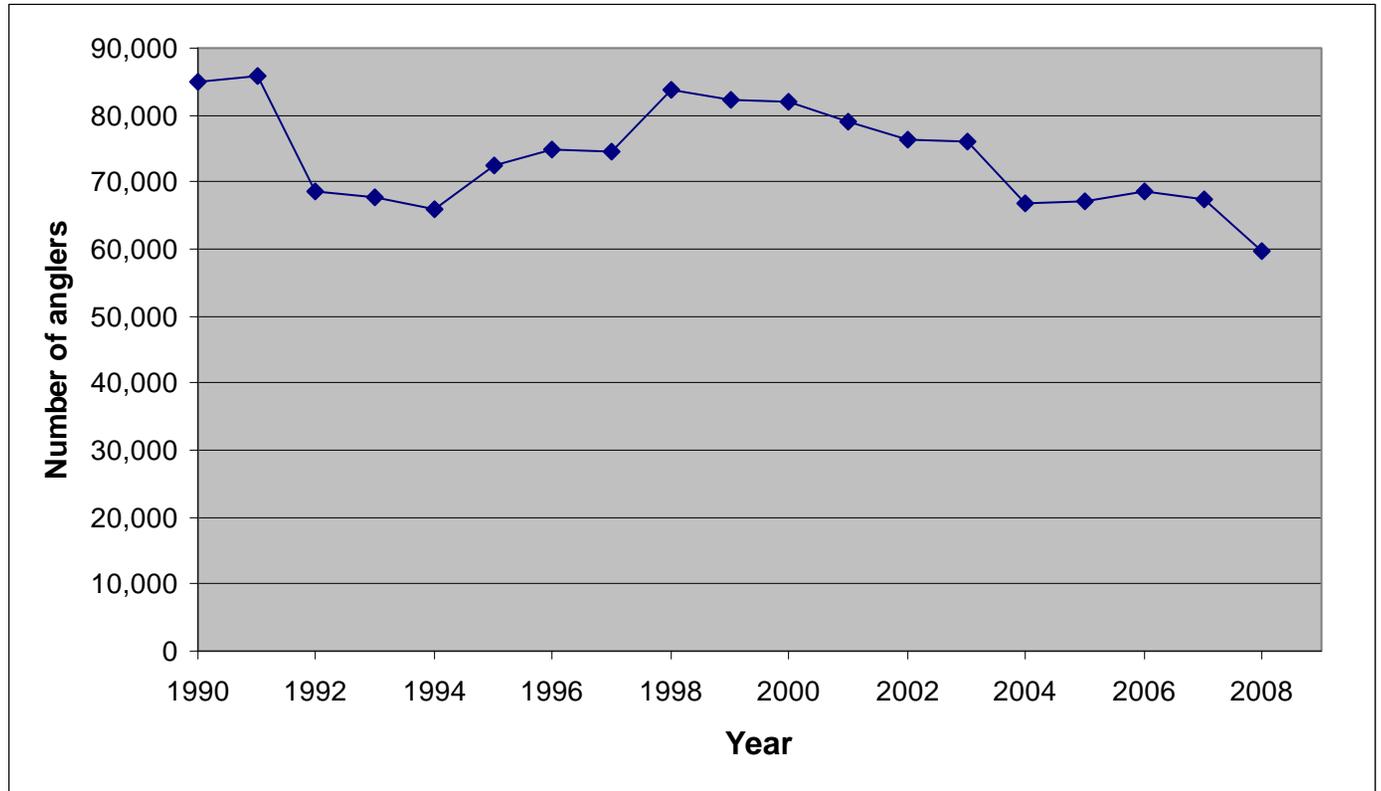


Figure 2(a).—Total number of charter anglers (trips) on the Michigan waters of Lake Michigan and Lake Huron (including tributaries), 1990-2008.

Year	Lake Michigan	Lake Huron
1990	57,140	14,604
1991	62,578	12,012
1992	47,145	8,965
1993	46,510	8,069
1994	46,759	7,613
1995	51,515	9,432
1996	52,527	9,612
1997	52,805	9,684
1998	60,250	11,913
1999	55,578	11,861
2000	57,006	11,009
2001	53,645	11,555
2002	53,213	10,742
2003	52,972	10,318
2004	49,959	9,947
2005	52,665	7,812
2006	50,903	6,521
2007	53,337	5,635
2008	47,977	4,951

