

Charter Boat Effort and Fish Harvest from the Michigan Waters of the Great Lakes, 2006

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Introduction

Michigan's charter boat industry increased from 250 operations in 1979 to nearly 900 in 1989. During the 1990s 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 2006, there were 605 operators. 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).

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). Charter operators are identified from (1) a list of operators who submitted catch reports the previous year, (2) review of MDNR's 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. The data is 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 that 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's 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). 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). Starting with 2004 reporting, and with further refinements in 2005, a method to calculate targeted harvest rates was implemented. This method separates salmonine (salmon and trout species) effort from percid

plus other (walleye, perch, smallmouth bass, muskellunge, and undefined) effort and uses one of these two efforts to calculate the harvest rates of individual species within each group. Both total harvest and targeted harvest 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 2006 fishing season, an average of 73% 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 2006 was 3% less than in 2005. In December 2006, at the time of sending final notification letters for one or more delinquent reports, 88% of the operators were in compliance. By January 2007, 92% of all charter operators had complied with the law; this is 3% less than 2005 and 4% less than 2004. This continued decrease in compliance may be partially attributable to the reduced number of reporting reminder notices sent to operators during the year.

Reporting of results

Starting with the 2004 charter fishing harvest and effort data, results are inclusive of any month of the year in 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 2006, charter anglers participated in 16,147 charter excursions on the Michigan

waters of Lakes Michigan, Huron, Erie, Superior, and the St. Clair system, including major tributaries (Tables 1-5). From 2005 to 2006, the change in number of total excursions is less than 1%; the number of excursions on Lakes Erie and St. Clair increased while excursions on Lakes Superior, Huron, and Michigan decreased (Table 6). Lake Erie had the largest change in number of excursions, increasing to 1,554 (2006) from 694 (2005). The distribution of charter fishing excursions in 2006 by lake was: 75% Lake Michigan, 11% Lake Huron, 10% Lake Erie, 2% Lake Superior, and 2% Lake St. Clair.

A total of 378,989 hours were spent fishing by 68,572 charter anglers in Michigan's waters and tributaries of the Great Lakes (Tables 1-5, Figures 1-2b). While there was a small decrease (3%) in angler hours, the total number of charter anglers increased slightly (2%) compared to 2005. 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 the past several years show the overall percentage of non-resident anglers have remained at 25-30%; Lake Superior charter operators consistently had the greatest percentage of non-resident clients.

Harvest

Charter operators reported a total of 191,103 fish harvested from the Michigan waters of the Great Lakes and its major tributaries in 2006 (Tables 1-5). Most of these fish were harvested from Lake Michigan (59%), followed by Lake Erie (24%), Lake Huron (8%), the St. Clair system (6%), and Lake Superior (2%). In comparison to 2005 total harvest, Lake Michigan harvest decreased 10% and Lake Erie harvest increased 11%; lakes Huron, Superior, and the St. Clair system had minimal change (2% or less per lake).

Historically, the most abundant species in the harvest has been yellow perch; however over the last few 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 2006, Chinook salmon accounted for 44% of the total harvest. Percent of total harvest for other species was as follows: walleye 22%, yellow perch 14%, lake trout 11%, rainbow trout 4%, coho salmon 3%, 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, muskellunge, and other species not defined on the report form.

Charter anglers harvested 83,965 Chinook salmon in 2006, which is a slight decrease (1%) relative to 2005. Total harvest in 2006 increased for walleye, yellow perch, and coho salmon, whereas rainbow trout, brown trout, and lake trout harvest decreased. Harvest numbers for these species in 2006 were: 41,127 walleye, 26,029 yellow perch, 21,146 lake trout, 7,860 rainbow trout, 6,390 coho salmon, and 455 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 operators.

The overall total number of salmonines (Chinook salmon, coho salmon, lake trout, rainbow trout, and brown trout) harvested from Michigan's Great Lakes waters in 2006 was 120,086, which is a 3% decrease (3,329 fish) from 2005.

Harvest rates

In 2006, charter anglers harvested 0.5 fish (all species from all lakes combined) per hour. 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. It is possible to separate fishing effort between “groups” of fish such as salmonines (trout and salmon) and percids (walleye and yellow perch), 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 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. 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. The improved methodology had the greatest effect on percid harvest rates when effort for percids + other was a small percent of the total effort. 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 2006 targeted the various species of salmonines. Comparing targeted harvest rates (fish per 5 angler hours) to 2005 data, Lake Michigan angler harvest rates increased for Chinook salmon, lake trout, coho salmon, yellow perch, and walleye. Brown trout and rainbow trout harvest rates decreased slightly (Figures 3-8). The targeted harvest rate reported in 2006 for Chinook salmon in Lake Michigan (1.47 fish per 5 hours of angler fishing) was the greatest recorded in the 17 year (1990-2006) data series (Figure 3).

Targeted harvest rates of fish per 5 angler hours for Lake Huron in 2006 increased compared to 2005 for all reported species other than brown trout (Figures 3-7 and Figure 9). The harvest rate for lake trout in Lake Huron (1.54 fish per 5 angler hours) is the greatest in the 1990-2006 data series for lakes Huron,

Michigan, and Superior (Figure 4). The harvest rate for walleye (2.42 fish per 5 angler hours) increased to the highest rate observed in Lake Huron during the same time period (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 2006 decreased slightly (compared to 2005; Figures 4-5). Other salmonine species such as Chinook salmon, rainbow trout, and brown trout do not occur in significant numbers in 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 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. Targeted harvest rates for walleye (4.56 fish per 5 angler hours) and fishing effort (7,807 anglers) increased significantly for Lake Erie in 2006 - a return to levels recorded prior to the 2004-2005 regulation changes (Figures 2b and 10). Conversely, yellow perch harvest rates (1.59 fish per 5 angler hours) decreased to a level last observed in the mid-1990’s (Figure 10). While targeted harvest rates for walleye decreased slightly on the St. Clair system in 2006 as compared to 2005, the 2006 rate is still the second highest rate in the 1990-2006 data series. Rates for yellow perch continued the recent upward trend (Figure 11).

Sea Lamprey Incidence

For 2006, sea lamprey incidence on Chinook salmon was unchanged in Lake Michigan but increased significantly in Lake Huron compared to 2005. Lake Huron’s incidence of 12.5 lampreys per 100 fish is close to levels last observed in 1992 (13.6 lamprey/100 fish) (Figure 12).

Sea lamprey incidence on lake trout decreased slightly Lake Michigan but increased in Lake Huron and Lake Superior. The occurrence of lamprey on lake trout (3

lamprey/100 fish) is the highest in the data series for Lake Superior (Figure 13).

Online Information

Previous years' 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 'Research', then 'Great Lakes Charter and Creel'.

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References

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

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, 2006.

