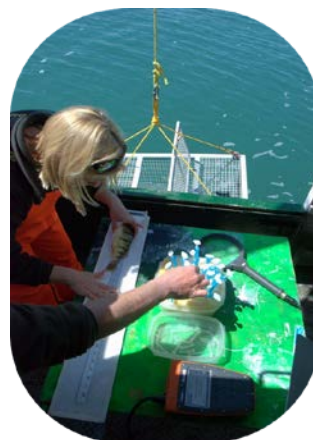


2014 Status of Major Stocks

Lake Erie Management Unit
March 2015



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) Funnel Cloud over Wheatley Harbour on July 30, 2014
- Port Dover Fisheries Technician, Duncan Norrie, working on the Grand River Walleye Tagging Program
- Wheatley Fisheries Technician, Christine Benoit, aboard the Keenosay working on the Yellow Perch Tagging Program
- Port Dover Fisheries Technician, Tina Werner, aboard the Erie Explorer working on the Long Point Bay Adult Index Gill Netting Program

2014 Status of Major Stocks

Lake Erie Management Unit
March 2015

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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 Unit also provides a coordination function for commercial fish management across the province of Ontario.

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.

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1. STATUS OF MAJOR SPECIES

The following is an overview of the status of major species in Ontario waters of Lake Erie for 2014. 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 2014 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 2014, the commercial Walleye fishery was composed mainly of the 2003 (age 11), 2011 (age 3), and 2010 (age 4) year classes. Lakewide fall surveys also indicated a strong presence of age 11 Walleye, and a moderate presence of age 3 and age 4 Walleye. These year classes will continue to contribute to the fishery and to spawner biomass in 2015. Interagency trawling to assess year class strength indicated a moderate 2013 year class which will recruit to the fishery in 2015, and a strong 2014 year class which will recruit to the fishery in 2015. Overall, the abundance of Walleye in the west and central basins is at a below average level.

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 percid. 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.

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 2014, the strong 2003 year class at age 11 represented 31% of the commercial harvest in Ontario statistical districts 4 and 5 (Figure 2.1.1) combined. Age 11 Walleye also comprised a significant fraction of the Walleye caught in the east basin Partnership gill net survey in 2014. Fishery and survey indicators were positive for east basin Walleye although juveniles were not caught in the east basin Partnership survey.

Yellow Perch

Lakewide Yellow Perch harvest in 2014 (5.5 million pounds) did not exceed the mean harvest from 2000 to present (5.6 million pounds) and was close to the long term mean harvest from when ITQs were introduced in 1984 (6.0 million pounds). In 2014, the lakewide commercial Yellow Perch fishery was mainly comprised of age 4 fish (2010 year class) and age 6 fish (2008 year class). In addition, the eastern basin fishery harvested a high proportion of age 2 and age 3 Yellow Perch, indicating moderate 2012 and 2011 year classes in the eastern basin. Fisheries in 2015 will continue to be supported by the 2010 and 2008 year classes.

Combined interagency assessments across multiple decades indicate that age 2 and older Yellow Perch abundance in 2014 was below average in the west basin and near average in the west-central, east-central and east basins. In Ontario waters, Partnership survey indices in 2014 for age 2 and older Yellow Perch was below average compared to recent decades in the west basin, moderate

in the west-central and east basins and above average in the east-central basin. The 2013 year class, recruiting to the fishery in 2015, was above average in the west basin, below average in the west-central, east-central and east basins. The 2014 year class, recruiting to the fishery in 2016, 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 2013 and 2014, LEPMAG began work on updating Yellow Perch assessment models. In 2015, 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. Targeted effort varies considerably between years but has been low in recent years. In 2014, 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 2014, only ten (10) Lake Whitefish were caught during the Partnership gill net surveys, one of those fish was caught in auxiliary index gear (see Section 4.1).

Lake Whitefish harvest in 2014 (113 thousand pounds) was below the mean harvest for the recent time period (2000-2014; 638 thousand pounds), and was the second lowest harvest since 1990. In 2014, the majority of the commercial Lake Whitefish harvest came from the 2003 (age 11) and 2005 (age 9) 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 4 through age 8 fish were harvested in the commercial fishery. The 2003 and 2005 year classes will continue to contribute to fisheries in 2015. Older Lake Whitefish were observed in the 2014 Ontario fisheries (up to age 26).

Due to the current poor status of Lake Erie's Lake Whitefish population, quotas are expected to remain low until recruitment improves significantly.

2. COMMERCIAL FISHERY

2.1 Lake Erie Fishery

In 2014, total commercial landings from Ontario waters of Lake Erie were 22.8 million pounds, a decrease of over 2 million pounds (-8%) from 2013 (Table 2.1.1). The value of the total commercial landings in 2014 was \$27.5 million, an increase of almost \$1.7 million (6%) from 2013 (Table 2.1.1). The decrease in harvest is due in part to the lower allocated quota for Yellow Perch and smaller harvests of White Bass and Rainbow Smelt in 2014. Harvest and landed value in 2014 are presented for each species by statistical district (Ontario Erie or OE, Figure 2.1.1) in Table 2.1.2.

Rainbow Smelt

The total landings of Rainbow Smelt decreased 13% to 6.0 million pounds in 2014 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The harvest was taken from OE-4 (84%) and OE-5 (16%). Summer harvest in OE-4 was primarily age 1 (64%) and age 2 (16%) fish. Age 1 fish comprised over 73% of OE-5 harvests throughout the year (Table 2.1.4). The commercial fishery harvested 39% of the quota allocated for 2014. Of the 179 licences with Rainbow Smelt quota, only 35 landed Rainbow Smelt in 2014, while only 4 attained more than 75% of their individual quota. The landed value of Rainbow Smelt was \$1.4 million, down 13% from 2013 (Tables 2.1.2 and 2.1.3).

