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Summary of Creel Survey Results for the St. Clair River, Lake St. Clair, and the Detroit River, 2002–05

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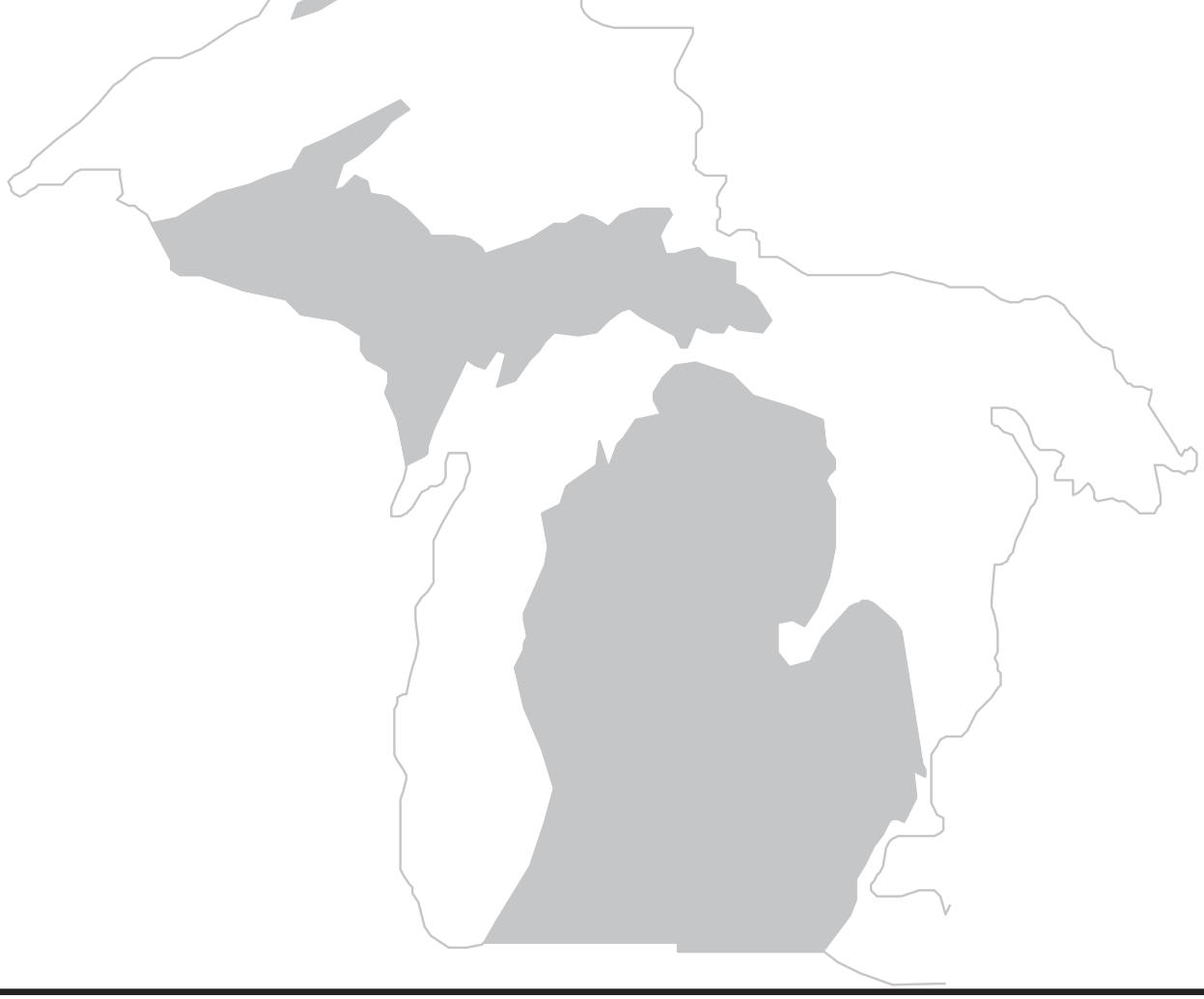

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Summary of Creel Survey Results for the St. Clair River, Lake St. Clair, and the Detroit River, 2002–05

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Abstract.–For decades, the St. Clair River, Lake St. Clair, and the Detroit River (collectively referred to in this report as the St. Clair System) have supported recreational fisheries based on self-sustaining populations of muskellunge, smallmouth bass, walleye, white bass, and yellow perch. These waters were last creel surveyed in 1983–85. Since that time, extensive ecological changes have taken place and the fish community has changed in response. An on-site creel survey was conducted from April 2002 to February 2005 to document the fishing effort, catch, and harvest for boat anglers on the Michigan portions of the St. Clair System and for the ice fishery on Lake St. Clair. We found that overall annual fishing effort across the St. Clair System from April 2002 to March 2003 (the time period with the most complete data) exceeded 3.0 million angler hours, a decline of 13% from the 3.4 million angler hours estimated by creel survey for the same waters 20 years earlier. This decline was minor in comparison with drastic declines in fishing effort documented by angler surveys at other areas on Michigan waters of the Great Lakes. Numerically, white bass dominated the harvest in the Detroit River, yellow perch dominated the harvest in Lake St. Clair, and walleye dominated the harvest in the St. Clair River. Large numbers of smallmouth and largemouth bass were caught, but few were harvested. A high proportion of the muskellunge that were caught were also released. When compared with the harvest 20 years earlier, walleye, smallmouth bass, and white bass harvests declined 31%, 46%, and 78%, respectively. Declines in population abundance were identified as likely factors in the reduced harvests for walleye and white bass. Reductions in smallmouth bass harvests were attributed to increased voluntary practice of catch-and-release by bass anglers. The costs for conducting this creel survey were substantial ($316,964 annually) and included six seasonal creel clerks (fisheries assistants) and a private aviation business for aerial boat counts. However, the estimated annual economic activity generated by just the boat and ice fisheries on the St. Clair system, exceeded $36.4 million. This estimate was a minimal or conservative estimate because the creel survey did not cover all aspects of the fishery in the St. Clair System (for example, shore fishing and night fishing were not included). If the shore fishery and night fishery had been monitored with the creel survey, we expect that the total annual fishing effort expended by anglers on the system from 2002 to 2005 would have approached 40% of the total effort expended on all of Michigan's Great Lakes waters combined. We submit that a fishery

1 Retired

supporting this level of participation, affecting fish populations shared with other jurisdictions, and generating substantial economic activity should be creel surveyed regularly, and more frequently than every 20 years.

Introduction

Sound fisheries management requires knowledge of both the response of fish stocks to fishing and the contributions of various fish stocks to the fisheries. Angler or "creel" surveys are vital to this task because they provide site-specific estimates of angling effort, fishing mortality and species-specific biological information (length, weight, age, hatchery origins, etc.). Additionally, creel surveys collect a wealth of other information on angler demography, fishing behavior, site fidelity, and knowledge of and compliance with fishing regulations.

Since 1986, Michigan's Department of Natural Resources (DNR) has conducted a statewide and continual creel survey of the boat, shore, and pier and ice fisheries in lakes Michigan, Huron, Superior, and Erie. However, the fisheries of the St. Clair System (St. Clair River, Lake St. Clair, and the Detroit River) have not been continuously monitored in this way. Prior to the present study, intensive creel surveys of the St. Clair System were done only twice; once in 1942 and 1943 (Krumholz and Carbine 1943 and 1945), and once from April 1983 through March 1985 (Haas et al. 1985). The Detroit River fishery alone was also surveyed in the spring of 2000 (Francis 2005).

In 2000, approximately 4.2 million of a total Michigan human population of 9.9 million resided within a one hour drive of the St. Clair System (SEMCOG 2002). In addition, over 50% of all Michigan registered boats kept in marinas, and 41% of all registered boats kept at private waterfront residences, were found in the four counties bordering the St. Clair System and Lake Erie (Stynes et al.1998). The reasons most often cited for not conducting a creel survey on the St. Clair System is the multiple access points and the complexity of the fisheries, which necessitate a large and expensive creel effort. For an effective access-site creel survey of the numerous boating and shoreline access locations, the costs of multiple creel clerks and an aerial survey must be supported. Another reason is that the vast majority of the system's fisheries are supported by self-sustaining sport fish populations, with little or no dependence on stocked fish. This is in contrast to many other locations in Great Lakes waters where large numbers of fish are stocked to support fisheries, and creel surveys are used to assess the survival and success of those stocking efforts.

The St. Clair System underwent major ecological changes during the late 1980s. Zebra mussels colonized, round gobies were introduced, pollution controls reduced nutrient inputs, water levels peaked and then declined, and aquatic macrophytes increased in densities and distribution (MacIsaac 1996). The fish community responded to these changes in habitat. The growing volume of aquatic macrophytes provided smallmouth bass and muskellunge (common and scientific names of fishes mentioned in this report are in Appendix A) with increased spawning and nursery habitat and they became more abundant and widely distributed (MacLennan 1996). Walleye recruitment from the Thames River stock declined, possibly due to reduced larval food availability caused by mussel filtering of algae and zooplankton, or increased predation on juveniles by smallmouth bass and muskellunge. As water clarity increased due to mussel filtering, a preference for low light conditions drove walleye to deeper water and places with higher turbidity, such as the shipping channels or the water masses from tributaries such as the Thames or Sydenham Rivers (Figure 1), which caused them to become less widely distributed.

In light of these extensive changes in the ecology of the St. Clair System, DNR Fisheries Division scheduled a three-year creel survey to begin in April 2002. The primary objective of this creel survey was to measure angler effort, harvest, and catch for the boat fishery throughout the St. Clair System and the

ice fishery on Lake St. Clair. Unfortunately, due to limited resources, the creel survey excluded the shore and night fisheries, both of which are known to be quite extensive (DNR Fisheries, unpublished data).

Study Area

The St. Clair System is comprised of the St. Clair River, which to the north connects to Lake Huron, Lake St. Clair, and the Detroit River, which to the south, connects to Lake Erie. The St. Clair River is approximately 70 kilometers (43.5 miles) in length, has a maximum natural depth of 30.5 m (100 ft), a mean depth of 11 m (36.1 ft) and a surface area of 37.7 km² (14.6 mi²). The watershed encompasses a total of 3,290 km² (1,270 mi²) and contains three major sub-watersheds, including those of the Black, Belle and Pine Rivers. As the St. Clair River enters Lake St. Clair it divides into a number of channels to form a large delta marsh. The historical mean discharge of the river is approximately 5,100 m^3/s (181,870 ft^3/s) with current velocities exceeding 1.4 m/s (4.6 ft/s) (Derecki 1984a; Griffiths et al. 1991). The DNR operates three public access sites from Port Huron to Algonac for anglers to launch their boats. There are municipal boat launch sites and dozens of marinas and private access sites anglers use also, including private residential docks and boat wells. Fishing activity is widespread along the length of the river, with much of the pressure focused on walleye. Cold water species, including both trout and salmon, are present during the fall, winter, and spring and attract anglers seasonally.

Lake St. Clair is 38.6 km (24 miles) wide and 41.8 km (26 miles) long with a surface area of 1,100 km^2 (425 mi^2) (Bolsenga and Herdendorf 1993). Approximately one-third of its surface area is Michigan waters, and two-thirds Ontario waters. Lake St. Clair is shallow with an average depth of 3.0 m (9.8 ft), maximum natural depth of 6.4 m (21 ft), and maximum dredged depth of 8.0 m (26.2 ft) within the shipping channel measured from Low Water Datum for Lake St. Clair (NOAA 1997). The lake receives the majority of its inflow from the St. Clair River (97%). Other major rivers which discharge to the lake include the Clinton (listed as a federal area of concern), Sydenham and Thames (Figure 1). Average hydraulic retention time of the lake is approximately seven days (Bolsenga and Herdendorf 1993).

The Lake St. Clair fishery is rather unique as it is a much smaller lake than any of the Great Lakes which surround Michigan, and has multiple access points, including 5 DNR operated boat launch sites, and a configuration which allows smaller boats to use the water under a wider variety of weather scenarios. The fishery is more typical of fisheries in large embayments of the upper Great Lakes such as Saginaw Bay of Lake Huron and the Bays De Noc of northern Lake Michigan. The anglers in Lake St. Clair are focused on self-sustaining populations of yellow perch, walleye, muskellunge and smallmouth bass.

The Detroit River is approximately 50 kilometers (31 miles) in length, and is dredged to maintain a depth of 8.2 m (27 ft) in the shipping channels. Before the completion of the navigation system in 1969, natural water depths averaged 6.0 to 7.6 m (19.7 to 25 ft) (Manny et al. 1988). The Detroit River watershed covers approximately 1,976 km² (763 mi²). Current velocities in the Detroit River exceed 1.7 m/s (5.6 ft/s) (Quinn and Kelley 1983), the average flushing time is 20 hours and mean discharge is 5,200 m^3/s (183,643 ft^3/s) (Derecki 1984b). The upper river consists of a single, well-defined channel about 700 to 1,000 m (2,297 to 3,281 ft) wide (Derecki 1984b), while a number of islands divide the lower river into distinct channels, which have been dredged for navigational purposes. There are numerous municipal boat launch sites and dozens of marinas and private access sites anglers use, and fishing activity is widely distributed, along the length of the river. While walleye have long been a primary focus of much of the fishing activity on the Detroit River, other species such as white bass, yellow perch, and smallmouth bass have also been important components of the fishery.

Methods

An on-site creel survey was conducted from March 2002 through February 2005 along the US side of the St. Clair River, Lake St. Clair, and the Detroit River. The entire system was divided into 20 grids, loosely based on a 10' latitude by 10' longitude grid system. For the purposes of this survey, the St. Clair River was defined as the waters encompassed by grids 515 to 519, Lake St. Clair was defined as the waters included in grids 506 to 514, and the Detroit River included the waters encompassed by grids 500 to 505 (Figure 2).

A "two-area" sampling design is typical for a DNR fisheries creel survey. Therefore, each river was divided into two areas; an upper section and a lower section. One clerk was hired to creel each river, alternating their time between the two sections. Lake St. Clair was divided into 3 areas (southern, central, and northern) with a single creel clerk assigned to each area. Further details on the schedules, areas, and access locations surveyed within those areas are presented in Appendix B.

The creel survey was based on a stratified design using three-stage sampling (i.e., the stages are days, shifts and count times) within strata. Strata included grid fished by month, by day-type (weekday-weekend/holiday), and by mode of fishing. Catch and effort estimates were made for each stratum and then combined to give monthly and seasonal figures.

Both weekend days and three randomly selected weekdays were sampled each week. The entire angling day from dawn to dusk was covered in each month. This was accomplished by breaking each day into two 8-hour work shifts, then randomly selecting one shift to be worked. The first shift began at daylight and ended in the afternoon; the second shift began in mid-morning and ended at sunset. Monthly shift lengths varied due to varying length of daylight among months.

When an individual was responsible for sampling more than one area, the site for interviewing for each clerk was 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 effort. An angler party was defined as one or more anglers who fished together.

The clerk interviewed each boat that returned to the access site during the scheduled shift. Angler party interview data were recorded on a Scantron® bubble form (Appendix C). Date, time and interview site were recorded for all interviews. If the boater did not fish, that was recorded on the form as a non-fishing party and the interview was ended. If fishing did take place, anglers were queried as to their mode of fishing (i.e., boat, 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 numbers kept, and the number of fishing trips they made or intended to make that day. Additional data were collected for one member of each party such as age and sex, zip code or county of residence, and the types of angling method used (casting, still fishing, trolling, etc.). If fishing took place in Canadian waters or outside the survey area (for example, Lake Erie or Lake Huron), the data were recorded, but these interviews were excluded from analysis. No effort was made to survey shore anglers.

Fishing effort was determined through instantaneous counts of boats made from airplanes. Local flight service companies were contracted to make the aerial counts. Five flights were made each week at randomly selected starting times. The days aerial counts took place corresponded to the days clerks interviewed anglers at the access sites. All boat counts were recorded on count data forms by contract pilots. The proportion of boaters interviewed by creel clerks, who indicated they were not fishing was used to adjust the aerial counts for non-fishing effort.

Newly hired, seasonal creel clerks were trained on-site by permanent fisheries technicians at the beginning of the field season. Count and interview data forms, completed by creel clerks were reviewed throughout the field season at Charlevoix Fisheries Research Station prior to computer entry. The software used for data entry employed range checks on various data fields for each count or interview record that was keyed. In addition, a module of the creel catch estimation software performed a final check of the data before estimates were made.

Effort estimates were made for each grid by month. 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. Harvest estimates were made for each grid by month for all fish species observed in the harvest by creel clerks. Catch estimates, which are numbers of harvested and legal-sized released fish, were made for each grid by month for certain fish species, including largemouth bass, muskellunge, northern pike, smallmouth bass, walleye, and white bass.

Standard mathematical formulas for creel survey (Lockwood et al. 1999) were used to calculate all estimates. Uncertainty estimates for all catch and effort estimates in this report are defined as two standard errors of their mean estimates (2 times the square root of the variance for an estimate). Error bounds for all mean length and weight data are 95% confidence limits. Statistical significance in the analysis comparing lake-wide or port estimates between years is based on two standard errors.

Creel clerks also collected biological data from harvested fish encountered during on-site interviews. Biological data collected included total length and weight for muskellunge, northern pike, smallmouth bass, walleye, and yellow perch. Dorsal fin spines or rays were also collected from walleye, smallmouth bass, muskellunge and northern pike for age estimation. We used these structures because we thought they provided the best combination of ease of collection in the field and accuracy and precision of age estimates (Clark et al. 2004). Monthly target sample sizes for age analysis were based on a minimum number needed to provide a reasonable representation of the age structure of the harvest each month, balanced with the logistical feasibility of the creel clerk to collect biological data samples without negatively affecting angler interview numbers.

Samples were sectioned using a table-mounted Dremel® rotary cutting tool. Sections approximately 0.5 mm thick were cut as close to the proximal end of the spine or ray as possible. Sections were examined at 40x-80x with transmitted light, and were photographed with a digital camera. The digital image was archived for multiple reads. We tested for differences in mean lengths at age using a two-way analysis of variance, controlling for age as a covariate. Statistical significance was set at $\alpha = 0.05$.