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	0.022	0.507	0	0	6	683	1,839	1,006	496	1,395	675	16	0	0	6,116
Chinook salmon	0.287	6.770	1	0	0	517	6,837	4,264	18,432	40,170	11,239	210	5	0	81,675
Rainbow trout	0.026	0.612	118	242	361	281	500	1,493	1,961	869	402	413	546	199	7,385
Brown trout	0.002	0.036	15	4	3	110	49	47	81	88	34	3	1	0	435
Lake trout	0.029	0.680	0	0	0	30	1,011	1,925	2,543	2,146	550	1	0	0	8,206
Yellow perch	0.024	0.567	0	0	0	0	63	758	3,064	2,635	323	3	0	0	6,846
Walleye	0.007	0.159	14	40	12	1	296	466	232	318	83	272	160	28	1,922
Other	0.001	0.018	0	0	1	1	18	37	56	66	23	11	0	0	213
Lamprey on:															
Chinook salmon			0	0	0	8	81	72	298	533	90	0	0	0	1,082
Lake trout			0	0	0	2	32	37	69	68	14	0	0	0	222
Angler hours			701	1,236	1,952	5,276	26,308	31,543	66,393	106,698	36,798	3,738	2,802	896	284,341
Anglers			108	180	282	841	4,313	5,341	11,870	20,121	6,711	586	417	133	50,903
Charter excursions			32	52	88	223	984	1,264	2,775	4,666	1,608	195	135	42	12,064

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, 2006.

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	0.004	0.091	0	0	0	15	25	13	27	57	17	6	0	0	160
Chinook salmon	0.063	1.273	0	0	0	4	86	240	737	854	302	23	0	0	2,246
Rainbow trout	0.012	0.243	0	0	29	28	20	63	144	110	28	7	0	0	429
Brown trout	0.000	0.007	0	0	0	0	2	5	5	1	0	0	0	0	13
Lake trout	0.264	5.365	0	0	0	0	845	2,373	2,908	2,617	720	7	0	0	9,470
Yellow perch	0.017	0.341	0	0	0	0	1	6	38	159	397	0	0	0	601
Walleye	0.074	1.512	0	0	0	27	136	934	1,154	340	49	29	0	0	2,669
Other	0.017	0.346	0	0	0	0	55	136	293	102	18	7	0	0	611
Lamprey on:															
Chinook salmon			0	0	0	0	17	32	115	107	16	1	0	0	288
Lake trout			0	0	0	0	15	32	60	51	9	1	0	0	168
Angler hours			0	0	114	597	2,778	7,999	11,311	9,795	3,096	221	0	0	35,911
Anglers			0	0	16	88	501	1,429	2,049	1,816	582	40	0	0	6,521
Charter excursions			0	0	9	33	145	379	539	483	163	14	0	0	1,765

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), 2006.

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	0.000	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	0.318	7.515	0	0	0	0	47	1,194	1,323	3,282	5,075	758	0	0	11,679
Walleye	0.912	21.564	0	0	0	92	3,444	19,995	8,825	1,102	52	0	0	0	33,510
Other	0.015	0.346	0	0	0	0	86	251	187	13	0	0	0	0	537
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	171	3,849	19,420	9,490	2,238	1,336	236	0	0	36,740
Anglers			0	0	0	34	791	4,246	1,988	434	268	46	0	0	7,807
Charter excursions			0	0	0	7	161	837	400	86	53	10	0	0	1,554

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, 2006.

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	0.009	0.286	0	0	0	0	1	49	39	14	11	0	0	0	114
Chinook salmon	0.003	0.111	0	0	0	0	6	7	7	5	19	0	0	0	44
Rainbow trout	0.004	0.116	0	0	0	0	2	9	13	16	6	0	0	0	46
Brown trout	0.001	0.018	0	0	0	0	2	4	1	0	0	0	0	0	7
Lake trout	0.287	9.397	0	0	0	0	234	787	1,341	970	388	20	0	0	3,740
Yellow perch	0.008	0.254	0	0	0	0	0	1	50	0	0	50	0	0	101
Walleye	0.002	0.050	0	0	0	0	0	1	18	0	1	0	0	0	20
Other	0.005	0.161	0	0	0	0	26	26	8	0	3	1	0	0	64
Lamprey on:															
Chinook salmon			0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	5	14	40	42	18	1	0	0	120
Angler hours			0	0	0	0	714	3,424	4,915	2,817	1,123	58	0	0	13,051
Anglers			0	0	0	0	113	414	687	431	182	9	0	0	1,836
Charter excursions			0	0	0	0	27	81	151	94	41	4	0	0	398

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), 2006.

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	0.000	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	0.760	18.585	0	0	0	0	0	800	840	622	1,456	2,557	527	0	6,802
Walleye	0.336	8.213	0	0	32	1,073	656	461	363	287	77	57	0	0	3,006
Other	0.272	6.656	0	0	0	18	32	457	852	843	220	14	0	0	2,436
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	36	1,567	782	1,801	1,487	1,818	796	587	72	0	8,946
Anglers			0	0	6	239	152	293	272	295	129	107	12	0	1,505
Charter excursions			0	0	2	68	44	67	66	70	26	21	2	0	366

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 2004-2006.

Lake	Year																
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
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
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
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
Superior	755	791	743	618	455	515	524	497	517	607	482	477	430	505	455	479	398
St. Clair	779	643	509	414	299	336	407	394	432	389	348	433	246	466	339	319	366
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

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, 2006. 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	0.022	0.522	0	0	6	683	1,839	1,006	495	1,395	675	16	0	0	6,115
Chinook salmon	0.294	6.976	1	0	0	517	6,837	4,264	18,431	40,170	11,238	210	5	0	81,673
Rainbow trout	0.027	0.630	117	236	359	281	500	1,493	1,961	869	402	413	546	199	7,376
Brown trout	0.002	0.037	15	4	3	110	49	47	81	88	34	3	1	0	435
Lake trout	0.029	0.701	0	0	0	30	1,011	1,925	2,541	2,146	550	1	0	0	8,204
Yellow perch	0.994	17.239	0	0	0	0	62	757	2,799	2,195	321	3	0	0	6,137
Walleye	0.301	5.216	13	21	12	1	295	466	231	311	80	272	151	4	1,857
Other	0.022	0.385	0	0	0	0	18	13	42	58	6	0	0	0	137
Lamprey on:															
Chinook salmon			0	0	0	8	81	72	298	533	90	0	0	0	1,082
Lake trout			0	0	0	2	32	37	69	68	14	0	0	0	222
Angler hours			701	1,236	1,952	5,276	26,308	31,543	66,393	106,698	36,798	3,738	2,802	896	284,341
Anglers			108	180	282	841	4,313	5,341	11,870	20,121	6,711	586	417	133	50,903
Charter excursions			32	52	88	223	984	1,264	2,775	4,666	1,608	195	135	42	12,064

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, 2006. 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	0.005	0.105	0	0	0	15	25	13	27	57	17	6	0	0	160
Chinook salmon	0.073	1.474	0	0	0	4	85	240	737	851	301	19	0	0	2,237
Rainbow trout	0.014	0.282	0	0	29	28	20	62	144	110	28	7	0	0	428
Brown trout	0.000	0.007	0	0	0	0	1	4	5	1	0	0	0	0	11
Lake trout	0.308	6.233	0	0	0	0	844	2,372	2,902	2,617	720	7	0	0	9,462
Yellow perch	0.082	1.717	0	0	0	0	1	6	37	159	221	0	0	0	424
Walleye	0.484	10.077	0	0	0	26	134	915	1,080	269	36	29	0	0	2,489
Other	0.063	1.308	0	0	0	0	9	64	191	52	5	2	0	0	323
Lamprey on:															
Chinook salmon			0	0	0	0	17	32	115	107	16	1	0	0	288
Lake trout			0	0	0	0	15	32	60	51	9	1	0	0	168
Angler hours			0	0	114	597	2,778	7,999	11,311	9,795	3,096	221	0	0	35,911
Anglers			0	0	16	88	501	1,429	2,049	1,816	582	40	0	0	6,521
Charter excursions			0	0	9	33	145	379	539	483	163	14	0	0	1,765

