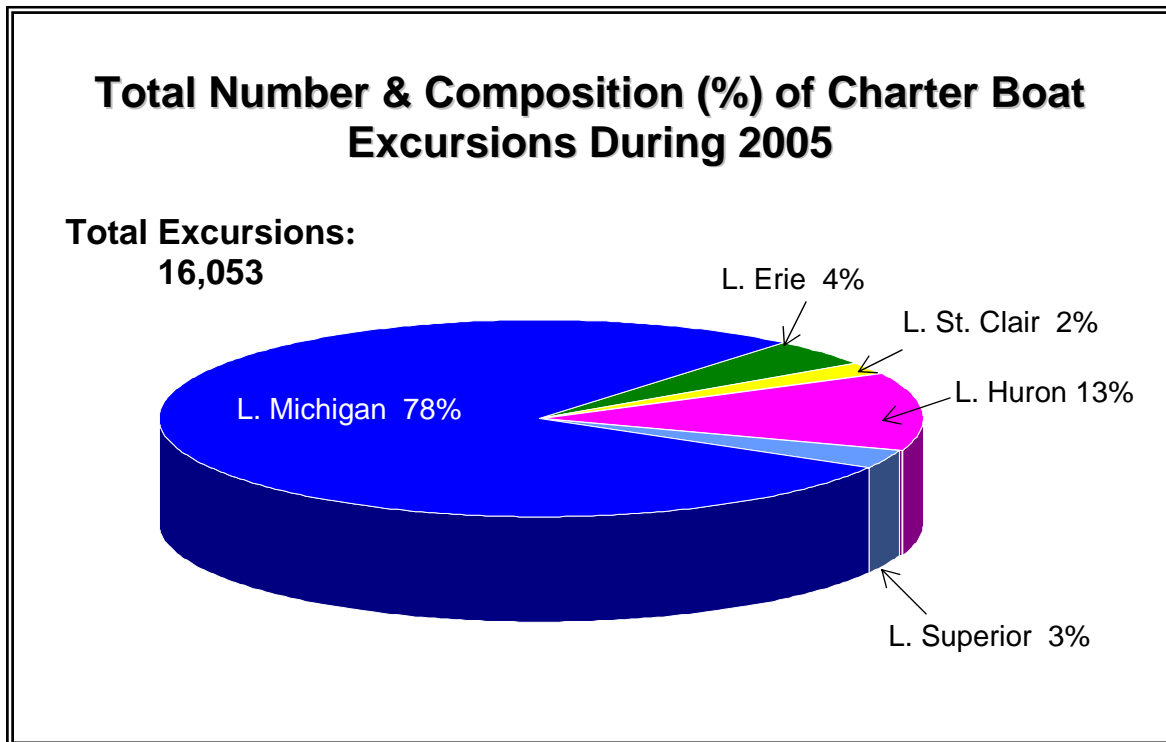


Charter Boat Effort and Fish Harvest from the Michigan Waters of the Great Lakes, 2005

Donna L. Wesander
and
David F. Clapp



Michigan Department of Natural Resources
Fisheries Division
Charlevoix Fisheries Research Station
April, 2006

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 2005, there were 600 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.

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). 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 had 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 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. The report form requires the following information regardless of fishing success: a MDNR assigned 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), number of resident and nonresident anglers, catch (number harvested) of major species, and number of sea lamprey seen attached to Chinook salmon and/or 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 the fishing effort and harvest of major sport fish.

The majority of charter businesses operate April through October. 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; the first monthly (after 10 days) reminder has been 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 each angler 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, and undefined) effort and uses one of these two efforts to calculate the harvest rates of individual species within each group.

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 2005 fishing season, an average of 76% 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 2005 was 5% less than in 2004. At the time of sending final notification letters for one or more delinquent months, 87% of the operators were in compliance. By January, 2006, 95% of all charter operators had complied with the law; this is 1% less than 2004 and 3% less than 2003.

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 2005, charter anglers participated in 16,053 charter excursions on the Michigan waters of Lakes Michigan, Huron, Erie, Superior, and the St. Clair system, including major tributaries. These excursions consisted of 67,037 angler trips and 391,022 angler hours (Tables 1-5, Figures 1-2). Relative to 2004 (which had 16,100 excursions, 66,845 angler trips, and 391,035 angler hours), the change in charter effort across all Great Lakes is less than 1%.

The number of excursions has varied over the last 15 years on all Great Lakes (Table 6). Comparing 2005 excursion data to 2004, there was less than a 1% decrease in total excursions;

for individual lakes, charter excursions increased on Lake Michigan (+4%) and Lake Superior (+5%), but decreased on Lake Huron (-20%), Lake Erie (-3%), and St. Clair system (-6%).

In 2005, 29% of all charter anglers were non-residents of Michigan. This figure has remained around 25-30% over the last few years. Non-residents frequent all the Great Lakes; however, Lake Superior charter operators continue to host the greatest percent of non-resident anglers (56%; Table 4).

Harvest

Charter operators reported a total of 163,081 fish harvested from the Michigan waters of the Great Lakes and its major tributaries in 2005 (Tables 1 through 5). Most of these fish were harvested from Lake Michigan (69%), followed by Lake Erie (13%), Lake Huron (10%), St. Clair system (5%), and Lake Superior (3%).

Historically, the most abundant species in the harvest has been yellow perch; however, over the last couple of 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 2005, Chinook salmon remained the most numerous species with 84,655 fish harvested (52% of the total harvest). Percent of total harvest for other species was as follows: yellow perch 15%, lake trout 14%, walleye 8%, rainbow trout 6%, coho salmon 3%, and brown trout 1%. The "other" species category accounted for 1% of the harvest; however, the species composition of this category is not fully known because MDNR does not require it to be identified.

Relative to 2004 total harvest, the 2005 Chinook salmon harvest of 84,655 fish is a 13% increase. The total harvest and percent change of other species in 2005 was: 25,291 yellow perch (+30%), 22,710 lake trout (-6%), 12,388 walleye (-29%), 9,082 rainbow trout (+21%), 5,632 coho salmon (-41%), and 1,108 brown trout (+22%).

The St. Clair system has the highest number of "other" species in the charter harvest. Many of the species targeted in the St. Clair system are not listed individually on the charter form (e.g.

smallmouth bass and muskellunge); therefore, they are grouped into the "other" fish category. The St. Clair system also supports a popular "catch and release" fishery for these species. Currently, species categorized as "other" are not differentiated, nor are released fish reported.

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 2005 was 123,187, which is a 5% increase (6,006 fish) from 2004.

Harvest rates

In 2005, charter anglers harvested 0.42 fish (all species from all lakes combined) per hour. Total harvest data (Tables 1 through 5) are lake-specific harvest 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 often 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 usually 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 of 'other' (undefined species) was combined with percid 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 rates will in most cases be greatly underestimated. The improved methodology had the greatest effect on percid harvest rates where the smaller proportion of the total effort occurs. The following discussion will focus on targeted harvest rates (Tables 7 through 11 and Figures 3 through 11).

Most charter excursions that took place on Michigan's Great Lakes waters during 2005

were aimed at the various species of salmonines. Comparing targeted harvest rates (fish per 5 angler hours) to 2004 data, Lake Michigan angler harvest rates increased for all reported species except coho salmon. Specific changes were as follows: Chinook salmon (+13%), lake trout (+10%), coho salmon (-47%), rainbow trout (+25%), brown trout (+100%), yellow perch (+35%), and walleye (+23%) (Figures 3 through 8). The targeted harvest rate reported in 2005 for Chinook salmon on Lake Michigan (1.39 fish per 5 hours of angler fishing) was the greatest recorded in the 15 year (1990-2005) data series (Figure 3).

On Lake Huron for 2005 (compared to 2004), targeted harvest rates of fish per 5 angler hours for coho salmon was unchanged. Rates increased for lake trout (+2%), rainbow trout (+20%), yellow perch (+36%), and walleye (+20%), while rates decreased for Chinook salmon (-50%) and brown trout (-50%) (Figures 3 through 7 and Figure 9). The harvest rate reported in 2005 for lake trout on Lake Huron (1.52 fish per 5 angler hours) was the greatest recorded in the 1990-2005 data series (Figure 4) while the rate for Chinook salmon (0.32 fish per 5 angler hours) was the lowest over the same data series (Figure 3).

Lake trout are the most important salmonine in the charter harvest from Lake Superior. Targeted harvest rates for lake trout on Lake Superior during 2005 increased slightly (+1%) while coho salmon rates decreased 14% as compared with 2004 (Figures 4 and 5). Other salmonine species (such as Chinook salmon 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 Lakes Erie and the St. Clair system. Targeted harvest rates for walleye by charter anglers declined on Lake Erie (-48%) and increased on the St. Clair system (+53%) during 2005 as compared to 2004, while rates for yellow perch increased for both Lake Erie (+76%) and the St. Clair system (+34%) (Figures 10 and 11).

