A synthesis of sport fishing activity in the St. Marys River May through October 1999 – 2001 and 2005 – 2009

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Abstract

The St. Marys River sport fishery was surveyed by the Ontario Ministry of Natural Resources and Michigan Department of Natural Resources between 1999 and 2009. The first survey in 1999-2000 covered the open water sport and subsistence fisheries (May to October) and localized ice fisheries where they occurred in the river. The 1999 survey determined that the sport fishery was the single largest fishery in the river. Subsequent surveys focused on the May to October sport fishery only (2000-2001 and 2005-2009), and did not cover the entire river. Estimates for non surveyed sites were extrapolated from surveyed sites where possible to determine riverwide fishing pressure (hours), harvest and harvest rates. Estimates of St. Marys River open water sport fishing pressure compared to that of the Michigan waters of Lake Huron continue to demonstrate the importance of this fishery. Sport effort for years when whole river estimates could be calculated ranged between 27.7% and 44.8% of the effort in the same year for the Michigan waters of Lake Huron. Annual harvest and harvest rates for cisco (*Coregonus artedii)*, northern pike (*Esox lucius*), smallmouth bass (*Micropterus dolomieu*), walleye (*Sander vitreus*) and yellow perch (*Perca flavescens)* remained stable or increased from 1999 levels. Species targeting by anglers differed between survey sites, but walleye, yellow perch and cisco were the most commonly targeted species overall. Open water seasonal fisheries occur in specific locations in the river for cisco, salmon, and rainbow trout (*Oncorhynchus mykiss*) and reflect life history activities for these species. Other species fisheries such as walleye and yellow perch are more broadly distributed in the river. Angling activity covered the entire river with most anglers residing in the St. Marys River watershed. With the exception of the rapids fishery, most anglers fished from boats employing either trolling or still fishing. Species preferences between anglers with Michigan licences differed from those with Ontario licences. Angling regulations differ between the two jurisdictions but became more closely aligned in 2008 following changes to seasons, and limits in Ontario waters. For these surveys few anglers reported achieving either the Michigan or Ontario limit for smallmouth bass, northern pike, walleye or yellow perch.

Fisheries managers have struggled to finance these partial river surveys yet see important value in continuing to monitor the sport fishery. Covering the entire river during each survey is preferred to extrapolation of partial surveys to determine riverwide effort and harvest. It is proposed that whole river surveys be conducted on a regular schedule in the same year as joint fish population surveys are conducted to present periodic whole river data on the status of sport fish and other species in the St. Marys River.

Introduction

The Michigan Department of Natural Resources (MDNR) and Ontario Ministry of Natural Resources (OMNR) have undertaken seven open water angler surveys of the St. Marys River since the first joint full year survey of 1999-2000 (Fielder et al. 2002). The 1999-2000 survey looked at the harvest of fishes from all sources of extraction. Two important findings from that first survey were noted: the sport fishing effort estimate was large (equal to 36% of the effort exerted for that year in the Michigan waters of Lake Huron) and licensed sport anglers contributed 98% of the total fishing effort (Fielder et al. 2002). As a result, subsequent surveys reported below focused on the May to October licensed sport fishery for the years 2000, 2001, and 2005-2009. These surveys did not cover the entire river in any one year. Because of the partial coverage, estimates for the entire river rely on the development of effort and harvest for non-surveyed sites based upon results extrapolated from estimates for those sites surveyed in the same year (see methods section).

This creel survey is intended to monitor angler harvest and effort trends and describe angling activity. These trends when considered alongside other fish population assessment efforts on the river (Fielder et al. 2007) produce the information needed to support fishery management including the development of Fish Community Objectives for St. Marys River/Lake Huron. While fisheries management agencies have yet to develop common sport fishing regulations for this binational water body they could not be achieved without this type of assessment and familiarity with angling activity. New stresses in the St. Marys River such as round goby (*Neogobius melanostomus*) and rusty crayfish (*Orconectes rusticus*) (U.S. Fish and Wildlife Service. Unpublished data. Alpena Fish and Wildlife Conservation Office, Alpena, Michigan, Lake Superior Binational Program 2010) could significantly impact the fish community in the river. The decade of angler survey and fishery independent survey (Fielder et al. 2007) data provides fishery managers with baseline data with which to assess the impacts of these and other invasive species that may colonize the river in the future. Finally, consultation with anglers, other stakeholders, and various management agencies held in 2000 by the St. Marys River Fisheries Task Group (Fielder 2002) identified the lack of fisheries data as an important impediment to addressing their concerns for maintenance of sustainable fisheries (Greenwood et al. 2002).

The St. Marys River is the connecting channel between Lakes Superior and Huron (Figure 1). The river flows south easterly from Lake Superior's Whitefish Bay for 112 km and empties into Lake Huron at De Tour, Michigan and into the North Channel of Lake Huron in Ontario. The river holds the international boundary line between Ontario, Canada and Michigan, United States of America. While the resident fish community is described by Duffy and Batterson (1987) and Ryder and Kerr (1978) as a percid one, the diversity of habitats in the river and linkages to Lakes Huron and Superior result in a combination of transient and resident warm, cool and coldwater species (St. Marys River RAP Team 1992). The number of fish species in the river now exceeds 74 with the recent discovery of previously unrecorded native species and the arrival of invasive non native species. Of resident species of interest to anglers, northern pike (*Esox lucius*), smallmouth bass (*Micropterus dolomieu*), walleye (*Sander vitreus*) and yellow perch (*Perca flavescens)* are well distributed in the river. These four species, along with cisco (*Coregonus artedii)*, will be highlighted throughout this report. The river, rapids and several St. Marys tributaries are seasonally used by salmonid species from Lakes Huron and Superior for feeding or spawning and nursery. Aquatic habitats vary throughout the river's length often changing abruptly from one habitat type to another. Habitats are generally characterized as open water, embayments, sand and gravel beaches, rapids and emergent wetlands (Duffy and Batterson 1987). The lower reaches of the river, Potagannissing Bay, Raber Bay and Munuscong Bay, are more lacustrine in form and at least seasonally contain feeding aggregations of cisco or migrating

Pacific salmons and rainbow trout (*Oncorhynchus mykiss*) resulting in short term, seasonal fisheries. Considerable shoreline and channel alteration and hardening, dredging, and flow control and flow redirection have occurred over the past two centuries. Both the distribution of habitat types and anthropogenic stresses influence the species anglers target in the various river reaches and the intensity and seasonality of fishing effort.

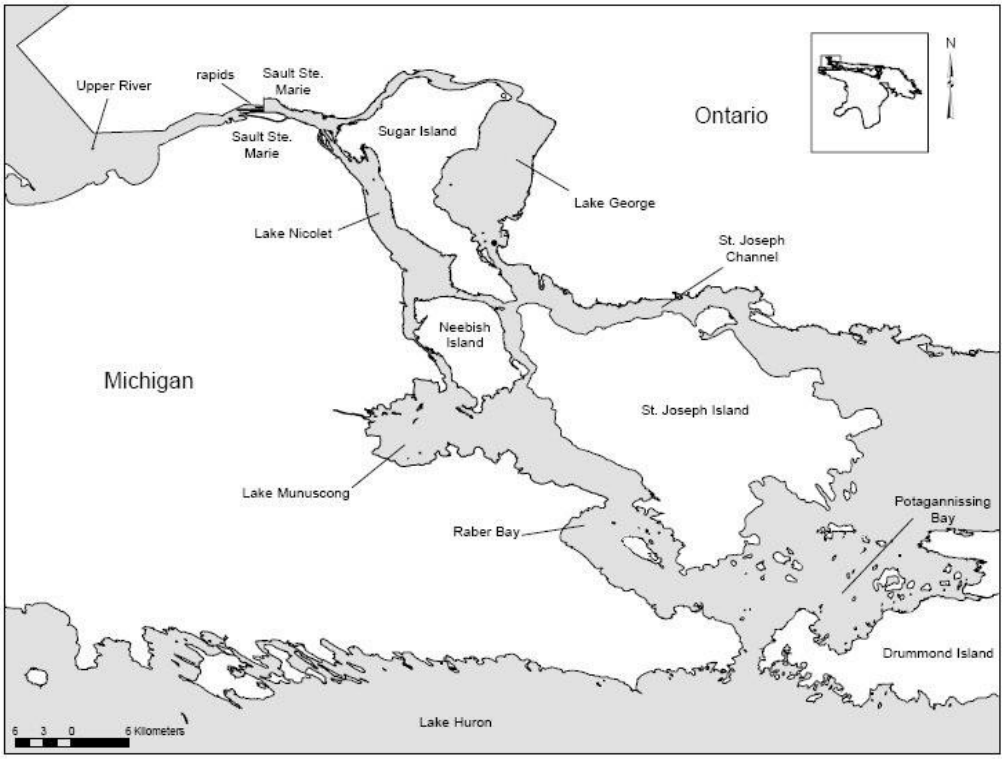

Figure 1. Map of the St. Marys River

Methods

These surveys followed the methodology of the Michigan Department of Natural Resources State Wide Angler Survey Program. The program oversees comprehensive annual access creel surveys on the Michigan waters of the Great Lakes and inland. The results in this report are derived from the St. Marys River portion of this creel census performed by MDNR and Ontario Ministry of Natural Resources during the open water season of 1999 - 2001 and 2005-2009. While 2000 and 2001 harvest and harvest rates are reported in Fielder et al. (2002) these two surveys did not cover the entire river (Site 405 was excluded). Data from those two years are discussed and presented in this report and are extrapolated (see below) to cover the entire river. During the years 2002-2004, creel surveys were restricted to a limited portion of the Michigan winter fishery and those results are not included in this report.

Site Descriptions

The St. Marys access creel survey covered the St. Marys River from Waiska Bay, Michigan and Gros Cap, Ontario to Detour, Michigan and the waters surrounding St. Joseph Island including

the St. Joseph Channel and Potagannissing Bay waters which flow into the North Channel of Lake Huron.

For sampling purposes, the river was divided into 7 sites (Figure 2):

- Site 404: north western most sampling location. Includes the river between Point Iroquois and Gros Cap and the vessel locks in Sault. St. Marie, including Waiska, Mosquito, Ashmun, Marks and Leigh Bays. These waters are collectively referred to as the upper St. Marys River.
- Site 403: the St. Marys Rapids includes the entire rapids from the compensating gates at its head to its outflow at the east end of Whitefish Island.
- Site 209: the river below the rapids, the Clergue Power Station and the vessel locks in Sault. St. Marie east and south to Neebish Island including Lake Nicolet.
- Site 208: the north channel of the river above Sugar Island to the southern tip of Sugar Island and including Echo Bay and Lake George.
- Site 405: the St. Joseph Channel from the south tip of Sugar Island east to its outflow into to the North Channel of Lake Huron.
- Site 207: the river south of Neebish Island to the village of Detour, including Lake Munuscong and Raber Bay.
- Site 210: Potagannissing Bay between St. Joseph Island and Drummond Island.

S*urvey design*

The creel survey is based on a stratified design using simple random sampling within strata (Rakoczy and Svoboda 1995, Lockwood et al. 1999). Strata include: site, weekday type (weekday, weekend, holiday), and mode of fishing (boat, shore, pier). All weekend days and 3 randomly selected weekdays are sampled throughout the survey. The entire angling day from dawn to 1 hour past dusk is covered. All interviews took place at the completion of angling activity.

In some years Michigan clerks were designated to spend half their contract surveying the St. Marys River and the remainder surveying the adjacent Les Cheneaux Islands waters outside the river boundary. The single Ontario clerk had interview effort divided between two sites in 2005, 2008 and 2009

The number of anglers fishing on shore and number of boats in the water were counted to obtain total fishing effort. For most of the St. Marys River, these counts were made from fixed-wing aircraft, because ground counts were not feasible due to multiple access points and restricted visibility for most sites. Counts in Site 403, the St. Marys rapids, were not done by aircraft due to its proximity to airport flight paths. Instead counts were made from the ground by the creel clerk as the entire site is visible from various vantage points along its length.

Creel clerks intercepted anglers at boat launching ramps, marinas, piers, and along the shoreline. For Site 403, interviews occurred at the Ontario Sault Ste. Marie recreation lock crossing, the single public access/exit point for the St. Marys rapids. Clerks interviewed both boating angling parties (one or more anglers fishing together) and non angling boating parties. The inclusion of

interviews of non angling boating parties was important to support the aerial count estimations of boats engaged in angling from all boats counted since the aircraft could not differentiate between angling boats and boats serving other purposes.

Anglers were asked questions related to their fishing trip to obtain angler effort (hours, trips, days fished), harvest (fish kept), and catch (fish kept or released). Questions pertaining to angling preferences included mode of fishing, location, target species, bait used, fishing method (trolling, casting, still fishing, fly fishing, jigging), and number of lines used. Angler personal details such as age, sex, zip and postal code or country of origin provided supporting data.

Harvest and effort estimates are calculated for each stratum and summed to give monthly and seasonal estimates (Appendix 1 Table 1, Appendix 2). Harvest rates are calculated for each site by season (Appendix 2) and for the entire river using total harvest and total effort for all species (Appendix 1 Table 1). Targeted effort was only calculated for selected species (Table 3) based on interviews targeting these species. 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 was composed of one or more fishing excursions during a 24-hour period. Error bounds for all harvest and effort estimates in this report are defined as 2 standard errors of the mean (Lockwood et al. 1999).

Comparisons of results over the entire data series (1999-2001 and 2005-2009) are confounded by the fact that not all sites were sampled in all years, due to constrained budgets. To follow trends in the fishery and make year-to-year comparisons, fishery information for sites with unsampled years was extrapolated (see *Extrapolation Method* below) from adjacent sites for the years in which all sites were sampled (Table 1). In 2008 and 2009 extrapolation for non-surveyed sites was not possible due to lack of an adjacent sampled site from which to extrapolate (e.g. one of 208 or 209 or one of 207 and 210, Table 1 and Figure 2). This is reflected in tables and figures in this report and in Appendix 1 which reports whole river effort, harvest and harvest per hour up to 2007 only. Tables 2 to 6 and Figures 3 and 4 contain riverwide estimates that include extrapolated values for sites that were not surveyed up to 2007. In 2006, no interviews were conducted for the Site 405, so estimates were generated from 2005 interviews and 2006 counts.

Results reported in Fielder et al. (2002) for the 1999 survey are repeated in this survey for review continuity between reports. The estimation software was revised post 1999 (Tracy Kolb, MDNR, personal communication, 2011). This revision if applied to the 1999-2000 data would have resulted in slight changes to estimates. We chose to use the original values reported in Fielder et al. (2002).

Site 403 supports a potadromous salmonid fishery from Lake Huron. It was surveyed less often and for shorter duration until 2008 (Table 1.) Extrapolation for non-surveyed years was not possible as there are no comparable adjacent sites. Results for the May to June rainbow trout fishery are reported in detail in a separate publication (Smith and Greenwood 2011 in press). Angler summary information for years when the rapids were surveyed is included in this report.

Table 1. Coverage of St. Marys River sites during 1999-2001 and 2005-2009.
E indicates coverage is complete and estimates can be calculated using traditional creel methods. NS means not sampled and harvest and effort numbers were obtained though extrapolation methods. NEx means the site was not sampled and harvest and effort numbers could not be obtained through extrapolation methods.

	Year							
Site	1999	2000	2001	2005	2006	2007	2008	2009
207	E	E	E	E	E	E	NEx	E
208	E	E	E	E	E	E	E	NEx
209	E	E	E	NS	E	NS	E	NEx
210	E	E	E	E	E	E	NEx	E
403	E	NEx	NEx	NEx	NEx	*E	E	E
404	E	NS	NS	NS	NS	NS	NEx	NEx
405	**E	NS	NS	E	**E	E	NEx	E

*Interviews were only conducted during May and June for the rainbow trout fishery
** In 1999, there were no October interviews. October counts were combined with September interviews to generate estimates. In 2006, no interviews were conducted so estimates were generated from 2005 interviews and 2006 counts.

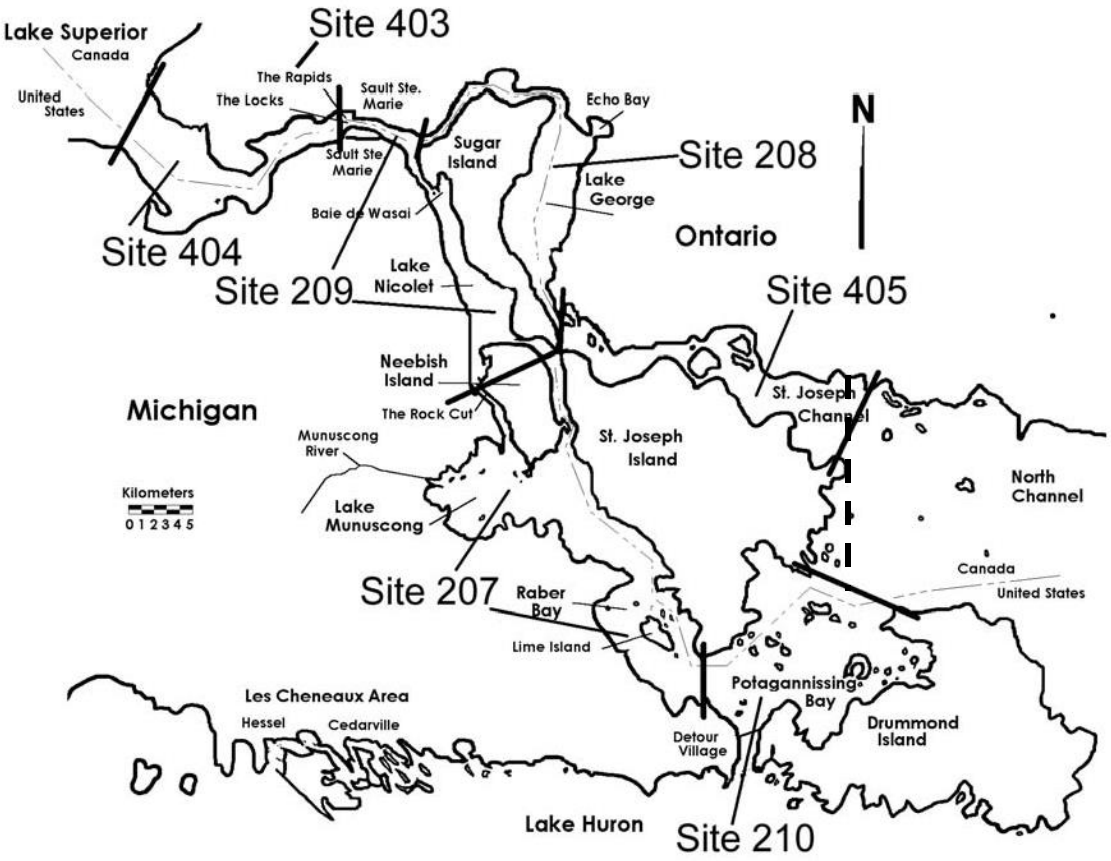

Figure 2. Creel survey interview sites for the St. Marys River. Dashed line notes the western boundary for commercial fishing in the North Channel

Extrapolation method

To calculate harvest (or effort) for site 209 (2005, 2007), site 404 (2000-2001, 2005-2007), and site 405 (2000, 2001), first we calculated a year and species-specific ratio-value, or "R";

$$R = \frac{X_u + X_{207} + X_{208} + X_{210}}{X_{207} + X_{208} + X_{210}}$$

where X_u is a year and species-specific harvest (or effort) value for a site that will later be extrapolated (209, 404, or 405), and X_{207}, X_{208}, and X_{210} are harvest (or effort) values for the same year and species for sites 207, 208, and 210 (reference sites that have been sampled throughout the entire time series). For sites 404 and 405 we only calculated one R-value, using data from 1999. For site 209, we calculated three R-values (1999, 2000, and 2001) and then used an average R-value for subsequent estimates.

Once we calculated an R-value for each site, we then calculated the harvest (or effort) value during the unsampled years where,

$$H\,(or\ E) = \left[R \times (X_{207} + X_{208} + X_{210})\right] - X_{207} + X_{208} + X_{210}$$

Where H is harvest (or E is effort), R is the ratio, and X_{207}, X_{208}, and X_{210} are the harvest (or effort) values for the reference sites in the unsampled year. Variances and standard errors were calculated using standard variance rules found in introductory science textbooks (Peters et. al. 1974).

Biological Sampling

Creel clerks collected biological samples for cisco, muskellunge (*Esox masquinongy*), northern pike, largemouth bass (*Micropterus salmoides*), smallmouth bass, lake whitefish (*Coregonus clupeaformis*), walleye, yellow perch and all salmonids in the harvest where possible. These data included total and fork lengths, weight, sex (when possible) and aging structures (scales or spines). Clerks attempted to randomly sample a minimum of 25 fish of each species per survey site per month. Rainbow trout samples in Site 403 were collected from a combination of angler harvest at the interview location and at the rapids before fish were released. A separate crew of samplers was used to collect samples from catch and release rainbow trout anglers. Since most anglers practiced catch and release this approach was necessary to collect enough samples to permit determination of spawning population attributes

Fish were aged using scales or dorsal spines for all but trout, salmon and whitefish for which only scales were collected.

Results

Interview Effort

During the open water period of the surveyed years (2000, 2001, 2005 - 2009) a total of 711 to 2 090 interviews were recorded per year (average 1 287). Compared to the 1999 May to October survey period of 3 081 interviews. Shore interviews of anglers including the St. Marys Rapids were between 10 and 318 with an average of 153 per year. Boat interviews for anglers were between 557 and 1 712 interviews (average 922). Interviews of non angling boaters made up between 15 and 293 (average 142). The wide range in contact numbers for each type of interview location reflects the sites surveyed in any given year (e.g. some sites have more shore fishing opportunities) and whether the clerks were assigned full or half time to the river survey (interview effort was not uniform for each year).

Angling Effort

Total effort per year by site and for the entire river is presented in Table 2. Annual river-wide effort for all species was highest in 2001 (565,095 hours) and lowest in 2005 (427,314 hours). Total river effort for 2008 and 2009 could not be calculated as noted in the Methods. Targeted effort for walleye, yellow perch and salmonines is presented in Table 3.

Table 2. Estimated total effort (in hours) for all species from open-water sport fisheries in the St. Marys River 1999-2001 and 2005-2007. Italics denotes data obtained though the extrapolation methods described in the Methods Section. Two standard errors of the mean are in parentheses.

	St. Marys River – all sites combined						
Year	207	208	209	210	404	405	Total
1999	112 283	96 732	68 441	140 743	58 561	65 307	556 399
	(19570)	(16 256)	(11 010)	(27 674)	(11 454)	(12 611)	(42 820)
2000	93 301	60 816	60 564	131 107	*55 616*	*61 572*	462 976
	(15 420)	(12 794)	(11 511)	(20 871)	*(46 434)*	*(76 874)*	(183 904)
2001	124 823	97 111	76 694	123 878	*67 671*	*74 918*	565 095
	(28 135)	(17 919)	(14 401)	(17 646)	*(64 802)*	*(106 689)*	(249 592)
2005	68 289	51 245	*54 378*	131 887	*47 410*	74 105	427 314
	(12 840)	(10 260)	(*232 480*)	(35 124)	*(60 886)*	(14 371)	(365 960)
2006	93 025	70 944	84 845	152 254	*58 378*	*52 984	512 430
	(24 502)	(14 685)	(15 437)	(36 035)	*(72 178)*	*(9 645)	(172 483)
2007	139 310	35 273	*71 430*	183 668	*62 276*	45 112	537 069
	(34 103)	(8 859)	*(313 367)*	(60 215)	*(107 502)*	(11 057)	(535 103)

* In 2006, no interviews were conducted for Site 405, so estimates were generated from 2005 interviews and 2006 counts.

Table 3. Estimated targeted effort (in hours) for selected species for the open-water sport fisheries in the St. Marys River 1999-2001 and 2005-2007. Two standard errors of the mean are in parentheses.

	Year					
Species	1999	2000	2001	2005	2006	2007
Walleye	126 988	119 122	161 526	168 031	168 333	200 006
	(25083)	(24 654)	(28 699)	(53 463)	(37 817)	(63 957)
Yellow perch	89 238	60 607	78 869	32 414	58 191	65 326
	(18 255)	(16 698)	(20 924)	(14 026)	(23 031)	(30 758)
Salmonids	122 280	56 988	79 529	76 419	49 241	66 488
	(20 238)	(14 007)	(21 306)	(43 360)	(14 674)	(44 801)

Harvest

Twenty-three species were reported harvested over the time series, however not every species was reported in each survey. (Appendix 1 Table 1). In addition a number of rarely reported species are not listed by name in Appendix 1 Table 1 but rather listed collectively as "other" species. Ten species were reported harvested every year. Two exotic species white bass (*Morone chrysops*) (2001, 2005, 2007 and 2009 surveys) and white perch (*Morone americana*) (2001 and 2007 surveys) were reported harvested from Site 207.

The harvest numbers for the years when total harvest could be estimated for the primary targeted species cisco, northern pike, smallmouth bass, walleye, and yellow perch are presented in Table 4 and Figure 3.

Table 4. Estimated harvest (numbers of fish) for cisco, northern pike, smallmouth bass, walleye, and yellow perch from open-water sport fisheries in the St. Marys River 1999-2001 and 2005-2007. Two standard errors of the mean are in parentheses.

	Species				
Year	Cisco	Northern Pike	Smallmouth Bass	Walleye	Yellow perch
1999	31 258	5 408	1 188	9 890	62 646
	(40 040)	(5 170)	(1 797)	(8 255)	(32 274)
2000	113 621	12 402	3 235	17 064	86 098
	(182 114)	(17 744)	(9 001)	(17 768)	(100 284)
2001	131 662	14 336	3 653	39 568	91 120
	(199 643)	(22 768)	(10 371)	(30 643)	(96 696)
2005	48 163	1 547	4 216	32 134	84 097
	(92 339)	(3 516)	(10 329)	(24 882)	(96 889)
2006	168 988	14 894	5 322	38 743	118 214
	(211 690)	(18 288)	(10 567)	(46 952)	(150 617)
2007	158 141	4 231	4 030	60 733	125 391
	(372 281)	(5 322)	(7 691)	(56 668)	(180 500)

Between 1999 and 2007 high harvest numbers compared to other species (Figure 3 and Appendix 1 Table 1) continued for these five key species.

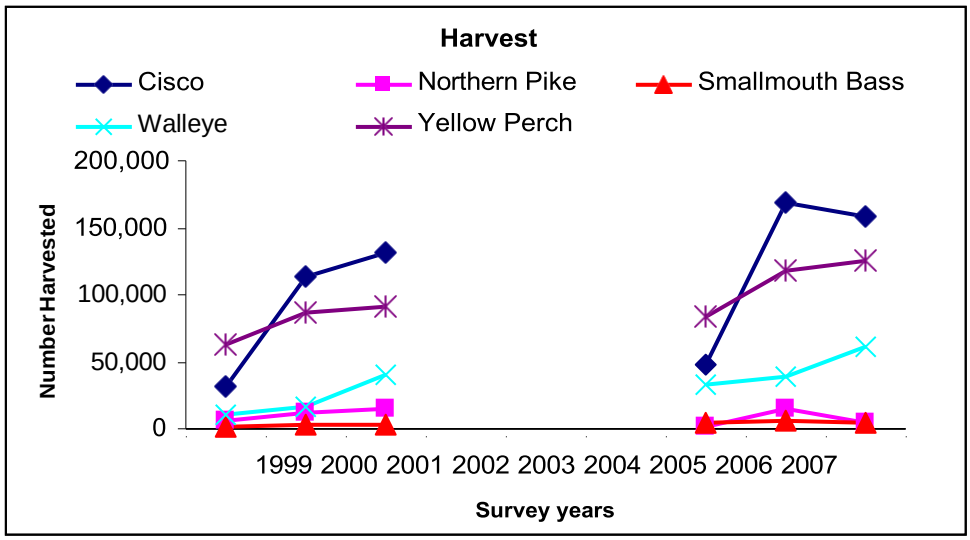

Figure 3. Trends in harvest of cisco, northern pike, smallmouth bass, walleye, and yellow perch from the St. Marys River by anglers 1999-2001, 2005-2007.

Harvest Rate:

Riverwide species specific harvest per hour based on total effort is presented in Appendix 1 Table 1 for the years it could be estimated. Site specific harvest per hour by year for cisco, northern pike, smallmouth bass, walleye, and yellow perch is presented in Appendix 1 Table 3. These rates are based upon total effort in each site for all species. Table 5 and Figure 3 summarize mean annual harvest per hour based on total effort for cisco, northern pike, smallmouth bass, walleye, and yellow perch.

Table 5. Mean annual harvest per hour for cisco, northern pike, smallmouth bass, walleye, and yellow perch (based on total effort) from open-water sport fisheries in the St. Marys River (from all sites including Potagannissing Bay), 1999-2001 and 2005-2007. Two standard errors of the mean are in parentheses. Site by site estimates are presented in Appendix 1 Table 3.

