

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-81-R-5

Study No.: 230427

Title: Measurement of sport fishing effort, catch and harvest in the Michigan waters of the Great Lakes

Period Covered: October 1, 2003 to September 30, 2004

Study Objective: To obtain random samples of sport-fishing activity in the Michigan waters of the Great Lakes (Superior, Michigan, Huron, and Erie), St. Clair system (St. Clair River, Lake St. Clair and the Detroit River) and tributaries of the Great Lakes that often support anadromous fish species. To use these samples to estimate total sport-fishing effort, catch, harvest, and catch rate of the major sport-fish. To report these findings to Michigan Department of Natural Resources (MDNR) personnel and Great Lake Fisheries Commission committees.

Summary: This report presents results from the 2003 angling season. Similar data are currently being collected for the 2004 season; these will be summarized in next year's report. The results in this report differ from previous reports because the comparisons of effort and harvest across water bodies and between years now account for the variation around each estimate ($\pm 2SE$ for creel estimates). This variation was often ignored in previous reports. Comparisons still remain somewhat subjective until formal statistical analyses are applied. Statistical analyses will be incorporated into future reports as the methodology is developed.

During the 2003 angling season, MDNR Fisheries Division conducted creel surveys at locations on Lakes Michigan, Huron, Erie and Superior, the St. Clair System (St. Clair River, Lake St. Clair and the Detroit River), and nine tributaries of the Great Lakes. These surveys included ports in 1836 Treaty waters where an agreement made between the State of Michigan and Native American tribes over fishing rights (2000 Consent Decree) mandates their inclusion in the survey. The Great Lakes creel survey is an integral part of the agreement because it provides the data needed to monitor harvest and develop statistical models used to set fishing quotas.

Temporal comparisons of effort, harvest and catch rate: In 2003, the total fishing effort from all Great Lakes ports and tributaries combined ($9,242,978 \pm 242,480$ hours; Table 1) did not differ from total fishing effort in 2002 ($9,355,396 \pm 270,127$) and the overall harvest of most species did not change between the two years. The exceptions include coho salmon and brown trout, both of which appear to have dropped significantly between 2002 and 2003. Coho salmon harvest decreased from $83,035 \pm 11,831$ in 2002 to $33,131 \pm 5,780$ in 2003 (Table 1). Brown trout harvest decreased from $30,698 \pm 5,380$ in 2002 to $18,451 \pm 3,915$ in 2003 (Table 1). When we compared harvest rates (instead of total harvest) between 2002 and 2003, we found similar differences; therefore, we limit the following results to harvest estimates only.

Spatial comparisons of effort, harvest, and catch rate: The spatial differences in effort and harvest across the Great Lakes and the St Clair System are consistent with those in 2002, with one exception. In 2003, fishing effort (angler hours) in Lake Michigan ($2,424,343 \pm 163,586$; Table 2) did not differ from Lake Huron ($2,337,620 \pm 102,873$; Table 3), even though these two lakes differed in 2002 (greater in Lake Michigan). Similar to 2002, salmonine (all trout and salmon combined) harvest in 2003 was highest in Lake Michigan (Table 2), followed by Lake Huron

(Table 3). Similar to 2002, percid (walleye and yellow perch) harvest in 2003 was highest in Lake Erie (Table 4).

Findings: Jobs 1, 2, 3, 4, 5 and 6 were scheduled for 2003-04, and progress is reported below.

Job 1. Initiate aerial boat counts.—In 2003, we conducted aerial surveys of boat, shore and pier angling effort on the Michigan waters of Lake Erie, the Detroit River, Lake St. Clair, the St. Clair River, and portions of Lake Huron (Saginaw Bay, from Harbor Beach to Tawas City, and St. Ignace northeast to Drummond Island). We also conducted aerial surveys of shanty and open ice angling effort, January through March, on Lake St. Clair and the portions of Lake Huron. All air flights were conducted using stratified random sampling schedules. At each survey area, we scheduled flights for all weekend days and three randomly selected weekdays per week. We randomly selected take-off times to ensure angler counts were made at various times during daylight hours each month.

We used aerial counts in place of ground counts for the above locations because we did not believe ground counts would provide an accurate measure of effort. Anglers in these areas likely enter the lake/river from access sites where a fisheries assistant cannot count them on the ground (e.g. privately-owned property or a site that cannot be seen by the clerk). If a clerk were to conduct ground counts in these areas, we would likely underestimate effort; hence the application of aerial surveys. In contrast, a study of aerial versus ground counts on the Lake Michigan shoreline suggests ground counts accurately characterize fishing effort along Lake Michigan (Lockwood and Rakoczy, in review). Aerial surveys are not used on Lake Michigan because the shoreline is steep and lake access is limited to locations where a fisheries assistant can count anglers. In all cases, if angler count data are not collected from aerial surveys as described above, fishery assistants collect the data from access points on the ground.

Job 2. Monitor fisheries.—We use angler interview data and angler count data to estimate monthly fishing effort and species-specific harvest, harvest rate, catch, and catch rate. The equations used to make the estimates are described in Lockwood et al. (1999). Monthly total fishing effort is derived from a combination of interview data (average fishing trip time), angler count data (total count) and daylight fishing hours in a month. Harvest estimates are the product of the average harvest rate (determined from interviews) multiplied by total fishing effort (as described above).

Fisheries assistants interview and count anglers at randomly selected times within a stratified random work schedule in which all weekend days and three randomly selected weekdays are sampled. We design the surveys so that we sample anglers at all locations within a sampling frame (geographical area from which an estimate will be made) where significant fishing is thought to occur. The sampling frame usually consists of a land-based “port” or a lake-based “grid”. When an estimate is made for a larger geographical area (e.g. Lake Huron), estimates from individual sampling frames (ports or grids) are summed.

Throughout the 2003 season, fisheries assistants sent completed data forms to the Charlevoix Fisheries Research Station every two weeks, where staff entered the data into a database. Data entry was completed by February 2004. Effort, catch, catch rate, harvest, and harvest rate estimates were completed by June 2004. Data entry for the current year (2004) is ongoing since creel clerks are still collecting data for the season. These data will be presented in next year’s report.

The following “lake-specific” results do not include estimates from a small number of ports that were not surveyed in 2003; however, these ports are usually not surveyed due to low effort. The same survey locations were used in 2002 and 2003, making it possible to compare these two years in this report. Beginning in 2005, MDNR will be conducting more inland surveys and less

Great Lakes surveys as part of newly formed angler survey program that seeks to create a more “statewide” survey of fishing effort, catch, and harvest. As a result, the number of Great Lakes survey sites will be further reduced. In response, future reports will include lake-wide estimates extrapolated to account for the reduction in number of ports.

The following survey areas contain 1836 Treaty waters: Grand Haven north to Little Bay de Noc in Lake Michigan; Alpena north to St. Ignace and Detour in Lake Huron; and Marquette east to Grand Marais (last port in the east with effort that is significant enough to be included) in Lake Superior. There are no 1836 Treaty waters in Lake Erie or the St. Clair System. Some of the ports in 1836 Treaty waters are no longer surveyed or are scheduled to be sampled “on rotation” every 3-5 years; therefore, we apply ratios from years of complete coverage to the current data in order to estimate the total effort and harvest in these waters. We sum effort and harvest estimates from this study (Study 427) with charter harvest (Study 462) and provide these data to tribal personnel who monitor harvest and model fish abundance in 1836 Treaty waters. These expanded data are not presented in this report.

Lake Michigan.—In 2003, twenty-four Great Lakes sites on Lake Michigan were sampled. These sites spanned the entire Lake Michigan shoreline, from New Buffalo to Harbor Springs in the Lower Peninsula and from Menominee to Little Bay de Noc in the Upper Peninsula. A large proportion of these sites was located in 1836 Treaty waters. We also sampled the fisheries in six Lake Michigan tributaries: the Menominee River, the Cedar River, the Bear River, the Manistee River, the Muskegon River, and the St. Joseph River; however, the lake-specific estimates described in this section (and all lake-specific sections to follow) *do not* include data from these rivers. River effort and harvest estimates are discussed in their own section.

In 2003, anglers fished $2,424,343 \pm 163,586$ hours and made $560,214 \pm 36,041$ fishing trips on the Michigan waters of Lake Michigan (Table 2). Yellow perch was the most abundant species in the harvest ($517,555 \pm 90,812$), followed by chinook salmon ($173,650 \pm 20,677$), rainbow trout ($27,910 \pm 8,476$), coho salmon ($27,352 \pm 5,604$), walleye ($21,970 \pm 7,640$), lake trout ($13,450 \pm 2,835$) and brown trout ($8,660 \pm 2,209$) (Table 2).

