

## STUDY PERFORMANCE REPORT

**State:** Michigan

**Study No.:** 427

**Project No.:** F-81-R-2

**Title:** Measurement of sportfishing harvest in lakes Michigan, Huron, Erie, and Superior

**Period Covered:** October 1, 2000 to September 30, 2001

**Study Objective:** To obtain a continuous record of sport catch, catch rates, and catch composition in the Michigan waters of the Great Lakes (Superior, Michigan, Huron, and Erie) and in anadromous river fisheries.

**Summary:** This report presents results from the 2000 angling season. Similar data are being collected for the 2001 season; these will be summarized in next year's report. During the 2000 angling season, the Michigan Department of Natural Resources (MDNR) conducted creel surveys at key ports and fishing areas on lakes Michigan, Huron, Erie, and Superior. The creel survey was expanded in 2000 on lakes Michigan and Huron to cover all ports and fishing areas within the 1836 Treaty waters of each lake. The State of Michigan entered into a binding agreement (Consent Decree) with various Native American tribes in the 1836 Treaty waters of lakes Michigan, Huron and Superior. The Great Lakes creel survey is an integral part of that agreement and provides essential harvest data for the management of fisheries in those shared waters.

A total of 92,780 anglers were interviewed at the conclusion of their fishing trips during the 2000 season (January-December 15). The number of anglers interviewed by lake was: Lake Michigan, 29,369; Lake Huron, 29,041; Lake Erie, 3,982; Lake Superior, 5,593. The number of anglers interviewed on some of the large rivers surveyed were: St. Mary's River, 3,689; Manistee River, 5,113; Muskegon River, 2,111; Detroit River, 2,114; and the Saginaw/Tittabawassee rivers, 2,074.

Anglers spent an estimated 8.1 million angler hours fishing at all sites sampled in 2000. This amounted to an estimated 1.8 million individual fishing trips or 1.7 million angler days.

A total of 2.7 million fish (of the 29 species that were on the angler party interview form) were harvested at all sample areas combined. Yellow perch was the most abundant species in the catch with an estimated harvest of 1.4 million fish. Over 461,000 walleye were estimated harvested by the sport fishery in all sample areas combined in 2000. Salmonines were also an important part of the Great Lakes sport harvest. During 2000, over 580,000 were estimated to have been harvested from all sample areas. Important species of Salmonines and their estimated harvests in numbers were: chinook salmon, 254,000; rainbow trout, 111,000; lake trout, 83,000; coho salmon, 75,000; and brown trout 48,000.

During 2000, a special two-season project began on central Lake Michigan to independently verify the boat counts conducted on the ground by creel clerks at five ports. Preliminary results from the first season indicated that there was very good agreement between each of the two boat count methods. Estimated fishing boat effort differed by less than 2% between air and ground counts.

**Job 1. Title: Initiate aerial boat counts.**

**Findings:** During 2000, air flights were utilized to count boats on Lake Erie (Figure 1). Boats, and shore and pier anglers were counted using air flights on Saginaw Bay (Tawas to Harbor Beach) and northern Lake Huron (St. Ignace to Drummond Island, Figure 2), and on the St. Mary's River system (Figure 3). During winter 2000, open ice anglers and ice shanties were also counted on Saginaw Bay during the winter ice fishery.

All air flights were conducted using stratified random sampling schedules. At each survey area, flights were attempted on each weekend day and three randomly selected weekdays per week. Random take off times were used to insure that fishing pressure counts were made at various times during daylight hours each month.

Also during 2000, a special two season project began on central Lake Michigan to independently verify the boat counts conducted on the ground by creel clerks at Pentwater, Ludington, Manistee, Onkama and Arcadia (Figure 4). An air service was contracted to count boats by grid in the area of Lake Michigan from Little Sable Point to Arcadia. Coincident with one of the times of the day when creel clerks were making interval counts of fishing boats leaving the pier heads, an air plane was counting the number of boats in 3 randomly chosen grids (one offshore grid and two inshore grids) in this area of the lake. Preliminary results from the 2000 season indicated that there was very good agreement between each of the boat count methods. Estimated fishing boat effort differed by less than 2% between air and ground counts.

**Job 2. Title: Monitor Great Lakes and anadromous sport fisheries.**

**Findings:** Census clerks used stratified random work schedules to monitored the sport fisheries in their respective Great Lakes shoreline areas.

Throughout the 2000 season creel clerks sent completed data forms to the Charlevoix Fisheries Research Station every two weeks for computer entry. Data entry (optical scanning) was completed by the middle of January 2001 for all sample areas surveyed in 2000. Summaries of the catch estimates by sample area were generated for all sites by the end of January 2001. Data entry (optical scanning) for the 2001 season is ongoing.

*Lake Michigan.*—On Lake Michigan, 31 areas were sampled from New Buffalo to Harbor Springs in the Lower Peninsula, and from Menominee to Naubinway in the Upper Peninsula (Figure 4). Eight ports in the 1836 Treaty waters of Lake Michigan were added to the survey in 2000. They were Whitehall/Montague, Pentwater, Arcadia, Platte Bay, Glen Arbor, Leland, Naubinway/Seul Choix Point, and Manistique. Harvest and effort estimates could not be made for Naubinway/Seul Choix Point due to the lack of any fishing pressure throughout the entire season.

Lake Michigan anglers spent an estimated 2.7 million hours fishing the ports and areas sampled during 2000 (Table 1). This amounted to an estimated 643,378 individual fishing trips. Yellow perch were the most abundant species in the catch with an estimated harvest of 393,140. Salmonines were also an important part of the Lake Michigan sport harvest. During 2000, an estimated 133,415 chinook salmon, 62,700 coho salmon, 40,286 brown trout, 37,788 lake trout, and 31,396 rainbow trout were harvested from the survey areas (Table 1). In addition, an estimated 37,047 walleye were harvested from Lake Michigan.

The expanded creel survey in the 1836 Treaty waters (Grand Haven to Little Bay de Noc) of Lake Michigan continued during the 2001 season (Figure 4.).

*Lake Huron.*—Lake Huron was surveyed in 2000 from Lexington to Cheboygan in the Lower Peninsula, and from St. Ignace to Detour in the Upper Peninsula (Figure 2). During 2000, the following 5 ports/fishing areas were added in the 1836 Treaty waters of Lake Huron; Cheboygan, Hammond Bay, St. Ignace, Les Cheneaux Islands, and Detour. Lake Huron anglers spent an estimated 1.8 million hours and made an estimated 378,118 fishing trips during the 2000 season at the 21 sample areas (Table 2). Yellow perch made up the majority of the harvest with an estimated 634,555 fish. In addition to yellow perch, other important species in the Lake Huron sport harvest included an estimated 68,841 chinook salmon, 57,195 walleye, 24,062 lake trout, 11,256 lake herring, 10,168 rainbow trout, and 2,928 brown trout.