Yellow Perch

In 2014 Yellow Perch landings decreased 8% to 5.5 million pounds (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The commercial fishery harvested 100% of allocated quota in 2014. Spring fisheries were characterized by harvest from a broad range of ages with ages 4 and 6 making a significant contribution to the harvest in OE-1 to OE-3 and OE-5 (57 to 67% combined) (Table 2.1.5). In the summer and fall harvest in OE-1, OE-2 and OE-5 ages 2, 3 and 4 were the major contributors. The landed value of Yellow Perch increased 12%, from 2013 to \$12.8 million in 2014 (Tables 2.1.2 and 2.1.3).

Walleye

Walleye landings increased 7% to 4.9 million pounds in 2014 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). Eighty-two percent of the 2014 quota was harvested. Lakewide harvest by Walleye size category was: Jumbo (59%), and Number 1 (38%) (see Table 2.1.6 for description of size categories). In the Number 1 category the 2010 and 2011 year classes, ages 3 and 4, made up significant portions of the harvest in OE-1 to OE-3 (43 to 73% combined). Age 3 fish of the Number 1 category became a significant part of the summer and fall harvest in OE-1 and OE-2 (30 to 49%). The 2003 year class at age 11 contributed 21% to the 2014 harvest, and across statistical districts was one of the major contributors to the jumbo harvest throughout the year (OE-1 16%, OE-2 19%, OE-3 36%, OE-4 42% and OE-5 27%) (Table 2.1.6). The landed value of Walleye increased 9% from 2013 to \$9.8 million in 2014 (Tables 2.1.2 and 2.1.3).

White Bass

The total landings of White Bass decreased over 1.0 million pounds (19%) to 4.3 million pounds in 2014 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The majority of harvest occurred in statistical districts OE-2 (53%) and OE-1 (36%). Age 4 fish dominated spring harvests in OE-1 (63%) and OE-2 (78%). Age 2 fish were a significant contributor to OE-1 and OE-2 fall harvests (72 to 79%), while ages 2 and 3 fish contributed significantly to the summer harvests of OE-1 and OE-2 (63% to 70%) (Table 2.1.7). White Bass have not been regulated by quota since 1993. The landed value of White Bass decreased 13% to \$2.4 million in 2014 (Tables 2.1.2 and 2.1.3).

White Perch

The total landings of White Perch remained the same at 1.8 million pounds in 2014 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The majority of harvest occurred in statistical districts OE-2 56% and OE-1 26%. In OE-1, ages 4 and 9 were the major contributors to the spring harvest (23% each) (Table 2.1.8). The fall harvests in OE-1 and OE-2 were dominated by younger age groups (ages 3 and 4; 68% and 69% respectively). White Perch are not regulated by quota. The total landed value of White Perch decreased 2% to \$0.8 million in 2014 (Tables 2.1.2 and 2.1.3).

Lake Whitefish

The total landings of Lake Whitefish increased 19 thousand pounds (21%) to 113 thousand pounds in 2014 (Tables 2.1.2 and 2.1.3, Figure 2.1.4). The commercial fishery harvested 94% of the quota allocated for 2014. Ninety percent of the total harvest came from OE-1, while nine percent was harvested from OE-2. The harvests during the fall in OE-1 and OE-2 were dominated by age 10+ fish (80% and 68% respectively) and age 9 fish (17% and 26% respectively) (Table 2.1.9). The landed value of Lake Whitefish increased \$47,000 (35%) to \$181,000 in 2014 (Tables 2.1.2 and 2.1.3). In 2014 an additional 1,316 pounds of Lake Whitefish were surrendered to Ontario Ministry of Natural Resources and Forestry (OMNRF) when several individual quotas were attained.

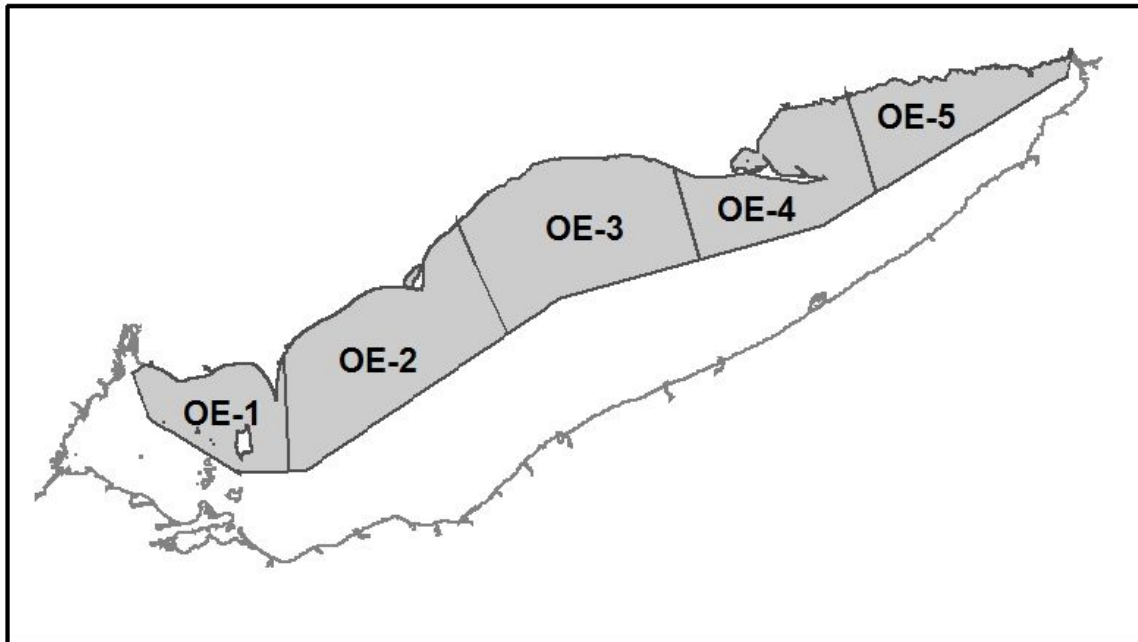


Figure 2.1.1 Spatial location of statistical districts in the Canadian waters of Lake Erie.