Comparisons of effort and harvest ($\pm 2SE$) between 2002 and 2003 suggest there were no *increases* in effort or harvest of any species. In contrast, coho salmon, rainbow trout, brown trout, lake trout, splake, and walleye harvest all *decreased* between 2002 and 2003. Two of the less prominent species, channel catfish and freshwater drum, were also less abundant in 2003 compared to 2002. Chinook salmon harvest in 2003 was high ($173,650; \pm 20,677$); however, it was not significantly different from harvest in 2002 ($159,116 \pm 17,274$).

Lake Huron.—In 2003, twenty Great Lakes sites on Lake Huron were sampled. These sites spanned an area from Lexington north to Cheboygan in the Lower Peninsula, and from St. Ignace east to Detour and Munuscong Bay in the Upper Peninsula. Northern Lake Huron (Alpena to Detour/Munuscong Bay) contains 1836 Treaty waters. We also sampled fisheries in two Lake Huron tributaries: the Saginaw River and Tittabawassee River. The St. Mary’s River was not sampled in 2003 but will be sampled in 2004. The following lake-specific estimates *do not* include data from these rivers.

In 2003, anglers fished $2,337,620 \pm 102,873$ hours and made $518,060 \pm 22,390$ fishing trips on the Michigan waters of Lake Huron (Table 3). Similar to Lake Michigan, yellow perch made up the majority of the harvest ($487,658 \pm 182,698$), followed by chinook salmon ($94,338 \pm 15,233$), walleye ($80,798 \pm 29,071$), lake trout ($41,457 \pm 12,601$), lake herring ($11,899 \pm 6,920$), brown trout ($6,022 \pm 3,205$), rainbow trout ($5,152 \pm 2,525$) and coho salmon ($1,254 \pm 1,281$) (Table 3).

Comparisons of effort and harvest ($\pm 2SE$) between 2002 and 2003 suggest there were no *increases* in effort or harvest of any species. The only species to have shown a *decrease* in harvest is coho salmon ($11,563 \pm 6,773$ in 2002). This pattern contrasts Lake Michigan, where there was decreased harvest across more than one species between 2002 and 2003.

Lake Erie.—In 2003, locations from Point Mouillee to the Michigan-Ohio state line were sampled. There are a limited number of tributaries in Western Lake Erie that support anadromous runs (e.g. Huron River); however, creel samples were not taken from these tributaries in 2003. In contrast to Lake Michigan, Huron and Superior, angler data and estimates from Lake Erie are categorized by grid number rather than port location. Charlevoix personnel calculate effort and harvest estimates for every grid in the Michigan waters of Lake Erie where fisheries assistants are able to obtain a minimum number of interviews. In 2003, we were able to estimate effort and harvest from 3 or 4 of the 5 grids, depending on the month. Grid estimates are combined to produce an estimate for the entire area (Table 4).

In 2003, anglers fished an estimated $451,646 \pm 59,234$ hours and made an estimated $94,615 \pm 12,580$ trips on the Michigan waters of Lake Erie (Table 4). Anglers harvested an estimated $286,453 \pm 116,530$ yellow perch and $102,068 \pm 33,331$ walleye. They also harvested an estimated $12,848 \pm 26,719$ channel catfish and $9,972 \pm 30,498$ white bass (Table 4).

Comparison of effort ($\pm 2SE$) between 2002 and 2003 suggests it was lower in 2003 ($451,646 \pm 59,234$ hours) compared to 2002 ($820,220 \pm 108,087$ hours). Yellow perch and walleye harvest numbers appear to have dropped between 2002 and 2003; however, this difference may be minimal given the degree of variation (e.g. $463,226 \pm 141,674$ yellow perch harvested in 2002, and $286,453 \pm 116,530$ in 2003).

None of the waters in Lake Erie fall within 1836 Treaty waters; however, walleye are harvested under a strict quota system in this Great Lake. As a result, each state and province that borders the lake must report annual walleye effort and harvest. We provided 2003 walleye sport effort and harvest (Study 427) and charter effort and harvest (Study 462) from the Michigan waters of Lake Erie to a multi-agency committee (Lake Erie Committee of the Great Lakes Fish Commission) that models walleye abundance and sets quotas for upcoming years. These values (creel + charter) are not presented in this report.

St. Clair and Detroit River System.—In 2002, the Great Lakes creel survey was expanded to include the St. Clair River, Lake St. Clair, and the Detroit River. This was the first time this system had been sampled since the early 1980's. Following the same design as 2002, numerous sites were sampled in 2003 in an effort to intercept most anglers who fish this system. Similar to Lake Erie, angler statistics in this system are categorized by grid number rather than port location. There are no 1836 Treaty waters in this area and no agreements with other jurisdictions to provide data from this area; however, these surveys provide valuable harvest data because historical creel data from this area are limited. We present results from the most active portion of this system, Lake St. Clair (Table 5). There are 9 grids in Lake St. Clair that contain Michigan waters. We were able to estimate monthly effort and harvest from a majority of these grids. Anadromous fisheries from this system were not sampled. They consist of four natural rivers where rainbow trout (steelhead) spawn in the spring: Mill Creek/Black River, the Clinton River, and the Belle River.

In 2003, anglers spent an estimated $1,804,643 \pm 113,578$ hours fishing and made an estimated $403,438 \pm 24,353$ trips in the Michigan waters of Lake St. Clair (Table 5). Anglers harvested an estimated $800,894 \pm 196,976$ yellow perch and $75,026 \pm 44,600$ walleye. These two species dominated the harvest, followed by smallmouth bass ($15,288 \pm 11,379$), bluegill ($13,375 \pm 13,605$), and pumpkinseed ($11,022 \pm 13,110$) (Table 5). Estimates for these latter species are less reliable

than walleye and yellow perch estimates because the error estimates are much larger. We hypothesize the larger error results from “process” error. Process error is the portion of the error term that results from the variability that occurs in the system rather than error that originates from a poor sampling design. It may occur when a small proportion of the anglers harvest a majority of the total harvest.

Comparisons of effort and harvest (\pm 2SE) between 2002 and 2003 cannot be made without first removing January and February from the 2003 estimates (We did not survey anglers in January and February 2002). January and February estimates (2003) are included in Table 5, but are not included in the following comparisons. When January and February were removed, we found no difference in total effort between 2002 (1,368,564 \pm 119,480 hours) and 2003 (1,293,980 \pm 100,226 hours), no difference in yellow perch harvest between 2002 (455,621 \pm 202,133) and 2003 (377,644 \pm 152,374) and no difference in walleye harvest between 2002 (41,972 \pm 23,406) and 2003 (75,026 \pm 44,600). In January and February of 2003, anglers spent 510,663 \pm 53,429 hours fishing for yellow perch, bluegill, pumpkinseed, black crappie, northern pike, and white bass. A majority of the harvest in January and February consisted of yellow perch (423,250 \pm 124,827), which accounted for approximately 50% of the total seasonal harvest of yellow perch (800,894 \pm 196,976).

Lake Superior.—In 2003, six Great Lakes sites were sampled in Lake Superior. These included Traverse Bay, Keweenaw Bay, and Marquette in the western Upper Peninsula and Munising, Au Train and Grand Marais in the central Upper Peninsula. A large proportion of the fishing effort in the Michigan waters of Lake Superior likely originates from these six sites; however, sites that have not been surveyed in many years (e.g. Ontonagon and Black River Harbor) will be sampled in upcoming years to assess the recent contributions from these areas. Four of the Great Lakes sites that were sampled in 2003 are located in 1836 Treaty waters: Marquette, Munising, Au Train, and Grand Marais. Creel surveys at these sites are believed to intercept most of the anglers who fish in 1836 Treaty waters. There are some anadromous fisheries in Lake Superior; however, only the Dead River was sampled in 2003. The following estimates *do not* include estimates from the Dead River.

In 2003, anglers spent an estimated 152,978 \pm 9,008 hours fishing the Michigan waters of Lake Superior and made an estimated 43,354 \pm 2,640 fishing trips (Table 6). Lake trout was the most abundant species in the harvest (17,995 \pm 2,345), followed by lake whitefish (14,169 \pm 4,090), siscowet (fat) lake trout (6,141 \pm 1,268), coho salmon (3,965 \pm 577), lake herring (1,821 \pm 391) and round whitefish (1,339 \pm 963) (Table 6). Variance estimates (2SE) on Lake Superior are much smaller than on other lakes. Compared to other Great Lakes survey locations, we conduct more daily angler counts in this area and we also hypothesize the process error to be much smaller, both of which likely contribute to a smaller variance.

Comparison of effort (\pm 2SE) between 2002 and 2003 indicates it did not differ between years (149,769 \pm 8,676 in 2002). Lake trout harvest in 2003 (6,141 \pm 1,268) was lower than 2002 (24,183 \pm 2,755), coho salmon harvest in 2003 (3,965 \pm 577) was lower than 2002 (6,255 \pm 767), and lake herring harvest in 2003 (1,821 \pm 391) was lower than 2002 (2,888 \pm 435). Harvest of siscowets, lake whitefish, and round whitefish did not change between 2002 and 2003.