The St. Mary's River system, a major tributary to Lake Huron, was surveyed in 2000. Unlike the previous year, only MDNR personnel surveyed the river during the open water (May-October) season. During 1999, MDNR, in cooperation with Canadian fisheries authorities (OMNR) and three Native American tribes – one from the U.S. side (Bay Mills Indian Community) and two from the Canadian side (Batchewana First Nation of Ojibways and Garden River First Nation of Ojibways) – conducted the first creel survey done for the entire river system. During 2000, anglers on the St. Mary's River spent an estimated 391,181 hours and made 94,508 fishing trips (Table 3) in the area from the rapids on the upper river to Detour, including Potagannissing Bay (Figure 3).

During the 2001 season, the expanded Lake Huron creel survey in the 1836 Treaty waters (Alpena to Detour, Figure 3) was continued as was the survey of Michigan waters of the St. Mary's River System.

*Lake Erie.*—The Lake Erie boat fishery was sampled from Point Mouillee to the Michigan-Ohio state line during mid-April through October 2000 (Figure 1). Lake Erie anglers spent an estimated 712,742 hours fishing Michigan waters of Lake Erie (Table 4). Anglers harvested an estimated 223,455 yellow perch and 205,215 walleye. In all, 11 species of fish were observed in the sport harvest. The same area and time period were covered by the creel survey in 2001.

The Detroit River, a major tributary to Lake Erie, was surveyed during March through May. During that time period, anglers fished an estimated 344,741 angler hours and made over 67,794 fishing trips (Table 5.). Walleye was the most numerous species in the harvest. Over 97,000 walleye were caught and kept by Detroit River anglers. The Detroit River was not surveyed during 2001.

*Lake Superior.*—Five areas in western and central Lake Superior were surveyed in 2000. Lake Superior anglers at these locations fished an estimated 152,367 angler hours and made 41,006 fishing trips (Table 6). Lake trout was the most abundant (21,131) species in the catch. The harvest also included an estimated 5,356 coho salmon, 6,659 lake whitefish, 2,243 siscowet lake trout, and 1,309 chinook salmon. During 2001 the port of Grand Marais, which is in the 1836 Treaty waters, was added to the Lake Superior survey.

**Job 3. Title: Quality control checks.**

**Findings:** Throughout the field season, data forms were reviewed at the Charlevoix Fisheries Research Station prior to data entry (optical scanning). After the count and interview forms were scanned, the data were subjected to editing routines using Microsoft Access queries. The data editing

queries employ range checks on various fields and search for illegal values for each count and interview record.

Frequent contacts and communications with creel clerks were employed to field questions, check progress, and head off problems. When consistent errors by certain employees were noted, those personnel were contacted to rectify the problem.

**Job 4. Title: Prepare succeeding years sampling schedules.**

**Findings:** Sampling schedules were prepared for the 2001 season to cover the following areas: Lake Erie, 31 sites on Lake Michigan, 21 sites on Lake Huron including Saginaw Bay, 6 sites on western and central Lake Superior, the Michigan waters of the St. Mary's River system, and 10 sites on the Manistee, Muskegon and St. Joseph river systems.

**Job 5. Title: Prepare status report summarizing results.**

**Findings:** Summaries in tabular form of harvest and effort estimates for all sites sampled during 2000 were disseminated to management unit and research station offices during January 2001. Required Federal Aid reports were completed as scheduled. The project biologist also made several presentations during the year regarding the status of the sport harvest in 2000 and comparisons to prior seasons. These presentations were made at sportsmen's clubs, charter boat workshops, watershed district workshops, and to MDNR meetings of stakeholders.

**Job 6. Title: Analyze and evaluate data.**

**Findings:** During 2000, the State of Michigan entered into a binding agreement (Consent Decree) with various Native American tribes in the 1836 Treaty waters of lakes Michigan, Huron, and Superior. The Great Lakes creel survey is an integral part of that agreement and provides essential harvest data for the management of fisheries in those shared waters. For example, lake trout harvest statistics for lakes Michigan, Huron, and Superior will be provided annually to task groups working under the Consent Decree to calculate and monitor the total allowable catch (TAC) of lake trout in various zones in the 1836 Treaty waters of the Great Lakes. These data will also be provided to the Lake Technical Committees of the Great Lakes Fishery Commission (GLFC). The GLFC formulates policy recommendations for lake trout management on the upper Great Lakes through the various lake committees.

The Lake Erie sport catch estimates and biological data for walleye and yellow perch are used annually by the Lake Erie Technical Committee of the GLFC to set harvest quota limits for the various state and provincial commercial and sport fisheries. Members of the committee include the Ohio Department of Natural Resources, Pennsylvania Fish Commission, New York Department of Environmental Conservation, OMNR, and MDNR. All agencies contribute their sport and commercial assessment data to this management effort.

During 1997, under the direction of the Great Lakes Fishery Commission's Lake Michigan Technical Committee, an ad hoc committee was assigned the task of making predator stocking recommendations for Lake Michigan. The project biologist was a member of this committee, which included representatives of the State agencies (Michigan, Indiana, Illinois, and Wisconsin), the U.S. Fish and Wildlife Service and the Chippewa-Ottawa Resource Authority (CORA). Among

other important inputs, the group utilized creel survey data, which have been collected over the years by all State agencies on Lake Michigan, to develop a computer model called CONNECT. The model was then used to test various salmonine stocking scenarios for Lake Michigan and their probable impact on the lake-wide forage base. The results of the committee's work were presented to the Lake Michigan Technical Committee in January 1997. As a result of this exercise, chinook stocking was reduced by all agencies on Lake Michigan in the spring of 1999. Chinook stocking was also reduced by MDNR in Lake Huron in 1999. Creel survey harvest estimates will be used to evaluate the effectiveness of these stocking reductions beginning in 2002.

During 1994, the project biologist was assigned to chair a committee made up of internal research personnel and a university research biologist. The charge to the committee was to review the present Great Lakes creel survey methods and to recommend improvements to the overall program. The committee's recommendations were accepted by the Fisheries Division Management Team during August 1995. The recommendations included: 1) the annual reporting of targeted fishing effort and targeted catch rates for important species complexes, such as Salmonines, yellow perch and walleye; 2) the estimation of caught and released fish; and 3) inclusion of important stream fisheries in the annual creel survey. These recommendations were implemented during 1999-00. The rewriting of the estimation software was completed during the fall months of 1999 and the new software was used to generate the 1999 estimates using the catch rate estimator recommended by Lockwood (1997). This software also generated estimates of targeted harvest and targeted effort for the two species complexes as well as estimates of caught and released fish. During 2000, the project biologist re-estimated all the 1997 and 1998 creel survey data with the new software system. This was done so that when annual point estimates for recent years were used for trend analysis, those data would have been subjected to the same estimation process. An added benefit of the re-estimation was that two more years of targeted effort, targeted harvest rate, and targeted catch rate data became available from those data sets.

