

87-6a

FISHERIES DIVISION

TECHNICAL REPORT

**Sportfishing Catch and Effort from the Michigan
Waters of Lakes Michigan, Huron, and Erie,
and their Important Tributary Streams,
April 1, 1986 – March 31, 1987**

Gerald P. Rakoczy
and
Richard D. Rogers

Number 87-6a
November 12, 1987



**Michigan Department of
Natural Resources**

**MICHIGAN DEPARTMENT OF NATURAL RESOURCES
FISHERIES DIVISION**

Fisheries Technical Report No. 87-6a

November 12, 1987

**SPORTFISHING CATCH AND EFFORT FROM THE MICHIGAN WATERS
OF LAKES MICHIGAN, HURON, AND ERIE, AND
THEIR IMPORTANT TRIBUTARY STREAMS,
APRIL 1, 1986 - MARCH 31, 1987**

Gerald P. Rakoczy

and

Richard D. Rogers

ABSTRACT

Sportfishing catch and effort were sampled on lakes Michigan, Huron, and Erie, and on several important river systems from April 1, 1986 through March 31, 1987. The objective of the creel census program is to obtain a continuous record of sport catch, catch rates, and catch composition in the Great Lakes and important anadromous river fisheries.

Over 70,000 anglers were sampled at the end of their fishing trips. Catch and effort estimates were calculated by month for all areas sampled. It was estimated that anglers spent 14,108,348 ($\pm 594,883$) angler hours in all areas of Michigan's waters of the Great Lakes that were censused. Total angler effort broken down by mode of fishing was 74% boat, 11% pier, 9% ice, and 6% shore. Forty-eight percent of the total angler days were spent on Lake Michigan while 33% were spent on Lake Huron.

Total catch was estimated to be over 12.4 million individual fish. Yellow perch were the most abundant species in the sport catch in most sample areas. The yellow perch catch for all areas censused was estimated at 9,639,181 ($\pm 849,641$) fish. In addition to yellow perch, sport anglers harvested an estimated 627,992 ($\pm 97,194$) chinook salmon, 196,434 ($\pm 46,389$) lake trout, 145,880 ($\pm 25,460$) coho salmon, 89,213 ($\pm 17,203$) brown trout, and 57,017 ($\pm 15,257$) rainbow trout.

INTRODUCTION

Michigan's Great Lakes sport fishery has been monitored with a statewide contact creel census program since 1983. The objective of the program is to obtain a continuous record of sport catch, catch rates, and catch composition in the Great Lakes and important anadromous river fisheries.

A fundamental requirement for sound management of the Great Lakes fisheries is knowledge of the response of fish stocks to fishing and the contributions of various fish stocks to the fisheries. The success of rehabilitation and the future value of the Great Lakes and anadromous stream fisheries depend on the long-term consequences of current management. It is essential that management decisions be based on a sound empirical knowledge of the history, current status, and dynamics of the fish communities.

Fishing statistics are needed for stock assessment and to facilitate stock identification. Coupled with fish marking studies, these kinds of data can be used to aid in identifying Great Lakes and anadromous fish stocks and in determining their spatial distribution, movements, and contribution to various sport fisheries. In future years, data collected from this program could be used to develop, test, and improve decision models which will help to discern management strategies for Great Lakes fish communities and fisheries.

During the 1986 open-water fishing season, angler catch and effort were sampled on lakes Michigan, Huron, and Erie. In addition, several important anadromous river fisheries tributary to lakes Michigan and Huron were also sampled. During the winter months of 1986-87, ice fisheries were sampled at several important locations on lakes Superior, Michigan, and Huron.

Michigan Department of Natural Resources (MDNR) Fisheries Division personnel interviewed over 70,000 anglers at the end of their fishing trips during the 1986 license year, April 1, 1986 through March 31, 1987. Approximately 60,000 of these anglers were contacted during the April through November open-water season. A total of 9,700 anglers were interviewed during the winter ice fishing season, January through March 1987.

STUDY AREA AND METHODS

In 1986 creel monitoring operations were conducted at two levels of intensity with the level of intensity referring to the frequency of sampling per port or fishing area. In an intensive creel census, the geographical area sampled per census worker is smaller than in a less intensive census. As a general rule, the intensive creel census is designed such that the sampling area is no larger than can be covered in one 8-hour workday. The same sample area is then traversed 5 days per week. For the less intensive creel sampling operations, personnel are spread over a much broader area covering several ports or fishing areas per week. As a result,

a particular port or fishing area may be sampled only six or seven times per month. The same sampling designs and data collection methods are used regardless of sampling frequency.

Personnel from ten district management offices and two Great Lakes research stations monitored the sport fisheries in their respective localities. In addition to the permanent personnel, 12 seasonal temporary workers were hired to accomplish the task of covering lakes Michigan, Huron, and Erie. The majority of temporary workers were used on the intensive census of Lake Huron.

During the 1986 open-water season, an intensive creel census was conducted at all important ports and sportfishing areas on Lake Huron from Port Huron to St. Ignace and from St. Ignace to Potagannissing Bay (Figure 1). The port of Alpena was surveyed under a separate study. An intensive creel census was also conducted on Lake Erie from Pointe Mouillee to the Michigan-Ohio state line (Figure 2). On Lake Erie the census focused on the boat fishery. Less intensive creel sampling was conducted on important ports and angling areas of Lake Michigan from New Buffalo to Harbor Springs and from Manistique to Menominee (Figure 3). Two important Lake Michigan ports, White Lake and Portage Lake, could not be sampled because of a lack of manpower.

The winter fishery was intensively sampled in Saginaw Bay and the Les Cheneaux Islands (Lake Huron), Big and Little Bays de Noc (Lake Michigan), Munuscong Bay (St. Mary's River), and Huron Bay and Munising Bay (Lake Superior). Plans for sampling ice fisheries on Lake Erie, Keweenaw Bay (Lake Superior), and Grand Traverse bays (Lake Michigan) were cancelled due to the lack of ice formation.

The creel census used in Michigan is based on a stratified design using simple random sampling within strata. Strata included port fished by month, by weekday-weekend (holiday), and by mode of fishing. Catch and effort estimates were made for each strata and then combined to give monthly and seasonal figures. Each work schedule was specifically tailored for the area being sampled. Both weekend days and three randomly selected weekdays were sampled each week. In some cases, four 10-hour days per work week were used when permanent personnel were required to drive long distances to and from the sampling area. In these cases, two randomly selected weekdays and both weekend days were sampled each week. The entire angling day from dawn to 1 hour past dusk was covered. This was accomplished by breaking each day into two 8-hour work shifts, then randomly selecting the actual shift to be worked. In the case where an individual was responsible for sampling more than one area, the port or fishing areas were also randomly selected for each day.

Two types of data were collected for each area sampled: angler party interviews for catch rates and angler (or boat) counts for pressure. An angler party was defined as one or more anglers who fished together. Angler parties were interviewed at the end of their fishing trips at various boat launching ramps, marinas, piers, and along the shoreline. Anglers were queried as

to their mode of fishing (i.e., boat, shore, pier, open ice, or shanty ice), where they fished, how long they fished, what they fished for, the numbers (by species) of fish they caught, and the number of fishing trips they made or intended to make that day. Additional data were collected on each angler in the party such as age and sex of the angler, zip code or county of residence, and the types of angling methods used (casting, still fishing, trolling, etc.). These data were recorded on an angler interview form by census personnel (Figure 4).

Instantaneous and interval counts were used to sample fishing pressure. Instantaneous counts were used when all boats or anglers in a sample area could be observed from a given point at one time. Interval counts were used when the sample area was too large to be observed from one point. In this case, the number of boats or anglers passing the observation point during some time period was used to determine the number of fishermen in the entire sampling area. Angler pressure was sampled by either ground or air counts of boats or boat trailers, ice shanties, pier (breakwall) anglers, shore anglers, or open-ice anglers. Most fishing effort counts were done from the ground by census workers according to randomly selected count times. All counts of boat trailers, pier, shore, and open-ice anglers and of ice shanties were instantaneous. However, both instantaneous and interval boat counts were made depending on the sampling area. The type and number of boating access points within the sample area determined the type of boat count used. Interval counts were used in cases where boat access to the open lake was limited to harbor areas where all boats exited through defined channels. A 30-minute duration was used for all interval counts. Instantaneous boat counts by airplane were made where numerous launching ramps or mooring facilities allowed access over a broad area.

Air counts (instantaneous) of boats, ice shanties, pier, shore, and open-ice anglers were used only when ground counts were not feasible. In general air flights were used in areas that had many access points for all modes of fishing. Specific areas where fishing pressure was sampled by air flights were Saginaw Bay, southern Lake Huron from Tawas to Port Huron, northern Lake Huron from St. Ignace to Potagannissing Bay, and western Lake Erie from Pointe Mouillee to the state line.

Local flight service companies were contracted to make aerial counts. Five flights were made each week at randomly selected starting times—one each weekend day, and one on each of three randomly selected week days.

All pressure counts, whether accomplished from the ground or air, were recorded on count data forms by census clerks or contract pilots (Figure 5).

Seasonal workers were trained on-site by permanent fisheries technicians at the beginning of the field season. Count and interview data forms, completed by both the seasonal and permanent personnel, were reviewed every 2 weeks by a designated individual at each district or research station office. Throughout the field season, completed data forms were sent to the

Charlevoix Great Lakes Research Station for computer entry. Data forms were further scrutinized at Charlevoix prior to data entry. The entry software employed range checks on various data for each count and interview record that was keyed. In addition, a module of the creel-catch-estimate software performed a final check of the data before the catch estimates were made.

Catch and effort estimates were made for each port or fishing area by month and species. Standard mathematical formulas for creel census (Ryckman 1981; Smith and Ryckman, in press) were used to calculate all estimates. Three measures of fishing effort were calculated: angler hours, angler trips, and angler days. An angler trip is one completed fishing excursion. An angler day is composed of one or more fishing excursions during a 24-hour period.

Scientific and common names of fish species observed during this study are contained in Table 1.

Detailed catch estimates by month, species, and sample area are contained in the appendices, Michigan Department of Natural Resources, Fisheries Technical Report Number 87-6b.

RESULTS

Lake Michigan

Anglers spent an estimated 6,601,340 ($\pm 488,588$) hours fishing the Michigan waters of Lake Michigan during the April through November 1986 open-water season (Table 2). The number of hours fished converts to an estimated 1,473,789 ($\pm 93,651$) individual angler trips or 1,358,327 ($\pm 85,964$) angler fishing days. Total angling effort broken down by mode of fishing was 86% boat, 12% pier, and 2% shore.

The waters of Lake Michigan from Ludington to Frankfort had the greatest concentration of fishing effort. Thirty-two percent of the lake-wide total estimated effort (angler hours) occurred in this area. The port of Ludington had the greatest amount of angler activity of any single port, with an estimated 833,763 ($\pm 258,924$) angler hours or 167,192 ($\pm 45,061$) individual fishing trips (Table 3). Grand Haven, Manistee, St. Joseph/Benton Harbor, and Frankfort also had substantial levels of sportfishing activity.

The average length of a fishing trip (all modes of fishing) was 4.5 hours. Anglers made approximately 1.1 fishing trips per day. Boat trips were the longest in duration, averaging 5.1 hours. Pier and shore trips averaged 2.8 and 2.2 hours, respectively.

Fishermen caught an estimated 3,565,545 ($\pm 454,625$) fish comprising 30 individual species during 1986 (Table 2). The bulk of this catch (83%) came from the boat fishery, while pier and shore anglers harvested 14% and 3% of the total catch, respectively (Tables 4, 5, and 6).

Yellow perch was the most numerous species in the catch, making up 69% of all the fish harvested. An estimated 2,469,587 ($\pm 439,120$) yellow perch were caught by all modes of fishing (Table 2). Fifty-two percent of the lake-wide yellow perch catch came from three southern Lake Michigan ports—New Buffalo, St. Joseph/Benton Harbor, and South Haven (Table 7). St. Joseph/Benton Harbor had the largest perch catch (590,044 \pm 307,649 fish) of any individual port. The bulk of this harvest (80%) came from the boat fishery. Manistee, Grand Traverse bays, and Big and Little Bays de Noc also had substantial yellow perch catches (Table 7).

The seasonal, lake-wide catch rate for yellow perch was 0.374 (± 0.072) fish per angler hour (Table 2). The greatest catch rate for perch was 3.708 (± 1.989) in Big Bay de Noc (Table 7). This particular fishery is short lived, occurring for a 30- to 45-day period during April and May. The best seasonal (April through November) catch rate for perch occurred in East Grand Traverse Bay, with an estimated 1.205 (± 0.472) perch per angler hour. Anglers in the St. Joseph/Benton Harbor and New Buffalo areas also had good yellow perch catch rates at nearly one fish per hour (Table 7).

Although yellow perch are important to the Lake Michigan sport fishery, most anglers seek the various species of salmonids. The Lake Michigan salmonid catch, exclusive of lake whitefish, in the study area was estimated at 899,712 ($\pm 111,311$) fish. If the uncensused catch at White Lake and Portage Lake were included, it is probable that the lake-wide catch of salmonids would have been over the 1,000,000 fish mark, based on 1985 census data (unpublished) from these ports.

The salmonid catch was composed of 57% chinook salmon, 15% lake trout, 15% coho salmon, 8% brown trout, 4% rainbow trout, and less than 1% of other salmonids such as pink salmon, brook trout, and splake. The vast majority of the salmonid harvest (95%) came from the boat fishery (Table 4).

Chinook salmon is the most important salmonid in the Lake Michigan sport fishery in terms of the numbers of fish harvested. An estimated 513,790 ($\pm 96,387$) chinooks were creel by anglers during 1986. Biological data collected from the Lake Michigan sport catch during 1985 indicated that the mean weight of a chinook in the catch was 10.9 (± 0.3) pounds. Based on these data, fishermen harvested approximately 5.6 million pounds of chinook from Lake Michigan during 1986. The largest catch of chinook salmon (129,388 \pm 76,019 fish) came from the port of Ludington (Table 8). Substantial catches, estimated over 60,000 fish, also occurred at each of the ports of Manistee, Grand Haven, and Frankfort. The lake-wide chinook catch rate was 0.078 (± 0.016). Ludington anglers had the greatest catch rate, averaging 0.155 (± 0.103) chinook per hour. Anglers at the ports of Manistee, Frankfort, Grand Haven, and Charlevoix all had excellent chinook catch rates in the 0.10 fish per hour range (Table 8).

Lake trout was the second most numerous salmonid in the Lake Michigan sport catch. An estimated 140,308 ($\pm 44,904$) were harvested by all anglers. Data collected from the sport fishery during 1985 indicated that creel lake trout averaged 5.7 (± 0.2) pounds. Assuming the mean weight remained stable during 1986, nearly 800,000 pounds may have been harvested by all modes of sportfishing. Of all the fishing areas sampled, the largest estimated lake trout catch of 33,654 ($\pm 40,334$) fish occurred at Frankfort (Table 9). St. Joseph/Benton Harbor, Ludington, and Grand Haven anglers also had significant seasonal catches of lake trout, ranging from 14,000 to 18,000 fish. Anglers fishing the northern Lake Michigan ports of Petoskey and Charlevoix had the highest catch rates for lake trout, 0.071 (± 0.031) and 0.066 (± 0.038) fish per angler hour, respectively.

Catch rates alone can be a misleading indicator of species abundance. In southern and central Lake Michigan, anglers tend to fish for chinook salmon. Most fishing for salmon is done with downriggers, and lures are fished a substantial distance from the bottom. Salmon are a mid-water species while lake trout are usually associated with the bottom. As a result, a large percentage of the lake trout catch in these areas is taken incidental to salmon fishing. In the Petoskey-Charlevoix area, anglers spent a good portion of the season (May and June) seeking lake trout, with lures fished at or very near the bottom, because salmon normally do not enter the area in large numbers until July. This is the main reason why catch rates for lake trout are higher in these northern ports when compared to rates in the south and central portion of the lake.