Great Lakes Tributaries.—Fishing effort and harvest in Great Lakes tributaries can contribute to the overall harvest of many species in the Great Lakes, particularly among the salmonines. In 2003, nine Great Lakes tributaries were sampled: the Menominee River, the Cedar River, the Bear River, the Manistee River, the Muskegon River, the St. Joseph River, the Saginaw and Tittabawassee Rivers, and the Dead River. We present results from one of these systems, the St. Joseph River (Table 7), where we estimated the effort and harvest for seven separate sites from the mouth of the river to upstream reaches in both Michigan and Indiana. This is the only MDNR creel survey area that contains waters outside the state of Michigan. This survey was made possible through a cooperative agreement with the Indiana Department of Natural Resources.

In 2003, anglers spent an estimated $287,129 \pm 12,148$ hours fishing the St. Joseph River (Table 7). This is approximately two times the hours spent fishing the combined surveyed ports on Lake Superior ($152,978 \pm 9,008$; Table 6) and two thirds of the hours spent boat fishing on the Detroit River ($459,221 \pm 55,388$). It is similar to the effort that occurs in the St. Clair River, where anglers spent $208,800 \pm 19,300$ hours fishing in 2003.

In 2003, approximately half of the angling effort on the St. Joseph River was targeted at salmonines ($159,674 \pm 9,788$ hours), while the remaining effort was targeted at other species such as bluegill and rock bass. In 2003, the most abundant salmonine in the harvest was rainbow trout ($7,496 \pm 1,229$) (Table 7). Relative to the 2003 harvest of rainbow trout from Lake Michigan proper ($27,910 \pm 8,476$; Table 2), 2003 harvest of rainbow trout from the St. Joseph River may amount to anywhere from 17%-45% (based on 2SE) of the combined harvest (St. Joseph River + Lake Michigan).

The second most abundant salmonine in the St. Joseph harvest in 2003 was chinook salmon ($1,066 \pm 325$; Table 7). Harvest of chinook salmon is much less than that of rainbow trout. Relative to Lake Michigan proper ($173,650 \pm 20,677$), St. Joseph chinook salmon harvest is quite insignificant. Harvest of all other salmonines from the St. Joseph River in 2003 is lower than the above species. Temporal comparison of anadromous fishes in Great Lakes tributaries will begin in next year's report.

Job 3. Check for quality control.—Fisheries assistants are typically trained at a training session held in early spring of each year, prior to the start of most surveys on the Great Lakes. Due to State of Michigan spending restrictions in 2003, the scheduled annual training did not take place in 2003. To compensate for this loss, we asked the supervisors of the fisheries assistants to ensure that all newly hired clerks receive thorough training. Furthermore, a recently developed committee, the State of Michigan Department of Natural Resources Fisheries Division Statewide Angler Survey Program Committee, requested Fisheries Division make a commitment to hold the training every year (to prevent missed training sessions in the future). Fisheries Division Management Team committed to annual funding for this training.

The current training procedure was reviewed by this committee in 2003. New training protocols and a training manual were established in 2004. This committee is also evaluating all aspects of the Great Lakes and Inland Creel Programs in order to implement a formal quality control procedure that will control error at all stages of the program (i.e. collection phase to estimation phase). Some of the recommendations were implemented in 2004 and some will be implemented in 2005. These procedures will be discussed in future reports.

In the interim, and throughout the 2003 field season, creel personnel and/or the supervisors of fishery assistants made frequent contacts with the assistants to field questions, check progress, and prevent problems. Upon receipt of datasheets every 2 weeks, we checked them for errors and contacted fisheries assistants and/or their supervisors if there were problems. In 2003, we scanned datasheets with an optical scanner (Scantron™) and entered the files into an electronic database. Once data were within the database, we used queries (a majority designed to check that data are within a realistic range of values) to search for additional data entry errors.

Job 4. Prepare succeeding schedules.—At the end of 2002, we prepared randomized sampling schedules for the 2003 season for each of the 36 clerks who covered the following areas: St. Clair River, Lake St. Clair, Detroit River, Lake Erie, Lake Michigan, Lake Huron including Saginaw Bay, western and central Lake Superior, and 9 Great Lakes tributaries (Menominee, Cedar, Bear, Manistee, Muskegon, St. Joseph, Saginaw, Tittabawassee Rivers and Dead Rivers).

Job 5. Analyze and evaluate data.—This report contains initial efforts to provide a more comprehensive analysis of creel data. These evaluations are contained within Job 4, which

reports results from each of the Great Lakes and one of its major tributaries with more consideration of the variance surrounding the estimates. Besides these efforts, creel personnel spent a significant amount of time analyzing data that needed to be reported to tribal personnel and Great Lakes Fishery Commission Committees.

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 are provided to task groups working under the Consent Decree so they can calculate and monitor the total allowable catch (TAC) of lake trout in various zones in the 1836 Treaty waters of the Great Lakes.

In 2003, we also provided Lake Michigan creel estimates to the Lake Michigan Technical Committee of the Great Lakes Fishery Commission (GLFC). These estimates were added to a “lake-wide” database of total effort and harvest. They are also used to estimate the total harvest of the major sport-fish from all of Lake Michigan. We are currently making improvements to the procedure that is used to append our data to the “lake-wide” database and to ensure their continued accuracy.

In 2003, we sent effort, harvest and catch estimates, and biological data on the size and age of walleye and yellow perch (collected via Study 427) to the GLFC Lake Erie Committee. Members of the committee include the Ohio Department of Natural Resources, Pennsylvania Fish Commission, New York Department of Environmental Conservation, Ontario Ministry of Natural Resources, and the Michigan Department of Natural Resources. This lake committee uses data from all of their respective jurisdictions to set harvest quota limits for the state and provincial commercial and sport fisheries.

Job 6. Prepare annual performance report.—We estimated the fishing effort, harvest, harvest rate, catch, and catch rate for all sites sampled in 2003. Throughout 2003 and 2004, creel personnel distributed these results in the form of databases, result tables, and query summaries to MDNR Fisheries Division biologists across the State of Michigan, by request. Federal aid reports were completed. Creel personnel and fisheries biologists across the state communicated the status and trends of the 2003 sport harvest to the public via oral presentations at charter boat workshops, MDNR Citizen’s Advisory meetings, and to other fishing organizations. Results were often presented in the popular literature (newspapers, magazines, and television).

Literature cited:

Lockwood, R.N., D.M. Benjamin, and J.R. Bence. 1999. Estimating angling effort and catch from Michigan roving and access site angler survey data. Michigan Department of Natural Resources Research Report No. 2044. Ann Arbor, Michigan.

Lockwood, R.N., and G. P. Rakoczy. In review. Comparison of interval and aerial count methods for estimating boating effort in Lake Michigan’s MM-6. Michigan Department of Natural Resources Fisheries Research Report. Ann Arbor, Michigan.

