

Charter Boat Catch and Effort from the Michigan Waters of the Great Lakes, 2012

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Introduction

The charter fishing industry provides Michigan with significant economic benefits. Economic impacts of charter fishing to coastal communities in Michigan included gross sales of at least \$14.9 million and 343,845 labor hours in 2009 (O'Keefe and Miller 2011). 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 2012 fishing season, there were 570 boats operated by 525 businesses; a number similar to the 573 charter boats reporting in 2011.

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 (DNR). 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 the DNR'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 DNR 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 consisting of two members each from DNR and MCBA developed the Michigan Charter Boat Daily Catch Report form (DNR 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 DNR 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. DNR 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 2012 reporting season, 32% of the operators (170) reporting for 184 boats were using the online system.

Charter operators are required by law to complete the paper version of the catch report form for each month they fish, or to use the alternate online reporting method. Regardless of method used, the completed monthly form is

to be submitted to the DNR 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, they 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 DNR 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 catch of major sport-fish.

The majority of charter businesses operate during late spring through early fall. If DNR 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, DNR 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, their name may be submitted to DNR 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 a 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 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 2012 fishing season, rate of compliance varied each month; when averaged over all reporting months, 71% 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 2012 was 1% less than 2011. In December 2012, 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 the same as in 2011.

Reporting delinquency rates at the time of the final notification had been consistently greater than 20 percent for numerous years. Charlevoix Fisheries Research Station personnel coordinated with DNR Law Enforcement Division to identify reasons for noncompliance. In January 2013, Charlevoix Fisheries Research Station personnel provided DNR Law Enforcement Division a list of delinquent reporters. Each operator on the list had not responded to the certified letter notification and had multiple months of reports missing for the 2012 reporting year. LED contacted each delinquent reporter on the list in person or via phone. While these actions took additional time to complete, the result was increased compliance for the 2012 season. By March 2013, 99% of all charter operators had complied with the law; this rate of compliance is 6% more than that observed in 2011

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 2012, charter anglers participated in 15,921 charter excursions on the Michigan waters of Lakes Michigan, Huron, Erie, Superior, and the St. Clair system, including major tributaries (Tables 1-6). From 2011 to 2012, there was a 13% increase in the number of total excursions. A part of the increase could be attributed to increased enforcement on non-reporters. However, charter excursions were up on all lakes and comments from numerous operators also indicated a good fishing season. Excursions on Lake Michigan increased 13%, from 10,834 (2011) to 12,236 (2012); excursions on Lake Huron increased 14%, from 1,399

(2011) to 1,594 (2012); Lake Superior excursions increased 8%, from 382 (2011) to 411 (2012); Lake Erie excursions increased 16%, from 698 (2011) to 813 (2012); and excursions on the St. Clair system increased 4%, from 831 (2011) to 867 (2012). The distribution of charter fishing excursions in 2012 by lake was: 77% Lake Michigan, 10% Lake Huron, 5% Lake Erie, 5% St. Clair System, and 3% Lake Superior. There were no changes in distribution of effort in comparison to 2011. Reported 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 363,143 hours were spent fishing by 64,567 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 11% and 12% respectively compared to 2011, corresponding with the 13% increase in excursions for 2012. Starting in 2008, some 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 2012. Based on charter operator's comments, windy weather continued to be reported as a reason for canceled excursions in 2012, similar to 2011 and 2010. 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 189,237 fish harvested from the Michigan waters of the Great Lakes and its major tributaries in 2012 (Tables 1-5); this is a 30% increase compared to 2011 total harvest (146,360). Most of these fish were harvested from Lake Michigan (67%), followed by Lake Erie (16%), Lake Huron (10%), the St. Clair system (6%), and Lake Superior (2%). In comparison to 2011, total harvest increased on

Lake Huron (1%), decreased 1% on both the St. Clair system and Lake Superior, and was unchanged on lakes Michigan and Erie.

Historically, the most abundant species in the charter harvest had 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 2012, Chinook salmon continued to dominate the species harvest and accounted for 47% of the total harvest (an 11% increase compared to 38% in 2011). The increase in Chinook salmon harvest resulted in less targeting of lake trout in locations where more than one salmonine can be the target species for the excursion. Lake trout accounted for 10% of total harvest in 2012, a decrease of 9% compared to 2011 (19%). Percent of total harvest for other species were as follows: walleye 14%, yellow perch 13%, rainbow trout 6%, coho salmon 6%, smallmouth bass 1%, and brown trout <1%. The "other" species category accounted for about 2% of the harvest. The species composition of this 'other' category is not fully known because DNR 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. Some operators provide comments on 'other' species they have caught. Some species listed included white bass, lake whitefish, Atlantic salmon, pink salmon, splake, carp, and freshwater drum. 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 88,943 Chinook salmon in 2012, which is a 59% increase relative to 2011 (55,904). Total harvest (all lakes combined) in 2012 increased for coho salmon, rainbow trout, brown trout, yellow perch; and walleye and smallmouth bass harvest was unchanged; and lake trout harvest decreased. Total harvest numbers in 2012 for species other than Chinook salmon were: 26,258 walleye, 24,769 yellow perch, 19,691 lake trout, 11,994 rainbow trout, 11,989 coho salmon, 2,142

smallmouth bass, and 550 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 2012 was 133,167, which is a 31% increase (31,306 fish) from 2011 harvest (101,861).

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 smallmouth bass and muskellunge were removed from the 'other' category and recorded separately. In 2012, charter anglers caught 15,973 smallmouth bass of which they released 13,831 and harvested 2,142. Catch of muskellunge was 1,281 and all but 3 were released. 10,026 total 'other' fish were caught, 2,898 were harvested and 7,128 released (Tables 1-5).

Harvest rates

In 2012, charter anglers harvested 0.52 fish (all species from all lakes combined) per hour; a 16% increase compared to 2011 (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 2012 targeted the various species of salmonines. Comparing targeted harvest rates (fish per 5 angler hours) to 2011 data, Lake Michigan

angler harvest rates increased for Chinook salmon, rainbow trout, and coho salmon. Brown trout harvest rates remained unchanged, while lake trout harvest rates decreased (Figures 3-7). The targeted harvest rate reported in 2012 for Chinook salmon in Lake Michigan (1.6 fish per 5 hours of angler fishing) is the highest in the 1990-2012 data series (Figure 3). Fishing effort for the 5 salmonines reported is combined into one target group. The increased harvest rate of Chinook salmon likely resulted in fewer lake trout being targeted, which is correlated to the decreased lake trout harvest rate.

Targeted harvest rates (fish per 5 angler hours) on Lake Huron in 2012 increased compared to 2011 for Chinook salmon, rainbow trout, lake trout, coho salmon, walleye; harvest rates were unchanged for brown trout (Figures 3-8). The harvest rate for walleye increased (2.87 fish per 5 angler hours) and remains high in relation to the 1990-2012 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 2011, the targeted harvest rate for lake trout decreased slightly from 1.65 to 1.61 fish per 5 hours; this is still the second highest harvest rate in the 23 year data series (Figure 4). The four remaining salmonids (Chinook salmon, coho salmon, rainbow trout, and brown trout) combined, make up a minor portion (9%) of the total Lake Superior salmonine harvest (4,300 fish) (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 2012. Targeted harvest rates for walleye (4.01 fish per 5 angler hours) increased (Figure 9) on Lake Erie for 2012, in comparison to 2011. Targeted harvest rates also increased for walleye (2.58 fish per 5 angler hours) on the St. Clair system in 2012, compared to 2011 (Figure 10). Changes in 2010 reporting requirements

included recording the target species (or fish group) for each fishing trip, allowing for more accurate reporting of harvest rates for walleye and yellow perch. 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 23.1 fish per 5 angler hours in 2012 (Figure 9). A similar increase is evident for the St. Clair System in 2010; the targeted harvest rate was 15.06 fish per 5 angler hours in 2012 (Figures 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. In 2012, catch rates on the St. Clair system for smallmouth bass and musky were 36.0 and 6.6 fish per excursion, respectively (Table 4). Targeted catch rates for smallmouth bass per excursion were 38.6 fish on Lake Erie, 28.7 fish on Lake Michigan, and 29.8 fish on Lake Huron (Tables 1-3).

