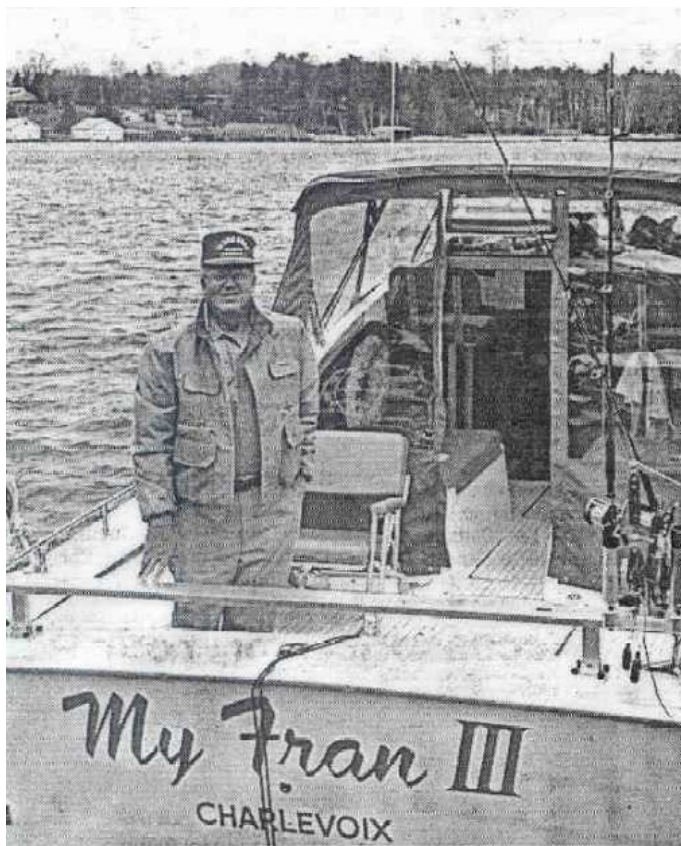
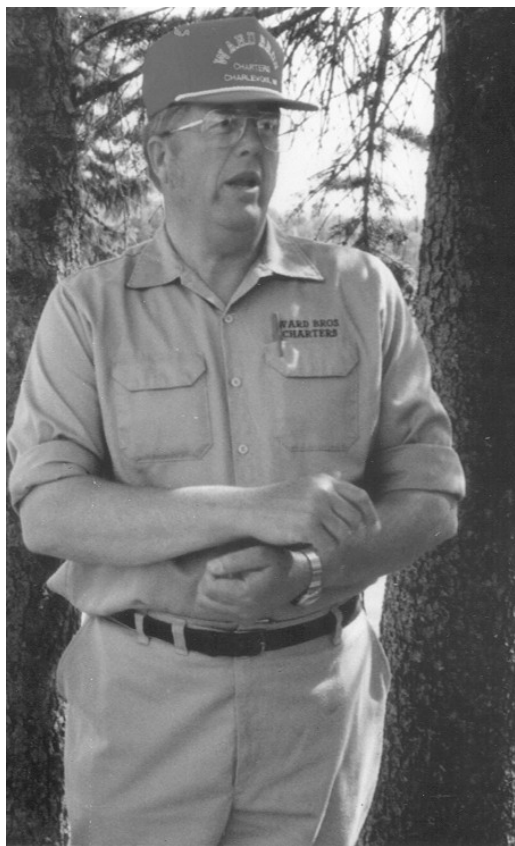


# Charter Boat Effort and Fish Harvest from the Michigan Waters of the Great Lakes, 2007

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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 2007, there were 579 operators.

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 every 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 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 will be an option for charter operators to use, but will not be mandatory.

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/or received a certificate of inspection for a fishing vessel, and (3) individuals who applied for and/or received a Sport Trolling License.

Charter operators are required by law to complete the catch report form each time they fish. The completed form is to be mailed 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 form for each boat and each lake fished. The report form requires the following information regardless of fishing success: 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 + nonresident 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 within the requested time of the notice, 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 2007 fishing season, an average of 64% 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 2007 was 9% less than in 2006 and 12% less than 2005. The continued decrease in compliance may be partially attributable to the reduced number of postcard reminder notices sent to operators during the year. In December 2007, at the time of sending final notification letters for one or more delinquent reports, 85% of the operators were in compliance; 3% less compliance than 2006 and 2% less than 2005. By January 2008, 95% of all charter operators had complied with the law; this is 3% greater than 2006 and comparable to 2005.

### *Reporting of results*

Starting with the 2004 charter fishing harvest and effort data, results are inclusive of any month of the year 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 2007, charter anglers participated in 16,132 charter excursions on the Michigan waters of Lakes Michigan, Huron, Erie, Superior, and the St. Clair system, including major tributaries (Tables 1-6). From 2006 to 2007, there was virtually no change in the number of total excursions; the number of excursions on Lakes Michigan and St. Clair increased while excursions on Lakes Superior, Huron, and Erie decreased (Table 6). Lake Erie had the largest negative percent change in number of excursions (-33%), decreasing to 1,039 (2007) from 1554 (2006). The St. Clair System had the largest positive percent change (+35%) in number of excursions, increasing to 493 (2007) from 366 (2006). The distribution of charter fishing excursions in 2007 by lake was:

79% Lake Michigan, 10% Lake Huron, 6% Lake Erie, 3% St. Clair System, and 2% Lake Superior.

A total of 373,209 hours were spent fishing by 67,513 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 2% compared to 2006. 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 187,178 fish harvested from the Michigan waters of the Great Lakes and its major tributaries in 2007 (Tables 1-5); this is a 1% decrease compared to 2006 total harvest (191,103). Most of these fish were harvested from Lake Michigan (65%), followed by Lake Erie (16%), the St. Clair system (9%), Lake Huron (8%), and Lake Superior (2%). In comparison to 2006 total harvest, Lake Michigan harvest increased 6%, and harvest from the St. Clair system increased 3%, while Lake Erie harvest decreased 8%. Harvest from Lakes Huron and Superior were unchanged.

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 2007, Chinook salmon accounted for 46% of the total harvest. Percent of total harvest for other species was as follows: walleye 17%, yellow perch 15%, lake trout 11%, coho salmon 6%, rainbow trout 4%, and brown trout <1%. The "other" species category accounted for 2% 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 86,523 Chinook salmon in 2007, which is a 3% increase relative to 2006. Total harvest (all lakes combined) in 2007 increased for yellow perch, coho salmon, rainbow trout, and brown trout, whereas walleye and lake trout harvest decreased. Harvest numbers for these species in 2007 were: 31,004 walleye, 27,358 yellow perch, 20,258 lake trout, 10,397 coho salmon, 8,005 rainbow trout, and 621 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 2007 was 125,804 which is a 5% increase (5,718 fish) from 2006.

#### *Harvest rates*

In 2007, charter anglers harvested 0.5 fish (all species from all lakes combined) per hour; the same as for 2006. 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 2007 targeted the various species of salmonines. Comparing targeted harvest rates (fish per 5 angler hours) to 2006 data, Lake Michigan angler harvest rates increased for lake trout,

coho salmon, and yellow perch. Chinook salmon and brown trout harvest rates remained unchanged, while rainbow trout harvest rates decreased slightly (Figures 3-8). The targeted harvest rate reported in 2007 for Chinook salmon in Lake Michigan (1.47 fish per 5 hours of angler fishing) was unchanged from 2006; equaling the highest rate recorded in the 1990-2007 data series (Figure 3).

Targeted harvest rates of fish per 5 angler hours for Lake Huron in 2007 increased compared to 2006 for Chinook salmon, brown trout, and walleye while rates decreased for lake trout, coho salmon, rainbow trout, and yellow perch (Figures 3-7 and Figure 9). The harvest rate for walleye (3.01 fish per 5 angler hours) increased to the highest rate observed in Lake Huron during the 1990-2007 data series (Figure 9).