Table 2.1.1 Total annual commercial fishery landings (pounds) and value (\$ CDN) from the Canadian waters of Lake Erie, 1960-2014.

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			

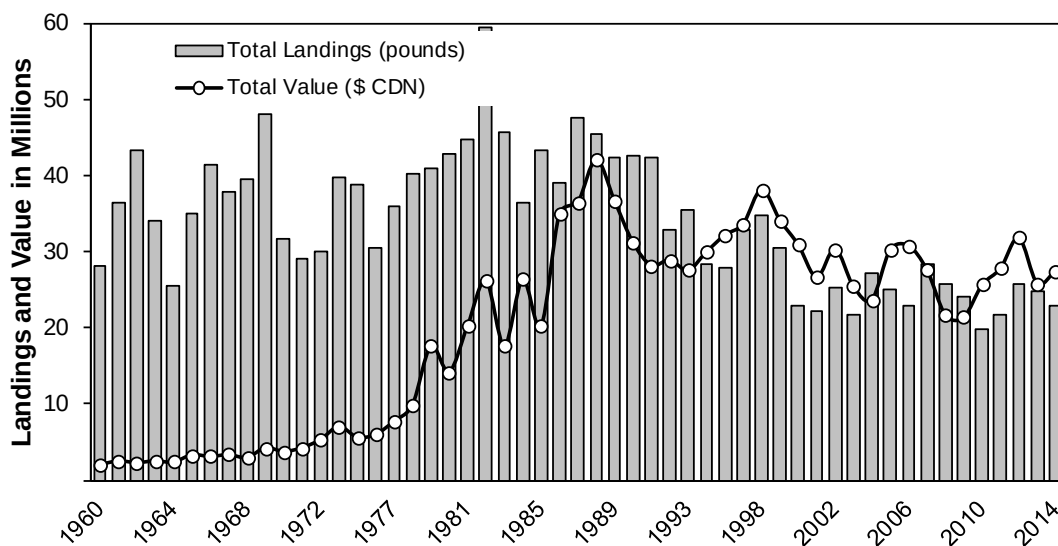


Figure 2.1.2 Commercial fishery landings (pounds) and value (\$ CDN) from the Canadian waters of Lake Erie, 1960-2014.

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, 2014.

Species	Landings by Statistical District					Total Landing	Total Value
	OE-1	OE-2	OE-3	OE-4 ^a	OE-5		
Brown Bullhead						0	\$0
Burbot			5	8	74	87	\$0
Carp	1,077	508	347			1,932	\$572
Catfish	14,150	4,325	1,667	20	115	20,277	\$5,617
Freshwater Drum	28,568	47,639	59,304	1,051		136,562	\$16,602
Gizzard Shad	1,330					1,330	\$119
Lake Whitefish	102,054	10,309	560	243	154	113,320	\$180,924
Rainbow Smelt	2	542	122	5,092,281	958,208	6,051,155	\$1,391,153
Rock Bass	40	3				43	\$9
Suckers	13,152	8,002	295		24	21,473	\$4,513
Walleye	2,550,452	973,730	1,141,900	54,967	149,476	4,870,525	\$9,846,891
White Bass	1,556,049	2,282,116	448,571	15,547	24,409	4,326,692	\$2,425,548
White Perch	460,134	1,008,593	300,090	4,051	17,133	1,790,001	\$835,504
Yellow Perch	620,667	1,679,175	2,665,213	24,323	465,284	5,454,662	\$12,775,242
Mixed ^b	159	4	1		2	166	\$84
Total Landing (lbs.)	5,347,834	6,014,946	4,618,075	5,192,491	1,614,879	22,788,225	
Total Value (\$)	\$7,874,071	\$7,667,048	\$9,014,026	\$1,344,818	\$1,582,815		\$27,482,778

^a Excludes Inner Long Point Bay.

^b A variety of incidentally caught species of little or no value.

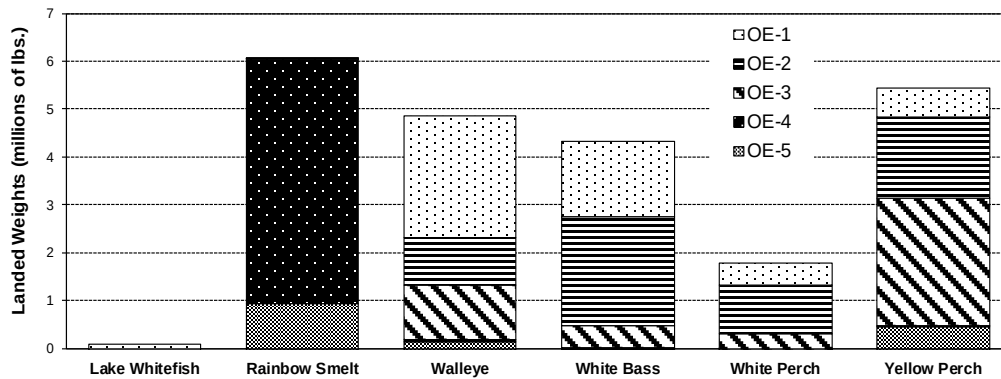


Figure 2.1.3 Total annual commercial fishery landed weights (millions of lbs.) for principle species by statistical district, Lake Erie 2014.