Sea Lamprey Incidence

Sea lamprey incidence on Chinook salmon increased in both Lake Michigan and Lake Huron compared to previous years (Figure 12). Incidence was at its highest level in Lake Michigan since data were first collected in 1990. Incidence in Lake Huron also increased, but remained well below historical rates.

Sea lamprey incidence on lake trout increased in Lake Michigan and Lake Superior, but decreased in Lake Huron (Figure 13). Similar to Chinook salmon, the occurrence of lamprey on lake trout is the highest recorded for Lake Michigan. Lake Superior occurrence is close to that observed in the early-mid 1990's.

Past 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>

Acknowledgments

The authors wish to thank the Michigan Charter Boat Association for their support throughout the season; Cheryl Benson (Fisheries Division, Lansing), who entered the fishing trip data into the computer database; and Michelle Fish and Karen McCann (Fisheries Division, Charlevoix) who assisted with clerical tasks.

Table 1.— Total harvest per hour, harvest per excursion, number fish harvested, and fishing effort (angler hours, trips, and charter excursions) for charter boats fishing Michigan waters of Lake Michigan and its tributaries, 2005.

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	0.017	0.424	0	0	41	783	1,824	504	473	937	695	29	0	0	5,286
Chinook salmon	0.269	6.581	0	0	0	131	9,780	5,396	18,894	34,835	12,634	420	11	0	82,101
Rainbow trout	0.028	0.689	60	88	405	231	554	1,845	2,458	1,315	402	397	747	92	8,594
Brown trout	0.004	0.086	0	2	40	312	328	71	148	123	36	2	9	2	1,073
Lake trout	0.020	0.494	0	0	0	14	770	1,141	1,593	2,113	525	0	0	1	6,157
Yellow perch	0.020	0.500	0	0	0	14	374	2,020	1,633	1,424	704	68	0	0	6,237
Walleye	0.007	0.164	20	21	4	1	302	422	197	282	335	219	226	15	2,044
Other	0.001	0.030	0	0	2	0	7	101	111	100	23	27	0	0	371
Lamprey on:															
Chinook salmon			0	0	0	4	178	79	276	450	94	1	0	0	1,082
Lake trout			0	0	0	0	24	32	50	42	21	0	0	0	169
Angler hours			330	943	2,222	4,924	32,305	33,787	70,067	109,393	40,401	5,519	4,338	1,091	305,320
Angler trips			46	132	313	772	5,433	5,756	12,122	19,044	7,222	843	636	159	52,478
Anglers															
Resident			9	41	132	441	3,705	3,878	8,294	13,691	5,287	425	225	72	36,200
Nonresident			37	91	181	331	1,728	1,878	3,828	5,353	1,935	418	411	87	16,278
Charter excursions			15	39	93	187	1,218	1,336	2,832	4,480	1,772	270	192	42	12,476

Table 2.—Total harvest per hour, harvest per excursion, number fish harvested, and fishing effort (angler hours, trips, and charter excursions) for charter boats fishing Michigan waters of Lake Huron and its tributaries, 2005.

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	0.078	0	0	0	0	27	17	54	58	6	1	0	0	163
Chinook salmon	0.057	1.212	0	0	0	0	160	296	768	832	439	31	0	0	2,526
Rainbow trout	0.010	0.215	0	0	0	26	26	35	271	64	18	9	0	0	449
Brown trout	0.001	0.016	0	0	0	0	8	4	11	6	4	0	0	0	33
Lake trout	0.273	5.769	0	0	0	0	1,464	2,347	3,698	3,653	861	6	0	0	12,029
Yellow perch	0.003	0.060	0	0	0	8	0	6	19	29	63	0	0	0	125
Walleye	0.032	0.668	0	0	0	10	105	598	412	200	65	3	0	0	1,393
Other	0.008	0.176	0	0	0	0	19	103	195	34	12	3	0	0	366
Lamprey on:															
Chinook salmon			0	0	0	0	5	23	72	48	11	3	0	0	162
Lake trout			0	0	0	0	23	15	29	57	14	1	0	0	139
Angler hours			0	0	0	221	4,221	8,435	14,306	12,882	3,704	225	0	0	43,994
Angler trips			0	0	0	34	724	1,478	2,478	2,353	707	38	0	0	7,812
Anglers															
Resident			0	0	0	33	684	1,322	2,033	1,923	611	28	0	0	6,634
Nonresident			0	0	0	1	40	156	445	430	96	10	0	0	1,178
Charter excursions			0	0	0	14	193	387	652	617	208	14	0	0	2,085

Table 3.—Total harvest per hour, harvest per excursion, number fish harvested, and fishing effort (angler hours, trips, and charter excursions) for charter boats fishing Michigan waters of Lake Erie, 2005.

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	0.769	21.032	0	0	0	0	635	544	214	5,467	5,885	1,851	0	0	14,596
Walleye	0.314	8.573	0	0	0	62	0	2,998	2,589	273	26	2	0	0	5,950
Other	0.008	0.209	0	0	0	0	25	20	6	70	24	0	0	0	145
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	120	148	7,965	5,853	2,336	2,091	464	0	0	18,977
Angler trips			0	0	0	20	30	1,414	1,021	424	393	90	0	0	3,392
Anglers															
Resident			0	0	0	16	24	1,291	830	373	360	64	0	0	2,958
Nonresident			0	0	0	4	6	123	191	51	33	26	0	0	434
Charter excursions			0	0	0	6	7	285	211	88	79	18	0	0	694

Table 4.—Total harvest per hour, harvest per excursion, number fish harvested, and fishing effort (angler hours, trips, and charter excursions) for charter boats fishing Michigan waters of Lake Superior, 2005.

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	0.012	0.382	0	0	0	0	0	118	44	8	13	0	0	0	183
Chinook salmon	0.002	0.056	0	0	0	0	0	11	8	4	3	1	0	0	27
Rainbow trout	0.003	0.081	0	0	0	0	2	26	6	3	2	0	0	0	39
Brown trout	0.000	0.004	0	0	0	0	0	0	1	1	0	0	0	0	2
Lake trout	0.299	9.445	0	0	0	0	186	1,197	1,638	1,158	314	31	0	0	4,524
Yellow perch	0.001	0.021	0	0	0	0	10	0	0	0	0	0	0	0	10
Walleye	0.000	0.008	0	0	0	0	4	0	0	0	0	0	0	0	4
Other	0.000	0.010	0	0	0	0	1	0	1	3	0	0	0	0	5
Lamprey on:															
Chinook salmon			0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	0	5	17	25	6	0	0	0	53
Angler hours			0	0	0	0	632	4,124	5,764	3,351	1,124	156	0	0	15,151
Angler trips			0	0	0	0	94	530	818	529	174	26	0	0	2,171
Anglers															
Resident			0	0	0	0	60	215	322	254	90	7	0	0	948
Nonresident			0	0	0	0	34	315	496	275	84	19	0	0	1,223
Charter excursions			0	0	0	0	20	108	177	129	39	6	0	0	479

Table 5.—Total harvest per hour, harvest per excursion, number fish harvested, and fishing effort (angler hours, trips, and charter excursions) for charter boats fishing the Michigan waters of the St. Clair System (Lake St. Clair, St. Clair River, and Detroit River), 2005.

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	0.003	0	0	0	1	0	0	0	0	0	0	0	0	1
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	0.570	13.552	0	0	0	0	134	123	222	736	536	2,154	418	0	4,323
Walleye	0.395	9.395	0	0	0	949	895	304	671	142	14	22	0	0	2,997
Other	0.175	4.163	0	0	0	0	2	426	289	465	144	2	0	0	1,328
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	2,025	1,437	879	1,174	1,067	496	461	41	0	7,580
Angler trips			0	0	0	292	230	130	186	172	84	81	9	0	1,184
Anglers															
Resident			0	0	0	240	210	118	182	164	84	81	9	0	1,088
Nonresident			0	0	0	52	20	12	4	8	0	0	0	0	96
Charter excursions			0	0	0	89	69	34	45	42	19	18	3	0	319

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 2004-2005.

Lake	Year															
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
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	12,476
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
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
Superior	755	791	743	618	455	515	524	497	517	607	482	477	430	505	455	479
St. Clair	779	643	509	414	299	336	407	394	432	389	348	433	246	466	339	319
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	16,053

Table 7.—Targeted harvest per hour, harvest per excursion and number fish harvested by species with total fishing effort (angler hours, trips, and charter excursions) for charter boats fishing Michigan waters of Lake Michigan and its tributaries, 2005.