Lake trout continues to be the most important salmonine in the charter harvest from Lake Superior. Targeted harvest rates for lake trout and coho salmon in Lake Superior during 2007 increased (compared to 2006; Figures 4-5). 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 for 2007. Targeted harvest rates for walleye (3.81 fish per 5 angler hours) and fishing effort (5,031 anglers) decreased in Lake Erie for 2007 in comparison to 2006 (Figures 2b and 10). Conversely, yellow perch harvest rates (1.91 fish per 5 angler hours) increased (Figure 10). Targeted harvest rates for walleye (2.19 fish per 5 angler hours) increased on the St. Clair system in 2007 to the highest rate in the 1990-2007 data series. Rates for yellow perch continued the recent upward trend (Figure 11).

### *Sea Lamprey Incidence*

For 2007, sea lamprey incidence on Chinook salmon increased slightly in Lake Michigan, compared to 2006 levels. While Lake Huron's incidence of 9.3 lampreys per 100 fish is less than 2006 levels of 12.5, lamprey incidence remains higher than levels observed in years 1993-2005 (Figure 12).

Sea lamprey incidence on lake trout decreased on Lake Michigan but increased on Lake Huron. The occurrence of lamprey on lake trout in Lake Superior (1.6 lamprey/100 fish) was approximately one-half the incidence in 2006 (3.0 lamprey/100 fish) (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 'Charter Fishing'.

### **Acknowledgments**

The authors thank the Michigan Charter Boat Association for their support throughout the season; and Cheryl Benson (Fisheries Division, Lansing), who entered the fishing trip data into the computer database; and Catherine Sullivan (Fisheries Division, Charlevoix), who assisted with mailings and other associated tasks.

### **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.

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, 2007.

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	0.034	0.799	0	0	1	490	2,237	512	1,504	4,235	1,107	54	13	0	10,153
Chinook salmon	0.287	6.662	6	0	0	208	5,219	4,699	20,389	42,079	11,696	335	5	0	84,636
Rainbow trout	0.026	0.602	79	153	217	172	1,320	1,337	2,063	1,459	309	181	316	45	7,651
Brown trout	0.002	0.047	0	0	4	97	172	53	135	97	30	4	0	0	592
Lake trout	0.036	0.828	0	0	0	15	1,359	2,415	3,523	2,647	541	4	9	3	10,516
Yellow perch	0.023	0.530	0	0	0	107	110	2,230	1,981	1,437	759	93	10	0	6,727
Walleye	0.006	0.140	11	132	32	4	272	287	111	224	170	333	177	25	1,778
Other	0.000	0.011	0	0	7	2	19	23	18	46	3	16	4	0	138
Lamprey on:															
Chinook salmon			0	0	0	1	61	55	362	619	104	1	0	0	1,203
Lake trout			0	0	0	0	15	32	102	81	13	0	0	0	243
Angler hours			423	1,126	1,796	3,745	26,126	30,271	70,934	117,246	35,481	3,842	2,907	573	294,470
Anglers			60	158	256	589	4,301	5,224	12,908	22,071	6,639	618	431	82	53,337
Charter excursions			20	44	75	159	982	1,273	3,031	5,121	1,643	199	133	24	12,704

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, 2007.

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	0.003	0.058	0	0	0	0	21	15	21	15	16	1	0	0	89
Chinook salmon	0.060	1.211	0	0	0	8	55	181	567	623	309	118	0	0	1,861
Rainbow trout	0.009	0.182	0	0	0	29	4	39	120	59	23	5	0	0	279
Brown trout	0.001	0.016	0	0	0	3	13	0	3	2	1	3	0	0	25
Lake trout	0.205	4.140	0	0	0	0	458	1,404	2,403	1,693	400	5	0	0	6,363
Yellow perch	0.018	0.358	0	0	0	0	40	122	44	92	226	27	0	0	551
Walleye	0.163	3.288	0	0	0	55	349	1,966	1,943	613	97	30	0	0	5,053
Other	0.021	0.434	0	0	0	1	85	137	245	95	99	5	0	0	667
Lamprey on:															
Chinook salmon			0	0	0	0	5	25	71	50	21	1	0	0	173
Lake trout			0	0	0	0	15	22	42	34	6	0	0	0	119
Angler hours			0	0	0	308	2,098	7,004	10,866	8,033	2,377	370	0	0	31,056
Anglers			0	0	0	52	373	1,268	1,938	1,488	438	78	0	0	5,635
Charter excursions			0	0	0	22	104	341	518	390	132	30	0	0	1,537



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), 2007.

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	0.006	0	0	0	0	0	6	0	0	0	0	0	0	6
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	0.381	9.414	0	0	0	0	108	236	771	2,539	5,182	945	0	0	9,781
Walleye	0.762	18.836	0	0	0	323	2,978	11,741	4,128	386	15	0	0	0	19,571
Other	0.018	0.443	0	0	0	0	112	284	11	0	53	0	0	0	460
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	406	3,445	12,920	5,861	1,213	1,555	281	0	0	25,681
Anglers			0	0	0	83	664	2,589	1,116	235	291	53	0	0	5,031
Charter excursions			0	0	0	19	140	528	237	47	57	11	0	0	1,039

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, 2007.

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	0.013	0.423	0	0	0	0	16	79	36	18	3	0	0	0	152
Chinook salmon	0.002	0.072	0	0	0	0	1	8	8	8	1	0	0	0	26
Rainbow trout	0.006	0.184	0	0	0	0	2	28	20	12	4	0	0	0	66
Brown trout	0.000	0.011	0	0	0	0	3	0	0	1	0	0	0	0	4
Lake trout	0.294	9.412	0	0	0	0	192	889	972	1,154	172	0	0	0	3,379
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	1	1	1	0	0	0	3
Lamprey on:															
Chinook salmon			0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	2	10	11	26	4	0	0	0	53
Angler hours			0	0	0	0	681	3,283	3,340	3,713	475	0	0	0	11,492
Anglers			0	0	0	0	105	445	467	531	82	0	0	0	1,630
Charter excursions			0	0	0	0	24	91	103	121	20	0	0	0	359

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), 2007.

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	0.006	0	0	0	1	2	0	0	0	0	0	0	0	3
Chinook salmon	0.000	0.000	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainbow trout	0.000	0.006	0	0	0	1	1	1	0	0	0	0	0	0	3
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	0.980	20.890	0	0	0	0	2	594	872	592	3,195	4,166	878	0	10,299
Walleye	0.438	9.335	0	0	48	1,799	1,636	452	409	134	26	98	0	0	4,602
Other	0.166	3.538	0	0	0	4	0	316	541	713	138	32	0	0	1,744
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	142	2,185	2,085	1,226	1,442	1,427	905	997	101	0	10,510
Anglers			0	0	22	414	412	215	227	222	166	180	22	0	1,880
Charter excursions			0	0	5	116	114	58	55	51	38	48	8	0	493

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 2004-2007.

Lake	Year																	
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Michigan	13,467	13,604	10,995	10,298	10,116	9,996	10,344	10,627	12,333	11,382	11,714	11,224	11,924	12,094	11,966	12,526	12,064	12,704
Huron	4,010	3,442	2,521	2,307	2,182	2,599	2,592	2,684	3,210	3,123	2,760	2,867	2,874	2,771	2,622	2,085	1,765	1,537
Erie	1,684	1,445	1,679	1,881	1,661	1,781	1,775	1,727	1,679	2,380	1,836	1,947	1,870	1,695	718	694	1,554	1,039
Superior	755	791	743	618	455	515	524	497	517	607	482	477	430	505	455	479	398	359
St. Clair	779	643	509	414	299	336	407	394	432	389	348	433	246	466	339	319	366	493
Total	20,695	19,925	16,447	15,518	14,713	15,227	15,642	15,929	18,171	17,881	17,140	16,948	17,344	17,531	16,100	16,103	16,147	16,132

