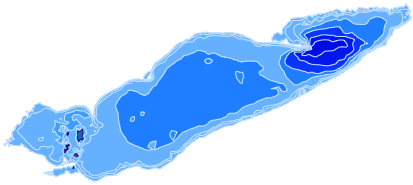


2015 Status of Major Stocks

Ontario Ministry of Natural Resources and Forestry
Lake Erie Management Unit
March 2016

Ontario

The Lake Erie Management Unit of the Ontario Ministry of Natural Resources and Forestry is responsible for managing the fishery resources of the Ontario waters of Lake Erie as well as the upper Niagara River, the Detroit River, Lake St. Clair, and the St. Clair River.

Ontario has been responsible for managing the fishery resources of these waters since 1898. In 1992, the Lake Erie Management Unit was created to improve Ontario's ability to manage these important resources. The Unit is based in London with field offices in Port Dover and Wheatley.

VISION: The Lake Erie Management Unit will contribute to the environmental, social, and economic well-being of the people of Ontario through the sustainable development of fishery resources within the Lake Erie basin.

MISSION: To ensure the long-term health of the Lake Erie ecosystem and to promote the sustainable harvest and development of its fishery resource through sound science, assessment, regulation, and advocacy.

GOAL: To foster and encourage the understanding of all users and partners on the complexity of managing the fishery resource of Lake Erie, to minimize conflict, and to endorse sound fishery management practices.

Under the Joint Strategic Plan for Management of Great Lakes Fisheries, the fisheries resources of Lake Erie and Lake St Clair are managed cooperatively by Ontario and the four U.S. states – New York, Pennsylvania, Ohio and Michigan.

Cover Photo (top to bottom):

- (Large Photo) Rainbow over Wheatley Harbour, December 14, 2016
- Port Dover Rehabilitation Ecologist, Tom MacDougall and Ohio Department of Natural Resources Fisheries Biologist, Matthew Faust, working on the Grand River Walleye Tagging Program
- Wheatley Fisheries Technicians, Rob Dietz, Chris Thomas and Christine Benoit working on the Thames River Walleye Tagging Program
- Port Dover's Summer Experience Student, Chris Haines and Fisheries Technician, Nathan Trebych, processing a Yellow Perch sample for the Commercial Catch Sampling program.

2015 Status of Major Stocks
Lake Erie Management Unit
March 2016

© Queen's Printer for Ontario, 2016
ISSN 1718-4924 (Print)
ISBN 978-1-4606-7457-4 (Print)

ISSN 1925-5454 (PDF)
ISBN 978-1-4606-7458-1 (PDF)

Citation:

Ontario Ministry of Natural Resources and Forestry (OMNRF). 2016. 2015 Status of Major Stocks Lake Erie Management Unit, ISSN 1718-4924 (Print), ISBN 978-1-4606-7457-4 (Print), ISSN 1925-5454 (PDF), ISBN 978-1-4606-7458-1 (PDF). 135 pp.

TABLE OF CONTENTS

		Page
	FORWARD	1
1.	**STATUS OF MAJOR SPECIES**	2
2.	**COMMERCIAL FISHERY**	
	2.1 Lake Erie Fishery	4
	2.2 Inner Long Point Bay Fishery	16
3.	**LAKE ERIE SPORT FISHERY DIARY PROGRAM**	17
4.	**INDEX FISHING PROJECTS**	
	4.1 Partnership Index Fishing: Gill Netting	27
	4.2 Index Trawling: Western Lake Erie	61
	4.3 Long Point Bay Index Trawl Surveys	73
	4.4 Long Point Bay Nearshore Fish Community Survey	89
5.	**FISHERIES MANAGEMENT PROJECTS**	
	5.1 Lake Erie Asian Carp Surveillance Program	97
	5.2 Lake Erie Yellow Perch PIT Tagging Study	98
6.	**LAKE ST. CLAIR PROJECTS**	
	6.1 St. Clair System Sport Fishery Diary Program	111
	6.2 Lake St. Clair Fall Trap Net Index	115
	6.3 Lake St. Clair Nearshore Index Fishing Program	122
	6.4 Walleye Tagging in Lake St. Clair Tributaries	128
APPENDIX A:	Operational Field and Lab Schedule 2015	134
APPENDIX B:	Lake Erie Management Unit Staff 2015	135

FORWARD

The mission of the Lake Erie Management Unit (LEMU) is to provide leadership and direction on sustainable resource management for Lake Erie, by maintaining and, where possible enhancing the social, economic, cultural and environmental benefits of the lake's rich aquatic resources. The LEMU works to achieve this through its annual fisheries assessment programs, Port Observer program and management activities on the Canadian waters of Lake Erie, Lake St. Clair and connecting waters. Presently the LEMU maintains facilities in Wheatley, Port Dover, and London.

The Province of Ontario and four U.S. States share the responsibility for managing Lake Erie's fishery resource. Since fish populations do not recognize borders, international cooperation is essential to the sustainable management of Lake Erie's fisheries. This cooperation is achieved via the Lake Erie Committee (LEC), which is comprised of representatives from state and provincial fisheries management agencies under the auspices of the Great Lakes Fishery Commission (GLFC). On a rotational basis, Ontario's Lake Erie Manager either chairs or vice-chairs this committee. Lake Erie Management Unit staff make key contributions to all of the LEC Task Groups, which jointly pursue scientific objectives, evaluate international fisheries management strategies, and set harvest levels for the lake.

The Lake Erie Management Unit consults regularly with resource management partners, namely Ontario sport and commercial fish interests on Lake Erie and Lake St. Clair. The principal venue for this consultation process is the Fisheries Management Zone 19 Council. Within this group, representatives from the sport and commercial bait and food fisheries discuss emergent and long-term fisheries issues, with the Lake Erie Manager acting as chair and facilitator. In addition, the Lake Erie Management Unit participates in the Lake Erie Percid Management Advisory Group (LEPMAG), which was established to help guide future Walleye and Yellow Perch management in Lake Erie. This group consists of LEC members, agency staff, and stakeholders from all jurisdictions bordering Lake Erie, and is facilitated by staff from the Quantitative Fisheries Centre of Michigan State University.

In addition, the unit leads and through collaboration with Regional Operating Division, Science and Research Branch and Biodiversity Branch Policy Division, supports numerous projects under the Canada Ontario Agreement with respect to Great Lakes ecosystems. These projects include native species restoration, state of resource science, invasive species surveillance and response as well as ecosystem restoration.

The purpose of the LEMU Status of Stocks report is to summarize and present Ontario's assessment and fishery data for Lake Erie and Lake St. Clair. This data is incorporated with similar information from the U.S. jurisdictions and analyses are performed by various task groups to determine population status, and recommended harvest levels that are consistent with LEC objectives.

The LEMU Team is pleased to present this report to our stakeholders and colleagues, and welcome any questions or comments you may have on its content.

For further information please contact one of our leadership team representatives:

Wheatley Fisheries Station-Headquarters
Brian Locke, Lake Manager
Emily Slavik, Assessment Supervisor
320 Milo Road
Wheatley, Ontario
N0P 2P0
519-825-4684

Port Dover Fisheries Station
Kurt Oldenburg
Fisheries Ecology Supervisor
49 Passmore Ave, Unit #7, Box 429
Port Dover, Ontario
N0A 1N0
519-583-3082

1. STATUS OF MAJOR SPECIES

The following is an overview of the status of major species in Ontario waters of Lake Erie for 2015. International lakewide perspectives are available in the following reports of the Lake Erie Committee (LEC) of the Great Lakes Fishery Commission:

Walleye Task Group Report
Yellow Perch Task Group Report
Forage Task Group Report
Cold Water Task Group Report
Habitat Task Group Report

Walleye

The lakewide commercial Walleye harvest (4.9 million pounds) in 2015 approximated the mean harvest from 2000 to present (4.8 million pounds) but was below the mean harvest from the inception of individual transferable quotas (ITQs) (1984 to present; 6.4 million pounds). In 2015, the commercial Walleye fishery was composed mainly of the 2003 (age 12), and 2014 (age 1) year classes, with contributions from the 2011 (age 3), 2013 (age 2), and 2010 (age 4) year classes. Age 1 Walleye were mainly captured as bycatch in small mesh (<3" mesh size) gill net fisheries. The lakewide fall gill net survey also indicated a strong presence of age 12 and age 1 Walleye. These year classes will continue to contribute to the fishery in 2015. Interagency trawling to assess year class strength indicated a strong 2014 year class and a strong 2015 year class. The fall gill net survey also indicated a strong 2015 year class which will recruit to the fishery in 2017. Overall, the abundance of fishable Walleye in the west and central basins is at a below average level, but is expected to improve by 2017.

In 2010, the LEC formed the Lake Erie Percid Management Advisory Group (LEPMAG), consisting of Lake Erie managers, scientists and stakeholders, with facilitation from Michigan State University's Quantitative Fisheries Center. The purpose of this group is to advise on objectives and management options for Lake Erie percids. In 2011 and 2012, LEPMAG outlined objectives for the Lake Erie Walleye population, suggested a range of possible management options, developed an updated Walleye assessment model and evaluated potential exploitation strategies. In 2013, the LEC implemented a draft Walleye exploitation policy developed through LEPMAG. This exploitation policy was adopted in 2014 as part of a revised Walleye Management Plan and its use continued in 2015.

The Walleye population in eastern Lake Erie consists of mixed stocks including those originating from east basin shoals, the Grand River (Ontario), United States tributaries, and immigrants from the western portion of the lake. Representation of older Walleye is typically greater in eastern Lake Erie compared to other regions of the lake. The greater average age of Walleye in the eastern basin is due in part to the contribution of older migratory individuals originating from the western basin. In 2015, the strong 2003 year class at age 12 represented 20% of the commercial harvest in Ontario statistical districts 4 and 5 (Figure 2.1.1) combined, and the 2010 year class (age 5) represented 24% of the fishery. Ages 5 and 12 Walleye also comprised a significant fraction of the Walleye caught in the east basin Partnership gill net survey in 2015. Fishery and survey indicators were positive for east basin Walleye abundance although juveniles were not caught in the east basin Partnership survey.

Yellow Perch

Lakewide Yellow Perch harvest in 2015 (4.5 million pounds) was below the mean harvest from 2000 to present (5.6 million pounds) and the long term mean harvest from when ITQs were introduced in 1984 (6.0 million pounds). In 2015, the lakewide commercial Yellow Perch fishery was mainly comprised of age 3 fish (2012 year class). In addition, the west basin harvested a high proportion of age 5 (2010 year class) and age 2 Yellow Perch (2013 year class), and the east-central basin harvested a high proportion of age 4 (2011 year class), age 5 (2010 year class), and age 7 fish (2008 year class). Fisheries in 2016 will continue to be supported by the 2012 year class.

Combined interagency assessments across multiple decades indicate that age 2 and older Yellow Perch abundance in 2015 was near average in the west and east basins, and below average in the west-central and east-central basins. In Ontario waters, Partnership survey indices in 2015 for age 2 and older Yellow Perch was below average compared to recent decades in the west-central and east basins, and moderate in the west and east-central basins. In the Partnership survey, the 2014 year class, recruiting to the fishery in 2016, was strong in the west and east basins, above average in the east-central and moderate in the west-central basins. The 2015 year class, recruiting to the fishery in 2017, was strong in the western basin trawl survey and moderate in the eastern basin Long Point Bay trawl assessment.

In 2012, LEPMAG consulted agencies and stakeholders regarding Yellow Perch fishery objectives and management options to be utilized in a management plan for Yellow Perch fisheries. In 2015, LEPMAG continued work on updating Yellow Perch assessment models, including incorporating suggestions from a technical review panel. In 2016, LEPMAG will continue to update the Yellow Perch assessment models and begin evaluating alternate exploitation strategies for Yellow Perch.

Lake Whitefish

Harvest trends help to describe the status of Lake Whitefish stocks; however, fishery effort is of marginal assessment value since a significant portion of the harvest is incidental from Walleye or White Bass effort. In 2014 and 2015, there was no targeted effort for Lake Whitefish; all Lake Whitefish were harvested incidentally. General measures of year class strength come from fishery harvest and the Partnership gill net survey. In 2015, only fourteen (14) Lake Whitefish were caught during the Partnership gill net surveys, four of those fish were caught in auxiliary index gear (see Section 4.1).

Lake Whitefish harvest in 2015 (69 thousand pounds) was below the mean harvest for the recent time period (2000-2015; 602 thousand pounds), and was the second lowest harvest since 1986. In 2015, the majority of the commercial Lake Whitefish harvest came from the 2003 (age 12) and 2005 (age 10) year classes. Lake Whitefish recruit to the commercial harvest gear between ages 4-5. Recent Lake Whitefish recruitment appears to be below average; very few age 5 through age 9 fish were harvested in the commercial fishery. The 2003 and 2005 year classes will continue to contribute to fisheries in 2016. Older Lake Whitefish were observed in the 2015 Ontario fisheries (up to age 25).

Four age 0 (2015 year class) Lake Whitefish were caught in the Partnership survey, and one age 0 fish was sampled from a commercial Rainbow Smelt trawl, indicating that there may be some recruitment of the 2015 year class to the fishery in a few years. Due to the current poor status of Lake Erie's Lake Whitefish population, quotas are expected to remain low until recruitment improves.

2. COMMERCIAL FISHERY

2.1 Lake Erie Fishery

In 2015, total commercial landings from Ontario waters of Lake Erie were 24.1 million pounds, an increase of 1.3 million pounds (6%) from 2014 (Table 2.1.2). The value of the total commercial landings in 2015 was $30.4 million, an increase of almost $2.9 million (11%) from 2014 (Table 2.1.2). The increase in harvest is almost entirely due to higher landings of Rainbow Smelt (2.3 million pounds) in 2015. Harvest and landed value in 2015 are presented for each species by statistical district (Ontario Erie or OE-1 to OE-5, Figure 2.1.1) in Table 2.1.3.

Rainbow Smelt

The total landings of Rainbow Smelt increased 38% to 8.3 million pounds in 2015 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The harvest was mainly taken from OE-4 (58%), OE-3 (28%), and OE-2 (14%). Summer harvest in OE-4 was primarily age 1 (64%) and age 2 (20%) fish. Age 1 fish comprised 84% of OE-5 summer harvest. The commercial fishery harvested 54% of the quota allocated for 2015. Of the 185 licences with Rainbow Smelt quota, only 39 landed Rainbow Smelt in 2015, while only 7 attained 75% or more of their individual quota. The landed value of Rainbow Smelt was $1.9 million up 40% from 2014 (Tables 2.1.2 and 2.1.3).

Yellow Perch

In 2015 Yellow Perch landings decreased 18% to 4.5 million pounds (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The commercial fishery harvested 88% of allocated quota in 2015. Spring fisheries were characterized by harvest from a broad range of ages with Ages 3, 4 and 5 making a significant contribution to the harvest in OE-1 to OE-3 and OE-5 (64% to 91% combined). In the summer and fall harvest in OE-1, OE-2, and OE-5 age 3 was the major contributor. The landed value of Yellow Perch increased 2% from 2014 to $13.0 million in 2015 (Tables 2.2 and 2.3).

Walleye

Walleye landings remained unchanged at 4.9 million pounds in 2015 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). Eighty-one percent of the 2015 quota was harvested. Lakewide harvest by Walleye size category was: Jumbo (65%) and Number 1 (30%) (see Table 2.1.6 for description of size categories). In the Number 1 category, the 2010 and 2011 year classes, ages 5 and 4, made up significant portions of the harvest in OE-1 to OE-3 (43% to 73% combined). Number 1 fish of age class 5 comprised the majority of the spring harvest in OE-5 (85%). Fish aged 2 to 5 of the Number 1 category became a significant part of the summer and fall harvest in OE-1 through OE-3 (64% to 95%). Age 1 fish were caught incidentally in the small mesh fishery. The 2003 year class at age 12 contributed 22% to the 2015 harvest, and across statistical districts is one of the major contributors to the jumbo harvest throughout the year (OE-1 = 13%, OE-2 = 25%, OE-3 = 35%, OE-4 = 22% and OE-5 = 18%) (Table 2.1.6). The landed value of Walleye increased 20% from 2014 to $11.8 million in 2015 (Tables 2.1.2 and 2.1.3).

White Bass

The total landings of White Bass decreased by 8% to 4.0 million pounds in 2015 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The majority of harvest occurred in statistical districts OE-2 (43%) and OE-1 (36%) (Table 2.1.2). Age 3 fish dominated spring harvest in OE-1 (83%). Age 3 fish were a significant contributor to the OE-1 summer harvest (78% to 79% combined), while age 3 and 4 fish contributed significantly to summer harvests in OE-2 and OE-3 (79%-88%) and the fall harvest in OE-1 (81% combined) (Table 2.1.7). White Bass have not been regulated by quota since 1993. The landed value of White Bass increased 5% to $2.5 million in 2015 (Tables 2.1.2 and 2.1.3).

White Perch

The total landings of White Perch increased 11% to 2.0 million pounds in 2015 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The majority of harvest occurred in statistical districts OE-2 (62%) and OE-1

(23%). In OE-1, ages 4 and 5 were the major contributors to the spring harvest (45% and 23% respectively) (Table 2.1.8a). The fall harvests in OE-1 were dominated by age groups 5 (31%), 4 (23%) and 6 (21%) respectively (Table 2.1.8a). Age class 3 dominated summer harvests in OE-3 (68%) and OE-2 (44%) (Table 2.1.8b). White Perch are not regulated by quota. The total landed value of White Perch increased 13% to $0.9 million in 2015 (Tables 2.1.2 and 2.1.3).

Lake Whitefish

The total landings of Lake Whitefish decreased 44,506 pounds (-39%) to 68,814 pounds in 2015 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). Lake Whitefish were not targeted by the commercial fishery; all Lake Whitefish were harvested as bycatch. The commercial fishery harvested 69% of the quota allocated for 2015. Seventy-one percent of the total harvest came from OE-1 (down 19%), while 22% was harvested from OE-2 (up 13%). This is likely the result of a trial from June 30th to year end allowing the transfer of Walleye out of Quota Zone 1 to protect spawning Lake Whitefish stocks. The fall harvests in OE-1 and OE-2 were dominated by age 10+ fish (95% and 92% respectively) (Table 2.1.9). The landed value of Lake Whitefish decreased $64,000 (-36%) to $116,000 in 2015 (Tables 2.1.2 and 2.1.3).

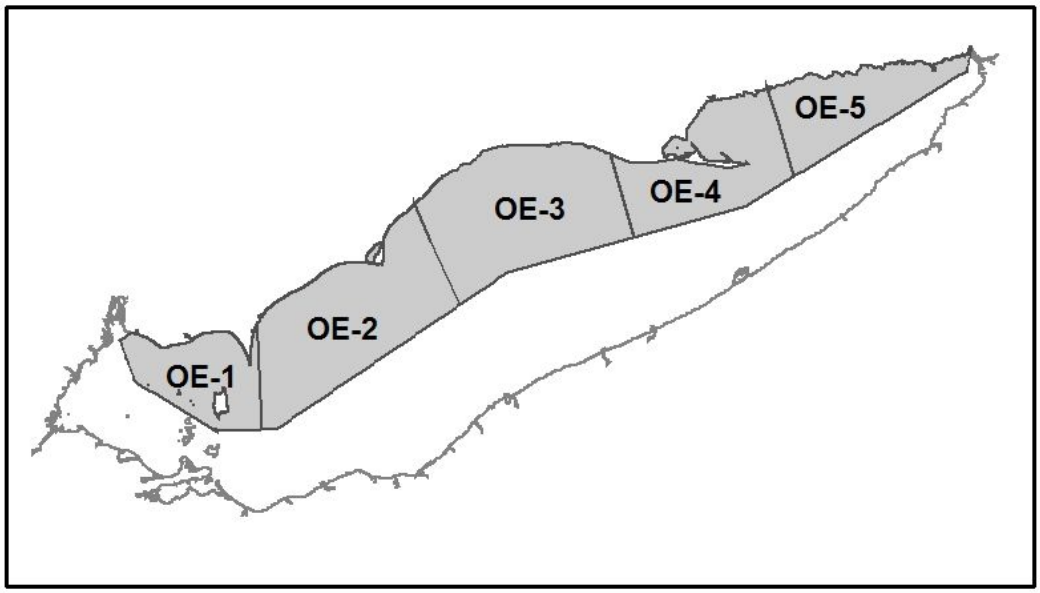


Figure 2.1.1 Spatial location of statistical districts in the Canadian waters of Lake Erie.

Table 2.1.1 Total annual commercial fishery landings (pounds) and value ($ CDN) from the Canadian waters of Lake Erie, 1960-2015.

Year	Total Pounds	Total Value	Year	Total Pounds	Total Value
1960	28,181,000	2,033,000	1988	45,333,210	42,069,940
1961	36,350,000	2,516,000	1989	42,225,415	36,642,716
1962	43,296,419	2,296,635	1990	42,533,681	31,191,417
1963	34,069,000	2,523,635	1991	42,447,098	28,198,998
1964	25,391,428	2,377,284	1992	32,814,073	28,888,799
1965	35,096,120	3,319,307	1993	35,524,282	27,545,957
1966	41,435,283	3,104,813	1994	28,306,102	29,957,675
1967	37,775,009	3,339,460	1995	27,788,500	32,158,827
1968	39,415,250	2,973,814	1996	27,566,700	31,406,644
1969	48,025,996	4,244,149	1997	32,912,134	33,640,390
1970	31,755,446	3,770,281	1998	34,731,109	38,144,985
1971	29,075,559	4,254,692	1999	30,540,383	34,114,272
1972	29,978,000	5,324,000	2000	22,871,377	30,872,107
1973	39,829,000	7,038,000	2001	22,096,515	26,612,420
1974	38,686,000	5,634,000	2002	25,237,063	30,349,232
1975	30,548,620	6,009,093	2003	21,702,507	25,414,340
1976	25,729,080	6,000,970	2004	27,106,068	23,688,955
1977	35,853,556	7,736,701	2005	25,065,670	30,237,098
1978	40,159,610	9,883,626	2006	22,847,529	30,750,957
1979	40,839,668	17,555,598	2007	28,224,615	27,584,280
1980	42,849,000	14,207,000	2008	25,824,134	21,698,647
1981	44,711,277	20,279,830	2009	23,969,575	21,373,889
1982	59,500,000	26,183,000	2010	19,789,394	25,617,325
1983	45,682,046	17,613,206	2011	21,648,261	27,774,266
1984	36,305,219	26,349,853	2012	25,816,359	31,800,755
1985	43,367,069	20,255,403	2013	24,812,164	25,819,801
1986	39,112,618	34,961,819	2014	22,788,225	27,482,778
1987	47,542,123	36,458,014	2015	24,053,286	30,375,728

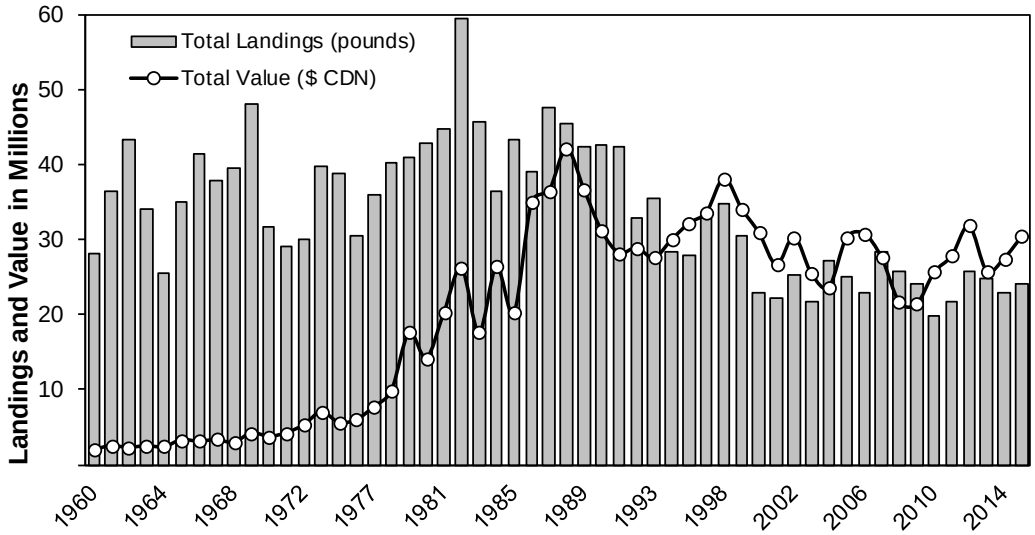


Figure 2.1.2 Commercial fishery landings (pounds) and value ($ CDN) from the Canadian waters of Lake Erie, 1960-2015.

Table 2.1.2 Total annual commercial fishery landings (landed weight in pounds) and value dollars by fish species and statistical district for the Canadian waters of Lake Erie, 2015.

Species	Landings by Statistical District					Total Landing	Total Value
	OE-1	OE-2	OE-3	OE-4[a]	OE-5		
Brown Bullhead			4			4	$0
Burbot		10	83	22	15	130	$10
Carp	3,861	1,044	410	41		5,356	$814
Catfish	29,305	13,161	6,180	49	163	48,858	$15,011
Freshwater Drum	45,589	70,655	112,592	1,483		230,319	$41,592
Gizzard Shad	348	2,856	347			3,551	$343
Lake Whitefish	48,730	15,045	3,889	892	258	68,814	$116,456
Rainbow Smelt	27	1,032,066	2,360,958	4,790,514	149,488	8,333,053	$1,942,506
Rock Bass	7	6				13	$7
Suckers[b]	37,860	10,569	480	7	14	48,930	$2,494
Walleye	1,753,860	1,282,932	1,497,156	165,378	180,253	4,879,579	$11,790,242
White Bass	1,416,251	1,724,955	769,018	54,013	14,258	3,978,495	$2,539,470
White Perch	467,278	1,241,536	279,001	6,625	1,387	1,995,827	$944,830
Yellow Perch	541,938	1,489,433	2,018,107	155,332	255,488	4,460,298	$12,981,854
Mixed Species[c]	49	9	1			59	$101
Total Landing (lbs)	4,345,103	6,884,277	7,048,226	5,174,356	601,324	24,053,286	
Total Value ($)	$7,134,659	$9,448,288	$10,673,360	$1,946,092	$1,184,540		$30,375,728

[a] Excludes Inner Long Point Bay.
[b] Includes species identified as Buffalos, Suckers and Quillbacks.
[c] A variety of incidentally caught species of little or no value (Crappie in 2015).

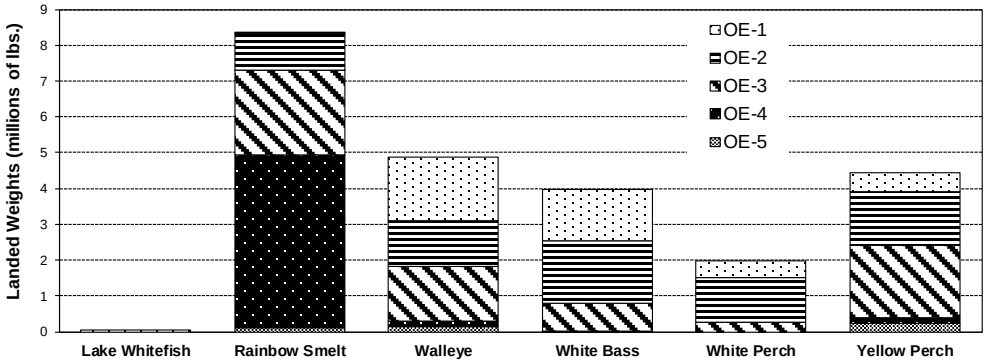


Figure 2.1.3 Total annual commercial fishery landed weights (millions of lbs.) for principle species by statistical district, Lake Erie 2015.

Table 2.1.3 Change in weight of the annual commercial fishery landed weight (pounds) from 2014 to 2015 by fish species and statistical district for the Canadian waters of Lake Erie.

Species	Landings by Statistical District					Total Landing	Total Value
	OE-1	OE-2	OE-3	OE-4[a]	OE-5		
Brown Bullhead	0	0	4	0	0	4	$0
Burbot	0	10	78	14	-59	43	$10
Carp	2,784	536	63	41	0	3,424	$242
Catfish	15,155	8,836	4,513	29	48	28,581	$9,394
Freshwater Drum	17,021	23,016	53,288	432	0	93,757	$24,990
Gizzard Shad	-982	2,856	347	0	0	2,221	$224
Lake Whitefish	-53,324	4,736	3,329	649	104	-44,506	-$64,468
Rainbow Smelt	25	1,031,524	2,360,836	-301,767	-808,720	2,281,898	$551,353
Rock Bass	-33	3	0	0	0	-30	-$2
Suckers[b]	24,708	2,567	185	7	-10	27,457	-$2,020
Walleye	-796,592	309,202	355,256	110,411	30,777	9,054	$1,943,351
White Bass	-139,798	-557,161	320,447	38,466	-10,151	-348,197	$113,922
White Perch	7,144	232,943	-21,089	2,574	-15,746	205,826	$109,326
Yellow Perch	-78,729	-189,742	-647,106	131,009	-209,796	-994,364	$206,612
Mixed Species[c]	-110	5	0	0	-2	-107	$17
Total Landing (lbs.)	-1,002,731	869,331	2,430,151	-18,135	-1,013,555	1,265,061	
Total Value ($)	-$739,412	$1,781,240	$1,659,334	$601,274	-$398,275		$2,892,950

[a] Excludes Inner Long Point Bay.

[b] Includes species identified as Buffalos, Suckers and Quillbacks

[c] A variety of incidentally caught species of little or no value, plus species with total landings less than 50 pounds (Crappie in 2015).

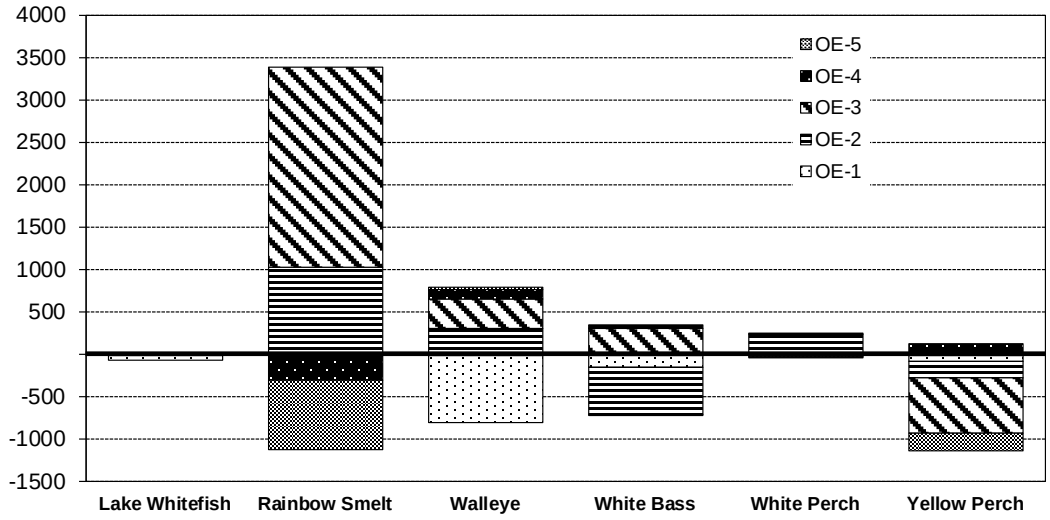


Figure 2.1.4 Change in weight of the annual commercial fishery landings (1000's of lbs.) from 2014 to 2015 for principle species by statistical district, Lake Erie.

Table 2.1.4 Rainbow Smelt year class composition, average total length (mm) and weight (g) from Lake Erie commercial catch samples taken from trawl nets by statistical district and season, 2015. n is sample size, sexes combined.

Stat. Dist.	Season*	Year Class and Age										All Ages	
		2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	Average	n
		0	1	2	3	4	5	6	7	8	9		
						Age Group Composition (%) **							
OE-2	Summer	-	58	23	13	6	-	-	-	-	-	1.7	48
OE-3	Summer	-	59	19	14	7	1	-	-	-	-	1.7	348
OE-4	Spring	-	72	12	7	7	-	0	1	-	-	1.6	206
	Summer	2	64	20	10	4	1	-	-	-	-	1.5	506
	Fall	-	93	3	5	-	-	-	-	-	-	1.1	40
OE-5	Summer	-	84	12	4	-	-	-	-	-	-	1.2	25
						Mean Total Length (mm)							
OE-2	Summer	-	123	161	165	187	-	-	-	-	-	141	48
OE-3	Summer	-	115	148	162	175	181	-	-	-	-	133	348
OE-4	Spring	-	82	125	168	166	-	210	213	-	-	101	206
	Summer	66	105	142	161	176	194	-	-	-	-	121	506
	Fall	-	113	136	168	-	-	-	-	-	-	116	40
OE-5	Summer	-	97	134	149	-	-	-	-	-	-	103	25
						Mean Round Weight (g)							
OE-2	Summer	-	10	24	25	38	-	-	-	-	-	17	48
OE-3	Summer	-	8	19	25	32	35	-	-	-	-	15	348
OE-4	Spring	-	3	10	27	24	-	62	55	-	-	8	206
	Summer	2	6	16	23	31	41	-	-	-	-	11	506
	Fall	-	8	14	27	-	-	-	-	-	-	9	40
OE-5	Summer	-	5	13	16	-	-	-	-	-	-	6	25

* Season: Winter = January - March Spring = April - June Summer = July - September Fall = October - December
** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

Table 2.1.5 Yellow Perch year class composition, average total length (mm) and weight (g) from Lake Erie commercial catch samples from small mesh (<76mm) gill nets by statistical district and season, 2015. n is sample size, sexes combined.

Stat. Dist.	Season*	Year Class and Age										All Ages	
		2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Average	n
		1	2	3	4	5	6	7	8	9	10+		
							Age Group Composition (%) **						
OE-1	Spring	-	1	29	12	35	8	11	4	0	0	4.7	400
	Summer	-	17	52	8	18	3	3	1	-	-	3.5	157
	Fall	-	41	29	7	15	4	3	1	-	-	3.2	313
OE-2	Spring	-	0	39	18	24	5	9	3	1	0	4.5	519
	Summer	0	7	56	19	11	3	3	1	0	0	3.6	875
	Fall	-	20	68	9	3	-	1	-	-	-	3.0	80
OE-3	Spring	-	0	8	24	32	2	19	7	5	2	5.5	1231
	Summer	-	0	31	32	23	1	7	3	2	0	4.4	678
	Fall	-	1	71	11	8	-	4	1	3	1	3.7	79
OE-4	Summer	-	-	4	22	25	-	29	12	9	-	6.0	77
OE-5	Spring	-	-	48	15	31	1	3	1	-	-	4.0	277
	Summer	-	10	64	7	15	0	2	1	0	1	3.5	316
	Fall	-	16	62	9	10	2	1	-	-	-	3.2	158
							Mean Total Length (mm)						
OE-1	Spring	-	206	216	223	220	228	226	231	219	275	221	400
	Summer	-	218	226	238	239	273	243	285	-	-	230	157
	Fall	-	220	230	235	238	233	232	235	-	-	228	313
OE-2	Spring	-	184	214	217	223	232	237	234	222	236	220	518
	Summer	197	212	213	219	227	241	249	257	233	242	218	874
	Fall	-	215	228	228	215	-	298	-	-	-	226	80
OE-3	Spring	-	198	208	219	226	225	232	233	232	239	225	1231
	Summer	-	198	204	216	225	226	232	222	239	223	216	678
	Fall	-	200	218	223	223	-	218	225	276	250	221	79
OE-4	Summer	-	-	208	224	227	-	234	229	225	-	228	77
OE-5	Spring	-	-	219	230	239	216	235	253	-	-	228	277
	Summer	-	216	221	241	242	232	251	262	212	307	227	316
	Fall	-	219	230	233	268	266	245	-	-	-	233	158
							Mean Round Weight (g)						
OE-1	Spring	-	114	127	144	138	148	146	154	132	275	138	400
	Summer	-	131	152	176	176	257	184	330	-	-	159	157
	Fall	-	125	143	161	173	154	158	170	-	-	143	313
OE-2	Spring	-	80	127	132	142	160	172	172	140	154	139	519
	Summer	102	129	136	150	167	213	225	252	170	197	148	875
	Fall	-	125	152	147	135	-	397	-	-	-	149	80
OE-3	Spring	-	104	115	132	144	140	152	157	150	170	142	1231
	Summer	-	105	117	135	153	153	171	149	197	142	138	678
	Fall	-	96	129	141	147	-	127	136	288	197	136	79
OE-4	Summer	-	-	122	140	148	-	159	138	141	-	147	77
OE-5	Spring	-	-	136	148	170	111	164	208	-	-	150	277
	Summer	-	136	142	194	188	149	208	248	119	453	156	316
	Fall	-	135	157	162	256	265	210	-	-	-	166	158

* Season: Winter = January - March Spring = April - June Summer = July - September Fall = October - December
** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

Table 2.1.6 Walleye year class composition, average total length (mm) and weight (g) from Lake Erie commercial catch samples from large mesh (≥76mm) gill nets by statistical district and season, 2015. n is sample size, sexes combined.

Stat. Dist.	Season*	Category**	Year Class and Age										All Ages	
			2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Average	n
			1	2	3	4	5	6	7	8	9	10+		
			Age Group Composition (%)* **											
OE-1	Spring	Number 1	-	-	19	37	22	5	2	3	-	11	5.0	293
		Jumbo	-	-	-	1	8	8	4	21	1	58	8.7	119
	Fall	Number 1	3	46	22	16	8	1	1	1	0	3	3.1	305
		Jumbo	-	-	-	12	18	-	12	24	-	35	7.6	17
OE-2	Spring	Number 1	-	2	13	45	20	7	6	2	-	6	4.8	125
		Jumbo	-	-	-	4	14	7	6	12	1	55	8.3	98
		Whitegill	-	-	10	20	15	15	-	-	5	35	6.7	20
	Summer	Number 1	-	13	27	30	20	-	-	-	-	11	4.3	56
		Jumbo	-	-	-	5	4	2	6	5	1	75	9.1	93
	Fall	Number 1	1	44	24	16	9	1	1	1	-	3	3.2	172
OE-3	Spring	Number 1	-	-	2	20	25	9	1	11	1	31	6.8	134
		Jumbo	-	-	-	3	5	6	9	10	3	64	8.9	159
		Whitegill	-	-	-	5	11	16	16	-	-	53	8.1	19
	Summer	Number 1	-	2	12	24	26	9	2	4	-	21	5.7	282
		Jumbo	-	-	0	5	11	6	6	11	1	59	8.5	254
	Fall	Number 1	-	40	30	25	-	5	-	-	-	-	3.0	20
		Jumbo	-	-	5	30	35	15	5	10	-	-	5.2	20
OE-4	Summer	Jumbo	-	-	-	2	3	7	5	12	-	72	9.1	60
	Fall	Jumbo	-	-	6	-	28	6	-	11	-	50	7.8	18
OE-5	Spring	Number 1	-	-	-	-	85	5	10	-	-	-	5.3	20
		Jumbo	-	-	-	-	41	3	14	7	12	24	7.2	59
	Summer	Jumbo	-	-	-	4	19	4	15	5	15	39	8.0	80
			Mean Total Length (mm)											
OE-1	Spring	Number 1	-	-	462	505	525	537	526	544	-	556	510	293
		Jumbo	-	-	-	582	568	595	622	630	641	681	652	119
	Fall	Number 1	364	451	487	491	522	527	534	509	548	547	474	305
		Jumbo	-	-	-	565	570	-	583	605	-	589	586	17
OE-2	Spring	Number 1	-	393	451	513	539	544	527	556	-	569	515	125
		Jumbo	-	-	-	544	558	565	625	634	617	669	633	98
		Whitegill	-	-	479	513	547	557	-	-	475	615	555	20
	Summer	Number 1	-	480	491	499	501	-	-	-	-	548	500	56
		Jumbo	-	-	-	538	587	577	614	612	696	642	630	93
	Fall	Number 1	327	453	484	514	523	526	498	562	-	539	480	172

Continued …

Table 2.1.6 continued…

Stat. Dist.	Season*	Category**	Year Class and Age										All Ages	
			2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	Average	n
			1	2	3	4	5	6	7	8	9	10+		
							Mean Total Length (mm) continued...							
OE-3	Spring	Number 1	-	-	469	517	533	553	568	547	490	557	539	134
		Jumbo	-	-	-	522	572	584	586	601	627	646	625	159
		Whitegill	-	-	-	497	565	553	598	-	-	646	607	19
	Summer	Number 1	-	426	490	507	524	538	553	547	-	550	521	282
		Jumbo	-	-	546	539	554	581	599	621	633	651	624	254
	Fall	Number 1	-	455	482	509	-	513	-	-	-	-	480	20
		Jumbo	-	-	536	552	591	618	565	632	-	-	583	20
OE-4	Summer	Jumbo	-	-	-	511	582	595	598	645	-	666	650	60
	Fall	Jumbo	-	-	539	-	568	581	-	668	-	696	642	18
OE-5	Spring	Number 1	-	-	-	-	513	561	518	-	-	-	515	20
		Jumbo	-	-	-	-	556	566	598	599	603	609	583	59
	Summer	Jumbo	-	-	-	530	552	578	604	621	604	662	614	80
							Mean Round Weight (g)							
OE-1	Spring	Number 1	-	-	937	1227	1378	1435	1304	1529	-	1576	1265	293
		Jumbo	-	-	-	2400	1836	2182	2390	2488	2366	3043	2731	119
	Fall	Number 1	445	904	1168	1213	1404	1376	1395	1245	1500	1704	1073	305
		Jumbo	-	-	-	1923	1926	-	1986	2488	-	2119	2133	17
OE-2	Spring	Number 1	-	585	946	1449	1606	1612	1541	1812	-	1588	1434	125
		Jumbo	-	-	-	1834	1861	1729	2394	2582	2654	2866	2533	98
		Whitegill	-	-	1056	1221	1584	1500	-	-	931	2229	1639	20
	Summer	Number 1	-	995	1061	1191	1240	-	-	-	-	1593	1184	56
		Jumbo	-	-	-	1558	2122	1848	2323	2327	3409	2504	2411	93
	Fall	Number 1	284	903	1162	1439	1500	1462	1225	1489	-	1595	1135	172
OE-3	Spring	Number 1	-	-	1025	1369	1448	1560	1831	1547	1177	1582	1488	134
		Jumbo	-	-	-	1581	1784	1885	1951	2126	2315	2565	2352	159
		Whitegill	-	-	-	1376	1763	1788	2075	-	-	2669	2273	19
	Summer	Number 1	-	767	1237	1335	1464	1541	1624	1579	-	1568	1426	282
		Jumbo	-	-	1594	1671	1766	1911	2158	2374	2539	2668	2405	254
	Fall	Number 1	-	945	1203	1423	-	1456	-	-	-	-	1167	20
		Jumbo	-	-	1691	1806	2232	2490	1712	2797	-	-	2146	20
OE-4	Summer	Jumbo	-	-	-	1388	1882	1984	1982	2500	-	2760	2587	60
	Fall	Jumbo	-	-	1804	-	2122	2294	-	3170	-	3508	2923	18
OE-5	Spring	Number 1	-	-	-	-	1297	1670	1323	-	-	-	1318	20
		Jumbo	-	-	-	-	1678	1855	2113	2107	2171	2145	1941	59
	Summer	Jumbo	-	-	-	1562	1651	1994	2207	2373	2230	2704	2275	80

* Season: Winter = January - March Spring = April - June Summer = July - September Fall = October - December

** Category: Number 1 (Category 1) = generally between 381 - 533 mm in total length
Jumbo (Category 2) = generally greater than 533 mm in total length
Number 2 (Category 3) = generally less than 381 mm in total length

*** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

Note: In 2015, 356 age1 walleye were sampled from small mesh gill nets which do not appear in this table.

Table 2.1.7 White Bass year class composition and average total length (mm) from Lake Erie commercial catch samples from large mesh (≥76mm) gill nets for marketable fish by statistical district and season, 2015. n is sample size, sexes combined.

Stat. Dist.	Season*	Year Class and Age										All Ages	
		2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Average	n
		1	2	3	4	5	6	7	8	9	10+		
						Age Group Composition (%) **							
OE-1	Spring	-	-	83	5	10	3	-	-	-	-	3.3	40
	Summer	-	15	78	5	3	-	-	-	-	-	3.0	40
	Fall	-	4	61	20	13	3	-	-	-	-	3.5	240
OE-2	Summer	-	1	51	37	10	1	-	-	-	-	3.6	79
OE-3	Summer	-	-	64	15	19	-	1	1	-	-	3.6	80
						Mean Total Length (mm)							
OE-1	Spring	-	-	299	328	334	367	-	-	-	-	306	40
	Summer	-	308	323	351	378	-	-	-	-	-	323	40
	Fall	-	305	325	342	355	367	-	-	-	-	333	240
OE-2	Summer	-	327	322	345	362	387	-	-	-	-	335	79
OE-3	Summer	-	-	333	358	368	-	410	385	-	-	345	80
						Mean Round Weight (g)							
OE-1	Spring	-	-	-	-	-	-	-	-	-	-	-	0
	Summer	-	402	478	596	795	-	-	-	-	-	480	40
	Fall	-	400	506	574	671	745	-	-	-	-	551	120
OE-2	Summer	-	470	456	552	667	827	-	-	-	-	518	79
OE-3	Summer	-	-	561	684	783	-	1031	790	-	-	630	80

* Season: Winter = January - March Spring = April - June Summer = July - September Fall = October - December
** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

Table 2.1.8a White Perch year class composition and average total length (mm) from Lake Erie commercial catch samples from large mesh (≥76mm) gill nets for marketable fish by statistical district and season, 2015. n is sample size, sexes combined.

Stat. Dist.	Season*	Year Class and Age										All Ages	
		2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Average	n
		1	2	3	4	5	6	7	8	9	10+		
						Age Group Composition (%)**							
OE-1	Spring	-	-	13	45	23	13	5	3	-	-	4.6	40
	Fall	-	2	8	23	31	21	8	4	3	-	5.2	159
						Mean Total Length (mm)							
OE-1	Spring	-	-	232	253	268	273	277	275	-	-	258	40
	Fall	-	216	251	263	274	279	294	299	310	-	273	159
						Mean Round Weight (g)							
OE-1	Spring	-	-	-	-	-	-	-	-	-	-	-	0
	Fall	-	-	287	315	356	394	482	459	-	-	355	41

* Season: Winter = January - March Spring = April - June Summer = July - September Fall = October - December
** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

Table 2.1.8b White Perch year class composition and average total length (mm) from Lake Erie commercial catch samples from small mesh (<76mm) gill nets for marketable fish by statistical district and season, 2015. n is sample size, sexes combined.

Stat. Dist.	Season*	Year Class and Age										All Ages	
		2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Average	n
		1	2	3	4	5	6	7	8	9	10+		
						Age Group Composition (%)**							
OE-2	Summer	-	16	44	19	13	7	1	-	-	-	3.6	70
OE-3	Summer	-	8	68	18	3	3	3	-	-	-	3.3	40
						Mean Total Length (mm)							
OE-2	Summer	-	216	227	243	268	279	284	-	-	-	238	70
OE-3	Summer	-	188	208	238	247	241	294	-	-	-	215	40
						Mean Round Weight (g)							
OE-2	Summer	-	154	182	235	338	367	378	-	-	-	223	70
OE-3	Summer	-	103	145	218	248	219	442	-	-	-	167	40

* Season: Winter = January - March Spring = April - June Summer = July - September Fall = October - December
** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

Table 2.1.9 Lake Whitefish year class composition, average total length (mm) and weight (g) from Lake Erie commercial catch samples from large mesh (≥76mm) gill nets by statistical district and season, 2015. n is sample size, sexes combined.

Stat. Dist.	Season*	Year Class and Age										All Ages	
		2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	Average	n
		1	2	3	4	5	6	7	8	9	10+		
Age Group Composition (%)**													
OE-1	Fall	-	-	-	-	1	2	0	1	1	95	9.9	385
OE-2	Fall	-	-	-	-	-	-	8	-	-	92	9.8	13
Mean Total Length (mm)													
OE-1	Fall	-	-	-	-	501	538	544	573	592	600	598	385
OE-2	Fall	-	-	-	-	-	-	591	-	-	610	609	13
Mean Round Weight (g)													
OE-1	Fall	-	-	-	-	1219	1494	1889	1913	2043	2237	2212	385
OE-2	Fall	-	-	-	-	-	-	2216	-	-	2281	2276	13

* Season: Spring = April - June Summer = July - September Fall = October - December
** A hyphen (-) indicates no fish of that age, a zero (0) indicates less than 0.5% fish of that age.

2.2 Inner Long Point Bay Fishery

The hoop and seine net fishery of Inner Long Point Bay contributes less the one percent (0.39%) by weight of the total annual commercial harvest landed in Ontario waters of Lake Erie. In 2015, total commercial landings were 92,781 pounds (Table 2.2.1) an increase of 19% from 2014. Of this value, live fish accounted for 59%. The value of the total commercial landings in 2015 was $107,281, an increase of 21% from 2014, and 0.35% of the total value of the Commercial fishery in Ontario waters of Lake Erie (Table 2.2.1).

Yellow Perch

In 2015, the total landing of Yellow Perch was 6,983 pounds a decrease of 10% from 2014. The Inner Bay commercial fishery harvested 26% of their allocated quota in 2015. The majority of Yellow Perch (87%) were caught in April. The landed value of Yellow Perch in 2015 was 5% larger than 2014 at $16,981.

Northern Pike

In 2015, the total landing of Northern Pike was 7,126 pounds, an increase of 33% from 2014. The Inner Bay commercial fishery harvested 26% of their allocated quota in 2015. The majority of Northern Pike (79%) were caught in April. The landed value of Northern Pike in 2015 was $2,688, an increase of 30% from 2014.

Table 2.2.1 Total annual commercial fishery landings (landed weight in pounds) and value in dollars by fish species for Inner Long Point Bay, 2015

Species	Total Landing[a]	Total Value
Bowfin	12,791	$15,389
Brown Bullhead	27,093	$12,027
Carp	4,802	$1,775
Freshwater Drum	25	
Sunfish species[b]	26,932	$46,710
Mudpuppy	1,502	$1,456
Northern Pike	7,126	$2,688
Crappie species[c]	1,708	$5,734
Rock Bass	3,819	$4,521
Yellow Perch	6,983	$16,981
Total Landing (lbs.)	92,781	
Total Value ($)		$107,281

[a] Inner Long Point Bay only.
[b] genus Lepomis
[c] genus Pomoxis

3. LAKE ERIE SPORT FISHERY DIARY PROGRAM

The Lake Erie Sport Fishery Diary Program is an ongoing survey that allows the Lake Erie Management Unit (LEMU) to track general trends in catch rates and angler activity targeting a variety of fish species. The Lake Erie Sport Fishery Diary Program entered its 32nd year in 2015. The survey area covered is illustrated in Figure 3.1. In this program, volunteer anglers complete a page in a diary for each trip taken. Fishing location, fishing duration, numbers of fish kept and released and biological information are also recorded. Other information such as fish health or unusual sightings of exotic species or fish disease is also recorded in the diary. The participants receive a summary of personal fishing activities with the number of fish caught and harvested by species and area, personal catch rate, a summary of biological information from their catch, a certificate of appreciation, and a summary of all data from Lake Erie and Lake St. Clair anglers.

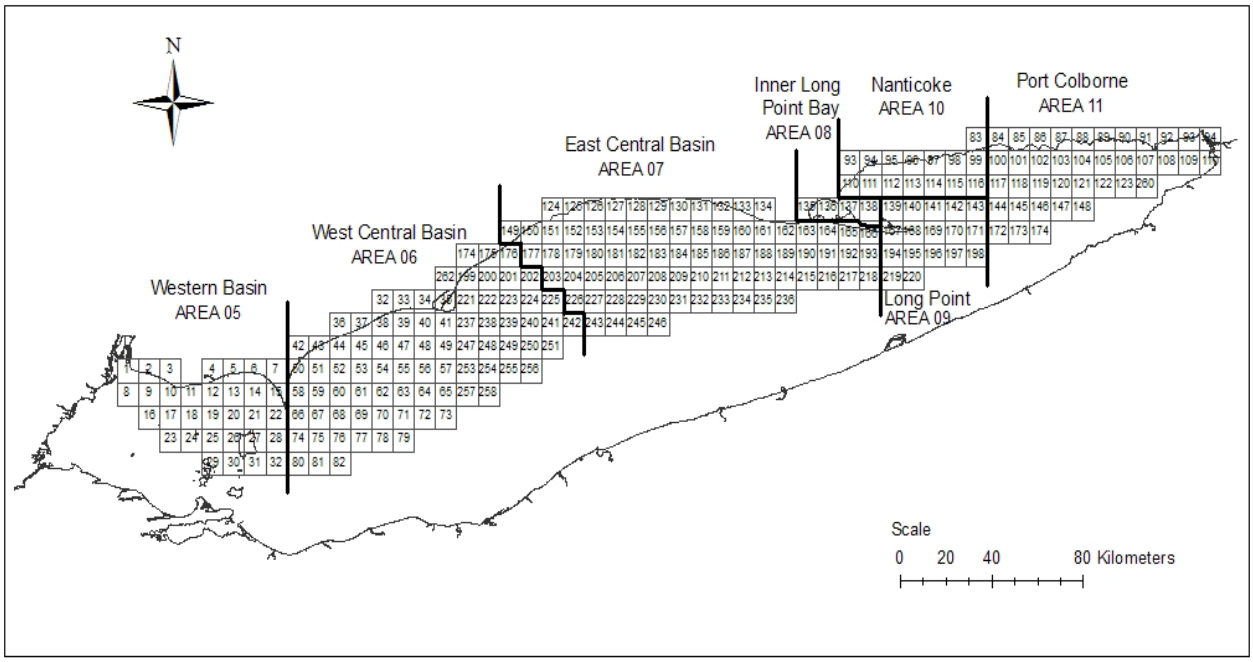


Figure 3.1 Lake Erie Sport Fishery Diary Survey Areas, 2015.

In 2015, 54 volunteers from Ontario completed angler diaries in Lake Erie. This was equal to the number of participants in 2014. Of the Ontario Sport Fishery Diary volunteers fishing in all areas, 85% have been participating in the program for three years or more. Sixty-eight percent have been involved in the program for ten years or more, and 42% have been involved in the program for twenty or more years.

In the Sport Fishery Diary Program, Lake Erie is divided into seven areas, Western Basin (Area 05), West-Central Basin (Area 06), East-Central Basin (Area 07), Inner Long Point Bay (Area 08), Long Point Bay (Area 09), Nanticoke (Area 10) and Port Colborne (Area 11). Angler catches are reported by 5 minute grid location within these areas (Figure 3.1).

Total diarist effort and catch for each area is presented in Tables 3.1, 3.2 and 3.3. Observed catch rates of selected preferred species by area, for the years 1990 to 2015, are presented in Tables 3.4, 3.5, 3.6 and 3.7. Effort may be directed at multiple species simultaneously, therefore, the percentages of annual effort directed at species may total more than 100% in Figures 3.2 to 3.4.

Western Basin (Area 05)

Fifteen participants completed diaries with western basin fishing effort. Western basin diarists fished 1,551 rod hours of effort over 77 fishing trips (Table 3.1). The majority of angling effort recorded by diarists in the western basin was directed towards Walleye (86%) and Yellow Perch (16%) (Table 3.4, Figure 3.2). No additional species were targeted in the western basin. Seven hundred and forty-eight Walleye and 1,560 Yellow Perch were caught in the western basin (Table 3.3).

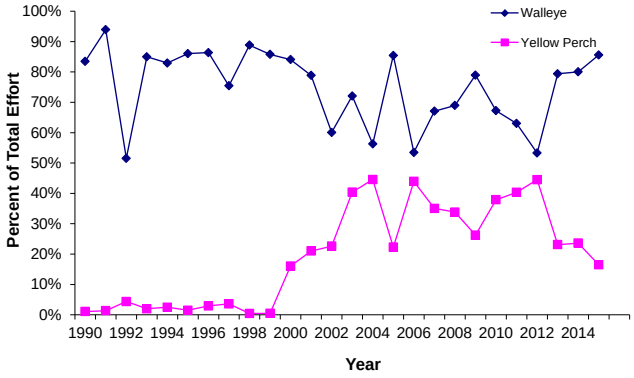


Figure 3.2 Western basin angler percent of area effort, Lake Erie Sport Diary Program, 1990-2015.

The Walleye catch per unit effort (CPUE) was 0.560 fish per rod hour; this was an 11% increase from the 2014 CPUE. The CPUE for Walleye was higher in the western basin (0.560 fish per rod hour) than in the central (0.143 fish per rod hour) and eastern basins (0.162 fish per rod hour) (Figure 3.5). The Yellow Perch CPUE was 6.070 fish per rod hour; this was an increase of 6% from 2014 CPUE. The CPUE for Yellow Perch was the highest in the western basin (6.070 fish per rod hour) compared to the central (5.204 fish per rod hour) and eastern basins (3.166 fish per rod hour) (Figure 3.6).

Central Basin (Areas 06 and 07)

Thirty-five participants completed diaries with central basin fishing effort. Central basin diarists fished 4,395 rod hours of effort over 196 fishing trips (Table 3.1). The majority of angling effort recorded by diarists in the central basin was directed towards Walleye (73%), Rainbow Trout (55%), and Yellow Perch (21%) (Figure 3.3). Rainbow Trout and Walleye are often targeted simultaneously. Other species targeted with at least 1% of effort include Largemouth Bass with 1% of the effort. Five hundred and twenty-six Rainbow Trout, 465 Walleye and 4,841 Yellow Perch were caught in the central basin (Table 3.3).

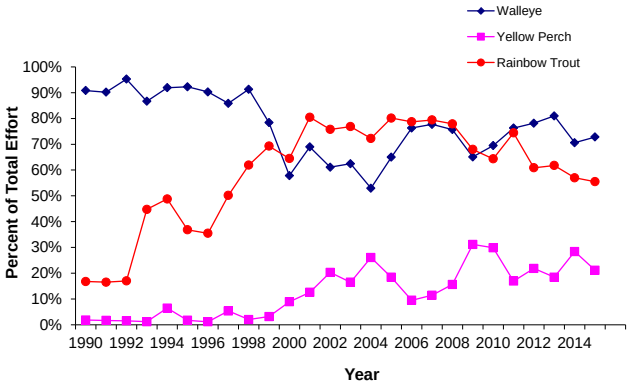


Figure 3.3 Central basin angler percent of area effort, Lake Erie Sport Diary Program, 1990-2015.

The overall central basin Walleye CPUE was 0.143 fish per rod hour; this was a decrease of 21% from 2014 CPUE (Figure 3.5). Walleye CPUE was higher in the east-central basin (Area 06; 0.163 fish per rod hour) than the west-central basin (Area 07; 0.129 fish per rod hour) (Table 3.5). The overall central basin Rainbow Trout CPUE was 0.210 fish per rod hour; this was an increase of 600% from the 2014 CPUE. Rainbow Trout CPUE was the higher in the west-central basin (Area 06; 0.291 fish per rod hour) compared to the east-central basin (Area 07; 0.045 fish per rod hour; Table 3.5). The overall central basin Yellow Perch CPUE was 5.204 fish per rod hour; this was a decrease of 11% from the 2014 CPUE. Yellow Perch CPUE was higher in the east-central basin (Area 07; 5.265 fish per rod hour) than the west-central basin (Area 06; 0.348 fish per rod hour), however there was only 1 trip targeting Yellow Perch in the west-central basin.

Eastern Basin (Areas 08, 09, 10 and 11)

Thirty-one participants completed diaries with eastern basin fishing effort. Eastern basin diarists fished 2,778 rod hours of effort over 277 fishing trips (Table 3.1). The majority of angling effort recorded by diarists in the eastern basin was directed towards Walleye (46%), Smallmouth Bass (25%), and Yellow Perch (20%) (Figure 3.4). Other fish species targeted in the eastern basin with at least 1% of the effort included: Largemouth Bass (6%), Northern Pike (6%), Rainbow Trout (2%) and Rock Bass (1%). Two hundred and ten Walleye, 814 Smallmouth Bass, and 1,181 Yellow Perch were caught in the eastern basin (Table 3.3).

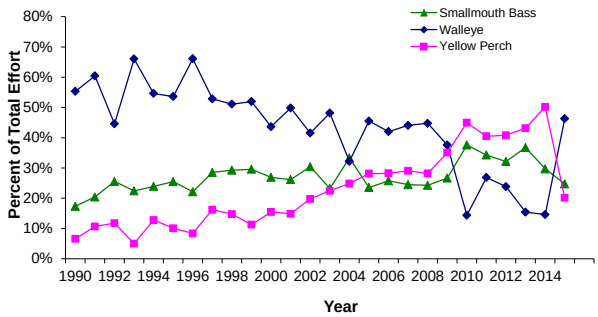


Figure 3.4 Eastern basin angler percent of area effort, Lake Erie Sport Diary Program, 1990-2015.

The overall eastern basin Yellow Perch CPUE was 3.166 fish per rod hour; this was a decrease of 25% from the 2014 CPUE (Figure 3.6). Within the east basin, Yellow Perch CPUE was highest in the Inner Long Point Bay area (Area 08; 7.611 fish per rod hour) (Table 3.7). The overall eastern basin Smallmouth Bass CPUE was 1.107 fish per rod hour; this was an increase of 13% from the 2014 CPUE. Smallmouth Bass CPUE was highest in the Nanticoke area (Area 10; 2.394 fish per rod hour) (Table 3.6). The overall eastern basin Walleye CPUE was 0.162 fish per rod hour; this was a decrease of 25% from the 2014 CPUE (Figure 3.5). Walleye CPUE was highest in the Port Colborne area (Area 11; 0.166 fish per rod hour) (Table 3.6).

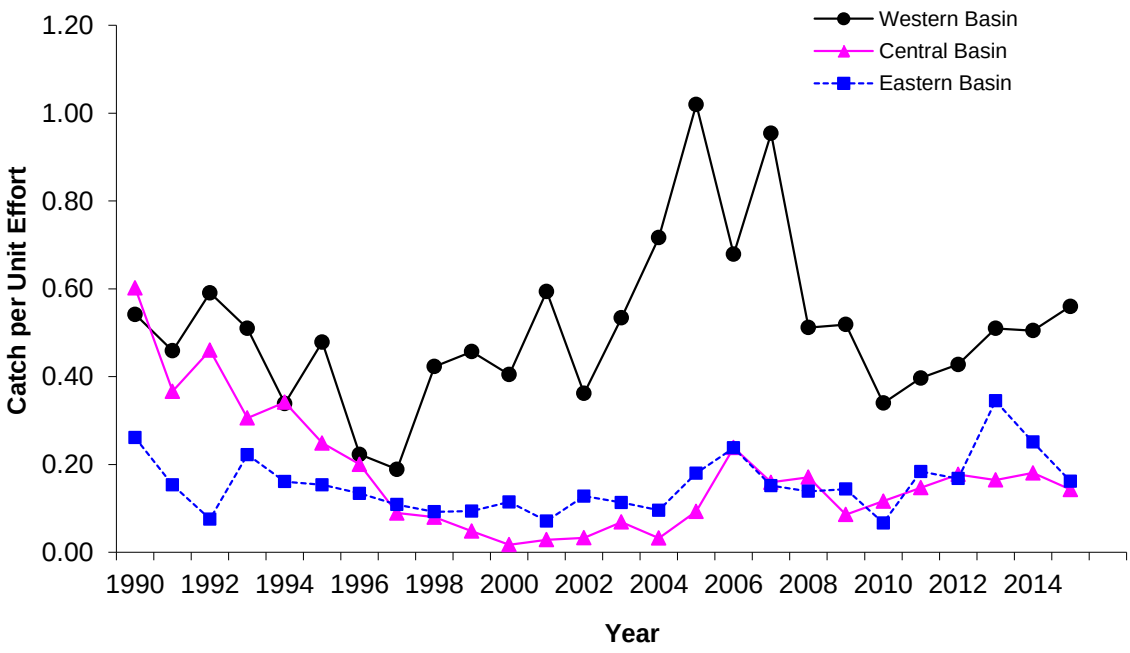


Figure 3.5 Walleye catch per unit effort (fish per rod hour) by basin, Lake Erie Sport Diary Program, 1990-2015.

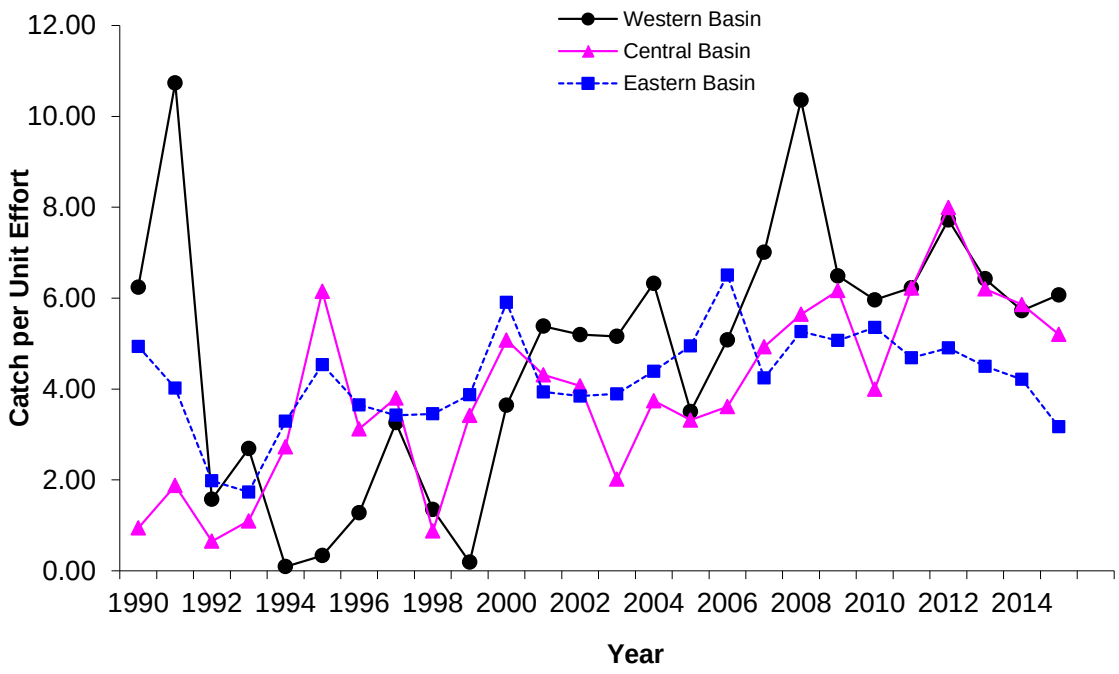


Figure 3.6 Yellow Perch catch per unit effort (fish per rod hour) by basin, Lake Erie Sport Diary Program 1990-2015.

Table 3.1 Total effort by survey area, reported by Sport Fishery Diary Program participants, 2015.

Survey Area	Number of Diarists	Number of Trips	Number of Rods per Trip	Total Rod Hours
Western Basin	15	77	4.4	1,551
West-Central Basin	22	81	5.3	2,141
East-Central Basin	17	115	4.1	2,254
Inner Long Point Bay	22	98	2.4	798
Long Point Bay	7	26	2.8	213
Nanticoke	10	90	2.4	774
Port Colborne	9	63	3.5	994
Total	**54[a]**	**550**	**3.6**	**8,724**

[a]Diarist may fish more than one survey area in a year.

Table 3.2 Total effort by survey area, reported by Sport Fishery Diary Program non-charter boat participants, 1986-2015.