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	0.018	0.439	0	0	41	783	1,824	504	473	937	695	28	0	0	5,285
Chinook salmon	0.278	6.820	0	0	0	131	9,780	5,395	18,894	34,834	12,631	418	11	0	82,094
Rainbow trout	0.029	0.713	47	86	404	231	554	1,844	2,458	1,315	402	397	747	92	8,577
Brown trout	0.004	0.089	0	2	40	312	328	71	148	123	36	2	9	2	1,073
Lake trout	0.021	0.512	0	0	0	14	770	1,141	1,593	2,113	525	0	0	1	6,157
Yellow perch	0.582	13.556	0	0	0	14	374	1,873	1,576	1,367	679	68	0	0	5,951
Walleye	0.197	4.590	18	17	2	1	301	422	196	266	334	219	225	14	2,015
Other	0.034	0.795	0	0	1	0	5	101	108	93	14	27	0	0	349
Lamprey on:															
Chinook salmon			0	0	0	4	178	79	276	450	94	1	0	0	1,082
Lake trout			0	0	0	0	24	32	50	42	21	0	0	0	169
Angler hours			330	943	2,222	4,924	32,305	33,787	70,067	109,393	40,401	5,519	4,338	1,091	305,320
Angler trips			46	132	313	772	5,433	5,756	12,122	19,044	7,222	843	636	159	52,478
Anglers															
Resident			9	41	132	441	3,705	3,878	8,294	13,691	5,287	425	225	72	36,200
Nonresident			37	91	181	331	1,728	1,878	3,828	5,353	1,935	418	411	87	16,278
Charter excursions			15	39	93	187	1,218	1,336	2,832	4,480	1,772	270	192	42	12,476

Table 8.—Targeted harvest per hour, harvest per excursion and number fish harvested by species with total fishing effort (angler hours, trips, and charter excursions) for charter boats fishing Michigan waters of Lake Huron and its tributaries, 2005.

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	0.086	0	0	0	0	27	17	54	57	6	1	0	0	162
Chinook salmon	0.063	1.336	0	0	0	0	160	296	765	831	438	31	0	0	2,521
Rainbow trout	0.011	0.236	0	0	0	26	26	35	269	63	18	9	0	0	446
Brown trout	0.001	0.016	0	0	0	0	8	4	8	6	4	0	0	0	30
Lake trout	0.303	6.374	0	0	0	0	1,463	2,347	3,698	3,652	861	6	0	0	12,027
Yellow perch	0.029	0.631	0	0	0	8	0	6	19	29	63	0	0	0	125
Walleye	0.284	6.141	0	0	0	10	103	595	349	123	33	3	0	0	1,216
Other	0.049	1.061	0	0	0	0	6	54	133	15	2	0	0	0	210
Lamprey on:															
Chinook salmon			0	0	0	0	5	23	72	48	11	3	0	0	162
Lake trout			0	0	0	0	23	15	29	57	14	1	0	0	139
Angler hours			0	0	0	221	4,221	8,435	14,306	12,882	3,704	225	0	0	43,994
Angler trips			0	0	0	34	724	1,478	2,478	2,353	707	38	0	0	7,812
Anglers															
Resident			0	0	0	33	684	1,322	2,033	1,923	611	28	0	0	6,634
Nonresident			0	0	0	1	40	156	445	430	96	10	0	0	1,178
Charter excursions			0	0	0	14	193	387	652	617	208	14	0	0	2,085

Table 9.—Targeted harvest per hour, harvest per excursion and number fish harvested by species with total fishing effort (angler hours, trips, and charter excursions) for charter boats fishing Michigan waters of Lake Erie, 2005.

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	0.769	21.032	0	0	0	0	635	544	214	5,467	5,885	1,851	0	0	14,596
Walleye	0.314	8.573	0	0	0	62	0	2,998	2,589	273	26	2	0	0	5,950
Other	0.008	0.209	0	0	0	0	25	20	6	70	24	0	0	0	145
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	120	148	7,965	5,853	2,336	2,091	464	0	0	18,977
Angler trips			0	0	0	20	30	1,414	1,021	424	393	90	0	0	3,392
Anglers															
Resident			0	0	0	16	24	1,291	830	373	360	64	0	0	2,958
Nonresident			0	0	0	4	6	123	191	51	33	26	0	0	434
Charter excursions			0	0	0	6	7	285	211	88	79	18	0	0	694

Table 10.—Targeted harvest per hour, harvest per excursion and number fish harvested by species with total fishing effort (angler hours, trips, and charter excursions) for charter boats fishing Michigan waters of Lake Superior, 2005.

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	0.012	0.383	0	0	0	0	0	118	44	8	13	0	0	0	183
Chinook salmon	0.002	0.056	0	0	0	0	0	11	8	4	3	1	0	0	27
Rainbow trout	0.003	0.082	0	0	0	0	2	26	6	3	2	0	0	0	39
Brown trout	0.000	0.004	0	0	0	0	0	0	1	1	0	0	0	0	2
Lake trout	0.299	9.464	0	0	0	0	186	1,197	1,638	1,158	314	31	0	0	4,524
Yellow perch	0.833	10.000	0	0	0	0	10	0	0	0	0	0	0	0	10
Walleye	0.333	4.000	0	0	0	0	4	0	0	0	0	0	0	0	4
Other	0.083	1.000	0	0	0	0	1	0	0	0	0	0	0	0	1
Lamprey on:															
Chinook salmon			0	0	0	0	0	0	0	0	0	0	0	0	0
Lake trout			0	0	0	0	0	5	17	25	6	0	0	0	53
Angler hours			0	0	0	0	632	4,124	5,764	3,351	1,124	156	0	0	15,151
Angler trips			0	0	0	0	94	530	818	529	174	26	0	0	2,171
Anglers															
Resident			0	0	0	0	60	215	322	254	90	7	0	0	948
Nonresident			0	0	0	0	34	315	496	275	84	19	0	0	1,223
Charter excursions			0	0	0	0	20	108	177	129	39	6	0	0	479

Table 11.—Targeted harvest per hour, harvest per excursion and number fish harvested by species with total fishing effort (angler hours, trips, and charter excursions) for charter boats fishing Michigan waters of St. Clair System (Lake St. Clair, St. Clair River, and Detroit River), 2005.

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	0.570	13.552	0	0	0	0	134	123	222	736	536	2,154	418	0	4,323
Walleye	0.395	9.395	0	0	0	949	895	304	671	142	14	22	0	0	2,997
Other	0.175	4.163	0	0	0	0	2	426	289	465	144	2	0	0	1,328
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	2,025	1,437	879	1,174	1,067	496	461	41	0	7,580
Angler trips			0	0	0	292	230	130	186	172	84	81	9	0	1,184
Anglers															
Resident			0	0	0	240	210	118	182	164	84	81	9	0	1,088
Nonresident			0	0	0	52	20	12	4	8	0	0	0	0	96
Charter excursions			0	0	0	89	69	34	45	42	19	18	3	0	319

Figure 1.—Total number of charter anglers (trips) on the Michigan waters of all the Great Lakes (including tributaries), 1990-2005.

Year	Number of 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	67,037

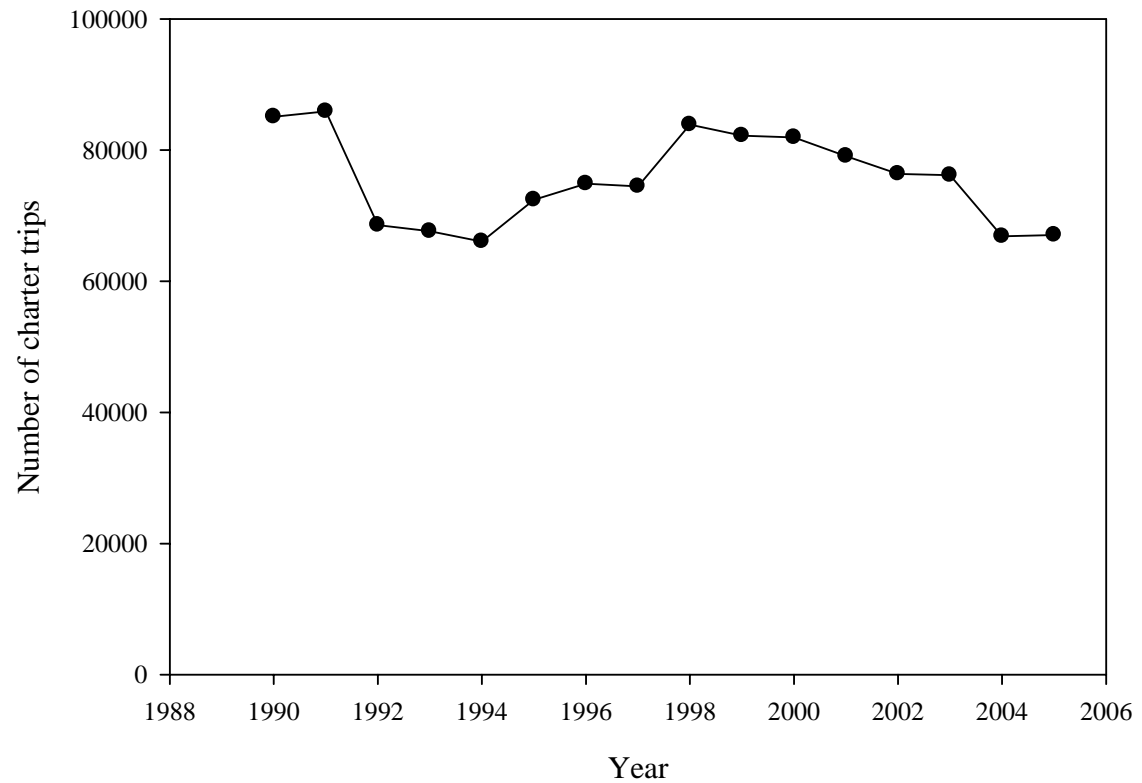


Figure 2(a).—Total number of charter anglers (trips) on the Michigan waters of Lake Michigan and Lake Huron (including tributaries), 1990-2005.

