

Charter Boat Catch and Effort from the Michigan Waters of the Great Lakes, 2011

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Introduction

The charter fishing industry provides Michigan with significant economic benefits. 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. During the 2011 fishing season, there were 573 boats operated by 529 businesses; a number similar to the 571 charter boats reporting in 2010.

Reporting of sport catch 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 caught by charter anglers. These data assist MDNR's Great Lakes fishery management efforts because they are used to track changes in fishing catch and catch rates over time. These changes in catch 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). Charter businesses have used this form to report their monthly charter fishing activity since 1990. The form was revised in January 2006 when the following changes were made: 1) a "total number of anglers" column replaced the "resident and non-resident" angler columns, and 2) recording columns for smallmouth bass and muskellunge

harvest were added. Further revision in February 2010 included additions of: 1) a second line for each trip to record released fish by species, and 2) the designation of trip target species, or species group. 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).

Charter operators are identified from (1) a list of operators who submitted catch reports the previous year, (2) review of MDNR Law Enforcement Division's list of individuals who applied for and received a certificate of inspection for a fishing vessel, and (3) review of the list of 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.

In the early to mid 2000s, 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. The number of businesses using the online reporting system has increased each year. During the initial reporting season in 2008, 14% of the operators were either using or had recently signed up to use the online system. By the end of the 2011 reporting season, 153 operators reporting for 169 boats (29%) were using the online system.

Charter operators are required by law to complete the paper version of the catch report form each time they fish, or to 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 and number released) of major species, fish specie(s) targeted, 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. Another change was made in 2006; the postcard notice now informed the operator of all months currently delinquent for the reporting year to date. 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 (anglers), and one charter excursion.

Charter data are also used to summarize the harvest, catch, harvest rate, and catch rate of those sport-fish listed on the form. Catch is the number of fish caught by an angler. Catch rate is the number of fish caught in a given amount of time (e.g., number/hour). Harvest is the number of fish caught and kept by an angler and harvest rate is the number of fish harvested in a given amount of time (e.g., number/hour). For most charter trips, it is possible to separate fishing effort between "groups" of fish - such as salmonine group (salmon and trout species) or a percid plus other species group (walleye, perch, smallmouth bass, muskellunge, and other) - since fishing trips usually target one or the other group. However, it is usually not possible to separate fishing effort between species within the salmonine group (i.e., fishing trips often target more than one species within the group). From 1990-2003, charter effort was reported as total fishing effort, regardless of target group or species. Starting with 2004 reporting, an improved method to calculate targeted harvest rates was implemented; this method separated

salmonine effort from percid effort and used 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. Starting in 2010, reporting requirements again improved by requiring the recording of more specific target species for each fishing trip. Fishing target and effort is still reported for the salmonines as a group, while trips for the other recorded species is target and effort specific. 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 2011 fishing season, rate of compliance varied each month; when averaged over all reporting months, 72% 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 2011 was 1% less than 2010. In December 2011, at the time of sending final notification letters for one or more delinquent reports, 77% of the operators/boats were in compliance; this compliance rate was 2% less than in 2010. By January 2012, 93% of all charter operators had complied with the law; this rate of compliance is 2% more than that observed in 2010.

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, catch, and effort from the Great Lakes, inclusive of tributaries.

Fishing effort

In 2011, charter anglers participated in 14,144 charter excursions on the Michigan waters of Lakes Michigan, Huron, Erie, Superior, and the St. Clair system, including major tributaries (Tables 1-6). From 2010 to 2011, there was a 5% increase in the number of total excursions; the number of excursions increased on lakes Michigan, Superior, and the St. Clair system. Excursions on Lake Michigan increased 6%, from 10,204 (2010) to 10,834 (2011); excursions on the St. Clair system increased 16%, from 719 (2010) to 831 (2011); and Lake Superior excursions increased 2%, from 374 (2010) to 382 (2010). Excursions on Lake Erie decreased 5%, from 738 (2010) to 698 (2011) and excursions on Lake Huron decreased 3%, from 1,446 (2010) to 1,399 (2011). The distribution of charter fishing excursions in 2011 by lake was: 77% Lake Michigan, 10% Lake Huron, 5% Lake Erie, 5% St. Clair System, and 3% Lake Superior. Comparing the distribution of effort in 2011 to 2010, there was only minimal changes with a 1% increase in the proportion of excursions on Lake Michigan, <1% increase on the St. Clair system, and a 1% decrease on Huron, and <1% decrease on Lake Erie. Effort on Lake Superior as a percent of great lake excursions was unchanged. Excursions on the St. Clair system increased starting in 2010 compared to years prior due to the addition of catch and release charter fishing data collection.

A total of 327,853 hours were spent fishing by 57,432 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 increased 3% and 4%

respectively compared to 2010, corresponding with the 5% increase in excursions for 2011. Starting in 2008, businesses have been influenced by high gasoline prices for consumers (over \$4.00 per gallon for some months of 2008) and prices remained in the mid to high \$3 per gallon range through 2011. Based on charter operator's comments throughout the 2008-2011 seasons, unemployment and the struggling economy were negative factors for the charter industry; some of the repeat or normal customers didn't have the income to spend on recreation. In addition, windy weather was reported by numerous operators as a reason for canceled excursions in both 2010 and 2011. Regardless, the charter industry continued its upward trend of recovery from the 2009 charter fishing season, which had experienced a 22% decrease in effort (compared to the stable 2004-2007 data series) and the lowest reported excursions in the entire data series (Table 6).

Harvest

Both total and targeted harvest numbers by species are included in this report. Charter operators reported a total of 146,360 fish harvested from the Michigan waters of the Great Lakes and its major tributaries in 2011 (Tables 1-5); this is a 2% increase compared to 2010 total harvest (143,565). Most of these fish were harvested from Lake Michigan (67%), followed by Lake Erie (16%), Lake Huron (9%), the St. Clair system (5%), and Lake Superior (3%). In comparison to 2010, total harvest increased on Lake Michigan (3%), decreased on Lake Erie (3%), and was unchanged or <1% change for Lake Superior and the St. Clair system.

Historically, the most abundant species in the charter harvest has been yellow perch; however over the years of this data series (1990-current day), 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 2011, Chinook salmon accounted for 38% of the total harvest. Percent of total harvest for other species were as follows: lake trout 19%, yellow perch 15%, walleye 13%, rainbow trout 7%, coho salmon 6%, smallmouth bass 1%, and

brown trout <1%. The "other" species category accounted for about 1% of the harvest. The species composition of this 'other' category is not fully known because MDNR does not require it to be identified; the category included smallmouth bass and muskellunge, in addition to other species not defined on the report form. Changes to the reporting form in 2010 allow for smallmouth bass and muskellunge to be recorded and reported on separately so they are no longer included in the 'other' category.

Charter anglers harvested 55,904 Chinook salmon in 2011, which is a 5% decrease relative to 2010 (58,817). Total harvest (all lakes combined) in 2011 increased for lake trout, rainbow trout, coho salmon, and smallmouth bass; harvest of brown trout, yellow perch, and walleye decreased. Harvest numbers in 2011 for species were: 27,101 lake trout, 22,073 yellow perch, 18,685 walleye, 9,853 rainbow trout, 8,496 coho salmon, 2,144 smallmouth bass, and 507 brown trout (Tables 1-5).

The total number of salmonines (Chinook salmon, coho salmon, lake trout, rainbow trout, and brown trout) harvested from Michigan's Great Lakes waters in 2011 was 101,861, which is a 9% increase (8,313 fish) from 2010 harvest (93,548).

In general, species categorized as "other" are not differentiated in the charter reporting data. Starting with 2006, two species, smallmouth bass and muskellunge, were listed individually on the charter form. However, due to low harvest of these two species, compiled harvest results continued to group these species into the "other" fish category. While harvest of smallmouth bass and muskellunge can be small in number, there is a popular "catch and release" fishery for these species. Changes to reporting in 2010 made it possible for operators to report on the catch and release fishery for these species. Consequently the number of 'other' species decreased due to smallmouth bass and muskellunge being removed from the category and recorded separately. In 2011, 1,592 'other' fish were recorded as harvested in relation to the 2,656 recorded in 2009 (the year prior to the reporting changes) (Tables 1-5).

Harvest rates

In 2011, charter anglers harvested 0.45 fish (all species from all lakes combined) per hour; the same as for 2010 (0.45 fish). Total harvest rates 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. Targeted harvest rates per hour and per excursion are based on targeted effort for an individual species or fish group in that lake. The following discussion will focus on targeted harvest rates (Tables 1-5 and Figures 3-10).