Sea Lamprey Incidence

For 2012, sea lamprey incidence on Chinook salmon decreased in Lake Huron and remained the same for Lake Michigan, compared to 2011 levels. Lake Huron incidence was 5.1 lampreys attached per 100 Chinook salmon and Lake Michigan incidence was 0.7 lampreys attached per 100 Chinook salmon (Figure 11).

Sea lamprey incidence on lake trout increased on lakes Michigan and Superior but decreased on Lake Huron. The occurrence of lamprey on lake trout in Lake Superior (1.6 lamprey/100 lake trout) increased compared to 1.0 lamprey/100 lake trout in 2011 (Figure 12).

Online Information

Previous annual reports and information on charter fishing effort and harvest at individual fishing ports can be found on the DNR website <http://www.michigan.gov/dnr>. Click on the following links to find the data: ‘Fishing’ link, then ‘Managing Michigan’s Fisheries’, then the ‘Charter Fishing’ link.

Acknowledgments

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References

O’Keefe, D. M., and S. R. Miller. 2011. 2009 Michigan Charter Fishing Study. Michigan Sea Grant MICHU-11. Available: <http://www.miseagrant.umich.edu/downloads/fisheries/11-200-Michigan-Charter-Fishing-Study.pdf> (October 2013)

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 select tributaries, 2012. 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
0.042	0.979	Coho salmon	0	0	164	847	2,757	1,470	1,698	3,264	1,308	47	0	0	11,555	11,555
0.043	0.992	released	0	0	2	22	40	9	3	42	26	12	0	0	156	156
0.320	7.404	Chinook salmon	0	0	30	2,127	8,267	8,019	26,140	34,506	7,964	342	0	0	87,395	87,406
0.322	7.466	released	0	0	0	9	141	51	95	64	155	218	0	0	733	734
0.040	0.921	Rainbow trout	107	243	218	116	410	2,002	4,105	1,852	512	491	603	217	10,876	10,931
0.042	0.983	released	10	62	141	68	4	35	20	21	26	240	79	26	732	734
0.002	0.040	Brown trout	0	0	96	49	35	45	127	99	18	4	2	1	476	477
0.003	0.059	released	0	0	24	17	3	114	26	4	5	5	26	2	226	226
0.043	1.002	Lake trout	0	0	45	228	1,566	2,118	3,916	3,270	659	19	2	0	11,823	11,830
0.053	1.228	released	0	0	1	10	157	692	1,135	589	88	6	0	0	2,678	2,704
2.722	52.571	Yellow perch	0	0	0	0	96	1,016	1,424	767	377	0	0	0	3,680	3,813
2.829	54.643	released	0	0	0	0	0	0	20	100	25	0	0	0	145	165
0.321	5.531	Walleye	27	33	3	4	206	48	121	249	296	10	25	51	1,073	1,120
0.537	9.263	released	77	188	36	0	89	88	96	69	50	4	3	24	724	738
0.017	0.252	Smallmouth Bass	0	0	0	0	0	0	1	0	26	0	0	0	27	51
1.934	28.692	released	0	0	0	0	437	1,218	903	377	91	17	0	0	3,043	3,183
		Musky	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
0.113	1.426	Other	0	0	3	0	0	84	0	0	0	0	0	0	87	246
0.326	4.098	released	0	0	3	0	0	40	120	0	0	0	0	0	163	256
		Lamprey on:														
		Chinook salmon	0	0	0	13	64	64	221	236	32	0	0	0	630	631
		Lake trout	0	0	4	0	23	29	77	40	7	0	0	0	180	180
		Total angler hours	684	1,434	2,129	5,799	26,403	32,824	72,130	99,857	29,988	4,448	3,391	1,424		280,511
		Total anglers	92	198	291	1,000	4,465	5,848	13,399	18,234	5,492	682	478	205		50,384
		Total excursions	33	66	98	247	1,023	1,430	3,159	4,313	1,413	228	163	63		12,236

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 select tributaries, 2012. 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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			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Harvest/year released/year	(target+non-target) Harvest/year released/year
0.012	0.221	Coho salmon	0	0	0	14	30	24	40	51	33	6	0	0	198	201
0.012	0.222	released	0	0	0	1	0	0	0	0	0	0	0	0	1	1
0.091	1.668	Chinook salmon	0	0	0	0	24	229	608	453	171	8	0	0	1,493	1,498
0.095	1.737	released	0	0	0	0	0	0	13	17	30	2	0	0	62	62
0.058	1.065	Rainbow trout	0	0	59	5	66	149	279	273	104	18	0	0	953	954
0.062	1.127	released	0	0	0	0	30	2	7	9	7	1	0	0	56	56
0.004	0.070	Brown trout	0	0	0	2	12	17	20	5	7	0	0	0	63	66
0.004	0.082	released	0	0	0	0	10	0	0	0	0	0	0	0	10	10
0.241	4.409	Lake trout	0	0	0	0	265	754	1,440	1,240	240	7	0	0	3,946	3,946
0.258	4.727	released	0	0	0	0	22	39	111	80	26	7	0	0	285	285
1.672	35.650	Yellow perch	0	0	0	106	180	69	73	455	422	121	0	0	1,426	1,854
1.862	39.700	released	0	0	0	0	6	0	40	82	34	0	0	0	162	212
0.573	12.313	Walleye	0	0	0	29	986	3,797	2,816	351	7	32	35	0	8,053	8,151
0.942	20.257	released	0	0	0	0	808	3,312	888	132	47	5	3	0	5,195	5,206
0.345	5.000	Smallmouth Bass	0	0	0	0	0	20	0	0	0	0	0	0	20	138
2.052	29.750	released	0	0	0	0	0	99	0	0	0	0	0	0	99	483
		Musky	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		released	0	0	0	0	0	0	0	0	0	0	0	0	0	9
1.278	23.000	Other	0	0	0	0	0	23	0	0	0	0	0	0	23	1,459
1.278	23.000	released	0	0	0	0	0	0	0	0	0	0	0	0	0	1,023
		Lamprey on:														
		Chinook salmon	0	0	0	0	7	18	34	15	1	2	0	0	77	77
		Lake trout	0	0	0	0	7	8	19	10	1	1	0	0	46	46
		Total angler hours	0	0	148	206	2,782	9,108	10,934	5,933	1,882	315	84	0		31,392
		Total anglers	0	0	21	39	488	1,591	2,017	1,130	344	54	13	0		5,697
		Total excursions	0	0	11	15	145	434	545	314	110	15	5	0		1,594