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Table 1.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) from all creel sites surveyed on ALL the Great Lakes combined (including Great Lakes tributaries), by all modes (non-charter) of sport-fishing, 2003. 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	0.0001 (0.0003)	0 (0)	0 (0)	0 (0)	29 (168)	0 (0)	25 (39)	104 (525)	214 (670)	9 (58)	0 (0)	0 (0)	0 (0)	381 (870)
Coho salmon	0.0036 (0.0006)	285 (63)	414 (82)	911 (247)	3,456 (315)	4,473 (2,509)	1,468 (1,010)	1,371 (734)	10,997 (3,958)	9,238 (3,113)	422 (134)	96 (70)	0 (0)	33,131 (5,780)
Chinook salmon	0.0340 (0.0029)	0 (0)	7 (1)	32 (26)	1,100 (548)	22,899 (8,656)	34,094 (12,574)	35,634 (7,227)	117,102 (15,817)	70,120 (10,703)	32,408 (3,891)	746 (197)	0 (0)	314,142 (25,797)
Rainbow trout	0.0086 (0.0010)	0 (0)	147 (50)	4,299 (338)	12,122 (774)	7,353 (1,713)	13,640 (8,213)	9,584 (1,972)	8,598 (1,697)	4,260 (1,070)	10,595 (1,013)	7,616 (910)	1,691 (274)	79,905 (8,997)
Atlantic salmon	0.0000 (0.0001)	0 (0)	0 (0)	0 (0)	0 (0)	43 (41)	190 (425)	180 (480)	19 (37)	7 (13)	0 (0)	0 (0)	0 (0)	439 (644)
Brown trout	0.0020 (0.0004)	20 (51)	131 (183)	387 (174)	4,392 (1,700)	3,789 (1,301)	2,917 (2,542)	2,480 (1,467)	2,500 (1,138)	1,198 (831)	404 (274)	233 (71)	0 (0)	18,451 (3,915)
Lake trout	0.0079 (0.0014)	18 (7)	181 (10)	405 (28)	62 (86)	10,084 (5,185)	19,769 (8,095)	20,478 (6,760)	16,644 (3,977)	4,330 (4,274)	956 (356)	78 (31)	0 (0)	73,005 (13,127)
Splake	0.0002 (0.0000)	0 (0)	214 (88)	257 (113)	658 (203)	284 (144)	67 (86)	12 (22)	51 (57)	30 (26)	149 (74)	0 (0)	0 (0)	1,722 (316)
Siscowet	0.0007 (0.0001)	91 (37)	1,249 (95)	1,414 (60)	0 (0)	89 (58)	1,229 (755)	1,205 (973)	735 (266)	95 (24)	34 (43)	0 (0)	0 (0)	6,141 (1,268)
Northern pike	0.0006 (0.0003)	1,661 (1,541)	778 (641)	18 (15)	159 (373)	400 (810)	769 (1,868)	583 (1,155)	327 (654)	216 (415)	94 (112)	130 (69)	0 (0)	5,135 (3,004)
Muskellunge	0.0001 (0.0004)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	405 (3,390)	137 (624)	0 (0)	24 (47)	0 (0)	0 (0)	0 (0)	566 (3,447)
White sucker	0.0002 (0.0002)	0 (0)	0 (0)	14 (66)	1,066 (1,572)	246 (624)	218 (410)	103 (107)	5 (8)	9 (16)	0 (0)	0 (0)	0 (0)	1,661 (1,745)
Channel catfish	0.0030 (0.0033)	0 (0)	0 (0)	0 (0)	690 (7,868)	2,499 (3,193)	7,678 (18,698)	8,842 (19,516)	5,152 (9,940)	2,129 (4,304)	553 (5,150)	0 (0)	0 (0)	27,543 (30,764)
White perch	0.0005 (0.0020)	7 (23)	52 (298)	84 (235)	0 (0)	337 (1,966)	2,339 (18,104)	326 (912)	1,241 (2,934)	88 (493)	111 (458)	0 (0)	0 (0)	4,585 (18,484)
White bass	0.0071 (0.0416)	83 (493)	71 (337)	0 (0)	1,315 (3,099)	6,993 (81,250)	53,775 (375,381)	1,262 (3,347)	1,176 (2,319)	586 (1,991)	80 (339)	0 (0)	0 (0)	65,341 (384,113)

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Table 1.—Continued.

Species	Harvest per hour	Month												Season
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Rock bass	0.0017 (0.0010)	68 (317)	271 (768)	76 (139)	526 (632)	1,406 (2,453)	5,178 (8,325)	2,929 (2,762)	3,157 (2,363)	1,439 (1,164)	244 (386)	231 (62)	0 (0)	15,525 (9,547)
Pumpkinseed	0.0014 (0.0015)	1,057 (1,687)	671 (1,364)	145 (580)	150 (644)	1,510 (3,012)	5,547 (12,928)	318 (879)	1,596 (2,135)	992 (2,227)	666 (2,986)	0 (0)	0 (0)	12,652 (14,173)
Bluegill	0.0034 (0.0019)	6,198 (10,985)	2,322 (5,836)	124 (296)	351 (456)	2,436 (1,447)	3,947 (3,097)	2,202 (2,046)	3,898 (7,753)	4,536 (3,627)	4,925 (8,727)	67 (133)	0 (0)	31,006 (17,898)
Smallmouth bass	0.0029 (0.0015)	0 (0)	0 (0)	8 (1)	46 (85)	868 (1,491)	6,087 (6,948)	6,107 (5,237)	9,353 (9,493)	3,957 (3,531)	596 (563)	0 (0)	0 (0)	27,022 (13,448)
Largemouth bass	0.0003 (0.0005)	0 (0)	0 (0)	0 (0)	38 (120)	812 (3,051)	617 (3,243)	222 (1,052)	726 (1,987)	192 (372)	12 (142)	0 (0)	0 (0)	2,619 (5,005)
Black crappie	0.0007 (0.0009)	743 (2,133)	202 (511)	472 (1,270)	698 (2,065)	2,478 (2,204)	1,323 (6,765)	0 (0)	410 (1,860)	82 (444)	225 (793)	0 (0)	0 (0)	6,633 (8,099)
Yellow perch	0.2345 (0.0347)	365,505 (111,106)	241,488 (98,543)	148,827 (73,315)	66,606 (51,062)	45,366 (39,666)	127,155 (109,978)	271,469 (124,361)	418,601 (131,238)	302,248 (120,339)	179,820 (92,104)	194 (275)	0 (0)	2,167,279 (315,214)
Walleye	0.0418 (0.0091)	1,268 (1,462)	7,164 (10,356)	3,995 (5,456)	46,368 (27,514)	41,512 (20,518)	140,221 (50,386)	94,792 (50,235)	39,801 (23,729)	8,357 (7,675)	1,694 (5,175)	689 (338)	298 (369)	386,159 (83,837)
Freshwater drum	0.0010 (0.0008)	0 (0)	0 (0)	54 (206)	12 (51)	1,431 (2,528)	4,030 (5,749)	2,502 (2,400)	1,199 (1,841)	194 (479)	23 (153)	0 (0)	0 (0)	9,445 (6,992)
Lake herring	0.0015 (0.0008)	349 (67)	924 (369)	503 (111)	45 (20)	67 (122)	4,390 (3,189)	7,369 (6,136)	30 (193)	43 (86)	0 (0)	0 (0)	0 (0)	13,720 (6,931)
Lake whitefish	0.0026 (0.0007)	247 (72)	5,094 (1,788)	1,874 (447)	1,177 (913)	5,054 (3,698)	8,046 (4,918)	705 (590)	417 (406)	47 (79)	1,098 (488)	0 (0)	0 (0)	23,759 (6,546)
Round whitefish	0.0005 (0.0002)	0 (0)	46 (66)	89 (66)	661 (503)	376 (275)	34 (103)	81 (142)	646 (913)	4 (6)	2,225 (1,212)	0 (0)	0 (0)	4,162 (1,634)
Other	0.0065 (0.0203)	0 (0)	33 (35)	701 (205)	636 (254)	438 (356)	56,333 (187,228)	1,273 (1,019)	382 (629)	422 (282)	160 (491)	0 (0)	0 (0)	60,378 (187,233)
Angler hours		521,852 (51,493)	542,739 (43,812)	408,962 (55,691)	637,278 (53,982)	721,603 (75,333)	1,428,655 (127,587)	1,456,009 (92,917)	1,713,587 (100,124)	1,103,247 (82,146)	564,524 (28,154)	118,725 (7,202)	25,797 (2,302)	9,242,978 (242,480)
Angler trips		140,723 (13,709)	135,996 (12,290)	103,522 (13,426)	160,251 (12,253)	162,925 (15,331)	302,119 (26,052)	321,576 (20,341)	378,558 (22,102)	243,677 (18,431)	127,460 (7,006)	25,783 (1,891)	5,804 (750)	2,108,394 (53,650)
Angler days		124,744 (12,642)	118,806 (11,050)	94,915 (12,536)	148,429 (11,439)	150,834 (13,402)	291,521 (25,104)	306,998 (19,507)	353,671 (19,886)	227,944 (17,135)	118,709 (6,640)	23,758 (1,671)	5,692 (739)	1,966,021 (49,967)

Table 2.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) from all creel sites sampled^a on Lake Michigan, by all modes (non-charter) of sport-fishing, 2003. Two standard errors of the mean in parentheses. Some estimates could not be made due to low sample size (-).

