

## STUDY PERFORMANCE REPORT

State: Michigan

Project No: F-81-R-16

Study No: 230499

Title: Michigan Statewide Angler Survey Program

Period Covered: October 1, 2014 – September 30, 2015

**Study Objective:** 1) To obtain a continuous record of sport fishing effort, catch, and harvest, catch and harvest rates, and catch composition for important Great Lakes, tributary, and inland fisheries of the State of Michigan; and 2) to provide consistent protocols and data collection methods, program oversight, and timely data analysis of recreational fisheries statistics to MDNR Fisheries Division managers and research biologists.

**Summary:** In fiscal year 2015, the Statewide Angler Survey Program (SASP) conducted winter surveys at 16 discrete sites (all on the Great Lakes or Great Lakes tributaries) and at Lake Gogebic. The Statewide Angler Survey Program conducted summer surveys at 72 discrete sites on the Great Lakes and Great Lakes tributaries and at 10 inland lakes. Stratified, random schedules were completed and creel clerks, lead workers, and supervisors received training prior to the winter and open-water seasons. Field oversight and quality assurance/quality control (QA/QC) occurred at four levels: 1) electronic data entry forms standardized and validated data entered in the field; 2) supervisors and lead workers reviewed clerk performance in the field; 3) data were received and reviewed monthly by lead workers, Lansing staff and personnel at the Institute for Fisheries Research in Ann Arbor; and 4) program supervision and oversight occurred from Ann Arbor, Lansing, and Charlevoix. New technologies for the future enhancement of the SASP were refined, including an online searchable database of creel estimates, and the creation of software to allow data entry in the field through the use of smartphones. Program statistician Zhenming Su continued to refine the estimation process. Data were analyzed and reported to various Michigan Department of Natural Resources (MDNR) personnel and other interested parties. The year culminated with the scheduled completion of this report.

**Findings:** Jobs 1–6 were scheduled for fiscal year 2015, and progress is reported below. Additional data prior to fiscal year 2015 are included in some cases, for comparative purposes.

**Job 1. Survey design and coordination.**—Great Lakes and previously-creeled inland waters were surveyed using template designs from previous years. Designs for previously unsampled sites were developed by combining site-specific information (area of water body, access points, purpose of study) with statistical theory to determine sampling intensity and technique. All fiscal year 2015 survey sites were selected by integrating SASP selection procedures and prioritization schemes with research and management needs, facilitated through the Fisheries Division Basin and Management Team processes.

Stratified-random schedules for clerks and aerial contractors were generated using MiCreel Designer (Su 2005). Winter survey designs and schedules were completed in winter (December) and summer survey designs were completed in February and March. Schedules consisted of the following materials: site names, directions to site, interview instructions, biological sampling instructions, maps, and a season shift schedule. Shifts consisted of the traditional morning and evening designations, as well as a designation (enacted in 2007) specifying a later start time for a morning shift which follows a late evening shift (for personal safety reasons). Instantaneous,

interval, or aerial counts were scheduled depending on the site and mode. For the Great Lakes, an access-point (boat launches, piers, or shore) interview design was used (Lockwood 1997, 2000; Lockwood et al. 1999). For inland lakes and certain tributaries, a roving interview design (whole lake) was used (Z. Su, MDNR Fisheries Division, personal communication).

Aerial surveys for boat, shore, and pier angling effort were scheduled for three areas of the Michigan waters of the Great Lakes: Lake Erie and the Detroit River; Saginaw Bay (from Harbor Beach to Tawas City); and northern Lake Huron (St. Ignace northeast to the St. Mary's River) (Table 1). The Statewide Angler Survey Program also conducted aerial surveys of shanty and open-ice angling effort, January through March, on Saginaw Bay. At each survey area, flights were scheduled for all weekend days and two or three randomly selected weekdays per week. Take-off times were randomized to ensure angler counts were made at various times during daylight hours each month. Schedules for air flight contractors were produced and distributed prior to the start of creel survey periods. The Statewide Angler Survey Program staff flew periodically with the aerial contractors to provide quality assurance during the season. When aerial counts were used in place of ground counts, it was because ground counts were unlikely to provide an accurate measure of effort. This is due to anglers in these areas entering the lakes or rivers from multiple access sites that creel clerks couldn't access.