**Literature Cited:**

Lockwood, R.N. 1997. Evaluation of catch rate estimators from Michigan access point angler surveys. *North American Journal of Fisheries Management* 17(3):611-620

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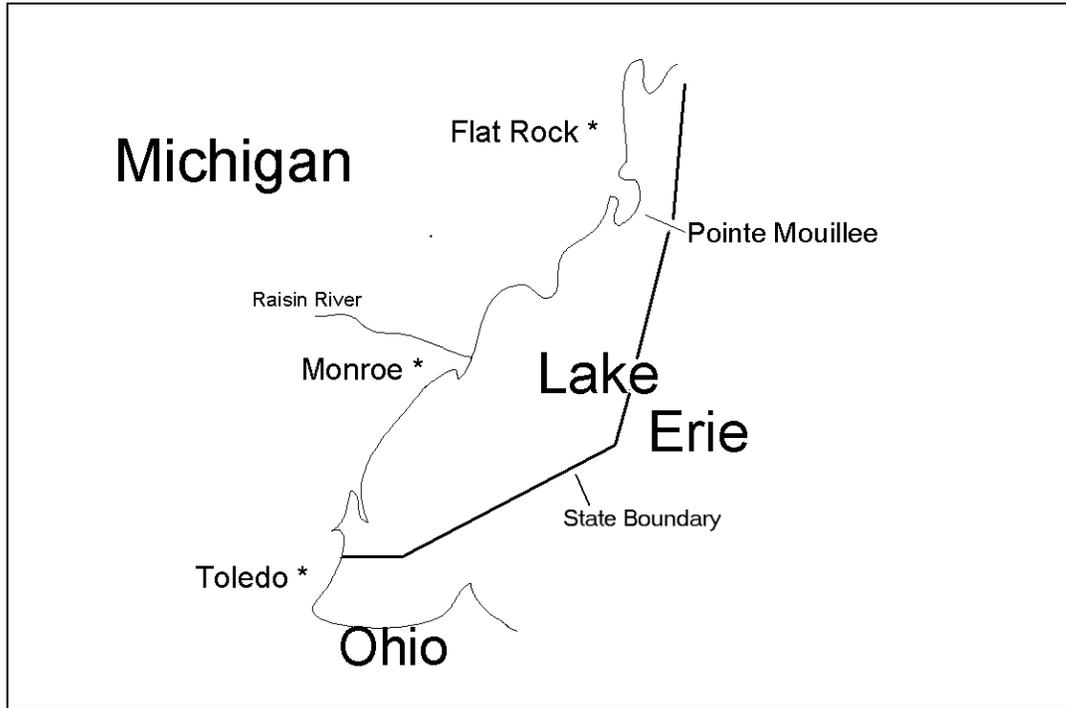


Figure 1.-Lake Erie creel survey area, 2000.

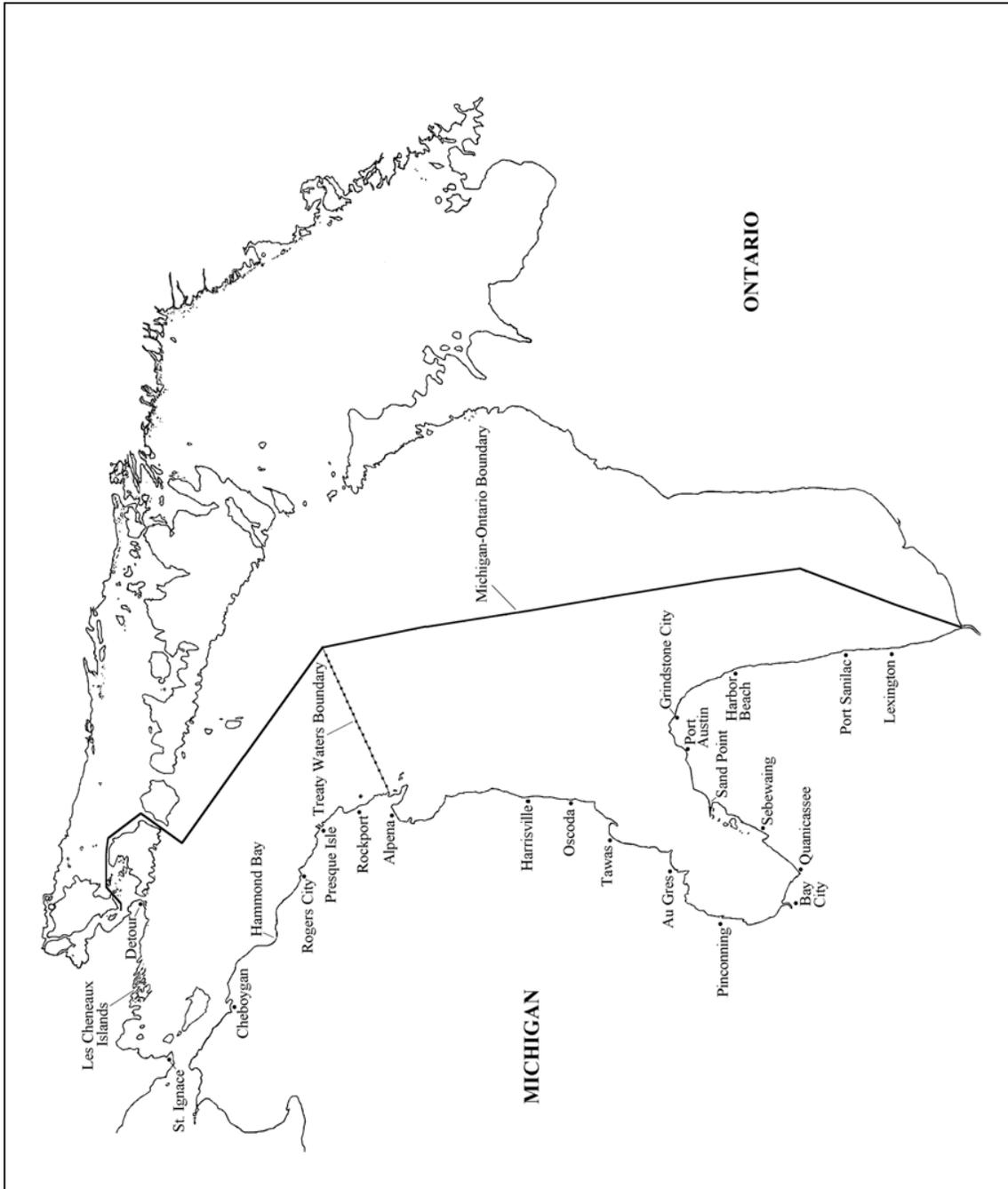


Figure 2.—Lake Huron creel survey locations, 2000.