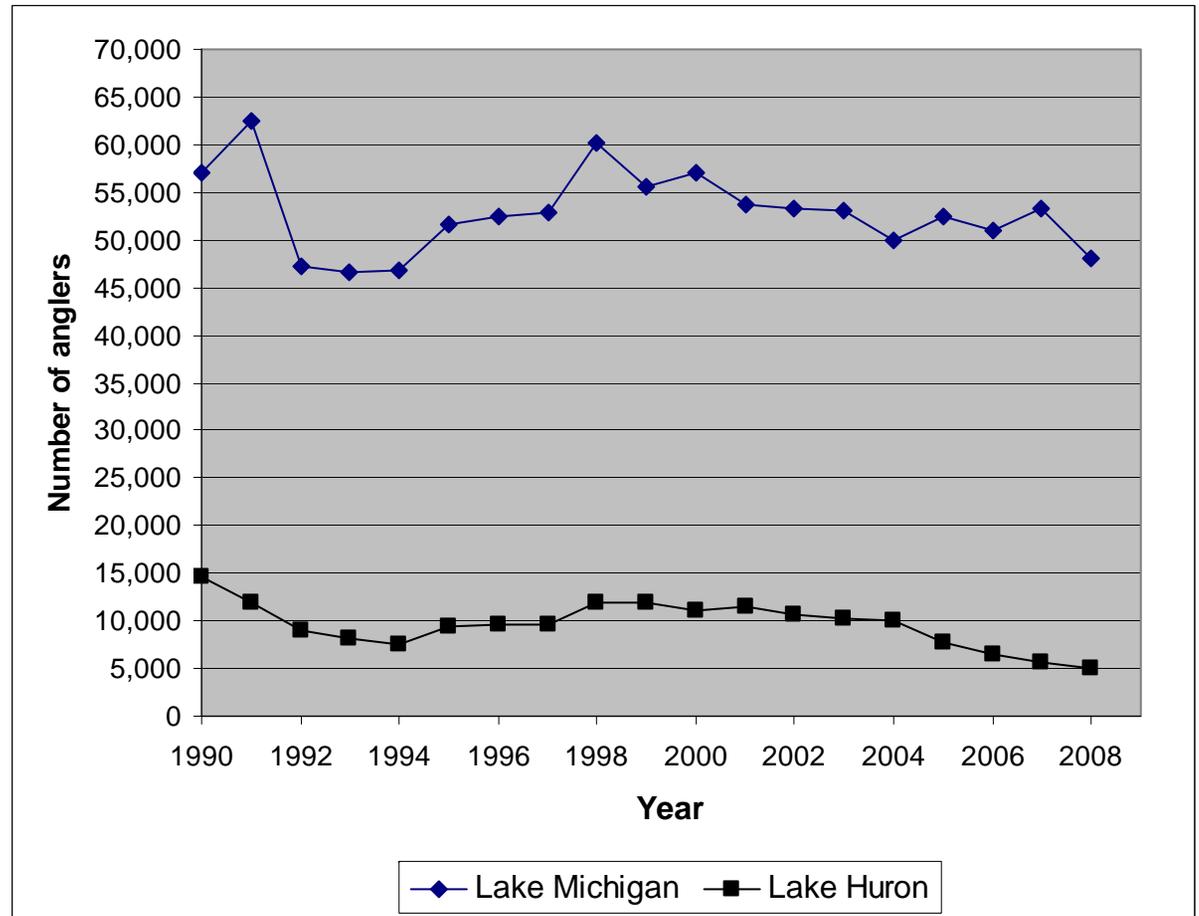


Figure 2 (b).—Total number of charter anglers (trips) on the Michigan waters of Lakes Erie, Superior, and the St. Clair System (including tributaries), 1990-2008.

Year	Lake Erie	Lake Superior	St. Clair System
1990	8,073	3,337	1,925
1991	6,139	3,588	1,585
1992	7,202	3,399	1,834
1993	8,829	2,858	1,349
1994	7,564	3,053	1,058
1995	8,144	2,411	925
1996	8,873	2,569	1,283
1997	8,280	2,481	1,181
1998	8,148	2,303	1,248
1999	10,645	2,869	1,228
2000	10,153	2,335	1,437
2001	10,226	2,222	1,435
2002	9,232	2,104	1,061
2003	8,514	2,446	1,901
2004	3,603	2,044	1,292
2005	3,392	2,171	1,184
2006	7,807	1,836	1,505
2007	5,031	1,630	1,880
2008	4,063	1,191	1,658

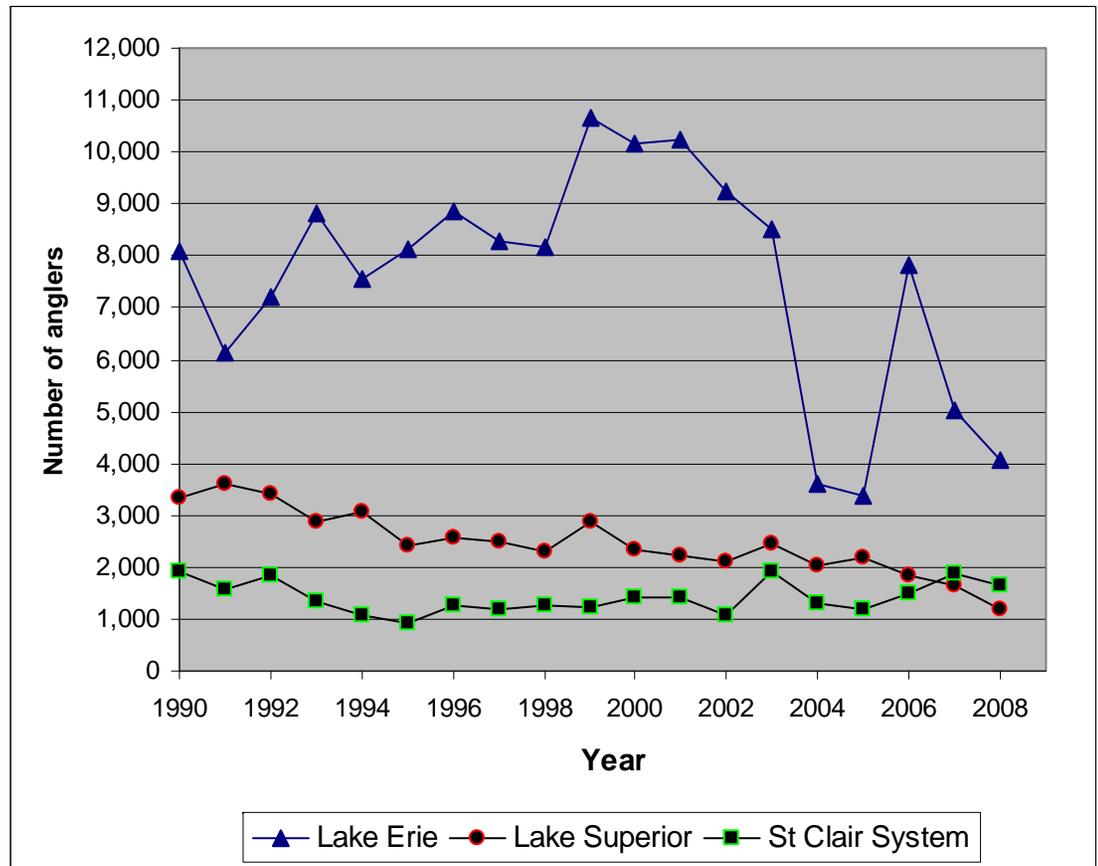


Figure 3. - Charter angler targeted harvest rates (fish per 5 angler hours) for Chinook salmon on Lake Michigan and Lake Huron, 1990-2008.