**Job 2. Conduct surveys / process samples.**—In fiscal year 2015, winter surveys were conducted at 16 Great Lakes and Great Lakes tributary sites between January and March (Table 2), and at Lake Gogebic (March only). During the open-water season (April – October), 72 Great Lakes sites were surveyed across Lakes Erie (6 sites; Table 3), Huron (21 sites; Table 4), Superior (7 sites; Table 5), Michigan (18 sites; Table 6), and tributaries to the Michigan waters of the Great Lakes (20 sites; Table 7). Additional creel surveys were done at 10 inland lakes: Au Train Lake, Devil's Lake, Hudson Lake, Pentwater Lake, Portage Lake, East Twin Lake, Lake Gogebic, Sanford Lake, South Manistique Lake, and West Twin Lake.

Each technician supervisor or lead worker was responsible for direct supervision of the creel personnel and data collection for the sites within their management unit. Any changes to a clerk's schedule were discussed and approved by the SASP program biologist (T. Kolb, Constitution Hall, Lansing, Michigan) prior to implementation. To document these changes, clerks use schedule change forms. These forms are filled out by clerks, reviewed by their immediate supervisor or lead worker, and sent to Lansing each month.

Additionally, supervisors or lead workers sent reports monthly to Lansing documenting that contact was made with clerks in the field, that clerks were performing their job duties appropriately, and to discuss any creel issues that arose during the month. During fiscal year 2015, SASP personnel traveled to the following creel survey sites to field-validate survey protocols: Alpena, Au Train Lake, bays de Noc, Boardman River, Copper Harbor, Detour, Detroit River, Drummond Island, East Twin Lake, Frankfort, Grand Marias, Grand River, Grand Traverse Bay, Keweenaw Bay, Lake Erie, Les Cheneaux Islands, Ludington, Manistee, Marquette, Munising, Onekama, Pentwater, Pentwater Lake, Portage Lake, Roger's City, St. Ignace, South Manistique Lake, West Twin Lakes and Whitehall.

Creel data (counts and interviews) were received monthly in Ann Arbor. Since 2006, count and interview data entry was performed using Personal Digital Assistants (PDAs) and MiCreel software. In 2015, SASP staff deployed a new data entry software using android smartphones and a customized application for SASP data entry. Throughout fiscal year 2015, SASP staff provided all software coding for the application and performed training, trouble-shooting, upgrades and bug fixes. For fiscal year 2016, SASP staff plan to continue to refine and improve the application.

In addition to angler interviews and counts, creel fisheries assistants collected biological data and samples from individual fish. These data and samples include age structures (usually scales or spines), length, weight, sex, maturity, and presence of fin clips or tags. At the beginning of every season, Great Lakes creel clerks received a chart listing the number of fish, by species and month, from which the clerk needed to collect biological data. These biological data “quotas” were developed by creel program personnel, in consultation with management and research biologists. Lake Erie and Lake Huron quotas were reviewed in fiscal year 2015 to ensure representative sampling of each fishery. In 2016, Lake Michigan and Lake Superior quotas will be reviewed.

During fiscal year 2015, SASP deployed the new smartphone application for biodata entry in the field. SASP staff provided all technical support (software design, maintenance, upgrades, and trouble-shooting). Physical biosamples were aged by management unit personnel after the field season and transferred to SASP personnel, who entered age data into a database and archived the physical samples. Standards are in place to ensure appropriate archiving of digital and physical data. During fiscal year 2015, more than 8,900 samples were collected and archived for 19 species of sport fish.

**Job 3. Manage data / maintain database.**—Raw data were validated electronically by software and then manually by field staff and then transferred to the Institute for Fisheries Research in Ann Arbor. At the end of the field season, raw data were transformed into monthly estimates of catch and effort using custom-built creel estimation software (Su, 2005). All raw count and interview files, monthly estimates, and biological data are maintained in a relational database management system. During the 2015 fiscal year, data management “best practices” were continued, including: metadata recording and data maintenance; ensuring referential integrity; improved standardization; and integration of raw, estimate, charter, and biological data within and between databases. In addition, an online, searchable database of Great Lakes estimates (<http://www.dnr.state.mi.us/chartercreel/>) continues to be refined and updated by SASP personnel and website programmers and an online list of inland creel estimates was added to Fisheries Division’s website ([http://www.michigan.gov/dnr/0,4570,7-153-10364\\_52261-327439--,00.html](http://www.michigan.gov/dnr/0,4570,7-153-10364_52261-327439--,00.html)).