There were two portions of this creel survey which were compromised by creel clerk fabrication of data. As a result, we did not include any estimates for the Detroit River creel survey in 2003 and the St. Clair River creel survey in 2004. Furthermore, the 2002 creel survey schedule started in April, so it did not record the winter ice fishery on Lake St. Clair during that year. In addition, the 2005 schedule only included creel survey of the ice fishery on Lake St. Clair during January and February, but the actual ice fishery continued through March. These gaps confounded efforts to compile system-wide estimates of annual effort, harvest, and catch. So, to allow comparisons of the fishery on the St. Clair System from 2002–05, with earlier creel surveys on the St. Clair System, or with creel surveys on other portions of the Great Lakes, it was necessary to summarize the data in an alternative manner.

For example, to allow direct comparisons of the system-wide estimates of effort and harvest with the creel survey in 1983–85 (Haas et al. 1985), we summarized the estimates for the St. Clair System from April 2002 to March 2003 and compared them with estimates for the St. Clair System for the period from April 1983 to March 1984. Likewise, to make comparisons between St. Clair System effort estimates and other areas of the Great Lakes, we used the average from the adjoining two years for the same water body in cases where effort was either not measured or compromised, to fill in gaps and allow valid comparisons across all waters.

Results

St. Clair River

Harvest and effort were estimated for April to October 2002 (Table 1), and April to October 2003 (Table 2). Estimates for April to October, 2004 were possible, but were deemed unreliable due to documented creel clerk data falsification. July was the month for peak effort on the St. Clair River in both 2002 and 2003, followed by June and August. The average boat fishing effort was 194,000 hours, with an increase from 172,303 hrs in 2002 to 215,926 hrs in 2003, or by about 21%. Averaged effort during this survey was approximately 59% of the earlier periods. During the 1942-43 fishing seasons in the St. Clair River effort averaged 329,975 angler hours (Krumholz and Carbine 1943 and 1945). Haas et al. (1985) reported that fishing effort by boat anglers averaged 365,108 hours during the creel survey in 1983 and 84.

Twelve fish species were observed in the St. Clair River harvest. Numerically, walleye dominated the harvest both years, with yellow perch second in numbers harvested. Some salmonids, including brown trout, Chinook salmon, coho salmon, and rainbow trout were observed in the harvest each year, mainly during the spring months. Between 2002 and 2003, harvest totals increased for walleye, yellow perch, smallmouth bass, and largemouth bass by 52%, 22%, 448%, and 221% respectively (Table 3).

Despite the increase in effort, harvest rates for walleye, smallmouth bass, northern pike, muskellunge and largemouth bass also improved, further contributing to increased harvest totals. When catch estimates were compared with harvest estimates, noted differences in percentage of fish released were apparent (Table 4). Walleye were rarely caught and released, while smallmouth bass were rarely caught and kept.

Lake St. Clair

Harvest and effort were estimated for March to October 2002 (Table 5), January to October, 2003 (Table 6), January to October 2004 (Table 7), and January and February, 2005 (Table 8). For open water months, fishing effort was low in April and May on Lake St. Clair, with peak effort taking place in June or July. Ice fishing effort was substantial, accounting for about 34% of the total effort in 2003, and about 37% of the total effort in 2004.

Twenty-two fish species were observed in the Lake St. Clair harvest across all years. Numerically, yellow perch heavily dominated the harvest during all years and during both the open water and ice fishing seasons. Walleye and bluegill were second and third in the harvest across all years of the survey. A few salmonids, including brown trout, Chinook salmon, coho salmon, and rainbow trout were observed in the harvest each year, mainly during the spring months. Although annual estimates for total harvest and effort are presented in Table 9, it is important to recognize that the 2002 survey only included the open-water fishery, while the 2005 survey only included part of the winter ice fishery.

Comparisons of 2003 and 2004 results can be made because both covered January through October. When compared with 2003, harvest increased slightly in 2004 for yellow perch (2%), but declined drastically for walleye (-65%), yet fishing effort changed very little between 2003 and 2004, with only a 5% decline. As in the earlier studies (Krumholz and Carbine 1943; Krumholz and Carbine 1945: Haas et al. 1985), yellow perch dominated the harvest from 2002 to 2005. This was especially true for the ice fishery, where well over 90% of the fish harvested over the three ice fishing periods in 2003, 2004 and 2005 were yellow perch.

The large decline in walleye harvest from 2003 to 2004 was primarily a result of a 63% decline in the harvest rate for anglers. Walleye catch rates declined similarly (Table 10) indicating that anglers were not releasing more walleye in 2004. When catch estimates were compared with harvest estimates, large differences in percentage of fish released were apparent (Table 11). For largemouth bass, at least 96% of the fish caught were released each year from 2002 to 2004. Similarly, at least 91% of the smallmouth bass

caught were released each year. Conversely, the percentage of walleye caught and released ranged from only 10% in 2003 to 18% in 2004. Clearly, harvest was the objective with the majority of walleye anglers, while harvest was rarely practiced by bass anglers. In general, muskellunge and northern pike were also rarely harvested, with at least 60% or more of those fish caught, subsequently released by anglers.

Detroit River

Harvest and effort were estimated for March to October 2002 (Table 12), and March to October 2004 (Table 13). Estimates for April to October, 2003 were possible, but were deemed unreliable due to suspected creel clerk data falsification. Fishing effort in 2002 was highest in April, followed by June, July and May. In 2004, June was the peak month for effort, followed by July, April and May. Angling effort on the Detroit River in 2002 and 2004 averaged over 849,000 angler hours. This was well above the average angler effort in 1983 and 1984 (Haas et al. 1985) and is possibly the only substantial fishery in the Great Lakes waters of Michigan which increased between the early 1980s and early 2000s.

Sixteen fish species were observed in the Detroit River harvest. Numerically, white bass dominated the harvest during both years, followed by walleye and yellow perch. The catch and harvest of white bass exceeded that of all other species in both 2002 and 2004, with an average of 206,959 fish harvested annually. When compared with 2002, harvest declined in 2004 for most species (Table 14). This decline was at least partially a function of a 6% decline in fishing effort in 2004. Despite lower effort, harvest for some species increased substantially in 2004, including pumpkinseed (68%), smallmouth bass (215%), white perch (214%), and yellow perch (99%). These increases were a result of substantially higher harvest rates for those species.

When catch estimates were compared with harvest estimates, noted differences in percentage of fish released were apparent (Table 15). Walleye was the species with the lowest percentage released, followed by white bass. In contrast, over 90% of the smallmouth and largemouth bass caught each year were released. Similarly, over 90% of the muskellunge and 83% of the northern pike caught each year were reportedly released.

Biological Data of Harvested Fish from the St. Clair System

Creel clerks collected biological samples from over 8,900 fish during on-site sampling from 2002 to 2004. Samples were collected from 11 different fish species, but yellow perch (46%), walleye (43%), and smallmouth bass (10%) combined to account for 99% of the samples (Table 16). Lake St. Clair accounted for 78% of the samples, while the Detroit and St. Clair Rivers accounted for 15% and 6% respectively.

Yellow perch sampled by creel clerks ranged from 104 mm (4.1 in) to 358 mm (14.1 in) in total length, with a mean total length of 231 mm (9.1 in). Mean lengths for yellow perch across water bodies was nearly identical (Table 17). In all three years, more than 70% of the yellow perch harvested exceeded 203 mm (8 in) in total length (Figure 3). There was no difference in the length frequency distribution of yellow perch between the three years.

Walleye ranged from 315 mm (12.4 in) to 780 mm (30.7 in) in total length, with a mean total length of 475 mm (18.7 in). The mean length for Detroit River walleye was significantly higher than for Lake St. Clair or St. Clair River walleye (Table 17), but the longest walleye measured came from the St. Clair River. Ages for walleye sampled ranged from 1 to 18 years, with a mean age of 4.4 years (Table 18). The mean age for Detroit River walleye was significantly higher than for Lake St. Clair or the St. Clair River. The 1999 year-class dominated the harvest as age-3 fish in 2002 and age-4 fish in 2003 (Figure 4). In 2004, the 2001 year-class was most abundant in the harvest, with the 1999 year-class also an important component.

Smallmouth bass ranged from 317 mm (12.5 in) to 559 mm (22.0 in) in total length, with a mean total length of 404 mm (15.9 in). The longest smallmouth bass measured came from Lake St. Clair, but there were no significant differences in mean lengths between the three water bodies (Table 17). Ages for smallmouth bass sampled ranged from 3 to 12 years, with a mean age of 5.1 years (Table 18). The 1998 year-class dominated the harvest as age-4 fish in 2002 and age-5 fish in 2003 (Figure 5). In 2004, the 1999 year-class was most abundant in the harvest, with the 1998 year-class also an important component.

Angler Demographics from the St. Clair System

Creel clerks conducted over 50,000 interviews from 2002 through 2005 at sites along the connecting waters. Over 23,000 of those interviews were for parties that reported recreational fishing activity. The average party size was 2 anglers and Michigan resident anglers accounted for 96% of the interviews (Table 19). Creel clerks interviewed non-resident anglers that resided in 29 states spread across the United States from California to North Dakota and from Texas to Virginia. Indiana and Ohio accounted for the most non-resident interviews at 1.2% and 1.5% respectively.

Michigan resident anglers came from 70 counties across the state. For the St. Clair River, the most common Michigan counties of residence for interviewed anglers (Table 20) were St. Clair (47%), Macomb (22%), and Oakland (8.4%). The most common Michigan counties of residence for anglers interviewed at Lake St. Clair sites were Macomb (58%), Oakland (14%), Saint Clair (10%), and Wayne (6%). Over 53% of the resident anglers interviewed at Detroit River sites originated from Wayne County, while Oakland and Macomb Counties accounted for 10% and 9% respectively. The average trip length was around 4.5 hours.

Over 76% of the anglers interviewed at St. Clair River sites reported walleye as their target species (Table 21). Smallmouth bass, salmon and trout, and yellow perch were the other major target species for the St. Clair River.

For Lake St. Clair, 52% of the anglers interviewed were targeting yellow perch (Table 21). However, the Lake St. Clair creel survey included both open-water fishery and the winter ice fishery, which differed markedly (Table 22). Boat anglers interviewed at Lake St. Clair sites targeted walleye (28%), yellow perch (23%), smallmouth bass (17%), and anything (14%). In contrast, almost 98% of the ice fishing anglers interviewed sought yellow perch.

Over 70% of the anglers interviewed at Detroit River sites reported walleye as their target species (Table 21). Yellow perch, anything and smallmouth bass were the other major target species reported by Detroit River anglers. However, the catch and harvest of white bass exceeded that of all other species in both 2002 and 2004, but interestingly, no anglers reported white bass as a target species (Table 21). In fact, 35% of the interviewed anglers who harvested white bass reported that they were fishing for "anything", 42% reported they were fishing for "walleye", and 14% reported they were fishing for panfish. So, although it appeared that few anglers were actively targeting white bass, it was clear that many anglers who were interested in harvesting fish for food considered white bass to be acceptable table fare.

Jigging was the most frequently used method of fishing for all anglers interviewed during the creel survey when the data were pooled across water bodies and species targeted (Table 23). By species, the most popular method of fishing varied greatly. For salmon and trout, 91% of the anglers interviewed reported trolling as their method of fishing. Casting was the most popular method of fishing for largemouth and smallmouth bass anglers, but drifting was also an important method for smallmouth bass fishing. Walleye fishing was fairly evenly split between drifting, jigging, and trolling. About 78% of muskellunge fishing was accounted for by trolling, but casting was a substantial part of the muskellunge fishery at 19%. For yellow perch fishing, jigging and still fishing combined to account for 89% of the fishery.

Discussion

When boat, open ice and shanty ice fishing effort from April 2002 to March 2003, were combined for the St. Clair System, it totaled over 3 million angler hours (Table 24) or 625,568 angler days. Over the past 20 years, large declines in sport fishing effort have been apparent across all the Great Lakes with estimated numbers of anglers fishing Michigan waters of the Great Lakes dropping from 1.3 million in 1985 (United States Department of the Interior, Fish and Wildlife Service and United States Department of Commerce, Bureau of Census 1989) to 461,000 in 2006 (United States Department of the Interior, Fish and Wildlife Service and United States Department of Commerce, Bureau of Census 2008). Surprisingly, fishing effort on the St. Clair System as a whole has remained relatively stable when compared with other areas of the Great Lakes. For example, Rakoczy (1992) reported a near steady decrease of boat angler effort in Lake Michigan in the late 1980s and early 1990s where effort in 1991 was approximately 50% of what it had been in 1985-86. Fishing effort measured during this survey represented only a 14% decline from the total of 3.5 million angler hours estimated for the survey period 20 years earlier (Table 24). Factors contributing to the relative stability of the fishing effort in the St. Clair System are unclear.

In addition to a system-wide decrease in effort, harvest of walleye was lower during the recent survey period by 31% (Table 24). We attribute the decline in the walleye harvest in the St. Clair System to lower abundances during the recent survey period. Walleye dispersing from, and returning to, spawning locations in Lake Erie are known to contribute heavily to the walleye harvest in the St. Clair System and even further north into Lake Huron, based on tag recoveries and genetic analyses (Haas et al. 1988; McParland et al. 1999; Belore et al. 2010). Recent population modeling estimated that Lake Erie walleye abundance exceeded 54 million age-2 and older fish in 1983, but had declined to about 16 million fish by 2002 (Thomas et al. 2007). Additionally, the walleye stock in the Thames River, the largest Ontario tributary to Lake St. Clair, and an important contributor to the sport fishery in the St. Clair River during the 1980s, also declined greatly during this same time period.

Decreases in walleye harvest measured by a daytime creel survey can also be explained by changes in the behavior of foraging walleye and by the introduction of round gobies. Over this 20-year time period, water clarity has increased as a result of both pollution abatement and bio-filtering by exotic dreissenid mussels. Walleye preference for low light conditions during feeding has contributed to less productive daytime fishing, as the fish have shifted to foraging more extensively at night. Drift fishing for walleye using earthworms on crawler harnesses has long been a popular walleye fishing technique on the St. Clair River. However, after the round goby invasion, this technique became impractical because the round gobies quickly removed the earthworms from the hooks. Some walleye anglers likely stopped fishing for walleye in the St. Clair River or switched to fishing after dark when gobies are inactive. Ultimately, walleye harvest occurring after dark may well have increased, but went unmeasured in the creel survey.

While walleye were the principal species targeted by anglers on the St. Clair River, and lower walleye abundances in recent years probably contributed to lower angler effort there, the Detroit River spring walleye fishery has grown in popularity over the past 20 years. Media exposure has played an important role in increasing the fishing effort in the Detroit River during this latest creel survey as the popularity of this fishery has been increasingly documented by numerous written articles and television fishing shows recording walleye fishing trips on the Detroit River during March and April. This spring fishery, which overlaps with walleye spawning, has been associated with some controversy. There has been public concern that too many “spawners” are taken from the Detroit River each spring during the intensive fishery from March through May.

In order to address that concern, tagging studies were used to provide evidence of substantial movement of walleye from spawning locations in Lake Erie northward through the Detroit River, Lake St. Clair, the St. Clair River, and further into Lake Huron (Thomas and Haas 2005). Tagged walleye recoveries and catch locations have allowed crude estimates to be made of the number of Lake Erie walleye migrating into the Detroit River on an annual basis. Based on the geographical distributions of tag recoveries from various tagging sites in Lake Erie, the number of migrants leaving Lake Erie and

migrating north into the St. Clair System is roughly 10% of the adult population abundance of walleye in Lake Erie (Robert Haas, DNR, personal communication). For example, when the Lake Erie adult walleye population was near 60 million in 1984 (Thomas et al. 2007), there were likely 6 million walleye migrating through the St. Clair System. Similarly, when the Lake Erie adult walleye population declined to near 14 million fish in 2004, the estimated number of walleye migrating through the St. Clair System was probably around 1.5 million fish.

Creel survey estimates for the walleye harvest during the spawning run (March through May) in Michigan waters of the Detroit River were only 105,427 in 2002 and 51,899 in 2004. The walleye harvest in the Detroit River was also estimated in 2000 with a 9-week creel survey from March 11 to May 16 (Francis 2005), which resulted in an estimated harvest of 97,292 walleyes. The average of these three harvest estimates (84,873) is only 6% of the lowest estimate of the Detroit River walleye run of 1.4 million for the time period. So, even in the years of the lowest walleye runs in recent times, we estimate that 95% of the walleye "spawners" migrating north from Lake Erie escape Michigan Detroit River anglers.

There are additional walleye caught on the Canadian side of the river, which were not included in these creel surveys. However, limited access sites in Ontario and much lower human population densities, combined with anecdotal information from anglers, leads us to believe that fewer walleye are taken on the Canadian side (compared to the Michigan side) of the Detroit River each spring. In summary, the combined Michigan and Ontario catch of spawning adult walleye each spring is very likely less than 10% of the entire walleye run.

When compared with the 1980s creel survey results, system-wide harvest of yellow perch was 17% lower during the recent survey period, closely matching the decline in effort (Table 24). Despite this, the popularity of the Lake St. Clair ice fishery for yellow perch appears to have expanded over the last 20 years. In the two winters of 1983-84 and 1984-85 ice anglers fished an average of just over 467,000 hours (Haas et al. 1985). However, in Jan-March of 2003 and 2004 the average ice angling effort was over 632,000 hours on Lake St. Clair. However, when climatic conditions result in no ice, or unsafe ice, the winter fishery effort is much reduced, such as occurred in January and February of 2005, when the ice angling effort was less than half of the same period in the two previous years (Tables 6, 7 and 8). Technological advances in ice fishing gear, such as portable shanties, portable fish locators, underwater video cameras, light-weight winter fishing apparel, and small off-road vehicles all have likely contributed to increased angler comfort and participation in this winter sport on Lake St. Clair.