Most charter excursions that took place on Michigan's Great Lakes waters during 2011 targeted the various species of salmonines. Comparing targeted harvest rates (fish per 5 angler hours) to 2010 data, Lake Michigan angler harvest rates increased slightly for lake trout, rainbow trout, and coho salmon. Brown trout harvest rates remained unchanged, while Chinook salmon harvest rates decreased slightly (Figures 3-7). The targeted harvest rate reported in 2011 for Chinook salmon in Lake Michigan (1.12 fish per 5 hours of angler fishing) is similar to 2010; the harvest rate remains high in relation to the average for the 1990-2011 data series (Figure 3).

Targeted harvest rates (fish per 5 angler hours) on Lake Huron in 2011 increased compared to 2010 for Chinook salmon and walleye, was unchanged for brown trout and rainbow trout, and decreased for lake trout and coho salmon (Figures 3-8). The harvest rate for walleye (2.36 fish per 5 angler hours) increased and remains high in relation to the 1990-2011 data series for Lake Huron (Figure 8).

Lake trout continues to be the most important salmonine in the charter harvest from Lake Superior. Compared to 2010, targeted harvest rates for lake trout increased to 1.65 fish per 5 hours, the highest harvest rate in the 22 year data series (Figure 4); the four remaining salmonids (coho salmon, Chinook salmon, rainbow trout, and brown trout) combined, make up a minor portion (8%) of the Lake Superior salmonine harvest (Table 5).

Walleye and yellow perch play an important role in charter fisheries on Lake Erie and the St.

Clair system. Lake-wide 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 from Lake Erie; this regulation remained in place through 2011. Targeted harvest rates for walleye (3.29 fish per 5 angler hours) decreased (Figure 9) on Lake Erie for 2011, in comparison to 2010. Targeted harvest rates also decreased slightly for walleye (2.20 fish per 5 angler hours) on the St. Clair system in 2011, compared to 2010 (Figure 10). Changes in 2010 reporting requirements included recording the target species (or fish group) for each fishing trip; making both walleye and yellow perch fishing target and effort specific. The 2010 data recording changes allow for more accurate reporting of harvest rates for these species. The affect this has on targeted harvest rates is most evident in yellow perch harvest rates. Targeted harvest rates for yellow perch are greatly increased starting with 2010 in relation to the 1990-2009 data series for Lake Erie; the targeted harvest rate was 26.08 fish per 5 angler hours in 2011. The same increase is evident for the St. Clair System, 11.88 fish per 5 angler hours in 2011 (Figures 9-10).

Catch and Catch rates

Catch is the number of fish caught by an angler regardless of whether the fish is harvested or released back to the water. Catch rate is the number of fish caught in a given amount of time (e.g., number/hour). Beginning in 2010, targeted catch per hour, targeted catch per excursion, targeted released number of fish per year, and total released number of fish per year, by species, are reported (Tables 1-5). Smallmouth bass and muskellunge ("musky") are popular species caught but not harvested; charter operations on the St. Clair system generally offer excursions for these species. In 2011, catch rates on the St. Clair system for smallmouth bass and musky were 39 and 5.8 fish per excursion, respectively. As more years of data are collected, additional reporting will be included in the annual charter reports.

Sea Lamprey Incidence

For 2011, sea lamprey incidence on Chinook salmon increased in Lake Huron and remained the same for Lake Michigan, compared to 2010 levels. Lake Huron incidence was 5.8 lampreys attached per 100 Chinook salmon (Figure 11).

Sea lamprey incidence on lake trout increased on lakes Huron and Superior but decreased on Lake Michigan. The occurrence of lamprey on lake trout in Lake Superior (1.0 lamprey/100 fish) increased slightly compared to 2010 (Figure 12).

Online Information

Previous 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 listed under the 'Related Resources' is the 'Charter Fishing Online Reporting' link.

Acknowledgments

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Table 1.— Targeted harvest & catch rates per hour, per excursion, and number of fish harvested or released by species for charter boats fishing Michigan waters of Lake Michigan and its tributaries, 2011. Targeted harvest & catch of any salmon or trout is based on total salmonine effort; other species are trip target specific. Catch Rates = harvested (kept) fish + released fish. Bottom lines show total fishing effort (angler hours, anglers, and charter excursions).

Targeted Harvest/hr Catch/hr	Targeted Harvest/excur Catch/excur	SPECIES Harvest= Line 1 Released = Line 2	Month												TARGETED	TOTAL
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Harvest/year released/year	(target+non-target) Harvest/year released/year
0.034	0.792	Coho salmon	0	1	38	802	707	418	601	3,851	1,650	188	5	0	8,261	8,264
0.034	0.810	released	0	0	15	2	4	9	31	30	35	63	4	0	193	193
0.224	5.259	Chinook salmon	0	0	0	166	3,827	3,901	9,790	26,149	10,210	811	0	0	54,854	54,861
0.227	5.331	released	0	0	0	0	36	72	111	125	236	172	0	0	752	755
0.038	0.883	Rainbow trout	29	84	246	101	762	582	2,619	2,292	1,105	638	640	114	9,212	9,241
0.042	0.978	released	46	34	78	235	11	19	22	29	27	295	155	38	989	991
0.002	0.041	Brown trout	0	3	4	78	92	16	111	97	26	3	0	1	431	434
0.003	0.069	released	1	0	1	50	38	85	46	37	12	0	1	15	286	287
0.080	1.892	Lake trout	0	0	0	297	1,355	3,957	7,872	4,980	1,183	85	9	0	19,738	19,738
0.093	2.182	released	0	0	0	20	158	631	1,388	645	164	17	0	0	3,023	3,025
2.682	55.303	Yellow perch	0	0	0	116	13	238	2,606	898	332	0	0	0	4,203	4,385
2.708	55.829	released	0	0	0	0	0	0	22	16	2	0	0	0	40	83
0.301	5.120	Walleye	0	24	5	43	161	221	142	146	211	82	55	16	1,106	1,128
0.522	8.889	released	0	75	34	7	100	244	114	100	54	23	21	42	814	864
0.000	0.000	Smallmouth Bass	0	0	0	0	0	0	0	0	0	0	0	0	0	14
1.603	27.424	released	0	0	0	0	176	645	940	369	151	50	0	0	2,331	2,387
0	0	Musky	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.000	0.000	Other	0	0	0	0	0	0	0	0	0	0	0	0	0	142
0.430	6.346	released	0	0	0	0	0	62	97	0	6	0	0	0	165	383
		Lamprey on:														
		Chinook salmon	0	0	0	0	25	22	82	194	43	1	0	0	367	367
		Lake trout	0	0	0	0	19	33	93	56	12	1	0	0	214	214
		Totals for Angler hours	295	957	1,555	3,852	18,618	26,478	64,142	93,570	34,090	5,122	3,148	644		252,471
		Anglers	42	136	219	662	3,094	4,620	11,529	16,744	6,197	822	452	95		44,612
		Charter excursions	15	43	72	192	714	1,115	2,736	3,951	1,552	268	144	32		10,834

Table 2.— Targeted harvest & catch rates per hour, per excursion, and number of fish harvested or released by species for charter boats fishing Michigan waters of Lake Huron and its tributaries, 2011. Targeted harvest & catch of any salmon or trout is based on total salmonine effort; other species are trip target specific. Catch Rates = harvested (kept) fish + released fish. Bottom lines show total fishing effort (angler hours, anglers, and charter excursions).