Table 2.1.3 Change in weight of the annual commercial fishery landed weight (pounds) from 2013 to 2014 by the 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	0	0	0	0	0
Burbot	0	-91	-14	-96	45	-156	-7
Carp	137	382	303	0	0	822	351
Catfish	-3,776	155	22	-2	45	-3,556	-631
Freshwater Drum	-5,304	3,108	49,260	1,051	0	48,115	9,035
Gizzard Shad	-775	-141	-3	-4	0	-923	-57
Lake Whitefish	28,312	-5,071	-788	-321	-2,791	19,341	47,217
Rainbow Smelt	2	-13,435	-19,150	-290,341	-561,242	-884,166	-203,883
Rock Bass	6	0	0	-1	0	5	1
Suckers	-5,310	-7,772	125	0	-21	-12,978	-1,232
Walleye	118,743	-21,698	169,819	39,912	10,429	317,205	849,270
White Bass	29,265	-342,512	-744,018	11,914	19,269	-1,026,082	-357,817
White Perch	-847	222,581	-198,846	-13,949	-12,373	-3,434	-20,921
Yellow Perch	-28,217	-124,509	-251,887	-106,146	32,601	-478,158	1,341,649
Mixed ^b	42	-19	1	0	2	26	1
Total Landing (lbs.)	132,278	-289,022	-995,176	-357,983	-514,036	-2,023,939	
Total Value (\$)	665,748	456,017	587,044	-181,320	135,488		1,662,977

^a Excludes Inner Long Point Bay.

^b A variety of incidentally caught species of little or no value, plus species with total landings less than 50 pounds.

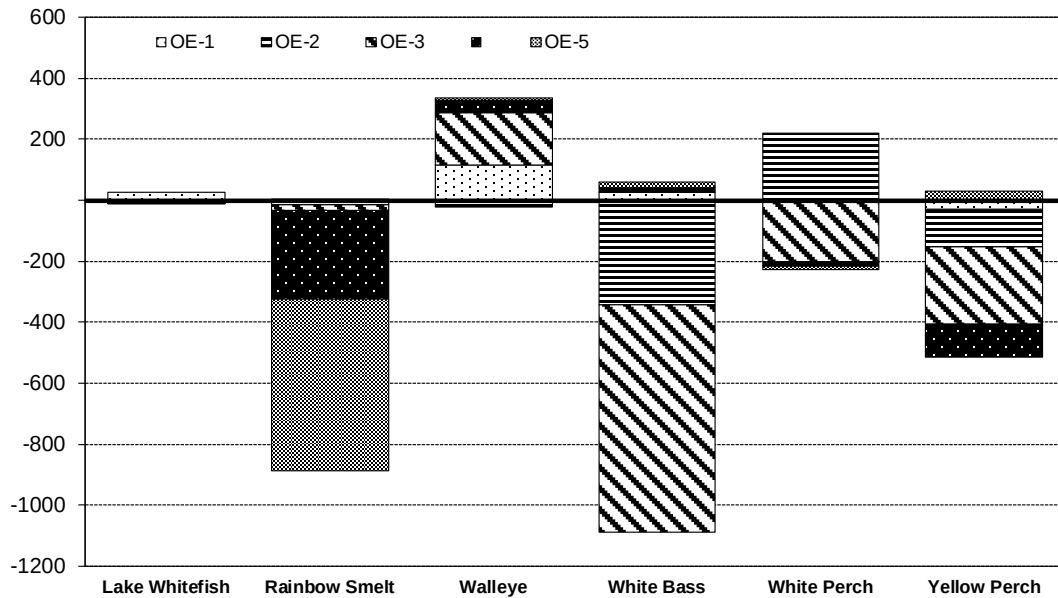


Figure 2.1.4 Change in weight of the annual commercial fishery landings (1000's of lbs.) from 2013 to 2014 for principle species by statistical district, Lake Erie.

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, 2014. 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
		0	1	2	3	4	5	6	7	8	9		
Age Group Composition (%) **													
OE-4	Spring	-	8	58	22	8	4	-	-	-	-	2.4	201
	Summer	0	64	16	13	6	1	0	-	-	-	1.6	500
	Fall	2	76	20	2	-	-	-	-	-	-	1.2	55
OE-5	Summer	3	73	18	5	1	1	-	-	-	-	1.3	157
Mean Total Length (mm)													
OE-4	Spring	-	82	125	153	164	182	-	-	-	-	133	201
	Summer	80	111	143	177	192	206	208	-	-	-	130	500
	Fall	95	113	142	203	-	-	-	-	-	-	120	55
OE-5	Summer	84	116	149	185	174	216	-	-	-	-	125	157
Mean Round Weight (g)													
OE-4	Spring	-	3	11	21	27	41	-	-	-	-	15	201
	Summer	2	7	16	30	40	49	50	-	-	-	14	500
	Fall	4	8	16	48	-	-	-	-	-	-	10	55
OE-5	Summer	3	8	18	34	28	65	-	-	-	-	12	157

* 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, 2014. n is sample size, sexes combined.