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), 2006. 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	0.318	7.515	0	0	0	0	47	1,194	1,323	3,282	5,075	758	0	0	11,679
Walleye	0.912	21.564	0	0	0	92	3,444	19,995	8,825	1,102	52	0	0	0	33,510
Other	0.015	0.346	0	0	0	0	86	251	187	13	0	0	0	0	537
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	171	3,849	19,420	9,490	2,238	1,336	236	0	0	36,740
Anglers			0	0	0	34	791	4,246	1,988	434	268	46	0	0	7,807
Charter excursions			0	0	0	7	161	837	400	86	53	10	0	0	1,554

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, 2006. 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	0.009	0.295	0	0	0	0	1	49	39	14	11	0	0	0	114
Chinook salmon	0.003	0.114	0	0	0	0	6	7	7	5	19	0	0	0	44
Rainbow trout	0.004	0.119	0	0	0	0	2	9	13	16	6	0	0	0	46
Brown trout	0.001	0.018	0	0	0	0	2	4	1	0	0	0	0	0	7
Lake trout	0.290	9.664	0	0	0	0	234	787	1,341	970	388	20	0	0	3,740
Yellow perch	0.754	9.182	0	0	0	0	0	1	50	0	0	50	0	0	101
Walleye	0.149	1.818	0	0	0	0	0	1	18	0	1	0	0	0	20
Other	0.381	4.636	0	0	0	0	25	22	0	0	3	1	0	0	51
Lamprey on:															
Chinook salmon			0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	5	14	40	42	18	1	0	0	120
Angler hours			0	0	0	0	714	3,424	4,915	2,817	1,123	58	0	0	13,051
Anglers			0	0	0	0	113	414	687	431	182	9	0	0	1,836
Charter excursions			0	0	0	0	27	81	151	94	41	4	0	0	398

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), 2006. 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	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chinook salmon	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
Brown trout	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
Yellow perch	0.760	18.585	0	0	0	0	0	800	840	622	1,456	2,557	527	0	6,802
Walleye	0.336	8.213	0	0	32	1,073	656	461	363	287	77	57	0	0	3,006
Other	0.272	6.656	0	0	0	18	32	457	852	843	220	14	0	0	2,436
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	36	1,567	782	1,801	1,487	1,818	796	587	72	0	8,946
Anglers			0	0	6	239	152	293	272	295	129	107	12	0	1,505
Charter excursions			0	0	2	68	44	67	66	70	26	21	2	0	366

Figure 1.—Total number of charter anglers (trips) on the Michigan waters of all the Great Lakes (including tributaries), 1990-2006.

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

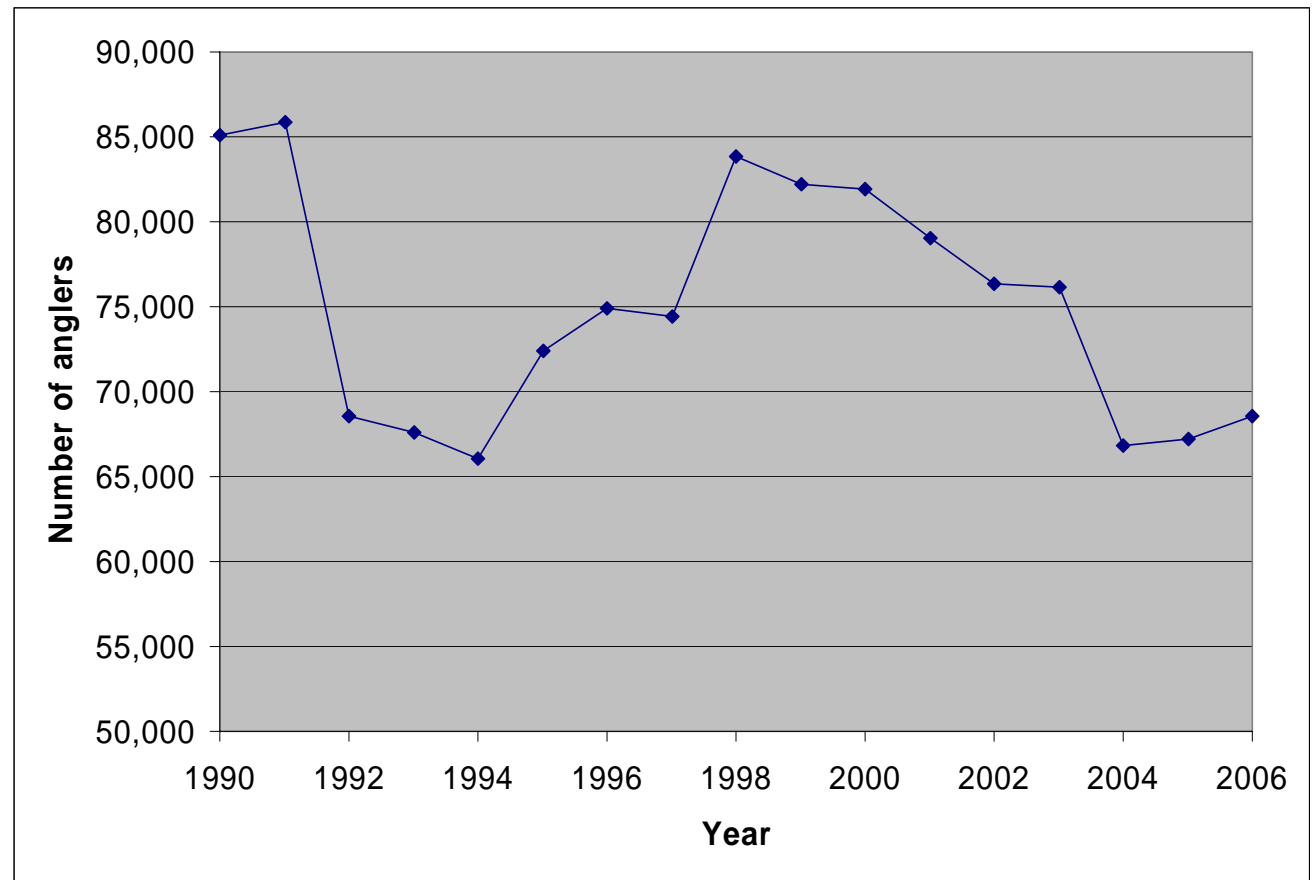


Figure 2(a).—Total number of charter anglers (trips) on the Michigan waters of Lake Michigan and Lake Huron (including tributaries), 1990-2006.