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	52,478	7,812

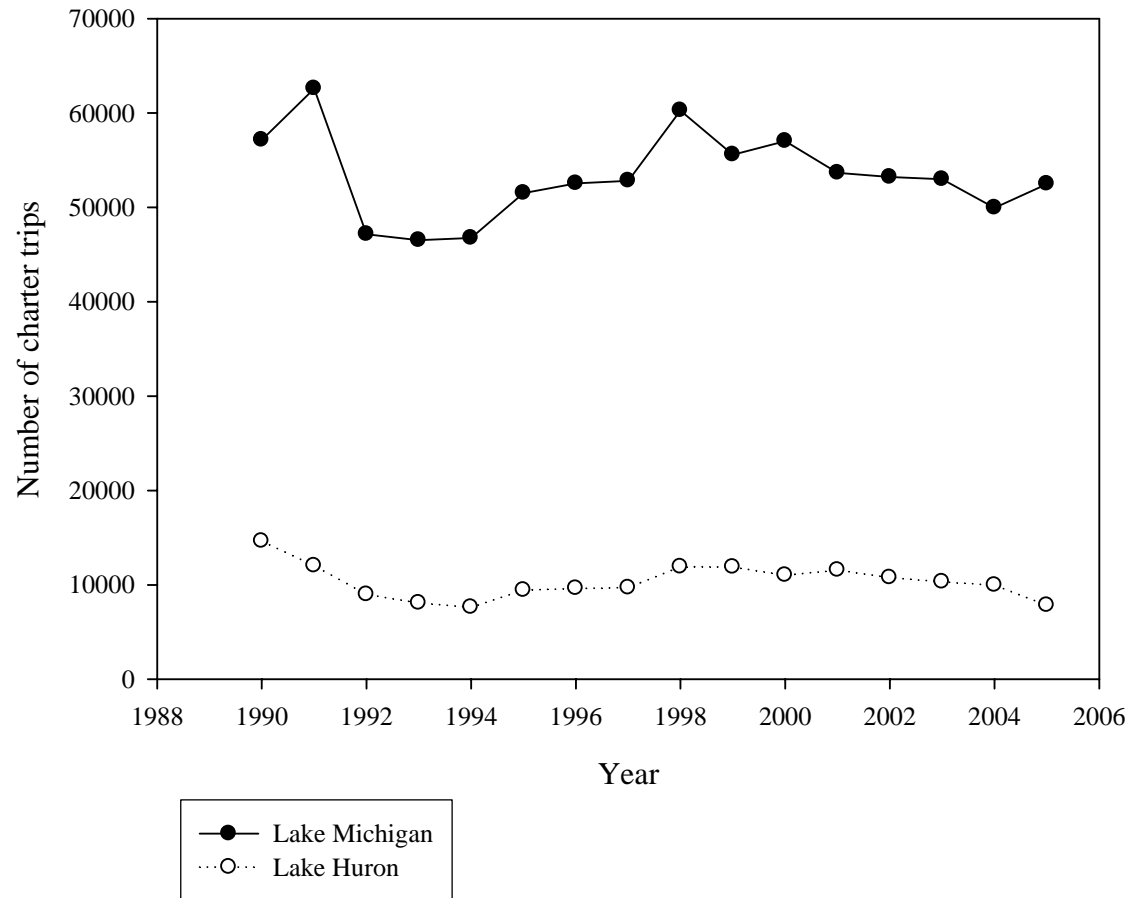


Figure 2 (b).—Total number of charter anglers (trips) on the Michigan waters of Lakes Erie, Superior, and the St. Clair System (including tributaries), 1990-2005.

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

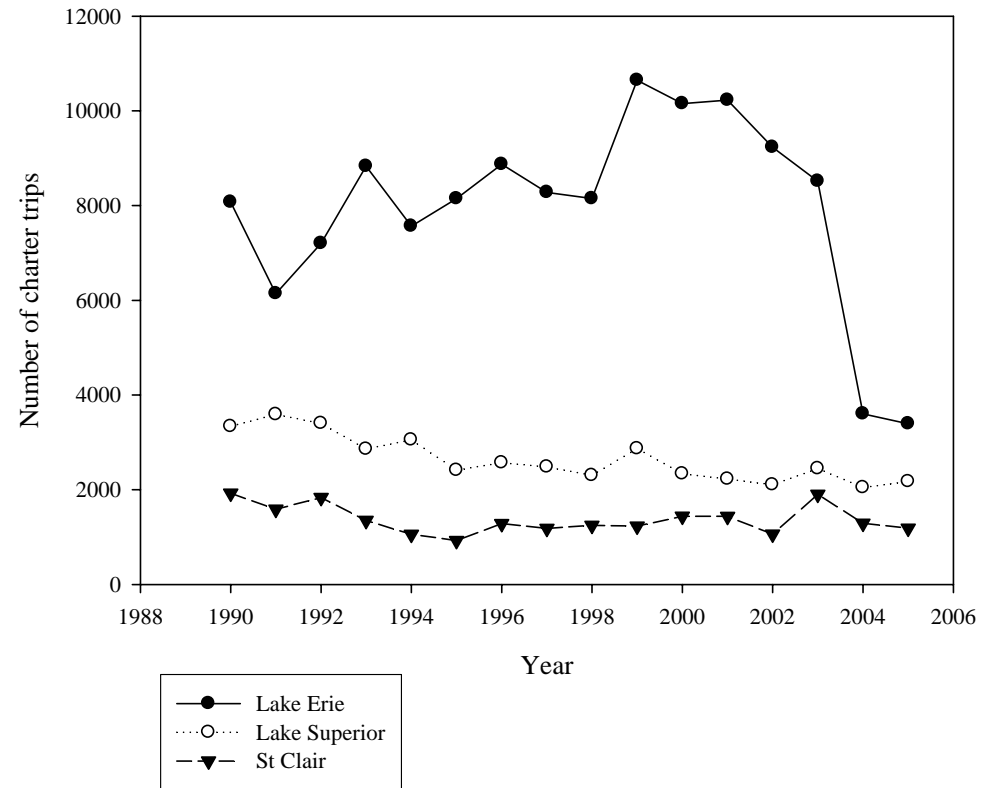


Figure 3. - Charter angler harvest rates (fish per 5 angler hours) for Chinook salmon on Lake Michigan and Lake Huron, 1990-2005.