Coho salmon was the third most abundant salmonid, with an estimated 134,132 ($\pm 25,194$) fish harvested by the sport fishery. The bulk of the coho catch (47%) came during April and May from the southern ports of New Buffalo and St. Joseph/Benton Harbor. Anglers in the St. Joseph/Benton Harbor area had the largest catch, estimated at 38,235 ($\pm 15,302$) fish. Both Ludington and New Buffalo anglers had good coho catches, estimated at 27,349 ($\pm 12,964$) and 24,247 ($\pm 9,592$) fish, respectively. Seventy-nine percent of the coho harvested at Ludington were landed during July and August. The lake-wide coho salmon catch rate was 0.020 (± 0.004). The greatest seasonal catch rate for coho was estimated to be 0.063 (± 0.029) fish per hour in the St. Joseph/Benton Harbor area.

A total of 73,768 ($\pm 16,136$) brown trout and 35,323 ($\pm 13,532$) rainbow trout were estimated to have been caught by Lake Michigan anglers (Table 2). Seventy-one percent of the brown trout catch came from the central Lake Michigan ports of Ludington, Manistee, and Frankfort. Most of these fish (54%) were caught during April. The greatest seasonal (April through November) catch rate for brown trout occurred at Manistee, estimated at 0.034 (± 0.018).

New Buffalo anglers had the largest estimated catch of rainbow trout (7,927 \pm 11,318). Anglers at this same port had the highest catch rate (0.017 \pm 0.024) for rainbows.

Manistee fishermen also had a substantial rainbow fishery, with an estimated harvest of 6,102 ($\pm 3,644$) fish.

Lake Huron

The intensive survey of the Michigan waters of Lake Huron showed that anglers spent an estimated 3,878,816 ($\pm 210,185$) hours fishing during the open-water season, April through November (Table 10). An estimated 901,478 ($\pm 44,895$) individual angler trips were made during this season or 804,684 ($\pm 40,412$) angler days.

Fishing effort broken down by mode was 87% boat, 8% shore, and 5% pier. The waters of Saginaw Bay had the greatest concentration of fishing effort on Lake Huron. Anglers spent an estimated 1,967,722 ($\pm 145,811$) hours, 427,900 ($\pm 31,175$) trips, or 444,477 ($\pm 29,957$) days fishing the Bay from Port Austin to Tawas (Table 11). This was 51% of the total angler effort noted for all sample areas. The area from Port Austin to Sand Point had the greatest amount of fishing pressure (446,012 \pm 88,587 angler hours) of any area or port sampled (Table 12). The Eagle Bay to Harbor Beach, Au Gres to Saganing Creek, and Lexington to Port Sanilac areas also had significant amounts of angler activity.

The average length of a fishing trip (all modes of fishing) on Lake Huron was 4.3 hours. Anglers made approximately 1.1 fishing trips per day. Boat trips were the longest in duration, averaging 4.7 hours. Pier and shore trips averaged 3.0 and 2.5 hours, respectively.

Lake Huron fishermen harvested an estimated 3,084,516 ($\pm 321,947$) fish comprising 34 individual species during 1986. Eighty-seven percent of the catch (2,669,650 \pm 316,558 fish) came from the boat fishery (Table 13). The shore fishery accounted for 10% and the pier fishery for 3% of the total harvest, respectively (Tables 14 and 15).

Yellow perch was the most abundant species in the catch, accounting for 79% of all the fish harvested. An estimated 2,436,811 ($\pm 312,407$) perch were caught from all modes of fishing. The bulk of the perch harvest (75%) came from the Port Austin to Tawas area (Saginaw Bay) (Table 11). The Les Cheneaux Island and Drummond Island areas of northern Lake Huron were also important perch fishing areas. Over 450,000 perch were estimated caught in the Les Cheneaux Islands (Diana et al. 1987) and 226,506 ($\pm 79,034$) in the Drummond Island area (Table 16).

The lake-wide catch rate for yellow perch during the open-water season was 0.628 (± 0.087) fish per hour. The perch catch rate on Saginaw Bay was 0.924 (± 0.163) (Table 11). Anglers in the Saginaw Bay area from Sebawaing to Essexville had the greatest catch rate for yellow perch (1.529 \pm 0.774) of all the Lake Huron sample areas. However, catch rates of over one fish per hour were noted also in the Saginaw River to Essexville, Saganing Creek to the Saginaw River, and Au Gres to Saganing Creek areas of Saginaw Bay (Table 16).

Walleye is becoming an important species to the Lake Huron sport fishery. An estimated 106,448 ($\pm 27,126$) were caught during 1986 (Table 10). Fifty-six percent of the walleye catch (59,268 \pm 25,319 fish) came from Saginaw Bay. Anglers in the vicinity of the Saginaw River mouth had the largest estimated catch of walleye in the Bay. Anglers fishing from the Saginaw River mouth, north to Saganing Creek, had an estimated catch of 16,902 ($\pm 6,120$) walleye, while anglers in the area from the Saginaw River mouth, south to Essexville, had an estimated harvest of 15,709 ($\pm 23,083$) walleye. In addition to Saginaw Bay, a substantial catch of walleye (32,525 \pm 6,674) was estimated for the Port Huron area. The majority of these fish were taken in the upper St. Clair River. The overall catch rate for walleye on Lake Huron was 0.027 (± 0.007). The greatest catch rate for walleye (0.326 \pm 0.077) was observed in the Port Huron area. The catch rate in Saginaw Bay for walleye was 0.030 (± 0.010) during the 1986 open-water season (Table 11). This was significantly higher than the rate (0.003 \pm 0.002) reported for the 1983 season (Ryckman 1986).

Several species of salmonids are also an important part of the Lake Huron sport fishery. An estimated 171,678 ($\pm 18,727$) salmonids were caught by anglers during the open-water season. The salmonid catch was composed of 53% chinook salmon, 33% lake trout, 7% brown trout, 4% coho salmon, and 3% rainbow trout. Ninety-four percent of the salmonids harvested came from the boat fishery.

A total of 91,525 ($\pm 11,580$) chinook salmon were estimated caught by anglers during 1986 (Table 10). Thirty-seven percent of the total catch came from the southern Lake Huron areas of Lexington to Port Sanilac and Eagle Bay to Harbor Beach (Table 17). The majority (68%) of the Lexington to Port Sanilac harvest came during April. The chinook catch in the Eagle Bay to Harbor Beach area was fairly evenly distributed throughout the season. Anglers fishing off the port of Rogers City had the largest estimated catch of chinook salmon (19,052 \pm 4,637 fish) of any single sample area. Sixty-three percent of the catch taken at Rogers City occurred during August.

The lake-wide chinook catch rate was 0.024 (± 0.003) fish per angler hour. Anglers in the Rockport (0.136 \pm 0.052) and Rogers City (0.119 \pm 0.036) areas had the greatest catch rates for chinook of all the Lake Huron sample areas. These catch rates were consistent with good chinook fisheries noted for Lake Michigan (Table 8). Anglers from Harrisville and Oscoda considered the chinook fishing poor in central Lake Huron during 1986. Survey results showed that the average catch rates at these ports were less than half the rates estimated for Rogers City and Rockport.

Lake trout were the second most abundant salmonid in the Lake Huron sport catch, with an estimated harvest of 55,911 ($\pm 11,644$) fish. The "Thumb" area (Port Austin and Eagle Bay to Harbor Beach) anglers had the largest catches of lake trout (Table 18). It was estimated that 49% of the total lake-wide catch came from these two areas. The largest lake trout harvest

(14,139 \pm 5,946 fish) of all the areas sampled occurred from Port Austin to Sand Point. Substantial catches of lake trout were also noted at Oscoda and Harrisville. The seasonal lake trout catch rate for all areas sampled was 0.014 (\pm 0.003). Anglers in the Harrisville area had the highest catch rate (0.071 \pm 0.040 fish per hour).

Brown trout were an important part of the sport catch in two sample areas. The total catch of browns was estimated at 11,693 (\pm 5,680) fish. Tawas area anglers had the largest estimated catch of any sample area (6,782 \pm 5,153 fish). In addition, 2,947 (\pm 2,161) brown trout were estimated caught in the Eagle Bay to Harbor Beach area. Alpena's Thunder Bay has probably the best brown trout fishery on Lake Huron, with an estimated catch of over 3,800 fish and catch rates exceeding 0.068 fish per hour (J. Weber, MDNR Fisheries Biologist, personal communication).

An estimated 7,559 (\pm 2,477) coho salmon and 4,613 (\pm 6,517) rainbow trout were also harvested by Lake Huron anglers. The largest estimated coho harvest, 3,047 (\pm 1,386) fish, occurred in the Lexington to Port Sanilac area, while the greatest rainbow trout harvest, 3,135 (\pm 6,457) fish, came from the Port Austin to Sand Point area.

In addition to the perch, walleye and salmonid catch, 78,810 (\pm 24,518) channel catfish and 43,444 (\pm 19,435) white bass were estimated caught by Lake Huron anglers (Table 10). Ninety-nine percent of these fish were caught in Saginaw Bay. The channel catfish catch probably is underestimated due to the fact that most fishing for this species occurs throughout the nighttime hours. Data collection was usually terminated for the day about 1 hour after dark.

Lake Erie

Approximately 30 miles of Lake Erie shoreline, from Pointe Mouillee to the Michigan-Ohio state line, were sampled during May through November 15, 1986. Anglers spent an estimated 2,079,668 (\pm 250,423) hours fishing from boats in the sample area (Table 19). A total of 371,265 (\pm 43,935) angler trips or 368,260 (\pm 43,659) angler days were spent in the area. Angler effort was fairly evenly distributed between the north and south halves of the study area. Forty-eight percent (989,708 \pm 165,690) of the estimated angler hours occurred in the north half of the study area, Pointe Mouillee to the mouth of the Raisin River. The south half, which encompassed the area from the mouth of the Raisin River to the Michigan-Ohio state line, had 52% or 1,089,960 (\pm 190,999) angler hours.

The average length of a boat fishing trip on Lake Erie was 5.6 hours. The average angler made one trip per day.

Fishermen harvested an estimated 1,652,275 (\pm 250,423) fish, comprising 19 individual species. Yellow perch and walleye made up 88% of the total catch, with yellow perch being the most abundant species in the catch. Anglers caught an estimated 844,294 (\pm 220,555) perch.

Nearly 70% of the perch catch was taken during September and October. Sixty-two percent of the perch catch came from the southern half of the study area. The overall seasonal catch rate for yellow perch was 0.406 (± 0.117) fish per hour. There was no significant difference in perch catch rates between the two sample areas.

A total of 605,666 ($\pm 110,365$) walleye were harvested from the Michigan waters of Lake Erie. The majority of the walleye catch (81%) was taken during May and June. Fifty-nine percent of the catch came from the south half of the census area. The overall seasonal catch rate for walleye was 0.291 (± 0.064). There was no significant difference in walleye catch rates between the two sample areas.

In addition to yellow perch and walleye, 76,375 ($\pm 26,110$) white bass and 73,270 ($\pm 31,265$) channel catfish were estimated to have been harvested by Lake Erie anglers. As was the case with Lake Huron, the channel catfish catch is probably underestimated due to the fact that most fishing for this species occurs throughout the nighttime hours.

River fisheries

Several Lake Michigan tributary streams were sampled during the spring and fall anadromous fish runs. Anglers spent an estimated 422,958 ($\pm 21,534$) hours fishing the St. Joseph, Kalamazoo, Grand, Muskegon, Betsie, Bear, Platte rivers, and Platte Bay (Table 20). The Manistee River was surveyed under a separate study (Fielder 1987). The greatest amount of angler activity occurred on the St. Joseph River. Fishing effort was estimated at 152,524 ($\pm 14,627$) angler hours, 26,924 ($\pm 2,654$) angler trips, or 24,598 ($\pm 2,517$) angler days on the St. Joseph for the months of March through May and September through the first week in December. The average length of an anadromous fishing trip on the seven Lake Michigan tributaries sampled was 4.7 hours. Anglers made an average of 1.1 fishing trips per day. Catch and effort during the fall months on these rivers were probably atypically low. Heavy rains in September caused severe flooding and as a result anglers found fishing difficult.

A total of 42,617 ($\pm 21,534$) chinook salmon, coho salmon, rainbow, and brown trout were harvested on these seven rivers and Platte Bay. Chinook salmon were the most abundant salmonid in the catch; a total of 19,969 ($\pm 4,609$) were estimated caught. Anglers on the Muskegon River had the largest estimated catch of chinook ($6,662 \pm 2,927$).

Rainbow trout were the second most numerous salmonid in the river catches. The total harvest from the seven rivers sampled was estimated to be 14,906 ($\pm 2,612$) fish. St. Joseph River anglers had the greatest catch, estimated at 4,358 ($\pm 1,341$) rainbow.

Coho salmon and brown trout were important in some river fisheries. The coho catch was estimated at 4,101 ($\pm 2,714$) fish. Ninety-five percent of the coho were harvested from the Betsie and Platte rivers and Platte Bay. A total of 3,641 ($\pm 1,822$) brown trout were

estimated harvested in the river fisheries. Fishermen on the St. Joseph River had the largest catch estimated at 1,231 ($\pm 1,174$) brown trout.

Two Lake Huron tributary streams, the Saginaw and Au Sable rivers, were surveyed during the entire season, April through mid-November. The Tittabawassee River was sampled only during May to coincide with the opening of walleye season.

Anglers spent an estimated 170,845 ($\pm 8,326$) hours fishing the Au Sable River from Foote Dam to Oscoda. Channel catfish were the most abundant species in the catch, with an estimated 13,316 ($\pm 4,145$) harvested. This figure is probably low since sampling was directed toward the daylight hours. Anglers also caught an estimated 2,704 ($\pm 1,024$) chinook salmon and 1,996 (± 611) rainbow trout.

The lower Saginaw River catch was composed of warmwater species. Anglers spent an estimated 41,897 ($\pm 20,208$) hours to catch a total of 63,279 ($\pm 114,680$) fish. Eighty percent of the catch was freshwater drum. The Tittabawassee River, which is a tributary of the Saginaw River, was estimated to have 211,344 ($\pm 97,000$) angler hours during the period May 15 through May 31, 1986. The catch primarily consisted of white bass (16,513 \pm 13,009) and walleye (14,643 \pm 14,901).

The average length of a fishing trip on the three Lake Huron rivers sampled was 4.0 hours. Anglers made an average of 1.2 fishing trips per day.

Winter fisheries

Catch and pressure were sampled at various areas on lakes Superior, Michigan, Huron, and Erie during the winter months of 1987. Keweenaw Bay, Huron Bay, and Munising Bay were surveyed on Lake Superior. Catch and effort estimates could not be made on Keweenaw Bay due to the lack of fishing activity caused by abnormally mild winter weather (i.e., no ice cover). Lake whitefish were the major species caught by ice anglers on Huron and Munising bays. On Huron Bay an estimated 1,184 (± 510) lake whitefish were caught. Fishermen spent an estimated 9,036 ($\pm 2,126$) angler hours and made an estimated 2,646 (± 617) trips on Huron Bay. Few lake trout were caught by Huron Bay fishermen because they could not reach their normal fishing grounds due to unsafe ice conditions.

An estimated 6,805 ($\pm 3,073$) lake whitefish were harvested on Munising Bay. Munising Bay had the greater catch rate for whitefish (0.241 \pm 0.121) of the two Lake Superior sample areas. Angler effort on Munising Bay was estimated at 28,240 ($\pm 6,156$) hours or 7,118 ($\pm 1,516$) trips.

Areas sampled on Lake Michigan included Big Bay de Noc and Little Bay de Noc. Winter census plans also called for sampling Grand Traverse bays but safe ice conditions never developed. It can be assumed that catch and effort on Grand Traverse bays were near zero.

Yellow perch were the most abundant species in the Big and Little Bays de Noc catch. Anglers on Little Bay de Noc had both the greatest estimated catch of yellow perch (517,372 \pm 413,793 fish) and fishing effort (246,113 \pm 44,309 angler hours). The poor error bounds on the Little Bay de Noc perch catch was caused by a lack of data collected for January. In addition to perch, 3,753 (\pm 3,060) walleye were harvested by anglers on Little Bay de Noc.

Yellow perch catch and effort on Big Bay de Noc were estimated at 174,515 (\pm 108,264) fish and 71,651 (\pm 28,586) angler hours, respectively. There was no significant difference in catch rates of yellow perch between the Bays de Noc. The average length of an ice fishing trip on these waters of Lake Michigan was 4.0 hours. Anglers made an average of one ice fishing trip per day.