Year	Cisco	Northern Pike	Smallmouth Bass	Walleye	Yellow Perch
1999	0.0562	0.0097	0.0021	0.0178	0.1126
	(0.0721)	(0.0093)	(0.0032)	(0.0149)	(0.0586)
2000	0.1631	0.0284	0.0069	0.0376	0.1314
	(0.1688)	(0.1626)	(0.1167)	(0.1606)	(0.3123)
2001	0.1790	0.0269	0.0055	0.0687	0.1462
	(0.1766)	(0.1685)	(0.1568)	(0.1872)	(0.3438)
2005	0.0708	0.0037	0.0072	0.0747	0.1297
	(0.2116)	(0.1457)	(0.1302)	(0.2265)	(0.3742)
2006	0.2303	0.0305	0.0108	0.0830	0.1705
	(0.2176)	(0.1775)	(0.1794)	(0.2294)	(0.4210)
2007	0.1587	0.0093	0.0080	0.0997	0.1686
	(0.5180)	(0.1829)	(0.2191)	(0.3410)	(0.3787)

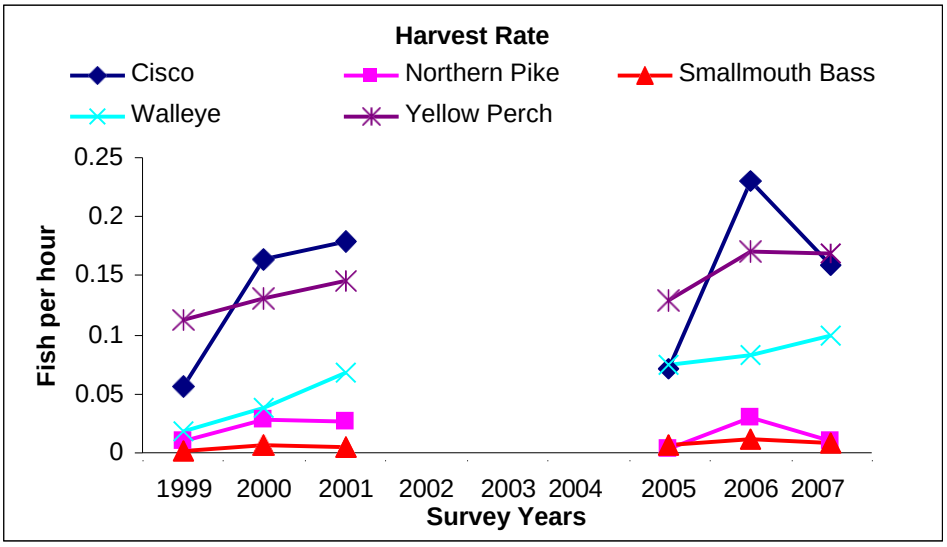

Figure 4. Trends in harvest rate for cisco, northern pike, smallmouth bass, walleye, and yellow perch (based on total effort) from the St. Marys River by anglers 1999-2001, 2005-2007.

Biological Summary of angler harvest

During the open water survey period between 384 and 909 fish were sampled per survey year (average 599) for a total of 4,195 samples. Table 6 summarizes the results for all 13 species in the sample collection. Detailed summaries for cisco, northern pike, smallmouth bass, walleye, and yellow perch are presented in Appendices 2-6. Only northern pike, smallmouth bass, walleye, and yellow perch were sampled in every survey.

Age class frequency, mean age and length by species by year are presented in Appendix 3. Cisco spanned 5 to 8 age classes within the time series with ages ranging from 2 to 9 (Appendix 3 Table 1). Northern pike spanned eight age classes with most fish between 3 and 6 years of age (Appendix 3 Table 2). Smallmouth bass age classes varied from 5 in 2000 to 8 in 2007. Most sampled smallmouth bass were between 4 and 7 years of age (Appendix 3 Table 3). From 9 to 12 walleye age classes were observed annually with most fish between 3 and 6 years of age (Appendix 3 Table 4). Yellow perch covered age classes 1 to 9 with most fish between 2 and 4 years old (Appendix 3 Table 5). Appendix 3 also presents length frequencies for the principle target species.

Table 6. Summary of biological data collected from the St. Marys River during the open water sport fishery for the years 1999-2001and 2005-2009. N = sample size and appears in parentheses if different than reported.

Species	Year	Capture sites	N	Mean Age	Mean Length (cm)	Mean Wt (g)
Atlantic Salmon	1999	209,210	15	3.2 (14)	73.0	4 810
	2001	209.0	13	2.5 (13)	65.7	3 148
	2006	209	11	3.5 (11)	65.3	3 336
	2007	210	1	3.0 (1)	59.7	2 041
	2008	208, 209	109	2.6 (95)	65.8	3 247
	2009	403	6	2.8 (6)	67.1	2 895
Chinook Salmon	1999	208, 209	214	3.0 (205)	84.0	6 698
	2000	208.0	14	3.1	86.0	7 355
	2001	208, 209, 210	14	2.9	81.0	5 621
	2006	208, 209, 210	56	3.5 (41)	77.0	4 248
	2007	208, 210, 405	62	2.7	75.0	4 090
	2008	208, 209, 403	47	2.7 (36)	75.4	4 611
	2009	207, 403	7	2.9	82.4	5 242
Coho Salmon	1999	209	18	2.7 (16)	60.2	2 694
	2006	208, 209	5	2.0 (4)	52.1	1 760
	2007	208, 405	6	2.7	69.6	3 145
	2008	208, 209, 403	36	2	57.4	1 971
	2009	403	18	2.1	64.9	2 389
Cisco	1999	207, 209, 210	138	4.2	33.8	540 (110)
	2000	207, 209, 210	88	3.8 (85)	31.6	469
	2001	207, 209, 210	58	4	33.8	
	2005	207, 210	53	3	32.4	358

Species	Year	Capture sites	N	Mean Age	Mean Length (cm)	Mean Wt (g)
	2006	210	70	5.3	36.8	526
	2007	207, 210	65	4.1	34.9	447
	2008	209	23	4.2	36.4	531
	2009	207, 210	95	4.9 (93)	38.0	606
Lake Whitefish	1999	209, 404	157	4.6 (154)	41.5	614 (156)
	2000	210	2	5	49.5	1,270
	2006	209	7	3.3	41.2	719
	2007	207, 210	12	4.9	42.9	794
	2008	209	60	3.7	38.3	584
	2009	210	6		41.6	726
	2008	208, 405	11	3.1	36.3	920
	2009	210	6	5.7	41.6	726
Largemouth Bass	2008	208, 405	11	3.2	36.3	920
	2009	210	1		38.1	771
Muskellunge	2000	207	8		108.4	8 541
	2007	207	1		94.5	
	2008	209	1	10	108.0	8 618
	2009	207	3	4	76.7	33 817
Northern Pike	1999	207, 208, 209, 210	88	4.6 (86)	66.8 (87)	1 852 (87)
	2000	207, 208, 209, 210	42	4.3	66.8	1 702
	2001	207, 208, 210	22	5.6	69.6	2 208
	2005	207, 210	15	5.1	73.4	2 734
	2006	208, 207, 209	83	3.8	65.1	1 855
	2007	207, 208, 210, 405	70	4.4	67.3	2 223
	2008	208, 209, 405	146	4.0	69.8	2 224
	2009	207, 210, 405	45	5.6 (44)	66.5	1 878
Pink Salmon	1999	208, 209	82	2.0 (56)	52.1	1 398
	2000	209	1	1	49.3	907
	2008	209, 403	31	1 (14)	44.3	661
	2009	403	2		47.2	1 089
Rainbow Trout	1999	209	29	2.5 (28)	50.3	1 595 (28)
	2000	208, 209	2	2	74.2	2 381
	2001	208, 209	2	3	61.0	2 041
	2006	209	11	2.5	44.9	1 064
	2008	208, 209, 403	25	3.5 (16)	54.6	1 970
	2009	403	69	4.8 (63)	63.7	2 757
Smallmouth Bass	1999	208	10	6.3	36.5	809
	2000	207, 210	22	6.5	39.4	1 000
	2001	207, 210	12	5.6	21.9	1 104

Species	Year	Capture sites	N	Mean Age	Mean Length (cm)	Mean Wt (g)
	2005	207, 210	52	4.7	39.2	1 010
	2006	207, 208, 209	44	5.7	41.3	1 334
	2007	207, 210, 405	57	4.8 (56)	36.5	909
	2008	208, 209	52	5.3 (51)	40.1	1 225
	2009	207, 210, 405	63	5.7	40.0	1 172
Walleye	1999	207, 208, 209, 210	205	5.4 (203)	47.1	1 042
	2000	207, 209, 210	78	5.7	48.5	1 135
	2001	207, 209, 210	211	4.1	47.7	1 046
	2005	207, 210	189	5.3	45.9	987
	2006	207, 208, 209	148	4	44.5	1 000
	2007	207, 210, 208. 405	259	4.7 (257)	44.7	1 026
	2008	208, 209	183	4.8	46.7	1 095
	2009	207, 210, 405	173	5.7 (172)	46.1	1 083
Yellow Perch	1999	207, 209, 210	258	5.5 (255)	21.9 (257)	151 (250)
	2000	207 210	127	3.4	24.2	321
	2001	207, 208, 209, 210	100	3.8	23.0	180
	2005	207, 210	150	3.7 (142)	21.2	125
	2006	207, 208, 209, 210	160	3.1 (159)	22.2	223
	2007	207, 210, 405	199	3.2 (195)	22.7	198
	2008	208, 209	174	3.3	21.5	135
	2009	207, 210, 405	190	3.5 (189)	21.3	128

Angler Interview Summary

Angler origin

Most anglers were from Michigan or Ontario with the majority of these from the local St Marys River watershed. A few anglers were from as far away as California, Colorado, Texas, Quebec and Europe. Site 403, the St. Mary rapids, was a destination fishery for many of the anglers from out of state and province.

Angling target species, angling method, mode and party size

During the open water season anglers targeted a wide variety of species (Table 7). Targeted species varied by survey site. Rainbow trout and salmon were the focus of the fishery in the St. Marys rapids (Site 403). With the exception of the fall salmon run through Site 208 (41%) and 209 (33%), walleye and yellow perch, northern pike or cisco were the most commonly targeted species in all survey sites except Site 403 (Table 8).

Table 7. Percent of angling parties in the St. Marys River open water sport fishery targeting specific species, by location as determined from all angler interviews between 1999 and 2009. The three most popular species in each site are presented in bold font. Site 404 (above the locks is not presented because it was only surveyed in 1999. N denotes number of respondents.

	Location						
Species	Munuscong Bay (207)	Lake George (208)	Lake Nicolet (209)	Potagannissing Bay (210)	Rapids (403)*	St. Joseph Channel (405)	Riverwide
Any	5.9	7.6	7.1	5.5	6.8	**29.0**	7
Atlantic Salmon		2.3	4.7	0.1	**11.7**		2.5
Cisco	**11.6**	0.2	3.3	**21.0**			**9.4**
Chinook Salmon	0.3	**24.6**	**11.8**	0.5	**7.3**	4.0	7.0
Coho Salmon		1.0	0.3		0.6		0.3
Lake Whitefish		0.6	13.7		2.4		3.4
Muskellunge	4.4	0.1	0.3				1.1
Northern Pike	**9.4**	**19.8**	3.2	5.8	0.1	**19.0**	7.8
Pan fish		0.1	0.1		0.5	0.3	0.1
Pink Salmon		1.0	5.1		7.7		2.0
Rainbow Trout		0.4	3.2		**48.4**		5.4
Salmon & Lake Trout	0.1	15.2	9.7	1.1	6.4	2.3	5.3
Salmon and Trout	0.1	1.6	**11.8**	0.3	5.9		3.5
Smallmouth Bass	3.5	2.3	0.2	2.6	0.5	4.6	2.1
Trout			0.3		0.5		0.1
Walleye	**54.6**	**17.3**	**21.0**	**24.1**	0.6	**33.9**	**27.4**
Walleye and Perch	2.2	0.6	0.4	1.5		0.3	1.1
Yellow Perch	8.1	5.3	3.8	**37.4**	0.2	5.2	**14.3**
Other		0.1	0.1	0.1	0.6	0.3	0.1
All	22.5	13.6	22.5	28.5	9.5	3.4	100%
N	2 320	1 396	2 313	2 935	979	343	10 268

*Site surveyed in May and June only in 2007 and May through October in 2008 and 2009

Species targeted by angler origin are presented in Table 8 for all surveyed locations. Excluding anglers targeting “any” species, anglers reporting a United States zip code preferred to target walleye, yellow perch, and cisco. Anglers reporting a Canadian postal code preferred to targeted walleye, salmon species and rainbow trout. The degree of targeting of cisco by Ontario anglers is not known since the July cisco fishery in Ontario waters was missed by these surveys because the principle landing point for cisco anglers on St. Joseph Island was not attended by a clerk.

Table 8. Percent of interviews reporting species targeted in the open water sport fishery of the St. Marys River by angler origin for all interviews between 1999 and 2009. N denotes number of anglers.

Species	USA	Canada
Any	5%	10%
Atlantic Salmon	1%	5%
Chinook Salmon	2%	**17%**
Coho Salmon	0%	1%
Cisco	**8%**	1%
Lake Whitefish	4%	9%
Muskellunge	1%	0%
Northern Pike	7%	4%
Pan fish	0%	0%
Pink Salmon	1%	3%
Rainbow Trout	2%	**14%**
Salmon & Lake Trout	3%	8%
Salmon & Trout	1%	**10%**
Smallmouth Bass	2%	1%
Trout	0%	0%
Walleye	**32%**	**11%**
Walleye & Perch	**16%**	1%
Yellow Perch	**17%**	5%
N	11 787	2 576

Anglers fishing the rapids (Site 403) seasonally targeted different species (Table 9). May and June anglers targeted rainbow trout, while late June and summer anglers fished for Atlantic salmon and salmon and trout (essentially rainbow trout). August and September anglers targeted rainbow trout, Atlantic, Chinook, coho and pink salmon. October saw a renewed interest in rainbow trout (36.3% of interviews) and a focus on the late fall coho salmon run.

Table 9. Percent of species targeted each month by anglers in May and June of 2007 and May through October in 2008 and 2009 for Site 403 (St. Marys rapids). N is the number of respondents.

Month	Rainbow trout	Atlantic Salmon	Salmon & Trout	Chinook Salmon	Pink Salmon	Coho Salmon	Salmon & Lake Trout	Any species	N
May	95.3	0.0	0.4					4.3	258
June	74.3	13.2	4.9				2.1	5.6	144
July	4.9	62.3	16.4				3.3	13.1	61
August	5.0	26.7	25.0	11.7			15.0	16.7	60
September	4.4	4.4	16.2	10.3	19.1		45.6		68
October	36.3		17.5	20.0		6.3	17.5	2.5	80

Fishing mode and method for all sites except the rapids (Site 403) and upper river (Site 404) (Appendix 4, Table 1) varied by targeted species and river reach over the survey period. Most anglers interviewed fished from boats (84%) with trolling (44%) and still fishing (38%) the most common methods. Of creel clerk contacts with boats 15% were recorded as non fishing. The most common party size was 2 anglers but ranged from 1-9 anglers. Most anglers fished 4-5 hours per day and most days consisted of only one trip. (Appendix 4, Table 2).

The mode and methods for anglers fishing the rapids (Site 403)was exclusively from shore or wading with 56% fly fishing, 30% casting and 3% drift fishing (Appendix 4, Table 1).

Discussion

The Interjurisdictional Fishery

Over the time period for which riverwide effort, harvest and harvest rates are reported (1999-2001 and 2005-2007) there were no regulations changes in either jurisdiction that might have affected these metrics. In 2008 Ontario introduced catch and possession limits for cisco and reduced catch and possession limits for walleye, yellow perch, northern pike and smallmouth bass (Appendix 5). Future reviews of species trends may need to take these changes into consideration.

Fishing Effort

While previous surveys in 1938, 1987 and 1991 (Fielder et al. 2002) noted fishing effort calculated based upon variable temporal and spatial scales it is apparent that the magnitude of the fishery has always been large (Table 10). In 1999 the open water angling fishery effort was equal to 36% of that noted for all Michigan waters of Lake Huron (Fielder et al. 2002). Over this reported time series the St Marys River fishery has been relatively consistent in the fishing effort expended: ranging between plus 4% in 2001 and minus 11% in 2005 of the 1999 estimate. It's similarly consistent comparison with Michigan waters Lake Huron fishery effort suggests little survey variability for both fisheries (Table 10). However fisheries managers should review these results with caution since effort estimates are derived from the extrapolation method described in the Methods. Confidence in the use of this method requires periodic whole river surveys for comparison. Presently only the 1999 survey is available for comparison.

Table 10. Comparison of fishing effort expressed as hours in the St. Marys River to the lake wide fishery in the Michigan waters of Lake Huron and for Saginaw Bay. Site 403, the St. Marys rapids is excluded.

Year	St. Marys River effort (Hours)	% of Lake Huron effort (Hours)	% of Saginaw Bay effort (hours)
1999	542 067	27.7	60.0
2000	462 976	26.7	61.2
2001	565 095	31.4	70.0
2005	427 314	32.3	57.3
2006	512 430	44.8	79.7
2007	537 069	38.7	62.7

Harvest

While the harvest numbers by species in surveyed years (1999 -2001 and 2005-2007) vary they also remain substantial. There have been no regulatory changes to influence the extent of annual harvest by species and during this time period few anglers reported achieving species limits. The lack of harvest details for the non-surveyed years and the inability to calculate riverwide estimates for the survey years 2008 and 2009 has interrupted the ten year time series and limits interpretation. Consistent riverwide surveys could provide the necessary trend data.

Of those species that spend their life cycle in the river, “river resident species”, yellow perch and walleye had the largest annual harvests. Harvest numbers for cisco, a species that may not be an obligate river resident, was also high (Figure 3). Comparing the two time series in Figure 3 the harvest trends for cisco, walleye and yellow perch were similar (increasing) however the fact that 2005 harvests were less than 2001 suggests harvest may have been declining even before the low 2005 level for at least one non surveyed year. Northern pike and smallmouth bass did not have substantial change between years and the harvests in non-surveyed years may have been similar

The St. Marys River has experienced noticeable fluctuations between years in spring water levels, timing and rate of the spring thaw and wind conditions. This environmental instability may be a factor in annual recruitment particularly for tributary spawners such as walleye and shallow nearshore and flood zones spawners such as northern pike and yellow perch.

Cisco harvest had similar trends in the two 3-year time series (Figure 3). These trends may reflect environmental factors in cisco abundance and/or the timing of the annual cisco fishery. Cisco school in specific locations in the early summer to feed on emerging burrowing mayflies (Hexagenia). If this weather and water temperature driven event is early or late anglers who have planned trips to fish cisco may miss the peak of the fishery and therefore harvested fewer fish in some years.

Rainbow trout harvest numbers (Appendix 1 Table 1) are not reliable trend indicators since many anglers practiced catch and release. For every party reporting harvested fish between 2006 and 2008 2 to 3 parties reported catch and release only (Smith and Greenwood in press). For the rainbow trout fishery, catch numbers would be a more reliable trend indicator.

Harvest rates

As with harvest the lack of survey information for the non-surveyed years and the inability to calculate riverwide harvest rate estimates for the survey years 2008 and 2009 limits interpretation. Available trend data (Figure 4) suggests an increasing trend in harvest rates for the five key species in the surveyed years. Of these species smallmouth bass harvest rates appeared the most stable between 1999 and 2007 (Figure 4). This is perhaps due to smallmouth bass recruitment which also appeared stable during that time period as illustrated in gillnet survey results for 2002 and 2006 (Fielder et al. (2007). Riverwide harvest rates for northern pike while apparently stable were also low. Fielder et al. (2007) reported a continuing decline in gillnet catch per unit effort from 2002-2006 for pike and suggested continued low water levels were affecting recruitment. Walleye and yellow perch harvest rates appeared to be stable or improving slightly despite the lack of information from the non surveyed years.

Cisco

Cisco harvest and harvest per hour over the survey periods 2000 to 2007 were higher than those reported in 1938, 1987, 1991 and 1999 (Fielder et al. 2002) and increased with each successive survey described here except for 2005.

High harvest numbers in the creels appear to be a result of the intense early summer fishery when cisco congregate in specific areas of the river to feed on emerging mayflies (Appendix 2). During this fishery, boats cluster in specific locations in Sites 207, 209 and 210 to jig for cisco.

As mentioned previously, there was an increasing trend in cisco harvest up through 2007. In 2008, however, a daily harvest limit for cisco was implemented for the first time in Ontario. Prior to 2008 there were no harvest limits for cisco in Ontario waters (Appendix 5). Repeated daily harvests of over 100 fish per boat were not uncommon. Many American anglers boated into Ontario to fish under an Ontario licence because of the unlimited harvest regulation. Two independent 15 day roving creels by the Ontario Ministry of Natural Resources (Smith and Greenwood in press) in the Ontario waters of Site 210 reported a decline in harvest between 2007 (unlimited harvest) and 2008 (new harvest limits) of 62%, from 27 093 to 10 167 fish for the 3 week July survey periods. The July cisco harvest based on this report's access creel surveys in 2007 and 2009 declined 46%, from 119 691 to 54 559 fish harvested, for Site 210 (Appendix 2 Tables 25 and 26). The greatest impact of the new Ontario regulation is that no angler may have more than 25 cisco in their possession. This has all but put a stop to the transport of large numbers of cisco back to the United States following a weekend or week long fishing trip. Improved protection is now afforded to what fisheries managers consider to be the last remnant stock of unhybridized cisco (cisco bloater cross) in the Lake Huron basin (Lake Huron Technical Committee 2007). This stock may be an important source of gametes for reintroduction efforts for Lake Huron (Lake Huron Technical Committee 2007).

Seven age classes of cisco were observed in the access creel fishery in 2000, 2001, 2006 and 2009. Only 4 age classes were present in this fishery in 2005 and 2008 (Figure 4). The OMNR roving creel crew in 2007 and 2008 (Smith and Greenwood in press) collected cisco by gillnet during the creel to provide samples for age interpretation since the collection of otoliths from angler caught fish was not possible. The two 45-minute gillnet sets were employed during the creel in the same locations as anglers fished to collect the needed aging structures. Age classes in the 2007 and 2008 otolith collection were from age 2 up to age 10 and 11 respectively. The majority of the fish sampled for both the access creel surveys (scale aged) and the roving creel

survey gillnet collection (otoliths aged) were between 2 and 5 years of age. However the 2007 and 2008 gillnet collection had good representation of age classes older than age 5. Older fish are difficult to age using scales and age class assignments for the access creel may benefit if separate gillnet collections are made in July during the creel to permit otolith aging. Relying on a same year fish community gill net survey probably would not provide sufficient cisco samples as it is conducted in late August when fish are not concentrated in feeding schools in association with that survey's designated gillnet set locations.

Northern Pike

Riverwide northern pike harvest and harvest per hour have been stable and low between 1999 and 2007 (Figures 3 and 4). The fishery kept pike between age 2 and 10 with most fish being age 3 to 5 (Table 6 and Appendix 3 Table 2). The fish community surveys (2002, 2006) over this time period noted a decline in pike recruitment (Fielder et al. 2007) implying a lower harvest could be expected.

Over the survey period northern pike catch and size limit regulations in Ontario and Michigan have differed with Ontario being less restrictive (Appendix 5.) Two factors may have mitigated the regulation difference. Between 1999 and 2007 85% of interviewed anglers fishing Ontario waters did not keep more than the 2 fish Michigan limit and fewer Ontario anglers targeted northern pike compared to Michigan (Table 8). In 2008 the Ontario daily limit regulation approximated the Michigan limit however it is doubtful that the change will reduce pike harvest given the Ontario angler harvest record and species target preference. While the pike harvest rate by site after 2007 was low it was not lower than harvest rates seen in some years when the more liberal Ontario limit was in effect (compare Appendix 1 Table 1 and Appendix 2 for Sites surveyed in 2007, 2008 and 2009).

While northern pike populations are not doing well harvest may not be the issue. Since 1996 the annual timing of the spring thaw has varied considerably and water levels have dropped; which may have some impact on spawning success and annual recruitment.

Smallmouth Bass

Angler interviews suggest smallmouth bass are not an important target species in the St. Marys River (< 3% for both jurisdictions). Smallmouth bass harvest and harvest per hour were stable for the two trend series (Figures 3 and 4). Mean size in the fishery was greater than 1999 and recruitment of younger aged fish into the fishery was apparent in 2006 to 2008 (Appendix 3 Table 3). Length at age of sampled fish appeared stable (Figure 5 and Appendix 3 Table 3). The fish community surveys of 2002 and 2006 noted an increased abundance of fish and increasing growth (Fielder et al. 2004 and Fielder et al. 2007). While not evident in Figure 3 riverwide harvest was also greater by a factor of 3 post 1999 (Table 4).

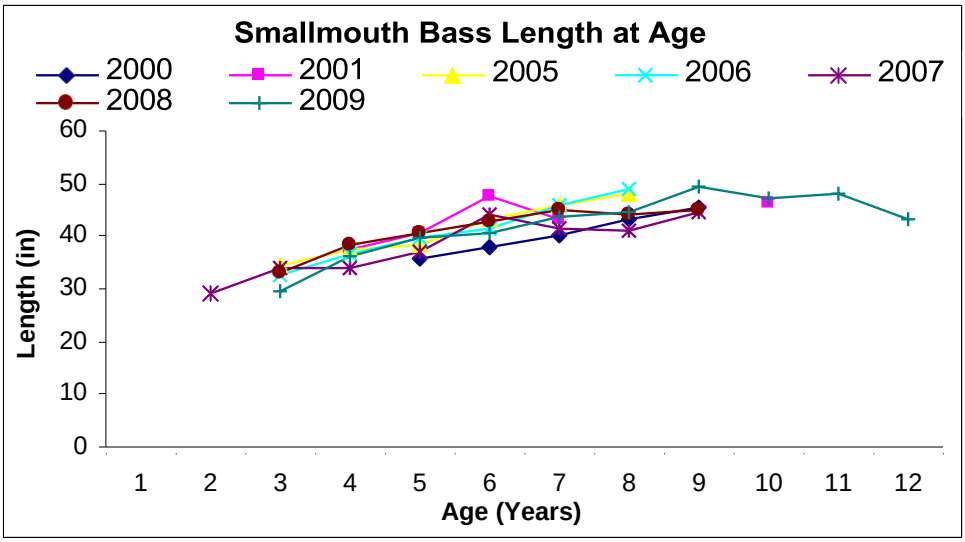

Figure 5. Smallmouth bass length at age for sampled fish from the open-water sport fisheries in the St. Marys River, 1999-2001 and 2005-2009.

While the state and provincial harvest and size limits for smallmouth bass differ (Appendix 5), the more liberal Ontario regulations were of little consequence over the survey years. Ontario anglers made up only 12 % of anglers targeting bass and no angler from either jurisdiction harvested more than 5 fish (average 1.7) over all interviews. After 2007 too few Ontario anglers targeted smallmouth bass or harvested incidentally for a meaningful harvest response comment relative to the new regulation.

Walleye

Walleye are an important sport fish in the St. Marys River with 27% of interviews reported targeting this species (Table 7). The 1999 survey stated walleye were the second most sought after sport fish in the river (Fielder et al. 2002). In 2007 anglers elevated walleye to the most targeted species, with Munuscong Bay (Site 207) followed by the St. Joseph Channel (Site 405) having the highest harvest and harvest rate per survey (Appendix 1 Tables 2 and 3). The 2000 riverwide harvest increased by a factor of two from 1999 and the following surveys were more than three times the 1999 harvest. The riverwide harvest of 2007 was six times that of 1999 (Table 4).

Walleye were harvested from every survey site. Earlier studies have demonstrated that walleye make seasonal migrations to and from spawning areas (Duffy and Batterson 1987). This dispersal included Potagannissing Bay (Site 210) which borders the North Channel of Lake Huron (Figure 2). The 1999 survey (Fielder et al. 2002) reported the western North Channel commercial fishery having taken 2 557 kg. of walleye in that year. On board sampling of commercially caught walleye by OMNR staff (1998-1999) included records of fish tagged in the Potagannissing River, Munsucong Bay and the Bar River. Commercial fishing continues and undoubtedly walleye that spawn in the St. Marys River system make up a portion of this local commercial walleye harvest. It is worth noting that North Channel commercial fishers have reported St. Marys River tagged walleye from as far as the eastern end of the North Channel (David Carlson, commercial fisher, Blind River, Ontario, personal communication 2011).

Most walleye harvested were age 3 or older. Ages in the harvest ranged from 1 to 16 years (Appendix 3 Table 4). Most of these fish were not assessed for maturity (99%), however Fielder et al. (2007) reported that in 2006 some fish were mature at 27 cm and all fish were mature by 47 to 51 cm. The average age per year surveyed was between 4 and 5 and the average size per year was between 44.8 (2005) and 48.5 cm (2000) (Appendix 3 Table 4). As also reported in the 1999 harvest survey (Fielder et al. 2002), few immature walleye were recruiting into the fishery.

With the exception of the Ontario waters of Site 208 and 209, Ontario walleye angling regulations were more liberal than Michigan's until 2008 (Appendix 5). Regardless few open water anglers reported achieving the Michigan or Ontario limits in any survey year. The Ontario Site 208 and 209 specific regulations were aimed at protecting large mature fish from the only remaining wild St Marys River genetic stock (Caroffino et al. 2010). This small spawning stock of walleye are very vulnerable to angling when they congregate in the Lake George waters pre and post spawning in the Bar River which drains into Lake George. The effectiveness of the added protection for walleye in Site 208 and 209 is not known. It did however better position Ontario for management discussions with aboriginal harvesters.

St. Marys River origin walleye fingerlings stocked by the Chippewa Ottawa Resource Authority contribute to the walleye fishery in the St. Marys. The extent of that contribution is being evaluated. In 2009, preliminary results suggest that 11% of walleye captured by recreational anglers in the St. Marys River were stocked (Mark Ebener, Chippewa Ottawa Resource Authority, Sault Ste. Marie, Michigan, personal communication 2011).

Yellow Perch

Starting with the 2000 survey yellow perch harvest and harvest per hour were higher than those noted for the 1999 survey (Tables 4 and 5). Harvest and harvest rate for yellow perch in 2005 were the lowest in the series but for the first and only time since 1999 were greater than cisco. Perch are widely distributed in the river and were targeted by anglers in all sites except the St. Marys Rapids (Site 403). Perch appears to be a more popular sport fish with American anglers with 17% of American interviews targeting this species compared to 5% Ontario interviews (Table 8).

Yellow perch recruited to the fishery at age 2. Most fish harvested were age 3 and 4 and few exceeded age 5 in all years (Appendix 3 Figure 10). Mean length harvested was stable over the survey period and exceeded the 18 cm. Michigan minimum size limit.

Changes to Ontario regulations in 2008 were too limited in scope to affect changes in overall harvest. Few anglers reported reaching the maximum Ontario harvest limit of 50 fish per licence in either jurisdiction in any survey year. Potagannissing Bay (Site 210) consistently had the largest estimated harvests each survey year (Appendix 2).