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

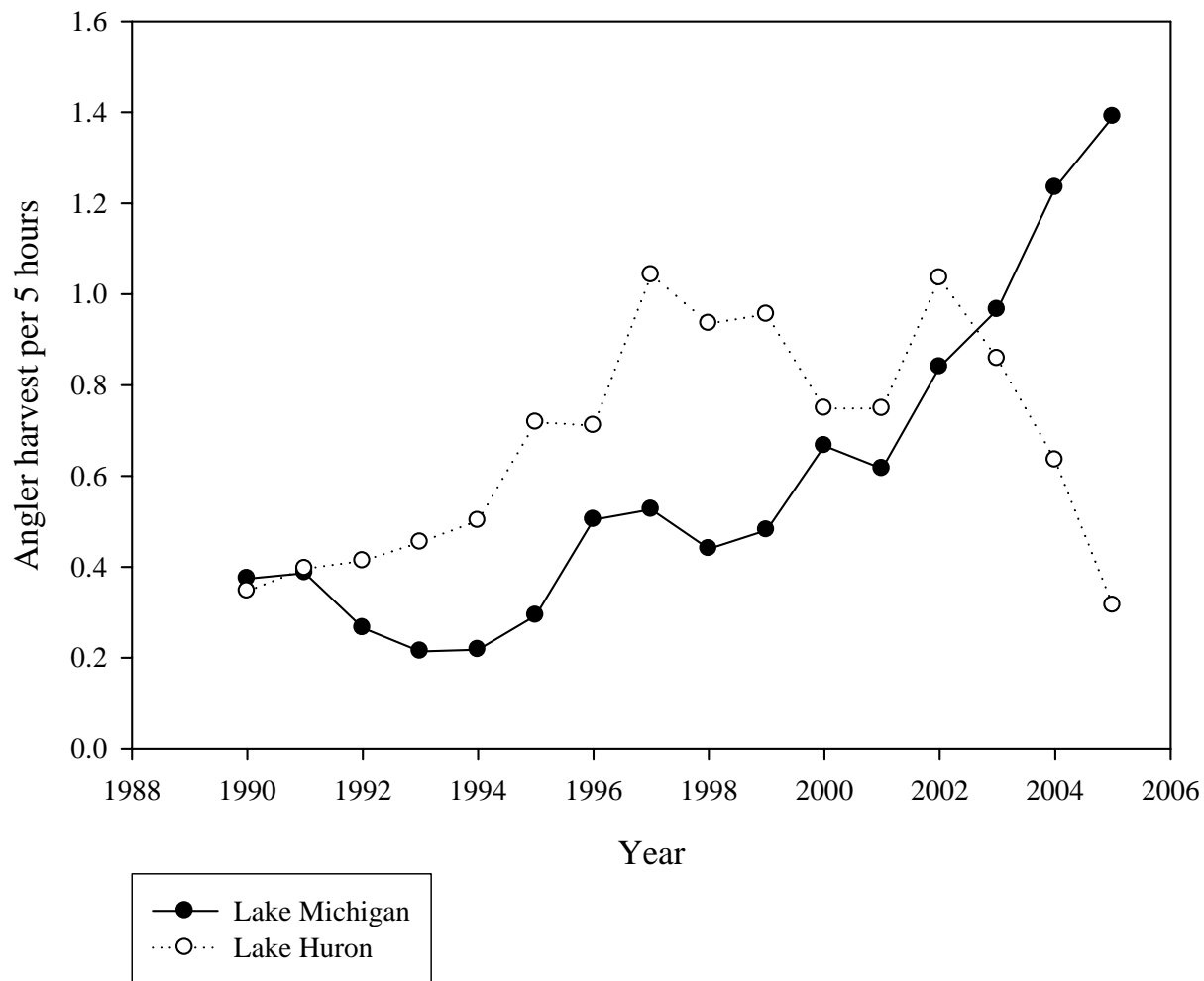


Figure 4.—Charter angler harvest rates (fish per 5 angler hours) for lake trout on Lakes Michigan, Huron, and Superior, 1990-2005.

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

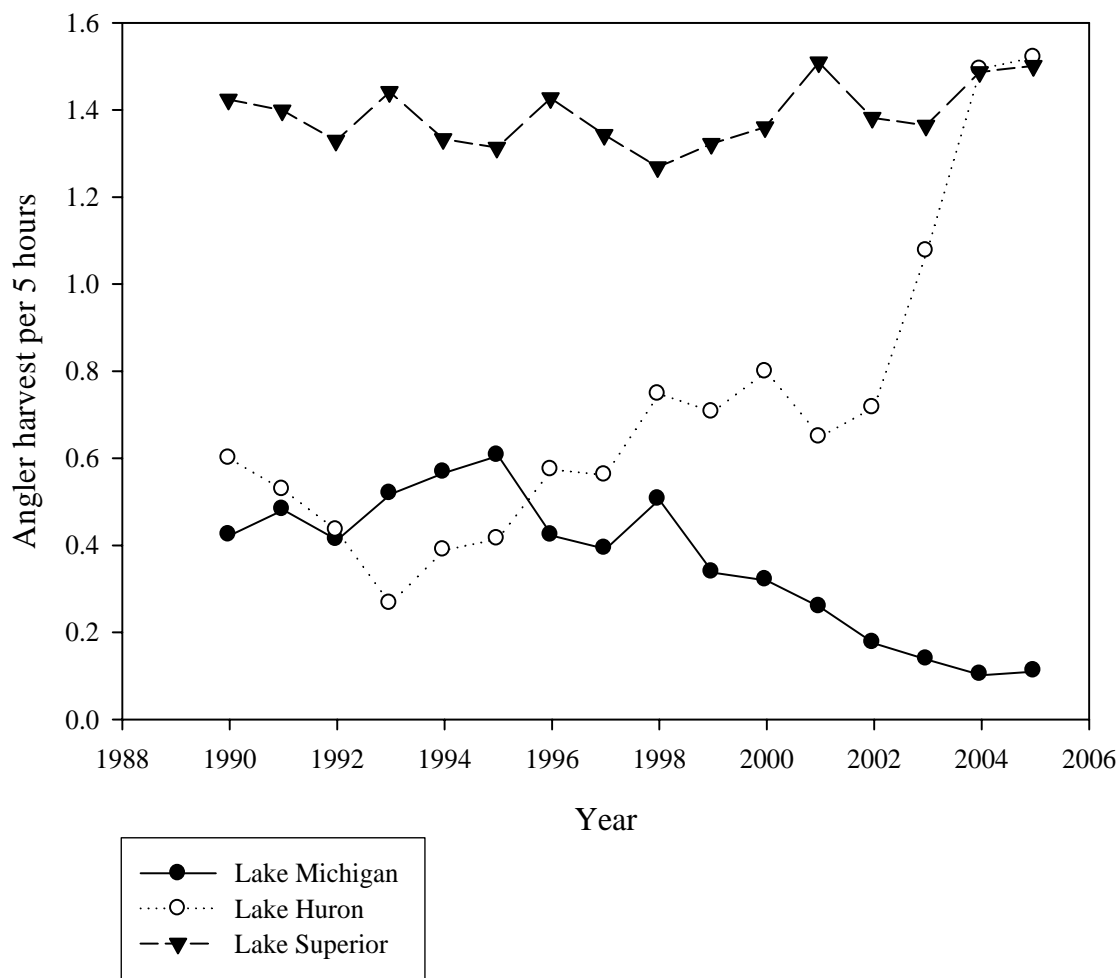


Figure 5.—Charter angler harvest rates (fish per 5 angler hours) for coho salmon on Lakes Michigan, Huron, and Superior, 1990-2005.

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

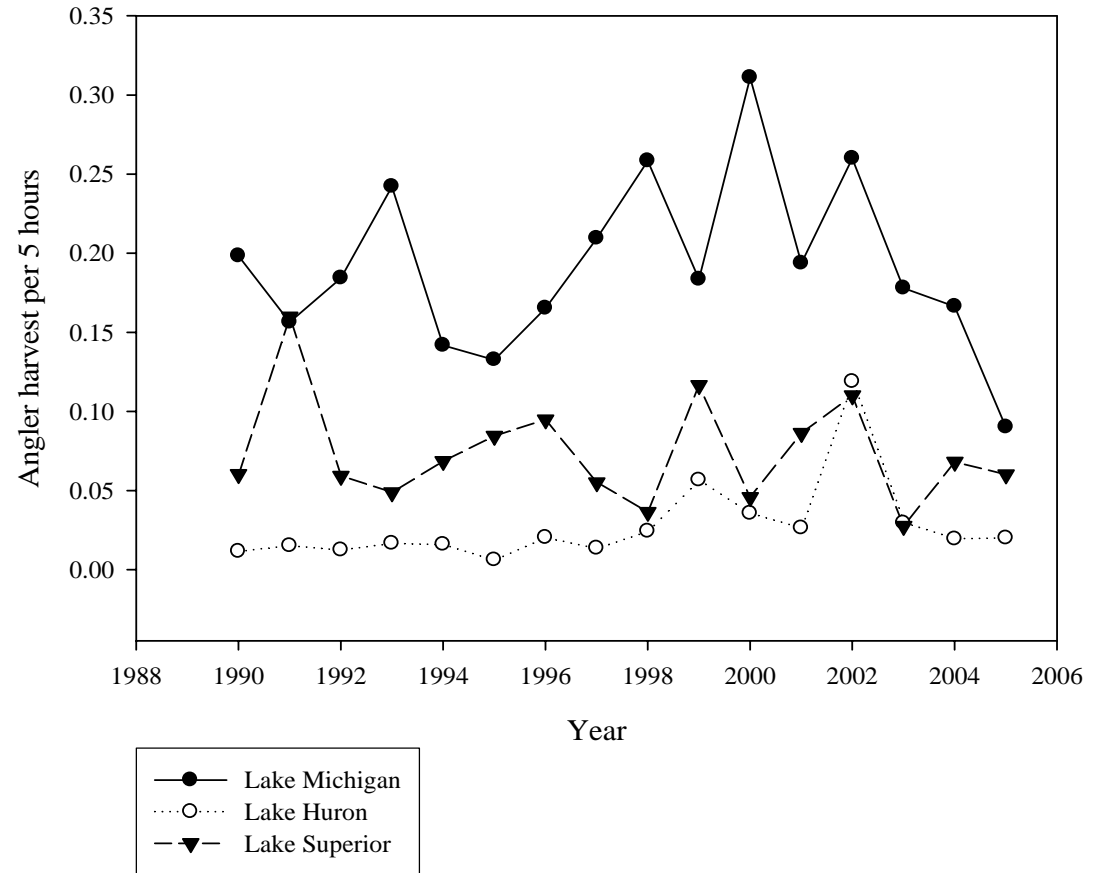


Figure 6.—Charter angler harvest rates (fish per 5 angler hours) for rainbow trout (steelhead) on Lake Michigan and Lake Huron, 1990-2005.