Year	Lake Michigan	Lake Huron
1990	0.37	0.35
1991	0.39	0.40
1992	0.27	0.41
1993	0.21	0.45
1994	0.22	0.50
1995	0.29	0.72
1996	0.50	0.71
1997	0.53	1.04
1998	0.44	0.93
1999	0.48	0.96
2000	0.67	0.75
2001	0.62	0.75
2002	0.84	1.04
2003	0.97	0.86
2004	1.23	0.63
2005	1.39	0.32
2006	1.47	0.37
2007	1.47	0.40
2008	1.23	0.37

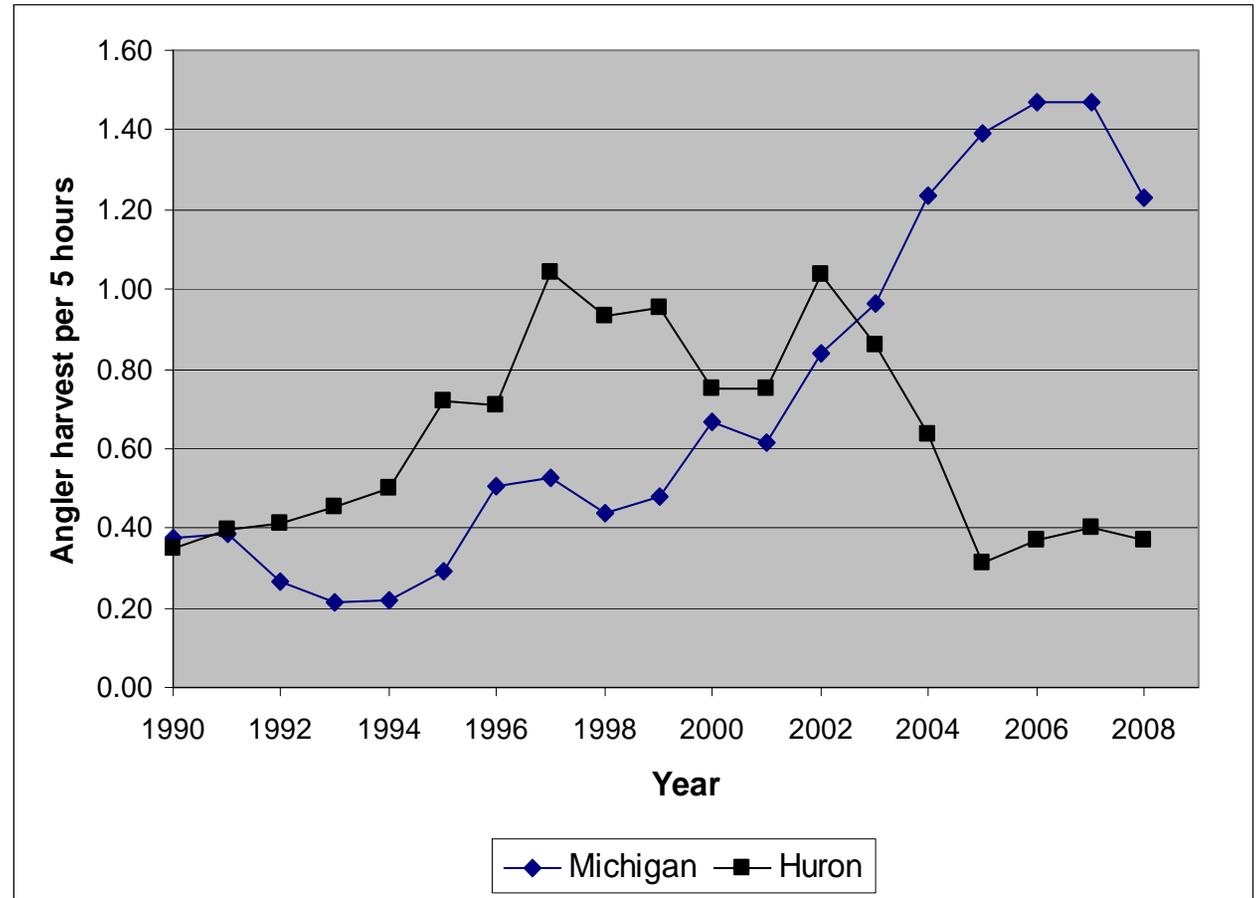


Figure 4.—Charter angler targeted harvest rates (fish per 5 angler hours) for lake trout on Lakes Michigan, Huron, and Superior, 1990-2008.

Year	Lake Michigan	Lake Huron	Lake Superior
1990	0.42	0.60	1.42
1991	0.48	0.53	1.40
1992	0.41	0.43	1.33
1993	0.52	0.26	1.44
1994	0.57	0.39	1.33
1995	0.61	0.41	1.31
1996	0.42	0.57	1.43
1997	0.39	0.56	1.34
1998	0.50	0.75	1.27
1999	0.34	0.71	1.32
2000	0.32	0.80	1.36
2001	0.26	0.65	1.51
2002	0.17	0.71	1.38
2003	0.14	1.08	1.36
2004	0.10	1.49	1.49
2005	0.11	1.52	1.50
2006	0.15	1.54	1.45
2007	0.19	1.38	1.47
2008	0.31	1.29	1.40