**Job 4. Analyze data, modeling.**—In fiscal year 2015, we estimated (Su and Clapp 2013) monthly species-specific fishing effort, harvest, harvest rate, catch, and catch rates for all sites surveyed in fiscal year 2014. Estimates for sites surveyed in 2015 will be completed upon conclusion of the creel season (October 31 2015). Estimates are used by fisheries managers and researchers to monitor angling trends, identify potential management issues, supplement data on fish population trends, and help manage sport fisheries (e.g., evaluate the effects of regulation changes or stocking). Data are summarized in a large variety of ways to meet these goals, and results are presented in a variety of formats. For example, SASP data were used in reports to lake committees (e.g., He et al. 2015) and for calculation and monitoring of the total allowable catch (TAC) of lake trout in various zones of 1836 Treaty waters of the Great Lakes (Modeling Subcommittee 2015). In total, SASP staff responded to 364 data requests from the public, universities, federal agencies, other states, and internal MDNR fisheries staff in fiscal year 2015. A subset of species-specific effort and harvest estimates are presented in this report for Lakes Michigan (Table 8), Huron (Table 9), Superior (Table 10), and Erie (Table 11).

**Job 5. Write annual performance report.**—This report was prepared as scheduled.

**Job 6. Write other reports.**—During fiscal year 2015, the following internal publications were completed and are provided with this report:

O’Neal, R. P., and T. L. Kolb. 2014a. A 2006 Hardy Impoundment Angler Survey Report. Michigan Department of Natural Resources, Fisheries Division Internal Report.

O'Neal, R. P., and T. L. Kolb. 2014b. 2007 Croton Impoundment Angler Survey Report. Michigan Department of Natural Resources, Fisheries Division Internal Report.

O'Neal, R. P., and T. L. Kolb. 2015a. Muskegon River Angler Survey Report, 1985 – 2005 Croton Dam to Muskegon Lake, with summaries of lakes, impoundments and other river sections. Michigan Department of Natural Resources, Fisheries Division Internal Report.

O'Neal, R. P., and T. L. Kolb. 2015b. A 2008 Muskegon River Angler Survey Report – Houghton Lake to Rogers Dam. Michigan Department of Natural Resources, Fisheries Division Internal Report.

O'Neal, R. P., and T. L. Kolb. 2015c. A 2011 Pere Marquette River Angler Survey Report. Michigan Department of Natural Resources, Fisheries Division Internal Report.

Tonello, M. A., T. L. Kolb, and M. E. Tonello. In press. Evaluation of the Steelhead Fishery in the Betsie River by Volunteer Steelhead Fin Clip Census (Fall 2006 – Spring 2010) and Creel Survey (2010). Michigan Department of Natural Resources, Fisheries Report, Lansing.

### References:

He, J. X., J. R. Bence, C. P. Madenjian, S. A. Pothoven, N. E. Dobiesz, D. G. Fielder, J. E. Johnson, M. P. Ebener, R. A. Cottrill, L. C. Mohr, and S. R. Koproski. 2015. Coupling age-structured stock assessment and fish bioenergetics models: a system of time-varying models for quantifying piscivory patterns during the rapid trophic shift in the main basin of Lake Huron. *Canadian Journal of Fisheries and Aquatic Sciences* 72(1):7-23.

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

Lockwood, R. N. 2000. Conducting roving and access site angler surveys. Chapter 14 in J. C. Schneider, editor. *Manual of fisheries survey methods II: with periodic updates*. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.

Lockwood, R. N., D. M. Benjamin, and J. R. Bence. 1999. Estimating angling effort and catch from Michigan roving and access site angler survey data. Michigan Department of Natural Resources, Fisheries Research Report 2044, Ann Arbor.

Modeling Subcommittee, Technical Fisheries Committee. 2015. Technical Fisheries Committee administrative report 2015: status of lake trout and lake whitefish populations in the 1836 Treaty-Ceded Waters of Lakes Superior, Huron and Michigan, with recommended yield and effort levels for 2015. [http://www.michigan.gov/documents/dnr/2015StatusStocksReport\\_498685\\_7.pdf](http://www.michigan.gov/documents/dnr/2015StatusStocksReport_498685_7.pdf)

Su, Z. 2005. Inland creel surveys, progress report, study 646. Michigan Department of Natural Resources, Federal Aid in Sport Fish Restoration, Annual Reports for 2004-05 RESIN Resource Inventory (F-81-R-6).