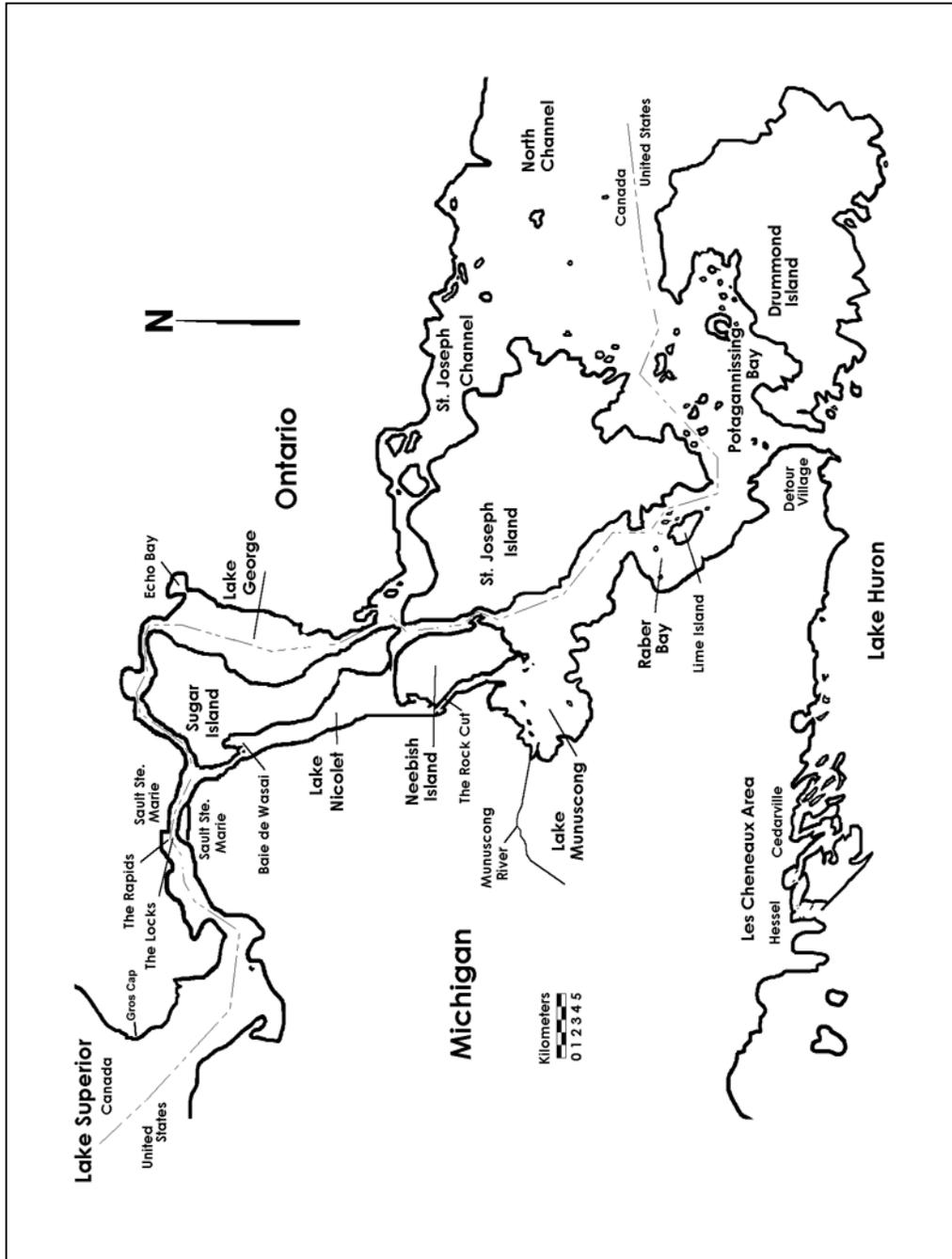


Figure 3.—St. Mary's River system.

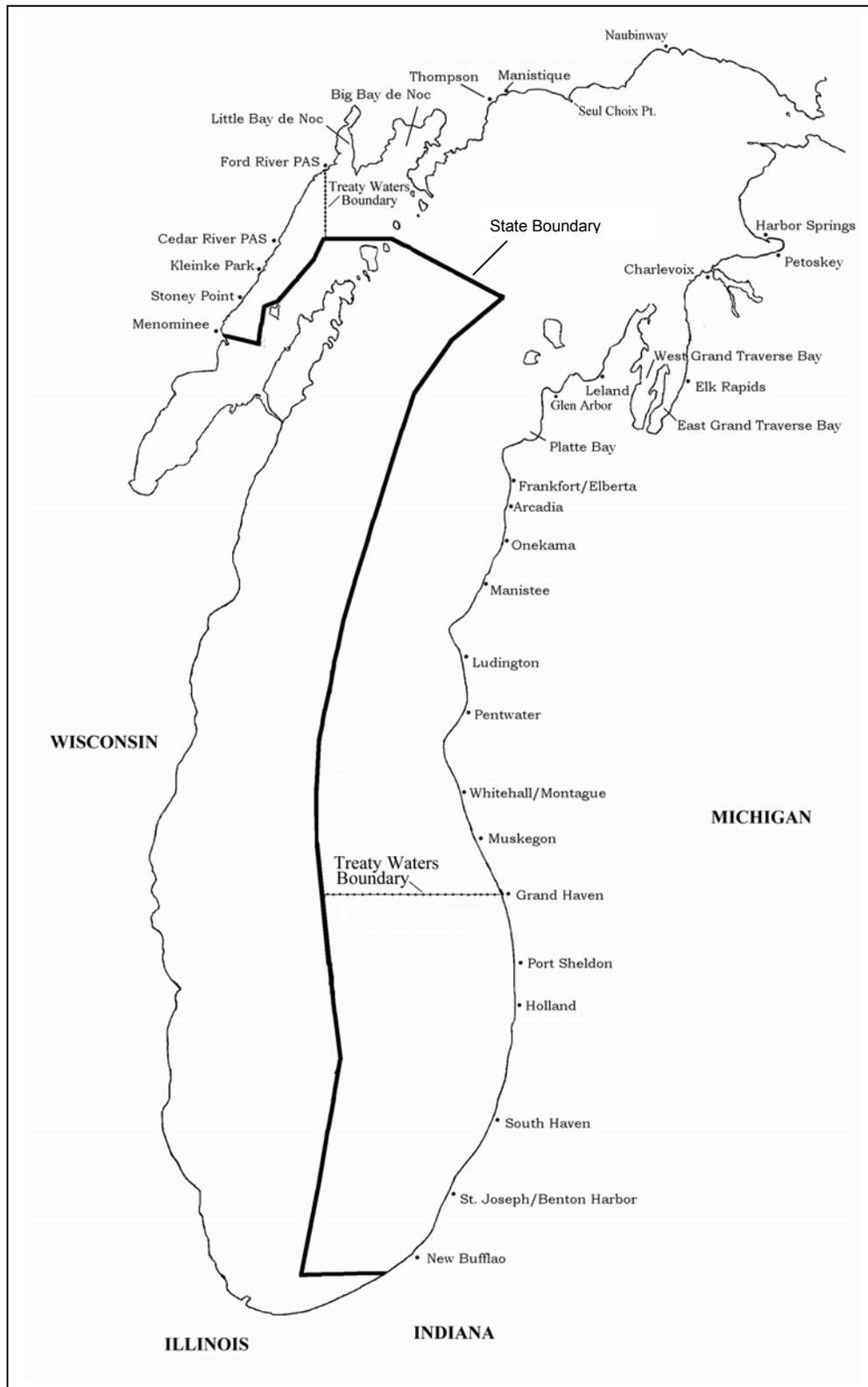


Figure 4.—Lake Michigan creel survey locations, 2000.