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, 2012. 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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		Coho salmon <i>released</i>	0 0	0 0												
		Chinook salmon <i>released</i>	0 0	0 0												
		Rainbow trout <i>released</i>	0 0	2 0												
		Brown trout <i>released</i>	0 0	0 0												
		Lake trout <i>released</i>	0 0	0 0												
4.620	110.727	Yellow perch	0	0	0	0	1,142	296	2,686	3,988	4,202	1,859	0	0	14,173	16,317
4.803	115.133	<i>released</i>	0	0	0	0	20	0	87	285	107	65	0	0	564	599
0.801	18.985	Walleye	0	0	31	515	2,093	7,499	2,452	143	45	2	30	5	12,815	12,905
0.890	21.090	<i>released</i>	0	0	0	90	320	840	147	8	0	0	16	0	1,421	1,455
0.000	0.000	Smallmouth Bass	0	0	0	0	0	0	0	0	0	0	0	0	0	36
2.711	38.556	<i>released</i>	0	0	0	0	0	0	0	0	27	86	234	0	347	383
0.000	0.000	Musky	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.000	0.000	<i>released</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	11
6.250	100.000	Other	0	0	0	0	0	0	100	0	0	0	0	0	100	910
6.250	100.000	<i>released</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	3,849
		Lamprey on:														
		Chinook salmon	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	2
		Total angler hours	0	0	63	746	3,441	8,674	3,548	1,102	1,097	410	114	12		19,207
		Total anglers	0	0	16	135	615	1,689	681	202	211	72	17	2		3,640
		Total excursions	0	0	4	38	143	362	150	43	46	18	8	1		813

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 the St. Clair System (Lake St. Clair, St. Clair River, and Detroit River), 2012. 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			
		Coho salmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		<i>released</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	
		Chinook salmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		<i>released</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	
		Rainbow trout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		<i>released</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	
		Brown trout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		<i>released</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	
		Lake trout	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		<i>released</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	
3.011	69.061	Yellow perch	0	0	0	0	0	0	423	0	971	796	89	0	2,279	2,785			
4.099	94.030	<i>released</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>313</i>	<i>467</i>	<i>44</i>	<i>0</i>	<i>824</i>	<i>869</i>			
0.516	11.703	Walleye	0	0	148	1,801	691	490	616	202	5	0	61	0	4,014	4,081			
0.559	12.697	<i>released</i>	<i>0</i>	<i>0</i>	<i>8</i>	<i>265</i>	<i>64</i>	<i>0</i>	<i>0</i>	<i>4</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>341</i>	<i>368</i>			
0.260	5.100	Smallmouth Bass	0	0	0	0	15	181	454	697	188	0	0	0	1,535	1,917			
1.834	36.027	<i>released</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>2,687</i>	<i>2,395</i>	<i>1,501</i>	<i>1,231</i>	<i>906</i>	<i>589</i>	<i>0</i>	<i>0</i>	<i>9,309</i>	<i>9,780</i>			
0.000	0.011	Musky	0	0	0	0	0	1	0	0	0	1	0	0	2	2			
0.238	6.612	<i>released</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>403</i>	<i>296</i>	<i>163</i>	<i>176</i>	<i>97</i>	<i>40</i>	<i>0</i>	<i>1,175</i>	<i>1,258</i>			
0.392	7.833	Other	0	0	0	0	94	0	0	0	0	0	0	0	94	262			
4.575	91.500	<i>released</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>400</i>	<i>593</i>	<i>0</i>	<i>0</i>	<i>6</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>1,004</i>	<i>1,867</i>			
		Lamprey on:																	
		Chinook salmon	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	
		Total angler hours	0	0	183	3,699	2,554	3,572	3,559	2,639	2,108	1,011	314	0		19,639			
		Total anglers	0	0	33	609	391	555	550	424	312	159	47	0		3,080			
		Total excursions	0	0	10	152	121	162	159	118	87	46	12	0		867			

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, 2012. 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
0.019	0.590	Coho salmon	0	0	0	0	1	46	81	81	24	0	0	0	233	233
0.020	0.630	released	0	0	0	1	5	2	0	8	0	0	0	0	16	16
0.003	0.099	Chinook salmon	0	0	0	2	2	4	15	12	4	0	0	0	39	39
0.004	0.122	released	0	0	0	3	2	4	0	0	0	0	0	0	9	9
0.009	0.268	Rainbow trout	0	0	0	0	0	20	41	34	11	0	0	0	106	106
0.009	0.286	released	0	0	0	0	5	0	1	1	0	0	0	0	7	7
0.001	0.018	Brown trout	0	0	0	0	0	5	0	2	0	0	0	0	7	7
0.001	0.020	released	0	0	0	1	0	0	0	0	0	0	0	0	1	1
0.322	9.911	Lake trout	0	0	0	0	182	936	1,343	1,183	271	0	0	0	3,915	3,915
0.352	10.838	released	0	0	0	23	50	66	114	100	10	3	0	0	366	366
		Yellow perch	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	Walleye	0	0	0	0	0	0	0	0	0	0	0	0	0	1
0.406	7.300	released	0	0	0	0	68	5	0	0	0	0	0	0	73	73
0.000	0.000	Smallmouth Bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.095	0.667	released	0	0	0	0	0	0	2	0	0	0	0	0	2	2
		Musky	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
0.235	2.667	Other	0	0	0	0	6	2	0	0	0	0	0	0	8	21
0.235	2.667	released	0	0	0	0	0	0	0	0	0	0	0	0	0	133
		Lamprey on:														
		Chinook salmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Lake trout	0	0	0	5	7	9	19	21	2	0	0	0	63	63
Total angler hours			0	0	0	130	620	2,926	4,294	3,611	760	53	0	0		12,394
Total anglers			0	0	0	18	92	403	610	521	115	7	0	0		1,766
Total charter excursions			0	0	0	8	31	91	134	118	27	2	0	0		411

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 2004-2012.

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	2012
Michigan	11,224	11,924	12,094	11,966	12,526	12,064	12,704	11,326	9,750	10,204	10,834	12,236
Huron	2,867	2,874	2,771	2,622	2,085	1,765	1,537	1,345	1,470	1,446	1,399	1,594
Erie	1,947	1,870	1,695	718	694	1,554	1,039	870	689	738	698	813
St. Clair System	433	246	466	339	319	366	493	440	425	719	831	867
Superior	477	430	505	455	479	398	359	245	244	374	382	411
Total	16,948	17,344	17,531	16,100	16,103	16,147	16,132	14,226	12,578	13,481	14,144	15,921

Figure 1.—Total number of charter anglers (trips) on the Michigan waters of the Great Lakes (including tributaries), 1990-2012.