Species	Harvest per hour	Month												Season
		Jan ^b	Feb ^b	Mar ^c	Apr ^d	May ^e	Jun ^f	Jul ^f	Aug ^f	Sep ^g	Oct ^h	Nov ⁱ	Dec	
Coho salmon	0.0113 (0.0024)	0 (0)	0 (0)	0 (0)	2,638 (218)	2,954 (2,315)	1,150 (700)	1,030 (682)	10,763 (3,944)	8,735 (3,081)	82 (56)	0 (0)	No survey	27,352 (5,604)
Chinook salmon	0.0716 (0.0098)	0 (0)	0 (0)	0 (0)	172 (62)	16,894 (6,111)	22,604 (9,836)	17,621 (4,791)	81,998 (13,968)	32,437 (8,649)	1,924 (777)	0 (0)		173,650 (20,677)
Rainbow trout	0.0115 (0.0036)	0 (0)	0 (0)	0 (0)	966 (261)	2,809 (910)	10,107 (8,102)	4,388 (1,414)	5,625 (1,455)	2,098 (934)	1,917 (571)	0 (0)		27,910 (8,476)
Atlantic salmon	0.0000 (0.0000)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	19 (37)	0 (0)	0 (0)	0 (0)		19 (37)
Brown trout	0.0036 (0.0009)	0 (0)	0 (0)	0 (0)	2,186 (556)	2,089 (930)	1,972 (1,706)	699 (381)	1,389 (782)	255 (191)	70 (53)	0 (0)		8,660 (2,209)
Lake trout	0.0055 (0.0012)	0 (0)	0 (0)	0 (0)	43 (48)	2,535 (1,381)	2,732 (1,223)	3,926 (1,837)	3,518 (1,077)	587 (285)	109 (116)	0 (0)		13,450 (2,835)
Splake	0.0002 (0.0000)	0 (0)	114 (35)	0 (0)	260 (95)	8 (15)	0 (0)	0 (0)	0 (0)	19 (22)	0 (0)	0 (0)		401 (104)
Northern pike	0.0003 (0.0001)	103 (26)	9 (2)	0 (0)	8 (14)	31 (36)	138 (157)	162 (138)	78 (91)	109 (159)	68 (110)	48 (66)		754 (310)
Muskellunge	0.0000 (0.0000)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	24 (47)	0 (0)	0 (0)		24 (47)
White sucker	0.0001 (0.0002)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	213 (410)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)		213 (410)
Channel catfish	0.0000 (0.0000)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	47 (65)	19 (34)	45 (91)	2 (3)	0 (0)		113 (117)
White perch	0.0001 (0.0002)	0 (0)	0 (0)	0 (0)	0 (0)	197 (392)	0 (0)	0 (0)	66 (133)	0 (0)	0 (0)	0 (0)		263 (414)
Rock bass	0.0010 (0.0004)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	368 (142)	591 (723)	969 (0)	547 (471)	0 (0)	0 (0)		2,475 (875)
Bluegill	0.0001 (0.0000)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	154 (-)	0 (0)	0 (0)	0 (0)	0 (0)		154 (-)
Smallmouth bass	0.0019 (0.0007)	0 (0)	0 (0)	0 (0)	0 (0)	310 (363)	1,178 (704)	725 (429)	538 (489)	1,385 (1,373)	452 (311)	0 (0)	No survey	4,588 (1,741)
Largemouth bass	0.0000 (0.0000)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	26 (30)	0 (0)	0 (0)	0 (0)	0 (0)		26 (30)

Table 2.–Continued.

Species	Harvest per hour	Month											Season
		Jan ^b	Feb ^b	Mar ^c	Apr ^d	May ^e	Jun ^f	Jul ^f	Aug ^f	Sep ^g	Oct ^h	Nov ⁱ	
Yellow perch	0.2135 (0.0401)	36,860 (5,696)	22,467 (4,481)	7,246 (967)	7,649 (5,347)	34,504 (25,388)	66,875 (31,386)	120,934 (55,502)	110,455 (43,071)	61,309 (32,180)	49,062 (23,747)	194 (275)	517,555 (90,812)
Walleye	0.0091 (0.0032)	377 (66)	1,019 (194)	0 (0)	1,887 (1,415)	12,746 (7,360)	3,175 (1,168)	226 (166)	1,364 (732)	487 (339)	225 (167)	464 (295)	21,970 (7,640)
Freshwater drum	0.0004 (0.0001)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	625 (97)	266 (293)	133 (145)	27 (33)	1 (0)	0 (0)	1,052 (343)
Lake whitefish	0.0037 (0.0021)	247 (72)	78 (10)	564 (83)	1,064 (910)	2,503 (3,353)	4,328 (3,532)	76 (121)	16 (33)	39 (78)	176 (152)	0 (0)	9,091 (4,961)
Round whitefish	0.0011 (0.0005)	0 (0)	0 (0)	0 (0)	605 (498)	0 (0)	0 (0)	70 (141)	0 (0)	0 (0)	1,898 (1,167)	0 (0)	2,573 (1,277)
Other	0.0004 (0.0004)	0 (0)	0 (0)	0 (0)	26 (36)	80 (82)	0 (0)	890 (965)	36 (70)	0 (0)	0 (0)	0 (0)	1,032 (972)
Angler hours		61,126 (9,043)	96,637 (16,053)	21,477 (2,648)	94,354 (14,828)	265,972 (65,331)	350,717 (85,296)	374,142 (59,294)	713,359 (82,308)	340,910 (64,899)	80,974 (10,474)	24,675 (6,192)	2,424,343 (163,586)
Angler trips		15,586 (2,723)	21,150 (4,436)	4,995 (829)	26,512 (3,927)	57,726 (12,930)	80,449 (18,675)	88,334 (13,533)	161,321 (18,289)	78,296 (14,597)	21,154 (2,718)	4,691 (1,292)	560,214 (36,041)
Angler days		14,084 (2,605)	18,921 (4,119)	4,770 (818)	24,369 (3,717)	51,540 (10,711)	76,647 (17,580)	83,064 (12,738)	145,300 (15,902)	71,201 (13,244)	18,699 (2,467)	3,202 (971)	511,797 (32,551)

^a INCLUDES: Menominee(001), Stoney Point (007), Cedar River PAS (015), Little Bay de Noc (020), Big Bay de Noc (025), Harbor Springs (080), Petoskey (085), Charlevoix (090), Elk Rapids (094), East Grand Traverse Bay (095), West Grand Traverse Bay (100), Frankfort/Elberta (124), Onekama (127), Manistee (128), Ludington (134), Pentwater (139), Whitehall/Montague (312), Muskegon (149), Grand Haven (153), Port Sheldon (155), Holland (156), South Haven (162), Benton Harbor/St. Joseph (164) and New Buffalo (166). DOES NOT INCLUDE: Manistique (048), Leland (116), Glen Arbor (118), Platte Bay (122), Arcadia (126), and Saugatuck (160).

^b Site 020 only. ^c Sites 001 and 020 only. ^d All sites *except* 080, 085, 090, 139, and 312. No estimate for site 025. ^e Site 139 and 312 surveys did not begin until mid-May.

^f All sites sampled except 007. ^g All sites sampled in September except site 007. Sites 139 and 312 surveys end in mid-September. ^h All sites sampled except 007, 139, and 312.

ⁱ Sites 020 and 025 only.

Table 3.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) from all creel sites sampled^a on Lake Huron, by all modes (non-charter) of sport-fishing, 2003. Two standard errors of the mean in parentheses.

Species	Harvest per hour	Month												Season
		Jan ^b	Feb ^b	Mar ^b	Apr ^c	May ^d	Jun ^d	Jul ^d	Aug ^d	Sep ^d	Oct ^e	Nov	Dec	
Pink salmon	0.0002 (0.0004)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	25 (39)	104 (525)	214 (670)	9 (58)	0 (0)	No survey	No survey	352 (854)
Coho salmon	0.0005 (0.0005)	0 (0)	0 (0)	0 (0)	97 (50)	587 (902)	262 (727)	62 (67)	126 (332)	120 (425)	0 (0)			1,254 (1,281)
Chinook salmon	0.0404 (0.0068)	0 (0)	0 (0)	0 (0)	681 (127)	5,489 (6,116)	11,341 (7,832)	17,939 (5,411)	34,326 (7,420)	19,227 (6,211)	5,335 (3,218)			94,338 (15,233)
Rainbow trout	0.0022 (0.0011)	0 (0)	12 (41)	11 (76)	700 (430)	1,243 (1,358)	996 (1,325)	1,114 (1,325)	701 (812)	154 (364)	221 (180)			5,152 (2,525)
Atlantic salmon	0.0002 (0.0003)	0 (0)	0 (0)	0 (0)	0 (0)	43 (41)	174 (424)	180 (480)	0 (0)	7 (13)	0 (0)			404 (642)
Brown trout	0.0026 (0.0014)	20 (51)	76 (177)	112 (137)	1,711 (1,577)	828 (889)	592 (1,884)	1,132 (1,414)	1,011 (827)	482 (807)	58 (248)			6,022 (3,205)
Lake trout	0.0177 (0.0054)	0 (0)	0 (0)	0 (0)	20 (71)	7,096 (4,991)	13,465 (7,954)	10,675 (6,290)	8,094 (3,617)	2,107 (4,237)	0 (0)			41,457 (12,601)
Splake	0.0000 (0.0000)	0 (0)	0 (0)	0 (0)	0 (0)	18 (77)	0 (0)	0 (0)	18 (38)	0 (0)	0 (0)			36 (86)
Northern pike	0.0009 (0.0005)	857 (463)	580 (460)	14 (15)	22 (101)	147 (175)	102 (291)	200 (929)	83 (314)	36 (277)	0 (0)			2,041 (1,261)
White sucker	0.0000 (0.0001)	0 (0)	0 (0)	0 (0)	6 (24)	88 (168)	0 (11)	0 (0)	0 (0)	0 (0)	0 (0)			94 (170)
Channel catfish	0.0044 (0.0065)	0 (0)	0 (0)	0 (0)	355 (7,839)	446 (1,417)	2,201 (5,461)	3,995 (9,604)	2,613 (6,293)	625 (1,531)	89 (496)			10,324 (15,090)
White perch	0.0001 (0.0006)	7 (23)	0 (0)	0 (0)	0 (0)	0 (0)	165 (1,338)	73 (642)	15 (119)	0 (0)	0 (0)			260 (1,489)
White bass	0.0000 (0.0003)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	80 (593)	7 (53)	0 (0)	0 (0)	0 (0)			87 (595)
Rock bass	0.0005 (0.0009)	68 (317)	0 (0)	0 (0)	2 (8)	200 (714)	221 (666)	362 (1,151)	266 (1,508)	3 (15)	0 (0)	No survey	No survey	1,122 (2,157)
Pumpkinseed	0.0002 (0.0004)	271 (857)	0 (0)	0 (0)	1 (4)	86 (373)	45 (243)	0 (0)	21 (41)	0 (0)	0 (0)			424 (967)
Bluegill	0.0011 (0.0039)	2,304 (9,020)	0 (0)	124 (296)	26 (113)	0 (0)	5 (21)	187 (882)	0 (0)	1 (1)	0 (0)			2,647 (9,069)

Table 3.—Continued.