Table 7.—Targeted harvest per hour, harvest per excursion and number of 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, 2007. Targeted harvest based on total salmonine effort (salmon and trout species) or total percid + other effort (perch, walleye, plus other= smallmouth bass, musky, & 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	0.035	0.823	0	0	1	490	2,237	512	1,504	4,235	1,107	54	13	0	10,153
Chinook salmon	0.294	6.864	6	0	0	208	5,219	4,699	20,389	42,079	11,695	335	5	0	84,635
Rainbow trout	0.026	0.619	78	142	214	172	1,319	1,337	2,063	1,459	309	181	316	42	7,632
Brown trout	0.002	0.048	0	0	4	97	172	53	135	97	30	4	0	0	592
Lake trout	0.037	0.853	0	0	0	15	1,359	2,415	3,523	2,647	541	4	9	3	10,516
Yellow perch	1.000	17.152	0	0	0	35	110	2,103	1,933	1,373	758	93	10	0	6,415
Walleye	0.269	4.612	10	124	25	2	272	285	111	216	163	332	165	20	1,725
Other	0.015	0.259	0	0	0	0	17	20	16	33	1	10	0	0	97
Lamprey on:															
Chinook salmon			0	0	0	1	61	55	362	619	104	1	0	0	1,203
Lake trout			0	0	0	0	15	32	102	81	13	0	0	0	243
Angler hours			423	1,126	1,796	3,745	26,126	30,271	70,934	117,246	35,481	3,842	2,907	573	294,470
Anglers			60	158	256	589	4,301	5,224	12,908	22,071	6,639	618	431	82	53,337
Charter excursions			20	44	75	159	982	1,273	3,031	5,121	1,643	199	133	24	12,704

Table 8.—Targeted harvest per hour, harvest per excursion and number of 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, 2007. Targeted harvest based on total salmonine effort (salmon and trout species) or total percid + other effort (perch, walleye, plus other= smallmouth bass, musky, & 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	0.004	0.078	0	0	0	0	21	15	21	15	16	1	0	0	89
Chinook salmon	0.080	1.632	0	0	0	8	52	181	567	618	307	118	0	0	1,851
Rainbow trout	0.012	0.245	0	0	0	29	4	39	119	59	23	5	0	0	278
Brown trout	0.001	0.021	0	0	0	3	13	0	2	2	1	3	0	0	24
Lake trout	0.275	5.598	0	0	0	0	457	1,404	2,395	1,687	400	5	0	0	6,348
Yellow perch	0.054	1.069	0	0	0	0	40	122	44	42	156	27	0	0	431
Walleye	0.601	11.908	0	0	0	55	347	1,954	1,811	527	76	29	0	0	4,799
Other	0.051	1.005	0	0	0	0	27	65	149	71	90	3	0	0	405
Lamprey on:															
Chinook salmon			0	0	0	0	5	25	71	50	21	1	0	0	173
Lake trout			0	0	0	0	15	22	42	34	6	0	0	0	119
Angler hours			0	0	0	308	2,098	7,004	10,866	8,033	2,377	370	0	0	31,056
Anglers			0	0	0	52	373	1,268	1,938	1,488	438	78	0	0	5,635
Charter excursions			0	0	0	22	104	341	518	390	132	30	0	0	1,537

Table 9.—Targeted harvest per hour, harvest per excursion and number of 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), 2007. Targeted harvest based on total salmonine effort (salmon and trout species) or total percid + other effort (perch, walleye, plus other= smallmouth bass, musky, & 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	0.381	9.414	0	0	0	0	108	236	771	2,539	5,182	945	0	0	9,781
Walleye	0.762	18.836	0	0	0	323	2,978	11,741	4,128	386	15	0	0	0	19,571
Other	0.018	0.443	0	0	0	0	112	284	11	0	53	0	0	0	460
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	406	3,445	12,920	5,861	1,213	1,555	281	0	0	25,681
Anglers			0	0	0	83	664	2,589	1,116	235	291	53	0	0	5,031
Charter excursions			0	0	0	19	140	528	237	47	57	11	0	0	1,039

Table 10.—Targeted harvest per hour, harvest per excursion and number of 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, 2007. Targeted harvest based on total salmonine effort (salmon and trout species) or total percid + other effort (perch, walleye, plus other= smallmouth bass, musky, & 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	0.013	0.423	0	0	0	0	16	79	36	18	3	0	0	0	152
Chinook salmon	0.002	0.072	0	0	0	0	1	8	8	8	1	0	0	0	26
Rainbow trout	0.006	0.184	0	0	0	0	2	28	20	12	4	0	0	0	66
Brown trout	0.000	0.011	0	0	0	0	3	0	0	1	0	0	0	0	4
Lake trout	0.294	9.412	0	0	0	0	192	889	972	1,154	172	0	0	0	3,379
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	2	10	11	26	4	0	0	0	53
Angler hours			0	0	0	0	681	3,283	3,340	3,713	475	0	0	0	11,492
Anglers			0	0	0	0	105	445	467	531	82	0	0	0	1,630
Charter excursions			0	0	0	0	24	91	103	121	20	0	0	0	359



Table 11.—Targeted harvest per hour, harvest per excursion and number of 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), 2007. Targeted harvest based on total salmonine effort (salmon and trout species) or total percid + other effort (perch, walleye, plus other = smallmouth bass, musky, & 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	0.980	20.890	0	0	0	0	2	594	872	592	3,195	4,166	878	0	10,299
Walleye	0.438	9.335	0	0	48	1,799	1,636	452	409	134	26	98	0	0	4,602
Other	0.166	3.538	0	0	0	4	0	316	541	713	138	32	0	0	1,744
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	142	2,185	2,085	1,226	1,442	1,427	905	997	101	0	10,510
Anglers			0	0	22	414	412	215	227	222	166	180	22	0	1,880
Charter excursions			0	0	5	116	114	58	55	51	38	48	8	0	493

Figure 1.—Total number of charter anglers (trips) on the Michigan waters of the Great Lakes (including tributaries), 1990-2007.

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

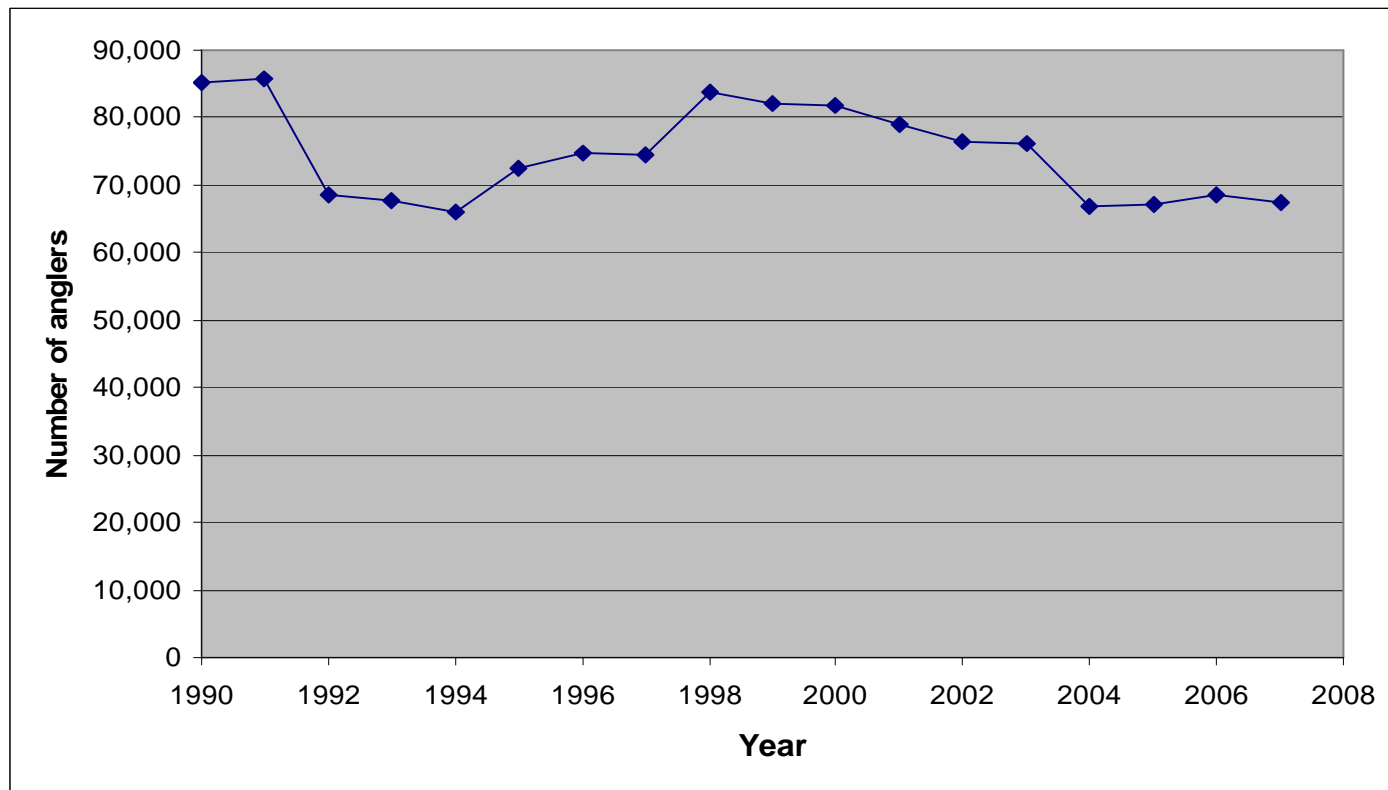


Figure 2(a).—Total number of charter anglers (trips) on the Michigan waters of Lake Michigan and Lake Huron (including tributaries), 1990-2007.