Ice fisheries at the Les Cheneaux Islands, Munuscong Bay, and Saginaw Bay areas of Lake Huron were also sampled during the winter months of 1987. Poor ice conditions and vehicle logistic problems caused a delayed start-up of the Les Cheneaux Island and Munuscong Bay creel sampling. As a result, catch and effort estimates could not be made for January at these two sites.

Anglers caught an estimated 19,524 (\pm 9,021) yellow perch during February and March in the Les Cheneaux Island area. The perch catch rate was 0.442 (\pm 0.242) fish per hour. Total angler effort was estimated to be 44,181 (\pm 13,029) angler hours or 9,250 (\pm 2,750) trips. These catch and effort figures are not typical of the normal winter ice fishery in this area because poor ice conditions reduced fishing pressure. Catch and effort for a more typical ice fishing season are reported by Diana et al. (1987).

Munuscong Bay fishermen caught an estimated 23,469 (\pm 10,871) yellow perch and 2,393 (\pm 2,244) walleye during the 1987 winter ice fishery. Catch rates for perch and walleye were 0.342 (\pm 0.192) and 0.035 (\pm 0.035), respectively. A total of 68,575 (\pm 21,791) angler hours or 12,124 (\pm 3,822) trips were estimated.

The Saginaw Bay ice fishery is the largest and most important ice fishery, in terms of catch and effort, on Michigan's waters of the Great Lakes. Anglers caught an estimated 3,153,609 (\pm 446,851) yellow perch from Saginaw Bay (Port Austin to Tawas) during January through March 1987 (Table 21). Nineteen other species of fish were noted in Saginaw Bay's winter catch. However, yellow perch made up 99% of the fish that anglers harvested. The winter perch catch was 73% greater than estimated for the 1986 open-water season.

The Sebewaing to Sand Point area of Saginaw Bay accounted for 38% (1,195,335 \pm 277,286 fish) of the Bay's perch catch. Substantial catches of yellow perch were also noted from Au Gres to Saganing Creek (822,722 \pm 291,437 fish) and the Saginaw River to Saganing Creek (485,927 \pm 114,189 perch). The winter catch rate for yellow perch on Saginaw Bay was 4.79 (\pm 0.832) fish per hour. Anglers fishing from the Au Gres to Saganing Creek had the greatest hourly rate of catch for perch (8.66 \pm 3.67) of the six areas sampled on the Bay. This

catch rate was significantly greater than those estimated for the Tawas or Sand Point to Port Austin areas.

In addition to yellow perch, 636 (± 388) walleye were estimated caught by Saginaw Bay ice anglers (Table 21). Fishermen in the Tawas area had the largest estimated catch of walleye (260 ± 332 fish). A greater walleye catch most probably occurred in the Saginaw River to Saganing Creek area. Fishermen found a large fishable population in the Linwood area the last few days of walleye season, which occurs at the end of February (L. Mrozinski, MDNR District Fisheries Biologist, personal communication). Anglers were not sampled in this area because they were overlooked by the creel clerk.

Anglers spent an estimated 657,770 ($\pm 65,934$) hours ice fishing on Saginaw Bay. This amounted to an estimated 164,771 ($\pm 17,245$) angler trips or 153,315 ($\pm 16,278$) angler days (Table 21). The Sebewaing to Sand Point area was estimated to have the greatest amount of angler activity ($217,261 \pm 43,157$ angler hours). The average duration of a Saginaw Bay ice fishing trip was 4.0 hours. Anglers made an average of 1.1 trips per day.

SUMMARY

During the 1986 license year anglers spent an estimated 14,108,348 ($\pm 594,883$) angler hours in the areas of Michigan's waters of the Great Lakes that were censused. This accounted for an estimated 3,219,614 ($\pm 117,064$) individual fishing trips and 2,970,977 ($\pm 108,838$) angler days. Total angler effort broken down by mode of fishing was 74% boat, 11% pier, 9% ice, and 6% shore. Forty-eight percent of the total angler days were spent on Lake Michigan while 33% were spent on Lake Huron. In terms of angler hours, Ludington was the busiest port on Lake Michigan. The Port Austin to Sand Point area was found to be the heaviest fished area on Lake Huron.

Total catch was estimated to be over 12.4 million individual fish. Yellow perch were the most abundant species in the sport catch in most sample areas. The yellow perch catch for all areas censused was estimated at 9,639,181 ($\pm 849,641$) fish. Fifty-two percent of the total yellow perch harvest came from Saginaw Bay, Lake Huron.

In addition to yellow perch, sport anglers harvested an estimated 627,992 ($\pm 97,194$) chinook salmon, 196,434 ($\pm 46,389$) lake trout, 145,880 ($\pm 25,460$) coho salmon, 89,213 ($\pm 17,203$) brown trout, and 57,017 ($\pm 15,257$) rainbow trout. Eighty-one percent of all salmonids harvested by anglers in the areas censused came from Lake Michigan. The salmonid catch in Lake Michigan was composed of 57% chinook salmon, 15% coho salmon, 15% lake trout, 8% brown trout, and 4% rainbow trout.

ACKNOWLEDGMENTS

The authors wish to thank the staffs of the fisheries district and research stations who participated in the census program. These field units did the day to day work of angler interviews, fishing pressure counts, and supervision of seasonal workers. Paul Wei of the Management Information Division wrote the interview and count data entry programs. Special thanks to Kelley Smith who wrote the computer programs for the calculation of the catch and effort estimates. Myrl Keller, Ron Rybicki, Kelley Smith, and Carl Latta edited the manuscript.



Figure 1. Lake Huron census area.

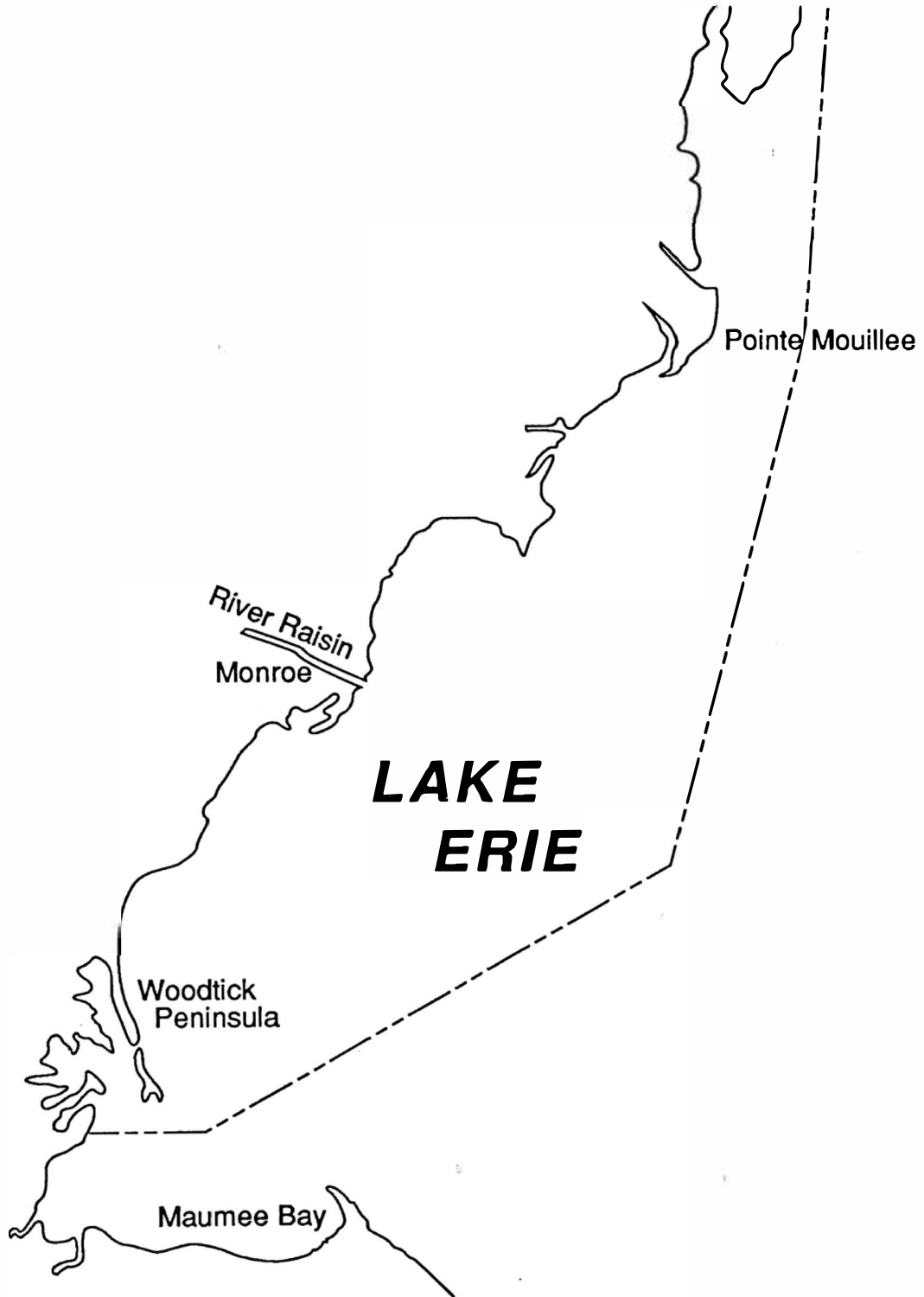


Figure 2. Lake Erie census area.

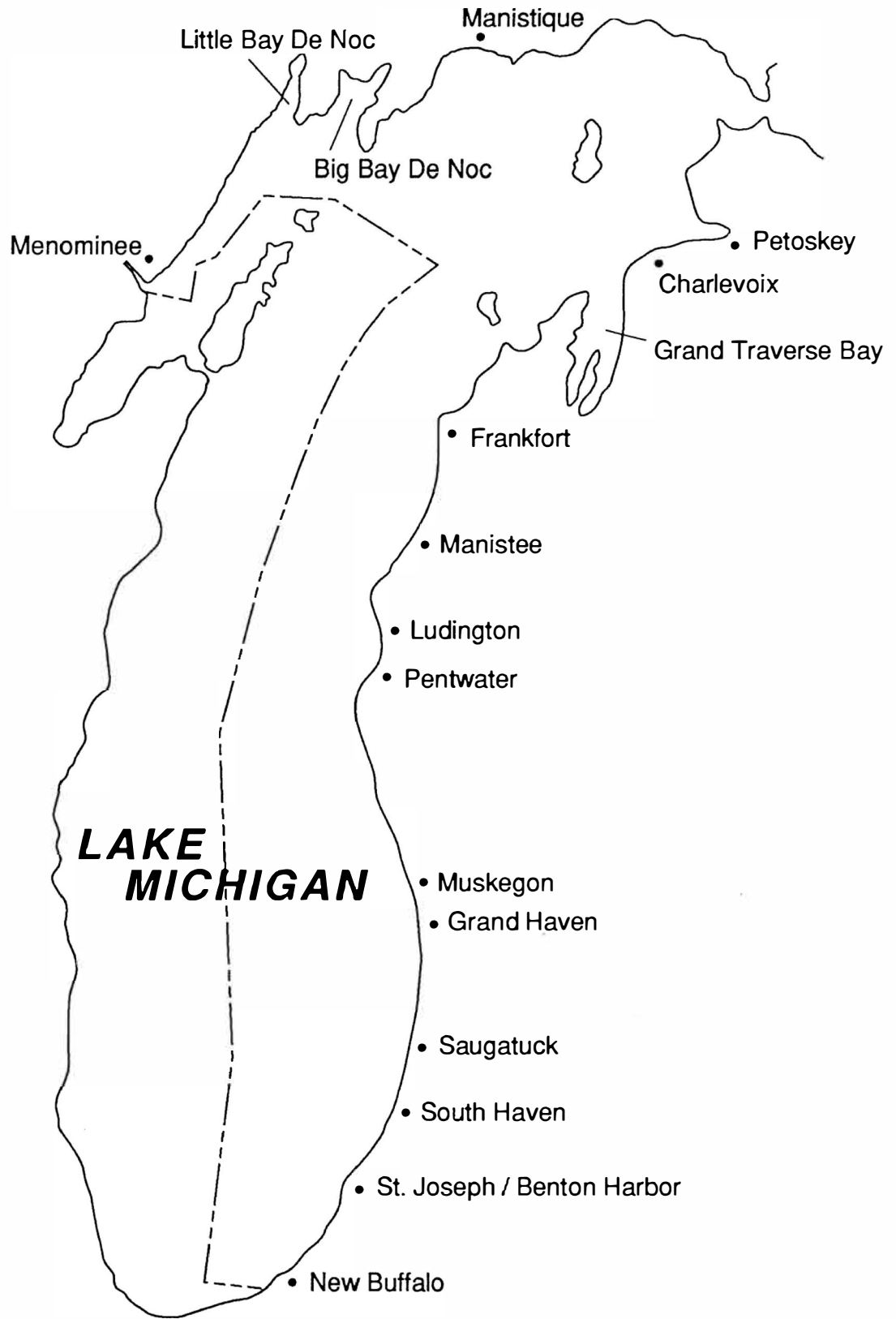


Figure 3. Lake Michigan census area.

ANGLER PARTY INTERVIEW FORM

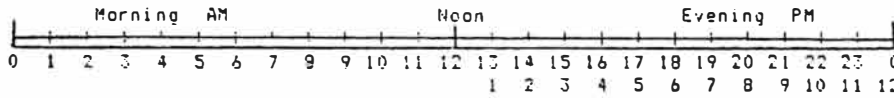
Project #: _____

Unit: _____ Soc. Sec. #: _____-_____-_____ Date: ____/____/____ Seq #: _____

Interview Site: _____ Site Name: _____
 Fishing Site: _____ Site Name: _____

Fishery Type: Gt Lk Anad. In. Lk In. Stream
 Mode of Fishing: Boat Shore Charter
 Ice (open) Pier/dock Ice (shanty)
 Pleasure Boat

Start Date: ____/____/____ Wk Day: _____ Start Time: ____:____ Intv. Time: ____:____
 Hrs Fished: ____-____ Complete Trip: (Y/N)



| Ang # | Sex | Age | Zip Code | Residence County/State | Cnty Code | Fishing Methods | | | | | sp | ear | dip | snag | jig |
|-------|--------------------------|--------------------------|----------|---------------------------|--------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | | | | | | cast | still | troll | fly | drift | | | | | |
| 1. | <input type="checkbox"/> | <input type="checkbox"/> | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. | <input type="checkbox"/> | <input type="checkbox"/> | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. | <input type="checkbox"/> | <input type="checkbox"/> | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. | <input type="checkbox"/> | <input type="checkbox"/> | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. | <input type="checkbox"/> | <input type="checkbox"/> | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. | <input type="checkbox"/> | <input type="checkbox"/> | _____ | _____ | _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Target Species: _____ Salmon Trout Salmon & Trout Perch & Walleye Anything

 species code

| Catch Data | | | Code | | | Code | | |
|------------|-----------------|-------|------|-----------------|-------|------|-----------------|-------|
| Code | Species | #Kept | Code | Species | #Kept | Code | Species | #Kept |
| PKS | Pink Salmon | _____ | CWS | White Sucker | _____ | BLG | Bluegill | _____ |
| COH | Coho Salmon | _____ | RHS | Redhorse (spp) | _____ | LSF | Longear Sunfish | _____ |
| CHS | Chinook Salmon | _____ | BLB | Black Bullhead | _____ | RSF | Redear Sunfish | _____ |
| RRT | Rainbow Trout | _____ | YLB | Yeil. Bullhead | _____ | SMB | Smallmouth Bass | _____ |
| ATS | Atlantic Salmon | _____ | BRB | Brown Bullhead | _____ | LMB | Largemouth Bass | _____ |
| BNT | Brown Trout | _____ | CCF | Channel Catfish | _____ | WCP | White Crappie | _____ |
| BKT | Brook Trout | _____ | WHP | White Perch | _____ | BCP | Black Crappie | _____ |
| LAT | Lake Trout | _____ | WHB | White Bass | _____ | YEP | Yellow Perch | _____ |
| SPL | Splake | _____ | RIB | Rockbass | _____ | WAE | Walleye | _____ |
| SMT | Rainbow Smelt | _____ | GSF | Green Sunfish | _____ | DRU | Freshwater Drum | _____ |
| NOP | Northern Pike | _____ | PSF | Pumpkinseed | _____ | | | |
| MUS | Muskellunge | _____ | WAR | Warmouth | _____ | | | |
| TMU | Tiger Musky | _____ | OSF | Orange. Sunfish | _____ | | | |

Other Species: _____

 species code

Figure 4. Angler party interview data sheet.