Species	Harvest per hour	Month											Season	
		Jan ^b	Feb ^b	Mar ^b	Apr ^c	May ^d	Jun ^d	Jul ^d	Aug ^d	Sep ^d	Oct ^e	Nov		Dec
Smallmouth bass	0.0014 (0.0021)	0 (0)	0 (0)	0 (0)	0 (0)	230 (1,296)	1,518 (4,022)	686 (1,148)	517 (1,088)	327 (2,090)	25 (48)			3,303 (4,973)
Largemouth bass	0.0002 (0.0011)	0 (0)	0 (0)	0 (0)	0 (0)	158 (1,187)	327 (2,223)	0 (0)	0 (0)	71 (371)	0 (0)			556 (2,547)
Black crappie	0.0003 (0.0009)	11 (76)	0 (0)	472 (1,270)	9 (27)	91 (1,199)	173 (1,159)	0 (0)	0 (0)	0 (0)	0 (0)			756 (2,098)
Yellow perch	0.2086 (0.0787)	57,504 (42,700)	25,051 (42,162)	27,657 (63,089)	52,887 (46,699)	4,252 (26,543)	8,210 (14,578)	50,866 (54,408)	128,403 (95,718)	84,677 (84,566)	48,151 (58,532)			487,658 (182,698)
Walleye	0.0346 (0.0125)	479 (-)	5,767 (10,322)	2,367 (4,712)	1,859 (3,616)	3,565 (5,689)	25,693 (14,945)	31,112 (19,463)	8,551 (7,887)	1,170 (2,579)	235 (471)			80,798 (29,071)
Freshwater drum	0.0005 (0.0009)	0 (0)	0 (0)	33 (200)	0 (0)	11 (22)	283 (1,341)	528 (698)	372 (1,259)	39 (202)	0 (0)			1,266 (1,988)
Lake herring	0.0051 (0.0030)	0 (0)	0 (0)	0 (0)	0 (0)	67 (122)	4,390 (3,189)	7,369 (6,136)	30 (193)	43 (86)	0 (0)			11,899 (6,920)
Lake whitefish	0.0001 (0.0003)	0 (0)	25 (161)	0 (0)	0 (0)	0 (0)	176 (750)	0 (0)	61 (67)	0 (0)	51 (227)			313 (803)
Round whitefish	0.0001 (0.0001)	0 (0)	12 (42)	0 (0)	0 (0)	0 (0)	15 (99)	0 (0)	0 (0)	0 (0)	222 (317)			249 (335)
Other	0.0006 (0.0016)	0 (0)	0 (0)	13 (0)	0 (0)	27 (119)	1,152 (3,785)	36 (40)	244 (288)	0 (0)	0 (0)	No survey	No survey	1,472 (3,798)
Angler hours		135,895 (19,455)	161,972 (22,410)	132,049 (48,445)	90,320 (13,068)	160,018 (25,643)	330,361 (37,611)	511,922 (50,853)	462,427 (38,843)	254,374 (27,629)	98,282 (15,945)			2,337,620 (102,873)
Angler trips		34,890 (5,259)	34,972 (4,822)	31,720 (10,754)	29,855 (4,475)	34,253 (4,870)	67,305 (7,881)	104,930 (10,277)	99,055 (8,379)	56,844 (6,332)	24,236 (3,602)			518,060 (22,390)
Angler days		30,711 (4,714)	28,937 (4,274)	26,730 (9,805)	24,691 (3,634)	31,556 (4,720)	63,166 (7,516)	97,859 (9,775)	91,321 (7,753)	49,442 (5,688)	20,017 (3,077)			464,430 (20,642)

^a INCLUDES: Munuscong Bay (207), Detour (211), Les Cheneaux Islands (214), St. Ignace (216), Rogers City (223), Presque Isle (224), Rockport (225), Alpena (227), Harrisville (232), Oscoda (234), Saginaw Bay (236, 241, 250, 255, 260, 278, 288, 356), Port Sanilac (245), and Lexington (248). DOES NOT INCLUDE: Drummond Island (210), Cheboygan (218), and Hammond Bay (219).

^b Sites 207, 214, 236, 250, 255, 260, 278, 288 and 356 only. ^c Sites 207, 211, 223, 224, 232, and 234 were not sampled. No estimate for site 241. ^d Site 207 not sampled. ^e Sites 207, 223, and 224 were not sampled.

Table 4.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) from all grids ^a in the Michigan waters of Lake Erie, by all modes (non-charter) of sport-fishing, 2003. Two standard errors of the mean in parentheses.

Species	Harvest per hour	Month												Season
		Jan	Feb	Mar	Apr ^b	May ^b	Jun ^c	Jul ^c	Aug ^b	Sep ^b	Oct ^b	Nov	Dec	
Coho salmon	0.0000 (0.0000)	No survey	No survey	No survey	1 (4)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	No survey	No survey	1 (4)
Rainbow trout	0.0000 (0.0002)				0 (0)	0 (0)	0 (0)	0 (0)	15 (102)	0 (0)	0 (0)			15 (102)
Northern pike	0.0000 (0.0003)				0 (0)	0 (0)	0 (0)	19 (119)	0 (0)	0 (0)	0 (0)			19 (119)
Channel catfish	0.0284 (0.0593)				311 (655)	1,395 (2,567)	4,547 (17,840)	3,110 (16,961)	1,895 (7,662)	1,153 (3,994)	437 (5,126)			12,848 (26,719)
White perch	0.0043 (0.0073)				0 (0)	51 (240)	377 (1,165)	237 (642)	1,074 (2,897)	88 (493)	111 (458)			1,938 (3,267)
White bass	0.0221 (0.0676)				1,069 (2,876)	1,362 (3,305)	5,006 (29,865)	1,099 (3,281)	801 (2,047)	555 (1,984)	80 (339)			9,972 (30,498)
Rock bass	0.0004 (0.0012)				0 (0)	7 (36)	66 (428)	44 (235)	0 (0)	32 (173)	33 (183)			182 (551)
Bluegill	0.0006 (0.0070)				0 (0)	31 (224)	0 (0)	190 (1,261)	65 (2,880)	7 (133)	0 (0)			293 (3,155)
Smallmouth bass	0.0009 (0.0019)				0 (0)	124 (590)	68 (356)	155 (450)	45 (178)	9 (61)	0 (0)			401 (844)
Largemouth bass	0.0008 (0.0039)				0 (0)	298 (1,752)	0 (0)	11 (123)	45 (179)	0 (0)	0 (0)			354 (1,765)
Black crappie	0.0004 (0.0017)				48 (310)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	125 (720)			173 (784)
Yellow perch	0.6342 (0.2711)				38 (293)	1,578 (3,389)	20,925 (40,710)	29,055 (43,950)	99,286 (60,013)	98,844 (62,423)	36,727 (49,804)			286,453 (116,530)
Walleye	0.2260 (0.0795)				844 (1,191)	4,569 (4,790)	69,341 (30,008)	20,413 (12,441)	6,562 (5,567)	320 (565)	19 (122)			102,068 (33,331)
Freshwater drum	0.0032 (0.0069)				12 (51)	188 (1,324)	461 (2,302)	457 (1,424)	254 (767)	67 (359)	10 (58)			1,449 (3,131)

Table 4.–Continued

Species	Harvest per hour	Month												Season
		Jan	Feb	Mar	Apr ^b	May ^b	Jun ^c	Jul ^c	Aug ^b	Sep ^b	Oct ^b	Nov	Dec	
Lake whitefish	0.0004 (0.0021)	No survey	No survey	No survey	0 (0)	0 (0)	165 (930)	0 (0)	0 (0)	0 (0)	0 (0)	No survey	No survey	165 (930)
Angler hours					8,133 (4,771)	24,440 (11,692)	166,544 (42,077)	99,652 (30,630)	78,136 (14,460)	52,943 (19,250)	21,798 (7,800)			451,646 (59,234)
Angler trips					1,989 (1,168)	5,446 (2,487)	32,980 (8,809)	20,879 (6,474)	16,725 (3,116)	11,535 (4,199)	5,061 (1,965)			94,615 (12,580)
Angler days					1,959 (1,147)	5,369 (2,461)	32,772 (8,775)	20,704 (6,470)	16,688 (3,107)	11,453 (4,175)	5,061 (1,965)			94,006 (12,537)

^a Michigan grids include 701-703 and 801-802: ^b Grids 701, 702 and 801 only. No estimates for 703 and 802: ^c Grids 701, 702, 703, and 801 only. No estimates for 802.