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0.003	0.068	Coho salmon	0	0	0	6	5	10	14	10	10	1	0	0	56	56
0.004	0.070	released	0	0	0	0	1	0	0	0	0	0	0	0	1	1
0.061	1.198	Chinook salmon	0	0	0	6	14	67	267	474	143	11	0	0	982	986
0.062	1.211	released	0	0	0	0	1	1	1	8	0	0	0	0	11	11
0.032	0.637	Rainbow trout	0	0	0	29	19	65	283	96	20	10	0	0	522	536
0.033	0.648	released	0	0	0	0	1	2	6	0	0	0	0	0	9	9
0.004	0.072	Brown trout	0	0	0	0	7	0	4	2	32	14	0	0	59	70
0.004	0.083	released	0	0	0	0	3	6	0	0	0	0	0	0	9	9
0.231	4.526	Lake trout	0	0	0	8	224	737	1,366	1,073	299	4	0	0	3,711	3,712
0.268	5.252	released	0	0	0	0	91	164	189	120	28	4	0	0	596	596
2.526	46.250	Yellow perch	0	0	0	0	0	0	21	177	542	0	0	0	740	968
3.024	55.375	released	0	0	0	0	0	0	9	137	0	0	0	0	146	184
0.472	10.389	Walleye	0	0	0	0	173	2,112	3,087	397	28	0	0	0	5,797	5,890
0.687	15.133	released	0	0	0	0	80	1,407	1,065	42	53	0	0	0	2,647	2,649
0.227	2.500	Smallmouth Bass	0	0	0	0	0	0	0	0	5	0	0	0	5	62
2.318	25.500	released	0	0	0	0	0	0	0	0	46	0	0	0	46	168
0	0	Musky	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.143	2.000	Other	0	0	0	0	0	0	0	0	6	0	0	0	6	575
0.643	9.000	released	0	0	0	0	0	10	0	0	11	0	0	0	21	331
		Lamprey on:														
		Chinook salmon	0	0	0	2	2	4	23	17	8	0	0	0	56	57
		Lake trout	0	0	0	0	11	23	28	22	5	0	0	0	89	89
		Totals for Angler hours	0	0	0	189	1,607	7,123	11,553	6,271	1,869	92	16	0		28,720
		Anglers	0	0	0	32	285	1,249	2,080	1,156	347	19	2	0		5,170
		Charter excursions	0	0	0	13	87	340	547	307	96	8	1	0		1,399

Table 3.— Targeted harvest & catch rates per hour, per excursion, and number of fish harvested or released by species for charter boats fishing Michigan waters of Lake Erie, 2011. Targeted harvest & catch of any salmon or trout is based on total salmonine effort; other species are trip target specific. Catch Rates = harvested (kept) fish + released fish. Bottom lines show total fishing effort (angler hours, anglers, and charter excursions).

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0.000	0.000	Coho salmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.000	0.000	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.000	0.000	Chinook salmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
0.000	0.000	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.000	0.000	Rainbow trout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
0.000	0.000	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
0.000	0.000	Brown trout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.000	0.000	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.000	0.000	Lake trout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.000	0.000	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4.579	116.277	Yellow perch	0	0	0	0	723	334	1,865	3,022	4,252	1,233	315	0	11,744	13,036	
4.763	120.970	released	0	0	0	0	60	9	58	41	177	114	15	0	474	537	
0.658	15.495	Walleye	0	0	0	267	979	5,379	2,343	267	0	0	0	0	9,235	9,311	
0.734	17.304	released	0	0	0	7	177	635	240	19	0	0	0	0	1,078	1,078	
0.000	0.000	Smallmouth Bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
0.000	0.000	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47
0.000	0.000	Musky	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.000	0.000	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0.000	0.000	Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	604
1.417	17.000	released	0	0	0	0	0	0	0	0	0	0	17	0	17	0	2,359
		Lamprey on:															
		Chinook salmon	0	0	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	0	0
		Totals for Angler hours	0	0	0	554	1,794	8,242	3,551	1,160	1,017	232	72	0			16,622
		Anglers	0	0	0	97	335	1,562	665	218	178	46	12	0			3,113
		Charter excursions	0	0	0	26	86	338	148	48	38	11	3	0			698

Table 4.— Targeted harvest & catch rates per hour, per excursion, and number of fish harvested or released by species for charter boats fishing Michigan waters of St. Clair System (Lake St. Clair, St. Clair River, and Detroit River), 2011. Targeted harvest & catch of any salmon or trout is based on total salmonine effort; other species are trip target specific. Catch Rates = harvested (kept) fish + released fish. Bottom lines show total fishing effort (angler hours, anglers, and charter excursions).

Targeted Harvest/hr Catch/hr	Targeted Harvest/excur Catch/excur	SPECIES Harvest= Line 1 Released = Line 2	Month												TARGETED	TOTAL	
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Harvest/year released/year	(target+non-target) Harvest/year released/year	
0	0	Coho salmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0	0	Chinook salmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	Rainbow trout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	Brown trout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	released	0	0	0	0	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	0	0
0	0	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.376	60.390	Yellow perch	0	0	0	0	0	990	481	0	572	433	0	0	2,476	3,680	
3.107	78.951	released	0	0	0	0	0	220	34	0	265	242	0	0	761	822	
0.439	8.550	Walleye	0	0	0	604	808	176	324	143	87	98	0	0	2,240	2,347	
0.477	9.290	released	0	0	0	41	102	1	18	0	11	21	0	0	194	203	
0.254	5.433	Smallmouth Bass	0	0	0	0	0	168	714	680	193	0	0	0	1,755	2,057	
1.824	38.969	released	0	0	0	0	2,437	3,313	1,649	1,820	819	794	0	0	10,832	11,321	
0.001	0.026	Musky	0	0	0	0	0	1	4	0	0	0	0	0	5	5	
0.220	5.808	released	0	0	0	0	0	357	361	216	98	84	0	0	1,116	1,155	
0.446	9.667	Other	0	0	0	0	0	115	0	0	1	0	0	0	116	241	
4.746	102.833	released	0	0	0	0	0	1,090	3	0	19	6	0	0	1,118	1,664	
		Lamprey on:															
		Chinook salmon	0	0	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	0	0
		Totals for															
		Angler hours	0	0	0	1,467	2,865	3,640	3,953	3,347	1,748	1,374	0	0			18,394
		Anglers	0	0	0	259	457	560	628	509	280	205	0	0			2,898
		Charter excursions	0	0	0	81	149	167	169	133	71	61	0	0			831

Table 5.— Targeted harvest & catch rates per hour, per excursion, and number of fish harvested or released by species for charter boats fishing Michigan waters of Lake Superior and its tributaries, 2011. Targeted harvest & catch of any salmon or trout is based on total salmonine effort; other species are trip target specific. Catch Rates = harvested (kept) fish + released fish. Bottom lines show total fishing effort (angler hours, anglers, and charter excursions).

Targeted Harvest/hr Catch/hr	Targeted Harvest/excur Catch/excur	SPECIES Harvest= Line 1 Released = Line 2	Month												TARGETED	TOTAL
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Harvest/year released/year	(target+non-target) Harvest/year released/year
0.016	0.494	Coho salmon	0	0	0	0	6	64	48	45	13	0	0	0	176	176
0.017	0.517	released	0	0	0	0	0	0	5	2	1	0	0	0	8	8
0.005	0.152	Chinook salmon	0	0	0	0	23	13	9	5	4	0	0	0	54	54
0.005	0.152	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.007	0.205	Rainbow trout	0	0	0	0	1	10	23	33	6	0	0	0	73	73
0.007	0.205	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.000	0.008	Brown trout	0	0	0	0	3	0	0	0	0	0	0	0	3	3
0.000	0.008	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.329	10.256	Lake trout	0	0	0	0	134	693	1,265	1,207	344	8	0	0	3,651	3,651
0.349	10.868	released	0	0	0	0	17	70	66	48	17	0	0	0	218	218
0	0	Yellow perch	0	0	0	0	0	0	0	0	0	0	0	0	0	4
0	0	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.019	0.500	Walleye	0	0	0	0	0	0	8	0	0	0	0	0	8	9
0.197	5.250	released	0	0	0	0	27	11	38	0	0	0	0	0	76	76
0.040	0.500	Smallmouth Bass	0	0	0	0	0	1	0	0	0	0	0	0	1	1
0.240	3.000	released	0	0	0	0	0	0	0	5	0	0	0	0	5	5
0	0	Musky	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	released	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.188	2.375	Other	0	0	0	0	0	11	8	0	0	0	0	0	19	30
0.337	4.250	released	0	0	0	0	0	0	9	6	0	0	0	0	15	26
		Lamprey on:														
		Chinook salmon	0	0	0	0	1	0	0	0	0	0	0	0	1	1
		Lake trout	0	0	0	0	2	6	8	14	5	0	0	0	35	35
		Totals for Angler hours	0	0	0	0	685	2,286	4,039	3,583	1,043	10	0	0		11,646
		Anglers	0	0	0	0	91	309	545	520	171	3	0	0		1,639
		Charter excursions	0	0	0	0	24	72	122	122	40	2	0	0		382

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 2004-2011.