Su, Z., and D. Clapp. 2013. Evaluation of sample design and estimation methods for Great Lakes angler surveys. *Transactions of the American Fisheries Society*, 142(1), 234-246.

**Prepared by:** Tracy Kolb

**Date:** September 30, 2015

Table 1.–Air flight surveys conducted over Michigan waters of the Great Lakes, fiscal year 2015.

Survey area	Contractor	Months surveyed	Modes surveyed
Lake Erie and Detroit River	Solo Aviation	April – October	Boat
Saginaw Bay	Bay Flying Inc.	January – October	Boat, Pier, Shore, Ice
Northern Lake Huron and the St. Mary's River	Great Lakes Air	May – October	Boat, Pier, Shore, Ice

Table 2.–Winter ice creel survey locations. An X denotes that the port or area was sampled during January, February, or March of the indicated year.

Survey location	Site #	Year										
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>LAKE MICHIGAN</b>												
Muskegon River	151/2	X										
Manistee River	130											
Menominee River	002		X	X	X	X	X			X		
St. Joseph River <sup>a</sup>	(see note)											
<b>MM-1</b>												
Menominee Harbor	001	X	X	X	X	X	X			X	X	
Little Bay de Noc	020	X	X	X	X	X	X	X	X	X	X	X
Big Bay de Noc	025											
<b>MM-4</b>												
Elk Rapids	094										X	
E. Grand Traverse Bay	095										X	
W. Grand Traverse Bay	100										X	
<b>MI-5</b>												
Marquette <sup>b</sup>	190	X	X	X	X	X	X	X	X	X	X	X
<b>MI-6</b>												
Au Train <sup>b</sup>	194	X	X	X								X
Munising Bay	195	X	X	X	X	X	X	X	X	X	X	X
<b>LAKE HURON</b>												
Au Sable River	316									X	X	
St. Mary's River	207	X	X	X	X	X	X	X	X	X	X	X
Tittabawassee River	401	X	X	X	X	X	X	X	X	X	X	X
Saginaw River	355	X	X	X	X	X	X	X	X	X	X	X
<b>MH-1</b>												
Les Cheneaux Islands	214	X	X	X	X	X	X	X	X	X	X	X

Table 2.–Continued.

Survey location	Site #	Year										
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b><i>MH-4</i></b>												
Port Austin	236	X	X	X	X	X	X	X	X	X	X	X
Saginaw R. to Quanicassee	356	X	X	X	X	X	X	X	X	X	X	X
Tawas	250	X	X	X	X	X	X	X	X	X	X	X
Au Gres	255	X	X	X	X	X	X	X	X	X	X	X
Saganing Creek to Sag. R.	260	X	X	X	X	X	X	X	X	X	X	X
Quanicassee to Sebewaing	278	X	X	X	X	X	X	X	X	X	X	X
Sebewaing to Sand Point	288	X	X	X	X	X	X	X	X	X	X	X
Caseville	290	X	X	X	X	X	X	X	X	X	X	X

<sup>a</sup> St. Joseph River includes sites 298, 345, 367, 387, 388, 389, 390, and 391.

<sup>b</sup> March only.

Table 3.–Open water Lake Erie survey locations (tributaries not included). An X denotes that the port or area was sampled during the indicated year.

Survey location	Grid #	Year										
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Lake Erie	699			X	X	X	X	X	X	X	X	X
	701	X	X	X	X	X	X	X	X	X	X	X
	702	X	X	X	X	X	X	X	X	X	X	X
	703	X	X	X	X	X	X	X	X	X	X	X
	801	X	X	X	X	X	X	X	X	X	X	X
	802	X	X	X	X	X	X	X	X	X	X	X

Table 4.–Open water Lake Huron creel survey locations (tributaries not included). An X denotes the port or area was sampled during the indicated year.