Table 1. List of scientific and common names of fish observed in study.

| Common name | Scientific name |
|------------------------|--|
| Rainbow smelt | <u>Osmerus mordax</u> |
| Northern pike | <u>Esox lucius</u> |
| Black bullhead | <u>Ictalurus melas</u> |
| Yellow bullhead | <u>Ictalurus natalis</u> |
| Brown bullhead | <u>Ictalurus nebulosus</u> |
| Channel catfish | <u>Ictalurus punctatus</u> |
| Burbot | <u>Lota lota</u> |
| White perch | <u>Morone americana</u> |
| White bass | <u>Morone chrysops</u> |
| Freshwater drum | <u>Aplodinotus grunniens</u> |
| Lake whitefish | <u>Coregonus clupeaformis</u> |
| Round whitefish | <u>Prosopium cylindraceum</u> |
| Chinook salmon | <u>Oncorhynchus tshawytscha</u> |
| Coho salmon | <u>Oncorhynchus kisutch</u> |
| Pink salmon | <u>Oncorhynchus gorbuscha</u> |
| Rainbow trout | <u>Salmo gairdneri</u> |
| Atlantic salmon | <u>Salmo salar</u> |
| Brown trout | <u>Salmo trutta</u> |
| Brook trout | <u>Salvelinus fontinalis</u> |
| Lake trout | <u>Salvelinus namaycush</u> |
| Splake | <u>Salvelinus namaycush</u> x <u>S. fontinalis</u> |
| White sucker | <u>Catostomus commersoni</u> |
| Redhorse, unidentified | <u>Moxostoma</u> spp. |
| Rock bass | <u>Ambloplites rupestris</u> |
| Green sunfish | <u>Lepomis cyanellus</u> |
| Pumpkinseed | <u>Lepomis gibbosus</u> |
| Warmouth | <u>Lepomis gulosus</u> |
| Bluegill | <u>Lepomis macrochirus</u> |
| Longear sunfish | <u>Lepomis megalotis</u> |
| Redear sunfish | <u>Lepomis microlophus</u> |
| Smallmouth bass | <u>Micropterus dolomieu</u> |
| Largemouth bass | <u>Micropterus salmoides</u> |
| White crappie | <u>Pomoxis annularis</u> |
| Black crappie | <u>Pomoxis nigromaculatus</u> |
| Yellow perch | <u>Perca flavescens</u> |
| Walleye | <u>Stizostedion vitreum</u> |

Table 2. Estimated sportfishing catch and effort for Lake Michigan, by all modes of fishing, 1986. Two standard errors in parentheses.

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|-----------------------|--------------------|---------------------|--------------------|---------------------|---------------------|--------------------|------------------|--------------|---------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Pink salmon | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 29 (62) | 9 (19) | 0 (0) | 0 (0) | 38 (65) |
| Coho salmon | 0.0203 (0.0041) | 55,296 (15,794) | 21,412 (10,050) | 2,071 (1,270) | 11,741 (7,731) | 31,760 (13,797) | 11,120 (5,680) | 732 (510) | 0 (0) | 134,132 (25,194) |
| Chinook salmon | 0.0778 (0.0157) | 19,369 (5,660) | 163,362 (79,258) | 26,993 (16,232) | 105,331 (35,704) | 154,805 (35,835) | 40,979 (12,360) | 2,941 (1,208) | 10 (14) | 513,790 (96,387) |
| Rainbow trout | 0.0054 (0.0021) | 3,161 (1,380) | 4,348 (2,223) | 1,791 (1,272) | 10,202 (11,787) | 5,422 (3,089) | 6,382 (4,931) | 3,765 (1,355) | 252 (107) | 35,323 (13,532) |
| Atlantic salmon | 0.0001 (0.0002) | 25 (52) | 0 (0) | 529 (1,071) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 554 (1,072) |
| Brown trout | 0.0112 (0.0026) | 35,294 (8,448) | 20,290 (11,085) | 6,784 (6,443) | 5,204 (3,798) | 5,031 (3,003) | 692 (758) | 473 (780) | 0 (0) | 73,768 (16,136) |
| Brook trout | 0.0002 (0.0003) | 281 (353) | 37 (80) | 951 (1,927) | 0 (0) | 285 (429) | 0 (0) | 0 (0) | 0 (0) | 1,554 (2,007) |
| Lake trout | 0.0213 (0.0070) | 249 (519) | 32,398 (12,596) | 56,675 (39,482) | 40,271 (16,932) | 10,544 (3,436) | 124 (270) | 47 (102) | 0 (0) | 140,308 (44,904) |
| Splake | <0.0000 (<0.0000) | 229 (163) | 0 (0) | 0 (0) | 0 (0) | 16 (26) | 0 (0) | 0 (0) | 0 (0) | 245 (165) |
| Northern pike | 0.0007 (0.0003) | 2 (4) | 1,324 (923) | 606 (472) | 901 (795) | 1,064 (993) | 306 (500) | 305 (319) | 0 (0) | 4,508 (1,745) |
| White sucker | 0.0001 (0.0001) | 60 (110) | 0 (0) | 288 (365) | 74 (117) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 422 (399) |
| Redhorse (spp.) | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 0 (0) | 10 (20) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 10 (20) |

Table 2. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|------------------|-------------------|------------------|-------------------|-------------------|------------------|------------------|----------|--------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Yellow bullhead | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 21 (42) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 21 (42) |
| Channel catfish | 0.0016 (0.0019) | 35 (59) | 161 (256) | 30 (38) | 4,023 (5,801) | 6,305 (11,460) | 77 (158) | 60 (125) | 0 (0) | 10,691 (12,849) |
| White bass | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 10 (20) | 25 (50) | 14 (28) | 0 (0) | 0 (0) | 0 (0) | 49 (61) |
| Rock bass | 0.0008 (0.0007) | 171 (253) | 718 (645) | 664 (451) | 3,893 (5,041) | 139 (213) | 0 (0) | 7 (15) | 0 (0) | 5,592 (5,113) |
| Green sunfish | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 239 (482) | 0 (0) | 0 (0) | 0 (0) | 239 (482) |
| Pumpkinseed | 0.0010 (0.0010) | 0 (0) | 1,794 (3,013) | 345 (504) | 2,067 (3,278) | 98 (197) | 2,520 (5,040) | 0 (0) | 0 (0) | 6,824 (6,747) |
| Bluegill | 0.0006 (0.0010) | 0 (0) | 5 (11) | 0 (0) | 0 (0) | 782 (1,418) | 3,360 (6,720) | 0 (0) | 0 (0) | 4,147 (6,868) |
| Smallmouth bass | 0.0032 (0.0008) | 306 (451) | 12,749 (3,700) | 4,031 (2,246) | 1,892 (1,530) | 1,803 (2,022) | 26 (39) | 42 (90) | 0 (0) | 20,849 (5,038) |
| Largemouth bass | 0.0002 (0.0003) | 0 (0) | 0 (0) | 0 (0) | 1,035 (1,927) | 0 (0) | 431 (1,010) | 0 (0) | 0 (0) | 1,466 (2,176) |
| White crappie | 0.0001 (0.0002) | 0 (0) | 460 (891) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 184 (402) | 0 (0) | 644 (977) |
| Black crappie | 0.0025 (0.0027) | 2,374 (5,138) | 0 (0) | 2,418 (5,431) | 8,963 (15,266) | 177 (357) | 292 (594) | 2,278 (4,646) | 0 (0) | 16,502 (17,636) |

Table 2. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|---------------------|------------------------|----------------------|------------------------|------------------------|----------------------|---------------------|------------------|------------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Yellow perch | 0.3741 (0.0721) | 254,386 (96,346) | 141,281 (37,177) | 401,754 (261,027) | 914,216 (267,466) | 295,799 (103,158) | 383,926 (175,798) | 75,983 (30,474) | 2,242 (3,661) | 2,469,587 (439,120) |
| Walleye | 0.0051 (0.0029) | 0 (0) | 16,775 (7,581) | 1,792 (891) | 14,218 (17,363) | 967 (1,051) | 50 (105) | 0 (0) | 0 (0) | 33,802 (18,996) |
| Freshwater drum | 0.0013 (0.0011) | 26 (55) | 239 (303) | 81 (107) | 7,601 (6,854) | 552 (910) | 0 (0) | 0 (0) | 0 (0) | 8,499 (6,922) |
| Lake whitefish | 0.0082 (0.0023) | 0 (0) | 5,396 (4,091) | 10,780 (8,074) | 22,462 (9,667) | 12,470 (5,566) | 502 (1,026) | 2,418 (1,742) | 0 (0) | 54,028 (14,507) |
| Round whitefish | 0.0042 (0.0023) | 0 (0) | 0 (0) | 0 (0) | 289 (583) | 7,496 (7,267) | 1,601 (1,703) | 17,172 (12,716) | 989 (922) | 27,547 (14,785) |
| Burbot | <0.0000 (<0.0000) | 21 (48) | 0 (0) | 25 (50) | 0 (0) | 107 (216) | 0 (0) | 0 (0) | 0 (0) | 153 (227) |
| Other | <0.0000 (<0.0000) | 21 (48) | 216 (440) | 0 (0) | 16 (32) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 253 (444) |
| Total | 0.5401 (0.0796) | 371,306 (98,308) | 422,965 (90,282) | 518,639 (264,780) | 1,154,434 (272,148) | 535,904 (111,226) | 452,397 (176,610) | 106,407 (33,458) | 3,493 (3,777) | 3,565,545 (454,625) |
| Angler hours | | 541,427 (55,068) | 1,138,146 (296,784) | 847,112 (146,568) | 1,722,730 (262,611) | 1,560,129 (213,228) | 636,923 (105,650) | 148,455 (22,893) | 6,418 (2,494) | 6,601,340 (488,588) |
| Angler trips | | 129,122 (12,097) | 232,307 (52,075) | 190,734 (31,479) | 389,385 (51,596) | 348,082 (42,221) | 142,384 (20,977) | 40,212 (6,037) | 1,563 (523) | 1,473,789 (93,651) |
| Angler days | | 119,537 (11,681) | 216,407 (46,697) | 184,317 (30,797) | 365,564 (48,612) | 308,503 (37,051) | 127,550 (18,793) | 35,275 (5,913) | 1,174 (500) | 1,358,327 (85,964) |

Table 3. Estimated angler effort in hours, trips, and days at selected Lake Michigan ports and fishing areas, 1986. Two standard errors in parentheses.

| Port/area | Angler | | |
|--------------------------|----------------------|---------------------|---------------------|
| | Hours | Trips | Days |
| Ludington | 833,763 (258,924) | 167,192 (45,061) | 143,573 (45,120) |
| Grand Haven | 700,543 (152,499) | 135,844 (26,009) | 135,255 (26,003) |
| Manistee | 681,144 (141,842) | 147,516 (29,040) | 120,801 (24,374) |
| St. Joseph/Benton Harbor | 607,060 (128,426) | 121,721 (22,990) | 118,463 (22,794) |
| Frankfort | 595,731 (192,737) | 136,891 (39,113) | 115,514 (35,137) |

Table 4. Estimated sportfishing catch and effort for the Lake Michigan boat fishery, 1986. Two standard errors in parentheses.

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|-----------------------|--------------------|---------------------|--------------------|---------------------|---------------------|--------------------|----------------|----------|---------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Pink salmon | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 29 (62) | 9 (19) | 0 (0) | 0 (0) | 38 (65) |
| Coho salmon | 0.0220 (0.0045) | 54,473 (15,784) | 21,071 (10,045) | 1,873 (1,226) | 11,458 (7,723) | 26,831 (10,510) | 8,836 (5,266) | 472 (427) | 0 (0) | 125,014 (23,443) |
| Chinook salmon | 0.0876 (0.0186) | 18,813 (5,640) | 160,184 (79,242) | 25,284 (16,147) | 104,804 (35,698) | 151,495 (35,811) | 34,842 (11,866) | 1,362 (967) | 0 (0) | 496,784 (96,283) |
| Rainbow trout | 0.0050 (0.0024) | 1,154 (616) | 3,826 (2,202) | 1,128 (1,029) | 10,051 (11,786) | 5,300 (3,084) | 5,612 (4,803) | 1,152 (860) | 0 (0) | 28,223 (13,361) |
| Atlantic salmon | 0.0001 (0.0002) | 0 (0) | 0 (0) | 529 (1,071) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 529 (1,071) |
| Brown trout | 0.0105 (0.0029) | 30,311 (8,170) | 14,911 (10,890) | 5,098 (6,293) | 4,423 (3,640) | 4,492 (2,956) | 49 (66) | 414 (771) | 0 (0) | 59,698 (15,733) |
| Brook trout | 0.0002 (0.0003) | 112 (103) | 37 (80) | 951 (1,927) | 0 (0) | 285 (429) | 0 (0) | 0 (0) | 0 (0) | 1,385 (1,978) |
| Lake trout | 0.0246 (0.0082) | 249 (519) | 31,994 (12,590) | 56,319 (39,480) | 40,271 (16,932) | 10,544 (3,436) | 124 (270) | 47 (102) | 0 (0) | 139,548 (44,900) |
| Splake | <0.0000 (<0.0000) | 190 (138) | 0 (0) | 0 (0) | 0 (0) | 16 (26) | 0 (0) | 0 (0) | 0 (0) | 206 (140) |
| Northern pike | 0.0007 (0.0003) | 2 (4) | 1,324 (923) | 483 (429) | 901 (795) | 1,064 (993) | 250 (495) | 156 (275) | 0 (0) | 4,180 (1,725) |
| White sucker | 0.0001 (0.0001) | 53 (109) | 0 (0) | 239 (351) | 48 (111) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 340 (384) |

Table 4. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|---------------------|--------------------|----------------------|----------------------|---------------------|----------------------|--------------------|------------------|------------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Redhorse (spp.) | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 0 (0) | 10 (20) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 10 (20) |
| Channel catfish | 0.0017 (0.0023) | 0 (0) | 120 (241) | 16 (25) | 3,569 (5,781) | 5,708 (11,416) | 0 (0) | 0 (0) | 0 (0) | 9,413 (12,799) |
| White bass | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 10 (20) | 25 (50) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 35 (54) |
| Rock bass | 0.0005 (0.0008) | 0 (0) | 227 (339) | 245 (301) | 2,414 (4,701) | 98 (197) | 0 (0) | 0 (0) | 0 (0) | 2,984 (4,727) |
| Green sunfish | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 239 (482) | 0 (0) | 0 (0) | 0 (0) | 239 (482) |
| Pumpkinseed | 0.0008 (0.0010) | 0 (0) | 1,524 (2,961) | 136 (273) | 469 (655) | 98 (197) | 2,520 (5,040) | 0 (0) | 0 (0) | 4,747 (5,892) |
| Bluegill | 0.0007 (0.0012) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 692 (1,412) | 3,360 (6,720) | 0 (0) | 0 (0) | 4,052 (6,867) |
| Smallmouth bass | 0.0029 (0.0008) | 0 (0) | 12,251 (3,659) | 2,046 (1,710) | 1,093 (848) | 1,066 (1,515) | 26 (39) | 0 (0) | 0 (0) | 16,482 (4,396) |
| Largemouth bass | 0.0003 (0.0004) | 0 (0) | 0 (0) | 0 (0) | 1,035 (1,927) | 0 (0) | 431 (1,010) | 0 (0) | 0 (0) | 1,466 (2,176) |
| White crappie | 0.0001 (0.0002) | 0 (0) | 441 (890) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 184 (402) | 0 (0) | 625 (977) |
| Black crappie | 0.0021 (0.0029) | 2,374 (5,138) | 0 (0) | 44 (91) | 8,963 (15,266) | 177 (357) | 292 (594) | 31 (88) | 0 (0) | 11,881 (16,123) |
| Yellow perch | 0.3430 (0.0816) | 219,445 (95,238) | 63,494 (27,765) | 289,552 (259,155) | 730,752 (264,114) | 198,299 (88,754) | 376,561 (175,742) | 64,175 (23,856) | 2,242 (3,661) | 1,944,520 (431,397) |