Stat. Dist.	Season*	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+		
Age Group Composition (%) **													
OE-1	Spring	-	0	9	39	11	28	10	3	0	-	5.0	319
	Summer	-	11	19	42	10	15	3	1	-	-	4.1	519
	Fall	-	28	13	41	9	7	3	-	-	-	3.6	197
OE-2	Spring	-	0	9	33	7	29	14	6	0	2	5.3	596
	Summer	-	19	24	29	3	15	6	2	-	1	4.0	636
	Fall	-	40	21	24	4	8	2	-	-	1	3.3	356
OE-3	Spring	-	-	4	25	4	32	18	12	2	2	5.9	1313
	Summer	-	0	19	32	1	29	11	5	1	1	5.0	515
	Fall	-	3	29	34	2	16	7	5	3	1	4.6	119
OE-4	Fall	-	28	34	23	-	8	6	1	-	-	3.5	79
OE-5	Spring	-	1	33	53	1	10	2	-	1	-	3.9	395
	Summer	-	25	25	27	1	13	5	2	1	-	3.8	314
	Fall	-	42	21	31	2	3	1	1	-	-	3.1	315
Mean Total Length (mm)													
OE-1	Spring	-	162	218	220	232	227	228	230	264	-	224	319
	Summer	-	213	221	227	228	236	228	249	-	-	226	519
	Fall	-	222	226	228	242	231	232	-	-	-	228	197
OE-2	Spring	-	207	212	222	222	227	230	228	215	248	225	596
	Summer	-	210	212	220	230	229	232	221	-	260	219	636
	Fall	-	216	226	233	237	250	243	-	-	269	227	356
OE-3	Spring	-	-	212	225	230	231	231	230	238	241	229	1313
	Summer	-	207	211	223	240	237	235	239	239	266	228	515
	Fall	-	227	219	223	233	241	247	234	224	213	227	119
OE-4	Fall	-	222	225	231	-	265	251	245	-	-	230	79
OE-5	Spring	-	219	224	235	229	238	244	-	272	-	232	395
	Summer	-	213	225	239	221	248	249	245	306	-	231	314
	Fall	-	219	233	248	240	257	276	271	-	-	233	315
Mean Round Weight (g)													
OE-1	Spring	-	57	129	130	173	145	146	147	223	-	141	319
	Summer	-	128	139	154	152	171	152	209	-	-	151	519
	Fall	-	134	142	146	186	152	160	-	-	-	146	197
OE-2	Spring	-	108	123	137	138	144	149	146	118	191	141	596
	Summer	-	127	132	145	170	161	179	145	-	235	144	636
	Fall	-	131	150	170	192	222	195	-	-	274	157	356
OE-3	Spring	-	-	117	136	149	151	151	145	167	169	145	1313
	Summer	-	115	127	143	177	173	171	181	174	291	156	515
	Fall	-	136	133	146	154	183	220	178	152	135	154	119
OE-4	Fall	-	141	148	159	-	270	226	205	-	-	163	79
OE-5	Spring	-	137	152	171	154	169	195	-	260	-	165	395
	Summer	-	129	147	182	128	214	217	219	432	-	168	314
	Fall	-	135	165	204	186	255	302	285	-	-	169	315

* 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 ($\geq 76\text{mm}$) gill nets by statistical district and season, 2014. n is sample size, sexes combined.

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+		
Age Group Composition (%)***														
OE-1	Spring	Number 1	-	1	35	38	9	3	4	-	0	9	4.5	312
		Jumbo	-	-	4	24	5	6	8	3	3	47	7.5	78
		Whitegill	-	-	15	36	23	5	10	-	-	10	5.1	39
	Summer	Number 1	-	17	42	19	5	5	2	-	2	8	4.0	59
		Jumbo	-	-	10	10	-	15	15	-	5	45	7.6	20
	Fall	Number 1	1	31	39	15	3	2	4	-	0	5	3.5	358
		Jumbo	-	-	5	11	5	5	11	-	5	58	8.2	19
OE-2	Winter	Number 1	-	20	50	20	-	5	-	-	-	5	3.5	20
	Spring	Number 1	-	13	47	21	7	1	4	1	-	8	4.0	160
		Jumbo	-	-	-	6	6	6	24	-	-	59	8.4	17
	Summer	Number 1	-	6	30	35	8	9	6	-	-	5	4.3	79
	Fall	Number 1	1	22	49	16	6	2	2	-	-	2	3.3	173
		Whitegill	-	10	35	25	15	-	-	5	-	10	4.4	20
OE-3	Spring	Number 1	-	-	25	18	14	6	8	3	5	21	5.9	77
		Jumbo	-	-	1	4	6	4	14	1	5	64	8.7	78
	Summer	Number 1	-	-	5	28	10	8	23	-	-	26	6.4	39
		Jumbo	-	-	-	8	6	7	21	2	5	51	8.2	219
	Fall	Jumbo	-	-	8	40	18	13	5	-	-	18	5.6	40
OE-4	Summer	Jumbo	-	-	-	5	-	25	20	-	-	50	8.1	20
OE-5	Spring	Jumbo	-	-	-	10	3	15	8	15	5	45	8.1	40
	Summer	Jumbo	-	-	-	5	3	18	8	18	2	45	8.2	60
Mean Total Length (mm)														
OE-1	Spring	Number 1	-	415	466	517	529	544	523	-	532	551	504	312
		Jumbo	-	-	464	534	560	596	624	654	666	673	616	78
		Whitegill	-	-	481	509	531	530	583	-	-	575	525	39
	Summer	Number 1	-	451	479	495	524	535	491	-	575	566	492	59
		Jumbo	-	-	541	515	-	529	570	-	614	573	559	20
	Fall	Number 1	397	456	492	506	511	548	542	-	545	551	489	358
		Jumbo	-	-	535	576	604	574	551	-	563	574	571	19
OE-2	Winter	Number 1	-	399	470	493	-	564	-	-	-	684	476	20
	Spring	Number 1	-	384	466	525	542	548	571	499	-	560	485	160
		Jumbo	-	-	-	540	573	600	640	-	-	662	641	17
	Summer	Number 1	-	432	490	516	540	549	531	-	-	539	510	79
	Fall	Number 1	383	457	493	520	510	539	514	-	-	575	492	173
		Whitegill	-	455	492	506	530	-	-	508	-	544	504	20