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

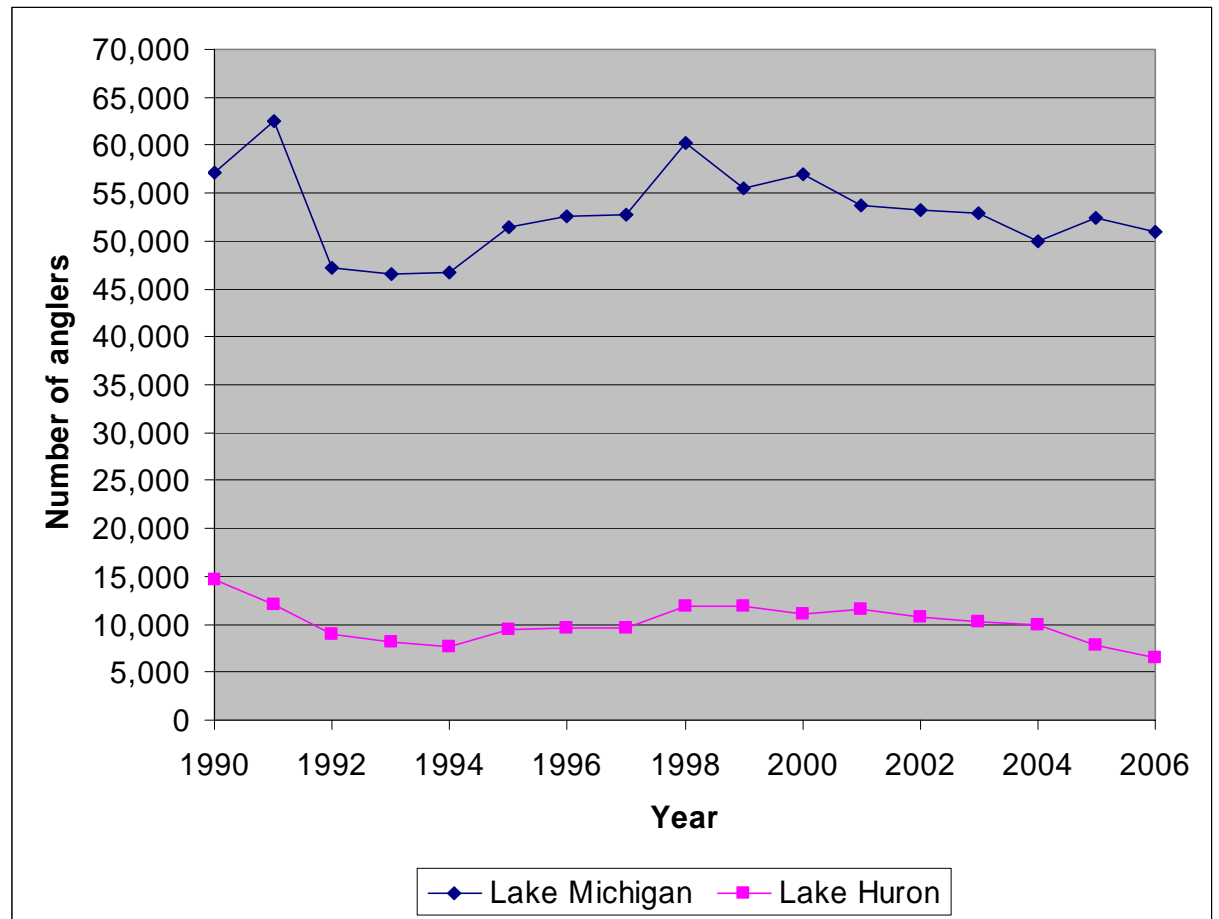


Figure 2 (b).—Total number of charter anglers (trips) on the Michigan waters of Lakes Erie, Superior, and the St. Clair System (including tributaries), 1990-2006.

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

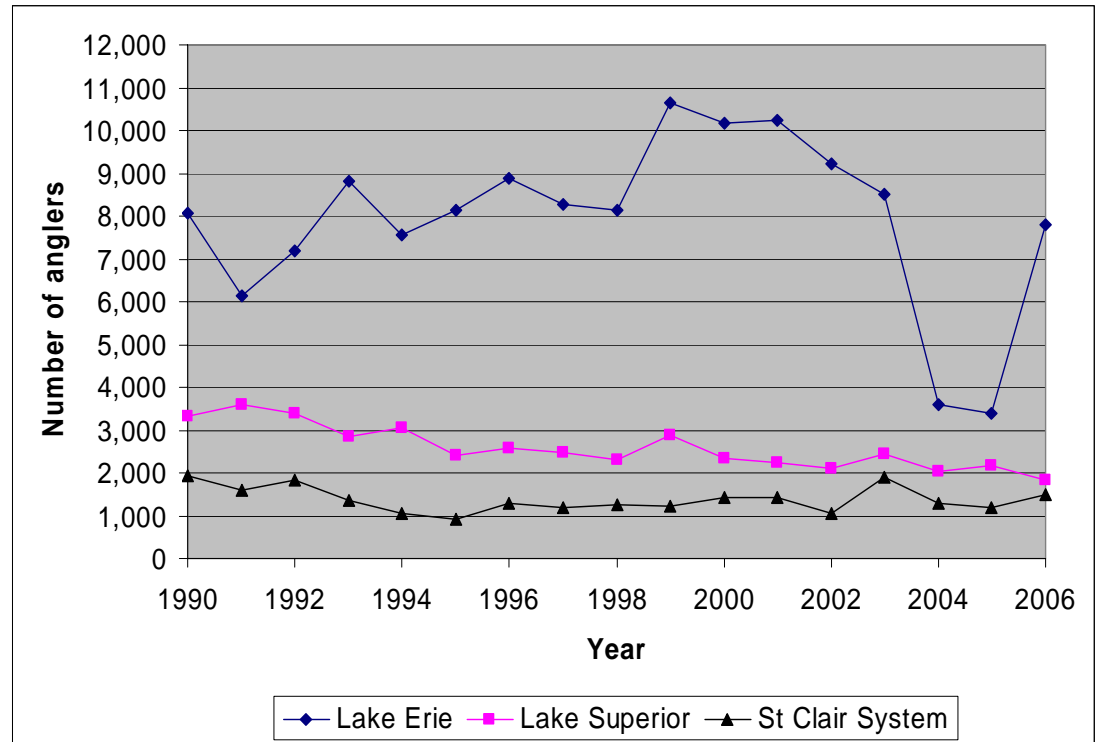


Figure 3. - Charter angler targeted harvest rates (fish per 5 angler hours) for Chinook salmon on Lake Michigan and Lake Huron, 1990-2006.