Angler preferences and characteristics

Trend comparisons in angler details (origin, mode, method, party size, number trips, target species, catch and release) are limited to the site interview data. These data were not extrapolated to non surveyed sites and were presented in the Results section as one data set not as annual data sets. This was because St. Marys River fisheries move up and down the river depending upon the season and target species. Without complete river coverage trends by survey year may be

misleading when site specific fisheries are missed. An example is the lack of data collected for anglers targeting cisco from an important access point in Ontario. Without this data the cisco angler details relative to other anglers fishing other species in this site are under represented.

In comparing this multi-year data set to that of 1999 most anglers continue to fish by boat employing trolling and still fishing. Also similar to 1999, the most common party size is 2 and most parties make one trip a day.

Angling regulation changes

In 2008, as a result of a two year provincial review of Ontario angling regulations, changes were made to regulations for the Ontario waters of the St. Marys River. The St. Marys River is included in the larger water body of the North Channel and Georgian Bay, Lake Huron with respect to common fisheries regulations (Fisheries Management Zone 14) (OMNR 2008-2009). Opportunities for exception regulations specific to the St. Marys River were limited within the new framework, however in general the new Ontario regulations are more conservative than they were previously and closer in species by species comparison to the Michigan regulations (Appendix 5 Table 1). Despite this, the new Ontario regulations did not appear to affect the individual angler harvest levels of any species except cisco (previously no harvest limit). Most anglers in Ontario were not achieving species harvest limits prior to 2008.

Economic value

A review of the 2005 Canadian Great Lakes recreational fishing survey (Fisheries and Oceans 2008) identified Lake Huron and St. Marys River anglers spending approximately $39 (CA) per trip. Assuming both Canadian and American anglers have similar daily expenditures the St. Marys River fishery generated approximately $3.95 million CA dollars in 2005. The valuation of the fishery for the Ontario waters of Lake Huron and St. Marys River based on resident and non resident direct expenditures attributable to fishing was $69.7 million CA (Fisheries and Oceans 2008) in 2005.

In 2006 an American national angling, hunting and wildlife viewing survey (USDI et al. 2006) noted Great Lakes anglers spent an average $59 US per day in support of their activities. Assuming both Canadian and American anglers have similar daily expenditures the St. Marys river fishery generated approximately $7.0 million US dollars in 2006. The total estimated expenditure for the Michigan waters of Lake Huron and the St. Marys by comparison was approximately $47.8 million US (USDI et al. 2006).

Survey coverage and effort and harvest estimation and trend development

During these surveys coverage has been for daylight hours. Creel clerks are roaming between angler access points (public shore locations and boat launches) in their assigned survey sites as early as 6 AM and as late as 10 PM. Aerial count flights were conducted during the same time period. Fielder et al. (2002) discussed how this approach leaves certain portions of the sport fishery underrepresented by missing interviews from private access points (residences) and night fishing. It was maintained that omission of these parts of the fishery may be minor provided that surveys were regular enough to indicate trends. This report is the first opportunity fisheries managers have had to present preliminary trends and year to year comparisons. These however

are based upon extrapolated data for sites that were not sampled every year and despite this approach data and trend gaps remain for sites and years when extrapolation was not possible (Table 1).

Extrapolation, while it seemed the best option available to the authors in the absence of being able to conduct regular whole river surveys lacks validation by comparison with one or more whole river surveys during the time series. Extrapolation of harvest and effort from regularly surveyed sites presumes site and jurisdiction comparability including fishery preferences and harvest reported at access points. However, in the St. Marys River, species preferred habitat (type and spatial coverage) and species preferred fisheries differ enough between and within sites to necessitate this method be verified by regular whole river surveys. This is also true when a site is surveyed one year by Michigan and another year by Ontario. There is evidence that Michigan and Ontario anglers' species preferences and resulting harvest differs in some sites. The authors maintain that being able to conduct surveys that cover the entire river on a regular basis provides important information needed to verify results generated in years when only partial surveys are possible.

The preferred approach is for this survey to cover the entire river on a regular basis. By concentrating data collection effort every 3 to 5 years instead of for 2 to 3 sites every year fisheries management agencies may realize a net savings in project costs for flights and creel clerks and avoid the necessity to infer annual fishery outcomes in non-surveyed sites and for the entire river by extrapolation.

Over the 10 year period refinements in harvest and effort calculation (software revision in 2003) have been made and will most likely continue to be made. We have chosen to refer to 1999 results presented in Fielder et al. 2002 when discussing 1999 results. However if the 1999 results were estimated today the values would not match. This is a common problem when establishing long term data sets and more in depth reviews of this data will need to keep this in mind when referring to earlier publications.

Recommendations

Fishery Management

Fishery regulations (seasons, limits, sizes) in Michigan and Ontario were different over most of the reporting period. Since the 2008 Ontario revision of provincial sport fish regulations season and limit disparity has lessened for the principle target species. However Michigan size limits and the lack of them in Ontario for smallmouth bass, perch, pike and walleye remain and imply different management strategies for these species. The St Marys River needs a shared vision of the type of species fisheries it can sustain (trophy, catch and release, harvest) and common regulations to support it.

The application of harvest limits for cisco in 2008 by Ontario is expected to lessen the harvest of this species in the future. This was observed for Site 210 in this report and in 2007 and 2008 roving creels conducted in this site by OMNR. Continued monitoring of effort and harvest in Ontario waters is needed to determine how cisco populations are responding. It should be recognized that other factors including environmental ones may also be influencing cisco abundance.

Northern pike harvest has been stable but low over the survey period. Fish community surveys have noted a decline in pike recruitment. It is not clear if further restrictions on harvest are needed and the SMRFTG suspects that under the present low water environment loss and contraction of spring spawning habitat may be responsible. Annual assessment of pike spawning success and YOY survival may be warranted.

This report covers only the open water day time fishery. A sizable ice fishery is conducted in the winter where ice conditions permit (Sites 207, 208, 404 and 405). The species targets are principally walleye, yellow perch, and northern pike. Angler effort during the winter of 2000 was 59,569 angler hours. This fishery needs to be monitored and reported on along side each open water creel to inform fisheries managers of total annual sport fishery harvest and effort.

Creel Survey Design

As described in the methods section riverwide trends in the fishery and year-to-year comparisons for sites with non-sampled years were extrapolated from adjacent sites for the years in which all sites were sampled. To help validate this method of expanding the results from partial surveys into estimates for the entire river the SMRFTG needs to conduct periodic whole river creels by surveying every site over a common time period.

Management Responsibility

The need for St. Marys River fish community objectives has been recognized by fisheries managers for some time and their development is presently underway by the Lake Huron Committee of the GLFC. When published these objectives and commitments to try and achieve them will require regular monitoring and assessment to evaluate the fish community and develop supportive management policies and actions. This could be accomplished by a standardized, consistent whole river survey cycle for the St. Marys River that includes the angler survey and other established independent surveys in the same year. The capacity of fisheries management agencies to conduct regular fisheries assessment including whole river harvest surveys is presently the outstanding issue preventing the accumulation of trend data needed to measure and report on the state of this resource. Agencies need to support and facilitate the St. Marys River Fisheries Task Group’s efforts to plan for and implement regular riverwide fisheries monitoring and assessment.

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Appendices

Appendix 1 Table 1.Estimated species harvest numbers and harvest rate (in parentheses) from open-water sport fisheries in the St. Marys River, 1999-2001 and 2005-2007.

Species	1999	2000	2001	2005	2006	2007
Atlantic Salmon	509	95	787	0	716	2 039
	(0.0009)	(0.0002)	(0.0014)	(0.0000)	(0.0014)	(0.0038)
Bluegill	107	0	0	0	0	0
	((0.0002)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Channel Catfish	109	5	12	131	0	13
	(0.0002)	(0.0000)	(0.0000)	(0.0003)	(0.0000)	(0.0000)
Chinook Salmon	6 249	5 707	6 785	1 619	3 632	4 042
	(0.0112)	(0.0123)	(0.012)	(0.0038)	(0.0071)	(0.0075)
Cisco	31 258	113 620	131 662	48 163	168 988	158 141
	(0.0562)	(0.2454)	(0.233)	(0.1127)	(0.3298)	(0.2945)
Coho Salmon	381	65	42	129	104	321
	(0.0007)	(0.0001)	(0.0001)	(0.0003)	(0.0002)	(0.0006)
Freshwater Drum	0	19	0	1 180	1 729	1 168
	(0.000)	(0.0000)	(0.0000)	(0.0028)	(0.0034)	(0.0022)
Lake Trout	1	0	0	162	0	454
	(0.0000)	(0.0000)	(0.0000)	(0.0004)	(0.0000)	(0.0008)
Lake whitefish	19 769	13 154	16 594	17 877	37 880	50 973
	(0.0355)	(0.0284)	(0.0294)	(0.0418)	(0.0739)	(0.0949)
Largemouth Bass	114	202	51	0	0	0
	(0.0012)	(0.0004)	(0.0001)	(0.0000)	(0.0000)	(0.0000)
Muskellunge	34	8	892	110	0	0
	(0.0001)	(0.0000)	(0.0016)	(0.0003)	(0.0000)	(0.0000)
Northern Pike	5 408	12 402	14 336	1 547	14 894	4 231
	(0.0097)	(0.0268)	(0.0254)	(0.0036)	(0.0291)	(0.0079)
Other	1 124	995	2 427	138	338	4 832
	(0.0020)	(0.0021)	(0.0043)	(0.0003)	(0.0007)	(0.009)
Pink Salmon	2 073	1 899	5 042	1 437	3 719	2 743
	(0.0037)	(0.0041)	(0.0089)	(0.0034)	(0.0073)	(0.0051)
Pumpkinseed	161	0	0	175	0	1
	(0.0003)	(0.0000)	(0.0000)	(0.0004)	(0.0000)	(0.0000)
Rainbow Trout	380	133	89	220	449	359
	(0.0007)	(0.0003)	(0.0002)	(0.0005)	(0.0009)	(0.0007)
Rock Bass	70	105	0	720	428	448
	(0.0003)	(0.0002)	(0.0000)	(0.0017)	(0.0008)	(0.0008)
Round whitefish	516	1 651	0	1 348	1 416	1 603
	(0.0009)	(0.0036)	(0.0000)	(0.0032)	(0.0028)	(0.003)
Smallmouth Bass	1 188	3 235	3 653	4 216	5 322	4 030
	(0.0032)	(0.007)	(0.0065)	(0.0099)	(0.0104)	(0.0075)
Walleye	9 898	17 064	39 568	32 134	38 743	60 733
	(0.0178)	(0.0369)	(0.0700)	(0.0752)	(0.0756)	(0.1131)
White bass		0	127	280	1 396	70
		(0.0000)	(0.0002)	(0.0007)	(0.0027)	(0.0001)
White perch		0	229	0	0	578
		(0.0000)	(0.0004)	(0.0000)	(0.0000)	(0.0011)
Yellow Perch	62 646	86 098	91 120	84 097	118 214	125 391
	(0.1126)	(0.186)	(0.1612)	(0.1968)	(0.2307)	(0.2335)

Appendices

Appendix 1 Table 2. Harvest (numbers of fish) for cisco, northern pike, smallmouth bass, walleye and yellow perch from open-water sport fisheries in the St. Marys River 1999-2001 and 2005-2007. An asterisk (*) or italics denote data which could not be estimated using traditional methodology (see methods section for further details). Two standard errors of the mean are in parentheses.

		Site						
	Year	207	208	209	210	404	405	Total
Cisco								
	1999	9 012		1 046	21 202			31 258
		(14 813)		(1 966)	(3)			(40 040)
	2000	30 018		2 161	81 442	*0*	*0*	113 621
		(12 599)		(1 742)	(28 543)	*(72 993)*	*(66 237)*	(182 114)
	2001	46 215		2 813	82 634	*0*	*0*	131 662
		(21 175)		(2 803)	(22 827)	*(80 500)*	*(72 338)*	(199 643)
	2005	6 694		*1 141*	40 328	*0*	0	48 163
		(5 026)		*(29 498)*	(19 930)	*(37 885)*	(0)	(92 339)
	2006	63 982		816	104 190	*0*	*0	168 988
		(42 527)		(814)	(44 912)	*(123 437)*	*(0)	(211 690)
	2007	34 201		*3 728*	120 212	*0*		158 141
		(20 559)		*(123 434)*	(83 611)	*(144 677)*		(372 281)
Northern Pike								
	1999	1 214	1 583	300	744	412	1 115	5 408
		(1 195)	(2 064)	(588)	(1 149)	(812)	(4 063)	(5 170)
	2000	1 683	2 381	483	2 737	*639*	*4 479*	12 402
		(738)	(1 445)	(409)	(1 792)	*(3 659)*	*(9 701)*	(17 744)
	2001	1 918	5 275	591	864	*710*	*4 978*	14 336
		(945)	(3 619)	(469)	(381)	*(5 599)*	*(11 755)*	(22 768)
	2005	751	102	*84*	326	*112*	172	1 547
		(630)	(141)	*(1 041)*	(295)	*(1 056)*	353	(3 516)
	2006	7 585	4 835	245	774	*1 142*	*313	14 894
		(5 847)	(1 854)	(260)	(581)	*(9 160)*	*(586)	(18 288)
	2007	1 070	58	*148*	1 160	*196*	1 599	4 231
		(667)	(85)	*(1 496)*	(770)	*(1 520)*	(784)	(5 322)
Smallmouth Bass								
	1999	497	200		454		24	1 188
		(1 324)	(731)		(956)		(143)	(1 797)
	2000	1 685	1 165		258	*0*	*127*	3 235
		(1 134)	(998)		(330)	(3 601)	*(2 938)*	(9 001)
	2001	2 021	806	274	419	*0*	*133*	3 653
		(1 272)	(1 164)	(467)	(364)	*(3 878)*	*(3 226)*	(10 371)
	2005	1 092		*105*	2 626	*0*	393	4 216
		(778)		*(2 907)*	(1 856)	*(4 436)*	(352)	(10 329)
	2006	1 755	2 406	165	717	*0*	*279	5 322
		(1 844)	(1 576)	(207)	(862)	*(5 768)*	*(310)	(10 567)
	2007	959	45	*73*	1 589	*0*	1 364	4 030
		(559)	(53)	*(1 766)*	(1 083)	*(2 952)*	(1 278)	(7 691)

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		Site						
	Year	207	208	209	210	404	405	Total
Walleye								
	1999	3 983	48	2 124	1 947	884	903	9 890
		(5 170)	(306)	(2 254)	(3 896)	(1 665)	*(4 278)	(8 255)
	2000	6 375	757	1 968	2 284	*1 532*	*4 148*	17 064
		(2 515)	(641)	(1 182)	(1 311)	*(4 810)*	*(7 309)*	(17 768)
	2001	12 963	2 410	3 466	8 127	*3 399*	*9 203*	39 568
		(3 218)	(1 747)	(1 741)	(2 382)	*(7 635)*	*(13 920)*	(30 643)
	2005	8 640	989	*3 849*	6 753	*2 598*	9 305	32 134
		(2 566)	(683)	*(6 984)*	(3 494)	*(7 313)*	(3 842)	(24 882)
	2006	11 901	5 833	6 629	4 535	*3 408*	*6 437	38 743
		(13 606)	(2 969)	(2 582)	(2 955)	*(21 932)*	*(2 908)	(46 952)
	2007	30 108	827	*8 971*	11 467	*6 056*	3 304	60 733
		(10 157)	(433)	*(18 510)*	(5 897)	*(19 048)*	(2 623)	(56 668)
Yellow Perch								
	1999	11 228	757	810	46 124	1 844	1 848	62 646
		(14 130)	(2 551)	(2 255)	(27 257)	(2 377)	(9 040)	(32 274)
	2000	9 165	825	0	65 680	*3 511*	*6 917*	86 098
		(4 002)	(1 002)	(0)	(23 019)	*(36 164)*	*(36 097)*	(100 284)
	2001	10 222	18 243	8 816	43 752	*3 396*	*6 691*	91 120
		(3 891)	(20 411)	(9 864)	(14 807)	*(7 635)*	*(40 088)*	(96 696)
	2005	3 175	2 460	*3 071*	70 102	*3 208*	2 081	84 097
		(4 790)	(4 073)	*(31 029)*	(20 477)	*(33 017)*	(3 503)	(96 889)
	2006	530	15 800	9 450	85 648	*4 391*	*2 395	118 214
		(1 078)	(9 623)	(8 214)	(50 653)	*(76 048)*	*(5 001)	(150 617)
	2007	10 224	5 389	*4 530*	96 733	*4 731*	3 784	125 391
		(6 235)	(3 648)	*(61 167)*	(41 706)	*(63 379)*	(4 365)	(180 500)

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Appendix 1 Table 3. Harvest per hour (based on total effort) for cisco, northern pike, smallmouth bass, walleye and yellow perch from open-water sport fisheries in the St. Marys River, 1999-2001 and 2005-2007. An asterisk (*) or italics denote data which could not be estimated using traditional methodology (see methods section for further details). Two standard errors of the mean are in parentheses. NAN indicates a non-real number.

	Site						
Year	207	208	209	210	404	405	Average
Cisco							
1999	0.0803		0.0153	0.1506			0.0562
	(0.1327)		(0.0288)	(0.2656)			(0.0721)
2000	0.3217		0.0357	0.6212			0.1631
	(0.2134)		(0.1922)	(0.2697)			(0.1688)
2001	0.3702		0.0367	0.6671			0.1790
	(0.2821)		(0.1913)	(0.2329)			(0.1766)
2005	0.0980		*0.0210*	0.3058			0.0708
	(0.2019)		*(0.5498)*	(0.3062)			(0.2116)
2006	0.6878		0.0096	0.6843			0.2303
	(0.5276)		(0.1822)	(0.3782)			(0.2176)
2007	0.2455		*0.0522*	0.6545			0.1587
	(0.2858)		*(1.7430)*	(0.5610)			(0.5180)
2008		0.0054	0.0263				
		(0.2160	(0.1751)				
2009	0.0740			0.4085			
	(0.2284)			(0.2788)			
Northern Pike							
1999	0.0108	0.0164	0.0044	0.0053	0.0070	0.0177	0.0097
	(0.0172)	(0.0215)	(0.0082)	(0.0082)	(0.0139)	(0.0623)	(0.0093)
2000	0.0180	0.0391	0.0080	0.0209	*0.0115*	*0.0727*	0.0284
	(0.1655)	(0.2117)	(0.1902)	(0.1598)	*(0.0665)*	*(0.1819)*	(0.1626)
2001	0.0154	0.0543	0.0077	0.0070	*0.0105*	*0.0664*	0.0269
	(0.2255)	(0.1882)	(0.1879)	(0.1425)	*(0.0834)*	*(0.1832)*	(0.1685)
2005	0.0110	0.0020	*0.0020*	0.0025	*0.0024*	0.0023	0.0037
	(0.1883)	(0.2002)	*(0.0028)*	(0.2663)	*(0.0225)*	(0.1940)	(0.1457)
2006	0.0815	0.0682	0.0029	0.0051	*0.0196*	*0.0059	0.0305
	(0.2708)	(0.2086)	(0.1820)	(0.2367)	*(0.1558)*	*(0.0111)	(0.1775)
2007	0.0077	0.0017	*0.0017*	0.0063	*0.0031*	0.0354	0.0093
	(0.2448)	(0.2512)	*(0.0025)*	(0.3279)	*(0.0250)*	(0.2457)	(0.1829)
2008		0.0543	0.0054				
		(0.2169)	(0.1726)				
2009	0.0123			0.0019		0.0219	
	(0.2196)			(0.2156)		(0.2007)	
Smallmouth Bass							
1999	0.0044	0.0021		0.0032		0.0177	0.0021
	(0.0118)	(0.0076)		(0.0068)		(0.0623)	(0.0032)
2000	0.0181	0.0192		0.0020		*0.0021*	0.0069
	(0.1657)	(0.2110)		(0.1592)		*(0.0478)*	(0.1167)

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Year		Site 207	208	209	210	404	405	Average
	2001	0.0162	0.0083	0.0036	0.0034		*0.0018*	0.0055
		(0.2256)	(0.1849)	(0.1879)	(0.1425)		*(0.0431)*	(0.1568)
	2005	0.0160	0.0000	*0.0019*	0.0199		0.0053	0.0072
		(0.1884)	(0.0000)	*(0.0019)*	(0.2667)		(0.1940)	(0.1302)
	2006	0.0189	0.0339	0.0019	0.0047		*0.0053	0.0108
		(0.2641)	(0.2082)	(0.1820)	(0.2367)		*(0.0059)	(0.1794)
	2007	0.0069	0.0013	*0.0010*	0.0087		0.0302	0.0080
		(0.2448)	(0.2512)	*(0.0251)*	(0.3279)		(0.2467)	(0.2191)
	2008		0.0247	0.0051				
			(0.2170)	(0.1727)				
	2009	0.0117			0.0166		0.0093	
		(0.2200)			(0.2159)		(0.1998)	
Walleye								
	1999	0.0355	0.0005	0.0310	0.0138	0.0151	0.0138	0.0178
		(0.0465)	(0.0032)	(0.0333)	(0.0278)	(0.0286)	(0.0656)	(0.0149)
	2000	0.0683	0.0124	0.0325	0.0174	*0.0275*	*0.0674*	0.0376
		(0.1675)	(0.2106)	(0.1911)	(0.1595)	*(0.0895)*	*(0.1455)*	(0.1606)
	2001	0.1039	0.0248	0.0452	0.0656	*0.0502*	*0.1228*	0.0687
		(0.2269)	(0.1854)	(0.1891)	(0.1437)	*(0.1227)*	*(0.2552)*	(0.1872)
	2005	0.1265	0.0193	*0.0708*	0.0512	*0.0548*	0.1256	0.0747
		(0.1917)	(0.2006)	*(0.3287)*	(0.2676)	*(0.1695)*	(0.2007)	(0.2265)
	2006	0.1279	0.0822	0.0781	0.0298	*0.0584*	*0.1215	0.0830
		(0.3013)	(0.2112)	(0.1845)	(0.2375)	*(0.3826)*	*(0.0592)	(0.2294)
	2007	0.2161	0.0234	*0.1256*	0.0624	*0.0972*	0.0732	0.0997
		(0.2554)	(0.2515)	*(0.6089)*	(0.3294)	*(0.3489)*	(0.2519)	(0.3410)
	2008		0.0911	0.1070				
			(.02194)	(0.1769)				
	2009	0.1587			0.0342		0.0603	
		(0.2252)			(0.2161)		(0.2040)	
Yellow Perch								
	1999	0.1000	0.0078	0.0118	0.3277	0.0315	0.0283	0.1126
		(0.1270)	(0.0264)	(0.0330)	(0.2041)	(0.0411)	(0.1385)	(0.0586)
	2000	0.0982	0.0136	0.0000	0.5010	*0.0631*	*0.1123*	0.1314
		(0.1707)	(0.2110)	(0.0000)	(0.2370)	*(0.6524)*	*(0.6028)*	(0.3123)
	2001	0.0819	0.1879	0.1149	0.3532	*0.0502*	*0.0893*	0.1462
		(0.2275)	(0.2797)	(0.2276)	(0.1860)	*(0.5923)*	*(0.5500)*	(0.3438)
	2005	0.0465	0.0480	*0.0565*	0.5315	*0.0677*	0.0281	0.1297
		(0.2007)	(0.2154)	*(0.6196)*	(0.3083)	*(0.7018)*	(0.1996)	(0.3742)
	2006	0.0057	0.2227	0.1114	0.5625	*0.0752*	*0.0452	0.1705
		(0.2636)	(0.2475)	(0.2061)	(0.4083)	*(1.306)*	*(0.0947)	(0.4210)
	2007	0.0734	0.1528	*0.0989*	0.5267	*0.0760*	0.0839	0.1686
		(0.2489)	(0.2716)	*(0.0634)*	(0.3988)	*(1.026)*	(0.2635)	(0.3787)
	2008		0.1136	0.1077				
			0.0024	(0.2015)				
	2009	0.0517			0.4145		0.0390	
		(0.0010)			(0.2977)		(0.2027)	

Appendices

Appendix 2 Table 1. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Sweets Point to the Neebish Island Ferry (includes Michigan and Ontario waters of Raber Bay, Munuscong Lake and Neebish Channel), by all modes (non-charter) in 1999. Two standard errors of the mean in parentheses.

Site 207 – 1999

Species	Harvest per hour	Month						Season
		May	June	July	Aug	Sept	Oct	
Channel catfish	0.0006	0	0	0	72	0	0	72
	(0.0038)	(0)	(0)	(0)	(430)	(0)	(0)	(430)
Chinook salmon	0.0025	0	0	60	217	0	0	277
	(0.0084)	(0)	(0)	(307)	(893)	(0)	(0)	(944)
Cisco	0.0803	0	3 941	5 071	0	0	0	9 012
	(0.1327)	(0)	(10 065)	(10 868)	(0)	(0)	(0)	(14 813)
Lake whitefish	0.0008	0	32	60	0	0	0	92
	(0.0040)	(0)	(179)	(411)	(0)	(0)	(0)	(448)
Muskellunge	0.0003	0	0	34	0	0	0	34
	(0.0021)	(0)	(0)	(234)	(0)	(0)	(0)	(234)
Northern pike	0.0108	84	167	170	687	106	0	1 214
	(0.0172)	(204)	(637)	(787)	(1 560)	(408)	(0)	(1 915)
Other	0.0003	0	34	0	0	0	0	34
	(0.0017)	(0)	(193)	(0)	(0)	(0)	(0)	(193)
Rock bass	0.0004	43	0	0	0	0	0	43
	(0.0013)	(142)	(0)	(0)	(0)	(0)	(0)	(142)
Smallmouth bass	0.0044	0	34	80	143	240	0	497
	(0.0118)	(0)	(198)	(431)	(606)	(1 077)	(0)	(1 324)
Walleye	0.0355	810	392	1 087	1 608	67	19	3 983
	(0.0465)	(1 164)	(836)	(2 572)	(4 232)	(379)	(91)	(5 170)
Yellow perch	0.1000	203	861	160	4 426	5 036	542	11 228
	(0.1270)	(608)	(2 539)	(557)	(10 972)	(8 386)	(1 347)	(14 130)
Angler hours		13 687	20 669	31 728	27 609	16 674	1 916	112 283
		(11 066)	(7 267)	(9 954)	(7 617)	(7 023)	(1 134)	(19 570)
Angler trips		3 352	5 291	6 423	6 939	4 149	417	26 571
		(2 730)	(1 961)	(2 132)	(2 040)	(1 820)	(254)	(4 836)
Angler days		2 102	3 977	5 436	5 510	3 170	417	20 612
		(1 721)	(1 500)	(1 851)	(1 713)	(1 449)	(254)	(3 706)

Appendices

Appendix 2 Table 2. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Sweets Point to the Neebish Island Ferry (includes Michigan and Ontario waters of Raber Bay, Munuscong Lake and Neebish Channel), by all modes (non-charter) in 2000. Two standard errors of the mean in parentheses.

Site 207 – 2000

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Cisco	0.3217	0	3 490	26 528	0	0	0	30 018
	(0.2134)	(0)	(4 045)	(11 932)	(0)	(0)	(0)	(15 976)
Muskellunge	0.0001	0	0	0	0	8	0	8
	(0.1653)	(0)	(0)	(0)	(0)	(17)	(0)	(17)
Northern pike	0.0180	0	420	499	580	178	5	1 683
	(0.1655)	(0)	(367)	(412)	(425)	(243)	(11)	(1 458)
Other	0.0029	0	190	0	50	0	35	274
	(0.1653)	(0)	(383)	(0)	(102)	(0)	(73)	(557)
Rock Bass	0.0011	0	0	80	0	22	0	103
	(0.1653)	(0)	(0)	(163)	(0)	(44)	(0)	(206)
Round whitefish	0.0000	0	0	0	0	0	0	0
	(0.0000)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Smallmouth bass	0.0181	18	90	0	120	1 451	5	1 685
	(0.1657)	(35)	(141)	(0)	(161)	(1 113)	(11)	(1 461)
Walleye	0.0683	367	0	1 234	3 232	1 157	385	6 375
	(0.1675)	(394)	(0)	(852)	(2 120)	(932)	(291)	(4 587)
Yellow perch	0.0982	18	1 796	1 066	4 532	1 160	593	9 165
	(0.1707)	(35)	(2 042)	(1 421)	(2 894)	(793)	(910)	(8 095)
Angler hours		2 392	15 578	32 321	26 398	13 820	2 791	93 301
		(1 845)	(8 392)	(8 300)	(7 109)	(6 551)	(1 271)	(33 467)
Angler trips		657	3 392	7 980	5 379	2 682	544	20 635
		(529)	(1 838)	(2 188)	(1 660)	(1 294)	(259)	(7 768)
Angler days		624	3 392	7 867	5 086	2 503	544	20 016
		(510)	(1 838)	(2 161)	(1 601)	(1 223)	(259)	(7 591)

Appendix 2 Table 3. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Sweets Point to the Neebish Island Ferry (includes Michigan and Ontario waters of Raber Bay, Munuscong Lake and Neebish Channel), by all modes (non-charter) in 2001. Two standard errors of the mean in parentheses.