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
2012	64,567

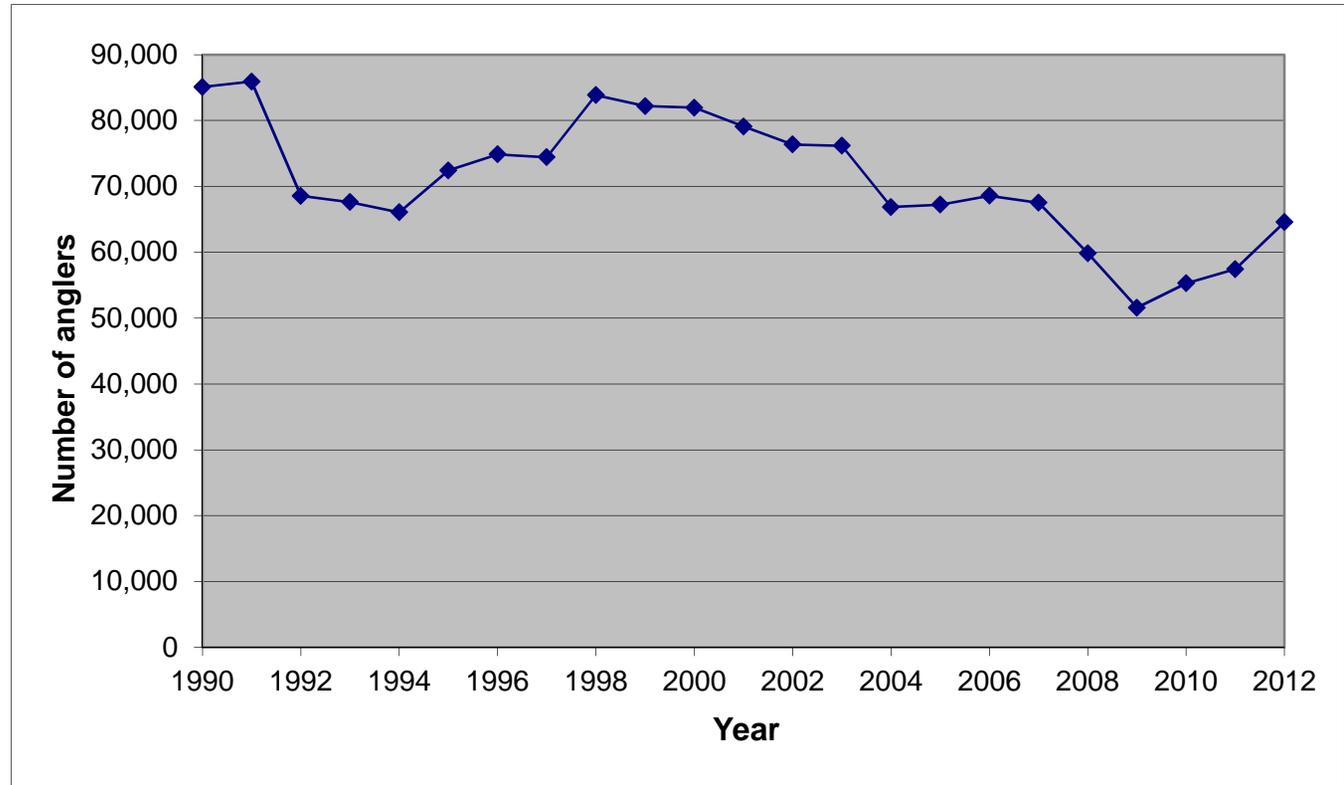


Figure 2(a).—Total number of charter anglers (trips) on the Michigan waters of Lake Michigan and Lake Huron (including tributaries), 1990-2012.

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
2012	50,384	5,697

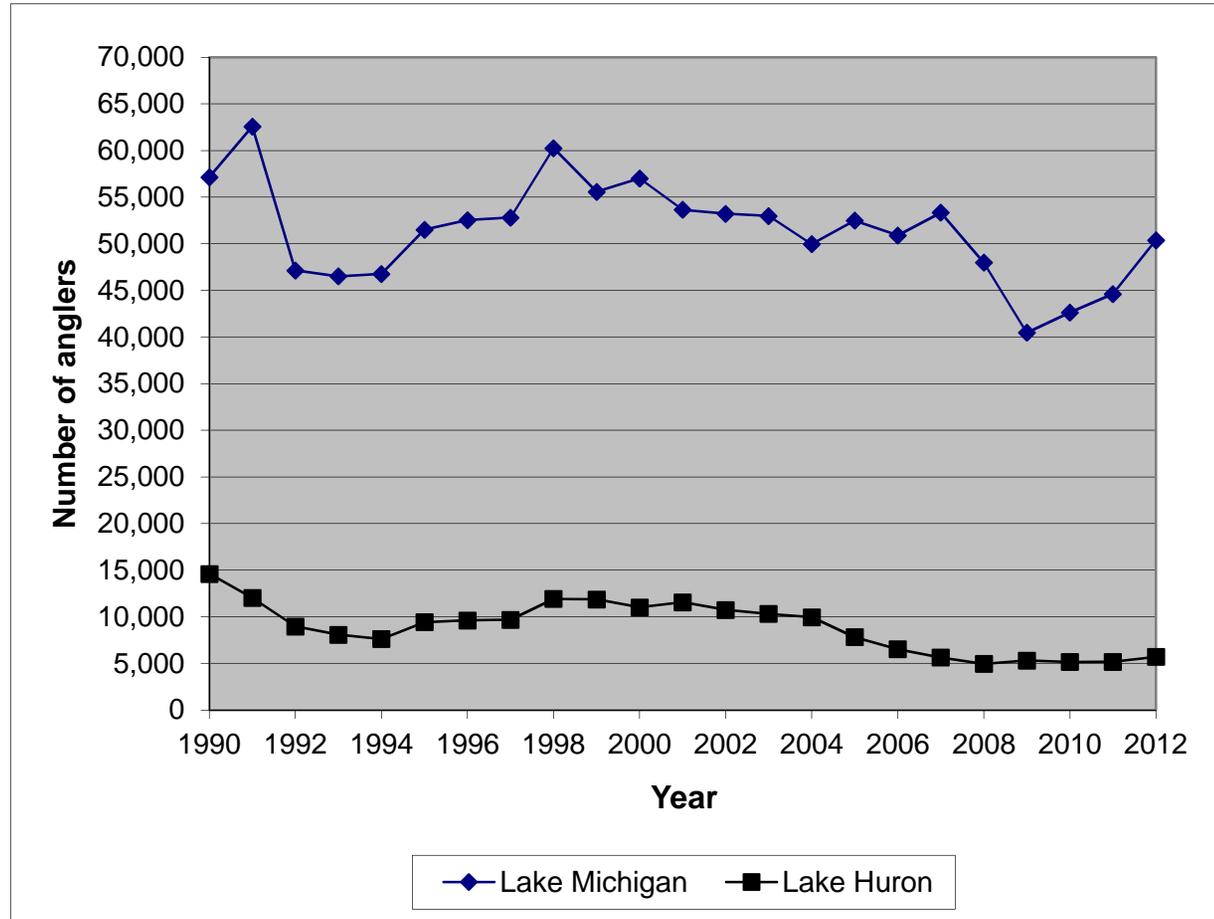


Figure 2 (b).—Total number of charter anglers (trips) on the Michigan waters of Lake Erie, Superior, and the St. Clair System (including tributaries), 1990-2012.