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

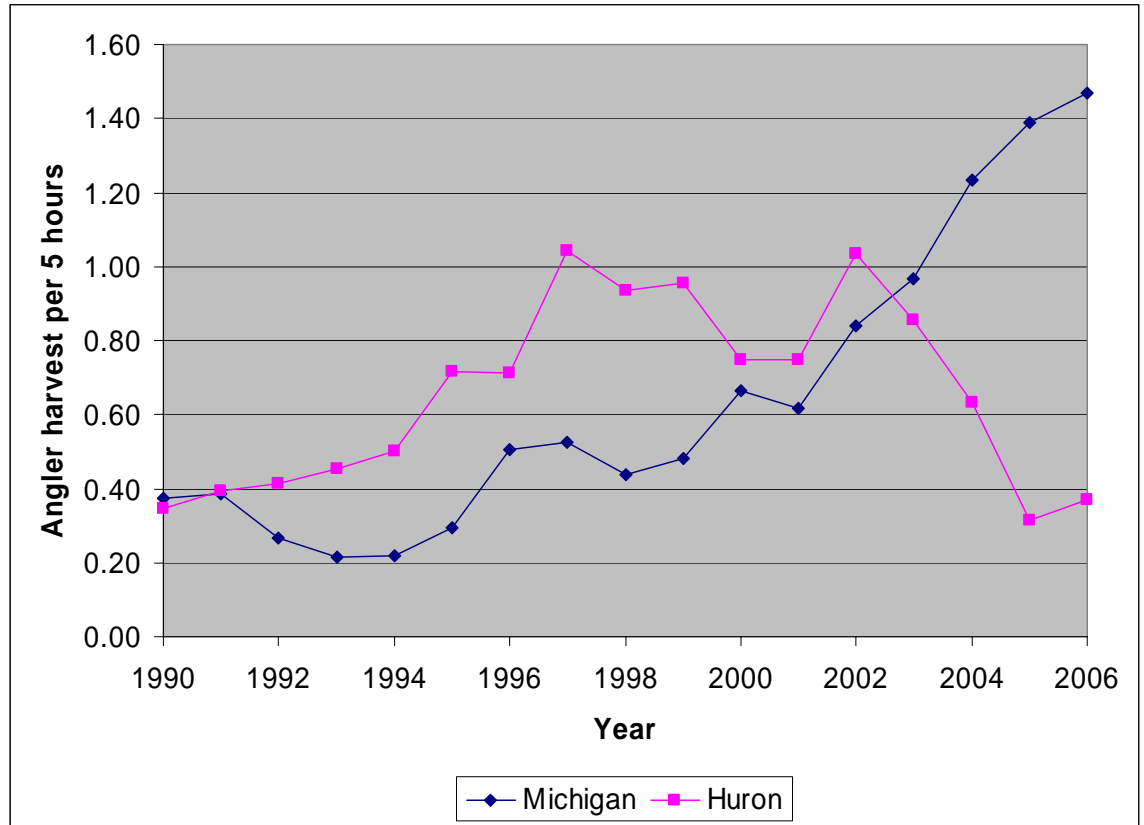


Figure 4.—Charter angler targeted harvest rates (fish per 5 angler hours) for lake trout on Lakes Michigan, Huron, and Superior, 1990-2006.

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

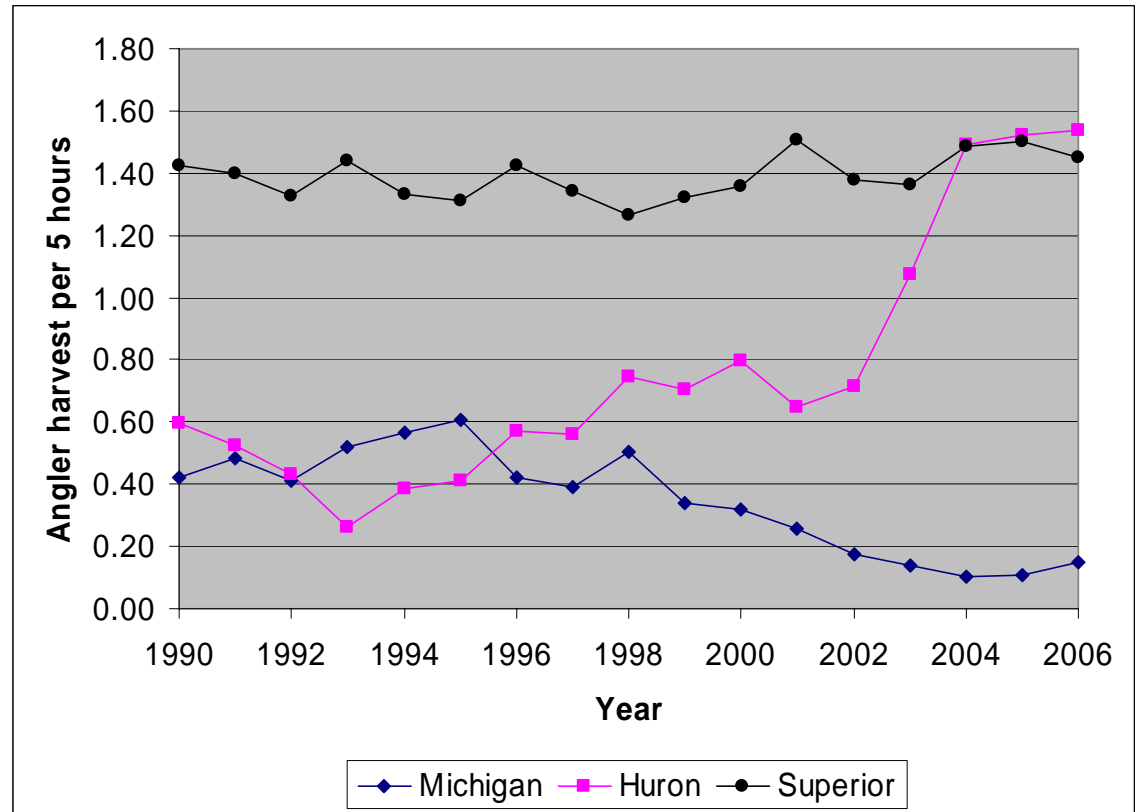


Figure 5.—Charter angler targeted harvest rates (fish per 5 angler hours) for coho salmon on Lakes Michigan, Huron, and Superior, 1990-2006.

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

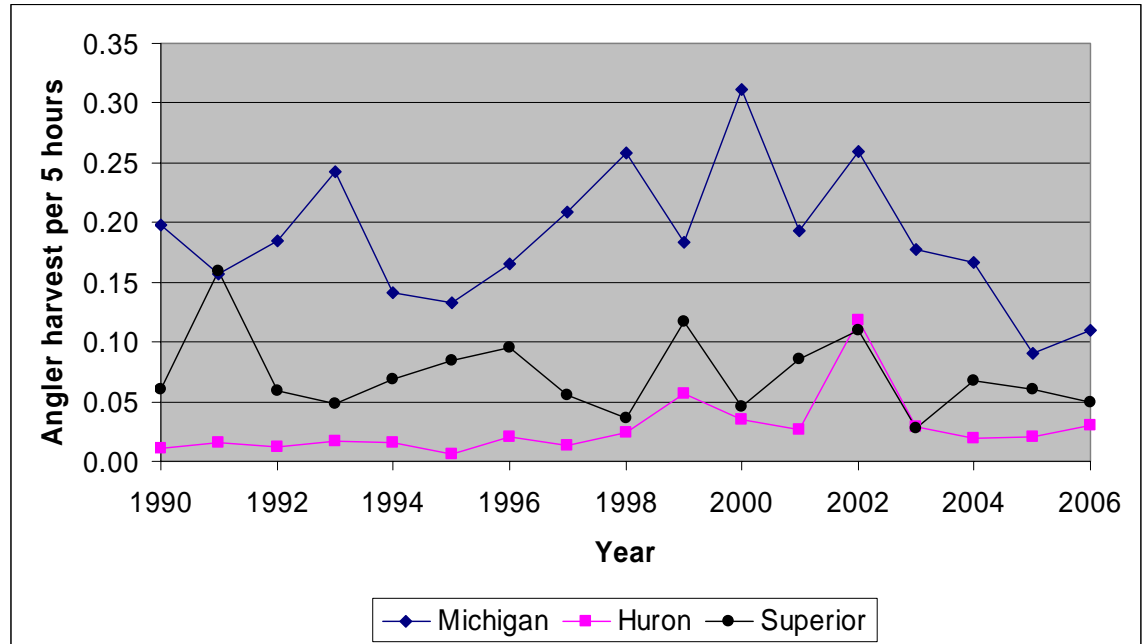


Figure 6.—Charter angler targeted harvest rates (fish per 5 angler hours) for rainbow trout (steelhead) on Lake Michigan and Lake Huron, 1990-2006.