Table 4. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|---------------------|------------------------|----------------------|------------------------|------------------------|----------------------|--------------------|------------------|------------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Walleye | 0.0051 (0.0031) | 0 (0) | 13,015 (3,851) | 1,278 (591) | 14,044 (17,361) | 797 (1,051) | 50 (105) | 0 (0) | 0 (0) | 29,184 (17,824) |
| Freshwater drum | 0.0010 (0.0010) | 0 (0) | 80 (161) | 81 (107) | 5,278 (6,056) | 473 (902) | 0 (0) | 0 (0) | 0 (0) | 5,912 (6,126) |
| Lake whitefish | 0.0095 (0.0027) | 0 (0) | 5,396 (4,091) | 10,664 (8,073) | 22,462 (9,667) | 12,470 (5,566) | 502 (1,026) | 2,381 (1,740) | 0 (0) | 53,875 (14,506) |
| Round whitefish | 0.0018 (0.0013) | 0 (0) | 0 (0) | 0 (0) | 289 (583) | 7,496 (7,267) | 1,601 (1,703) | 869 (966) | 0 (0) | 10,255 (7,549) |
| Burbot | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 25 (50) | 0 (0) | 107 (216) | 0 (0) | 0 (0) | 0 (0) | 132 (222) |
| Total | 0.5206 (0.0906) | 327,176 (97,186) | 329,895 (86,537) | 396,001 (262,862) | 962,359 (268,803) | 427,776 (97,582) | 435,065 (176,502) | 71,243 (23,995) | 2,242 (3,661) | 2,951,757 (446,710) |
| Angler hours | | 428,686 (52,392) | 1,013,922 (296,644) | 717,160 (145,414) | 1,529,522 (262,195) | 1,389,390 (212,780) | 520,200 (105,077) | 69,176 (21,433) | 1,880 (2,350) | 5,669,936 (487,253) |
| Angler trips | | 89,359 (10,648) | 190,797 (51,927) | 144,083 (30,588) | 303,143 (50,992) | 274,826 (41,309) | 104,880 (20,571) | 16,412 (5,284) | 367 (466) | 1,123,867 (92,214) |
| Angler days | | 85,070 (10,399) | 180,046 (46,558) | 139,984 (29,907) | 285,462 (48,042) | 246,223 (36,037) | 97,152 (18,490) | 16,076 (5,242) | 367 (466) | 1,050,380 (84,537) |

Table 5. Estimated sportfishing catch and effort for the Lake Michigan pier fishery, 1986. Two standard errors in parentheses.

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|-----------------------|------------------|------------------|------------------|------------------|------------------|------------------|----------------|-------------|-------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Coho salmon | 0.0097 (0.0118) | 823 (574) | 341 (308) | 198 (331) | 283 (365) | 4,929 (8,939) | 693 (534) | 139 (179) | 0 (0) | 7,406 (8,994) |
| Chinook salmon | 0.0183 (0.0058) | 556 (482) | 3,178 (1,582) | 1,709 (1,656) | 527 (652) | 3,310 (1,299) | 4,329 (3,343) | 332 (329) | 0 (0) | 13,941 (4,344) |
| Rainbow trout | 0.0047 (0.0022) | 537 (584) | 180 (169) | 652 (748) | 151 (156) | 122 (172) | 591 (1,093) | 1,258 (767) | 117 (81) | 3,608 (1,665) |
| Brown trout | 0.0175 (0.0047) | 4,608 (2,020) | 5,289 (2,071) | 1,686 (1,383) | 781 (1,086) | 539 (530) | 424 (730) | 0 (0) | 0 (0) | 13,327 (3,504) |
| Brook trout | 0.0002 (0.0004) | 169 (337) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 169 (337) |
| Lake trout | 0.0010 (0.0008) | 0 (0) | 397 (384) | 356 (413) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 753 (564) |
| Northern pike | 0.0001 (0.0001) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 56 (70) | 0 (0) | 0 (0) | 56 (70) |
| White sucker | <0.0000 (<0.0000) | 7 (15) | 0 (0) | 0 (0) | 26 (38) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 33 (41) |
| Channel catfish | 0.0016 (0.0015) | 35 (59) | 41 (85) | 0 (0) | 454 (485) | 597 (1,001) | 65 (156) | 60 (125) | 0 (0) | 1,252 (1,135) |
| White bass | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 14 (28) | 0 (0) | 0 (0) | 0 (0) | 14 (28) |
| Rock bass | 0.0023 (0.0024) | 171 (253) | 46 (68) | 46 (92) | 1,479 (1,822) | 41 (82) | 0 (0) | 0 (0) | 0 (0) | 1,783 (1,845) |
| Bluegill | 0.0001 (0.0002) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 48 (99) | 0 (0) | 0 (0) | 0 (0) | 48 (99) |
| Smallmouth bass | 0.0019 (0.0020) | 306 (451) | 302 (397) | 0 (0) | 80 (140) | 737 (1,338) | 0 (0) | 0 (0) | 0 (0) | 1,425 (1,473) |
| White crappie | <0.0000 (<0.0000) | 0 (0) | 19 (39) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 19 (39) |

Table 5. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|--------------------|--------------------|---------------------|---------------------|---------------------|--------------------|--------------------|----------------|---------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Black crappie | 0.0030 (0.0062) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 2,247 (4,645) | 0 (0) | 2,247 (4,645) |
| Yellow perch | 0.5664 (0.0995) | 18,411 (9,564) | 46,900 (21,491) | 98,755 (28,697) | 175,316 (40,911) | 75,969 (44,468) | 5,464 (3,212) | 10,242 (18,908) | 0 (0) | 431,057 (73,456) |
| Walleye | 0.0048 (0.0086) | 0 (0) | 3,286 (6,515) | 276 (289) | 79 (178) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 3,641 (6,524) |
| Freshwater drum | 0.0034 (0.0042) | 26 (55) | 159 (257) | 0 (0) | 2,323 (3,209) | 79 (120) | 0 (0) | 0 (0) | 0 (0) | 2,587 (3,222) |
| Lake whitefish | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 37 (75) | 0 (0) | 37 (75) |
| Round whitefish | 0.0227 (0.0167) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 16,303 (12,679) | 989 (922) | 17,292 (12,712) |
| Burbot | <0.0000 (<0.0000) | 21 (48) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 21 (48) |
| Other | <0.0000 (<0.0000) | 21 (48) | 0 (0) | 0 (0) | 16 (32) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 37 (58) |
| Total | 0.6580 (0.1036) | 25,691 (9,841) | 60,138 (22,619) | 103,678 (28,794) | 181,515 (41,102) | 86,385 (45,411) | 11,622 (4,851) | 30,618 (23,251) | 1,106 (926) | 500,753 (75,856) |
| Angler hours | | 87,921 (16,178) | 97,379 (8,501) | 107,134 (13,606) | 170,566 (14,598) | 147,725 (12,905) | 91,652 (10,290) | 55,622 (7,444) | 3,023 (719) | 761,022 (32,566) |
| Angler trips | | 31,024 (5,408) | 31,197 (3,654) | 37,350 (4,981) | 67,012 (6,802) | 59,021 (6,467) | 29,200 (3,795) | 17,052 (2,733) | 800 (197) | 272,656 (13,319) |
| Angler days | | 27,441 (5,057) | 26,713 (3,318) | 35,580 (4,866) | 61,846 (6,319) | 48,098 (6,300) | 23,456 (3,058) | 14,257 (2,609) | 551 (153) | 237,942 (12,492) |

Table 6. Estimated sportfishing catch and effort for the Lake Michigan shore fishery, 1986. Two standard errors in parentheses.

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|------------------|--------------|------------------|------------------|------------|------------------|----------------|-------------|------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Coho salmon | 0.0100 (0.0121) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1,591 (2,060) | 121 (213) | 0 (0) | 1,712 (2,071) |
| Chinook salmon | 0.0180 (0.0066) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1,808 (887) | 1,247 (645) | 10 (14) | 3,065 (1,097) |
| Rainbow trout | 0.0205 (0.0081) | 1,470 (1,088) | 342 (253) | 11 (21) | 0 (0) | 0 (0) | 179 (227) | 1,355 (712) | 135 (70) | 3,492 (1,346) |
| Atlantic salmon | 0.0001 (0.0002) | 25 (52) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 25 (52) |
| Brown trout | 0.0044 (0.0046) | 375 (735) | 90 (88) | 0 (0) | 0 (0) | 0 (0) | 219 (194) | 59 (118) | 0 (0) | 743 (774) |
| Lake trout | <0.0000 (<0.0000) | 0 (0) | 7 (13) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 7 (13) |
| Splake | 0.0002 (0.0004) | 39 (86) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 39 (86) |
| Northern pike | 0.0016 (0.0015) | 0 (0) | 0 (0) | 123 (197) | 0 (0) | 0 (0) | 0 (0) | 149 (161) | 0 (0) | 272 (254) |
| White sucker | 0.0003 (0.0006) | 0 (0) | 0 (0) | 49 (102) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 49 (102) |
| Yellow bullhead | 0.0001 (0.0002) | 0 (0) | 0 (0) | 21 (42) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 21 (42) |
| Channel catfish | 0.0002 (0.0003) | 0 (0) | 0 (0) | 14 (29) | 0 (0) | 0 (0) | 12 (26) | 0 (0) | 0 (0) | 26 (39) |
| Rock bass | 0.0048 (0.0037) | 0 (0) | 445 (545) | 373 (322) | 0 (0) | 0 (0) | 0 (0) | 7 (15) | 0 (0) | 825 (633) |
| Pumpkinseed | 0.0122 (0.0193) | 0 (0) | 270 (558) | 209 (424) | 1,598 (3,212) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 2,077 (3,288) |
| Bluegill | 0.0003 (0.0005) | 0 (0) | 5 (11) | 0 (0) | 0 (0) | 42 (85) | 0 (0) | 0 (0) | 0 (0) | 47 (86) |
| Smallmouth bass | 0.0173 (0.0117) | 0 (0) | 196 (383) | 1,985 (1,456) | 719 (1,266) | 0 (0) | 0 (0) | 42 (90) | 0 (0) | 2,942 (1,969) |

Table 6. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|----------------|----------------------|--------------------|--------------------|--------------------|--------------------|--------------------|-------------------|-------------------|----------------|---------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Black crappie | 0.0139 (0.0318) | 0 (0) | 0 (0) | 2,374 (5,430) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 2,374 (5,430) |
| Yellow perch | 0.5518 (0.2196) | 16,530 (10,986) | 30,887 (12,221) | 13,447 (12,253) | 8,148 (10,392) | 21,531 (28,051) | 1,901 (3,067) | 1,566 (1,424) | 0 (0) | 94,010 (36,421) |
| Walleye | 0.0057 (0.0046) | 0 (0) | 474 (452) | 238 (601) | 95 (196) | 170 (0) | 0 (0) | 0 (0) | 0 (0) | 977 (777) |
| Lake whitefish | 0.0007 (0.0006) | 0 (0) | 0 (0) | 116 (101) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 116 (101) |
| Other | 0.0013 (0.0027) | 0 (0) | 216 (440) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 216 (440) |
| Total | 0.6634 (0.2263) | 18,439 (11,065) | 32,932 (12,271) | 18,960 (13,507) | 10,560 (10,952) | 21,743 (28,051) | 5,710 (3,811) | 4,546 (1,745) | 145 (71) | 113,035 (37,146) |
| Angler hours | | 24,820 (5,080) | 26,845 (3,251) | 22,818 (12,314) | 22,642 (2,364) | 23,014 (4,949) | 25,071 (3,869) | 23,657 (3,056) | 1,515 (424) | 170,382 (15,575) |
| Angler trips | | 8,739 (1,928) | 10,313 (1,437) | 9,301 (5,524) | 19,230 (3,960) | 14,235 (5,864) | 8,304 (1,567) | 6,748 (1,029) | 396 (132) | 77,266 (9,481) |
| Angler days | | 7,026 (1,654) | 9,648 (1,380) | 8,753 (5,507) | 18,256 (3,897) | 14,182 (5,865) | 6,942 (1,392) | 4,942 (821) | 256 (95) | 70,005 (9,337) |

Table 7. Estimated catch and catch rate (fish per angler hour) of yellow perch at selected Lake Michigan ports and fishing areas, 1986. Two standard errors in parentheses.

| Port/area | Number of fish | Catch per hour |
|--------------------------|----------------------|-------------------|
| New Buffalo | 393,858 (192,915) | 0.818 (0.476) |
| St. Joseph/Benton Harbor | 590,044 (307,649) | 0.972 (0.547) |
| South Haven | 307,847 (150,200) | 0.787 (0.409) |
| Manistee | 226,199 (131,847) | 0.332 (0.206) |
| West Grand Traverse Bay | 76,971 (43,181) | 0.439 (0.251) |
| East Grand Traverse Bay | 139,804 (51,654) | 1.205 (0.472) |
| Big Bay de Noc | 136,968 (65,315) | 3.708 (1.989) |
| Little Bay de Noc | 139,828 (50,923) | 0.699 (0.265) |

Table 8. Estimated catch and catch rate (fish per angler hour) of chinook salmon at selected Lake Michigan ports and fishing areas, 1986. Two standard errors in parentheses.

| Port/area | Number of fish | Catch per hour |
|--------------------------|---------------------|-------------------|
| Ludington | 129,388 (76,019) | 0.155 (0.103) |
| Manistee | 69,662 (22,074) | 0.102 (0.039) |
| Frankfort | 65,080 (36,322) | 0.109 (0.070) |
| Grand Haven | 68,698 (29,759) | 0.098 (0.048) |
| St. Joseph/Benton Harbor | 29,015 (9,526) | 0.049 (0.019) |
| Muskegon | 28,417 (9,654) | 0.089 (0.034) |
| Pentwater | 20,519 (11,893) | 0.090 (0.065) |
| Charlevoix | 10,027 (3,679) | 0.100 (0.044) |

Table 9. Estimated catch and catch rate (fish per angler hour) of lake trout at selected Lake Michigan ports and fishing areas, 1986. Two standard errors in parentheses.

| Port/area | Number of fish | Catch per hour |
|--------------------------|--------------------|-------------------|
| Frankfort | 33,654 (40,334) | 0.057 (0.071) |
| St. Joseph/Benton Harbor | 18,217 (11,018) | 0.030 (0.019) |
| Ludington | 15,163 (8,973) | 0.018 (0.012) |
| Grand Haven | 14,731 (7,598) | 0.021 (0.012) |
| Saugatuck | 8,847 (4,701) | 0.024 (0.016) |
| West Grand Traverse Bay | 8,365 (3,527) | 0.048 (0.021) |
| Charlevoix | 6,640 (3,483) | 0.066 (0.038) |
| Petoskey | 2,697 (1,076) | 0.071 (0.031) |

Table 10. Estimated sportfishing catch and effort for Lake Huron, by all modes of fishing, 1986. Two standard errors in parentheses.