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

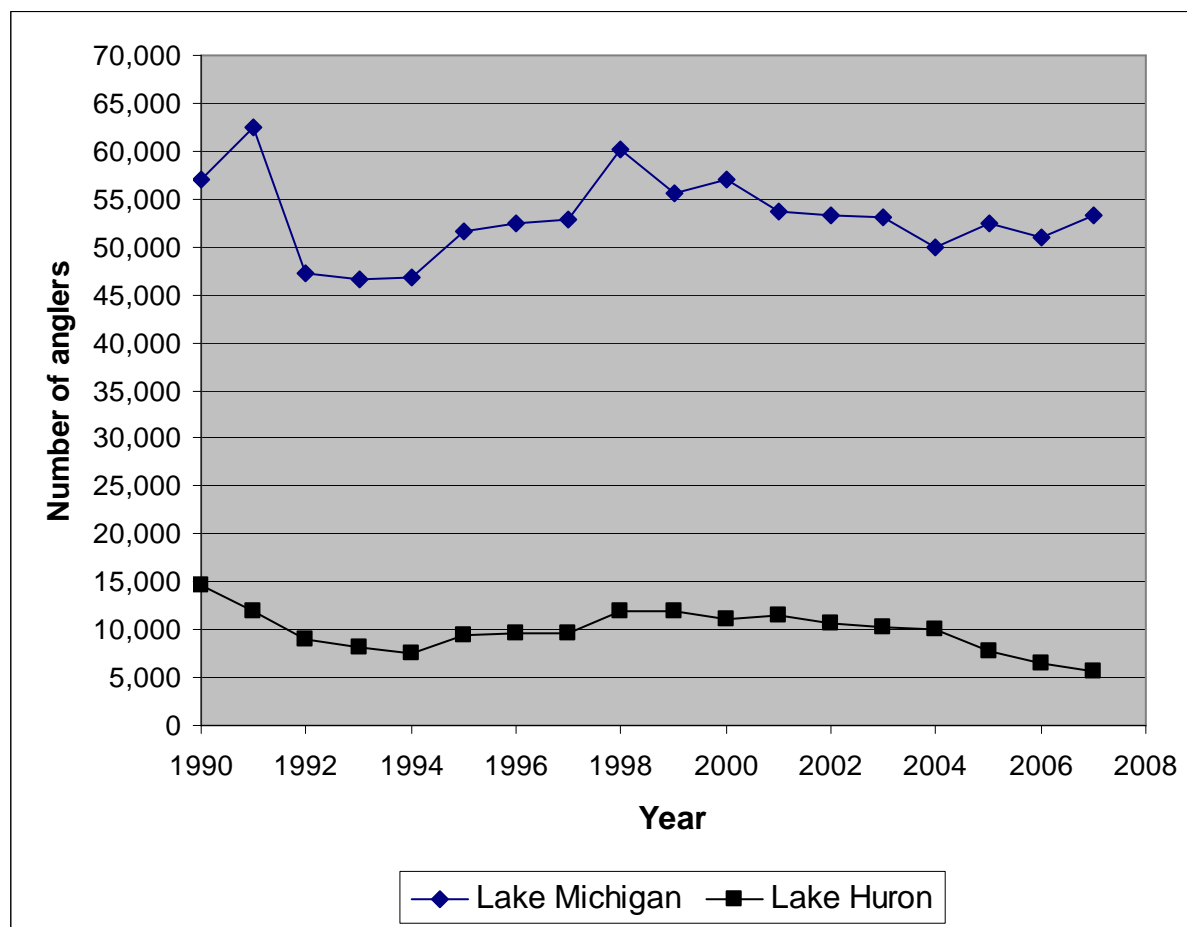


Figure 2 (b).—Total number of charter anglers (trips) on the Michigan waters of Lakes Erie, Superior, and the St. Clair System (including tributaries), 1990-2007.

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

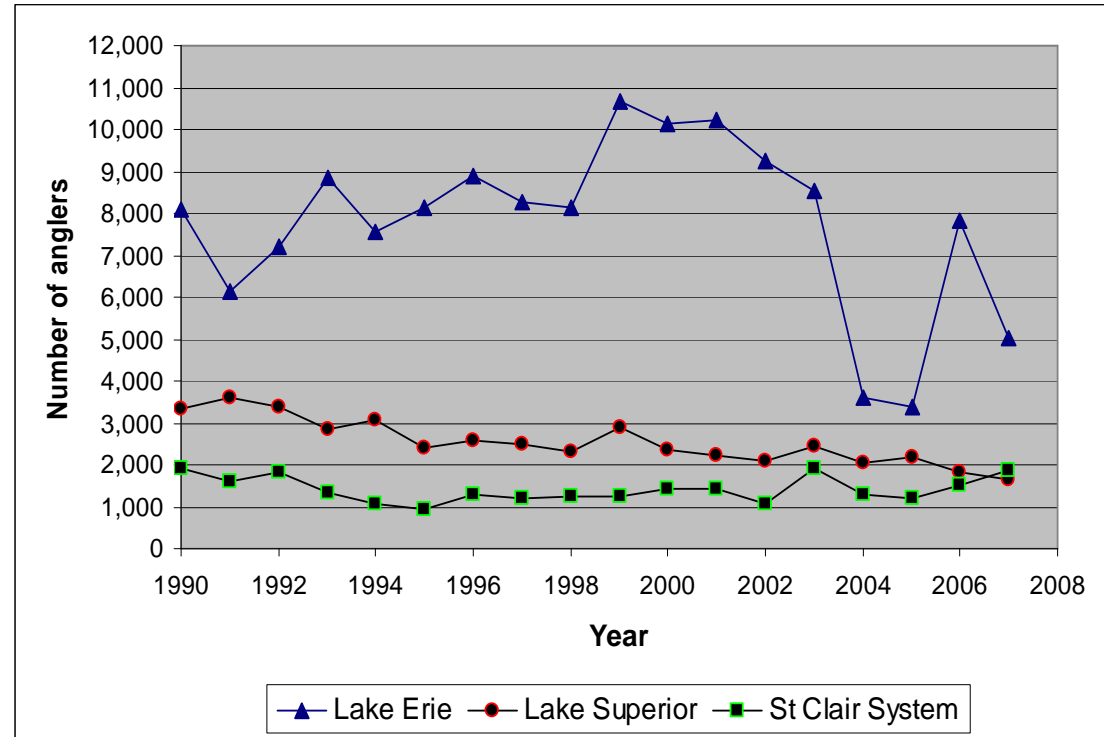


Figure 3. - Charter angler targeted harvest rates (fish per 5 angler hours) for Chinook salmon on Lake Michigan and Lake Huron, 1990-2007.