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

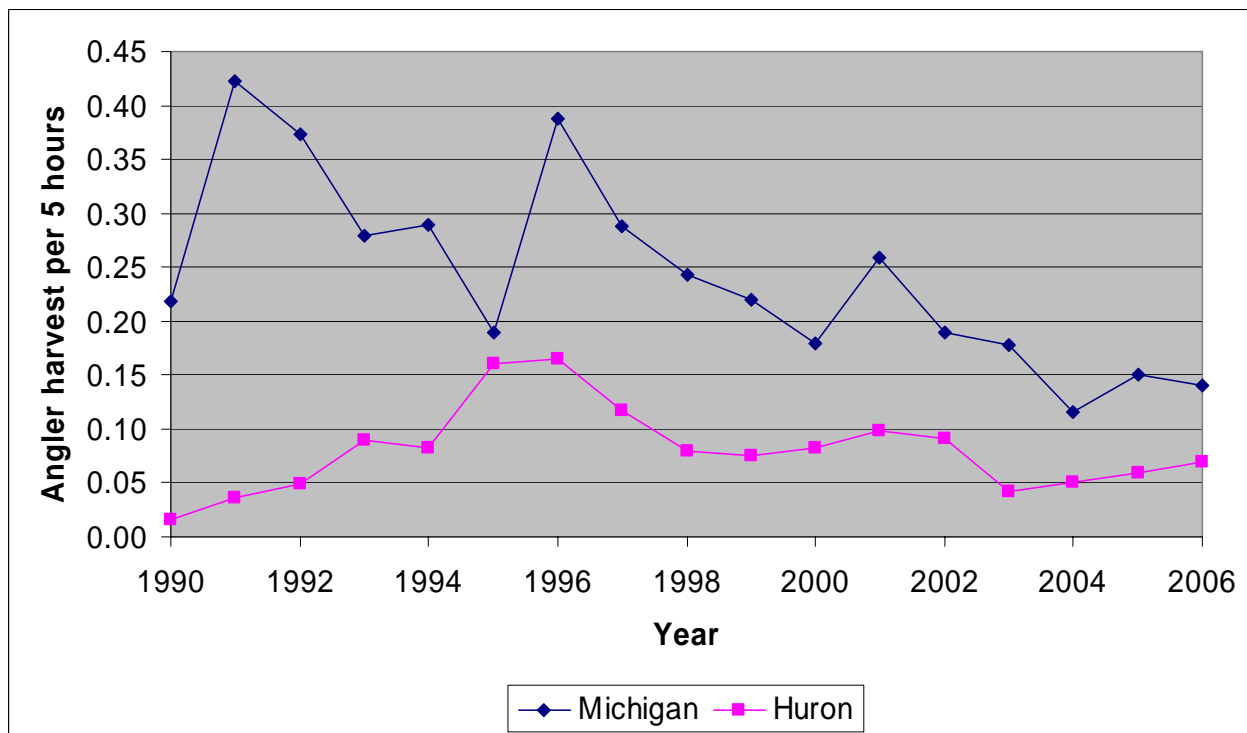


Figure 7.—Charter angler targeted harvest rates (fish per 5 angler hours) for brown trout on Lake Michigan and Lake Huron, 1990-2006.

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	<0.01

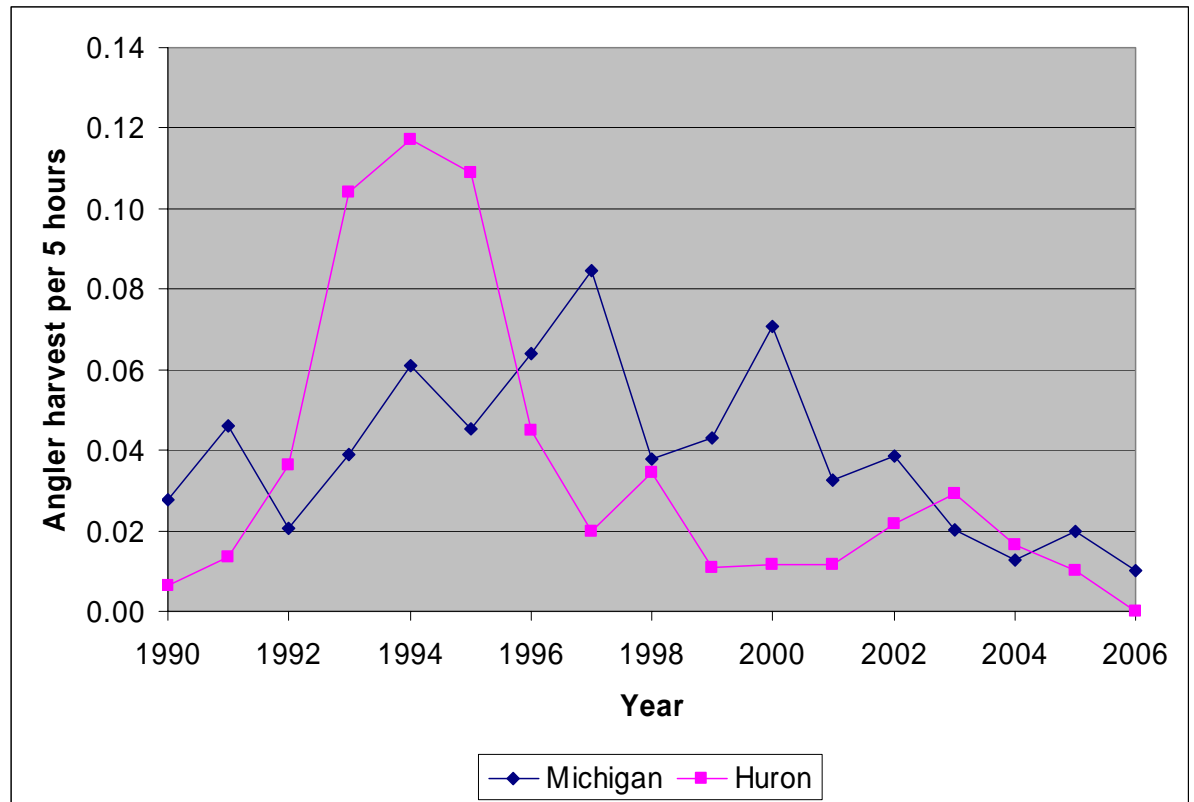


Figure 8.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch on Lake Michigan, 1990-2006.