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|--------------------|------------------|-------------------|-------------------|--------------------|--------------------|------------------|-------------|--------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Pink salmon | <0.0000 (<0.0000) | 0 (0) | 22 (46) | 0 (0) | 117 (179) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 139 (185) |
| Coho salmon | 0.0019 (0.0006) | 2,066 (1,274) | 966 (1,011) | 1,711 (1,038) | 1,084 (1,378) | 381 (271) | 1,031 (600) | 320 (286) | 0 (0) | 7,559 (2,477) |
| Chinook salmon | 0.0236 (0.0032) | 16,231 (6,345) | 4,386 (2,282) | 4,086 (1,696) | 12,871 (4,963) | 32,275 (5,851) | 20,577 (5,150) | 1,099 (601) | 0 (0) | 91,525 (11,580) |
| Rainbow trout | 0.0012 (0.0017) | 3,786 (6,503) | 151 (111) | 183 (186) | 303 (341) | 19 (38) | 18 (37) | 79 (84) | 74 (106) | 4,613 (6,517) |
| Brown trout | 0.0030 (0.0015) | 6,744 (5,235) | 1,498 (1,749) | 209 (294) | 1,788 (1,065) | 477 (375) | 466 (594) | 507 (286) | 4 (9) | 11,693 (5,680) |
| Brook trout | 0.0001 (0.0001) | 0 (0) | 4 (9) | 0 (0) | 83 (162) | 0 (0) | 151 (303) | 0 (0) | 0 (0) | 238 (344) |
| Lake trout | 0.0144 (0.0031) | 75 (117) | 9,109 (5,270) | 20,613 (7,562) | 19,875 (6,651) | 6,239 (2,523) | 0 (0) | 0 (0) | 0 (0) | 55,911 (11,644) |
| Rainbow smelt | 0.0039 (0.0057) | 14,627 (22,072) | 83 (175) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 486 (384) | 35 (42) | 15,231 (22,076) |
| Northern pike | 0.0070 (0.0021) | 14 (30) | 8,922 (5,373) | 2,727 (2,355) | 1,765 (1,782) | 7,321 (4,754) | 3,702 (1,801) | 2,784 (1,836) | 84 (146) | 27,319 (8,175) |
| White sucker | 0.0026 (0.0033) | 9,156 (12,791) | 335 (413) | 656 (741) | 8 (17) | 0 (0) | 0 (0) | 44 (79) | 0 (0) | 10,199 (12,819) |
| Redhorse (spp.) | 0.0001 (0.0001) | 0 (0) | 59 (130) | 0 (0) | 224 (324) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 283 (349) |
| Black bullhead | 0.0009 (0.0017) | 62 (99) | 81 (163) | 0 (0) | 3,346 (6,486) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 3,489 (6,489) |
| Yellow bullhead | 0.0010 (0.0008) | 1,487 (2,112) | 1,451 (2,111) | 618 (927) | 146 (297) | 292 (533) | 0 (0) | 69 (109) | 0 (0) | 4,063 (3,188) |
| Brown bullhead | 0.0032 (0.0017) | 2,051 (1,220) | 1,912 (976) | 4,378 (5,816) | 551 (436) | 958 (697) | 1,253 (1,852) | 1,315 (1,336) | 0 (0) | 12,418 (6,493) |
| Channel catfish | 0.0203 (0.0064) | 1,153 (1,488) | 9,879 (5,059) | 19,889 (7,115) | 17,793 (6,810) | 13,375 (15,445) | 16,071 (15,406) | 650 (648) | 0 (0) | 78,810 (24,518) |

Table 10. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|----------------------|---------------------|---------------------|----------------------|----------------------|----------------------|---------------------|--------------------|------------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| White perch | <0.0000 (<0.0000) | 21 (42) | 15 (33) | 35 (74) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 71 (91) |
| White bass | 0.0112 (0.0050) | 2,390 (2,935) | 20,154 (15,625) | 15,981 (9,231) | 485 (604) | 1,398 (1,637) | 3,036 (6,058) | 0 (0) | 0 (0) | 43,444 (19,435) |
| Rock bass | 0.0027 (0.0019) | 74 (127) | 1,705 (1,429) | 2,760 (2,717) | 995 (829) | 4,507 (6,467) | 303 (572) | 253 (348) | 0 (0) | 10,597 (7,239) |
| Green sunfish | 0.0001 (0.0001) | 103 (188) | 94 (198) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 197 (273) |
| Pumpkinseed | 0.0003 (0.0002) | 242 (520) | 435 (410) | 64 (65) | 284 (582) | 212 (285) | 0 (0) | 0 (0) | 0 (0) | 1,237 (929) |
| Bluegill | 0.0004 (0.0003) | 97 (113) | 163 (157) | 629 (706) | 816 (853) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1,705 (1,124) |
| Longear sunfish | 0.0006 (0.0009) | 0 (0) | 740 (1,597) | 1,531 (3,151) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 2,271 (3,533) |
| Redear sunfish | 0.0010 (0.0006) | 0 (0) | 1,068 (1,737) | 231 (341) | 947 (1,151) | 348 (290) | 1,014 (727) | 328 (343) | 0 (0) | 3,936 (2,278) |
| Smallmouth bass | 0.0023 (0.0015) | 0 (0) | 3,302 (4,243) | 1,905 (1,792) | 459 (559) | 2,827 (3,372) | 257 (358) | 217 (442) | 0 (0) | 8,967 (5,764) |
| Largemouth bass | 0.0008 (0.0004) | 0 (0) | 1,154 (805) | 448 (490) | 1,164 (1,111) | 118 (155) | 61 (88) | 0 (0) | 0 (0) | 2,945 (1,468) |
| White crappie | 0.0004 (0.0008) | 1,507 (3,246) | 0 (0) | 36 (56) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1,543 (3,246) |
| Black crappie | 0.0006 (0.0004) | 201 (229) | 655 (742) | 29 (69) | 505 (983) | 477 (946) | 377 (359) | 90 (199) | 0 (0) | 2,334 (1,624) |
| Yellow perch | 0.6282 (0.0874) | 445,586 (121,457) | 112,584 (38,207) | 224,474 (55,596) | 450,231 (110,071) | 397,832 (148,080) | 489,404 (186,577) | 266,919 (94,056) | 49,781 (24,392) | 2,436,811 (312,407) |
| Walleye | 0.0274 (0.0071) | 1,276 (2,583) | 3,131 (1,774) | 10,867 (4,746) | 57,436 (24,416) | 30,270 (10,207) | 3,120 (1,720) | 333 (466) | 15 (23) | 106,448 (27,126) |

Table 10. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|---------------------|----------------------------|------------------------------|-----------------------------|-----------------------------|--------------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|--------------------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Freshwater drum | 0.0032 (0.0017) | 202 (236) | 787 (781) | 6,270 (5,666) | 3,201 (1,427) | 1,737 (2,479) | 189 (243) | 98 (225) | 0 (0) | 12,484 (6,408) |
| Lake whitefish | 0.0001 (0.0001) | 0 (0) | 0 (0) | 0 (0) | 572 (749) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 572 (749) |
| Round whitefish | 0.0002 (0.0003) | 0 (0) | 0 (0) | 273 (563) | 364 (742) | 0 (0) | 0 (0) | 21 (45) | 0 (0) | 658 (933) |
| Burbot | <0.0000 (<0.0000) | 47 (97) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 49 (38) | 27 (25) | 123 (107) |
| Other | 0.0321 (0.0142) | 89 (115) | 4,467 (3,191) | 293 (326) | 118,261 (54,752) | 42 (67) | 177 (263) | 1,353 (1,098) | 1 (3) | 124,683 (54,858) |
| Total | 0.7952 (0.0935) | 509,287 (124,694) | 189,312 (42,920) | 320,896 (58,354) | 695,674 (126,027) | 501,105 (149,659) | 541,207 (187,412) | 277,014 (94,100) | 50,021 (24,393) | 3,084,516 (321,947) |
| Angler hours | | 397,603 (80,677) | 373,969 (61,813) | 539,170 (56,416) | 1,030,166 (114,171) | 822,424 (94,866) | 550,944 (90,063) | 149,522 (22,190) | 15,018 (5,186) | 3,878,816 (210,185) |
| Angler trips | | 88,570 (15,988) | 80,979 (11,833) | 129,126 (12,700) | 228,576 (23,917) | 187,047 (20,904) | 131,072 (20,039) | 49,048 (6,351) | 7,060 (2,787) | 901,478 (44,895) |
| Angler days | | 82,149 (15,108) | 68,129 (9,994) | 114,097 (11,290) | 207,694 (21,753) | 167,530 (18,325) | 115,104 (18,299) | 44,176 (5,379) | 5,805 (2,177) | 804,684 (40,412) |

Table 11. Estimated sportfishing catch and effort for Saginaw Bay (Port Austin to Tawas), by all modes of fishing, 1986. Two standard errors in parentheses.

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|-----------------------|--------------------|------------------|------------------|------------------|------------------|------------------|--------------|------------|--------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Coho salmon | 0.0009 (0.0008) | 216 (508) | 0 (0) | 132 (280) | 644 (1,303) | 74 (92) | 671 (525) | 0 (0) | 0 (0) | 1,737 (1,523) |
| Chinook salmon | 0.0055 (0.0023) | 308 (478) | 696 (1,125) | 281 (299) | 4,789 (3,865) | 2,255 (1,030) | 2,280 (1,141) | 189 (236) | 0 (0) | 10,798 (4,352) |
| Rainbow trout | 0.0020 (0.0033) | 3,485 (6,492) | 45 (58) | 48 (97) | 211 (324) | 0 (0) | 0 (0) | 79 (84) | 39 (65) | 3,907 (6,502) |
| Brown trout | 0.0038 (0.0027) | 5,666 (5,137) | 592 (273) | 131 (271) | 707 (703) | 17 (35) | 102 (113) | 271 (230) | 4 (9) | 7,490 (5,206) |
| Lake trout | 0.0100 (0.0033) | 43 (90) | 1,863 (2,111) | 5,979 (3,007) | 9,184 (4,649) | 2,521 (2,047) | 0 (0) | 0 (0) | 0 (0) | 19,590 (6,270) |
| Rainbow smelt | 0.0077 (0.0112) | 14,627 (22,072) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 486 (384) | 35 (42) | 15,148 (22,075) |
| Northern pike | 0.0003 (0.0002) | 14 (30) | 233 (344) | 0 (0) | 87 (102) | 148 (300) | 59 (83) | 39 (49) | 0 (0) | 580 (478) |
| White sucker | 0.0050 (0.0065) | 9,125 (12,791) | 335 (413) | 395 (442) | 8 (17) | 0 (0) | 0 (0) | 44 (79) | 0 (0) | 9,907 (12,806) |
| Redhorse (spp.) | <0.0000 (<0.0000) | 0 (0) | 59 (130) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 59 (130) |
| Black bullhead | 0.0001 (0.0001) | 62 (99) | 81 (163) | 0 (0) | 13 (28) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 156 (193) |
| Yellow bullhead | 0.0020 (0.0016) | 1,487 (2,112) | 1,451 (2,111) | 618 (927) | 0 (0) | 292 (533) | 0 (0) | 69 (109) | 0 (0) | 3,917 (3,174) |

Table 11. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|------------------|--------------------|-------------------|-------------------|--------------------|--------------------|--------------|----------|--------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Brown bullhead | 0.0059 (0.0033) | 2,051 (1,220) | 1,912 (976) | 4,378 (5,816) | 551 (436) | 811 (625) | 1,236 (1,851) | 592 (518) | 0 (0) | 11,531 (6,367) |
| Channel catfish | 0.0396 (0.0128) | 1,092 (1,482) | 9,879 (5,059) | 19,840 (7,114) | 17,553 (6,806) | 12,974 (15,442) | 15,992 (15,406) | 526 (606) | 0 (0) | 77,856 (24,513) |
| White perch | <0.0000 (<0.0000) | 21 (42) | 15 (33) | 35 (74) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 71 (91) |
| White bass | 0.0220 (0.0100) | 2,390 (2,935) | 20,069 (15,624) | 15,950 (9,230) | 485 (604) | 1,384 (1,637) | 3,036 (6,058) | 0 (0) | 0 (0) | 43,314 (19,433) |
| Rock bass | 0.0008 (0.0004) | 74 (127) | 708 (657) | 121 (96) | 489 (281) | 29 (43) | 20 (40) | 44 (56) | 0 (0) | 1,485 (737) |
| Green sunfish | 0.0001 (0.0001) | 103 (188) | 94 (198) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 197 (273) |
| Pumpkinseed | 0.0006 (0.0005) | 242 (520) | 435 (410) | 64 (65) | 284 (582) | 212 (285) | 0 (0) | 0 (0) | 0 (0) | 1,237 (929) |
| Bluegill | 0.0009 (0.0006) | 97 (113) | 163 (157) | 629 (706) | 816 (853) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1,705 (1,124) |
| Longear sunfish | 0.0004 (0.0009) | 0 (0) | 740 (1,597) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 740 (1,597) |
| Redear sunfish | 0.0011 (0.0006) | 0 (0) | 45 (64) | 0 (0) | 617 (933) | 232 (243) | 872 (668) | 328 (343) | 0 (0) | 2,094 (1,224) |
| Smallmouth bass | 0.0005 (0.0004) | 0 (0) | 242 (416) | 353 (517) | 216 (262) | 26 (55) | 0 (0) | 217 (442) | 0 (0) | 1,054 (841) |

Table 11. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|----------------------|---------------------|---------------------|----------------------|----------------------|----------------------|---------------------|--------------------|------------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Largemouth bass | 0.0015 (0.0008) | 0 (0) | 1,154 (805) | 448 (490) | 1,164 (1,111) | 118 (155) | 31 (64) | 0 (0) | 0 (0) | 2,915 (1,466) |
| White crappie | 0.0008 (0.0017) | 1,507 (3,246) | 0 (0) | 36 (56) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1,543 (3,246) |
| Black crappie | 0.0010 (0.0008) | 201 (229) | 655 (742) | 0 (0) | 505 (983) | 477 (946) | 53 (84) | 0 (0) | 0 (0) | 1,891 (1,572) |
| Yellow perch | 0.9243 (0.1629) | 380,390 (109,732) | 47,169 (15,819) | 202,061 (54,793) | 382,239 (108,090) | 320,727 (144,083) | 271,037 (177,702) | 169,073 (68,857) | 46,116 (24,275) | 1,818,812 (290,939) |
| Walleye | 0.0301 (0.0131) | 1,265 (2,583) | 2,199 (1,570) | 7,172 (3,553) | 37,941 (23,795) | 10,226 (7,273) | 400 (420) | 50 (103) | 15 (23) | 59,268 (25,319) |
| Freshwater drum | 0.0056 (0.0032) | 157 (211) | 540 (584) | 6,215 (5,665) | 2,276 (1,095) | 1,713 (2,478) | 138 (220) | 0 (0) | 0 (0) | 11,039 (6,314) |
| Burbot | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 49 (38) | 27 (25) | 76 (45) |
| Other | 0.0026 (0.0017) | 89 (115) | 4,367 (3,183) | 293 (326) | 73 (105) | 0 (0) | 3 (5) | 256 (428) | 1 (3) | 5,082 (3,232) |
| Total | 1.0749 (0.1699) | 424,712 (113,117) | 95,741 (23,431) | 265,179 (56,816) | 460,852 (111,090) | 354,236 (145,145) | 295,930 (178,487) | 172,312 (68,867) | 46,237 (24,275) | 2,115,199 (295,246) |
| Angler hours | | 239,127 (61,385) | 174,324 (31,607) | 327,698 (40,644) | 594,238 (91,656) | 347,781 (59,645) | 187,968 (52,392) | 83,368 (10,567) | 13,218 (5,169) | 1,967,722 (145,811) |
| Angler trips | | 56,570 (12,331) | 41,216 (7,026) | 80,397 (9,367) | 125,198 (17,932) | 83,693 (12,812) | 50,795 (13,261) | 28,683 (3,676) | 6,348 (2,764) | 472,900 (31,175) |
| Angler days | | 50,891 (11,364) | 37,717 (6,685) | 76,242 (9,119) | 119,986 (17,334) | 79,952 (12,640) | 47,814 (12,778) | 26,601 (3,498) | 5,274 (2,159) | 444,477 (29,957) |

Table 12. Estimated angler effort in hours, trips, and days at selected Lake Huron ports and fishing areas, 1986. Two standard errors in parentheses.

| Port/area | Angler | | |
|-----------------------------|---------------------|---------------------|--------------------|
| | Hours | Trips | Days |
| Lexington to Port Sanilac | 338,189 (67,523) | 74,650 (12,787) | 70,123 (12,134) |
| Eagle Bay to Harbor Beach | 405,603 (87,305) | 84,516 (17,352) | 77,009 (16,009) |
| Port Austin to Sand Point | 446,012 (88,587) | 103,136 (18,262) | 95,228 (17,337) |
| Au Gres to Saganing Creek | 353,863 (54,625) | 90,270 (13,655) | 89,593 (13,598) |
| Essexville to Saginaw River | 258,088 (51,088) | 65,125 (10,644) | 64,364 (10,627) |
| Tawas | 370,596 (64,812) | 85,226 (12,426) | 74,585 (11,349) |
| Drummond Island | 394,971 (69,192) | 98,031 (17,313) | 61,730 (11,076) |
| Oscoda | 218,329 (58,765) | 47,667 (12,591) | 41,207 (10,803) |

Table 13. Estimated sportfishing catch and effort for the Lake Huron boat fishery, 1986. Two standard errors in parentheses.