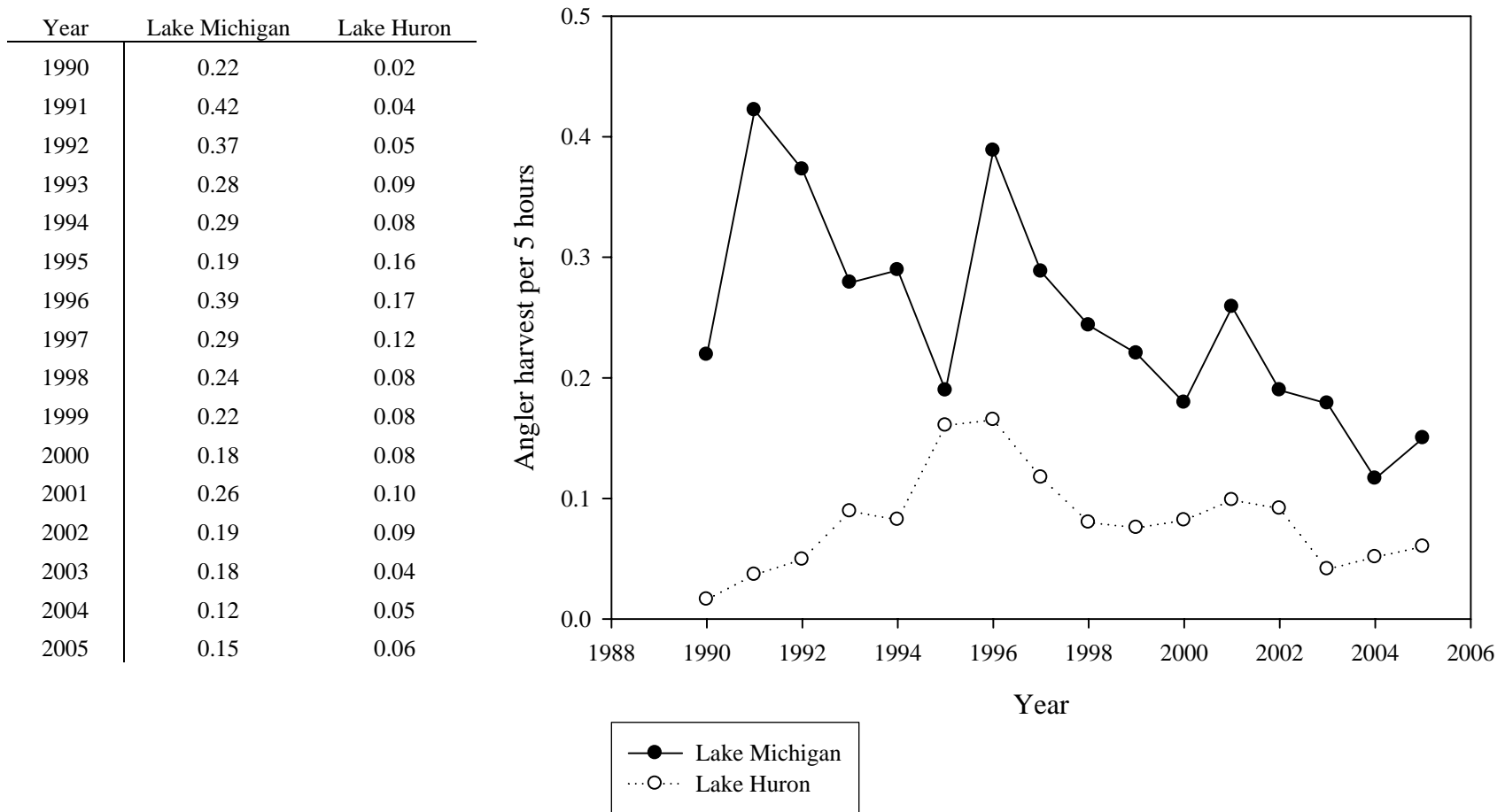


Figure 7.—Charter angler harvest rates (fish per 5 angler hours) for brown trout on Lake Michigan and Lake Huron, 1990-2005.

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

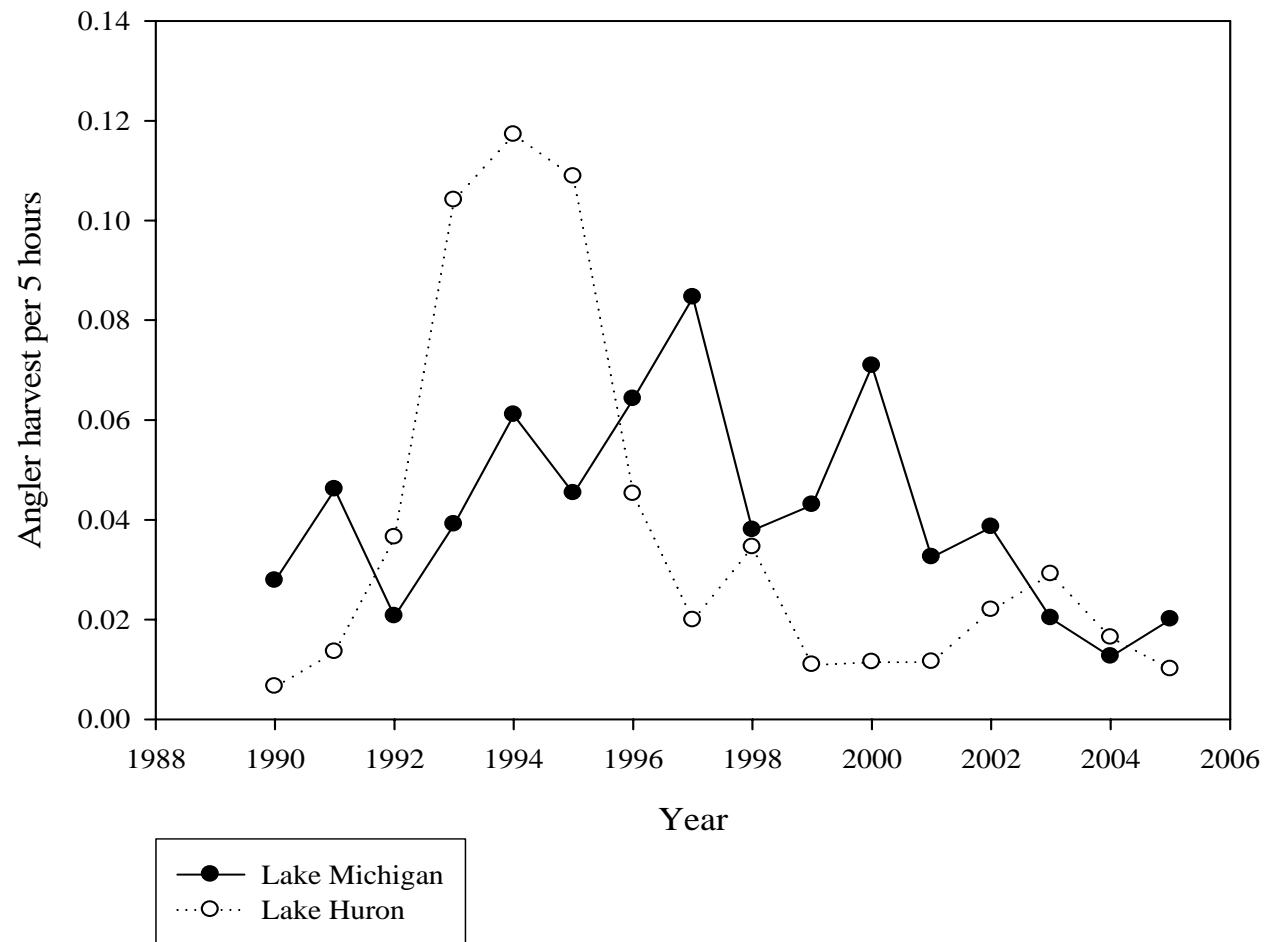


Figure 8.—Charter angler harvest rates (fish per 5 angler hours) for yellow perch on Lake Michigan, 1990-2005.