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
2012	3,640	1,766	3,080

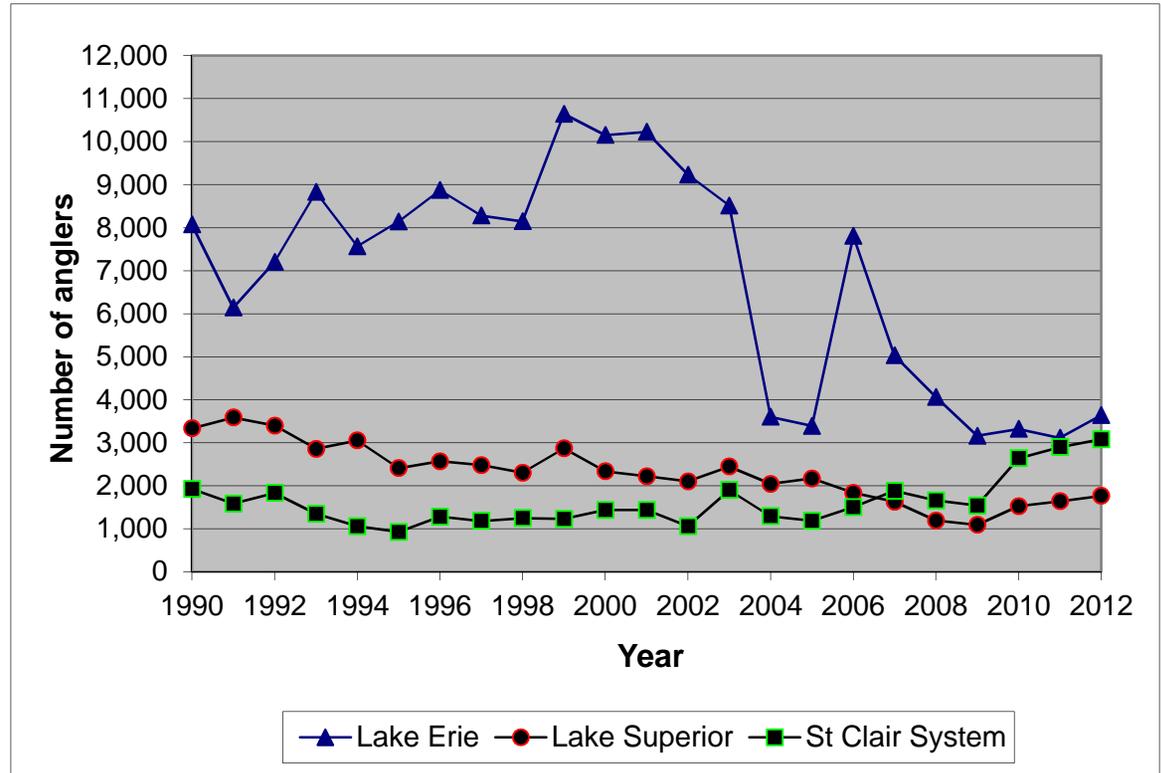


Figure 3. - Charter angler targeted harvest rates (fish per 5 angler hours) for Chinook salmon on Lake Michigan and Lake Huron, 1990-2012.

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
2012	1.60	0.46

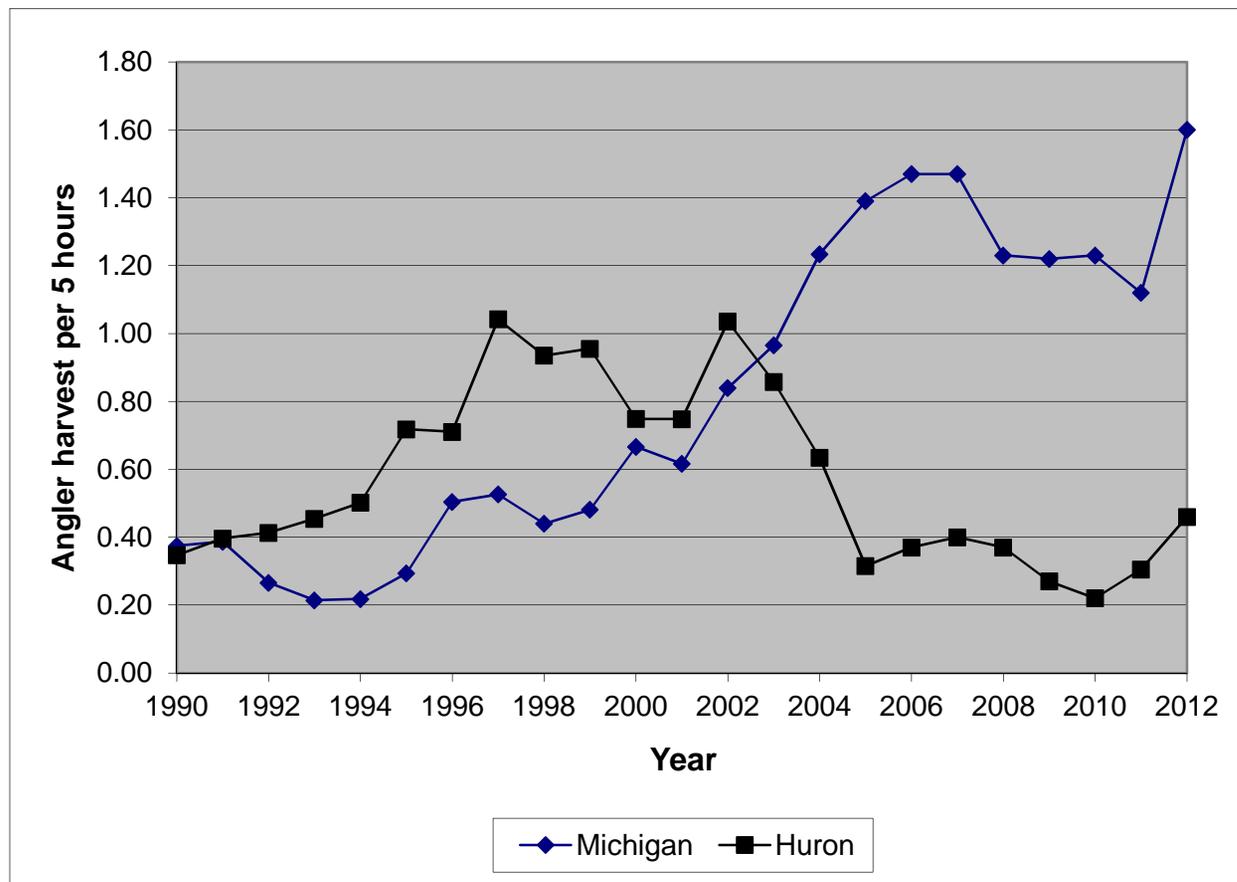


Figure 4.—Charter angler targeted harvest rates (fish per 5 angler hours) for lake trout on Lake Michigan, Huron, and Superior, 1990-2012.

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
2012	0.22	1.21	1.61

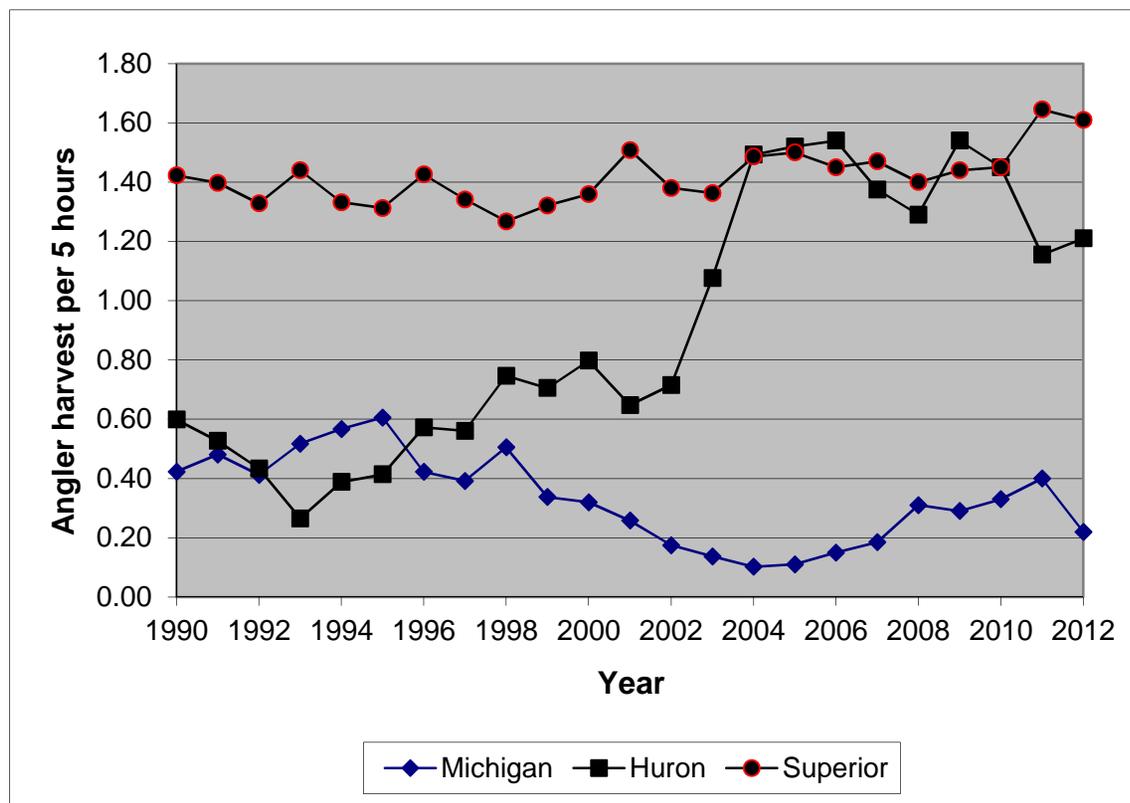


Figure 5.—Charter angler targeted harvest rates (fish per 5 angler hours) for coho salmon on Lake Michigan, Huron, and Superior, 1990-2012.