Site 207 – 2001

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Channel catfish	0.0001	0	12	0	0	0	0	12
	(0.2254)	(0)	(25)	(0)	(0)	(0)	(0)	(25)
Cisco	0.3702	0	0	46 215	0	0	0	46 215
	(0.2821)	(0)	(0)	(21 175)	(0)	(0)	(0)	(21 175)
Lake trout	0.0000	0	0	0	0	0	0	0
	(0.0000)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Lake whitefish	0.0093	0	0	1 158	0	0	0	1 158
	(0.2257)	(0)	(0)	(1 398)	(0)	(0)	(0)	(1 398)
Largemouth bass	0.0004	0	0	0	51	0	0	51
	(0.2254)	(0)	(0)	(0)	(102)	(0)	(0)	(102)
Muskellunge	0.0004	0	0	0	51	0	5	56
	(0.2254)	(0)	(0)	(0)	(102)	(0)	(9)	(112)
Northern pike	0.0154	21	209	992	264	368	64	1 918
	(0.2255)	(41)	(146)	(867)	(192)	(279)	(68)	(1 594)
Other	0.0032	72	0	0	0	328	0	400
	(0.2255)	(126)	(0)	(0)	(0)	(602)	(0)	(728)
Smallmouth bass	0.0162	0	15	97	597	1 211	100	2 021
	(0.2256)	(0)	(31)	(142)	(468)	(1 169)	(108)	(1 918)
Walleye	0.1039	301	2 174	3 388	5 362	1 414	325	12 963
	(0.2269)	(505)	(839)	(1 885)	(2 251)	(831)	(292)	(6 603)
White bass	0.0010	0	0	0	28	0	99	127
	(0.2254)	(0)	(0)	(0)	(57)	(0)	(198)	(255)
White perch	0.0018	0	0	0	0	229	0	229
	(0.2254)	(0)	(0)	(0)	(0)	(351)	(0)	(351)
Yellow perch	0.0819	32	0	1 453	3 473	4 972	291	10 222
	(0.2275)	(66)	(0)	(1 431)	(2 020)	(2 986)	(304)	(6 807)
Angler hours		3 308	14 329	59 141	24 048	21 116	2 881	124 823
		(1 756)	(3 514)	(25 134)	(7 116)	(9 522)	(1 773)	(48 815)
Angler trips		936	3 309	13 661	5 515	5 089	562	29 072
		(575)	(853)	(6 087)	(1 677)	(2 376)	(346)	(11 914)
Angler days		870	2 317	11 573	4 811	4 394	509	24 474
		(566)	(617)	(5 230)	(1 498)	(2 061)	(315)	(10 288)

Appendices

Appendix 2 Table 4. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Sweets Point to the Neebish Island Ferry (includes Michigan and Ontario waters of Raber Bay, Munuscong Lake and Neebish Channel), by all modes (non-charter) in 2005. Two standard errors of the mean in parentheses.

Site 207 – 2005

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Black crappie	0.0003	19	0	0	0	0	0	19
	(0.1880)	(39)	(0)	(0)	(0)	(0)	(0)	(39)
Channel catfish	0.0018	30	92	0	0	0	0	122
	(0.1880)	(62)	(135)	(0)	(0)	(0)	(0)	(197)
Chinook salmon	0.0010	30	0	19	0	22	0	71
	(0.1880)	(60)	(0)	(38)	(0)	(45)	(0)	(143)
Cisco	0.0980	0	0	6 694	0	0	0	6 694
	(0.2019)	(0)	(0)	(5 030)	(0)	(0)	(0)	(5 030)
Freshwater drum	0.0005	0	0	0	21	15	0	36
	(0.1880)	(0)	(0)	(0)	(40)	(30)	(0)	(70)
Lake whitefish	0.0056	0	0	382	0	0	0	382
	(0.1882)	(0)	(0)	(468)	(0)	(0)	(0)	(468)
Muskellunge	0.0016	0	0	0	110	0	0	110
	(0.1881)	(0)	(0)	(0)	(216)	(0)	(0)	(216)
Northern pike	0.0110	30	377	87	241	15	0	751
	(0.1883)	(61)	(536)	(107)	(306)	(29)	(0)	(1 039)
Rock Bass	0.0036	0	0	0	221	22	0	243
	(0.1881)	(0)	(0)	(0)	(454)	(44)	(0)	(498)
Round whitefish	0.0000	0	0	0	0	0	0	0
	(0.0000)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Smallmouth bass	0.0160	0	0	0	186	257	650	1 092
	(0.1884)	(0)	(0)	(0)	(257)	(288)	(676)	(1 220)
Walleye	0.1265	246	2 606	2 636	1 586	501	1 066	8 640
	(0.1917)	(251)	(1 515)	(1 607)	(974)	(374)	(747)	(5 468)
White bass	0.0041	0	0	0	221	59	0	280
	(0.1881)	(0)	(0)	(0)	(439)	(121)	(0)	(561)
Yellow perch	0.0465	15	55	218	2 531	74	283	3 175
	(0.2007)	(30)	(84)	(211)	(4 768)	(78)	(386)	(5 558)
Angler hours		2 719	11 263	26 038	18 338	5 950	3 981	68 289
		(1 957)	(4 595)	(10 554)	(4 718)	(2 129)	(1 325)	(25 278)
Angler trips		701	3 152	5 542	4 536	1 374	958	16 263
		(523)	(1 332)	(2 339)	(1 342)	(539)	(361)	(6 436)
Angler days		675	3 043	5 171	4 330	1 264	925	15 408
		(510)	(1 294)	(2 212)	(1 328)	(505)	(354)	(6 204)

Appendix 2 Table 5. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Sweets Point to the Neebish Island Ferry (includes Michigan and Ontario waters of Raber Bay, Munuscong Lake and Neebish Channel), by all modes (non-charter) in 2006. Two standard errors of the mean in parentheses, NAN means no estimate could be generated.

Site 207 – 2006

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Cisco	0.6878	0	0	63 982	0	0	0	63 982
	(0.5276)	(0)	(0)	(42 527)	(0)	(0)	(0)	(42 527)
Freshwater drum	0.0084	0	0	0	778	0	0	778
	(0.2637)	(0)	(0)	(0)	(1 242)	(0)	(0)	(1 242)
Lake whitefish	0.0299	0	0	2 782	0	0	0	2 782
	(0.2641)	(0)	(0)	(1 849)	(0)	(0)	(0)	(1 849)
Northern pike	0.0815	0	0	0	0	7 585	0	7 585
	(0.2708)	(0)	(0)	(0)	(0)	(5 847)	(0)	(5 847)
Rock Bass	0.0019	0	177	0	0	0	0	177
	(0.2634)	(0)	(359)	(0)	(0)	(0)	(0)	(359)
Smallmouth bass	0.0189	0	0	0	0	1 090	665	1 755
	(0.2641)	(0)	(0)	(0)	(0)	(1 844)	(0)	(1 844)
Walleye	0.1279	0	2 248	1 089	3 113	5 451	0	11 901
	(0.3013)	(0)	(3 676)	(1 474)	(3 020)	(12 661)	(0)	(20 831)
Yellow perch	0.0057	0	530	0	0	0	0	530
	(0.2636)	(0)	(1 078)	(0)	(0)	(0)	(0)	(1 078)
Angler hours		2 715	18 108	30 531	21 015	19 105	1 551	93 025
		(NAN)	(10 216)	(15 884)	(10 404)	(11 639)	(NAN)	(48 142)
Angler trips		444	5 388	7 306	3 821	7 666	222	24 847
		(NAN)	(3 356)	(3 935)	(1 958)	(4 600)	(NAN)	(13 849)
Angler days		444	5 388	7 306	3 821	7 666	222	24 847
		(NAN)	(3 356)	(3 935)	(1 958)	(4 600)	(NAN)	(13 849)

Appendix 2 Table 6. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Sweets Point to the Neebish Island Ferry (includes Michigan and Ontario waters of Raber Bay, Munuscong Lake and Neebish Channel), by all modes (non-charter) in 2007. Two standard errors of the mean in parentheses.

Site 207 – 2007

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Channel catfish	0.0001	0	0	0	0	0	12	12
	(0.2448)	(0)	(0)	(0)	(0)	(0)	(23)	(23)
Cisco	0.2455	0	0	34 201	0	0	0	34 201
	(0.2858)	(0)	(0)	(20 559)	(0)	(0)	(0)	(20 559)
Freshwater drum	0.0003	0	0	0	35	0	0	35
	(0.2448)	(0)	(0)	(0)	(70)	(0)	(0)	(70)
Lake whitefish	0.0019	0	0	264	0	0	0	264
	(0.2448)	(0)	(0)	(527)	(0)	(0)	(0)	(527)
Northern pike	0.0077	0	353	137	309	211	60	1 070
	(0.2448)	(0)	(441)	(252)	(375)	(189)	(101)	(1 359)
Other	0.0023	315	0	0	0	0	12	327
	(0.2448)	(669)	(0)	(0)	(0)	(0)	(23)	(692)
Rock Bass	0.0003	0	0	0	0	37	0	37
	(0.2448)	(0)	(0)	(0)	(0)	(76)	(0)	(76)
Smallmouth bass	0.0069	0	116	252	315	74	202	959
	(0.2448)	(0)	(134)	(370)	(291)	(153)	(223)	(1 171)
Walleye	0.2161	2 219	7 004	13 869	5 417	1 195	403	30 108
	(0.2554)	(3 043)	(3 355)	(8 322)	(3 413)	(1 287)	(313)	(19 733)
White bass	0.0005	0	0	0	70	0	0	70
	(0.2448)	(0)	(0)	(0)	(139)	(0)	(0)	(139)
White perch	0.0041	0	226	0	352	0	0	578
	(0.2449)	(0)	(455)	(0)	(709)	(0)	(0)	(1 165)
Yellow perch	0.0734	33	3 180	4 198	1 574	1 227	12	10 224
	(0.2489)	(70)	(3 037)	(5 023)	(1 423)	(1 548)	(18)	(11 119)
Angler hours		5 479	20 797	68 452	31 004	11 362	2 216	139 310
		(3 845)	(7 216)	(28 879)	(14 690)	(6 672)	(1 361)	(62 663)
Angler trips		1 244	4 728	17 275	6 748	2 294	400	32 688
		(896)	(1 720)	(7 291)	(3 296)	(1 413)	(250)	(14 866)
Angler days		1 244	4 629	15 837	5 886	2 103	400	30 099
		(896)	(1 691)	(6 879)	(2 896)	(1 335)	(250)	(13 947)

Appendix 2 Table 7. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Sweets Point to the Neebish Island Ferry (includes Michigan and Ontario waters of Raber Bay, Munuscong Lake and Neebish Channel), by all modes (non-charter) in 2001. Two standard errors of the mean in parentheses.

Site 207 – 2009

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Channel catfish	0.0025	0	59	111	0	86	0	256
	(0.2195)	(0)	(116)	(221)	(0)	(173)	(0)	(510)
Chinook salmon	0.0007	0	0	0	74	0	0	74
	(0.2195)	(0)	(0)	(0)	(146)	(0)	(0)	(146)
Lake herring	0.0740	0	0	7 614	0	0	0	7 614
	(0.2284)	(0)	(0)	(6 508)	(0)	(0)	(0)	(6 508)
Freshwater drum	0.0007	0	0	0	74	0	0	74
	(0.2195)	(0)	(0)	(0)	(144)	(0)	(0)	(144)
Lake whitefish	0.0006	0	0	66	0	0	0	66
	(0.2195)	(0)	(0)	(97)	(0)	(0)	(0)	(97)
Muskellunge	0.0010	0	0	22	0	86	0	108
	(0.2195)	(0)	(0)	(45)	(0)	(169)	(0)	(214)
Northern pike	0.0123	0	708	160	294	50	56	1 268
	(0.2196)	(0)	(564)	(183)	(373)	(102)	(86)	(1 308)
Rock Bass	0.0003	0	7	22	0	0	0	29
	(0.2195)	(0)	(0)	(45)	(0)	(0)	(0)	(45)
Smallmouth bass	0.0117	0	0	0	74	989	139	1 201
	(0.2200)	(0)	(0)	(0)	(145)	(1 404)	(148)	(1 697)
Walleye	0.1587	49	3 428	3 999	6 426	1 908	532	16 341
	(0.2252)	(92)	(2 572)	(2 526)	(3 334)	(1 476)	(523)	(10 523)
White bass	0.0007	0	0	0	74	0	0	74
	(0.2195)	(0)	(0)	(0)	(145)	(0)	(0)	(145)
Yellow perch	0.0517	12	237	999	3 482	588	0	5 318
	(0.2210)	(25)	(400)	(1 013)	(2 319)	(604)	(0)	(4 361)
Angler hours		1 308	20 024	26 461	33 083	17 295	4 772	102 943
		(1 442)	(11 141)	(11 894)	(13 303)	(7 654)	(2 735)	(48 169)
Angler trips		204	5 433	5 142	6 657	3 934	990	22 360
		(235)	(2 965)	(2 548)	(2 758)	(1 769)	(578)	(10 854)
Angler days		192	5 332	5 142	6 524	3 933	990	22 113
		(222)	(2 942)	(2 548)	(2 722)	(1 769)	(578)	(10 781)

Appendix 2 Table 8. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Lake George to Green Point (includes Little Lake George and the area from Belleview Marina to Stribling Point in Ontario, Canada), by all modes (non-charter) in 1999, two standard errors of the mean in parentheses.

Site 208 – 1999

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Chinook salmon	0.0373	0	0	0	1 390	2 216	0	3 606
	(0.0298)	(0)	(0)	(0)	(1 412)	(2 437)	(0)	(2 816)
Coho salmon	0.0031	0	0	0	0	301	0	301
	(0.0096)	(0)	(0)	(0)	(0)	(928)	(0)	(928)
Lake whitefish	0.0007	0	27	38	0	0	0	65
	(0.0030)	(0)	(155)	(248)	(0)	(0)	(0)	(292)
Northern pike	0.0164	242	369	755	72	145	0	1 583
	(0.0215)	(519)	(734)	(1 624)	(261)	(865)	(0)	(2 064)
Pink salmon	0.0035	0	0	0	336	0	0	336
	(0.0104)	(0)	(0)	(0)	(1 005)	(0)	(0)	(1 005)
Pumpkinseed	0.0002	0	0	0	24	0	0	24
	(0.0016)	(0)	(0)	(0)	(157)	(0)	(0)	(157)
Rainbow trout	0.0005	0	0	0	0	48	0	48
	(0.0031)	(1)	(0)	(0)	(0)	(302)	(0)	(302)
Smallmouth bass	0.0021	0	55	0	0	145	0	200
	(0.0076)	(0)	(306)	(0)	(0)	(664)	(0)	(731)
Walleye	0.0005	0	0	0	0	48	0	48
	(0.0032)	(0)	(0)	(0)	(0)	(306)	(0)	(306)
Yellow perch	0.0078	0	0	227	0	530	0	757
	(0.0264)	(0)	(0)	(1 201)	(0)	(2 251)	(0)	(2 551)
Angler hours		4 646	11 254	15 783	35 929	27 270	1 850	96 732
		(2 169)	(4 637)	(4 131)	(10 780)	(10 110)	(1 599)	(16 256)
Angler trips		1 080	2 588	4 313	7 409	5 648	444	21 482
		(498)	(1 129)	(1 205)	(2 288)	(2 134)	(384)	(3 593)
Angler days		1 064	2 588	4 208	7 247	5 501	444	21 052
		(493)	(1 129)	(1 192)	(2 244)	(2 087)	(384)	(3 532)

Appendix 2 Table 9. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Lake George to Green Point (includes Little Lake George and the area from Belleview Marina to Stribling Point in Ontario, Canada), by all modes (non-charter) in 2000. Two standard errors of the mean in parentheses.

Site 208 – 2000

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0003	0	0	17	0	0	0	17
	(0.2104)	(0)	(0)	(27)	(0)	(0)	(0)	(27)
Chinook salmon	0.0702	0	0	17	2 654	1 599	0	4 270
	(0.2124)	(0)	(0)	(38)	(1 485)	(1 000)	(0)	(2 523)
Largemouth bass	0.0033	0	0	202	0	0	0	202
	(0.2105)	(0)	(0)	(407)	(0)	(0)	(0)	(407)
Northern pike	0.0391	191	518	226	1 009	437	0	2 381
	(0.2117)	(290)	(786)	(217)	(1 061)	(462)	(0)	(2 816)
Pumpkinseed	0.0285	0	0	0	820	912	0	1 732
	(0.0000)	(0)	(0)	(0)	(1 289)	(945)	(0)	(2 234)
Rainbow trout	0.0012	0	0	0	0	0	73	73
	(0.2104)	(0)	(0)	(0)	(0)	(0)	(158)	(158)
Smallmouth bass	0.0192	0	0	709	189	267	0	1 165
	(0.2110)	(0)	(0)	(930)	(228)	(279)	(0)	(1 437)
Walleye	0.0124	0	62	0	0	255	440	757
	(0.2106)	(0)	(137)	(0)	(0)	(362)	(510)	(1 010)
Yellow perch	0.0136	0	0	0	315	510	0	825
	(0.2110)	(0)	(0)	(0)	(654)	(759)	(0)	(1 413)
Angler hours		2 351	10 551	3 428	27 017	15 342	2 127	60 816
		(1 595)	(8 219)	(1 683)	(7 632)	(5 561)	(1 260)	(25 950)
Angler trips		555	1 573	743	5 135	3 163	440	11 608
		(412)	(1 243)	(450)	(1 614)	(1 216)	(273)	(5 209)
Angler days		555	1 573	743	5 022	3 041	440	11 373
		(412)	(1 243)	(450)	(1 586)	(1 170)	(273)	(5 134)

Appendix 2 Table 10. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Lake George to Green Point (includes Little Lake George and the area from Belleview Marina to Stribling Point in Ontario, Canada), by all modes (non-charter) in 2001. Two standard errors of the mean in parentheses NAN means no estimate could be generated.

Site 208 – 2001

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0044	0	0	430	0	0	0	430
	(0.1847)	(0)	(0)	(850)	(0)	(0)	(0)	(850)
Chinook salmon	0.0410	0	0	215	2 668	1 094	0	3 977
	(0.1862)	(0)	(0)	(425)	(2 140)	(1 109)	(0)	(3 673)
Northern pike	0.0543	277	770	3 100	650	478	0	5 275
	(0.1882)	(265)	(650)	(3 228)	(1 268)	(761)	(0)	(6 172)
Pink salmon	0.0000	0	0	0	0	0	0	0
	(0.1867)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Pumpkinseed	0.0257	0	0	0	1 375	1 116	0	2 491
	(0.0000)	(0)	(0)	(0)	(2 300)	(1 470)	(0)	(3 770)
Rainbow trout	0.0002	21	0	0	0	0	0	21
	(0.1845)	(40)	(0)	(0)	(0)	(0)	(0)	(40)
Smallmouth bass	0.0083	0	0	0	487	319	0	806
	(0.1849)	(0)	(0)	(0)	(951)	(672)	(0)	(1 623)
Walleye	0.0248	0	242	1 217	356	595	0	2 410
	(0.1854)	(0)	(476)	(1 354)	(626)	(774)	(0)	(3 230)
Yellow perch	0.1879	0	40	3 676	712	13 815	0	18 243
	(0.2797)	(0)	(79)	(6 740)	(1 341)	(19 219)	(0)	(27 379)
Angler hours		3 819	7 816	21 465	31 513	28 358	4 140	97 110
		(1 292)	(3 459)	(8 023)	(9 886)	(12 056)	(NAN)	(34 717)
Angler trips		892	1 963	4 432	6 434	7 008	1 183	21 912
		(328)	(898)	(1 828)	(2 441)	(3 414)	(NAN)	(8 910)
Angler days		726	1 246	3 536	6 131	6 657	1 183	19 478
		(271)	(574)	(1 565)	(2 428)	(3 204)	(NAN)	(8 042)

Appendix 2 Table 11. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Lake George to Green Point (includes Little Lake George and the area from Belleview Marina to Stribling Point in Ontario, Canada), by all modes (non-charter) in 2005. Two standard errors of the mean in parentheses.

Site 208 – 2005

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Chinook salmon	0.0152	0	0	0	227	525	25	777
	(0.2004)	(0)	(0)	(0)	(239)	(372)	(50)	(661)
Coho salmon	0.0015	0	0	0	0	78	0	78
	(0.2002)	(0)	(0)	(0)	(0)	(109)	(0)	(109)
Northern pike	0.0020	0	102	0	0	0	0	102
	(0.2002)	(0)	(141)	(0)	(0)	(0)	(0)	(141)
Other	0.0007	0	0	0	0	34	0	34
	(0.2002)	(0)	(0)	(0)	(0)	(70)	(0)	(70)
Rainbow trout	0.0007	38	0	0	0	0	0	38
	(0.2002)	(77)	(0)	(0)	(0)	(0)	(0)	(77)
Walleye	0.0193	0	208	430	57	218	76	989
	(0.2006)	(0)	(299)	(538)	(79)	(234)	(161)	(1 311)
Yellow perch	0.0480	0	0	0	0	0	2 460	2 460
	(0.2154)	(0)	(0)	(0)	(0)	(0)	(4 073)	(4 073)
Angler hours		1 414	4 584	8 596	18 451	12 790	5 411	51 245
		(949)	(1 912)	(3 698)	(6 751)	(5 661)	(3 067)	(22 038)
Angler trips		524	1 348	2 070	4 874	3 019	1 247	13 082
		(357)	(667)	(1 029)	(1 943)	(1 356)	(939)	(6 291)
Angler days		524	1 205	2 070	4 874	3 019	1 247	12 939
		(357)	(610)	(1 029)	(1 943)	(1 356)	(939)	(6 233)

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Appendix 2 Table 12. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Lake George to Green Point (includes Little Lake George and the area from Belleview Marina to Stribling Point in Ontario, Canada), by all modes (non-charter) in 2006. Two standard errors of the mean in parentheses.

Site 208 – 2006

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Chinook salmon	0.0066	0	0	0	197	273	0	469
	(0.2071)	(0)	(0)	(0)	(240)	(322)	(0)	(562)
Freshwater drum	0.0087	0	0	0	564	0	56	620
	(0.2072)	(0)	(0)	(0)	(682)	(0)	(95)	(778)
Northern pike	0.0682	1 013	901	394	1 051	1 307	169	4 835
	(0.2086)	(877)	(689)	(550)	(1 012)	(886)	(287)	(4 301)
Pumpkinseed	0.0007	0	0	0	0	53	0	53
	(0.0000)	(0)	(0)	(0)	(0)	(106)	(0)	(106)
Round whitefish	0.0005	0	34	0	0	0	0	34
	(0.2070)	(0)	(65)	(0)	(0)	(0)	(0)	(65)
Smallmouth bass	0.0339	0	57	1 217	470	251	411	2 406
	(0.2082)	(0)	(117)	(1 311)	(532)	(309)	(612)	(2 880)
Walleye	0.0822	47	562	2 514	1 650	976	85	5 833
	(0.2112)	(67)	(539)	(2 128)	(1 574)	(1 222)	(145)	(5 674)
Yellow perch	0.2227	58	293	2 834	2 380	7 668	2 567	15 800
	(0.2475)	(0)	(283)	(2 562)	(2 981)	(7 853)	(3 926)	(17 604)
Angler hours		4 269	7 703	18 829	16 503	19 401	4 239	70 944
		(2 850)	(3 152)	(6 408)	(7 020)	(9 982)	(2 760)	(32 172)
Angler trips		1 232	1 945	5 670	4 066	5 884	1 324	20 121
		(807)	(863)	(2 305)	(1 859)	(3 366)	(1 005)	(10 205)
Angler days		1 232	1 723	5 670	3 818	5 778	1 280	19 501
		(807)	(794)	(2 305)	(1 777)	(3 306)	(991)	(9 981)

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Appendix 2 Table 13. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Lake George to Green Point (includes Little Lake George and the area from Belleview Marina to Stribling Point in Ontario, Canada), by all modes (non-charter) in 2007. Two standard errors of the mean in parentheses.

Site 208 – 2007

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0057	6	57	137	0	0	0	200
	(0.2512)	(8)	(65)	(109)	(0)	(0)	(0)	(182)
Chinook salmon	0.0547	0	0	34	709	1 185	0	1 928
	(0.2522)	(0)	(0)	(50)	(526)	(589)	(0)	(1 165)
Coho salmon	0.0075	0	0	0	12	235	16	263
	(0.2512)	(0)	(0)	(0)	(25)	(184)	(33)	(242)
Lake whitefish	0.0063	0	185	0	0	0	36	221
	(0.2513)	(0)	(226)	(0)	(0)	(0)	(79)	(304)
Northern pike	0.0017	0	42	0	0	16	0	58
	(0.2512)	(0)	(79)	(0)	(0)	(33)	(0)	(111)
Pumpkinseed	0.0003	0	0	0	12	0	0	12
	(0.0000)	(0)	(0)	(0)	(25)	(0)	(0)	(25)
Rainbow trout	0.0020	6	27	0	0	0	36	69
	(0.2512)	(17)	(34)	(0)	(0)	(0)	(79)	(130)
Smallmouth bass	0.0013	0	0	0	12	32	0	45
	(0.2512)	(0)	(0)	(0)	(25)	(47)	(0)	(71)
Walleye	0.0234	84	0	293	225	97	127	827
	(0.2515)	(101)	(0)	(261)	(250)	(127)	(175)	(914)
Yellow perch	0.1528	9	0	50	296	3 542	1 491	5 389
	(0.2716)	(21)	(0)	(98)	(449)	(2 934)	(2 118)	(5 620)
Angler hours		1 006	1 921	4 662	11 031	15 266	1 387	35 273
		(705)	(743)	(1 789)	(6 520)	(5 540)	(1 020)	(16 317)
Angler trips		217	489	1 321	2 209	3 441	249	7 926
		(161)	(203)	(550)	(1 440)	(1 279)	(184)	(3 817)
Angler days		217	489	1 290	2 110	3 359	249	7 713
		(161)	(203)	(536)	(1 379)	(1 251)	(184)	(3 713)

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Appendix 2 Table 14.Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from Lake George to Green Point (includes Little Lake George and the area from Belleview Marina to Stribling Point in Ontario, Canada), by all modes (non-charter) in 2008. Two standard errors of the mean in parentheses.

Site 208– 2008

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0008	0	57	0	0	0	0	57
	(0.2157)	(0)	(84)	(0)	(0)	(0)	(0)	(84)
Chinook salmon	0.0165	0	0	0	620	451	52	1 124
	(0.2159)	(0)	(0)	(0)	(504)	(375)	(63)	(942)
Cisco	0.0054	0	0	370	0	0	0	370
	(0.2160)	(0)	(0)	(756)	(0)	(0)	(0)	(756)
Coho salmon	0.0095	0	0	0	0	212	434	645
	(0.2158)	(0)	(0)	(0)	(0)	(238)	(322)	(560)
Largemouth bass	0.0006	0	0	0	0	42	0	42
	(0.2157)	(0)	(0)	(0)	(0)	(84)	(0)	(84)
Northern pike	0.0543	0	410	834	1 568	811	80	3 703
	(0.2169)	(0)	(308)	(903)	(1 028)	(602)	(103)	(2 945)
Other	0.0002	0	11	0	0	0	0	11
	(0.2157)	(0)	(19)	(0)	(0)	(0)	(0)	(19)
Pink salmon	0.0005	0	0	0	35	0	0	35
	(0.2157)	(0)	(0)	(0)	(68)	(0)	(0)	(68)
Rainbow trout	0.0022	0	39	0	0	70	42	152
	(0.2157)	(0)	(73)	(0)	(0)	(143)	(52)	(267)
Rock Bass	0.0006	0	39	0	0	0	0	39
	(0.2157)	(0)	(81)	(0)	(0)	(0)	(0)	(81)
Smallmouth bass	0.0247	0	41	123	138	1 248	138	1 688
	(0.2170)	(0)	(90)	(237)	(176)	(1 559)	(266)	(2 328)
Walleye	0.0911	0	670	2 887	2 242	381	38	6 216
	(0.2194)	(0)	(545)	(2 406)	(1 160)	(333)	(75)	(4 518)
Yellow perch	0.1136	750	480	2 671	676	3 172	0	7 749
	(0.2242)	(866)	(614)	(2 903)	(838)	(2 673)	(0)	(7 895)
Angler hours		1 848	7 294	14 313	21 818	19 979	2 967	68 220
		(279)	(2 621)	(8 687)	(8 177)	(8 108)	(1 246)	(29 118)
Angler trips		244	2 219	3 281	4 657	4 358	804	15 563
		(0)	(865)	(2 164)	(1 864)	(1 851)	(383)	(7 128)
Angler days		194	2 219	2 996	4 587	4 215	777	14 988
		(0)	(865)	(1 987)	(1 837)	(1 792)	(372)	(6 853)

Appendix 2 Table 15. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from the Neebish Island Ferry to the rapids in Sault Ste. Marie (includes Lake Nicolet, the St. Marys River below the rapids and the area from the rapids to Belleview Marina in Ontario, Canada), by all modes (non-charter) in 1999. Two standard errors of the mean in parentheses.