Year	Western Basin			West-Central			East-Central			Inner Long Point Bay		
	No. of Diarists	Total Effort		No. of Diarists	Total Effort		No. of Diarists	Total Effort		No. of Diarists	Total Effort	
		Trips	Rod Hours		Trips	Rod Hours		Trips	Rod Hours		Trips	Rod Hours
1986	13	123	1,234	18	228	3,176	20	306	4,078	14	97	864
1987	10	118	1,272	30	392	5,323	34	355	4,794	18	150	1,462
1988	26	280	2,886	36	422	7,100	58	748	10,781	33	226	2,439
1989	33	244	2,175	33	421	4,883	45	444	4,412	49	229	2,139
1990	38	231	2,068	45	388	5,020	51	404	4,195	59	265	2,445
1991	34	234	2,538	38	318	3,841	60	474	5,719	50	311	2,917
1992	34	254	2,220	59	435	6,104	73	383	5,070	60	286	4,068
1993	39	306	4,428	48	428	6,537	51	407	4,995	56	331	3,347
1994	14	152	885	41	308	4,190	43	322	3,583	58	373	4,047
1995	35	157	1,209	58	382	6,248	47	267	2,762	61	442	4,798
1996	43	254	2,436	45	305	6,200	43	214	3,100	55	324	3,354
1997	29	145	1,499	40	265	6,691	37	224	3,573	80	564	5,881
1998	39	210	2,016	41	265	5,879	26	163	2,953	61	508	4,821
1999	22	112	1,066	37	208	4,826	29	176	2,767	65	383	3,809
2000	24	78	732	31	240	5,175	21	173	3,672	52	312	2,899
2001	24	88	833	28	147	3,769	20	142	2,457	53	236	2,449
2002	14	74	809	25	138	2,594	19	154	2,108	45	255	2,429
2003	20	147	1,508	26	191	3,690	21	142	2,190	45	203	1,882
2004	31	199	2,663	24	157	3,322	19	112	1,556	42	277	2,740
2005	26	204	2,638	27	174	4,351	25	186	3,669	45	200	2,121
2006	17	109	1,375	22	142	4,207	27	182	3,803	37	179	1,857
2007	12	95	929	25	158	4,374	20	166	3,960	34	176	1,932
2008	12	79	768	21	168	3,799	27	115	2,697	29	177	1,677
2009	22	150	2,618	24	138	3,322	19	107	2,198	24	174	1,803
2010	11	74	955	14	121	2,990	19	116	2,561	25	149	1,475
2011	18	99	1,506	29	148	3,937	20	120	2,479	23	152	1,538
2012	18	127	1,516	20	108	2,927	18	109	2,171	18	121	988
2013	15	81	1,576	14	87	2,378	21	126	2,652	23	155	1,371
2014	13	70	1,165	11	48	1,389	15	99	1,852	21	105	850
2015	15	77	1,551	22	81	2,141	17	115	2,254	22	98	798
90-15 Avg.	**24**	**146**	**1,673**	**31**	**213**	**4,227**	**30**	**200**	**3,115**	**44**	**260**	**2,627**

Year	Long Point Bay			Nanticoke			Port Colborne			Total Lake Effort		
	No. of Diarists	Total Effort		No. of Diarists	Total Effort		No. of Diarists	Total Effort		No. of Diarists	Total Effort	
		Trips	Rod Hours		Trips	Rod Hours		Trips	Rod Hours		Trips	Rod Hours
1986	15	125	1,636	16	152	834	6	97	608	50	1,128	12,430
1987	15	65	781	15	150	572	9	172	1,499	66	1,402	15,703
1988	21	95	3,601	28	211	1,506	13	267	1,818	131	2,249	30,131
1989	45	289	3,607	46	371	3,318	12	271	2,060	146	2,269	22,594
1990	57	360	4,658	58	450	4,312	19	243	2,320	166	2,341	25,018
1991	51	239	2,961	53	377	3,787	33	392	3,966	189	2,345	25,729
1992	57	287	3,767	56	334	2,728	28	342	4,009	207	2,321	27,966
1993	54	285	3,685	55	364	3,698	24	262	3,242	185	2,383	29,933
1994	37	157	2,005	49	290	3,201	24	243	2,825	157	1,845	20,736
1995	35	132	1,949	34	177	1,737	39	361	4,849	198	1,918	23,551
1996	28	124	1,713	35	241	3,164	33	318	5,868	181	1,780	25,834
1997	30	102	1,690	38	219	2,683	56	518	9,129	203	2,037	31,145
1998	35	171	2,776	29	204	1,846	42	486	7,540	176	2,007	27,831
1999	29	138	2,488	34	203	1,765	44	397	7,319	174	1,617	24,041
2000	30	159	2,313	29	183	1,534	29	270	4,459	142	1,415	20,785
2001	29	136	1,791	27	156	1,195	27	213	4,418	132	1,118	16,913
2002	29	124	1,531	26	162	1,329	24	228	4,265	106	1,135	15,063
2003	21	78	979	26	166	1,603	24	169	3,273	113	1,096	15,125
2004	19	68	818	22	155	1,298	22	147	2,608	114	1,115	15,005
2005	21	82	1,030	23	187	1,634	19	175	3,143	113	1,208	18,585
2006	13	55	644	19	126	1,020	15	144	2,328	93	937	15,234
2007	9	33	363	19	128	1,080	17	132	2,757	82	888	15,394
2008	10	33	463	16	92	834	15	99	1,921	72	763	12,159
2009	7	33	390	14	138	1,070	18	107	1,986	84	847	13,388
2010	6	22	265	15	106	757	8	35	526	60	623	9,529
2011	4	17	139	11	84	659	12	76	1,202	74	696	11,459
2012	6	15	121	9	97	687	7	48	824	59	625	9,234
2013	6	17	161	13	101	695	7	48	596	60	615	9,429
2014	5	20	181	8	92	658	5	23	328	54	457	6,423
2015	7	26	213	10	90	774	9	63	994	54	550	8,724
90-15 Avg.	**24**	**112**	**1,504**	**28**	**189**	**1,759**	**23**	**213**	**3,334**	**125**	**1,334**	**18,240**

Table 3.3 Total catch and harvest reported by sport fishery diary participants, Lake Erie Sport Fishery Diary Program, 2015.

Species	Western Basin		West-Central Basin		East-Central Basin		Inner Long Point Bay		Long Point Bay		Nanticoke		Port Colborne		Total	
	Caught	Harvested	Caught	Harvested	Caught	Harvested	Caught	Harvested	Caught	Harvested	Caught	Harvested	Caught	Harvested	Caught	Harvested
Chinook Salmon			1	1											1	1
Rainbow Trout			480	414	46	46	5	-	-	-	3	3	3	2	537	465
Lake Trout											1	1			1	1
Rainbow Smelt					1	-									1	-
Northern Pike			2	-	3	-	82	5	211	53	1	-			299	58
Muskellunge	1	-					3	-	2	-	1	-			7	-
Common Carp							24	-							24	-
Brown Bullhead							3	-					1	-	4	-
Channel Catfish	7	5			1	-	3	-	1	1			2	-	14	6
White Perch	333	-			23	1									356	1
White Bass	67	-	85	6	155	27	2	-	8	1	67	3	67	15	451	52
Rock Bass			1	-	30	-	242	33	6	3	19	-			298	36
Pumpkinseed							33	-							33	-
Bluegill							40	1							40	1
Smallmouth Bass			1	-	14	-	462	260	56	44	272	132	24	13	829	449
Largemouth Bass			37	-			213	33	1	-					251	33
Black Crappie			33	30											33	30
Lepomis sp.							14	-							14	-
Pomoxis sp.							3	-							3	-
Yellow Perch	1,560	886	4	-	4,837	4,095	814	421	2	2	758	405	307	175	8,282	5,984
Walleye	748	655	241	225	224	218	1	1	4	4	59	58	146	145	1,423	1,306
Round Goby	5	1			79	57	4	4			6	-	8	8	102	70
Freshwater Drum	107	-	22	1	57	7	6	-	1	-	30	-	25	1	248	9
Total	**2,828**	**1,547**	**907**	**677**	**5,470**	**4,451**	**1,954**	**758**	**292**	**108**	**1,217**	**602**	**583**	**359**	**13,251**	**8,502**

Table 3.4 Angler success rates (CPUE) of non-charter boat anglers targeting particular species, western basin survey area, Lake Erie, 1990-2015[a]. Effort may be directed at more than one species simultaneously.

Western Basin (Area 05)									
Year	Total Rod Hours	Walleye				Yellow Perch			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	2,304	212	1,924	0.542	84%	5	25	6.240	1%
1991	2,405	211	2,259	0.459	94%	2	33	10.738	1%
1992	3,087	203	1,591	0.591	52%	15	135	1.574	4%
1993	2,220	279	1,887	0.510	85%	9	44	2.689	2%
1994	885	126	734	0.339	83%	4	22	0.090	2%
1995	1,204	136	1,036	0.479	86%	3	18	0.333	1%
1996	2,428	213	2,097	0.223	86%	12	71	1.275	3%
1997	1,499	91	1,131	0.189	75%	10	54	3.258	4%
1998	2,016	171	1,791	0.423	89%	2	9	1.347	0%
1999	1,071	91	919	0.457	86%	1	5	0.188	0%
2000	729	64	613	0.405	84%	8	117	3.641	16%
2001	833	66	657	0.594	79%	24	175	5.383	21%
2002	809	54	486	0.362	60%	13	183	5.197	23%
2003	1,508	102	1,087	0.534	72%	60	609	5.158	40%
2004	2,663	114	1,499	0.717	56%	93	1,187	6.325	45%
2005	2,638	173	2,254	1.020	85%	42	588	3.505	22%
2006	1,375	68	735	0.679	53%	44	604	5.082	44%
2007	929	56	624	0.954	67%	39	326	7.012	35%
2008	768	39	529	0.512	69%	42	260	10.360	34%
2009	2,618	93	2,068	0.519	79%	64	687	6.490	26%
2010	955	33	642	0.340	67%	44	362	5.963	38%
2011	1,506	36	950	0.397	63%	65	608	6.230	40%
2012	1,516	42	808	0.428	53%	82	675	7.721	45%
2013	1,576	52	1,251	0.510	79%	31	364	6.427	23%
2014	1,165	46	933	0.505	80%	28	275	5.726	24%
2015	1,551	62	1,328	0.560	86%	16	256	6.070	16%
90-15 Avg	**1,625**	**109**	**1,224**	**0.510**	**75%**	**29**	**296**	**4.770**	**20%**

[a]CPUE represents observed catch divided by observed angling effort in rod-hours directed at that particular species.

Table 3.5 Angler success rates (CPUE) of non-charter boat anglers targeting particular species, west-central and east-central basins survey areas, Lake Erie, 1990-2015[a]. Effort may be directed at more than one species simultaneously.

West-Central Basin (Area 06)

Year	Total Rod Hours	Walleye				Rainbow Trout				Yellow Perch			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	5,020	328	4,326	0.642	86%	54	1,031	0.010	21%	11	59	0.659	1%
1991	3,841	287	3,488	0.366	91%	26	441	0.032	11%	4	27	0.679	1%
1992	6,104	410	5,886	0.501	96%	54	733	0.056	12%	10	96	0.385	2%
1993	6,537	395	5,081	0.308	78%	231	3,217	0.118	49%	14	94	1.521	1%
1994	4,190	279	3,670	0.373	88%	172	2,271	0.086	54%	20	466	2.923	11%
1995	6,248	348	5,768	0.215	92%	150	2,893	0.055	46%	11	130	6.243	2%
1996	6,200	244	5,543	0.213	89%	89	2,070	0.049	33%	6	50	5.500	1%
1997	6,691	201	5,912	0.077	88%	122	3,909	0.083	58%	4	36	9.103	1%
1998	5,879	224	5,298	0.076	90%	138	3,191	0.117	54%	4	18	3.611	0%
1999	4,826	146	3,865	0.033	80%	140	3,611	0.110	75%	2	20	11.150	0%
2000	4,251	124	2,498	0.011	59%	154	3,013	0.308	71%	5	46	2.863	1%
2001	3,769	82	2,596	0.016	69%	131	3,554	0.136	94%	9	99	5.088	3%
2002	2,594	75	1,656	0.013	64%	121	2,402	0.275	93%	14	126	3.852	5%
2003	3,690	126	2,343	0.046	63%	161	3,288	0.234	89%	16	186	4.047	5%
2004	3,322	74	1,951	0.037	59%	118	2,827	0.187	85%	37	442	6.117	13%
2005	4,351	86	2,525	0.069	58%	132	3,812	0.185	88%	38	520	4.215	12%
2006	4,207	91	3,058	0.215	73%	118	3,733	0.200	89%	9	145	5.253	3%
2007	4,374	95	3,220	0.149	74%	106	3,578	0.220	82%	30	274	7.935	6%
2008	3,799	98	2,814	0.160	74%	110	3,149	0.254	83%	48	433	7.277	11%
2009	3,322	74	2,553	0.071	77%	85	2,841	0.132	86%	46	466	2.088	14%
2010	2,990	74	2,451	0.053	82%	75	2,528	0.243	85%	40	370	4.464	12%
2011	3,937	98	3,163	0.121	80%	100	3,337	0.132	85%	33	347	5.202	9%
2012	2,927	87	2,637	0.169	90%	74	2,284	0.122	78%	20	296	7.299	10%
2013	2,378	69	2,152	0.155	90%	57	1,898	0.068	80%	6	93	0.679	4%
2014	1,389	43	1,340	0.148	96%	38	1,254	0.030	90%	4	22	3.116	2%
2015	2,141	60	1,841	0.129	86%	55	1,636	0.291	76%	1	12	0.348	1%
90-15 Avg.	**4,191**	**162**	**3,371**	**0.168**	**80%**	**108**	**2,635**	**0.144**	**68%**	**17**	**187**	**4.293**	**5%**

East-Central Basin (Area 07)

Year	Total Rod Hours	Walleye				Rainbow Trout				Yellow Perch			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	4,195	385	4,045	0.559	96%	40	517	0.006	12%	11	110	1.091	3%
1991	5,719	415	5,133	0.367	90%	88	1,138	0.090	20%	8	134	2.111	2%
1992	5,070	358	4,757	0.410	94%	70	1,169	0.023	23%	12	77	0.978	2%
1993	4,995	396	4,912	0.304	98%	153	1,945	0.055	39%	7	44	0.182	1%
1994	3,583	310	3,475	0.309	97%	131	1,521	0.007	42%	2	37	0.270	1%
1995	2,762	249	2,547	0.326	92%	39	426	0.068	15%	5	27	5.704	1%
1996	3,100	190	2,853	0.176	92%	72	1,231	0.059	40%	9	57	1.035	2%
1997	3,573	143	2,902	0.115	81%	54	1,241	0.088	35%	69	514	3.426	14%
1998	2,953	138	2,767	0.088	94%	103	2,278	0.119	77%	24	161	0.567	5%
1999	3,708	133	2,825	0.069	76%	97	2,302	0.135	62%	38	252	2.803	7%
2000	1,522	52	840	0.037	55%	41	708	0.072	47%	61	470	5.291	31%
2001	2,457	67	1,697	0.048	69%	58	1,455	0.056	59%	70	684	4.199	28%
2002	2,108	55	1,217	0.061	58%	52	1,160	0.109	55%	91	828	4.101	39%
2003	2,190	65	1,329	0.110	61%	55	1,231	0.068	56%	71	784	1.534	36%
2004	1,556	38	632	0.019	41%	40	698	0.119	45%	66	831	2.475	53%
2005	3,669	109	2,688	0.116	73%	101	2,617	0.123	71%	76	957	2.829	26%
2006	3,803	124	3,054	0.262	80%	100	2,571	0.072	68%	47	615	3.221	16%
2007	3,960	115	3,255	0.170	82%	107	3,040	0.116	77%	48	680	3.722	17%
2008	2,697	81	2,102	0.186	78%	72	1,913	0.056	71%	33	583	4.431	22%
2009	2,198	40	1,041	0.123	47%	34	912	0.115	41%	69	1,253	7.683	57%
2010	2,561	53	1,406	0.228	55%	40	1,044	0.083	41%	66	1,287	3.856	50%
2011	2,479	64	1,731	0.195	70%	52	1,438	0.063	58%	54	740	6.699	30%
2012	2,171	53	1,348	0.194	62%	30	819	0.029	38%	54	818	8.249	38%
2013	2,652	74	1,923	0.176	73%	41	1,209	0.046	46%	54	835	6.817	31%
2014	1,852	40	948	0.229	51%	22	593	0.030	32%	58	899	5.925	49%
2015	2,254	50	1,359	0.163	60%	24	803	0.045	36%	64	918	5.265	41%
90-15 Avg.	**3,069**	**146**	**2,415**	**0.194**	**74%**	**66**	**1,384**	**0.071**	**46%**	**45**	**561**	**3.633**	**23%**

[a]CPUE represents observed catch divided by observed angling effort in rod-hours directed at that particular species.

Table 3.6 Angler success rates (CPUE) of non-charter boat anglers targeting particular species, Inner Long Point Bay and Long Point Bay survey areas, Lake Erie, 1990-2015[a]. Effort may be directed at more than one species simultaneously.

Inner Long Point Bay (Area 08)

Year	Total Rod Hours	Smallmouth Bass				Yellow Perch				Largemouth Bass				Northern Pike			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	3,409	169	1,735	0.718	51%	21	167	5.886	5%	16	554	0.806	16%	22	191	0.272	6%
1991	2,614	161	1,633	0.838	62%	46	492	5.301	19%	16	717	0.958	27%	26	312	0.183	12%
1992	4,658	214	2,304	0.708	49%	47	438	2.172	9%	17	1,534	0.633	33%	38	550	0.167	12%
1993	3,347	196	2,008	0.626	60%	27	209	1.937	6%	19	1,430	0.774	43%	28	239	0.301	7%
1994	4,047	171	2,030	0.656	50%	80	933	3.911	23%	16	1,305	0.850	32%	47	418	0.256	10%
1995	4,798	203	2,298	0.657	48%	69	859	4.714	18%	22	2,233	0.740	47%	59	626	0.241	13%
1996	3,354	156	1,735	0.788	52%	53	601	3.825	18%	11	1,111	0.678	33%	29	291	0.179	9%
1997	5,881	282	3,145	0.870	53%	176	1,903	4.045	32%	24	1,551	0.661	26%	54	542	0.266	9%
1998	4,821	235	2,391	0.858	50%	150	1,519	3.829	32%	19	1,111	0.781	23%	76	742	0.259	15%
1999	3,811	188	2,097	0.643	55%	110	1,034	4.080	27%	15	734	0.917	19%	56	517	0.330	14%
2000	2,899	148	1,563	0.826	54%	87	887	6.263	31%	14	640	0.879	22%	32	312	0.514	11%
2001	2,449	121	1,363	0.747	56%	65	698	4.081	29%	13	592	0.994	24%	24	191	0.419	8%
2002	2,429	136	1,463	0.896	60%	64	615	3.777	25%	14	676	1.241	28%	16	114	0.167	5%
2003	1,882	116	1,191	1.112	63%	40	478	3.812	25%	12	437	1.183	23%	13	85	0.495	5%
2004	2,740	125	1,528	0.624	56%	78	712	4.015	26%	83	617	1.276	23%	23	236	0.246	9%
2005	2,121	83	1,084	0.720	51%	70	779	7.923	37%	55	489	2.022	23%	12	135	1.049	6%
2006	1,857	87	1,063	1.004	57%	66	572	9.042	31%	25	255	1.838	14%	24	210	0.694	11%
2007	1,932	81	1,024	0.845	53%	75	806	4.905	42%	30	351	1.621	18%	18	191	0.470	10%
2008	1,677	85	995	1.033	59%	77	672	5.938	40%	28	260	1.468	16%	22	121	0.818	7%
2009	1,803	81	1,013	0.869	56%	71	745	5.836	41%	16	142	1.837	8%	18	158	0.501	9%
2010	1,475	62	753	0.873	51%	74	672	7.752	46%	22	200	1.464	14%	8	72	0.294	5%
2011	1,538	88	986	1.147	64%	54	581	6.204	38%	29	258	1.084	17%	3	33	0.452	2%
2012	988	62	574	1.207	58%	43	289	5.784	29%	23	207	0.975	21%	8	61	0.836	6%
2013	1,371	82	771	1.294	56%	56	495	4.147	36%	23	184	0.728	13%	17	149	0.404	11%
2014	850	45	416	0.932	49%	41	325	4.532	38%	20	166	1.057	19%	5	32	1.480	4%
2015	798	47	463	0.956	58%	18	94	7.611	12%	22	161	1.315	20%	10	46	1.231	6%
90-15 Avg.	**2,675**	**132**	**1,447**	**0.863**	**55%**	**68**	**676**	**5.051**	**27%**	**23**	**689**	**1.107**	**23%**	**26**	**253**	**0.482**	**8%**

Long Point Bay (Area 09)

Year	Total Rod Hours	Rainbow Trout				Walleye				Northern Pike				Smallmouth Bass			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	4,304	22	397	0.048	9%	265	3,456	0.205	80%	9	101	0.446	2%	32	381	0.855	9%
1991	2,793	22	266	0.098	10%	160	2,005	0.125	72%	13	174	0.189	6%	28	330	1.074	12%
1992	3,829	89	1,170	0.143	31%	141	1,909	0.046	50%	2	9	0.000	0%	28	380	0.708	10%
1993	3,685	113	1,631	0.072	44%	222	3,006	0.164	82%	6	76	0.132	2%	47	450	1.044	12%
1994	2,005	70	997	0.022	50%	112	1,581	0.089	79%	0	0		0%	29	293	1.453	15%
1995	1,949	24	390	0.067	20%	87	1,389	0.086	71%	0	0		0%	31	345	1.216	18%
1996	1,713	20	321	0.044	19%	78	1,316	0.105	77%	0	0		0%	43	361	1.528	21%
1997	1,642	24	536	0.030	33%	49	998	0.028	61%	11	116	0.586	7%	39	492	1.229	30%
1998	2,776	61	1,114	0.069	40%	101	1,849	0.051	67%	9	83	0.545	3%	40	586	0.843	21%
1999	2,008	65	1,021	0.094	51%	56	974	0.024	49%	16	224	0.869	11%	28	357	1.150	18%
2000	2,313	100	1,647	0.241	71%	73	1,148	0.017	50%	16	144	3.395	6%	8	70	0.892	3%
2001	1,791	82	1,196	0.135	67%	56	903	0.050	50%	22	182	2.764	10%	11	128	0.476	7%
2002	1,531	87	1,157	0.079	76%	35	424	0.012	28%	20	217	0.661	14%	20	200	0.802	13%
2003	979	50	729	0.064	74%	34	509	0.016	52%	16	130	0.559	13%	12	118	0.834	12%
2004	818	40	583	0.067	71%	24	338	0.012	41%	10	82	0.540	10%	8	53	1.258	7%
2005	1,030	50	658	0.059	64%	41	548	0.055	53%	8	77	0.506	7%	20	244	0.775	24%
2006	644	18	306	0.095	47%	17	310	0.132	48%	8	74	0.952	11%	16	136	1.547	21%
2007	363	8	117	0.232	32%	6	112	0.099	31%	8	84	1.485	23%	9	86	1.291	24%
2008	463	17	290	0.007	62%	15	298	0.024	64%	26	157	0.712	34%	4	29	0.655	6%
2009	390	6	115	0.000	29%	6	115	0.000	29%	11	133	0.278	34%	16	181	0.838	46%
2010	265	0	0		0%	0	0		0%	10	106	1.349	40%	12	159	1.279	60%
2011	139	0	0		0%	0	0		0%	9	94	0.786	68%	7	42	2.583	30%
2012	121	1	9	0.000	7%	1	9	0.000	7%	6	53	1.415	44%	8	57	0.792	47%
2013	161	2	3	0.131	2%	2	15	0.393	9%	8	92	1.803	57%	7	54	1.551	34%
2014	181	0	0		0%	0	0		0%	13	112	1.143	62%	5	68	0.574	38%
2015	213	2	20	0.000	9%	5	40	0.050	19%	15	105	2.019	49%	6	68	0.735	32%
90-15 Avg.	**1,466**	**37**	**564**	**0.078**	**35%**	**61**	**894**	**0.078**	**45%**	**10**	**101**	**1.006**	**20%**	**20**	**218**	**1.076**	**22%**

[a]CPUE represents observed catch divided by observed angling effort in rod-hours directed at that particular species.

Table 3.7 Angler success rates (CPUE) of non-charter boat anglers targeting particular species, Nanticoke and Port Colborne survey areas, Lake Erie, 1990-2015[a]. Effort may be directed at more than one species simultaneously.

Nanticoke (Area 10)

Year	Total Rod Hours	Yellow Perch				Walleye				Rainbow Trout				Smallmouth Bass			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	4,123	101	548	6.812	13%	292	3,412	0.336	83%	42	534	0.021	13%	49	357	0.745	9%
1991	3,424	62	491	4.792	14%	213	2,301	0.169	67%	11	106	0.095	3%	55	330	1.011	10%
1992	2,769	98	824	2.445	30%	155	1,359	0.098	49%	24	225	0.111	8%	116	863	1.242	31%
1993	3,698	34	232	2.660	6%	270	3,062	0.229	83%	61	720	0.071	19%	54	455	1.019	12%
1994	3,201	48	288	3.824	9%	196	2,585	0.170	81%	51	476	0.013	15%	46	348	0.844	11%
1995	1,737	57	338	5.546	19%	118	1,395	0.166	80%	7	123	0.016	7%	27	221	0.862	13%
1996	3,164	71	405	4.581	13%	155	2,513	0.144	79%	28	288	0.076	9%	32	366	0.604	12%
1997	2,683	96	778	3.082	29%	91	1,476	0.041	55%	29	405	0.027	15%	55	552	1.052	21%
1998	1,846	93	571	3.641	31%	68	836	0.059	45%	34	367	0.037	20%	54	465	1.273	25%
1999	1,765	70	354	5.601	20%	62	760	0.043	43%	35	488	0.044	28%	73	696	1.495	39%
2000	1,534	91	593	6.945	39%	27	337	0.012	22%	30	339	0.121	22%	54	458	2.900	30%
2001	1,195	67	469	4.584	39%	33	269	0.007	23%	39	368	0.076	31%	49	413	2.091	35%
2002	1,329	116	901	4.849	68%	20	152	0.000	11%	23	176	0.079	13%	24	345	1.115	26%
2003	1,603	118	1,032	4.247	64%	18	257	0.047	16%	19	251	0.064	16%	22	245	1.806	15%
2004	1,298	129	1,041	4.714	80%	4	64	0.016	5%	7	80	0.075	6%	29	273	1.504	21%
2005	1,634	140	1,107	4.093	68%	21	296	0.034	18%	26	313	0.086	19%	18	165	1.706	10%
2006	1,020	108	804	4.959	79%	14	188	0.069	18%	11	156	0.019	15%	6	44	1.545	4%
2007	1,080	90	644	3.893	60%	20	272	0.048	25%	23	287	0.153	27%	12	114	1.982	11%
2008	834	68	507	4.467	61%	13	223	0.130	27%	11	187	0.048	22%	7	53	2.110	6%
2009	1,070	119	847	5.074	79%	9	163	0.012	15%	5	74	0.054	7%	10	72	1.437	7%
2010	757	87	582	3.235	77%	3	34	0.059	4%	0	0		0%	15	113	1.113	15%
2011	659	77	584	3.361	89%	1	12	0.083	2%	1	12	0.000	2%	12	110	0.444	17%
2012	687	83	566	4.346	82%	1	12	0.083	2%	1	12	0.083	2%	14	116	0.879	17%
2013	695	84	539	4.166	77%	2	4	0.000	1%	2	30	0.067	4%	21	174	1.270	25%
2014	658	78	538	3.674	82%	3	47	0.149	7%	1	16	0.063	2%	14	94	1.604	14%
2015	774	57	344	2.198	44%	20	359	0.164	46%	2	13	0.000	2%	17	103	2.394	13%
90-15 Avg.	**1,740**	**86**	**613**	**4.300**	**49%**	**70**	**861**	**0.091**	**35%**	**20**	**233**	**0.060**	**13%**	**34**	**290**	**1.386**	**17%**

Port Colborne (Area 11)

Year	Total Rod Hours	Walleye				Smallmouth Bass				Yellow Perch			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1990	3,889	165	1,763	0.229	45%	30	250	0.556	6%	47	228	1.142	6%
1991	3,965	290	3,357	0.163	85%	48	322	0.848	8%	52	283	0.993	7%
1992	4,009	91	3,449	0.085	86%	52	352	0.727	9%	63	429	0.876	11%
1993	3,242	220	3,085	0.273	95%	24	221	0.647	7%	32	214	0.829	7%
1994	2,825	184	2,388	0.202	85%	33	217	0.852	8%	33	261	1.091	9%
1995	4,849	294	4,229	0.174	87%	60	537	1.354	11%	12	113	0.585	2%
1996	5,868	256	5,286	0.138	90%	55	658	1.072	11%	15	134	0.427	2%
1997	9,129	356	7,443	0.135	82%	135	1,329	1.311	15%	47	411	0.481	5%
1998	7,540	310	5,900	0.112	78%	150	1,526	1.361	20%	54	307	0.695	4%
1999	7,231	250	5,790	0.113	80%	117	1,232	1.365	17%	28	201	0.801	3%
2000	4,459	165	3,383	0.159	76%	91	924	1.943	21%	13	143	0.491	3%
2001	4,418	150	3,678	0.082	83%	46	675	0.911	15%	18	141	0.817	3%
2002	4,265	138	3,316	0.151	78%	78	897	0.880	21%	23	267	1.815	6%
2003	3,273	121	2,859	0.141	87%	34	243	0.944	7%	17	160	2.307	5%
2004	2,608	87	1,991	0.113	76%	61	632	1.357	24%	3	34	2.537	1%
2005	3,143	134	2,749	0.222	87%	36	373	0.981	12%	13	248	0.275	8%
2006	2,328	103	1,948	0.272	84%	25	264	1.770	11%	16	156	4.450	7%
2007	2,756	98	2,306	0.167	84%	19	277	0.766	10%	23	248	2.101	9%
2008	1,921	71	1,655	0.162	86%	13	111	0.840	6%	17	143	2.646	7%
2009	1,986	77	1,688	0.168	85%	10	133	0.211	7%	25	228	2.860	11%
2010	526	24	387	0.067	73%	9	111	0.378	21%	4	38	3.893	7%
2011	1,202	50	938	0.185	78%	8	74	1.389	6%	26	261	4.279	22%
2012	824	20	604	0.172	73%	10	95	0.537	12%	21	203	5.107	25%
2013	596	22	390	0.370	65%	4	39	0.961	6%	24	182	6.520	30%
2014	328	12	248	0.271	76%	3	21	0.524	6%	13	119	2.321	36%
2015	994	50	878	0.166	88%	8	53	0.396	5%	14	122	2.453	12%
90-15 Avg.	**3,391**	**144**	**2,758**	**0.173**	**81%**	**45**	**445**	**0.957**	**12%**	**25**	**203**	**2.030**	**10%**

[a]CPUE represents observed catch divided by observed angling effort in rod-hours directed at that particular species.

4. INDEX FISHING PROJECTS

4.1 Partnership Index Fishing: Gill Netting

The Partnership Index Fishing Gill Netting Program is a cooperative fisheries assessment program with the Ontario Commercial Fisheries' Association (OCFA). Fieldwork and laboratory sampling are funded through the Commercial Fish Business Relationship (CFBR) between the province of Ontario and the OCFA. Prior to 1998, the program relied on volunteer participation from the fishing industry to complete the field component. This program has monitored abundance, age structure, size, and species composition throughout Lake Erie since 1989. Data from this community index are applied in statistical catch-at-age analyses to estimate population abundance of Yellow Perch and Walleye. These population estimates are critical elements of the international allocation process for these species.

The lakewide survey was partitioned spatially into projects defined as the west, west-central, east-central, Pennsylvania Ridge and eastern basins. In 2015, 133 sites were fished across Lake Erie by two commercial fishing vessels including the Lincoln R and the Lee Marie (Figure 4.1.1). Lake Erie fish processors assisted by transporting fish and gear, providing cold storage and supplying ice for boats. Since 2003, gill nets 110 feet in length with a mesh size of 4.75" (121 mm), 50 meshes deep were fished canned (suspended) at the same depths as canned index nets to examine the effectiveness of index gear catching suspended Walleye. These nets were approximately 17 feet deep with 3.1 times the area of the 50' index nets. Comparisons of mean Walleye catch and size distributions in 2015 are made for index and auxiliary gear. Also in 2015, additional 1 fathom canned index nets were fished at 12 of the random sites in both the west-central and east-central basin surveys. These shallow suspended gangs were intended to provide additional information describing the vertical distribution of Walleye in the central basin.

Partnership index gill nets consisted of 1,250 feet (0.38 km) panels of graded monofilament mesh including 1.25", 1.5", 1.75", 2.0", 2.25", 2.5", 2.75", 3.0", 3.5", 4.0", 4.5", 5.0", 5.5", and 6.0" (32 mm to 152 mm). Mesh sizes 2.0 inches (51 mm) and greater were composed of two 50 foot panels, and those less than 2 inches were single panels 50 feet (15.25 m) in length. Sets are intended to be approximately 24 hours in duration. Average fishing duration in 2015 was 21.6 hours, ranging from 13 to 31 hours (STD = 2.8, N = 304).

Survey locations were allocated by random stratified sampling by basin. Number of locations fished by basin were: west (22), west-central (36), east-central (36), Pennsylvania Ridge (9) and east basin (30). Depth strata for the western basin included 0 to 10 m and greater than 10 m. In the west-central and east-central basins, depths were grouped as 0 to 15 m, 15 to 20 m, and greater than 20 m. The Pennsylvania Ridge and eastern basin depth strata were partitioned as 0 to 15 m, 15 to 30 m and depths greater than 30 m.

At each site, nets were fished on the bottom and suspended (canned) at depths determined partly by the depth stratum and by random selection. In the western basin, nets were canned at 1 fathom (1.8 m). In the west-central and east-central basins, gill nets were canned at 2.7 fathoms (5 m) or 6.0 fathoms (11 m) or 9.2 fathoms (17 m). The central basin surveys were fished following fall turnover, when the water temperature was uniform throughout the water column. Twelve additional gangs of 1 fathom index nets were fished in addition to the standard complement of canned nets in the west-central and east-central basins, as described above.

In the deeper Pennsylvania Ridge and east basin areas, index gear was fished during thermal stratification. The gear was fished in the standard manner with gill nets set on bottom and canned at 2 fathoms (3.7 m) or 4 fathoms (7.3 m), or 8 fathoms (14.6 m) at all sites. Additional canned nets were fished within the thermocline where applicable in the east basin survey but not in the Pennsylvania Ridge area during 2015.

All Walleye and Yellow Perch were scanned for passive integrated transponder (PIT) tags using a Biomark reader with a racket style antenna as bags of fish caught in index gear were removed from totes. All fish were identified, counted and weighed "in bulk" by species and mesh size. Biological sampling for selected species included determination of length, weight, sex, maturity, gonad weight

and age. In addition to standard scale sample collection, sagittal otoliths were collected from Burbot, Lake Whitefish and Smallmouth Bass greater than 30 cm in length. Otoliths were collected from Yellow Perch 15 cm and greater in total length caught in bottom nets, while scales were used to age smaller Yellow Perch. For Yellow Perch caught in canned nets, scales were used for aging, but otoliths were also collected and aged for fish longer than 250 mm. Otoliths were collected from all Walleye 38 cm and larger, and from subsamples of catches of smaller Walleye (minimum of 6 per site). Lake Trout heads were retained to recover coded wire tags present in stocked Lake Trout. All species were examined for Lamprey scars and wounds. Salmonids were examined for the presence of fin clips. Results from surveys include total catches, mean species biomass and age specific information for Yellow Perch, Walleye, Lake Whitefish, Smallmouth Bass, White Perch and White Bass. Catch rates presented have not been adjusted for selectivity bias associated with the gang configuration of mesh sizes.

The Partnership Index began September 6, 2015 in Pennsylvania Ridge and continued until the east basin survey was completed on September 17, 2015. Fishing began in the western basin on September 21, 2015 and was completed by September 29, 2015. The west-central basin survey started on October 6, 2015 after fall turnover and was finished by October 19, 2015. Index fishing continued in the east-central basin survey from October 21 to November 2, 2015.

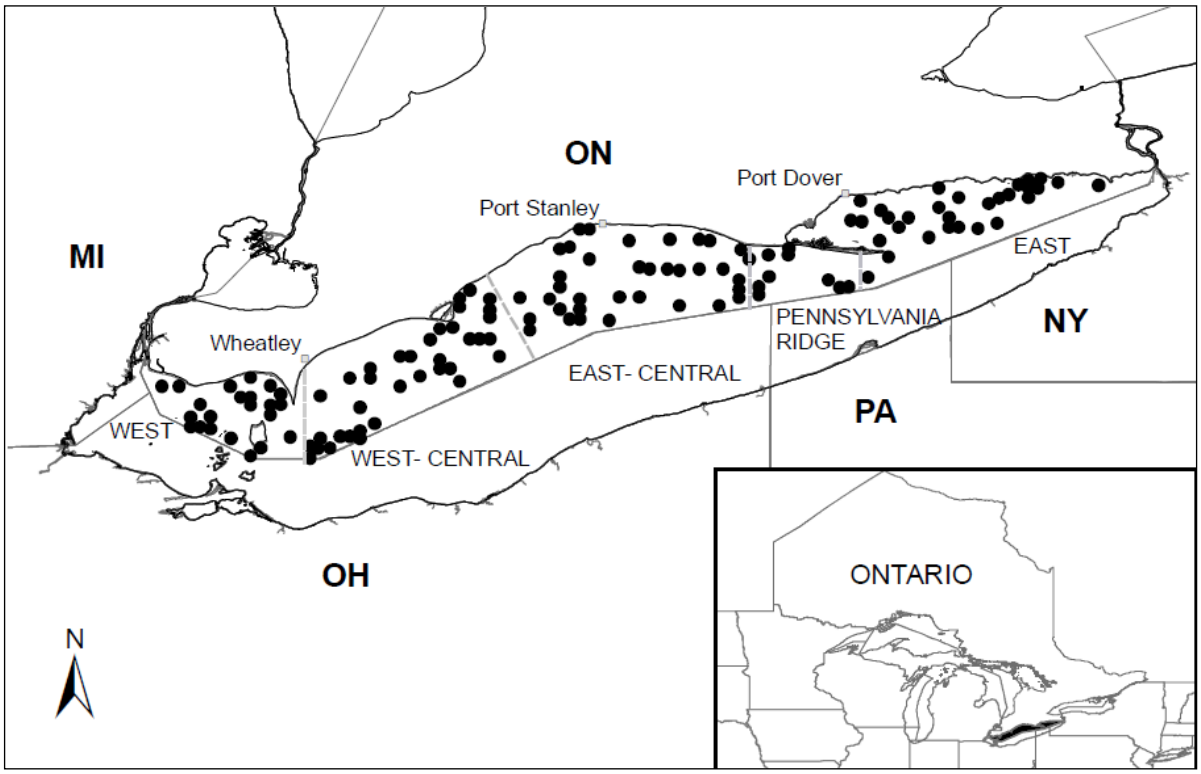


Figure 4.1.1 Lake Erie Partnership Index Fishing gill netting locations fished in 2015.

Results

Fish Community

Catch in numbers of fish by species over the time series is presented for the west, west-central, east-central, Pennsylvania Ridge and east basins in Tables 4.1.1 to 4.1.5 respectively. Catches were standardized to an equal number of gangs as specified in Tables 4.1.1 to 4.1.5. The reference number of gangs in this report reflects the target number of gangs as targets have usually been met since the lakewide index fishing tender process began in 1998. Tables 4.1.1 to 4.1.5 include only catches in standard bottom and canned monofilament nets. Observed lakewide catches in monofilament index gill nets fished at all depths are presented in Table 4.1.6a (1989-2002) and Table 4.1.6b (2003-2015) with corresponding sampling effort by gear. Twenty seven (27) fish species were caught in index gill nets in 2015, with one additional species (Brown Trout) caught only in auxiliary commercial style gear.

Alewife abundance in Lake Erie was depressed since 2003, showing only periodic upturns in 2006, 2012 and 2013. In 2015 surveys, only 59 Alewife were caught; all from the east basin survey (Tables 4.1.1 – 4.1.6). All of the Alewives caught in 2015 were yearling or older with total lengths ranging from 161 mm to 205 mm. Gizzard Shad abundance indices were below average throughout most of Lake Erie, with moderate catches observed in the west-central survey (Tables 4.1.1 - 4.1.5). Length distributions indicated young-of-the-year (YOY) represented 79%, 88% and 66% of Gizzard Shad caught in the west, west-central and east-central basin surveys, respectively. Of the few Gizzard Shad caught in the east basin, 50% were YOY whereas no YOY were caught in the 2015 Pennsylvania Ridge survey.

Invasive Round Gobies first appeared in the Partnership index in the west-central basin during 1997 (Tables 4.1.2 and 4.1.6). In the following year, 1998, Round Gobies appeared in the west basin and east-central basin surveys (Tables 4.1.1, 4.1.3). By 2000, they were present in the east basin survey (Table 4.1.4). Lakewide, the catch of Round Gobies in 2015 remained moderate but was below the time series average (Table 4.1.6). Relative catches of Round Gobies varied regionally, however, Round Goby catches were above average in the west basin, at moderate levels in central basin surveys and below average in the Pennsylvania Ridge and the east basin surveys (Tables 4.1.1 to 4.1.5). Due to their smaller size and body shape, Round Gobies are not completely vulnerable to capture in index gill nets.

Freshwater Drum catches in 2015 were average lakewide but differed regionally (Table 4.1.6). In the west and east-central basin surveys, total catches were moderate but below average while total catch was above average in the west-central basin survey. Freshwater Drum catches were below average in the Pennsylvania Ridge and east basin surveys (Tables 4.1.1 to 4.1.5). Albeit with fluctuations between years, Freshwater Drum catches exhibited a gradual decline over the time series in the east basin where catches remained low in 2015 (Table 4.1.5). YOY Freshwater Drum were only present in west (2%) and west-central (13%) basin catches during 2015 based on length frequencies. With the exception of the west-central basin survey, mean length of Freshwater Drum has trended upwards over time, reflecting decreasing recruitment, at least regionally.

Burbot catch (3) in 2015 was the lowest catch in index gear over 27 years during which lakewide surveys occurred (Table 4.1.6). Fewer Burbot were caught (2) in 1996 due to the fact that surveys were limited to the west and west-central basins (Tables 4.1.1 and 4.1.2). Two Burbot were caught in the east basin while one was captured in the Pennsylvania Ridge area in 2015 (Tables 4.1.4 and 4.1.5). No Sea Lamprey wounds or scars were observed on the three Burbot. Their lengths ranged from 38 to 76 cm.

Lake Trout are stocked in Lake Erie by United States (U.S.) agencies and the Ontario Ministry Natural Resources and Forestry (OMNRF) as part of an effort to rehabilitate this native species. Many stocked fish are fin clipped with coded wire tags implanted in the nares. In 2015, a total of sixty one (61) Lake Trout were caught in index gear (Table 4.1.6b), distributed among surveys as follows: east-central basin (1), Pennsylvania Ridge (1) and the east basin (59). Two of the Lake Trout were caught in auxiliary index nets which do not appear in Tables 4.1.1 to 4.1.5; one was caught in the east-central basin nets canned at 1 fathom while the other was landed from a gang

fished in the thermocline, eastern basin. Another (1) additional Lake Trout was caught in auxiliary commercial style gear (4¾") fished suspended in the thermocline of the east basin. Four of the sixty-one (4/61) Lake Trout caught in index nets were from canned (suspended) nets, whereas the majority (57/61) were caught in nets fished on bottom. Gear depths at which Lake Trout were caught ranged from 4 to 55 m (mean = 25 m). Water temperatures at which Lake Trout were caught ranged from 6.1 ºC to 19.6 ºC (mean = 11.8 ºC); capture at the warmer temperature was associated with gill nets suspended at 16 m. The east basin Lake Trout catch in standard index nets in 2015 (58) was more than double the time series mean (24.5) (Table 4.1.5). Of the 61 Lake Trout caught lakewide in index nets, 58 had adipose fin clips, 2 Lake Trout had right pectoral fin clips and one (1) lacked a fin clip. The additional Lake Trout caught in auxiliary commercial style 4¾" gill net was adipose clipped. A single Lake Trout lacking a fin clip did not have a coded wire tag (CWT), implying that 1/62 (2%) of Lake Trout observed from all gear may be of natural origin. Thirteen (13) Lake Trout had fin clips but lacked coded wire tags. Strains were identified for 48 of all 62 Lake Trout caught. The number of Lake Trout by strain in 2015 was Slate Island (27), Lake Champlain (17), Finger Lakes (2), Klondike (1) and one (1) unknown strain (Finger Lake or Superior). Lake Trout caught in index gear in 2015 had total lengths ranging from 412-761 mm with a mean length of 657 mm. Ages based on coded wire tags ranged from 2 to 29 with a mean of 5.6. The fraction of Lake Trout observed with A4 wounds was 0.07. The wounding rate (wounded Lake Trout per 100 examined) of type A1, A2 or A3 was 0 on all Lake Trout examined. By strain of Lake Trout, 12% of Slate Island Lake Trout and 8% of clipped Lake Trout lacking coded wire tags had A4 wounds while remaining strains did not exhibit any scars or wounds.

In the west basin survey, two (2) Lake Sturgeon were caught in index gill nets during 2015 (Table 4.1.1). Both fish were identified and released. Lake Sturgeon in the Great Lakes is currently listed as *Threatened* under the Endangered Species Act of Ontario.

Silver Chub occur throughout Lake Erie, with the greatest densities observed in the west basin (Tables 4.1.1 - 4.1.5). Silver Chub abundance indices were lower over the recent decade compared to years prior (Tables 4.1.1, 4.1.6). In 2015, five (5) Silver Chub were caught in the west basin whereas one (1) was caught in the east-central basin Partnership survey. The Silver Chub ranged from 124 to 228 mm total length with a mean length of 187 mm. Lake Erie is in the northern part of the geographic range of Silver Chub. The status of Silver Chub is currently listed as *Threatened* under the Endangered Species Act of Ontario.

Lakewide Rainbow Trout (or Steelhead) catch in Partnership index gill nets during 2015 (17) was below average (30) (Table 4.1.6b). Rainbow Trout were distributed among index nets canned at standard depths, auxiliary index nets canned at 1 fathom in the central basin, index nets fished suspended in the thermocline and in index nets fished on bottom in the east basin and Pennsylvania Ridge surveys. Catches in auxiliary 1 fathom canned index nets in the central basin and in thermocline nets fished in the Pennsylvania Ridge and east basin surveys are not reported in Tables 4.1.3, 4.1.4 and 4.1.5 due to periodic use of this gear over time. Catches of Rainbow Trout from all index gear are included in the lakewide summary Table 4.1.6. One additional Rainbow Trout was caught in auxiliary commercial style 50 mesh 121 mm nets fished canned in the east basin survey. None of the 18 Rainbow Trout examined exhibited Lamprey scars or wounds. Rainbow Trout represent the majority of more than 2 million Salmonids stocked annually by Lake Erie agencies. Naturalized populations of Rainbow Trout also occur in Lake Erie.

One mature female Brown Trout (495 mm total length, 1,569 g) was caught in auxiliary 50 mesh 121 canned nets in the west-central basin survey. The fish lacked fin clips and there were no Sea Lamprey wounds or scars visible.

Species Biomass

Biomass trends for dominant species are presented for the west, west-central, east-central and east basins in Figure 4.1.2. Species with average biomass equaling at least 3% of basin averages are represented graphically. Remaining species are presented in the "other" species category. In Lake Erie, productivity and thermal gradients exist, varying from west to east, promoting differences in fish community structure. Since the west basin is considerably smaller in surface area and volume than other basins assessed, absolute numbers and biomass may be comparatively less than other

basins. Trends in mean biomass per gang of all species differed among Lake Erie surveys. West basin species biomass in 2015 (52 kg/gang) was ranked 32nd percentile in the time series, below the basin average (60 kg/gang). West-central biomass in 2015 (54 kg/gang, 48th percentile) was near the time series average (56 kg/gang). Similarly, the east-central (40 kg/gang, 67th percentile) and Pennsylvania Ridge (37 kg/gang, 52nd percentile) biomass levels were slightly above their respective time series means: 39 and 34 kg/gang, respectively. East basin biomass (11 kg/gang, 9th percentile) was well below the time series mean (20 kg/gang). Mean fish biomass per gang of all fish species caught was greatest in the east-central basin in 2015, followed by west-central, west, Pennsylvania Ridge, and east basin surveys.

The smallest mesh size in the index gear configuration is 32 mm which excludes most small bodied forage fish such as Rainbow Smelt, Emerald Shiners, and juvenile fish of many species. Round Gobies are caught in index gill nets when they are larger, but due to their body shape and benthic behaviour, they are underrepresented in gill net assessments and accounted for less than 1% of biomass in all 2015 surveys.

Fish biomass in the 2015 west basin survey decreased 19% from 2014, and consisted of Yellow Perch (30%), White Perch (20%), Walleye (15%), Gizzard Shad (10%), Freshwater Drum (7%), Channel Catfish (7%), White Bass (6%) and other species (6%). Shorthead Redhorse Suckers (3%) also contributed significantly to west basin biomass in 2015. Biomass increased from 2014 for Yellow Perch (20%) and Walleye (21%) but decreased significantly for White Perch, White Bass, Freshwater Drum and Channel Catfish. Gizzard Shad biomass in 2015 was comparable to 2014; however, values for both years were well below average. Biomass levels in 2015 for Yellow Perch, White Perch, White Bass, and Channel Catfish were at 75th percentiles or greater relative to their time series. Walleye and Gizzard Shad biomass in 2015 both ranked 16th percentile in their respective time series. Freshwater Drum biomass (44th percentile) was slightly below average in 2015 west basin index. Alewife biomass in 2015 was unchanged from 2014, remaining at zero in in the west basin survey. Smallmouth Bass historically accounted for more than 1% of all biomass but represented less than 1% in 2015, ranking 24th percentile over the 1990-2015 west basin time series. Shorthead Redhorse and Quillback Carpsucker biomass represented 96th and 80th percentiles respectively in 2015 relative to their time series while White Sucker biomass was moderate and ranked 44th percentile.

West-central basin total biomass per gang in 2015 was 41% greater than 2014 but with differences in species composition. Mean biomass per gang in 2015 was dominated by White Perch (32%), Freshwater Drum (30%), Walleye (11%), Yellow Perch (10%), Gizzard Shad (7%) and White Bass (3%) leaving 7% attributed to other species. Freshwater Drum biomass attained 100th percentile in 2015, followed by White Perch (92nd percentile), White Bass (64th percentile), Walleye (48th percentile), Yellow Perch (28th percentile) and Gizzard Shad (16th percentile). Alewife biomass in 2015 (0 kg/gang) remained unchanged from 2014. Channel Catfish (4%) and White Suckers (2%) contributed significantly to total biomass in 2015, with Channel Catfish biomass in 2015 attaining the highest level in the time series.

In the east-central basin survey, mean total biomass per gang in 2015 was 46% greater than 2014. Mean biomass per gang in 2015 was dominated by Yellow Perch (41%), White Perch (26%), Freshwater Drum (14%), Walleye (9%), White Bass (4%), and Gizzard Shad (1%) leaving 5% attributed to other species. White Perch biomass in 2015 was 80th percentile in the time series, followed by Walleye and White Bass (72nd percentiles), Yellow Perch (68th percentile), Freshwater Drum (40th percentile) and Gizzard Shad (8th percentile). Alewife biomass was zero for the second consecutive year in 2015. White Suckers (2%), Channel Catfish (2%) and Rainbow Smelt (1%) contributed significantly to total biomass in 2015. Similar to the west-central basin survey, Channel Catfish biomass in 2015 achieved the highest level in the east-central basin time series.

In the east basin survey, mean biomass per gang of all species in 2015 declined 20% from 2014. The species composition of eastern Lake Erie consists of warm, cool, and cold water fish communities. Seven species represented 93% of the fish biomass in 2015 including Lake Trout (27%), Walleye (26%), Yellow Perch (18%), Freshwater Drum (10%), White Bass (6%), Smallmouth Bass (3%), and White Suckers (3%). Unlike observations from surveys in west and central Lake Erie, Alewife biomass increased in 2015 but remained well below average. Alewife comprised 1% of

total biomass in 2015 in the east basin whereas Gizzard Shad represented less than 1%. Lake Trout biomass in 2015 was 96th percentile in this species' time series, followed by White Bass (88th percentile) and Walleye (73rd percentile). Moderate to low biomass levels relative to each species' time series was observed for Alewife, Yellow Perch, Freshwater Drum, White Perch, White Suckers and Gizzard Shad, Smallmouth Bass and Burbot. Other species that contributed significantly to total biomass in 2015 were Channel Catfish (3%), Rainbow Trout (1%) and Rainbow Smelt (1%). Lake Whitefish biomass in east basin index gill nets during 2015 was zero for the third consecutive year. Numbers were rounded to the nearest percentage.

Yellow Perch

In 2015, Yellow Perch catch rates (all ages) increased from 2014 in the west (24%), Pennsylvania Ridge (28%) and east basin (65%) surveys, remained unchanged in the east-central survey, and decreased in the west-central (58%) basin (Figure 4.1.3). Yellow perch catch rates (all ages) in 2015 ranked 84th, 20th, 69th, 71st and 54th in percentiles for the west, west-central, east-central, Pennsylvania Ridge and east basin surveys respectively.

Age composition and catch rates of Yellow Perch are influenced by the mesh size configuration of the index gear. Although catches were standardized to equal effort among mesh sizes, the following results are otherwise not adjusted for any bias due to mesh size configuration. Generally, catch rates reported here underestimate the abundance of yearling Yellow Perch relative to older Yellow Perch.

Yellow Perch ages 1 to 8 were present in the 2015 west basin survey with age 1 fish being the most abundant age group (2014 year class; 51%) followed by age 2 (2013 year class; 36%) and age 3 (2012 year class; 7%) (Figure 4.1.3). In the 2015 west-central basin survey, the Yellow Perch age composition included ages 1 to 9 with age 3 (2012 year class; 34%), age 1 (2014 year class; 33%) and age 2 (2013 year class; 21%) most abundant. East-central Yellow Perch catches consisted of fish ages 1 to 14 with age 3 (2012 year class; 54%), age 4 (2011 year class; 12%) and age 1 (2014 year class; 11%) representing 78% of the catch. The east basin survey was composed of Yellow Perch age 1 (2014 year class; 62%), age 2 (2013 year class; 17%) and age 3 (2012 year class; 15%) with ages ranging from 1 to 11. In contrast, Pennsylvania Ridge catches were comprised of Yellow Perch age 3 (2012 year class; 46%) with significant contributions from ages 4 (18%), 5 (12%) and 7 (14%). Age 12 (2003 year class) comprised 1% of the catch in the Pennsylvania Ridge survey.

The cohort strength of the 2014 year class was assessed as strong in the west basin (92nd percentile) and in the east basin survey (96th percentile) (Figure 4.1.3). Yearling Yellow Perch were not as strong in central basin and Pennsylvania Ridge surveys, with catch rates in 2015 ranking 44th, 68th and 38thnd percentiles for the west-central, east-central and Pennsylvania Ridge surveys respectively. The abundance index of Yellow Perch ages 6 and older in 2015 was the highest in the Pennsylvania Ridge survey where they represented 20% of Yellow Perch caught. Ages 6 and older Yellow Perch were significant in the 2015 east-central basin survey, accounting for 8% of Yellow Perch caught. The contribution of age 6 and older Yellow Perch in the west, west-central and east basin surveys was lower, representing 2%, 3% and 1% of 2015 catches respectively.

The mean age of Yellow Perch caught reflects differences in age composition between surveys with the highest value in the Pennsylvania Ridge survey (3.7) and the lowest value in the west and east basins (1.8) (Figure 4.1.4). Yellow Perch sex ratios remained relatively stable over the time series to 2015, during which females represented 43% (east-central) to 58% (west) of Yellow Perch ages 2 and older (Figure 4.1.5).

Mean total length (mm) and weight (g) for each sex was plotted by basin for Yellow Perch collected in 2015 with 95% confidence limits to compare with the time series average up to 2014 (Figure 4.1.6). Length and weight of Yellow Perch may be influenced by factors such as temperature, forage abundance, competition, and survival. A transition in 2005 to aging older Yellow Perch using otoliths may have contributed to observations for which annual mean size of older fish fall below the time series mean. Mean length at age in 2015 was near or above average for males in all surveys, except for age 1 male in the east-central basin which appeared smaller (Figure 4.1.6). Female

length at age in 2015 was near or above average in the west and east basin surveys, while ages 1 and 2 in the east-central basin survey and older females in both central basin surveys were near or below average length. Similar patterns were observed for mean weight at age with older females and some males exhibiting lower mean weight in central basin surveys (Figure 4.1.6). Mean length trends at ages 1, 2 and 3 by sex of Yellow Perch caught in surveys are presented in Figure 4.1.7. Oscillations in mean length at age were evident for both sexes in all basins. Yellow Perch mean lengths at ages 1, 2 and 3 were average or higher in the west and west-central basin surveys compared to their respective time series (Figure 4.1.7). Mean length of age 1 Yellow Perch declined in the east-central basin during 2015, and to some degree in the east basin survey. Mean lengths of age 2 Yellow Perch in 2015 were large for both sexes in the east basin survey.

All Yellow Perch caught during the 2015 fall Partnership gill net survey were scanned for passive integrated transponder tags (PIT) which have been applied by OMNRF since 2009 and by Ohio Department of Natural Resources (ODNR) since 2013. Yellow Perch (2,125 kg or 21,305 fish) were scanned for PIT tags as sample bags were removed from totes in the lab. No PIT tags were detected in Yellow Perch scanned in 2015.

Walleye

Abundance indices of Walleye in 2015 were strongly influenced by the presence or absence of juveniles which varied from west to east. Walleye catch rates in 2015 increased from 2014 in the west, west-central and east-central basin and Pennsylvania Ridge surveys but declined in the east basin (Figure 4.1.8). The increase throughout most of the lake was attributed primarily to abundant YOY and yearling Walleye; these age groups were absent in east basin Walleye catches.

Young-of-the-year Walleye catch rates were at record high levels (100th percentile) in the west, west-central, and east-central basin surveys but were absent in the Pennsylvania Ridge and east basin surveys (Figure 4.1.8). Age 1 Walleye indices were good in the west (68th percentile) but second highest (96th percentiles) in the time series for the west-central and east-central basin surveys (Figure 4.1.8). Yearling abundance was moderate in the Pennsylvania Ridge survey (52nd percentile) and zero in the east basin assessment. Age 2 Walleye catch rates in 2015 were lower in the west basin (32nd percentile) compared to central basin and Pennsylvania Ridge surveys (west-central 48th, east-central 44th, Pennsylvania Ridge 43rd percentiles). Age 3 catch rates were weaker in the west and west-central basin surveys, present at moderate levels in the east-central and east basin surveys and better in the Pennsylvania Ridge survey (Figure 4.1.8). Catch rates of age 4 Walleye in 2015 ranged from weak in the west (28th percentile), gradually improving eastward to moderate in the east basin survey (67th percentile). Walleye age 5 were present in moderate numbers in the west and central basin surveys but had a strong presence (92nd percentile) in the east basin survey. Six year old Walleye catches were low lakewide. Catch rates of age 7 and older Walleye were highest in the east basin (100th percentile), Pennsylvania Ridge (100th percentile) and east-central basin (76th percentile) but were more moderate in the west (68th percentile) and west-central (64th percentile) basin surveys. Age 12 Walleye (2003 year class) comprised 1%, 1%, 2%, 16% and 22% of catches in the west, west-central, east-central, Pennsylvania Ridge and east basin respectively in 2015.

The mean age of Walleye caught in 2015 was lowest in the west-central (0.8), followed by the west (0.9) and east-central basins (1.2), Pennsylvania Ridge (7.4) and east basin (7.7) surveys (Figure 4.1.9). Walleye mean age in 2015 was influenced by the strength of the 2015 and 2014 year classes (ages 0, 1). The percentage of age 2 and older Walleye caught that were female in 2015 surveys ranged from 34% to 68% in surveys. In 2015, the proportions of age 2 and older Walleye that were female in the west (44%) and west-central (34%) basins were below average (Figure 4.1.2).

Mean total length (mm) and weight (g) with 95% confidence limits for each sex was plotted by basin for Walleye collected in 2015. The average size at age for each sex across years pooled to 2014 was plotted for comparison (Figure 4.1.11). Both sexes of Walleye caught in 2015 were generally above or near average in length lakewide (Figure 4.1.11). With several exceptions for older Walleye, mean weights at age were near average levels in 2015. In the east basin 2015 survey however, mean weights at age for most males and some females fell below time series averages (Figure 4.1.11). To describe change in mean length over time, trends are presented for YOY Walleye with

sexes pooled, yearlings with sexes pooled and ages 2 and 3 Walleye by sex for the west, central basin surveys combined and east basin survey (Figure 4.1.12). YOY Walleye mean length was near average in 2015 for fish collected during the west basin survey, but was below average for YOY caught in central basin surveys. Mean length of yearling Walleye declined in 2015 in west and central basin surveys. Mean lengths of Walleye ages 2 and 3 in 2015 were large compared to the west basin time series, but were comparable to or less than average length in the central basin time series. Age specific metrics may be influenced by the transition from using scales to otoliths for age determination.

In 2015, Walleye index gill net catch rates were greater in bottom nets compared to standard canned index nets in the west, east-central, and east basin surveys, but not in the west-central basin (Figure 4.1.13). Catch rates in auxiliary index nets fished at 1 fathom (1.8 m) depths in the west-central basin (34.7 Walleye/gang) were higher than observed for standard canned (27.6 Walleye/gang) and bottom nets (16.6 Walleye/gang) while catch rates in 1 fathom canned nets in the east-central basin (7.9 Walleye/gang) were marginally greater than standard canned nets (7.5 Walleye/gang) but less than nets fished on bottom (9.3 Walleye/gang) (Figure 4.1.13). In the east basin survey the Walleye catch rate in nets fished within the thermocline (1.1 Walleye/gang) was slightly less than the catch rate of standard canned nets (1.5 Walleye/gang) and nets fished on bottom (1.7 Walleye/gang). Catch rate comparisons among gear are influenced by dominant age groups which vary spatially and annually.

Walleye catch rates in commercial style 50 mesh 121 mm (4¾") nets fished adjacent to all index canned nets were highest in the west-central basin (1.4 Walleye/gang), and east basin nets fished in the thermocline (1.4), followed by canned nets fished in the east basin (0.9), east-central basin (0.7) and in the western basin at standard canned depths (0.4) (Figure 4.1.13). In Figure 4.1.13, central basin catch rates combined nets fished at standard depths along with canned nets fished at 1 fathom (1.8 m). Total lengths of Walleye caught in index nets ranged from 13 to 75 cm whereas commercial style 4¾" nets caught Walleye 19 cm to 76 cm in length and were generally composed of larger Walleye (Figure 4.1.13).

Walleye catch rates in 4¾" (121 mm) nets are presented for the west, west-central, and east-central basins pooled (Figure 4.1.14) and for the east basin (Figure 4.1.15). Walleye catch rates in 2015 were the lowest observed for the pooled west-central series since 2003 (Figure 4.1.14). Walleye catch rates in 2015 in the east basin tripled catch rates observed in 2014 (Figure 4.1.15). Ages in the auxiliary west and central surveys ranged from 0 to 16 with ages 5 (21%), 4 (19%) and 12 (19%) and 3 (14%) most common. In the east basin, Walleye ages ranged from 4 to 14 with ages 12 (26%), 5 (20%), and 14 (9%) most abundant. Walleye ages 7 and older accounted for 32% of Walleye caught in the west and central areas compared to 67% of Walleye caught in the east basin (Figures 4.1.14 and 4.1.15).

All 3,357 Walleye caught and sampled during Partnership surveys were scanned for PIT tags in 2015. No PIT tags were detected.

Lake Whitefish

Lake Whitefish are a migratory cold water species caught in central basin surveys following fall turnover and in the cold, hypolimnetic waters of the eastern basin while the water column is thermally stratified. The west basin survey occurs in September when the water is warm, preceding the Lake Whitefish migration into the west basin to spawn.

Ten (10) Lake Whitefish were caught in Partnership index gear in 2015. Catches were distributed between the west-central basin (5) and east-central basin (4) and Pennsylvania Ridge (1). Four additional Lake Whitefish were caught in auxiliary 121 mm canned nets in the west-central basin in 2015.

Lake Whitefish indices are standardized to equal effort among mesh sizes. Lake Whitefish catch rates remained low in 2015; catch rates by basin were: west-central (0.07), east-central (0.10), Pennsylvania Ridge (0.11) and east basin (0). A composite index of all gill net surveys using standard index gear, excluding the west basin, is presented in Figure 4.1.16. Catch rates in the

2015 composite index exceeded the previous 4 years slightly and was 15th percentile over the time series.

The age composition of Lake Whitefish caught in Partnership index gear in 2015 included ages 0 to 14, with age 12 (2003 year class) and age 0 (2015 year class) most abundant. In addition, 4 mature male Lake Whitefish were caught in auxiliary 121 mm gear that was ages 8, 10, 12 and 13. The presence of age 0 Lake Whitefish is a positive sign as they have not been observed in the Partnership index since 2003. None of the YOY Lake Whitefish sampled had Sea Lamprey wounds or scars. Only one adult Lake Whitefish (1/10) had an A4 wound.

The mean age in the Lake Whitefish population began a trend upward with the recruitment of the 2003 year class at age 2 in 2005. In 2015, the mean age dropped significantly due to young-of-the-year (age 0) Lake Whitefish caught in 2015 (Figure 4.1.17). The lengths and weights of Lake Whitefish at age caught in index gill nets during 2015 are presented in Figure 4.1.18 along with mean size at age over the time series. Only one Lake Whitefish caught in 2015 was female. Age 12 males (N = 5) in 2015 were close to average length and weight. Sex of age 0 Lake Whitefish was unknown. Sample sizes were limited for size based comparisons.

Smallmouth Bass

In Ontario waters of Lake Erie, the majority of Smallmouth Bass are caught primarily in the east and west basins. Most Partnership survey locations in eastern Lake Erie were situated outside of Long Point Bay which is recognized as excellent habitat for Smallmouth Bass (Figure 4.1.1). Smallmouth Bass catch rates in 2015 were very low for both the west (12th percentile) and east basin (0 percentile) (Table 4.1.1, Table 4.1.5, and Figure 4.1.19). West basin Smallmouth Bass age composition ranged from 0 to 14 whereas east basin ages ranged from 2–9. Ages 0 (38%), 2 (25%) and 1 (13%) accounted for the largest fraction of Smallmouth Bass caught in the west basin survey. Eastern Smallmouth Bass age composition consisted of ages 7 (38%), 5 (29%), 6 (10%) with remaining age representation more evenly distributed. Mean length and weight at age of Smallmouth Bass in 2015 were near the long term averages for the west basin survey, although data were limited for comparisons. In the east basin survey, male and female Smallmouth Bass sizes at age were generally near the long term means with the exception of age 7 females which were shorter and lighter than long term average length and weight (Figure 4.1.20).

White Perch

Temporal trends in White Perch catch rates differed across Lake Erie. Catch rates in 2015 decreased from 2014 in the west (35%) but more so in the Pennsylvania Ridge (98%) and east basin (99%) surveys. In contrast, increased catch rates were observed in the west-central (21%) and east-central basin (90%) surveys (Figure 4.1.21). White Perch catches in 2015 were near average in the west and central basin surveys, but were the lowest catches in the time series for Pennsylvania Ridge and east basin surveys (Tables 4.1.1 – 4.1.5). White Perch ages ranged from 0 to 8 in the west, 0 to 9 in the west-central, 0–8 in the east-central, 2-4 in Pennsylvania Ridge survey but included only age 4 White Perch in the east basin survey (Figure 4.1.21). In the west and central basin surveys, age 3 (2012 year class) fish were abundant, though yearlings were most abundant in the west basin (Figure 4.1.21). Mean lengths and weights at age were at or above average for all age groups in all basins surveyed in 2015 (Figure 4.1.22).

White Bass

White Bass abundance indices in 2015 were below average to various degrees in all surveys except for the Pennsylvania Ridge survey (Tables 4.1.1 - 4.1.6). Catch rates in 2015 decreased from 2014 in all surveys, but only marginally so in the east-central basin (Figure 4.1.23). White Bass ages ranged from 0 to 6 in the west, 0 to 6 in the west-central, 0 to 5 in the east-central, 3 to 6 in Pennsylvania Ridge and 3 to 6 in the east basin surveys (Figure 4.1.23). Age 3 (2012 cohort) White Bass dominated all surveys, representing from 71% to 81% of White Bass caught. With few exceptions, mean weight at age was near average (Figure 4.1.22).

Table 4.1.1 Total numbers of each species caught during western basin Partnership Index Fishing, Lake Erie, 1990-2015. Numbers are standardized to 44 gangs. Average catch from 1990-2015 is presented for each species.

Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
Silver Lamprey	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0.1
Lake Sturgeon	0	0	1	1	1	1	2	0	1	0	3	0	2	5	8	0	1	9	2	0	2	1	1	4	1	2	1.9
Longnose Gar	0	0	1	0	1	0	0	0	1	7	4	1	0	0	0	0	0	0	0	1	1	0	2	2	1	1	0.9
Alewife	87	2,272	309	196	349	1,384	105	54	1,159	1,239	1,939	154	721	0	103	2	80	1	0	0	0	14	7	249	0	0	400.9
Gizzard Shad	718	7,729	2,856	4,103	5,844	6,624	1,118	1,416	2,873	8,542	2,838	4,056	8,561	7,043	5,294	14,185	8,329	2,887	3,283	1,544	1,846	7,927	7,082	1,993	1,767	1,343	4,684.6
Pink Salmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.0
Chinook Salmon	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Rainbow Trout	3	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0.3
Brown Trout	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Lake Whitefish	10	1	0	1	0	5	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8
Rainbow Smelt	8	1	0	37	0	1	0	1	1	0	1	95	1	0	1	1	2	2	34	1	1	0	2	0	2	0	7.4
Muskellunge	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Quillback	0	1	6	3	5	4	12	5	4	12	7	34	24	25	13	12	9	9	11	8	1	12	11	4	12	14	9.9
White Sucker	59	43	130	46	94	46	73	71	30	39	42	101	90	77	127	133	69	61	71	91	29	201	78	44	43	97	76.4
Silver Redhorse	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Golden Redhorse	0	0	0	0	0	0	0	19	0	1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0
Shorthead Redhorse	1	4	22	7	15	13	14	50	17	19	23	31	6	28	33	15	10	41	34	84	31	54	37	26	39	66	27.7
Redhorse sp.	0	0	0	0	0	0	0	0	1	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8
Goldfish	0	0	0	0	0	1	0	0	0	2	4	0	0	0	0	2	0	0	5	2	0	0	0	0	12	4	1.2
Common Carp	25	29	4	7	3	2	7	3	1	3	16	22	6	1	4	1	8	3	3	5	1	3	9	1	4	0	6.6
Silver Chub	25	35	147	121	59	96	89	73	67	185	133	61	48	44	84	21	38	9	2	1	2	8	3	6	16	5	53.0
Hornyhead Chub	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Emerald Shiner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0.1
Spottail Shiner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	1	0	0	0	0	0	0	0	0	0.2
Brown Bullhead	0	0	1	0	0	0	0	0	0	0	3	1	1	0	0	2	0	1	1	0	0	0	2	0	1	0	0.5
Channel Catfish	62	112	45	83	48	55	59	37	35	62	38	86	89	139	97	244	167	218	106	140	106	268	263	149	343	185	124.5
Stonecat	1	1	0	1	0	0	1	0	2	2	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0.4
Tadpole Madtom	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Brindled Madtom	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Burbot	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Trout-perch	0	0	0	0	0	0	0	1	4	0	1	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4
White Perch	462	713	3,155	2,217	1,194	971	972	382	309	1,795	2,053	1,710	1,195	3,090	2,998	3,613	5,360	3,462	1,852	2,108	973	5,167	2,989	2,474	4,223	2,636	2,233.6
White Bass	158	110	65	67	288	89	135	271	102	174	225	308	460	367	218	285	277	275	357	435	134	804	2,041	524	728	294	353.5
Rock Bass	6	27	20	1	18	5	12	9	8	5	8	23	7	13	8	3	5	21	1	9	10	0	3	6	12	6	9.4
Pumpkinseed	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0.2
Bluegill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.0
Smallmouth Bass	41	83	149	231	231	108	248	162	166	93	116	12	59	12	17	2	32	15	19	78	17	13	34	16	21	13	76.4
Largemouth Bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.0
Black Crappie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	1	0	0	0	0	0.2
Yellow Perch	822	1,324	2,737	2,211	3,291	4,612	5,102	3,468	3,292	4,415	3,445	10,701	5,774	5,566	7,396	6,843	3,616	5,057	8,472	4,981	2,326	5,448	4,360	2,648	5,328	6,381	4,600.6
Walleye	602	1,648	1,356	1,886	1,002	1,503	821	1,148	648	769	1,143	691	714	1,297	1,408	1,365	914	483	837	831	326	2,178	848	588	582	1,008	1,022.9
Round Goby	0	0	0	0	0	0	0	0	5	3	5	4	4	4	10	2	0	0	12	5	1	1	0	3	5	5	2.7
Freshwater Drum	460	378	377	405	398	308	459	314	238	572	445	873	864	536	578	1,196	433	459	317	407	101	1,019	545	273	661	237	494.3
Goldfish-Carp Hybrid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	1	1	0	1	0.3
Total	3,551	14,517	11,383	11,624	12,842	15,829	9,231	7,484	8,965	17,939	12,505	18,968	18,646	18,249	18,407	27,927	19,354	13,016	15,422	10,731	5,914	23,120	18,319	9,011	13,801	12,298	14,194
Number of Sites	21	22	21	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Number of Gangs	40	38	40	42	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	43

Note: Values are continually corrected for errors and may be updated from previous reports.