Lake	Year										
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Michigan	13,467	13,604	10,995	10,298	10,116	9,996	10,344	10,627	12,333	11,382	11,714
Huron	4,010	3,442	2,521	2,307	2,182	2,599	2,592	2,684	3,210	3,123	2,760
Erie	1,684	1,445	1,679	1,881	1,661	1,781	1,775	1,727	1,679	2,380	1,836
St. Clair System	779	643	509	414	299	336	407	394	432	389	348
Superior	755	791	743	618	455	515	524	497	517	607	482
Total	20,695	19,925	16,447	15,518	14,713	15,227	15,642	15,929	18,171	17,881	17,140

Table 6 (continued)

Lake	Year										
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Michigan	11,224	11,924	12,094	11,966	12,526	12,064	12,704	11,326	9,750	10,204	10,834
Huron	2,867	2,874	2,771	2,622	2,085	1,765	1,537	1,345	1,470	1,446	1,399
Erie	1,947	1,870	1,695	718	694	1,554	1,039	870	689	738	698
St. Clair System	433	246	466	339	319	366	493	440	425	719	831
Superior	477	430	505	455	479	398	359	245	244	374	382
Total	16,948	17,344	17,531	16,100	16,103	16,147	16,132	14,226	12,578	13,481	14,144

Figure 1.—Total number of charter anglers (trips) on the Michigan waters of the Great Lakes (including tributaries), 1990-2011.

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	76,353
2003	76,151
2004	66,845
2005	67,224
2006	68,572
2007	67,513
2008	59,840
2009	51,568
2010	55,273
2011	57,432

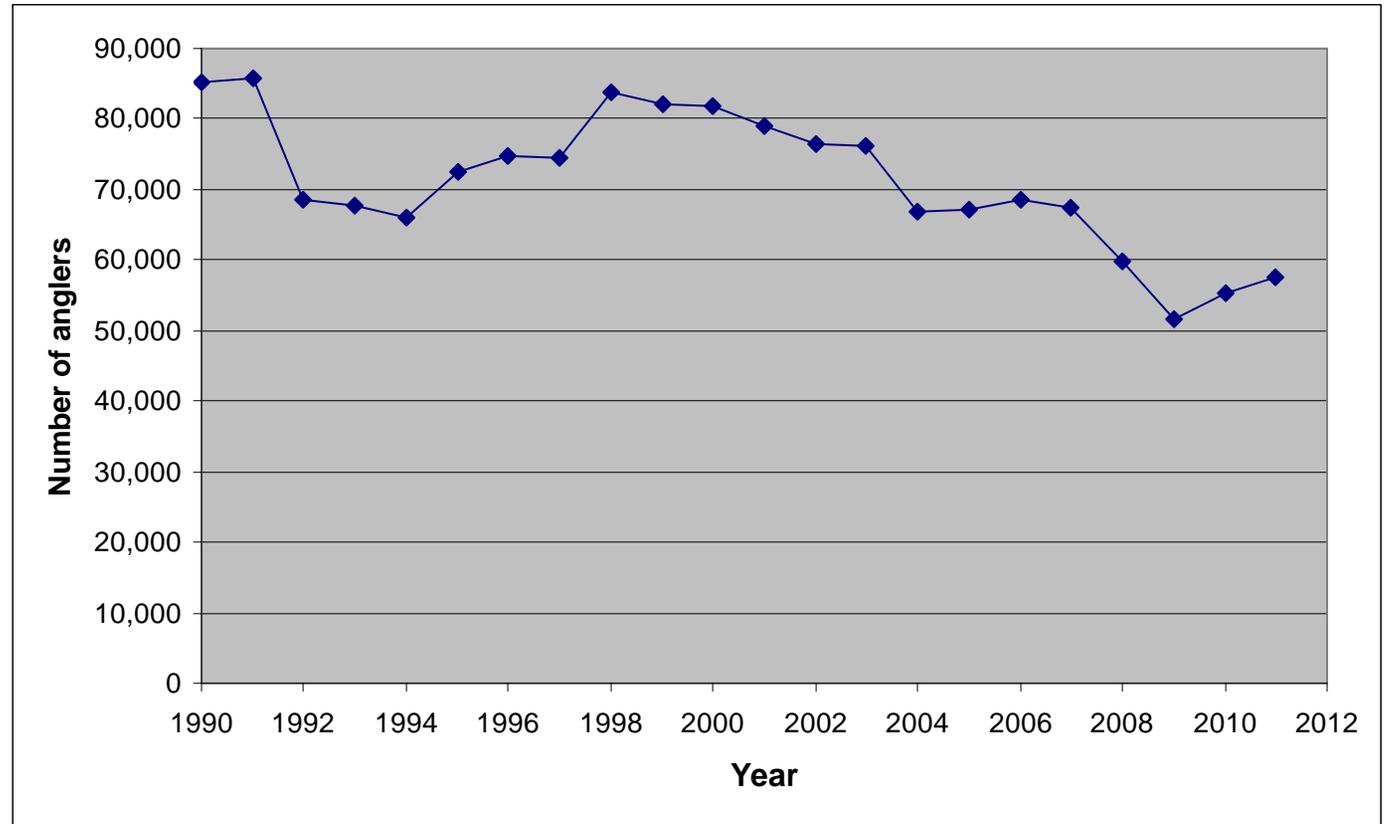


Figure 2(a).—Total number of charter anglers (trips) on the Michigan waters of Lake Michigan and Lake Huron (including tributaries), 1990-2011.

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	10,743
2003	52,972	10,318
2004	49,959	9,947
2005	52,478	7,812
2006	50,903	6,521
2007	53,337	5,635
2008	47,977	4,951
2009	40,472	5,303
2010	42,635	5,148
2011	44,612	5,170

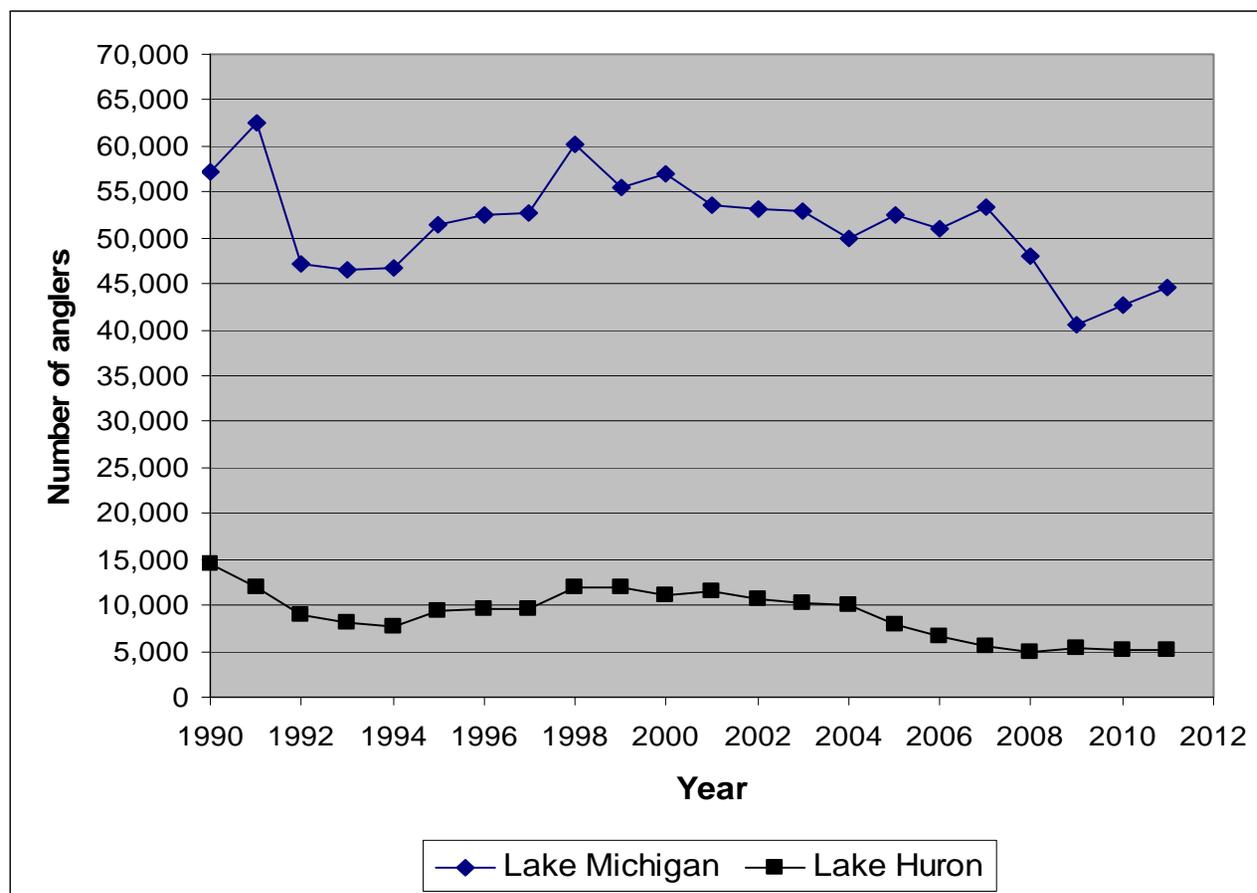


Figure 2 (b).—Total number of charter anglers (trips) on the Michigan waters of Lakes Erie, Superior, and the St. Clair System (including tributaries), 1990-2011.