Site 209 – 1999

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0016	0	21	88	0	0	0	109
	(0.0041)	(0)	(78)	(272)	(0)	(0)	(0)	(283)
Channel catfish	0.0005	37	0	0	0	0	0	37
	(0.0027)	(186)	(0)	(0)	(0)	(0)	(0)	(186)
Chinook salmon	0.0164	0	0	0	306	501	317	1 124
	(0.0158)	(0)	(0)	(0)	(609)	(621)	(621)	(1 069)
Cisco	0.0153	0	0	1 045	0	0	1	1 046
	(0.0288)	(0)	(0)	(1 966)	(0)	(0)	(3)	(1 966)
Coho salmon	0.0009	19	11	0	0	28	5	63
	(0.0023)	(62)	(53)	(0)	(0)	(133)	(13)	(157)
Lake trout	0.0000	0	1	0	0	0	0	1
	(0.0000)	(0)	(2)	(0)	(0)	(0)	(0)	(2)
Lake whitefish	0.0872	696	3 237	1 676	164	89	104	5 966
	(0.0651)	(1 349)	(2 967)	(2 726)	(664)	(539)	(366)	(4 349)
Largemouth bass	0.0001	0	0	0	0	7	0	7
	(0.0002)	(0)	(0)	(0)	(0)	(14)	(0)	(14)
Northern pike	0.0044	180	95	0	24	1	0	300
	(0.0082)	(478)	(271)	(0)	(99)	(2)	(0)	(558)
Other	0.0004	0	11	0	0	15	0	26
	(0.0010)	(0)	(23)	(0)	(0)	(63)	(0)	(67)
Pink salmon	0.0143	0	0	0	121	858	0	979
	(0.0246)	(0)	(0)	(0)	(366)	(1 639)	(0)	(1 680)
Pumpkinseed	0.0158	0	0	0	123	956	0	1 079
	(0.0000)	(0)	(0)	(0)	(128)	(729)	(0)	(857)
Rainbow trout	0.0023	44	108	0	0	7	0	159
	(0.0036)	(106)	(219)	(0)	(0)	(44)	(0)	(247)
Round whitefish	0.0004	0	24	0	0	1	0	25
	(0.0013)	(0)	(88)	(0)	(0)	(2)	(0)	(88)
Walleye	0.0310	12	1	477	1 190	444	0	2 124
	(0.0333)	(63)	(3)	(1 170)	(1 473)	(1 241)	(0)	(2 254)
Yellow perch	0.0118	604	119	21	0	66	0	810
	(0.0330)	(2 165)	(550)	(89)	(0)	(293)	(0)	(2 255)
Angler hours		3 745	9 376	14 611	20 441	16 847	3 421	68 441
		(1 730)	(3 512)	(3 841)	(7 414)	(5 830)	(1 477)	(11 010)
Angler trips		957	2 355	3 692	4 468	4 128	907	16 507
		(440)	(898)	(1 054)	(1 648)	(1 422)	(398)	(2 647)
Angler days		938	2 236	3 617	4 447	3 982	907	16 127
		(430)	(854)	(1 038)	(1 640)	(1 376)	(398)	(2 595)

Appendix 2 Table 16. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from the Neebish Island Ferry to the rapids in Sault Ste. Marie (includes Lake Nicolet, the St. Marys River below the rapids and the area from the rapids to Belleview Marina in Ontario, Canada), by all modes (non-charter) in 2000. Two standard errors of the mean in parentheses.

Site 209 – 2000

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0013	0	0	78	0	0	0	78
	(0.1901)	(0)	(0)	(121)	(0)	(0)	(0)	(121)
Chinook salmon	0.0181	0	0	19	256	741	78	1 094
	(0.1902)	(0)	(0)	(40)	(293)	(330)	(40)	(703)
Cisco	0.0357	0	0	2 161	0	0	0	2 161
	(0.1922)	(0)	(0)	(1 742)	(0)	(0)	(0)	(1 742)
Freshwater drum	0.0003	0	0	19	0	0	0	19
	(0.1901)	(0)	(0)	(38)	(0)	(0)	(0)	(38)
Lake whitefish	0.0382	75	414	669	125	338	694	2 315
	(0.1918)	(134)	(338)	(622)	(188)	(530)	(1 246)	(3 058)
Northern pike	0.0080	167	123	145	0	48	0	483
	(0.1902)	(186)	(214)	(278)	(0)	(98)	(0)	(777)
Other	0.0002	13	0	0	0	0	0	13
	(0.1901)	(26)	(0)	(0)	(0)	(0)	(0)	(26)
Pumpkinseed	0.0017	0	0	0	102	0	0	102
	(0.0000)	(0)	(0)	(0)	(157)	(0)	(0)	(157)
Rainbow trout	0.0006	0	15	19	0	0	0	35
	(0.1901)	(0)	(31)	(38)	(0)	(0)	(0)	(69)
Round whitefish	0.0001	8	0	0	0	0	0	8
	(0.1901)	(16)	(0)	(0)	(0)	(0)	(0)	(16)
Walleye	0.0325	42	15	431	939	531	10	1 968
	(0.1911)	(81)	(31)	(474)	(925)	(557)	(21)	(2 090)
Angler hours		2 664	9 129	16 936	16 533	12 333	2 968	60 564
		(1 302)	(2 911)	(8 967)	(4 542)	(4 345)	(1 556)	(23 622)
Angler trips		644	1 570	3 521	3 621	3 327	730	13 413
		(340)	(490)	(1 892)	(1 177)	(1 306)	(402)	(5 607)
Angler days		615	1 541	3 521	3 621	3 150	730	13 178
		(328)	(482)	(1 892)	(1 177)	(1 209)	(402)	(5 490)

Appendix 2. Table 17. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from the Neebish Island Ferry to the rapids in Sault Ste. Marie (includes Lake Nicolet, the St. Marys River below the rapids and the area from the rapids to Belleview Marina in Ontario, Canada), by all modes (non-charter) in 2001. Two standard errors of the mean in parentheses.

Site 209 – 2001

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0046	0	0	316	40	0	0	357
	(0.1879)	(0)	(0)	(487)	(74)	(0)	(0)	(561)
Chinook salmon	0.0259	0	0	0	196	1 630	163	1 989
	(0.1883)	(0)	(0)	(0)	(273)	(1 035)	(149)	(1 457)
Cisco	0.0367	0	54	2 759	0	0	0	2 813
	(0.1913)	(0)	(116)	(2 801)	(0)	(0)	(0)	(2 917)
Lake whitefish	0.0281	31	238	1 529	81	182	95	2 156
	(0.1897)	(64)	(342)	(2 022)	(148)	(314)	(194)	(3 085)
Northern pike	0.0077	156	189	95	0	151	0	591
	(0.1879)	(214)	(215)	(187)	(0)	(305)	(0)	(921)
Other	0.0009	0	0	0	0	0	72	72
	(0.1878)	(0)	(0)	(0)	(0)	(0)	(142)	(142)
Pumpkinseed	0.0265	0	0	0	0	2 033	0	2 033
	(0.0000)	(0)	(0)	(0)	(0)	(1 924)	(0)	(1 924)
Rainbow trout	0.0009	0	0	48	0	0	18	65
	(0.1878)	(0)	(0)	(94)	(0)	(0)	(32)	(125)
Smallmouth bass	0.0036	0	0	0	224	50	0	274
	(0.1879)	(0)	(0)	(0)	(456)	(102)	(0)	(557)
Walleye	0.0452	133	0	498	1 202	1 205	428	3 466
	(0.1891)	(156)	(0)	(530)	(1 076)	(1 130)	(539)	(3 431)
Yellow perch	0.1149	0	0	308	4 742	3 766	0	8 816
	(0.2276)	(0)	(0)	(450)	(6 541)	(7 369)	(0)	(14 361)
Angler hours		3 355	6 789	23 387	17 499	23 362	2 302	76 694
		(1 191)	(2 320)	(7 402)	(6 593)	(10 065)	(1 018)	(28 587)
Angler trips		740	1 663	5 102	3 652	5 127	605	16 890
		(324)	(653)	(1 721)	(1 548)	(2 314)	(283)	(6 844)
Angler days		740	1 663	3 631	3 560	4 809	605	15 009
		(324)	(653)	(1 216)	(1 520)	(2 180)	(283)	(6 177)

Appendix 2 Table 18. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from the Neebish Island Ferry to the rapids in Sault Ste. Marie (includes Lake Nicolet, the St. Marys River below the rapids and the area from the rapids to Belleview Marina in Ontario, Canada), by all modes (non-charter) in 2006. Two standard errors of the mean in parentheses.

Site 209– 2006

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0084	0	121	343	149	78	25	716
	(0.1820)	(0)	(86)	(368)	(189)	(89)	(45)	(777)
Chinook salmon	0.0352	0	0	0	198	2 261	524	2 983
	(0.1827)	(0)	(0)	(0)	(202)	(1 267)	(475)	(1 944)
Coho salmon	0.0012	79	0	0	0	8	17	104
	(0.1819)	(106)	(0)	(0)	(0)	(17)	(34)	(156)
Cisco	0.0096	0	62	754	0	0	0	816
	(0.1822)	(0)	(124)	(806)	(0)	(0)	(0)	(930)
Freshwater drum	0.0039	0	0	0	222	0	109	331
	(0.1820)	(0)	(0)	(0)	(243)	(0)	(161)	(404)
Lake whitefish	0.1157	493	1 907	6 554	0	336	523	9 813
	(0.1900)	(520)	(903)	(4 415)	(0)	(675)	(726)	(7 240)
Northern pike	0.0029	89	17	0	113	27	0	245
	(0.1820)	(114)	(31)	(0)	(225)	(54)	(0)	(424)
Other	0.0014	123	0	0	0	0	0	123
	(0.1820)	(196)	(0)	(0)	(0)	(0)	(0)	(196)
Pink salmon	0.0000	0	0	0	0	0	0	0
	(0.1843)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Pumpkinseed	0.0432	0	0	0	19	3 588	59	3 666
	(0.0000)	(0)	(0)	(0)	(38)	(2 482)	(75)	(2 595)
Rainbow trout	0.0052	299	21	14	37	27	42	439
	(0.1820)	(341)	(26)	(30)	(75)	(54)	(93)	(619)
Rock Bass	0.0030	52	171	28	0	0	0	251
	(0.1820)	(110)	(250)	(44)	(0)	(0)	(0)	(404)
Round whitefish	0.0015	52	76	0	0	0	0	128
	(0.1820)	(84)	(138)	(0)	(0)	(0)	(0)	(221)
Smallmouth bass	0.0019	0	0	0	38	27	101	165
	(0.1820)	(0)	(0)	(0)	(77)	(54)	(185)	(316)
Walleye	0.0781	11	193	2 623	2 625	974	203	6 629
	(0.1845)	(24)	(241)	(1 768)	(1 543)	(979)	(377)	(4 931)
Yellow perch	0.1114	17	69	1 304	226	4 725	3 109	9 450
	(0.2061)	(31)	(94)	(1 273)	(460)	(7 130)	(3846)	(12 834)
Angler hours		5 419	6 041	26 706	15 324	25 953	5 402	84 845
		(2 952)	(1 979)	(7 984)	(5 352)	(10 79)	(3 68)	(32 815)
Angler trips		1 808	1 656	7 236	3 444	5 700	1 419	21 263
		(1 075)	(554)	(2 235)	(1 291)	(2 472)	(969)	(8 595)
Angler days		1 808	1 641	6 996	3 264	4 773	1 419	19 902
		(1 075)	(552)	(2 177)	(1 245)	(2 034)	(969)	(8 051)

Appendices

Appendix 2 Table 19.Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the area from the Neebish Island Ferry to the rapids in Sault Ste. Marie (includes Lake Nicolet, the St. Marys River below the rapids and the area from the rapids to Belleview Marina in Ontario, Canada), by all modes (non-charter) in 1999. Two standard errors of the mean in parentheses.

Site 209– 2008

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0212	67	174	597	281	182	113	1 413
	(0.1728)	(120)	(186)	(469)	(296)	(248)	(108)	(1 426)
Channel catfish	0.0033	0	0	0	9	212	0	221
	(0.1727)	(0)	(0)	(0)	(18)	(436)	(0)	(453)
Chinook salmon	0.0138	0	0	0	136	705	81	923
	(0.1727)	(0)	(0)	(0)	(166)	(427)	(77)	(670)
Cisco	0.0263	4	0	410	1 344	0	0	1 758
	(0.1751)	(8)	(0)	(571)	(1 945)	(0)	(0)	(2 524)
Coho salmon	0.0028	51	38	0	0	64	32	185
	(0.1725)	(61)	(88)	(0)	(0)	(73)	(36)	(257)
Freshwater drum	0.0004	0	0	0	29	0	0	29
	(0.1725)	(0)	(0)	(0)	(60)	(0)	(0)	(60)
Lake trout	0.0004	27	0	0	0	0	0	27
	(0.1725)	(55)	(0)	(0)	(0)	(0)	(0)	(55)
Lake whitefish	0.1056	1 727	1 712	3 426	103	85	0	7 053
	(0.1833)	(3 235)	(1 472)	(2 216)	(148)	(171)	(0)	(7 241)
Northern pike	0.0054	43	48	47	136	85	0	359
	(0.1726)	(45)	(70)	(69)	(206)	(132)	(0)	(522)
Other	0.0005	32	0	0	0	0	0	32
	(0.1725)	(53)	(0)	(0)	(0)	(0)	(0)	(53)
Pink salmon	0.0375	0	0	0	24	2 476	6	2 506
	(0.1736)	(0)	(0)	(0)	(50)	(1 325)	(12)	(1 387)
Rainbow trout	0.0120	355	288	34	91	21	11	801
	(0.1729)	(648)	(232)	(66)	(133)	(43)	(25)	(1 146)
Rock Bass	0.0143	0	953	0	0	0	0	953
	(0.1740)	(0)	(1 517)	(0)	(0)	(0)	(0)	(1 517)
Smallmouth bass	0.0051	27	43	0	0	273	0	343
	(0.1727)	(41)	(55)	(0)	(0)	(518)	(0)	(615)
Walleye	0.1070	296	567	362	4 712	1 206	0	7 143
	(0.1769)	(426)	(589)	(346)	(2 406)	(726)	(0)	(4 493)
Yellow perch	0.1077	413	233	337	2 741	759	2 705	7 188
	(0.2015)	(670)	(379)	(428)	(4 204)	(877)	(4 207)	(10 766)
Angler hours		5 694	10 560	9 472	19 652	18 179	3 207	66 763
		(2 703)	(4 484)	(3 571)	(8 112)	(5 318)	(1 501)	(25 690)
Angler trips		1 625	2 836	2 282	4 075	3 719	935	15 472
		(853)	(1 284)	(899)	(1 722)	(1 210)	(442)	(6 408)
Angler days		1 620	2 836	2 239	3 848	3 497	922	14 962
		(852)	(1 284)	(885)	(1 641)	(1 144)	(438)	(6 244)

Appendix 2 Table 20. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for Potagannissing Bay (Michigan and Ontario), by all modes (non-charter) in 1999. Two standard errors of the mean in parentheses.

Site 210-1999

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0020	0	0	278	0	0	0	278
	(0.0095)	(0)	(0)	(1 337)	(0)	(0)	(0)	(1 337)
Bluegill	0.0008	0	0	107	0	0	0	107
	(0.0047)	(0)	(0)	(657)	(0)	(0)	(0)	(657)
Chinook salmon	0.0072	0	0	534	440	42	0	1 016
	(0.0249)	(0)	(0)	(3 299)	(1 123)	(221)	(0)	(3 492)
Cisco	0.1506	0	4 216	16 986	0	0	0	21 202
	(0.2656)	(0)	(6 842)	(36 511)	(0)	(0)	(0)	(37 147)
Lake whitefish	0.0030	0	75	342	0	0	0	417
	(0.0084)	(0)	(390)	(1 106)	(0)	(0)	(0)	(1 173)
Largemouth bass	0.0008	0	0	107	0	0	0	107
	(0.0048)	(0)	(0)	(677)	(0)	(0)	(0)	(677)
Northern pike	0.0053	163	242	0	238	101	0	744
	(0.0082)	(407)	(602)	(0)	(830)	(321)	(0)	(1 149)
Other	0.0026	45	0	278	46	0	0	369
	(0.0099)	(175)	(0)	(1 350)	(253)	(0)	(0)	(1 385)
Pink salmon	0.0024	0	0	0	340	0	0	340
	(0.0082)	(0)	(0)	(0)	(1 154)	(0)	(0)	(1 154)
Pumpkinseed	0.0003	0	0	0	0	40	0	40
	(0.0015)	(0)	(0)	(0)	(0)	(215)	(0)	(215)
Rock bass	0.0002	24	0	0	0	0	0	24
	(0.0009)	(127)	(0)	(0)	(0)	(0)	(0)	(127)
Smallmouth bass	0.0032	73	301	0	0	80	0	454
	(0.0068)	(287)	(811)	(0)	(0)	(417)	(0)	(956)
Walleye	0.0138	142	96	1 452	257	0	0	1 947
	(0.0278)	(309)	(360)	(3 737)	(993)	(0)	(0)	(3 896)
Yellow perch	0.3277	1 720	229	278	4 171	35 702	4 024	46 124
	(0.2041)	(4 531)	(842)	(982)	(10 667)	(23 978)	(5 658)	(27 257)
Angler hours		17 034	18 755	49 405	28 790	16 559	10 200	140 743
		(8 294)	(7 856)	(21 705)	(9 914)	(6 177)	(5 270)	(27 674)
Angler trips		4 816	5 511	13 994	8 328	4 121	3 317	40 087
		(2 444)	(2 359)	(5 925)	(3 170)	(1 595)	(1805)	(7 905)
Angler days		3 110	3 429	11 901	5 437	2 888	3 004	29 769
		(1 529)	(1 462)	(5 435)	(2 169)	(1 155)	(1 668)	(6 545)

Appendix 2 Table 21. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for Potagannissing Bay (Michigan and Ontario), by all modes (non-charter) in 2000. Two standard errors of the mean in parentheses.

Site 210-2000

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Chinook salmon	0.0026	0	0	115	194	34	0	343
	(0.1592)	(0)	(0)	(233)	(332)	(69)	(0)	(634)
Cisco	0.6212	0	16 352	64 044	0	110	936	81 442
	(0.2697)	(0)	(11 536)	(26 097)	(0)	(133)	(736)	(38 503)
Coho salmon	0.0005	0	0	0	65	0	0	65
	(0.1592)	(0)	(0)	(0)	(134)	(0)	(0)	(134)
Lake whitefish	0.0064	0	0	689	0	147	0	836
	(0.1594)	(0)	(0)	(927)	(0)	(228)	(0)	(1 155)
Northern pike	0.0209	36	249	402	1 951	37	63	2 737
	(0.1598)	(64)	(424)	(508)	(1 661)	(74)	(77)	(2 808)
Other	0.0006	0	0	0	0	74	0	74
	(0.1592)	(0)	(0)	(0)	(0)	(108)	(0)	(108)
Pink salmon	0.0000	0	0	0	0	0	0	0
	(0.1592)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Pumpkinseed	0.0005	0	0	0	65	0	0	65
	(0.0000)	(0)	(0)	(0)	(111)	(0)	(0)	(111)
Smallmouth bass	0.0020	0	107	114	0	37	0	258
	(0.1592)	(0)	(223)	(233)	(0)	(74)	(0)	(530)
Walleye	0.0174	18	861	1 146	259	0	0	2 284
	(0.1595)	(34)	(824)	(927)	(422)	(0)	(0)	(2 208)
Yellow perch	0.5010	151	0	1 761	8 562	31 312	23 893	65 680
	(0.2370)	(210)	(0)	(3 508)	(12 237)	(14 846)	(12 139)	(42 941)
Angler hours		4 694 (3 475)	19 805 (9 135)	48 819 (14 721)	34 390 (8 894)	15 852 (5 755)	7 546 (3 337)	131 107 (45 316)
Angler trips		1 096 (871)	6 357 (3 189)	14 402 (4 710)	11 640 (3 552)	3 723 (1 441)	1 764 (795)	38 982 (14 559)
Angler days		1 059 (855)	5 741 (2 887)	14 003 (4 616)	11 493 (3 535)	3 237 (1 298)	1 749 (794)	37 282 (13 985)

Appendix 2 Table 22. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for Potagannissing Bay (Michigan and Ontario), by all modes (non-charter) in 2001. Two standard errors of the mean in parentheses.

Site 210-2001

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Chinook salmon	0.0066	0	0	178	625	17	0	819
	(0.1425)	(0)	(0)	(202)	(543)	(33)	(0)	(778)
Coho salmon	0.0003	0	0	42	0	0	0	42
	(0.1424)	(0)	(0)	(85)	(0)	(0)	(0)	(85)
Cisco	0.6671	0	13 158	69 335	0	127	14	82 634
	(0.2329)	(0)	(6 444)	(21 899)	(0)	(102)	(17)	(28 462)
Lake whitefish	0.0111	0	0	1 330	0	50	0	1 381
	(0.1426)	(0)	(0)	(815)	(0)	(75)	(0)	(890)
Northern pike	0.0070	303	211	167	176	8	0	864
	(0.1425)	(205)	(161)	(216)	(173)	(15)	(0)	(771)
Other	0.0033	52	15	0	0	307	35	409
	(0.1425)	(84)	(29)	(0)	(0)	(276)	(71)	(461)
Pink salmon	0.0000	0	0	0	0	0	0	0
	(0.1426)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Pumpkinseed	0.0042	0	0	0	518	0	0	518
	(0.0000)	(0)	(0)	(0)	(873)	(0)	(0)	(873)
Smallmouth bass	0.0034	0	174	211	0	33	0	419
	(0.1425)	(0)	(185)	(310)	(0)	(47)	(0)	(543)
Walleye	0.0656	2 717	2 783	573	2 037	17	0	8 127
	(0.1437)	(1 428)	(1 248)	(524)	(1 342)	(34)	(0)	(4 576)
Yellow perch	0.3532	1 314	116	1 590	3 098	33 972	3 662	43 752
	(0.1860)	(1 498)	(234)	(1 764)	(2 618)	(14 155)	(2 577)	(22 846)
Angler hours		11 567	25 938	43 120	19 552	20 753	2 948	123 878
		(4 419)	(8 862)	(10 408)	(6 672)	(7 564)	(1 807)	(39 731)
Angler trips		3 055	6 571	11 846	5 657	5 268	769	33 167
		(1 233)	(2 281)	(3 040)	(2 029)	(1 996)	(475)	(11 054)
Angler days		2 128	4 483	8 779	4 680	3 947	541	24 558
		(872)	(1 572)	(2 333)	(1 683)	(1 502)	(338)	(8 299)

Appendix 2 Table 23. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for Potagannissing Bay (Michigan and Ontario), by all modes (non-charter) in 2005. Two standard errors of the mean in parentheses.

Site 210-2005

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Cisco	0.3058	0	5 133	35 195	0	0	0	40 328
	(0.3062)	(0)	(5 142)	(19 255)	(0)	(0)	(0)	(24 397)
Lake trout	0.0004	0	0	59	0	0	0	59
	(0.2663)	(0)	(0)	(118)	(0)	(0)	(0)	(118)
Lake whitefish	0.0202	0	58	2 608	0	0	0	2 666
	(0.2668)	(0)	(112)	(2 037)	(0)	(0)	(0)	(2 149)
Northern pike	0.0025	125	0	0	111	90	0	326
	(0.2663)	(129)	(0)	(0)	(234)	(125)	(0)	(488)
Pink salmon	0.0000	0	0	0	0	0	0	0
	(0.2663)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Pumpkinseed	0.0022	161	0	0	125	0	0	286
	(0.2663)	(304)	(0)	(0)	(261)	(0)	(0)	(565)
Rock Bass	0.0026	0	0	0	339	0	0	339
	(0.2663)	(0)	(0)	(0)	(384)	(0)	(0)	(384)
Round whitefish	0.0004	0	0	59	0	0	0	59
	(0.2663)	(0)	(0)	(118)	(0)	(0)	(0)	(118)
Smallmouth bass	0.0199	37	519	1 297	727	46	0	2 626
	(0.2667)	(71)	(769)	(1 471)	(821)	(94)	(0)	(3 227)
Walleye	0.0512	1 161	1 692	159	3 497	244	0	6 753
	(0.2676)	(889)	(1 244)	(251)	(3 124)	(218)	(0)	(5 726)
Yellow perch	0.5315	1 203	0	218	4 303	27 199	37 180	70 102
	(0.3083)	(1 162)	(0)	(287)	(3 440)	(11 630)	(16 456)	(32 975)
Angler hours		9 377	15 502	67 005	18 607	12 689	8 708	131 887
		(4 441)	(5 449)	(33 637)	(5 854)	(3 176)	(2 906)	(55 462)
Angler trips		2 478	4 099	14 051	5 792	3 275	2 567	32 264
		(1 199)	(1 575)	(7 170)	(2 173)	(892)	(888)	(13 897)
Angler days		2 296	3 783	13 035	4 653	3 134	2 567	29 468
		(1 135)	(1 491)	(6 634)	(1 911)	(875)	(888)	(12 934)

Appendix 2 Table 24. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for Potagannissing Bay (Michigan and Ontario), by all modes (non-charter) in 2006. Two standard errors of the mean in parentheses.

Site 210-2006

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Chinook salmon	0.0012	0	0	180	0	0	0	180
	(0.2367)	(0)	(0)	(260)	(0)	(0)	(0)	(260)
Cisco	0.6843	0	14 612	89 577	0	0	0	104 190
	(0.3782)	(0)	(13 862)	(42 720)	(0)	(0)	(0)	(56 582)
Lake whitefish	0.0619	0	3 897	5 528	0	0	0	9 425
	(0.2446)	(0)	(8 552)	(3 903)	(0)	(0)	(0)	(12 456)
Northern pike	0.0051	0	0	0	379	149	246	774
	(0.2367)	(0)	(0)	(0)	(340)	(261)	(393)	(994)
Round whitefish	0.0064	0	0	976	0	0	0	976
	(0.2370)	(0)	(0)	(1 969)	(0)	(0)	(0)	(1 969)
Smallmouth bass	0.0047	0	0	0	568	149	0	717
	(0.2367)	(0)	(0)	(0)	(822)	(261)	(0)	(1 083)
Walleye	0.0298	337	997	586	1 573	1 043	0	4 535
	(0.2375)	(284)	(1 572)	(854)	(1 589)	(1 711)	(0)	(6 010)
Yellow perch	0.5625	27 886	0	1 578	3 032	33 884	19 269	85 648
	(0.4083)	(27 420)	(0)	(1 283)	(5 909)	(15 325)	(39 274)	(89 211)
Angler hours		11 590	15 345	69 303	13 238	21 044	21 735	152 254
		(7 412)	(11 532)	(28 169)	(5 639)	(6 979)	(15 381)	(75 113)
Angler trips		2 126	3 159	12 343	3 067	3 821	4 925	29 442
		(1 388)	(2 755)	(5 080)	(1 474)	(1 430)	(3 746)	(15 873)
Angler days		2 126	3 159	10 541	2 680	3 573	4 925	27 004
		(1 388)	(2 755)	(4 473)	(1 448)	(1 386)	(3 746)	(15 197)

Appendix 2 Table 25. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for Potagannissing Bay (Michigan and Ontario), by all modes (non-charter) in 2007. Two standard errors of the mean in parentheses.

Site 210-2007

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0029	0	0	530	0	0	0	530
	(0.3279)	(0)	(0)	(644)	(0)	(0)	(0)	(644)
Chinook salmon	0.0003	0	0	55	0	0	0	55
	(0.3278)	(0)	(0)	(112)	(0)	(0)	(0)	(112)
Cisco	0.6545	0	521	119 691	0	0	0	120 212
	(0.5610)	(0)	(961)	(83 605)	(0)	(0)	(0)	(84 566)
Lake trout	0.0009	0	0	165	0	0	0	165
	(0.3278)	(0)	(0)	(263)	(0)	(0)	(0)	(263)
Lake whitefish	0.0629	0	191	11 367	0	0	0	11 558
	(0.3311)	(0)	(283)	(8 528)	(0)	(0)	(0)	(8 811)
Northern pike	0.0063	471	0	110	260	320	0	1 160
	(0.3279)	(545)	(0)	(221)	(269)	(418)	(0)	(1 452)
Other	0.0071	0	40	475	0	781	0	1 296
	(0.3279)	(0)	(82)	(790)	(0)	(841)	(0)	(1 713)
Pink salmon	0.0000	0	0	0	0	0	0	0
	(0.3278)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
Pumpkinseed	0.0011	40	40	55	65	0	0	200
	(0.0000)	(87)	(77)	(112)	(135)	(0)	(0)	(411)
Rainbow trout	0.0006	0	0	119	0	0	0	119
	(0.3278)	(0)	(0)	(237)	(0)	(0)	(0)	(237)
Rock Bass	0.0017	0	320	0	1	0	0	321
	(0.3279)	(0)	(615)	(0)	(1)	(0)	(0)	(617)
Round whitefish	0.0064	0	0	1 178	0	0	0	1 178
	(0.3279)	(0)	(0)	(1 388)	(0)	(0)	(0)	(1 388)
Smallmouth bass	0.0087	0	496	704	341	49	0	1 589
	(0.3279)	(0)	(469)	(927)	(288)	(99)	(0)	(1 784)
Walleye	0.0624	2 678	1 098	6 021	1 620	49	0	11 467
	(0.3294)	(1 822)	(963)	(5 448)	(913)	(98)	(0)	(9 244)
Yellow perch	0.5267	6 822	40	1 233	1 941	48 132	38 565	96 733
	(0.3988)	(6 584)	(82)	(1 339)	(1 898)	(27 578)	(30 498)	(67 979)
Angler hours		15 782	15 967	97 767	18 214	22 968	12 969	183 668
		(7 028)	(6 966)	(57 482)	(4 544)	(10 705)	(9 407)	(96 132)
Angler trips		3 287	4 673	20 093	4 391	5 402	3 166	41 012
		(1 559)	(2 252)	(11 384)	(1 369)	(2 663)	(2 341)	(21 569)
Angler days		3 075	4 482	17 732	3 740	4 877	2 722	36 628
		(1 482)	(2 156)	(10 163)	(1 243)	(2 429)	(2 027)	(19 500)

Appendices

Appendix 2 Table 26 Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for Potagannissing Bay (Michigan and Ontario), by all modes (non-charter) in 2000. Two standard errors of the mean in parentheses.