Table 1.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) for all Lake Michigan sites (n=31<sup>1</sup>) combined, by all modes (non-charter) of sportfishing, 2000. Two standard errors of the mean in parentheses.

Species	Harvest per hour	Month												Season	
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov			
Pink salmon	0.0000 (0.0000)	0 (0)	0 (0)	0 (0)	13 (21)	0 (0)	0 (0)	0 (0)	0 (0)	23 (29)	0 (0)	0 (0)	0 (0)	0 (0)	36 (35)
Coho salmon	0.0029 (0.0053)	0 (0)	0 (0)	8,844 (3,707)	6,099 (2,583)	6,041 (2,830)	3,746 (1,169)	7,294 (2,921)	16,716 (11,072)	13,710 (5,287)	0 (0)	250 (166)	0 (0)	0 (0)	62,700 (13,744)
Chinook salmon	0.0486 (0.0085)	0 (0)	0 (0)	154 (104)	4,058 (2,918)	8,800 (2,496)	9,561 (2,985)	46,710 (12,949)	50,016 (15,249)	12,836 (4,008)	0 (0)	1,280 (468)	0 (0)	0 (0)	133,415 (20,980)
Rainbow trout	0.0114 (0.0036)	85 (32)	0 (0)	110 (96)	1,051 (359)	890 (620)	5,222 (1,249)	14,722 (9,296)	5,649 (2,110)	909 (439)	0 (0)	2,758 (683)	0 (0)	0 (0)	31,396 (9,675)
Atlantic salmon	0.0000 (0.0000)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	5 (9)	19 (37)	0 (0)	0 (0)	0 (0)	0 (0)	24 (38)
Brown trout	0.0147 (0.0020)	4 (8)	7 (0)	2,597 (1,004)	15,551 (3,308)	3,843 (1,096)	2,549 (645)	10,761 (2,528)	3,785 (1,223)	830 (474)	0 (0)	359 (153)	0 (0)	0 (0)	40,286 (4,658)
Brook trout	0.0000 (0.0000)	0 (0)	0 (0)	11 (16)	43 (78)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	54 (79)
Lake trout	0.0138 (0.0036)	0 (0)	0 (0)	0 (0)	815 (401)	4,305 (1,509)	4,367 (1,078)	17,806 (8,734)	9,919 (3,258)	576 (295)	0 (0)	0 (0)	0 (0)	0 (0)	37,788 (9,517)
Splake	0.0013 (0.0004)	111 (39)	162 (0)	862 (480)	1,057 (609)	351 (499)	11 (21)	549 (366)	137 (152)	0 (0)	0 (0)	295 (222)	0 (0)	0 (0)	3,535 (1,029)
Northern pike	0.0017 (0.0009)	1,359 (373)	928 (269)	88 (117)	25 (17)	226 (277)	94 (180)	1,259 (2,482)	400 (296)	99 (73)	0 (0)	158 (190)	43 (68)	0 (0)	4,679 (2,575)
White sucker	0.0002 (0.0002)	0 (0)	0 (0)	0 (0)	77 (124)	0 (0)	274 (485)	31 (61)	0 (0)	0 (0)	0 (0)	35 (71)	0 (0)	0 (0)	417 (509)
Channel catfish	0.0009 (0.0005)	0 (0)	0 (0)	0 (0)	30 (60)	1,342 (1,117)	614 (582)	111 (120)	89 (25)	175 (228)	0 (0)	8 (15)	0 (0)	0 (0)	2,369 (1,287)
White perch	0.0000 (0.0000)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	107 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	107 (0)
Rock bass	0.0007 (0.0002)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	768 (182)	560 (44)	632 (551)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1,960 (582)

(Table 1.--continued.)

Species	Harvest per hour	Month												Season		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov				
Pumpkinseed	0.0000	0	0	0	0	0	0	0	0	27	0	0	0	27	0	(59)
Bluegill	0.0000	0	0	0	0	0	42	50	0	7	0	0	0	99	0	(80)
Smallmouth bass	0.0019	0	0	0	0	332	2,159	928	540	465	703	0	0	5,127	0	(1,418)
Largemouth bass	0.0000	0	0	0	0	0	11	56	0	0	0	0	0	67	0	(68)
Black crappie	0.0000	0	0	0	0	0	0	0	0	13	21	8	42	48	0	(48)
Yellow perch	0.1433	56,714	44,877	6,476	82,747	16,575	33,641	67,835	46,628	15,235	19,345	3,067	393,140	65,152	0	(3,235)
Walleye	0.0135	607	561	795	1,452	17,699	6,885	1,895	2,179	588	1,099	3,287	37,047	13,609	0	(587)
Freshwater drum	0.0002	0	0	4	0	128	290	122	0	0	0	0	544	409	0	(409)
Lake herring	0.0001	0	0	0	1	179	41	0	8	0	59	0	288	223	0	(223)
Lake whitefish	0.0053	0	0	752	660	1,558	3,077	2,695	104	73	5,499	16	14,434	6,066	0	(6,066)
Round whitefish	0.0013	0	0	0	94	0	144	31	0	211	2,994	0	3,474	1,550	0	(1,550)
Other	0.0003	31	26	0	148	21	343	33	85	4	0	0	691	541	0	(541)
Angler hours		136,561	120,413	41,968	245,556	215,177	264,425	686,769	616,453	289,512	100,442	25,250	2,742,526	209,849	0	(209,849)
Angler trips		27,692	27,807	11,059	61,964	51,765	62,066	151,953	140,360	74,275	29,853	4,584	643,378	45,806	0	(45,806)
Angler days		26,473	26,288	10,218	57,763	42,992	56,482	138,986	124,242	62,945	23,670	3,364	573,423	40,665	0	(40,665)

<sup>1</sup> Harvest and effort could not be estimated for sites 007 (Stoney Point, Menominee County), 053 (Seul Choix Point, Schoolcraft County), and 058 (Naubinway, Mackinaw County) due to the lack of fishing pressure.

Table 2.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) for all Lake Huron survey sites (n=21) combined, by all modes (non-charter) of sportfishing, 2000. Two standard errors of the mean in parentheses.