Table 5.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) from all grids^a in the Michigan waters of Lake St. Clair, by all modes (non-charter) of sport-fishing, 2003. Two standard errors of the mean in parentheses.

Species	Harvest per hour	Month												Season
		Jan ^b	Feb ^b	Mar ^b	Apr ^c	May ^d	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Chinook salmon	0.0001 (0.0002)	0 (0)	0 (0)	0 (0)	109 (433)	4 (23)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	No survey	No survey	113 (433)
Rainbow trout	0.0000 (0.0002)	0 (0)	0 (0)	0 (0)	20 (289)	66 (268)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)			86 (394)
Northern pike	0.0010 (0.0014)	682 (1,469)	189 (445)	0 (0)	0 (0)	170 (702)	360 (1,537)	180 (660)	155 (567)	63 (265)	0 (0)			1,799 (2,457)
Muskellunge	0.0003 (0.0019)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	370 (3,375)	137 (624)	0 (0)	0 (0)	0 (0)			507 (3,432)
White sucker	0.0000 (0.0000)	0 (0)	0 (0)	14 (66)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)			14 (66)
Channel catfish	0.0003 (0.0007)	0 (0)	0 (0)	0 (0)	0 (0)	32 (134)	344 (1,141)	60 (261)	103 (584)	24 (161)	0 (0)			563 (1,325)
White perch	0.0001 (0.0003)	0 (0)	52 (298)	84 (235)	0 (0)	0 (0)	32 (190)	15 (83)	85 (430)	0 (0)	0 (0)			268 (610)
White bass	0.0006 (0.0015)	83 (493)	71 (337)	0 (0)	0 (0)	0 (0)	418 (2,296)	156 (656)	375 (1,089)	31 (164)	0 (0)			1,134 (2,696)
Rock bass	0.0024 (0.0024)	0 (0)	271 (768)	30 (105)	5 (28)	670 (2,331)	1,247 (1,996)	937 (2,110)	836 (1,627)	398 (898)	5 (38)			4,399 (4,234)
Pumpkinseed	0.0061 (0.0073)	786 (1,453)	671 (1,364)	145 (580)	148 (644)	1,412 (2,989)	4,805 (11,808)	318 (879)	1,132 (2,115)	939 (2,148)	666 (2,986)			11,022 (13,110)
Bluegill	0.0074 (0.0076)	3,894 (6,268)	2,322 (5,836)	0 (0)	40 (107)	504 (1,306)	444 (1,421)	132 (753)	1,712 (5,353)	885 (2,900)	3,442 (8,389)			13,375 (13,605)
Smallmouth bass ^e	0.0085 (0.0063)	0 (0)	0 (0)	0 (0)	6 (32)	44 (211)	2,697 (5,091)	3,392 (5,042)	7,103 (8,513)	1,964 (2,334)	82 (426)			15,288 (11,379)
Largemouth bass ^e	0.0006 (0.0015)	0 (0)	0 (0)	0 (0)	19 (113)	356 (2,197)	78 (353)	185 (1,045)	417 (1,005)	0 (0)	12 (142)	No survey	No survey	1,067 (2,662)
Black crappie	0.0019 (0.0043)	732 (2,131)	202 (511)	0 (0)	590 (2,039)	596 (1,826)	995 (6,661)	0 (0)	258 (1,839)	73 (444)	65 (321)			3,511 (7,769)
Yellow perch	0.4438 (0.1127)	237,647 (89,396)	185,603 (87,122)	109,176 (34,780)	254 (540)	1,979 (4,956)	28,781 (95,851)	68,660 (86,110)	77,828 (49,025)	47,513 (32,229)	43,453 (44,033)			800,894 (196,976)
Walleye	0.0416 (0.0249)	0 (0)	0 (0)	18 (87)	61 (266)	4,746 (4,606)	19,913 (19,469)	25,540 (36,037)	18,856 (14,909)	5,162 (6,787)	730 (4,671)			75,026 (44,600)

Table 5.–Continued.

Species	Harvest per hour	Month												Season
		Jan ^b	Feb ^b	Mar ^b	Apr ^c	May ^d	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Freshwater drum ^e	0.0016 (0.0030)	0 (0)	0 (0)	0 (0)	0 (0)	22 (104)	2,124 (5,070)	463 (1,379)	282 (1,084)	54 (241)	12 (142)			2,957 (5,373)
Lake whitefish	0.0000 (0.0000)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	6 (38)	0 (0)	0 (0)	0 (0)	0 (0)			6 (38)
Other ^e	0.0168 (0.0319)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	30,227 (57,454)	0 (0)	77 (553)	0 (0)	83 (481)			30,387 (57,458)
Angler hours		277,377 (41,880)	233,286 (33,177)	103,071 (18,619)	15,912 (5,331)	63,775 (14,159)	323,269 (72,206)	256,429 (36,925)	292,947 (37,039)	168,627 (35,845)	69,950 (15,356)			1,804,643 (113,578)
Angler trips		77,221 (11,024)	66,116 (10,199)	25,266 (4,680)	3,975 (1,309)	13,472 (3,066)	58,074 (12,159)	51,778 (7,865)	57,697 (7,457)	34,517 (7,532)	15,322 (3,532)			403,438 (24,353)
Angler days		66,923 (9,973)	57,436 (9,098)	23,239 (4,313)	3,796 (1,285)	12,914 (3,005)	56,992 (12,091)	51,116 (7,764)	57,310 (7,379)	34,288 (7,512)	15,288 (3,529)			379,302 (23,266)

^a Michigan grids include 506-514. ^b Grids 507, 509, 512, 513, and 514 only. No estimates for 506, 508, 510, and 511. ^c Grids 506, 507, 509, 512, 513 and 514 only. No estimates for 508, 510, and 511. ^d Grids 506, 507, 509, 510, 512, 513 and 514 only. No estimates for 508 and 511. ^eNo adjustments made to account for tournament effects.

Table 6.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) from all sites surveyed ^a in Lake Superior, by all modes (non-charter) of sport-fishing, 2003. Two standard errors of the mean in parentheses.

Species	Harvest per hour	Month												Season
		Jan ^b	Feb ^c	Mar ^d	Apr ^e	May	Jun	Jul	Aug	Sep ^f	Oct ^g	Nov	Dec	
Coho salmon	0.0259 (0.0041)	285 (63)	414 (82)	911 (247)	720 (222)	932 (353)	56 (44)	279 (263)	108 (65)	156 (68)	104 (86)	No survey	No survey	3,965 (577)
Chinook salmon	0.0056 (0.0014)	0 (0)	7 (1)	32 (26)	80 (43)	451 (172)	150 (78)	33 (35)	80 (64)	17 (23)	12 (18)			862 (210)
Rainbow trout	0.0039 (0.0009)	0 (0)	1 (0)	55 (31)	206 (77)	179 (91)	66 (49)	22 (26)	30 (34)	5 (10)	29 (8)			593 (140)
Atlantic salmon	0.0001 (0.0002)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	16 (32)	0 (0)	0 (0)	0 (0)	0 (0)			16 (32)
Brown trout	0.0011 (0.0005)	0 (0)	0 (0)	60 (49)	0 (0)	83 (45)	6 (13)	0 (0)	9 (14)	3 (7)	11 (13)			172 (71)
Lake trout	0.1176 (0.0168)	18 (7)	181 (10)	405 (28)	0 (0)	452 (248)	3,572 (869)	5,877 (1,660)	5,032 (1,256)	1,636 (489)	822 (334)			17,995 (2,345)
Splake	0.0074 (0.0018)	0 (0)	100 (81)	248 (112)	340 (151)	248 (119)	67 (86)	0 (0)	32 (43)	12 (14)	87 (51)			1,134 (261)
Siscowet	0.0401 (0.0086)	91 (37)	1,249 (95)	1,414 (60)	0 (0)	89 (58)	1,229 (755)	1,205 (973)	735 (266)	95 (24)	34 (43)			6,141 (1,268)
Northern pike	0.0005 (0.0002)	20 (6)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	12 (19)	11 (17)	9 (12)	18 (21)			70 (36)
White sucker	0.0002 (0.0002)	0 (0)	0 (0)	0 (0)	0 (0)	24 (35)	4 (9)	0 (0)	0 (0)	0 (0)	0 (0)			28 (36)
Rock bass	0.0005 (0.0010)	0 (0)	84 (151)	0 (0)	0 (0)			84 (151)						
Smallmouth bass	0.0002 (0.0002)	0 (0)	0 (0)	8 (1)	0 (0)	0 (0)	0 (0)	0 (0)	17 (30)	0 (0)	0 (0)			25 (30)
Yellow perch	0.0030 (0.0013)	0 (0)	162 (132)	143 (89)	0 (0)	0 (0)	0 (0)	70 (40)	89 (97)	0 (0)	0 (0)			464 (191)
Walleye	0.0001 (0.0001)	0 (0)	0 (0)	0 (0)	0 (0)	12 (12)	0 (0)	2 (4)	0 (0)	0 (0)	0 (0)			14 (12)
Lake herring	0.0119 (0.0027)	349 (67)	924 (369)	503 (111)	45 (20)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	No survey	No survey	1,821 (391)
Lake whitefish	0.0926 (0.0273)	0 (0)	4,986 (1,780)	1,310 (440)	113 (69)	2,551 (1,560)	3,370 (3,206)	628 (577)	340 (399)	8 (12)	863 (404)			14,169 (4,090)