Site 210- 2009

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0003	0	0	36	0	0	0	36
	(0.2156)	(0)	(0)	(72)	(0)	(0)	(0)	(72)
Cisco	0.4085	0	0	54 559	0	0	0	54 559
	(0.2788)	(0)	(0)	(23 616)	(0)	(0)	(0)	(23 616)
Lake whitefish	0.0299	0	0	3 995	0	0	0	3 995
	(0.2163)	(0)	(0)	(2 341)	(0)	(0)	(0)	(2 341)
Largemouth bass	0.0000	0	2	0	0	0	0	2
	(0.2156)	(0)	(4)	(0)	(0)	(0)	(0)	(4)
Northern pike	0.0019	60	42	11	115	0	24	252
	(0.2156)	(109)	(62)	(21)	(231)	(0)	(49)	(472)
Other	0.0011	60	0	0	0	86	0	146
	(0.2156)	(119)	(0)	(0)	(0)	(172)	(0)	(291)
Pink salmon	0.0002	4	0	22	0	0	0	25
	(0.2156)	(8)	(0)	(39)	(0)	(0)	(0)	(47)
Pumpkinseed	0.0000	0	2	0	0	0	0	2
	(0.2156)	(0)	(4)	(0)	(0)	(0)	(0)	(4)
Rock Bass	0.0006	0	0	87	0	0	0	87
	(0.2156)	(0)	(0)	(157)	(0)	(0)	(0)	(157)
Smallmouth bass	0.0166	239	298	903	346	432	0	2 218
	(0.2159)	(475)	(293)	(995)	(685)	(703)	(0)	(3 151)
Walleye	0.0342	53	1 581	650	1 299	981	0	4 564
	(0.2161)	(116)	(880)	(822)	(1 195)	(1 060)	(0)	(4 072)
Yellow perch	0.4145	8 162	45	4 146	96	26 151	16 751	55 351
	(0.2977)	(9 972)	(64)	(4 265)	(131)	(15 217)	(20 059)	(49 708)
Angler hours		12 197	10 495	60 319	15 725	24 124	10 687	133 546
		(9 897)	(3 850)	(24 058)	(7 284)	(7 138)	(5 761)	(57 988)
Angler trips		3 119	2 116	11 412	4 173	6 217	4 068	31 105
		(2 573)	(841)	(4 627)	(1 998)	(1 956)	(2 280)	(14 274)
Angler days		3 119	1 896	10 581	3 949	6 216	4 016	29 776
		(2 573)	(771)	(4 346)	(1 932)	(1 956)	(2 260)	(13 838)

Appendix 2 Table 27. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the St. Marys River Rapids, by all modes (non-charter) in 1999. Two standard errors of the mean in parentheses. NS stands for not sampled.

Site 403 - 1999

		Month						
Species	Harvest per hour	May	Jun	Jul	Aug	Sep	Oct	Season
Atlantic salmon	0.0026	0	0	34	0	0	3	37
	(0.0055)	(0)	(0)	(77)	(0)	(0)	(15)	(78)
Chinook salmon	0.0061	0	0	0	1	44	43	88
	(0.0126)	(0)	(0)	(0)	(6)	(128)	(126)	(180)
Coho salmon	0.0011	0	0	0	0	12	4	16
	(0.0054)	(0)	(0)	(0)	(0)	(72)	(29)	(77)
Lake whitefish	0.0046	66	0	0	0	0	0	66
	(0.0156)	(223)	(0)	(0)	(0)	(0)	(0)	(223)
Pink salmon	0.0292	0	0	0	22	387	9	418
	(0.0453)	(0)	(0)	(0)	(50)	(640)	(56)	(644)
Rainbow trout	0.0117	97	0	54	0	8	9	168
	(0.0210)	(245)	(0)	(164)	(0)	(36)	(37)	(299)
Round whitefish	0.0018	0	0	0	0	0	26	26
	(0.0121)	(0)	(0)	(0)	(0)	(0)	(173)	(173)
Smallmouth bass	0.0010	15	0	0	0	0	0	15
	(0.0067)	(96)	(0)	(0)	(0)	(0)	(0)	(96)
Yellow perch	0.0024	35	0	0	0	0	0	35
	(0.0137)	(196)	(0)	(0)	(0)	(0)	(0)	(196)
Angler hours		3 707	0	2 230	493	6 382	1 518	14 330
		(1 154)	(0)	(1 600)	(447)	(2 120)	(655)	(3 002)
Angler trips		651	0	459	107	1 367	355	2 939
		(226)	(0)	(339)	(96)	(410)	(164)	(609)
Angler days		651	0	418	102	1 356	341	2 868
		(226)	(0)	(312)	(90)	(406)	(159)	(589)

Appendix 2 Table 28. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the St. Marys River Rapids, by all modes (non-charter) in 2007. Two standard errors of the mean in parentheses. NS stands for not sampled.

Site 403 - 2007

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0009	2	5	NS	NS	NS	NS	*7*
	(0.1574)	(4)	(9)	(NS)	(NS)	(NS)	(NS)	*(13)*
Chinook salmon	0.0000	0	0	NS	NS	NS	NS	*0*
	(0.0732)	(1)	(0)	(NS)	(NS)	(NS)	(NS)	*(1)*
Coho salmon	0.0000	0	0	NS	NS	NS	NS	*0*
	(0.0000)	(0)	(0)	(NS)	(NS)	(NS)	(NS)	*(0)*
Lake trout	0.0000	0	0	NS	NS	NS	NS	*0*
	(0.0000)	(0)	(0)	(NS)	(NS)	(NS)	(NS)	*(0)*
Lake whitefish	0.0827	142	511	NS	NS	NS	NS	*653*
	(0.1762)	(88)	(319)	(NS)	(NS)	(NS)	(NS)	*(407)*
Pink salmon	0.0000	0	0	NS	NS	NS	NS	*0*
	(0.0000)	(0)	(0)	(NS)	(NS)	(NS)	(NS)	*(0)*
Rainbow trout	0.0997	129	21	NS	NS	NS	NS	*150*
	(0.1576)	(62)	(18)	(NS)	(NS)	(NS)	(NS)	*(80)*
Smallmouth bass	0.0000	0	0	NS	NS	NS	NS	*0*
	(0.0000)	(0)	(0)	(NS)	(NS)	(NS)	(NS)	*(0)*
Angler Hours		5 179	2 722	NS	NS	NS	NS	*7 901*
		(758)	(458)	(NS)	(NS)	(NS)	(NS)	*(1 216)*
Angler Trips		932	584	NS	NS	NS	NS	*1 516*
		(162)	(127)	(NS)	(NS)	(NS)	(NS)	*(288)*
Angler Days		926	578	NS	NS	NS	NS	*1 503*
		(161)	(126)	(NS)	(NS)	(NS)	(NS)	*(287)*

Appendix 2 Table 29. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the St. Marys River Rapids, by all modes (non-charter) in 2008. Two standard errors of the mean in parentheses.

Site 403 - 2008

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0015	0	26	0	0	0	0	*26*
	(0.0652)	(0)	(28)	(0)	(0)	(0)	(0)	*(28)*
Chinook salmon	0.0145	0	0	0	31	0	223	*254*
	(0.0949)	(0)	(0)	(0)	(48)	(0)	(214)	*(262)*
Coho salmon	0.0003	0	0	0	0	0	4	*4*
	(0.0411)	(0)	(0)	(0)	(0)	(0)	(9)	*(9)*
Lake trout	0.0009	0	15	0	0	0	0	*15*
	(0.0652)	(0)	(33)	(0)	(0)	(0)	(0)	*(33)*
Lake whitefish	0.0000	0	0	0	0	0	0	*0*
	(0.0000)	(0)	(0)	(0)	(0)	(0)	(0)	*(0)*
Pink salmon	0.0479	0	0	0	0	149	43	*192*
	(0.0415)	(0)	(0)	(0)	(0)	(0)	(84)	*(84)*
Rainbow trout	0.0386	84	38	1	0	0	29	*153*
	(0.2545)	(67)	(51)	(3)	(0)	(0)	(32)	*(153)*
Smallmouth bass	0.0000	0	0	0	0	0	0	*0*
	(0.0000)	(0)	(0)	(0)	(0)	(0)	(0)	*(0)*
Angler Hours		5 173	2 169	920	986	5 808	2 484	*17 541*
		(2 010)	(848)	(460)	(300)	(0)	(612)	*(4 230)*
Angler Trips		1 085	573	179	315	1 258	602	*4 013*
		(470)	(246)	(106)	(112)	(0)	(196)	*(1 130)*
Angler Days		1 042	573	179	315	1 258	589	*3 956*
		(469)	(246)	(106)	(112)	(0)	(196)	*(1 129)*

Appendix 2 Table 30. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the St. Marys River Rapids, by all modes (non-charter) in 2009. Two standard errors of the mean in parentheses.

Site 403 – 2009

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0050	8	0	42	14	0	0	*64*
	(0.1426)	(15)	(0)	(54)	(12)	(0)	(0)	*(81)*
Chinook salmon	0.0052	0	0	0	0	17	51	*68*
	(0.0816)	(0)	(0)	(0)	(0)	(31)	(62)	*(93)*
Coho salmon	0.0097	0	0	0	0	9	116	*125*
	(0.0818)	(0)	(0)	(0)	(0)	(18)	(85)	*(104)*
Lake trout	0.0000	0	0	0	0	0	0	*0*
	(0.0000)	(0)	(0)	(0)	(0)	(0)	(0)	*(0)*
Lake whitefish	0.0000	0	0	0	0	0	0	*0*
	(0.0000)	(0)	(0)	(0)	(0)	(0)	(0)	*(0)*
Pink salmon	0.0067	0	0	0	0	19	0	*19*
	(0.0294)	(0)	(0)	(0)	(0)	(38)	(0)	*(38)*
Rainbow trout	0.1285	268	58	0	11	0	2	*339*
	(0.1884)	(173)	(66)	(0)	(14)	(0)	(5)	*(258)*
Smallmouth bass	0.0000	0	0	0	0	0	0	*0*
	(0.0000)	(0)	(0)	(0)	(0)	(0)	(0)	*(0)*
Angler Hours		3 445	2 110	1 436	1 054	2 986	1 923	*12 954*
		(875)	(582)	(456)	(297)	(525)	(600)	*(3 334)*
Angler Trips		689	401	372	289	650	427	*2 828*
		(214)	(138)	(150)	(101)	(155)	(143)	*(900)*
Angler Days		633	368	301	289	624	427	*2 642*
		(200)	(131)	(127)	(101)	(155)	(143)	*(856)*

Appendix 2 Table 31. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the upper St. Marys River (International Bridge in Sault Ste. Marie to a line running from Gros Cap, Ontario to Point Iroquois, Michigan), by all modes (non-charter) in 1999. Two standard errors of the mean in parentheses, NAN means no estimate could be generated.

Site 404 - 1999

		Month						
Species	Harvest per hour	May	Jun	Jul	Aug	Sep	Oct	Season
Rainbow trout	0.0000	0	0	0	0	0	2	2
	(0.0001)	(0)	(0)	(0)	(0)	(0)	(5)	(5)
Northern pike	0.0070	346	0	0	0	66	0	412
	(0.0139)	(783)	(0)	(0)	(0)	(214)	(0)	(812)
Pumpkinseed	0.0017	0	0	97	0	0	0	97
	(0.0096)	(0)	(0)	(559)	(0)	(0)	(0)	(559)
Yellow perch	0.0315	520	285	0	0	821	218	1 844
	(0.0411)	(1 212)	(1 092)	(0)	(0)	(1 584)	(693)	(2 377)
Walleye	0.0151	635	249	0	0	0	0	884
	(0.0286)	(1 391)	(916)	(0)	(0)	(0)	(0)	(1 665)
Lake whitefish	0.2248	3 486	7 464	2 197	0	0	16	13 163
	(0.2505)	(5 666)	(10 952)	(7 519)	(0)	(0)	(68)	(14 442)
Round whitefish	0.0079	116	348	0	0	0	1	465
	(0.0261)	(465)	(1 454)	(0)	(0)	(0)	(2)	(1 526)
Other	0.0119	695	0	0	0	0	0	695
	(0.0554)	(3 239)	(0)	(0)	(0)	(0)	(0)	(3 239)
Angler hours		14 319	17 823	19 374	2 414	3 315	1 316	58 561
		(5 917)	(5 534)	(7 797)	(1 259)	(1 445)	(1 052)	(11 454)
Angler trips		3 110	4 131	6 003	557	984	557	15 342
		(1 334)	(1 467)	(2 495)	(293)	(505)	(468)	(3 274)
Angler days		2 866	3 915	5 039	418	946	551	13 735
		(1 255)	(1 399)	(2 242)	(240)	(497)	(467)	(3 013)

Appendix 2 Table 32. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the St. Joseph Channel Ontario, Canada, by all modes (non-charter) in 1999. Two standard errors of the mean in parentheses, NS stands for not sampled.

Site 405-1999

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Atlantic salmon	0.0013	0	0	0	0	86		86
	(0.0064)	(0)	(0)	(0)	(0)	(418)		(418)
Chinook salmon	0.0021	0	0	0	0	138		138
	(0.0122)	(0)	(0)	(0)	(0)	(797)		(797)
Northern pike	0.0177	1	166	845	143	0		1 155
	(0.0623)	(3)	(485)	(3 972)	(703)	(0)		(4 063)
Rainbow trout	0.0000	0	0	2	0	0		2
	(0.0001)	(0)	(0)	(7)	(0)	(0)		(7)
Rock bass	0.0000	0	3	0	0	0		3
	(0.0002)	(0)	(11)	(0)	(0)	(0)		(11)
Smallmouth bass	0.0004	0	23	0	0	1		24
	(0.0022)	(0)	(143)	(0)	(0)	(1)		(143)
Walleye	0.0138	0	69	603	143	88		903
	(0.0656)	(0)	(323)	(4 172)	(765)	(447)		(4 278)
Yellow perch	0.0283	0	246	121	1 481	0		1 848
	(0.1385)	(0)	(925)	(800)	(8 957)	(0)		(9 040)
Angler hours		177	5 422	25 553	17 463	16 692		65 307
		(92)	(1 970)	(8 356)	(7 319)	(5 636)		(12 611)
Angler trips		70	1 376	4 829	3 835	4 174		14 284
		(46)	(528)	(1 463)	(1 725)	(1 912)		(3 009)
Angler days		70	1 263	4 825	3 835	4 174		14 167
		(46)	(500)	(1 463)	(1 725)	(1 912)		(3 004)

Appendix 2 Table 33. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the St. Joseph Channel Ontario, Canada, by all modes (non-charter) in 2005. Two standard errors of the mean in parentheses.

Site 405-2005

		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Northern pike	0.0023	172	0	0	0	0	0	172
	(0.1940)	(353)	(0)	(0)	(0)	(0)	(0)	(353)
Smallmouth bass	0.0053	0	0	140	195	0	58	393
	(0.1940)	(0)	(0)	(173)	(277)	(0)	(131)	(581)
Walleye	0.1256	0	939	4 473	2 874	729	290	9 305
	(0.2007)	(0)	(1 171)	(2 560)	(2 376)	(1 014)	(407)	(7 528)
Yellow perch	0.0281	0	55	0	325	1 700	0	2 081
	(0.1996)	(0)	(110)	(0)	(647)	(3 441)	(0)	(4 197)
Angler hours		2 932	11 462	26 498	21 198	10 260	1 755	74 105
		(2 968)	(6 878)	(9 648)	(6 609)	(3 505)	(1 162)	(30 770)
Angler trips		599	2 394	5 736	4 859	3 203	366	17 158
		(587)	(1 438)	(2 301)	(1 714)	(1 373)	(252)	(7 665)
Angler days		599	2 394	5 736	4 859	3 203	366	17 158
		(587)	(1 438)	(2 301)	(1 714)	(1 373)	(252)	(7 665)

Appendix 2 Table 34. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the St. Joseph Channel Ontario, Canada, by all modes (non-charter) in 2007. Two standard errors of the mean in parentheses, NAN means no estimate could be generated.

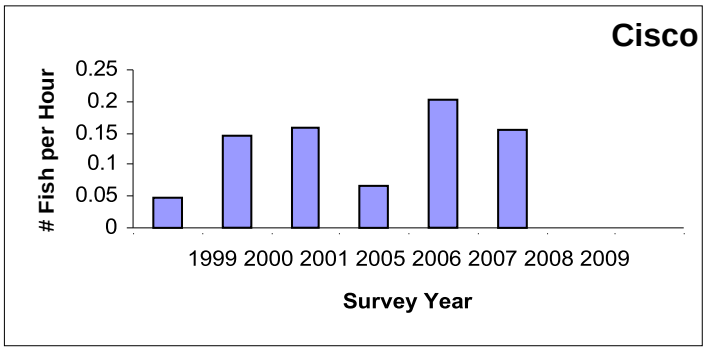
Site 405-2007

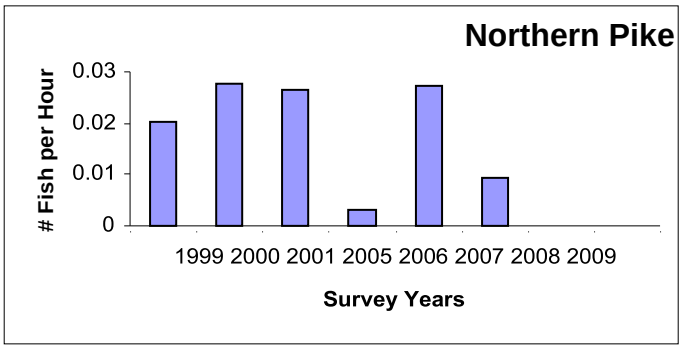
		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Chinook salmon	0.0030	0	88	0	34	16	0	137
	(0.2451)	(0)	(132)	(0)	(66)	(30)	(0)	(228)
Coho salmon	0.0006	0	0	0	0	25	0	25
	(0.2451)	(0)	(0)	(0)	(0)	(49)	(0)	(49)
Northern pike	0.0354	116	60	350	135	938	0	1 599
	(0.2457)	(126)	(70)	(412)	(308)	(574)	(0)	(1 490)
Other	0.0005	23	0	0	0	0	0	23
	(0.2451)	(NAN)	(0)	(0)	(0)	(0)	(0)	(NAN)
Rock Bass	0.0001	5	0	0	0	0	0	5
	(0.2451)	(NAN)	(0)	(0)	(0)	(0)	(0)	(NAN)
Smallmouth bass	0.0302	0	0	1 006	359	0	0	1 364
	(0.2467)	(0)	(0)	(1 109)	(636)	(0)	(0)	(1 745)
Walleye	0.0732	340	434	2 137	292	63	37	3 304
	(0.2519)	(408)	(488)	(2 519)	(341)	(91)	(80)	(3 927)
Yellow perch	0.0839	139	90	2 669	861	25	0	3 784
	(0.2635)	(278)	(151)	(4 072)	(1 538)	(56)	(0)	(6 096)
Angler hours		3 354	6 091	18 865	9 217	6 211	1 374	45 112
		(1 652)	(2 257)	(9 509)	(3 953)	(2 897)	(NAN)	(20 268)
Angler trips		685	1 186	3 519	1 593	919	288	8 191
		(364)	(493)	(1 880)	(875)	(424)	(NAN)	(4 036)
Angler days		673	1 174	3 519	1 593	919	288	8 167
		(364)	(493)	(1 880)	(875)	(424)	(NAN)	(4 036)

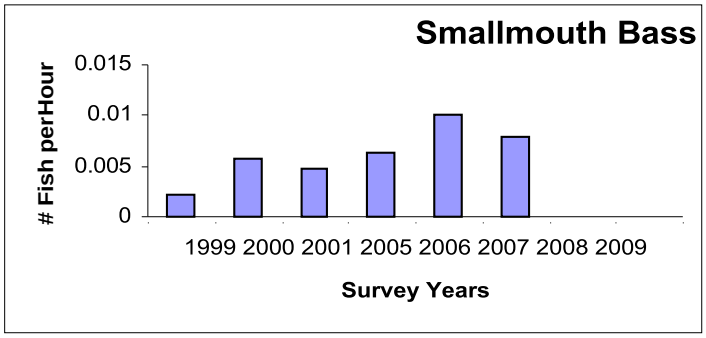
Appendix 2 Table 35. Estimated harvest per hour, number harvested, and effort (angler hours, trips and days) of sport fishing and subsistence fishing with sport gears for the St. Joseph Channel Ontario, Canada, by all modes (non-charter) in 1999. Two standard errors of the mean in parentheses.

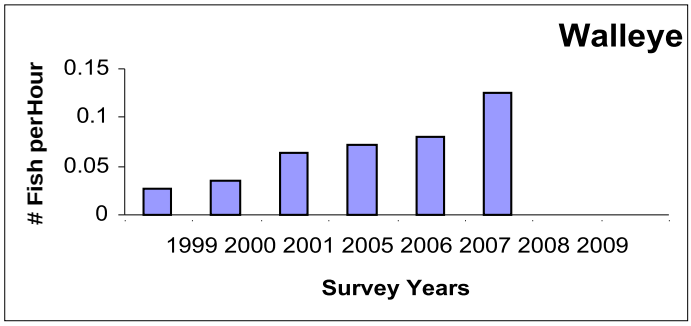
Site 405- 2009

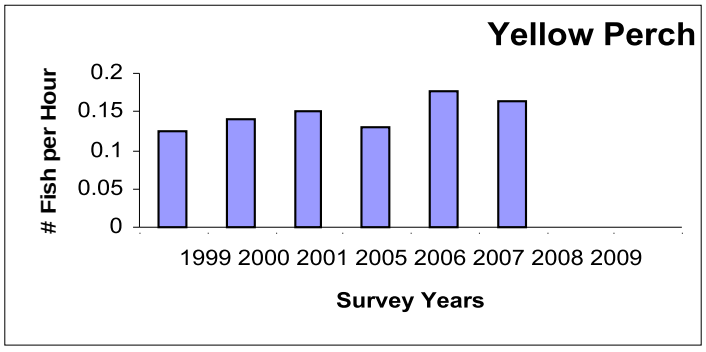
		Month						
Species	Harvest per hour	May	June	July	Aug	Sept	Oct	Season
Northern pike	0.0219	0	276	443	0	0	0	720
	(0.2007)	(0)	(389)	(628)	(0)	(0)	(0)	(1 017)
Smallmouth bass	0.0093	0	138	166	1	0	0	305
	(0.1998)	(0)	(143)	(339)	(2)	(0)	(0)	(483)
Walleye	0.0603	0	184	1 125	672	0	0	1 981
	(0.2040)	(0)	(214)	(1 390)	(0)	(0)	(0)	(1 604)
Yellow perch	0.0390	0	0	1 281	0	0	0	1 281
	(0.2027)	(0)	(0)	(1 193)	(0)	(0)	(0)	(1 193)
Angler hours		251	2 456	12 247	12 673	5 159	51	32 836
		(338)	(1 271)	(5 776)	(97)	(2 787)	(102)	(10 372)
Angler trips		10	757	2 719	1 490	2 501	0	7 477
		(21)	(543)	(1 479)	(12)	(1 702)	(0)	(3 757)
Angler days		10	757	2 719	1 490	2 501	0	7 477
		(21)	(543)	(1 479)	(12)	(1 702)	(0)	(3 757)









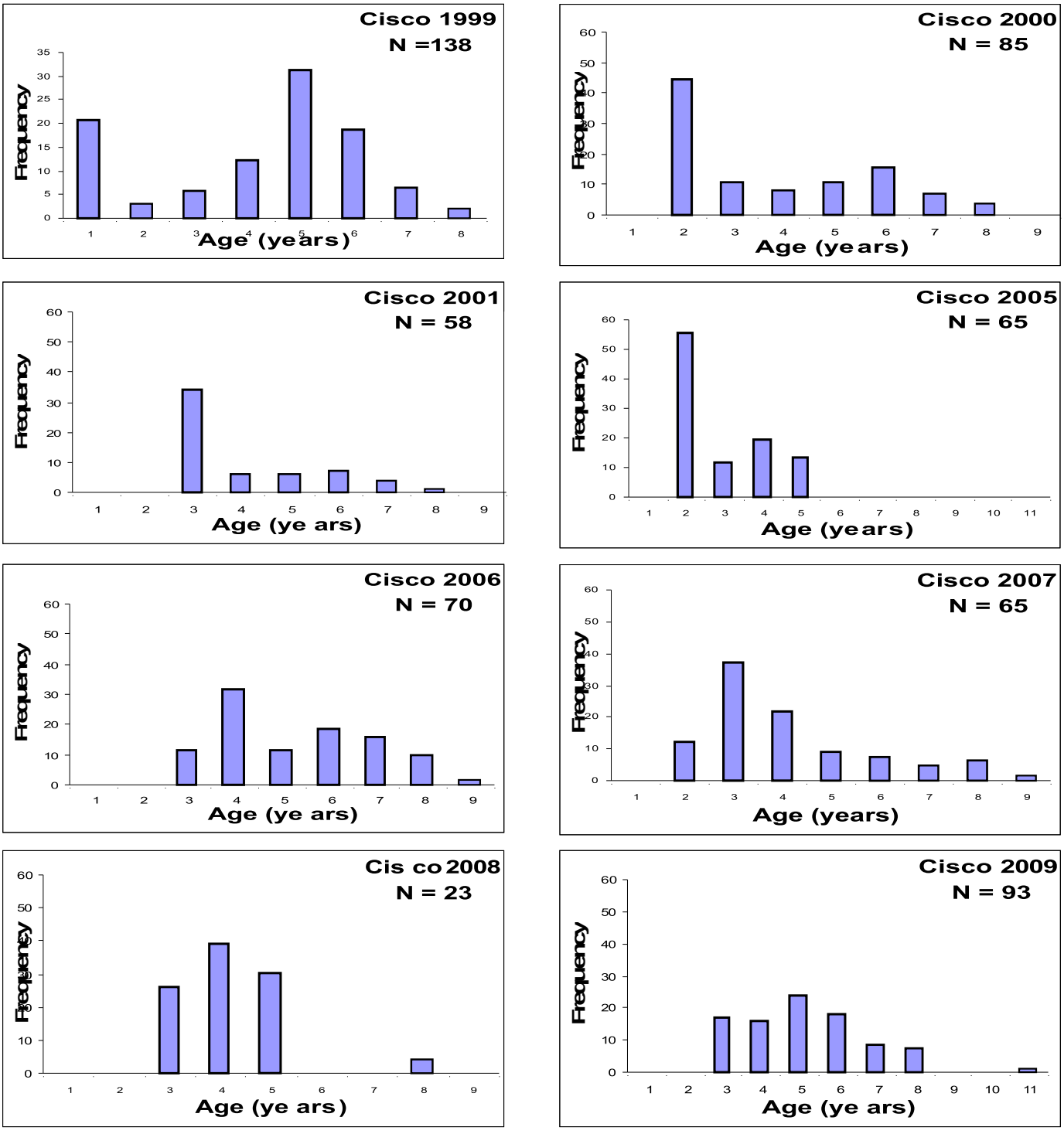


Appendix 3 Figure 1. Harvest rate for cisco, northern pike, smallmouth bass, walleye, and yellow perch in the St. Marys River for the survey years 1999 -2001, 2005-2007.

Appendices

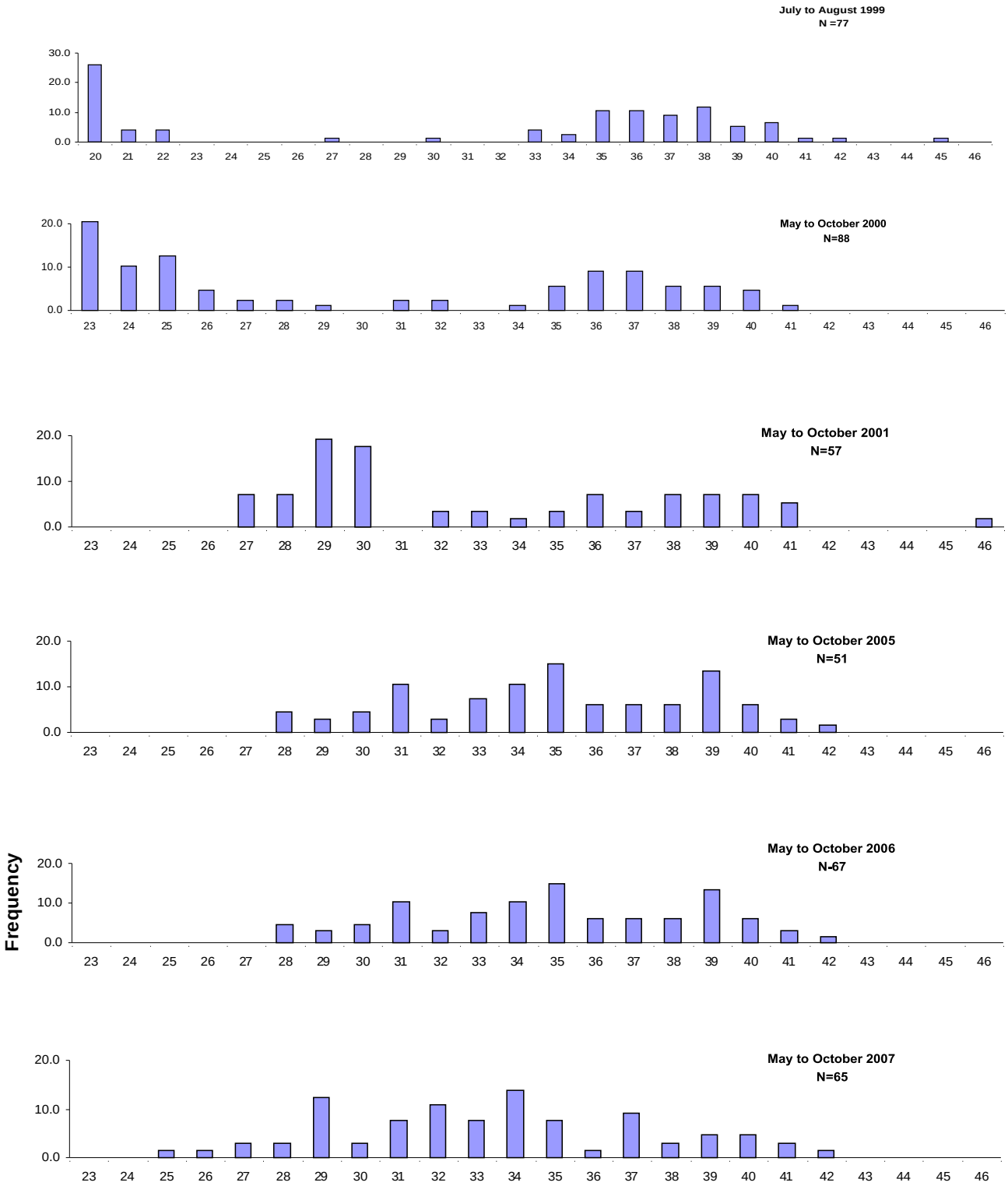
Appendix 3 Table 1. Cisco age composition (number and frequency) and average length at age based on biological information collected from the sport fishery in US and Canadian waters of the St. Marys River from May to October for years 1999-2001 and 2005 to 2009. All lengths are in cm.