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
2009	3,162	1,091	1,540
2010	3,322	1,527	2,641
2011	3,113	1,639	2,898

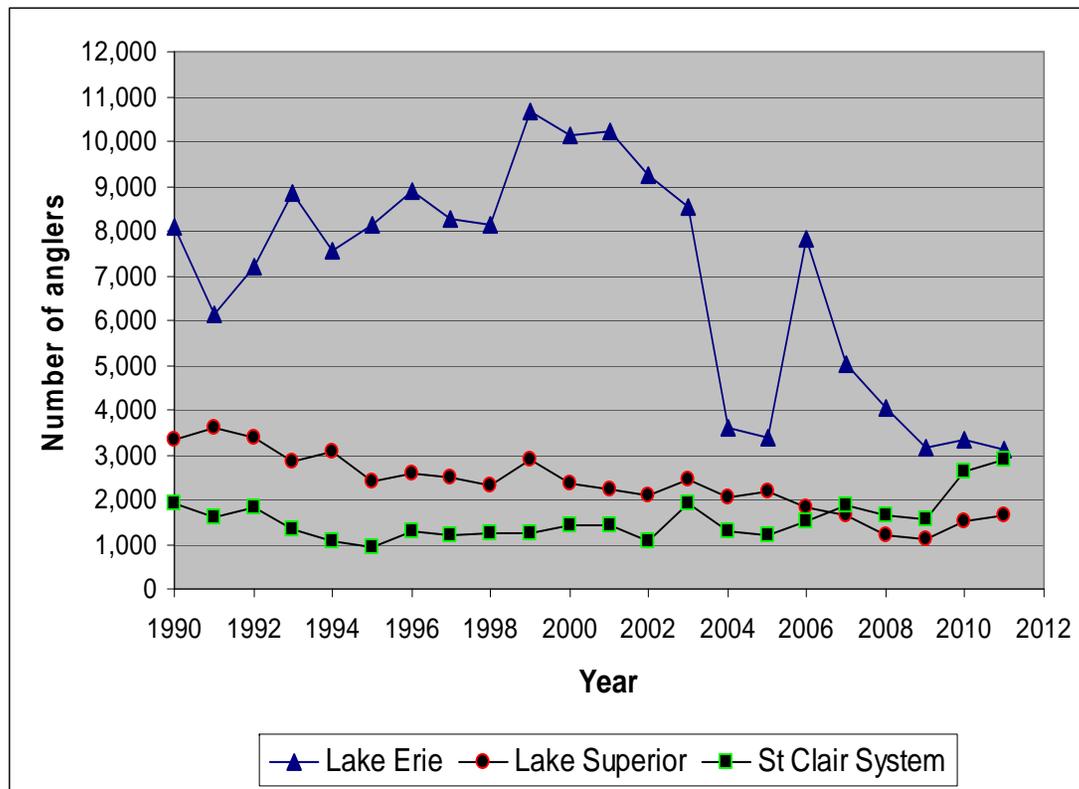


Figure 3. - Charter angler targeted harvest rates (fish per 5 angler hours) for Chinook salmon on Lake Michigan and Lake Huron, 1990-2011.

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
2009	1.22	0.27
2010	1.23	0.22
2011	1.12	0.31

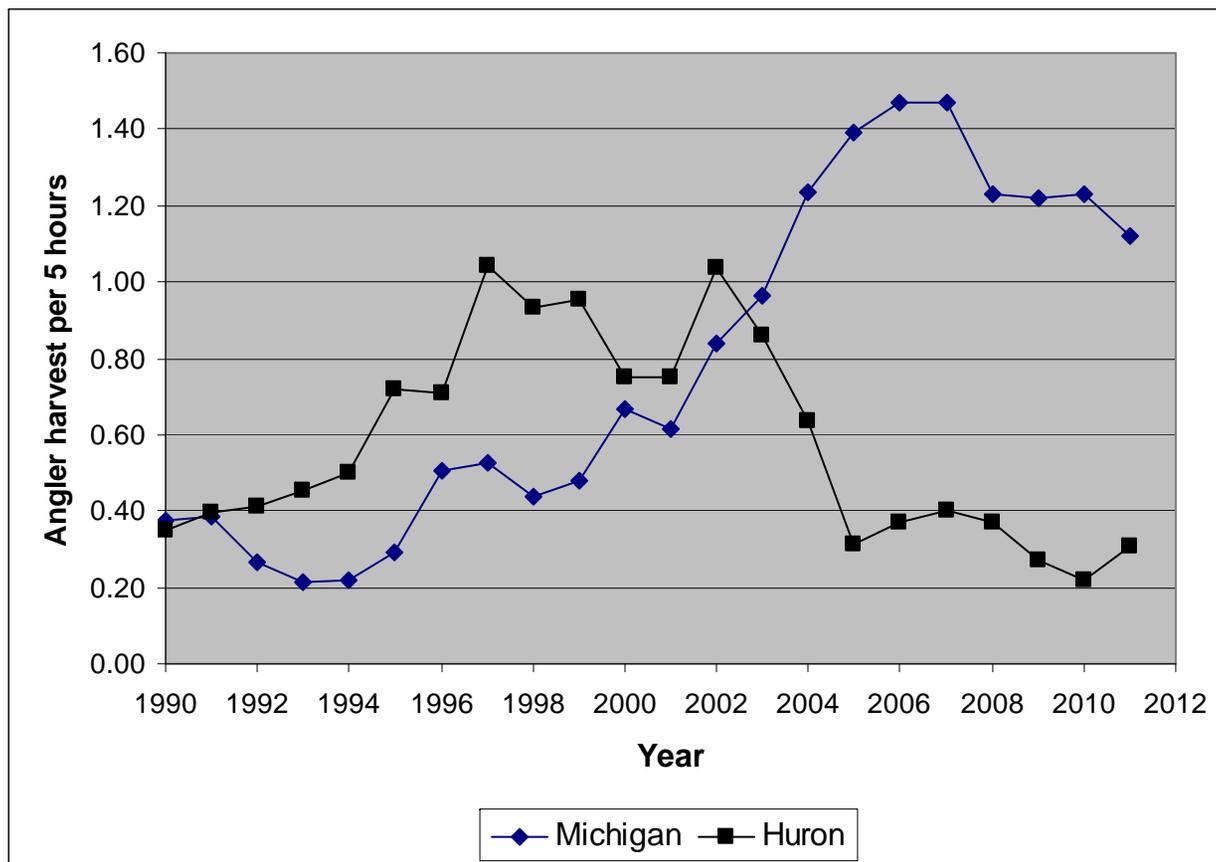


Figure 4.—Charter angler targeted harvest rates (fish per 5 angler hours) for lake trout on Lakes Michigan, Huron, and Superior, 1990-2011.

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
2009	0.29	1.54	1.44
2010	0.33	1.45	1.45
2011	0.40	1.16	1.65