Species	Harvest per hour	Month												Season	
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Pink salmon	0.0015 (0.0010)	0 (0)	0 (0)	0 (0)	10 (20)	114 (310)	214 (138)	783 (688)	1,491 (1,595)	59 (88)	0 (0)	0 (0)	0 (0)	0 (0)	2,671 (1,772)
Coho salmon	0.0019 (0.0007)	0 (0)	0 (0)	0 (0)	446 (402)	238 (242)	873 (709)	1,122 (768)	618 (445)	19 (61)	6 (20)	0 (0)	0 (0)	0 (0)	3,322 (1,231)
Chinook salmon	0.0392 (0.0060)	0 (0)	0 (0)	3 (12)	713 (458)	2,716 (1,559)	6,569 (2,788)	29,422 (7,665)	20,042 (4,704)	7,797 (2,124)	1,467 (1,115)	112 (140)	0 (0)	0 (0)	68,841 (9,852)
Rainbow trout	0.0058 (0.0013)	9 (44)	10 (60)	638 (364)	952 (451)	714 (627)	1,057 (1,429)	2,876 (1,248)	1,620 (789)	389 (315)	728 (161)	1,105 (379)	70 (77)	0 (0)	10,168 (2,287)
Atlantic salmon	0.0001 (0.0002)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	58 (93)	122 (234)	59 (85)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	239 (265)
Brown trout	0.0017 (0.0009)	13 (59)	29 (136)	575 (1,129)	653 (478)	119 (250)	140 (516)	927 (666)	310 (282)	72 (96)	75 (61)	15 (25)	0 (0)	0 (0)	2,928 (1,546)
Lake trout	0.0137 (0.0038)	0 (0)	0 (0)	0 (0)	26 (52)	3,939 (1,879)	8,247 (4,790)	6,523 (2,764)	4,747 (2,656)	580 (1,320)	0 (0)	0 (0)	0 (0)	0 (0)	24,062 (6,551)
Northern pike	0.0012 (0.0008)	1,051 (1,024)	116 (195)	30 (190)	0 (0)	170 (350)	196 (369)	175 (448)	311 (640)	53 (251)	48 (304)	0 (0)	0 (0)	0 (0)	2,150 (1,465)
White sucker	0.0002 (0.0004)	0 (0)	0 (0)	13 (33)	0 (0)	370 (634)	0 (0)	0 (0)	0 (0)	0 (0)	6 (37)	0 (0)	0 (0)	0 (0)	389 (636)
Channel catfish	0.0037 (0.0036)	0 (0)	0 (0)	3 (13)	7 (15)	1,573 (1,210)	1,652 (4,906)	1,487 (1,950)	1,457 (3,026)	175 (488)	72 (305)	0 (0)	0 (0)	0 (0)	6,426 (6,231)
White perch	0.0003 (0.0010)	401 (1,662)	0 (0)	9 (24)	0 (0)	0 (0)	124 (0)	14 (102)	0 (0)	26 (183)	0 (0)	0 (0)	0 (0)	0 (0)	574 (1,675)
White bass	0.0002 (0.0006)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	184 (681)	162 (807)	3 (18)	0 (0)	0 (0)	0 (0)	0 (0)	349 (1,056)
Rock bass	0.0004 (0.0007)	0 (0)	0 (0)	60 (120)	45 (89)	31 (75)	400 (1,167)	96 (470)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	632 (1,269)

(Table 2.--continued.)

Species	Harvest per hour	Month												Season			
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
Pumpkinseed	0.0003 (0.0010)	43 (215)	305 (1,433)	64 (190)	0 (0)	0 (0)	40 (285)	0 (0)	0 (0)	48 (831)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	500 (1,705)	
Bluegill	0.0007 (0.0015)	466 (1,753)	227 (1,357)	561 (1,559)	0 (0)	0 (0)	0 (0)	23 (165)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1,277 (2,715)
Smallmouth bass	0.0003 (0.0002)	0 (0)	0 (0)	0 (0)	0 (0)	95 (92)	211 (221)	108 (227)	33 (155)	60 (114)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	507 (382)
Largemouth bass	0.0001 (0.0002)	0 (0)	0 (0)	0 (0)	0 (0)	42 (31)	0 (0)	33 (264)	27 (235)	0 (0)	1 (2)	0 (0)	0 (0)	0 (0)	0 (0)	103 (355)	
Black crappie	0.0009 (0.0018)	517 (881)	723 (2,841)	111 (228)	58 (356)	84 (827)	7 (15)	0 (0)	0 (0)	0 (0)	0 (0)	95 (598)	0 (0)	0 (0)	0 (0)	1,595 (3,173)	
Yellow perch	0.3609 (0.0918)	143,795 (52,591)	36,600 (25,146)	111,534 (51,359)	16,624 (31,340)	3,289 (10,018)	37,295 (65,930)	55,356 (53,744)	140,806 (74,270)	54,107 (40,444)	35,149 (57,109)	0 (0)	0 (0)	0 (0)	0 (0)	634,555 (157,375)	
Walleye	0.0325 (0.0161)	251 (740)	500 (1,033)	219 (622)	179 (438)	239 (390)	1,145 (2,311)	36,091 (24,737)	17,023 (11,274)	545 (1,926)	964 (5,985)	20 (30)	19 (18)	19 (18)	19 (18)	57,195 (28,040)	
Freshwater drum	0.0008 (0.0013)	0 (0)	0 (0)	0 (0)	0 (0)	22 (76)	481 (1,862)	304 (885)	536 (1,000)	75 (329)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1,418 (2,316)	
Lake herring	0.0064 (0.0079)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	4,001 (5,248)	7,255 (12,871)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	11,256 (13,899)	
Lake whitefish	0.0009 (0.0006)	0 (0)	0 (0)	12 (13)	26 (41)	37 (40)	23 (45)	62 (185)	6 (44)	0 (0)	0 (0)	0 (0)	0 (0)	1,452 (1,000)	12 (26)	1,630 (1,021)	
Round whitefish	0.0002 (0.0001)	9 (45)	24 (95)	0 (0)	33 (44)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	115 (0)	106 (90)	0 (0)	0 (0)	0 (0)	287 (145)	
Other	0.0002 (0.0001)	19 (60)	0 (0)	31 (49)	39 (124)	0 (0)	163 (46)	14 (102)	13 (88)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	279 (204)	
Angler hours		85,963 (20,918)	66,187 (9,482)	51,535 (11,134)	69,608 (14,001)	87,569 (16,644)	221,543 (31,390)	509,817 (63,380)	433,003 (57,421)	158,616 (20,753)	65,508 (9,981)	8,124 (1,260)	567 (227)	567 (227)	567 (227)	1,758,040 (99,780)	
Angler trips		21,023 (5,131)	16,060 (2,355)	11,119 (2,579)	17,479 (3,457)	19,078 (3,561)	47,575 (7,286)	101,102 (12,426)	87,003 (11,202)	37,380 (4,778)	17,861 (2,684)	2,157 (411)	281 (145)	281 (145)	281 (145)	378,118 (20,648)	
Angler days		18,380 (4,907)	13,281 (2,073)	9,208 (2,242)	15,766 (3,167)	17,752 (3,360)	43,562 (6,645)	94,766 (11,872)	80,718 (10,615)	34,490 (4,367)	16,108 (2,400)	1,688 (349)	164 (97)	164 (97)	164 (97)	345,883 (19,428)	

Table 3.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) for St. Mary’s River, by all modes (non-charter) of sportfishing, 2000. Two standard errors of the mean in parentheses.