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

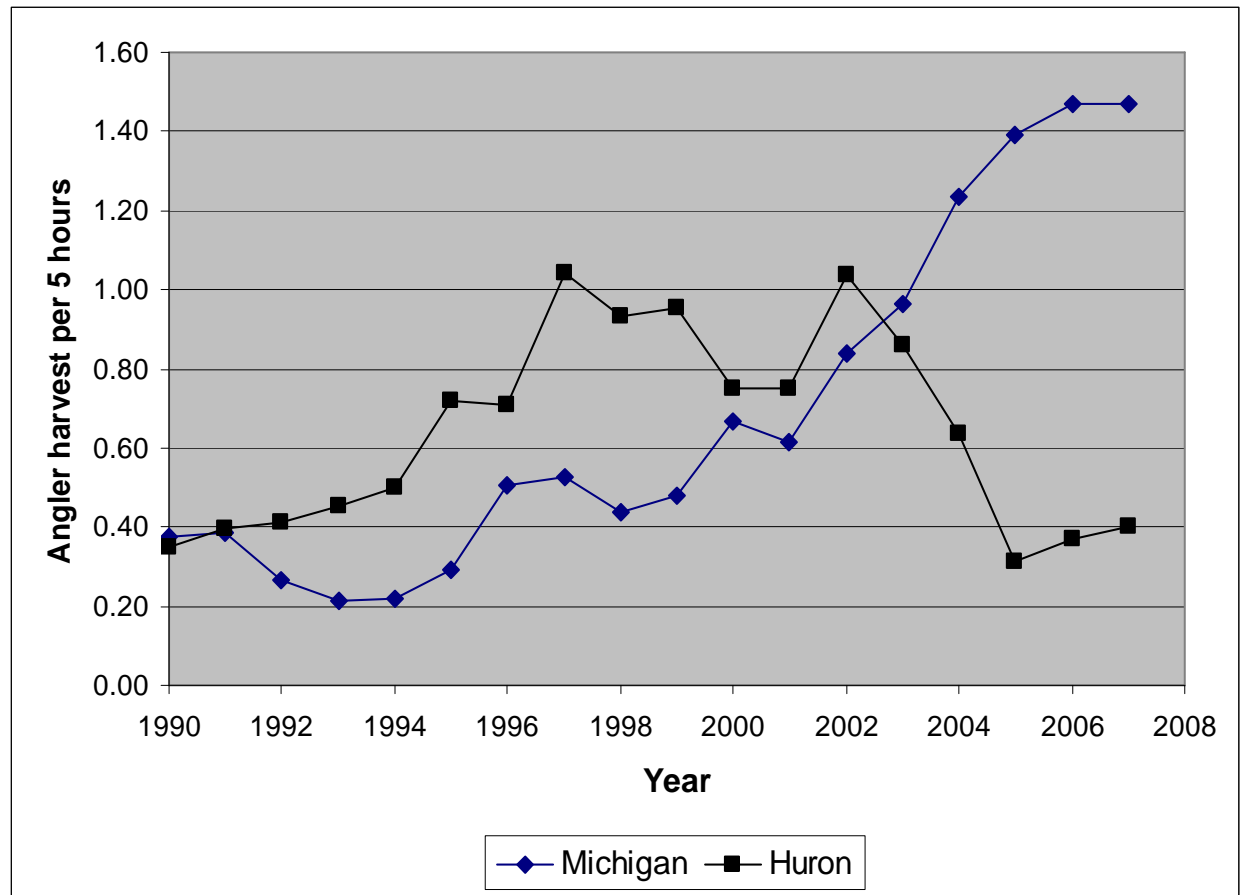


Figure 4.—Charter angler targeted harvest rates (fish per 5 angler hours) for lake trout on Lakes Michigan, Huron, and Superior, 1990-2007.

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

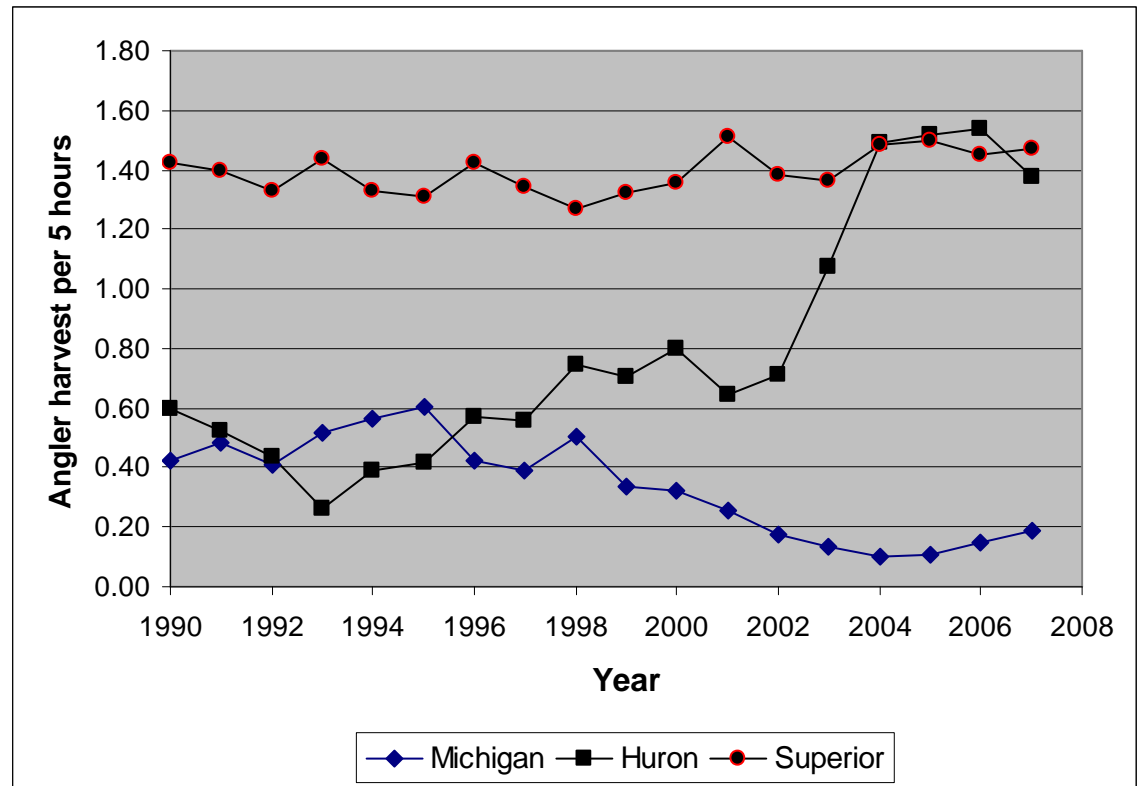


Figure 5.—Charter angler targeted harvest rates (fish per 5 angler hours) for coho salmon on Lakes Michigan, Huron, and Superior, 1990-2007.