Table 4.1.2 Total numbers of each species caught during west-central basin Partnership Index Fishing, Lake Erie, 1990-2015. Numbers are standardized to 72 gangs. Average catch from 1990-2015 is presented for each species. Only standard gear was included.

Species	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
Lake Sturgeon	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0.1
Longnose Gar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.1
Alewife	3,113	12,712	1,578	1,746	2,821	3,437	785	27	2,616	5,532	3,082	432	7,928	0	1	0	64	0	0	0	0	0	45	1,274	0	0	1,815.1
Gizzard Shad	1,011	4,481	1,619	2,575	1,555	2,381	1,814	812	1,873	4,506	6,522	2,496	13,739	2,552	3,053	4,985	2,010	3,165	435	1,492	11,074	2,608	6,981	1,807	422	1,751	3,373.8
Coho Salmon	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Chinook Salmon	0	4	0	1	0	3	0	3	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0.5
Rainbow Trout	2	0	1	0	0	2	0	0	0	3	1	0	3	2	0	0	3	1	0	1	0	1	0	0	0	0	0.8
Lake Whitefish	5	0	5	4	10	29	15	62	31	47	49	11	17	36	15	82	40	29	50	21	5	9	1	1	7	5	22.5
Rainbow Smelt	47	386	230	155	332	1,382	435	331	89	336	124	33	85	49	71	251	102	365	560	314	444	315	34	203	290	157	273.8
Muskellunge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.0
Quillback	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	1	1	1	0	0	0	0	0	0	2	0.3
White Sucker	71	79	80	9	25	26	25	29	42	19	63	15	29	57	98	60	67	77	64	97	121	26	109	101	45	101	59.0
Spotted Sucker	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Silver Redhorse	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0.2
Golden Redhorse	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Shorthead Redhorse	1	6	2	0	0	1	1	0	0	4	0	1	0	3	2	0	2	1	5	10	1	4	2	1	2	4	2.0
Goldfish	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.1
Common Carp	3	0	0	0	0	2	1	1	0	0	2	0	2	1	0	0	3	5	1	0	1	4	0	3	0	1	1.2
Silver Chub	2	5	15	0	0	1	0	0	3	4	3	0	2	0	0	1	0	1	5	3	0	0	1	0	0	0	1.8
Emerald Shiner	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	3	0	0	0	0	0	0.2
Spottail Shiner	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0.4
Brown Bullhead	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.1
Channel Catfish	17	28	25	15	6	25	27	5	6	3	13	1	9	7	7	11	49	65	13	44	70	63	52	127	61	141	34.2
Stonecat	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Burbot	3	7	5	3	5	3	2	8	9	0	2	1	0	4	0	0	0	0	0	0	0	0	0	0	2	0	2.1
Trout-perch	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
White Perch	3,898	2,055	5,184	2,881	1,141	1,221	552	865	881	2,177	3,431	1,269	2,896	2,978	6,473	6,438	9,077	6,237	6,923	5,880	6,037	5,386	5,080	8,891	3,054	5,561	4,094.8
White Bass	212	184	70	26	347	232	304	678	287	296	481	125	248	217	383	582	654	474	511	367	854	1,072	926	1,338	491	258	446.8
Rock Bass	0	1	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2
Pumpkinseed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.0
Bluegill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.0
Smallmouth Bass	0	3	2	0	1	1	1	1	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0.5
Largemouth Bass	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Yellow Perch	1,810	2,315	2,105	1,165	2,020	2,260	3,813	5,002	3,070	5,034	11,823	9,604	10,941	12,950	24,743	13,156	11,161	15,409	12,276	9,516	7,616	7,538	8,658	6,706	6,453	2,846	7,691.9
Walleye	479	591	740	483	282	783	527	486	183	98	462	56	197	317	1,765	1,022	629	428	211	318	632	309	512	257	258	1,138	506.2
Round Goby	0	0	0	0	0	0	0	1	8	37	19	13	10	24	15	9	17	4	49	11	7	8	1	4	4	6	9.5
Freshwater Drum	3,306	1,395	2,696	1,330	1,740	1,192	1,441	1,534	840	1,231	1,752	809	3,249	1,883	1,736	2,076	2,281	1,360	1,475	1,587	1,374	1,238	1,395	1,735	583	2,594	1,685.8
Goldfish-Carp Hybrid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0.2
Total	13,981	24,253	14,357	10,393	10,286	12,983	9,744	9,845	9,939	19,330	27,834	14,866	39,359	21,084	38,368	28,676	26,161	27,624	22,579	19,664	28,240	18,582	23,800	22,452	11,673	14,574	20,025
Number of Sites	34	36	36	36	36	36	36	36	28	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	36	36	36
Number of Gangs	68	72	72	72	72	72	72	72	56	72	72	72	72	72	72	72	72	72	72	72	72	72	72	70	72	72	71

Note: Values are continually corrected for errors and may be updated from previous reports.

Table 4.1.3 Total numbers of each species caught during east-central basin Partnership Index Fishing, Lake Erie, 1989-2015. Numbers are standardized in 2015 to an effort of 72 gangs. Average catch from 1989-2015 is presented for each species. Study was not done in 1996. Only standard gear was included.

Species	1989	1990	1991	1992	1993	1994	1995	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
Lake Sturgeon	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Alewife	677.3	3,567	12,878	1,894	682	578	1,556	143	1,350	7,108	5,033	793	8,380	4	4	48	153	18	4	0	1	35	1,058	3,497	0	0	1,951.3
Gizzard Shad	860	285	2,633	522	1,003	637	1,971	426	1,250	3,197	2,281	462	5,753	127	351	1,822	892	608	53	247	503	520	5,788	254	24	116	1,269.0
Coho Salmon	1.3	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Chinook Salmon	0	0	0	0	0	2	0	9	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5
Rainbow Trout	2.7	0	1	2	1	0	2	2	1	1	0	2	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0.7
Lake Trout	1.3	0	1	2	0	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	1	0	0.4
Lake Whitefish	5.3	2	2	4	41	21	24	142	46	33	21	11	21	27	14	43	36	13	6	13	9	2	1	0	2	4	21.5
Rainbow Smelt	320	118	525	322	375	324	1,418	309	1,329	589	248	1,450	920	307	835	423	438	758	1,083	1,088	142	834	191	958	158	717	634.3
Northern Pike	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5
Quillback	0	0	0	0	24	9	3	0	1	0	5	0	0	0	2	2	0	0	0	1	0	5	0	0	1	4	2.2
White Sucker	72	52	63	72	129	78	126	46	60	56	71	30	135	13	60	78	83	35	35	73	52	62	30	28	39	62	62.7
Silver Redhorse	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Golden Redhorse	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2
Shorthead Redhorse	0	15	0	4	12	0	2	2	1	2	18	0	1	0	0	0	1	1	1	3	1	3	0	0	1	3	2.8
Goldfish	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0.1
Lake Chub	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Common Carp	0	0	0	1	5	0	0	0	1	0	7	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.8
Silver Chub	0	0	0	1	0	0	0	0	24	14	18	7	2	0	1	4	2	2	0	2	0	2	0	0	3	1	3.3
Emerald Shiner	0	0	0	0	15	2	5	0	0	0	0	0	0	2	2	0	1	0	2	4	0	0	2	0	0	0	1.4
Common Shiner	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Spottail Shiner	0	2	1	1	3	0	0	2	0	18	0	0	10	0	2	0	2	0	0	0	2	0	0	0	0	5	1.9
Notropis sp.	9.3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Channel Catfish	12	3	11	10	43	19	12	7	6	6	26	9	23	2	17	8	11	18	0	8	8	12	19	12	5	39	13.3
Stonecat	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Tadpole Madtom	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Burbot	30.7	13	9	19	20	19	14	25	36	15	2	12	9	0	1	3	2	1	2	0	2	1	0	2	1	0	8.3
Trout-perch	0	7	1	19	12	4	0	2	2	1	0	15	4	12	7	1	3	0	4	0	0	0	0	0	0	0	3.8
White Perch	7621.3	4,449	1,929	3,480	809	392	203	268	179	529	1,086	1,225	4,046	1,967	1,777	6,905	3,674	2,364	2,688	1,713	2,440	3,009	6,230	3,705	1,400	2,883	2,374.0
White Bass	636	88	170	91	67	203	176	734	167	419	316	101	261	276	232	329	765	330	161	201	143	1,451	952	1,040	267	215	366.2
Rock Bass	0	0	0	0	3	0	3	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0.3
Bluegill	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0.1
Smallmouth Bass	0	0	0	0	0	0	8	0	6	2	0	0	1	0	0	1	0	0	0	2	0	0	0	0	0	0	0.8
Largemouth Bass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.0
Black Crappie	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.0
Yellow Perch	3332	1,121	1,174	1,295	726	2,179	1,944	4,681	2,347	7,149	9,229	4,613	8,458	5,744	6,956	8,578	8,132	9,367	9,967	12,384	7,153	12,186	5,732	3,790	7,487	7,814	6,008.3
Walleye	465.3	118	207	276	367	366	237	82	70	17	29	27	99	68	639	473	310	63	45	81	33	152	108	92	97	504	182.4
Round Goby	0	0	0	0	0	0	0	0	2	40	61	34	157	76	70	148	39	41	41	34	91	68	22	4	47	18	39.7
Freshwater Drum	3612	2,443	1,876	2,380	1,323	1,184	548	956	669	985	1,304	1,304	2,399	1,077	1,890	1,123	1,227	670	799	1,156	311	907	1,575	1,182	239	541	1,202.7
Goldfish-Carp Hybrid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0
Total	17,659	12,296	21,482	10,398	5,662	6,023	8,247	7,836	7,549	20,181	19,758	10,099	30,682	9,706	12,860	19,992	15,774	14,290	14,892	17,012	10,892	19,253	21,708	14,565	9,772	12,927	14,154
Number of Sites	27	22	31	30	29	17	24	33	32	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	36	36	33
Number of Gangs	54	44	62	60	58	34	48	66	64	72	72	72	72	72	72	72	72	72	72	72	72	72	72	70	72	72	66

Note: Values are continually corrected for errors and may be updated from previous reports.

Table 4.1.4 Total numbers of each species caught during Pennsylvania Ridge Partnership Index Fishing, Lake Erie, 1991-2015. Numbers are standardized to an effort of 18 gangs. Average catch from 1991-2015 is presented for each species. The study was not done in 1996,1997 and 2013. Only standard canned nets are included (no thermocline gangs).

Species	1991	1992	1993	1994	1995	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2014	2015	Average
Longnose Gar	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.0
Alewife	740	1,530	0	16	133	605	69	2,284	42	1,076	0	0	0	489	0	0	0	11	2	263	0	0	330.0
Gizzard Shad	16	20	36	531	95	96	101	515	141	374	15	17	2	163	20	85	48	98	306	246	1	2	133.1
Pink Salmon	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Coho Salmon	2	0	2	0	0	0	1	0	2	0	1	0	0	0	0	1	0	0	1	0	0	0	0.5
Chinook Salmon	0	0	0	1	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Rainbow Trout	1	0	2	0	1	2	5	3	8	17	7	13	35	8	0	1	1	1	4	3	1	6	5.4
Lake Trout	1	2	8	5	9	3	2	0	5	4	1	10	3	4	2	1	2	3	5	4	6	1	3.7
Lake Whitefish	13	17	33	15	53	59	1	1	14	1	9	3	12	1	115	43	11	0	0	2	0	1	18.4
Rainbow Smelt	179	22	38	38	60	40	14	8	111	21	54	80	9	16	630	183	86	6	10	489	3	54	97.8
Muskellunge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.0
Quillback	0	0	0	0	0	0	1	2	6	1	0	2	0	2	0	1	2	0	12	0	6	1	1.6
White Sucker	18	20	12	15	15	62	11	9	65	10	24	16	13	19	7	12	72	40	37	15	12	20	23.8
Silver Redhorse	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	3	1	0	1	0.4
Golden Redhorse	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Shorthead Redhorse	0	3	3	1	2	24	2	2	18	2	3	9	0	3	0	6	44	2	50	0	4	2	8.2
Redhorse sp.	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Common Carp	0	0	0	0	0	0	0	3	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.2
Silver Chub	0	0	0	0	0	0	0	0	3	0	8	0	0	1	0	2	2	0	1	0	0	0	0.8
Emerald Shiner	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0.1
Spottail Shiner	0	3	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	2	0	1	0	0.5
Channel Catfish	0	4	2	3	0	4	2	1	5	2	0	1	0	1	2	1	1	0	10	1	2	1	2.0
Stonecat	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Burbot	8	8	8	12	15	71	59	36	74	49	76	49	10	10	54	17	20	8	14	6	1	1	27.5
Trout-perch	0	0	0	0	0	0	0	1	4	2	1	0	0	0	2	0	0	0	0	0	0	0	0.5
White Perch	446	195	93	34	46	70	56	68	142	104	129	34	39	186	16	73	44	436	425	58	218	11	132.9
White Bass	55	63	7	4	84	35	20	36	26	5	6	5	3	103	20	34	18	21	106	9	146	69	39.8
Rock Bass	1	1	0	1	1	13	7	2	9	1	0	0	0	2	0	1	0	2	3	0	0	0	2.0
Smallmouth Bass	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Black Crappie	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Yellow Perch	714	20	190	104	483	1,743	1,654	3,752	1,881	3,008	1,115	1,310	2,558	4,710	4,280	3,508	3,783	5,204	2,853	4,395	2,595	3,036	2,404.3
Walleye	13	34	23	27	47	19	12	7	13	7	14	9	102	30	7	39	31	18	20	17	30	36	25.2
Round Goby	0	0	0	0	0	0	2	19	30	38	37	4	9	146	95	67	28	25	22	3	1	1	23.9
Freshwater Drum	285	118	43	142	88	103	41	62	74	56	39	15	9	21	14	37	127	56	98	3	120	9	70.9
Total	2,493	2,060	501	949	1,134	2,953	2,062	6,813	2,679	4,782	1,540	1,581	2,804	5,917	5,263	4,112	4,321	5,931	3,985	5,515	3,147	3,252	3,354.3
Number of Sites	9	9	9	9	9	9	9	9	9	9	9	9	9	9	4	9	9	9	9	9	9	9	8.8
Number of Gangs	18	18	18	18	18	18	18	18	18	18	18	18	18	18	8	18	18	18	18	18	18	18	17.5

Note: Values are continually corrected for errors and may be updated from previous reports.

Table 4.1.5 Total numbers for each species caught during eastern basin Partnership Index Fishing surveys, Lake Erie, 1989-2015. Numbers are standardized to an effort of 60 gangs. Average catch from 1989-2015 is presented for each species. Study was not done in 1996 and 1997. Low sample size in 1995 limits the value of information. Only standard gear included. Thermocline gangs and 2 m above thermocline sets were excluded. Supplementary Walleye Cap Area catches are not included.

Species	1989	1990	1991	1992	1993	1994	1995	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
Sea Lamprey	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.0
Longnose Gar	1	0	0	0	0	0	0	1	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Alewife	2,257	111	1,628	1,248	193	118	1,046	1,697	599	2,296	29	2,597	2	12	14	1,214	7	3	2	102	15	701	1,691	1	59	705.7
Gizzard Shad	325	75	73	18	76	52	266	382	335	514	190	1,001	99	14	714	845	36	111	151	490	90	409	161	0	3	257.2
Pink Salmon	0	0	4	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0.3
Coho Salmon	0	0	4	2	2	0	0	0	1	0	2	1	0	0	1	1	0	0	1	0	0	0	1	0	0	0.6
Chinook Salmon	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0.2
Rainbow Trout	1	3	5	8	0	2	4	6	2	0	4	6	6	1	15	1	1	2	7	4	1	1	8	6	9	4.1
Brown Trout	1	0	0	0	0	0	0	3	0	0	0	21	2	2	1	0	0	0	1	0	3	0	1	1	0	1.4
Lake Trout	15	5	8	3	26	24	4	11	11	18	9	15	30	8	18	24	21	15	17	58	57	95	45	18	58	24.5
Lake Whitefish	15	43	35	14	0	10	8	133	6	0	2	18	2	2	3	45	16	39	4	45	0	4	0	0	0	17.6
Cisco	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Rainbow Smelt	669	577	94	26	2	81	79	5	13	32	58	223	61	220	128	88	179	365	643	148	68	229	501	268	223	199.1
Northern Pike	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Mooneye	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Quillback	4	0	0	0	0	5	0	0	2	4	3	0	1	0	0	4	4	0	3	2	0	4	4	0	0	1.6
White Sucker	260	168	88	57	148	63	26	66	116	107	122	152	54	26	35	107	39	45	87	32	66	30	30	40	21	79.3
Silver Redhorse	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.0
Golden Redhorse	0	0	0	0	0	0	0	0	1	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4
Shorthead Redhorse	40	99	16	44	86	17	8	21	18	47	39	5	20	6	1	4	39	0	5	6	0	6	2	2	0	21.2
Redhorse sp.	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2
Common Carp	22	3	0	2	0	0	4	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3
Silver Chub	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Emerald Shiner	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.0
Brown Bullhead	0	1	0	0	0	2	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3
Channel Catfish	5	3	0	2	2	0	4	7	6	7	28	3	2	7	3	6	14	10	26	3	3	20	8	4	4	7.0
Stonecat	12	3	6	3	7	0	0	0	10	2	3	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1.9
Burbot	5	11	20	11	29	49	53	238	185	212	108	143	171	113	101	31	64	25	24	9	21	5	5	5	2	65.6
Trout-perch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	1	0	0	0	0.2
White Perch	3,339	1,421	481	129	104	36	56	22	49	35	76	181	19	10	45	1,117	117	224	123	262	183	200	348	149	7	349.4
White Bass	174	28	187	23	15	10	64	34	24	61	19	45	8	6	23	172	60	45	49	23	128	31	482	375	79	86.5
Rock Bass	209	76	30	96	152	122	71	56	299	480	109	11	20	43	7	14	117	7	64	41	2	28	4	76	0	85.4
Pumpkinseed	0	1	0	0	11	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.6
Bluegill	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Smallmouth Bass	137	333	64	239	300	370	270	284	242	890	341	111	156	195	150	413	854	298	201	166	48	109	90	92	20	254.9
Largemouth Bass	0	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0.2
Black Crappie	6	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Yellow Perch	1,180	464	382	228	135	47	146	211	679	1,306	3,160	1,321	3,608	1,983	1,643	4,650	3,796	2,936	3,948	5,524	2,131	3,085	1,306	789	1,220	1,835.1
Walleye	140	79	31	57	63	46	34	29	41	62	41	42	31	38	345	109	199	98	162	65	173	70	74	150	90	90.7
Round Goby	0	0	0	0	0	0	0	0	0	9	19	178	93	54	23	55	27	25	26	45	11	44	34	5	19	26.7
Freshwater Drum	1,063	335	178	207	404	172	266	374	142	145	303	151	183	257	319	343	74	168	270	162	173	69	128	171	84	245.6
Total	9,879	3,840	3,332	2,415	1,753	1,225	2,408	3,580	2,786	6,233	4,674	6,229	4,575	2,999	3,590	9,243	5,664	4,417	5,818	7,191	3,175	5,143	4,923	2,152	1,898	4,366
Number of Sites	27	26	26	20	19	19	8	30	30	29	30	30	30	30	30	30	21	30	30	29	30	30	30	30	30	27
Number of Gangs	49	45	52	40	37	38	16	60	60	58	60	60	60	60	60	60	42	60	60	58	60	60	60	60	60	53

Note: Values are continually corrected for errors and may be updated from previous reports.

Table 4.1.6a Observed total numbers of each species caught fishing monofilament index gill nets in all basins during Partnership Index surveys, Lake Erie,1989-2002.

Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Silver Lamprey	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Sea Lamprey	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lake Sturgeon	-	-	-	1	1	1	1	2	1	2	-	3	-	2
Longnose Gar	1	-	-	1	-	1	-	-	-	2	9	4	1	-
Alewife	2,498	5,322	27,914	5,799	2,601	3,534	6,270	890	212	6,696	15,805	16,499	1,477	25,749
Gizzard Shad	945	1,871	13,502	4,682	7,382	8,264	10,485	2,932	2,618	5,919	16,717	12,686	7,520	29,523
Pink Salmon	-	-	4	1	1	-	-	-	-	-	1	-	-	-
Coho Salmon	8	1	6	1	4	-	-	-	-	-	7	3	5	9
Chinook Salmon	-	-	4	1	1	2	3	-	11	1	2	1	1	4
Rainbow Trout	4	7	6	8	4	1	5	-	2	9	101	65	60	96
Atlantic Salmon	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brown Trout	1	-	-	1	-	-	-	-	-	3	-	1	1	23
Lake Trout	14	7	9	6	24	21	10	-	-	15	13	21	43	23
Lake Whitefish	21	47	46	34	71	41	105	15	192	258	89	74	39	58
Cisco	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Rainbow Smelt	1,005	1,027	1,099	537	531	574	2,409	435	615	1,296	1,021	483	1,770	1,262
Northern Pike	-	8	1	-	-	-	-	-	-	-	-	-	-	-
Muskellunge	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Mooneye	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Quillback	3	-	1	5	22	12	6	12	5	5	16	19	43	26
White Sucker	271	284	264	316	260	211	178	98	142	244	261	324	356	439
Spotted Sucker	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Silver Redhorse	-	-	-	-	-	-	-	-	-	2	-	5	-	2
Golden Redhorse	-	-	-	-	-	-	-	-	19	-	2	23	6	-
Shorthead Redhorse	33	86	23	57	73	27	19	15	52	63	45	116	90	22
Redhorse sp.	-	-	-	-	-	-	-	-	-	1	-	-	-	25
Goldfish	-	-	-	-	-	-	2	-	-	-	2	4	-	-
Lake Chub	-	-	-	2	-	-	-	-	-	-	-	-	-	-
Common Carp	18	28	25	6	11	3	5	8	4	2	4	28	28	8
Silver Chub	-	25	35	150	115	59	97	89	73	90	203	154	72	52
Hornyhead Chub	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Emerald Shiner	-	-	-	-	12	1	3	1	-	-	-	1	-	1
Common Shiner	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spottail Shiner	-	1	1	4	2	-	-	-	2	-	19	-	-	10
Notropis sp.	7	-	2	-	-	-	-	-	-	-	-	-	-	-
Brown Bullhead	-	1	-	1	-	1	-	-	-	-	2	4	2	1
Channel Catfish	13	76	134	79	132	66	89	86	48	56	79	88	129	126
Stonecat	10	4	6	2	5	1	1	1	-	3	12	2	3	-
Tadpole Madtom	-	-	6	1	-	-	-	-	-	-	-	-	-	-
Brindled Madtom	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Burbot	47	25	40	36	46	57	41	2	31	348	266	277	222	223
Trout-perch	2	4	1	16	10	2	1	-	3	6	1	2	22	6
White Perch	9,084	8,138	5,195	11,233	5,806	2,577	2,388	1,524	1,493	1,245	4,613	6,684	4,489	8,472
White Bass	710	483	642	283	160	741	539	439	1,622	542	941	1,135	617	1,036
Rock Bass	171	63	51	83	97	97	27	12	9	77	323	553	174	30
Pumpkinseed	-	1	-	-	7	-	-	2	-	-	-	1	1	-
Bluegill	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Smallmouth Bass	112	288	130	296	405	466	187	249	163	457	338	1,100	442	234
Largemouth Bass	-	1	-	-	-	-	-	-	-	-	-	1	-	-
Black Crappie	5	-	-	-	-	1	-	-	-	-	-	1	-	-
Yellow Perch	3,749	3,694	5,514	5,844	4,133	6,474	8,690	8,915	12,761	9,720	19,361	31,933	31,305	30,226
Walleye	519	1,168	2,232	2,275	2,641	1,513	2,500	1,348	1,709	900	990	1,745	909	1,118
Round Goby	-	-	-	-	-	-	-	-	1	13	82	113	101	399
Freshwater Drum	3,809	5,442	3,775	5,278	3,075	2,948	2,024	1,900	2,724	1,963	3,090	3,841	3,509	6,804
Goldfish-Carp Hybrid	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Number of Fish	23,060	28,104	60,668	37,040	27,632	27,697	36,086	18,975	24,512	29,938	64,415	77,995	53,438	106,009
Sites	60	107	124	116	115	103	99	58	91	121	133	142	142	144
Standard Canned Gangs	54	98	118	114	112	103	99	58	91	121	133	142	142	144
Bottom Gangs	60	107	124	116	115	103	99	58	91	121	133	142	142	144
Thermocline Gangs	10	4	-	-	-	-	-	-	-	-	25	23	26	34
Aux Central Basin 1 fa Gangs	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2 m Above Thermocline	-	-	-	-	-	-	-	-	-	-	25	-	-	-
Total Gangs	124	209	242	230	227	206	198	116	182	242	316	307	310	322

Table 4.1.6b (cont'd) Observed total numbers of each species caught fishing monofilament index gill nets in all basins during Partnership Index surveys, Lake Erie, 2003-2015. Average catches presented for 1989-2015.

Species	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
Silver Lamprey	-	1	-	-	-	-	-	1	-	-	-	-	-	0
Sea Lamprey	-	-	-	-	-	-	-	1	1	1	-	-	-	0
Lake Sturgeon	5	8	1	1	10	2	-	2	2	1	4	1	2	2
Longnose Gar	1	-	-	1	-	-	1	2	-	4	2	1	1	1
Alewife	9	127	81	2,482	34	13	5	199	135	2,954	10,703	1	59	5,114
Gizzard Shad	9,866	9,131	22,246	12,510	7,790	4,211	3,685	16,607	12,524	23,350	4,783	2,294	3,351	9,533
Pink Salmon	-	1	-	-	-	-	1	2	-	3	-	-	-	1
Coho Salmon	1	-	1	1	-	1	1	-	1	2	1	-	-	2
Chinook Salmon	-	1	2	-	-	-	1	2	1	-	-	-	-	1
Rainbow Trout	49	22	111	58	4	14	42	39	34	15	20	8	17	30
Atlantic Salmon	-	-	1	-	-	-	-	-	-	-	-	-	-	0
Brown Trout	2	3	3	-	-	2	4	1	5	-	1	1	-	2
Lake Trout	38	32	23	44	16	23	39	68	115	108	45	25	61	31
Lake Whitefish	82	35	153	168	104	170	99	85	11	14	2	9	10	75
Cisco	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Rainbow Smelt	489	1,629	910	745	1,688	2,556	2,766	1,023	1,464	1,184	1,924	749	1,210	1,200
Northern Pike	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Muskellunge	-	-	-	-	-	-	1	-	-	-	-	1	-	0
Mooneye	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Quillback	27	19	14	16	13	14	14	3	29	16	8	19	21	14
White Sucker	255	354	380	368	203	228	453	343	539	268	199	179	302	286
Spotted Sucker	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Silver Redhorse	-	5	-	-	-	-	-	-	3	1	-	-	1	1
Golden Redhorse	-	-	-	-	-	-	-	1	-	-	-	-	-	2
Shorthead Redhorse	55	51	17	20	70	48	146	41	111	45	29	48	75	55
Redhorse sp.	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Goldfish	-	-	6	-	-	5	2	-	-	-	-	12	4	1
Lake Chub	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Common Carp	2	5	2	11	8	4	5	2	7	9	4	4	1	9
Silver Chub	52	85	26	41	12	9	8	2	11	4	6	19	6	55
Hornyhead Chub	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Emerald Shiner	4	3	-	3	-	2	5	5	4	3	1	-	-	2
Common Shiner	2	-	-	-	-	-	-	-	-	-	-	-	-	0
Spottail Shiner	-	10	-	3	1	-	-	2	2	-	-	1	14	3
Notropis sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Brown Bullhead	-	-	2	-	1	1	-	-	-	3	1	1	-	1
Channel Catfish	156	131	271	234	313	131	221	190	356	357	294	415	375	172
Stonecat	-	-	-	-	1	-	-	1	-	1	-	-	-	2
Tadpole Madtom	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Brindled Madtom	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Burbot	284	176	148	105	70	56	54	19	48	12	7	9	3	98
Trout-perch	14	7	1	3	1	5	2	1	2	1	-	-	-	4
White Perch	8,212	11,504	17,150	19,774	12,492	11,996	9,940	10,212	14,762	14,622	15,127	9,052	11,461	8,861
White Bass	889	1,287	1,362	2,668	1,762	1,339	1,291	1,448	4,080	4,792	3,991	2,589	1,460	1,439
Rock Bass	39	51	31	21	103	11	76	54	6	32	10	88	6	85
Pumpkinseed	-	3	-	1	-	-	-	1	-	-	-	-	-	1
Bluegill	3	-	-	1	-	1	-	-	2	-	-	-	-	0
Smallmouth Bass	267	232	320	445	614	332	289	178	64	143	106	113	33	296
Largemouth Bass	4	1	-	-	2	-	-	-	1	-	-	-	-	0
Black Crappie	-	1	-	2	-	-	-	-	1	-	1	-	-	0
Yellow Perch	30,870	42,626	33,730	32,913	34,412	40,323	37,662	28,524	30,750	26,779	14,166	22,785	21,304	21,450
Walleye	1,804	4,469	4,052	2,316	1,303	1,443	1,743	1,429	3,168	1,842	1,202	1,209	3,194	1,879
Round Goby	247	161	196	260	106	200	205	173	140	81	45	62	49	98
Freshwater Drum	3,800	4,631	4,789	4,315	2,554	2,858	3,610	2,038	3,562	3,613	3,240	1,788	3,469	3,498
Goldfish-Carp Hybrid	-	-	-	-	1	1	2	2	-	1	3	-	2	0
Total Number of Fish	57,528	76,802	86,029	79,530	63,688	65,999	62,374	62,701	71,941	80,261	55,925	41,483	46,491	54,308
Sites	144	143	144	140	119	143	143	141	144	142	122	133	133	124
Standard Canned Gangs	144	143	144	140	119	143	143	141	144	142	122	133	133	123
Bottom Gangs	144	143	144	140	119	143	143	141	144	142	122	133	133	124
Thermocline Gangs	29	26	13	20	0	26	24	19	24	21	12	16	14	14
Aux Central Basin 1 fa Gangs	0	24	24	24	24	25	24	24	24	24	24	24	24	11
2 m Above Thermocline	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total Gangs	317	336	325	324	262	337	334	325	336	329	280	306	304	272

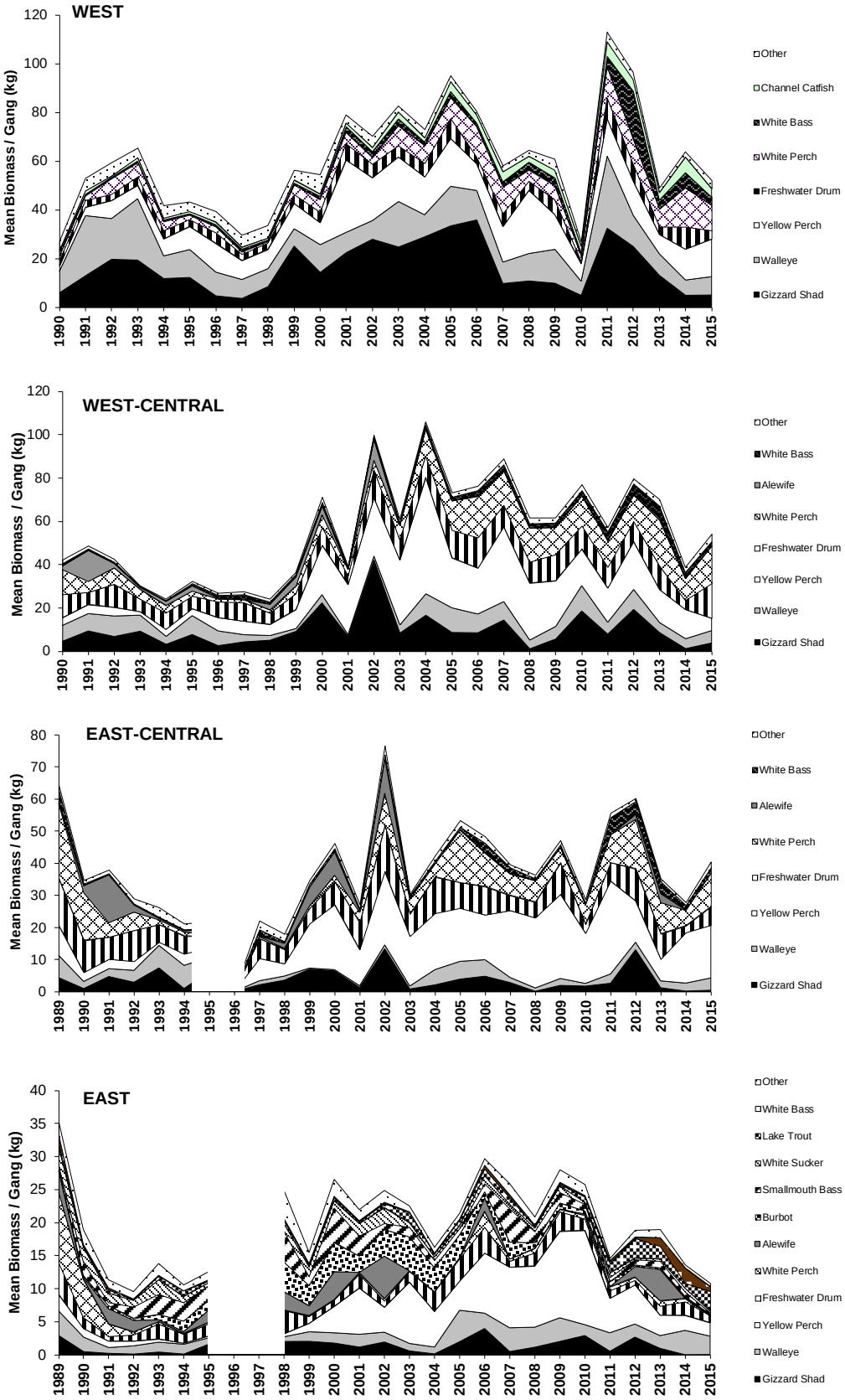


Figure 4.1.2 Mean species biomass (kg / gang) by basin, Partnership Index Fishing, 1989-2015. Species with an average biomass representing less than 3% of the average of all species combined were included in "Other" group. Thermocline gangs (1989, 1990, 1999-2015) were included for the east basin. Studies were not done in the east-central basin in 1996 or in the east basin from 1996-1997. Axes differ between basins. Effort was standardized across mesh sizes.

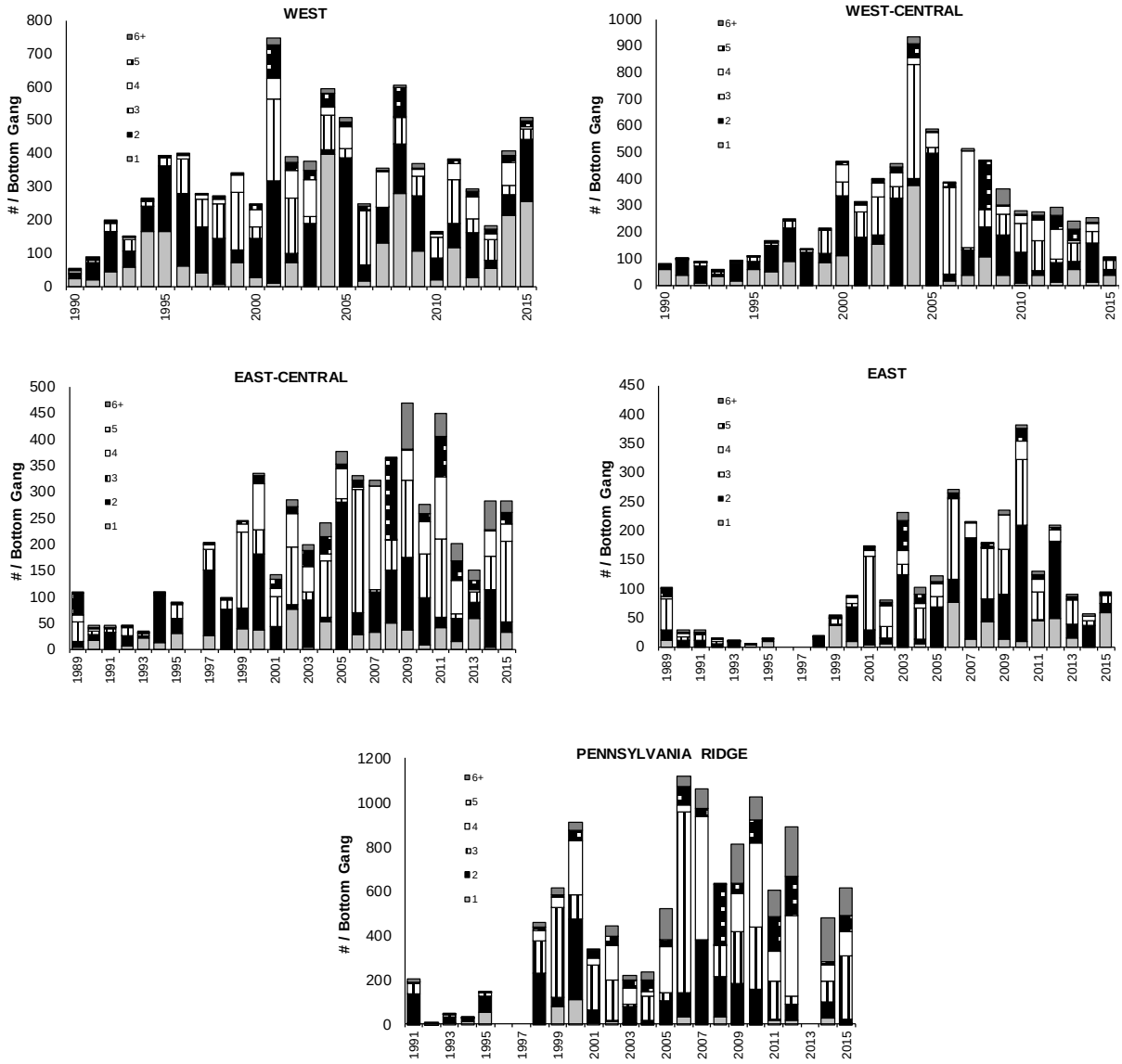


Figure 4.1.3 Yellow Perch catch at age (number) per bottom gang of Partnership index gill nets, by basin. Time frames and axes differ among basins. Absent bars indicate when studies were not done. Ages 6 and older pooled. East basin results include depths 30 m or less. Walleye Cap Areas surveys were not done since 2012. Surveys were not done in east-central 1996, and east in 1996,1997. Survey in the east basin 1995 had low sample size. Pennsylvania Ridge survey was not done in 1996 and in 2013.

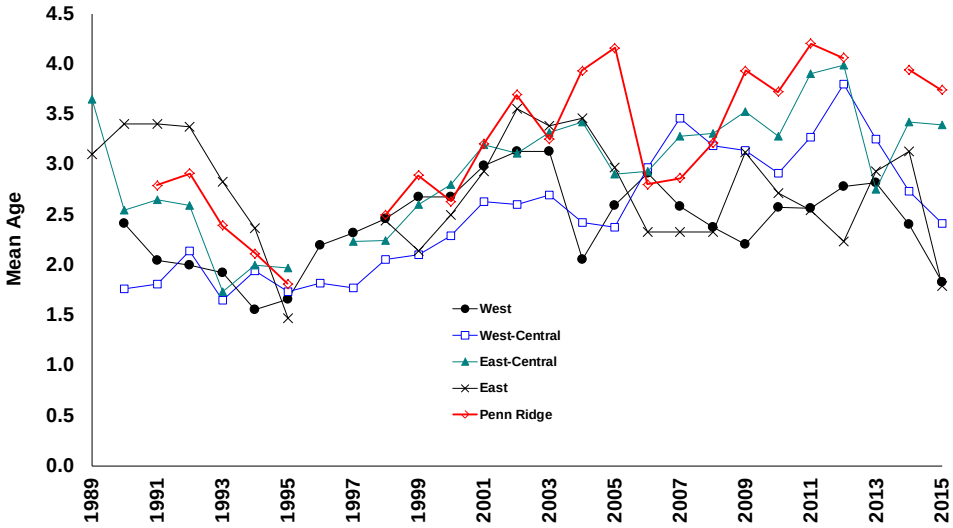


Figure 4.1.4 Mean age of Yellow Perch caught in Partnership index gill nets by basin, 1989-2015. All age groups included in calculations. Ages based on scales and otoliths since 2005.

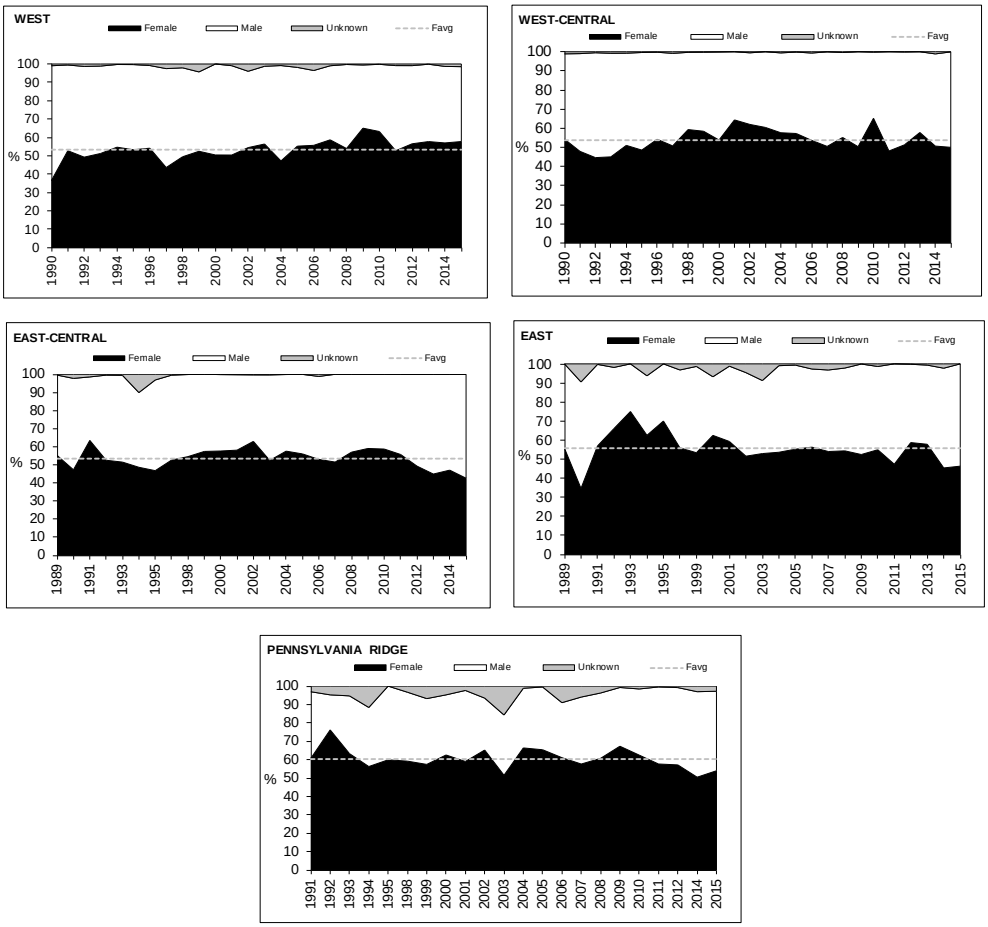


Figure 4.1.5 Proportion of Yellow Perch ages 2 and older represented by each sex caught in fall. Partnership index gill netting, 1989-2015. Note absent years in east-central, and east basin time series. Dashed line represents average fraction of females over the time series. Pennsylvania Ridge survey not done in 2013.

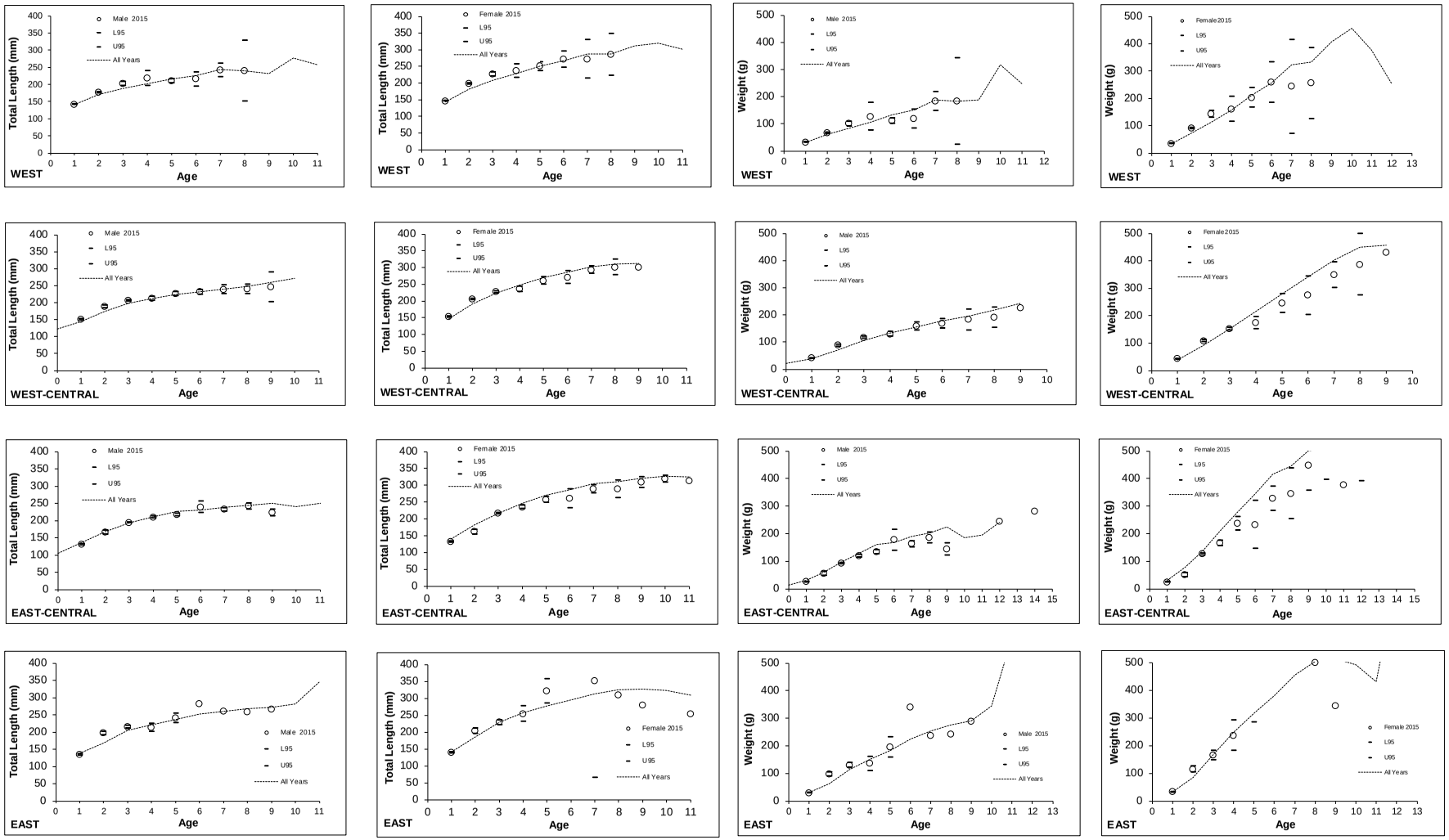


Figure 4.1.6 Yellow Perch mean total length (mm) and weight (g) of males and females at age for the west (top row), west-central, east-central and east (bottom row) basins in 2015 (circles). 95% confidence limits shown. Dotted line represents mean size at age for all years to 2014. Partnership Index Fishing, 1989-2015. Fish with ages but unknown gender excluded.

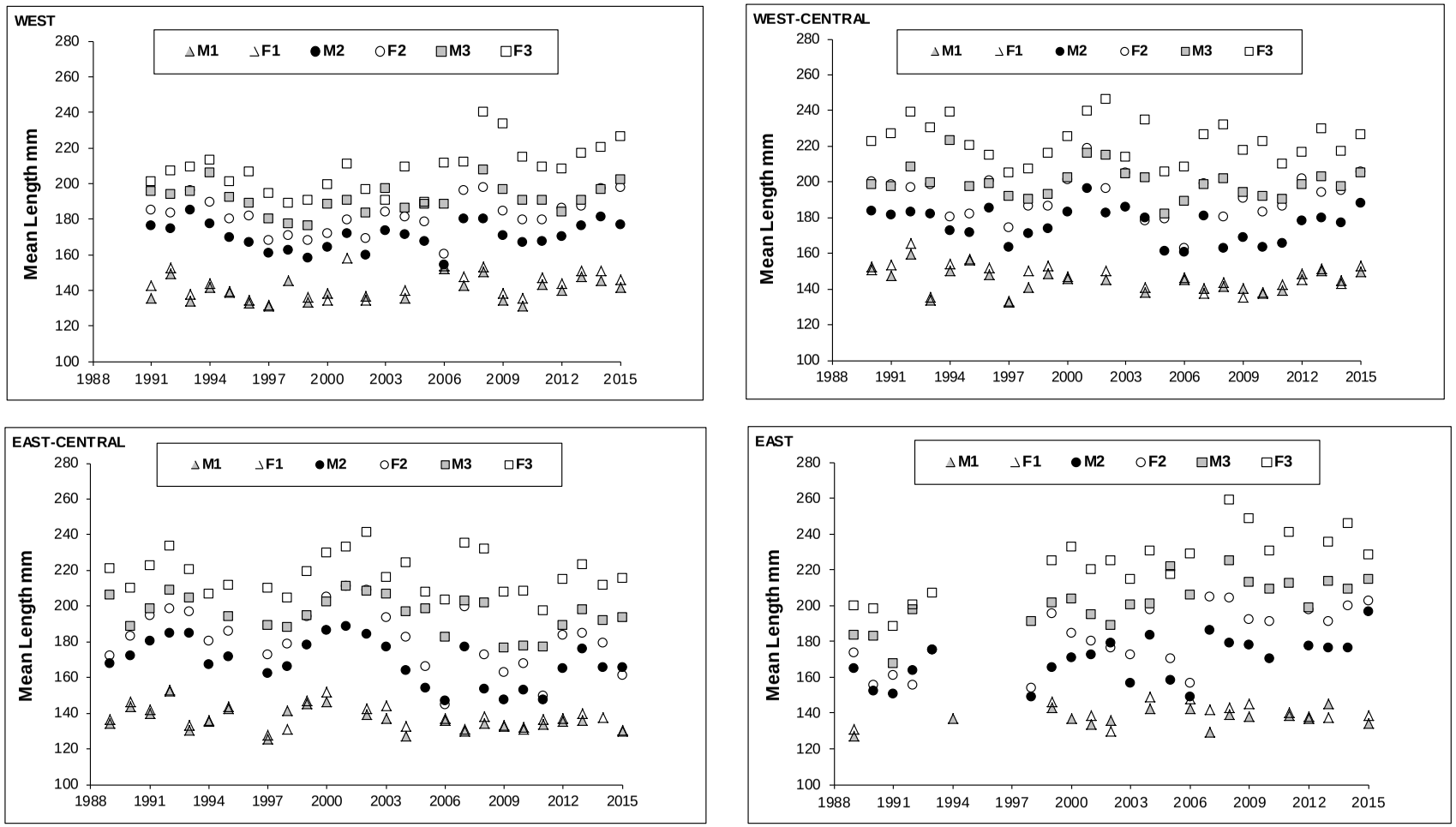


Figure 4.1.7 Mean total length (mm) of Yellow Perch ages 1, 2, and 3 by sex in the west, west-central, east-central and east basin surveys. East includes the Walleye Cap Area sites. M=male F=female. Samples with less than 6 fish were excluded. Mean is weighted by relative effort among mesh sizes. Samples restricted temporally for west (September), west-central (≥ October) and east-central (≥ October) and east basin (≤ September) surveys to negate bias due to interannual differences between sampling periods.

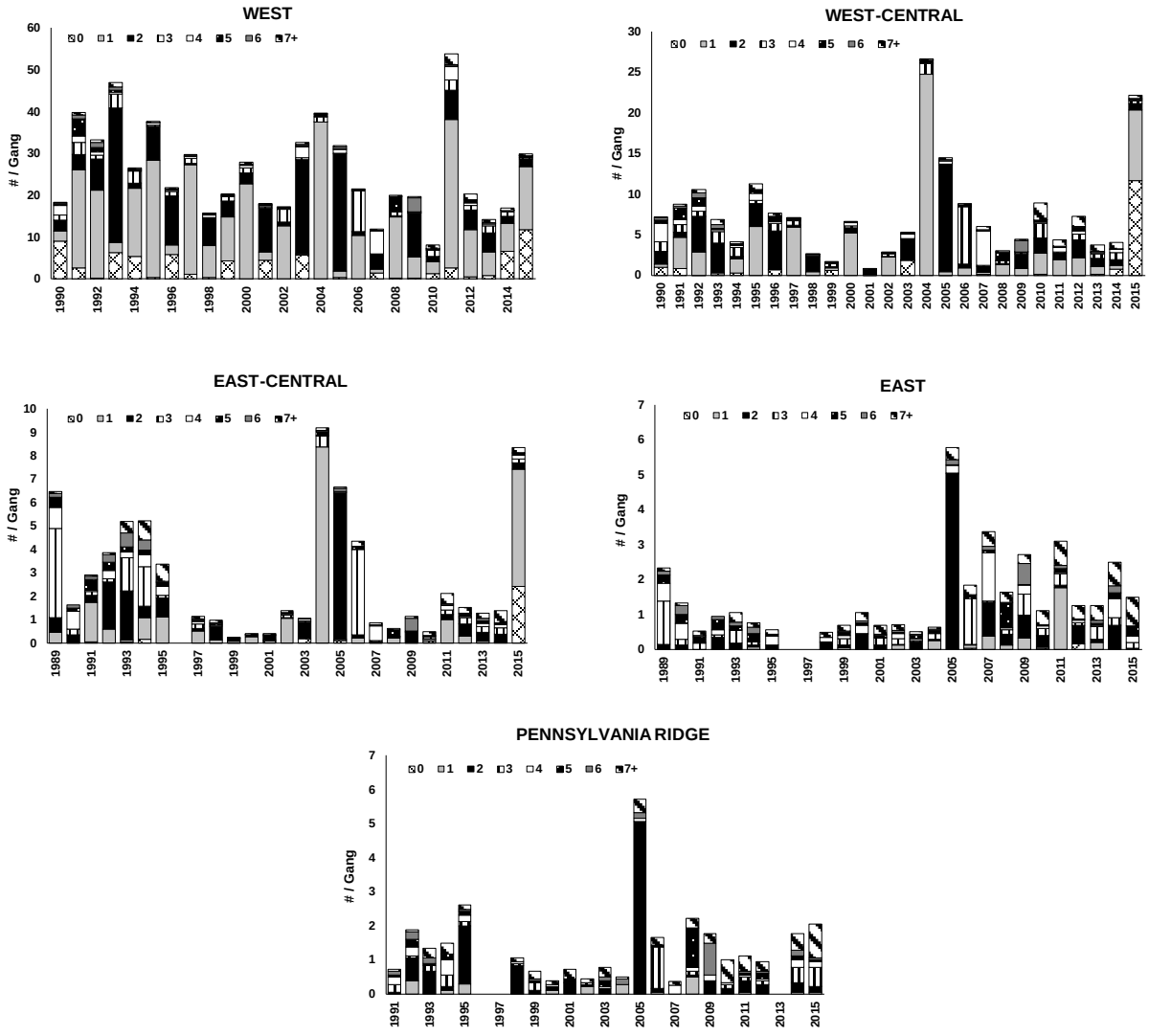


Figure 4.1.8 Walleye catch at age (numbers) per gang of index gill nets (canned and bottom), in the west, west-central, east-central, Pennsylvania Ridge and east basin Partnership surveys. Only standard canned sets are included in all graphs. Note that catch rate and time axes differ among basins. Catch rates have been adjusted for Walleye lacking age data. Absent bars indicate years when study was not done. Pennsylvania Ridge survey was not done in 1996, 1997, 2013. East basin survey was not done in 1996 and 1997. East basin survey had low sample size in 1995.

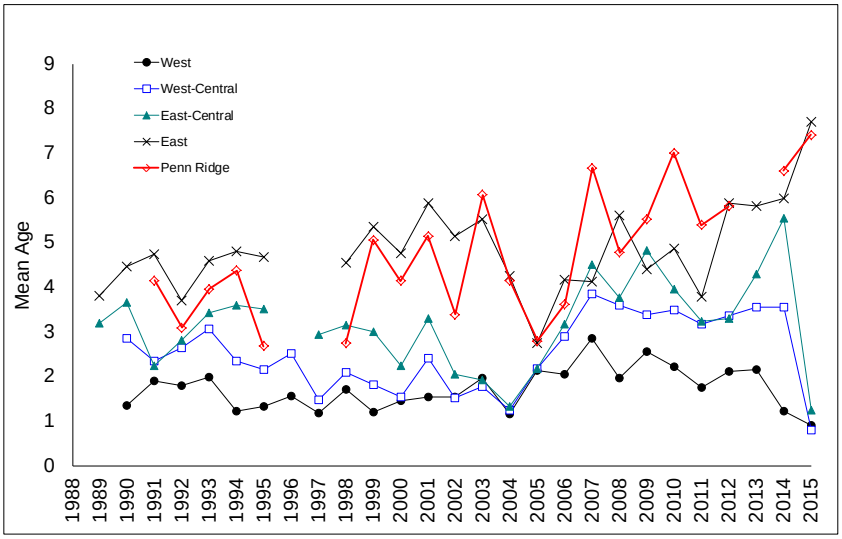


Figure 4.1.9 Mean age of Walleye caught in Partnership index gill nets by basin, 1989-2015.

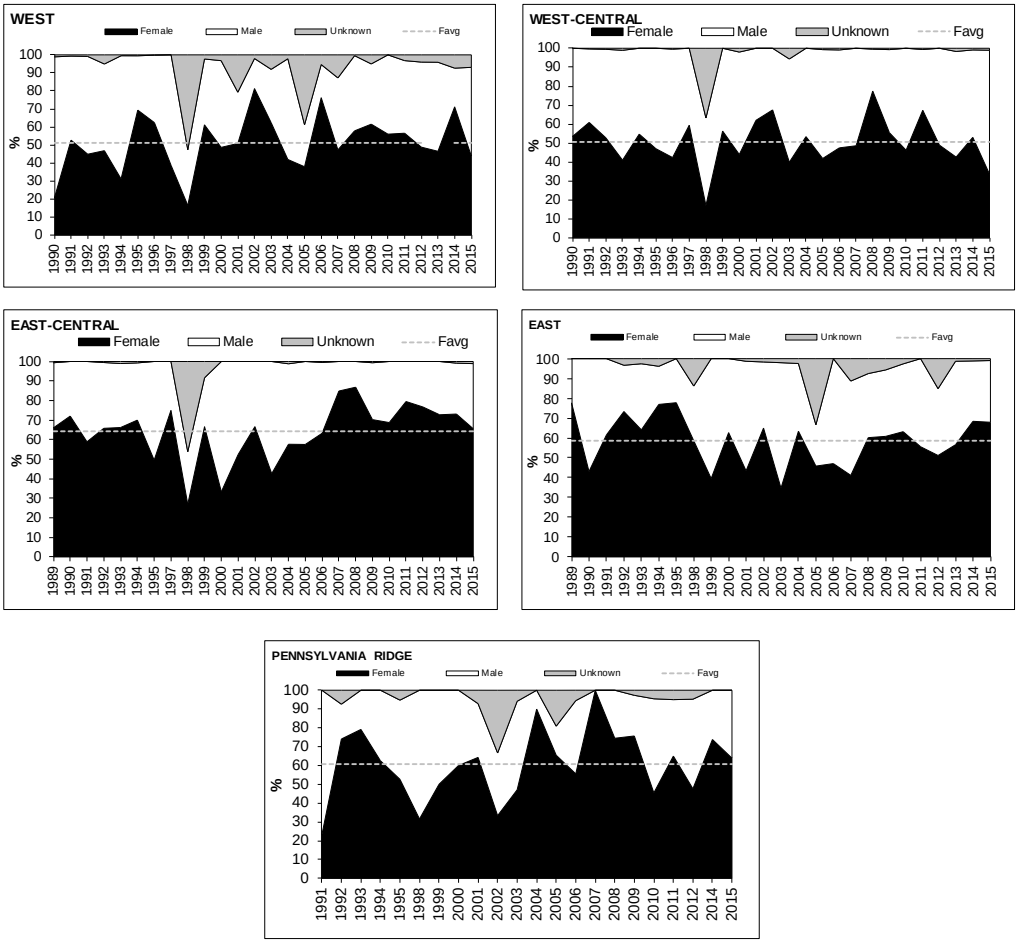


Figure 4.1.10 Proportion of Walleye ages 2 and older represented by each sex caught in fall Partnership index gill netting, 1989-2015. Note absent years in east-central and east basin time series. Dashed line represents average proportion of females over the time series. Pennsylvania Ridge not fished in 2013.

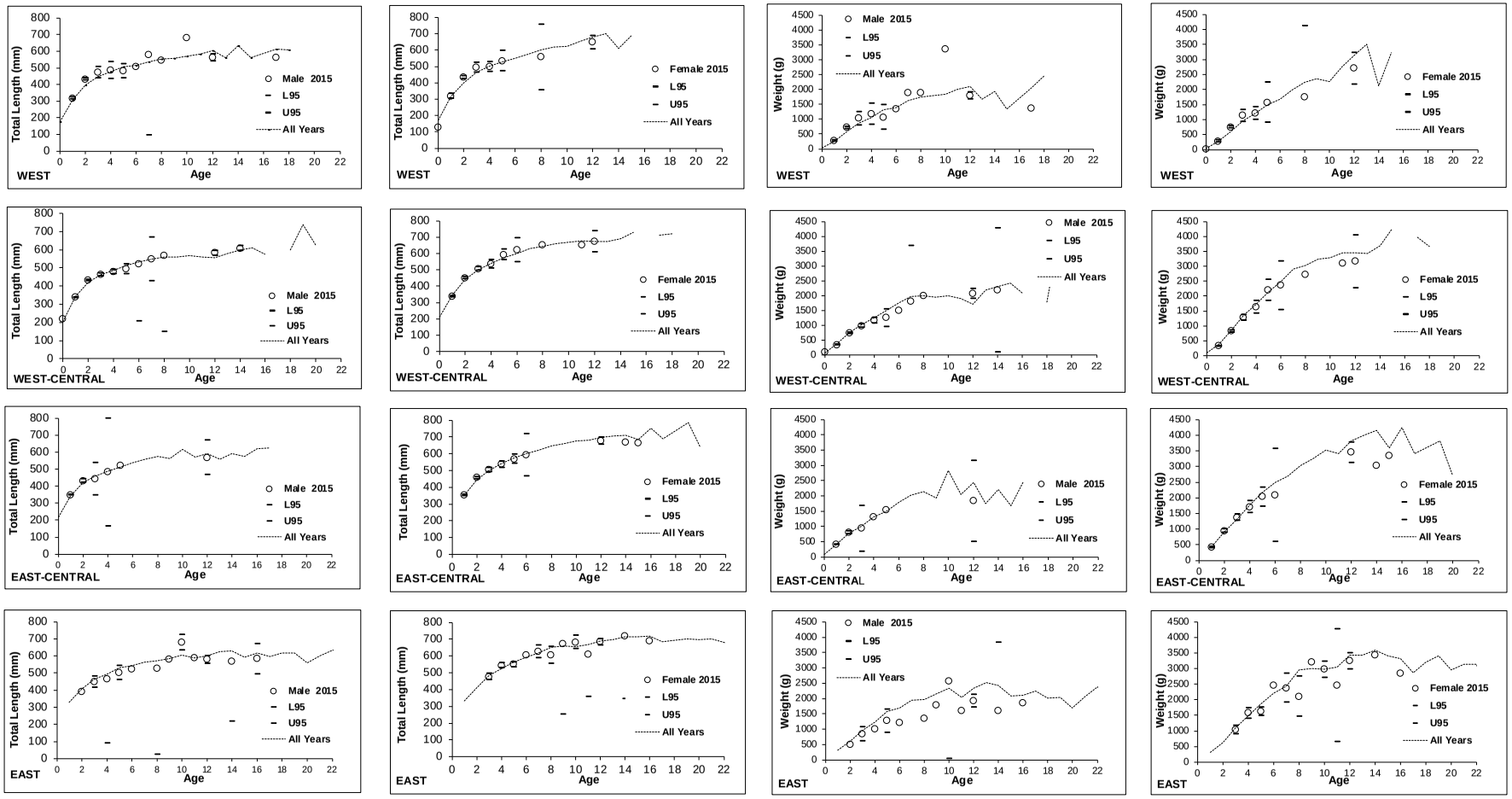


Figure 4.1.11 Walleye mean total length (mm) and weight (g) of males and females at age for the west (top row), west-central, east-central and east (bottom row) basins in 2015 (circles). 95% confidence limits shown. Dotted line represents mean size at age for all years to 2014. Partnership Index Fishing, 1989-2015. Fish with ages but unknown gender excluded.

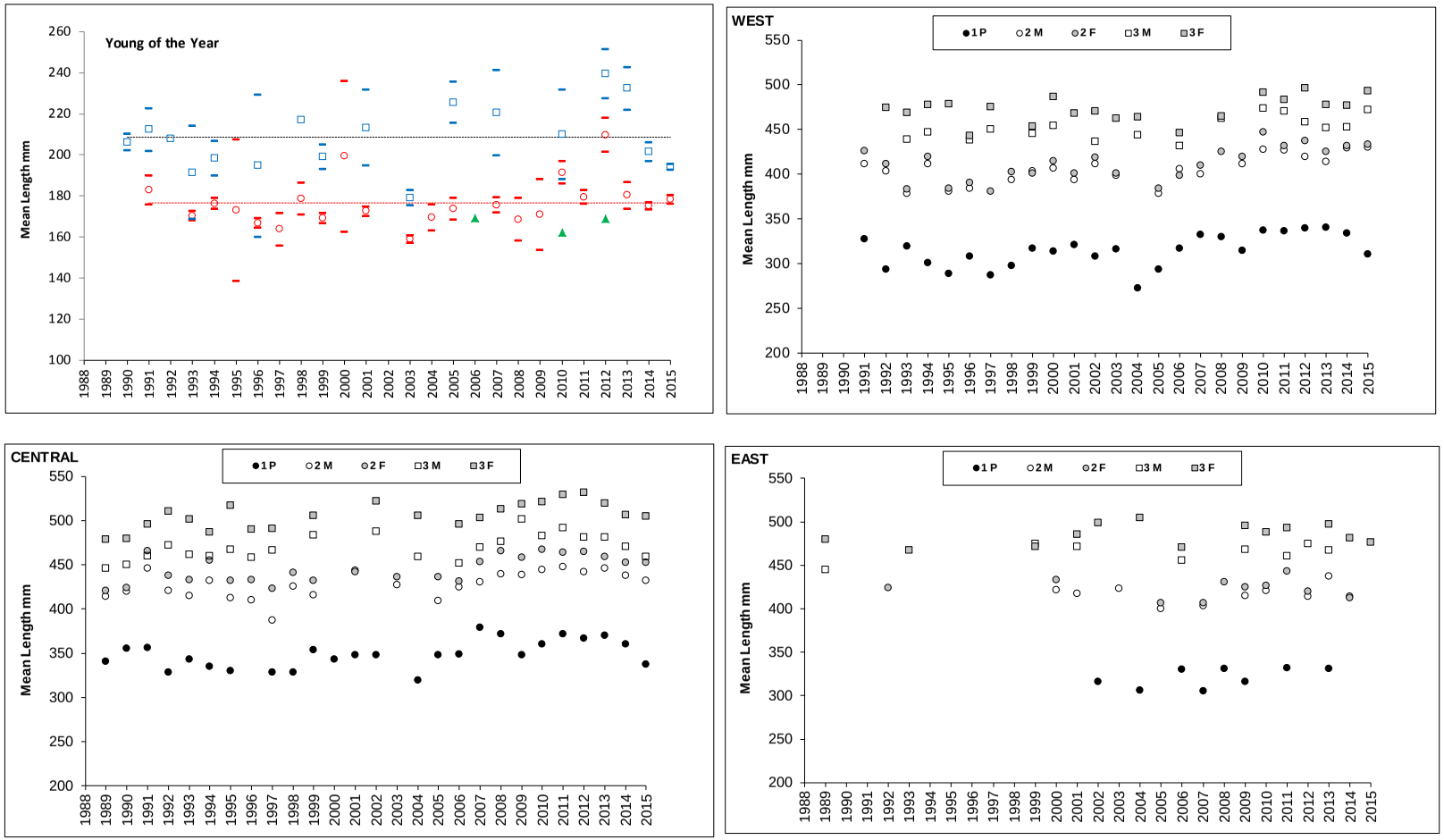


Figure 4.1.12 Mean total length of young-of-the-year (YOY) Walleye in the west (circles), central (squares) and east basin (triangles,top left) and for ages 1, 2 and 3 by sex for the west (top right), central (bottom left) and east basin (bottom right) surveys. YOY mean lengths with 95% confidence limits. P indicates pooled sexes; F is female and M is male. Samples restricted temporally for west (September), central (≥ October) and east basin (≤September). Time series means presented for YOY west and central series as dotted lines.