Survey location	Site #	Year										
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>MH-1</b>												
Potagannissing Bay	210	X	X	X		X		X		X		X
St. Vital Pt. to Detour	211	X	X	X	X	X	X	X	X	X	X	X
Les Cheneaux Islands	214	X	X	X	X	X	X	X	X	X	X	X
St. Ignace to St. Martins Bay	216	X	X	X	X	X	X	X	X	X	X	X
Cheboygan	218		X						X			X
Mackinaw City	071											X
Hammond Bay	219		X						X			
Rogers City	223	X	X	X	X	X	X	X	X	X	X	X
<b>MH-2</b>												
Presque Isle Harbor	224	X	X	X	X	X	X	X	X	X		
Rockport	225	X	X	X	X	X	X	X	X	X		
Alpena	227	X	X	X	X	X	X	X	X	X	X	X
<b>MH-3</b>												
Harrisville	232	X	X	X	X	X	X	X	X	X	X	X
Oscoda	234	X	X	X	X	X	X	X	X	X	X	X
<b>MH-4</b>												
Tawas	250	X	X	X	X	X	X	X	X	X	X	X
Au Gres	255	X	X	X	X	X	X	X	X	X	X	X
Saganing Creek to Sag. Rv.	260	X	X	X	X	X	X	X	X	X	X	X
Saginaw Rv. to Quanicassee	356	X	X	X	X	X	X	X	X	X	X	X
Quanicassee to Sebewaing	278	X	X	X	X	X	X	X	X	X	X	X
Sebewaing to Sand Point	288	X	X	X	X	X	X	X	X	X	X	X
Sand Point to Port Austin	236	X	X	X	X	X	X	X	X	X	X	X
Caseville	290	X	X	X	X	X	X	X	X	X	X	X
<b>MH-5</b>												
Eagle Bay to Harbor Beach	241	X	X	X	X	X	X	X	X	X	X	X

Table 4.–Continued.

Survey location	Site #	Year										
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>MH-6</b>												
Port Sanilac	245	X	X	X	X	X	X	X	X	X	X	X
Lexington	246	X	X	X	X	X	X	X	X	X	X	X
Port Huron	248											

Table 5.–Open water Lake Superior creel survey locations (tributaries not included). An X denotes the port or area was sampled during the indicated year.

Survey location	Site #	Year										
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>MI-2</b>												
Black River Harbor	168		X		X		X		X		X	
Ontonagon	172		X		X		X		X		X	
<b>MI-3</b>												
Eagle Harbor	175					X		X				X
Copper Harbor	177		X	X		X		X		X		X
<b>MI-4</b>												
Traverse Bay	182	X	X		X	X	X	X	X	X	X	X
Keweenaw Bay	185	X	X		X	X	X	X	X	X	X	X
<b>MI-5</b>												
Marquette	190	X	X	X	X	X <sup>a</sup>						
<b>MI-6</b>												
Au Train	194	X	X	X	X	X	X	X	X	X	X	
Munising	195	X	X	X	X	X	X	X	X	X	X	X
<b>MI-7</b>												
Grand Marias	197	X	X	X	X	X	X	X	X	X	X	X

<sup>a</sup> Marquette was creeled full time by one clerk until 2009 and then it was creeled half time.

Table 6.–Open water Lake Michigan creel survey locations (tributaries not included). An X denotes the port or area was sampled during the indicated year.

Survey location	Site #	Year										
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>MM-1</b>												
Menominee Harbor	001		X		X	X			X	X		
Stoney Pt. Kleinke Park	007		X		X	X			X	X		
Cedar River PAS	015		X		X	X			X	X		
Little Bay de Noc <sup>a</sup>	020	X	X	X	X	X	X	X	X	X	X	X
Big Bay de Noc	025	X	X	X	X	X	X	X	X	X	X	X
Fairport	330	X	X	X	X	X	X	X	X	X	X	X
<b>MM-2<sup>b</sup></b>												
Manistique Harbor & R.	048							X				
<b>MM-3</b>												
Harbor Springs	080	X	X	X	X	X	X	X	X	X	X	X
Petoskey	085	X	X	X	X	X	X	X	X	X	X	X
Charlevoix	090	X	X	X	X	X	X	X	X	X	X	X
<b>MM-4</b>												
Elk Rapids	094	X	X	X	X	X	X	X	X	X	X	X
E. Grand Traverse Bay	095	X	X	X	X	X	X	X	X	X	X	X
W. Grand Traverse Bay	100	X	X	X	X	X	X	X	X	X	X	X
<b>MM-5</b>												
Leland	116	X	X			X			X			
Glen Arbor	118	X	X			X			X	X		
Platte Bay	122	X				X				X		
Frankfort/Elberta	124	X	X	X	X	X	X	X	X	X	X	X
<b>MM-6</b>												
Arcadia	126	X				X						
Onkama	127	X	X	X	X	X	X	X	X	X	X	X
Manistee	128	X	X	X	X	X	X	X	X	X	X	X
Ludington	134	X	X	X	X	X	X	X	X	X	X	X
Pentwater	139	X	X	X	X	X	X	X	X	X	X	X

Table 6.--Continued.