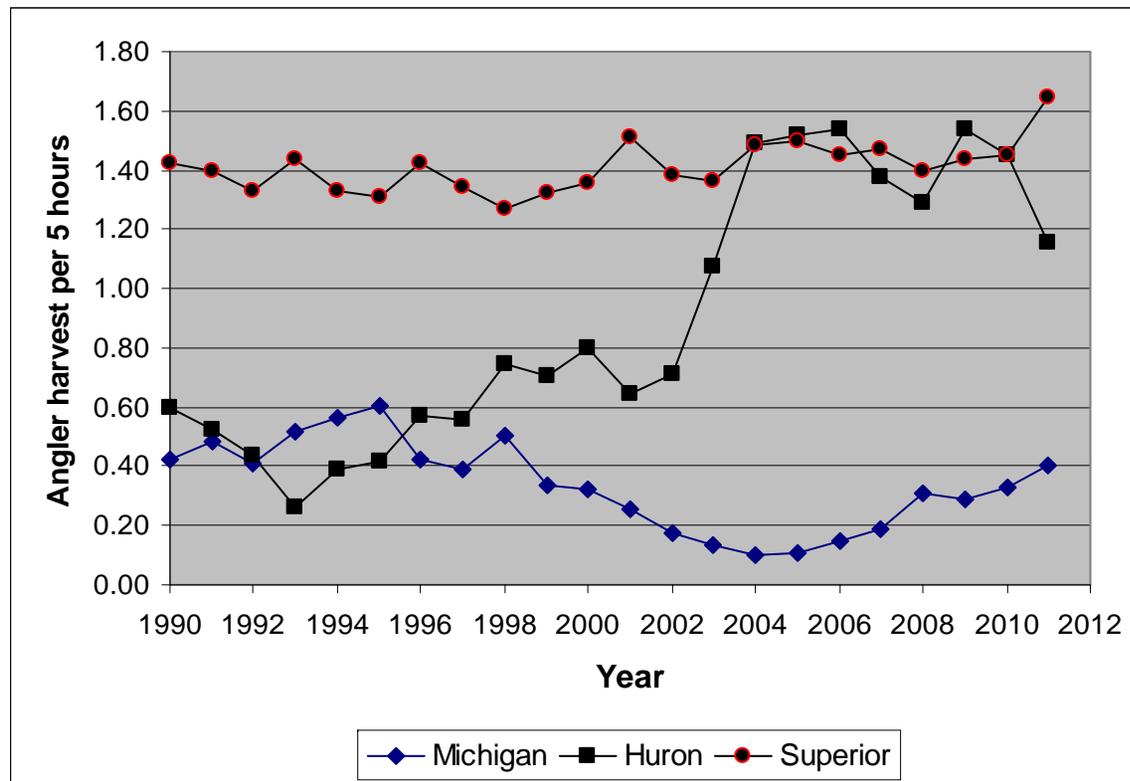


Figure 5.—Charter angler targeted harvest rates (fish per 5 angler hours) for coho salmon on Lakes Michigan, Huron, and Superior, 1990-2011.

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
2009	0.16	0.02	0.02
2010	0.12	0.02	0.15
2011	0.17	0.02	0.08

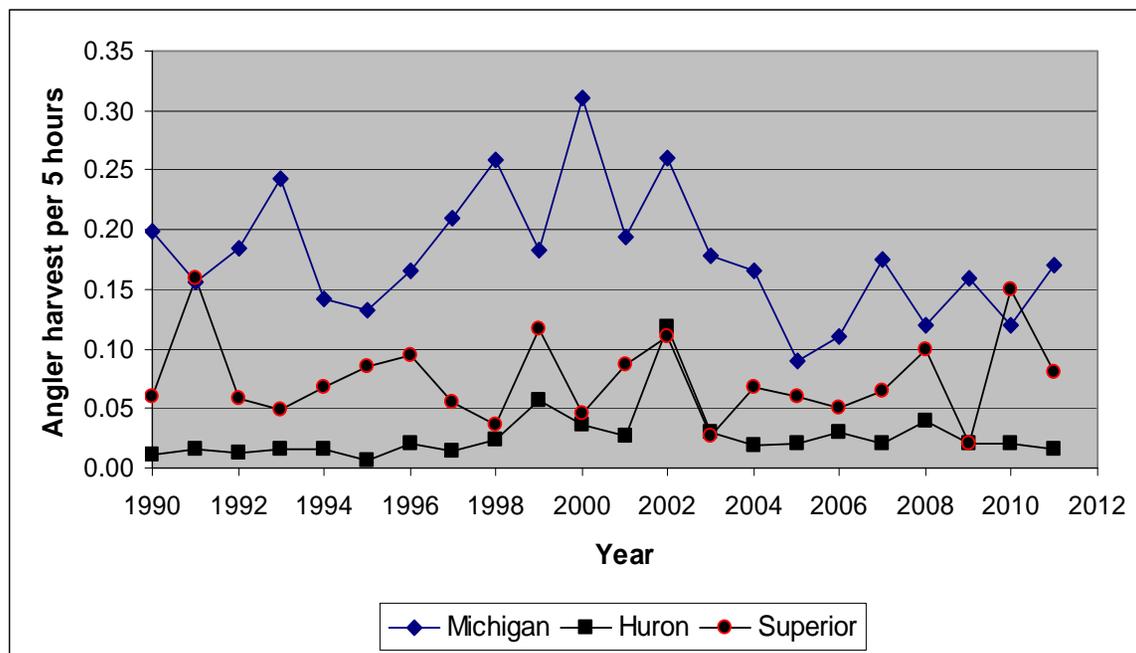


Figure 6.—Charter angler targeted harvest rates (fish per 5 angler hours) for rainbow trout (steelhead) on Lake Michigan and Lake Huron, 1990-2011.

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
2009	0.18	0.11
2010	0.11	0.16
2011	0.19	0.16

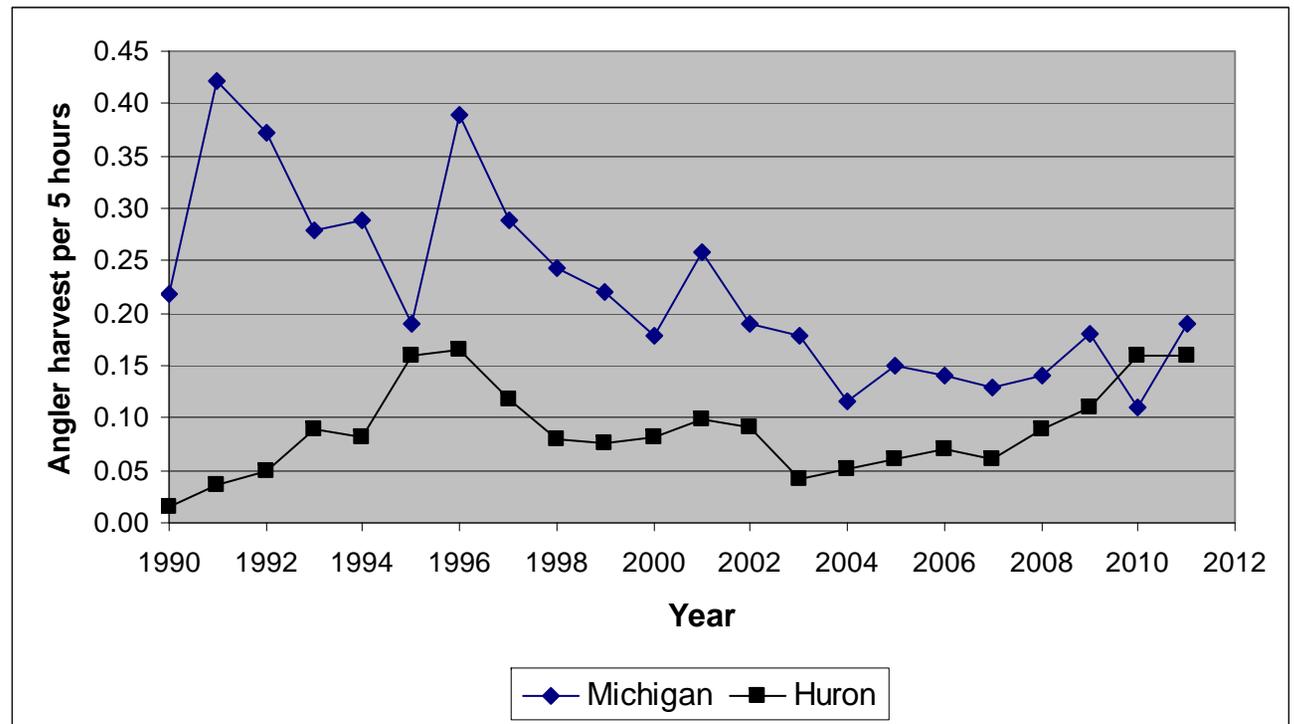


Figure 7.—Charter angler targeted harvest rates (fish per 5 angler hours) for brown trout on Lake Michigan and Lake Huron, 1990-2011.