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
2012	0.21	0.06	0.10

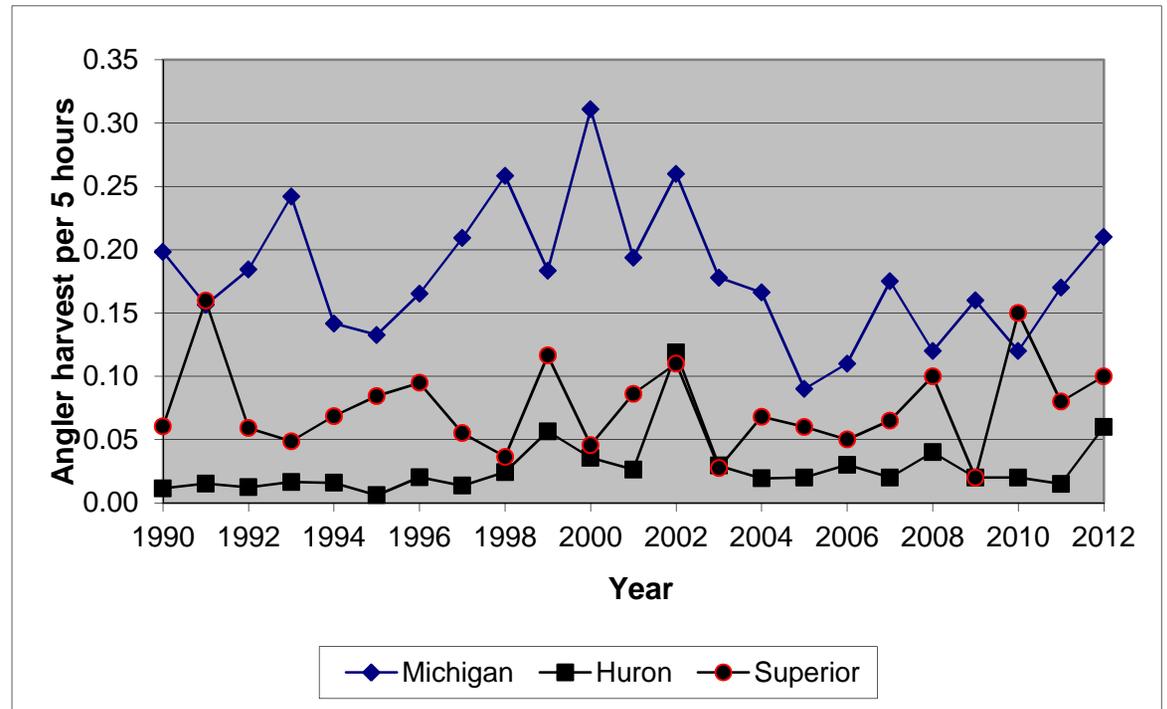


Figure 6.—Charter angler targeted harvest rates (fish per 5 angler hours) for rainbow trout (steelhead) on Lake Michigan and Lake Huron, 1990-2012.

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
2012	0.20	0.29

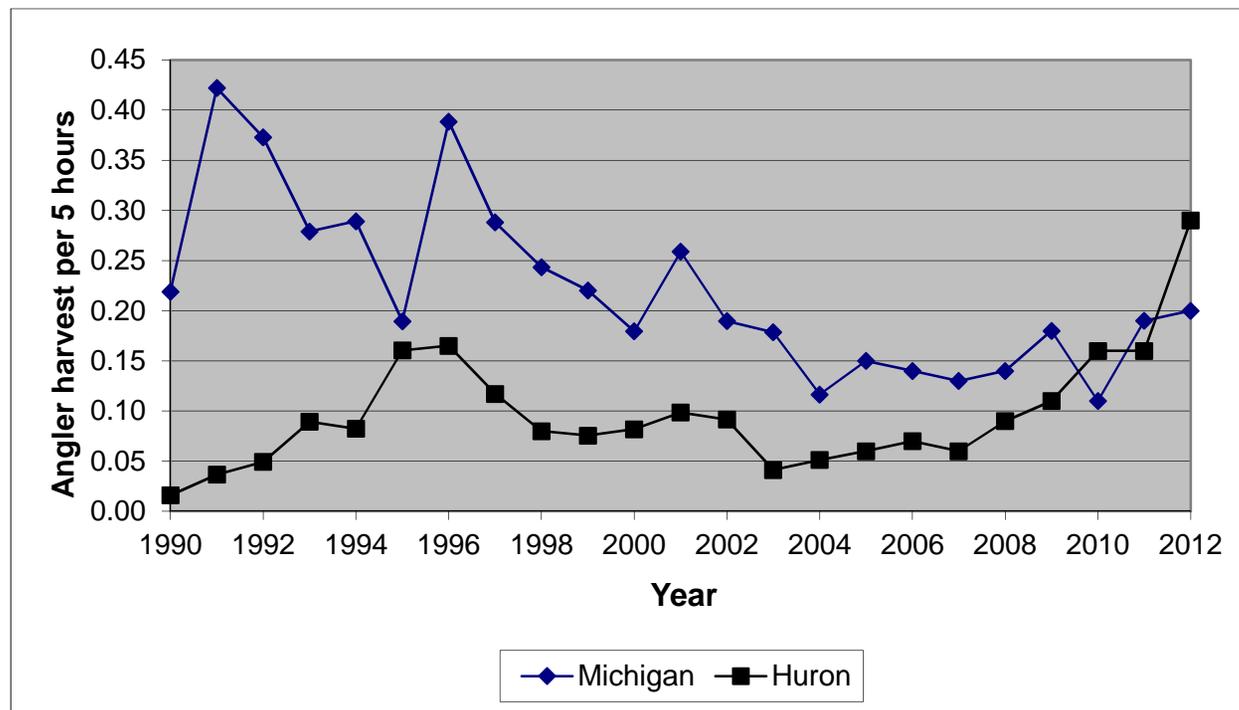


Figure 7.—Charter angler targeted harvest rates (fish per 5 angler hours) for brown trout on Lake Michigan and Lake Huron, 1990-2012.