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

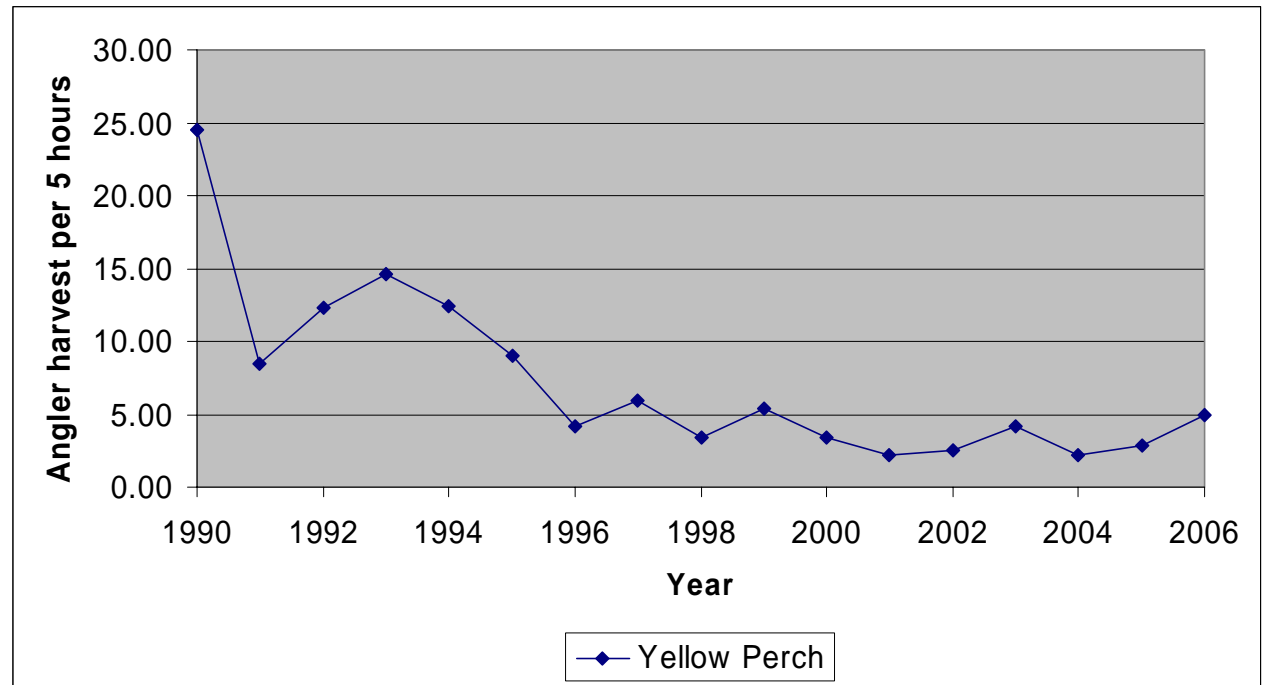


Figure 9.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on Lake Huron, 1990-2006.

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

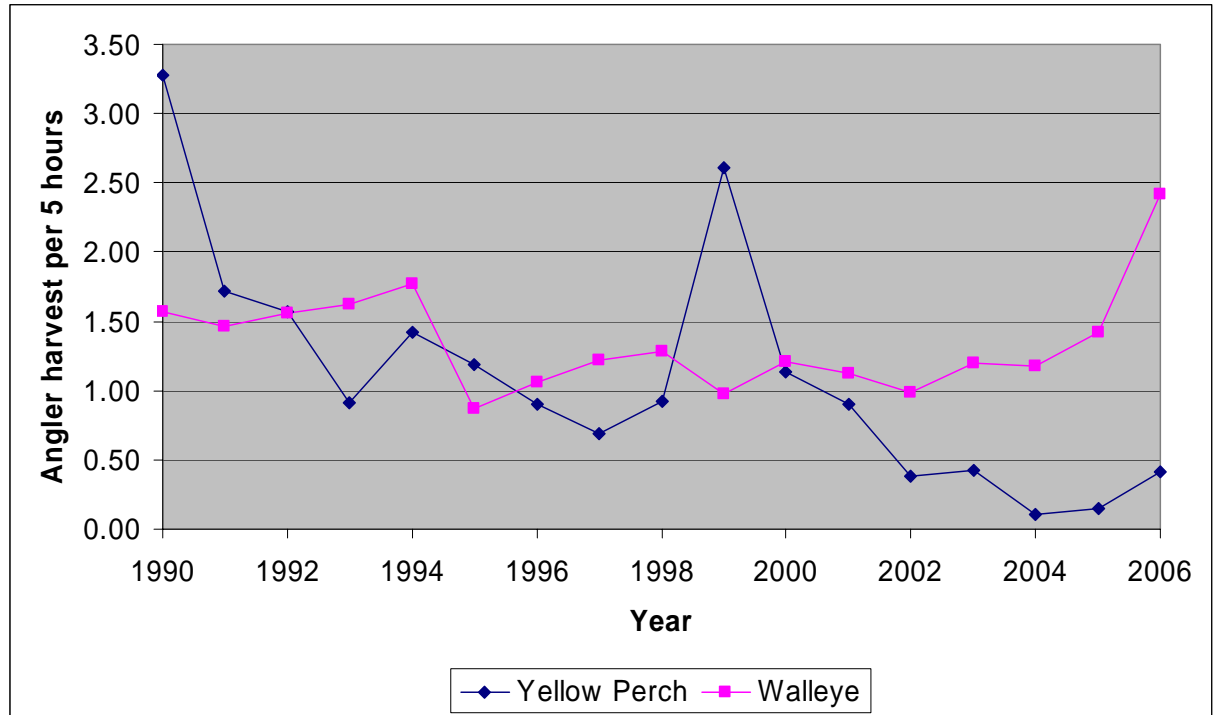


Figure 10.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on Lake Erie, 1990-2006.

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

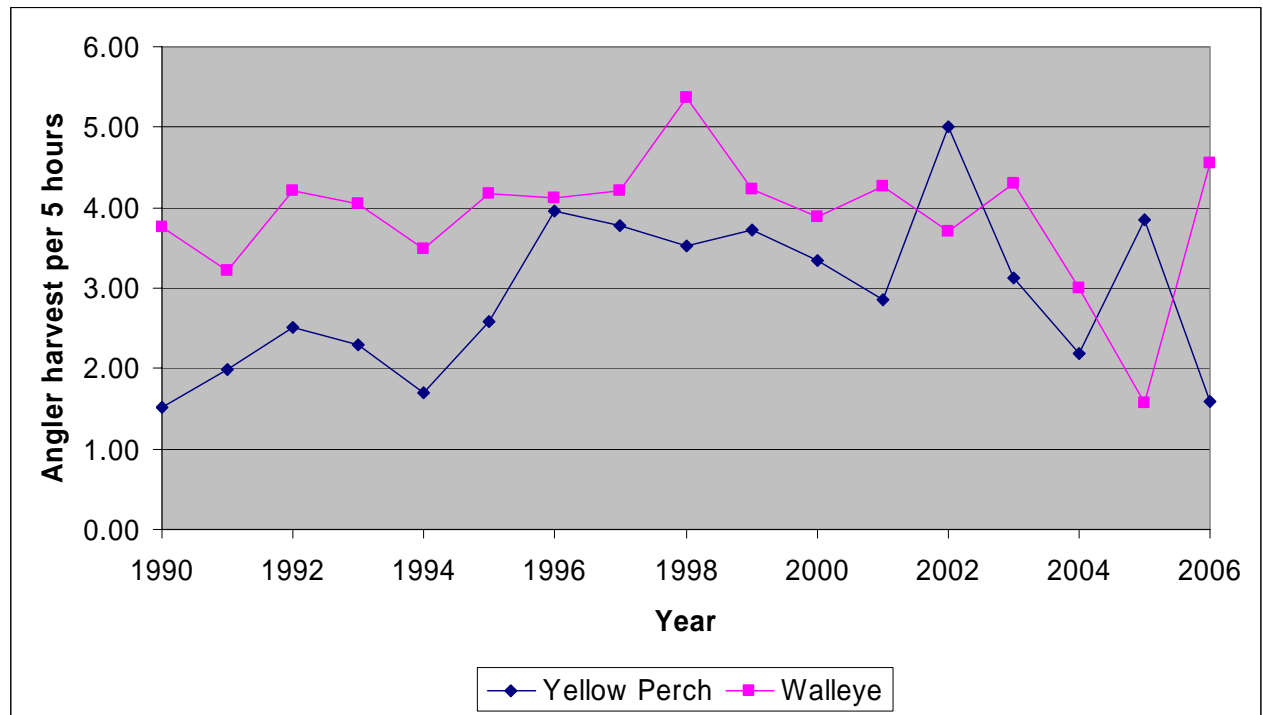


Figure 11.—Charter angler targeted harvest rates (fish per 5 angler hours) for yellow perch and walleye on the St. Clair system, 1990-2006.