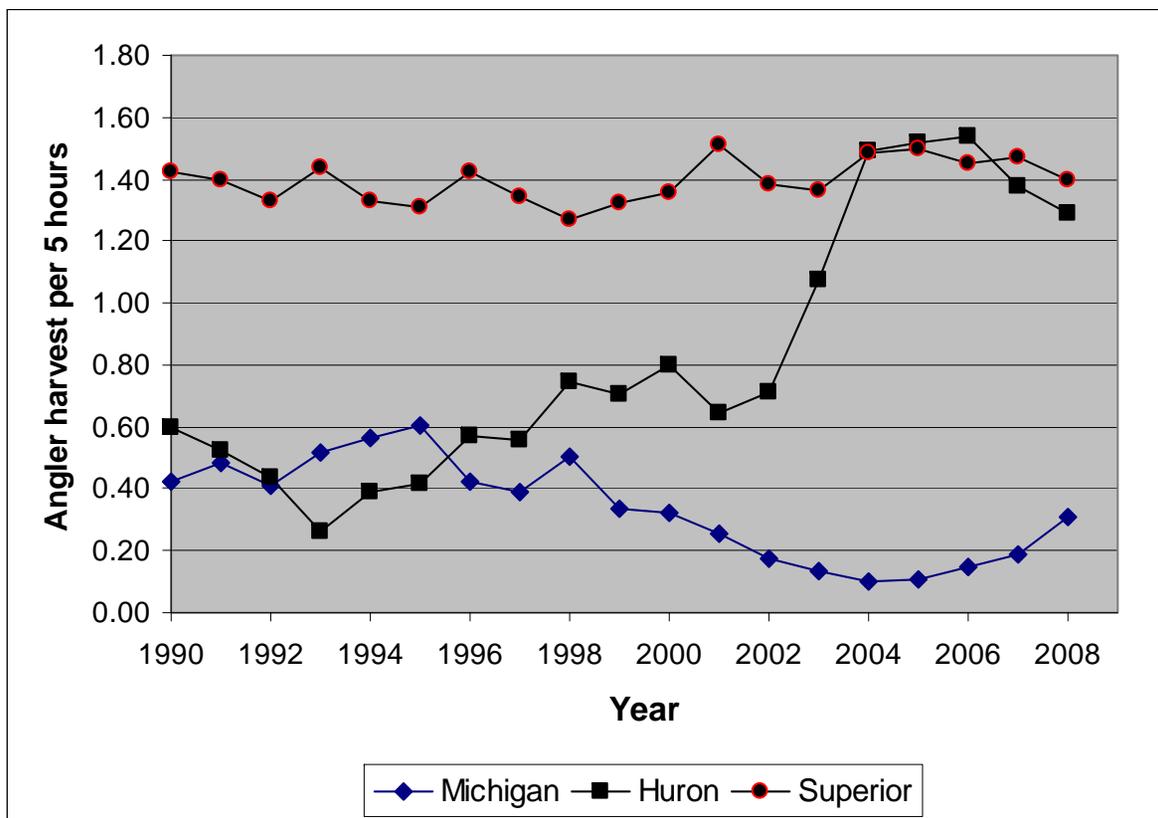


Figure 5.—Charter angler targeted harvest rates (fish per 5 angler hours) for coho salmon on Lakes Michigan, Huron, and Superior, 1990-2008.

Year	Lake Michigan	Lake Huron	Lake Superior
1990	0.20	0.01	0.06
1991	0.16	0.02	0.16
1992	0.18	0.01	0.06
1993	0.24	0.02	0.05
1994	0.14	0.02	0.07
1995	0.13	0.01	0.08
1996	0.17	0.02	0.09
1997	0.21	0.01	0.06
1998	0.26	0.02	0.04
1999	0.18	0.06	0.12
2000	0.31	0.04	0.05
2001	0.19	0.03	0.09
2002	0.26	0.12	0.11
2003	0.18	0.03	0.03
2004	0.17	0.02	0.07
2005	0.09	0.02	0.06
2006	0.11	0.03	0.05
2007	0.18	0.02	0.07
2008	0.12	0.04	0.10

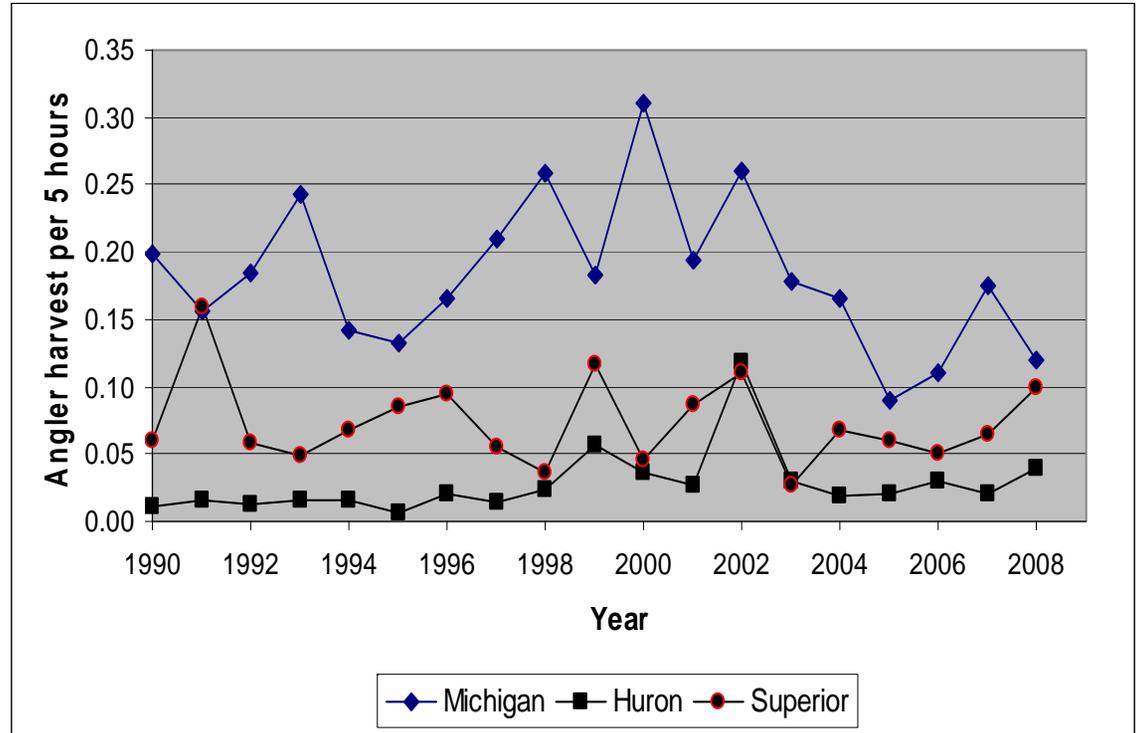


Figure 6.—Charter angler targeted harvest rates (fish per 5 angler hours) for rainbow trout (steelhead) on Lake Michigan and Lake Huron, 1990-2008.

Year	Lake Michigan	Lake Huron
1990	0.22	0.02
1991	0.42	0.04
1992	0.37	0.05
1993	0.28	0.09
1994	0.29	0.08
1995	0.19	0.16
1996	0.39	0.17
1997	0.29	0.12
1998	0.24	0.08
1999	0.22	0.08
2000	0.18	0.08
2001	0.26	0.10
2002	0.19	0.09
2003	0.18	0.04
2004	0.12	0.05
2005	0.15	0.06
2006	0.14	0.07
2007	0.13	0.06
2008	0.14	0.09