Smallmouth bass harvest was 33% lower during the period from April 2002 to March 2003, than during the creel survey 20 years earlier on the St. Clair System (Table 24). We attribute this large decline in harvest primarily to a shift in angler behavior. While the estimated smallmouth bass harvest in 2002 was only 13,710, the estimated catch was over 186,000 for the same period. This suggests that few anglers are interested in harvesting smallmouth bass, and now they practice catch-and-release fishing. Angler behavior was similar for largemouth bass. During earlier creel surveys, harvest was measured, but no data on released fish was recorded, so it is not possible to quantitatively evaluate differences in practice of catch-and-release between the earlier creel surveys and the most recent creel survey. However, we are confident that anglers harvested a much higher proportion of the smallmouth bass, largemouth bass and muskellunge caught in the early 1980s. The increased practice of catch-and-release reflects changing attitudes among anglers to preserve and help manage fish populations for higher catch rates and larger individual fish.

White bass experienced the largest decline in harvest, with a 75% reduction in total number harvested from the St. Clair System in 2002-03, when compared with 1983-84 (Table 24). During both time periods, nearly all of the white bass harvest occurred in the Detroit River and mostly during the spawning run in May and June. Lake Erie white bass populations also declined during the early 1980s, and remained depressed through the 1990s. This decline was attributed to the white perch invasion which resulted in reduced survival of white bass during its early life history (Madenjian et al. 2000). We suspect

that this trend in lower abundance of white bass was an important factor in the large decline in white bass harvest indicated by the 2002-03 creel survey.

For various reasons, some segments of the sport fishery in the St. Clair System were not well represented in the creel survey results for 2002 to 2005. For example, a small but growing lake sturgeon fishery exists in the St. Clair River, but nearly all of the effort in the fishery occurs after dark, so it was not detected by the creel survey. Mooneye, a state-listed endangered species, are often caught by walleye anglers fishing in the St. Clair River delta channels. Mooneye harvest is not legal anywhere in the State, and none were observed in the harvest during the creel survey. Unfortunately, the creel survey data recording forms did not include a space for recording released mooneye, so their presence in the system remained undocumented by the survey.

In the St. Clair River, some species harvested in large numbers in the earlier time period (Haas et al. 1985), such as redhorse suckers, white bass, and freshwater drum, were nearly absent in the harvest during 2002 and 2003. These data may reflect changes in the fish community, but likely were related to changes in angler preference or attitude. Fish consumption advisories which warned anglers about contaminants in Great Lakes fish had been published in this time period. Consumption advisories can affect angler behavior, reducing or redirecting fishing activity and harvest (Jakus et al. 1997; Burger 2004). The Michigan Department of Community Health has advised restricted consumption for a variety of fish species from St. Clair System waters. Some fisheries biologists have speculated that media reports of chemical contaminants in Great Lakes fish, along with consumption advisories, have convinced some anglers that consuming any fish from any Great Lake or connecting water is a health risk.

Although muskellunge was the fourth most sought-after species among Lake St. Clair boat anglers, very few were harvested and therefore practically no biological data on the harvest was acquired during the creel survey. In fact, only 8 muskellunge were sampled for length, weight, and age by the creel clerks during the 3 years of survey on the system. Similarly, the sturgeon fishery in the St. Clair River was not measured by this creel survey as most of the effort occurs after dark. To measure or monitor these types of specialized segments of the fishery, managers can not rely on the standard creel survey, but must use alternative strategies. A cooperative angler diary program has been in place for monitoring the sport fishery of the St. Clair System since 1986. This program, supported by both the DNR and Ontario Ministry of Natural Resources, has proven successful in monitoring trends in catch rates for muskellunge, catches of rare species such as mooneye, and has provided biological samples from released fish (Thomas and Haas 2004). A mail survey has recently been completed of Michigan sturgeon anglers fishing the St. Clair System and this survey has provided valuable data on participation, effort, and catch for that unique fishery (Towns and Thomas 2011).

From 1993 to 2002, the DNR stocked the St. Clair River with an average of 43,628 yearling brown trout in an effort to develop a coldwater fishery. While anecdotal reports of angler catches seemed to support this stocking effort, the creel survey documented very few catches. All recorded brown trout catches occurred in April of both years (Tables 12 and 13), but it is possible that this fishery peaked in months which were not surveyed (March, November or December) or that shore anglers were more actively involved than boat anglers in the fishery. This is supported by anecdotal angler reports (Towns, unpublished) suggesting that targeted effort for brown trout occurred mainly from shore in the Port Huron area and that fishing success was best during the winter months, dependent on ice conditions in the river.

Comparison of the results of this creel survey with published results from earlier creel surveys of the Michigan waters of the St. Clair System (Krumholz and Carbine 1943; Krumholz and Carbine 1945: Haas et al. 1985) can provide some insight into possible changes in the sport fishery through time. However, it should be noted that there were differences in survey methodology, including differences in calculations used to estimate catch rates (Lockwood 1997), between the surveys conducted in these different time periods. These differences could contribute to differences in results. Similarly, comparisons with creel survey results from other water bodies may also be complicated by differences in creel survey method or design. Therefore, direct comparisons of results between creel surveys can be challenging.

Furthermore, while estimates of fishing effort, harvest and catch produced by the creel survey on the St. Clair System from 2002 to 2005 were substantial, they were incomplete estimates of the fishery on these waters, because shore fishing from the multiple public access points, private and public marinas, numerous channels and islands and private residential and industrial sites was excluded from the survey. Fishing activity that occurred after dark, when waters are generally calmer, recreational boat traffic is minimal, and when certain species are more vulnerable to angling (walleye and lake sturgeon) was excluded. Boat fishing activity in Michigan waters of the St. Clair System during November and December was excluded. Shore fishing was excluded. Haas et al. (1985) estimated that shore anglers harvested over 140,000 white bass from the lower Detroit River during 1983, and during this survey we noted that many shore anglers continued to fish for and harvest white bass along the lower Detroit River, but none of their catch is included with the estimates presented here. As a result, we expect that the estimates of fishing effort, harvest and catch produced by the creel survey on the St. Clair System from 2002 to 2005 may actually represent only a fraction of the total fishing activity supported by those waters during that time period.

By itself, the Lake St. Clair boat fishery (non-charter) averaged over 1.225 million angler hours (Table 25) for the 3 year period from 2002 to 2004, which was greater than the estimated open water effort for Lake Superior (0.169 million angler hours) and more than 50% of Lake Huron effort (2.415 million angler hours) during the same time period. Interestingly, the St. Clair System comprises less than 1% of the total surface area of Michigan's Great Lakes waters. Yet, during the period from 2002 to 2004, nearly 30% of the annual fishing effort occurring in Michigan waters of the Great Lakes was recorded during this creel survey on the St. Clair System (Table 25). When Lake Erie data are combined with the St. Clair System estimates, an average of over 35% of the annual fishing effort in Michigan's waters of the Great Lakes took place in boats, or on the ice, along the shoreline of Southeast Michigan, between Port Huron and the Ohio border. Clearly these were the most heavily fished waters along Michigan's Great Lakes shorelines from 2002 to 2004.

The costs of conducting the boat and ice fishery creel survey on the St. Clair System from spring 2002 to spring 2005 were substantial. Total estimated salary and wages for this period were $791,339. Total travel, vehicle rental, and aerial counts were estimated at $159,552. Combined, overall costs to Fisheries Division to conduct this survey were approximately $317,000 annually for the 3 year period. Efforts to better measure the other components of the fishery in these waters, such as shore fishing, night fishing, or the November and December boat fishing activity, would result in additional survey expenses. However, the annual fishing effort from boats and on the ice for the Michigan waters of the St. Clair System averaged 2.9 million angler hours (Table 25) or approximately 617,000 angler days (average 4.7 hours per angler day), generating at least $36.4 million dollars of economic activity annually (based on $59.00 per angler day: United States Department of the Interior, Fish and Wildlife Service and United States Department of Commerce, Bureau of Census 2006). So the annual costs of the creel survey represented less than 1% of the economic benefits generated by the boat and ice fishery in Michigan waters of the St. Clair System during the creel survey, and we view that expense as a wise investment in monitoring the use of this very valuable resource.

Summary

The St. Clair System is within a one-hour drive of nearly half of Michigan's population, and it provides summer and winter fishing opportunities for many self-sustaining species. Anglers fish the St. Clair System waters for recreation and subsistence. The creel survey on the St. Clair System from April 2002 to February 2005 documented that the Michigan waters of the St. Clair River, Lake St. Clair, and Detroit River (in combination accounting for only 1% of the area of Michigan's Great Lakes and connecting waters), collectively supported 29% of the annual fishing effort occurring in Michigan's Great Lakes waters during that time period. This was clearly the most intensive recreational fishery found in

Michigan's Great Lakes waters. If the shore fishery and night fishery had been monitored with the creel survey, we expect that the total annual fishing effort expended by anglers on the system from 2002 to 2005 would have approached 40% of the total effort expended on all of the Michigan Great Lakes waters combined. The costs for conducting this creel survey were substantial ($316,964 annually) and included 6 seasonal creel clerks (fisheries assistants) and a private aviation business for aerial boat counts. However, the estimated annual economic activity generated by just the boat and ice fisheries on the St. Clair system, exceeded $36.4 million. We suggest that while it may not be financially feasible to creel survey the entire St. Clair System annually, a fishery supporting this level of participation, affecting fish populations shared with other jurisdictions, and producing substantial economic benefits should be creel surveyed much more frequently than every 20 years.

Acknowledgments

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Figure 1.– Water flows south from Lake Huron, through the St. Clair River, Lake St. Clair, and the Detroit River, which drains to western Lake Erie.

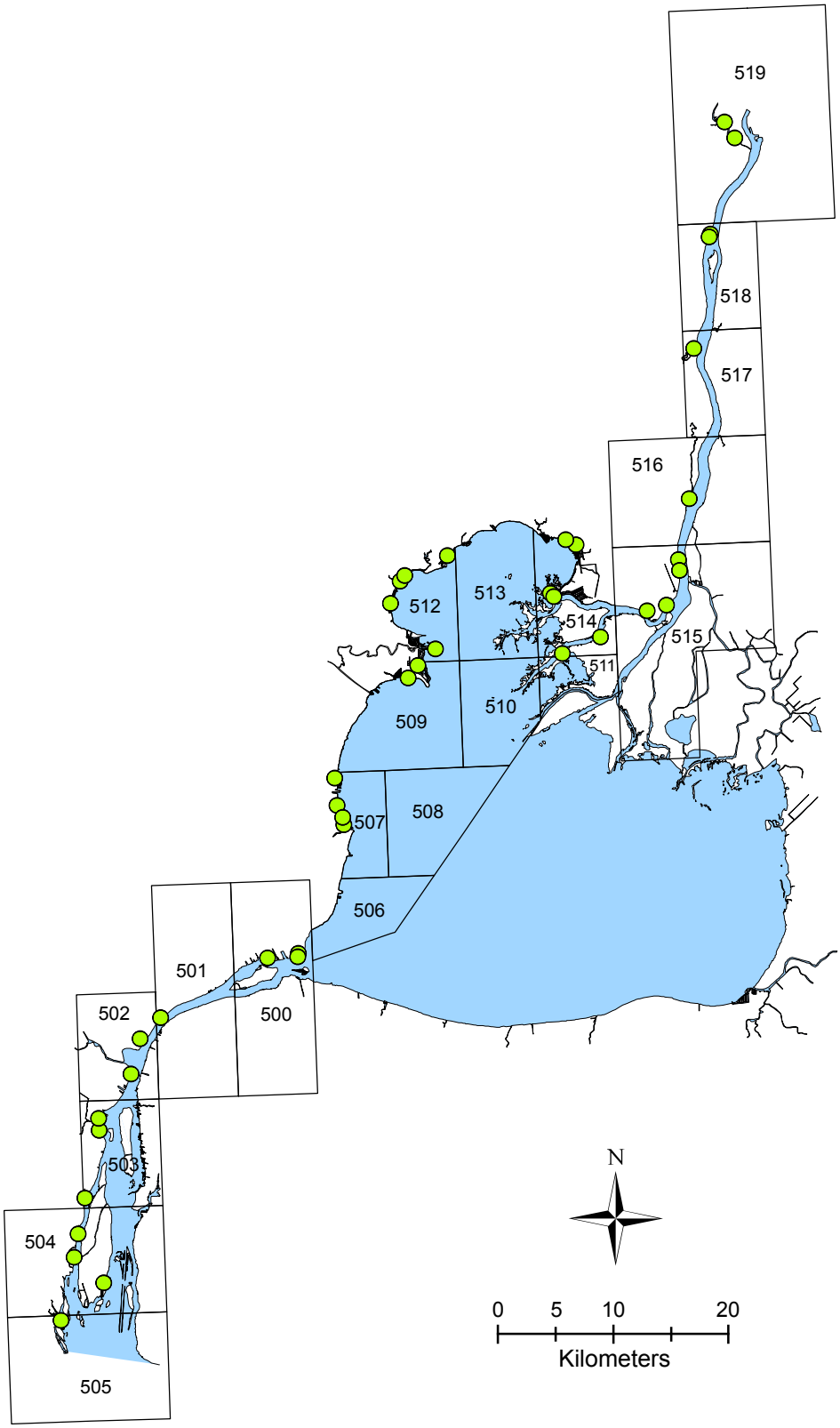

Figure 2.– Spatial grid system used for creel survey on the Detroit River, Lake St. Clair, and the St. Clair River from 2002 to 2005. Dots represent boating access points where creel clerks interviewed anglers and ice access points on Lake St. Clair.

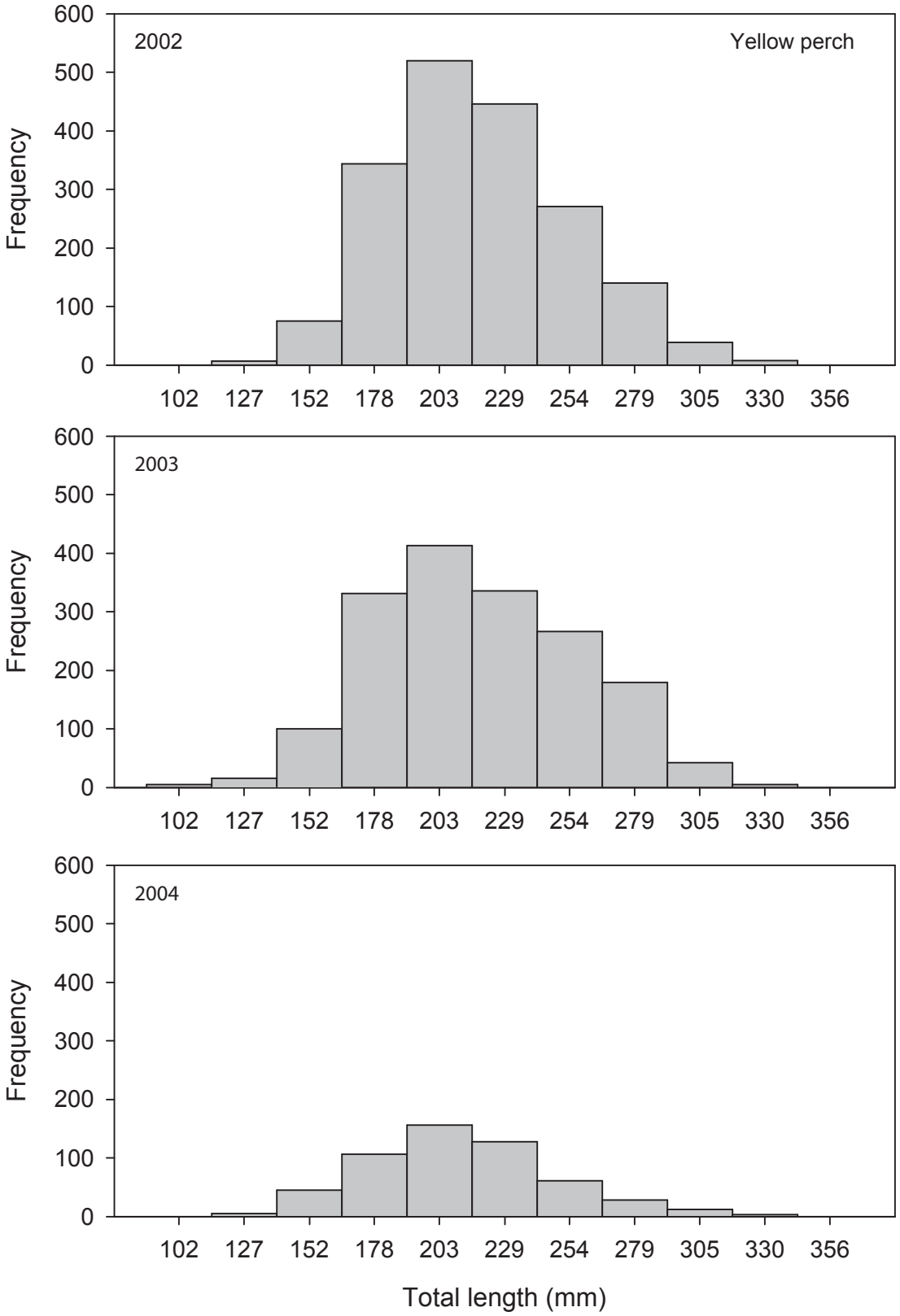

Figure 3.– Length frequency distributions for all yellow perch sampled during creel survey on the Detroit River, Lake St. Clair, and the St. Clair River by year, from 2002 through 2004.