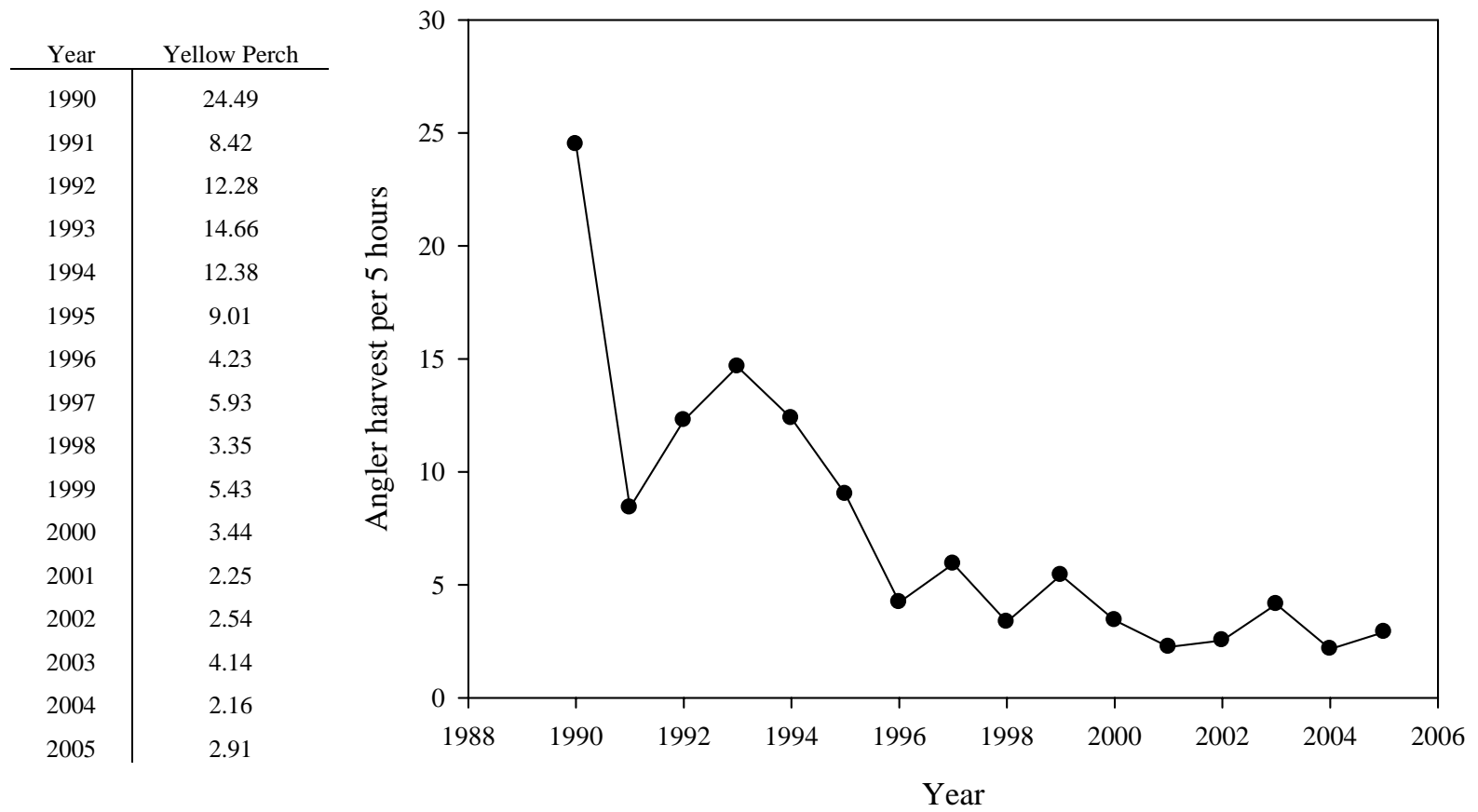


Figure 9.—Charter angler harvest rates (fish per 5 angler hours) for yellow perch and walleye on Lake Huron, 1990-2005.

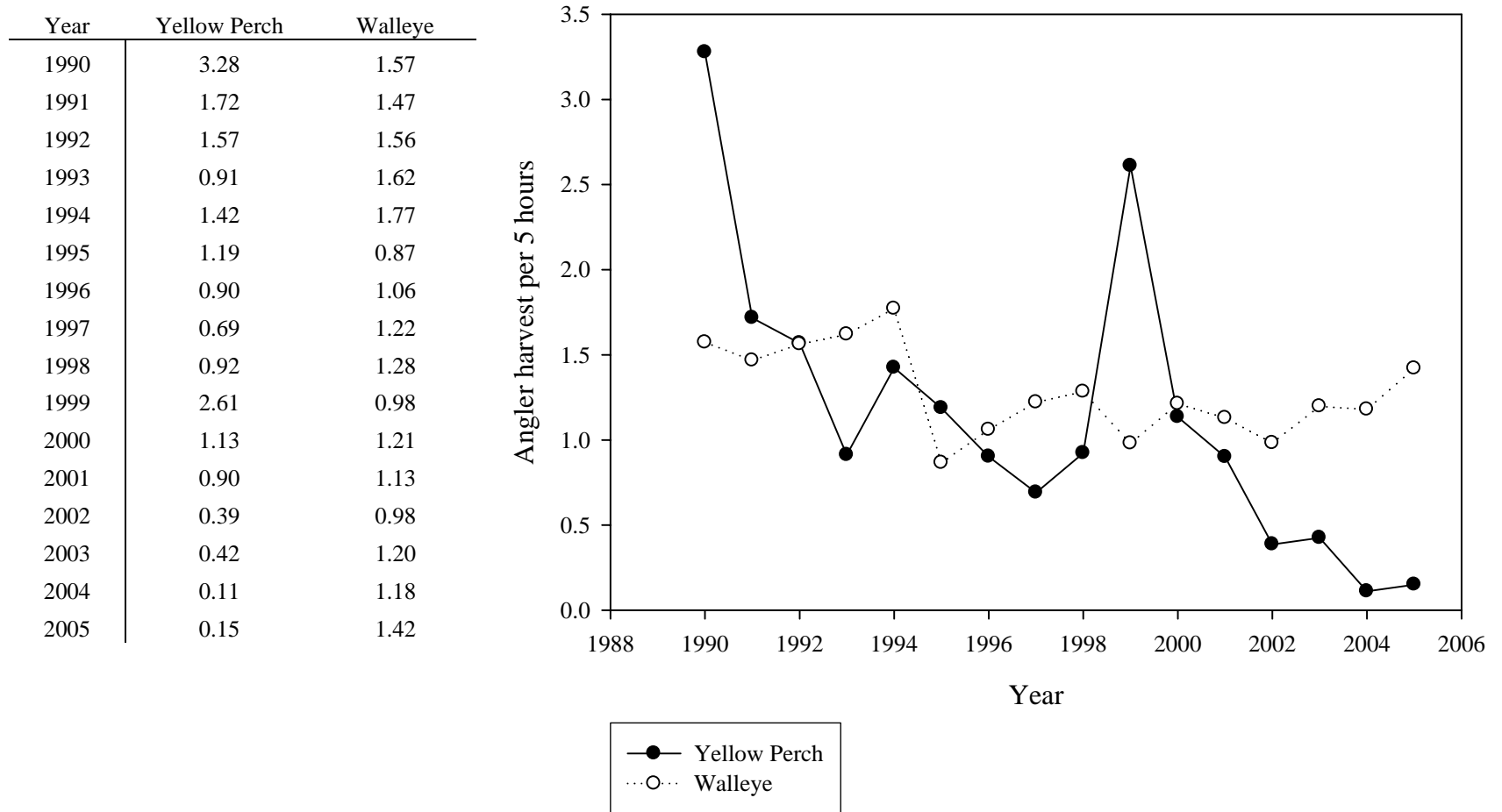


Figure 10.—Charter angler harvest rates (fish per 5 angler hours) for yellow perch and walleye on Lake Erie, 1990-2005.