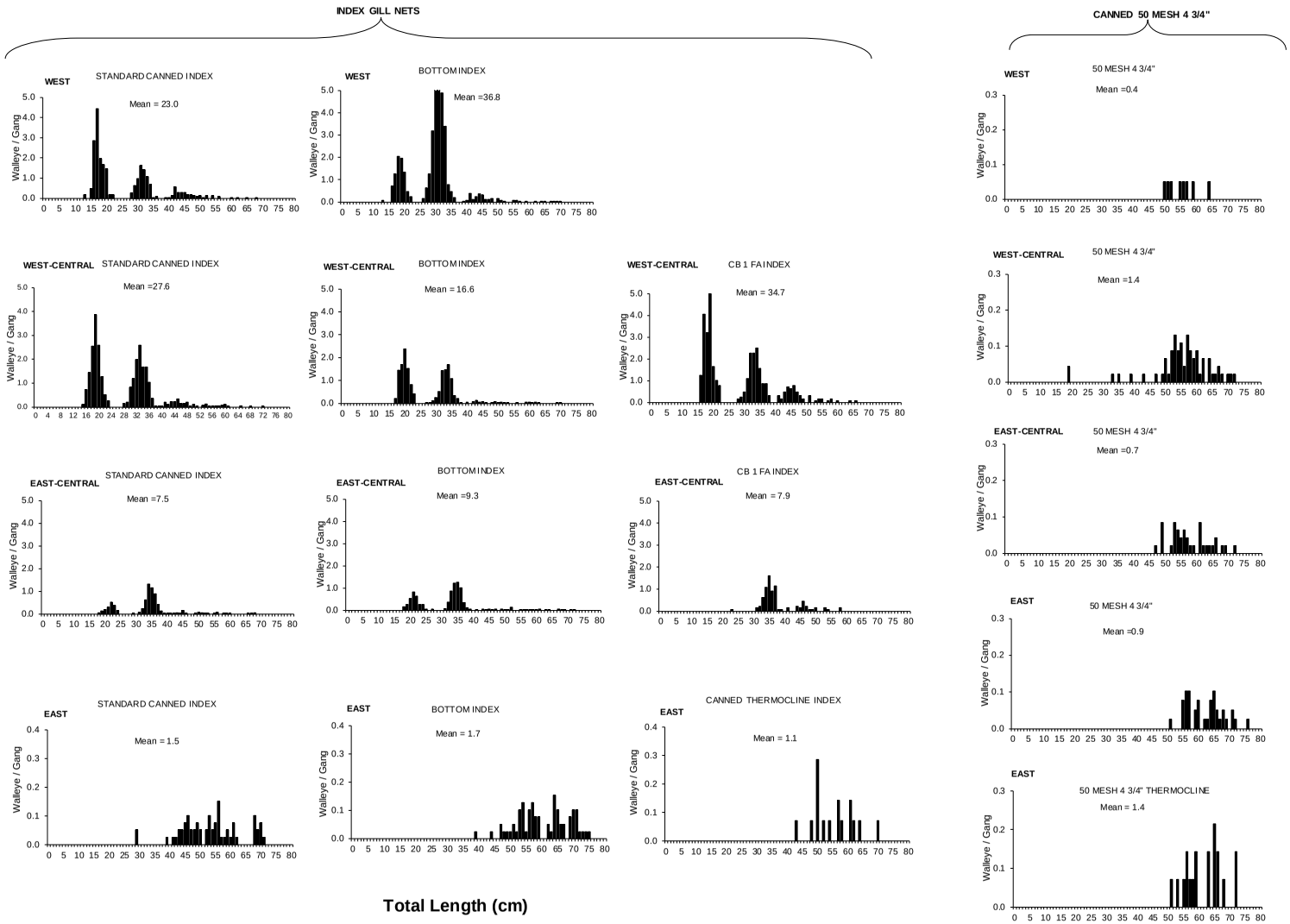


Figure 4.1.13 Walleye catch rates in 2015 by 1 cm length intervals in west basin (top row), west-central (2nd row), east-central (3rd row) and east basin (bottom row) in standard index canned gill nets, bottom nets, central basin 1 fathom canned nets, canned thermocline nets (east only) and in 50 mesh 4.75" canned nets (column on far right). All graphs have same X axes (length). East includes Pennsylvania Ridge and east basin surveys fished at all depths. Partnership Index Fishing, 2015.

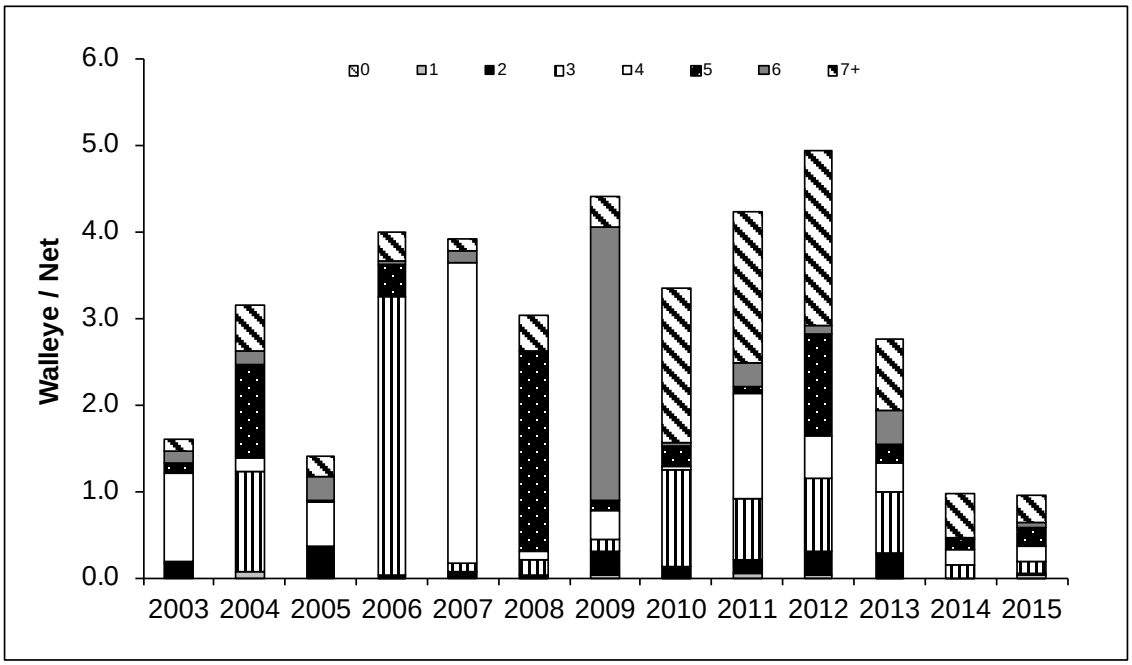


Figure 4.1.14 Walleye catch at age per 50 mesh deep 121 mm, 34 m canned gill net fished adjacent to index gill nets in the west, west-central, and east-central basins. All canned depths were included.

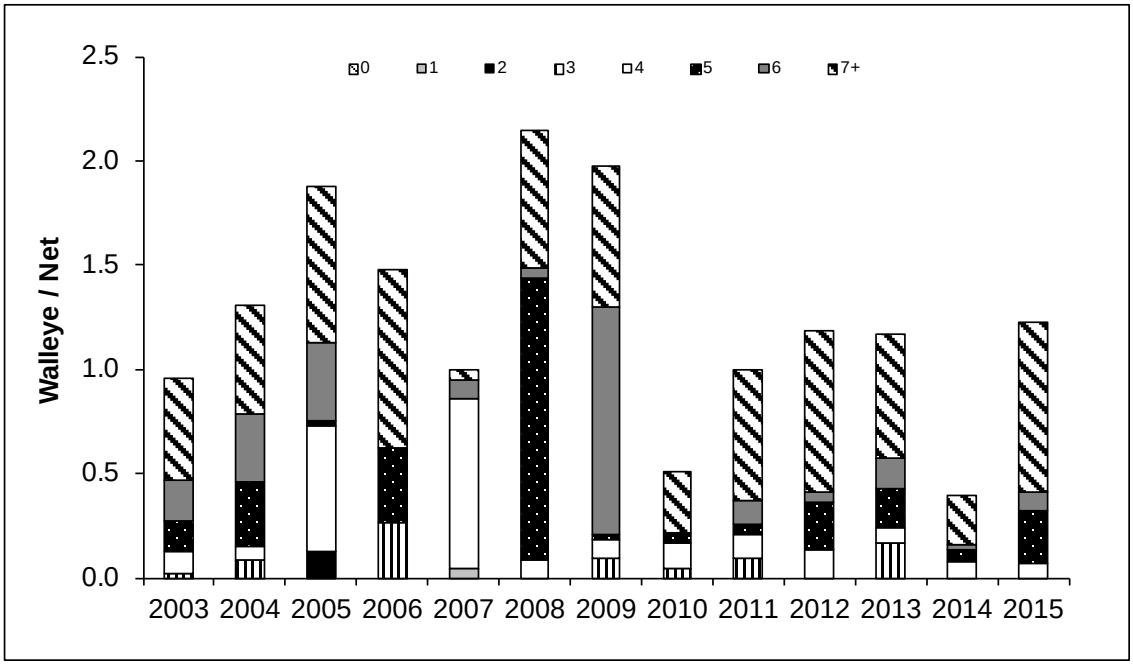


Figure 4.1.15 Walleye catch at age per 50 mesh deep 121 mm, 34 m canned gill net fished adjacent to index gill nets in east basin surveys. This graph excludes Pennsylvania Ridge and Walleye Cap Area surveys. All canned depths included.

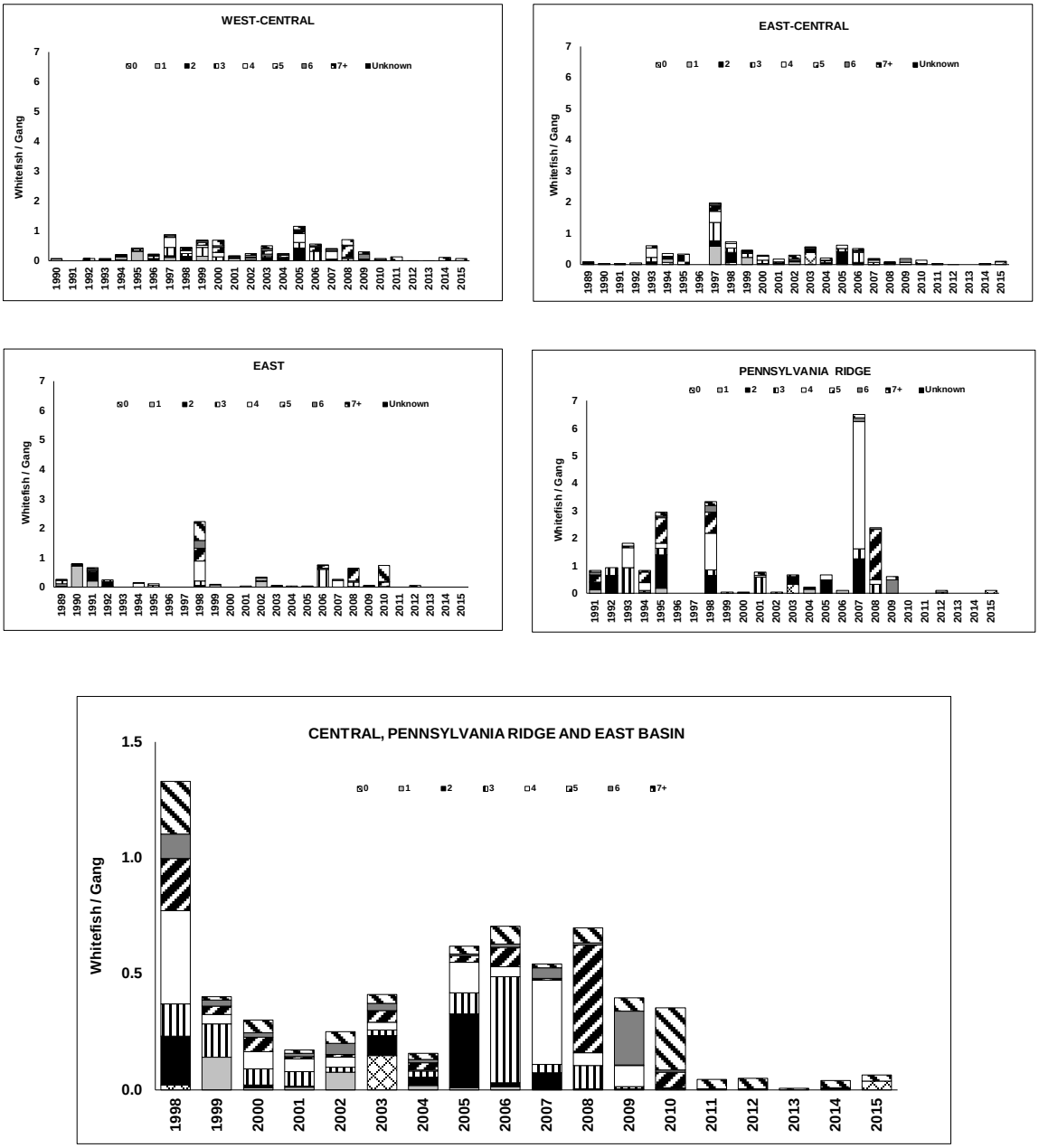


Figure 4.1.16 Lake Whitefish catch at age (numbers) per gang of index gill nets (canned and bottom), in the west-central, east-central, Pennsylvania Ridge, east basin and with basins pooled. Only standard canned sets included in east basin and Pennsylvania Ridge graphs. Lake Whitefish samples lacking age data are represented by the "unknown" series. East basin 1995 based on few sites. East-central basin survey not completed in 1996. East basin and Pennsylvania Ridge surveys were not done in 1996,1997. Pooled basins include extra Walleye Cap Area sites. Pennsylvania Ridge and extra Walleye Cap Area sites were not fished in 2013.

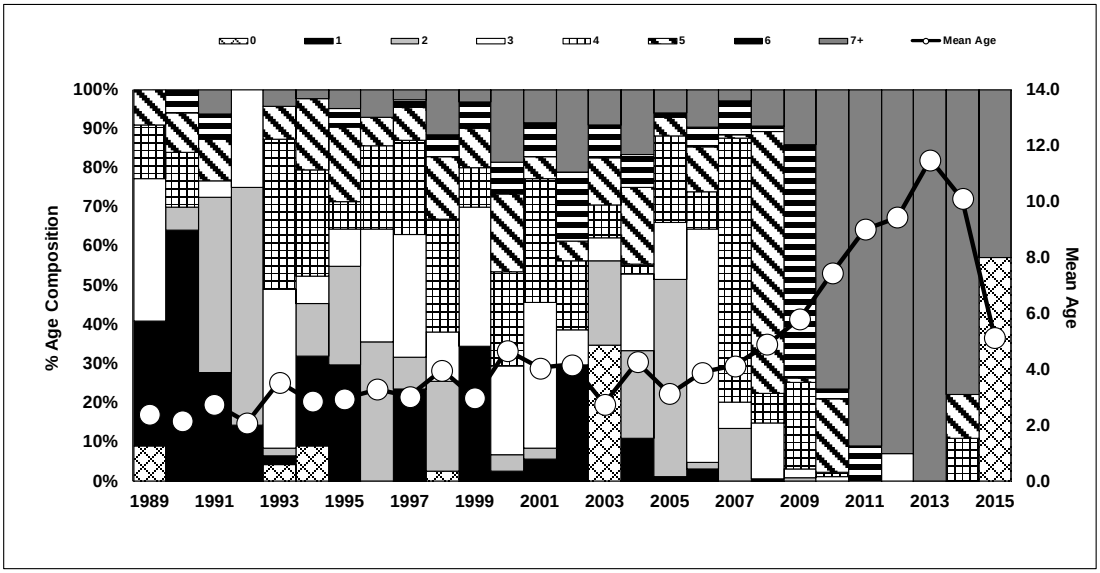


Figure 4.1.17 Lake Whitefish age composition and mean age (line) from Partnership Index Fishing all basins combined, all index gear included. Ages 7 and older pooled in 7+ group. Otolith and scale ages were determined in 2015. Standardized to equal effort among mesh sizes.

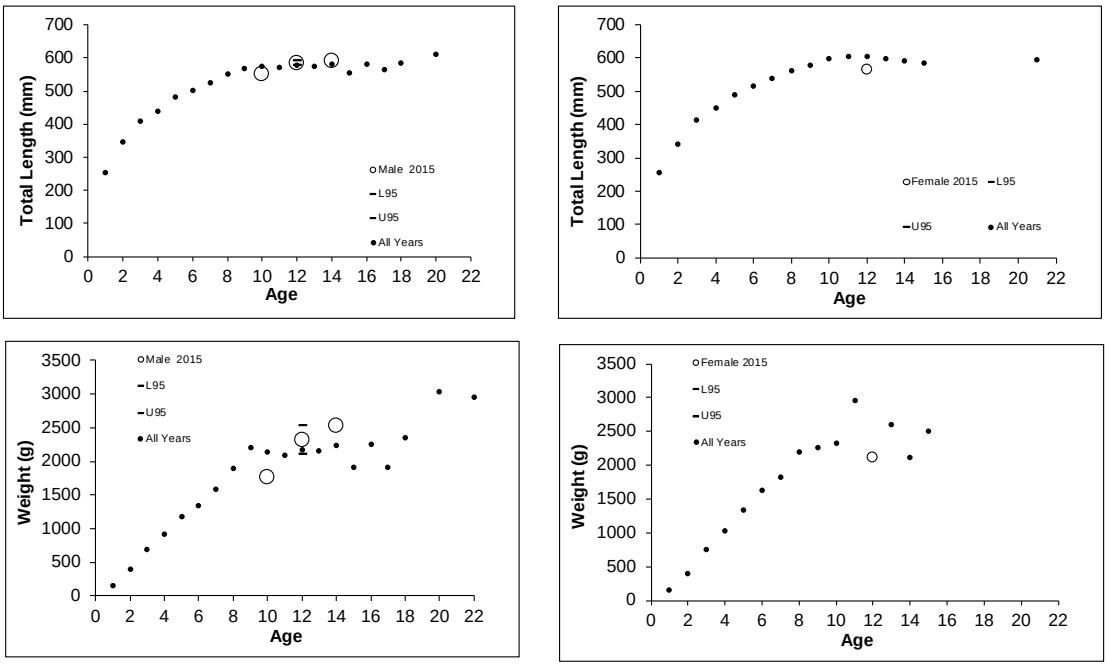


Figure 4.1.18 Mean length (top) and weight (bottom) at age for male (left) and female (right) Lake Whitefish, 2015 (circles). 95% confidence limits shown. Dotted line represents mean size at age 1989-2014, combined. Ages based on scales prior to 2006. Partnership Index Fishing 1989-2015.

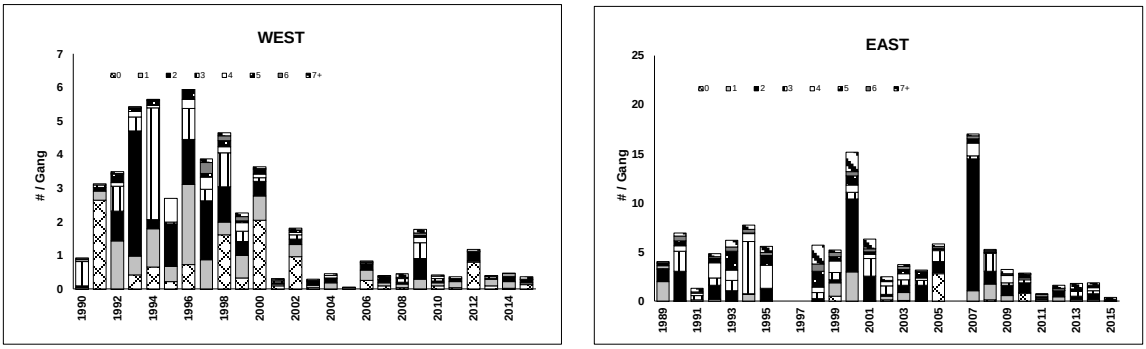


Figure 4.1.19 Smallmouth Bass catch at age (numbers) per gang of index gill nets (canned and bottom), in the west and east basin Partnership surveys 1989-2015. Only standard canned sets are included in east basin graph. Absent bars indicate years when study was not done. East includes extra Walleye Cap Area sites.

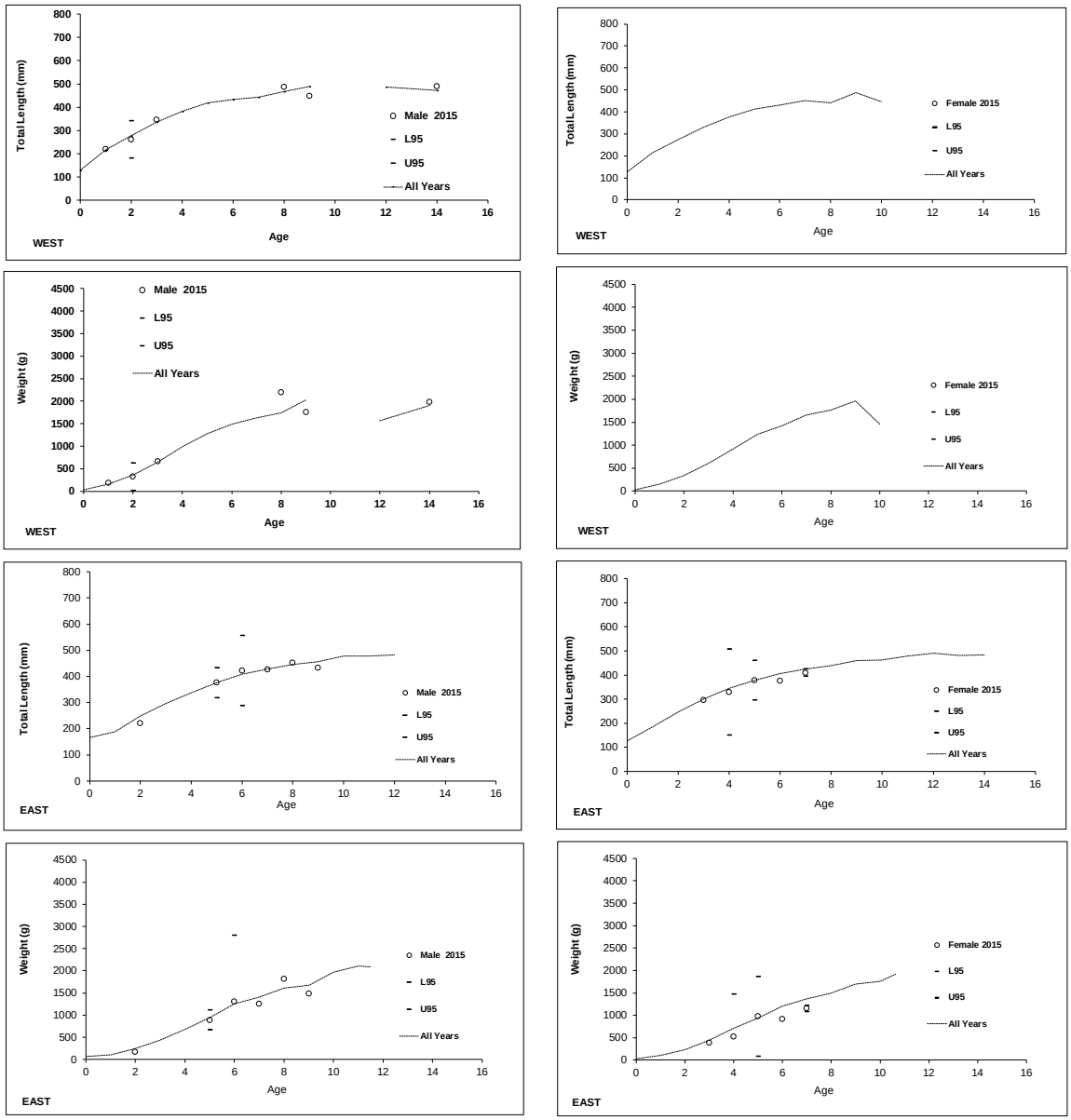


Figure 4.1.20 Smallmouth Bass mean total length (mm) and weight (g) of males and females at age for the west (top four graphs) and east (bottom four graphs) basins in 2015 (circles). 95% confidence limits shown. Dotted line represents mean size at age for all years to 2014. Partnership Index Fishing, 1989-2015.

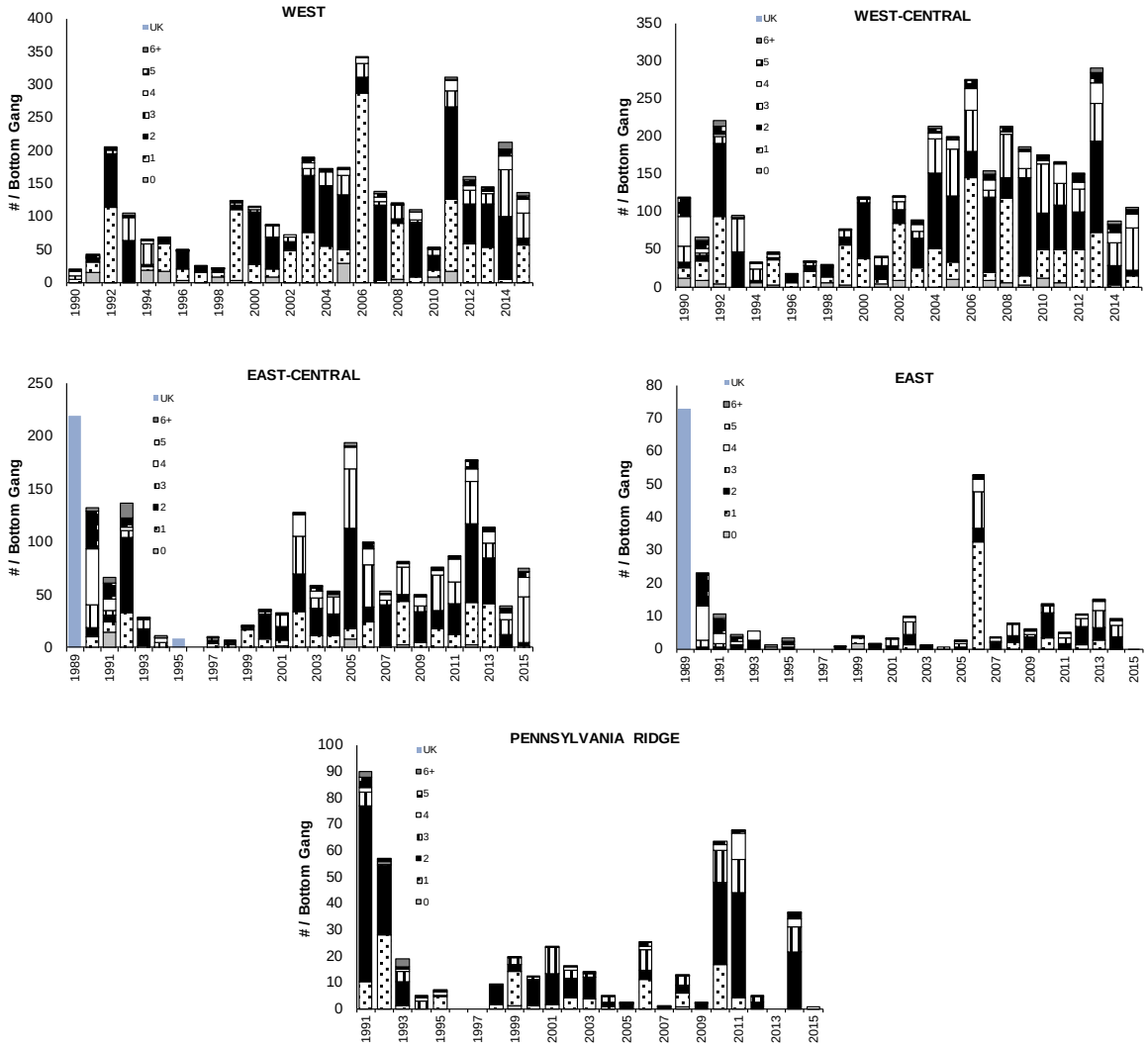


Figure 4.1.21 White Perch catch at age (number) per gang of Partnership bottom gill nets, by basin. Time frames and axes differ among basins. Absent bars indicate when studies were not done. Ages 6 and older pooled. East basin results include depths 30 m or less. Survey in the east basin 1995 had low sample size. Pennsylvania Ridge survey was not done in 1996 and 2013. UK indicates ages unknown.

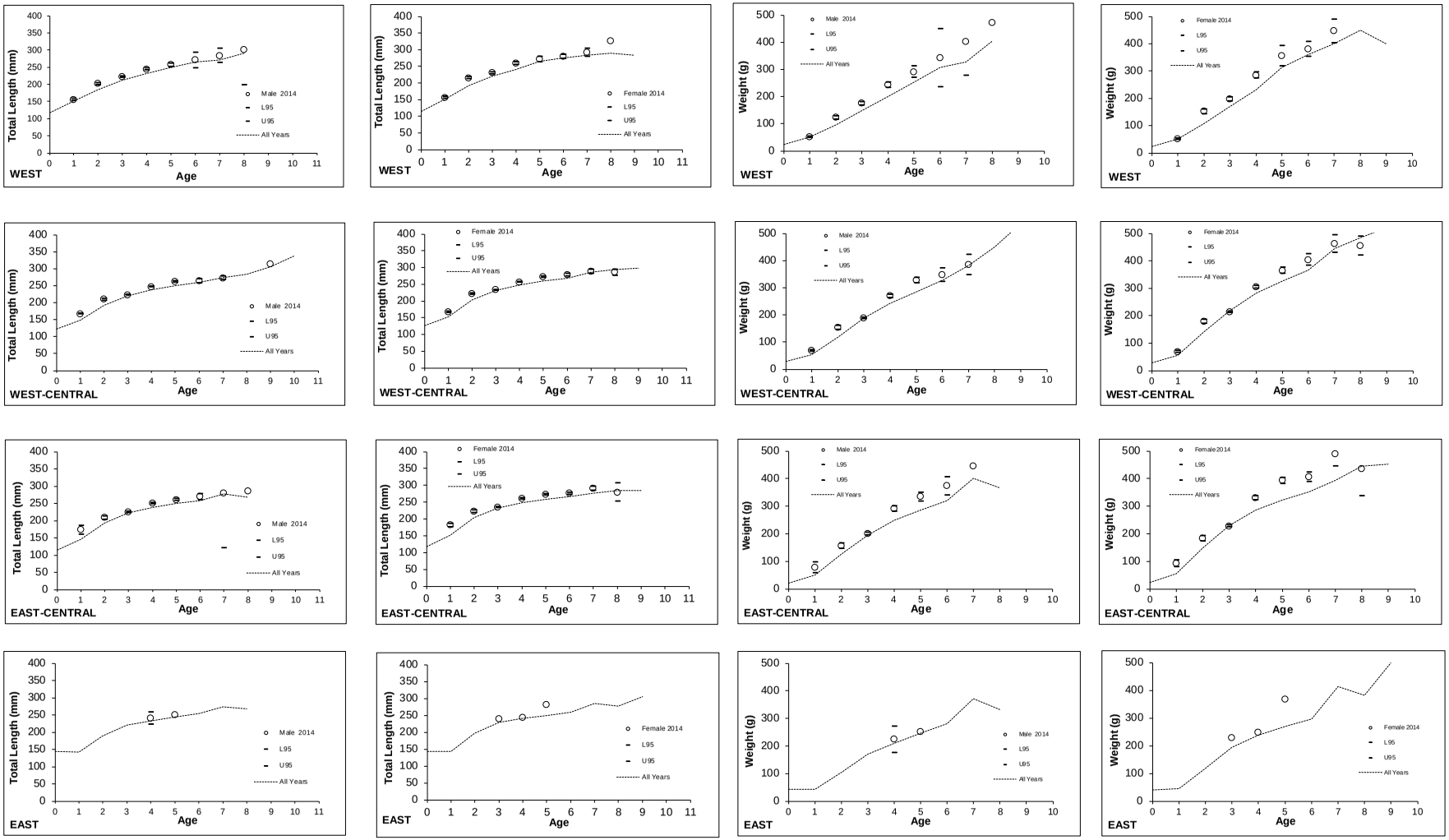


Figure 4.1.22 White Perch mean total length (mm) and weight (g) of males and females at age for the west (top row), west-central, east-central and east (bottom row) basins in 2015 (circles). 95% confidence limits shown. Dotted line represents mean size at age for all years to 2014. Partnership Index Fishing, 1989-2015.

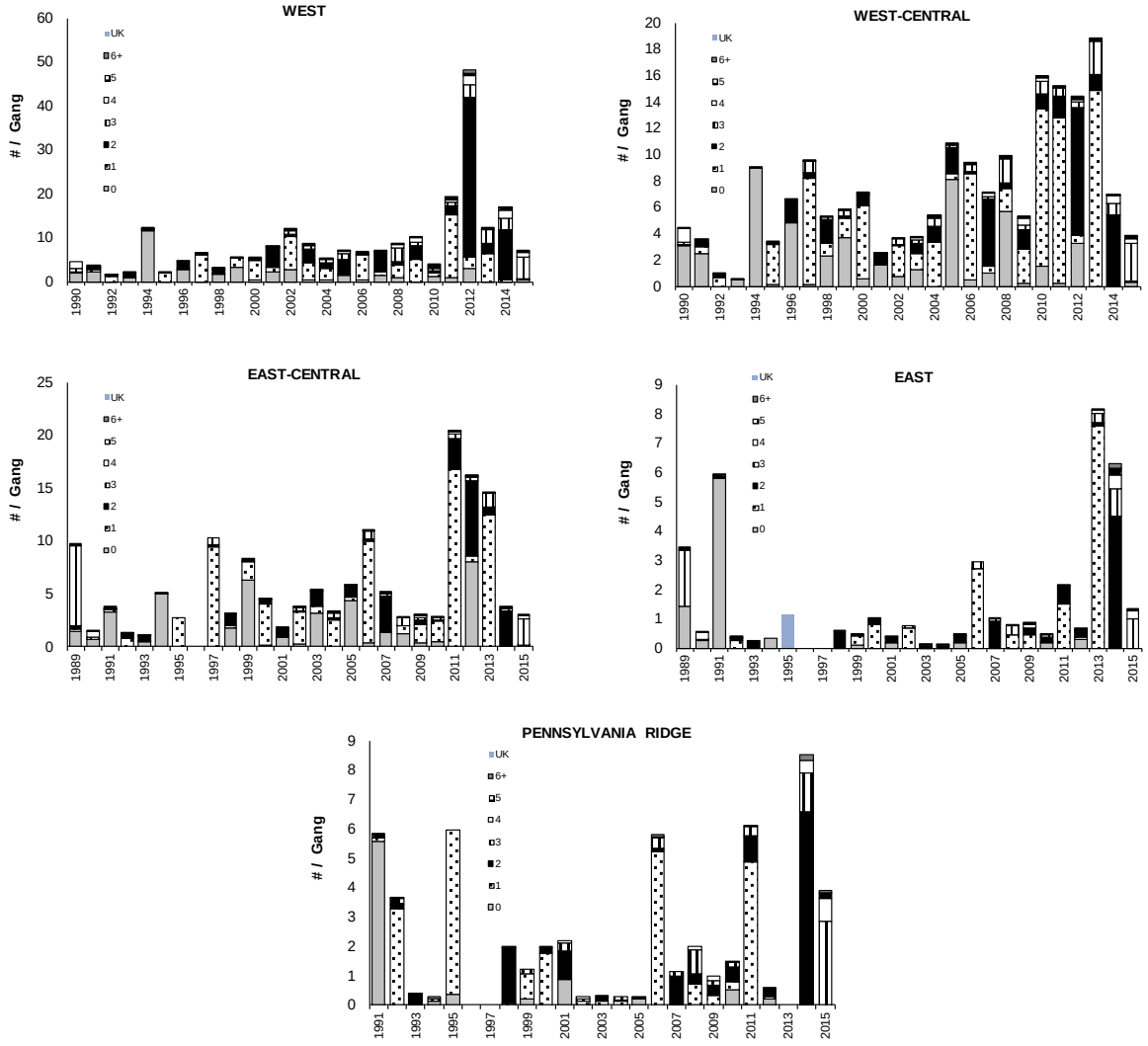


Figure 4.1.23 White Bass catch at age (number) per gang of Partnership index gill nets, by basin. Time frames and axes differ among basins. Absent bars indicate when studies were not done. Ages 6 and older pooled. East basin results include depths 30 m or less. Survey in the east basin 1995 had low sample size. Pennsylvania Ridge survey was not done in 1996 and 2013. UK indicates ages unknown.

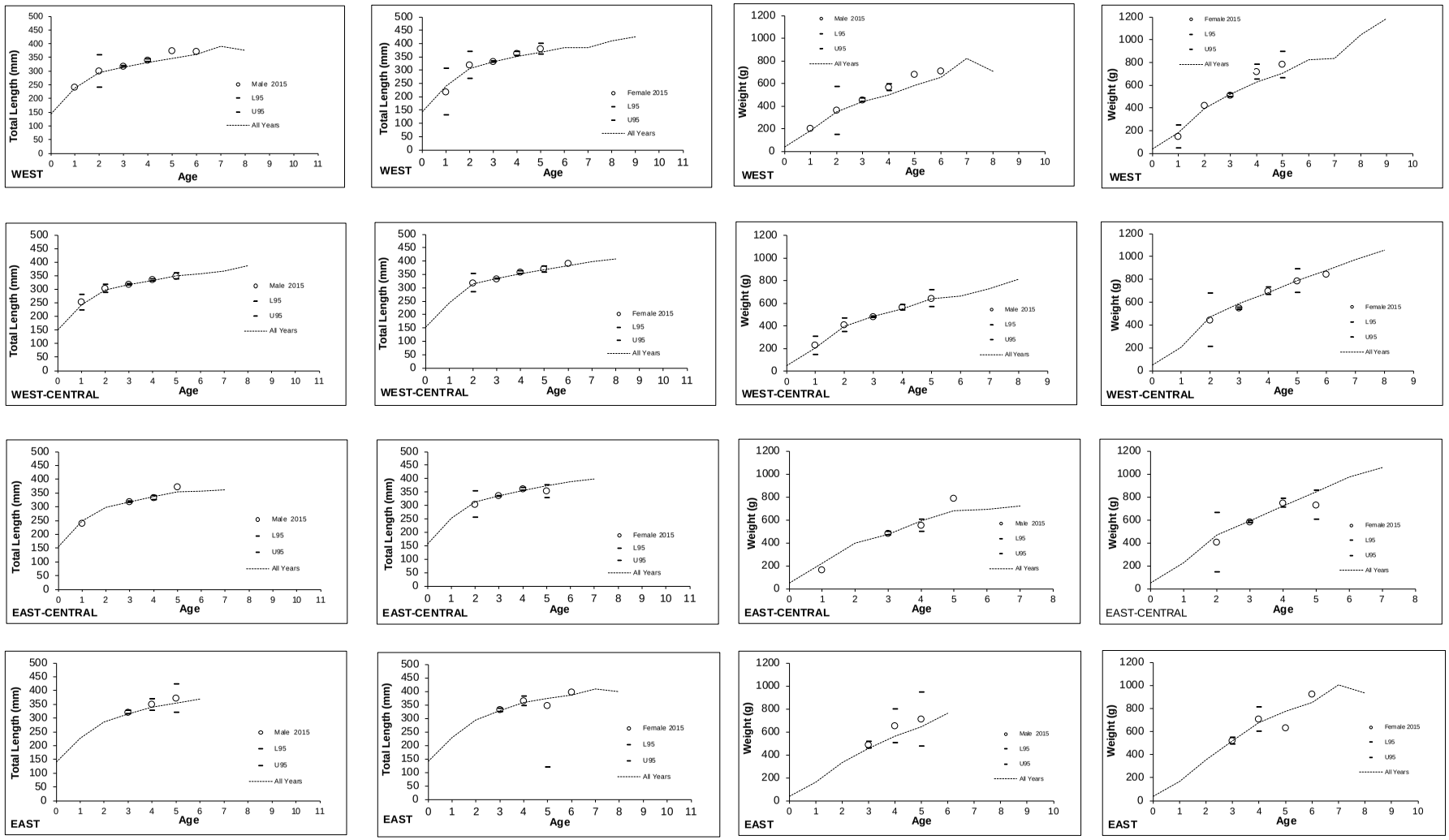


Figure 4.1.24 White Bass mean total length (mm) and weight (g) of males and females at age for the west (top row), west-central, east-central and east (bottom row) basins in 2015 (circles). 95% confidence limits shown. Dotted line represents mean size at age for all years to 2014. Partnership Index Fishing, 1989-2015.

4.2 Index Trawling: Western Lake Erie

West Basin Bottom Trawling

The western basin interagency trawling index is conducted annually during August by Ontario and Ohio. The study is used to assess year class strength of species based on catches of young-of-the-year (YOY) and yearling and older fish (YAO). Data from Ontario Ministry of Natural Resources and Forestry (OMNRF) and Ohio Department of Natural Resources (ODNR) are combined into a more spatially extensive survey, producing results that may differ from individual data sources. Lake Erie task groups use these values to project abundance of two-year-old Yellow Perch and Walleye in advance of recruitment to fisheries. These recruitment projections contribute annually to the calculation of recommended allowable harvest (RAH) for Yellow Perch and Walleye. Species composition and trends in forage abundance are also described by index trawling. Length measurements are recorded on board according to length-based age group criteria. Additional measurements of weight and length occurred in the laboratory for juvenile Yellow Perch and Walleye since 1998. Age 0 fish were weighed to a precision of 1 milligram whereas larger, older fish were weighed by scales to the nearest gram. Subsamples of Yellow Perch and Walleye were aged using otoliths.

The gear used was a two seam, 33' Biloxi bottom trawl (38' ground line) with a ½" liner. Trawl duration was 10 minutes on bottom at 1.7 knots. Ontario fieldwork in western Lake Erie took place at 36 stations over two weeks from August 10 to August 19, 2015 (Figure 4.2.1).

Due to concerns about the potential effects of hypoxia on the distribution of juvenile percids and other species, representatives from task groups, the Standing Technical Committee, researchers from the Quantitative Fisheries Center at Michigan State University (MSU) and Ohio State University (OSU) developed an interim policy for the assignment of bottom trawl status. Informed by literature (Eby and Crowder 2002, Craig and Crowder 2005) and field study (ODNR/OSU) concerning fish avoidance of hypoxic waters, an interim policy was agreed upon whereby bottom trawls that occurred in waters with dissolved oxygen less than or equal to 2 mg/l would be excluded from analyses applied retroactively from 2009. Hypoxic conditions (dissolved oxygen < 2 mg/l) did not occur in the west basin during the 2015 trawl survey.

To address effects on fish distribution when hypoxia occurs, OMNRF continued a midwater trawl study that began in 2012. The study occurred during the last week of August 2015. Methodology and results for this study are described following the results of west basin interagency bottom trawls.

Bottom trawl indices of abundance expressed as number caught per hectare (CPHA) are presented for YOY fish, YAO and small bodied fish with age groups pooled (all ages) for the period 1988-2015 (Table 4.2.1). Decade (2006-2015) and time series (1988-2015) means are presented for comparison. Additional summaries are presented for Yellow Perch yearlings and ages 2 and older and for yearling Walleye which used length and age data for age classification.

Yellow Perch YOY were the most abundant species at any life history stage in bottom trawls, representing approximately 1/3 of all fish caught (Table 4.2.1). The YOY Yellow Perch index in 2015 (1,081 YOY/ha) ranked 89th percentile over the 1988-2015 time series and for the recent decade (Figure 4.2.2). Although White Perch YOY catch rates were second highest among species and age groups, the 2015 index (923 YOY/ha) was below short and long term average catch rates, ranking 22nd and 30th percentiles respectively. The YOY Walleye catch rate in 2015 (82.6 YOY/ha) was the highest index in the recent decade and the second highest (96th percentile) catch rate over the 28 year time series (Table 4.2.1).

YOY Gizzard Shad abundance in 2015 was moderate (67th percentile) relative to the recent decade but weaker (48th percentile) relative to the 1988-2015 time period. White Bass YOY abundance in 2015 exceeded short and long term means, attaining 78th and 74th percentiles respectively. Smallmouth Bass young-of-the-year catch rate (0.4/ha) suggests a weak 2015 cohort. Similarly, other YOY Centrarchids were absent from bottom trawls in 2015.

Compared to their respective catch rates over time for yearling and older (YAO) groups, Walleye, Yellow Perch, White Perch and White Suckers were abundant in 2015 trawls (Table 4.2.1). Channel Catfish and Quillback Carpsucker YAO were present at moderate levels in 2015. Other species YAO were caught in low numbers relative to their respective time series (Table 4.2.1).

Catch rates for yearling (YRL) and ages 2 and older Yellow Perch (Figure 4.2.3) were parsed from YAO catches using length frequency and age data. Yellow Perch age compositions were applied to age 2 and older catch rates to produce age specific catch rates for 1998-2015 (Figure 4.2.4). The yearling Yellow Perch catch rate in 2014 was 93rd percentile for the full time series (Figure 4.2.3). Yellow Perch in the age 2 and older group in 2015 ranked 74th percentile since 1988. Within this group, ages ranged from 2 to 11, with age 2 most common (66%) followed by age 3 (17%) and age 5 (8%).

The 2014 year class strength of Walleye was assessed to be above average as young-of-the-year (81st percentile) in 2014 (Figure 4.2.5) and one year later as yearlings (89th percentile) in 2015 (Figure 4.2.6).

The composition of forage species, (which remain potential prey for the duration of their life histories), was composed mostly of Rainbow Smelt (40%), Round Gobies (28%), juvenile Cyprinids (10%), Trout-perch (10%), Logperch (6%), Emerald Shiners (3%) and Mimic Shiners (3%) (Table 4.2.1). Spottail Shiners represented a minimal fraction of forage species caught (1%) and Alewife were present (<1%). Rainbow Smelt abundance in 2015 (125/ha) was the second strongest index since 1988 (Table 4.2.1). The majority of Rainbow Smelt (>99%) were YOY. The Logperch catch rate in 2015 (17.3/ha) was the highest index in the recent decade and second highest observed since 1988. Mimic Shiner catch rate in 2015 (7.5/ha) was the second highest value from 1988-2015. Round Goby abundance (76.3/ha) in 2015 was assessed as moderate in Ontario waters of western Lake Erie, falling slightly below the decade mean (87.8/ha). Abundance indices in 2015 were low for Emerald Shiners (7.4/ha) and Trout-perch (23.4/ha) as they dropped below short term and long term means. Alewife catches remained poor in 2015, consistent with low densities observed since 2003 in western Lake Erie. Silver Chub catch rate in 2015 (0.4/ha) was low, ranking 11th and 7th percentiles over the decade and long time series respectively. The Silver Chub status is currently listed as *Threatened* under the Endangered Species Act of Ontario. The vulnerability of some species and age groups to capture in bottom trawls may be low or variable due sometimes to changes in vertical distribution in response to abiotic conditions. For additional focus on this topic, refer to the west basin midwater trawling study later in this section.

Catch rates for species encountered infrequently (10 year average #/ha < 0.2) are presented in Table 4.2.2. An adult Northern Pike (total length 471 mm) was caught in the trawl survey during 2015, representing the second occurrence of this species since 1994. An adult Bluegill Sunfish was caught for the first time during the survey, although YOY have been caught previously (Table 4.2.2). Tubnose Gobies (2) were caught in 2015, representing the second year for this occurrence. Previously, a Tubnose Goby was caught in 2011.

In 2015, the average total length of YOY Yellow Perch (60 mm) was below the 1988-2015 mean (65 mm) (Figure 4.2.7). The average total length of YOY Walleye during August trawls in 2015 (127 mm) was also below the time series average (133 mm) (Figure 4.2.8). The average length of yearling Yellow Perch (136 mm) remained above average in 2015 (Figure 4.2.9). The average total length of yearling Walleye (262 mm) in August was below the time series average (275 mm) for the first time since 2004 (Figure 4.2.10). Mean condition [10^5(Weight)/Length^3] for YOY Yellow Perch in 2015 (1.03) exceeded the 1998-2015 mean (1.00) (Figure 4.2.11) whereas confidence intervals about the YOY Walleye mean condition in 2015 (0.77) overlapped with the time series mean (Figure 4.2.12).

During 3 early years of this survey (1988, 1992, 1993), catches of Burbot were recorded that cannot be confirmed. The code for this cold water species resembles other species common to the west basin (Trout-perch and Freshwater Drum) leaving in question the species designation.

West Basin Midwater Trawling

In response to hypoxia observed during recent years of the west basin interagency trawling survey, an interim interagency protocol was implemented to exclude samples (from indices) since 2009 that exhibited hypoxia (≤2mg/l). To examine fish response to variable environmental conditions, west basin midwater trawl study commenced in 2012. Fieldwork took place from August 24 to August 27 in 2015.

The research vessel Keenosay fished midwater trawl gear at 7 stations with replicates on bottom, (benthic) suspended (pelagic) below surface and in the middle of the water column where depths permitted (at 4 stations: 8, 12, 18, 24 ≥ 9m) (Figure 4.2.13). At three stations, the net was not on bottom as intended; these were reclassified as midwater and trawls on bottom were repeated with more cable deployed. A total of 21 trawls were completed in 2015. Locations were unchanged from those fished in the 2012 pilot study.

The mid-water trawl has a 3 m square opening, with 102, 76, 51, and 25 mm graded mesh running from the gape to 13 mm mesh in the cod-end. Trawl duration was 10 minutes at 3.0 knots. Water temperature and dissolved oxygen profiles were logged at each location at the start and end of the first trawl at each site. Catches were sorted by species and size into age groups so that all percids (Walleye and Yellow Perch) and large fish were counted in full whereas volumetric subsamples were taken, and then expanded for small bodied forage species.

During the midwater trawl study, bottom dissolved oxygen concentrations ranged from 7.9 to 8.4 mg/l and bottom temperatures were from 20.9 to 23.9 º C. Suitable oxygen conditions did not allow us to compare the response of species' vertical distributions to hypoxia, but further defined baseline vertical distributions under favourable environmental conditions.

Catch rates (number per hectare) by species and age group are presented for areas fished in the water column (bottom, middle, top and combined as "All") in Table 4.2.3. Total catch rates of species and age groups combined in 2015 were highest in pelagic trawls at the top of the water column: 11,527 fish/ha) with comparable catches middle of the water column: (5,552 fish/ha) and in bottom trawls (5,390 fish/ha). YOY and yearling Walleye were caught exclusively in trawls fished on bottom in 2015. YOY Yellow Perch were caught only on bottom in 2015 (1,078 YOY/ha) while yearling and older (YAO) Yellow Perch caught primarily on bottom (94 YAO/ha) but were also present at low densities in the middle of the water column (2 YAO/ha). YOY White Perch were caught mostly in bottom trawls (1,121 YOY/ha) with minimal presence (0.5 YOY/ha) in the upper water column.

Emerald Shiner catch rates were highest among species-age groups in all fishing modes (bottom, middle, top), but with higher catches in pelagic trawls. YOY Yellow Perch, YOY White Perch, YOY Gizzard Shad and Rainbow Smelt comprised most of the remaining fish caught, although vertical distributions differed among these species (Table 4.2.3). Emerald Shiners, YOY Gizzard Shad and Rainbow Smelt were most abundant in the top layer of the water column, followed by the middle and bottom layers. White Bass YOY were distributed at comparable densities in the bottom (11 YOY/ha) and top (9 YOY/ha) with fewer caught in the middle of the water column (3 YOY/ha). Brook Silversides were present in comparable numbers in the bottom (23/ha), middle (27/ha) and top (20/ha) of the water column in 2015. The remaining species-age groups were caught only in trawls fished on bottom.

References:

Eby, L.A. and L.B. Crowder. 2002. Hypoxia-based habitat compression in the Neuse River Estuary: context-dependent shifts in behavioral avoidance thresholds. Can. J. Fish. Aquat. Sci. Vol. 59, 2002.

Craig, J.K. and L.B. Crowder. 2005. Hypoxia-induced habitat shifts and energetic consequences in Atlantic croaker and brown shrimp on the Gulf of Mexico shelf Mar Ecol Prog. Ser. Vol. 294: 79–94.

Table 4.2.1 Mean catch per hectare (CPHA) of abundant species as young-of-the-year, yearling-and-older and all ages, collected during interagency bottom trawling in western Lake Erie 1988-2015 by the OMNRF Lake Erie Management Unit. Means are presented for 2006-2015 and 1988-2015. Species with long term mean CPHA less than 0.2 were excluded. These other species appear in Table 4.2.2.

Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average 06 - 15	Average 88 - 15
young-of-the-year																														
White Perch	4,988.7	6,046.9	7,725.0	3,878.4	1,183.6	1,063.1	1,054.4	293.5	1,009.5	118.4	124.0	232.9	898.3	1,489.9	358.0	1,312.8	4,657.0	1,762.1	3,254.0	4,265.0	1,947.0	2,477.0	1,303.2	754.9	4,504.5	826.6	1,695.8	923.1	2,195.1	2,148.1
Gizzard Shad	956.4	1,197.1	1,099.6	59.0	260.4	826.4	103.9	81.6	2,409.1	33.8	413.3	214.0	1,646.5	2,224.8	47.2	436.0	23.4	152.7	174.1	340.0	2.6	793.8	47.8	22.8	291.3	12.7	14.7	180.6	188.0	502.4
Yellow Perch	202.1	513.7	470.9	72.4	173.9	499.3	554.8	741.4	1,914.9	71.6	188.1	468.2	46.5	655.9	14.5	2,220.6	57.7	117.6	361.0	331.7	663.0	74.8	161.2	220.7	72.5	280.8	1,550.7	1,080.9	479.7	492.2
White Bass	23.1	67.9	64.7	13.8	14.9	124.0	36.9	51.1	125.3	327.3	24.5	136.9	140.4	167.9	81.8	590.7	58.7	50.7	159.4	29.2	54.6	167.2	100.4	21.9	56.7	43.4	9.9	129.6	77.2	102.6
Freshwater Drum	72.1	10.2	2.4	84.4	0.5	3.1	0.7	0.2	6.9	1.4	2.9	9.8	23.0	16.9	107.8	117.4	33.8	20.1	1.4	7.0	-	0.4	5.9	1.9	6.5	1.5	0.4	1.7	2.7	19.3
Walleye	14.1	1.4	35.1	49.4	0.2	8.4	19.5	0.9	35.0	6.3	5.1	41.8	0.3	16.1	0.1	117.4	5.5	5.3	0.8	10.4	0.7	6.3	6.2	3.7	3.2	2.4	33.9	82.6	15.0	18.3
Smallmouth Bass	0.1	0.2	2.1	-	-	0.8	1.6	6.6	4.6	2.0	1.2	1.0	0.7	1.4	8.8	0.1	-	1.7	6.1	0.9	1.7	0.6	2.5	1.6	0.3	1.5	0.3	0.4	1.6	1.7
Rock Bass	-	-	0.1	0.5	-	0.3	0.3	0.2	0.3	-	-	0.6	0.9	1.3	0.7	-	0.1	0.3	0.3	-	0.3	0.4	0.9	3.0	0.1	0.1	-	-	0.5	0.4
White Crappie	0.5	0.1	-	8.8	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	0.1	-	-	-	-	-	-	-	-	-	0.0	0.3
yearling-and-older																														
Yellow Perch	169.4	7.8	52.0	89.3	70.7	99.3	68.3	137.5	374.7	73.9	98.7	187.8	328.9	131.3	120.1	470.2	402.9	294.9	83.5	84.2	536.2	416.6	154.8	139.6	75.4	123.0	203.8	399.6	221.7	192.7
White Perch	113.1	21.4	12.1	138.8	394.4	92.9	1.9	35.2	27.3	2.7	3.8	109.6	55.8	41.3	27.3	1,142.3	193.3	70.2	126.3	24.3	268.6	99.1	95.1	76.7	78.9	175.9	75.6	159.2	118.0	130.8
Freshwater Drum	143.9	0.1	22.2	36.6	20.2	37.5	9.5	17.2	39.6	14.3	24.4	33.3	61.4	51.2	98.7	67.5	90.9	91.3	58.0	29.5	36.6	41.2	38.6	47.0	38.7	72.4	20.2	30.7	41.3	45.5
Walleye	15.2	2.9	3.5	6.7	24.3	3.3	3.1	11.4	2.2	4.0	6.2	5.2	20.9	2.3	4.0	3.1	72.4	12.7	4.0	1.7	4.1	4.5	2.0	4.1	2.7	3.2	1.3	15.2	4.3	8.8
White Bass	6.0	0.1	1.0	0.2	1.8	12.3	0.1	1.9	-	0.8	-	0.5	8.2	0.2	1.9	2.1	3.7	0.4	2.3	0.7	0.8	0.9	0.6	8.7	0.2	10.5	1.3	0.2	2.6	2.4
Gizzard Shad	1.7	-	0.2	41.2	0.1	0.2	0.1	0.7	0.2	9.7	0.1	0.7	0.4	0.1	0.7	-	-	0.1	0.2	0.1	-	-	0.2	0.2	0.4	-	0.1	-	0.1	2.0
Channel Catfish	6.5	-	1.8	1.8	0.7	0.8	0.1	0.4	1.2	-	0.1	1.1	0.4	0.4	0.7	0.9	0.7	1.5	2.3	0.4	0.8	0.8	2.3	1.6	0.3	2.2	1.9	0.8	1.3	1.2
Carp	4.1	-	2.9	2.8	1.3	0.6	0.7	1.8	0.7	0.5	0.5	0.8	0.8	0.4	1.0	0.3	1.8	1.2	0.8	0.5	0.7	0.3	0.9	0.5	0.3	0.3	0.5	0.1	0.5	1.0
White Sucker	0.3	-	0.5	0.5	0.9	0.3	0.1	1.5	0.3	0.3	-	1.3	0.4	1.0	2.0	0.7	1.7	2.3	0.7	1.6	0.5	2.0	0.5	1.4	0.4	0.7	0.9	2.0	1.1	0.9
Rock Bass	1.7	-	1.0	1.2	0.6	1.2	2.5	1.3	2.2	0.4	0.1	0.3	0.7	1.8	0.6	0.3	0.2	0.3	-	0.6	0.2	1.2	-	0.2	0.1	0.4	0.1	0.1	0.3	0.7
Brown Bullhead	2.7	-	1.2	0.5	0.2	-	-	-	-	0.1	-	0.8	0.3	2.5	-	-	-	-	0.2	2.7	1.0	-	0.6	0.1	0.1	0.3	0.1	-	0.5	0.5
Smallmouth Bass	0.1	-	0.9	-	3.6	1.1	0.7	1.1	0.3	0.1	0.4	1.4	0.1	0.6	-	0.3	0.2	-	0.2	0.1	0.3	-	-	0.6	0.2	-	-	-	0.1	0.4
Burbot	0.2	-	-	-	0.6	9.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4
Quillback	-	-	0.5	0.6	-	0.1	-	0.5	0.4	0.2	-	0.2	0.2	0.2	0.9	0.1	2.0	0.1	-	-	0.1	-	0.4	0.1	-	0.3	-	0.1	0.1	0.3
all ages																														
Alewife	877.9	254.0	313.7	51.3	3,188.8	2,112.9	30.4	73.2	742.4	66.4	33.8	107.0	536.7	520.6	218.4	-	-	-	0.3	0.5	-	-	0.1	-	0.2	2.3	-	0.1	0.3	326.1
Trout-perch	211.7	142.6	347.7	479.3	71.1	267.8	182.9	63.9	336.0	61.5	67.1	128.7	321.6	187.4	196.8	40.8	670.4	311.9	281.9	92.4	34.9	457.4	281.1	54.6	97.0	86.0	88.9	23.4	149.7	199.5
Emerald Shiner	2.6	3.3	143.3	12.0	60.4	30.9	21.0	108.2	129.2	61.3	6.1	39.3	34.8	52.6	98.5	633.8	88.4	118.9	65.8	285.8	141.0	249.4	83.7	63.3	416.4	44.4	65.4	7.4	142.2	109.5
Round Goby	-	-	-	-	-	-	-	-	-	2.7	83.8	92.1	111.1	84.2	117.1	59.6	207.5	59.8	170.6	71.4	172.0	199.7	16.8	43.7	41.8	51.2	34.9	76.3	87.8	60.6
Spottail Shiner	46.9	21.6	31.7	49.5	40.6	29.3	28.3	331.5	40.4	81.2	87.9	75.3	23.1	66.5	13.1	15.9	16.9	94.5	17.5	31.7	5.5	4.9	29.8	1.2	1.1	0.9	2.1	2.3	9.7	42.5
Rainbow Smelt	1.4	3.1	10.9	0.2	64.3	18.7	0.1	2.8	1.6	2.0	6.5	-	39.7	0.2	6.4	29.2	82.1	2.0	52.6	45.9	84.8	65.8	0.5	8.0	2.3	82.6	124.9	106.8	57.4	30.2
Cyprindae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	15.7	14.2	-	23.2	0.4	6.5	214.8	19.5	22.3	27.8	34.4	12.3
Silver Chub	2.8	0.1	1.5	7.1	21.8	9.5	4.7	1.5	5.3	10.6	9.4	17.4	4.4	6.2	5.2	4.1	8.7	6.1	0.9	1.7	0.2	1.9	1.4	1.3	2.8	0.7	1.6	0.4	1.3	5.0
Logperch	2.7	1.7	1.8	8.5	0.2	0.3	20.1	1.3	8.2	2.0	3.4	0.2	0.1	-	-	0.6	3.9	2.2	2.1	0.6	2.3	13.2	1.1	1.2	0.1	3.7	4.0	17.3	4.6	3.7
Mimic Shiner	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	21.3	-	1.0	0.7	0.3	0.6	0.2	2.4	7.5	3.4	1.2
Total	7,868	8,296	10,350	5,095	5,600	5,254	2,147	1,969	7,218	955	1,192	1,908	4,307	5,725	1,532	7,267	6,684	3,181	4,843	5,696	3,960	5,103	2,340	1,491	5,910	1,850	3,958	3,276	3,843	4,463
# of trawls	37	45	39	42	36	27	38	34	32	32	32	30	32	36	34	35	36	36	36	36	36	29	35	33	36	36	36	36	35	35

CPHA (catch per hectare) = Unweighted, arithmetic mean catch per hectare

Samples collected since 2009 with dissolved oxygen ≤ 2 mg / l were excluded based on an interim interagency protocol adopted in 2012.

Table 4.2.2 Mean catch per hectare (CPHA) of species caught infrequently as young-of-the-year, yearling-and-older and all ages, collected during interagency bottom trawling in western Lake Erie 1988-2015 by the OMNRF Lake Erie Management Unit. Means are presented for 2006-2015 and 1988-2015. Species with long term mean CPHA greater than 0.2 were excluded. These other species appear in Table 4.2.1.

Species	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average 06 - 15	Average 88 - 15
young-of-the-year																														
Largemouth Bass	-	-	-	4.59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	-	0.11	-	-	-	-	-	0.02	0.17
Quillback	1.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05
Channel Catfish	-	-	-	0.31	-	-	-	0.29	-	-	-	-	-	0.11	-	-	-	-	-	-	-	-	-	-	0.26	-	-	-	0.02	0.03
Bluegill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	0.12	-	-	-	-	0.03	0.01
Morone sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-	-	-	-	-	-	0.10	-	0.03	0.01
Pumpkinseed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Black Crappie	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	-	-	-	-	-	-	-	-	0.01	0.00
White Sucker	-	-	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Centrarchidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	-	-	-	0.01	0.00
yearling-and-older																														
Shorthead Redhorse	-	-	-	0.09	-	-	0.09	-	-	-	-	-	-	-	-	0.52	1.32	0.11	-	-	0.65	0.47	0.10	0.12	0.11	-	-	0.11	0.15	0.13
Largemouth Bass	-	-	-	1.77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06
Lake Sturgeon	-	-	-	-	-	-	0.18	-	-	0.12	-	-	-	-	-	0.11	-	-	-	0.10	-	-	0.11	0.12	-	-	-	-	0.03	0.03
Golden Redhorse	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	-	-	-	-	-	-	-	0.51	-	-	-	-	-	-	0.05	0.02
Silver Redhorse	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	-	-	0.11	-	-	-	-	0.13	-	0.12	0.11	-	-	-	0.03	0.02
Black Crappie	0.10	-	-	-	-	-	-	-	0.09	-	-	-	-	-	-	-	-	-	0.25	-	-	-	-	-	-	-	-	-	0.02	0.02
Silver Lamprey	-	-	-	-	-	-	-	-	-	0.12	-	-	-	-	-	-	-	0.11	-	-	-	-	0.21	-	-	-	-	-	0.03	0.02
Moxostoma sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.23	-	-	-	-	0.02	0.01
Yellow Bullhead	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	-	-	-	-	-	0.11	-	-	-	0.02	0.01
Carp-Goldfish Hybrid	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	-	-	-	-	-	0.11	-	-	0.02	0.01
Muskellunge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	-	-	-	-	-	-	0.10	-	0.02	0.01
Northern Pike	-	-	-	-	-	-	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	0.01	0.01
Lake Whitefish	-	-	-	-	-	-	-	-	-	-	-	-	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
White Crappie	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Longnose Sucker	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	-	-	-	-	-	0.01	0.00
Bluegill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09	0.01	0.00
all ages																														
Johnny Darter	-	-	-	-	-	-	2.08	-	1.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.12	0.12
Brook Silverside	-	-	-	-	-	0.77	-	0.10	-	-	-	-	-	-	-	-	-	0.11	-	0.76	-	-	-	0.48	0.21	0.10	-	-	0.09	0.09
Goldfish	0.11	-	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	-	-	-	-	-	0.29	0.10	0.76	-	0.05	0.05
Tubenose Goby	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.12	-	-	-	0.22	0.01	0.01
Nocomis sp.	0.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.01
Blacknose Dace	-	-	-	-	-	-	-	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.00
Common Shiner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.00
Spotfin Shiner	-	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.00
Notropis sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09	-	-	-	-	-	-	-	-	-	-	-	0.00	0.00
Total	1.82	0.09	0.20	6.76	-	0.77	2.45	0.49	1.36	0.24	-	-	0.12	0.31	0.12	0.72	1.52	0.33	0.47	1.41	0.76	1.11	0.85	1.31	1.19	0.31	0.96	0.52	0.84	0.94
# of trawls	37	45	39	42	36	27	38	34	32	32	32	30	32	36	34	35	36	36	36	36	36	29	35	33	36	36	36	36	35	35

CPHA (catch per hectare) = Unweighted, arithmetic mean catch per hectare
Samples collected since 2009 with dissolved oxygen ≤ 2 mg / l were excluded based on an interim interagency protocol adopted in 2012.

Table 4.2.3 Mean number per hectare of species and age groups caught by midwater trawl depth categories in western Lake Erie. Unspecified age group indicates all ages included. Number of trawls (N), mean and minimum dissolved oxygen (mg/l) at gear depth and water temperature (°C) at gear depth are presented; 2012-2015.

Age Group, Species	BOTTOM				MIDDLE				TOP				All			
	2012	2013	2014	2015	2012	2013	2014	2015	2012	2013	2014	2015	2012	2013	2014	2015
YOY Yellow Perch	227.4	335.3	1,305.1	1,077.6	30.8	0.0	0.0	0.0	0.0	0.0	2.7	0.0	95.3	130.4	481.9	359.2
YAO Yellow Perch	77.1	27.4	2.5	94.4	0.0	0.0	0.0	1.6	0.5	0.0	0.0	0.0	30.2	10.7	0.9	32.0
YOY White Perch	9,337.9	209.9	401.0	1,120.6	19.4	0.0	0.0	0.0	0.0	0.0	0.0	0.5	3,635.7	81.6	147.7	373.7
YAO White Perch	105.3	115.9	0.8	13.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	41.0	45.1	0.3	4.5
YOY White Bass	72.8	5.8	3.7	11.3	11.9	0.0	3.4	2.6	5.3	0.5	3.5	8.7	33.0	2.5	3.5	7.5
YAO White Bass	1.7	5.3	4.0	2.1	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.7	2.0	1.9	0.7
YOY Freshwater Drum	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
YAO Freshwater Drum	53.6	10.5	1.8	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.9	4.1	0.7	0.5
YOY Smallmouth Bass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YAO Smallmouth Bass	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
YOY Rock Bass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YAO Rock Bass	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
YOY Walleye	5.8	0.0	5.0	40.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.0	1.9	13.6
Yearling Walleye	6.2	1.6	0.8	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	2.4	0.6	0.5	1.6
Age 2 and Older Walleye	1.5	1.1	0.5	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.4	0.2	0.0
YOY Channel Catfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YAO Channel Catfish	1.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0
Alewife	1.3	62.1	0.0	0.0	0.9	19.2	0.0	0.0	1.0	10.8	0.0	0.0	1.1	32.6	0.0	0.0
YOY Gizzard Shad	589.8	591.3	219.7	135.1	46.1	67.0	108.9	296.6	77.1	108.4	556.7	586.3	269.6	287.0	314.7	339.3
YAO Gizzard Shad	0.6	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.2
Rainbow Smelt	7.5	106.4	497.3	137.7	0.9	0.9	28.7	147.3	0.0	5.1	59.3	400.1	3.1	43.6	212.6	228.4
YOY Common White Sucker	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YAO Common White Sucker	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0
Round Goby	14.4	0.0	0.0	23.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	0.0	0.0	7.7
Emerald Shiner	7,040.9	3,859.4	949.1	2,671.3	10,323.3	15,892.3	4,200.8	5,077.0	7,742.2	15,672.4	3,340.3	10,506.6	8,043.1	11,127.3	2,685.8	6,085.0
Spottail Shiner	0.6	0.0	0.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.2	0.3
Silver Chub	40.6	6.3	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.8	2.5	0.0	0.2
Common Carp	0.6	2.6	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.0	0.0	0.2
Logperch	0.0	0.5	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0
Trout-perch	84.5	55.7	0.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.9	21.7	0.0	3.9
YOY White Crappie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YOY Black Crappie	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lake Sturgeon	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Cyprinid	3.9	7.4	0.0	17.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.6	1.5	2.9	0.0	7.3
Brook Silverside	44.4	2.7	61.4	23.4	1.1	0.0	0.0	27.3	69.9	3.2	16.6	20.1	44.7	2.3	28.7	23.6
Total	17,721	5,409	3,453	5,390	10,435	15,979	4,344	5,552	7,896	15,800	3,980	11,527	12,281	11,799	3,882	7,490
Number of Trawls	7	7	7	7	4	4	5	7	7	7	7	7	18	18	19	21
Mean Dissolved Oxygen[1] mg/l	7.0	8.0	9.7	8.8	8.1	8.7	8.5	8.8	8.3	8.6	8.8	8.8	7.4	8.2	9.5	8.8
Minimum Dissolved Oxygen[1] mg/l	5.8	7.5	7.6	7.9	8.1	8.6	8.5	8.0	8.1	7.8	8.5	8.1	5.8	7.5	7.6	7.9
Mean Temperature[1] °C	24.3	23.8	23.3	22.3	24.2	23.6	23.8	22.9	24.3	23.9	24.0	22.6	24.3	23.8	23.5	22.5

[1] At depth trawl was fished.