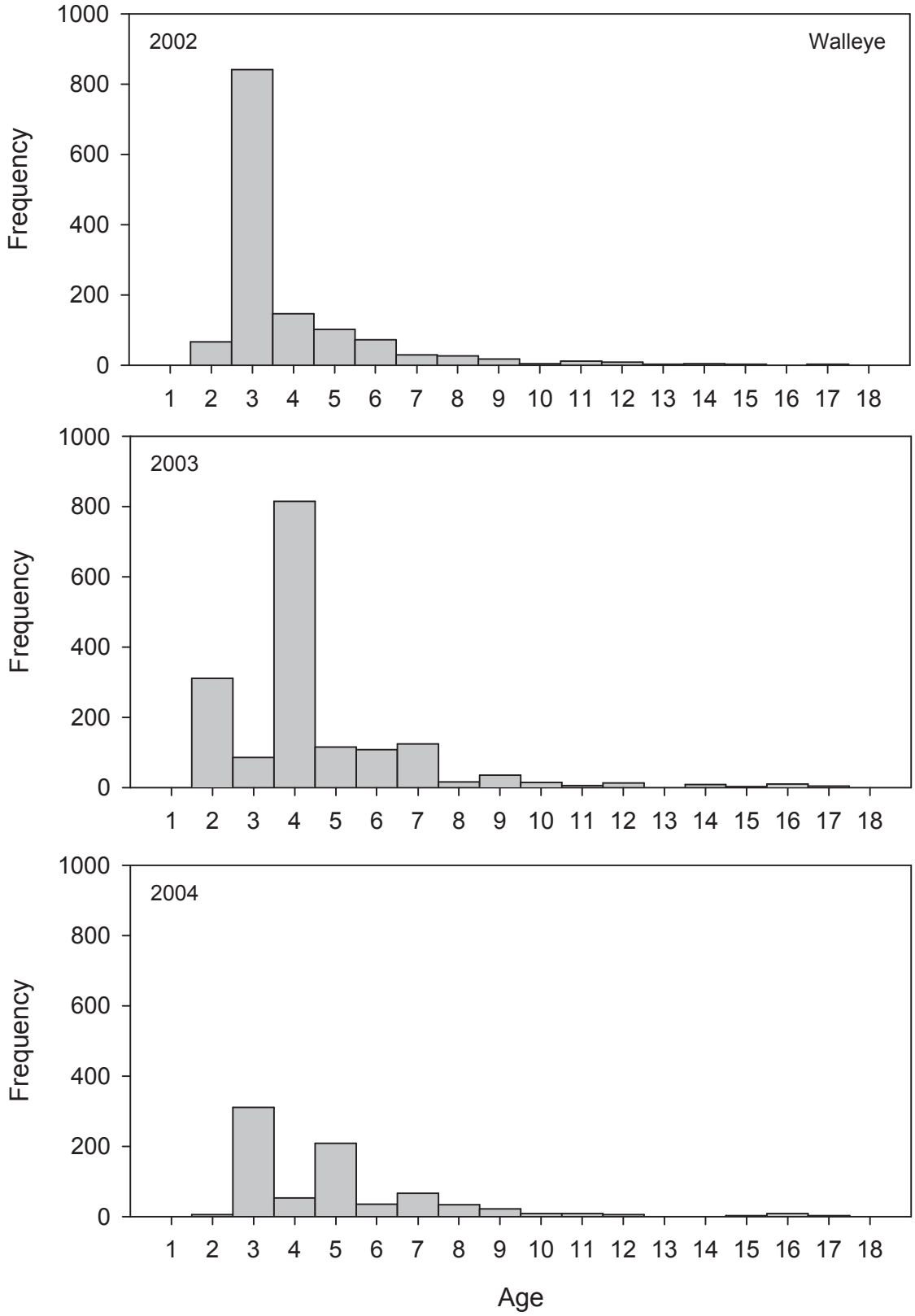

Figure 4.– Age distribution for all walleye sampled during creel survey on the Detroit River, Lake St. Clair, and the St. Clair River by year, from 2002 through 2004.

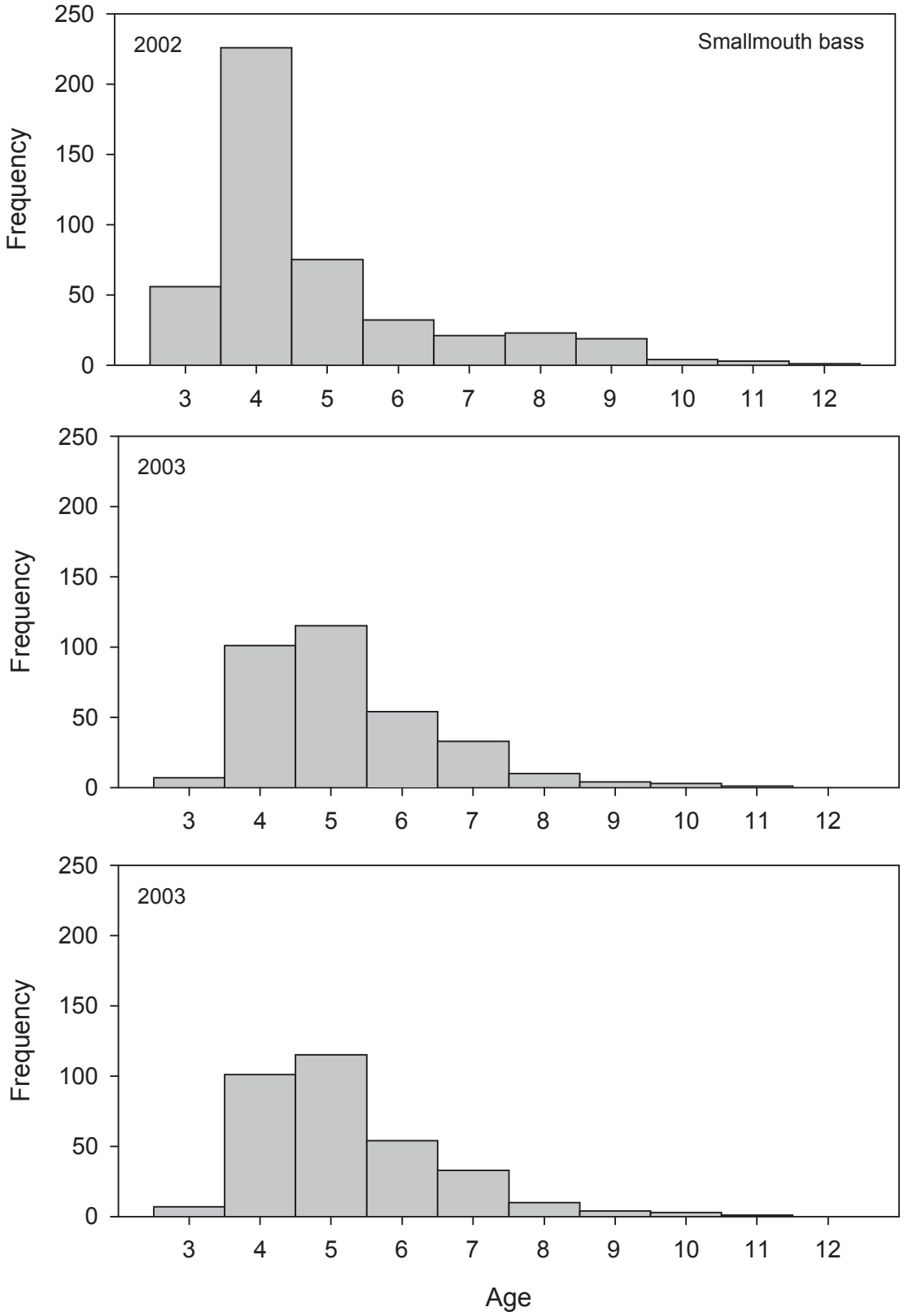

Figure 5.– Age distribution for all smallmouth bass sampled during creel survey on the Detroit River, Lake St. Clair, and the St. Clair River by year, from 2002 through 2004.

Table 1.–Estimated monthly harvest per hour, number harvested, and effort (angler hours, trips, and days) for all species from the St. Clair River, by sport fishing from boats (non-charter), 2002 (H=harvest). Estimated total released per hour and number released is also presented for selected species (R=released).

Species	Harvest (H) or Released (R)	Fish per hour	Month							Grand Total
			Apr	May	Jun	Jul	Aug	Sep	Oct	
Bluegill	H	0.0070	0	0	0	1,210	0	0	0	1,210
Brown trout	H	0.0001	18	0	0	0	0	0	0	18
Chinook salmon	H	0.0003	0	58	0	0	0	0	0	58
Coho salmon	H	0.0002	27	15	0	0	0	0	0	43
Lake trout	H	0.0000	0	0	0	0	0	0	0	0
Lake trout	R	0.0009	106	0	0	0	0	0	0	106
Largemouth bass	H	0.0007	0	0	0	121	0	0	0	121
Largemouth bass	R	0.0025	0	0	238	61	290	72	0	660
Muskellunge	H	0.0001	0	0	0	0	23	0	0	23
Muskellunge	R	0.0006	0	78	0	0	21	0	0	99
Northern pike	H	0.0000	0	0	0	0	0	0	0	0
Northern pike	R	0.0021	12	15	169	0	163	0	0	359
Pumpkinseed	H	0.0014	0	0	0	0	240	0	0	240
Rainbow trout	H	0.0002	28	0	0	0	0	0	0	28
Rock bass	H	0.0002	0	0	0	42	0	0	0	42
Smallmouth bass	H	0.0013	0	0	0	85	42	95	0	222
Smallmouth bass	R	0.0546	0	0	473	3,985	2,340	2,616	0	9,414
Walleye	H	0.1784	315	4,461	4,886	8,810	8,598	3,658	16	30,744
Walleye	R	0.0091	0	31	1,019	109	355	55	0	1,569
Yellow perch	H	0.0444	0	256	3,844	1,320	327	341	1,566	7,653
Angler hours			6,446	19,851	33,171	53,978	37,400	19,262	2,198	172,305
Angler trips			1,539	5,006	8,970	14,106	9,130	4,305	520	43,576
Angler days			1,482	4,800	8,844	13,483	9,071	4,305	520	42,505

Table 2.–Estimated monthly harvest per hour, number harvested, and effort (angler hours, trips, and days) for all species from the St. Clair River, by sport fishing from boats (non-charter), 2003 (H=harvest). Estimated total released per hour and number released is also presented for selected species (R=released).

Species	Harvest (H) or Released (R)	Fish per hour	Month Apr	May	Jun	Jul	Aug	Sep	Oct	Grand Total
Bluegill	H	0.0034	0	0	0	0	726	0	0	726
Brown trout	H	0.0003	75	0	0	0	0	0	0	75
Chinook salmon	H	0.0028	463	152	0	0	0	0	0	615
Chinook salmon	R	0.002	38	0	0	0	0	0	0	38
Coho salmon	H	0.0000	0	0	0	0	0	0	0	0
Coho salmon	R	0.0003	62	0	0	0	0	0	0	62
Lake trout	H	0.0000	0	0	0	0	0	0	0	0
Lake trout	R	0.0003	0	0	0	0	0	0	68	68
Largemouth bass	H	0.0018	0	0	0	0	389	0	0	389
Largemouth bass	R	0.0026	0	0	0	48	196	319	0	563
Muskellunge	H	0.0003	0	0	57	0	0	0	0	57
Muskellunge	R	0.0003	0	0	57	0	0	0	0	57
Northern pike	H	0.0009	0	0	185	0	0	0	0	185
Northern pike	R	0.0004	0	0	0	0	72	22	0	95
Rainbow trout	H	0.0001	26	0	0	0	0	0	0	26
Rock bass	H	0.0002	0	0	40	0	0	0	0	40
Smallmouth bass	H	0.0056	0	0	0	54	936	227	0	1,217
Smallmouth bass	R	0.0715	0	0	290	2,386	3,658	8,681	428	15,445
Walleye	H	0.2166	26	4,552	14,969	19,998	5,757	1,221	243	46,767
Walleye	R	0.0050	0	0	71	61	630	327	0	1,088
Yellow perch	H	0.0433	0	463	1,219	1,702	2,497	2,289	1,189	9,359
Angler hours			6,365	17,204	56,759	66,082	42,917	22,772	3,827	215,926
Angler trips			1,663	5,693	14,315	17,395	11,166	4,619	879	55,731
Angler days			1,608	5,693	14,235	17,200	11,166	4,619	857	55,378

Table 3.–Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) from the St. Clair River (grids 515, 516, 517, 518, 519) for sport fishing from boats (non-charter) 2002 and 2003. Two standard errors of the point estimate in parentheses.

	Harvest rate per hour		Total harvest	
Species	2002	2003	2002	2003
Bluegill	0.0070	0.0034	1,210	726
	(0.0129)	(0.0069)	(2,225)	(1,481)
Brown trout	0.0001	0.0003	18	75
	(0.0001)	(0.0004)	(23)	(95)
Chinook salmon	0.0003	0.0028	58	615
	(0.0005)	(0.0027)	(86)	(573)
Coho salmon	0.0002	0.0000	43	0
	(0.0002)	(0.0000)	(40)	–
Largemouth bass	0.0007	0.0018	121	389
	(0.0014)	(0.0024)	(240)	(524)
Muskellunge	0.0001	0.0003	23	57
	(0.0003)	(0.0006)	(49)	(120)
Northern pike	0.0000	0.0009	0	185
	(0.0000)	(0.0014)	–	(302)
Pumpkinseed	0.0014	0.0000	240	0
	(0.0031)	(0.0000)	(538)	–
Rainbow trout	0.0002	0.0001	28	26
	(0.0002)	(0.0001)	(37)	(30)
Rock bass	0.0002	0.0002	42	40
	(0.0005)	(0.0004)	(85)	(83)
Smallmouth bass	0.0013	0.0056	222	1,217
	(0.0013)	(0.0052)	(219)	(1,115)
Walleye	0.1784	0.2166	30,744	46,767
	(0.0359)	(0.0445)	(5,645)	(8,656)
Yellow perch	0.0444	0.0433	7,653	9,359
	(0.0340)	(0.0225)	(5,833)	(4,797)
Angler hours			172,305	215,926
			(14,063)	(19,195)
Angler trips			43,576	55,731
			(4,540)	(6,049)
Angler days			42,505	55,378
			(4,466)	(6,024)

Table 4.–Estimated catch per hour, number caught, and effort (angler hours, trips, and days) for selected species from the St. Clair River (grids 515, 516, 517, 518, 519) for sport fishing from boats (non-charter) 2002 and 2003.

	2002	2003	2002			2003		
	Catch rate per hour							
Species			Total catch	Total harvest	% released	Total catch	Total harvest	% released
Chinook salmon	0.0000	0.0030	0	0	–	653	615	6
Coho salmon	0.0005	0.0000	87	43	51	0	0	–
Lake trout	0.0006	0.0000	106	0	100	0	0	–
Largemouth bass	0.0045	0.0044	782	121	85	952	389	59
Muskellunge	0.0007	0.0005	122	23	81	114	57	50
Northern pike	0.0021	0.0013	359	0	100	279	185	34
Rainbow trout	0.0010	0.0001	173	28	84	26	26	0
Smallmouth bass	0.0559	0.0772	9,636	222	98	16,660	1,217	93
Walleye	0.1875	0.2216	32,313	30,744	5	47,855	46,767	2
Angler hours			172,305			215,926		
Angler trips			43,576			55,731		
Angler days			42,505			55,378		

Table 5.–Estimated monthly harvest per hour, number harvested, and effort (angler hours, trips, and days) for all species from Lake St. Clair, by sport fishing from boats (non-charter), 2002 (H=harvest). Estimated total released per hour and number released is also presented for selected species (R=released).

Species	Harvest (H) or Released (R)	Fish per hour	Month								Grand Total
			Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Black crappie	H	0.0014	59	331	697	344	0	16	421	103	1,969
Bluegill	H	0.0082	38	849	1,131	3,256	2,165	1,379	1,383	1,038	11,241
Brown trout	H	0.0000	11	0	0	0	0	0	0	0	11
Channel catfish	H	0.0007	0	0	64	639	42	73	78	9	905
White sucker	H	0.0000	0	0	0	0	0	0	26	0	26
Freshwater drum	H	0.0008	0	0	6	99	631	129	266	37	1,168
Largemouth bass	H	0.0005	0	0	0	242	380	27	9	56	714
Largemouth bass	R	0.0253	23	1,124	3,830	12,177	7,154	8,509	1,381	725	34,923
Muskellunge	H	0.0001	0	0	0	87	0	0	50	21	158
Muskellunge	R	0.0013	0	16	15	385	524	231	610	51	1,831
Northern pike	H	0.0013	0	10	170	444	982	180	68	0	1,854
Northern pike	R	0.0058	32	273	600	2,848	1,959	1,269	775	192	7,948
Pumpkinseed	H	0.0019	0	205	245	1,184	396	356	145	33	2,565
Rock bass	H	0.0066	0	123	307	4,143	1,572	1,629	1,086	195	9,056
Smallmouth bass	H	0.0104	0	0	0	1,287	4,237	3,699	4,952	229	14,404
Smallmouth bass	R	0.1396	139	806	5,871	69,544	57,294	38,462	17,411	2,945	192,474
Walleye	H	0.0354	163	522	1,341	8,288	12,760	17,652	7,207	908	48,841
Walleye	R	0.0052	8	6	275	3,898	44	1,532	1,059	333	7,154
White bass	H	0.0005	0	4	0	86	436	140	47	0	713
White bass	R	0.0029	0	9	341	1,088	727	1,044	844	9	4,063
White perch	H	0.0001	0	0	12	0	41	0	66	0	119
Yellow perch	H	0.4064	486	7,296	6,366	83,203	137,250	82,608	198,393	44,586	560,189
Other	H	0.0002	0	147	0	85	0	0	0	10	242
Angler hours			2,748	16,990	65,665	368,348	396,657	251,320	219,056	57,693	1,378,477
Angler trips			976	4,036	13,787	70,134	76,294	43,951	41,249	12,092	262,519
Angler days			950	3,820	12,854	67,825	74,662	43,592	40,342	11,869	255,913

Table 6.–Estimated monthly harvest per hour, number harvested, and effort (angler hours, trips, and days) for all species from Lake St. Clair, by sport fishing from boats (non-charter) and ice fishing, 2003 (H=harvest). Estimated total released per hour and number released is also presented for selected species (R=released).