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|-----------------------|-------------------|------------------|-------------------|-------------------|--------------------|-------------------|------------------|-------------|--------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Pink salmon | <0.0000 (<0.0000) | 0 (0) | 22 (46) | 0 (0) | 117 (179) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 139 (185) |
| Coho salmon | 0.0020 (0.0007) | 1,516 (866) | 966 (1,011) | 1,711 (1,038) | 1,084 (1,378) | 355 (266) | 685 (516) | 320 (286) | 0 (0) | 6,637 (2,273) |
| Chinook salmon | 0.0261 (0.0038) | 16,128 (6,343) | 4,386 (2,282) | 4,086 (1,696) | 12,871 (4,963) | 31,821 (5,841) | 18,541 (5,101) | 722 (492) | 0 (0) | 88,555 (11,547) |
| Rainbow trout | 0.0003 (0.0002) | 301 (381) | 129 (100) | 121 (156) | 303 (341) | 19 (38) | 18 (37) | 0 (0) | 0 (0) | 891 (546) |
| Brown trout | 0.0028 (0.0017) | 5,371 (5,130) | 1,427 (1,747) | 209 (294) | 1,750 (1,062) | 477 (375) | 86 (99) | 103 (160) | 0 (0) | 9,423 (5,546) |
| Brook trout | <0.0000 (<0.0000) | 0 (0) | 4 (9) | 0 (0) | 83 (162) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 87 (162) |
| Lake trout | 0.0164 (0.0036) | 32 (74) | 9,109 (5,270) | 20,498 (7,558) | 19,875 (6,651) | 6,239 (2,523) | 0 (0) | 0 (0) | 0 (0) | 55,753 (11,641) |
| Rainbow smelt | <0.0000 (<0.0000) | 0 (0) | 83 (175) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 83 (175) |
| Northern pike | 0.0080 (0.0025) | 0 (0) | 8,711 (5,362) | 2,727 (2,355) | 1,757 (1,782) | 7,321 (4,754) | 3,694 (1,801) | 2,763 (1,836) | 84 (146) | 27,057 (8,168) |
| White sucker | 0.0001 (0.0002) | 0 (0) | 53 (59) | 261 (595) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 314 (598) |
| Redhorse (spp.) | 0.0001 (0.0001) | 0 (0) | 0 (0) | 0 (0) | 224 (324) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 224 (324) |
| Black bullhead | 0.0010 (0.0019) | 0 (0) | 0 (0) | 0 (0) | 3,333 (6,486) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 3,333 (6,486) |
| Yellow bullhead | 0.0003 (0.0003) | 0 (0) | 159 (243) | 391 (803) | 146 (297) | 253 (527) | 0 (0) | 22 (48) | 0 (0) | 971 (1,035) |
| Brown bullhead | 0.0014 (0.0017) | 120 (234) | 569 (441) | 2,853 (5,505) | 53 (110) | 471 (519) | 17 (36) | 723 (1,232) | 0 (0) | 4,806 (5,688) |
| Channel catfish | 0.0157 (0.0057) | 807 (1,452) | 7,064 (4,705) | 16,227 (6,990) | 15,112 (6,652) | 12,607 (15,433) | 782 (1,460) | 492 (617) | 0 (0) | 53,091 (18,922) |

Table 13. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|-----------------------|----------------------|--------------------|---------------------|----------------------|----------------------|----------------------|---------------------|------------------|------------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| White perch | <0.0000 (<0.0000) | 0 (0) | 15 (33) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 15 (33) |
| White bass | 0.0125 (0.0058) | 2,387 (2,935) | 19,681 (15,619) | 15,642 (9,215) | 402 (592) | 1,320 (1,633) | 2,963 (6,056) | 0 (0) | 0 (0) | 42,395 (19,421) |
| Rock bass | 0.0028 (0.0021) | 0 (0) | 1,269 (1,287) | 2,639 (2,715) | 559 (789) | 4,494 (6,467) | 283 (571) | 231 (346) | 0 (0) | 9,475 (7,205) |
| Green sunfish | <0.0000 (<0.0000) | 0 (0) | 94 (198) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 94 (198) |
| Pumpkinseed | 0.0001 (0.0001) | 0 (0) | 345 (391) | 18 (37) | 0 (0) | 129 (263) | 0 (0) | 0 (0) | 0 (0) | 492 (473) |
| Bluegill | 0.0002 (0.0002) | 7 (16) | 163 (157) | 194 (401) | 302 (314) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 666 (533) |
| Longear sunfish | 0.0007 (0.0011) | 0 (0) | 740 (1,597) | 1,531 (3,151) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 2,271 (3,533) |
| Redear sunfish | 0.0008 (0.0007) | 0 (0) | 1,064 (1,737) | 231 (341) | 755 (1,122) | 177 (202) | 392 (494) | 0 (0) | 0 (0) | 2,619 (2,163) |
| Smallmouth bass | 0.0021 (0.0016) | 0 (0) | 2,571 (4,205) | 1,180 (1,011) | 427 (555) | 2,827 (3,372) | 257 (358) | 0 (0) | 0 (0) | 7,262 (5,524) |
| Largemouth bass | 0.0007 (0.0004) | 0 (0) | 857 (757) | 316 (409) | 1,164 (1,111) | 118 (155) | 30 (61) | 0 (0) | 0 (0) | 2,485 (1,415) |
| White crappie | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 24 (50) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 24 (50) |
| Black crappie | 0.0006 (0.0005) | 0 (0) | 574 (725) | 29 (69) | 505 (983) | 477 (946) | 324 (349) | 90 (199) | 0 (0) | 1,999 (1,598) |
| Yellow perch | 0.6227 (0.0987) | 286,065 (115,665) | 95,923 (37,788) | 204,936 (55,037) | 445,910 (110,046) | 392,298 (148,008) | 482,432 (186,550) | 195,992 (92,178) | 8,815 (4,774) | 2,112,371 (308,500) |
| Walleye | 0.0309 (0.0082) | 47 (86) | 3,131 (1,774) | 10,867 (4,746) | 57,020 (24,408) | 30,270 (10,207) | 3,098 (1,719) | 283 (454) | 9 (20) | 104,725 (26,996) |
| Freshwater drum | 0.0018 (0.0009) | 107 (150) | 764 (780) | 1,831 (1,304) | 1,585 (972) | 1,542 (2,473) | 39 (72) | 98 (225) | 0 (0) | 5,966 (3,074) |

Table 13. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|----------------------|---------------------|---------------------|----------------------|----------------------|----------------------|---------------------|------------------|------------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Lake whitefish | 0.0002 (0.0003) | 0 (0) | 0 (0) | 0 (0) | 572 (749) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 572 (749) |
| Round whitefish | 0.0002 (0.0003) | 0 (0) | 0 (0) | 273 (563) | 364 (742) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 637 (931) |
| Other | 0.0366 (0.0163) | 42 (96) | 4,292 (3,187) | 89 (182) | 118,226 (54,752) | 42 (67) | 174 (263) | 1,353 (1,098) | 0 (0) | 124,218 (54,857) |
| Total | 0.7870 (0.1051) | 312,930 (116,003) | 164,165 (42,430) | 288,884 (57,482) | 684,499 (125,985) | 493,257 (149,585) | 513,815 (186,743) | 203,192 (92,217) | 8,908 (4,776) | 2,669,650 (316,558) |
| Angler hours | | 288,891 (78,510) | 320,145 (61,366) | 464,650 (56,000) | 976,241 (114,008) | 777,657 (94,727) | 466,515 (89,670) | 96,030 (21,440) | 1,918 (611) | 3,392,047 (208,656) |
| Angler trips | | 53,850 (13,969) | 63,059 (11,482) | 97,143 (11,947) | 209,996 (23,812) | 164,762 (20,614) | 99,835 (18,891) | 27,302 (5,709) | 543 (217) | 716,490 (43,025) |
| Angler days | | 49,712 (13,182) | 52,395 (9,626) | 84,936 (10,482) | 190,265 (21,649) | 147,636 (18,005) | 86,218 (17,070) | 24,806 (4,748) | 473 (224) | 636,441 (38,511) |

Table 14. Estimated sportfishing catch and effort for the Lake Huron shore fishery, 1986. Two standard errors in parentheses.

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|--------------------|------------------|------------------|------------------|--------------|--------------------|--------------|-------------|--------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Coho salmon | 0.0016 (0.0019) | 216 (508) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 250 (240) | 0 (0) | 0 (0) | 466 (562) |
| Chinook salmon | 0.0044 (0.0018) | 41 (97) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1,032 (423) | 204 (256) | 0 (0) | 1,277 (504) |
| Rainbow trout | 0.0018 (0.0023) | 340 (673) | 0 (0) | 48 (97) | 0 (0) | 0 (0) | 0 (0) | 77 (84) | 73 (106) | 538 (693) |
| Brown trout | 0.0036 (0.0029) | 766 (815) | 30 (62) | 0 (0) | 0 (0) | 0 (0) | 46 (66) | 217 (196) | 4 (9) | 1,063 (843) |
| Rainbow smelt | 0.0500 (0.0755) | 14,627 (22,072) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 14,627 (22,072) |
| Northern pike | 0.0007 (0.0012) | 0 (0) | 197 (341) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 197 (341) |
| White sucker | 0.0317 (0.0437) | 8,702 (12,760) | 282 (409) | 300 (419) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 9,284 (12,773) |
| Redhorse (spp.) | 0.0002 (0.0004) | 0 (0) | 59 (130) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 59 (130) |
| Black bullhead | 0.0005 (0.0007) | 62 (99) | 81 (163) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 143 (191) |
| Yellow bullhead | 0.0106 (0.0104) | 1,487 (2,112) | 1,292 (2,097) | 227 (463) | 0 (0) | 39 (80) | 0 (0) | 47 (98) | 0 (0) | 3,092 (3,015) |
| Brown bullhead | 0.0259 (0.0109) | 1,931 (1,198) | 1,343 (870) | 1,476 (1,873) | 498 (422) | 487 (465) | 1,236 (1,851) | 592 (518) | 0 (0) | 7,563 (3,129) |
| Channel catfish | 0.0846 (0.0535) | 346 (325) | 2,815 (1,858) | 3,416 (1,303) | 2,681 (1,460) | 736 (600) | 14,574 (15,300) | 158 (199) | 0 (0) | 24,726 (15,552) |

Table 14. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|--------------------|------------------|------------------|------------------|------------------|------------------|--------------------|--------------------|---------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| White perch | 0.0002 (0.0003) | 21 (42) | 0 (0) | 35 (74) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 56 (85) |
| White bass | 0.0036 (0.0025) | 3 (6) | 473 (444) | 339 (538) | 83 (121) | 78 (114) | 73 (148) | 0 (0) | 0 (0) | 1,049 (732) |
| Rock bass | 0.0023 (0.0022) | 74 (127) | 409 (620) | 46 (42) | 109 (132) | 0 (0) | 20 (40) | 19 (29) | 0 (0) | 677 (650) |
| Green sunfish | 0.0004 (0.0007) | 103 (188) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 103 (188) |
| Pumpkinseed | 0.0025 (0.0027) | 242 (520) | 90 (123) | 46 (53) | 284 (582) | 83 (109) | 0 (0) | 0 (0) | 0 (0) | 745 (799) |
| Bluegill | 0.0031 (0.0033) | 90 (111) | 0 (0) | 343 (550) | 479 (792) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 912 (971) |
| Redear sunfish | 0.0045 (0.0025) | 0 (0) | 4 (8) | 0 (0) | 192 (255) | 171 (208) | 622 (533) | 328 (343) | 0 (0) | 1,317 (714) |
| Smallmouth bass | 0.0058 (0.0056) | 0 (0) | 731 (568) | 725 (1,480) | 32 (66) | 0 (0) | 0 (0) | 217 (442) | 0 (0) | 1,705 (1,647) |
| Largemouth bass | 0.0016 (0.0014) | 0 (0) | 297 (275) | 132 (270) | 0 (0) | 0 (0) | 31 (64) | 0 (0) | 0 (0) | 460 (391) |
| White crappie | 0.0052 (0.0112) | 1,507 (3,246) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1,507 (3,246) |
| Black crappie | 0.0009 (0.0008) | 201 (229) | 7 (12) | 0 (0) | 0 (0) | 0 (0) | 53 (84) | 0 (0) | 0 (0) | 261 (244) |
| Yellow perch | 0.7688 (0.1580) | 95,695 (29,918) | 9,041 (4,413) | 9,478 (5,675) | 1,941 (1,730) | 5,119 (4,566) | 6,249 (3,166) | 58,709 (18,277) | 38,578 (23,851) | 224,810 (43,400) |

Table 14. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|---------------------|-------------------|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|---------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Walleye | 0.0016 (0.0022) | 0 (0) | 0 (0) | 0 (0) | 416 (644) | 0 (0) | 0 (0) | 50 (103) | 5 (12) | 471 (652) |
| Freshwater drum | 0.0206 (0.0192) | 95 (182) | 23 (32) | 4,343 (5,512) | 1,262 (879) | 195 (173) | 99 (208) | 0 (0) | 0 (0) | 6,017 (5,591) |
| Other | 0.0014 (0.0011) | 47 (64) | 175 (160) | 143 (240) | 35 (71) | 0 (0) | 3 (5) | 0 (0) | 0 (0) | 403 (304) |
| Total | 1.0380 (0.1965) | 126,596 (39,540) | 17,349 (5,425) | 21,097 (8,433) | 8,012 (2,750) | 6,908 (4,640) | 24,288 (15,753) | 60,618 (18,298) | 38,660 (23,851) | 303,528 (53,338) |
| Angler hours | | 58,165 (14,186) | 35,049 (6,346) | 49,649 (5,566) | 35,215 (5,394) | 28,721 (4,239) | 41,690 (7,420) | 32,351 (4,723) | 11,570 (5,102) | 292,410 (20,566) |
| Angler trips | | 19,426 (5,293) | 11,912 (2,556) | 21,092 (3,563) | 11,118 (1,767) | 15,648 (3,150) | 19,244 (6,533) | 14,643 (2,541) | 5,930 (2,762) | 119,013 (10,819) |
| Angler days | | 17,869 (4,774) | 10,780 (2,432) | 19,870 (3,519) | 10,411 (1,688) | 13,784 (3,137) | 17,959 (6,452) | 12,894 (2,294) | 4,763 (2,146) | 108,330 (10,260) |

Table 15. Estimated sportfishing catch and effort for the Lake Huron pier fishery, 1986. Two standard errors in parentheses.

| Species | Total catch per hour | Month | | | | | | | | Season total |
|-----------------|----------------------|------------------|------------|--------------|--------------|--------------|----------------|--------------|------------|------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Coho salmon | 0.0023 (0.0041) | 334 (784) | 0 (0) | 0 (0) | 0 (0) | 26 (53) | 96 (190) | 0 (0) | 0 (0) | 456 (808) |
| Chinook salmon | 0.0087 (0.0037) | 62 (129) | 0 (0) | 0 (0) | 0 (0) | 454 (333) | 1,004 (569) | 173 (231) | 0 (0) | 1,693 (710) |
| Rainbow trout | 0.0164 (0.0333) | 3,145 (6,457) | 22 (47) | 14 (28) | 0 (0) | 0 (0) | 0 (0) | 2 (4) | 1 (2) | 3,184 (6,457) |
| Brown trout | 0.0062 (0.0046) | 607 (644) | 41 (56) | 0 (0) | 38 (81) | 0 (0) | 334 (582) | 187 (133) | 0 (0) | 1,207 (884) |
| Brook trout | 0.0008 (0.0016) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 151 (303) | 0 (0) | 0 (0) | 151 (303) |
| Lake trout | 0.0008 (0.0013) | 43 (90) | 0 (0) | 115 (233) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 158 (250) |
| Rainbow smelt | 0.0027 (0.0020) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 486 (384) | 35 (42) | 521 (386) |
| Northern pike | 0.0003 (0.0003) | 14 (30) | 14 (29) | 0 (0) | 8 (18) | 0 (0) | 8 (12) | 21 (31) | 0 (0) | 65 (56) |
| White sucker | 0.0031 (0.0047) | 454 (892) | 0 (0) | 95 (141) | 8 (17) | 0 (0) | 0 (0) | 44 (79) | 0 (0) | 601 (907) |
| Black bullhead | 0.0001 (0.0002) | 0 (0) | 0 (0) | 0 (0) | 13 (28) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 13 (28) |
| Brown bullhead | 0.0003 (0.0006) | 0 (0) | 0 (0) | 49 (99) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 49 (99) |
| Channel catfish | 0.0051 (0.0056) | 0 (0) | 0 (0) | 246 (237) | 0 (0) | 32 (67) | 715 (1,059) | 0 (0) | 0 (0) | 993 (1,087) |
| Rock bass | 0.0023 (0.0012) | 0 (0) | 27 (32) | 75 (86) | 327 (219) | 13 (27) | 0 (0) | 3 (6) | 0 (0) | 445 (239) |
| Bluegill | 0.0007 (0.0011) | 0 (0) | 0 (0) | 92 (187) | 35 (49) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 127 (193) |
| White crappie | 0.0001 (0.0002) | 0 (0) | 0 (0) | 12 (25) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 12 (25) |