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	-	-	470	540	554	565	584	636	559	560	537	77
		Jumbo	-	-	482	540	578	592	625	597	672	663	642	78
	Summer	Number 1	-	-	495	530	536	522	543	-	-	575	543	39
		Jumbo	-	-	-	559	587	600	612	607	642	651	627	219
	Fall	Jumbo	-	-	530	566	584	603	586	-	-	634	584	40
OE-4	Summer	Jumbo	-	-	-	542	-	615	619	-	-	680	645	20
OE-5	Spring	Jumbo	-	-	-	544	616	606	610	625	662	680	639	40
	Summer	Jumbo	-	-	-	540	573	590	605	613	538	658	622	60
Mean Round Weight (g)														
OE-1	Spring	Number 1	-	721	1024	1320	1386	1518	1317	-	1313	1460	1237	312
		Jumbo	-	-	981	1604	1811	2029	2396	2621	2606	2944	2367	78
		Whitegill	-	-	1034	1134	1386	1369	1701	-	-	1561	1291	39
	Summer	Number 1	-	839	1006	1156	1362	1420	1124	-	1564	1704	1116	59
		Jumbo	-	-	1451	1293	-	1366	1705	-	2185	1702	1610	20
	Fall	Number 1	626	924	1240	1322	1382	1608	1628	-	1737	1627	1199	358
		Jumbo	-	-	1612	1829	2414	1980	2002	-	1857	1839	1882	19
OE-2	Winter	Number 1	-	681	1147	1386	-	2192	-	-	-	3389	1266	20
	Spring	Number 1	-	547	1090	1473	1522	1643	1754	1147	-	1551	1198	160
		Jumbo	-	-	-	1716	1940	2090	2462	-	-	2737	2527	17
	Summer	Number 1	-	768	1115	1280	1392	1460	1313	-	-	1428	1231	79
	Fall	Number 1	503	946	1254	1426	1384	1526	1355	-	-	1959	1237	173
		Whitegill	-	916	1163	1260	1406	-	-	1410	-	1581	1253	20
OE-3	Spring	Number 1	-	-	1162	1499	1628	1650	1871	2669	1643	1597	1531	77
		Jumbo	-	-	1286	1599	1953	2268	2410	2318	2802	2826	2615	78
	Summer	Number 1	-	-	1295	1407	1412	1291	1509	-	-	1618	1471	39
		Jumbo	-	-	-	1730	1957	2071	2152	2234	2683	2621	2365	219
	Fall	Jumbo	-	-	1615	1821	1931	2220	2231	-	-	2432	2002	40
OE-4	Summer	Jumbo	-	-	-	1613	-	2384	2365	-	-	3093	2696	20
OE-5	Spring	Jumbo	-	-	-	1617	2173	2250	2294	2476	3242	3344	2764	40
	Summer	Jumbo	-	-	-	1629	1859	2007	2217	2421	1876	2830	2445	60

* 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.

Table 2.1.7 White Bass year class composition and average total length (mm) from Lake Erie commercial catch samples from large mesh ($\geq 76\text{mm}$) gill nets for marketable fish by statistical district and season, 2014. n is sample size, sexes combined.

Stat. Dist.	Season*	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+		
Age Group Composition (%) **													
OE-1	Spring	-	1	17	63	5	5	6	3	-	-	4.3	120
	Summer	-	54	16	26	1	3	-	-	-	-	2.8	80
	Fall	-	79	11	8	3	-	-	-	-	-	2.3	38
OE-2	Spring	-	5	3	78	8	5	3	-	-	-	4.1	40
	Summer	-	25	38	35	-	3	-	-	-	-	3.2	40
	Fall	-	72	10	15	3	-	-	-	-	-	2.5	79
Mean Total Length (mm)													
OE-1	Spring	-	334	324	339	355	369	369	388	-	-	342	120
	Summer	-	299	327	340	357	385	-	-	-	-	317	80
	Fall	-	305	327	332	351	-	-	-	-	-	311	38
OE-2	Spring	-	258	299	328	341	360	386	-	-	-	328	40
	Summer	-	307	336	351	-	367	-	-	-	-	335	40
	Fall	-	302	327	348	364	-	-	-	-	-	313	79

* 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 (≥ 76 mm) gill nets for marketable fish by statistical district and season, 2014. n is sample size, sexes combined.

Stat. Dist.	Season*	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+		
Age Group Composition (%)**													
OE-1	Spring	-	-	5	23	8	15	15	5	23	8	6.6	40
	Summer	-	-	15	31	10	15	26	-	3	-	5.2	39
	Fall	-	18	41	28	5	3	5	-	-	-	3.5	39
OE-2	Spring	-	-	10	50	23	13	5	-	-	-	4.5	40
	Summer	-	-	30	38	23	8	3	-	-	-	4.2	40
	Fall	-	9	45	22	14	6	3	-	-	-	3.7	77
Mean Total Length (mm)													
OE-1	Spring	-	-	228	248	265	276	281	309	300	312	277	40
	Summer	-	-	253	264	265	282	294	-	316	-	274	39
	Fall	-	223	243	266	266	278	289	-	-	-	250	39
OE-2	Spring	-	-	229	252	255	261	279	-	-	-	253	40
	Summer	-	-	245	255	257	264	257	-	-	-	253	40
	Fall	-	227	245	262	271	284	305	-	-	-	255	77

* 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 (< 76 mm) gill nets for marketable fish by statistical district and season, 2014. n is sample size, sexes combined.

Stat. Dist.	Season*	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+		
Age Group Composition (%)**													
OE-1	Spring	-	-	53	20	13	3	13	-	-	-	4.0	40
	Summer	-	13	77	10	-	-	-	-	-	-	3.0	39
Mean Total Length (mm)													
OE-1	Spring	-	-	215	236	248	263	280	-	-	-	233	40
	Summer	-	215	228	248	-	-	-	-	-	-	228	39

* 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 ($\geq 76\text{mm}$) gill nets by statistical district and season, 2014. n is sample size, sexes combined.