Species	Harvest (H) or Released (R)	Fish per hour	Month										Grand total
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Black crappie	H	0.0022	816	227	0	655	628	1,263	0	264	77	93	4,024
Bluegill	H	0.0084	4,639	2,662	0	43	532	455	146	1,848	1,022	4,035	15,381
Brown trout	H	0.0000	0	0	0	0	24	0	0	0	0	0	24
Channel catfish	H	0.0003	0	0	0	0	34	353	67	116	28	0	598
Chinook salmon	H	0.0001	0	0	0	117	5	0	0	0	0	0	121
Chinook salmon	R	0.0000	0	0	0	26	48	0	0	0	0	0	55
Coho salmon	H	0.0000	0	0	0	0	0	33	0	0	0	0	33
White sucker	H	0.0000	0	0	15	0	0	0	0	0	0	0	15
Freshwater drum	H	0.0017	0	0	0	0	24	2,221	517	291	59	27	3,138
Lake trout	H	0.0000	0	0	0	0	0	0	0	0	0	18	18
Largemouth bass	H	0.0006	0	0	0	22	369	79	218	429	0	27	1,144
Largemouth bass	R	0.0161	0	0	15	240	6,000	6,942	4,246	8,423	1,657	1,743	29,268
Lake whitefish	H	0.0000	0	0	0	0	0	6	0	0	0	0	6
Muskellunge	H	0.0003	0	0	0	0	0	482	152	0	0	0	634
Muskellunge	R	0.0005	0	0	0	18	66	366	191	202	13	141	998
Northern pike	H	0.0011	787	222	0	0	199	425	195	174	70	0	2,072
Northern pike	R	0.0057	44	0	0	264	1,003	5,704	915	1,396	669	349	10,343
Pink salmon	H	0.0004	0	0	0	173	576	0	0	0	0	0	749
Pumpkinseed	H	0.0065	878	736	164	167	1,545	5,030	332	1,194	1,074	744	11,863
Rainbow trout	H	0.0001	0	0	0	60	73	0	0	0	0	0	133
Rainbow trout	R	0.0000	0	0	0	0	88	0	0	0	0	0	88
Rock bass	H	0.0026	0	344	33	5	777	1,261	991	929	454	8	4,801
Smallmouth bass	H	0.0093	0	0	0	7	47	2,805	3,964	7,970	2,108	148	17,048
Smallmouth bass	R	0.0968	0	0	0	1,077	13,890	44,370	24,293	62,308	28,056	2,438	176,431
Walleye	H	0.0511	0	0	19	97	5,175	23,443	35,572	21,311	5,995	1,543	93,155
Walleye	R	0.0058	0	0	0	205	2,708	2,856	1,208	1,287	791	1,434	10,490
White bass	H	0.0007	93	78	0	0	0	419	169	402	39	0	1,201
White bass	R	0.0025	0	0	0	0	0	212	720	446	3,104	0	4,482
White perch	H	0.0002	0	62	84	0	0	33	17	90	0	0	285

Table 6.–Continued.

Species	Harvest (H) or Released (R)	Fish per hour	Month										Grand total
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Yellow perch	H	0.5250	290,145	221,316	119,795	271	6,881	36,131	88,091	85,118	52,006	57,557	957,310
Other	H	0.0168	0	0	0	0	0	30,367	0	90	0	95	30,551
Angler hours			287,408	236,053	103,129	17,355	68,295	323,280	256,429	292,980	168,627	69,950	1,823,505
Angler trips			79,946	66,563	25,286	4,256	15,498	58,077	51,778	57,703	34,517	15,322	408,945
Angler days			69,313	57,860	23,259	4,077	14,941	56,994	51,116	57,317	34,288	15,288	384,453

Table 7.–Estimated monthly harvest per hour, number harvested, and effort (angler hours, trips, and days) for all species from Lake St. Clair, by sport fishing from boats (non-charter) and ice fishing, 2004 (H=harvest). Estimated total released per hour and number released is also presented for selected species (R=released).

Species	Harvest (H) or Released (R)	Fish per hour	Month Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Grand Total
Black crappie	H	0.0016	35	63	26	85	1,029	64	0	0	943	481	2,727
Bluegill	H	0.0106	697	6,883	0	331	1,192	254	80	738	4,688	3,666	18,530
Channel catfish	H	0.0003	0	0	0	0	0	0	256	135	104	0	495
Chinook salmon	H	0.0006	0	0	0	46	0	0	1,069	0	0	0	1,115
Coho salmon	H	0.0000	0	0	11	0	0	0	0	0	0	0	11
Coho salmon	R	0.0000	0	0	0	4	0	0	0	0	0	0	4
Freshwater drum	H	0.0016	0	0	0	0	0	0	15	2,459	376	0	2,851
Largemouth bass	H	0.0005	0	0	7	7	0	17	23	236	660	0	950
Largemouth bass	R	0.0166	12	157	22	1,181	3,479	7,807	7,202	4,335	1,833	2,898	28,925
Muskellunge	H	0.0001	0	0	0	0	0	82	0	0	81	0	164
Muskellunge	R	0.0062	0	0	9	57	402	1,839	6,081	1,244	1,032	82	10,744
Northern pike	H	0.0009	66	623	33	0	492	25	225	75	48	7	1,593
Northern pike	R	0.0058	0	47	22	299	1,039	3,103	2,399	1,624	1,413	110	10,056
Pumpkinseed	H	0.0020	474	1,316	12	88	1,182	127	63	39	93	2	3,396
Rainbow trout	H	0.0000	0	0	0	10	0	0	0	0	0	0	10
Rainbow trout	R	0.0000	0	0	0	4	0	0	0	0	0	0	4
Rock bass	H	0.0017	3	172	8	68	1,625	371	221	170	356	21	3,015
Smallmouth bass	H	0.0032	0	0	0	0	0	998	1,181	2,109	1,216	17	5,521
Smallmouth bass	R	0.0603	38	0	1	3,242	9,906	27,251	29,764	23,984	10,051	786	105,022
Walleye	H	0.0189	36	63	44	312	4,035	7,377	8,798	8,250	3,461	446	32,822
Walleye	R	0.0040	0	0	0	75	1,123	1,215	819	895	1,115	1,766	7,006
White bass	H	0.0002	0	0	0	0	14	0	32	333	0	0	379
White bass	R	0.0007	0	0	0	9	174	175	581	0	349	0	1,288
White perch	H	0.0002	0	0	0	0	0	0	0	150	143	0	293

Table 7.–Continued.

Species	Harvest (H) or Released (R)	Fish per hour	Jan	Feb	Mar	Apr	Month May	Jun	Jul	Aug	Sep	Oct	Grand Total
Yellow perch	H	0.5629	280,738	509,595	12,999	586	3,490	33,368	33,078	59,147	26,850	20,282	980,133
Angler hours			217,297	413,511	8,098	11,744	72,174	245,476	296,023	263,201	163,366	50,279	1,741,169
Angler trips			64,405	100,090	2,579	3,336	15,822	45,590	59,624	49,670	32,001	12,237	385,354
Angler days			56,591	93,866	2,473	3,209	15,729	45,360	59,444	49,561	31,824	12,237	370,293

Table 8.–Estimated monthly harvest per hour, number harvested, and effort (angler hours, trips, and days) for all species from Lake St. Clair, by ice fishing, January through February, 2005 (H=harvest). Estimated released per hour and number released is also presented for selected species (R=released). Survey was terminated at the end of February due to funding constraints, although ice angling continued through the end of March.

Species	Harvest (H) or Released (R)	Fish per hour	Month		Grand Total
			Jan	Feb	
Black crappie	H	0.0005	14	125	139
Bluegill	H	0.0132	1,834	1,599	3,433
Largemouth bass	H	0.0000	0	0	0
Largemouth bass	R	0.0006	14	129	143
Northern pike	H	0.0003	0	88	88
Northern pike	R	0.0001	0	13	13
Pumpkinseed	H	0.0072	1,100	763	1,863
Rock bass	H	0.0002	0	62	62
Smallmouth bass	H	0.0000	0	0	0
Smallmouth bass	R	0.0004	0	114	114
Walleye	H	0.0001	22	0	22
Walleye	R	0.0000	0	12	12
White bass	H	0.0004	0	105	105
White bass	R	0.0001	16	0	16
Yellow perch	H	0.5139	60,223	73,277	133,500
Angler hours			143,024	116,766	259,790
Angler trips			37,572	27,291	64,864
Angler days			37,527	26,684	64,211

Table 9.–Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) from Lake St. Clair for boat (non-charter) and ice sport fishing, 2002 (March to October), 2003 (January to October), 2004 (January to October), and 2005 (January and February). Two standard errors of the point estimate in parentheses.

	Harvest rate per hour				Total harvest			
Species	2002	2003	2004	2005	2002	2003	2004	2005
Black crappie	0.0014	0.0022	0.0016	0.0005	1,969	4,024	2,727	139
	(0.0009)	(0.0014)	(0.0013)	(0.0004)	(1,195)	(2,478)	(2,299)	(110)
Bluegill	0.0082	0.0084	0.0106	0.0132	11,241	15,381	18,530	3,433
	(0.0029)	(0.0032)	(0.0047)	(0.0081)	(3,872)	(5,725)	(8,144)	(2,114)
Brown trout	0.0000	0.0000	0.0000	0.0000	11	0	0	0
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(22)	–	–	–
Channel catfish	0.0007	0.0003	0.0003	0.0000	905	598	495	0
	(0.0008)	(0.0002)	(0.0002)	(0.0000)	(1,088)	(409)	(403)	–
Chinook salmon	0.0000	0.0001	0.0006	0.0000	0	121	1,115	0
	(0.0000)	(0.0001)	(0.0011)	(0.0000)	–	(165)	(1,956)	–
Coho salmon	0.0000	0.0000	0.0000	0.0000	0	33	11	0
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	–	(67)	(21)	–
White sucker	0.0000	0.0000	0.0000	0.0000	26	15	0	0
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(52)	(29)	–	–
Freshwater drum	0.0008	0.0017	0.0016	0.0000	1,168	3,138	2,851	0
	(0.0005)	(0.0010)	(0.0023)	(0.0000)	(722)	(1,837)	(4,064)	–
Largemouth bass	0.0005	0.0006	0.0005	0.0000	714	1,144	950	0
	(0.0003)	(0.0005)	(0.0007)	(0.0000)	(456)	(890)	(1,303)	–
Muskellunge	0.0001	0.0003	0.0001	0.0000	158	634	164	0
	(0.0001)	(0.0005)	(0.0001)	(0.0000)	(156)	(948)	(162)	–
Northern pike	0.0013	0.0011	0.0009	0.0003	1,854	2,072	1,593	88
	(0.0013)	(0.0005)	(0.0005)	(0.0004)	(1,841)	(895)	(952)	(106)
Other	0.0002	0.0168	0.0000	0.0000	242	30,551	0	0
	(0.0002)	(0.0120)	(0.0000)	(0.0000)	(340)	(21,752)	–	–
Pumpkinseed	0.0019	0.0065	0.0020	0.0072	2,565	11,863	3,396	1,863
	(0.0006)	(0.0025)	(0.0009)	(0.0056)	(755)	(4,428)	(1,581)	(1,456)
Rainbow trout	0.0000	0.0001	0.0000	0.0000	0	133	10	0
	(0.0000)	(0.0001)	(0.0000)	(0.0000)	–	(137)	(17)	–
Rock bass	0.0066	0.0026	0.0017	0.0002	9,056	4,801	3,015	62
	(0.0025)	(0.0008)	(0.0009)	(0.0002)	(3,418)	(1,457)	(1,514)	(53)
Smallmouth bass	0.0104	0.0093	0.0032	0.0000	14,404	17,048	5,521	0
	(0.0040)	(0.0022)	(0.0013)	(0.0000)	(5,322)	(3,849)	(2,164)	–
Walleye	0.0354	0.0511	0.0189	0.0001	48,841	93,155	32,822	22
	(0.0067)	(0.0089)	(0.0052)	(0.0002)	(8,180)	(15,183)	(8,833)	(45)
White bass	0.0005	0.0007	0.0002	0.0004	713	1,201	379	105
	(0.0005)	(0.0005)	(0.0003)	(0.0007)	(711)	(828)	(536)	(178)
White perch	0.0001	0.0002	0.0002	0.0000	119	285	293	0
	(0.0001)	(0.0001)	(0.0002)	(0.0000)	(124)	(212)	(365)	–

Table 9.–Continued.

Species	Harvest rate per hour				Total harvest			
	2002	2003	2004	2005	2002	2003	2004	2005
Yellow perch	0.4064	0.5250	0.5629	0.5139	560,189	957,310	980,133	133,500
	(0.0929)	(0.0616)	(0.0879)	(0.1114)	(118,470)	(95,110)	(143,239)	(28,927)
Angler hours					1,378,477	1,823,505	1,741,169	259,790
					(119,576)	(113,645)	(95,735)	(52,936)
Angler trips					262,519	408,945	385,354	64,864
					(24,220)	(24,418)	(21,553)	(3,785)
Angler days					255,913	384,453	370,293	64,211
					(23,867)	(23,277)	(21,140)	

Table 10.–Estimated catch per hour for selected species from Lake St. Clair for boat (non-charter) and ice fishing, 2002 (March to October), 2003 (January to October), 2004 (January to October), and 2005 (January and February).

	Catch rate per hour			
Species	2002	2003	2004	2005
Largemouth bass	0.0259	0.0167	0.0245	0.0006
Muskellunge	0.0014	0.0009	0.0090	0.0000
Northern pike	0.0071	0.0068	0.0096	0.0004
Smallmouth bass	0.1501	0.1061	0.0908	0.0004
Walleye	0.0406	0.0568	0.0327	0.0001
White bass	0.0035	0.0031	0.0014	0.0005

Table 11.–Estimated catch (number caught), and effort (angler hours, trips, and days) for selected species from Lake St. Clair for sport fishing from boats and ice angling, 2002 (March to October), 2003 (January to October), 2004 (January to October), and 2005 (January and February). Annual harvest estimates and percentage of reported catch released are also included for comparison.

	2002			2003			2004			2005		
Species	Total catch	Total harvest	% released	Total catch	Total harvest	% released	Total catch	Total harvest	% released	Total catch	Total harvest	% released
Largemouth bass	35,637	714	98	30,410	1,144	96	29,876	950	97	151	0	100
Muskellunge	1,990	158	92	1,631	634	61	10,909	164	98	0	0	–
Northern pike	9,802	1,854	81	12,416	2,072	83	11,650	1,593	86	101	88	13
Smallmouth bass	206,876	14,404	93	193,481	17,048	91	110,544	5,521	95	114	0	100
Walleye	55,996	48,841	13	103,644	93,155	10	39,830	32,822	18	34	22	35
White bass	4,775	713	85	5,682	1,201	79	1,667	379	77	121	105	13

Table 12.–Estimated monthly harvest per hour, number harvested, and effort (angler hours, trips, and days) for all species from the Detroit River, by sport fishing from boats (non-charter), 2002 (H=harvest). Estimated total released per hour and number released is also presented for selected species (R=released).

Species	Harvest (H) or Released (R)	Fish per hour	Month								Grand Total
			Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Black crappie	H	0.0007	0	0	650	0	0	0	0	0	650
Bluegill	H	0.0059	8	138	377	3,022	1,625	33	0	0	5,202
Channel catfish	H	0.0007	0	0	0	0	500	33	68	0	601
White sucker	H	0.0002	0	0	0	0	145	0	0	0	145
Freshwater drum	H	0.0024	0	0	40	438	1,601	0	0	0	2,079
Largemouth bass	H	0.0008	0	0	0	367	0	0	309	0	676
Largemouth bass	R	0.0124	0	0	1,265	2,517	1,033	1,220	4,008	863	10,906
Muskellunge	H	0.0002	0	0	0	94	0	0	68	0	162
Muskellunge	R	0.0017	94	162	22	100	534	316	103	166	1,498
Northern pike	H	0.0007	0	48	0	377	160	0	71	0	657
Northern pike	R	0.0036	39	180	1,050	555	701	416	216	0	3,157
Pumpkinseed	H	0.0011	0	0	0	0	250	753	0	0	1,003
Rock bass	H	0.0090	0	0	888	2,181	4,530	305	0	0	7,905
Smallmouth bass	H	0.0027	0	0	0	800	467	840	274	0	2,380
Smallmouth bass	R	0.0460	0	2,350	6,849	15,185	9,285	3,989	1,254	1,459	40,371
Walleye	H	0.2272	6,839	61,944	36,644	35,926	38,017	18,895	953	0	199,219
Walleye	R	0.0098	86	1,457	1,048	1,013	2,102	1,172	1,446	249	5,377
White bass	H	0.2777	0	0	17,588	211,627	14,306	0	0	0	243,521
White bass	R	0.0919	0	0	4,659	73,992	1,443	0	464	0	80,558
White perch	H	0.0056	0	0	81	3,793	1,080	0	0	0	4,955
Yellow perch	H	0.0629	510	2,655	2,638	15,387	7,113	19,027	6,038	1,785	55,153
Angler hours			44,898	218,942	135,918	208,745	148,470	85,480	29,873	4,622	876,948
Angler trips			9,912	44,245	29,701	46,904	32,657	17,732	6,507	987	188,645
Angler days			9,368	42,794	28,075	45,236	31,640	17,640	6,503	987	182,246

Table 13.–Estimated monthly harvest per hour, number harvested, and effort (angler hours, trips, and days) for all species from the Detroit River, by sport fishing from boats (non-charter), 2004 (H=harvest). Estimated total released per hour and number released is also presented for selected species (R=released).