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

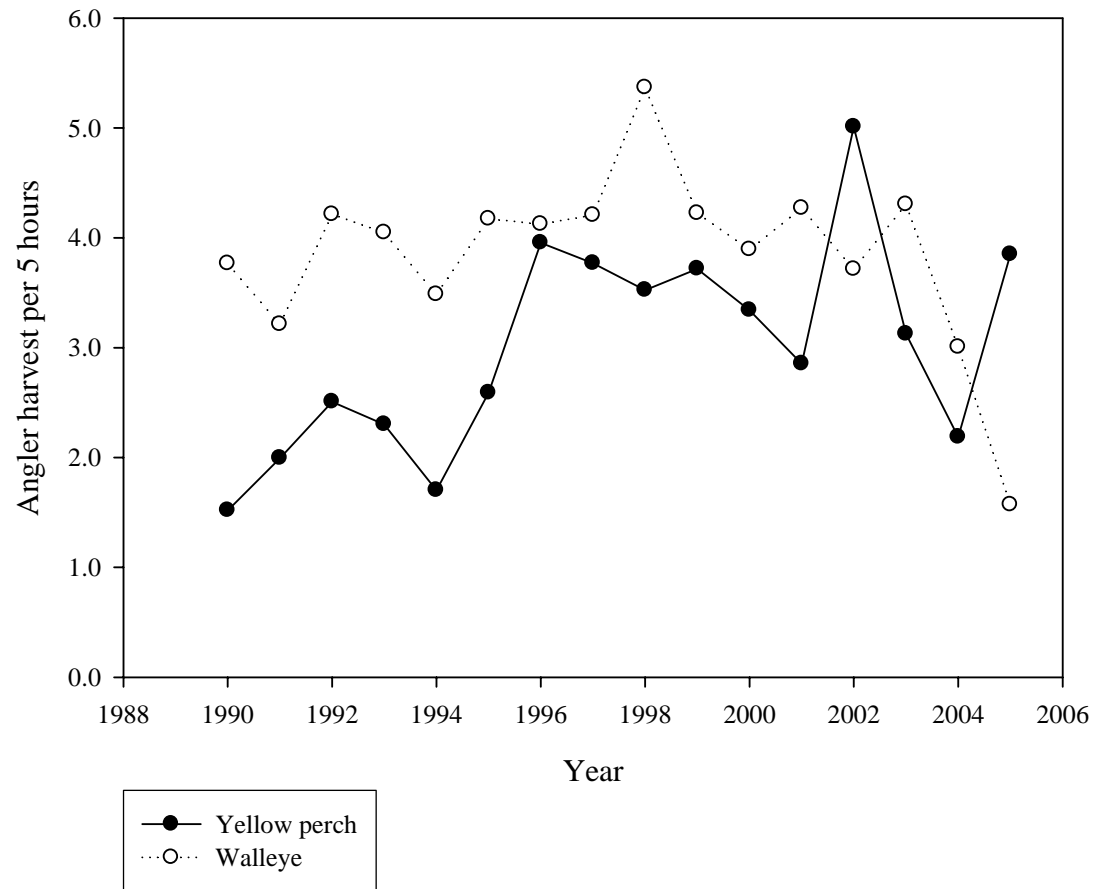


Figure 11.—Charter angler harvest rates (fish per 5 angler hours) for yellow perch and walleye on the St. Clair system, 1990-2005.

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

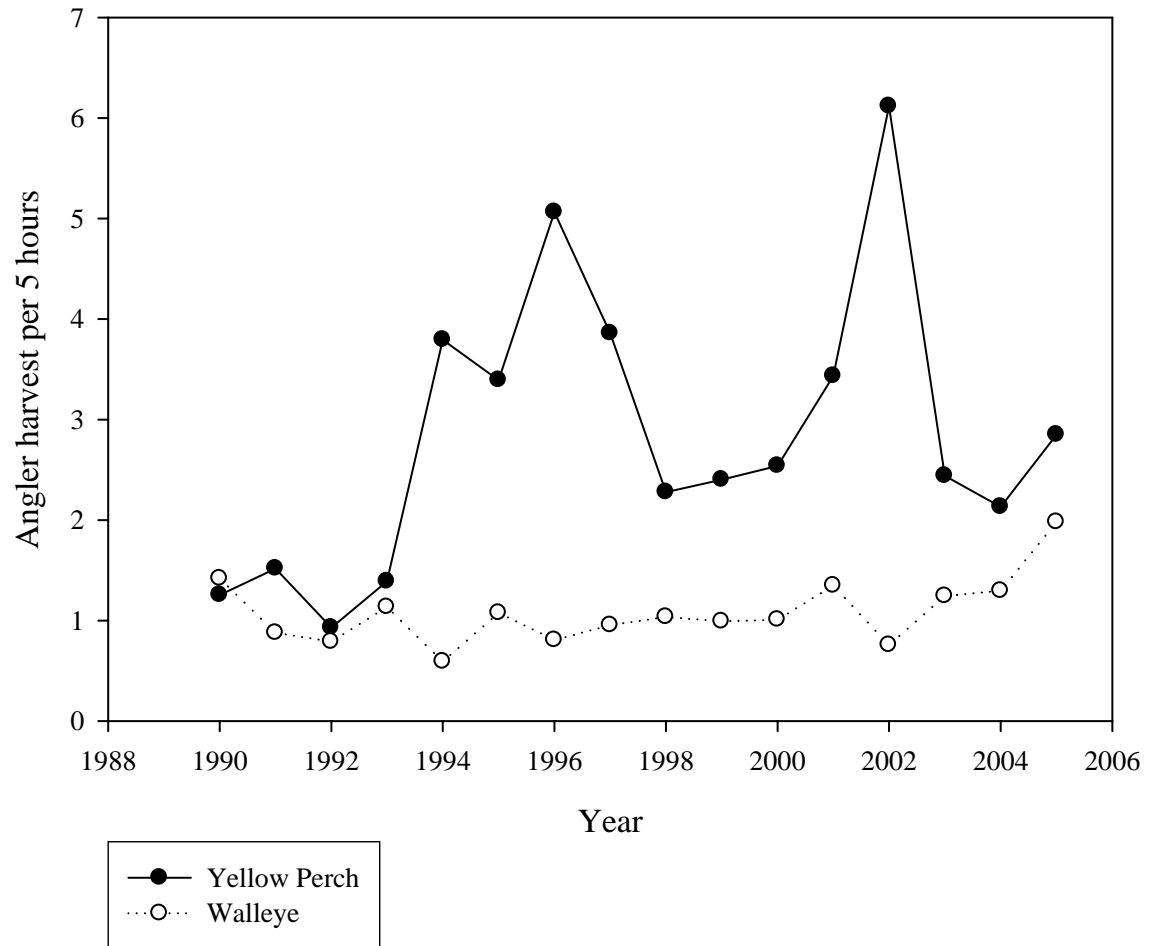


Figure 12.—Sea lamprey incidence (number attached per 100 fish) on Chinook salmon harvested by charter anglers on Lake Michigan and Lake Huron, 1990-2005.

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

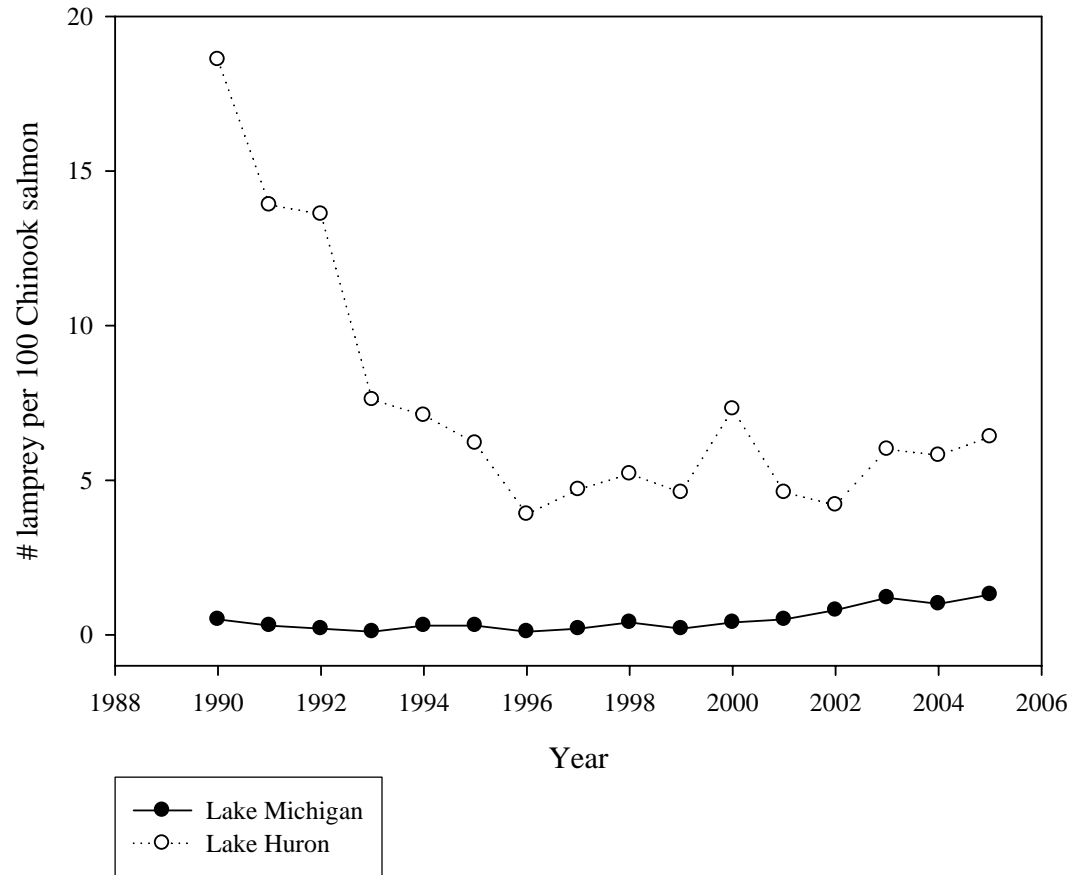


Figure 13.—Sea lamprey incidence (number attached per 100 fish) on lake trout harvested by charter anglers on Lakes Michigan, Huron, and Superior, 1990-2005.

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