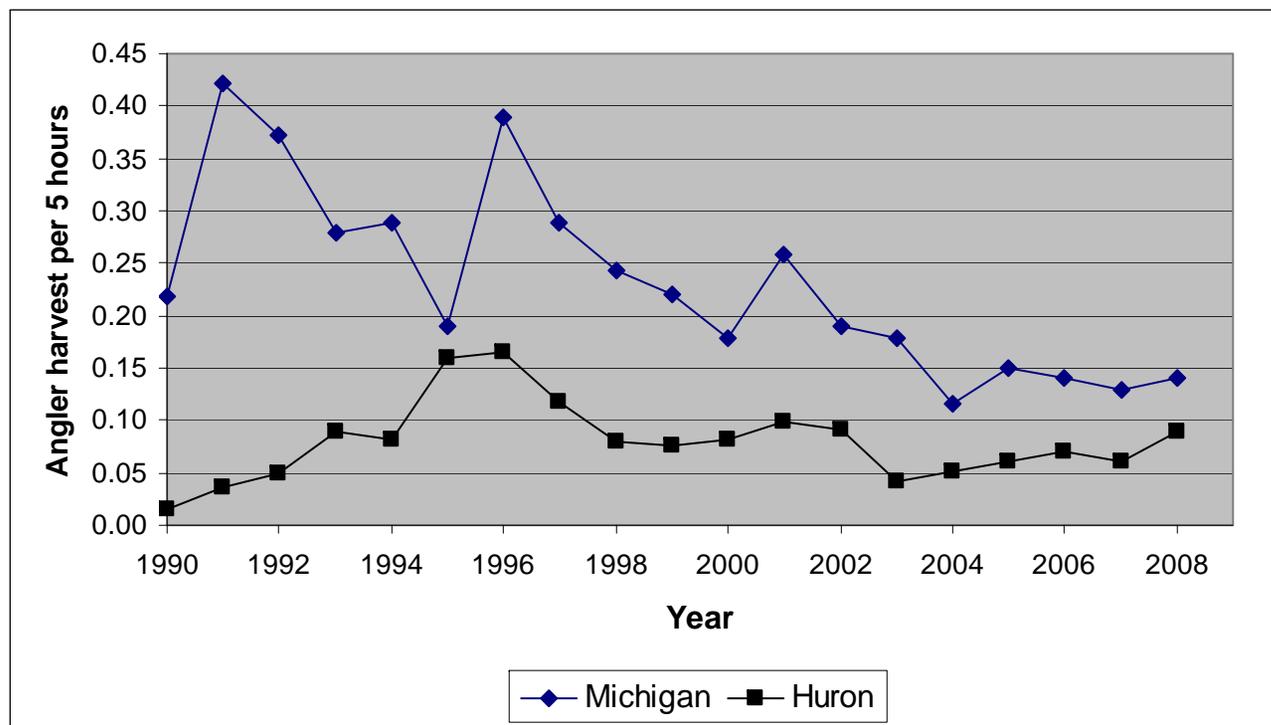


Figure 7.—Charter angler targeted harvest rates (fish per 5 angler hours) for brown trout on Lake Michigan and Lake Huron, 1990-2008.

Year	Lake Michigan	Lake Huron
1990	0.03	0.01
1991	0.05	0.01
1992	0.02	0.04
1993	0.04	0.10
1994	0.06	0.12
1995	0.05	0.11
1996	0.06	0.05
1997	0.08	0.02
1998	0.04	0.03
1999	0.04	0.01
2000	0.07	0.01
2001	0.03	0.01
2002	0.04	0.02
2003	0.02	0.03
2004	0.01	0.02
2005	0.02	0.01
2006	0.01	0.00
2007	0.01	0.01
2008	0.01	0.00

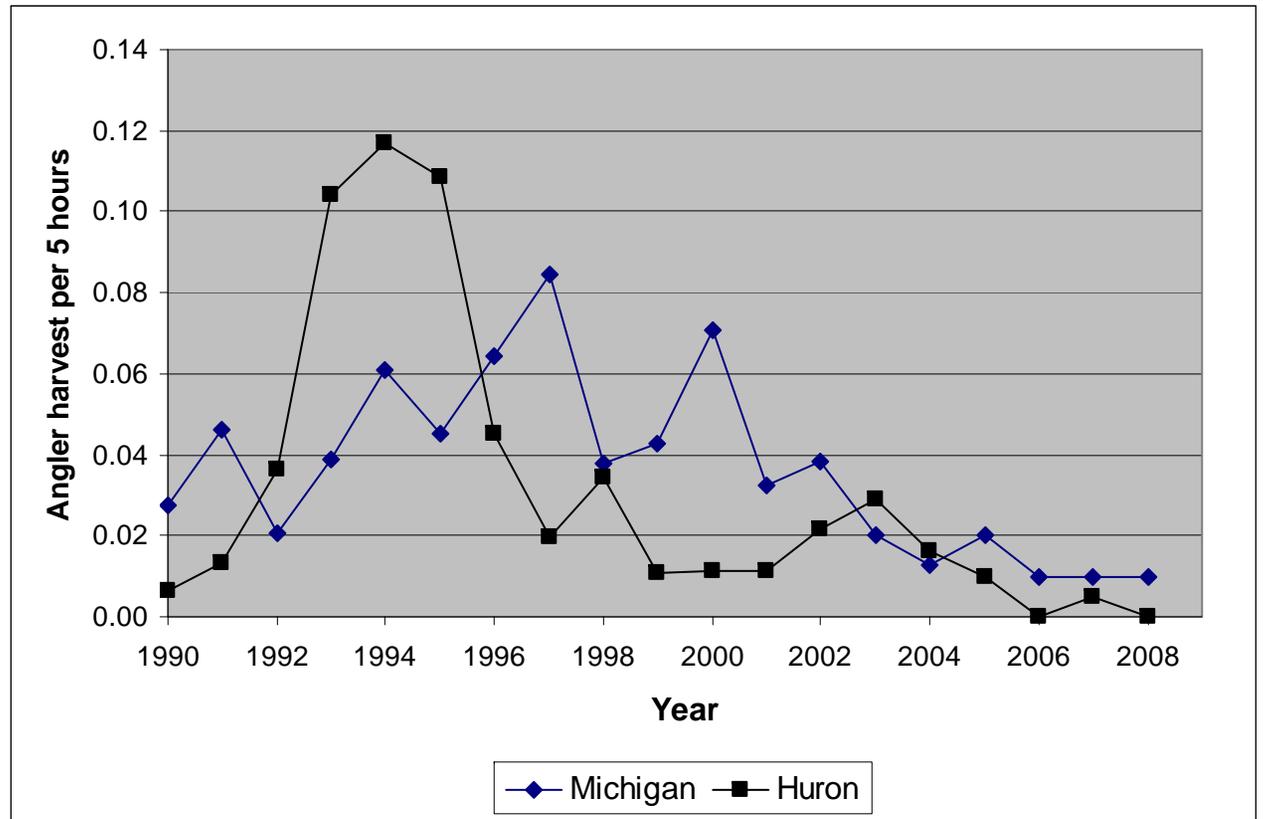


Figure 8.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch on Lake Michigan, 1990-2008.