Species	Harvest (H) or Released (R)	Fish per hour	Month								Grand total
			Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
Bluegill	H	0.0022	0	0	56	67	59	816	826	0	1,825
Channel catfish	H	0.0009	0	0	0	134	0	418	226	0	778
Freshwater drum	H	0.0022	0	0	41	1,534	188	63	0	0	1,827
Largemouth bass	H	0.0008	0	0	0	191	345	84	0	24	643
Largemouth bass	R	0.0266	0	0	5,669	4,159	2,526	5,783	2,039	1,654	21,828
Muskellunge	H	0.0000	0	0	0	0	39	0	0	0	39
Muskellunge	R	0.0069	7	76	0	539	3,392	99	1,447	108	5,669
Northern pike	H	0.0008	0	27	284	67	0	141	101	46	665
Northern pike	R	0.0090	105	501	2,520	1,114	945	601	1,297	306	7,389
Pumpkinseed	H	0.0021	0	0	0	1,459	0	127	103	0	1,688
Rainbow trout	H	0.0000	0	0	0	0	39	0	0	0	39
Rock bass	H	0.0066	0	0	1,808	1,927	0	923	727	0	5,385
Smallmouth bass	H	0.0091	0	0	0	1,015	1,635	2,482	2,321	56	7,509
Smallmouth bass	R	0.0793	0	3,975	4,263	6,391	16,996	10,856	19,399	3,258	65,137
Walleye	H	0.1643	185	30,439	21,275	32,504	33,532	13,322	3,382	327	134,967
Walleye	R	0.0251	72	1,748	1,117	2,534	5,753	4,429	3,884	1,061	20,596
White bass	H	0.2074	0	0	85,462	76,520	8,416	0	0	0	170,397
White bass	R	0.1373	0	196	29,114	74,132	8,214	1,107	0	0	112,764
White perch	H	0.0190	0	0	4,548	10,763	270	0	0	0	15,581
Yellow perch	H	0.1334	2,278	6,446	9,633	14,532	6,924	29,779	25,003	14,982	109,576
Angler hours			9,694	151,750	118,728	167,762	155,954	109,238	80,240	28,152	821,518
Angler trips			2,446	30,717	27,164	37,536	35,991	26,589	18,895	6,183	185,521
Angler days			2,389	30,662	27,070	37,338	35,627	26,516	18,895	6,142	185,640

Table 14.–Estimated harvest per hour, number harvested, and effort (angler hours, trips, and days) from the Detroit River, by boat anglers (non-charter), 2002 and 2004. Two standard errors of the point estimate in parentheses.

	Harvest rate per hour		Total harvest	
Species	2002	2004	2002	2004
Black crappie	0.0007	0.0000	650	0
	(0.0015)	(0.0000)	(1,300)	–
Bluegill	0.0059	0.0022	5,202	1,825
	(0.0063)	(0.0021)	(5,482)	(1,704)
Channel catfish	0.0007	0.0009	601	778
	(0.0008)	(0.0007)	(740)	(611)
White sucker	0.0002	0.0000	145	0
	(0.0003)	(0.0000)	(289)	–
Freshwater drum	0.0024	0.0022	2,079	1,827
	(0.0020)	(0.0021)	(1,715)	(1,684)
Largemouth bass	0.0008	0.0008	676	643
	(0.0011)	(0.0007)	(939)	(609)
Muskellunge	0.0002	0.0000	162	39
	(0.0003)	(0.0001)	(233)	(74)
Northern pike	0.0007	0.0008	657	665
	(0.0006)	(0.0007)	(556)	(546)
Pumpkinseed	0.0011	0.0021	1,003	1,688
	(0.0017)	(0.0021)	(1,458)	(1,685)
Rainbow trout	0.0000	0.0000	0	39
	(0.0000)	(0.0001)	–	(74)
Rock bass	0.0090	0.0066	7,905	5,385
	(0.0061)	(0.0040)	(5,325)	(3,274)
Smallmouth bass	0.0027	0.0091	2,380	7,509
	(0.0015)	(0.0032)	(1,289)	(2,589)
Walleye	0.2272	0.1643	199,219	134,967
	(0.0308)	(0.0249)	(23,039)	(17,774)
White bass	0.2777	0.2074	243,521	170,397
	(0.0742)	(0.0587)	(62,740)	(46,530)
White perch	0.0056	0.0190	4,955	15,581
	(0.0033)	(0.0143)	(2,897)	(11,731)
Yellow perch	0.0629	0.1334	55,153	109,576
	(0.0244)	(0.0322)	(21,041)	(25,118)
Angler hours			876,948	821,518
			(62,048)	(61,232)
Angler trips			188,645	185,521
			(13,753)	(13,890)
Angler days			182,246	184,640
			(13,375)	(13,848)

Table 15.–Estimated catch per hour, number caught, and effort (angler hours, trips, and days) for selected species from the Detroit River, by boat anglers (non-charter), 2002 and 2004. Annual harvest estimates and percentage of reported catch released for 2002 and 2004 are also included for comparison.

	Catch rate per hour		Total catch	Total harvest	% released	Total catch	Total harvest	% released
Species	2002	2004		2002			2004	
Largemouth bass	0.0132	0.0274	11,582	676	94	22,474	643	97
Muskellunge	0.0019	0.0076	1,659	162	90	5,707	39	99
Northern pike	0.0043	0.0098	3,813	657	83	8,055	665	92
Smallmouth bass	0.0488	0.0884	42,752	2,380	94	72,647	7,509	90
Walleye	0.2369	0.1894	207,791	199,219	4	155,564	134,967	13
White bass	0.3696	0.3447	324,079	243,521	25	283,161	170,397	40
Angler hours			876,948			821,518		
Angler trips			188,645			185,521		
Angler days			182,246			184,640		

Table 16.–Numbers of biological samples collected by creel survey clerks during on-site interviews on the Detroit River, Lake St. Clair, and the St. Clair River from 2002 through 2004.

	Water body				
Species	Detroit River	Lake St. Clair	St. Clair River	Total	% of total
Brown trout	0	1	1	2	0
Chinook salmon	0	2	8	10	0
Coho salmon	0	0	5	5	0
Largemouth bass	0	6	0	6	0
Muskellunge	1	6	1	8	0
Northern pike	8	63	1	72	1
Rainbow trout	0	0	1	1	0
Rock bass	0	2	0	2	0
Smallmouth bass	55	800	24	879	10
Walleye	1,084	2,294	461	3,839	43
Yellow perch	230	3,810	49	4,089	46
Total	1,378	6,984	551	8,913	100
% of total	15	78	6	100	

Table 17.–Mean, minimum (Min), and maximum (Max) lengths (mm) recorded for yellow perch, walleye, and smallmouth bass sampled by creel clerks during on-site creel surveys on the Detroit River, Lake St. Clair, and the St. Clair River from 2002 through 2004. 2SE = Standard error of the mean X 2.

	Yellow perch					Walleye					Smallmouth bass				
Water body	Mean	2SE	Min	Max	N	Mean	2SE	Min	Max	N	Mean	2SE	Min	Max	N
Detroit River	232	5.2	104	348	230	507	5.1	315	777	1,083	408	11.6	318	521	55
Lake St. Clair	231	1.2	107	358	3,810	459	2.8	318	754	2,294	403	2.7	330	559	800
St. Clair River	236	9.1	185	310	49	468	6.4	330	780	461	400	13.8	356	460	24
All water bodies	232	1.2	104	358	4,089	474	2.5	315	780	3,838	403	2.6	318	559	879

Table 18.–Mean, minimum (Min), and maximum (Max) ages recorded for walleye, and smallmouth bass sampled by creel clerks during on-site creel surveys on the Detroit River (DR), Lake St. Clair (LSC), and the St. Clair River (SCR) from 2002 through 2004. 2SE = Standard error of the mean X 2.

	Walleye					Smallmouth bass				
Water body	Mean age	2SE	Minimum age	Maximum age	N	Mean age	2SE	Minimum age	Maximum age	N
DR	5.1	0.2	1	18	1,083	5.5	0.6	3	12	54
LSC	4.0	0.1	1	18	2,245	5.0	0.1	3	11	795
SCR	4.2	0.2	2	17	459	5.0	0.8	3	10	23
Total	4.4	0.1	1	18	3,787	5.1	0.1	3	12	872

Table 19.–State of residence of anglers interviewed at sites on the Detroit River (DR), Lake St. Clair (LSC), and the St. Clair River (SCR) during creel surveys, 2002–05.

	DR		LSC		SCR		All water bodies	
State	Number	%	Number	%	Number	%	Number	%
Alabama	2	0.1	1	0.0	0	0.0	3	0.0
Arizona	1	0.0	0	0.0	0	0.0	1	0.0
California	0	0.0	2	0.0	0	0.0	2	0.0
Colorado	0	0.0	1	0.0	0	0.0	1	0.0
Connecticut	1	0.0	1	0.0	0	0.0	2	0.0
Florida	1	0.0	7	0.0	1	0.1	9	0.0
Georgia	1	0.0	1	0.0	0	0.0	2	0.0
Illinois	23	0.7	14	0.1	0	0.0	37	0.2
Indiana	40	1.2	221	1.2	16	1.6	277	1.2
Iowa	3	0.1	1	0.0	0	0.0	4	0.0
Kentucky	5	0.1	19	0.1	5	0.5	29	0.1
Louisiana	0	0.0	1	0.0	0	0.0	1	0.0
Michigan	3,235	94.0	18,510	96.8	947	92.5	22,692	96.2
Minnesota	1	0.0	2	0.0	0	0.0	3	0.0
Mississippi	4	0.1	3	0.0	0	0.0	7	0.0
Missouri	1	0.0	3	0.0	2	0.2	6	0.0
New Jersey	1	0.0	0	0.0	0	0.0	1	0.0
New York	0	0.0	1	0.0	0	0.0	1	0.0
North Carolina	1	0.0	2	0.0	0	0.0	3	0.0
North Dakota	1	0.0	3	0.0	0	0.0	4	0.0
Oklahoma	1	0.0	0	0.0	0	0.0	1	0.0
Ohio	77	2.2	249	1.3	36	3.5	362	1.5
Pennsylvania	2	0.1	6	0.0	1	0.1	9	0.0
South Carolina	1	0.0	0	0.0	0	0.0	1	0.0
Tennessee	2	0.1	4	0.0	2	0.2	8	0.0
Texas	0	0.0	7	0.0	0	0.0	7	0.0
Virginia	1	0.0	9	0.0	0	0.0	10	0.0
West Virginia	2	0.1	0	0.0	0	0.0	2	0.0
Wisconsin	5	0.1	2	0.0	1	0.1	8	0.0
Wyoming	0	0.0	1	0.0	0	0.0	1	0.0
Total	3,442		19,124		1,024		23,590	

Table 20.–County of residence for Michigan resident anglers interviewed during creel survey on the Detroit River (DR), Lake St. Clair (LSC) and St. Clair River (SCR) from 2002 through 2005, expressed as a percentage of the total number of residence interviews by water body.

	Water body (%)		
County	DR	LSC	SCR
Alcona	0.0	0.0	0.2
Alger	0.0	0.0	0.0
Allegan	0.2	0.0	0.0
Alpena	0.0	0.0	0.0
Antrim	0.1	0.0	0.0
Arenac	0.0	0.0	0.0
Barry	0.1	0.0	0.0
Bay	0.1	0.1	0.0
Benzie	0.0	0.0	0.0
Berrien	0.1	0.1	0.0
Branch	0.1	0.0	0.0
Calhoun	0.4	0.1	0.0
Cass	0.1	0.0	0.0
Charlevoix	0.0	0.0	0.0
Chippewa	0.0	0.0	0.0
Clare	0.1	0.0	0.0
Clinton	0.1	0.1	0.4
Crawford	0.0	0.0	0.1
Delta	0.0	0.0	0.0
Eaton	0.9	0.1	0.4
Emmet	0.0	0.0	0.0
Genesee	0.8	1.2	2.1
Gladwin	0.0	0.0	0.3
Grand Traverse	0.1	0.0	0.0
Gratiot	0.1	0.0	0.0
Hillsdale	0.1	0.0	0.0
Huron	0.0	0.1	0.1
Ingham	0.8	0.2	0.3
Ionia	0.2	0.0	0.0
Iosco	0.0	0.0	0.1
Isabella	0.0	0.0	0.0
Jackson	1.0	0.1	0.2
Kalamazoo	0.4	0.1	0.1
Kalkaska	0.1	0.0	0.0
Kent	0.5	0.1	0.3
Lake	0.1	0.0	0.0
Lapeer	0.3	1.4	2.7
Lenawee	0.5	0.1	0.1
Livingston	1.4	0.5	0.3
Luce	0.1	0.0	0.0
Macomb	9.2	57.5	21.7

Table 20.–Continued.

County	Water body (%)		
	DR	LSC	SCR
Manistee	0.1	0.0	0.0
Mason	0.1	0.0	0.0
Mecosta	0.1	0.0	0.0
Midland	0.1	0.0	0.0
Missaukee	0.0	0.0	0.0
Monroe	4.3	0.2	0.0
Montcalm	0.3	0.0	0.1
Montmorency	0.0	0.0	0.0
Muskegon	0.5	0.0	0.0
Newaygo	0.0	0.0	0.2
Oakland	10.5	14.3	8.4
Oceana	0.0	0.0	0.0
Ogemaw	0.0	0.0	0.0
Osceola	0.0	0.0	0.0
Oscoda	0.0	0.0	0.2
Otsego	0.1	0.0	0.0
Ottawa	0.6	0.1	0.0
Presque Isle	0.0	0.0	0.0
Roscommon	0.1	0.0	0.0
Saginaw	0.2	0.1	0.0
Saint Clair	0.7	10.3	47.3
Saint Joseph	0.1	0.1	0.0
Sanilac	0.0	0.4	1.1
Shiawassee	0.1	0.1	0.5
Tuscola	0.1	0.1	0.3
Unknown	7.1	5.7	9.1
Van Buren	0.1	0.0	0.0
Washtenaw	3.3	0.4	0.6
Wayne	53.7	6.0	2.9
Wexford	0.0	0.0	0.0
Total Number	3,442	19,124	1,024

Table 21.–Species sought by anglers interviewed during creel survey on the Detroit River (DR), Lake St. Clair (LSC) and St. Clair River (SCR) from 2002 through 2005, expressed as a percentage of the total number of residence interviews by water body.

	DR		LSC		SCR		Total	
Target species	Number	%	Number	%	Number	%	Number	%
Anything	244	7.1	1,635	8.5	33	3.2	1,912	8.1
Salmon and trout	0	0.0	53	0.3	56	5.5	109	0.5
Largemouth bass	46	1.3	169	0.9	4	0.4	219	0.9
Muskellunge	58	1.7	610	3.2	0	0.0	668	2.8
Northern pike	50	1.5	392	2.0	1	0.1	443	1.9
Panfish	58	1.7	424	2.2	5	0.5	487	2.1
Smallmouth bass	209	6.1	1,941	10.2	93	9.1	2,243	9.5
Suckers	0	0.0	1	0.0	0	0.0	1	0.0
Walleye	2,448	71.1	3,254	17.0	778	76.0	6,480	27.5
Walleye and perch	72	2.1	646	3.4	10	1.0	728	3.1
Yellow perch	257	7.5	9,998	52.3	44	4.3	10,299	43.7
Total	3,442		19,123		1,024		23,589	

Table 22.–Species sought by anglers interviewed during creel survey at Lake St. Clair sites during open water (boat fishery) and winter (ice fishery) seasons from 2002 through 2005.

	Boat fishery		Ice fishery		Total fishery	
Target species	Number	%	Number	%	Number	%
Anything	1,603	13.8	32	0.4	1,635	8.5
Salmon and trout	53	0.5	0	0.0	53	0.3
Largemouth bass	169	1.5	0	0.0	169	0.9
Muskellunge	610	5.2	0	0.0	610	3.2
Northern pike	337	2.9	55	0.7	392	2.0
Panfish	360	3.1	64	0.9	424	2.2
Smallmouth bass	1,941	16.7	0	0.0	1,941	10.2
Suckers	1	0.0	0	0.0	1	0.0
Walleye	3,250	27.9	4	0.1	3,254	17.0
Walleye and perch	642	5.5	4	0.1	646	3.4
Yellow perch	2,684	23.0	7,314	97.9	9,998	52.3
Total	11,650		7,473		19,123	

Table 23.–Fishing method used by anglers targeting various species based on interviews at sites on the Detroit River, Lake St. Clair, and the St. Clair River from 2002 through 2005, including the ice fishery on Lake St. Clair.

	Casting		Drifting		Fly fishing		Jigging		Spearing		Still fishing		Trolling		Total
Species sought	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number
Anything	430	22.5	873	45.7	5	0.3	39	2.0	17	0.9	328	17.2	217	11.4	1,910
Salmon and trout	2	1.8	4	3.7	0	0.0	2	1.8	0	0.0	2	1.8	99	90.8	109
Largemouth bass	203	92.7	11	5.0	0	0.0	2	0.9	0	0.0	2	0.9	1	0.5	219
Muskellunge	127	19.0	15	2.2	3	0.4	0	0.0	0	0.0	3	0.4	520	77.8	668
Northern pike	279	62.8	14	3.2	13	2.9	5	1.1	43	9.7	14	3.2	75	16.9	444
Panfish	86	17.7	69	14.2	0	0.0	51	10.5	0	0.0	274	56.4	6	1.2	486
Smallmouth bass	1,680	74.9	385	17.2	6	0.3	42	1.9	0	0.0	43	1.9	87	3.9	2,244
Walleye	227	3.5	2,126	32.8	1	0.0	1,786	27.6	1	0.0	99	1.5	2,236	34.5	6,477
Walleye and perch	17	2.3	448	61.5	0	0.0	22	3.0	0	0.0	98	13.5	143	19.6	728
Yellow perch	35	0.3	1,013	9.8	0	0.0	4,978	48.3	21	0.2	4,196	40.7	55	0.5	10,300
All species	3,086	13.1	4,958	21.0	28	0.1	6,927	29.4	82	0.3	5,059	21.5	3,439	14.6	23,579

Table 24.–Comparison of fishing effort and harvest for the boat and ice fisheries combined across the Detroit River, Lake St. Clair, and the St. Clair River, for the periods from April 1983–March 1984 (data from Haas et al. 1985), and April 2002–March 2003.