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
2009	0.01	0.08
2010	0.01	0.02
2011	0.01	0.02

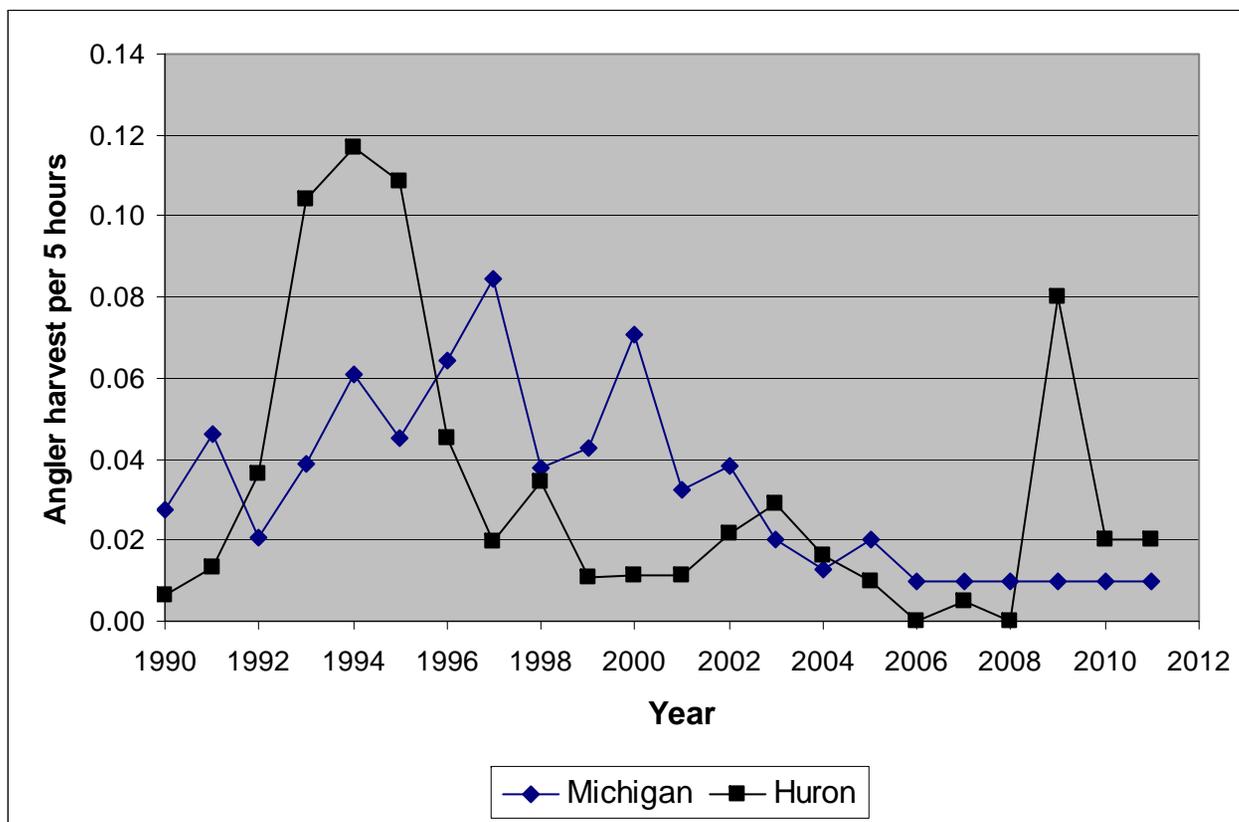


Figure 8.—Charter angler targeted harvest rates (fish per 5 angler hours) for walleye on Lake Huron, 1990-2011.

Year	Walleye
1990	1.57
1991	1.47
1992	1.56
1993	1.62
1994	1.77
1995	0.87
1996	1.06
1997	1.22
1998	1.28
1999	0.98
2000	1.21
2001	1.13
2002	0.98
2003	1.20
2004	1.18
2005	1.42
2006	2.42
2007	3.01
2008	3.28
2009	3.00
2010	2.20
2011	2.36

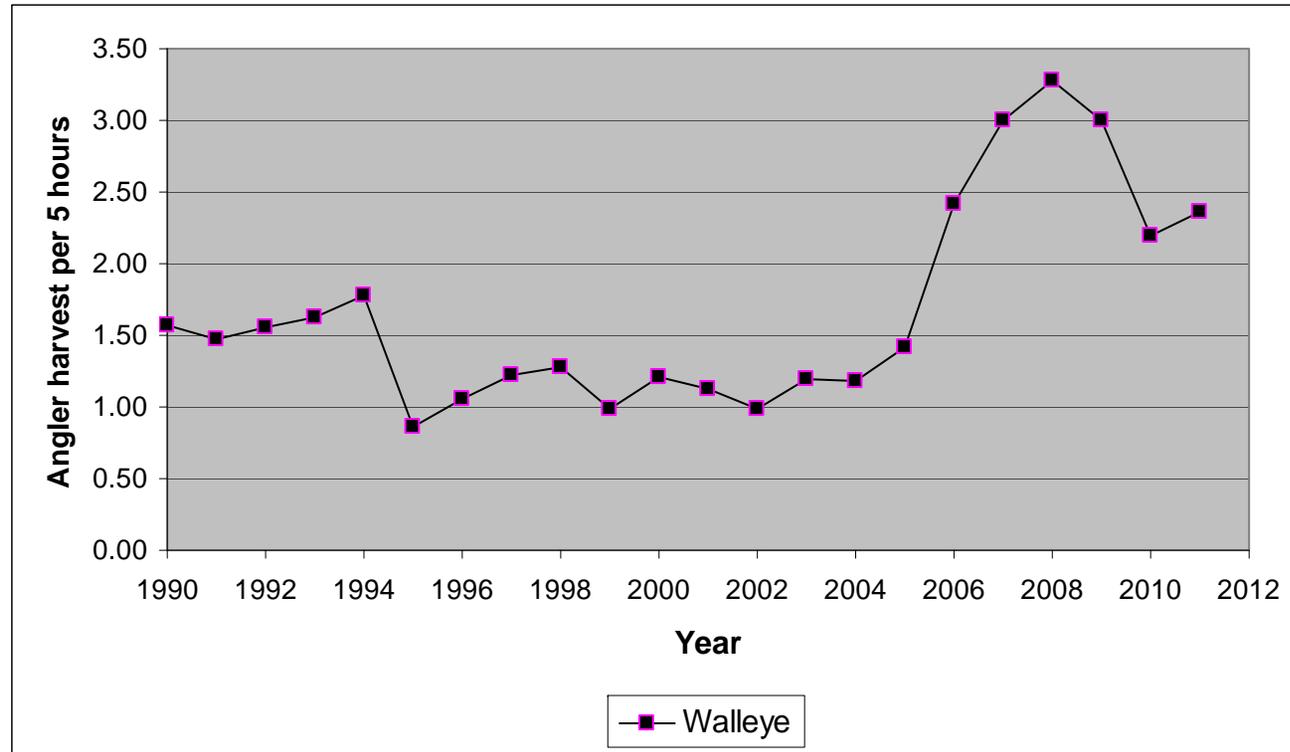


Figure 9.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on Lake Erie, 1990-2011.

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
2009	2.96	3.04
2010	26.08	3.46
2011	22.90	3.29

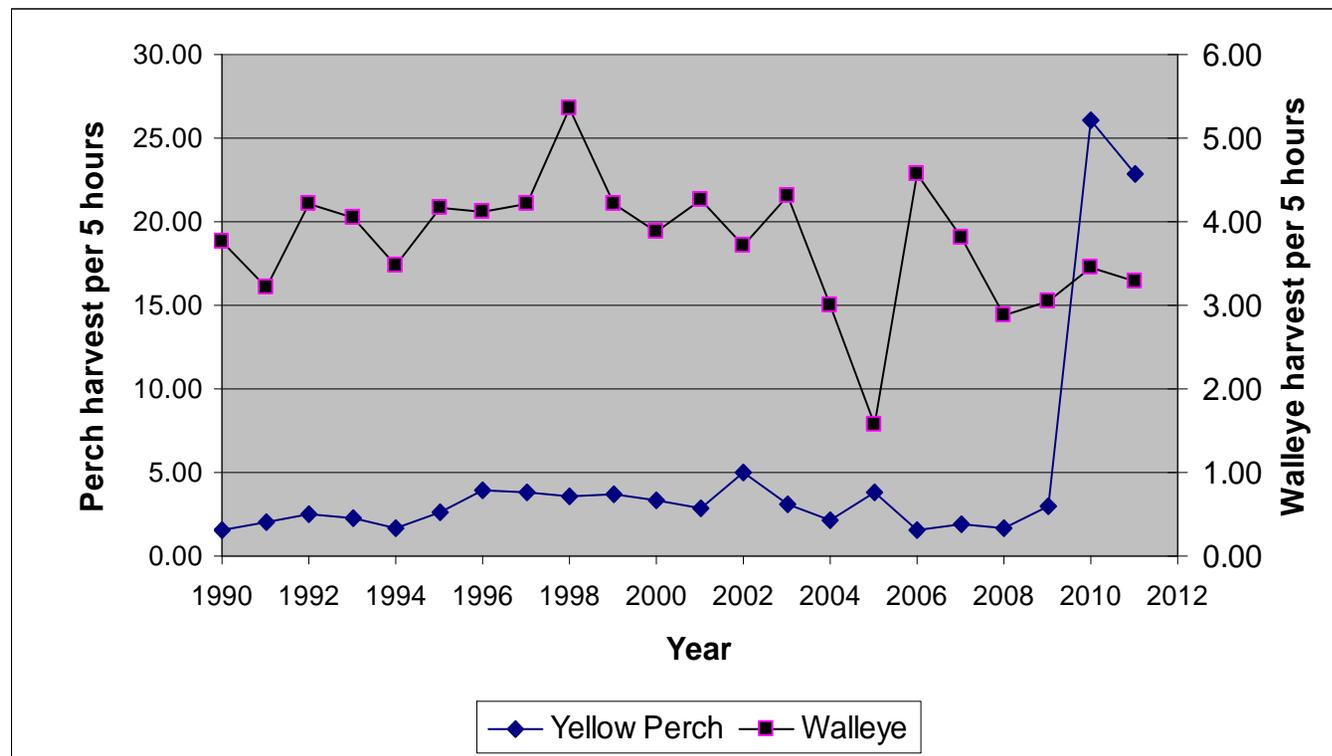


Figure 10.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on the St. Clair system, 1990-2011.