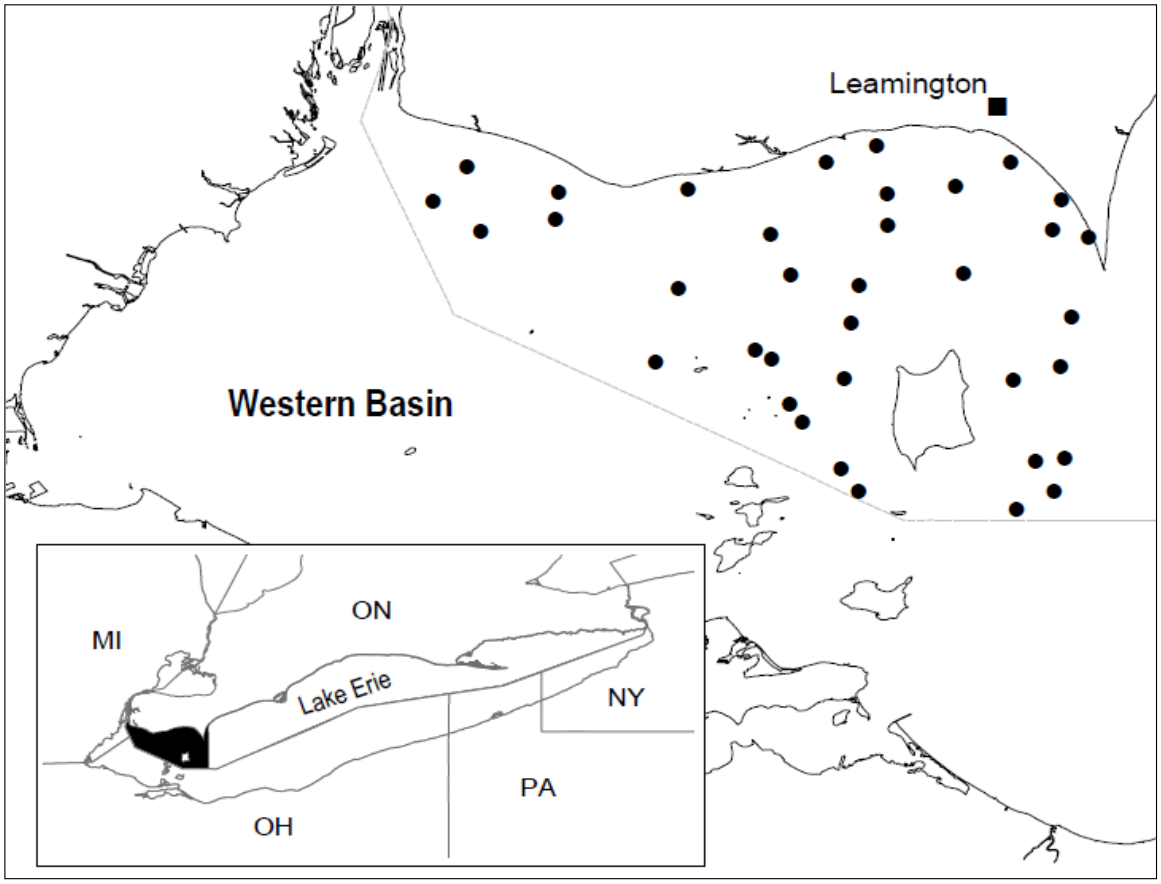


Figure 4.2.1 Ontario bottom trawl index locations fished in the western basin of Lake Erie during August 2015. Thirty-six (36) stations were completed. No sites were excluded in 2015 due to hypoxia.

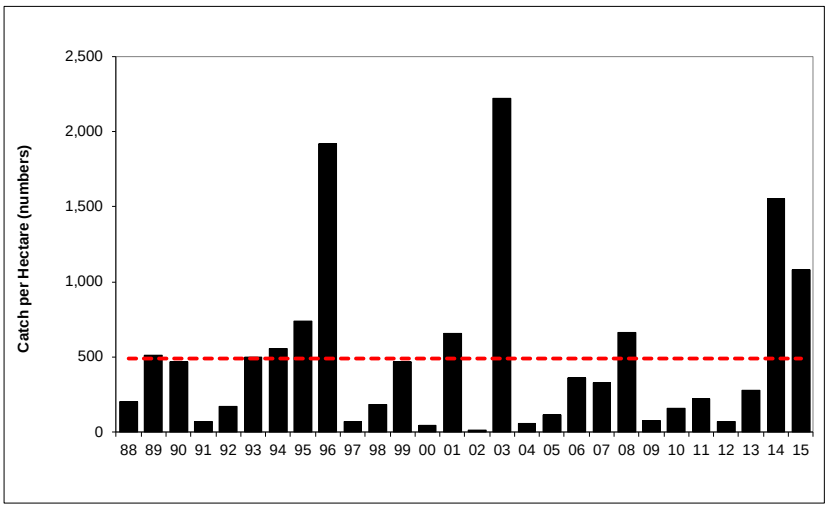


Figure 4.2.2 Number of young-of-the-year Yellow Perch caught per hectare during interagency trawling (1988-2015) in western Lake Erie. Horizontal line indicates 1988-2015 mean catch per hectare.

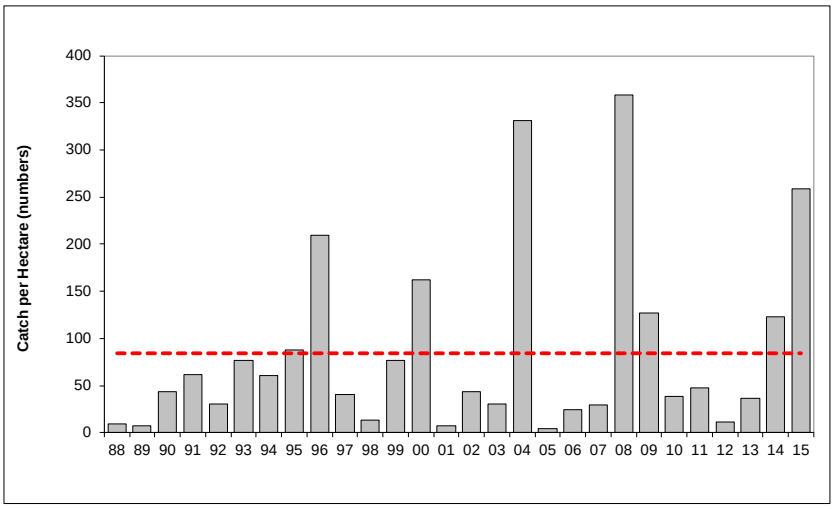


Figure 4.2.3 Number of yearling Yellow Perch caught per hectare during interagency trawling (1988-2015) in western Lake Erie. Horizontal line indicates 1988-2015 mean catch per hectare.

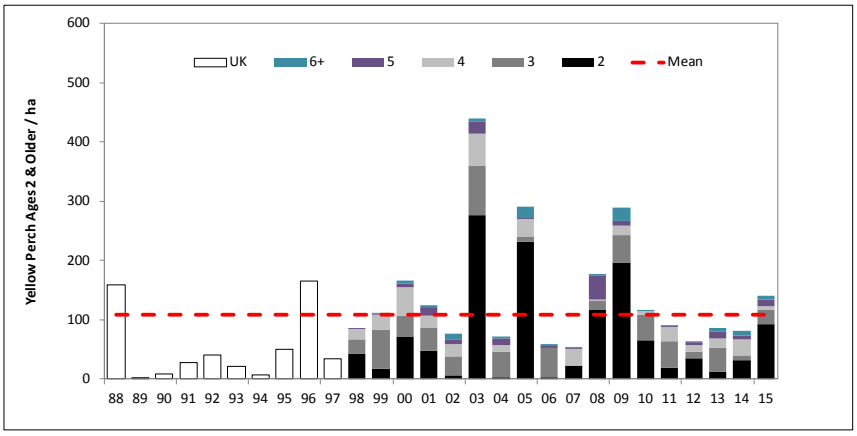


Figure 4.2.4 Number of Yellow Perch ages 2 and older caught per hectare during interagency trawling (1988-2015) in western Lake Erie. Yellow Perch were aged from 1998 to 2015. UK indicates unknown age composition within this size group.

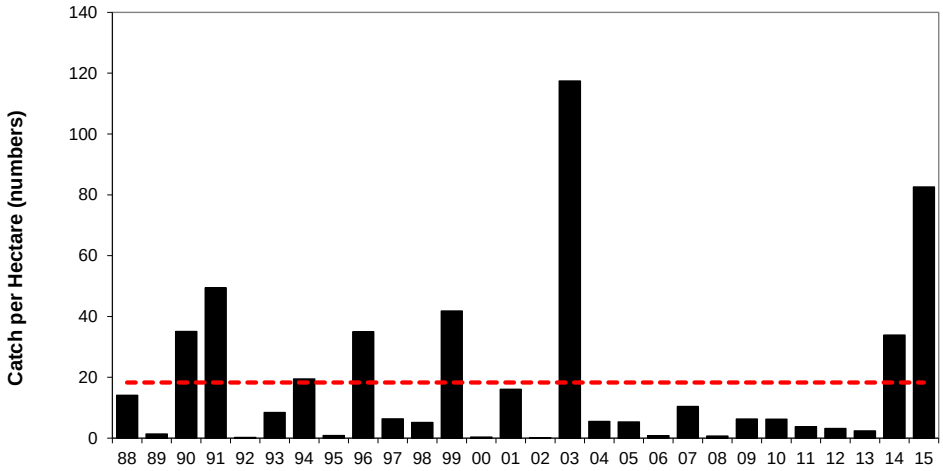


Figure 4.2.5 Number of young-of-the-year Walleye caught per hectare during interagency trawling (1988-2015) in western Lake Erie. Horizontal line indicates 1988-2015 mean catch per hectare.

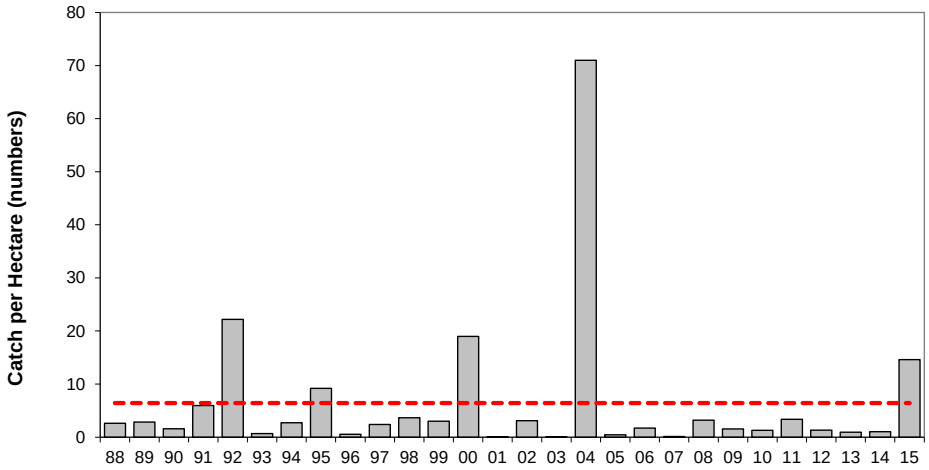


Figure 4.2.6 Number of yearling Walleye caught per hectare during interagency trawling (1988-2015) in western Lake Erie. Horizontal line indicates 1988-2015 mean catch per hectare.

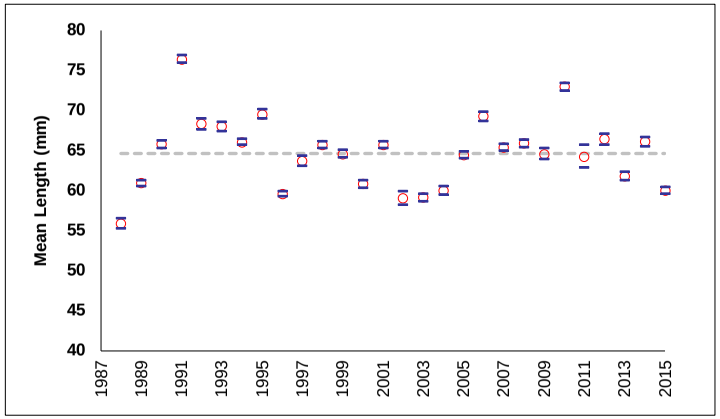


Figure 4.2.7 Mean total length of young-of-the-year (YOY) Yellow Perch with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2015. Horizontal broken line indicates the average of the time series.

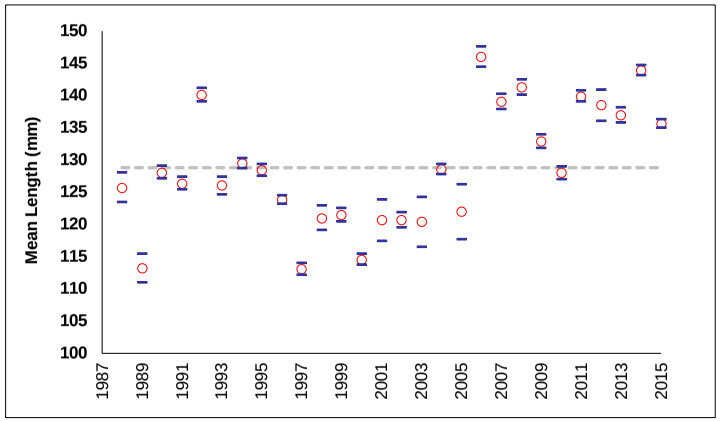


Figure 4.2.9 Mean total length of yearling Yellow Perch with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2015. Horizontal broken line indicates the average of the time series.

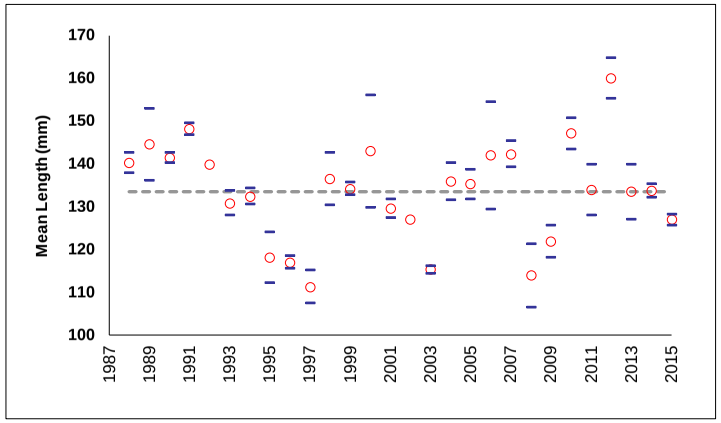


Figure 4.2.8 Mean total length of young-of-the-year (YOY) Walleye with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2015. Horizontal broken line indicates the average of the time series. Two (2) YOY Walleye were caught in 1992 and one (1) in 2002.

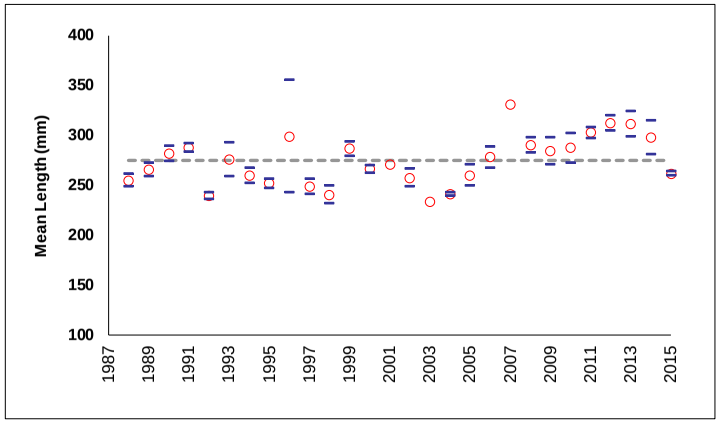


Figure 4.2.10 Mean total length of yearling Walleye with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2015. Horizontal broken line indicates the average of the time series. In 2007 one (1) yearling Walleye was caught.

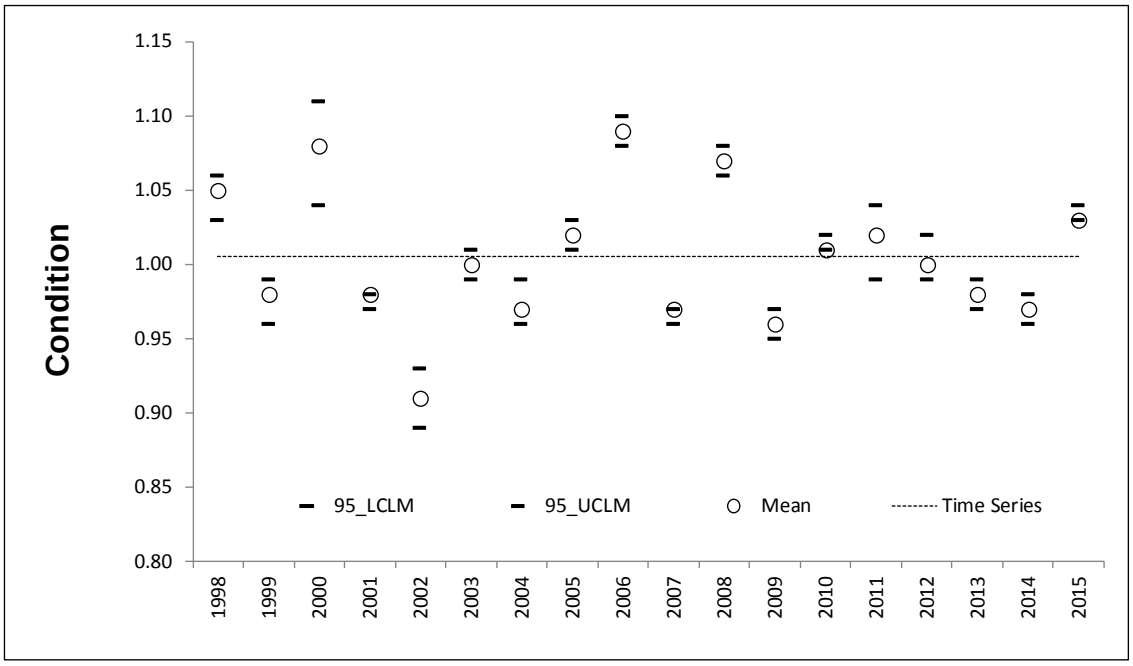


Figure 4.2.11 Mean condition of young-of-the-year (YOY) Yellow Perch with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2015. Horizontal broken line indicates the average of the time series. Precision to two decimal places.

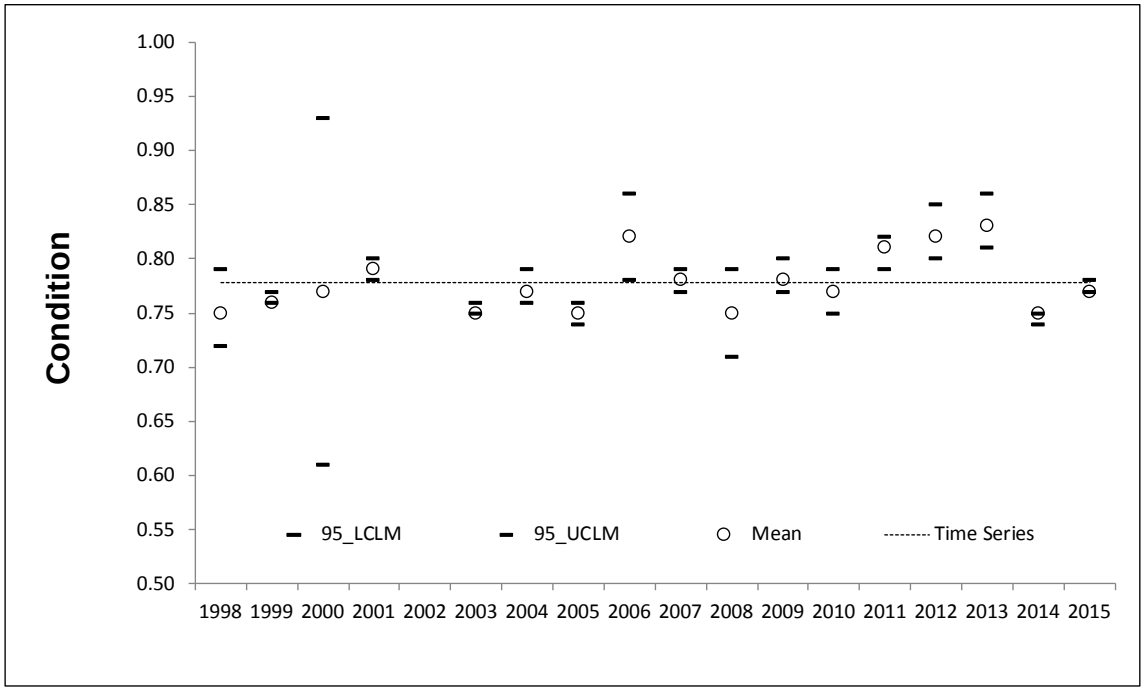


Figure 4.2.12 Mean condition of young-of-the-year (YOY) walleye with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2015. Horizontal broken line indicates the average of the time series. Precision to two decimal places.

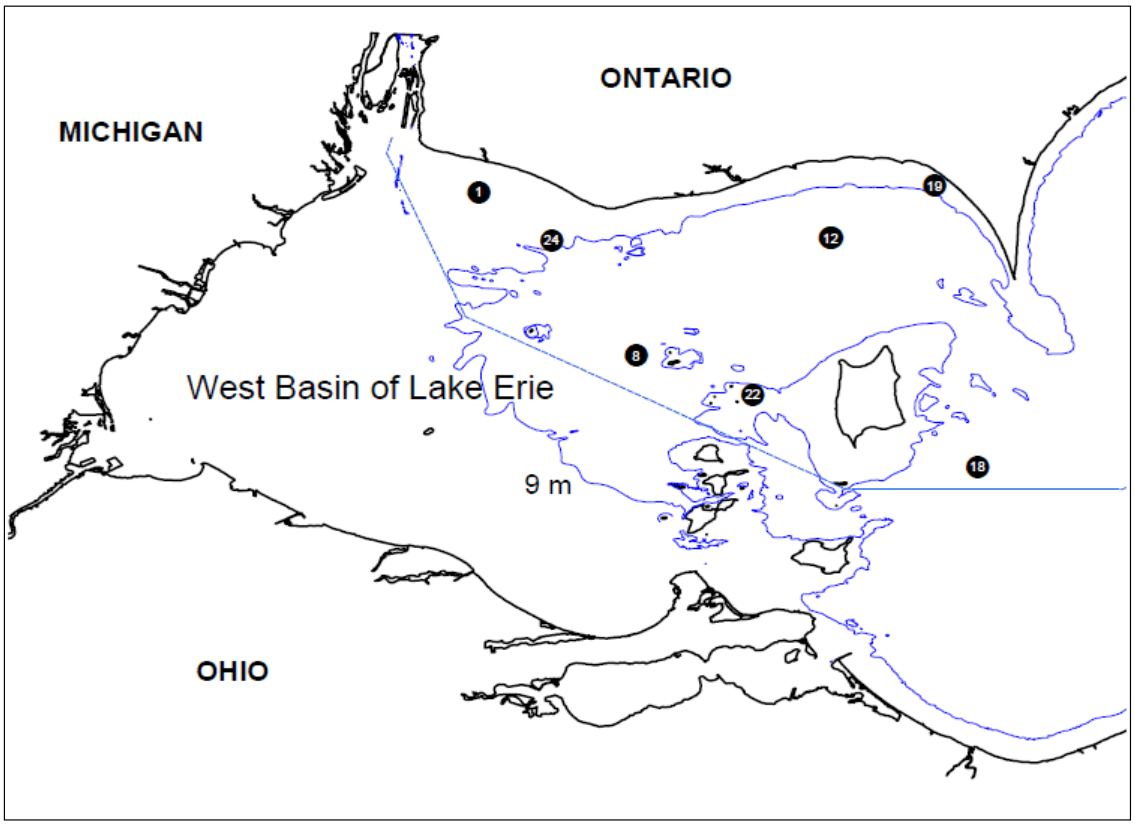


Figure 4.2.13 Ontario midwater trawl locations fished in the western basin of Lake Erie during August 2015. Seven sites were selected from the bottom trawl survey which took place during the previous 2 weeks. Site numbers are visible. Trawls were fished near the surface and on bottom at all sites. At depths close to 9 m or greater, trawls were also fished in the middle of the water column.

4.3 Long Point Bay Index Trawl Surveys

Assessment of juvenile fish in Long Point Bay consists of three independent bottom trawl surveys conducted during early fall each year in three areas (Figure 4.3.1a). Two surveys targeting Yellow Perch have been conducted annually since 1980 in Inner Long Point Bay (Inner Bay Trawl Assessment) at four fixed stations, and the nearshore waters of outer Long Point Bay (Nearshore Outer Bay Trawl Assessment) at three fixed stations with a 6.1 m modified Biloxi bottom trawl. A third trawl survey was initiated in 1984 to measure recruitment of Rainbow Smelt. In this survey, a 10 m Biloxi bottom trawl was fished in the offshore waters of Outer Long Point Bay (Offshore Outer Bay Trawl Assessment) at four fixed stations. For all surveys, two consecutive trawls were towed at each station during each sample event.

Trawling at all nearshore index stations was conducted weekly during September and October from 1980 to 2010. Beginning in 2011, the standard survey period for nearshore trawling was changed to four or five weekly sample events from August 26th to October 5th. Total annual trawling effort was reduced to 400 and 300 minutes, for the Inner Bay and Outer Bay surveys, respectively, following implementation of a truncated survey period in 2011.

Trawling at the offshore Outer Bay stations occurred weekly during September and October from 1984 to 1995. In 1996, sampling at the offshore trawl stations was abbreviated to weekly sample events during October plus a few days before and after. In 2011, the standard survey period for reporting offshore trawl data was further refined to include up to five weekly sample events from September 25th to November 8th across the entire time series, resulting in an annual total trawl effort of some 400 minutes.

Trawl catches were sorted by species and age group. Species catch was classified as young-of-the-year (YOY) and yearling-and-older (YAO) based on a fork length criterion derived from examinations of size frequency distributions and age determination of representative juveniles from selected length classes. Random samples of YOY and YAO for selected species were measured for length and weight. Sex, maturity and age (from scale interpretations) were also recorded for YAO fish.

Relative abundance indices were expressed as arithmetic mean catch (number) per hectare (NPHa). Arithmetic means were calculated from the summed catch and effort of tows 1 and 2 at each location. Values from all years were adjusted to the new (post 2010) standardized effort for each survey.

A new index of YOY Yellow Perch abundance was introduced in 2010 that combines the annual recruitment estimates from each of three Long Point Bay trawl assessments into a single composite index series. Referred to as the Yellow Perch or Long Point Bay composite index (LPBc), this new method of reporting YOY Yellow Perch abundance was created to better reflect the overall abundance of YOY perch in Long Point Bay following a shift in the spatial distribution of juvenile Yellow Perch from predominately nearshore to predominately offshore habitats since about 2003. The composite index combines the annual mean abundance (NPHa) estimates from each of the three trawl assessments and assigns a 3.6 times greater weight to the offshore Outer Bay trawl mean estimate based on the proportion of the total surface area of Long Point Bay (including Inner Bay) represented by bottom depths greater than 5 m (78.3%) and less than or equal to 5 m (21.7%) according to the following equation:

$$LPBc_i = (OOB_i \times 0.783) + \frac{(IB_i \times 0.217)}{2} + \frac{(NOB_i \times 0.217)}{2},$$

where $LPBc_i$ is the YOY Yellow Perch composite index in year i, and OOB_i, IB_i and NOB_i are the YOY perch mean NPHa estimates for each of the three Long Point Bay trawl assessments in year i; Offshore Outer Bay (OOB), Inner Bay (IB), and Nearshore Outer Bay (NOB).

Outer Long Point Bay Grid Trawl Assessment

In addition to the three long-term index bottom trawl assessments described above, a spatially extensive trawl survey was implemented in 2008 to examine the abundance and distribution of juvenile Yellow Perch and forage fish species in Outer Long Point Bay. It provides a secondary benefit of evaluating the effectiveness of the existing standard index trawl assessment programs that feature multiple weeks of sampling at a few fixed locations in Long Point Bay.

This grid based bottom trawl survey (Long Point Bay Grid Trawl Assessment) has been completed every year since 2008. Target sample locations were established on a UTM Grid covering the offshore waters of Outer Long Point Bay deeper than 5 metres (Figure 4.3.1b). Thirty-six total sample stations were identified; 26 stations were defined by the intersection of 5 by 5 km UTM Easting and Northing grid lines. An additional 10 sites were selected at the centre of 5 x 5 km grids where bottom depth was 15 metres and deeper. A greater sampling resolution was applied in areas $\geq$15 m to enable a more detailed examination of depth-dependent species distribution in a region of the bay that has the greatest bathymetric gradient and has exhibited the highest concentration of juvenile Yellow Perch during most of the last 10 years.

Grid trawling was completed over a 2 to 5 day period during mid to late October each year. The Ontario Ministry of Natural Resources and Forestry (OMNRF) research vessel Erie Explorer, gear (10 m trawl), and trawl procedures used were the same as for the Offshore Outer Bay Trawl Assessment. A single 10 minute bottom tow was completed at each grid station. Under favorable conditions (weather/lake), the survey crew can sample between 15 and 20 sites per day. In most years a subset of the 36 potential target trawl stations were actually sampled due to weather related interruptions. The 2015 survey occurred over two days (October 21st and 22nd) and sampled 25 stations. Long Point Bay Grid Trawl Assessment results are described separately from species reports below.

Yellow Perch

Trends in YOY Yellow Perch catch across the three index surveys were inconsistent (Tables 4.3.1 to 4.3.3). In 2015, YOY Yellow Perch density in the Inner Bay was at its highest level (NPHa = 326.0) since 2001 and above the long-term (1980-2014) mean NPHa of 241.4. The 2015 Inner Bay YOY Yellow Perch density ranked 9th highest since 1980 (77th percentile). YOY Yellow Perch density in the Nearshore Outer Bay (NPHa = 78.5) in 2015 was a small decrease from 2014. This value was slightly above the long-term (1980-2014) mean NPHa of 74.6 and ranked 11th highest since 1980 (71st percentile). YOY Yellow Perch density in the offshore Outer Bay (NPHa = 18.7) was lower than the 2014 density and below the long-term (1984-2014) mean NPHa of 41.4. The offshore YOY Yellow Perch density in 2015 ranked 10th highest since 1984 (71st percentile). The Long Point Bay composite index, which takes into consideration all trawl locations and is weighted heavily towards the larger offshore Outer Bay, indicated the 2015 year class strength was similar to the long-term average (2015 NPHa = 58.5, 1984-2014 mean NPHa = 63.6) and the strongest year class since 2011 (Figure 4.3.2).

In 2015, the mean size of YOY Yellow Perch from the Inner and Outer Bay Nearshore Trawl Assessments decreased for the fourth consecutive year (Figure 4.3.3). YOY Yellow Perch mean length and weight in 2015 were the second lowest observed since 1980.

Densities of YAO Yellow Perch in 2015 in the three Trawl Assessments were all below long-term averages (Table 4.3.4). NPHa of YAO Yellow Perch for 2015 was 3.4 in the Inner Bay (mean 1980-2014 NPHa = 87.5), 0.8 in the Nearshore Outer Bay (mean 1980-2014 NPHa = 39.3) and 2.1 in the offshore Outer Bay (mean 1984-2014 NPHa = 14.6). The 2014 year class was the largest cohort of YAO Yellow Perch captured in all three Index Surveys in 2015.

Rainbow Smelt

Recruitment of YOY Rainbow Smelt increased for a second consecutive year, with 2015 showing the highest density (NPHa = 3245.2) since 2003 and the second highest density in the offshore Outer Bay time series (97th percentile) (Table 4.3.5).

YAO Rainbow Smelt density increased in 2015 in the offshore Outer Bay to the highest level since 2009 (NPHa = 411.0; Table 4.3.5) though density remained below the long-term mean (1984-2014 avg. NPHa = 423.2). Age 1 Rainbow Smelt accounted for 97% of the 2015 YAO Rainbow Smelt catch in number (Table 4.3.5).

YOY Rainbow Smelt mean length and weight increased in 2015 following a substantial decrease in 2014, although length and weight values remained below the long-term average in 2015 (Figure 4.3.4). The 2014 year class of Rainbow Smelt (age 1) remained of below average length and weight in 2015 (Figure 4.3.4).

Smallmouth Bass

YOY Smallmouth Bass abundance increased in 2015 (NPHa = 6.3) in the Inner Bay Trawl Assessment from the previous year, but remained below the long-term average density of 15.2 bass/ha for the sixth consecutive year (Table 4.3.1). YOY Smallmouth Bass mean length and weight increased from 2014 and was above average (Figure 4.3.5). YOY Smallmouth Bass have trended towards larger sizes since 1982.

Round Goby

Round Goby density (all ages) increased in all three survey areas in 2015 from 2014 values (Tables 4.3.1 to 4.3.3). The highest density was observed in the nearshore Outer Bay (NPHa = 359.1); density here was higher than at any other time in this area since Round Goby were first detected in Long Point Bay in 1999. Density in Inner Long Point Bay in 2015 (NPHa = 151.6) reached the highest value since 2009 and was above the 1999-2014 average (NPHa = 104.7). Density was lowest in the offshore Outer Bay (2015 NPHa = 67.2), despite this area having the highest average density over the 1999-2014 time series (NPHa = 164.9).

YOY of Other Species

Spottail Shiner were an important component of the nearshore forage fish community in Long Point Bay during the 1980's and 90's, but YOY recruitment decreased sharply after 2000 (Tables 4.3.1 and 4.3.2). For instance, YOY densities of Spottail Shiner in the Nearshore Outer Bay Trawl Assessment averaged 632.0/ha from 1980 to 2000 and only 25.7/ha since 2001 (Table 4.3.2). A few YOY Spottail Shiner were captured in the Nearshore Outer Bay Trawl Assessment during 2015 (5.8/ha), but there has not been a single YOY Spottail Shiner captured in the Inner Bay Trawl Assessment since 2007 (Table 4.3.1).

YOY Banded Killifish density was low in 2014 and 2015 in the Inner Bay after a short lived increase in 2013 that followed ten years of low abundance (Table 4.3.1) (2015 NPHa = 6.8). YOY recruitment indices for Rock Bass (NPHa = 0.1) in the Inner Bay remained low in 2015, continuing a trend that began around 2000, while YOY *Lepomis* (sunfish) species had the highest density observed since 2005 (NPHa = 5.8) but was below average (27.6 NPHa) (Table 4.3.1).

Small numbers of YOY White Bass and White Perch were captured in the 2015 offshore Outer Bay Trawl Assessment during 2015 after a two year absence (Table 4.3.3). Small numbers of YOY White Perch were captured in the 2015 Nearshore Outer Bay Trawl Assessment for the first time since 2012 (Tables 4.3.2). YOY Alewife density in 2015 remained low in the nearshore (NPHa = 3.4) and offshore (NPHa = 0.7) Outer Bay (Tables 4.3.2 and 4.3.3). Gizzard Shad density in the nearshore Outer Bay increased, after two years of low density, to the 10th highest level seen in the time series in 2015 (NPHa = 10.1). Gizzard Shad density also increased in the offshore Outer Bay as well, but to a lower level (NPHa = 0.4). YOY Emerald Shiner abundance increased to the 6th highest value in the offshore Outer Bay time series (NPHa = 346.7) but were completely absent in the Nearshore Outer Bay Trawl Assessment.

Species Spatial/Depth Distribution, Grid Trawl Assessments, 2008-2015

In 2015, 25 of the 36 target grid trawl locations were sampled (Table 4.3.6), the lowest sampling effort for this program to date. A principal objective of the Grid Trawl Assessment was to examine

the spatial/depth distribution of juvenile Yellow Perch. Beginning about 2003, YOY Yellow Perch distribution shifted from predominately nearshore to predominately offshore habitat in Long Point Bay. Figure 4.3.6 combines point-in-time catch data from the Grid Trawl Assessment with time-averaged, site-specific YOY Yellow Perch abundance indices from the three standard long-term trawl assessments (mean species abundance at fixed trawl stations sampled during a 4 to 5 week period).

In 2008, 2010 to 2012, and 2014, YOY Yellow Perch abundance was moderate to high and site-specific densities during these five years were consistently higher in the offshore waters of Outer Long Point Bay compared to nearshore areas and the Inner Bay. YOY Yellow Perch recruitment was poor in 2009 and 2013, and juvenile Yellow Perch densities were too low in these years to provide meaningful information about Yellow Perch distribution (Table 4.3.6, Figure 4.3.6).

In 2015, a notable shift to larger catches in the Inner Bay occurred in the standard index surveys and larger catches were observed in the shallower waters of the Grid Trawl Assessment. Three of the four largest catches of YOY Yellow Perch in the Grid Trawl Assessment were in depths of 5-10 m; no YOY Yellow Perch were captured in these depths in this program in any previous year except 2008. The remainder of the 2015 catch was distributed throughout 7 other sites in deeper water. Overall, the mean density of YOY Yellow Perch in 2015 in the Grid Trawl Assessment was 10.8 fish/hectare, ranking 4th in the 8 years of this program.

Sampling of 25 grid trawl stations over 2 days in 2015 provided a “snap shot” perspective for examining abundance and distribution of all fish species (Table 4.3.6; Figure 4.3.7). Both YOY and YAO Rainbow Smelt densities in 2015 were the highest of any year in the Grid Trawl Assessment, which coincided with high catches of YOY and YAO Rainbow Smelt in the Offshore Index Trawl Assessment. High densities (>1000 fish/ha) of Rainbow Smelt occurred from 5-40 m of depth in 2015. In contrast, 2014 densities were much lower and the higher densities of Rainbow Smelt were observed in depths >10 m. Round Goby were the third most abundant species captured in the Grid Trawl Assessment, averaging 276.8 Goby/ha across the 25 stations in 2015 (Table 4.3.6). This was third highest mean Round Goby density observed during the survey’s 8 year history. All samples, except one, that captured Round Gobies in 2015 were in depths >25 m. Round Goby captures were concentrated in the southwest corner of Long Point Bay, similar to 2014. Emerald Shiner (all ages) density in the Grid Trawl Assessment was the second highest since 2008 (NPHa = 758.1), increasing from a time series low of 0.9/ha in 2014.

Table 4.3.1 Relative abundance (mean number per hectare) of selected young-of-the-year fish species caught in Inner Long Point Bay, Lake Erie during bottom trawl assessments (6.1 m trawl) , September, 1980-2015.

Year	Effort (min.)	Yellow Perch	Rock Bass	Smallmouth Bass	Largemouth Bass	Spottail Shiner	Banded Killifish	Johnny Darter	Sunfish (*Lepomis* spp.)	Round[a] Goby
1980	130	167.8	7.3	4.0	3.0	364.2	0.0	1.3	3.0	0.0
1981	220	534.9	2.9	0.0	0.0	2.4	0.0	0.4	7.1	0.0
1982	400	1026.8	12.1	11.8	3.4	126.9	0.3	1.3	0.0	0.0
1983	220	125.9	7.0	7.5	5.3	0.2	1.0	1.2	11.8	0.0
1984	400	761.7	41.1	2.3	6.8	37.4	1.3	0.9	128.9	0.0
1985	480	20.8	19.0	12.9	5.2	983.2	0.9	0.9	2.5	0.0
1986	400	1859.5	10.5	5.3	6.2	932.7	0.3	0.0	2.1	0.0
1987	400	3.8	6.9	5.0	6.9	195.2	0.0	0.0	7.3	0.0
1988	400	305.0	2.3	5.6	3.8	627.8	0.1	0.3	3.4	0.0
1989	400	457.7	13.2	5.3	6.9	871.9	23.2	25.6	111.9	0.0
1990	400	202.6	4.4	4.9	7.9	55.1	12.5	17.0	161.2	0.0
1991	400	144.0	4.1	13.1	7.7	382.6	10.6	23.4	8.1	0.0
1992	400	594.0	4.2	19.1	1.6	83.7	1.1	9.9	0.1	0.0
1993	400	239.8	22.3	26.4	2.9	97.5	6.1	11.1	184.5	0.0
1994	400	84.0	5.7	40.9	39.1	51.4	11.8	47.0	9.8	0.0
1995	400	5.3	82.3	19.6	74.4	116.8	52.6	57.3	72.4	0.0
1996	400	53.6	197.6	23.9	57.6	49.7	48.0	24.3	171.2	0.0
1997	400	21.5	23.9	72.0	17.2	79.6	19.3	41.9	4.0	0.0
1998	480	1005.9	17.6	13.3	11.8	171.7	226.3	16.5	16.5	0.0
1999	480	34.0	12.8	91.7	96.6	51.0	44.0	11.1	6.1	0.6
2000	400	1.2	37.8	7.9	5.1	2.4	11.8	4.3	3.1	26.5
2001	400	463.8	1.3	21.7	3.3	0.3	12.9	4.3	1.6	183.1
2002	400	8.3	11.8	14.0	24.8	0.0	74.0	7.3	29.2	56.2
2003	320	224.0	4.2	12.8	4.4	0.4	4.2	4.5	6.1	28.6
2004	480	0.1	0.2	12.0	0.8	0.2	0.3	16.2	0.2	95.4
2005	480	8.8	9.7	9.0	7.0	1.0	3.7	0.2	10.3	21.0
2006	400	0.3	0.5	5.0	3.8	0.1	0.4	12.0	0.1	34.0
2007	400	73.9	0.3	8.2	1.6	0.5	0.3	2.1	0.0	263.0
2008	400	0.3	1.3	8.4	1.2	0.0	0.5	0.1	0.7	211.8
2009	320	0.0	1.1	19.1	0.7	0.0	0.5	0.7	0.0	280.5
2010	400	5.7	0.0	11.0	5.8	0.0	0.9	1.2	0.3	135.1
2011	400	3.9	4.1	6.1	3.5	0.0	3.7	2.0	2.5	114.6
2012	400	1.6	0.3	2.2	1.0	0.0	1.4	1.0	0.0	79.8
2013	400	2.1	2.9	7.3	4.2	0.0	25.1	0.4	0.7	49.6
2014	400	4.7	0.5	4.2	1.9	0.0	4.1	1.4	0.1	95.4
2015	400	326.0	0.1	6.3	2.1	0.0	6.8	2.6	5.8	151.6
Avg. for 1980-2014		241.4	16.4	15.2	12.4	151.0	17.2	10.0	27.6	47.9

[a] Abundance indices of Round Goby include all ages.

Table 4.3.2 Relative abundance (mean number per hectare) of selected young-of-the-year fish species caught in the nearshore waters of Outer Long Point Bay, Lake Erie during index bottom trawl assessments (6.1 m trawl), September, 1980-2015.

Year	Effort (min.)	Yellow Perch	White Perch	White Bass	Alewife	Gizzard Shad	Emerald Shiner	Spottail Shiner	Round[b] Goby
1980	209	21.1	0.0	10.6	8.4	14.7	40.8	101.8	0.0
1981	200	137.4	0.0	1.2	0.0	4.7	0.0	2.8	0.0
1982	200	69.6	0.0	1.0	214.5	2.6	1.0	103.0	0.0
1983 [a]	0								
1984	300	283.9	120.9	153.9	4.1	22.8	12.6	140.1	0.0
1985	360	2.4	0.6	29.6	27.0	7.0	65.0	858.1	0.0
1986	300	102.0	55.5	33.1	14.0	82.8	0.3	305.0	0.0
1987	300	3.4	1.4	0.5	28.5	9.3	12.4	203.5	0.0
1988	280	667.7	98.1	0.0	0.7	17.2	5.9	861.8	0.0
1989	240	296.9	3.4	12.7	31.3	7.5	0.9	1055.4	0.0
1990	300	43.3	79.2	8.8	0.2	8.3	0.0	1098.6	0.0
1991	299	15.5	0.9	0.2	6.0	0.5	26.7	571.1	0.0
1992	300	54.3	0.5	0.0	869.7	0.2	0.0	267.9	0.0
1993	240	21.6	12.5	0.4	0.2	2.6	0.0	1339.6	0.0
1994	240	159.8	40.5	0.0	6.7	31.7	1.5	409.4	0.0
1995	300	6.0	2.1	0.2	2.2	4.6	1.8	282.6	0.0
1996	300	199.1	28.3	0.3	0.0	74.1	0.3	1508.5	0.0
1997	300	18.9	12.0	0.2	0.2	2.7	1.2	1093.7	0.0
1998	300	114.9	0.1	0.0	0.0	3.7	0.0	588.1	0.0
1999	300	2.5	0.2	0.4	0.0	5.5	0.0	999.1	0.6
2000	300	10.2	3.5	0.2	8.2	9.3	0.0	851.1	37.0
2001	300	76.7	5.0	1.1	0.4	2.9	2.3	51.8	183.4
2002	300	0.6	0.0	0.0	12.2	1.6	0.2	16.6	150.9
2003	240	93.3	14.6	0.4	17.6	5.1	0.0	74.1	114.2
2004	360	0.5	0.2	0.0	1.5	1.0	258.3	43.8	94.4
2005	360	10.3	0.4	0.7	11.0	1.9	1.1	58.7	28.0
2006	300	2.8	1.2	0.3	711.8	28.7	12.4	19.8	32.7
2007	300	6.3	0.7	0.2	44.6	22.0	1.2	35.2	73.9
2008	300	4.9	2.1	0.5	11.9	4.0	0.5	37.8	63.4
2009	240	1.5	0.0	0.0	1.9	0.0	0.0	3.7	91.2
2010	300	13.2	0.0	0.3	0.0	3.8	0.0	3.0	67.6
2011	300	3.9	0.0	0.0	6.8	3.4	1.1	2.5	103.3
2012	300	11.3	0.9	0.2	6.0	20.0	23.8	19.1	68.0
2013	290	1.8	0.0	0.0	26.1	0.3	0.2	8.1	76.3
2014	300	80.1	0.0	0.0	0.0	0.4	5.9	5.0	98.5
2015	300	78.5	0.2	0.0	3.4	10.1	0.0	5.8	359.1
Avg. for 1980-2014		74.6	14.3	7.6	61.0	12.0	14.0	383.0	37.7

[a] Index trawling discontinued during 1983.
[b] Abundance indices of Round Goby include all ages.

Table 4.3.3 Relative abundance (mean number per hectare) of selected young-of-the-year fish species caught in the offshore waters of Outer Long Point Bay, Lake Erie, during index bottom trawl assessments (10 m trawl), October, 1984-2015.

Year	Effort (min.)	Rainbow Smelt	White Perch	White Bass	Yellow Perch	Alewife	Gizzard Shad	Emerald Shiner	Round[a] Goby
1984	320.0	2206.3	13.7	166.2	7.3	22.4	14.6	0.1	0.0
1985	394.0	84.0	12.9	8.1	1.6	0.5	0.4	0.8	0.0
1986	380.0	2979.8	0.2	32.7	0.0	16.6	77.1	2.4	0.0
1987	440.0	267.6	0.7	0.1	0.0	19.8	0.8	46.2	0.0
1988	480.0	972.8	3.5	0.1	0.4	21.8	3.1	42.8	0.0
1989	400.0	1158.4	1.3	5.5	0.4	36.4	0.2	9.0	0.0
1990	400.0	1194.3	0.9	7.9	0.0	30.6	0.6	7.4	0.0
1991	400.0	54.4	13.3	3.8	0.7	82.0	2.1	12.0	0.0
1992	400.0	1468.8	0.0	0.0	0.0	4.8	0.0	5.5	0.0
1993	400.0	203.6	0.3	4.2	2.9	10.2	1.0	8.9	0.0
1994	400.0	341.9	0.8	2.1	10.6	8.3	18.6	55.3	0.0
1995	400.0	84.0	0.9	0.3	4.0	0.6	0.0	9.1	0.0
1996	240.0	353.2	0.3	0.3	7.9	0.0	0.3	390.7	0.0
1997	400.0	154.4	0.0	0.0	0.0	0.1	0.0	0.1	0.0
1998	400.0	422.5	0.5	0.1	8.1	1.4	4.9	19.6	0.0
1999	310.0	40.3	1.0	40.0	15.5	2174.5	65.2	15.1	0.2
2000	400.0	259.9	0.0	2.0	3.0	25.6	0.3	3.3	50.8
2001	400.0	2633.3	6.1	19.4	13.8	81.1	16.0	12.7	69.0
2002	400.0	142.5	0.0	0.0	0.0	35.3	3.2	9.5	127.0
2003	400.0	7058.1	16.2	2.0	240.6	0.5	68.6	3388.0	158.8
2004	400.0	132.2	0.0	0.0	0.1	0.3	0.2	20.3	323.8
2005	400.0	0.9	0.1	1.1	156.2	0.1	1.7	645.7	66.9
2006	400.0	1256.0	0.9	0.3	38.0	78.6	1.4	452.3	93.3
2007	400.0	991.3	0.1	0.2	70.0	1.0	34.6	29.3	973.2
2008	400.0	1293.0	5.4	1.3	356.0	2.3	86.5	16.0	452.6
2009	400.0	148.2	0.6	0.2	0.3	0.1	0.4	54.8	43.6
2010	400.0	326.9	1.6	0.4	63.5	0.9	13.3	117.6	9.7
2011	400.0	509.2	0.0	0.2	224.6	2.1	18.9	70.3	125.4
2012	400.0	1657.7	0.8	0.2	33.2	707.3	47.6	438.3	129.0
2013	400.0	217.9	0.0	0.0	0.1	17.7	0.0	58.7	14.5
2014	400.0	1001.6	0.0	0.0	24.6	0.0	0.0	2.9	0.5
2015	400.0	3245.2	0.5	0.1	18.7	0.7	0.4	346.7	67.2
Avg. for 1984-2014		955.3	2.7	9.6	41.4	109.1	15.5	191.7	85.1

[a] Abundance indices of round goby include all ages.

Table 4.3.4 Relative abundance (mean number per hectare) of Yellow Perch at ages 0 to 3 caught with a 6.1 m bottom trawl in nearshore Long Point Bay, Lake Erie, September, 1980-2015.

	Year	Effort (minutes)	AGE 0	1	2	3
Inner Bay	1980	130	167.8	198.5	142.1	134.5
	1981	220	534.9	231.0	55.2	20.2
	1982	400	1026.8	176.2	34.7	41.3
	1983	220	125.9			
	1984	400	761.7	44.5	57.7	35.5
	1985	480	20.8	125.5	64.1	43.6
	1986	400	1859.5	61.7	192.3	39.2
	1987	400	3.8	39.7	2.6	15.5
	1988	400	305.0	2.9	41.4	1.9
	1989	400	457.7	84.6	29.4	114.3
	1990	400	202.6	21.0	46.2	4.6
	1991	400	144.0	24.5	14.5	17.3
	1992	400	594.0	32.8	6.9	1.3
	1993	400	239.8	17.9	11.9	2.2
	1994	400	84.0	29.8	10.3	13.0
	1995	400	5.3	54.3	20.5	2.1
	1996	400	53.6	6.1	22.4	9.9
	1997	400	21.5	5.4	5.0	11.9
	1998	480	1005.9	14.9	10.7	1.0
	1999	480	34.0	155.7	25.8	11.0
	2000	400	1.2	4.8	107.0	6.0
	2001	400	463.8	2.7	13.0	18.1
	2002	400	8.3	42.6	8.8	10.4
	2003	320	224.0	1.5	8.5	0.7
	2004	480	0.1	21.4	2.8	2.6
	2005	480	8.8	0.2	10.9	0.6
	2006	400	0.3	4.8	1.4	4.0
	2007	400	73.9	3.0	7.0	2.3
	2008	400	0.3	4.1	0.1	0.0
	2009	320	0.0	0.0	0.0	0.0
	2010	400	5.7	0.6	1.6	3.6
	2011	400	3.9	12.8	2.6	1.7
	2012	400	1.6	1.7	1.4	0.0
	2013	400	2.1	5.6	4.4	1.0
	2014	400	4.7	0.0	0.3	1.3
	2015	400	326.0	3.0	0.3	0.0
	Avg. for 1980-2014		241.4	42.1	28.3	16.8
Outer Bay	1980	209	21.1	61.5	23.8	22.0
	1981	200	137.4	5.0	5.1	0.8
	1982	200	69.6	22.6	6.9	5.8
	1983	0				
	1984	300	283.9	9.7	2.7	1.8
	1985	360	2.4	32.6	14.0	3.5
	1986	300	102.0	0.2	30.7	3.1
	1987	300	3.4	284.1	15.7	89.3
	1988	280	667.7	0.8	52.4	10.6
	1989	240	296.9	53.2	26.6	84.5
	1990	300	43.3	12.0	28.8	4.6
	1991	299	15.5	1.0	0.5	0.9
	1992	300	54.3	9.0	1.2	0.5
	1993	240	21.6	4.5	2.4	0.2
	1994	240	159.8	15.3	11.2	2.4
	1995	300	6.0	33.7	14.3	3.6
	1996	300	199.1	2.6	4.5	1.3
	1997	300	18.9	59.8	3.1	3.7
	1998	300	114.9	1.2	0.6	0.3
	1999	300	2.5	69.5	1.3	1.0
	2000	300	10.2	2.1	13.9	0.2
	2001	300	76.7	2.0	3.0	5.3
	2002	300	0.6	13.9	1.7	5.9
	2003	240	93.3	0.8	7.9	0.2
	2004	360	0.5	4.3	0.6	1.3
	2005	360	10.3	0.1	6.9	0.3
	2006	300	2.8	1.4	0.2	1.2
	2007	300	6.3	0.9	0.6	0.0
	2008	300	4.9	6.6	1.1	0.6
	2009	240	1.5	4.2	5.5	0.0
	2010	300	13.2	0.6	0.2	1.5
	2011	300	3.9	1.9	0.2	0.2
	2012	300	11.3	1.1	0.2	0.0
	2013	290	1.8	0.5	0.2	0.0
	2014	300	80.1	0.2	0.5	0.0
	2015	300	78.5	0.3	0.2	0.2
	Avg. for 1980-2014		74.6	21.1	8.5	7.5

Table 4.3.5 Relative abundance (mean number per hectare) of Rainbow Smelt at ages 0 to 2 and yearling-and-older (YAO) caught with a 10 m bottom trawl in the offshore waters of Outer Long Point Bay, Lake Erie, October 1984-2015.

Year	Effort (minutes)	Age Group 0	1	2	YAO
1984	320	2206.3	15.1	8.1	29.8
1985	394	84.0	397.8	11.8	409.6
1986	380	2979.8	32.0	356.3	398.8
1987	440	267.6	3159.0	168.8	3328.1
1988	480	972.8	25.4	72.0	99.1
1989	400	1158.4	620.1	2.6	622.6
1990	400	1194.3	437.5	191.2	633.4
1991	400	54.4	514.5	0.4	649.4
1992	400	1468.8	26.6	68.2	97.2
1993	400	203.6	1395.9	76.8	1477.9
1994	400	341.9	6.5	2.2	8.8
1995	400	84.0	272.9	42.3	347.8
1996	240	353.2	16.4	1.6	18.2
1997	400	154.4	168.4	14.1	188.5
1998	400	422.5	9.9	13.7	25.1
1999	310	40.3	137.1	33.6	140.1
2000	400	259.9	21.7	7.0	29.1
2001	400	2633.3	663.0	29.0	692.8
2002	400	142.5	3.5	1.9	5.9
2003	400	7058.1	165.7	32.5	205.8
2004	400	132.2	495.8	61.5	565.6
2005	400	0.9	3.7	2.9	7.6
2006	400	1256.0	28.9	40.8	136.2
2007	400	991.3	214.0	9.1	232.8
2008	400	1293.0	48.7	25.6	77.3
2009	400	148.2	1551.6	91.5	1654.3
2010	400	326.9	106.0	112.0	222.7
2011	400	509.2	249.4	27.1	277.1
2012	400	1657.7	302.1	61.3	367.8
2013	400	217.9	140.8	18.3	165.3
2014	400	1001.6	4.1	0.5	4.6
2015	400	3245.2	397.4	13.4	411.0
Avg. for 1984-2014		955.3	362.4	51.1	423.2

Table 4.3.6 Relative abundance (mean number per hectare) of selected fish species by age group, caught in the offshore waters of Outer Long Point Bay, Lake Erie, during index grid trawl assessments (10 m trawl), October, 2008-2015.

Species	Age Group	Survey Year								2008-2014 Average
		2008	2009	2010	2011	2012	2013	2014	2015	
Yellow Perch	YOY	30.5	0.1	6.0	6.9	36.0	0.9	32.5	10.8	16.1
Yellow Perch	YAO	27.1	2.4	0.8	1.4	2.8	3.9	1.8	2.3	5.7
Yellow Perch	ALL	57.6	2.5	6.7	8.2	38.8	4.8	34.3	13.1	21.8
Rainbow Smelt	YOY	104.1	93.4	97.1	314.6	449.2	87.7	37.7	3389.0	169.1
Rainbow Smelt	YAO	63.8	508.6	320.2	263.3	309.1	327.2	37.9	567.2	261.4
Rainbow Smelt	ALL	167.9	602.0	417.3	577.8	758.3	414.9	75.5	3956.2	430.5
Emerald Shiner	YOY	93.7	19.7	89.8	297.0	103.5	270.8	0.4	683.1	125.0
Emerald Shiner	YAO	16.3	16.6	16.6	873.0	45.6	96.3	0.6	74.9	152.1
Emerald Shiner	ALL	110.0	36.2	106.5	1170.0	149.1	367.1	0.9	758.1	277.1
White Perch	YOY	1.6	0.1	0.1	0.1	0.8	0.4	0.0	2.0	0.4
White Perch	YAO	1.0	0.1	0.2	0.0	0.3	10.6	0.0	0.1	1.8
White Perch	ALL	2.6	0.2	0.4	0.1	1.2	11.0	0.0	2.1	2.2
White Bass	YOY	0.4	0.0	0.5	0.0	0.4	0.0	0.0	0.0	0.2
White Bass	YAO	0.1	0.0	0.0	0.0	0.1	0.2	0.0	0.1	0.1
White Bass	ALL	0.4	0.0	0.5	0.0	0.5	0.2	0.0	0.1	0.2
Alewife	YOY	9.2	0.1	0.6	3.2	29.7	10.0	0.0	0.6	7.5
Gizzard Shad	YOY	0.4	0.1	1.9	1.1	0.7	0.5	0.0	0.3	0.7
Round Goby	ALL	325.8	78.2	20.0	128.7	88.9	341.4	9.5	276.8	141.8
Trout-perch	ALL	0.4	0.6	0.1	0.1	0.3	0.4	0.0	0.3	0.3
No. Stations sampled		**27**	**26**	**29**	**30**	**25**	**36**	**36**	**25**	**29.9**
Total Effort (min)		**270**	**260**	**290**	**300**	**250**	**360**	**360**	**250**	**298.6**

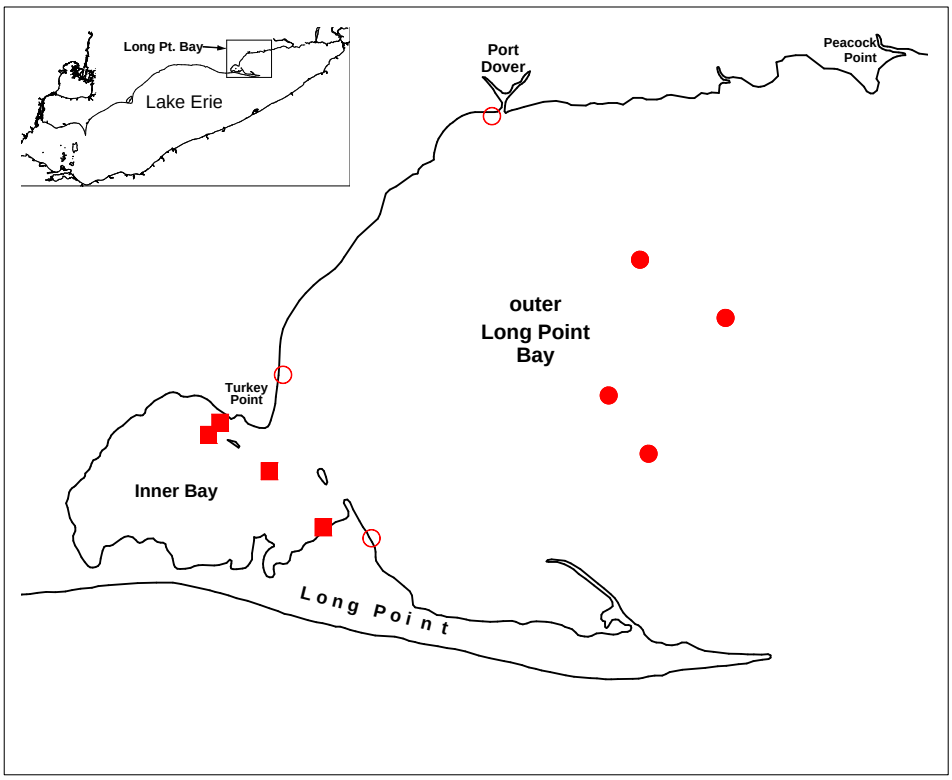


Figure 4.3.1a Location of trawl stations where bottom trawling was conducted in Inner Bay (■), and the nearshore (○) and offshore (●) waters of Long Point Bay, Lake Erie.

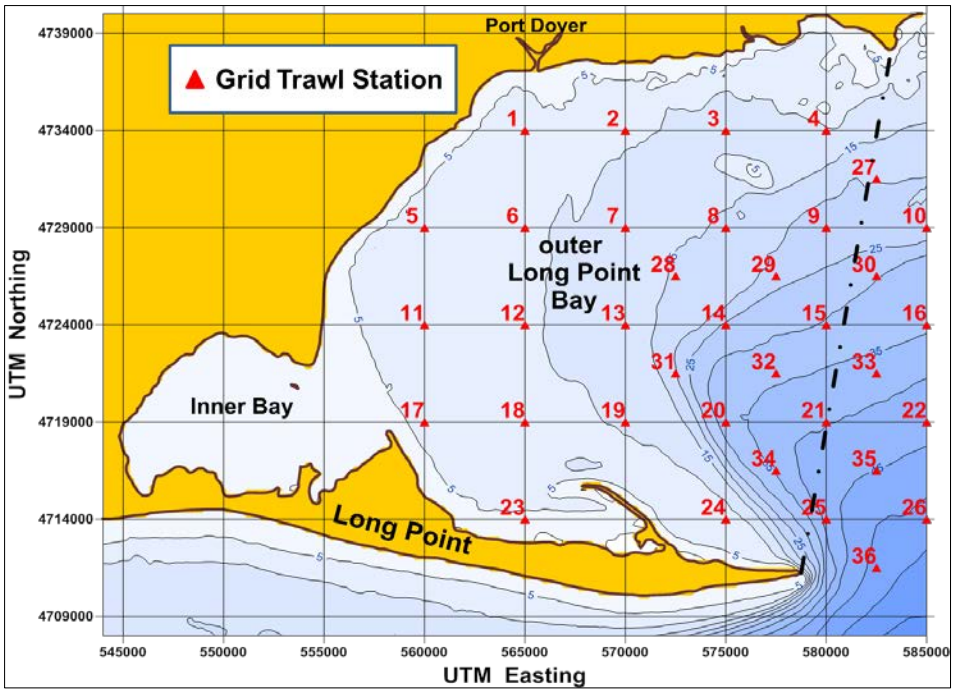


Figure 4.3.1b Target bottom trawl stations (1 to 36) sampled annually during October to examine the spatial distribution of juvenile Yellow Perch and forage fish species in Outer Point Bay, Lake Erie. Map axis are 5 km UTM grid units.

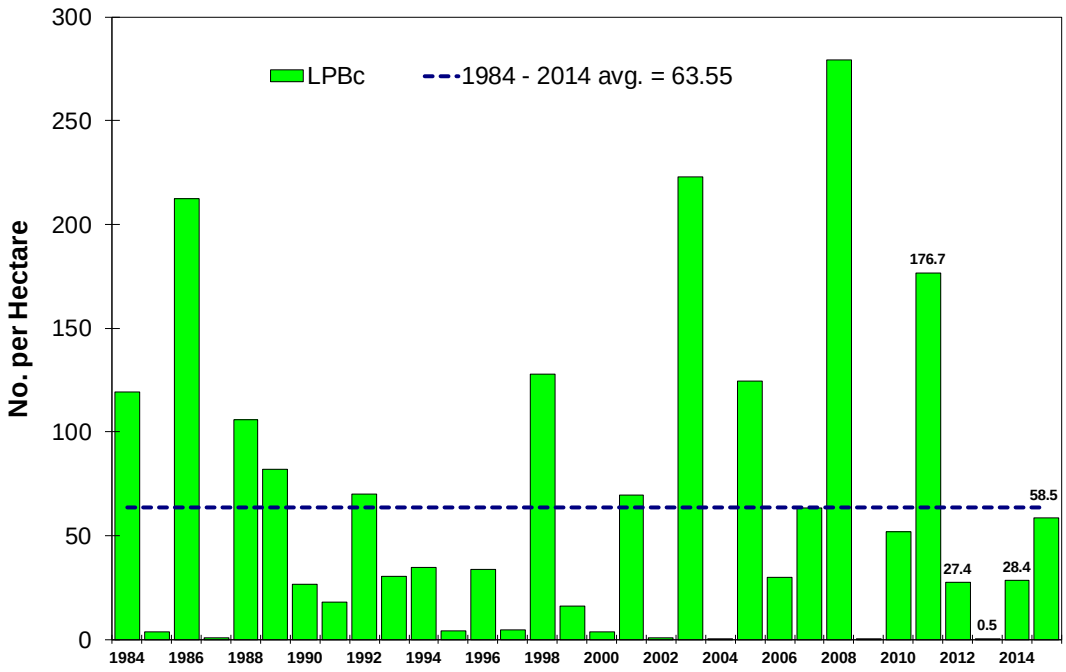


Figure 4.3.2 Relative abundance (mean number per hectare) of age 0 Yellow Perch from a composite index (LPBc) of three bottom trawl assessments in Long Point Bay, Lake Erie, during September-October, 1984-2015.