Year	Yellow Perch
1990	24.49
1991	8.42
1992	12.28
1993	14.66
1994	12.38
1995	9.01
1996	4.23
1997	5.93
1998	3.35
1999	5.43
2000	3.44
2001	2.25
2002	2.54
2003	4.14
2004	2.16
2005	2.91
2006	4.97
2007	5.00
2008	4.26

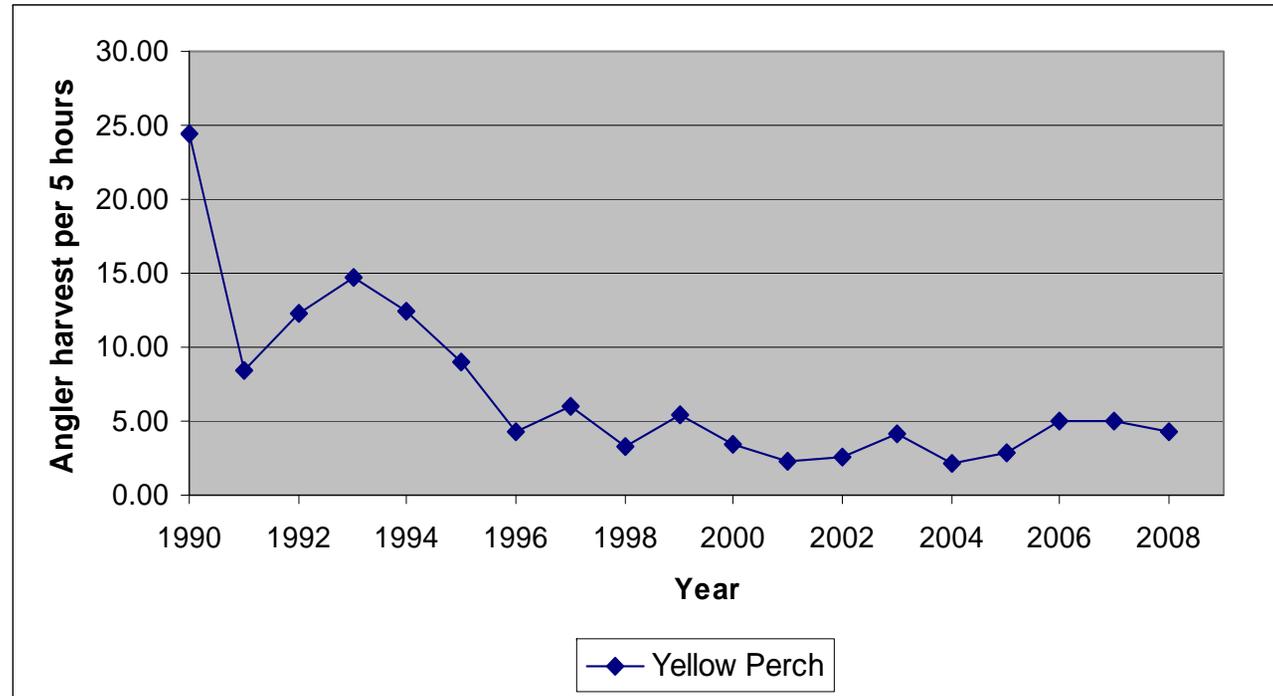


Figure 9.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on Lake Huron, 1990-2008.

Year	Yellow perch	Walleye
1990	3.28	1.57
1991	1.72	1.47
1992	1.57	1.56
1993	0.91	1.62
1994	1.42	1.77
1995	1.19	0.87
1996	0.90	1.06
1997	0.69	1.22
1998	0.92	1.28
1999	2.61	0.98
2000	1.13	1.21
2001	0.90	1.13
2002	0.39	0.98
2003	0.42	1.20
2004	0.11	1.18
2005	0.15	1.42
2006	0.41	2.42
2007	0.27	3.01
2008	0.65	3.28

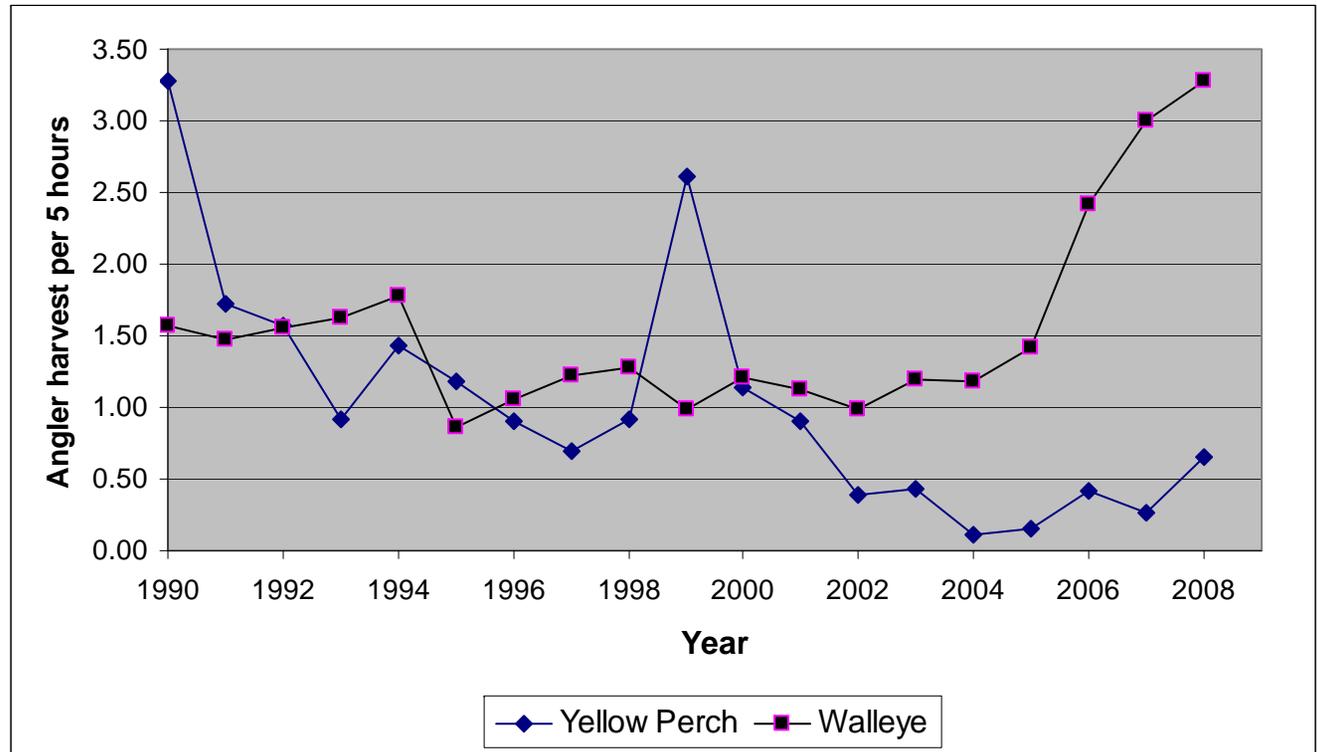


Figure 10.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on Lake Erie, 1990-2008.