Effort and harvest	1983–84	2002–03	Change	% change
Fishing effort (angler hours)	3,495,908	3,006,675	-489,233	-14
Walleye harvest	320,778	271,820	-48,958	-15
Yellow perch harvest	1,238,977	1,253,255	14,278	1
Smallmouth bass harvest	25,320	17,007	-8,313	-33
White bass harvest	994,499	244,405	-750,094	-75

Table 25.–Comparison of estimated fishing effort (expressed as angler hours) for Michigan waters of the Great Lakes during 2002, 2003, and 2004. Italicized values are averaged from the other two years to fill in gaps in creel survey coverage. Data from Lake Michigan, Huron, and Superior are from T. Kolb, Charlevoix Research Station (personal communication).

Location	Category	2002	2003	2004	Mean
St. Clair River	boat	172,305	215,926	194,116	205,021
Lk. St. Clair	Ice	632,749	626,590	638,907	632,749
	boat	1,378,477	1,196,915	1,102,262	1,225,885
Detroit River	boat	876,948	849,233	821,518	849,233
Subtotal St. Clair System		3,060,479	2,888,664	2,756,803	2,901,982
Percent of statewide total		28%	29%	29%	29%
Lake Erie	boat	884,514	525,660	731,740	628,700
St. Clair Sys + Lk Erie		3,944,993	3,414,324	3,488,543	3,615,953
Percent of statewide total		37%	34%	37%	36%
Lake Michigan	ice	177,495	184,642	170,347	177,495
	boat and pier	3,391,186	3,032,894	3,253,423	3,225,834
Lake Huron	ice	463,329	537,497	389,161	463,329
	boat and pier	2,626,432	2,601,797	2,017,376	2,415,202
Lake Superior	ice	28,987	44,463	45,757	45,110
	boat and pier	158,999	170,091	178,678	169,256
Upper Lakes total		6,846,427	6,571,384	6,054,743	6,490,851
Percent of statewide total		63%	66%	63%	65
Statewide total		10,791,420	9,985,708	9,543,286	10,106,805

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Alan D. Sutton, Graphics
Ellen S. Grove, Desktop Publisher

Approved by Tammy J. Newcomb

Appendix A.–Common and scientific names of fishes included in this report.

Common name	Scientific name
Lake sturgeon	*Acipenser fulvescens*
Rock bass	*Ambloplites rupestris*
Freshwater drum	*Aplodinotus grunniens*
White sucker	*Catostomus commersonii*
Northern pike	*Esox lucius*
Muskellunge	*Esox masquinongy*
Mooneye	*Hiodon tergisus*
Channel catfish	*Ictalurus punctatus*
Pumpkinseed	*Lepomis gibbosus*
Bluegill	*Lepomis macrochirus*
Smallmouth bass	*Micropterus dolomieu*
Largemouth bass	*Micropterus salmoides*
White perch	*Morone americana*
White bass	*Morone chrysops*
Silver redhorse	*Moxostoma anisurum*
Golden redhorse	*Moxostoma erythrurum*
Shorthead redhorse	*Moxostoma macrolepidotum*
Round goby	*Neogobius melanostomus*
Coho salmon	*Oncorhynchus kisutch*
Rainbow trout	*Oncorhynchus mykiss*
Chinook salmon	*Oncorhynchus tshawytscha*
Yellow perch	*Perca flavescens*
Black crappie	*Pomoxis nigromaculatus*
Brown trout	*Salmo trutta*
Walleye	*Sander vitreus*

Appendix B.–Details on spatial strata for creel survey clerks on Detroit River, Lake St. Clair, and St. Clair River, 2002 through 2005, including separate instructions for winter creel survey on Lake St. Clair.

Detroit River
Creel Census Schedule
Lake Erie Management Unit

1 Fisheries Assistant

Work shifts	I	March through October	6:00am to 2:30pm
	II	March	10:30am to 7:00pm
		April and October	11:30am to 8:00pm
		May through September	12:30pm to 9:00pm

INTERVIEW SITES

Area A: Lower Detroit River, site grids 500, 501, and 502

Includes the following access sites; Lake Erie Metro ramps, Elizabeth Park ramps, Trenton Rotary ramp, Riverview Municipal ramp, Wyandotte Municipal ramp and Ecorse Municipal ramp.

Area B: Upper Detroit River, site grids 503, 504, and 505

Includes the following access site; Belanger Park ramp, Delray ramp, St. Jean ramp and Alter Road ramp

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INSTRUCTIONS: Interview as many anglers at the end of their fishing trip as possible and record the data on the interview data sheets. Record data for the entire fishing party on one interview sheet. Do not interview charter boat anglers. Check all boats coming back to the launch ramps/access areas and **do not forget to record non-fishing (pleasure boats, but not sailboats or jet skis) on your interview form.** For non-fishing boats, record all data up to and including 'Day of week' on the interview form.

Grid numbers are used for both fishing sites and interview sites (see enclosed maps). If you interview an angler party in grid 501, but they actually fished in grid 500, then 500 is the fishing site number and 501 is the interview site number. If the angler party fished in more than one grid, then the fishing site number would be the grid number where most of the fish were caught or most of the fishing effort took place. If the angler party fished outside Michigan waters, in other words in Canadian waters for the entire fishing trip do not record the interview. If the angler party spent 50% or more of their time fishing in Michigan waters, record the interview data.

For tournament angler parties: In addition to recording the fish harvest and other appropriate information also **code PKS as 00** under Fish Caught and Kept. This will help us identify angler parties that are actively fishing in a Fishing Tournament from all other anglers.

As you travel your interview route, the main requirement for being at a particular site is to gather as many interviews as possible. If you have traveled the route and most of the days activity is at one site, then that is where you should spend most of your time.

BIOLOGICAL SAMPLING INSTRUCTIONS

Biological data should be collected randomly from the sport catch for the areas listed below. The numbers of samples for each species listed for each month should be STRICTLY FOLLOWED!

Lower Detroit River (Grids 500, 501 and 502)

SPECIES	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
YEP	25	25	25	25	25	25	50	50
SMB				50	25	25	25	25
WAE	50	50	25	25	25	25	25	25
MUS				ALL	ALL	ALL	ALL	ALL

Upper Detroit River (Grids 503, 504 and 505)

SPECIES	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
YEP	25	25	25	25	25	25	50	50
SMB				50	25	25	25	25
WAE	50	50	25	25	25	25	25	25
MUS				ALL	ALL	ALL	ALL	ALL

Southern Lake St. Clair
Creel Census Schedule
Lake Erie Management Unit

1 Fisheries Assistant

Work shifts	I	March through October	6:00am to 2:30pm
	II	March	10:30am to 7:00pm
		April and October	11:30am to 8:00pm
		May and September	12:30pm to 9:00pm
		June and August	1:30pm to 10:00pm
		July	2:30pm to 11:00pm

INTERVIEW SITES

Area A: Access site in grids 507 and 509 (not including Metro Beach or Harrison Township ramps). Includes private marinas such as Ginos Surf and Jimmys Boats and the numerous marinas in the southern portion of grid 509 (see map).

Area B: Metro Beach ramp and Harrison Township ramp (at spillway). Each ramp needs to be worked and equal amount of time. Therefore, on odd numbered Area B days work Metro Beach and on even numbered Area B days work Harrison Township.

INSTRUCTIONS: Interview as many anglers at the end of their fishing trip as possible and record the data on the interview data sheets. Record data for the entire fishing party on one interview sheet. Do not interview charter boat anglers. Check all boats coming back to the launch ramps/access areas and **do not forget to record non-fishing (pleasure boats, but not sailboats or jet skis) on your interview form.** For non-fishing boats, record all data up to and including 'Day of week' on the interview form.

Grid numbers are used for both fishing sites and interview sites (see enclosed maps). If you interview an angler party in grid 507, but they actually fished in grid 506, then 506 is the fishing site number and 507 is the interview site number. If the angler party fished in more than one grid, then the fishing site number would be the grid number where most of the fish were caught or most of the fishing effort took place. If the angler party fished outside Michigan waters, in other words in Canadian waters, for the entire fishing trip do not record the interview. If the angler party spent 50% or more of their time fishing in Michigan waters, record the interview data.

For tournament angler parties: In addition to recording the fish harvest and other appropriate information also **code PKS as 00** under Fish Caught and Kept. This will help us identify angler parties that are actively fishing in a Fishing Tournament from all other anglers.

Prior to the opening of bass season (March 1 through June 14) in addition to recording the fish harvest and other appropriate information code all anglers who you think may have been fishing for smallmouth bass (catch and release) as **SMB RELEASED 00.** This coding box can be found on side two of the interview form. If the angler party responds that they were catch and release fishing for smallmouth bass then record the actual number of smallmouth bass released. To determine whether on not an angler party may have been targeting smallmouth prior to the season **observe their fishing gear.** A bass type boat or bass type lures on their rods is sufficient reason to code SMB released as 00.

BIOLOGICAL SAMPLING INSTRUCTIONS

Biological data should be collected randomly from the sport catch for the areas listed below. The numbers of samples for each species listed for each month should be STRICTLY FOLLOWED!

Area A

SPECIES	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
YEP	25	25	25	25	25	25	50	50
SMB				50	25	25	25	25
WAE	50	50	25	25	25	25	25	25
MUS				ALL	ALL	ALL	ALL	ALL

Area B

SPECIES	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
YEP	25	25	25	25	25	25	50	50
SMB				50	25	25	25	25
WAE	50	50	25	25	25	25	25	25
MUS				ALL	ALL	ALL	ALL	ALL

Central Lake St. Clair
Creel Census Schedule
Lake Erie Management Unit

1 Fisheries Assistant

Work shifts	I	March through October	6:00am to 2:30pm
	II	March	10:30am to 7:00pm
		April and October	11:30am to 8:00pm
		May and September	12:30pm to 9:00pm
		June and August	1:30pm to 10:00pm
		July	2:30pm to 11:00pm

INTERVIEW SITES

Area A: Private marinas in grid 512 south of Selfridge Public Access Site (see map) such as Mac and Ray Marine, McMachen Marine, Markely Marine, Sundog Marine, MI Mar Salv Marine, C&N Marine, Island Cove Marine, Lands End and Roy's Boats.

Area B: Harley public boat launch.

INSTRUCTIONS: Interview as many anglers at the end of their fishing trip as possible and record the data on the interview data sheets. Record data for the entire fishing party on one interview sheet. Do not interview charter boat anglers. Check all boats coming back to the launch ramps/access areas and **do not forget to record non-fishing (pleasure boats, but not sailboats or jet skis) on your interview form.** For non-fishing boats, record all data up to and including 'Day of week' on the interview form.

Grid numbers are used for both fishing sites and interview sites (see enclosed maps). If you interview an angler party in grid 512, but they actually fished in grid 513, then 513 is the fishing site number and 512 is the interview site number. If the angler party fished in more than one grid, then the fishing site number would be the grid number where most of the fish were caught or most of the fishing effort took place. If the angler party fished outside Michigan waters, in other words in Canadian waters, for the entire fishing trip do not record the interview. If the angler party spent 50% or more of their time fishing in Michigan waters, record the interview data.

For tournament angler parties: In addition to recording the fish harvest and other appropriate information also **code PKS as 00** under Fish Caught and Kept. This will help us identify angler parties that are actively fishing in a Fishing Tournament from all other anglers.

Prior to the opening of bass season (March 1 through June 14) in addition to recording the fish harvest and other appropriate information code all anglers who you think may have been fishing for smallmouth bass (catch and release) as **SMB RELEASED 00.** This coding box can be found on side two of the interview form. If the angler party responds that they were catch and release fishing for smallmouth bass, then record the actual number of smallmouth bass released. To determine whether on not an angler party may have been targeting smallmouth prior to the season **observe their fishing gear.** A bass type boat or bass type lures on their rods is sufficient reason to code SMB released as 00.

BIOLOGICAL SAMPLING INSTRUCTIONS

Biological data should be collected randomly from the sport catch for the areas listed below. The numbers of samples for each species listed for each month should be STRICTLY FOLLOWED!

Area A

SPECIES	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
YEP	25	25	25	25	25	25	50	50
SMB				50	25	25	25	25
WAE	50	50	25	25	25	25	25	25
MUS				ALL	ALL	ALL	ALL	ALL

Area B

SPECIES	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
YEP	25	25	25	25	25	25	50	50
SMB				50	25	25	25	25
WAE	50	50	25	25	25	25	25	25
MUS				ALL	ALL	ALL	ALL	ALL

Northern Lake St. Clair
2004 Creel Census Schedule
Lake Erie Management Unit

1 Fisheries Assistant

Work shifts	I	March through October	6:00am to 2:30pm
	II	March	10:30am to 7:00pm
		April and October	11:30am to 8:00pm
		May and September	12:30pm to 9:00pm
		June and August	1:30pm to 10:00pm
		July	2:30pm to 11:00pm

INTERVIEW SITES

Area A: Access sites in grid 514 (see map). Equal amounts of time should be spent at public launch ramps and at private marinas. Therefore, on even numbered Area A days interview anglers at public launch ramps in grid 514 such as Fairhaven or Deckers ramps. On odd number days Area A days conduct interviews at private marinas in grid 514 (to be named).

Area B: Access sites in grid 513 and north half of 512 (includes Selfridge public access launch, Captains Cove, American Marina, Cotton Road, Prop Basin Marina, Sunup Marina, Lagos Bosun-Walts Marina, Brandenberg PAS, Schmid Marina, Chateau Marina.

INSTRUCTIONS: Interview as many anglers at the end of their fishing trip as possible and record the data on the interview data sheets. Record data for the entire fishing party on one interview sheet. Do not interview charter boat anglers. Check all boats coming back to the launch ramps/access areas and **do not forget to record non-fishing (pleasure boats, but not sailboats or jet skis) on your interview form.** For non-fishing boats, record all data up to and including 'Day of week' on the interview form.

Grid numbers are used for both fishing sites and interview sites (see enclosed maps). If you interview an angler party in grid 514, but they actually fished in grid 513, then 513 is the fishing site number and 514 is the interview site number. If the angler party fished in more than one grid, then the fishing site number would be the grid number where most of the fish were caught or most of the fishing effort took place. If the angler party fished outside Michigan waters, in other words in Canadian waters, for the entire fishing trip do not record the interview. If the angler party spent 50% or more of their time fishing in Michigan waters, record the interview data.

For tournament angler parties: In addition to recording the fish harvest and other appropriate information also **code PKS as 00** under Fish Caught and Kept. This will help us identify angler parties that are actively fishing in a Fishing Tournament from all other anglers.

Prior to the opening of bass season (March 1 through June 14) in addition to recording the fish harvest and other appropriate information code all anglers who you think may have been fishing for smallmouth bass (catch and release) as **SMB RELEASED 00.** This coding box can be found on side two of the interview form. If the angler party responds that they were catch and release fishing for smallmouth bass, then record the actual number of smallmouth bass released. To determine whether on not an angler party may have been targeting smallmouth prior to the season **observe their fishing gear.** A bass type boat or bass type lures on their rods is sufficient reason to code SMB released as 00.

BIOLOGICAL SAMPLING INSTRUCTIONS

Biological data should be collected randomly from the sport catch for the areas listed below. The numbers of samples for each species listed for each month should be STRICTLY FOLLOWED!

Area A

SPECIES	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
YEP	25	25	25	25	25	25	50	50
SMB				50	25	25	25	25
WAE	50	50	25	25	25	25	25	25
MUS				ALL	ALL	ALL	ALL	ALL

Area B

SPECIES	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
YEP	25	25	25	25	25	25	50	50
SMB				50	25	25	25	25
WAE	50	50	25	25	25	25	25	25
MUS				ALL	ALL	ALL	ALL	ALL

St. Clair River
2004 Creel Census Schedule
Lake Erie Management Unit

1 Fisheries Assistant

Work shifts	I	March through October	6:00am to 2:30pm
	II	March	10:30am to 7:00pm
		April and October	11:30am to 8:00pm
		May and September	12:30pm to 9:00pm
		June and August	1:30pm to 10:00pm
		July	2:30pm to 11:00pm

INTERVIEW SITES

Area A: Lower St. Clair River, grids 515 and 516
Includes the following access sites; Algonac public launch, Algonac municipal launch ramp and the Marine City public access ramp.

Area B: Upper St. Clair River, grids 517, 518 and 519
Includes the following access sites; St. Clair launch ramp, St. Clair Harbor, Marysville municipal ramp and 12th Street ramp (Port Huron)

INSTRUCTIONS: Interview as many anglers at the end of their fishing trip as possible and record the data on the interview data sheets. Record data for the entire fishing party on one interview sheet. Do not interview charter boat anglers. Check all boats coming back to the launch ramps/access areas and **do not forget to record non-fishing (pleasure boats, but not sailboats or jet skis) on your interview form.** For non-fishing boats, record all data up to and including 'Day of week' on the interview form.

Grid numbers are used for both fishing sites and interview sites (see enclosed maps). If you interview an angler party in grid 515, but they actually fished in grid 517, then 517 is the fishing site number and 515 is the interview site number. If the angler party fished in more than one grid, then the fishing site number would be the grid number where most of the fish were caught or most of the fishing effort took place. If the angler party fished outside Michigan waters, in other words in Canadian waters for the entire fishing trip do not record the interview. If the angler party spent 50% or more of their time fishing in Michigan waters, record the interview data.

For tournament angler parties: In addition to recording the fish harvest and other appropriate information also **code PKS as 00** under Fish Caught and Kept. This will help us identify angler parties that are actively fishing in a Fishing Tournament from all other anglers.

As you travel your interview route, the main requirement for being at a particular site is to gather as many interviews as possible. If you have traveled the route and most of the days activity is at one site, then that is where you should spend most of your time.

BIOLOGICAL SAMPLING INSTRUCTIONS

Biological data should be collected randomly from the sport catch for the areas listed below. The numbers of samples for each species listed for each month should be STRICTLY FOLLOWED!