Species	Harvest per hour	Month												Season
		Jan <sup>1</sup>	Feb <sup>1</sup>	Mar <sup>1</sup>	Apr <sup>2</sup>	May	Jun	Jul	Aug	Sep	Oct			
Pink salmon	0.0038 (0.0139)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	812 (4,525)	674 (3,027)	0 (0)	0 (0)	1,486 (5,444)	
Coho salmon	0.0001 (0.0010)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	56 (380)	0 (0)	0 (0)	0 (0)	56 (380)	
Chinook salmon	0.0110 (0.0146)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	131 (734)	15 (116)	2,536 (4,787)	1,616 (3,032)	15 (116)	15 (116)	4,298 (5,715)	
Rainbow trout	0.0001 (0.0004)	0 (0)	0 (0)	0 (0)	0 (0)	13 (118)	18 (119)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	31 (168)	
Atlantic salmon	0.0002 (0.0010)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	81 (386)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	81 (386)	
Northern pike	0.0155 (0.0175)	129 (64)	485 (359)	6 (5)	168 (1,346)	908 (2,941)	1,101 (2,199)	60 (236)	2,616 (5,322)	600 (1,694)	60 (236)	60 (236)	6,073 (6,832)	
Muskellunge	0.0000 (0.0001)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	8 (57)	0 (0)	0 (0)	8 (57)	
Channel catfish	0.0000 (0.0001)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	5 (32)	5 (32)	
Rock bass	0.0002 (0.0013)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	73 (505)	0 (0)	0 (0)	18 (153)	0 (0)	0 (0)	91 (528)	
Smallmouth bass	0.0062 (0.0104)	0 (0)	0 (0)	0 (0)	12 (86)	149 (627)	574 (2,403)	5 (33)	251 (918)	1,421 (3,074)	5 (33)	5 (33)	2,412 (4,058)	
Largemouth bass	0.0003 (0.0026)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	134 (1,030)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	134 (1,030)	

(Table 3.--continued.)

Species	Harvest per hour	Month												Season
		Jan <sup>1</sup>	Feb <sup>1</sup>	Mar <sup>1</sup>	Apr <sup>2</sup>	May	Jun	Jul	Aug	Sep	Oct			
Yellow perch	0.1848 (0.1231)	3,129 (1,248)	2,601 (1,000)	2,706 (1,482)		98 (582)	1,318 (5,195)	2,562 (10,701)	9,356 (26,958)	28,362 (31,012)	22,173 (21,186)	72,305 (47,790)		
Walleye	0.0261 (0.0231)	382 (200)	873 (542)	0 (0)	0 (0)	173 (1,197)	777 (2,041)	2,589 (3,837)	3,522 (6,916)	1,571 (3,414)	341 (685)	10,228 (8,978)		
Freshwater drum	0.0000 (0.0003)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	18 (119)	0 (0)	0 (0)	0 (0)	18 (119)		
Lake herring	0.2637 (0.1727)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	16,725 (25,532)	85,486 (61,925)	0 (0)	87 (379)	847 (2,032)	103,145 (67,014)		
Lake whitefish	0.0060 (0.0127)	18 (19)	0 (0)	0 (0)	0 (0)	69 (364)	355 (1,072)	1,218 (3,296)	86 (541)	354 (1,599)	233 (3,080)	2,333 (4,948)		
Round whitefish	0.0000 (0.0001)	0 (0)	0 (0)	0 (0)	0 (0)	8 (45)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	8 (45)		
Other	0.0008 (0.0031)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	173 (1,071)	0 (0)	47 (356)	58 (314)	30 (237)	308 (1,195)		
Angler hours		13,830 (4,024)	26,772 (6,799)	2,473 (717)		12,535 (4,502)	55,740 (15,265)	101,888 (19,217)	104,812 (14,451)	58,972 (11,463)	14,159 (4,118)	391,181 (32,291)		
Angler trips		3,180 (1,082)	6,058 (1,795)	516 (177)		2,938 (1,156)	12,818 (3,966)	26,668 (5,548)	25,866 (4,404)	13,274 (2,698)	3,190 (981)	94,508 (8,939)		
Angler days		3,180 (1,082)	5,936 (1,780)	516 (177)		2,838 (1,130)	12,158 (3,715)	26,155 (5,457)	25,311 (4,357)	12,282 (2,512)	3,174 (980)	91,550 (8,689)		

<sup>1</sup> During the winter months (Jan-Mar) ice fisheries were surveyed on both the Michigan and Ontario sides of the river. Potaganissing Bay (Site 210) was only surveyed during May-October.

<sup>2</sup> No sampling was conducted during April.

Table 4.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) for the boat fishery (non-charter) in the Michigan waters of Lake Erie, 2000. Two standard errors of the mean in parentheses.

Species	Harvest per hour	Month							Season
		Apr	May	Jun	Jul	Aug	Sep	Oct	
Rainbow trout	0.0001 (0.0008)	0 (0)	0 (0)	84 (585)	0 (0)	0 (0)	0 (0)	0 (0)	84 (585)
Channel catfish	0.0053 (0.0092)	25 (105)	36 (157)	856 (3,206)	1,824 (5,037)	511 (554)	159 (482)	365 (2,563)	3,776 (6,542)
White perch	0.0076 (0.0150)	25 (100)	0 (0)	1,093 (5,597)	1,149 (3,858)	1,704 (7,563)	1,002 (2,768)	447 (1,746)	5,420 (10,683)
White bass	0.0094 (0.0142)	516 (1,474)	2,030 (4,662)	2,294 (8,122)	1,184 (3,198)	448 (937)	144 (1,105)	49 (417)	6,665 (10,118)
Rock bass	0.0002 (0.0021)	0 (0)	39 (1,441)	0 (0)	66 (480)	0 (0)	16 (106)	15 (104)	136 (1,526)
Bluegill	0.0013 (0.0074)	34 (167)	48 (361)	0 (0)	83 (602)	55 (12)	9 (72)	730 (5,190)	959 (5,240)
Smallmouth bass	0.0031 (0.0064)	0 (0)	87 (666)	1,262 (3,973)	301 (1,231)	430 (1,376)	155 (901)	0 (0)	2,235 (4,523)
Largemouth bass	0.0001 (0.0007)	0 (0)	0 (0)	0 (0)	70 (499)	0 (0)	0 (0)	0 (0)	70 (499)
Yellow perch	0.3135 (0.5814)	985 (2,497)	8,724 (44,473)	26,152 (50,252)	17,396 (37,107)	72,944 (397,326)	53,749 (58,650)	43,505 (62,701)	223,455 (413,673)
Walleye	0.2879 (0.1115)	1,863 (10,147)	20,810 (16,537)	35,803 (37,027)	112,895 (56,303)	30,382 (29,131)	1,390 (2,141)	2,072 (7,043)	205,215 (76,291)
Freshwater drum	0.0029 (0.0083)	0 (0)	247 (1,462)	520 (3,692)	848 (4,242)	336 (550)	131 (935)	0 (0)	2,082 (5,911)
Other	0.0000 (0.0001)	19 (72)	6 (45)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	25 (85)
Angler hours		16,956 (6,405)	86,422 (30,573)	178,041 (53,292)	208,986 (28,121)	144,720 (32,223)	47,359 (15,760)	30,258 (10,081)	712,742 (77,426)
Angler trips		3,225 (1,311)	15,603 (5,556)	33,180 (9,983)	35,324 (5,165)	25,700 (5,816)	9,808 (3,291)	5,928 (2,008)	128,768 (14,408)
Angler days		3,209 (1,308)	15,423 (5,470)	32,954 (9,937)	34,886 (5,124)	25,385 (5,743)	9,667 (3,237)	5,892 (2,001)	127,416 (14,286)

Table 5.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) for the Detroit River, by all modes (non-charter) of sportfishing, March- May, 2000. Two standard errors of the mean in parentheses.