Year	Yellow perch	Walleye
1990	1.52	3.77
1991	1.99	3.21
1992	2.51	4.21
1993	2.30	4.05
1994	1.70	3.48
1995	2.59	4.17
1996	3.95	4.12
1997	3.77	4.21
1998	3.52	5.37
1999	3.72	4.22
2000	3.34	3.89
2001	2.85	4.27
2002	5.01	3.71
2003	3.13	4.30
2004	2.19	3.00
2005	3.85	1.57
2006	1.59	4.56
2007	1.91	3.81
2008	1.61	2.89

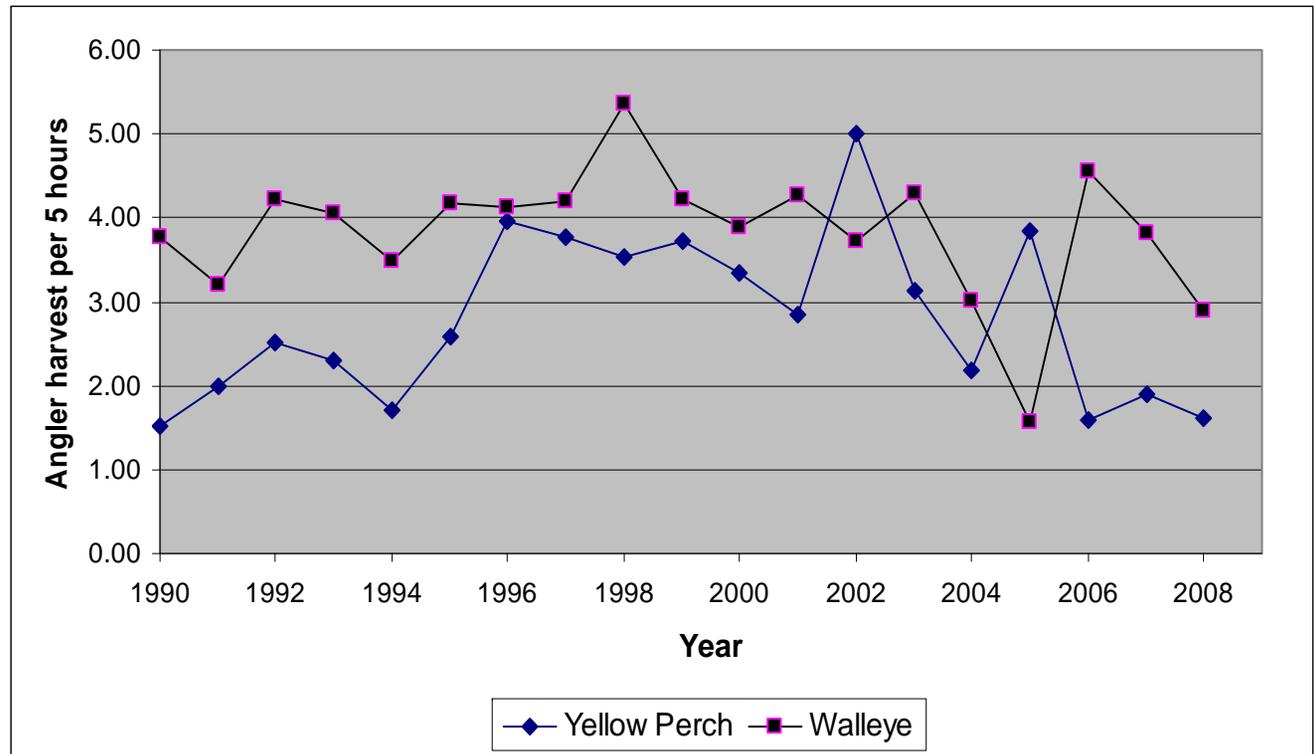


Figure 11.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on the St. Clair system, 1990-2008.

Year	Yellow perch	Walleye
1990	1.25	1.42
1991	1.52	0.88
1992	0.93	0.79
1993	1.39	1.13
1994	3.79	0.59
1995	3.39	1.07
1996	5.06	0.81
1997	3.86	0.95
1998	2.28	1.03
1999	2.40	0.99
2000	2.54	1.01
2001	3.43	1.35
2002	6.12	0.76
2003	2.44	1.24
2004	2.13	1.29
2005	2.85	1.98
2006	3.80	1.68
2007	4.90	2.19
2008	1.96	1.10