Stat. Dist.	Season*	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+		
Age Group Composition (%)**													
OE-1	Fall	-	-	-	1	1	1	0	1	17	80	9.7	392
OE-2	Fall	-	-	-	-	5	-	-	-	26	68	9.5	19
Mean Total Length (mm)													
OE-1	Fall	-	-	-	484	506	546	503	580	573	586	582	392
OE-2	Fall	-	-	-	-	551	-	-	-	585	586	584	19
Mean Round Weight (g)													
OE-1	Fall	-	-	-	1029	1193	1661	1142	2000	1929	2095	2049	366
OE-2	Fall	-	-	-	-	1766	-	-	-	1984	1965	1960	19

* 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 contributed less than one percent (0.34%) by weight of the total annual commercial harvest landed in Ontario waters of Lake Erie. In 2014, total commercial landings were 77,743 pounds (Table 2.2.1) a decrease of 26% from 2013. Of this value, live fish accounted for 69%. The value of the total commercial landings in 2014 was \$88,674, a decrease of 18% from 2013, and 0.32% of the total value of the Commercial fishery in Ontario waters of Lake Erie (Table 2.2.1).

Yellow Perch

In 2014, the total landing of Yellow Perch was 7,749 pounds a decrease of 10% from 2013. The Inner Bay commercial fishery harvested 29% of their allocated quota in 2014. The majority of Yellow Perch (84%) were caught in the spring (April). The landed value of Yellow Perch in 2014 was negligibly smaller than 2013 at \$16,244.

Northern Pike

In 2014, the total landing of Northern Pike was 5,341 pounds, a decrease of 64% from 2013. The Inner Bay commercial fishery harvested 20% of their allocated quota in 2014. The majority of Northern Pike (91%) were caught in the spring (April). The landed value of Northern Pike in 2014 was \$2,075, a decrease of 43% from 2013.

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, 2014.

Species	Total Landing^a	Total Value
Bowfin	9,591	\$11,577
Brown Bullhead	22,098	\$10,388
Carp	4,120	\$1,580
Freshwater Drum	54	\$9
Lepomis spp.	22,304	\$36,701
Mudpuppy	1,764	\$1,710
Northern Pike	5,341	\$2,075
Pomoxis spp.	1,336	\$4,430
Rock Bass	3,329	\$3,953
White Perch	57	\$7
Yellow Perch	7,749	\$16,244
Total Landing (lbs.)	77,743	
Total Value (\$)		\$88,674

^a Only Inner Long Point Bay.

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 31st year in 2014. 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.

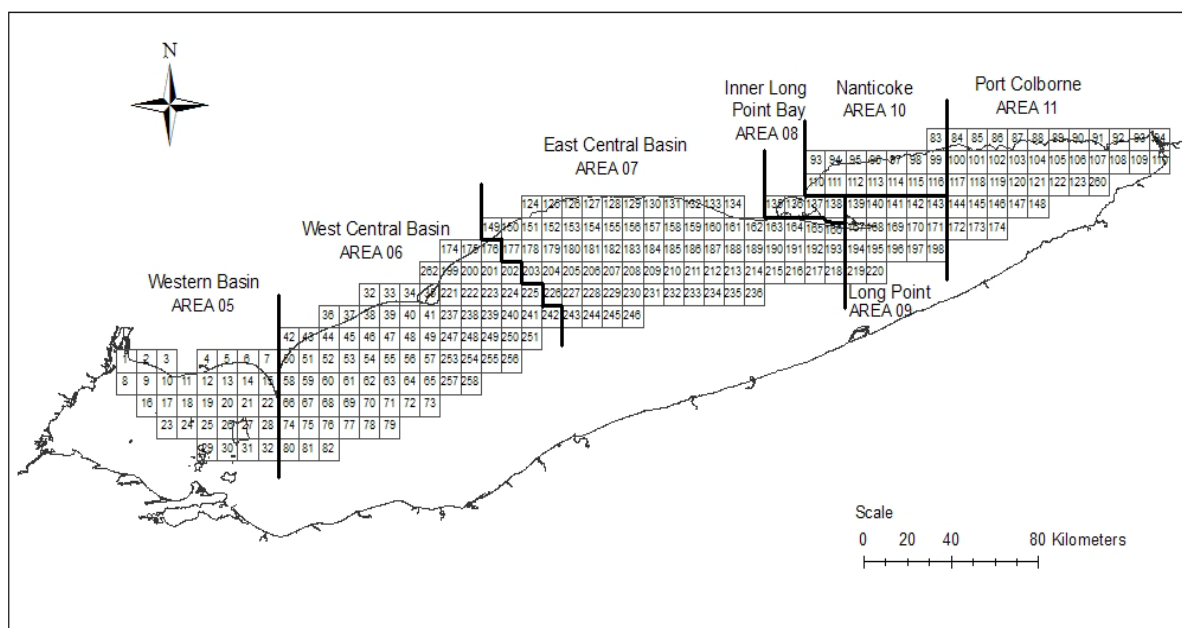


Figure 3.1 Lake Erie Sport Fishery Diary Survey Areas, 2014.

In 2014, 54 volunteers from Ontario completed angler diaries in Lake Erie. This was down from 60 participants in 2013. Of the Ontario Sport Fishery Diary volunteers, 87% have been participating in the program for three years or more. Seventy-two percent have been involved in the program for twelve years or more and 48% 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 2014, 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)

Thirteen participants completed diaries with western basin fishing effort. Western basin diarists fished 1,165 rod hours of effort over 70 fishing trips (Table 3.1). The majority of angling effort recorded by diarists in the western basin was directed towards Walleye (80%) and Yellow Perch (24%) (Table 3.4, Figure 3.2). No additional species were targeted in the western basin. Four hundred and seventy-six Walleye were caught, and 1,579 Yellow Perch were caught in the western basin (Table 3.3).