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
2009	0.86	2.07
2010	15.90	2.23
2011	11.88	2.20

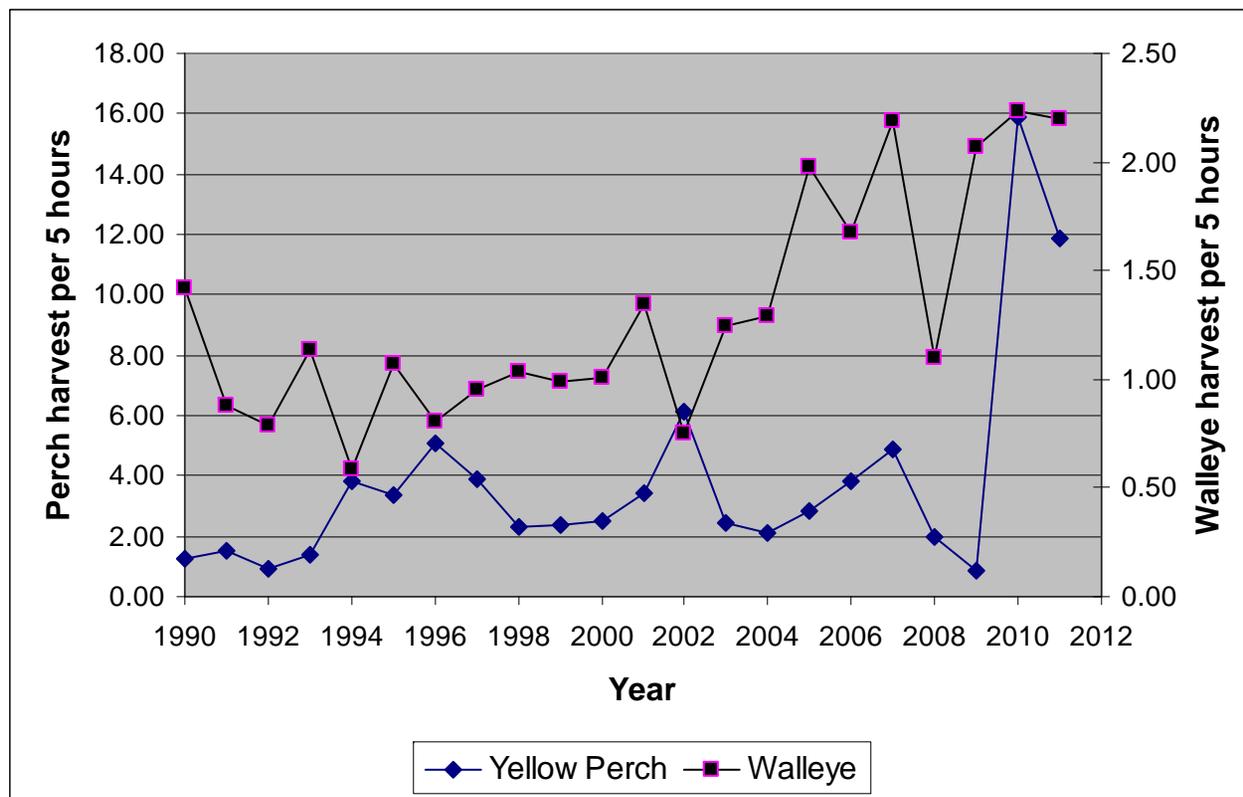


Figure 11.—Sea lamprey incidence (number attached per 100 fish) on Chinook salmon harvested by charter anglers on Lake Michigan and Lake Huron, 1990-2011.

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
2009	1.0	6.3
2010	0.7	4.5
2011	0.7	5.8

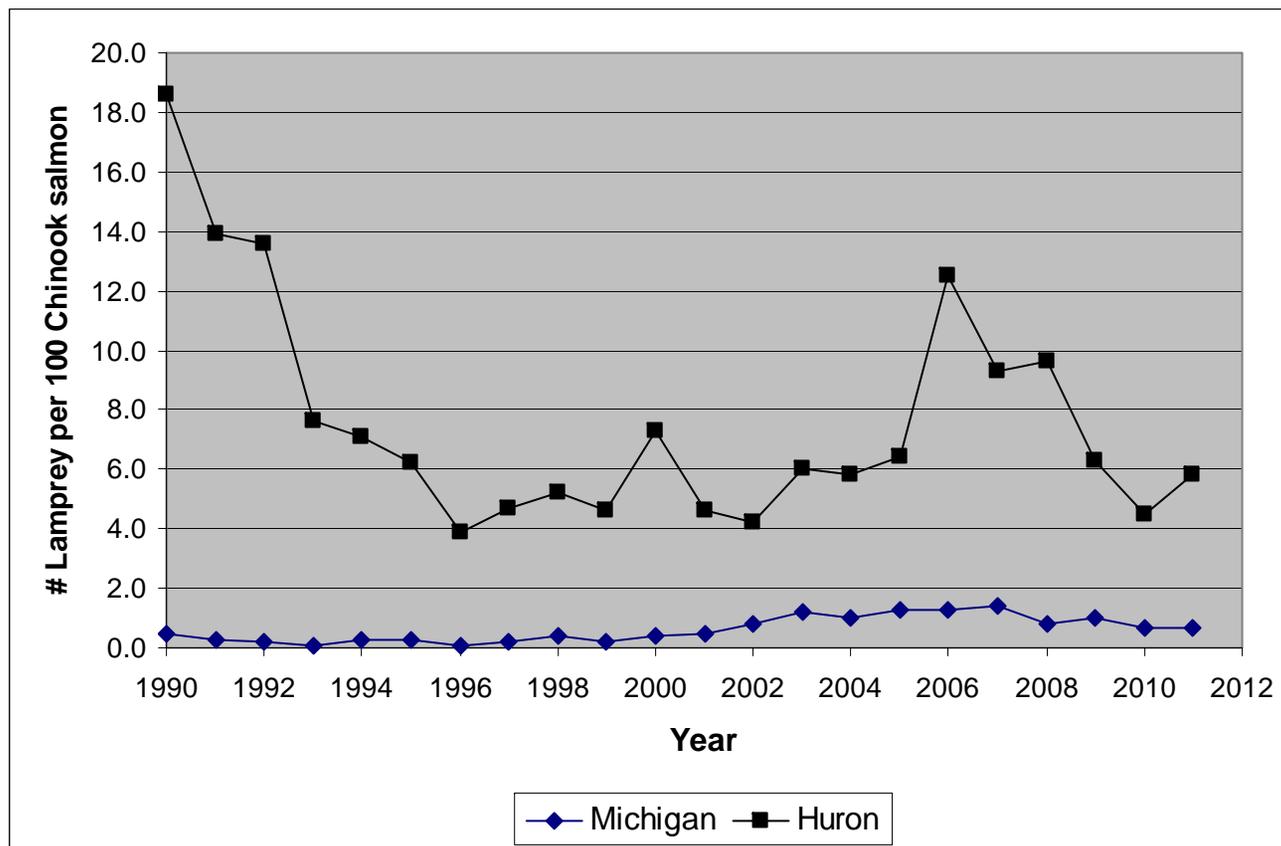


Figure 12.—Sea lamprey incidence (number attached per 100 fish) on lake trout harvested by charter anglers on Lakes Michigan, Huron, and Superior, 1990-2011.

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
2009	1.7	1.3	1.1
2010	1.3	1.6	0.9
2011	1.1	2.4	1.0