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

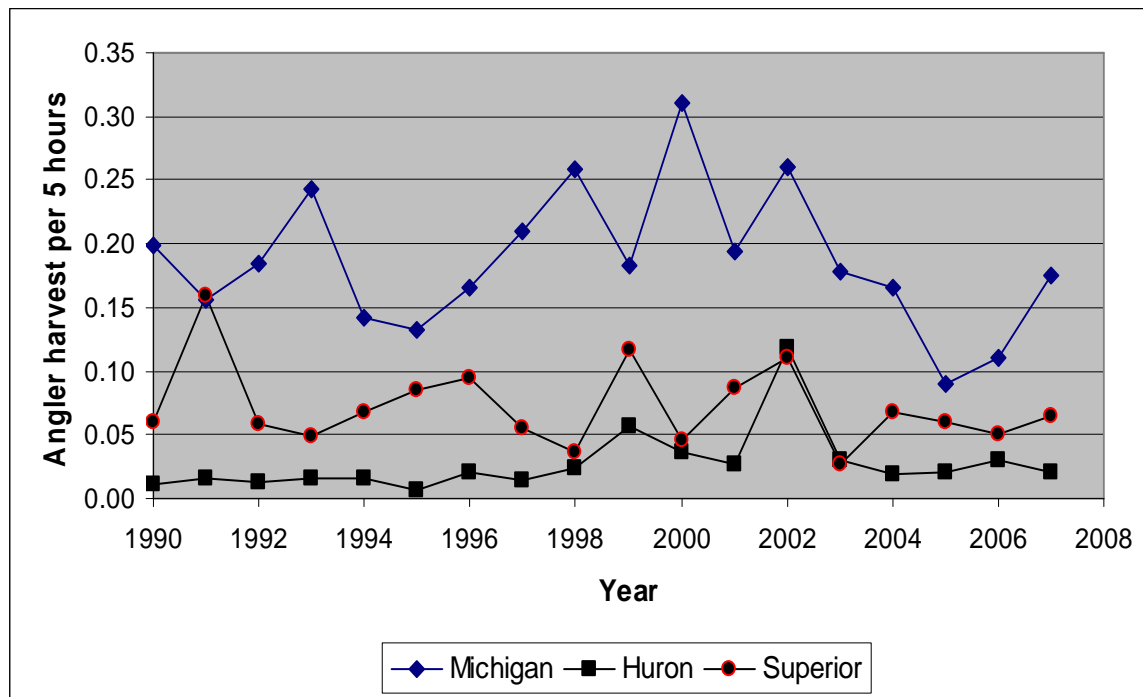


Figure 6.—Charter angler targeted harvest rates (fish per 5 angler hours) for rainbow trout (steelhead) on Lake Michigan and Lake Huron, 1990-2007.

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

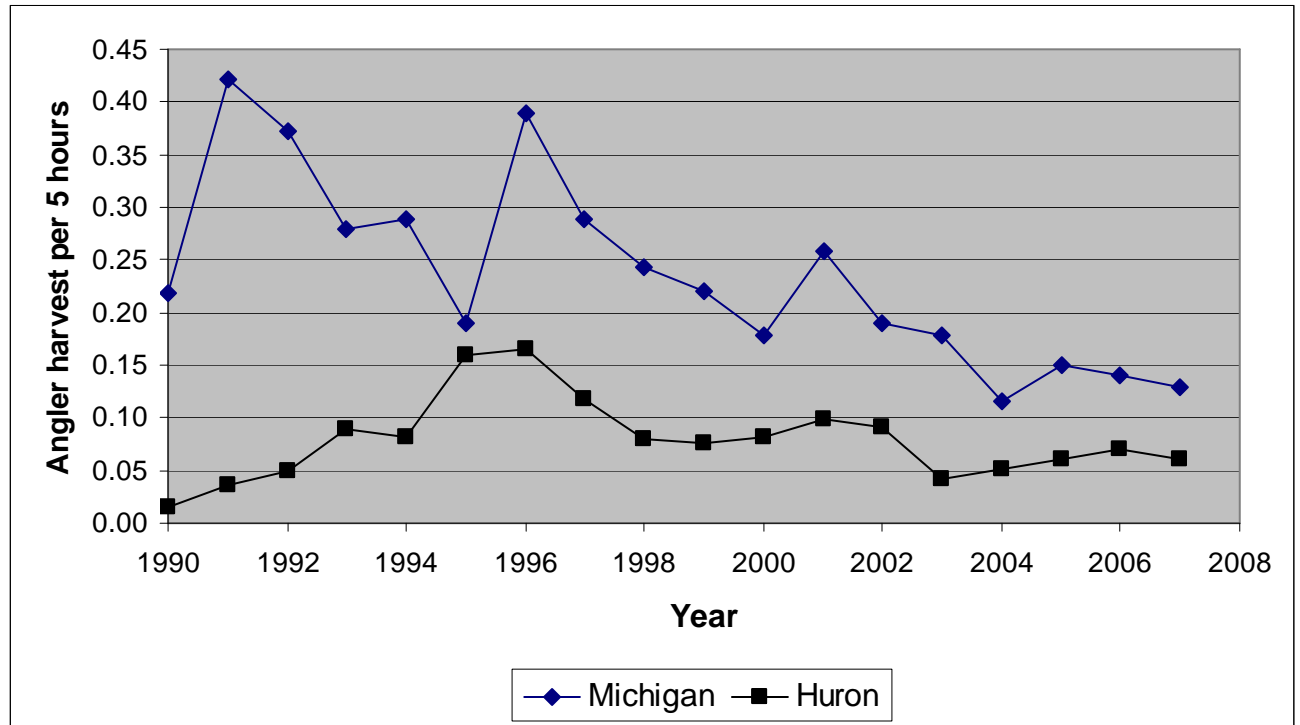




Figure 7.—Charter angler targeted harvest rates (fish per 5 angler hours) for brown trout on Lake Michigan and Lake Huron, 1990-2007.

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

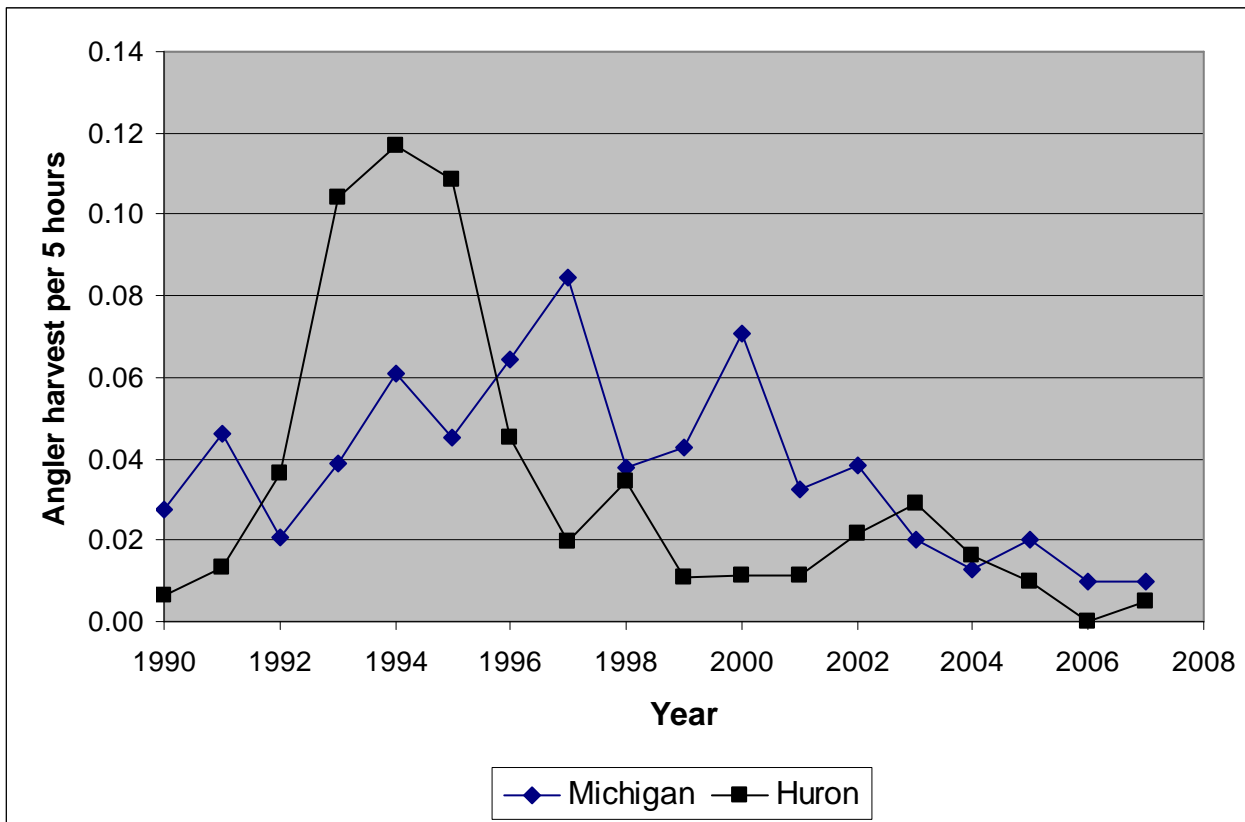


Figure 8.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch on Lake Michigan, 1990-2007.