Table 6.–Continued.

Species	Harvest per hour	Month											Season	
		Jan ^b	Feb ^c	Mar ^d	Apr ^e	May	Jun	Jul	Aug	Sep ^f	Oct ^g	Nov		Dec
Round whitefish	0.0088 (0.0063)	0 (0)	34 (51)	89 (66)	56 (69)	376 (275)	20 (27)	10 (14)	646 (913)	4 (6)	104 (75)			1,339 (963)
Other	0.0012 (0.0004)	0 (0)	33 (35)	61 (48)	87 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)			181 (59)
Angler hours		2,616 (407)	19,432 (1,314)	24,670 (1,518)	8,234 (1,597)	16,766 (4,044)	24,544 (4,859)	22,249 (4,368)	21,819 (3,485)	8,102 (1,593)	4,546 (817)			152,978 (9,008)
Angler trips		870 (151)	5,391 (421)	7,257 (518)	2,825 (509)	4,910 (1,174)	6,032 (1,327)	6,218 (1,336)	5,846 (1,023)	2,394 (421)	1,611 (308)			43,354 (2,640)
Angler days		870 (151)	5,206 (414)	7,085 (507)	2,772 (500)	4,360 (949)	5,608 (1,175)	5,943 (1,236)	5,704 (995)	2,345 (416)	1,598 (307)			41,491 (2,402)

^a INCLUDES: Traverse Bay (182), Keweenaw Bay (185), Marquette (190), Au Train (194), Munising (195), and Grand Marais (197). DOES NOT INCLUDE: Black River Harbor (168), Ontonagon (172), Huron Bay (188), and Big Bay (189).

^b Site 185 only. ^c Sites 185 and 195 only. ^d Sites 182 and 197 not sampled. ^e Site 197 not sampled. No estimate for site 182. ^f Site 194 not sampled. ^g Sites 182, 185 and 190 only.

Table 7.—Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) from all sites surveyed ^a on the St. Joseph River, by all modes (non-charter) of sport-fishing, 2003. Two standard errors of the mean in parentheses.

Species	Harvest per hour	Month												Season
		Jan	Feb	Mar ^b	Apr	May ^c	Jun	Jul	Aug	Sep	Oct	Nov	Dec ^d	
Coho salmon	0.0011 (0.0006)	No survey	No survey	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	127 (116)	128 (86)	57 (68)	0 (0)	312 (160)
Chinook salmon	0.0037 (0.0011)			0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	17 (24)	557 (223)	388 (211)	104 (101)	0 (0)	1,066 (325)
Rainbow trout	0.0261 (0.0044)			532 (293)	333 (187)	0 (0)	126 (125)	74 (70)	562 (276)	514 (249)	1,872 (655)	2,766 (863)	717 (239)	7,496 (1,229)
Brown trout	0.0009 (0.0004)			21 (37)	11 (16)	0 (0)	0 (0)	0 (0)	17 (24)	33 (0)	116 (93)	50 (64)	0 (0)	248 (122)
Lake trout	0.0001 (0.0001)			0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	25 (42)	0 (0)	0 (0)	25 (42)
White sucker	0.0011 (0.0007)			0 (0)	198 (170)	0 (0)	0 (0)	103 (107)	5 (8)	9 (16)	0 (0)	0 (0)	0 (0)	315 (201)
Channel catfish	0.0064 (0.0028)			0 (0)	0 (0)	0 (0)	367 (434)	809 (522)	394 (341)	251 (201)	25 (33)	0 (0)	0 (0)	1,846 (787)
Rock bass	0.0191 (0.0104)			46 (91)	519 (631)	185 (201)	2,321 (2,694)	781 (542)	963 (617)	459 (544)	197 (331)	0 (0)	0 (0)	5,471 (2,964)
Pumpkinseed	0.0016 (0.0010)			0 (0)	0 (0)	12 (22)	0 (0)	0 (0)	443 (286)	14 (20)	0 (0)	0 (0)	0 (0)	469 (287)
Bluegill	0.0435 (0.0159)			0 (0)	267 (405)	541 (564)	3,498 (2,752)	1,539 (1,118)	1,493 (1,115)	3,588 (2,078)	1,483 (2,403)	67 (133)	0 (0)	12,476 (4,545)
Smallmouth bass	0.0025 (0.0014)			0 (0)	40 (79)	34 (47)	181 (250)	333 (246)	93 (135)	23 (9)	11 (20)	0 (0)	0 (0)	715 (388)
Largemouth bass	0.0001 (0.0001)			0 (0)	19 (39)	0 (0)	0 (0)	0 (0)	0 (0)	2 (4)	0 (0)	0 (0)	0 (0)	21 (39)
Black crappie	0.0009 (0.0009)			0 (0)	51 (93)	0 (0)	155 (221)	0 (0)	0 (0)	9 (17)	35 (80)	0 (0)	0 (0)	250 (254)
Walleye	0.0097 (0.0029)			20 (22)	0 (0)	40 (49)	799 (412)	683 (455)	280 (171)	199 (258)	262 (241)	199 (165)	298 (369)	2,780 (834)
Freshwater drum	0.0047 (0.0030)	No survey	No survey	21 (49)	0 (0)	0 (0)	537 (487)	626 (687)	145 (134)	7 (13)	0 (0)	0 (0)	0 (0)	1,336 (854)

Table 7.–Continued.

Species	Harvest per hour	Month												Season
		Jan	Feb	Mar ^b	Apr	May ^c	Jun	Jul	Aug	Sep	Oct	Nov	Dec ^d	
Other	0.0023 (0.0015)			84 (196)	101 (146)	28 (49)	29 (33)	347 (325)	25 (35)	7 (12)	49 (94)	0 (0)	0 (0)	670 (423)
Angler hours				22,077 (3,861)	22,906 (2,516)	3,900 (1,060)	30,778 (4,026)	31,736 (3,916)	36,842 (3,785)	41,134 (6,045)	58,806 (5,258)	26,723 (3,376)	12,227 (1,939)	287,129 (12,148)
Angler trips				6,084 (1,318)	7,952 (1,024)	1,271 (460)	10,703 (1,694)	8,774 (1,339)	10,157 (1,036)	9,337 (1,323)	14,165 (1,360)	6,284 (859)	2,756 (593)	77,483 (3,663)
Angler days				5,657 (1,271)	7,679 (997)	1,271 (460)	10,360 (1,616)	8,370 (1,291)	9,961 (1,024)	8,912 (1,275)	13,148 (1,303)	6,143 (850)	2,675 (580)	74,176 (3,540)

^a INCLUDES: Corrunde to Jasper Dairy PAS (367), Jasper Dairy PAS to Berrien Springs Dam (298), Berrien Springs Dam to Buchanan Dam (345), Buchanan Dam to the Niles Dam (Site 387), the Dowagiac River (Site 391), the MI-OH Stateline to the South Bend Dam (Site 388), South Bend Dam to Mishawaka Dam (Site 389), and Mishawaka Dam to the Twin Branch Dam (Site 390). NOTE: In 2003, the St Joseph River is the only site in Michigan that includes sites outside the State of Michigan.

^b No estimate for site 389. ^c Sites 388 and 390 only. No estimate for site 389. ^d Sites 298, 345, 367 and 391 only. No estimate for site 387.