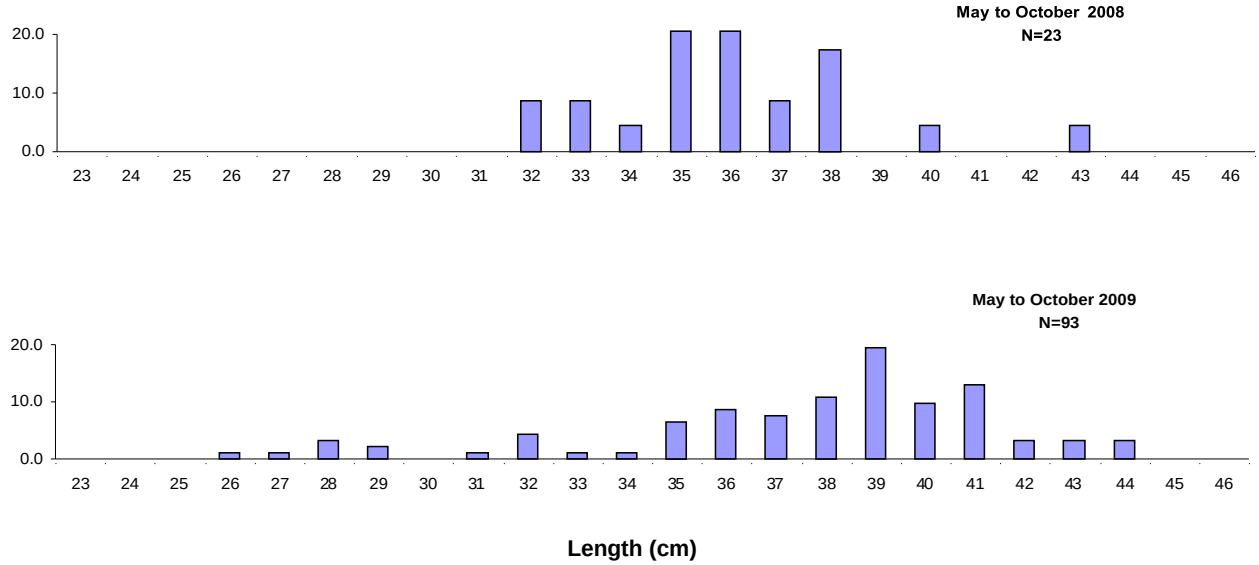
		AGE											Average	Average
Year	Parameters	1	2	3	4	5	6	7	8	9	10	11	length	age
1999	Number N=138	28	4	8	17	43	26	9	3					
	Frequency (%)	20.6	2.9	5.8	12.3	31.2	18.8	6.5	2.2					
	Average length	20.3	27.5	34.6	36	37.4	38.6	40	41.1				33.8	4.2
2000	Number N=85		38	9	7	9	13	6	3					
	Frequency (%)		44.7	10.6	8.2	10.6	15.3	7.1	3.5					
	Average length		26.1	28.4	36.9	36.9	39.4	38.4	41.4				31.6	3.8
2001	Number N=58			34	6	6	7	4	1					
	Frequency (%)			58.6	10.3	10.3	12.1	6.9	1.7					
	Average length			30.4	34.6	39.5	39.2	40.3	47.0				33.7	2.9
2005	Number N=52		29	6	10	7								
	Frequency (%)		55.8	11.5	19.2	13.5								
	Average length		28.2	33.5	38.3	39.6							32.3	2.9
2006	Number N=70			8	22	8	13	11	7	1				
	Frequency (%)			11.4	31.4	11.4	18.6	15.7	10.0	1.4				
	Average length			33.6	33.3	37.1	39.2	40.1	40.9	44.5			36.8	5.3
2007	Number N=65		8	24	14	6	5	3	4	1				
	Frequency (%)		12.3	36.9	21.5	9.2	7.7	4.6	6.2	1.5				
	Average length		29.0	32.8	35.8	38.1	39.6	40.3	40.1	41.9			34.9	4.1
2008	Number N=23			6	9	7			1					
	Frequency (%)			26.1	39.1	30.4			4.3					
	Average length			33.8	35.9	38.3			43.7				36.4	4.2
2009	Number N=93			16	15	22	17	8	7			1		
	Frequency (%)			17.2	16.1	23.7	18.3	8.6	7.5			1.1		
	Average length			29.5	34.3	37.7	17.0	41.8	40.3			44.5	38.1	4.9



Appendix 3 Figure 2. Age (years) composition of cisco harvested from the St. Marys River by anglers from May to October for 1999-2001, 2005-2009.

Appendices


July to August 1999
N =77
May to October 2000
N=88
May to October 2001
N=57
May to October 2005
N=51
May to October 2006
N-67
May to October 2007
N=65
Frequency

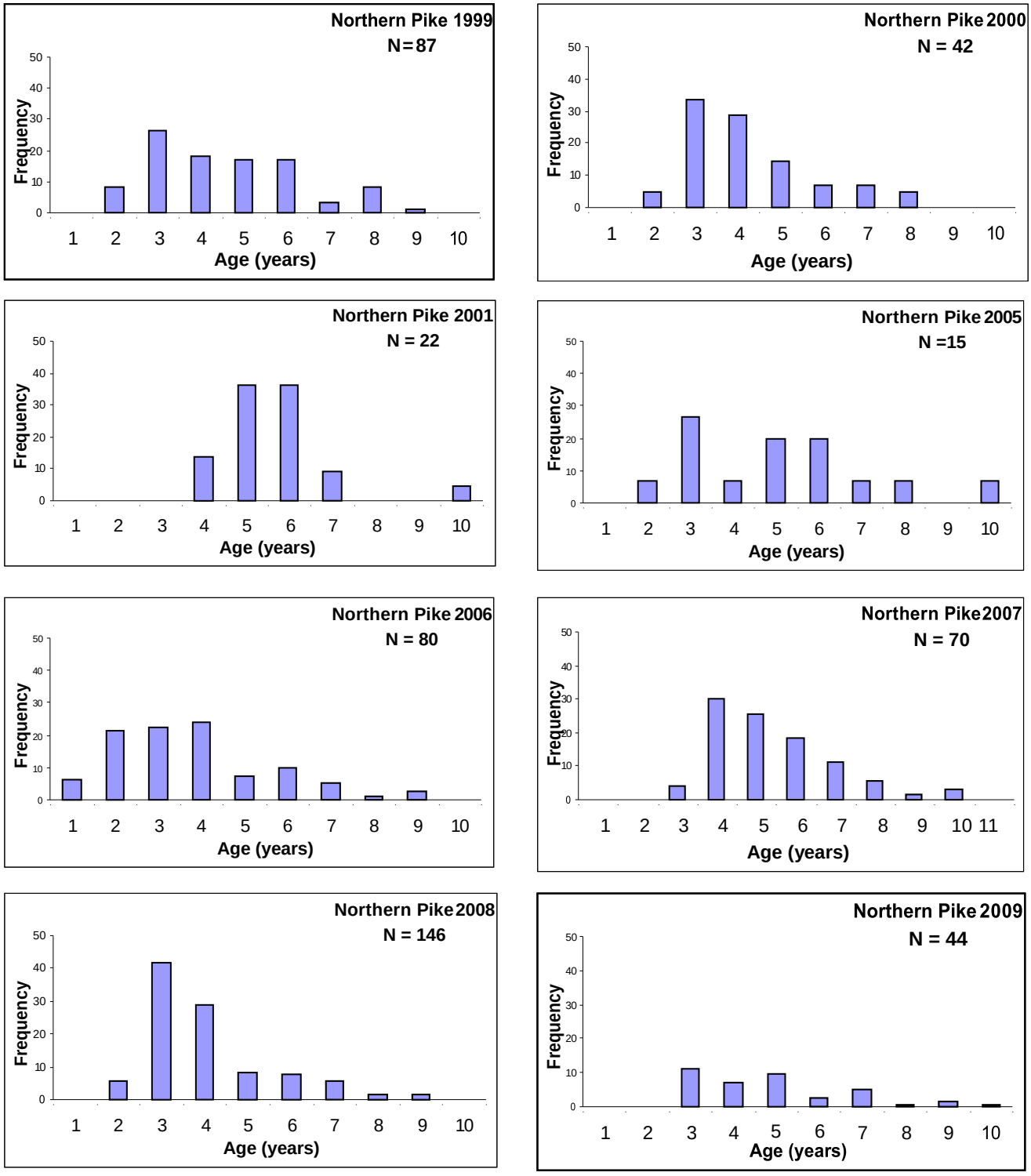


Appendix 3 Figure 3. Cisco length frequencies (percent total) during the May to Oct angler survey 1999-2001, 2005-2009 in the St. Marys River

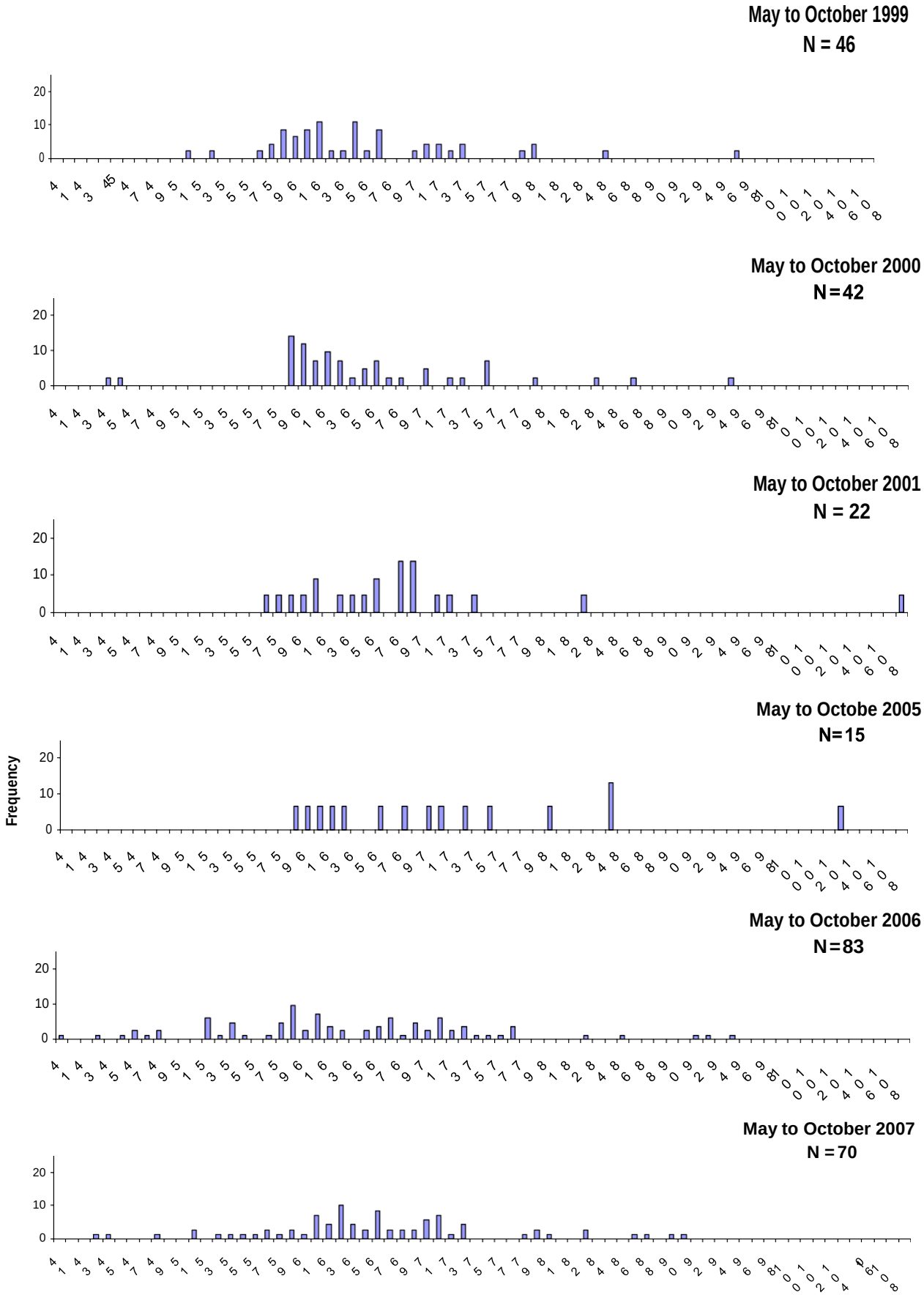
Appendices

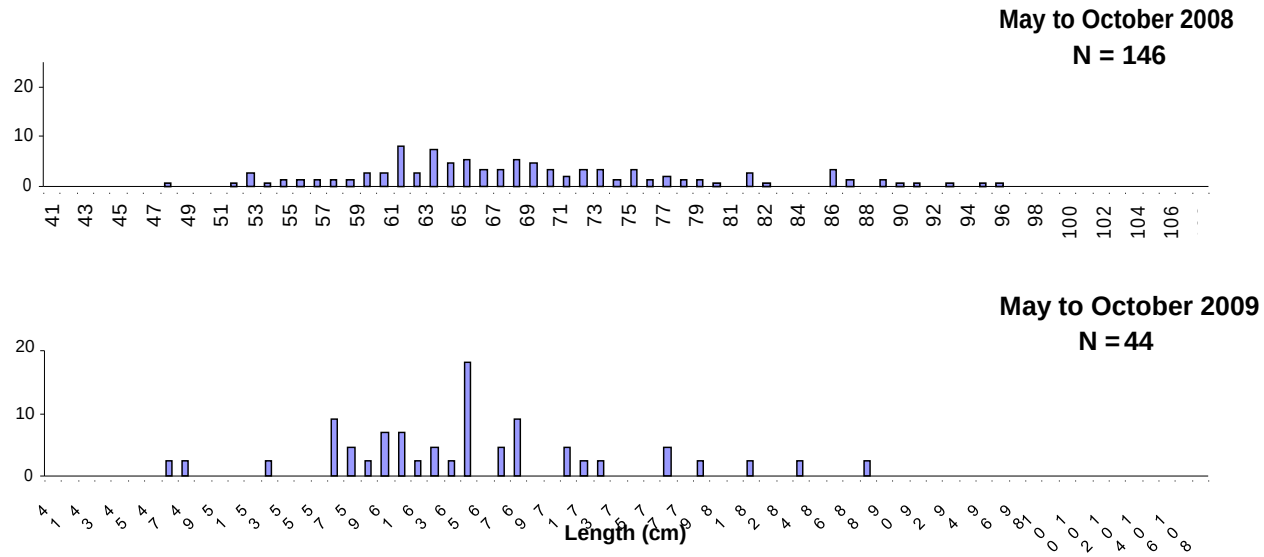
Appendix 3 Table 2. –Northern pike age composition (number and frequency) and average length at age based on biological information collected from the sport fishery in US and Canadian waters of the St. Marys River from May to October for years 1999-2001 and 2005 to 2009. All lengths are in cm.

		AGE										Average	Average
Year	Parameters	1	2	3	4	5	6	7	8	9	10	length	age
1999	Number N= 87		7	23	16	15	15	3	7	1			
	Frequency (%)		8	26.4	18.4	17.2	17.2	3.4	8	1.1			
	Average length		56.4	60.7	64.1	68.7	71.6(14)	72.9	82.4	99.1		66.8(86)	4.57
2000	Number N=42		2	14	12	6	3	3	2				
	Frequency (%)		4.8	33.3	28.6	14.3	7.1	7.1	4.8				
	Average length		46.2	63.3	66.9	68.5	70.1	69.7	92.1			66.8	4.3
2001	Number N=22				3	8	8	2			1		
	Frequency (%)				13.6	36.4	36.4	9.1			4.5		
	Average length				61.6	67.5	69.2	71.8			104.1	69.6	5.6
2005	Number N=15		1	4	1	3	3	1	1		1		
	Frequency (%)		6.7	26.7	6.7	20.0	20.0	6.7	6.7		6.7		
	Average length		61.7	62.9	72.4	75.4	74.5	76.2	85.1		104.1	73.4	5.1
2006	Number N=80	5	17	18	19	6	8	4	1	2			
	Frequency (%)	6.3	21.3	22.5	23.8	7.5	10.0	5.0	1.3	2.5			
	Average length	46.9	55.3	63.0	66.5	72.2	71.6	85.9	95.3	88.6		64.7	3.8
2007	Number N=70		3	21	18	13	8	4	1	2	0		
	Frequency (%)		4.3	30.0	25.7	18.6	11.4	5.7	1.4	2.9	0.0		
	Average length		69.4	66.0	63.6	66.5	69.7	76.25	91.4	76.4		67.3	4.4
2008	Number N=146		8	61	42	12	11	8	2	2	0		
	Frequency (%)		5.5	41.8	28.8	8.2	7.5	5.5	1.4	1.4	0.0		
	Average length		57.9	65.4	70.0	74.2	81.5	84.6	79.4	85.7		69.8	4.0
2009	Number N=44			5	10	14	4	7	1	2	1		
	Frequency (%)			11.4	6.9	9.7	2.8	4.8	0.7	1.4	0.7		
	Average length			58.7	65.9	68.4	67.6	61.0	65.2	81.9	11.9	66.5	5.3



Appendix 3 Figure 4. Age (years) composition of northern pike harvested from the St. Marys River by anglers from May to October for 1999-2001 and 2005-2009.


May to October 1999
N = 46
May to October 2000
N=42
May to October 2001
N = 22
May to Octobe 2005
N=15
May to October 2006
N=83
May to October 2007
N = 70
Frequency
0
10
20

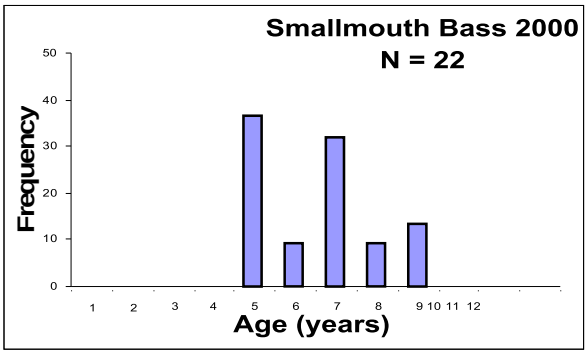


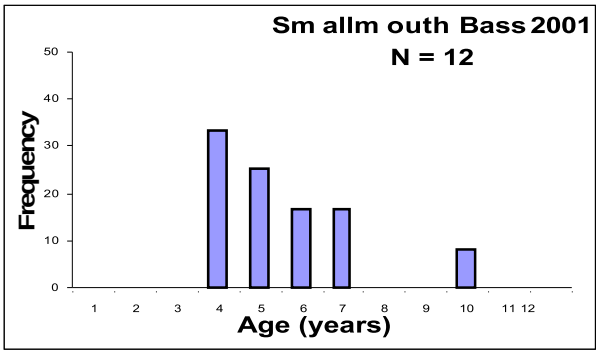
Appendix 3 Figure 5. Northern pike length frequencies (percent total) during the May to Oct angler survey 1999-2001, 2005-2009 in the St. Marys River.

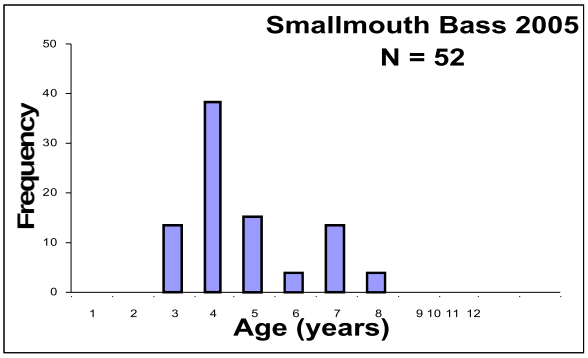
Appendices

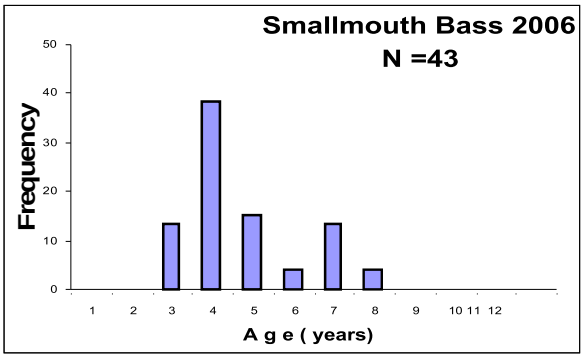
Appendix 3 Table 3. Smallmouth bass age composition (number and frequency) and average length at age based on biological information collected from the sport fishery in US and Canadian waters of the St. Marys River from May to October for years 1999-2001 and 2005 to 2009. All lengths are in cm.

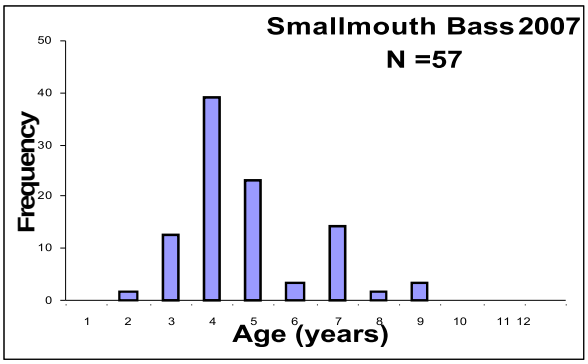
		AGE												Average	Average
Year	Parameters	1	2	3	4	5	6	7	8	9	10	11	12	length	age
1999	Number N=10			1	3		1	1	2	1	1				
	Frequency (%)			10.0	30.0		10.0	10.0	20.0	10.0	10.0				
	Average length			28.0	31.7		38.6	39.9	39.9	42.7	41.5			36.5	6.3
2000	Number N=22					8	2	7	2	3					
	Frequency (%)					36.4	9.1	31.8	9.1	13.6					
	Average length					35.9	38.0	40.2	43.4	45.4				39.4	6.5
2001	Number N=12				4	3	2	2			1				
	Frequency (%)				33.3	25.0	16.7	16.7			8.3				
	Average length				37.7	40.7	47.5	43.4			46.2			41.2	3.9
2005	Number N=52			7	20	8	2	7	2						
	Frequency (%)			13.5	38.5	15.4	3.8	13.5	3.8						
	Average length			34.5	37.7	38.6	43.4	45.7	48.3					39.2	4.7
2006	Number N=43			3	4	13	9	10	4						
	Frequency (%)			7.0	9.3	30.2	20.9	23.3	9.3						
	Average length			32.8	36.5	39.5	41.7	45.7	48.9					41.3	5.7
2007	Number N=57		1	7	22	13	2	8	1	2					
	Frequency (%)		1.8	12.5	39.3	23.2	3.6	14.3	1.8	3.6					
	Average length		29.2	34.1	33.8	37.1	43.9	41.6	41.1	44.5				36.5	4.8
2008	Number N=51			5	16	9	6	10	3	2					
	Frequency (%)			9.6	30.8	17.3	11.5	19.2	5.8	3.8					
	Average length			33.2	38.2	40.5	42.6	45.0	43.9	45.1				40.1	5.3
2009	Number N=63			3	6	31	11	5	2	1	2	1	1		
	Frequency (%)			4.8	9.5	49.2	17.5	7.9	3.2	1.6	3.2	1.6	1.6		
	Average length			29.5	36.4	39.5	40.5	43.7	44.7	49.5	47.1	48.0	43.2	40.0	5.7

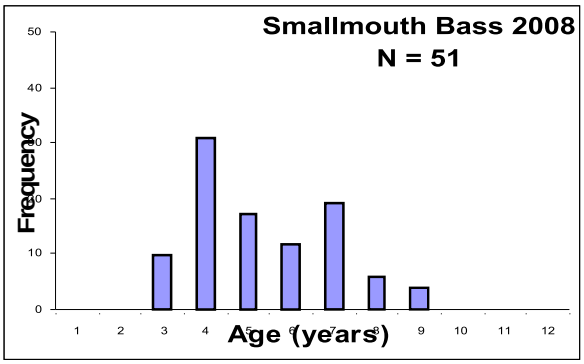


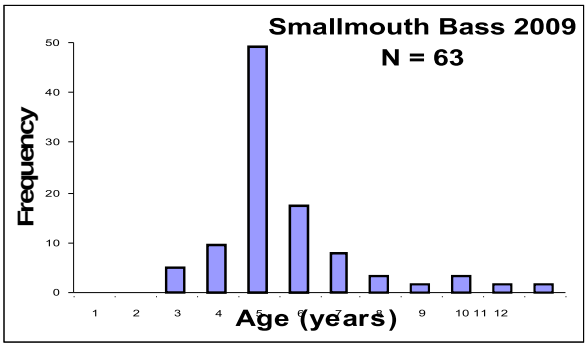


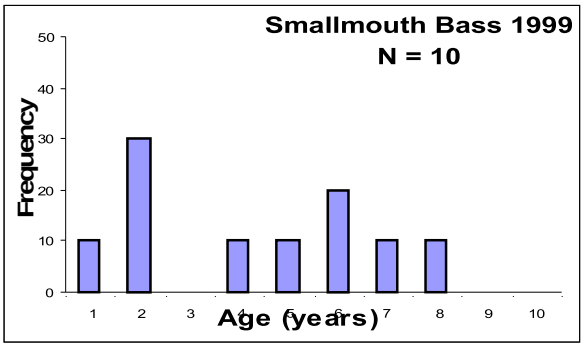






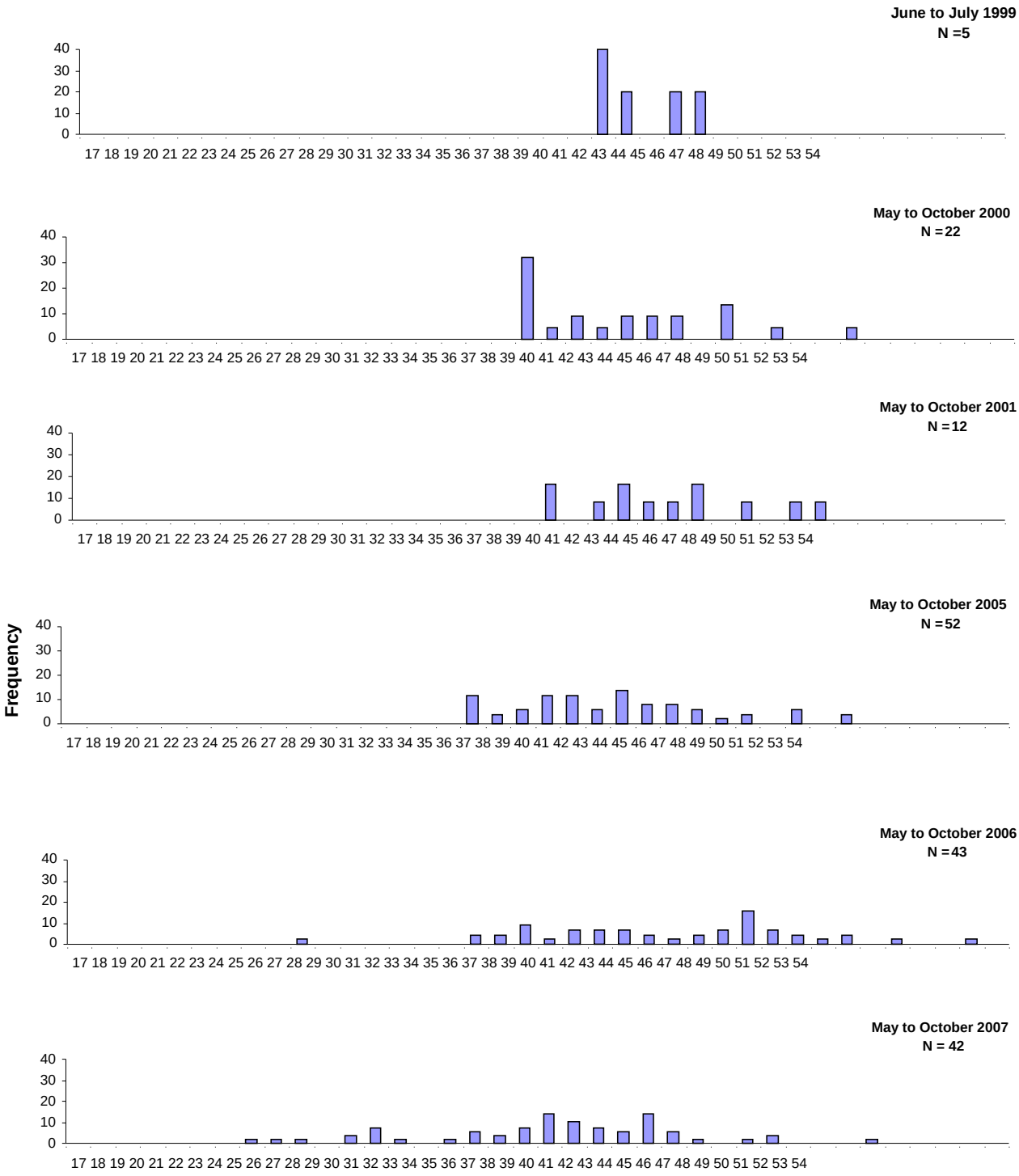


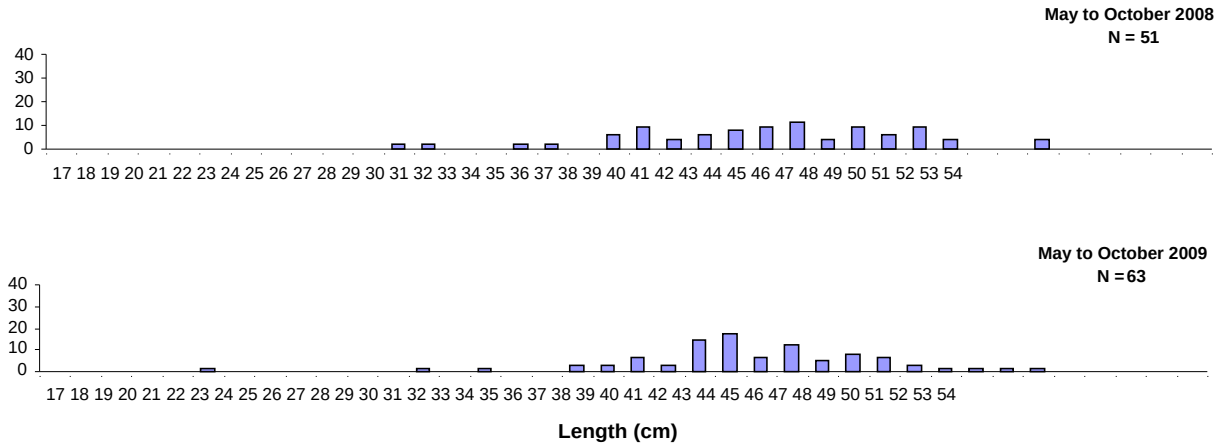




Appendix 3 Figure 6. Age (years) composition of smallmouth bass harvested from the St. Marys River by anglers from May to October for 1999-2001 and 2005-2009.