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

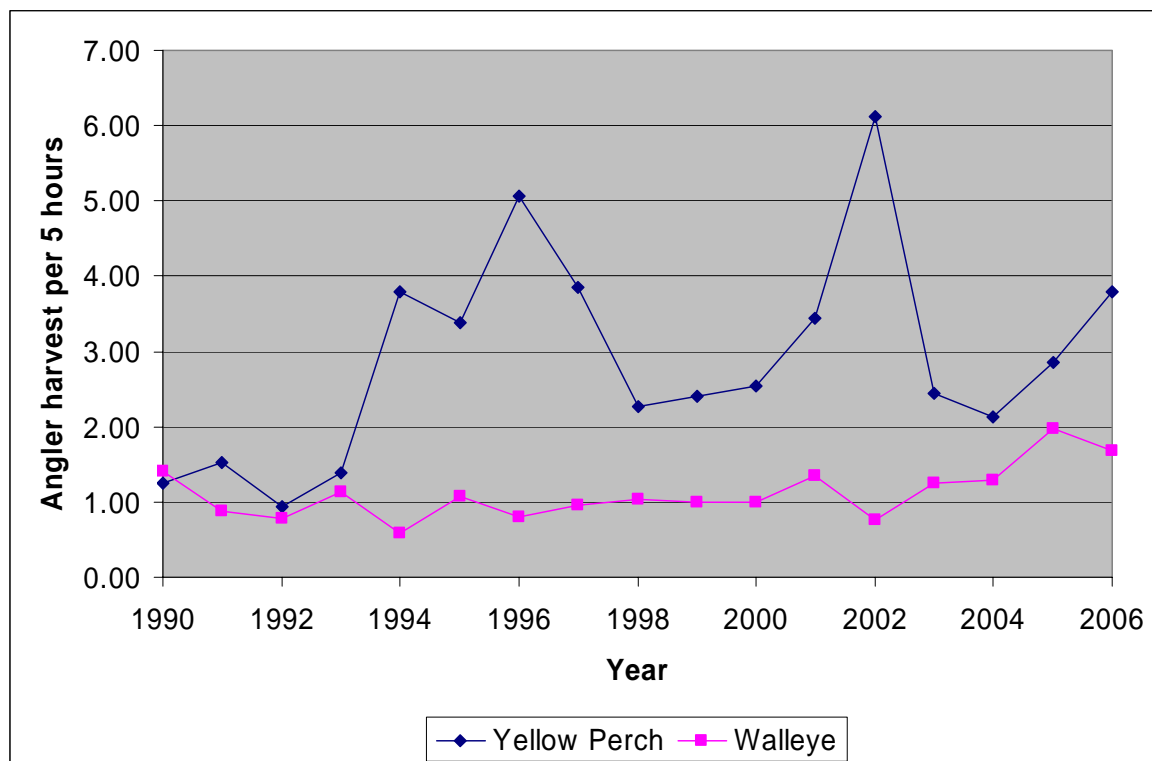


Figure 12.—Sea lamprey incidence (number attached per 100 fish) on Chinook salmon harvested by charter anglers on Lake Michigan and Lake Huron, 1990-2006.

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

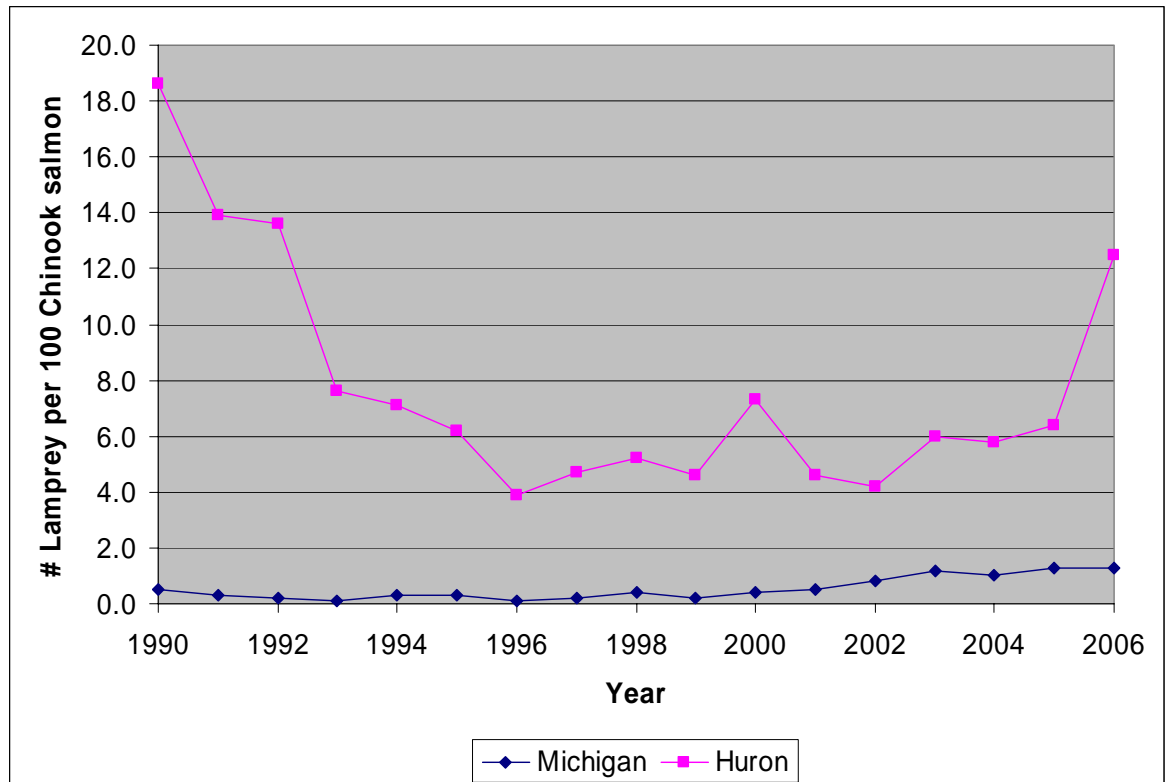


Figure 13.—Sea lamprey incidence (number attached per 100 fish) on lake trout harvested by charter anglers on Lakes Michigan, Huron, and Superior, 1990-2006.

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