Table 15. Continued:

| Species | Total catch per hour | Month | | | | | | | | Season total |
|---------------------|----------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|---------------------|
| | | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Black crappie | 0.0004 (0.0008) | 0 (0) | 74 (156) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 74 (156) |
| Yellow perch | 0.5126 (0.1259) | 63,826 (21,867) | 7,620 (3,508) | 10,060 (5,438) | 2,380 (1,601) | 415 (671) | 723 (337) | 12,218 (3,948) | 2,388 (1,823) | 99,630 (23,283) |
| Walleye | 0.0064 (0.0132) | 1,229 (2,582) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 22 (35) | 0 (0) | 1 (2) | 1,252 (2,582) |
| Freshwater drum | 0.0026 (0.0031) | 0 (0) | 0 (0) | 96 (138) | 354 (566) | 0 (0) | 51 (104) | 0 (0) | 0 (0) | 501 (592) |
| Round whitefish | 0.0001 (0.0002) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 21 (45) | 0 (0) | 21 (45) |
| Burbot | 0.0006 (0.0005) | 47 (97) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 49 (38) | 27 (25) | 123 (107) |
| Other | 0.0003 (0.0006) | 0 (0) | 0 (0) | 61 (124) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1 (3) | 62 (124) |
| Total | 0.5728 (0.1328) | 69,761 (22,987) | 7,798 (3,512) | 10,915 (5,458) | 3,163 (1,715) | 940 (754) | 3,104 (1,427) | 13,204 (3,977) | 2,453 (1,824) | 111,338 (24,397) |
| Angler hours | | 50,547 (11,990) | 18,775 (3,836) | 24,871 (3,981) | 18,710 (2,828) | 16,046 (2,917) | 42,739 (3,929) | 21,141 (3,230) | 1,530 (699) | 194,359 (14,737) |
| Angler trips | | 15,294 (5,697) | 6,008 (1,291) | 10,891 (2,421) | 7,462 (1,374) | 6,637 (1,456) | 11,993 (1,427) | 7,103 (1,130) | 587 (298) | 65,975 (6,884) |
| Angler days | | 14,568 (5,630) | 4,954 (1,136) | 9,291 (2,281) | 7,018 (1,302) | 6,110 (1,338) | 10,927 (1,354) | 6,476 (1,064) | 569 (290) | 59,913 (6,688) |

Table 16. Estimated catch and catch rate (fish per angler hour) of yellow perch at selected Lake Huron ports and fishing areas, 1986. Two standard errors in parentheses.

| Port/area | Number of fish | Catch per hour |
|---------------------------------|----------------------|-------------------|
| Drummond Island | 226,506 (79,034) | 0.574 (0.224) |
| Au Gres to Saganing Creek | 385,765 (83,284) | 1.090 (0.289) |
| Saganing Creek to Saginaw River | 282,407 (80,113) | 1.274 (0.454) |
| Saginaw River to Essexville | 374,036 (203,342) | 1.453 (0.839) |
| Sebewaing to Essexville | 185,985 (89,205) | 1.529 (0.774) |
| Sand Point to Sebewaing | 151,464 (72,382) | 0.773 (0.389) |
| Port Austin to Sand Point | 337,804 (110,150) | 0.757 (0.289) |

Table 17. Estimated catch and catch rate (fish per angler hour) of chinook salmon at selected Lake Huron ports and fishing areas, 1986. Two standard errors in parentheses.

| Port/area | Number of fish | Catch per hour |
|---------------------------|-------------------|------------------|
| Lexington to Port Sanilac | 16,745 (6,027) | 0.080 (0.020) |
| Eagle Bay to Harbor Beach | 17,286 (5,742) | 0.043 (0.017) |
| Port Austin to Sand Point | 6,709 (4,115) | 0.015 (0.010) |
| Oscoda | 6,136 (2,629) | 0.028 (0.014) |
| Harrisville | 6,077 (2,291) | 0.045 (0.021) |
| Rockport | 7,580 (2,607) | 0.136 (0.052) |
| Rogers City | 19,052 (4,637) | 0.119 (0.030) |

Table 18. Estimated catch and catch rate (fish per angler hour) of lake trout at selected Lake Huron ports and fishing areas, 1986. Two standard errors in parentheses.

| Port/area | Number of fish | Catch per hour |
|---------------------------|-------------------|------------------|
| Eagle Bay to Harbor Beach | 13,127 (6,829) | 0.032 (0.018) |
| Port Austin to Sand Point | 14,139 (5,946) | 0.032 (0.015) |
| Oscoda | 8,744 (4,837) | 0.040 (0.025) |
| Harrisville | 9,544 (4,740) | 0.071 (0.040) |

Table 19. Estimated sportfishing catch and effort for the Lake Erie boat fishery for all sites sampled, 1986. Two standard errors in parentheses.

| Species | Total catch per hour | Month | | | | | | | Season total |
|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------------|--------------------|------------------|------------------|--------------------|
| | | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Coho salmon | <0.0000 (<0.0000) | 51 (104) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 51 (104) |
| White sucker | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 57 (117) | 34 (68) | 0 (0) | 0 (0) | 0 (0) | 91 (135) |
| Redhorse (spp.) | 0.0001 (0.0002) | 0 (0) | 0 (0) | 194 (298) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 194 (298) |
| Yellow bullhead | 0.0011 (0.0016) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 46 (95) | 2,244 (3,346) | 0 (0) | 2,290 (3,347) |
| Brown bullhead | 0.0008 (0.0007) | 274 (414) | 344 (709) | 320 (592) | 529 (1,101) | 0 (0) | 216 (486) | 72 (161) | 1,755 (1,581) |
| Channel catfish | 0.0352 (0.0156) | 7,724 (7,205) | 20,230 (24,113) | 13,948 (10,445) | 16,192 (12,356) | 11,563 (8,316) | 1,874 (2,108) | 1,739 (2,961) | 73,270 (31,265) |
| White perch | 0.0052 (0.0040) | 2,553 (1,499) | 2,680 (3,937) | 900 (957) | 0 (0) | 4,616 (6,872) | 0 (0) | 0 (0) | 10,749 (8,117) |
| White bass | 0.0367 (0.0133) | 13,401 (8,505) | 1,755 (1,112) | 13,564 (8,421) | 20,880 (14,377) | 24,720 (17,870) | 1,696 (3,251) | 359 (804) | 76,375 (26,110) |
| Rock bass | 0.0015 (0.0011) | 17 (36) | 0 (0) | 730 (546) | 651 (650) | 1,413 (2,103) | 249 (564) | 72 (161) | 3,132 (2,343) |
| Pumpkinseed | <0.0000 (<0.0000) | 75 (158) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 75 (158) |
| Warmouth | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 22 (45) | 0 (0) | 0 (0) | 22 (45) |
| Bluegill | 0.0010 (0.0015) | 0 (0) | 0 (0) | 1,969 (3,144) | 0 (0) | 91 (191) | 0 (0) | 0 (0) | 2,060 (3,150) |
| Smallmouth bass | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 52 (107) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 52 (107) |
| White crappie | 0.0004 (0.0006) | 13 (27) | 0 (0) | 237 (398) | 0 (0) | 577 (1,197) | 0 (0) | 0 (0) | 827 (1,262) |

Table 19. Continued:

| Species | Total catch per hour | Month | | | | | | | Season total |
|-----------------|----------------------|----------------------|----------------------|----------------------|---------------------|----------------------|----------------------|--------------------|------------------------|
| | | May | Jun | Jul | Aug | Sep | Oct | Nov | |
| Black crappie | 0.0004 (0.0008) | 0 (0) | 0 (0) | 29 (58) | 0 (0) | 804 (1,598) | 0 (0) | 0 (0) | 833 (1,599) |
| Yellow perch | 0.4060 (0.1170) | 20,436 (8,348) | 77,688 (35,765) | 48,911 (13,908) | 98,780 (55,325) | 370,960 (161,952) | 207,535 (130,728) | 19,984 (26,894) | 844,294 (220,555) |
| Walleye | 0.2912 (0.0638) | 91,440 (40,066) | 281,856 (90,520) | 205,934 (43,269) | 26,233 (22,562) | 203 (349) | 0 (0) | 0 (0) | 605,666 (110,365) |
| Freshwater drum | 0.0145 (0.0057) | 8,111 (3,985) | 6,853 (6,383) | 5,191 (3,637) | 7,029 (7,133) | 1,847 (1,661) | 1,176 (2,061) | 0 (0) | 30,207 (11,302) |
| Other | 0.0002 (0.0004) | 332 (683) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 332 (683) |
| Total | 0.7945 (0.1544) | 144,427 (42,638) | 391,406 (100,561) | 292,036 (47,651) | 170,328 (63,101) | 416,862 (163,326) | 214,990 (130,847) | 22,226 (27,069) | 1,652,275 (250,423) |
| Angler hours | | 365,526 (118,728) | 689,383 (177,869) | 570,164 (107,263) | 224,545 (59,767) | 153,724 (45,453) | 65,437 (31,790) | 10,889 (6,794) | 2,079,668 (252,852) |
| Angler trips | | 63,709 (20,236) | 115,176 (29,679) | 98,203 (18,427) | 43,801 (12,174) | 32,112 (9,555) | 15,886 (7,659) | 2,378 (1,485) | 371,265 (43,935) |
| Angler days | | 63,117 (20,116) | 114,681 (29,530) | 97,299 (18,263) | 43,662 (12,137) | 31,237 (9,365) | 15,886 (7,659) | 2,378 (1,485) | 368,260 (43,659) |

Table 20. Estimated catch and effort for salmonids taken at various Lake Michigan tributaries, 1986. Two standard errors in parentheses.

| River | Chinook salmon | Coho salmon | Rainbow trout | Brown trout | Angler hours |
|-------------------------|-------------------|------------------|-------------------|------------------|---------------------|
| St. Joseph | 5,625 (1,706) | 0 (0) | 4,358 (1,341) | 1,231 (1,174) | 152,524 (14,627) |
| Kalamazoo | 946 (596) | 11 (15) | 723 (285) | 348 (359) | 35,603 (5,554) |
| Grand | 2,009 (1,771) | 40 (59) | 1,885 (971) | 71 (98) | 34,098 (6,601) |
| Muskegon | 6,662 (2,927) | 3 (6) | 2,946 (1,081) | 529 (786) | 60,899 (4,134) |
| Betsie | 3,071 (2,319) | 1,947 (1,685) | 2,600 (1,401) | 831 (783) | 65,542 (9,408) |
| Bear | 1,656 (949) | 163 (256) | 1,290 (682) | 44 (88) | 30,142 (4,044) |
| Platte Bay and River | 1,241 (747) | 1,937 (2,112) | 1,104 (638) | 587 (751) | 44,150 (7,309) |
| Total | 19,969 (4,609) | 4,101 (2,714) | 14,906 (2,612) | 3,641 (1,822) | 422,958 (21,534) |

Table 21. Estimated sportfishing catch and effort for the Saginaw Bay ice fishery for all modes of fishing, 1987. Two standard errors in parentheses.

| Species | Total catch per hour | Month | | | Season total |
|-----------------|-----------------------|------------------------|------------------------|----------------------|------------------------|
| | | Jan | Feb | Mar | |
| Chinook salmon | <0.0000 (<0.0000) | 4 (9) | 0 (0) | 0 (0) | 4 (9) |
| Rainbow trout | 0.0002 (0.0001) | 44 (59) | 4 (6) | 85 (78) | 133 (98) |
| Brown trout | <0.0000 (<0.0000) | 1 (2) | 17 (31) | 0 (0) | 18 (31) |
| Rainbow smelt | 0.0101 (0.0086) | 6,489 (5,597) | 144 (147) | 0 (0) | 6,633 (5,599) |
| Northern pike | 0.0035 (0.0021) | 954 (908) | 1,332 (1,018) | 0 (0) | 2,286 (1,364) |
| White sucker | 0.0037 (0.0062) | 15 (32) | 1 (2) | 2,401 (4,039) | 2,417 (4,039) |
| Channel catfish | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 16 (32) | 16 (32) |
| White perch | 0.0002 (0.0003) | 16 (32) | 0 (0) | 130 (220) | 146 (222) |
| White bass | <0.0000 (<0.0000) | 0 (0) | 1 (1) | 0 (0) | 1 (1) |
| Rock bass | 0.0001 (0.0002) | 0 (0) | 0 (0) | 42 (72) | 42 (72) |
| Green sunfish | 0.0002 (0.0004) | 0 (0) | 0 (0) | 149 (300) | 149 (300) |
| Pumpkinseed | 0.0047 (0.0044) | 129 (263) | 117 (175) | 2,852 (2,962) | 3,098 (2,978) |
| Bluegill | 0.0002 (0.0004) | 129 (263) | 16 (32) | 0 (0) | 145 (265) |
| Black crappie | 0.0030 (0.0022) | 71 (86) | 239 (312) | 1,693 (1,402) | 2,003 (1,439) |
| Yellow perch | 4.7944 (0.8321) | 1,272,121 (216,832) | 1,077,666 (224,418) | 803,822 (319,838) | 3,153,609 (446,851) |
| Walleye | 0.0010 (0.0006) | 104 (143) | 532 (361) | 0 (0) | 636 (388) |
| Burbot | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 18 (28) | 18 (28) |
| Other | <0.0000 (<0.0000) | 0 (0) | 0 (0) | 5 (10) | 5 (10) |
| Total | 4.8214 (0.8338) | 1,280,077 (216,907) | 1,080,069 (224,421) | 811,213 (319,881) | 3,171,359 (446,920) |
| Angler hours | | 292,546 (43,712) | 237,234 (29,663) | 127,990 (39,455) | 657,770 (65,934) |
| Angler trips | | 77,173 (11,509) | 55,708 (7,498) | 31,890 (10,426) | 164,771 (17,245) |
| Angler days | | 71,797 (10,766) | 52,065 (7,164) | 29,453 (9,887) | 153,315 (16,278) |

LITERATURE CITED

- Diana, J. S., C. A. Jones, D. O. Lucchesi, and J. S. Schneider. 1987. Evaluation of a yellow perch fishery and its importance to the local economy of the Les Cheneaux Islands area. Final Report Grant LRP-AC-7, Coastal Zone Management Program. Department of Natural Resources, March 1987, Ann Arbor, Michigan, USA.
- Fielder, D. G. 1987. An assessment of the introduction of summer steelhead into Michigan. M.S. thesis, The University of Michigan, Ann Arbor, Michigan, USA.
- Ryckman, J. R. 1986. A creel survey of sportfishing in Saginaw Bay, Lake Huron, 1983-84. Michigan Department of Natural Resources, Fisheries Technical Report No. 86-4, Ann Arbor, Michigan, USA.
- Ryckman, J. R. 1981. Creel census methods in general. Appendix VI-A-9 in Manual of Fisheries Survey Methods, J. W. Merna et al. Michigan Department of Natural Resources, Fisheries Management Report No. 9, Ann Arbor, Michigan, USA.
- Smith, K. D., and J. R. Ryckman. 1987. Creel census methodology in Michigan. (In preparation.)