Species	Harvest per hour	Month			Season
		Mar	Apr	May	
Northern pike	0.0002 (0.0000)	0 (0)	84 (11)	0 (0)	84 (11)
Channel catfish	0.0002 (0.0000)	0 (0)	78 (11)	0 (0)	78 (11)
White perch	0.0099 (0.0020)	0 (0)	107 (24)	3,313 (690)	3,420 (690)
White bass	0.0368 (0.0062)	0 (0)	210 (36)	12,479 (2,092)	12,689 (2,092)
Rock bass	0.0038 (0.0004)	0 (0)	393 (63)	921 (111)	1,314 (127)
Bluegill	0.0076 (0.0008)	211 (40)	2,425 (253)	0 (0)	2,636 (256)
Black crappie	0.0012 (0.0002)	262 (50)	145 (19)	0 (0)	407 (53)
Yellow perch	0.0208 (0.0034)	1,860 (410)	2,627 (294)	2,697 (1,013)	7,184 (1,132)
Walleye	0.2822 (0.0148)	6,180 (1,369)	78,836 (3,323)	12,276 (1,850)	97,292 (4,042)
Freshwater drum	0.0000 (0.0000)	0 (0)	0 (0)	14 (10)	14 (10)
Angler hours		21,189 (3,279)	256,151 (7,898)	67,401 (7,030)	344,741 (11,070)
Angler trips		4,877 (1,047)	49,540 (2,904)	13,377 (1,877)	67,794 (3,613)
Angler days		4,877 (1,047)	49,221 (2,920)	13,377 (1,877)	67,475 (3,626)

Table 6.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) for all Lake Superior sites (n=5) combined, by all modes (non-charter) of sportfishing, 2000. Two standard errors of the mean in parentheses.

Species	Harvest per hour	Month												Season		
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct					
Pink salmon	0.0024 (0.0017)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	367 (260)	0 (0)	367 (260)
Coho salmon	0.0352 (0.0067)	216 (40)	1,132 (692)	1,858 (517)	908 (245)	322 (206)	62 (44)	138 (110)	161 (95)	443 (201)	443 (201)	116 (66)	116 (66)	5,356 (959)	116 (66)	5,356 (959)
Chinook salmon	0.0086 (0.0021)	0 (0)	22 (4)	55 (31)	214 (34)	392 (243)	235 (107)	141 (127)	30 (33)	202 (95)	202 (95)	18 (40)	18 (40)	1,309 (316)	18 (40)	1,309 (316)
Rainbow trout	0.0061 (0.0016)	0 (0)	0 (0)	264 (109)	409 (156)	62 (40)	9 (10)	102 (120)	7 (13)	22 (31)	22 (31)	49 (40)	49 (40)	924 (234)	49 (40)	924 (234)
Brown trout	0.0017 (0.0007)	0 (0)	2 (0)	126 (74)	84 (60)	23 (26)	0 (0)	0 (0)	5 (9)	0 (0)	0 (0)	23 (25)	23 (25)	263 (103)	23 (25)	263 (103)
Lake trout	0.1387 (0.0186)	64 (63)	137 (23)	538 (353)	552 (277)	2,131 (673)	3,170 (796)	6,334 (1,564)	4,978 (1,317)	2,362 (791)	2,362 (791)	865 (317)	865 (317)	21,131 (2,490)	865 (317)	21,131 (2,490)
Splake	0.0057 (0.0021)	0 (0)	97 (114)	334 (184)	139 (139)	165 (149)	29 (40)	0 (0)	40 (80)	31 (39)	31 (39)	27 (35)	27 (35)	862 (315)	27 (35)	862 (315)
Siscowet	0.0147 (0.0055)	8 (8)	0 (0)	0 (0)	218 (65)	126 (140)	410 (305)	804 (663)	515 (356)	137 (90)	137 (90)	25 (0)	25 (0)	2,243 (832)	25 (0)	2,243 (832)
Northern pike	0.0003 (0.0002)	8 (8)	36 (28)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	9 (19)	0 (0)	0 (0)	0 (0)	0 (0)	53 (34)	0 (0)	53 (34)
Yellow perch	0.0255 (0.0054)	1,291 (396)	1,926 (114)	181 (189)	0 (0)	0 (0)	405 (628)	38 (51)	0 (0)	39 (67)	39 (67)	0 (0)	0 (0)	3,880 (779)	0 (0)	3,880 (779)
Lake herring	0.0105 (0.0023)	310 (50)	1,186 (317)	108 (88)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1,604 (332)	0 (0)	1,604 (332)

(Table 6.--continued.)

Species	Harvest per hour	Month												Season
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct			
Lake whitefish	0.0437 (0.0127)	9 (6)	3,948 (1,737)	1,127 (471)	228 (101)	141 (234)	219 (231)	297 (310)	0 (0)	0 (0)	0 (0)	0 (0)	690 (346)	6,659 (1,890)
Round whitefish	0.0064 (0.0031)	0 (0)	19 (31)	36 (28)	118 (226)	0 (0)	0 (0)	37 (78)	0 (0)	0 (0)	0 (0)	0 (0)	767 (395)	977 (463)
Other	0.0221 (0.0170)	0 (0)	3,161 (2,570)	180 (196)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	29 (29)	3,370 (2,577)
Angler hours		3,591 (357)	23,605 (2,619)	17,349 (2,946)	13,434 (1,724)	14,043 (3,189)	15,104 (2,398)	28,444 (6,752)	17,578 (3,272)	13,497 (2,329)	5,722 (899)	152,367 (9,853)		
Angler trips		988 (116)	6,667 (766)	5,349 (901)	4,185 (518)	3,348 (758)	3,398 (586)	6,709 (1,654)	4,266 (840)	4,174 (721)	1,922 (329)	41,006 (2,582)		
Angler days		988 (116)	6,565 (764)	5,238 (898)	4,098 (503)	3,306 (755)	3,387 (585)	6,688 (1,652)	4,255 (840)	4,082 (717)	1,879 (328)	40,486 (2,573)		