Survey location	Site #	Year										
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>MM-7</b>												
Whitehall/Montague	312	X	X	X	X	X	X	X	X	X	X	X
Muskegon	149	X	X	X	X	X	X	X	X	X	X	X
Grand Haven	153	X	X	X	X	X	X	X	X	X	X	X
Port Sheldon	155	X								X		
<b>MM-8</b>												
Holland	156	X								X		
Saugatuck	160											
South Haven	162		X	X	X	X	X	X	X	X	X	X
Benton Harbor/St. Joe	164	X	X	X	X	X	X	X	X	X	X	X
New Buffalo	166	X										

<sup>a</sup> Ford River PAS was combined with the Little Bay de Noc site beginning with the 1988 season.

<sup>b</sup> No harvest or effort estimates could be made for Seul Choix Point or Naubinway due to the lack of angler effort.

Table 7.—Open water tributary creel survey locations. An X denotes that the port or area was sampled during the indicated year.

Survey Location	Site #	Year										
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>LAKE MICHIGAN</b>												
Betsie River	123						X					
Bear River	84	X	X	X	X	X	X	X	X	X	X	X
Boardman River	(-)											X
Bryan Creek	(-)									X	X	X
Cedar River	16		X		X	X			X	X		
Flat River <sup>a</sup>	509											X
Grand River <sup>b</sup>	5041											X
Grand River <sup>b</sup>	5042											X
Grand River <sup>b</sup>	505											X
Manistee River <sup>c</sup>	130											
Manistee River <sup>c</sup>	341											
Menominee River	002		X		X	X			X	X		
Muskegon River <sup>d</sup>	151	X			X <sup>e</sup>							
Muskegon River <sup>d</sup>	152	X			X <sup>e</sup>							
Platte River	(-)										X	
St. Joseph River <sup>f</sup>	298	X	X				X					
St. Joseph River <sup>f</sup>	345											
St. Joseph River <sup>f</sup>	367											
St. Joseph River <sup>f</sup>	387											
St. Joseph River <sup>f</sup>	388	X										
St. Joseph River <sup>f</sup>	389	X										
St. Joseph River <sup>f</sup>	390	X										
St. Joseph River <sup>f</sup>	391		X				X					
Two-Mile Creek	(-)									X	X	X
<b>LAKE HURON</b>												
Au Sable River <sup>g</sup>	316					X <sup>e</sup>				X	X	
Ocqueoc River	221			X						X		X
Saginaw River	355	X	X	X	X	X	X	X	X	X	X	X
St. Mary's River <sup>h</sup>	207	X	X	X	X	X		X	X	X		
St. Mary's River <sup>h</sup>	208	X	X	X	X		X					

Table 7.–Continued.

Survey Location	Site #	Year											
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
<b>LAKE HURON—continued</b>													
St. Mary's River <sup>h</sup>	209		X		X		X					X	
St. Mary's River <sup>h</sup>	210	X	X	X		X			X				
St. Mary's River <sup>h</sup>	403		X	X	X	X	X						
St. Mary's River <sup>h</sup>	404					X							
St. Mary's River <sup>h</sup>	405	X	X	X		X							
Tittabawassee River <sup>i</sup>	401	X	X	X	X	X	X	X	X	X	X	X	X
<b>LAKE SUPERIOR</b>													
Chocolay River	321				X		X	X	X	X	X	X	X
Dead River	324	X	X	X	X	X	X	X	X	X	X	X	X
E, Branch Tahquamenon River	(–)										X	X	X
Upper Tahquamenon River	(–)										X	X	X
<b>LAKE ERIE</b>													
Detroit River	500												X <sup>j</sup>
Detroit River	501												X <sup>j</sup>
Detroit River	502												X <sup>j</sup>
Detroit River	503												X <sup>j</sup>
Detroit River	504												X <sup>j</sup>
Detroit River	505												X <sup>j</sup>
St. Clair River <sup>k</sup>	514	X								X			
St. Clair River <sup>k</sup>	515	X								X			
St. Clair River <sup>k</sup>	516	X								X			
St. Clair River <sup>k</sup>	517	X								X			
St. Clair River <sup>k</sup>	518	X								X			
St. Clair River <sup>k</sup>	519	X								X			

<sup>a</sup> Flat River site 509 is Lowell to Flat River Dam.