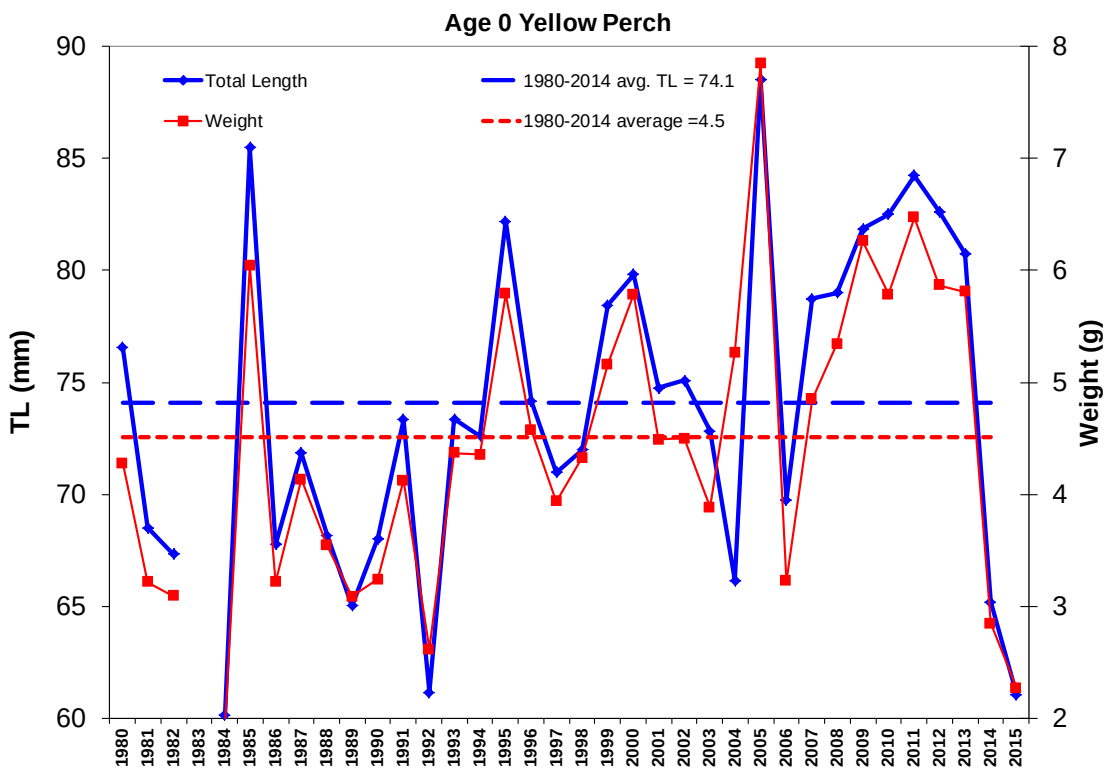
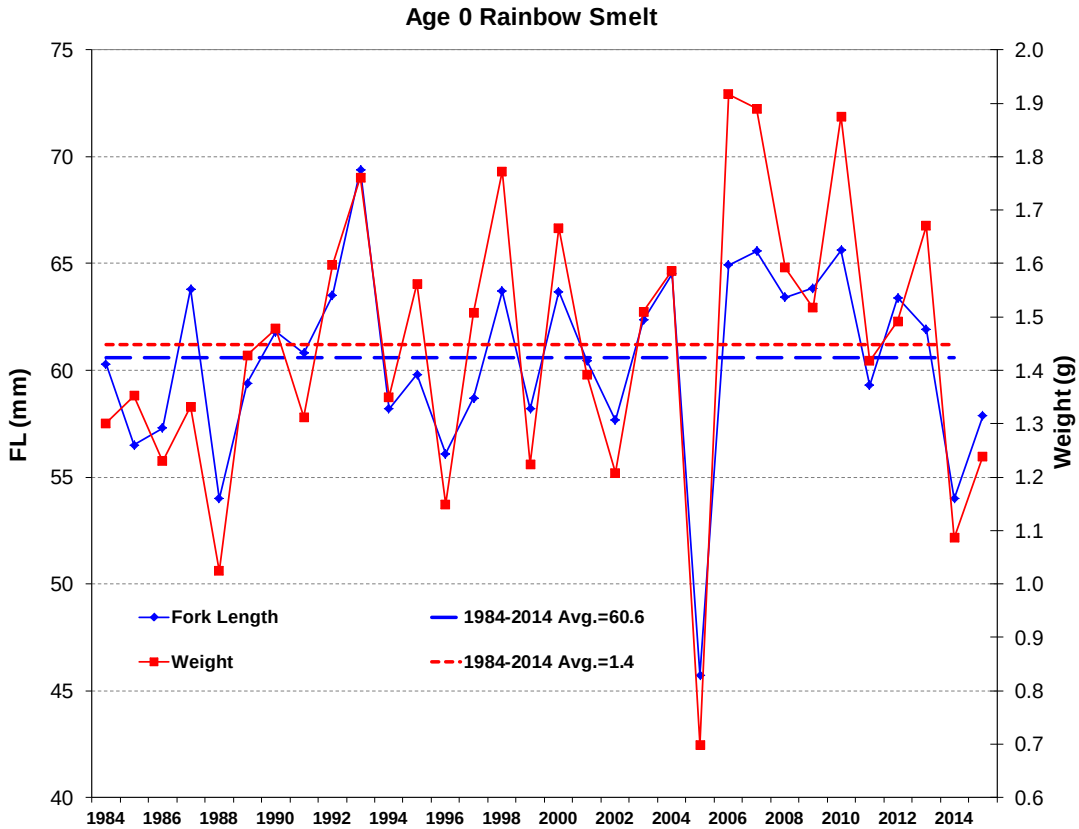


Figure 4.3.3 Mean total length (mm) and weight (g) of age 0 Yellow Perch from 6.1 m index trawl catches in the nearshore waters of Long Point Bay (Inner and Outer Bays combined), Lake Erie, 1980-2015 (September data). No fish sampled in 1983.



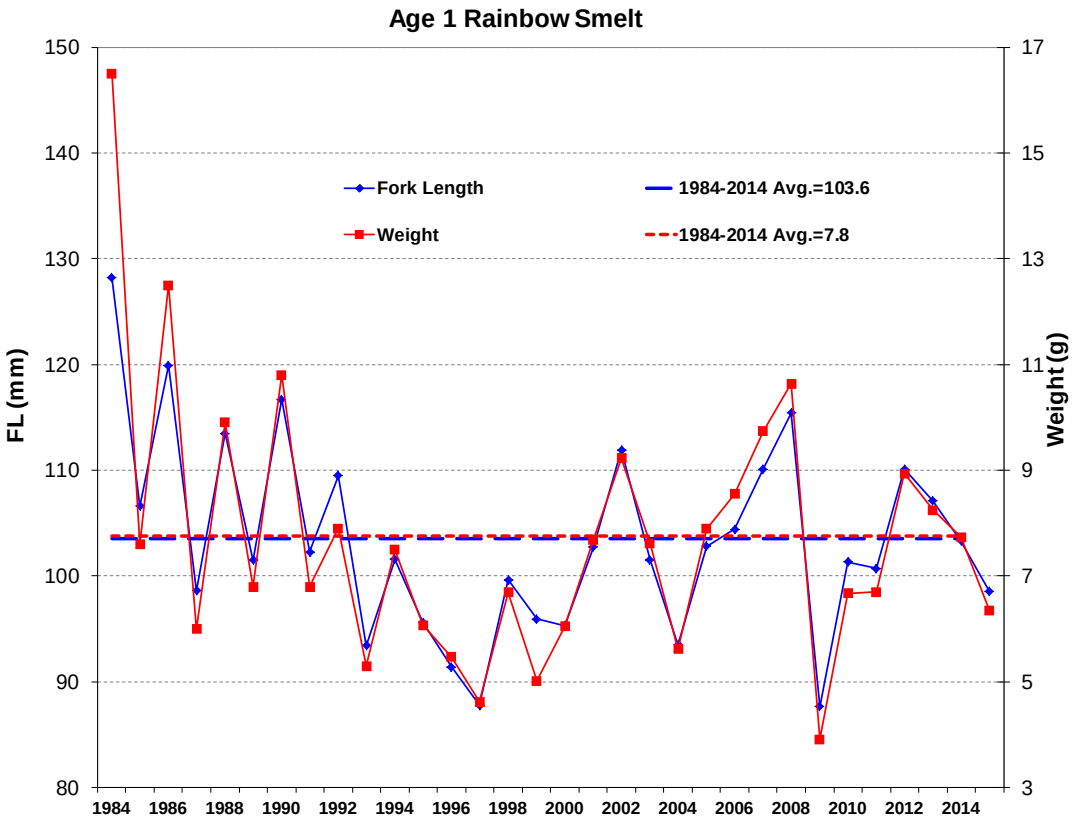


Figure 4.3.4 Mean fork length (mm) and weight (g) of age 0 (top graph) and age 1 (bottom graph) Rainbow Smelt from 10 m index trawl catches in the offshore waters of Outer Long Point Bay, Lake Erie, 1984-2015 (October data).

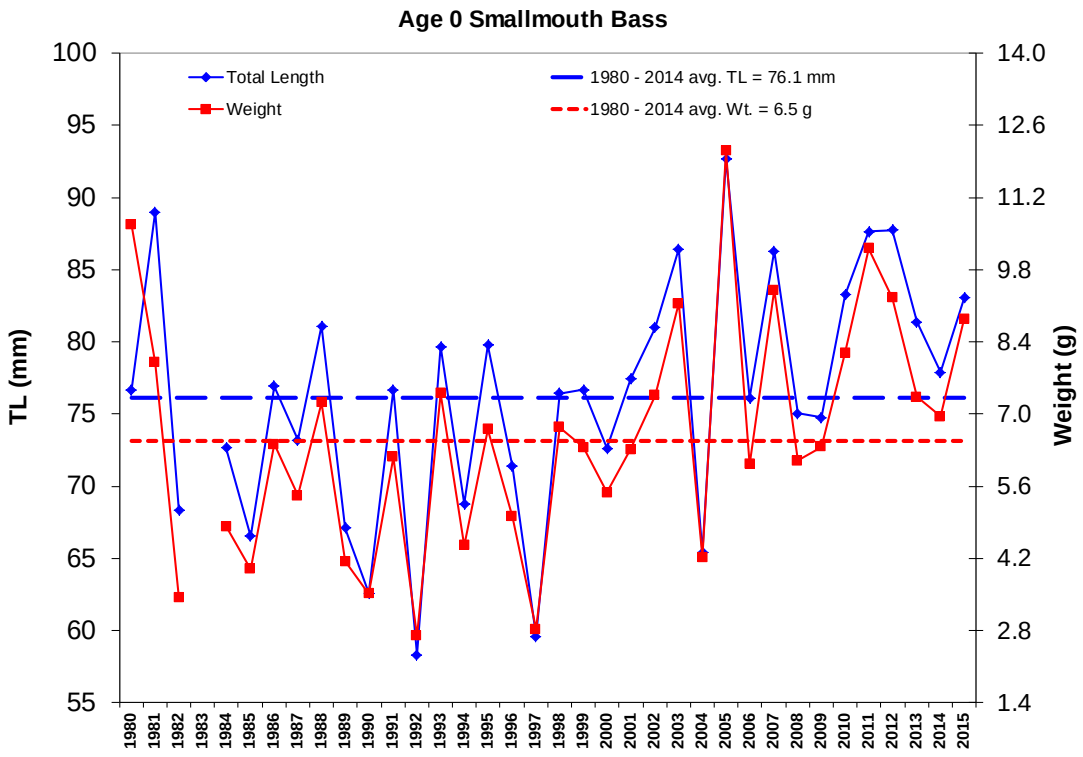


Figure 4.3.5 Mean total length (mm) and weight (g) of age 0 Smallmouth Bass from 6.1 m index trawl catches in Inner Long Point Bay, Lake Erie, 1980-2015 (September data). No fish sampled in 1983.

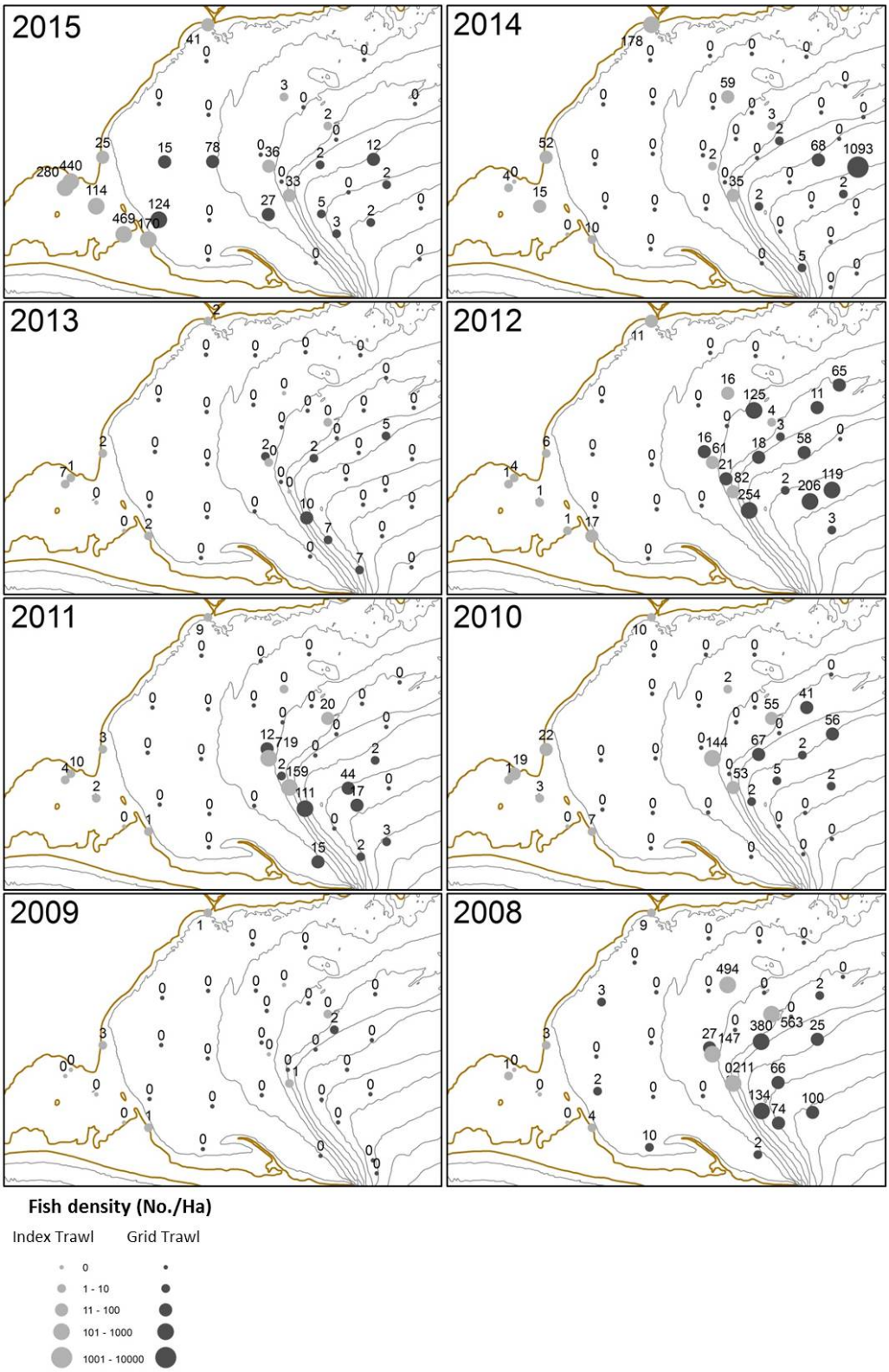


Figure 4.3.6 Relative abundance of age 0 Yellow Perch at up to 36 bottom trawl stations established within a 5 km UTM grid design and sampled during a 2 to 5 day period in October to examine species spatial/depth distribution in Outer Long Point Bay, Lake Erie, 2008 to 2015. Size of black dots and associated values represent number per hectare of age 0 Yellow Perch captured in a single 10 min tow at each grid station. Size of grey dots and associated values represent the mean number per hectare of age 0 Yellow Perch captured at standard index bottom trawl stations shown in Figure 4.3.1 (each dot is an average of all 10 min tows at that station).

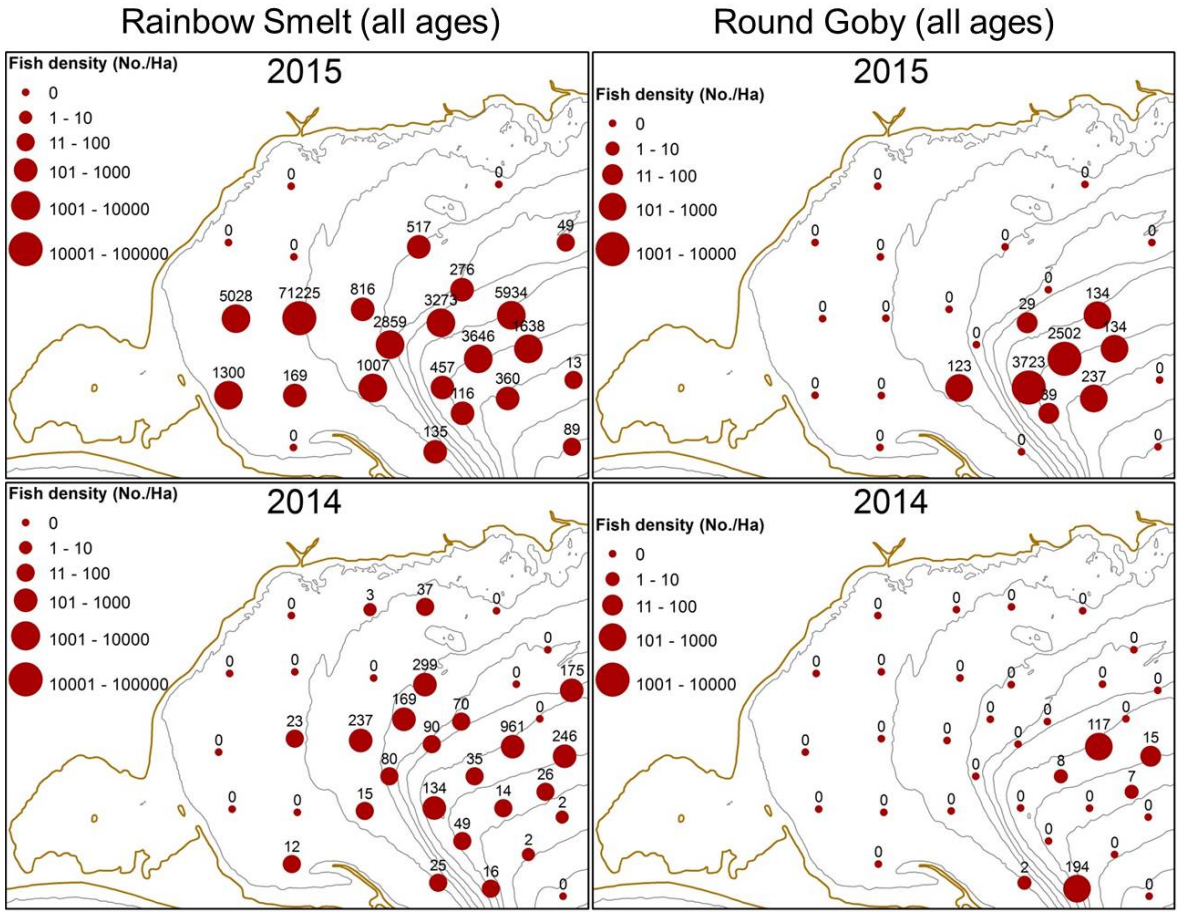


Figure 4.3.7 Relative abundance of Rainbow Smelt (left) and Round Goby (right) at bottom trawl stations established within a 5 km UTM grid design and sampled in October to examine fish species spatial/depth distribution in Outer Long Point Bay, Lake Erie (n=36 stations in 2014; n=25 stations in 2015). Values above dots are the number per hectare of Rainbow Smelt or Round Goby (all ages both species) captured in a 10 min tow at each grid station.

4.4 Long Point Bay Nearshore Fish Community Survey

A gill net survey has been conducted annually in Long Point Bay since 1986 to monitor the composition of the fish community, and describe the abundance and biological characteristics of important sport and commercial species over time.

Study Area and Sampling Design

The standard study area encompasses the nearshore waters within outer Long Point Bay, from the minimum depth (12 feet or 3.7 m) that the gear could be set, to the 30 foot (9.1 m) depth contour (Figure 4.4.1). The bay was partitioned into three sampling areas, then further partitioned into sampling grids (0.5 X 0.5 nautical miles) and 2 depth strata, 12-18 feet (3.7-5.5 m) and >18-30 feet (>5.5-9.1 m). Areas 1, 2 and 4 have been sampled each year since 1986. Area 3, the Inner Bay, has rarely been sampled and is not part of the standard study area.

An additional depth stratum has been sampled on an exploratory basis since 2011 to examine the distribution and abundance of fish species, especially Yellow Perch, in deeper offshore areas of Long Point Bay not covered by the standard survey design. This extra deep stratum extended sampling from the 30 foot (9.1 m) contour to the 66 foot (20 m) contour and increased, by approximately 90%, the number of potential sample grids and the overall surface area of the Long Point Bay study area (Figure 4.4.1).

One area was sampled each week on a rotational basis. Within that area, two randomly selected grids per depth stratum were sampled each week (i.e. four grids in the standard survey; six grids when including the extra deep stratum). Sampling is targeted to run for 10 weeks, resulting in a target of 40 grids sampled in the standard survey and 60 grids sampled in the extended survey with the extra deep stratum. In 2015, the target number of grids was sampled in each depth stratum.

The survey period was from spring to fall during 1986 to 1993. This was reduced to June-August for the years 1994 and later. Only data from a comparable time period (June-August) for the entire time series (1986-2015) are reported below.

One monofilament net composed of single 50 foot panels of mesh sizes 1.25”, 1.5” and 1.75” (stretched mesh) and 2 panels each of mesh sizes 2.0”, 2.25”, 2.5”, 2.75”, 3.0”, 3.5”, 4.0”, 4.5”, 5.0”, 5.5” and 6.0” was set in each grid. The total length of a monofilament gang was 1,250 feet (381 m). Each gang was fished overnight for approximately 24 hours. Observed numbers and biomass (weight in grams) of fish species catches in the 1.25”, 1.5” and 1.75” mesh size panels were doubled to standardize catch to an equivalent 100 foot panel length. Species CUE’s as number per km and biomass (grams) per km of net were calculated from the total catch in gangs excluding the catch in 5.5” and 6.0” mesh sizes. Multifilament nets were used exclusively in this survey prior to 1991 and were switched to exclusively monofilament nets in 1995 after four years of using both gears. Species catches from multifilament nets (pre 1991) were adjusted to comparable efficiency of monofilament nets by conversion ratio multipliers.

Fish Community

The total catch of all species was at its lowest value in over 20 years. Catch (all mesh sizes, standardized to 40 gill net sets for the standard survey area) by species from 1996 to 2015 are summarized in Table 4.4.1. Smallmouth Bass was the most commonly captured species in 2015, accounting for 33% of the total catch. Despite this, fewer Smallmouth Bass were captured in 2015 than in any of the 5 previous years. Yellow Perch was the second most abundant species in gill nets in 2015, making up 22% of the total catch. Yellow Perch catch was at its lowest level in the gill netting time series. The three next most abundant species in 2015 were Freshwater Drum (15% of total catch), Rock Bass (9%) and Brown Bullhead (4%). Alewife catch remained at zero in 2015 for a second year following very high numbers (>29,000) captured in 2013; this variability in Alewife catch is apparent throughout the time series. Lake Trout catch in 2015 declined after a record high catch in 2014 to the lowest numbers (3 captured) since 2009.

Total species catch and composition varied with depth strata in 2015. Table 4.4.2 summarizes species catch by depth strata and includes fish captured during sampling of the extra deep stratum (>9.1-20 m). Twenty-one (21) fish species totaling 1,683 individuals were caught in the shallowest stratum (3.7-5.5 m) compared to 20 species (814 total fish) in the >5.5-9.1 m stratum and 15 species (459 total fish) in the >9.1-20 m depth stratum. Smallmouth Bass, the most abundant species captured overall in 2015, comprised 26%, 48% and 6% of the total catch by depth stratum from shallowest to deepest, respectively. Yellow Perch, the second most abundant species across the three depth strata, comprised 24%, 19% and 44% of the total catch by depth stratum from shallowest to deepest, respectively. Most species showed a declining catch with increased depth in 2015, most notably Longnose Gar, Northern Pike, Quillback, Common Carp, Brown Bullhead, White Perch, Rock Bass, Pumpkinseed, Smallmouth Bass, and Freshwater Drum. Alewife, Lake Trout, Rainbow Smelt and Walleye were captured in the largest numbers in the deepest stratum. No Burbot were captured in 2015, continuing a trend of low or no catches since 2001.

Trends in Abundance, Biomass and Growth of Yellow Perch 1986-2015

Yellow Perch abundance has peaked twice from 1986-2015. Yellow Perch were abundant in Long Point Bay during the late 80s (Figure 4.4.2). Population size decreased precipitously during the early 1990s and remained at low levels throughout the decade until 2000, when age 2 Yellow Perch from the strong 1998 year class began to recruit into the population. Catch of Yellow Perch peaked in 2002, with most of the catch consisting of the 1998 year class, and since then has generally declined. Yellow Perch CUE (#/km of gill net) in 2015 was the lowest observed since this netting program started in 1986 and is down 95% from the 2002 peak. Yellow Perch biomass (grams/km of gill net) was also at its lowest observed value in 2015. The 2012 year class of Yellow Perch was the most prevalent year class in the 2015 catch (26% of Yellow Perch catch; 17% of biomass). The 2010 year class was the second most prevalent by catch (17%) and contributed most to the total Yellow Perch biomass (26%).

Yellow Perch mean size-at-age (size measured as total length (TL)) has generally increased over the survey's time series, with variation between ages and the specific range of years examined (Figure 4.4.4). Steady increases in size-at-age occurred early in the time series. From 2001 to 2008, there was decreased or steady size-at-age. Over the past five years, size-at-age has increased for age 2 to 5 Yellow Perch, whereas it has remained steady for age 6 and 7. The 2010 year class had the largest size-at-age observed in the 1986-2015 time series each year since it was first observed as age 2 in 2012. In 2015, size-at-age increased compared to 2014 for older Yellow Perch (ages 5, 6, 7). Mean TL of ages 5, 6 and 7 Yellow Perch were very similar in 2015, ranging from 262 to 271 mm. The size-at-age of age 3 and 4 Yellow Perch decreased in 2015 and the size-at-age of age 2 fish did not change compared to 2014.

Trends in Abundance, Biomass and Growth of Smallmouth Bass 1986-2015

Catch rates of Smallmouth Bass in Long Point Bay index gill nets have been variable from 1986-2015, while Smallmouth Bass biomass has increased over that time (Figure 4.4.3). Catch ranged between 20 to 50 bass per km during most of the survey years between 1986 and 2003, followed by low catches in 2004 and 2005 (Figure 4.4.3). Since then, catches increased and most years had catch rates greater than 50 bass per km. The 2005 year class contributed greatly to the high catches in the years after 2006 (making up from 32% to 79% of the catch in 2007-2010). Smallmouth Bass reached record high biomass and the second highest abundance in numbers in 2014. In 2015, the number of Smallmouth Bass per km of gill net (53 bass per km) decreased to the lowest level since 2009. Biomass (43 kg per km) decreased in 2015 to the lowest level since 2011. The 2011 year class (age 4 fish) made up the largest proportion of the catch in 2015 (32% of the catch, 23% of biomass). The 2010 year class (age 5 fish) was the second most abundant year class (31%) in the catch of 2015 and contributed most to the overall Smallmouth Bass biomass (30%). Age 7 fish (2008 year class) made up the third largest year class in the 2015 catch (12% of the catch, 17% of biomass). No age 2 fish were captured in 2015, for the first time since 1994.

Smallmouth Bass size at age 2 through 7 increased since about the late 90's and then decreased gradually since about 2008 (Figure 4.4.5). In 2015, the mean TL-at-age of age 3, 4, 5 and 7 fish all decreased compared to 2014, while mean TL-at-age of age 6 fish increased slightly.

Table 4.4.1 Total numbers of each fish species caught in monofilament nets during the Long Point Bay Index Gill Netting Survey, 1996-2015. Numbers include catch in all mesh sizes (14 mesh sizes from 32 to 152 mm) standardized to 40 sets at 12-30 ft (3.7-9.1 m) bottom depths for comparison.

Species	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Longnose Gar	31	159	5	260	30	5	0	0	28	31	161	10	6	12	61	0	33	15	130	67
Bowfin	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0
Alewife	7	3	4,215	1,070	5,809	28	19,339	12	2	24	7,776	61	22	0	96	36	4,371	29,092	0	0
Gizzard Shad	47	114	19	185	531	81	503	227	122	60	483	447	104	53	452	80	1,788	354	3	3
Pink Salmon	0	0	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Rainbow Trout	1	2	5	1	0	0	0	6	0	0	2	2	1	0	1	2	2	0	0	0
Atlantic Salmon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Trout	3	3	7	1	0	2	2	6	1	1	0	9	5	1	5	4	2	2	4	1
Lake Trout	1	0	1	0	0	0	0	0	2	1	2	0	0	0	5	7	7	10	26	3
Lake Whitefish	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainbow Smelt	0	9	0	0	0	12	0	0	20	13	3	20	26	72	27	7	4	5	48	10
Northern Pike	1	9	7	47	6	7	7	19	10	1	2	4	6	6	9	4	6	61	11	18
Mooneye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quillback	0	22	8	8	12	2	5	24	16	3	10	11	9	9	46	28	24	13	20	20
White Sucker	133	163	199	334	141	122	95	150	92	149	41	61	59	54	93	78	49	40	172	70
Northern Hog Sucker	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Redhorse Sucker	40	27	51	62	41	62	21	36	22	27	13	26	13	11	13	5	13	8	17	2
Common Carp	1	0	10	3	6	10	5	11	8	0	12	11	3	5	7	3	7	8	4	11
Golden Shiner	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emerald Shiner	0	0	0	0	5	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Spottail Shiner	0	4	0	0	2	4	2	0	2	2	2	0	0	0	0	0	0	0	0	0
Yellow Bullhead	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Brown Bullhead	9	1	2	36	0	1	12	24	81	35	32	50	38	53	69	75	87	89	20	108
Channel Catfish	0	7	5	1	5	1	0	2	2	1	3	0	2	4	0	0	5	10	3	8
Stonecat	6	10	4	3	19	15	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Burbot	26	10	22	19	33	5	1	0	0	0	0	0	0	0	0	0	5	0	0	0
Trout-perch	0	0	0	0	2	0	2	0	2	0	0	2	0	0	2	2	0	0	0	2
White Perch	11	83	7	52	58	31	73	58	103	42	60	59	54	118	278	253	168	506	124	32
White Bass	4	37	3	26	16	2	19	42	11	4	50	34	19	19	71	38	90	226	80	78
Rock Bass	470	380	264	640	291	201	81	151	69	151	219	136	104	174	123	148	135	77	156	237
Pumpkinseed	41	52	139	62	5	16	2	7	3	9	9	25	5	2	12	1	54	8	11	26
Bluegill	514	2	4	1	0	1	0	0	0	0	0	3	2	0	2	0	0	0	0	0
Smallmouth Bass	514	742	293	427	485	509	428	702	181	132	376	1,129	791	396	1,045	934	1,209	1,273	1,347	833
Black Crappie	1	6	5	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Perch	1,320	1,404	1,577	2,083	7,134	9,633	11,134	7,233	7,625	7,359	7,183	5,389	3,145	4,989	3,120	2,698	2,033	1,830	1,601	554
Walleye	11	20	4	14	3	4	5	27	40	23	18	13	31	23	78	30	35	48	26	25
Round Goby	0	0	0	8	68	708	2,399	424	391	134	275	172	222	89	47	70	48	39	22	22
Freshwater Drum	539	577	472	412	270	225	256	537	240	150	170	495	263	282	698	254	293	434	368	367
Totals	3,736	3,847	7,328	5,764	14,973	11,688	34,395	9,698	9,074	8,355	16,902	8,169	4,930	6,373	6,360	4,757	10,471	34,151	4,193	2,497
Actual Number of Sets	28	36	40	40	44	40	40	36	40	40	40	40	40	40	40	40	40	40	36	40

Table 4.4.2 Total numbers of each fish species caught by depth strata in monofilament nets during the Long Point Bay Index Gill Netting Survey, 2015. Numbers include catch in all mesh sizes (14 mesh sizes from 32 to 152 mm) standardized to 20 sets per depth strata.

Species	Depth Stratum			Total
	12-18 ft (3.7-5.5 m)	>18-30 ft (>5.5-9.1 m)	>30-66 ft (>9.1-20 m)	
Longnose Gar	63	4	0	67
Bowfin	0	0	0	0
Alewife	0	0	2	2
Gizzard Shad	3	0	0	3
Rainbow Trout	0	0	0	0
Brown Trout	1	0	1	2
Lake Trout	1	2	25	28
Rainbow Smelt	1	9	54	64
Northern Pike	14	4	0	18
Quillback	18	2	1	21
White Sucker	30	40	25	95
Redhorse Sucker	1	1	0	2
Common Carp	6	5	2	13
Brown Bullhead	99	9	0	108
Channel Catfish	3	5	0	8
Burbot	0	0	0	0
Trout-perch	0	2	0	2
White Perch	22	10	4	36
White Bass	36	42	15	93
Rock Bass	209	28	6	243
Pumpkinseed	25	1	0	26
Smallmouth Bass	440	393	27	860
Yellow Perch	396	158	201	755
Walleye	10	15	52	77
Round Goby	14	8	13	35
Freshwater Drum	291	76	31	398
Total Catch (No.)	1,683	814	459	2,956
No. Species	21	20	15	23
Actual No. Gill Net Sets	20	20	20	60

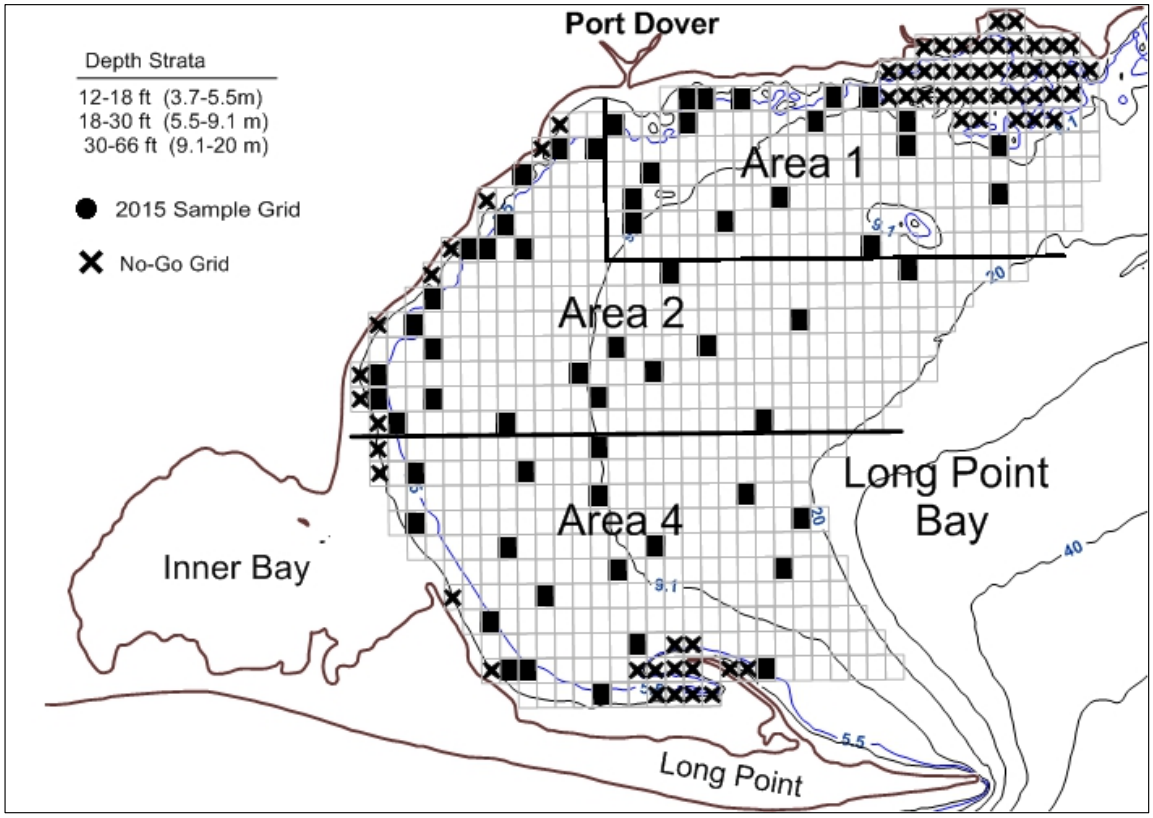


Figure 4.4.1 Long Point Bay gill net assessment study area showing potential sample grids by spatial (Areas 1, 2 and 4) and depth strata. Grids sampled in 2015 and grids considered unfishable are indicated. The standard study area encompasses sample grids in the 12-18 ft. (3.7-5.5 m) and >18-30 ft. (>5.5-9.1 m) depth strata. An additional deeper depth stratum extending from the >30 to 66 ft. (>9.1-20 m) depth contours was sampled on a supplementary basis since 2011.

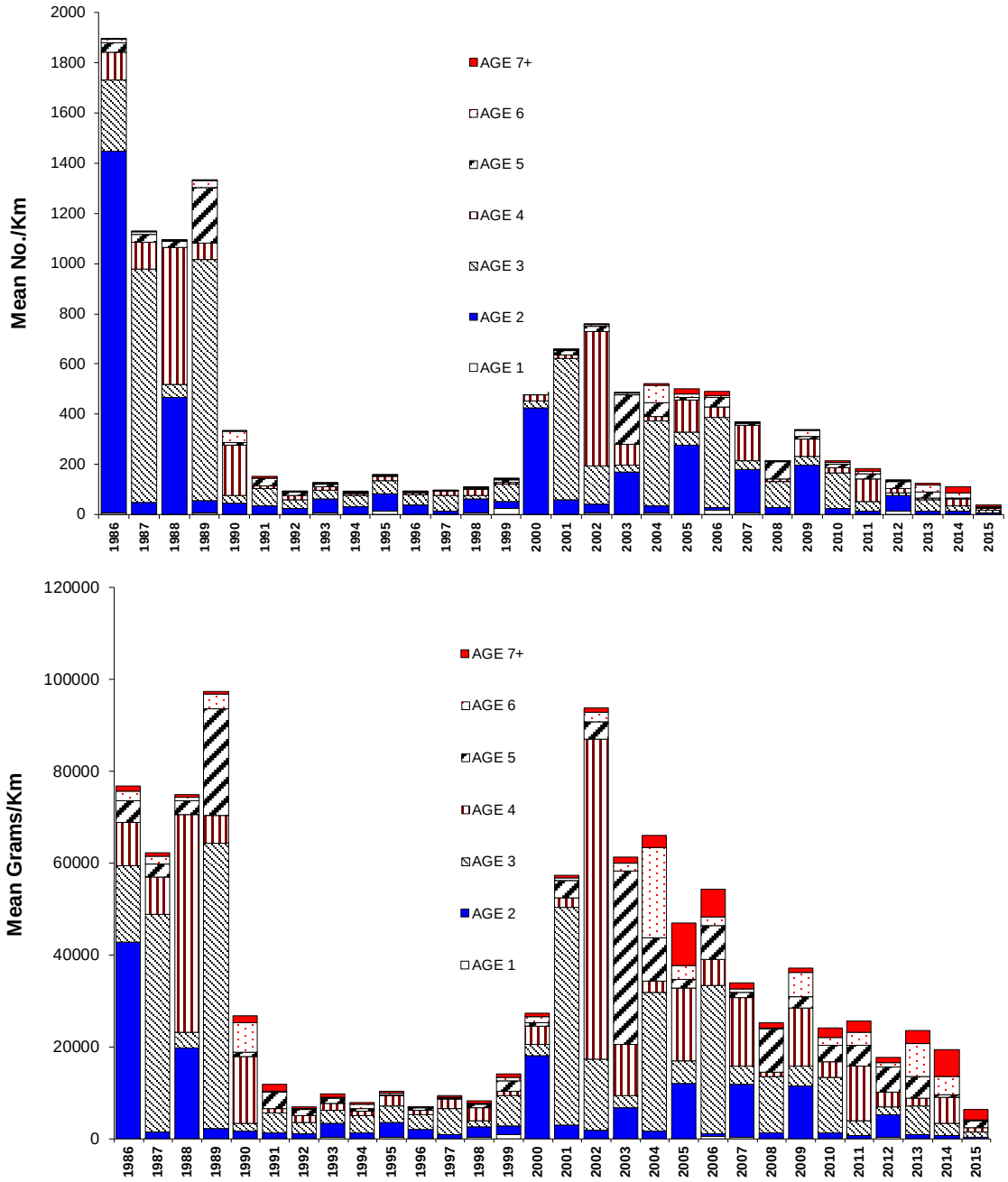


Figure 4.4.2 Catch at age of Yellow Perch in Long Point Bay index gill nets set overnight at 12-30 ft. (3.7-9.1 m) depths during June-August, 1986-2015. Catch reported as arithmetic mean number per kilometer (top graph) and arithmetic mean weight (g) per kilometer (bottom graph). Age 7 and older Yellow Perch combined.

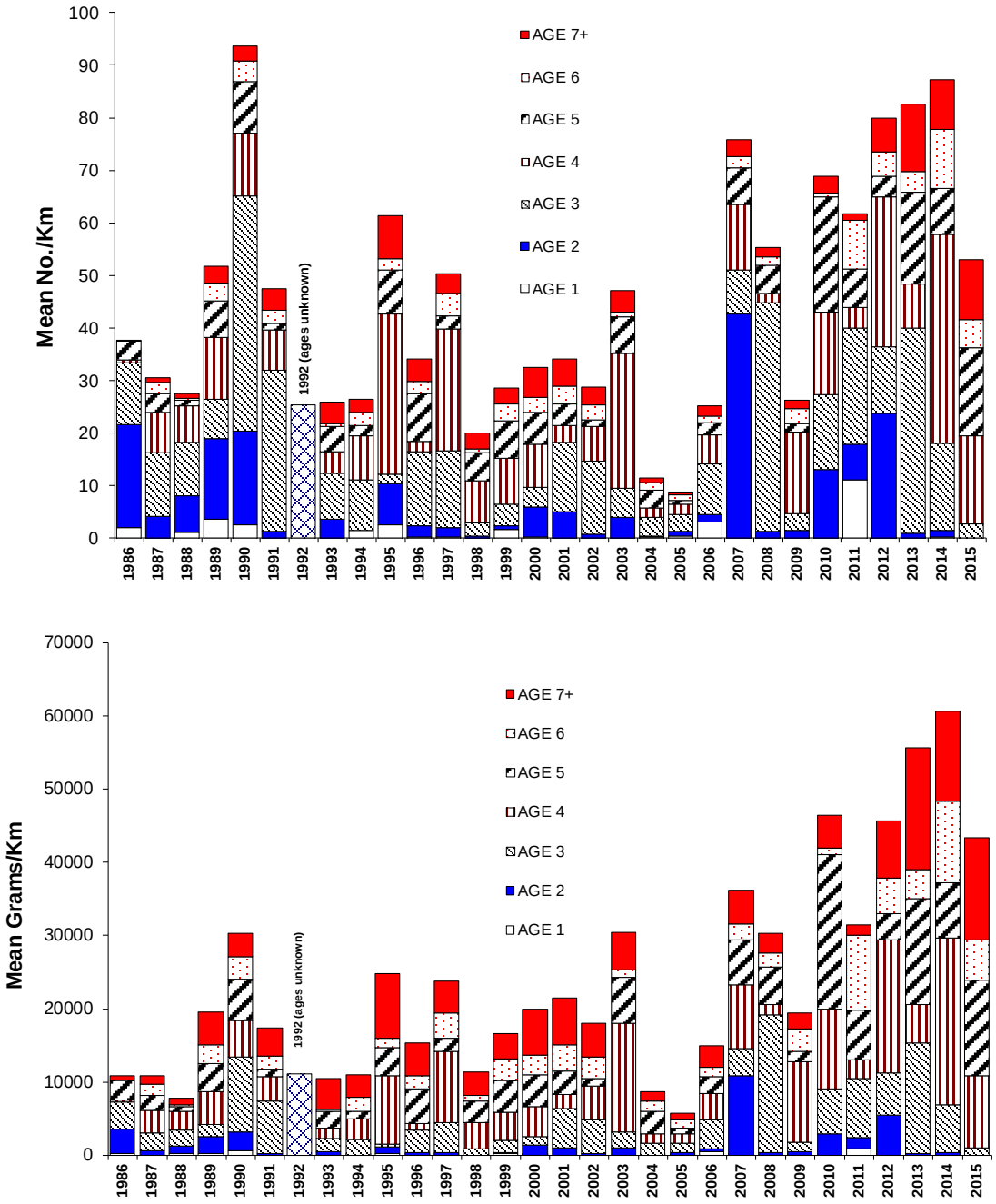


Figure 4.4.3 Catch at age of Smallmouth Bass in Long Point Bay index gill nets set overnight at 12-30 ft. (3.7-9.1 m) depths during June-August, 1986-2015. Catch reported as arithmetic mean number per kilometer (top graph) and arithmetic mean weight (g) per kilometer (bottom graph). Age 7 and older Smallmouth Bass combined.

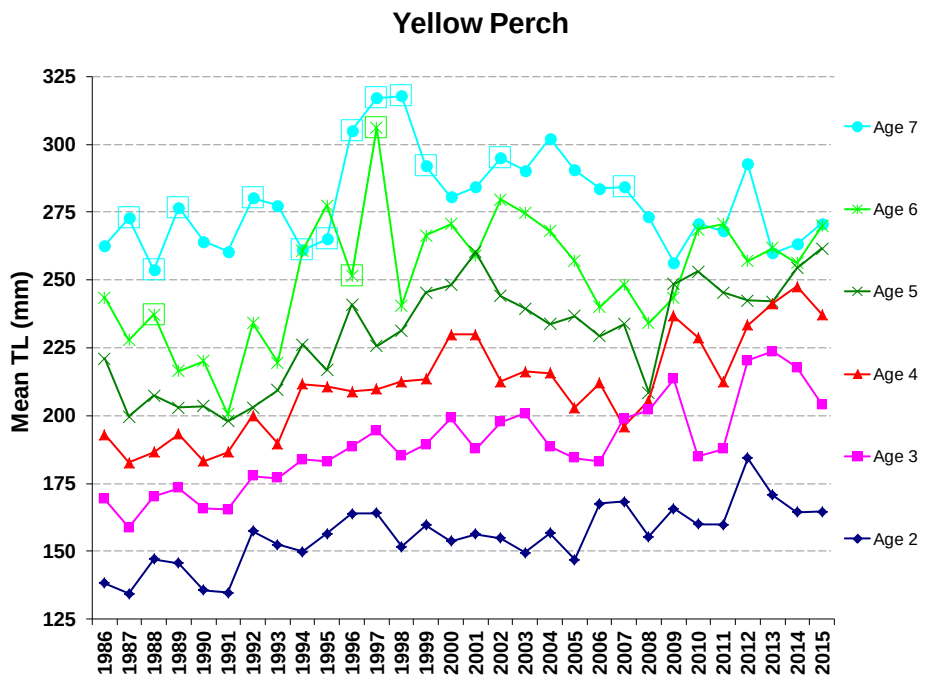


Figure 4.4.4 Yellow Perch mean total length (mm) at ages 2 to 7 in Long Point Bay index gill nets set overnight at 12-30 ft. (3.7-9.1 m) depths during June-August, 1986-2015. Males and females combined. Mean values outlined with a box were estimated from N < 10 samples.

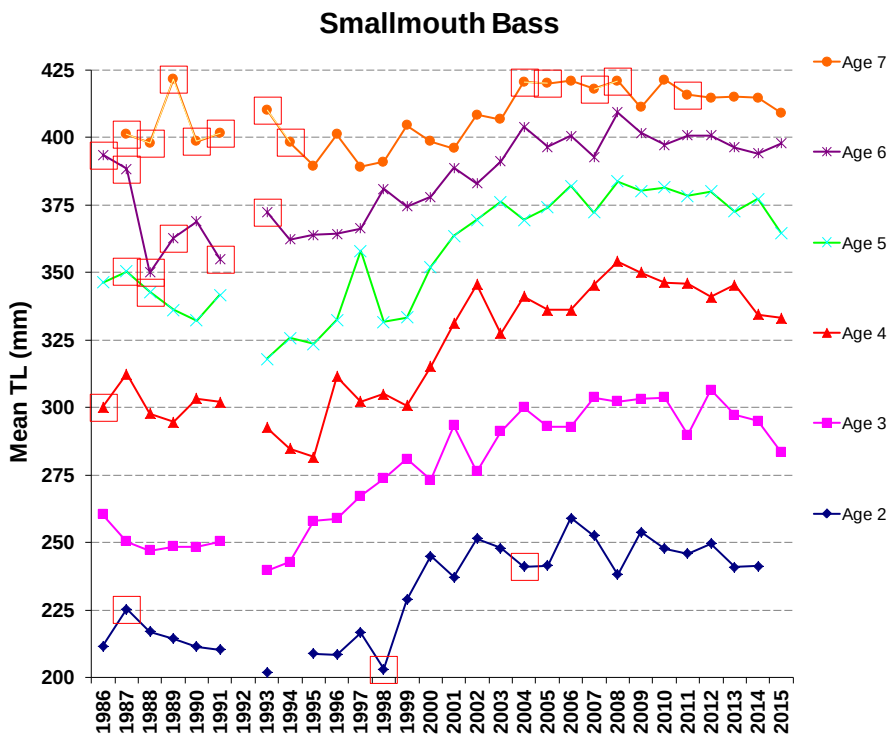


Figure 4.4.5 Smallmouth Bass mean total length (mm) at ages 2 to 7 in Long Point Bay index gill nets set overnight at 12-30 ft. (3.7-9.1 m) depths during mid-June to mid-September, 1986-2015. Males and females combined. Mean values values outlined with a box were estimated from N < 10 samples. Smallmouth Bass ages were not available for 1992 samples.

5. FISHERIES MANAGEMENT PROJECTS

5.1 Lake Erie Asian Carp Surveillance Program

The Asian Carps include four species of fish. Three of these species Bighead Carp (*Hypophthalmichthys nobilis*), Silver Carp (*Hypophthalmichthys molitrix*) and Grass Carp (*Ctenopharyngodon idella*) have become naturalized in the United States. Two of these species (Bighead and Silver Carps) have dispersed north up the Mississippi River basin and have the potential to colonize the Great Lakes. Individual Grass Carp have been observed within the Lake Erie watershed.

Environmental DNA (eDNA) is genetic material which is shed by living or dead organisms into the environment. The presence of eDNA in the environment indicates that the organism may have been present. The collection of eDNA provides a method for detecting species present in low abundance, which may not be found through conventional surveys. In September 2012, Lake Erie Management Unit (LEMU) commenced a field program utilizing eDNA to assess if Asian Carps are present in the Canadian waters of Lake Erie or the St. Clair System. This program continued in 2013, 2014, and 2015, with water samples tested for Bighead, Silver, and Grass and Black Carp eDNA

The LEMU Asian Carp surveillance program occurred from May to July 2015. Water samples were taken from 101 sites in Lake Erie, Lake Erie tributaries, Lake St. Clair, Thames River, Sydenham River, and Lake Huron tributaries (Figure 5.1.1). Seventy-eight of these sites were sampled twice.

Environmental DNA water sampling followed the University of Notre Dame protocol (Mahon et al, 2010). Three water samples were taken during each sampling event, for a total of 537 individual water samples, in order to verify any potential positive results. The LEMU Wheatley and Port Dover offices filtered the water samples. Filtered samples were sent to Dr. Chris Wilson (Aquatic Research and Monitoring Section, Trent University) for DNA amplification PCR and enzyme gel electrophoresis.

In 2015, three water samples were weakly positive for Asian Carp eDNA. Two samples in the Thames River were positive for Silver Carp. One sample in Lake Erie at Colchester Marina was positive for Silver Carp and Bighead Carp. There was no response to these positive detections as these sites were located in urban areas/marinas and weak positive detections were attributed to human influences. In addition to the directed eDNA sampling, LEMU index netting programs (described in this report) found no Asian Carp in Lake Erie and Lake St. Clair.

The Ontario commercial fishery in Lake Erie works with LEMU to report catches of invasive species. The commercial fishery uses a variety of fishing methods, including gill nets, trap nets, and trawls. In 2015 there was approximately 40,542 km of gill nets deployed, 6,603 hours of trawling, and 164 trap net lifts by the commercial fishery in Lake Erie.

One grass carp was captured by a commercial fisher in a trap net in the western basin of Lake Erie. The fish was captured on September 17, 2015. It was 96.7 cm in length and 10.6 kg. The fish was surrendered to Fisheries and Oceans Canada, who determined that the fish was triploid (sterile). In response to this capture, two LEMU electrofishing crews performed 11.6 hours of electrofishing in the area, and 2,000 ft. of gill nets were set in the area. Fisheries and Oceans Canada also performed additional netting and electrofishing in this area. No additional Asian Carp were found during this response.

Reference:

Mahon, A. R., A. Rohly, M. Budny, E. Elgin, C. L. Jerde, W. L. Chadderton, and D. M. Lodge. 2010. Environmental DNA Monitoring and Surveillance: Standard Operation Procedures. Report to the United States Army Corps of Engineers, Environmental Laboratories, Cooperative Environmental Studies Unit, Vicksburg, Mississippi. CESU agreement #W912HZ-08-2-0014, modification P00007.

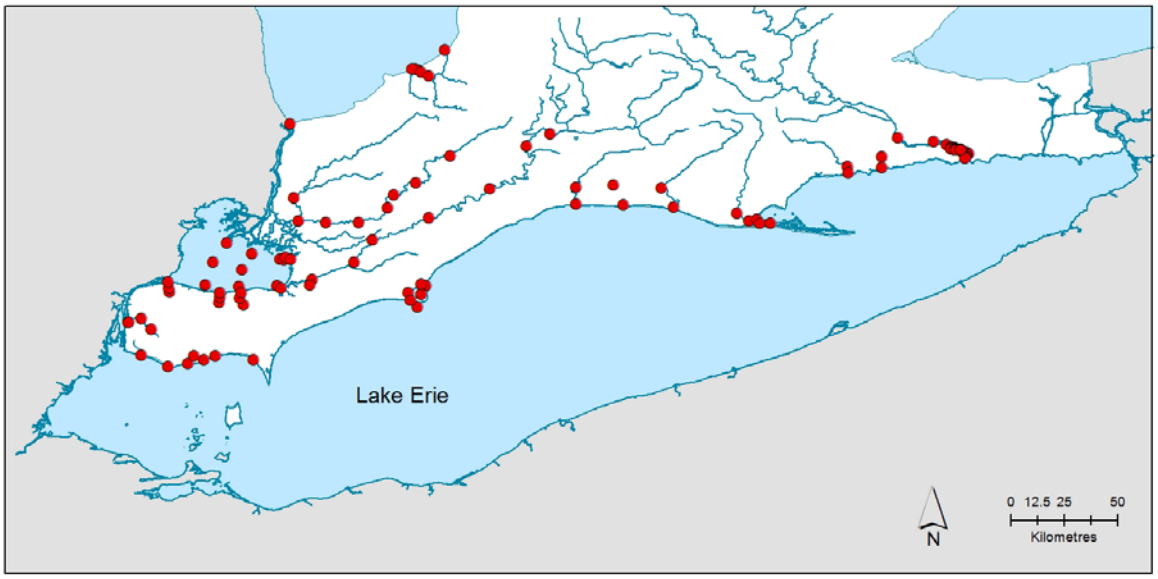


Figure 5.1.1 Location of sample sites for 2015 Asian Carp surveillance program.

5.2 Lake Erie Yellow Perch PIT Tagging Study

Yellow Perch are managed based on individual transferable quotas in Ontario waters of Lake Erie, administered across three quota zones (1, 2, 3) with the most easterly quota zone (3) further portioned into Quota Zone 3 – West and the East Basin Management Zone. These quota zones form Ontario's share of four international Yellow Perch management units (MUs) with United States (U.S.) fisheries management agencies (Yellow Perch Task Group (YPTG) 2015). The rationale for Yellow Perch management unit delineation was based upon real or perceived differences in Yellow Perch populations and historical harvest districts (YPTG 1984). Yellow Perch biological characteristics (growth rates, parasites), harvest densities and political areas contributed to Yellow Perch management unit delineations by jurisdiction (YPTG 1984). Currently, the assumption of discreet management units remains an integral part of the Lake Erie Yellow Perch assessment and management process under the Lake Erie Committee (YPTG 2015).

This study addresses uncertainties concerning the spatial management of Lake Erie Yellow Perch by inferring movement from a broad scale mark-recapture experiment spanning seven years to date (2009–2015). Previous Yellow Perch tagging studies have been done in Lake Erie, (Rawson, 1983, OMNR 1987, Ferguson 1957, Cummins 1954) that relied on fishers to report tagged fish. Modern tag-recapture methods offer an alternative to relying on voluntary fishery reporting, thereby reducing uncertainty surrounding reporting rates. Commencing in 2009, the Ontario Commercial Fisheries Association (OCFA) and the Ontario Ministry of Natural Resources and Forestry (OMNRF) launched a PIT (Passive Integrated Transponder) tag study to describe the movement of Yellow Perch following tagging in the west basin. In subsequent years, this was repeated in MU1 and MU2 in Ontario and starting in 2013, MU3 in Ohio. Although this report focuses exclusively on results of Yellow Perch movement inferred by mark-recapture, the study expanded in 2013 in cooperation with Ohio Department of Natural Resources (ODNR), United States Geological Survey (USGS), Ohio State University (OSU) and volunteers to include other objectives such as estimation of exploitation rates and natural mortality. Aspects of the tagging study that took place in Ontario waters of Lake Erie are emphasized in this report; however some results include mark and recapture information collected in Ohio waters.

From 2009 to 2015, Yellow Perch were caught primarily in bottom trawls from late April to the middle of May during spawning, tagged and released back in Lake Erie from the OMNRF research vessel Keenosay. Bottom trawls were completed at 1.6 knots using a 2 seam 10 m Biloxi trawl with an 11.6 m ground line and ½". Average trawl depth from 2009–2015 was 10.3 m with a range of 3.7 m to 19.4 m. Several attempts to collect Yellow Perch in gill nets resulted in few Yellow Perch caught. Yellow Perch were sorted from other species caught in the trawls and kept alive in a trough with circulating water. The sex and gonad state of each Yellow Perch was determined by external observation, followed by measurement of total length, scanning for pre-existing tags and application of tags. Twelve mm passive integrated transponder (PIT) tags (TX1400STBE and TX1411SSTBE 134.2 KHz) were injected ventrally, anterior to the pelvic fins into the dermis of Yellow Perch using pre-loaded syringes bathed in isopropyl alcohol. PIT tag readers (Destron Fearing 2001F-ISO and more recently Biomark HPR plus) with racket antennae were used to scan tagged fish and store unique PIT tag numbers in excel spreadsheets or in the internal memory of the HPR plus reader. Since 2013, a minimum total length criterion of 17 cm was required to apply PIT tags. From 2009 to 2012, Yellow Perch were released immediately following tagging. Dead or dying fish were recovered from the surface when possible and coded as dead in the tag database.

As study objectives expanded in 2013, it became necessary to evaluate mortality associated with capture, handling and tagging. In 2013, a modified Windermere trap was used to release tagged fish near the lake bottom and recover dead and dying Yellow Perch when the trap was retrieved. The door of the trap remained open until retrieved, released by a slip knot. The trap was suspended from the vessel for 20 minutes to one hour prior to retrieval. Biological data were collected from recovered dead fish including total length, weight, sex, maturity and age structure in addition to unique PIT tag numbers. The tag status codes were changed to identify dead fish, allowing estimation of mortality. In 2014, two improved steel Yellow Perch deployment cages were constructed (48" x 30" x 30") with a sliding door that opened once the cage reached bottom. These cages were lowered to the bottom and left unattended while additional trawls were conducted. After a minimum of ½ hour, the cages were retrieved and dead/dying fish were kept for laboratory sampling. In the event fish were active when retrieved, they were kept in circulating tanks and redeployed with the subsequent sample of tagged fish. Since 2014, Go Pro cameras were used to evaluate cage performance and provide estimates of the number of dead Yellow Perch that left the cage that would otherwise be assumed at large.

Harvested Yellow Perch were scanned in Lake Erie fish processing plants by OCFA weight observers, at dockside and in the laboratory by OMNRF technicians and by OCFA technicians assessing fish caught in the lakewide Partnership gill net index. Additional scanning occurred opportunistically but at lower magnitudes in other assessment programs without detecting any PIT tags. Due to the smaller number of fish scanned without recapture detections, these scanned fish are not reported here but will be included in future mark-recapture reports and modelling. Dextron 2001F-ISO and Biomark HPR plus readers with racket antennae were used to scan Yellow Perch in packers and individually. Fishery harvest scanning was recorded by weight using information from daily catch reports (DCRs). Recapture locations from Ontario's commercial fishery are based on 5 minute grid resolution, with coordinates at the centre of each grid used for analyses.

Results

The numbers of Yellow Perch tagged by year, jurisdiction and MU are presented in Table 5.2.1. To date, the numbers of Yellow Perch PIT tagged since 2009 were 10,395, 3,299 and 8,351 in management units 1, 2 and 3 respectively. MU1 tag locations were dispersed throughout Ontario waters of the west basin, with the highest density of Yellow Perch tagged in Pigeon Bay (Figure 5.2.1). Central basin tagging in MUs 2 and 3 were concentrated near Erieau in Ontario waters and near Fairport, Ohio in U.S. waters. In both jurisdictions, tagging occurred near MU2 – MU3 boundaries (Figure 5.2.1). Tagging in Ohio waters began in 2013, taking place exclusively in MU3. From 2009 to 2015, 22,044 Yellow Perch were tagged with PIT tags in Lake Erie. These numbers exclude dead, tagged Yellow Perch that were recovered near tagging locations and from cages deployed to evaluate tagging mortality.

Annual sex composition of tagged Yellow Perch usually favoured males or fish of unknown gender (Table 5.2.2). The percentage of females tagged each year by management units ranged from 0%

to 26%, and 4 % of all Yellow Perch tagged were females for all years and management units combined. Mean lengths of Yellow Perch tagged in the central basin (MU2 all years: 196 mm MU3 all years: 224 mm) were generally larger than those tagged in the west basin (MU1 all years: 170 mm).

From 2009 to 2015, the quantity of Yellow Perch scanned ranged from 938,703 pounds in 2009 to 2,269,693 with a total of 11.9 million pounds scanned (Table 5.2.3). The majority of Yellow Perch were scanned in commercial fish processing plants and dockside at commercial fishing ports. The amount of Ontario Yellow Perch harvest scanned was greatest in MU3, followed by MU2, MU1 and MU4 (Table 5.2.3). The spatial distribution of Yellow Perch scanned in Ontario by weight from 2009 to 2015 is presented in Figure 5.2.2 according to 5 minute grids. On occasion, some commercial harvest was scanned by OMNRF staff in harbours and repeated later by OCFA staff in processing plants. Although information presented in this report excludes duplication of commercial harvest scanned; the magnitude ranged from 1.7% to 4.4% annually, amounting to 4.4% across all study years (2009-2015).

The number of recaptured Yellow Perch detected in fisheries and surveys combined is presented by jurisdiction and year of recapture for annual, MU - specific, tagging (Table 5.2.1). From 2009 to 2015, Ontario scanning efforts detected 375 PIT tags while Ohio's participation since 2013 recovered 174 PIT tags for a total of 549 recaptures (Table 5.2.1). Cumulative PIT tag recapture rates ranged from 1.3 % to 6.5 % for tagged cohorts and 2.5% overall (Table 5.2.1).

For Yellow Perch tagged in MU1, 75% of recaptured fish were detected in MU1, caught primarily in commercial fisheries but with one recapture in the west basin Partnership survey during 2010. The remaining 25% of recaptured MU1 tagged Yellow Perch came from MU2 (21%) and MU3 (4%) (Table 5.2.4). Recaptures of Yellow Perch that were tagged in MU2 and MU3 were distributed similarly between adjacent central basin management units, with fewer recaptures detected in MU1 (Table 5.2.4). Recaptures of Yellow Perch tagged in MU2 occurred in MU3 (54%), MU2 (40%) and MU1 (6%). Recaptures of Yellow Perch tagged in MU3 occurred in MU3 (67%), MU2 (33%) and MU1 (<1%). No recaptures were detected in MU4.

The mean distance between tag and recapture locations for all jurisdictions and management units where tagging occurred was 34.8 km with a range of 1.7 to 167.5 km (Table 5.2.5). For all recaptures in Ontario waters only, mean distance was 31.7 km with a range of 1.7 to 167.5 km. For recaptures in Ohio waters, mean distance from tag site to recapture location was 41.5 km with a range of 2.6 to 136.0 km. There was a difference in mean distance from tag site to recapture location among management units in which tags were applied (ANOVA: $F_{2, 537} = 28.02$, $p < 0.0001$). Mean distance was lowest for Yellow Perch tagged in MU1 (19.4 km), followed by MU2 (39.8 km) and MU3 (48.3 km). A backwards step-wise selection of independent variables for the ANOVA model did not find significant effects of tagging year, sex, length, or days at large on the distance from tag site to recapture location ($p > 0.05$).

Trajectories (or vectors) for each recaptured Yellow Perch (2009–2015) from the origin of tagging to the site of recapture are presented in Figure 5.2.3 according to the management unit where tagging took place (MUs 1, 2, 3). Average tag-recapture vectors associated with management units where tagging took place, consist of a mean distance and direction as presented in Table 5.2.6. Yellow Perch tagged in MU1 were caught more to the east of their respective tag locations but the magnitude of the distance was relatively small (mean vector 6.1 km @ 101°) (Table 5.2.6 and Figure 5.2.3). The mean recapture vector for Yellow Perch tagged in MU2 was 12.0 km @ 91°. Most (99) recaptures of Yellow Perch tagged in MU2 occurred in Ontario waters where the mean vector was only 7.3 km @ 65°, indicating a greater likelihood of recapture within a short distance east of Erieau (Table 5.2.6). Yellow Perch recaptured that were tagged in MU3 near Fairport, Ohio had a mean vector of 21.6 km @ 4°. This differed by recapture jurisdiction however, with more Ohio recaptures occurring slightly east of the Fairport tagging site (mean distance 16.6 km @ 53°) compared to recaptures in Ontario waters which had a mean vector of 66.4 km with direction 329° (Table 5.2.6, Figure 5.2.3). The majority of recaptures detected in Ohio waters were caught in commercial trap nets.

The duration from when PIT tags were applied to the date of recapture ranged from 5 to 1,470 days for all years of study (2009-2015) (Table 5.2.7). The highest mean number of days until recapture among tagging MUs occurred in MU1 (405 days), followed by MU2 (367 days) and MU3 (247 days) (Table 5.2.7). In addition to fishing pressure, these results are influenced by years in which tagging occurred in each management unit and by the size of fish tagged. MU1 tagging began in 2009, followed by MU2 in 2011 and MU3 in 2013 weakening comparisons of days at large between MUs where tagging took place. Delayed recruitment to fisheries likely occurred for some Yellow Perch tagged from 2009 to 2012 prior to implementing the minimum total length criterion of 17 cm.

In 2015, 219 Yellow Perch were tagged that were not retrieved from cages dead or dying (15 or 6.4%). Camera footage in cages deployed recorded 1 dead Yellow Perch drifting from the cage (0.4%). In addition, 4 tagged Yellow Perch were eaten by gulls (1.7%). The latter two instances of mortality cannot be assigned to individual fish as their PIT numbers are unknown. However, the total mortality of the 234 Yellow Perch initially tagged was 8.5 % in 2015. Total mortality rates observed in 2013 and 2014 were 32% and 35% respectively with an additional 1.8% mortality observed in 2014 from Yellow Perch drifting from cages.

Some of this mortality may be attributed to barotrauma associated with depressurization during trawl retrieval. These estimates of mortality following the release of tagged Yellow Perch may be considered minimum estimates due to the limited viewing range and duration of observations. Tagging mortality estimates may be useful in future evaluations of exploitation and natural mortality.

Rather than a complete description of Yellow Perch movement throughout areas of Lake Erie, movement pattern interpretations described by this study are subject to the spatial pattern of fishery harvest and scanning. This is underscored by recaptures of Yellow Perch tagged in Ohio waters of MU3, where Ohio fishery recaptures indicated mainly east and west dispersal in contrast to Ontario recaptures that revealed movement northwards. Collectively, central basin Yellow Perch appear to move in all possible directions with implications for assessment and management. Although Yellow Perch tagged in MU1 experienced more recaptures in MU1 than elsewhere, there was evidence of some migration to the central basin while the opposite movement from the central basin to the west was less frequent. Yellow Perch movement into MU4 was not apparent but this may be attributed to low scanning effort. Historic tagging studies (OMNR 1987) documented movement of Yellow Perch from Long Point Bay towards the central basin.

References:

Cummins, R. Jr. 1954. Preliminary report on a fish tagging project in western Lake Erie. Section of Fish. Mgmt. Ohio Div. Wildl. Sandusky, Ohio. 35 p.

Ferguson, 1957. Fish tagging studies in Lakes Erie, St. Clair and Huron. Preliminary Report. Ont. Dept. of Lands and Forests. Div. of Research.

Ontario Ministry of Natural Resources (OMNR). 1987. A Twelve Year Study of the Fish Community in the Nanticoke Region of Long Point Bay, Lake Erie. Lake Erie Fisheries Assessment Unit Report 1987-3. 1973-1981 Summary Report. 622 p.

Rawson, M.R. 1983. Yellow perch movements. Final Report. Dingell Johnson Project F-35-R-Study 4. Lake Erie Fisheries Investigations. Ohio Dept. Nat. Res. Div. Wildl. 28 p.

Yellow Perch Task Group (YPTG). 1984. Yellow Perch Task Group Preliminary Report, March 1984. Presented to the Standing Technical Committee of Lake Erie Committee, Great Lakes Fishery Commission.

Yellow Perch Task Group (YPTG). 2015. Report of the Yellow Perch Task Group, March 2015. Presented to the Standing Technical Committee, Lake Erie Committee of the Great Lakes Fishery Commission. Ann Arbor, Michigan, USA.

Table 5.2.1 Number of Yellow Perch tagged and recaptured by year of tagging, jurisdiction, management unit (MU), and year of recapture from 2009-2015. Percentage of each tagging cohort caught by jurisdiction.