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
2012	0.01	0.02

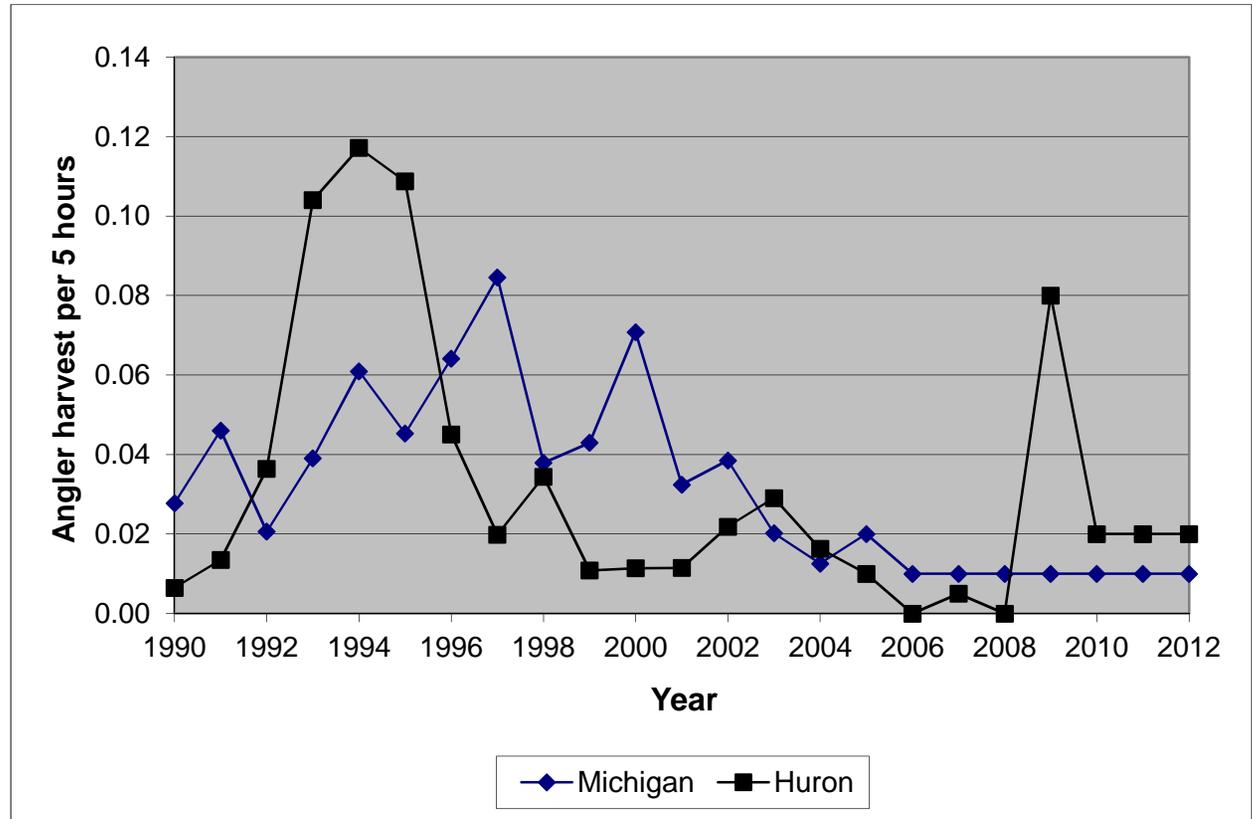


Figure 8.—Charter angler targeted harvest rates (fish per 5 angler hours) for walleye on Lake Huron, 1990-2012.

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
2012	2.87

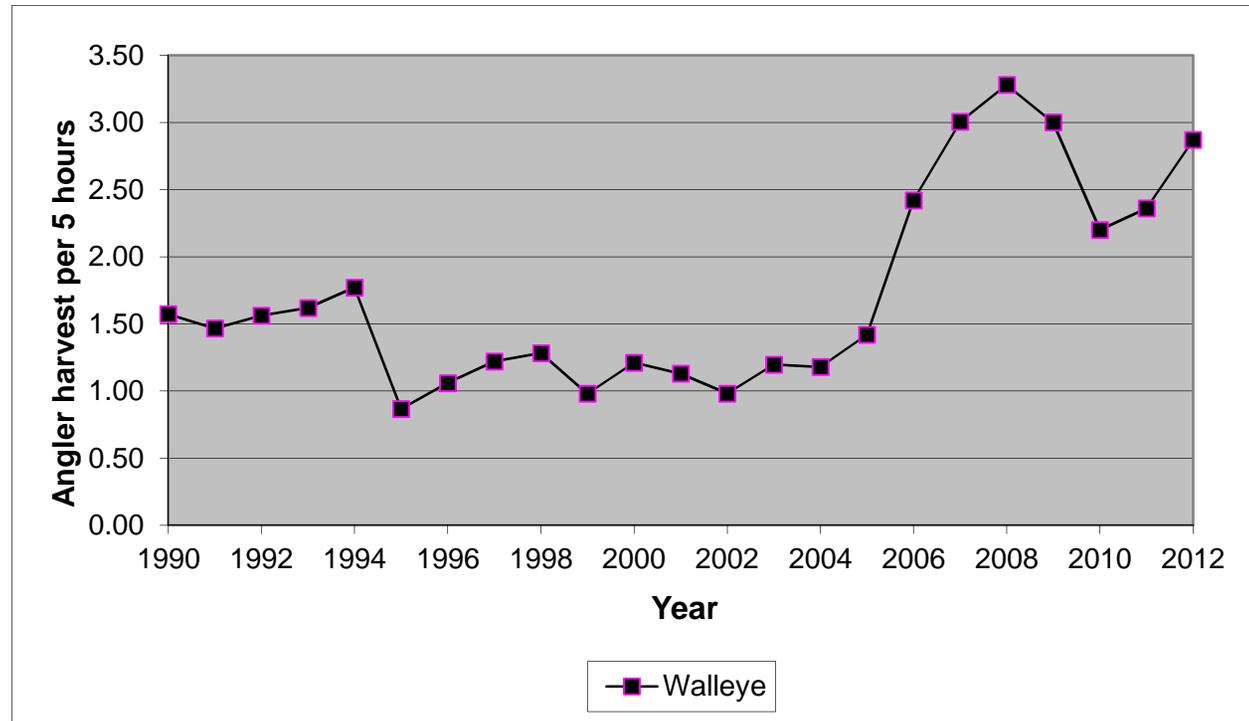


Figure 9.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on Lake Erie, 1990-2012.

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
2012	23.1	4.01

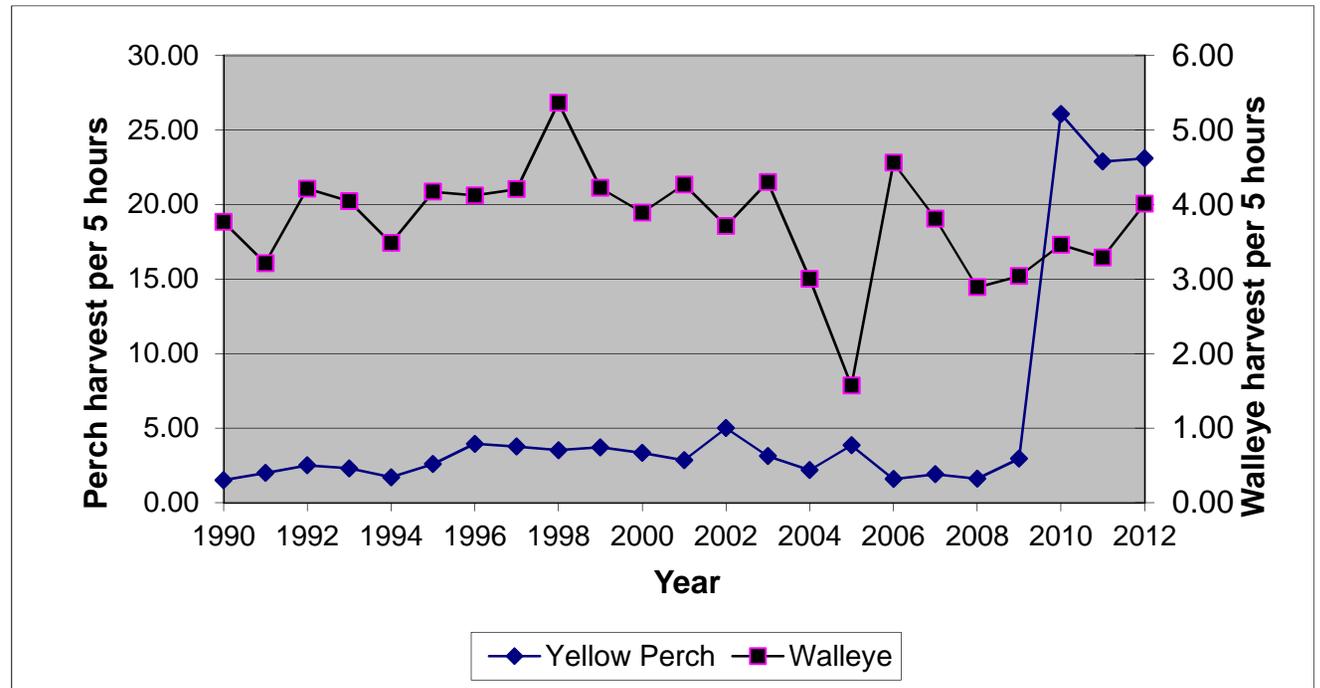


Figure 10.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on the St. Clair system, 1990-2012.