<sup>b</sup> Grand River site 5401 is Johnson Park to 6<sup>th</sup> Street Dam, site 5402 is 6<sup>th</sup> Street Dam to Riverside Park and site 505 is West River Drive to Lowell.

<sup>c</sup> Manistee River site 130 is Tippy Dam to Bear Creek and site 341 is Bear Creek to Stronach Dam.

<sup>d</sup> Muskegon River site 151 is Croton Dam to Newago and site 152 is Newago to Muskegon Lake.

<sup>e</sup> Muskegon River (2008) was sampled in conjunction with the Huron Pines Resource Council.

- <sup>f</sup> St. Joseph River site 298 is Berrien Springs to Jasper Dairy, site 345 is Berrien Springs Dam to Buchanan Dam, site 367 is River Park to US-31 Bridge, site 387 is Buchanan Dam to Niles Dam, site 388 is State Line to South Bend Indiana, site 389 is South Bend Dam to Uniroyale, site 390 is Uniroyale to Twin Branch, and site 391 is the Dowagiac River.
- <sup>g</sup> Au Sable River was sampled in conjunction with the Huron Pines Resource Council (Huron Pines survey administrator, 2009; Patrick Ertel).
- <sup>h</sup> St. Mary's River site 207 is Sweets Point to the Neebish Island Ferry; site 208 is Lake George, Little Lake George, and the area around Sugar Island; site 209 is the area between the rapids and the Neebish Island Ferry including Lake Nicolet; site 210 is Drummond Island, including Potagannissing Bay; site 403 is the St. Mary's Rapids (sampled by Ontario Ministry of Natural Resources (OMNR)); site 404 is Upper St. Mary's River (sampled by OMNR and Chippewa and Ottawa Resource Authority); site 405 is the St. Joseph Channel (sampled by OMNR).
- <sup>i</sup> Tittabawassee River is sampled in April and May only.
- <sup>j</sup> Detroit River 2015 was sampled in conjunction with the Ontario Ministry of Natural Resources.
- <sup>k</sup> The St. Clair River site 514 is Decker's Ferry, site 515 is Algonac State and City parks and Walpole Ferry South, site 516 is from Sombra Ferry Park to Marine City Park, site 517 is Palmer Park, site 518 is Marysville Ramp, and site 519 is from Edison Plant Pier to Bluewater Bridge.

Table 8.—Fishing harvest (number of fish) and effort (hours, trips, days) on Lake Michigan, 2005–2014. Data are from April–October for nine Lake Michigan sites (St. Joseph, Grand Haven, Muskegon, Ludington, Manistee, Frankfort, West Grand Traverse Bay, Charlevoix, and Little Bay de Noc), combined.

Species	Year									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Brown Trout	6,375	2,113	2,841	1,567	4,255	4,620	2,793	2,271	2,337	4,620
Chinook Salmon	161,767	222,959	139,166	94,919	82,774	74,682	96,641	121,989	54,138	47,849
Coho Salmon	5,367	12,392	13,804	6,657	9,790	6,069	19,934	10,272	13,909	9,803
Lake Trout	6,795	8,871	7,786	6,497	10,514	8,396	15,287	7,549	12,329	15,350
Rainbow Trout	17,227	12,287	10,448	9,051	16,946	9,607	14,608	21,536	10,287	23,725
Smallmouth Bass	946	669	1,360	547	1,730	2,327	3,881	1,398	770	2,611
Walleye	13,065	10,952	16,296	8,066	6,115	6,112	16,638	7,690	4,203	6,411
Yellow Perch	229,062	178,923	98,702	185,019	150,371	104,153	180,509	46,274	80,651	72,539
Angler hours	1,497,799	1,432,933	1,206,791	873,262	999,997	796,119	996,084	831,383	732,510	752,109
Angler trips	340,476	335,208	289,684	224,376	252,426	201,528	249,543	213,201	188,748	190,227
Angler days	315,724	299,396	267,226	205,206	231,818	183,491	228,514	193,955	167,310	171,688

Table 9.—Fishing harvest (number of fish) and effort (hours, trips, days) on Lake Huron, 2005–2014. Data are from April–October for ten Lake Huron sites (Rogers City, Rockport, Alpena, Harrisville, Oscoda, Tawas, Port Austin, Eagle Bay to Harbor Beach, Port Sanilac and Lexington), combined.