Tag Year	Tagging Jurisdiction	Tag MU	# Tagged [1]	Ontario Recaptures by Year of Recapture									Ohio Recaptures by Year					Ontario and Ohio Recaptures				
				2009	2010	2011	2012	2013	2014	2015	All Years	%	2013	2014	2015	All Years	%	2013	2014	2015	All Years	%
2009	ON	1	3,557	44	12	13	4	1	0	0	74	2%	0	0	0	0	0.0%	1	0	0	74	2.1%
2010	ON	1	3,782	0	15	17	14	2	0	0	48	1%	0	0	0	0	0.0%	2	0	0	48	1.3%
2011	ON	2	1,875	0	0	10	27	6	3	0	46	2%	1	3	0	4	0.2%	7	6	0	50	2.7%
2012	ON	1	2,837	0	0	0	45	28	16	3	92	3%	1	0	0	1	0.0%	29	16	3	93	3.3%
		2	124	0	0	0	2	3	1	0	6	5%	0	0	0	0	0.0%	3	1	0	6	4.8%
2013	ON	1	219	0	0	0	0	5	4	0	9	4%	0	0	0	0	0.0%	5	4	0	9	4.1%
		2	294	0	0	0	0	10	3	6	19	6%	0	0	0	0	0.0%	10	3	6	19	6.5%
	OH	3	6,259	0	0	0	0	28	19	4	51	1%	50	33	22	105	1.7%	78	52	26	156	2.5%
2014	ON	2	787	0	0	0	0	0	13	10	23	3%	0	0	4	**4**	0.5%	0	13	14	27	3.4%
	OH	3	638	0	0	0	0	0	0	0	0	0%	0	8	1	9	1.4%	0	8	1	9	1.4%
2015	ON	2	219	0	0	0	0	0	0	5	5	2%	0	0	1	1	0.5%	0	0	6	6	2.7%
	OH	3	1,454	0	0	0	0	0	0	2	2	0%	0	0	50	50	3.4%	0	0	52	52	3.6%
All	ON	1	10,395	44	27	30	63	36	20	3	223	2%	1	0	0	1	0.0%	37	20	3	224	2.2%
		2	3,299	0	0	10	29	19	20	21	99	3%	1	3	5	9	0.3%	20	23	26	108	3.3%
	OH	3	8,351	0	0	0	0	28	19	6	53	1%	50	41	73	164	2.0%	78	60	79	217	2.6%
		All	22,045	44	27	40	92	83	59	30	375	2%	52	44	78	174	0.8%	135	103	108	549	2.5%

ON 2010 recaptures includes 1 tagged Yellow Perch tagged in 2010 caught during the fall west basin Partnership survey.

Recaptures exclude 6 ON recaptures that could not be associated with a source tag. Duplicate detections and agency tagging recaptures were also excluded.

[1] Numbers of fish tagged have not been adjusted for dead fish without known PIT numbers (drift dead from cage or eaten by gulls; see text concening mortality)

Table 5.2.2 Mean total length (mm) and sample size (N) of tagged Yellow Perch by jurisdiction, management unit (MU) and year of tagging for each sex.

Year	Jurisdiction	MU	Male		Female		Unknown		Both Sexes		%
			Mean	N	Mean	N	Mean	N	Mean	N	Female
2009	ON	1	175	1,503	242	27	169	2,024	172	3,554	1%
2010	ON	1	163	1,107	207	14	158	2,661	159	3,782	0%
2011	ON	2	183	1,392	223	74	179	407	184	1,873	4%
2012	ON	1	182	658	210	4	179	2,174	180	2,836	0%
		2	191	100	216	8	177	16	191	124	6%
2013	ON	1	190	53	248	4	197	162	197	219	2%
		2	206	238	263	55	261	1	217	294	19%
	OH	3	224	5,973	251	269	251	15	225	6,257	4%
2014	ON	2	212	614	237	74	214	99	215	787	9%
	OH	3	219	469	225	167			221	636	26%
2015	OH	3	222	1,220	235	132			224	1,352	10%
	ON	2	205	207	255	8	222	3	207	218	4%
All	ON	1	172	3,321	230	49	168	7,021	170	10,391	0%
		2	194	2,551	238	219	186	526	196	3,296	7%
	OH	3	223	7,662	240	568	251	15	224	8,245	7%
All Years	ON OH	All	205	13,534	239	836	170	7,562	194	21,932	4%

Table 5.2.3 Yellow Perch scanned (pounds) for PIT tags by management unit and source (Ontario) from 2009 to 2015 without duplication between OCFA and OMNRF.

Scanning Source	Year	Management Unit				Total
		1	2	3	4	
Commercial Harvest	2009	249,456	481,079	196,541	-	927,076
	2010	177,505	392,362	478,358	10,973	1,059,198
	2011	352,370	635,951	827,133	4,007	1,819,461
	2012	375,832	813,515	1,071,975	-	2,261,322
	2013	326,895	831,289	966,541	8,962	2,133,687
	2014	306,090	740,845	916,989	-	1,963,924
	2015	281,384	657,555	709,816	1,099	1,649,854
Laboratory Sampling	2009	72	25	350	73	521
	2010	24	-	611	379	1,015
	2011	13	26	599	378	1,016
	2012	-	161	53	-	214
	2013	358	751	714	260	2,083
	2014	-	-	300	234	534
	2015	265	508	493	153	1,418
Partnership Surveys	2009	994	2,769	4,846	2,497	11,106
	2010	509	2,176	3,745	1,848	8,278
	2011	1,084	2,105	4,984	885	9,057
	2012	1,027	3,052	3,269	809	8,157
	2013	521	1,941	835	367	3,665
	2014	704	1,588	2,820	285	5,397
	2015	743	711	3,023	207	4,684
All (Ontario)	2009	250,522	483,873	201,738	2,570	938,703
	2010	178,039	394,538	482,714	13,200	1,068,491
	2011	353,467	638,082	832,715	5,270	1,829,534
	2012	376,859	816,728	1,075,297	809	2,269,693
	2013	327,774	833,981	968,089	9,589	2,139,434
	2014	306,794	742,433	920,109	520	1,969,856
	2015	282,392	658,774	713,332	1,459	1,655,957
Total		2,075,847	4,568,410	5,193,994	33,417	11,871,668

Table 5.2.4 Number (left) and percentage (right) of Yellow Perch recaptured by management unit (MU) and MU in which Yellow Perch were tagged.

Number of Yellow Perch Recaptured

TAG MU	Recapture MU				All
	1	2	3	4	
1	169	47	8	0	224
2	7	43	58	0	108
3	1	71	145	0	217
Total	177	161	211	0	549

% of Yellow Perch Recaptured

TAG MU	Recapture MU				All
	1	2	3	4	
1	75%	21%	4%	0%	100%
2	6%	40%	54%	0%	100%
3	0%	33%	67%	0%	100%
All MUs	32%	29%	38%	0%	100%

Table 5.2.5 Mean distance (km) between locations of tagging and recapture by fisheries and surveys within each jurisdiction according to the management unit (MU) in which tagging occurred and the year during which tags were applied to Yellow Perch. Mean distances are independent of bearings.

Tagging Year	Tag MU	Km For Recaptures in Ontario Waters				Km For Recaptures in Ohio Waters				Km For Recaptures in Both Jurisdictions			
		Mean	Min	Max	N	Mean	Min	Max	N	Mean	Min	Max	N
2009	1	20.9	1.7	146.6	74					20.9	1.7	146.6	74
2010	1	24.4	2.5	167.5	48					24.4	2.5	167.5	48
2011	2	39.0	6.1	86.1	46	86.3	74.8	95.5	4	42.8	6.1	95.5	50
2012	1	15.0	2.4	101.4	92	136.0	136.0	136.0	1	16.3	2.4	136.0	93
	2	48.1	12.1	83.2	6					48.1	12.1	83.2	6
2013	1	11.8	5.5	18.1	9					11.8	5.5	18.1	9
	2	26.7	7.6	53.2	19					26.7	7.6	53.2	19
	3	78.8	44.0	98.7	51	41.0	2.6	84.1	105	53.4	2.6	98.7	156
2014	2	27.6	6.5	70.8	23	91.6	75.8	99.4	4	37.1	6.5	99.4	27
	3					37.7	11.1	73.4	9	37.7	11.1	73.4	9
2015	2	52.1	12.6	112.0	5	96.1	96.1	96.1	1	59.5	12.6	112.0	6
	3	93.3	79.2	107.3	2	32.6	7.7	58.5	50	34.9	7.7	107.3	52
All	1	18.8	1.7	167.5	223	136.0	136.0	136.0	1	19.4	1.7	167.5	224
	2	35.2	6.1	112.0	99	89.7	74.8	99.4	9	39.8	6.1	112.0	108
	3	79.4	44.0	107.3	53	38.2	2.6	84.1	164	48.3	2.6	107.3	217
	All	31.7	1.7	167.5	375	41.5	2.6	136.0	174	34.8	1.7	167.5	549

Table 5.2.6 Mean vector distance and bearing (km, degrees) from tagging sites to recapture locations by management unit (MU) where tagging occurred and by recapture jurisdiction. N= number of Yellow Perch

Tag MU	Recapture Jurisdiction	Distance (km)	Bearing (degrees)	N
1	OH	136.0	91	1
1	ON	5.6	102	223
1	Both	6.1	101	224
2	OH	79.4	117	9
2	ON	7.3	65	99
2	Both	12.0	91	108
3	OH	16.6	53	164
3	ON	66.4	329	53
3	Both	21.6	4	217

Note: 0˚ or 360˚ is North

Table 5.2.7 Number of days from the date of tagging to recapture by year of tagging and management unit in which tags were applied to Yellow Perch.

Tagging Year	Management Unit 1					Management Unit 2					Management Unit 3					Management Units 1, 2 and 3				
	Mean	Std	Min	Max	N	Mean	Std	Min	Max	N	Mean	Std	Min	Max	N	Mean	Std	Min	Max	N
2009	394	352	12	1,470	74											394	352	12	1,470	74
2010	490	299	42	1,086	48											490	299	42	1,086	48
2011						495	319	46	1,153	50						495	319	46	1,153	50
2012	382	309	16	1,305	93	392	235	79	728	6						382	304	16	1,305	99
2013	292	194	91	563	9	331	328	20	809	19	315	261	18	854	156	315	265	18	854	184
2014						222	179	5	468	27	74	134	5	427	9	185	180	5	468	36
2015						43	24	5	70	6	75	25	22	119	52	72	27	5	119	58
All	405	320	12	1,470	224	367	307	5	1,153	108	247	248	5	854	217	335	299	5	1,470	549

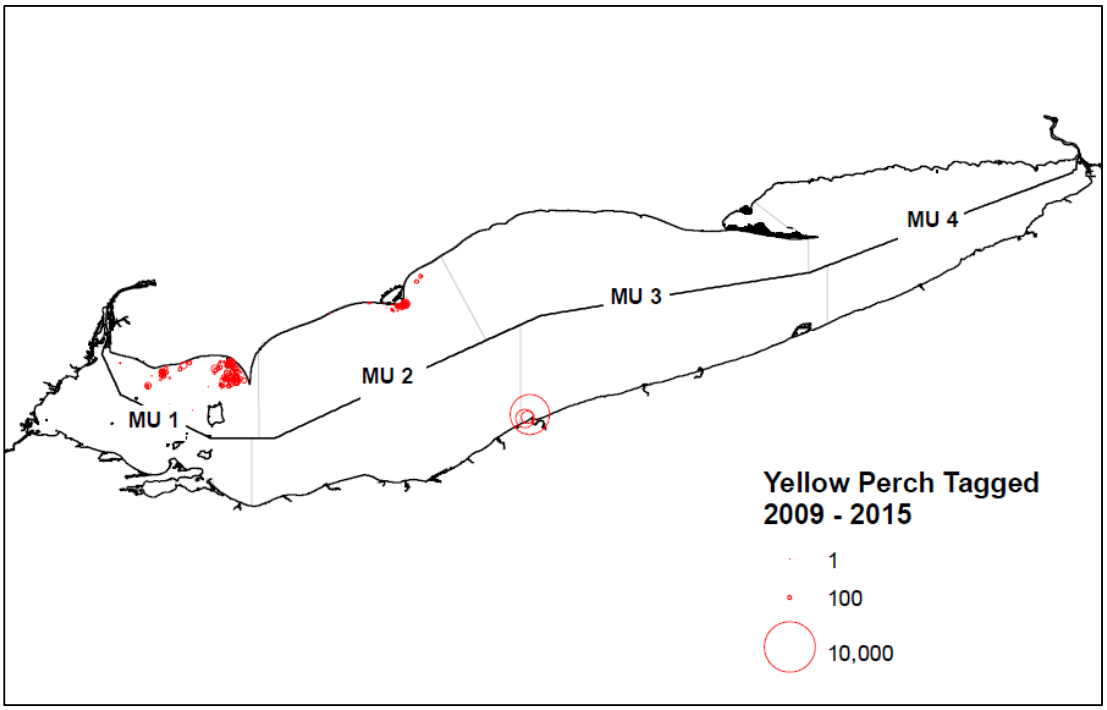


Figure 5.2.1 Number of Yellow Perch PIT tagged in Ontario and Ohio from 2009-2015.

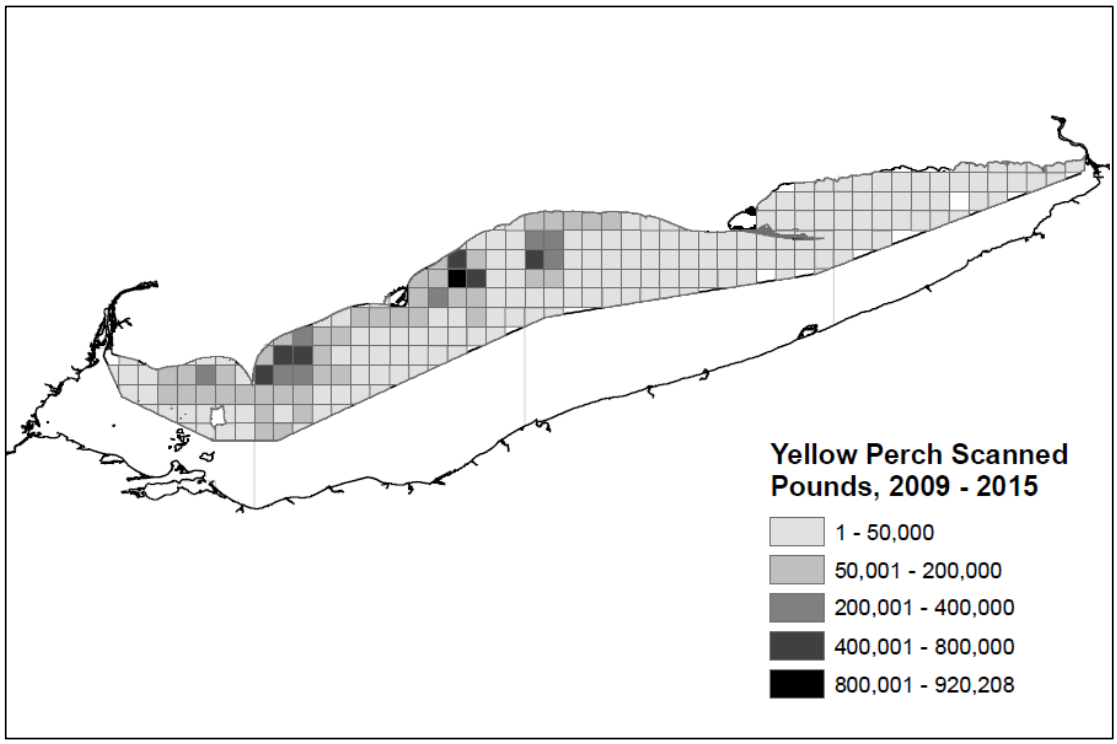


Figure 5.2.2 Ontario Yellow Perch (pounds) scanned from commercial harvest and from the Partnership gill net surveys by 5 minute grid 2009-2015.

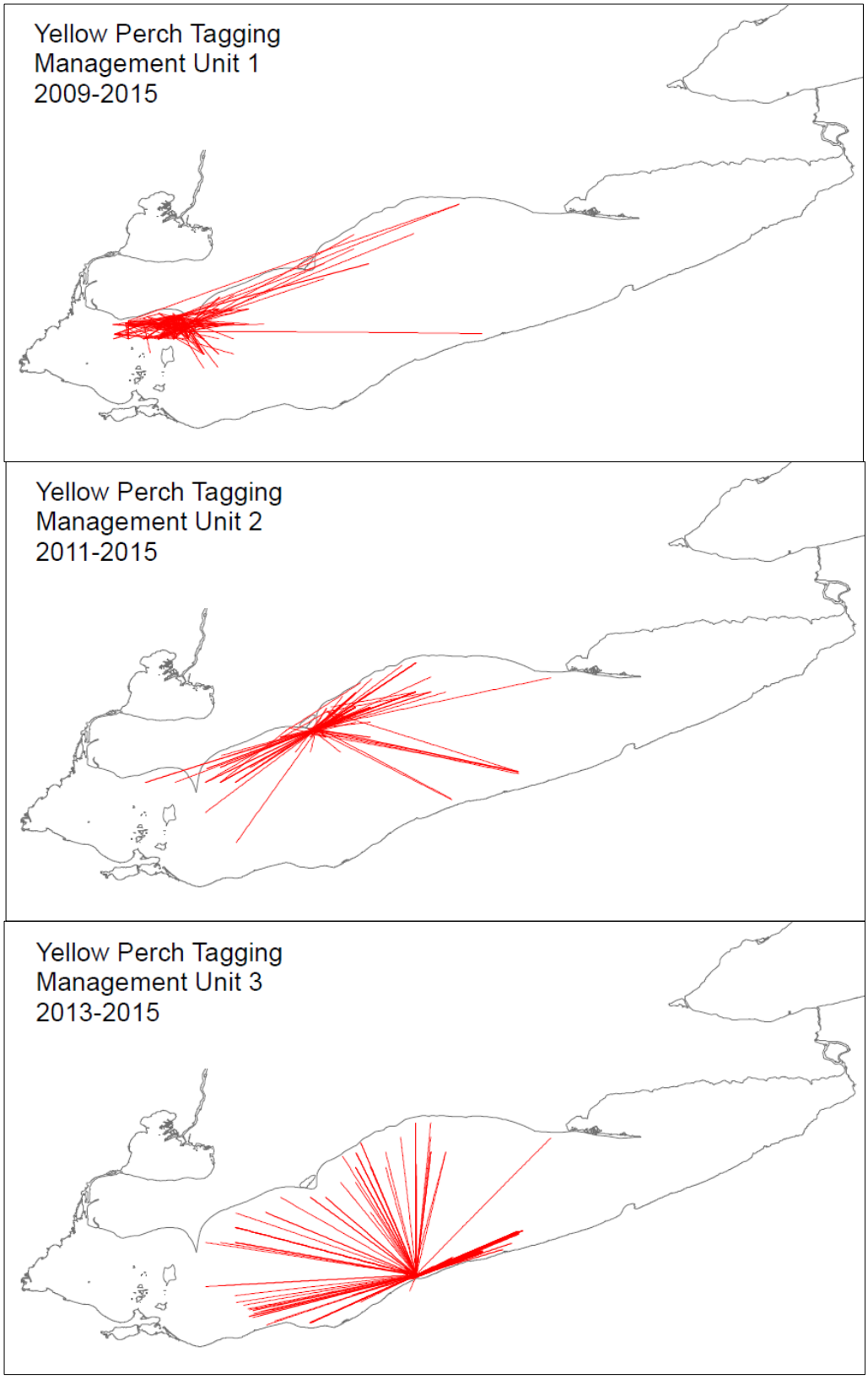


Figure 5.2.3 Vectors for individual PIT tag detections from tag locations in MU1 (top), MU2 (middle) and MU3 (bottom) to recapture locations, 2009-2015. Note that some lines overlap, obscuring multiple recaptures.

6. LAKE ST. CLAIR PROJECTS

6.1 St. Clair System Sport Fishery Diary Program

The St. Clair System Sport Fishery Diary Program is an ongoing survey used to track general trends in catch rates and angler activity targeting a variety of fish species in Lake St. Clair, Detroit River and St. Clair River. This is a combined program with the Lake Erie Sport Fishery Diary Program and volunteer anglers complete a page in a diary for each fishing trip taken as outlined in Section 3 of this report.

In 2015, 50 volunteers completed diaries in the St. Clair System (Lake St. Clair, Detroit River and St. Clair River) (Table 6.1.1). Anglers from both Ontario and Michigan participated in the diary program for the St. Clair System. Ontario Ministry of Natural Resources and Forestry Lake Erie Management Unit (LEMU) collected information from Ontario anglers, while the Michigan Department of Natural Resources collected data from Michigan anglers. In 2015, there were 34 participants in Lake St. Clair, 30 participants in the Detroit River, and 16 participants in the St. Clair River (some anglers fish in more than one area). The number of participants decreased in Lake St. Clair (from 35 participants in 2014), Detroit River (from 31 participants in 2014), and St. Clair River (from 18 participants in 2014).

In total there were 800 fishing trips by angler diarists in the St. Clair System (Table 6.1.1). The total effort was 9,054 rod hours, with 65% of effort in Lake St. Clair, 25% in the Detroit River and 11% in the St. Clair River.

Table 6.1.1 Total effort reported by Sport Fishery Diary Program participants in Lake St. Clair, Detroit River, and St. Clair River, 2015.

Survey Area	Number of Diarists	Number of Trips	Number of Rods per Trip	Total Rod Hours	Hours per Trip
Lake St. Clair	34	434	2.8	5,852	4.8
Detroit River	30	265	2.0	2,244	4.2
St. Clair River	16	101	2.4	958	4.0
Total	**50[a]**	**800**	**2.6**	**9,054**	**4.5**

[a] Diarist may fish more than one survey area in a year.

Lake St. Clair

Lake St. Clair diarists fished 5,852 rod hours of effort over 434 fishing trips (Table 6.1.1). In 2015, 42% of diary participant effort in Lake St. Clair was directed towards Walleye, 24% of effort was directed towards Smallmouth Bass, 22% of effort was directed towards Yellow Perch, and 17% of effort was directed towards Muskellunge (effort may be directed towards more than one species simultaneously) (Table 6.1.2, Figure 6.1.1). Additional species targeted with greater than one percent of the effort included: Rock Bass (2%), and Largemouth Bass (1%).

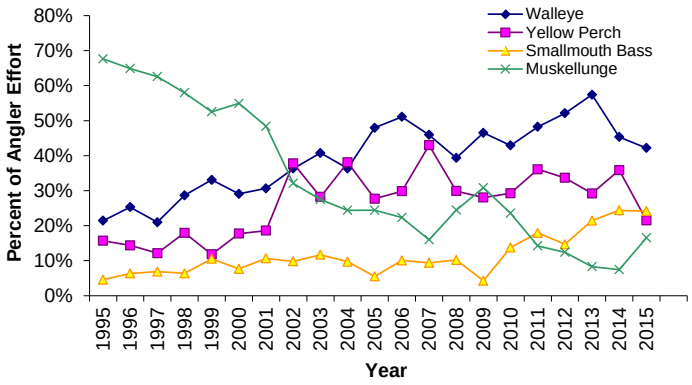


Figure 6.1.1 Percent of angler diarist effort in Lake St. Clair by species 1995-2015.

The 2015 Walleye catch rate (0.324 fish per rod hour) decreased 27% percent from the 2014 catch rate (Table 6.1.2). The Smallmouth Bass catch rate (0.253 fish per rod hour) decreased 15% from 2014. In 2015, the Smallmouth Bass catch rate in Lake St. Clair was higher than the catch rate in the Detroit River (Figure 6.1.4). The Yellow Perch catch rate (2.284 fish per rod hour) increased 20% from the 2014 catch rate. The 2015 Muskellunge catch rate (0.076 fish per rod hour) increased 73% from 2014 (Table 6.1.2).

Detroit River

Detroit River diarists fished 2,244 rod hours of effort over 265 fishing trips (Table 6.1.1). In the Detroit River, 92% of diary participant effort was directed towards Walleye, 3% of effort was directed towards Yellow Perch, and 2% of effort was directed towards Smallmouth Bass. (Table 6.1.2, Figure 6.1.2). Additional species targeted with more than one percent of the effort included: White Bass (4%), and Bluegill (2%).

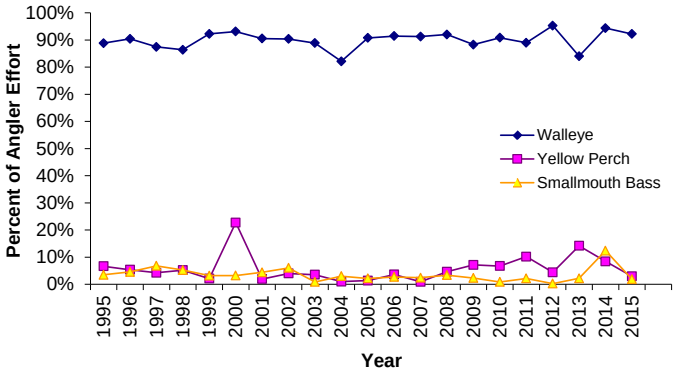


Figure 6.1.2 Percent of angler diarist effort in the Detroit River by species 1995-2015.

The 2015 Walleye catch rate (0.663 fish per rod hour) increased 8% percent from the 2014 catch rate (Table 6.1.2). The Yellow Perch catch rate (4.123 fish per rod hour) increased from the low 2014 catch rate of 0.785 fish per rod hour. The Yellow Perch catch rate in the Detroit River was higher than the Yellow Perch catch rate in Lake St. Clair (Figure 6.1.5). The Smallmouth Bass catch rate (0.168 fish per rod hour) increased 113% from 2014.

St. Clair River

St. Clair River diarists fished 958 rod hours of effort over 101 fishing trips (Table 6.1.1). In the St. Clair River, 55% of diary participant effort was directed towards Walleye. In 2015, there was no effort directed towards Rainbow Trout in the St. Clair River, for the first time in the survey (Table 6.1.2, Figure 6.1.3). Other species targeted with at least one percent of the effort included: Smallmouth Bass (3%), and Northern Pike (1%).

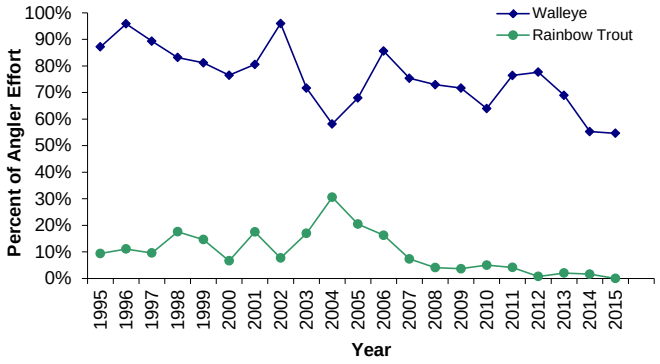


Figure 6.1.3 Percent of angler diarist effort in the St. Clair River by species 1995-2015.

The 2015 Walleye catch rate (0.839 fish per rod hour) was similar to the 2014 Walleye catch rate (0.840 fish per rod hour; Table 6.1.2). For the third consecutive year, the Walleye catch rate in the St. Clair River was higher than the Walleye catch rate in Lake St. Clair and the Detroit River (Figure 6.1.6).

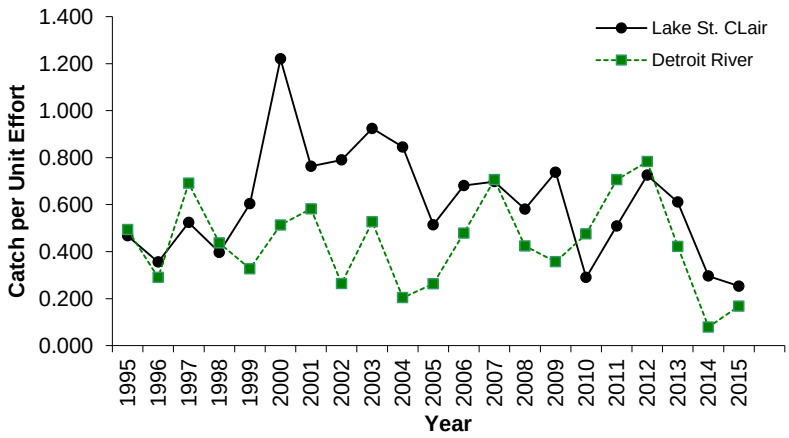


Figure 6.1.4 Smallmouth Bass catch per unit effort (fish per rod hour) in Lake St. Clair and the Detroit River, Sport Fish Diary Program 1995-2015.

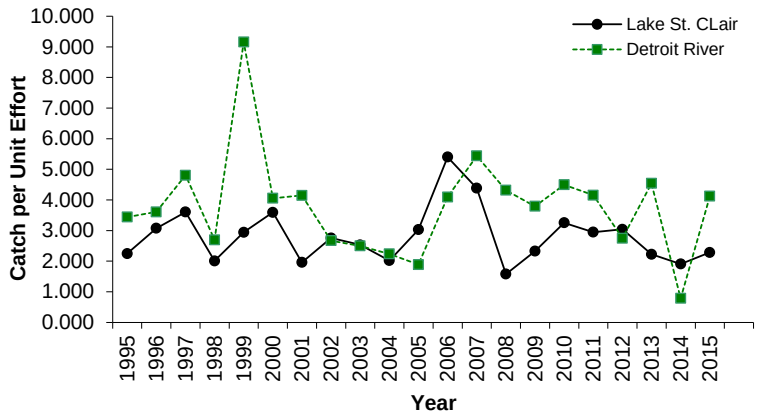


Figure 6.1.5 Yellow Perch catch per unit effort (fish per rod hour) in Lake St. Clair and the Detroit River Sport Fish Diary Program 1995-2015.

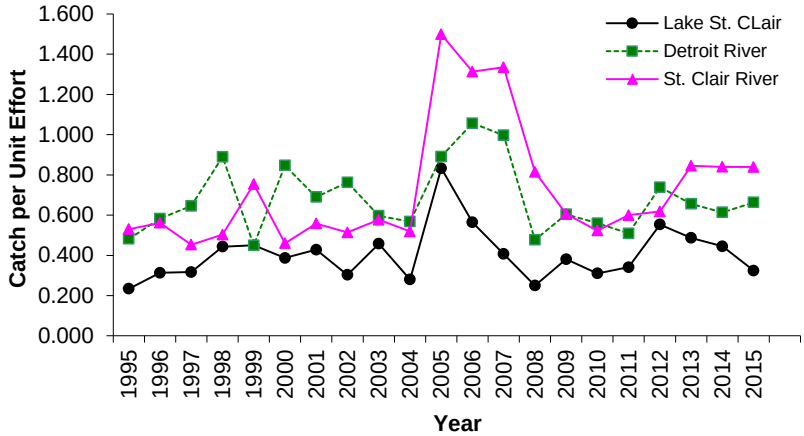


Figure 6.1.6 Walleye catch per unit effort (fish per rod hour) in Lake St. Clair, Detroit River and the St. Clair River Sport Fish Diary Program 1995-2015.

Table 6.1.2 Angler success rates (CPUE) of non-charter boat anglers targeting particular species in the Lake St. Clair, Detroit River and St. Clair River, 1995-2015[a]. Effort may be directed at more than one species simultaneously.

Lake St. Clair

Year	Total Rod Hours	Walleye				Yellow Perch				Smallmouth Bass				Muskellunge			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1995	28,867	451	6,185	0.234	21%	340	4,524	2.246	16%	137	1,317	0.467	5%	642	19,524	0.073	68%
1996	24,093	484	6,097	0.313	25%	265	3,462	3.076	14%	153	1,533	0.356	6%	494	15,629	0.093	65%
1997	22,387	409	4,697	0.317	21%	253	2,714	3.607	12%	149	1,537	0.524	7%	400	14,010	0.103	63%
1998	19,532	510	5,600	0.443	29%	304	3,505	2.008	18%	127	1,248	0.397	6%	383	11,326	0.095	58%
1999	17,509	622	5,792	0.450	33%	224	2,065	2.943	12%	222	1,841	0.604	11%	314	9,199	0.069	53%
2000	15,862	442	4,613	0.387	29%	228	2,811	3.594	18%	190	1,216	1.220	8%	267	8,714	0.086	55%
2001	15,644	444	4,797	0.428	31%	246	2,907	1.958	19%	209	1,665	0.763	11%	254	7,568	0.115	48%
2002	12,327	425	4,475	0.303	36%	412	4,658	2.756	38%	153	1,207	0.790	10%	156	3,953	0.070	32%
2003	13,577	543	5,533	0.458	41%	335	3,829	2.532	28%	179	1,586	0.924	12%	141	3,730	0.091	27%
2004	10,287	393	3,740	0.280	36%	293	3,917	2.019	38%	126	1,000	0.845	10%	114	2,510	0.094	24%
2005	10,104	526	4,845	0.833	48%	232	2,798	3.028	28%	82	556	0.514	6%	109	2,468	0.085	24%
2006	8,229	436	4,204	0.564	51%	231	2,455	5.401	30%	84	829	0.681	10%	89	1,838	0.071	22%
2007	7,911	376	3,633	0.407	46%	275	3,399	4.384	43%	90	742	0.698	9%	65	1,264	0.118	16%
2008	7,164	291	2,819	0.250	39%	154	2,143	1.578	30%	88	731	0.581	10%	81	1,752	0.060	24%
2009	8,903	425	4,142	0.381	47%	157	2,495	2.326	28%	42	378	0.738	4%	79	2,746	0.103	31%
2010	7,010	305	3,008	0.310	43%	157	2,051	3.252	29%	88	964	0.290	14%	53	1,651	0.090	24%
2011	6,994	323	3,373	0.341	48%	165	2,525	2.947	36%	84	1,256	0.509	18%	28	994	0.090	14%
2012	6,884	352	3,587	0.553	52%	143	2,317	3.041	34%	71	1,009	0.725	15%	31	853	0.137	12%
2013	6,004	350	3,446	0.487	57%	102	1,753	2.225	29%	101	1,288	0.611	21%	19	498	0.066	8%
2014	5,803	275	2,630	0.445	45%	134	2,081	1.907	36%	103	1,415	0.296	24%	22	431	0.044	7%
2015	5,852	236	2,469	0.324	42%	94	1,259	2.284	22%	94	1,413	0.253	24%	30	966	0.076	17%
95-15 Avg.	**12,426**	**410**	**4,271**	**0.405**	**39%**	**226**	**2,841**	**2.815**	**26%**	**122**	**1,178**	**0.609**	**11%**	**180**	**5,315**	**0.087**	**33%**

Detroit River

Year	Total Rod Hours	Walleye				Yellow Perch				Smallmouth Bass				Muskellunge			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1995	4,297	558	3,817	0.482	89%	41	286	3.439	7%	28	149	0.494	3%	9	164	0.171	4%
1996	4,087	569	3,695	0.583	90%	30	218	3.611	5%	26	186	0.290	5%	9	133	0.248	3%
1997	4,867	625	4,255	0.646	87%	33	206	4.807	4%	44	330	0.691	7%	11	113	0.177	2%
1998	5,247	707	4,533	0.890	86%	32	272	2.696	5%	32	275	0.437	5%	25	150	0.133	3%
1999	3,861	622	3,560	0.450	92%	14	80	9.157	2%	17	122	0.327	3%	9	63	0.079	2%
2000	3,333	503	3,103	0.847	93%	15	758	4.053	23%	16	107	0.513	3%	8	21	0.578	1%
2001	4,036	531	3,654	0.690	91%	12	77	4.147	2%	23	177	0.582	4%	18	137	0.007	3%
2002	4,382	553	3,961	0.763	90%	15	175	2.671	4%	26	265	0.264	6%	17	234	0.141	5%
2003	3,733	463	3,317	0.597	89%	13	132	2.500	4%	4	32	0.527	1%	20	152	0.204	4%
2004	2,947	300	2,420	0.568	82%	4	28	2.237	1%	12	88	0.204	3%	16	191	0.257	6%
2005	2,299	246	2,086	0.891	91%	4	31	1.888	1%	8	50	0.263	2%	3	13	0.154	1%
2006	1,789	219	1,635	1.057	91%	7	64	4.094	4%	4	48	0.479	3%	1	22	0.091	1%
2007	1,418	172	1,294	0.997	91%	3	13	5.440	1%	5	34	0.706	2%	2	42	0.095	3%
2008	1,473	153	1,355	0.477	92%	14	68	4.317	5%	6	50	0.424	3%	0	0		0%
2009	3,064	365	2,704	0.604	88%	26	219	3.791	7%	7	70	0.357	2%	2	30	0.267	1%
2010	3,468	391	3,150	0.560	91%	19	233	4.495	7%	4	30	0.475	1%	1	24		1%
2011	2,832	364	2,519	0.509	89%	37	288	4.154	10%	9	61	0.706	2%	0	0		0%
2012	2,931	377	2,792	0.739	95%	16	129	2.750	4%	2	8	0.783	0%	0	0		0%
2013	2,830	289	2,378	0.656	84%	31	401	4.540	14%	8	62	0.422	2%	0	0		0%
2014	2,467	280	2,328	0.614	94%	18	208	0.785	8%	14	306	0.079	12%	0	0		0%
2015	2,244	243	2,069	0.663	92%	11	65	4.123	3%	4	42	0.168	2%	0	0		0%
95-15 Avg.	**3,219**	**406**	**2,887**	**0.680**	**90%**	**19**	**188**	**3.795**	**6%**	**14**	**119**	**0.438**	**3%**	**7**	**71**	**0.186**	**2%**

St. Clair River

Year	Total Rod Hours	Walleye				Rainbow Trout				Chinook			
		Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort	Trips	Rod Hours	CPUE	% Total Effort
1995	2,179	316	1,900	0.530	87%	15	205	0.010	9%	27	309	0.013	14%
1996	2,070	318	1,984	0.562	96%	16	229	0.000	11%	36	516	0.033	25%
1997	2,299	276	2,053	0.453	89%	21	220	0.009	10%	37	505	0.075	22%
1998	2,852	311	2,372	0.503	83%	36	501	0.000	18%	67	733	0.046	26%
1999	2,189	274	1,776	0.754	81%	33	321	0.012	15%	67	603	0.045	28%
2000	1,330	165	1,017	0.460	76%	16	88	0.045	7%	31	227	0.084	17%
2001	1,391	161	1,121	0.558	81%	20	244	0.021	18%	22	190	0.068	14%
2002	841	120	807	0.514	96%	10	65	0.015	8%	17	182	0.044	22%
2003	848	97	608	0.577	72%	12	144	0.014	17%	21	261	0.291	31%
2004	1,078	84	627	0.519	58%	20	329	0.146	31%	11	128	0.016	12%
2005	1,279	150	869	1.499	68%	14	262	0.031	20%	6	75	0.107	6%
2006	1,428	175	1,222	1.313	86%	9	232	0.026	16%	0	0		0%
2007	977	118	736	1.335	75%	3	72	0.167	7%	1	3	0.400	0%
2008	964	123	703	0.815	73%	1	39	0.385	4%	2	5	0.632	0%
2009	951	98	681	0.606	72%	3	35	0.000	4%	3	22	0.000	2%
2010	1,077	68	689	0.523	64%	1	54	0.019	5%	1	6	0.000	1%
2011	726	61	555	0.600	76%	1	30	0.033	4%	0	0		0%
2012	821	70	638	0.618	78%	1	6	0.067	1%	0	0		0%
2013	592	46	408	0.845	69%	1	12	0.000	2%	0	0		0%
2014	818	61	452	0.840	55%	1	13	0.077	2%	0	0		0%
2015	958	78	523	0.839	55%	0	0		0%	0	0		0%
95-15 Avg.	**1,317**	**151**	**1,035**	**0.727**	**76%**	**11**	**148**	**0.054**	**10%**	**17**	**179**	**0.124**	**10%**

[a]CPUE represents observed catch divided by observed angling effort in rod-hours directed at that particular species.

6.2 Lake St. Clair Fall Trap Net Index

The Lake St. Clair Fall Trap Net Index is an adult fish community index that has been conducted annually since 1974. This program surveys the adult fish community at three sites in Lake St. Clair and information from this program provides a trend through time data series describing fish species composition, indices of abundance, and age group composition for each sampling location.

Single trap nets were set at three index fishing sites on Lake St. Clair as shown in Figure 6.2.1. The south shore site was Tremblay Creek, Mitchell's Bay was the north shore site, and the east shore site was St. Lukes. All three sites were fished in 1974; however from 1975 to 1985 only two sites, Tremblay Creek and Mitchell's Bay were fished. From 1986 to 2015, all three sites were fished each year, with the exception of 1999, 2002, and 2010 when no fishing occurred.

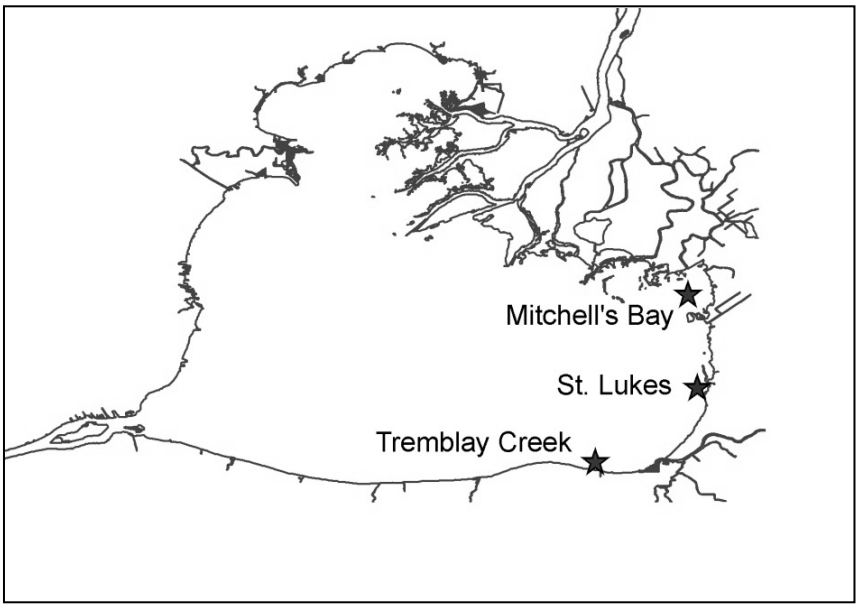


Figure 6.2.1 Lake St. Clair Fall Trap Net Index site locations.

Nets were set approximately 0.8 kilometres from the shoreline, with the leads set perpendicular to the shoreline. The water depth at the index fishing sites averaged three metres. The nets were approximately 20 ft. long, with an 8 ft. long front end and 40 ft. wings. The lead of the nets was 310 ft. long with 7 inch mesh. The wings and front had 4 inch mesh; the crib had 2 inch mesh. In 2015, the nets were set from September 28, 2015 to November 17, 2015. Lifts were scheduled for three times per week, however, in many cases nets were lifted less frequently than this due to rough water conditions.

At each sampling event, all nets were lifted, emptied of fish, and immediately reset. All fish were identified and fork length was measured. Selected species were sub-sampled in the field for later age assessment, or returned to the lab for more detailed examination and Ministry of Environment and Climate Change (MOECC) contaminant sample preparation. Secchi disc depth and water temperature were recorded at each lift. Data for 2015 are preliminary.

In 2015, there was a total of 140 net nights of effort (Figure 6.2.2). There were 41.8 net nights of effort at Mitchell's Bay, 48.8 nights of effort at St. Lukes, and 49.7 nights of effort at Tremblay Creek. Seven nights of effort were lost at Mitchell's Bay due to net damage.

In total, across all survey years, 43 different species have been captured during the Lake St. Clair fall trap net index. In 2015, 23 species were caught. The most commonly caught species were Channel Catfish (36% of the catch) and Freshwater Drum (26% of the catch) (Figure 6.2.3).

The total catch per net night at all three sites combined, was 6.6 fish in 2015; this was a decrease of 40% from 2014 (Figure 6.2.3). It was the lowest catch rate observed in the 1986 to present time series (when all three sites were regularly sampled). At Mitchell's Bay the catch rate was 4.2 fish per net night, a decrease of 17% from 2014 (Table 6.2.1). The St. Lukes catch rate decreased 27% in 2015 to 6.6 fish per net night (Table 6.2.2); this was the lowest catch rate observed at St. Lukes in the time series. At Tremblay Creek the catch rate was 8.4 fish per net night, a decrease of 54% from 2014 (Table 6.2.3).

The average Walleye CPUE has decreased since the beginning of the survey period. From 1974 to 1990 the average Walleye CPUE was 5.5 fish per net night, this decreased to an average of 1.1 fish per net night from 1991-2014 at the Tremblay Creek and Mitchell's Bay sites combined (standard north and south sites fished from 1974 to present). In 2015, the Walleye catch rate declined at all three sites, the mean Walleye CPUE was 0.20 fish per net night (at all sites combined), and was the lowest CPUE observed in the time series. Walleye comprised 3.0% of the total catch in 2015. The long term (1986 to 2014) average CPUE at all sites combined was 1.8 fish per net night and Walleye comprised 8% of the catch on average. In 2015, the highest catch rate of Walleye was at the Tremblay Creek site (Figure 6.2.4). Only 28 walleye were caught in 2015, compared 86 walleye caught on average over the previous ten years.

In 2015, only 16 Yellow Perch were caught during the survey, compared to an average of 38 Yellow Perch caught during the last ten years. The highest Yellow Perch catch rate in 2015, was at St. Lukes (0.27 fish per net night) (Figure 6.2.5). The overall 2015 catch rate (0.11 fish per net night) was less than the long term average (0.29 fish per net night). However, Yellow Perch comprised 1.7% of the total catch, equal to the 1986 to 2014 average value of 1.7%.

The catch rate of Smallmouth Bass increased at all sites in 2015. The highest catch rate was observed at the St. Lukes site (0.53 fish per net night) (Figure 6.2.6). The average 2015 Smallmouth Bass catch rate at all sites combined (0.35 fish per net night) was less than the long term average (0.57 fish per net night). However, Smallmouth Bass comprised 5.3% of the total catch in 2015 which was above the long term average of 3.4%.

Table 6.2.1 Catch per net night by species and year at the Mitchell's Bay site (a hyphen (-) indicates no fish were caught, a zero (0) indicates less than 0.05 fish per net night).

CATCH PER NET NIGHT

YEAR	Freshwater Drum	Walleye	Yellow Perch	Black Crappie	Largemouth Bass	Smallmouth Bass	Bluegill	Pumpkinseed	Rock Bass	White Bass	White Perch	Burbot	Stonecat	Channel Catfish	Brown Bullhead	Common Carp	Shorthead Redhorse Sucker	Golden Redhorse Sucker	Silver Redhorse Sucker	Spotted Sucker	Bigmouth Buffalo	White Sucker	Quillback Carpsucker	Mooneye	Muskellunge	Northern Pike	Gizzard Shad	Bowfin	Longnose Gar	Others*	TOTAL
1974	0.3	0.7	0.0	7.0	0.5	0.0	2.3	16.0	2.0	0.1	-	-	-	1.9	0.8	1.3	-	-	-	-	-	0.1	0.0	-	-	0.7	0.1	2.1	-	0.2	36.0
1975	0.7	2.6	0.2	16.9	0.3	0.1	1.9	2.9	0.2	0.3	-	-	-	2.1	1.5	2.7	-	-	-	-	-	0.1	0.1	-	0.0	0.6	0.0	0.9	0.0	0.2	34.3
1976	4.3	4.3	0.1	8.5	0.6	0.3	2.8	5.4	2.4	0.7	-	-	-	1.9	2.1	10.6	0.0	-	0.2	-	-	0.4	0.4	-	-	1.6	0.0	1.5	-	0.3	48.5
1977	0.2	1.4	0.0	7.0	0.2	0.2	0.2	0.9	0.3	0.1	-	-	-	1.8	1.6	1.7	0.2	-	0.0	-	-	0.3	0.1	-	-	0.4	0.1	0.9	-	-	18.8
1978	2.8	2.3	0.1	7.2	0.1	0.5	0.2	2.2	0.3	0.3	-	-	-	0.9	1.9	4.5	0.0	0.0	-	-	-	0.1	0.1	-	-	0.5	0.1	0.7	-	0.1	24.6
1979	5.9	3.4	0.1	2.3	0.2	0.4	0.0	1.4	0.7	0.4	-	-	-	1.9	0.9	1.0	0.4	0.2	0.1	-	-	0.2	0.3	0.0	-	0.6	-	0.9	0.0	0.1	36.4
1980	3.9	3.3	0.1	3.0	0.1	0.4	0.1	3.9	0.5	0.2	-	-	-	1.7	1.4	6.8	0.1	-	0.2	-	-	0.1	0.1	-	-	0.6	0.1	1.1	-	0.0	27.5
1981	6.9	2.6	0.6	3.5	0.0	0.3	-	3.3	0.3	0.1	0.1	-	-	0.6	1.2	5.4	0.4	0.0	-	-	0.0	0.1	0.1	-	-	0.6	-	3.5	-	-	29.6
1982	4.8	2.0	0.6	4.5	0.1	0.6	0.2	4.1	0.3	0.4	0.1	-	-	1.1	0.9	4.8	0.2	0.0	0.0	-	0.0	0.1	-	0.0	-	0.4	0.0	1.2	-	-	26.4
1983	3.0	2.6	0.7	11.9	0.2	0.3	0.7	7.7	1.2	0.2	0.1	-	-	0.4	0.5	0.5	0.4	0.2	0.1	0.0	0.0	0.0	0.1	-	-	0.5	0.0	0.8	-	-	31.8
1984	2.8	1.7	0.1	13.7	0.3	0.7	0.5	2.9	0.5	0.2	0.1	-	-	0.6	0.3	0.9	0.2	0.1	0.1	0.0	0.1	0.0	0.0	-	-	0.3	0.1	0.4	-	-	26.3
1985	4.4	3.2	0.3	19.5	0.5	1.2	0.3	10.6	0.7	0.6	0.1	-	-	1.9	2.3	1.6	1.1	0.1	0.1	-	-	0.3	0.1	-	-	0.7	0.0	2.3	-	-	51.4
1986	5.4	2.0	0.1	6.2	0.1	0.2	0.1	1.2	0.5	0.5	0.9	0.0	-	2.7	0.2	1.2	0.5	0.1	0.3	0.0	-	0.1	0.3	-	-	0.3	0.0	0.3	-	0.1	23.1
1987	4.4	2.4	0.3	1.6	0.3	0.3	0.2	1.3	0.8	0.1	0.4	-	-	0.6	1.5	1.2	0.1	0.0	0.1	-	-	0.1	0.0	0.1	-	1.1	0.1	0.8	-	0.0	17.7
1988	3.4	1.6	0.1	0.4	0.0	0.0	1.0	0.8	0.4	0.2	0.2	-	-	0.2	1.1	1.0	0.1	0.1	-	-	-	0.0	0.1	0.0	-	0.6	-	0.7	-	-	12.0
1989	2.5	0.8	0.2	1.6	0.2	0.2	0.8	0.6	0.3	0.0	-	-	-	0.8	0.1	0.8	0.3	0.1	0.1	-	-	0.1	0.1	-	-	0.6	-	0.2	-	-	10.1
1990	4.4	0.9	0.0	1.4	0.1	0.3	1.2	0.6	0.3	0.0	0.4	-	-	1.6	0.5	1.0	0.5	0.0	0.1	0.1	0.0	0.2	0.0	-	-	0.1	0.0	0.3	-	-	14.1
1991	1.6	0.3	0.0	2.5	0.4	0.7	1.5	0.7	0.2	0.1	-	-	-	0.8	0.1	0.5	0.2	0.1	0.0	-	-	-	0.0	-	0.0	0.1	0.0	0.1	-	0.0	10.3
1992	4.4	1.2	0.4	3.3	0.0	0.7	0.2	1.1	1.1	0.1	0.3	-	-	0.9	0.1	0.6	0.4	0.1	0.1	0.0	-	0.1	0.1	-	0.0	0.4	-	0.1	-	-	15.7
1993	5.6	2.4	0.4	0.6	0.7	0.2	1.2	2.0	0.7	0.1	0.3	-	-	0.9	0.2	0.7	0.2	0.1	0.6	0.0	0.0	0.0	0.1	-	-	0.7	0.1	0.4	-	-	18.2
1994	2.9	0.9	1.3	1.9	0.3	0.2	3.4	1.7	1.0	0.7	-	-	-	1.2	0.4	0.6	0.5	0.1	0.2	0.1	0.0	0.0	0.8	-	-	0.3	0.0	0.2	-	-	18.6
1995	0.4	0.2	0.4	0.5	0.3	0.0	7.2	1.5	0.1	-	0.1	-	-	0.4	0.2	0.4	0.1	-	-	0.1	-	-	-	-	-	0.5	-	0.1	-	-	12.6
1996	6.2	1.4	0.5	1.5	0.2	0.1	2.3	2.2	0.6	0.1	1.1	-	-	0.4	0.1	0.6	0.3	0.2	0.2	-	0.0	0.0	0.2	-	-	0.7	-	0.2	-	-	19.6
1997	2.7	0.5	0.1	0.8	0.3	0.3	1.2	3.1	1.1	0.1	0.3	-	-	1.0	0.2	0.5	0.2	0.1	0.1	0.1	-	-	0.0	0.0	-	0.4	0.0	0.1	-	-	13.0
1998	0.8	0.5	0.7	0.2	0.1	0.2	0.0	0.4	1.5	0.1	0.2	-	-	0.2	-	0.3	0.3	0.1	0.1	0.0	0.0	-	0.3	-	0.0	0.4	0.1	0.1	-	0.0	6.5
2000	4.6	1.8	0.4	1.0	1.1	0.9	0.8	1.4	0.6	0.3	0.5	-	-	1.2	0.1	1.1	0.4	0.1	1.7	0.2	0.1	-	0.4	-	-	2.8	0.1	0.5	-	-	21.8
2001	3.6	0.6	0.2	0.2	0.2	0.1	0.9	1.2	0.2	0.1	0.4	-	-	0.4	0.4	0.6	0.3	-	0.2	0.1	0.1	-	0.2	0.0	0.1	0.9	-	0.4	-	-	11.1
2003	3.3	0.6	0.1	0.1	0.2	0.1	0.2	0.3	0.4	0.1	0.7	-	-	0.5	0.1	0.1	0.1	-	0.5	0.1	-	-	0.3	0.0	0.1	0.3	0.3	0.0	0.0	0.0	8.4
2004	2.2	0.3	0.9	0.2	0.4	0.3	0.4	3.2	0.9	0.1	0.6	-	-	0.9	0.1	0.5	0.2	0.1	0.4	0.1	0.0	-	0.2	-	0.0	0.3	0.0	0.2	-	-	12.3
2005	1.2	0.1	0.3	0.2	0.3	0.2	1.0	1.0	0.5	0.0	0.2	-	-	0.2	0.1	0.7	0.1	-	0.1	-	-	-	-	-	-	0.2	-	0.1	-	-	8.1
2006	2.4	1.3	0.5	0.1	1.0	0.1	1.4	4.3	0.5	0.6	1.2	-	-	0.4	0.1	1.8	0.4	0.2	0.2	0.2	0.2	-	0.2	0.1	0.0	1.9	0.2	0.1	-	0.5	19.9
2007	0.7	0.2	0.1	-	0.6	0.0	2.3	3.1	0.9	0.1	0.1	-	-	0.4	0.0	0.5	0.0	0.0	0.0	0.1	-	-	0.1	-	-	0.4	0.0	0.0	-	0.0	9.9
2008	0.6	0.2	0.0	0.0	0.2	0.1	0.1	0.5	0.3	0.1	0.1	-	-	0.4	0.0	0.2	-	0.0	0.1	0.1	-	-	0.1	0.0	-	0.2	-	0.0	-	0.0	3.6
2009	1.1	0.5	0.2	0.0	0.3	0.2	0.3	1.4	0.7	0.0	0.3	-	-	0.3	0.0	0.2	0.0	0.0	-	0.0	-	-	0.1	-	0.0	0.2	-	-	-	0.1	6.2
2011	0.3	0.1	0.4	0.0	0.2	0.1	0.3	3.1	0.3	0.4	0.8	-	-	1.4	0.0	0.2	0.0	0.1	0.1	0.0	0.0	-	0.0	-	0.0	0.1	0.0	0.4	-	0.1	8.5
2012	0.3	0.6	0.3	1.0	0.7	0.0	6.6	4.7	0.2	0.1	0.3	-	-	0.3	0.3	0.5	0.1	0.0	0.2	0.1	0.0	0.1	0.0	-	0.1	1.7	-	0.5	0.0	0.5	19.3
2013	1.5	0.4	0.2	0.1	0.2	0.1	1.1	1.7	0.3	0.5	1.3	-	-	1.3	0.1	0.6	0.0	0.0	0.2	-	-	-	0.0	-	0.1	0.7	0.1	0.1	-	0.0	10.7
2014	0.4	0.1	0.1	0.1	0.6	0.0	0.4	1.3	0.1	0.1	0.0	-	-	1.0	0.2	0.2	-	0.0	0.0	-	-	-	0.0	-	0.0	0.3	-	0.2	-	0.0	5.1
2015	0.4	0.2	0.0	0.1	0.3	0.1	0.1	0.4	0.1	-	0.0	-	-	1.7	-	0.1	0.0	-	0.1	0.1	-	-	0.1	-	0.0	0.1	-	0.1	-	0.0	4.2
Mean	2.7	1.3	0.3	3.4	0.3	0.3	1.2	2.7	0.6	0.2	0.4	0.0	-	1.0	0.6	1.5	0.2	0.1	0.2	0.1	0.0	0.1	0.1	0.0	0.0	0.6	0.1	0.6	0.0	0.1	18.8

*Others include: Goldfish, Rainbow Trout, Silver Lamprey, Lake Whitefish, Coho Salmon, and Yellow Bullhead.

Table 6.2.2 Catch per net night by species and year at the St. Luke's site (a hyphen (-) indicates no fish were caught, a zero (0) indicates less than 0.05 fish per net night).

CATCH PER NET NIGHT

YEAR	Freshwater Drum	Walleye	Yellow Perch	Black Crappie	Largemouth Bass	Smallmouth Bass	Bluegill	Pumpkinseed	Rock Bass	White Bass	White Perch	Burbot	Stonecat	Channel Catfish	Brown Bullhead	Common Carp	Shorthead Redhorse Sucker	Golden Redhorse Sucker	Silver Redhorse Sucker	Spotted Sucker	Bigmouth Buffalo	White Sucker	Quillback Carpsucker	Mooneye	Muskellunge	Northern Pike	Gizzard Shad	Bowfin	Longnose Gar	Others*	TOTAL
1974	2.6	2.5	0.1	1.7	-	0.2	-	1.3	1.8	1.5	-	-	0.0	3.2	0.0	0.3	-	-	-	-	-	0.2	0.4	-	0.0	0.4	0.1	-	-	0.3	16.7
1986	22.0	6.4	0.7	0.2	0.0	0.8	-	0.1	1.2	3.5	14.6	-	-	4.5	-	0.7	0.9	0.2	0.8	-	-	0.4	1.3	-	0.0	0.2	-	-	-	-	58.6
1987	6.8	7.9	0.3	0.1	0.0	0.6	-	-	1.1	3.6	11.0	-	-	4.2	-	0.4	0.4	0.2	0.5	-	-	0.3	0.7	0.0	0.1	0.3	-	-	0.0	-	38.4
1988	15.2	5.3	0.0	0.1	0.0	1.4	0.0	0.1	0.8	4.0	7.8	0.0	-	3.7	0.0	0.8	0.7	0.0	0.5	-	-	0.1	0.7	0.1	0.0	1.1	0.0	-	0.1	0.1	42.7
1989	9.8	3.7	-	0.0	0.0	1.0	-	-	0.2	1.3	3.2	0.0	-	5.5	-	0.5	0.2	0.3	0.3	-	0.1	0.0	0.7	-	0.0	0.3	-	-	-	-	27.2
1990	7.9	3.1	0.4	-	0.0	0.6	-	-	0.3	2.0	5.0	0.0	-	8.1	0.0	1.0	1.0	0.3	1.8	-	-	0.3	1.5	-	0.1	0.5	0.0	0.0	-	-	34.0
1991	14.1	1.9	0.2	-	-	2.9	-	0.0	0.6	0.6	2.5	-	-	4.3	-	0.7	0.5	0.1	0.5	-	-	0.1	0.8	0.0	-	0.2	-	-	0.0	0.0	30.0
1992	7.2	1.0	0.3	-	0.0	0.1	0.0	0.1	0.5	0.1	0.9	0.0	-	1.8	0.0	1.5	0.4	-	0.0	-	-	0.1	0.5	-	-	0.1	-	0.0	-	-	14.8
1993	12.4	2.3	0.5	0.3	0.2	0.3	0.6	0.3	1.5	0.3	4.0	0.1	-	0.8	0.4	0.9	0.8	0.0	0.3	0.0	-	0.0	1.2	-	0.0	0.0	0.0	0.0	-	-	26.7
1994	12.0	3.9	0.4	-	0.1	4.1	0.1	0.1	1.1	0.6	1.0	0.1	-	6.3	0.1	0.7	0.7	0.1	0.4	-	0.0	0.1	0.9	-	0.0	0.2	-	0.0	-	0.0	32.7
1995	16.0	1.0	0.4	0.0	0.1	1.1	0.2	0.2	1.2	0.6	1.7	0.0	0.1	1.2	0.0	0.5	0.7	0.2	0.5	-	0.0	0.1	1.0	-	0.0	0.2	0.0	-	0.0	-	26.9
1996	11.7	1.5	0.0	0.2	0.2	0.5	0.1	0.2	1.3	0.7	3.2	0.0	-	3.8	0.0	1.4	0.4	0.4	0.3	-	0.0	0.0	1.8	-	0.1	0.1	0.0	0.0	0.1	-	28.1
1997	7.1	1.4	0.3	0.1	0.2	0.9	0.0	0.5	3.4	0.6	1.0	0.0	-	5.4	-	0.5	0.2	0.6	0.7	-	0.0	-	2.1	-	0.1	0.2	-	-	0.1	0.1	25.4
1998	5.8	0.4	0.7	-	-	0.3	-	0.3	1.6	0.1	1.6	0.0	-	2.3	-	0.1	0.1	0.2	0.1	-	-	0.1	0.3	-	0.0	0.1	-	-	0.0	-	14.3
2000	11.6	1.3	0.4	-	0.0	1.0	0.0	0.0	0.1	0.5	2.6	-	-	4.6	0.0	0.6	0.4	0.0	1.1	-	-	0.2	0.8	-	-	0.2	0.0	0.1	-	0.0	25.4
2001	8.9	0.7	0.1	-	0.0	0.3	-	0.0	0.2	0.7	1.8	-	-	4.6	-	0.4	0.4	-	0.4	-	-	-	0.5	-	0.1	0.1	0.0	-	-	0.0	19.1
2003	6.9	0.7	-	-	0.0	0.5	-	-	0.1	1.0	1.9	-	-	8.8	0.0	0.4	0.1	0.0	0.4	-	-	-	2.9	-	0.1	0.1	0.0	-	0.0	0.0	24.0
2004	5.5	0.3	0.1	0.1	0.1	0.2	-	0.2	0.8	0.5	5.6	-	-	1.8	0.0	0.4	0.3	0.1	0.4	-	0.1	0.1	0.4	-	-	0.0	-	0.0	0.1	0.0	17.0
2005	4.2	0.2	0.1	0.0	0.0	0.1	-	0.0	0.2	0.5	3.3	-	-	1.0	0.0	0.6	0.1	0.1	0.2	-	0.2	-	2.1	-	0.1	-	-	-	0.2	0.0	13.3
2006	10.6	1.1	1.1	-	0.0	0.3	0.1	0.1	1.1	0.5	3.9	-	-	2.3	-	0.9	0.5	0.1	0.0	-	-	-	2.7	-	0.0	-	-	-	0.1	0.2	25.7
2007	5.9	0.1	0.1	-	0.1	0.3	0.2	0.1	0.3	0.3	2.7	-	-	1.6	0.0	0.5	0.1	0.0	0.1	-	0.0	-	2.2	-	0.0	0.1	-	-	0.1	0.1	15.0
2008	4.0	0.6	0.1	-	0.0	0.1	0.0	-	0.5	0.5	1.8	-	-	2.2	-	0.4	0.0	0.0	0.3	-	0.0	-	1.7	-	0.0	0.1	0.0	-	0.1	0.0	12.8
2009	7.7	0.9	0.0	-	0.0	0.2	0.0	0.0	0.2	0.8	3.5	-	-	2.8	0.0	1.0	0.1	0.4	0.2	-	-	-	3.1	-	-	0.0	-	-	0.1	0.1	21.4
2011	7.6	0.9	0.1	-	0.1	0.4	-	0.1	0.3	1.7	4.3	-	-	2.6	0.0	0.3	0.0	0.2	0.2	-	0.0	-	1.8	0.0	-	-	0.1	-	0.1	0.0	20.9
2012	4.1	0.3	0.2	-	0.0	0.3	0.1	0.0	0.1	0.7	2.7	-	-	3.9	0.0	0.1	0.0	0.0	0.0	-	-	-	0.4	-	0.0	0.0	0.0	0.0	0.0	-	13.3
2013	7.0	0.6	0.1	-	0.1	0.9	0.0	0.1	0.2	0.5	3.2	-	-	2.6	0.0	0.3	0.1	-	0.0	-	-	-	0.9	-	0.1	0.3	-	-	0.1	0.0	17.2
2014	4.2	0.2	0.1	-	0.0	0.3	-	0.0	0.2	0.5	0.2	-	-	1.4	-	0.1	0.0	0.0	0.0	-	-	-	1.5	-	-	0.1	-	0.0	0.1	0.0	9.1
2015	2.0	0.2	0.3	-	0.0	0.5	-	-	0.4	0.1	0.7	-	-	1.7	-	0.1	0.0	-	0.0	-	0.0	-	0.3	-	-	0.1	-	-	0.1	-	6.6
Mean	8.6	1.8	0.3	0.2	0.1	0.7	0.1	0.2	0.8	1.0	3.5	0.0	0.0	3.5	0.1	0.6	0.3	0.2	0.4	0.0	0.0	0.1	1.3	0.0	0.0	0.2	0.0	0.0	0.1	0.1	23.5

*Others include: Lake Whitefish, Longnose Sucker, Rainbow Trout, Silver Lamprey, Flathead Catfish, Goldeye, Yellow Bullhead, and Alewife

Table 6.2.3 Catch per net night by species and year at the Tremblay Creek site (a hyphen (-) indicates no fish were caught, a zero (0) indicates less than 0.05 fish per net night).