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

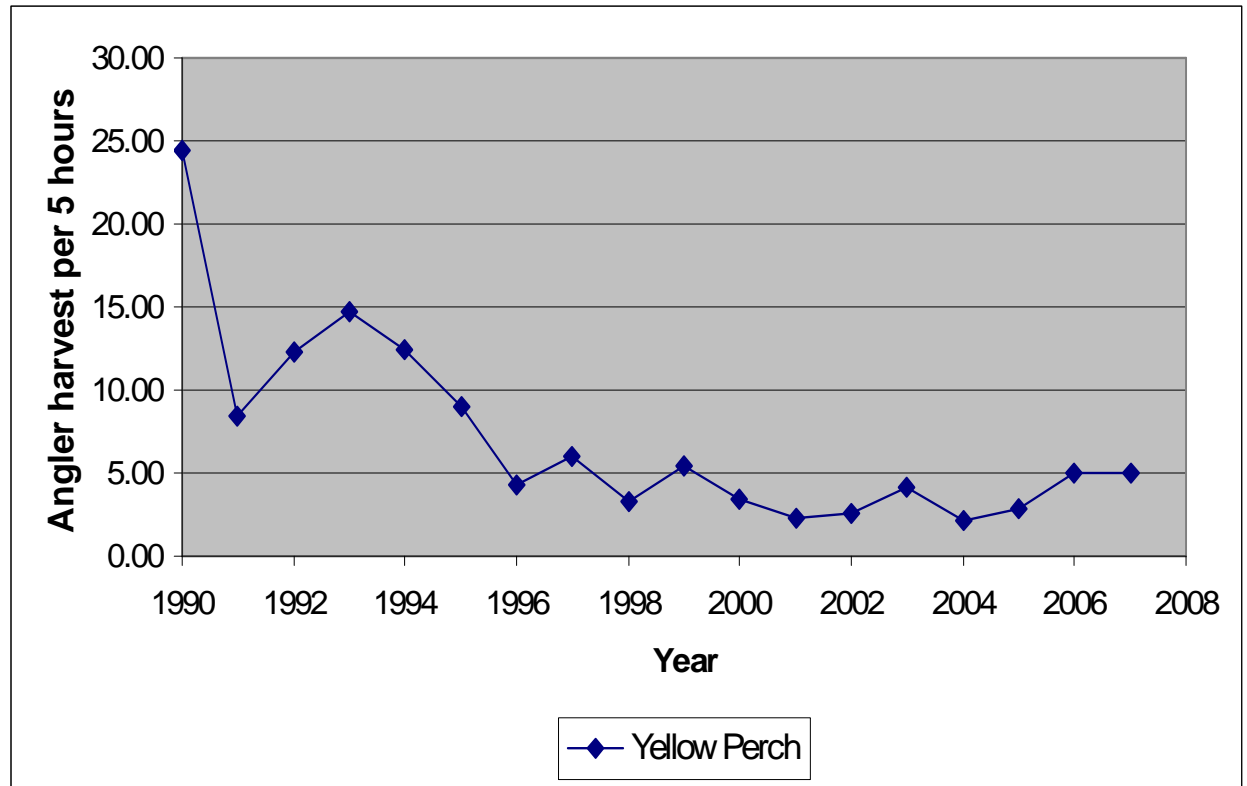


Figure 9.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on Lake Huron, 1990-2007.

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

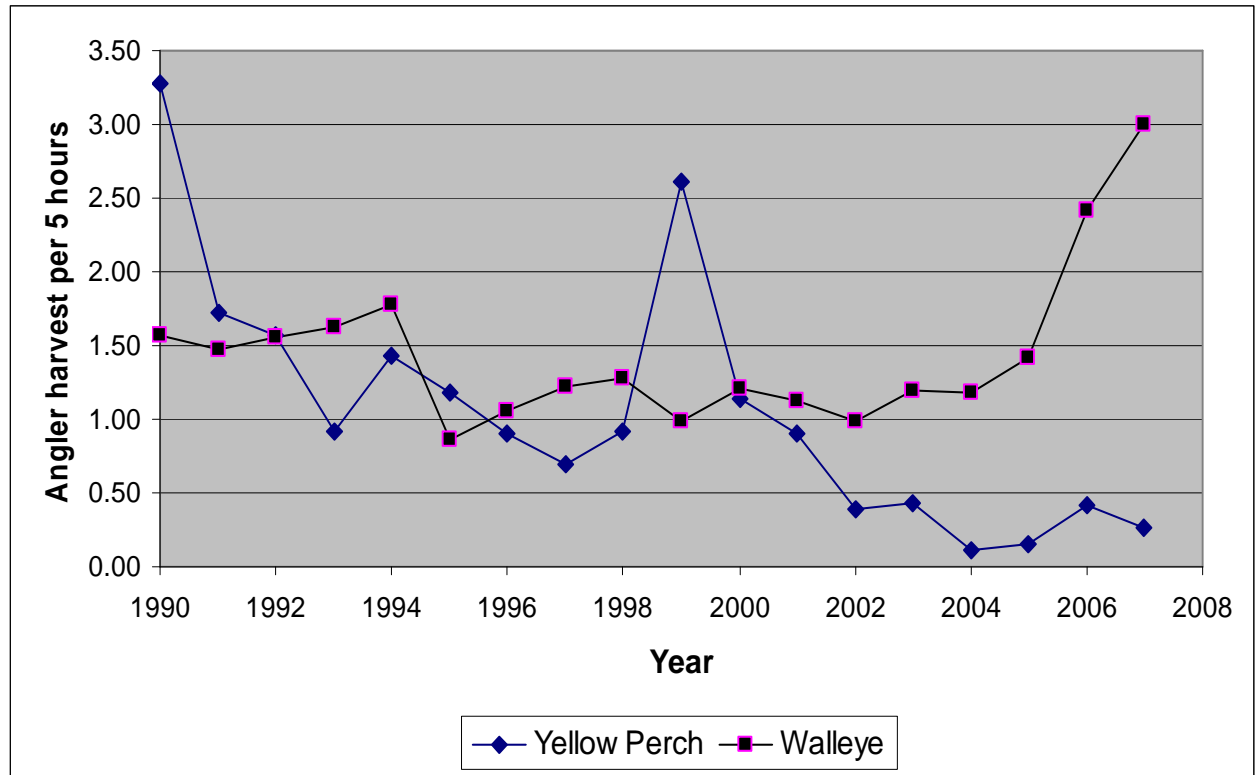


Figure 10.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on Lake Erie, 1990-2007.