Species	Year									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Atlantic Salmon	25	85	39	171	348	135	136	679	61	786
Brown Trout	756	284	118	85	118	684	542	929	403	197
Chinook Salmon	10,368	9,063	4,360	3,705	3,978	2,978	3,767	5,269	4,748	3,345
Coho Salmon	610	1,294	911	1,458	1,861	863	956	1,886	828	1,360
Lake Trout	24,731	9,852	8,964	5,771	12,236	7,836	7,768	8,067	5,958	12,982
Pink Salmon	202	653	380	206	115	1,056	625	2,643	92	1,066
Rainbow Trout	1,895	1,184	948	1,089	1,115	2,202	3,171	6,452	2,568	3,464
Smallmouth Bass	187	380	718	183	3,925	1,089	910	1,236	1,080	3,476
Walleye	5,503	2,658	5,478	4,808	8,943	18,775	21,202	14,465	12,773	14,427
Yellow Perch	21,540	83,916	48,375	15,157	20,592	17,688	30,458	42,158	9,954	16,400
Angler hours	394,395	256,943	253,501	187,823	264,655	226,766	259,331	295,530	268,667	262,210
Angler trips	100,740	67,526	70,589	52,652	77,101	61,013	75,444	85,897	75,873	67,437
Angler days	95,846	65,001	65,789	48,905	74,147	58,774	72,897	83,008	73,344	64,921

Table 10.—Fishing harvest (number of fish) and effort (hours, trips, days) on Lake Superior, 2005–2014. Data are from April–October for five Lake Superior sites (Traverse Bay, Keweenaw Bay, Marquette, Au Train, Munising), combined.

Species	Year									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Brown Trout	83	117	173	80	146	172	63	74	112	217
Chinook Salmon	987	765	511	1,178	1,167	662	1,138	1,162	2,624	2,473
Coho Salmon	3,919	3,805	3,436	3,151	3,811	8,069	5,086	5,034	7,135	1,947
Lake Trout "fat"	2,268	2,723	918	1,082	2,629	1,178	3,177	3,054	2,949	3,969
Lake Trout "lean"	15,133	12,254	8,303	12,264	12,146	12,124	17,849	17,184	17,409	15,145
Lake Herring	57	13	0	392	17	0	40	12	61	49
Lake Whitefish	935	1,258	385	943	444	88	124	55	407	1,034
Rainbow Trout	425	434	155	773	755	398	800	693	787	667
Splake	639	914	1,153	634	619	1,116	1,151	517	1,042	1,901
Yellow Perch	3	699	159	35	302	136	560	476	175	225
Angler hours	95,367	91,322	60,716	85,248	103,172	90,085	110,150	92,869	105,415	106,394
Angler trips	24,653	24,365	16,725	25,048	27,123	24,305	29,230	25,910	28,869	29,062
Angler days	23,112	22,791	15,517	23,038	26,645	23,145	28,392	25,100	27,677	27,801

Table 11.—Fishing harvest (number of fish) and effort (hours, trips, days) on Lake Erie, 2005–2014. Data are from April–October for Lake Erie (grids 699, 701–703, and 801–802, combined).

Species	Year									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Channel Catfish	7,274	4,527	3,160	912	1,418	608	1,323	1,181	1,240	16,453
Freshwater Drum	1,367	916	1,597	1,174	1,955	1,276	1,442	711	1,221	496
Smallmouth Bass	343	70	200	324	26	132	462	158	1,014	192
Walleye	34,213	305,574	152,782	115,185	85,186	47,954	42,599	77,448	45,855	34,326
White Bass	6,997	11,751	6,672	5,002	1,391	3,123	9,971	11,789	4,680	5,047
Yellow Perch	189,742	228,799	173,457	134,603	344,811	300,574	474,586	299,071	218,299	161,995
Angler hours	353,050	731,543	556,730	520,855	466,151	399,871	311,925	399,766	318,804	236,871
Angler trips	73,744	161,752	113,306	101,035	89,461	77,402	64,512	85,484	66,769	45,962
Angler days	73,559	160,945	112,939	96,664	89,381	76,735	63,596	84,980	66,399	45,962