CATCH PER NET NIGHT

YEAR	Freshwater Drum	Walleye	Yellow Perch	Black Crappie	Largemouth Bass	Smallmouth Bass	Bluegill	Pumpkinseed	Rock Bass	White Bass	White Perch	Burbot	Stonecat	Channel Catfish	Brown Bullhead	Common Carp	Shorthead Redhorse Sucker	Golden Redhorse Sucker	Silver Redhorse Sucker	Spotted Sucker	Bigmouth Buffalo	White Sucker	Quillback Carpsucker	Mooneye	Muskellunge	Northern Pike	Gizzard Shad	Bowfin	Longnose Gar	Others*	TOTAL
1974	12.9	6.3	1.4	0.0	-	0.4	-	0.0	2.8	1.6	-	-	0.9	2.6	-	0.1	-	-	-	-	-	0.7	0.2	0.1	-	0.0	-	-	-	1.2	31.3
1975	2.9	2.1	0.1	-	-	0.2	-	-	1.3	0.5	-	-	-	2.9	-	0.1	-	-	-	-	-	0.1	0.2	0.0	-	-	0.1	-	-	0.2	10.8
1976	6.8	3.8	0.2	-	-	0.2	-	-	0.9	0.8	-	-	0.1	0.8	-	0.4	0.5	-	0.2	-	-	0.1	0.1	0.1	0.1	-	0.1	-	-	0.1	15.0
1977	39.1	7.1	1.0	-	-	0.6	-	-	2.8	8.2	0.0	-	0.1	22.9	-	0.7	1.1	0.3	0.4	-	0.0	0.8	1.6	0.1	0.1	0.0	0.4	-	-	0.1	87.3
1978	16.3	9.5	1.8	0.0	0.0	0.8	0.0	0.0	2.7	3.1	0.0	0.0	0.1	4.5	0.0	0.2	0.9	0.3	0.0	0.0	0.0	0.6	0.4	0.0	0.0	0.0	0.1	0.0	0.0	0.1	41.3
1979	11.3	12.8	0.1	0.0	-	0.4	-	-	0.8	2.9	-	-	0.0	4.3	-	0.9	1.7	0.3	0.1	-	0.0	0.7	0.9	0.1	-	0.0	0.1	-	-	0.0	37.5
1980	30.2	13.2	0.5	0.1	-	0.2	-	-	1.2	2.2	0.1	-	0.0	1.7	-	0.8	1.0	0.2	0.4	-	-	0.6	1.5	0.0	0.1	-	0.1	0.0	-	-	54.1
1981	26.9	7.8	3.2	0.0	-	0.2	-	-	3.5	4.2	1.6	0.0	0.2	2.6	0.0	0.4	1.0	0.2	0.1	-	-	1.2	0.5	-	-	0.0	-	-	-	-	53.7
1982	3.0	9.1	1.4	0.1	-	0.2	-	-	3.1	1.5	2.5	-	-	1.3	-	0.3	0.9	0.1	0.1	-	-	0.6	0.1	-	-	-	0.1	-	0.0	-	24.3
1983	8.5	13.4	0.1	0.1	-	0.1	-	-	2.3	3.4	7.9	0.0	0.1	0.9	-	0.3	1.0	0.2	0.3	-	0.0	0.9	1.1	-	0.0	0.1	1.9	-	-	0.1	42.3
1984	3.2	4.4	1.6	0.0	-	0.3	-	-	2.6	0.9	9.0	0.0	0.1	2.4	-	0.1	0.2	0.1	0.2	-	-	0.6	0.2	0.0	0.0	0.0	0.5	-	-	-	26.5
1985	33.2	15.6	1.0	-	-	0.4	0.0	-	1.2	2.2	10.6	0.1	-	1.9	0.0	0.5	0.4	0.1	0.6	-	-	1.1	1.0	0.0	0.0	0.0	0.2	-	-	0.1	70.3
1986	13.6	13.4	0.5	0.1	-	0.1	-	-	1.3	2.2	22.1	0.2	0.1	3.8	-	1.0	0.5	0.1	0.4	-	-	0.7	1.1	-	0.1	0.1	-	-	-	0.1	61.4
1987	7.2	13.5	0.6	0.0	-	0.1	-	-	1.3	2.7	19.5	0.1	0.1	1.3	0.0	0.4	0.8	0.1	0.2	-	-	0.5	0.4	0.0	-	0.1	0.0	-	-	-	48.7
1988	2.3	6.7	0.2	-	0.0	0.9	-	-	1.5	0.9	8.0	0.1	0.0	1.3	-	0.3	1.1	0.2	0.2	-	-	0.4	0.5	0.0	0.0	0.1	-	-	0.1	0.0	24.9
1989	3.0	2.4	0.2	-	0.0	1.6	-	-	1.1	0.3	3.2	0.1	-	2.8	-	0.1	0.3	0.0	-	-	-	0.1	0.3	0.0	0.0	-	0.1	-	-	-	16.0
1990	3.2	5.8	0.2	-	-	0.9	-	0.0	0.9	0.6	8.2	-	-	2.3	-	0.8	0.7	0.2	1.2	-	0.0	0.2	1.1	0.1	0.1	0.0	0.1	-	-	-	26.7
1991	2.1	3.4	0.1	0.0	0.0	0.5	0.0	0.0	0.1	0.1	4.5	0.0	0.0	2.9	0.0	0.4	0.4	0.3	0.8	0.0	0.0	0.1	0.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0	16.5
1992	2.6	1.8	0.1	-	-	0.3	-	-	0.1	0.4	1.6	-	0.0	2.5	-	0.6	0.6	0.0	0.9	-	-	0.0	0.6	0.1	0.1	-	0.0	-	-	0.0	12.3
1993	2.8	3.2	0.2	0.0	-	0.4	-	0.0	1.1	0.3	2.4	-	-	1.8	0.1	0.4	0.6	0.1	1.0	-	-	0.1	0.2	0.1	0.0	0.0	0.1	-	-	-	14.9
1994	3.0	2.0	0.1	-	0.1	0.7	0.0	-	1.2	0.0	0.7	-	-	2.6	-	0.2	0.6	0.1	0.9	-	-	0.0	0.2	-	0.1	0.0	-	0.0	-	-	12.5
1995	1.5	0.5	0.4	-	0.1	0.1	0.0	0.2	0.2	0.0	0.2	0.0	-	1.3	0.0	0.5	0.5	0.0	0.3	-	0.0	-	-	-	-	0.1	-	0.0	-	-	6.1
1996	8.7	3.2	0.6	0.0	0.0	0.9	-	0.0	1.4	0.4	4.3	-	-	5.0	0.1	0.7	0.5	0.2	0.2	-	0.0	0.0	0.1	-	0.0	0.2	0.0	-	-	-	26.7
1997	3.1	1.5	0.1	0.0	0.0	1.6	-	0.0	5.3	0.1	2.9	-	-	3.2	0.1	0.1	0.3	0.1	0.1	-	0.0	0.0	0.2	0.0	0.1	-	-	-	-	-	18.8
1998	2.2	0.8	0.2	-	-	1.8	-	-	1.1	0.1	0.7	0.1	-	3.8	-	0.0	0.3	-	0.0	-	-	0.1	0.1	-	0.0	0.1	0.4	-	-	0.1	11.8
2000	2.7	2.0	0.0	-	0.0	1.4	-	-	0.3	1.5	4.1	0.1	-	4.2	-	0.2	0.8	0.0	0.0	-	-	-	0.2	0.0	0.1	0.6	0.9	-	-	0.0	18.8
2001	2.1	1.3	0.9	-	-	1.7	-	-	0.6	0.4	5.4	-	-	6.1	-	0.3	0.4	-	-	-	-	0.0	0.5	-	0.1	0.2	-	-	-	-	19.8
2003	2.9	1.0	0.2	-	0.0	1.6	-	-	1.0	0.5	6.8	-	-	7.3	-	0.0	0.3	-	0.1	-	-	0.0	0.2	0.0	0.1	0.2	0.1	-	-	0.3	22.4
2004	1.2	0.7	0.1	-	0.1	0.6	-	0.0	0.9	0.2	2.9	-	-	3.2	-	0.1	0.3	0.1	0.1	-	0.0	-	0.2	-	0.1	0.1	0.1	-	0.0	0.1	11.0
2005	1.3	1.4	0.4	-	-	1.3	-	-	1.0	0.2	2.5	-	-	3.2	-	0.2	0.2	-	-	-	0.0	-	0.2	-	0.1	0.1	0.0	-	-	-	12.0
2006	9.9	3.7	0.5	-	0.1	0.9	-	0.0	0.3	0.7	3.8	-	-	11.3	-	0.8	0.4	0.1	0.3	-	0.0	-	2.2	0.0	0.2	0.1	0.4	-	-	0.2	36.1
2007	5.1	0.5	0.5	-	-	0.6	-	-	0.5	0.1	1.7	-	-	3.6	-	0.1	0.3	0.1	-	-	0.0	-	0.1	0.0	0.1	0.1	0.5	-	0.0	0.1	14.0
2008	4.0	0.5	0.7	-	-	0.9	-	-	0.8	0.6	2.7	-	-	3.7	-	0.1	0.3	0.1	0.0	-	0.1	-	0.2	-	0.1	0.1	0.1	-	-	0.0	15.1
2009	2.9	0.7	1.0	-	-	0.7	-	0.0	0.5	0.4	1.7	-	-	6.7	0.0	0.0	0.1	0.1	-	-	-	-	0.2	-	0.0	0.1	0.0	-	-	0.1	15.4
2011	4.1	1.1	0.4	0.0	-	0.5	0.0	0.1	0.4	1.9	4.5	-	-	4.1	-	0.2	0.3	0.2	0.2	-	-	-	1.2	0.0	0.2	0.0	0.1	-	-	0.0	19.6
2012	2.3	0.9	-	-	0.0	0.4	-	-	0.4	0.6	1.4	-	-	4.7	-	0.0	0.2	0.3	0.7	-	0.0	-	0.9	-	0.4	0.2	0.2	-	0.0	0.1	13.8
2013	1.4	0.4	0.1	-	0.0	0.4	-	-	0.1	1.5	4.3	-	-	2.3	-	0.1	0.0	0.1	0.4	-	0.0	-	0.9	-	0.1	0.2	0.3	0.0	0.1	0.0	12.6
2014	6.1	1.0	0.2	-	0.0	0.3	0.0	-	0.1	1.6	0.4	-	-	5.3	-	0.1	0.1	0.1	1.4	-	-	-	1.4	-	0.1	0.1	-	-	0.0	0.0	18.4
2015	2.5	0.2	0.0	-	-	0.4	-	-	0.1	0.2	0.8	-	-	3.5	-	0.1	0.1	-	0.2	-	-	-	0.1	-	0.1	0.0	-	-	0.1	-	8.4
Mean	7.6	4.6	0.6	0.0	0.0	0.6	0.0	0.0	1.3	1.3	4.4	0.1	0.1	3.9	0.0	0.3	0.5	0.1	0.4	-	0.0	0.4	0.6	0.1	0.1	0.1	0.2	0.0	0.0	0.1	26.4

*Others include: Goldfish, Sauger, Lake Sturgeon, Rainbow Trout, Silver Lamprey, Lake Whitefish, Alewife, and Flathead Catfish.

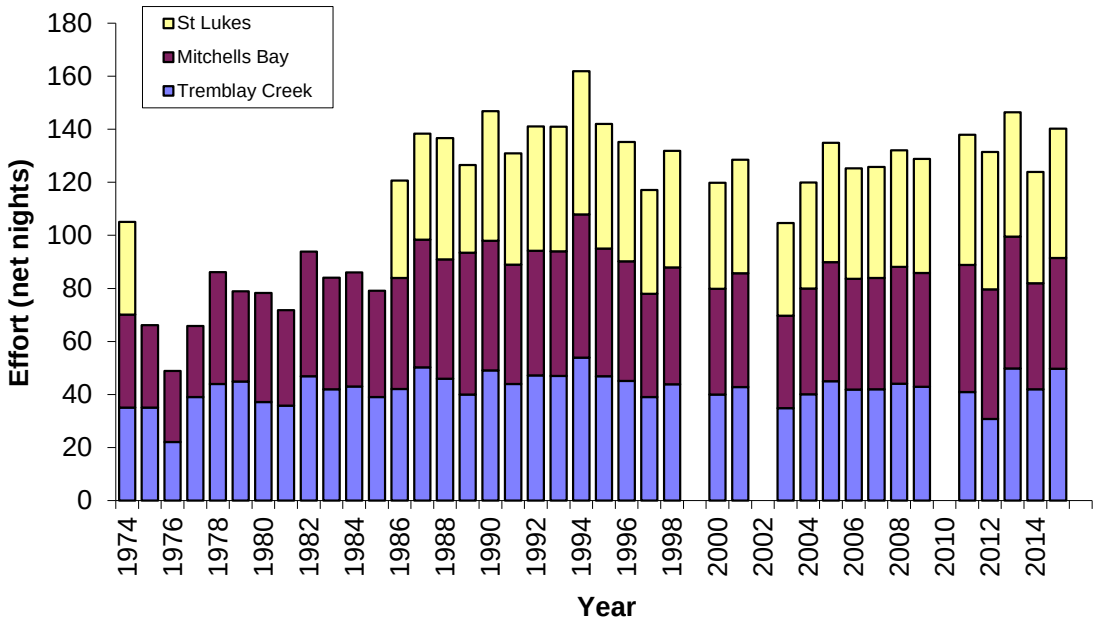


Figure 6.2.2 Total effort for the Lake St. Clair Fall Trap Net Index by site, 1974 to 2015 (St. Lukes was not fished from 1975 to 1985).

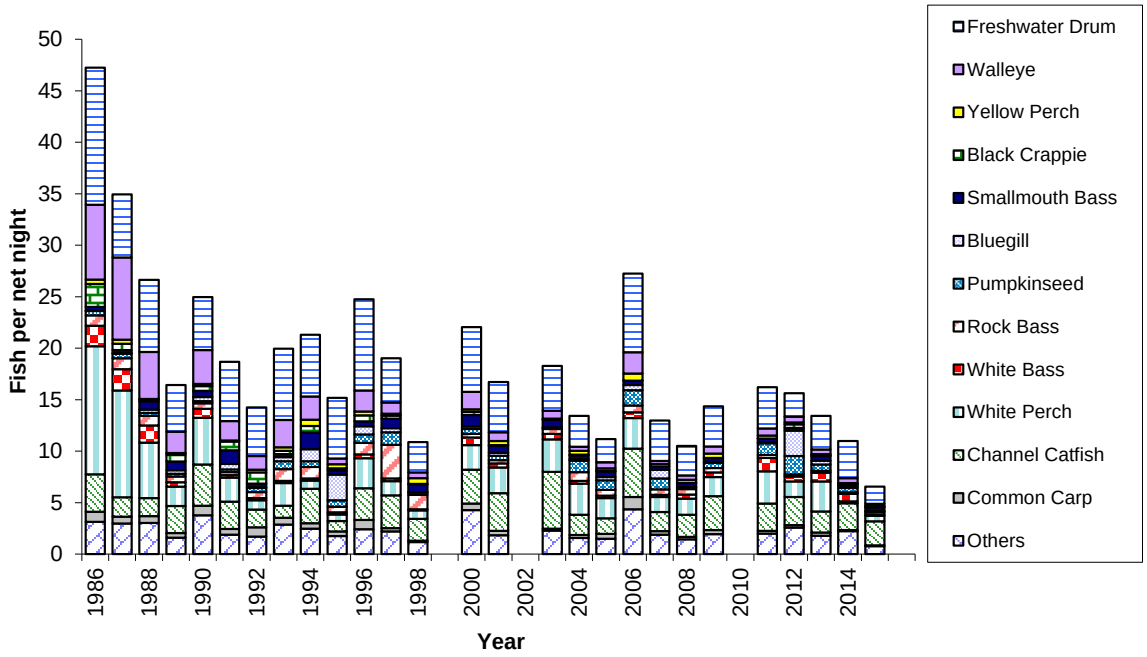


Figure 6.2.3 Catch per net night by species for all sites combined (Mitchell's Bay, St. Lukes, Tremblay Creek), 1986 to 2015.

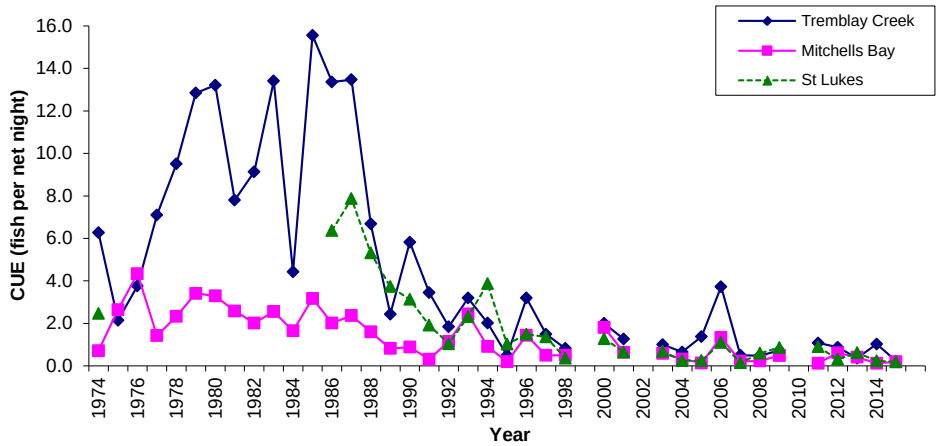


Figure 6.2.4 Catch per net night of Walleye at Tremblay Creek, Mitchell's Bay and St. Lukes sites, 1974 to 2015.

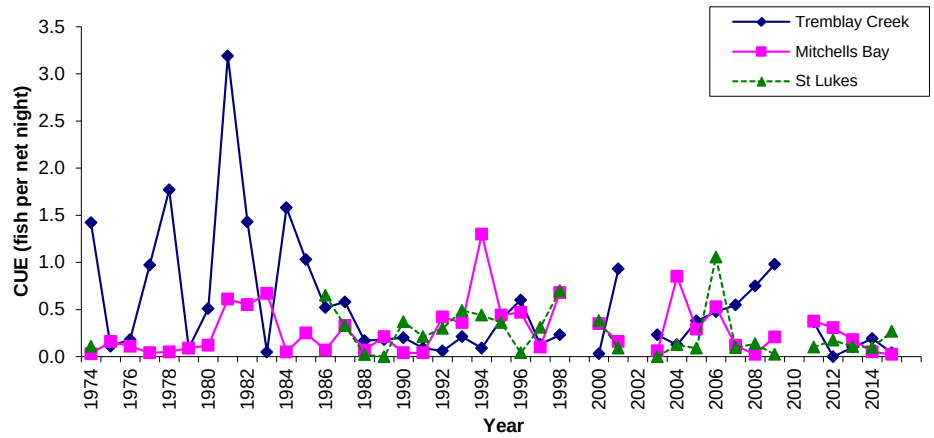


Figure 6.2.5 Catch per net night of Yellow Perch at Tremblay Creek, Mitchell's Bay and St. Lukes sites, 1974 to 2015.

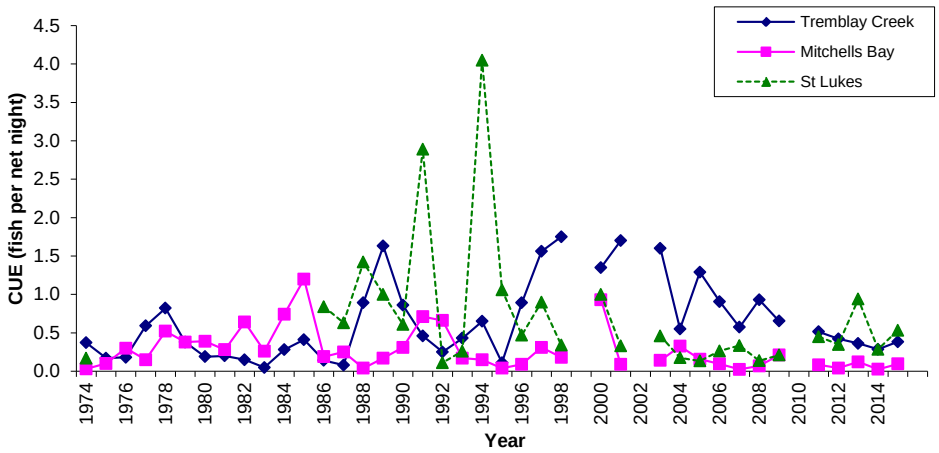


Figure 6.2.6 Catch per net night of Smallmouth Bass at Tremblay Creek, Mitchell's Bay and St. Lukes sites, 1974 to 2015.

6.3 Lake St. Clair Nearshore Index Fishing Program

Lake St. Clair is home to diverse populations of warm-water fish species. It provides critical spawning and nursery habitat for economically important species and some species at risk. The Lake St. Clair nearshore index program originated when the Ontario Ministry of Natural Resources' Wheatley Fisheries Research Station conducted a juvenile fish study to generate young-of-year (YOY) index data from 1970–1977. In 1979, a YOY index fishing program that targeted Walleye and Yellow Perch was instituted by the Lake St. Clair Fisheries Assessment Unit (LSCFAU). This program complimented the time series data started by the Wheatley Fisheries Research Station. From 1979 to 1996 the program was carried out intermittently due to resource constraints with the program ceasing altogether in 1996. In 2005 the program was restarted as a pilot project and became an annual assessment activity in 2007. Although the program was originally designed to assess annual abundances of YOY other contemporary objectives include assessing and tracking changes in the nearshore fish community with emphasis on forage fish species. In addition to tracking long-term trends in abundances, compositions and biodiversity, additional benefits of this program include detection of aquatic invasive species (AIS) and monitoring species at risk.

The Lake St. Clair Nearshore Index sampled eight fixed sites along the Canadian shores from June 1 to July 31, 2015 (Figure 6.3.1). At each site, duplicate 30 m transects were performed using a small mesh (5 mm x 2 mm) beach seine that is 9.7 m x 1.2 m in dimension. This seine net is believed to retain all fish with fork lengths greater than 27 mm (MacLennan 1979). Catch per unit effort (CUE), species-richness, Shannon-Wiener index and Simpsons diversity index were calculated from this sampling. The Shannon-Wiener index is sensitive to changes in rare species while Simpson's index is more greatly influenced by abundant species, hence each represents a different metric of species diversity. Calculations were performed to produce daily, weekly and yearly summaries by site and annual totals for all sites. Lengths were measured for up to 30 individuals from each transect. While site-date, site-week, site-year and year summaries have been generated and are available, in this report site-specific summaries are provided for environmental data, catch rates and species diversity; a 2015 species list with catch rates of YOY and adult fish and; eight year (2007-2015) trends in temperature, species richness and catch rates for a few key species are presented.

In 2015, 124 seine transects were performed over the sampling period. The depth of seines transects ranged from 0.3 m to 1.3 m with an average of 0.9 m. Secchi disk transparency depths ranged from 0.1 m to 1.3 m and averaged 0.7 m across the seine transect sites; site visibility was to the bottom for 67 (54%) seine transects. Ambient air temperatures averaged 22.8 °C which was slightly lower than the eight year average (24.6 °C). Average water temperature of Lake St. Clair (23.2 °C) was also slightly below the eight year average (23.8 ºC) (Figure 6.3.2).

The 2015 survey captured a total of 19,037 fish representing at least 43 species from 15 families there were some fish of unknown species and/or identified to family (Table 6.3.1). Species richness based on Simpson Diversity index and Shannon-Wiener index rose slightly in 2015 to 0.86 and 3.5 (respectively) from 2014 (0.80 and 3.1) and were above the 2007-2015 average (0.84 and 3.3) (Figure 6.3.3). Species richness at individual sites ranged from a minimum of 11 (Mitchell's Bay offshore) to 27 species (Peter Street) (Table 6.3.2). Average lakewide CUE was 154 fish/seine, less than half of the 2014 catch rate of 328 fish/seine and lower than the 2007-2015 average 185 fish/seine.

Of the total lakewide catch, 83% (15,860 fish) were young-of-year fishes. Cyprinids (34%), Clupeidae (herring including Gizzard Shad) (31%), Logperch (10%) and Brook Silversides (8%) were the predominant species caught throughout the sampling period. Catch of sport fish generally declined. Forty-nine, YOY Yellow Perch were caught which was approximately 1/4 of 2014 captures. One adult but no YOY Walleye were caught. One YOY and 2 adult Muskellunge were caught, a species that has been caught sporadically and in relatively small numbers throughout the history of this survey (Figure 6.3.4). Historically, this program has not captured high numbers of YOY Yellow Perch, Walleye, or Muskellunge even in years of known strong year classes. A total of 573 YOY Smallmouth Bass were caught, which was approximately 9x more than 2014 and represented approximately 3% of the total catch. Smallmouth Bass catch was above the 2007-2015 average (328) whereas 144 YOY and 11 adult Largemouth Bass caught in 2015 was <1% of total catch, 1/8

of the 2014 catch and, below the 2007-2015 average (1,069). Four invasive species were captured; Common Carp (< 0.1%), White Perch (1.5%), Round Gobies (1%) and Tubenose Gobies (1.5%), all of which have previously been reported in Lake St. Clair. One species at risk, Pugnose Shiner (*Notropis anogenus*) was captured during 2015 with eight individuals captured at the St. Lukes site. Between 2007-2015, Pugnose Shiners have been caught consistently in the Lake St. Clair nearshore index, but in few numbers ranging from 0-15 fish per year. All captures since 2012 have been at the St. Lukes site. In 2015, one species of special concern was captured, a single Grass Pickerel (*Esox americanus vermiculatus*) at the St.Lukes site.

In the past, the irregular sampling of the Lake St. Clair Nearshore Index has prevented reporting on time-series trends of the nearshore fish community dynamics. This report summarizes the contemporary program from 2007-2015. The temporal inconsistency of the survey with limited (9 yrs.) continuous (annual) data remains a limitation of testing/examining relationships between nearshore YOY abundances and recruitment of recreationally and commercially important fish species. Continued annual sampling might help address this information gap by providing a predictive model of year class strength for Lake St. Clair. However the current value of this program is the ability to monitor changes in this ecosystem in response to climatic conditions such as climate change, and changes caused by invasions of new AISs (such as the potential threat of Asian Carps).

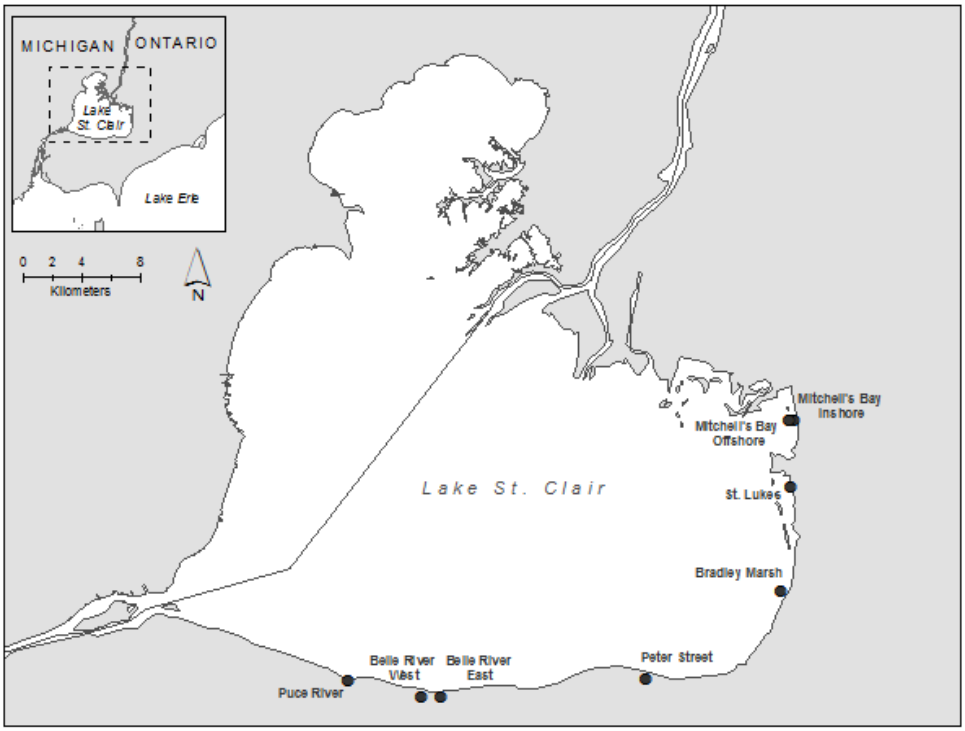


Figure 6.3.1 Location of eight fixed sites on Lake St. Clair of the Lake St. Clair Nearshore Index Fishing Program.

Table 6.3.1 Summary of catch by species for the Lake St.Clair Nearshore Index Fishing Program, 2015.

Common Name	Scientific Name	Total			CUE	Relative
		YOY	Adult	All	(fish/seine)	Adundance
Longnose Gar	*Lepisosteus osseus*		6	6	0.05	0.03%
Herrings[1]	*CLUPEIDAE spp.*	1,516		1,516	12.23	7.96%
Gizzard Shad	*Dorosoma cepedianum*	4,359		4,359	35.15	22.90%
Muskellunge	*Esox masquinongy*	1	2	3	0.02	0.02%
Grass Pickerel	*Esox americanus vermiculatus*	1		1	0.01	0.01%
Suckers[1]	*CATOSTOMIDAE spp.*	351	3	354	2.85	1.86%
Quillback	*Carpiodes cyprinus*	9	1	10	0.08	0.05%
White Sucker	*Catostomus commersoni*	10		10	0.08	0.05%
Shorthead Redhorse	*Moxostoma macrolepidotum*		37	37	0.30	0.19%
Carps and Minnows[1]	*CYPRINIDAE spp.*	4,515	1	4,516	36.42	23.72%
Common Carp	*Cyprinus carpio*	14	2	16	0.13	0.08%
Golden Shiner	*Notemigonus crysoleucas*	1	15	16	0.13	0.08%
Pugnose Shiner	*Notropis anogenus*		8	8	0.06	0.04%
Emerald Shiner	*Notropis atherinoides*	85	284	369	2.98	1.94%
Blackchin Shiner	*Notropis heterodon*		2	2	0.02	0.01%
Blacknose Shiner	*Notropis heterolepis*		431	431	3.48	2.26%
Spottail Shiner	*Notropis hudsonius*	394	241	635	5.12	3.34%
Spotfin Shiner	*Cyprinella spiloptera*	1	51	52	0.42	0.27%
Sand Shiner	*Notropis stramineus*		253	253	2.04	1.33%
Mimic Shiner	*Notropis volucellus*	3	62	65	0.52	0.34%
Bluntnose Minnow	*Pimephales notatus*	92	30	122	0.98	0.64%
Fathead Minnow	*Pimephales promelas*		4	4	0.03	0.02%
Bullhead Catfishes[1]	*ICTALURIDAE spp.*	1		1	0.01	0.01%
Yellow Bullhead	*Ameiurus natalis*		1	1	0.01	0.01%
Brown Bullhead	*Ameiurus nebulosus*	1	3	4	0.03	0.02%
Channel Catfish	*Ictalurus punctatus*		9	9	0.07	0.05%
Tadpole Madtom	*Noturus gyrinus*		2	2	0.02	0.01%
Flathead Catfish	*Pylodictis olivaris*		2	2	0.02	0.01%
Banded Killifish	*Fundulus diaphanus*		31	31	0.25	0.16%
Brook Stickleback	*Culaea inconstans*		1	1	0.01	0.01%
Trout-perch	*Percopsis omiscomaycus*		6	6	0.05	0.03%
Temperate Basses[1]	*MORONIDAE spp.*	575		575	4.64	3.02%
White Perch	*Morone americana*	93	188	281	2.27	1.48%
White Bass	*Morone chrysops*	121	14	135	1.09	0.71%
Sunfishes[1]	*CENTRARCHIDAE*	10		10	0.08	0.05%
Rock Bass	*Ambloplites rupestris*	6	22	28	0.23	0.15%
Pumpkinseed	*Lepomis gibbosus*		51	51	0.41	0.27%
Bluegill	*Lepomis macrochirus*	12	17	29	0.23	0.15%
Smallmouth Bass	*Micropterus dolomieu*	573		573	4.62	3.01%
Largemouth Bass	*Micropterus salmoides*	144	11	155	1.25	0.81%
White Crappie	*Pomoxis annularis*	7	3	10	0.08	0.05%
Black Crappie	*Pomoxis nigromaculatus*		4	4	0.03	0.02%
Perches[1]	*PERCIDAE spp.*	21		21	0.17	0.11%
Yellow Perch	*Perca flavescens*	49	388	437	3.52	2.30%
Walleye	*Sander vitreus*		1	1	0.01	0.01%
Logperch	*Percina caprodes*	1,829	53	1,882	15.18	9.89%
Brook Silverside	*Labidesthes sicculus*	829	676	1,505	12.14	7.91%
Round Goby	*Neogobius melanostomus*	98	75	173	1.40	0.91%
Tubenose Goby	*Proterorhinus marmoratus*	138	182	320	2.58	1.68%
Freshwater Drum	*Aplodinotus grunniens*		4	4	0.03	0.02%
Unknown	N/A	1		1	0.01	0.01%
Total		**15,860**	**3,177**	**19,037**	**153.52**	**100%**

[1]Counts of fish identified to family, species level identified was not done .

Table 6.3.2 Summary of environmental conditions, effort and catch, and species diversity by site for the Lake St.Clair Nearshore Index, 2015. Environmental data presented as average and range; range specified in table. Species richness is presented as total which included all fish identified to species or family and the number of individually identified species in brackets (i.e. minimum number of species present).

Site	Environmental				Effort and Catch				
	Site temp (°C) 95% C.I.	Air temp (°C) 95% C.I.	Site depth (m) min-max	Secchi depths (m) min-max	No. of Seines	No. fish caught	Species Richness (no. of species)	Simpsons Diversity Index (1-D)	Shannon-Wiener Index (H)
Puce River	**23.0** 20.8 - 25.2	**23.4** 18.6 - 28.3	**1.0** 0.75 - 1.2	**0.4** 0.1 - 1.2	**12**	**4,803**	**21 (18)**	**0.3**	**1.1**
Bell River West	**22.8** 20.7 - 24.8	**21.5** 16.3 - 26.7	**0.6** 0.3 - 0.8	**0.5** 0.1 - 0.8	**14**	**838**	**30 (26)**	**0.9**	**3.7**
Bell River East	**22.7** 20.8 - 24.6	**26.1** 24.2 - 28.0	**1.0** 0.75 - 1.1	**0.4** 0.1 - 1	**16**	**1,380**	**29 (25)**	**0.9**	**3.4**
Peter Street	**22.8** 20.9 - 24.8	**23.4** 20.0 - 26.7	**0.9** 0.5 - 1	**0.4** 0.1 - 0.9	**16**	**2,834**	**34 (27)**	**0.7**	**2.7**
Bradley Marsh	**23.4** 21.3 - 25.6	**20.4** 16.1 - 24.7	**0.9** 0.5 - 1.1	**0.6** 0.2 - 1	**16**	**3,881**	**24 (19)**	**0.6**	**2.0**
St. Lukes	**23.9** 21.6 - 26.1	**18.8** 13.5 - 24.1	**0.9** 0.75 - 1	**0.9** 0.75 - 1	**14**	**2,074**	**25 (22)**	**0.8**	**2.9**
Mitchell's Bay Inshore	**23.7** 22.2 - 25.3	**24.7** 22.5 - 26.8	**0.8** 0.5 - 1	**0.8** 0.5 - 1	**18**	**2,246**	**15 (13)**	**0.7**	**2.2**
Mitchell's Bay Offshore	**23.4** 21.8 - 25.0	**24.6** 22.9 - 26.4	**1.0** 0.75 - 1.3	**1.0** 0.75 - 1.3	**18**	**981**	**12 (11)**	**0.8**	**2.4**
Lakewide	**23.2** 22.6 - 23.9	**22.8** 21.5 - 24.1	**0.9** 0.3 - 1.3	**0.7** 0.1 - 1.3	**124**	**19,037**	**51 (43)**	**0.9**	**3.5**

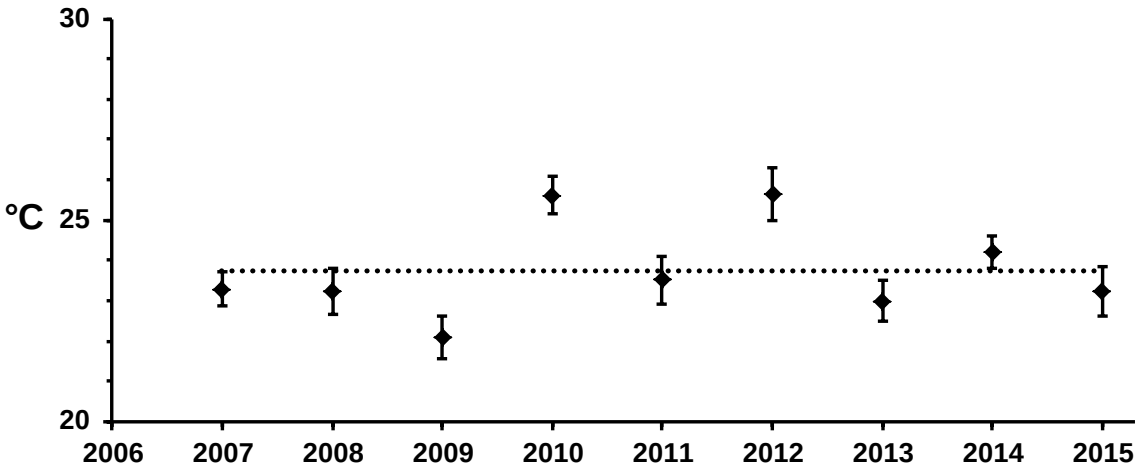


Figure 6.3.2 Average temperatures in the Lake St. Clair nearshore from 2007-2015. Error bars represent 95% C.I.; dotted line is the long term 2007-2015 average 23.8 °C with the solid line and equation representing the long term trend.

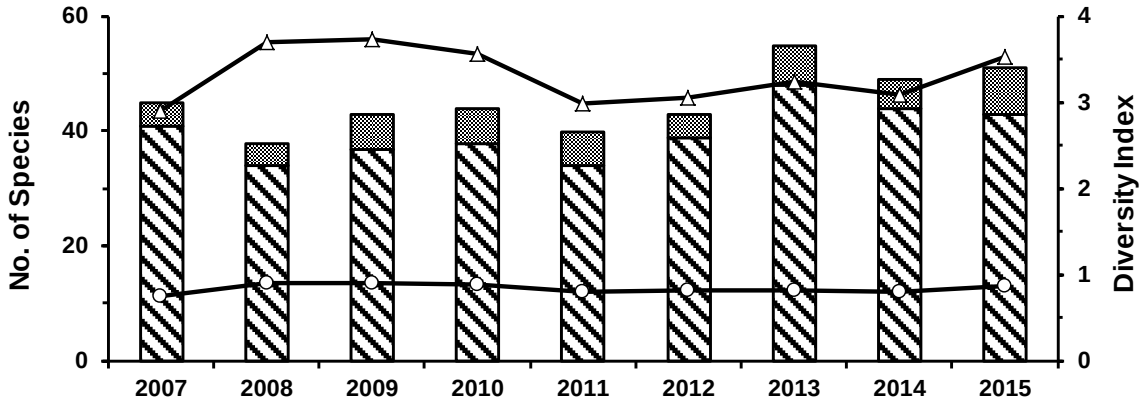


Figure 6.3.3 Species diversity in the Lake St. Clair nearshore from 2007-2015. Bars represent total number of species observed (species abundance); bottom portion represents actual number of species identified (i.e. minimum number of species), top portion is identified to functional/family groups. Circles represent Simpson's diversity index (1-D) and triangles represent the Shannon-Wiener Index (H).

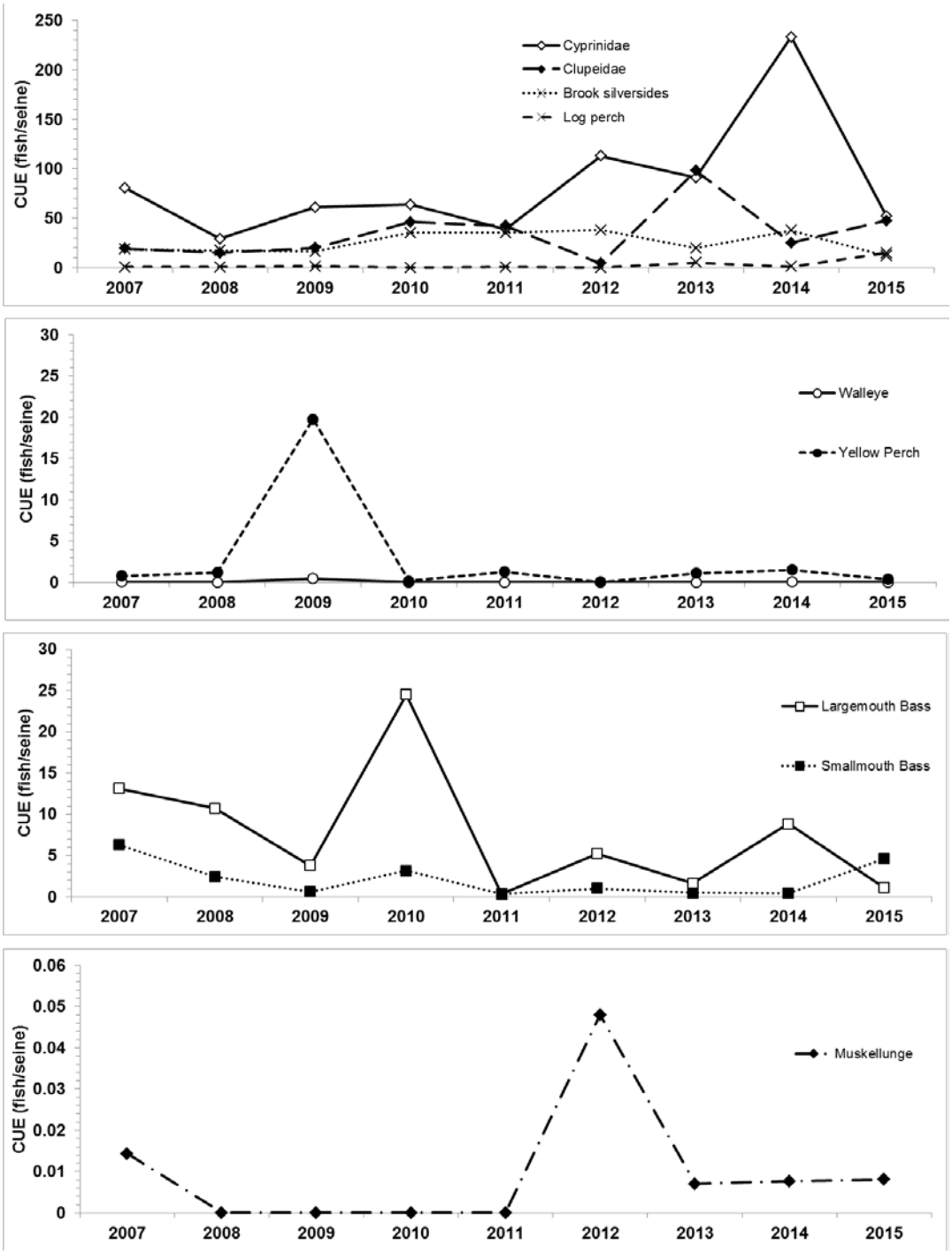


Figure 6.3.4 Catch rates (CUE) of forage fish (top graph) and young-of-the-year (YOY) sport fish in the Lake St. Clair nearshore from 2007 to 2015. Note scale differences in catch rates.

6.4 Walleye Tagging in Lake St. Clair Tributaries

The Thames River extends from its mouth at Lake St. Clair upstream unimpeded to London beyond which three branches occur. This large 5,825 square km watershed drains agricultural and urban lands while providing habitat to a diversity of fish and wildlife. To its north, the Sydenham River is a smaller tributary of the St. Clair system which extends from the mouth at the Chanel Ecarte upstream over 100 km. Walleye which spawn in these rivers provide angling opportunities not only in the Thames and Sydenham Rivers but also in Lake St. Clair, the St. Clair River and to some degree in Lakes Huron, Erie and the Detroit River.

In 2013, a Walleye tagging study assessed the status and characteristics of the Sydenham River Walleye population. Walleye tagging continued in 2014 and 2015 on the Thames River, once considered highly productive for Walleye compared to recent decades. Movement, abundance, exploitation, survival, and biological characteristics may be described using tagging and recapture data. Sydenham River Walleye tagging methodology was described in the Ontario Ministry of Natural Resources and Forestry, Lake Erie Management Unit 2013 Status of Major Stocks. Results from tagging Walleye on the Thames (2014, 2015) and Sydenham (2013) Rivers are reported here.

Walleye were collected from April 1 to May 1, 2015 on the Thames River by electrofishing from a 21 foot Smith Root vessel operating between 12-15 amps (mean 13 amps) at 500 volts. Walleye were tagged with size 12 metal butt end tags crimped to the left mandible and passive integrated transponder (PIT) tags were injected ventrally posterior to the head. The Biomark HPT12 PIT tags were 12.5 mm in length with a frequency of 134.2 KHz. PIT tags were scanned using an HPR plus (ISO 11785) reader with racket antenna. Double tagging (jaw + PIT) allows for jaw tag loss estimation and recapture detection on Lake Erie, Lake St Clair and other Great Lakes where PIT scanning occurs using Biomark HPR plus and Destron Fearing 2001F-ISO readers. Total lengths were measured, sex, reproductive state were recorded and the several anterior dorsal spines were removed for aging tagged Walleye. Environmental conditions and measurements were documented at locations where tagging took place.

In 2015, 340 Walleye were tagged on the Thames River (Table 6.4.1). The age composition of tagged Walleye by sex is presented in Figure 6.4.1, along with mean length at age by gender. Males represented 67% of Walleye tagged, while females and Walleye of undetermined sex accounted for 12% and 22% respectively. Ages of tagged Walleye ranged from 2 to 11, with ages 4 (25%), 5 (24%) and 6 (16%), the 2011, 2010 and 2009 year classes respectively, being most common. While collecting Walleye for tagging by electrofishing in 2015, 7 tagged Walleye were recaptured and released.

Jaw tags are visible to recreational, commercial and native fisheries while PIT tags are detected solely by scanning Walleye harvest. For Walleye tagged in the Thames River, most recaptures are expected to be reported from sport fisheries that observe jaw tags. Commercial scanning of Walleye occurs primarily on Lake Erie. Numbers of Thames River Walleye recaptured and tagged by sex and type of jaw tag (non-reward and reward) are presented in Table 6.4.1, along with recovery rates of tagged Walleye. In addition to reward and non-reward versions of jaw tags, they were further partitioned according to contact information on the tag: by mailing address (OMNR, 320 Milo Wheatley, ON N0P 2P0) and phone number (800-667-1940).

There were 22 Walleye recaptured in 2015 that were tagged on the Thames River; most (20) were tagged in 2015 while only 2 were from 2014 (Table 6.4.1). In 2015, recapture rates were higher for reward tags than non-reward tags for Walleye tagged in 2014 (reward 2.0%: non-reward 0.5%) and 2015 (reward 13%: non-reward 4%). Walleye tagged in the Thames River were recaptured in the Thames River, from the Detroit River mouth, throughout the St. Clair System to the entrance of Saginaw Bay, Lake Huron (Figure 6.4.2).

Walleye were tagged in the Sydenham River during spring of 2013, with recaptures occurring in 2013 (10) and 2014 (9) but none (0) in 2015 (Table 6.4.2). Walleye tagged in the Sydenham River were caught by anglers in the Sydenham River, Chanel Ecarte, Lake St. Clair and the St. Clair River (Figure 6.4.3).

Recaptures of Thames and Sydenham River tagged Walleye took place during all seasons from 2013 to 2015, with the highest recoveries in 2015 during June and May (Figure 6.4.4). The largest fraction of Thames River Walleye recaptured were caught by Michigan anglers in 2014 (80%) and 2015 (64%) with the balance caught by Ontario anglers (Figure 6.4.5). This pattern was opposite for the Sydenham River stock, for which Ontario anglers caught 60% and 89% of recaptured Walleye in 2013 and 2014 respectively (Figure 6.4.5).

Reported Walleye recaptures by tag type (reward-phone, reward-address, non-reward-phone, non-reward-address) in 2014 was directly proportional to the application of tags (Figure 6.4.6). In 2015, reported tags were more numerous for reward-address and reward-phone labels than for non-reward tags with phone or address labels (Figure 6.4.6).

Table 6.4.1 Number of Walleye double tagged (jaw and PIT) on the Thames River in 2014 and 2015. Number and fraction of Walleye recaptured by anglers during 2014, 2015 by tag cohort. NR = Non Reward Jaw Tag R = Reward Jaw Tag

Sex	Tagged 2014			Recaptured 2014			Recaptured 2015			% Recaptured in 2014			% Recaptured in 2015		
	NR	R	All	NR	R	Total	NR	R	Total	NR	R	Total	NR	R	Total
Male	107	29	136	2	1	3	1	0	1	1.9%	3.4%	2.2%	0.9%	0.0%	0.7%
Female	27	6	33	3	0	3	0	0	0	11.1%	0.0%	9.1%	0.0%	0.0%	0.0%
Unknown	70	14	84	3	1	4	0	1	1	4.3%	7.1%	4.8%	0.0%	7.1%	1.2%
ALL	204	49	253	8	2	10	1	1	2	3.9%	4.1%	4.0%	0.5%	2.0%	0.8%

Sex	Tagged 2015			Recaptured 2015			% Recaptured in 2015		
	NR	R	All	NR	R	Total	NR	R	Total
Male	178	47	225	11	6	17	6%	13%	8%
Female	31	8	39	0	3	3	0%	38%	8%
Unknown	62	14	76	0	0	0	0%	0%	0%
ALL	271	69	340	11	9	20	4%	13%	6%

Table 6.4.2 Number of Walleye double tagged (jaw and PIT) on the Sydenham River in 2013. Number of Walleye recaptured by anglers in 2013, 2014 by tag cohort. NR = Non Reward Jaw Tag R = Reward Jaw Tag

Sex	Tagged 2013			Recaptured 2013			Recaptured 2014			% Recaptured in 2013			% Recaptured in 2014		
	NR	R	Total	NR	R	Total	NR	R	Total	NR	R	Total	NR	R	Total
Male	230	96	326	3	4	7	5	1	6	1.3%	4.2%	2.1%	2.2%	1.0%	1.8%
Female	12	4	16	0	1	1	0	1	1	0.0%	25.0%	6.3%	0.0%	25.0%	6.3%
Unknown	19	38	57	1	1	2	0	2	2	5.3%	2.6%	3.5%	0.0%	5.3%	3.5%
ALL	261	138	399	4	6	10	5	4	9	1.5%	4.3%	2.5%	1.9%	2.9%	2.3%

Sex	Recaptured 2015			% Recaptured in 2015		
	NR	R	Total	NR	R	Total
Male	0	0	0	0.0%	0.0%	0.0%
Female	0	0	0	0.0%	0.0%	0.0%
Unknown	0	0	0	0.0%	0.0%	0.0%
ALL	0	0	0	0.0%	0.0%	0.0%

Note: The year of tagging and river origin for one recapture in 2015 is unknown (excluded from tables).

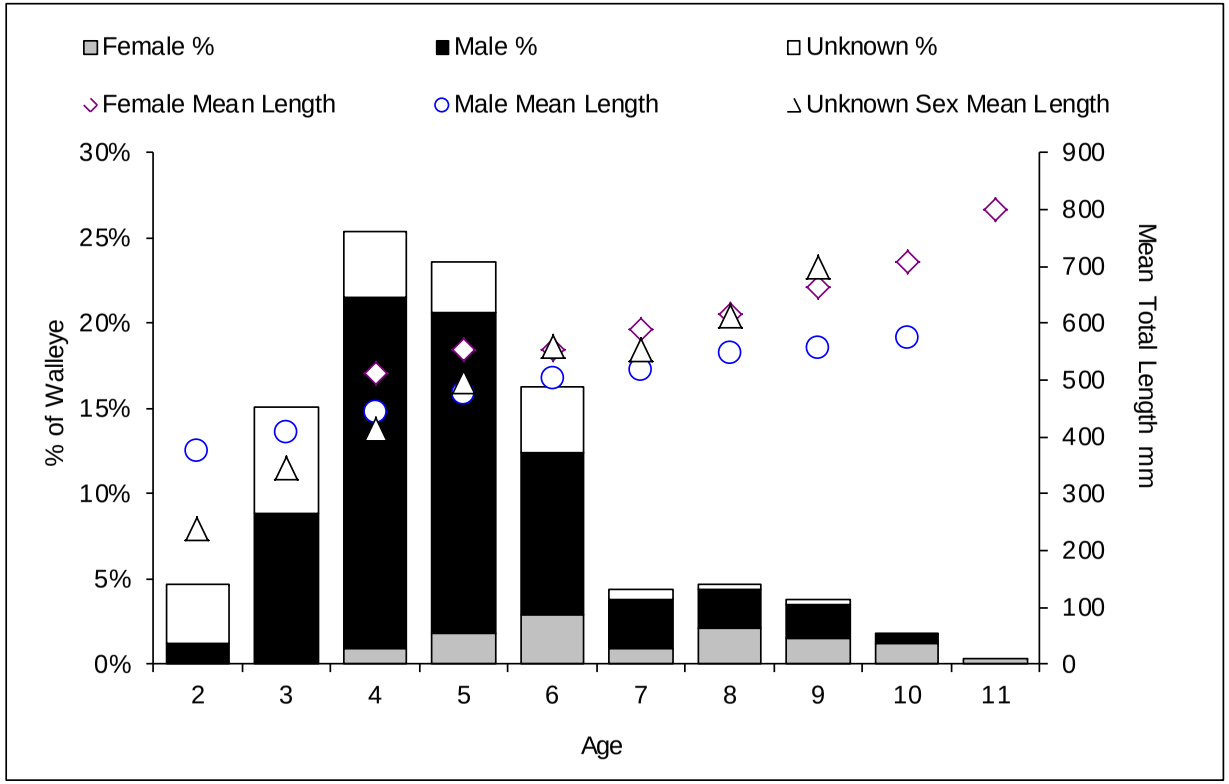


Figure 6.4.1 Age composition of Walleye tagged on the Thames River in 2015 by sex. Mean total length (mm) at age (dorsal spines) by sex on second Y axis. N = 339

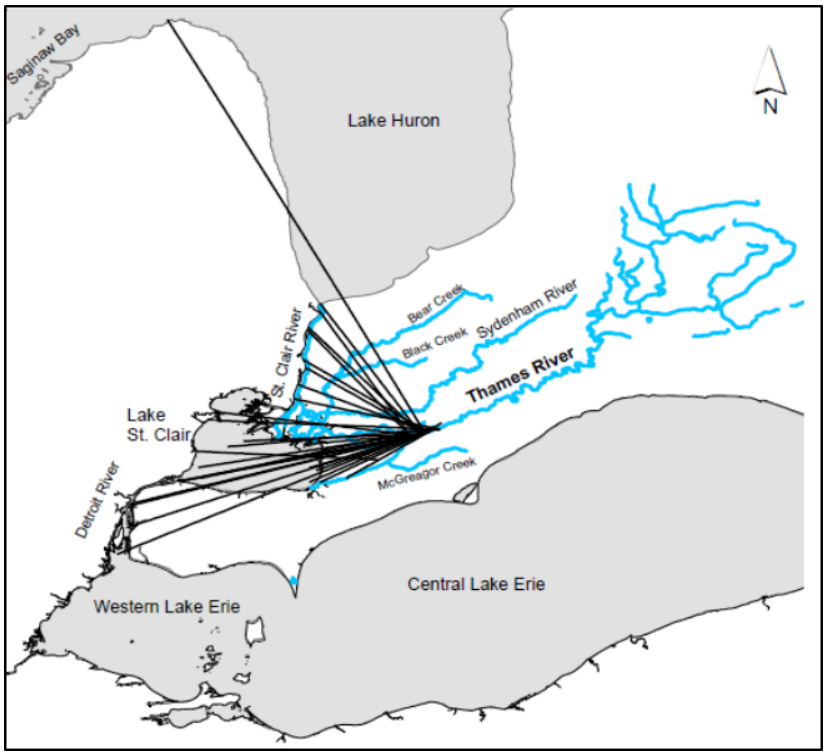


Figure 6.4.2 Lines joining recapture locations in 2014, 2015 to corresponding sites where PIT and jaw tags were applied to each Walleye in the Thames River, 2014-2015.

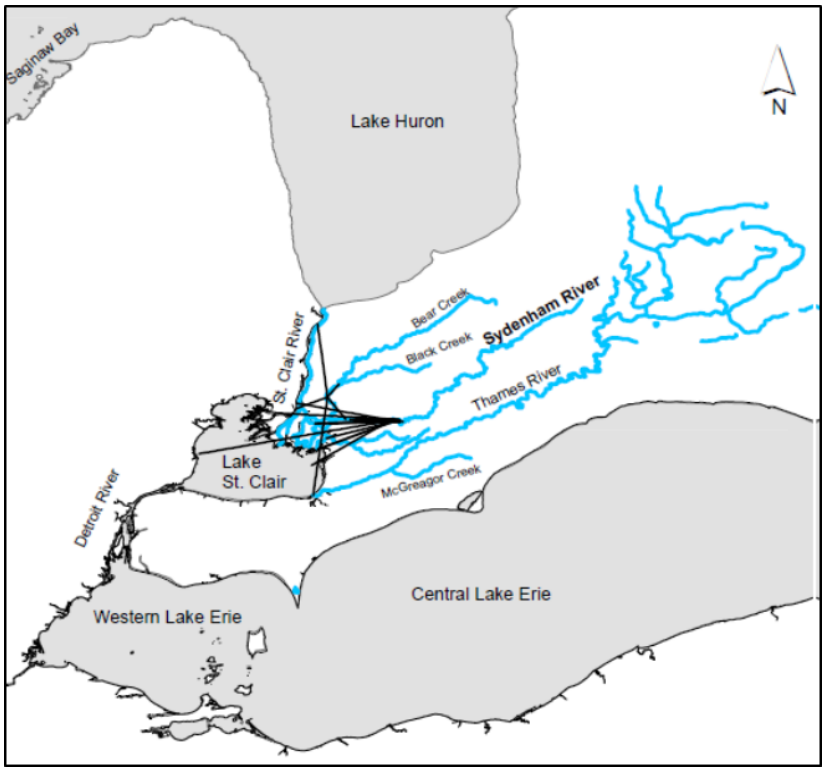


Figure 6.4.3 Lines joining recapture locations in 2013-2015 to corresponding sites where PIT and jaw tags were applied to each Walleye in the Sydenham River, 2013. Note that 5 Walleye recaptured were tagged in Bear Creek, which enters the Sydenham River in Wallaceburg.

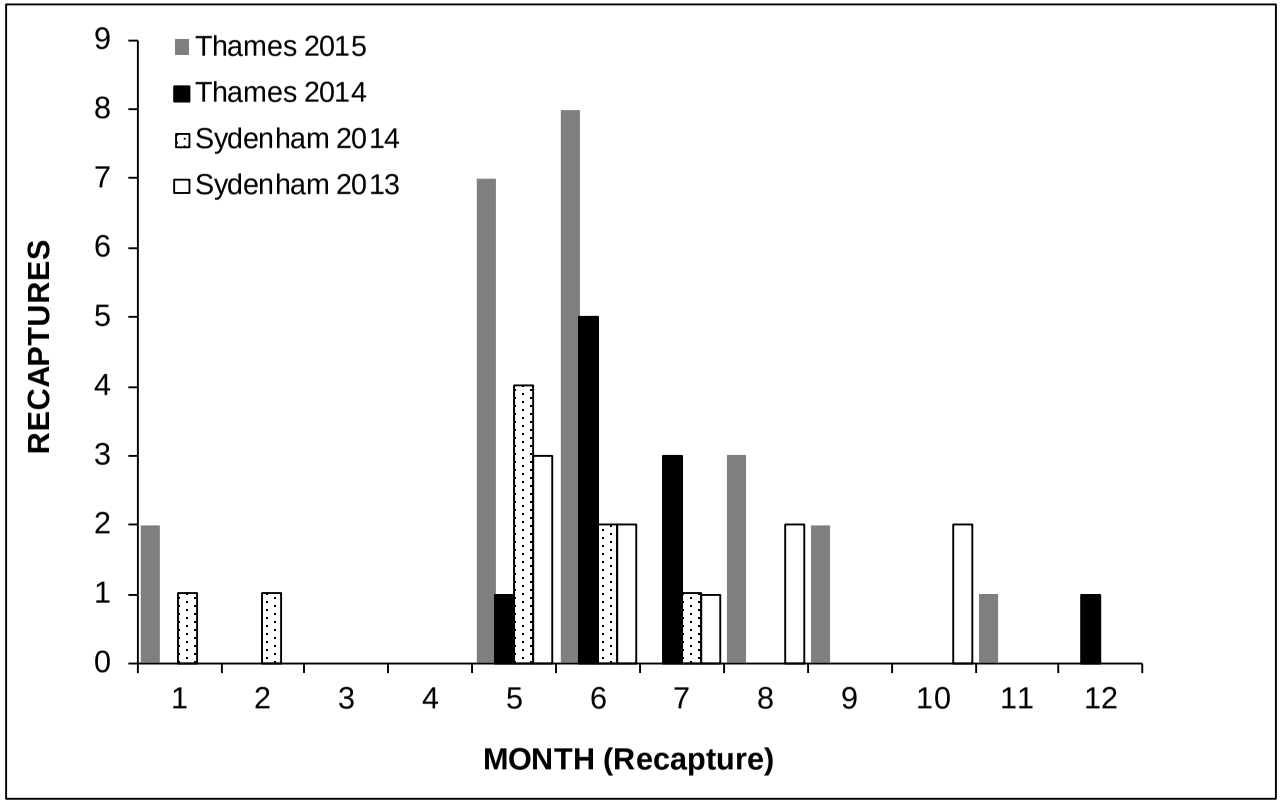
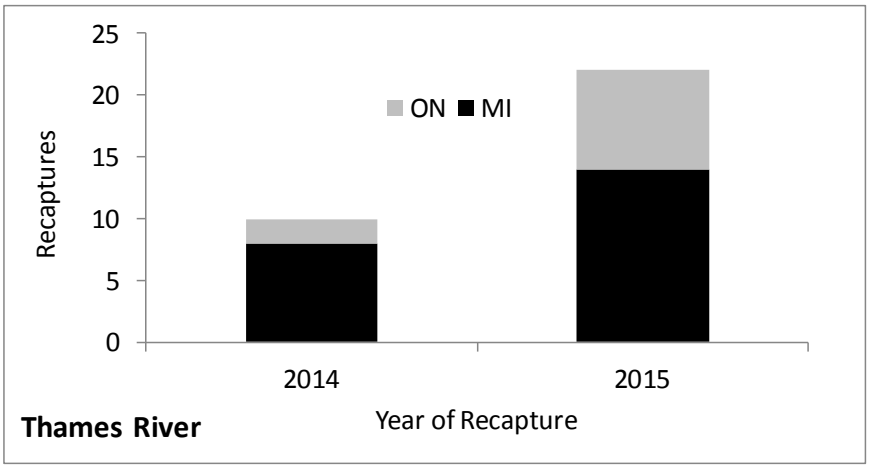


Figure 6.4.4 Walleye recaptures by month and year for Walleye tagged in the Thames and Sydenham Rivers 2013-2015.



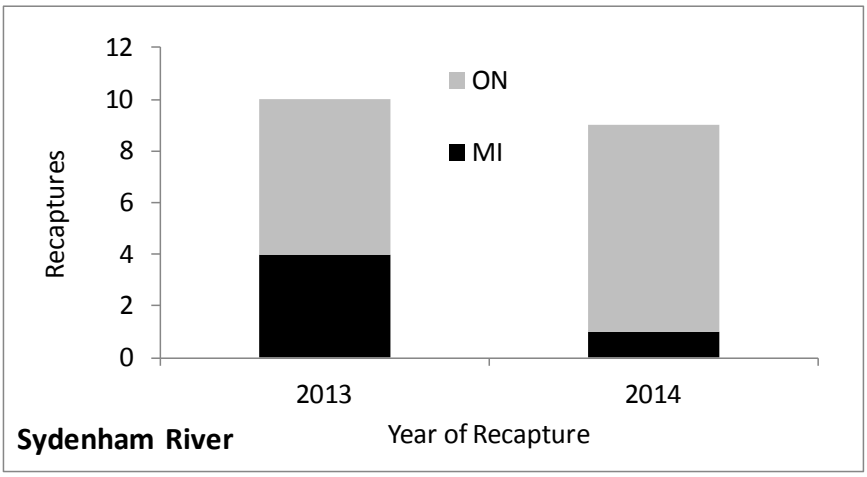


Figure 6.4.5 Walleye recaptures by year of recapture and jurisdiction for Walleye tagged in the Thames River (top) and Sydenham River (bottom). No Walleye tagged in the Sydenham River were recaptured in 2015.

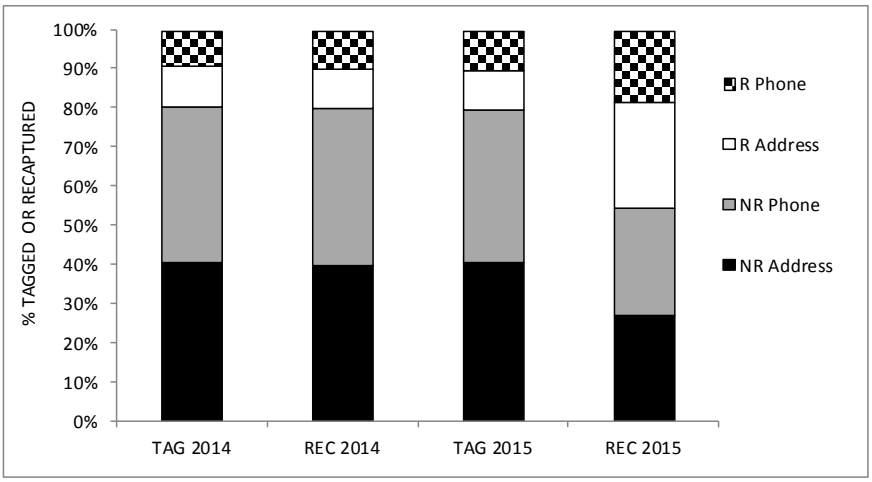


Figure 6.4.6 Proportion (%) of Thames River Walleye tagged and recaptured by type of jaw tag including 1) non reward with address (NR Address), 2) non reward with phone number (NR Phone), 3) reward with address (R Address) and 4) reward with phone number (R Phone) in 2014 and 2015.

APPENDIX A

Operational Field and Lab Schedule 2015

Field and Lab Projects	Dates	Species Assessed, Monitored, or Stocked	Project Lead	Location	Funding Source
Thames River Walleye Tagging	April	Walleye	Cook	Wheatley	SPA/CRF
Commercial Catch Sampling	Apr-Nov	Walleye, Y. Perch, R. Smelt, L. Whitefish, W. Bass, W. Perch	Belore	Wheatley	SPA
Contaminant Sampling	Apr-Nov	Multiple Species	Benoit	Wheatley	SPA
Lake Erie Temperature Loggers	Apr-Nov	Limnology	Genereaux	Wheatley	SPA
Lake Erie & Lake St. Clair Sport Fishery Diary	Apr-Nov	Multiples Species	Belore	Wheatley	SPA
Yellow Perch Tagging	May	Yellow Perch	Cook	Wheatley	SPA
Microcystin	June-Oct	Multiple fish species and water samples	Marklevitz	Wheatley	SPA
Lake Erie Limnology	May-Oct	Limnology	MacDougall	Wheatley	SPA
Lake St. Clair Limnology	May-Sept	Limnology	Marklevitz	Wheatley	SPA
Asian Carp eDNA Monitoring	May-Jul	Asian Carp	Belore	Wheatley	COA
Lake St. Clair YOY Index	Jun-Jul	Multiple Species	Marklevitz	Wheatley	SPA
Bycatch Monitoring	Jun-Dec	Multiple Species	Marklevitz	Wheatley	COA
Detroit River Creel	Apr-Oct	Multiple Species	Belore	Wheatley	SPA
Lake Erie Central Basin Hydro Acoustics	July	Multiple Species	Cook	Wheatley	SPA
West Basin Interagency Trawling	August	Multiple Species	Cook	Wheatley	SPA
West Basin Mid water Trawling	August	Multiple Species	Cook	Wheatley	SPA
Partnership Index	Aug-Nov	Multiple Species	Cook	Wheatley	SPA/CRF
Lake St. Clair Fall Index	Sept-Nov	Multiple Species	Belore	Wheatley	SPA
Age and Growth	Continuous	Multiple Species	Multiple	Wheatley	SPA
Lake Erie Limnology	May-Oct	Chlorophyll, Zooplankton	MacDougall	Pt. Dover	SPA
Long Point Bay Roving Creel Survey	Jun-July	Multiple Species	Multiple	Pt. Dover	SPA
Contaminant Sampling- LPB & Eastern Basin	Apr-Nov	Multiple Species	Greenwood	Pt. Dover	SPA
Long Point Bay Temperature Loggers	Mar-Oct	Water temps - L. P. Bay, Port Dover Intake, 2 Gas Wells	Witzel	Pt. Dover	SPA
Grand River Walleye Tagging	April	Walleye	MacDougall	Pt. Dover	SPA/COA/GLFC
Lake Trout Stocking	April	Lake Trout	MacDougall	Pt. Dover	SPA/CRF
Lake Trout Gill Netting	Oct-Nov	Lake Trout	MacDougall	Pt. Dover	SPA
Lake Trout Tag Removal	Continuous	Lake Trout	MacDougall	Pt. Dover	SPA
Juvenile Sturgeon Assessment	May & Sept	Sturgeon	MacDougall	Pt. Dover	SPA
Cold Water Survey	August	Lake Trout, Burbot, Lake Whitefish	Witzel	Pt. Dover	SPA
Long Point Bay Adult Index Gillnetting	Jun-Aug	Multiple Species	Witzel	Pt. Dover	SPA
Long Point Bay Nearshore Trawling	Sept	Multiple Species	Witzel	Pt. Dover	SPA
Long Point Bay Offshore Trawling	Sept-Nov	Multiple Species	Witzel	Pt. Dover	SPA
Long Point Bay Grid Trawling	October	Multiple Species	Witzel	Pt. Dover	SPA
Lake Erie Eastern Basin Hydro Acoustics	July	Smelt and Other Pelagic Forage Fish	Witzel	Pt. Dover	SPA
Diet Study	June-Jan	Multiple Species	Harrison	Pt. Dover	SPA
Age and Growth	Continuous	Multiple Species	Multiple	Pt. Dover	SPA

Note: SPA = Special Purpose Account, COA = Canada Ontario Agreement, GLFC= Great Lakes Fisheries Commission, CRF=Consolidated Revenue Fund

APPENDIX B

LAKE ERIE MANAGEMENT UNIT STAFF
2015

LONDON

659 Exeter Road, London, ON N6E 1L3
Tel: 519-873-4611 Fax: 519-873-4645

Richard Drouin – Lead Management Biologist
Jennifer Richards – C.O.A. Coordinator
Karen Pringle – Administrative Assistant

WHEATLEY

320 Milo Road, Wheatley, ON N0P 2P0
Tel: 519-825-4684 Fax: 519-825-3163

Brian Locke – Lake Manager
Emily Slavik – Assessment Supervisor
Tyler Genereaux – Operations Coordinator
Craig McDonald – Vessel Master
Andy Cook – Assessment Biologist
Megan Belore – Assessment Biologist
Stephen Marklevitz – Aquatic Ecosystem Biologist
Karen Soper – Systems Officer
Vicki McKay – A/Systems Officer
Rob Dietz – Fisheries Technician
Aida Baptista –Administrative Assistant

Seasonal Staff:

Joey Battaglia – Fisheries Technician
Christine Benoit – Fisheries Technician/Biologist
Chris Gignac – Fisheries Technician
Kiera Hamm – Fisheries Technician
Kaylin Liznick– Fisheries Technician
Spencer Neufeld – Fisheries Technician
Chris Thomas – Fisheries Technician
Brandon Wood – Fisheries Technician
Sean Yardley– Fisheries Technician
Steven Mailloux – Port Observer
Tyler Verburg – Port Observer
Stephanie Baptista – SEP Student
Brianne Kucharski– SEP Student
Jack Noble – SEP Student
Brianne Fennema/Spencer Neufeld – Lead Stewardship Rangers
Cole McGregor– Stewardship Youth Ranger
Parker Garrod – Stewardship Youth Ranger
Taylor Dziver – Stewardship Youth Ranger
Victoria Brown– Stewardship Youth Ranger

Aquatic Ecosystems Science Section

Yingming Zhao – Research Scientist

PORT DOVER

49 Passmore Avenue, Unit 7
P.O. Box 429, Port Dover, ON N0A 1N0
Tel: 519-583-0981 Fax: 519-583-1547

Kurt Oldenburg – Fisheries Ecology Supervisor
Dixie Greenwood – Operations Coordinator
Gord Ives – Vessel Master
Tom MacDougall – Rehabilitation Ecologist
Larry Witzel – Assessment Biologist
(Retired-August 30, 2015)

Seasonal Staff:

Tina Werner – Fisheries Technician
Heather Harrison – Fisheries Technician
Duncan Norrie – Fisheries Technician
Sarah Walton – C.O.A. Biologist
Nathan Trebych – Fisheries Technician
Lindsay Laroche – Port Observer
Chris Haines – SEP Student
Savanna Talbot – SEP Student
Marion Mummery – Student

SOUTHERN MARINE ENFORCEMENT UNITS:

AYLMER

615 John Street North
Aylmer, Ontario N5H 2S8
Tel: (519) 773-4712

Al DiMenna – Conservation Officer

CHATHAM

870 Richmond Street
Chatham, Ontario N7M 5J5
Tel: (519) 354-4925

Bill Ingham – Conservation Officer

VINELAND

4890 Victoria Ave. N
Vineland, Ontario L0R 2E0
Tel: (905) 562-1193

Ron Arnold – Conservation Office

WHEATLEY

320 Milo Road
Wheatley, ON N0P 2P0
Tel: (519) 825-4684 Fax: (519) 825-3947

Edwin VanDenOetelaar - Enforcement Supervisor
Colin Stass – A/Enforcement Supervisor
Kevin Sprague – Conservation Officer
Sean Insley – Conservation Officer

Acronyms Reference: A/-Acting, C.O.A–Canada Ontario Agreement, SEP–Summer Experience Program

ISSN 1718-4924 (Print)
ISBN 978-1-4606-7457-4 (Print)
ISSN 1925-5454 (PDF)
ISBN 978-1-4606-7458-1 (PDF)
March 2016