Appendices


June to July 1999
N =5
May to October 2000
N = 22
May to October 2001
N = 12
May to October 2005
N = 52
May to October 2006
N = 43
May to October 2007
N = 42
Frequency
0
10
20
30
40
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54

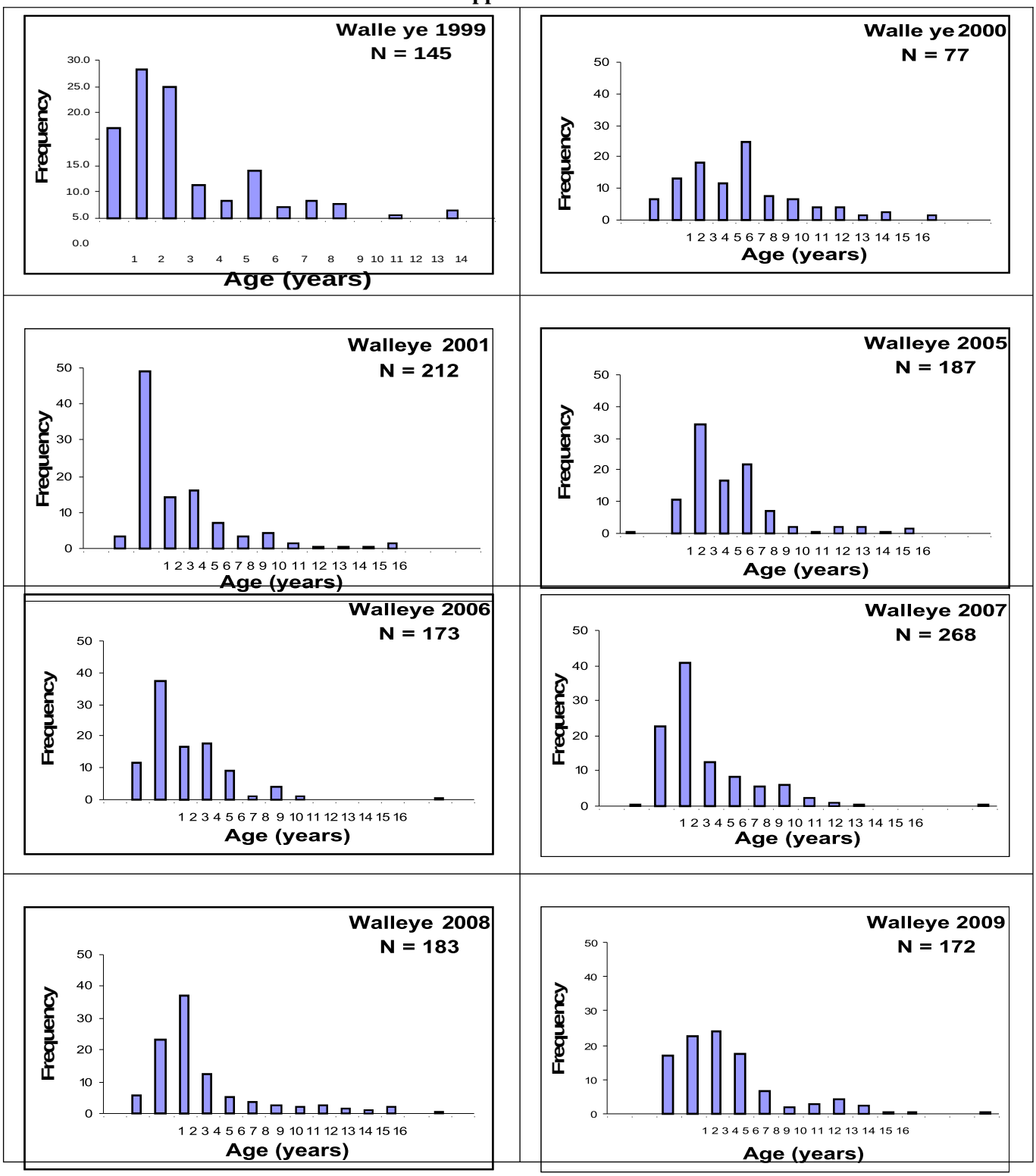


Appendix 3 Figure 7. Smallmouth bass length frequencies (percent total) during the May to Oct angler survey 2000-2001, 2005-2009 in the St. Marys River.

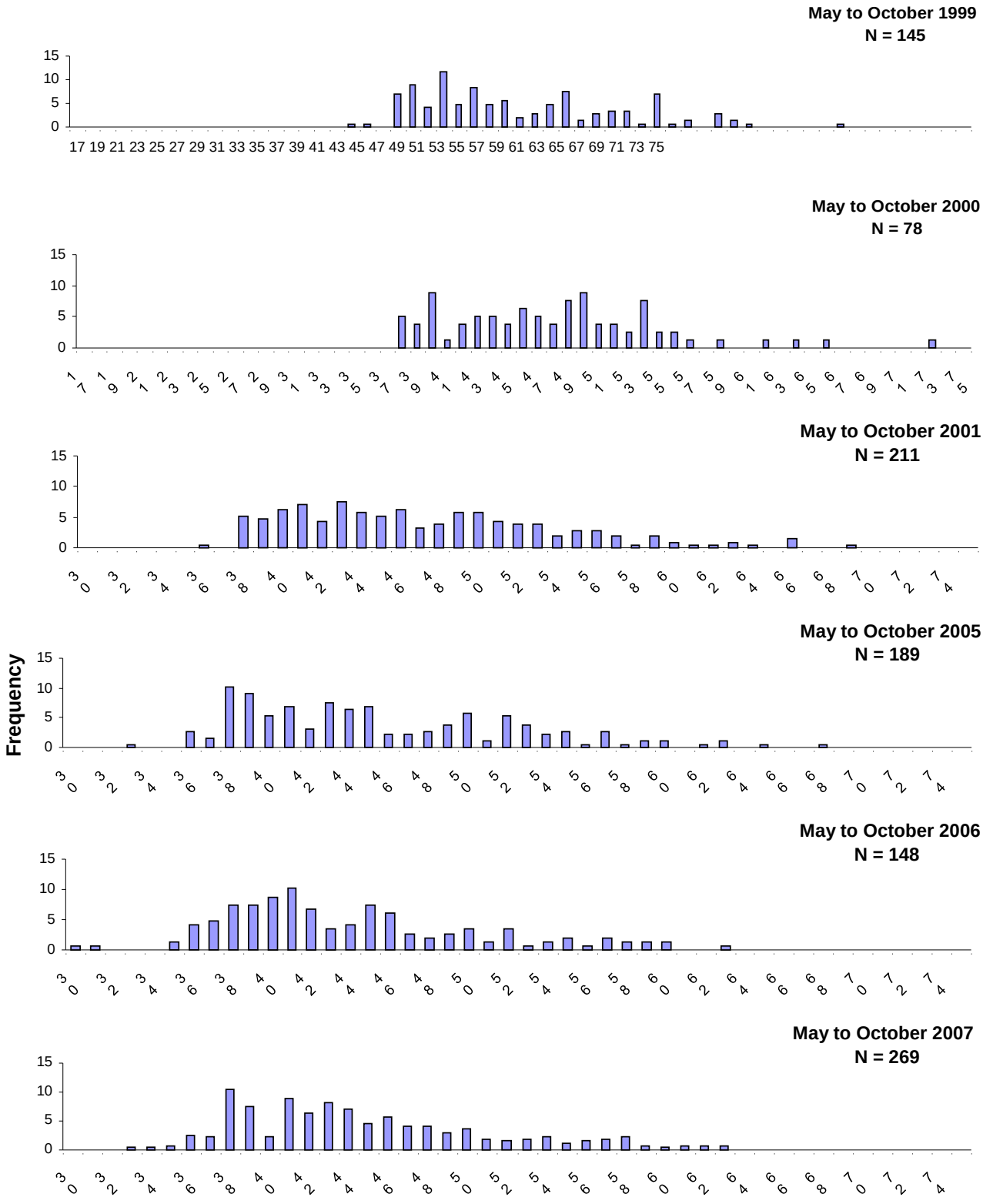
Appendices

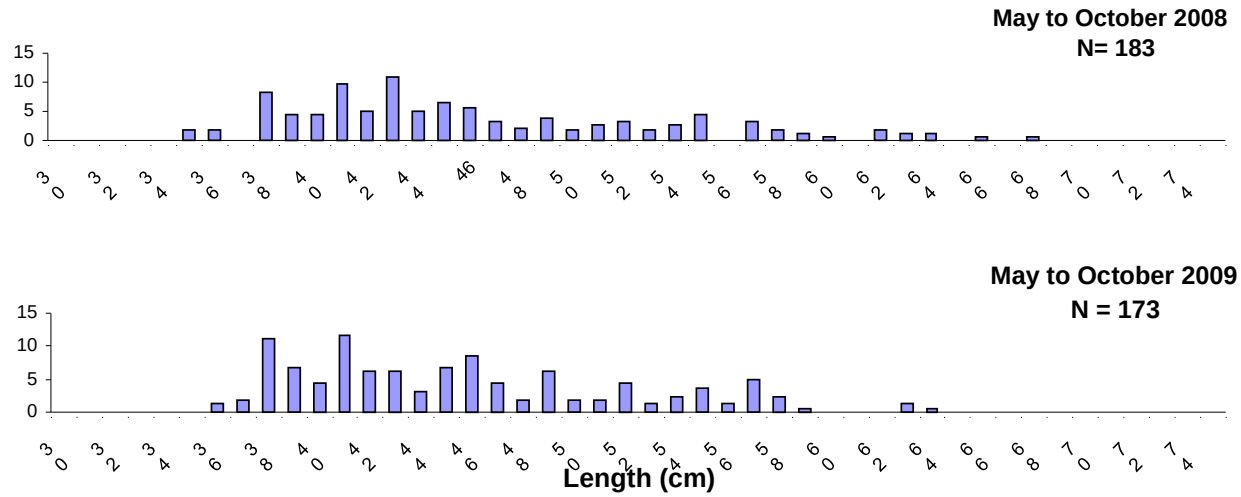
Appendix 3 Table 4. Walleye age composition (number and frequency) and average length at age based on biological information collected from the sport fishery in US and Canadian waters of the St. Marys River from May to October for years 1999-2001 and 2005-2009. All lengths are in cm.

		AGE																Average	Average
Year	Parameters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Length	Age
1999	Number N=145		1	25	41	36	9	5	13	3	5	4		1		2			
	Frequency (%)		0.7	17.2	28.3	24.8	6.2	3.4	9.0	2.1	3.4	2.8		0.7		1.4			
	Average length		38.1	40.6	42.3	46.1	51.9	52.6	53.3	58.2	56.5	57.3		55.9		63.5		46.4	5.4
2000	Number N=77		5	10	14	9	19	6	5	3	3	1	2		1				
	Frequency (%)		6.5	13.0	18.2	11.7	24.7	7.8	6.5	3.9	3.9	1.3	2.6		1.3				
	Average length		39.7	41.3	4.0	48.9	49.3	54.4	55.3	54.9	54.0	66.8	54.7		73.4			48.5	5.7
2001	Number N=211		7	104	30	34	15	7	9	3	1	1	1	3					
	Frequency (%)		3.3	49.3	14.2	16.1	7.1	3.3	4.3	1.4	0.5	0.5	0.5	1.4					
	Average length		39.8	43.0	48.8	52.5	54.3	58.5	59.1	64.3	63.2	66.0						47.7	4.1
2005	Number N=187	1		20	64	31	41	13	4	1	4	4	1	3					
	Frequency (%)	0.5		10.7	34.2	16.6	21.9	7.0	2.1	0.5	2.1	2.1	0.5	1.6					
	Average length	18.3		39.6	41.2	45.0	50.4	51.9	58.3	49.5	57.1	59.1	61.0	62.3				45.9	5.3
2006	Number N=173		20	65	29	31	16	2	7	2						1			
	Frequency (%)		11.6	37.6	16.8	17.9	9.2	1.2	4.0	1.2						0.6			
	Average length		38.9	41.4	43.0	48.7	52.5	54.7	57.8	55.1						63.5		44.8	4.1
2007	Number N=270		1	61	109	33	22	15	16	6	3	1					1		
	Frequency (%)		0.4	22.8	40.7	12.3	8.2	5.6	6.0	2.2	1.1	0.4					0.4		
	Average length		34.0	39.7	42.9	46.7	49.9	52.8	56.1	55.4	59.7	55.4					63.5	45.1	4.7
2008	Number N=183		10	42	68	23	9	7	5	4	5	3	2	4		1			
	Frequency (%)		5.5	23.0	37.2	12.6	4.9	3.8	2.7	2.2	2.7	1.6	1.1	2.2		0.5			
	Average length		37.3	41.3	45.1	47.5	51.8	57.2	55.0	59.2	60.7	62.5	64.1	57.9		59.7		46.7	4.8
2009	Number N=172			29	39	41	30	11	3	5	7	4	1	1			1		
	Frequency (%)			16.9	22.7	23.8	17.4	6.4	1.7	2.9	4.1	2.3	0.6	0.6			0.6		
	Average length			39.4	42.2	44.8	48.8	53.9	57.2	53.8	56.1	57.6	57.2	57.2			64.8	46.1	5.4



Appendix 3 Figure 8. Age (years) composition of walleye harvested from the St. Marys River by anglers from May to October for 1999-2001 and 2005-2009.

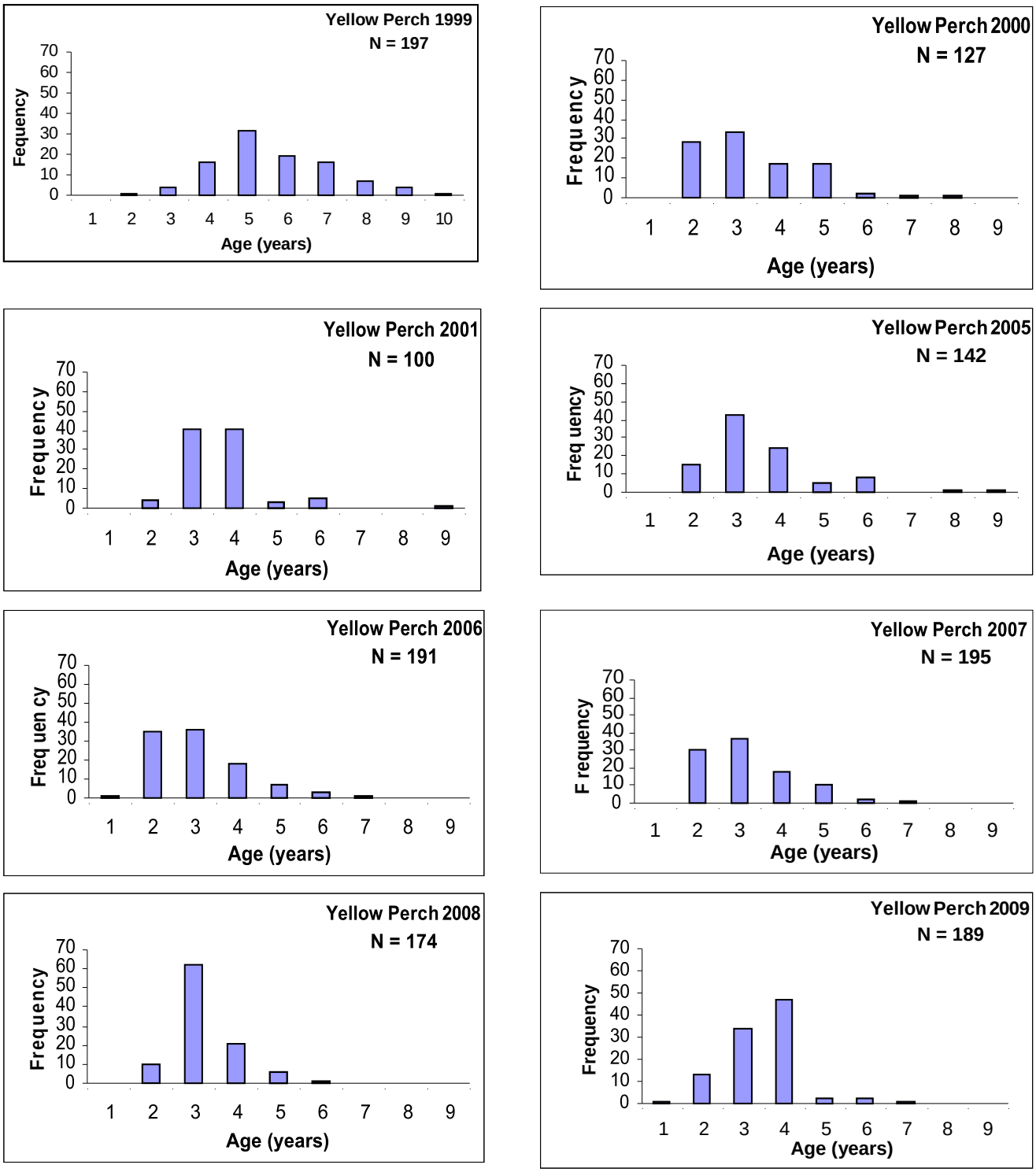

May to October 1999
N = 145
May to October 2000
N = 78
May to October 2001
N = 211
May to October 2005
N = 189
May to October 2006
N = 148
May to October 2007
N = 269
Frequency



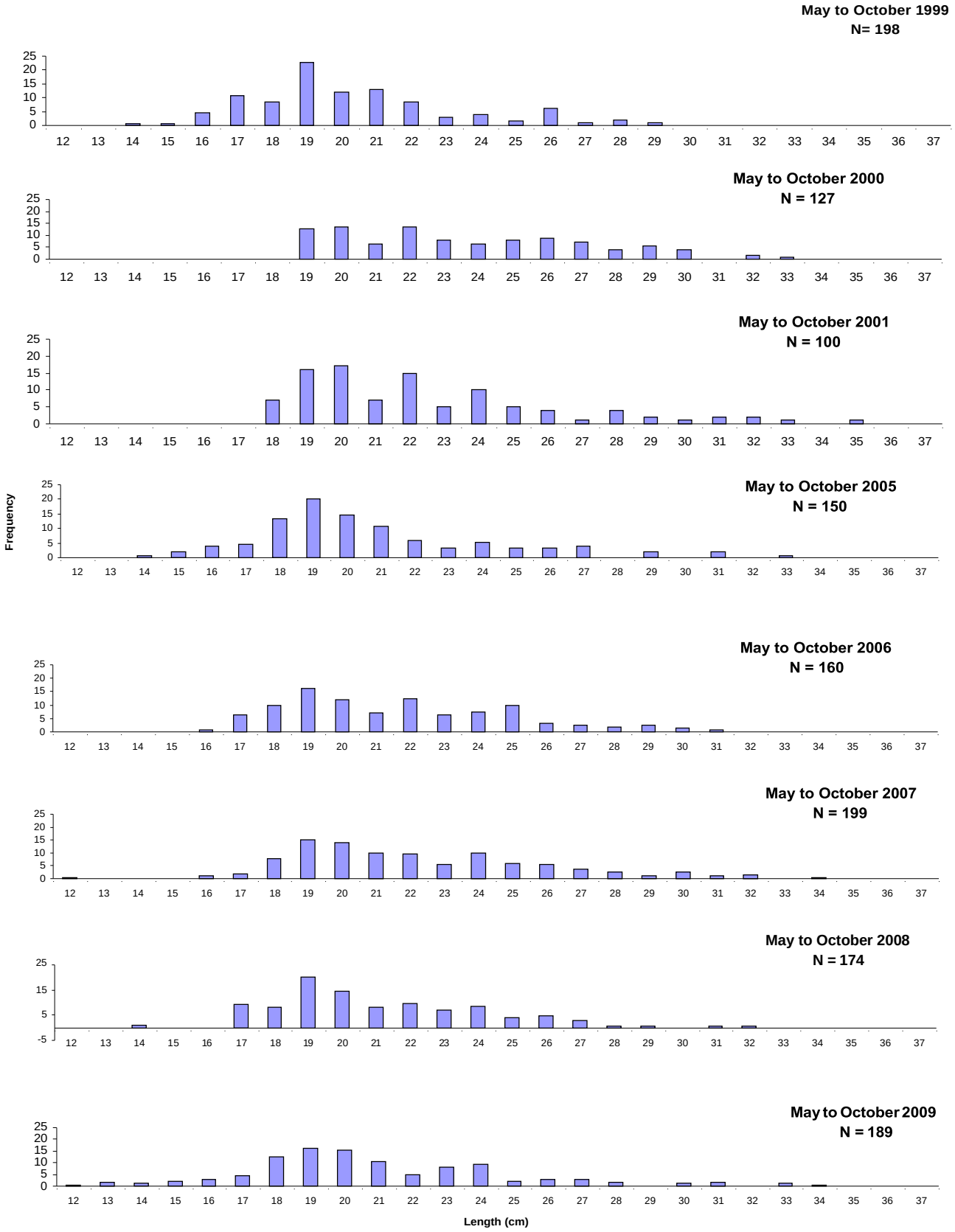
Appendix 3 Figure 9. Walleye length frequencies (percent total) during the May to Oct angler survey 1999-2001, 2005-2009 in the St. Marys River.

Appendix 3 Table 5. Yellow perch age composition (number and frequency) and average length at age based on biological information collected from the sport fishery in US and Canadian waters of the St. Marys River from May to October for years 1999-2001 to 2005-2009. All lengths are in cm.

		AGE										Average	Average
Year	Parameters	1	2	3	4	5	6	7	8	9	10	Length	Age
1999	Number N=195		1	8	32	62	38	32	14	8	2		
	Frequency (%)		0.5	4.1	16.2	31.5	19.3	16.2	7.1	4.1	1.0		
	Average length		18.5	18.9	19.7	20.6	21.9	23.0	26.2	28.6	29.0	21.8	5.7
2000	Number N=127		36	42	22	22	3	1	1				
	Frequency (%)		28.3	33.1	17.3	17.3	2.4	0.8	0.8				
	Average length		21.4	23.3	25.4	28.6	27.8	29.0	27.4			24.2	3.4
2001	Number N=100		4	41	41	3	5	5		1			
	Frequency (%)		4.0	41.0	41.0	3.0	5.0	5.0	0.0	1.0			
	Average length		19.4	20.2	23.6	28.2	29.9	31.5		35.6		23.0	3.8
2005	Number N=142		22	60	34	7	12	3	2	2			
	Frequency (%)		15.5	42.3	23.9	4.9	8.5	2.1	1.4	1.4			
	Average length		17.9	19.5	22.3	24.9	26.2	31.1	30.9	31.8		21.3	3.7
2006	Number N=191	2	67	68	34	13	5	2					
	Frequency (%)	1.0	35.1	35.6	17.8	6.8	2.6	1.0					
	Average length	18.8	20.7	22.1	23.2	26.3	26.2	26.9				22.2	3.1
2007	Number N=195	1	60	71	34	21	5	2		1			
	Frequency (%)	0.5	30.8	36.4	17.4	10.8	2.6	1.0		0.5			
	Average length	13.0	19.7	23.1	23.8	25.2	28.4	29.3		40.6		22.7	3.2
2008	Number N=173		17	108	36	11	2						
	Frequency (%)		9.8	62.4	20.8	6.4	1.2						
	Average length		19.4	21.2	22.6	23.0	25.0					21.5	3.3
2009	Number N=189	1	25	64	89	4	5	1					
	Frequency (%)	0.5	13.2	33.9	47.1	2.1	2.6	0.5					
	Average length	15.0	18.8	21.2	21.7	30.8	30.8	31.8				21.4	3.5



Appendix 3 Figure 10. Age (years) composition of yellow perch harvested from the St. Marys River by anglers from May to October for 1999- 2001, 2005-2009.



Appendix 3 Figure 11. Yellow perch length frequencies (percent total) during the May to Oct angler survey 1999-2001, 2005-2009 in the St. Marys River.

Appendices

Appendix 4, Table 1. Percent method and percent mode of sport anglers fishing the St. Marys River during the open water season (May – Oct.) 1999-2009 by river reach. N denotes interview sample size.

	Location							
	Lake Nicolet (209)	Lake George (208)	Munuscong Bay (207)	St. Marys Rapids (403)	Upper River (404)	St. Joseph Ch. (405)	Potagannissing Bay (210)	Riverwide (total)
Method								
Casting	12	13	3	30	8	40	3	9
Drifting	7	4	3	3	2	5	9	6
Fly Fishing				56	1			2
Jigging	1	2	2	5	1	3		1
Snagging	3							1
Still Fishing	41	10	25	5	66	24	61	38
Trolling	35	72	68		22	27	27	44
N	2 313	1 393	2 342	252	190	345	2 957	9 792
Mode								
Boat	68	93	97	2	84	64	91	84
Shore or wade	21	7	1	92	13	28		10
Pier/Dock	11		2	6	3	8	9	6
N	2 317	1 395	2 354	252	192	348	2 968	9 826

This table should be reviewed with reference to Table 1 for interpretation support.

Appendix 4, Table 2. Percent party size and percent number of trips per day made by sport anglers fishing the open water (May-Oct.) fishery in the St. Marys River, by location, 1999-2009. N denotes sample size.

	Location							
	Lake Nicolet (209)	Lake George (208)	Munuscong Bay (207)	St. Marys Rapids (403)	Upper River (404)	St. Joseph Ch. (405)	Potagannissing Bay (210)	Riverwide (total)
Party size								
1	41.7	19.4	18.1	38.5	34.9	29.9	17.9	25.1
2	42.6	58.4	59.2	42.1	42.7	43.1	52.6	51.8
3	11.8	16.9	15.8	13.1	14.1	17.8	17.5	15.5
4	2.8	4.4	5.4	4.0	5.2	6.3	9.0	5.7
5	0.7	0.6	0.8	1.6	2.6	1.7	2.0	1.2
6	0.3	0.1	0.6	0.0	0.5	0.9	0.7	0.5
7		0.1	0.1			0.3	0.1	0.1
8		0.1		0.4			0.1	0.1
9				0.4			0.1	
Number of Trips								
1	95.3	93.5	81.0	96.0	90.1	97.1	72.5	84.7
2	4.7	6.5	18.9	3.6	9.9	2.9	27.4	15.2
3				0.4			0.2	0.1
N	2 317	1 395	2 354	252	192	348	2 968	9 826

Appendices

Appendix 5: Ontario and Michigan angling regulations from 1999 to 2009 cisco, northern pike, smallmouth bass, walleye, and yellow perch.

Species	Regulation	Ontario up to end 2007	Michigan	Ontario post 2007
Cisco	Season	none	none	none
	Limit (Sport / Conservation licence)	none	12	25/12
	Size restriction	none	none	none
Northern Pike	Season	Open except Dec. 24	May 15 to Mar. 15	Jan. 1 to Mar. 1 & May 1 to Dec. 31
	Limit (Sport / Conservation licence)	6 / 2	2	2 / 1 per day 4 / 2 possession
	Size restriction	None (1999-2003) 1 > 86 cm (34 “) (2003-2007)	None < 24 inches (61 cm)	none
Smallmouth Bass	Season	Last Sat. June – Nov. 1	Sat. before Memorial Day to Dec. 31	4th Sat. in June to Nov. 30
	Limit (Sport / Conservation licence)	6 / 2	5	3/1
	Size restriction	none	None < 14 inches (35.6 cm)	
Walleye	Season	Open except Dec. 24	May 15 –Feb 28	Jan 1-last day in Feb. May 15 -Dec 31.
From Compensating Gates to longitude 83° 45’ W and south to International boundary (excluding the two locations below)	Limit (Sport / Conservation licence)	6 / 2	5	4 / 2
	Size restriction	none	None < 15 in. (38 cm)	none
***Walleye**	Season	Closed Dec 24	May 15 –Feb 28	Open except Dec. 24
(Birch Pt. up to compensating gates)	Limit (Sport / Conservation licence)	Catch limit 0 Apr 15-Fri before 3rd Sat. in May	5	No longer applies
	Size restriction	6 / 2 None > 46 cm	None < 15 in. (38	No longer applies

Species	Regulation	Ontario up to end 2007	Michigan	Ontario post 2007
		(18 in)	cm)	
***Walleye**	Season	Closed April 15 – June 15	May 15 –Feb 28	Open except Dec. 24
(Pumpkin Pt up to north boundary with Laird Twp)	Limit (Sport / Conservation licence)	0 limit (April 15 to 3rd Friday in May) 6 / 2	5	0 limit from Apr. 1 – June 15.
	Size restriction	None > 46 cm (18 in)	None < 15 in. (38 cm)	none
Yellow Perch	Season	none	none	none
	Limit (Sport / Conservation licence)	50 / 25 per day, 100 / 25 possession	50	25 / 12 per day 50 / 25 possession
	Size restriction	none	None < 7 in. (17.8 cm)	none

* intended to protect remnant wild stock pre and post spawn walleye that stage in Lake George off the Bar River.