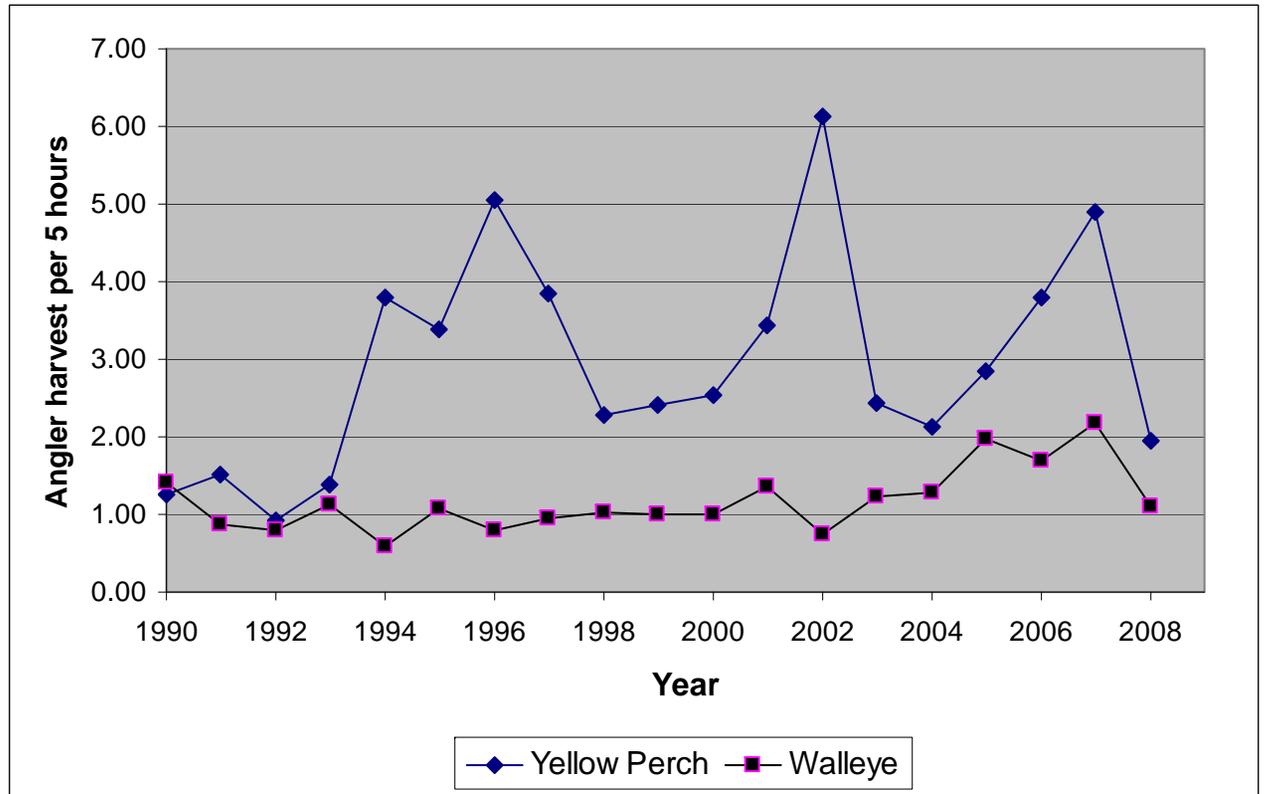


Figure 12.—Sea lamprey incidence (number attached per 100 fish) on Chinook salmon harvested by charter anglers on Lake Michigan and Lake Huron, 1990-2008.

Year	Lake Michigan	Lake Huron
1990	0.5	18.6
1991	0.3	13.9
1992	0.2	13.6
1993	0.1	7.6
1994	0.3	7.1
1995	0.3	6.2
1996	0.1	3.9
1997	0.2	4.7
1998	0.4	5.2
1999	0.2	4.6
2000	0.4	7.3
2001	0.5	4.6
2002	0.8	4.2
2003	1.2	6.0
2004	1.0	5.8
2005	1.3	6.4
2006	1.3	12.5
2007	1.4	9.3
2008	0.8	9.6

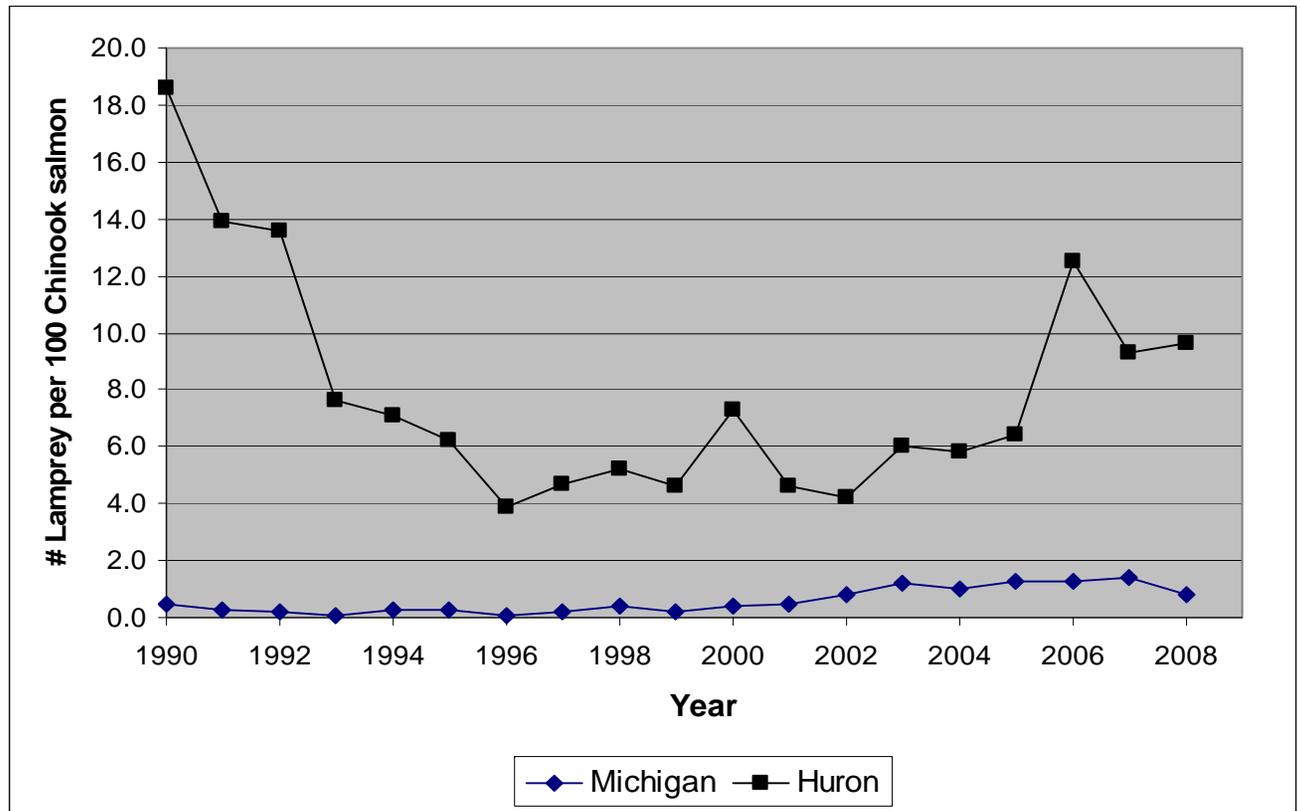


Figure 13.—Sea lamprey incidence (number attached per 100 fish) on lake trout harvested by charter anglers on Lakes Michigan, Huron, and Superior, 1990-2008.

Year	Lake Michigan	Lake Huron	Lake Superior
1990	1.8	6.6	1.8
1991	1.2	5.7	1.6
1992	0.8	4.6	0.8
1993	0.6	2.1	0.5
1994	0.6	3.3	1.1
1995	1.0	2.7	0.7
1996	0.7	1.9	1.0
1997	1.1	3.0	0.6
1998	1.1	2.1	0.5
1999	1.2	1.8	0.5
2000	1.3	2.2	0.4
2001	1.3	2.0	0.7
2002	2.2	1.5	0.4
2003	2.4	1.3	0.7
2004	2.6	1.4	0.8
2005	2.8	1.1	1.2
2006	2.7	1.8	3.0
2007	2.3	1.9	1.6
2008	1.2	2.0	1.1