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
2012	15.06	2.58

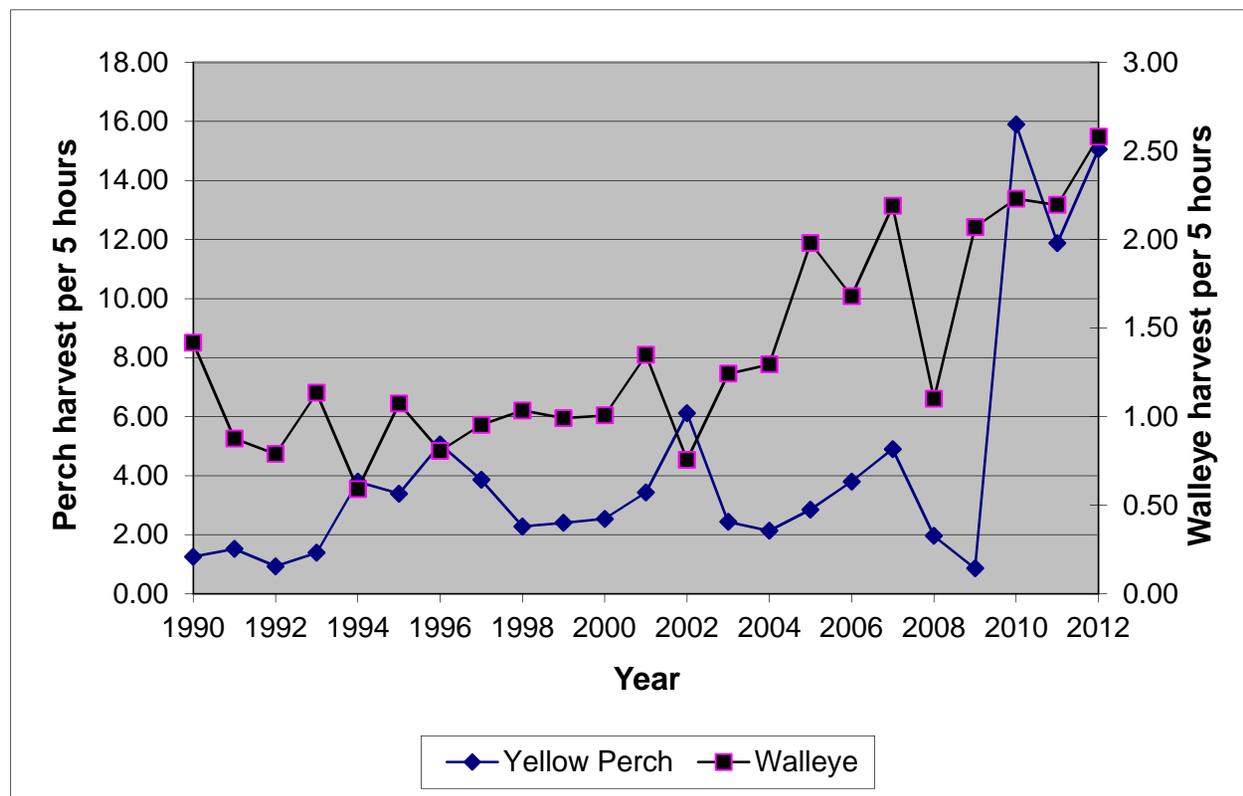


Figure 11.—Sea lamprey incidence (number attached per 100 fish) on Chinook salmon harvested by charter anglers on Lake Michigan and Lake Huron, 1990-2012.

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
2012	0.7	5.1

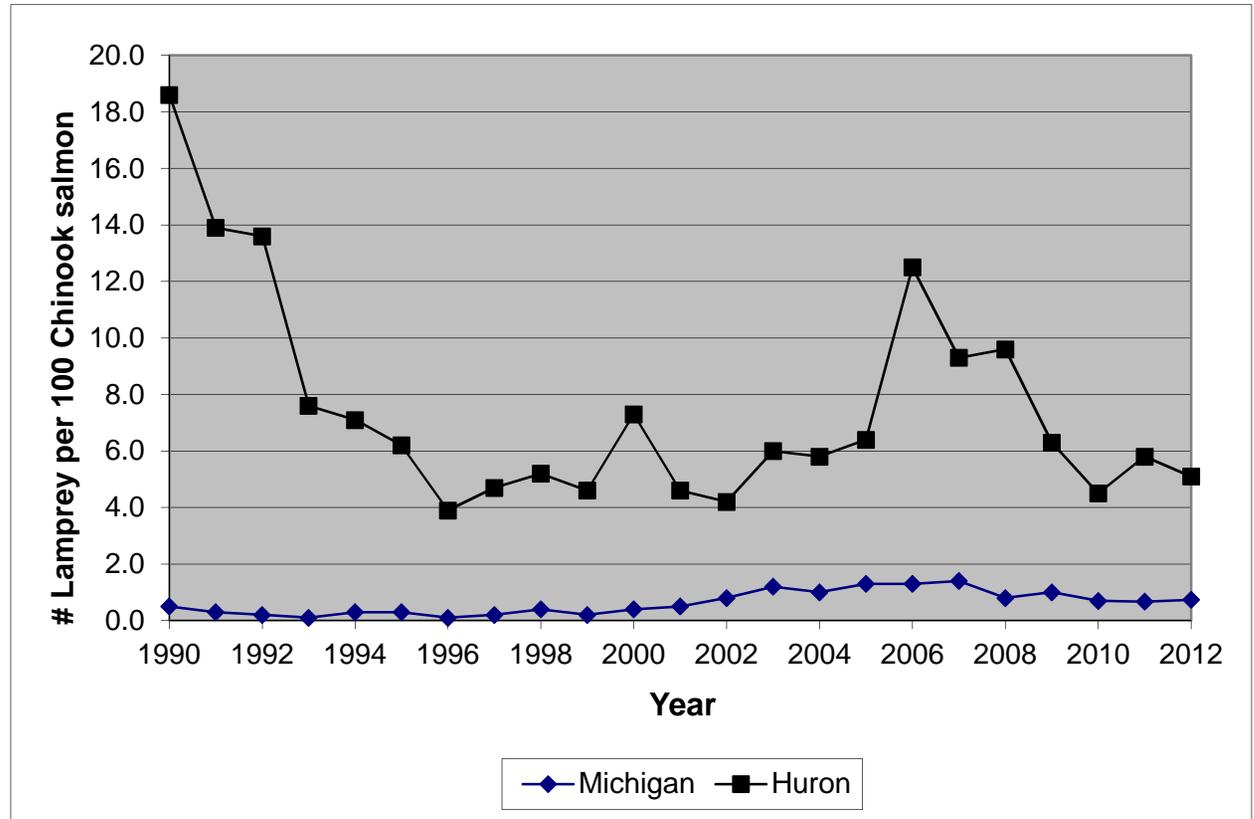


Figure 12.—Sea lamprey incidence (number attached per 100 fish) on lake trout harvested by charter anglers on Lake Michigan, Huron, and Superior, 1990-2012.

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
2012	1.6	1.2	1.6