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

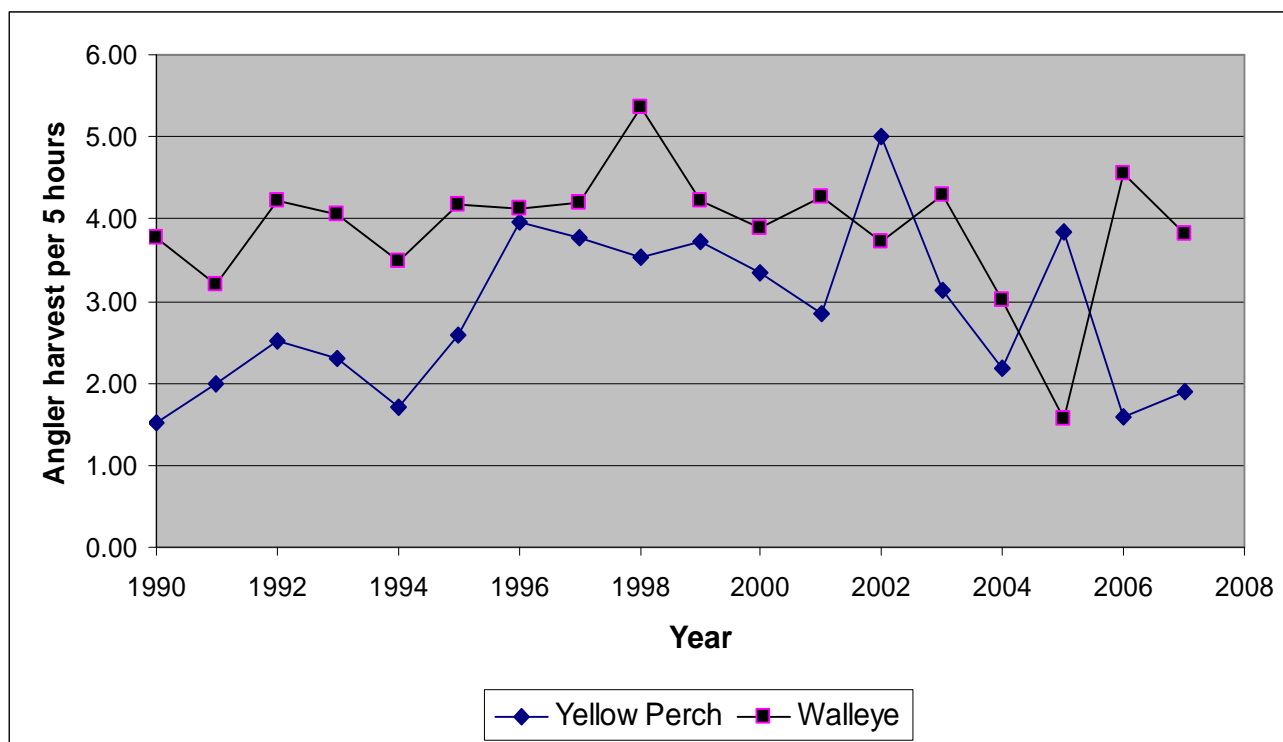


Figure 11.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on the St. Clair system, 1990-2007.

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

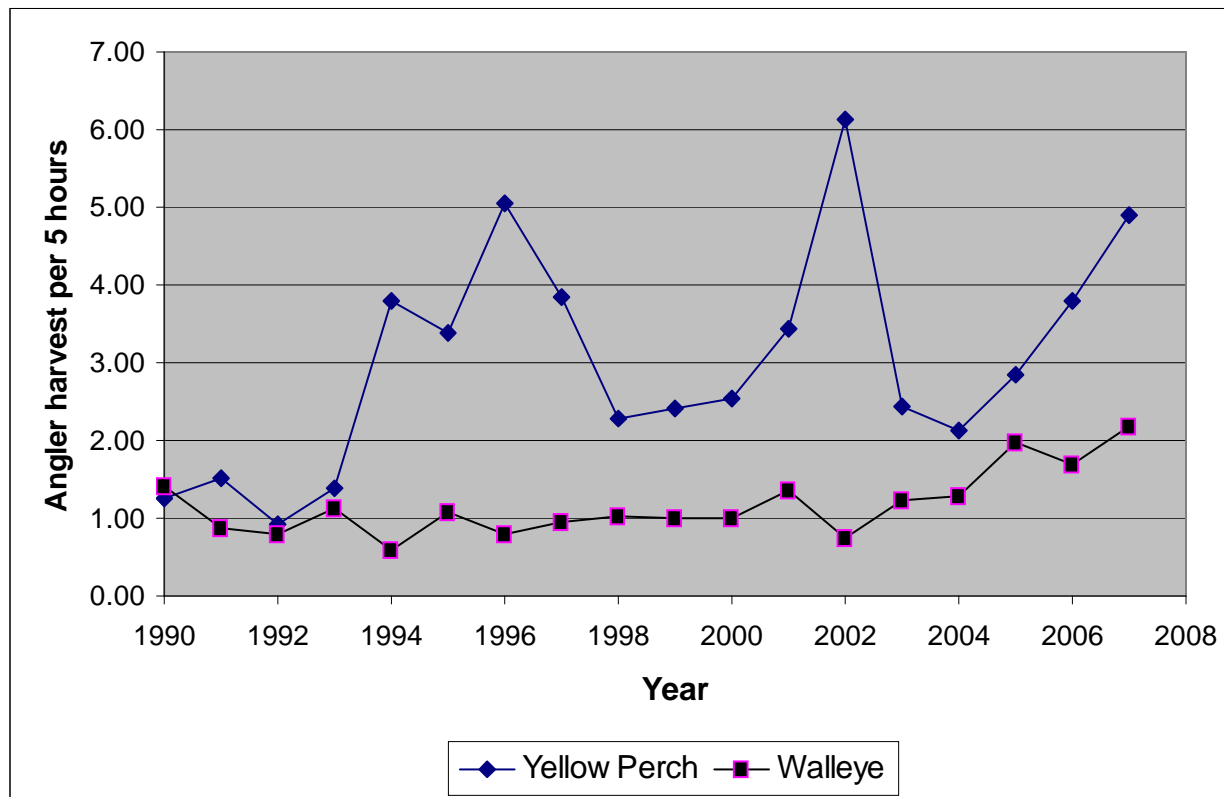


Figure 12.—Sea lamprey incidence (number attached per 100 fish) on Chinook salmon harvested by charter anglers on Lake Michigan and Lake Huron, 1990-2007.

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

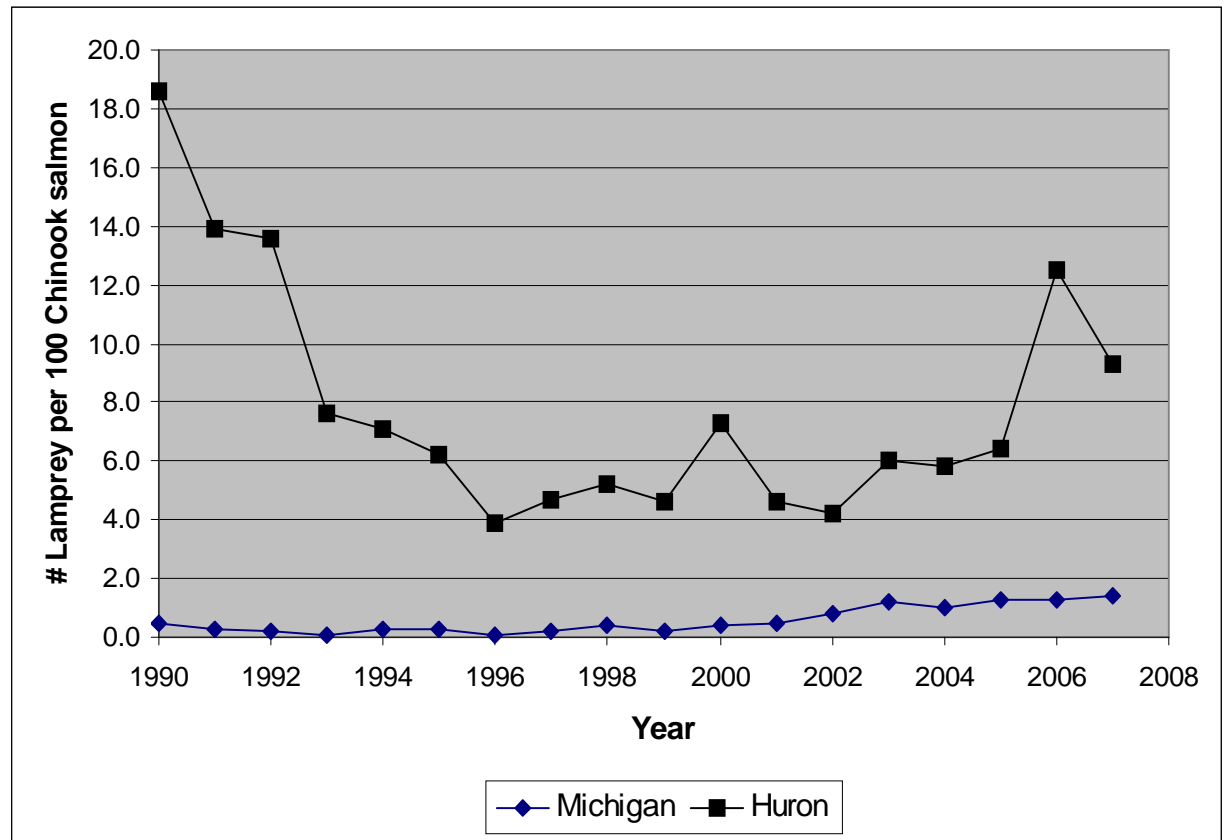


Figure 13.—Sea lamprey incidence (number attached per 100 fish) on lake trout harvested by charter anglers on Lakes Michigan, Huron, and Superior, 1990-2007.

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