Lower St. Clair River (Grids 515 and 516)

SPECIES	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
YEP	25	25	25	25	25	25	50	50
SMB				50	25	25	25	25
WAE	50	50	25	25	25	25	25	25
MUS				ALL	ALL	ALL	ALL	ALL

Upper St. Clair River (Grids 517, 518 and 519)

SPECIES	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
CHS	25	25	25					
RBT	25	25	25					
YEP	25	25	25	25	25	25	50	50
SMB				50	25	25	25	25
WAE	50	50	25	25	25	25	25	25
MUS				ALL	ALL	ALL	ALL	ALL

LAKE ST. CLAIR – Grids 507 and 509
2004 WINTER CREEL SURVEY
Lake Erie Management Unit

1 Fisheries Assistant

Work shifts	I	8:00 am to 4:30 pm
	II	10:30 am to 7:00 pm

INTERVIEW SITES

Area A Grid 507 – includes St. Clair Shores Municipal ramp at the end of 11 Mile road, St. Clair Shores Blossom Heath Park & launch, Gross point Woods ramp

Area B Grid 509 – includes Metro Beach, Ginos Surf restaurant parking, DNR Spillway PAS, Spillway Canal county parking, Harrison Twp. Park near Shook road, St. Clair Shores Memorial Park at Masonic road.

INSTRUCTIONS: Interview as many anglers at the end of their fishing trip as possible and record the data for the entire fishing party on the interview data sheet.

PLEASE NOTE: collect interviews from all the following fishing modes.

1) **Shanty** – all anglers using stationary and portable shanties; remember to ask whether they were fishing in a shanty or on open ice (#2). Portable shanties are considered "Shanty" fishing not open ice. This is because the air pilot cannot differentiate the 2 types of shanties while doing counts from the airplane.
2) **Open Ice** – anglers fishing on the lake, off shore, or off any docks (such as in the marinas) this is only used when the anglers are fishing THROUGH the ICE in any of the locations.
3) **Boat** – all anglers using boats
4) **Pier/Dock or Shore** – use these modes ONLY when no ice is present in the area. Interview the anglers fishing open waters from shore or on pier/docks.

On the days for which times are indicated, go out onto the ice and do a shanty occupancy check. DO NOT VENTURE OUT ON UNSAFE ICE! Just because some angler is out there fishing does not mean the ice is safe, check it yourself-- **DO NOT TAKE CHANCES**. Record the total number of ice shanties (both portable and non-portable) you checked, the number occupied, and the number that were not occupied on the ice shanty data sheet (attached at the rear of this schedule). You should attempt to check all shanties in your work area. However, there can be times when there are so many ice shanties that it is impractical to check them all, and then do a sub-sample. A sub-sample means to check a representative number of ice shanties, for instance 50 of 100. A shanty occupancy check should last a maximum of 2 hours. REMEMBER TO RECORD THE NUMBER OF SHANTIES YOU ACTUALLY CHECKED AND NOT THE TOTAL NUMBER OF SHANTIES ON THE ICE.

Biological data should be collected throughout the winter as per the guidelines on the following page.

BIOLOGICAL SAMPLING INSTRUCTIONS

Biological data should be collected randomly from the sport catch for the grids listed below. The numbers of samples for each species listed for each month should be STRICTLY FOLLOWED!

Grids 507 and 509

SPECIES - STRUCTURE	JANUARY	FEBRUARY
YEP - scales	100	100
WAE – dorsal spine ray	50	50
NOP – dorsal spine ray	50	50

LAKE ST. CLAIR – Grid 512
WINTER CREEL SURVEY 2004
Lake Erie Management Unit

1 Fisheries Assistant

Work shifts	I	8:00 am to 4:30 pm
	II	10:30 am to 7:00 pm

INTERVIEW SITES

Area A Access sites in **northern ½** of Grid 512 – includes Brandenburg Park, Cotton Road (where it intersects with Jefferson), and Selfridge PAS (the southern boundary for area A)

Area B Access sites in **southern ½** of Grid 512 – includes Garwoods parking lot, Harley PAS, Sea Cadets parking lot on S. River Road (access to Clinton River & Archer canals), Bridgeview parking lot on N. River Road (Clinton River access)

INSTRUCTIONS: Interview as many anglers at the end of their fishing trip as possible and record the data for the entire fishing party on the interview data sheet.

PLEASE NOTE: collect interviews from all the following fishing modes.

1) **Shanty** – all anglers using stationary and portable shanties; remember to ask whether they were fishing in a shanty or on open ice (#2). Portable shanties are considered "Shanty" fishing not open ice. This is because the air pilot cannot differentiate the 2 types of shanties while doing counts from the airplane.
2) **Open Ice** – anglers fishing on the lake, off shore, or off any docks (such as in the marinas) this is only used when the anglers are fishing THROUGH the ICE in any of the locations.
3) **Boat** – all anglers using boats
4) **Pier/Dock or Shore** – use these modes ONLY when no ice is present in the area. Interview the anglers fishing open waters from shore or on pier/docks.

On the days for which times are indicated, go out onto the ice and do a shanty occupancy check. DO NOT VENTURE OUT ON UNSAFE ICE! Just because some angler is out there fishing does not mean the ice is safe, check it yourself-- **DO NOT TAKE CHANCES**. Record the total number of ice shanties (both portable and non-portable) you checked, the number occupied, and the number that were not occupied on the ice shanty data sheet (attached at the rear of this schedule). You should attempt to check all shanties in your work area. However, there can be times when there are so many ice shanties that it is impractical to check them all, and then do a sub-sample. A sub-sample means to check a representative number of ice shanties, for instance 50 of 100. A shanty occupancy check should last a maximum of 2 hours. REMEMBER TO RECORD THE NUMBER OF SHANTIES YOU ACTUALLY CHECKED AND NOT THE TOTAL NUMBER OF SHANTIES ON THE ICE.

Biological data should be collected throughout the winter as per the guidelines on the following page.

BIOLOGICAL SAMPLING INSTRUCTIONS

Biological data should be collected randomly from the sport catch for the grids listed below. The numbers of samples for each species listed for each month should be STRICTLY FOLLOWED!

Grid 512

SPECIES - STRUCTURE	JANUARY	FEBRUARY
YEP - scales	100	100
WAE – dorsal spine ray	50	50
NOP – dorsal spine ray	50	50

LAKE ST. CLAIR – Grid 513 and Grid 514
WINTER CREEL SURVEY 2004
Lake Erie Management Unit

1 Fisheries Assistant

Work shifts	I	8:00 am to 4:30 pm
	II	10:30 am to 7:00 pm

INTERVIEW SITES

Area A Grid 513 – includes New Baltimore Park, Swan Creek, Ruedisale Park, and there are private lands used to access the ice.

Area B Grid 514 – includes Fairhaven PAS, Raft parking lot, possible at Deckers PAS (if no ice)

INSTRUCTIONS: Interview as many anglers at the end of their fishing trip as possible and record the data for the entire fishing party on the interview data sheet.

PLEASE NOTE: collect interviews from all the following fishing modes.

1) **Shanty** – all anglers using stationary and portable shanties; remember to ask whether they were fishing in a shanty or on open ice (#2). Portable shanties are considered "Shanty" fishing not open ice. This is because the air pilot cannot differentiate the 2 types of shanties while doing counts from the airplane.
2) **Open Ice** – anglers fishing on the lake, off shore, or off any docks (such as in the marinas) this is only used when the anglers are fishing THROUGH the ICE in any of the locations.
3) **Boat** – all anglers using boats
4) **Pier/Dock or Shore** – use these modes ONLY when no ice is present in the area. Interview the anglers fishing open waters from shore or on pier/docks.

On the days for which times are indicated, go out onto the ice and do a shanty occupancy check. DO NOT VENTURE OUT ON UNSAFE ICE! Just because some angler is out there fishing does not mean the ice is safe, check it yourself-- **DO NOT TAKE CHANCES**. Record the total number of ice shanties (both portable and non-portable) you checked, the number occupied, and the number that were not occupied on the ice shanty data sheet (attached at the rear of this schedule). You should attempt to check all shanties in your work area. However, there can be times when there are so many ice shanties that it is impractical to check them all, and then do a sub-sample. A sub-sample means to check a representative number of ice shanties, for instance 50 of 100. A shanty occupancy check should last a maximum of 2 hours. REMEMBER TO RECORD THE NUMBER OF SHANTIES YOU ACTUALLY CHECKED AND NOT THE TOTAL NUMBER OF SHANTIES ON THE ICE.

Biological data should be collected throughout the winter as per the guidelines on the following page.

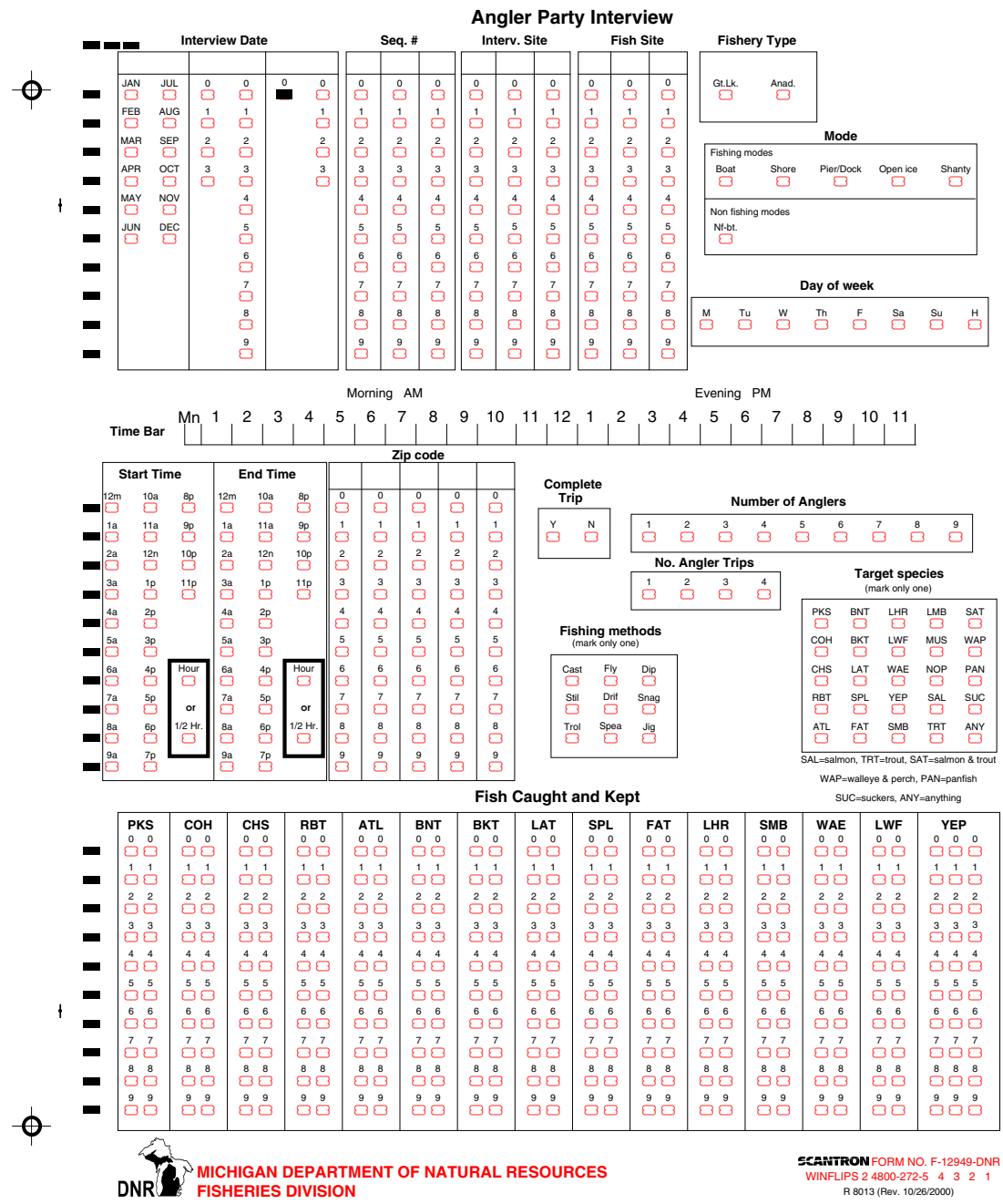
BIOLOGICAL SAMPLING INSTRUCTIONS

Biological data should be collected randomly from the sport catch for the grids listed below. The numbers of samples for each species listed for each month should be STRICTLY FOLLOWED!

Grids 513 & Grid 514

SPECIES - STRUCTURE	JANUARY	FEBRUARY
YEP - scales	100	100
WAE – dorsal spine ray	50	50
NOP – dorsal spine ray	50	50

Appendix C-1.– Bubble form used by creel clerks to record party interview data during creel survey on the Detroit River, Lake St. Clair, and St. Clair River, 2002 and 2003.



(Side 2, Angler Interview)

Fish Caught and Kept

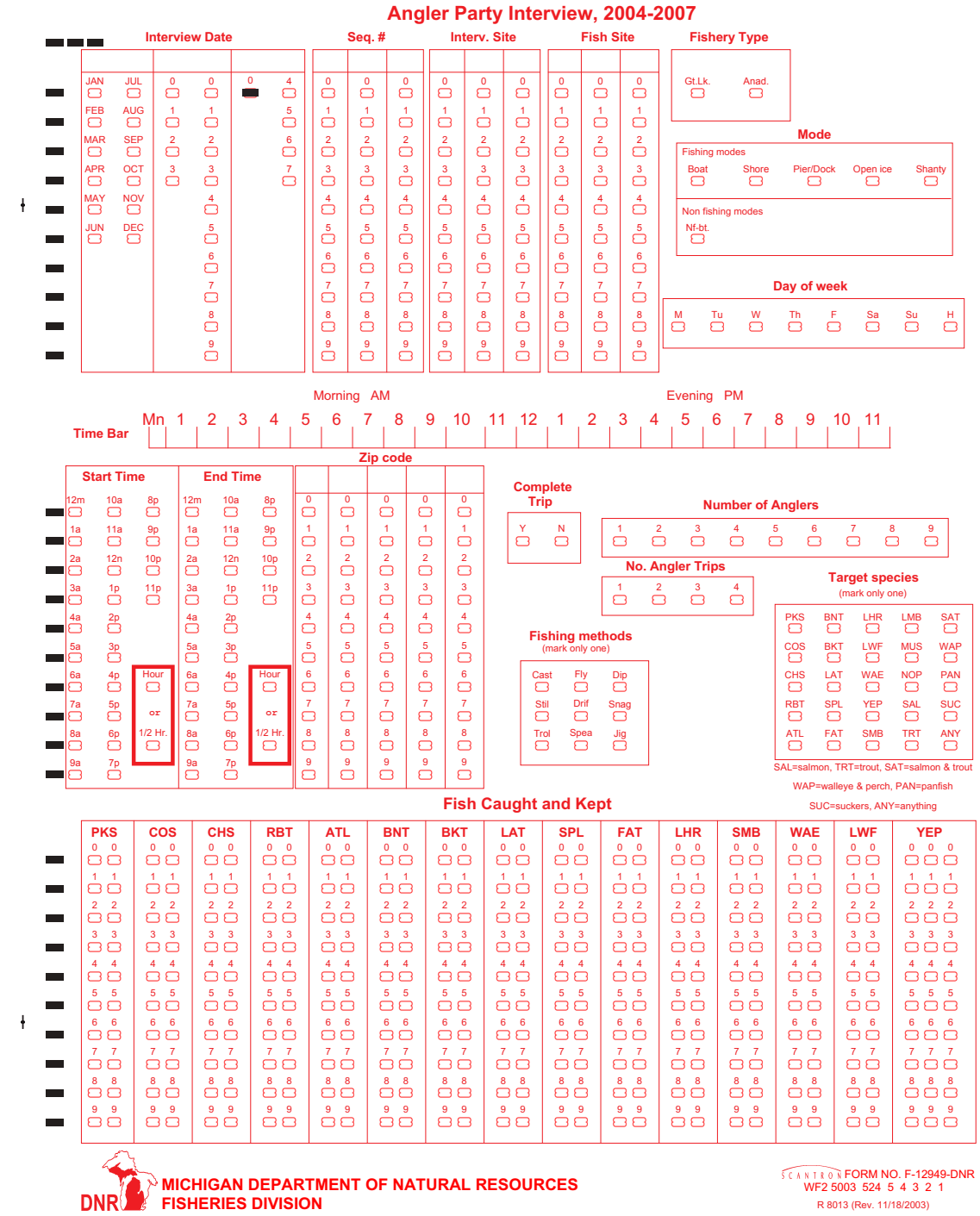
WHB	WHP	NOP	MUS	TMU	BCR	BLG	LMB	PSF	RKB	CCF	DRU	CWS	RWF	OTH
0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2
3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3
4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4
5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5
6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6
7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7
8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8
9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9

Fish Caught and Released (Legal size only)

COH	CHS	RBT	BNT	LAT	SMB	LMB	WAE	NOP	MUS	WHB				
0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2
3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3
4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4
5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5
6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6
7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7
8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8
9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9

R 8013 (Rev. 10/26/2000)

Appendix C-2.– Bubble form used by creel clerks to record party interview data during creel survey on the Detroit River, Lake St. Clair, and St. Clair River, 2004 and 2005.



(Side 2, Angler Interview, 2004-2007)

Fish Caught and Kept

WHB	WHP	NOP	MUS	TMU	BCR	BLG	LMB	PSF	RKB	CCF	DRU	CWS	RWF	OTH
0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2
3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3
4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4
5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5
6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6
7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7
8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8
9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9

Fish Caught and Released (Legal size only)

COS	CHS	RBT	BNT	LAT	SMB	LMB	WAE	NOP	MUS	WHB				
0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2
3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3
4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4
5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5
6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6
7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7
8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8
9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9

Fish Caught and Released (NON-LEGAL size only)

COS	CHS	RBT	BNT	LAT	SMB	LMB	WAE	NOP	MUS	WHB				
0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2	2 2
3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3	3 3
4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4	4 4
5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5	5 5
6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6	6 6
7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7	7 7
8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8	8 8
9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9	9 9

R 8013 (Rev. 11/18/2003)