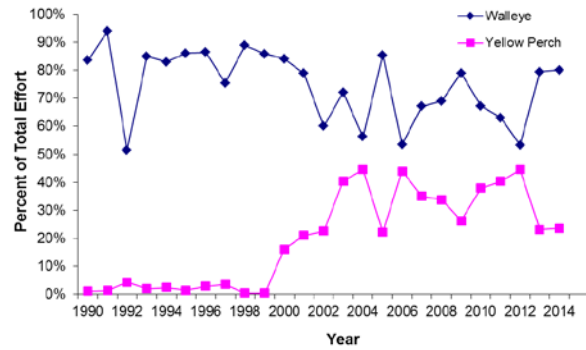


Figure 3.2 Western basin angler percent of area effort, Lake Erie Sport Diary Program, 1990-2014.

The Walleye catch per unit effort (CPUE) was 0.505 fish per rod hour; this was a 1% decrease from the 2013 CPUE. The CPUE for Walleye was higher in the western basin (0.505 fish per rod hour) than in the central (0.181 fish per rod hour) and eastern basins (0.251 fish per rod hour) (Figure 3.5). The Yellow Perch CPUE was 5.726 fish per rod hour; this was a decrease of 11% from the 2013 CPUE. The CPUE for Yellow Perch was the highest in the central (5.859 fish per rod hour) and western basins (5.726 fish per rod hour) compared to the eastern basin (4.212 fish per rod hour) (Figure 3.6).

Central Basin (Areas 06 and 07)

Twenty-six participants completed diaries with central basin fishing effort. Central basin diarists fished 3,241 rod hours of effort over 147 fishing trips (Table 3.1). The majority of angling effort recorded by diarists in the central basin was directed towards Walleye (71%), Rainbow Trout (57%) and Yellow Perch (28%) (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. Fifty-six Rainbow Trout were caught, 418 Walleye were caught, and 5,454 Yellow Perch were caught in the central basin (Table 3.3).

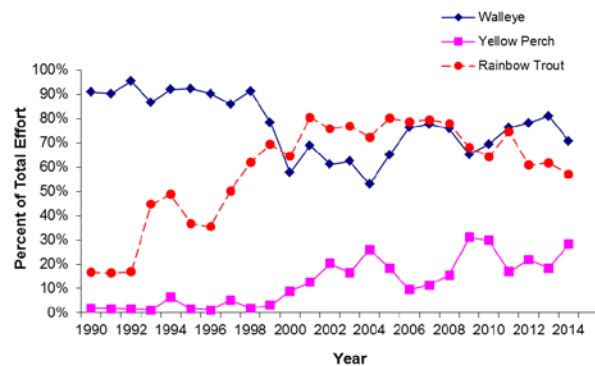


Figure 3.3 Central basin angler percent of area effort, Lake Erie Sport Diary Program, 1990-2014.

The overall central basin Walleye CPUE was 0.181 fish per rod hour; this was an increase of 10% from 2013 CPUE (Figure 3.5). Walleye CPUE was higher in the east-central basin (Area 06; 0.229 fish per rod hour) than the west-central basin (Area 07; 0.148 fish per rod hour) (Table 3.5). The overall central basin Rainbow Trout CPUE was 0.030 fish per rod hour; this was a decrease of 50% from the 2013 CPUE. Rainbow Trout CPUE was the same in both the west-central and east-central basins (0.030 fish per rod hour; Table 3.5). The overall central basin Yellow Perch CPUE was 5.859 fish per rod hour; this was a decrease of 6% from the 2013 CPUE. Yellow Perch CPUE was higher in the east-central basin (Area 07; 5.925 fish per rod hour) than the west-central basin (Area 06; 3.116 fish per rod hour), however there were only 4 trips for Yellow Perch in the west-central area.

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

Twenty-nine participants completed diaries with eastern basin fishing effort. Eastern basin diarists fished 2,016 rod hours of effort over 240 fishing trips (Table 3.1). The majority of angling effort recorded by diarists in the eastern basin was directed towards Yellow Perch (50%), Smallmouth Bass (30%) and Walleye (15%) (Figure 3.4). Other fish species targeted in the eastern basin with at least 1% of the effort included: Largemouth Bass (8%), Northern Pike (7%), Rainbow Trout (1%) and Rock Bass (1%). Seventy-four Walleye were caught, 801 Smallmouth Bass were caught, and 4,298 Yellow Perch were caught in the eastern basin (Table 3.3).

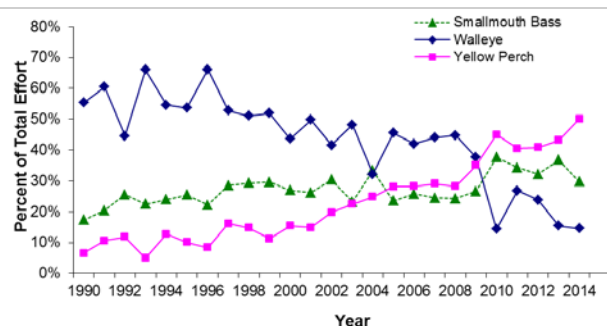


Figure 3.4 Eastern basin angler percent of area effort, Lake Erie Sport Diary Program 1990-2014.

The overall eastern basin Yellow Perch CPUE was 4.212 fish per rod hour; this was a decrease of 6% from the 2013 CPUE (Figure 3.6). Within the east basin, Yellow Perch CPUE was highest in the Inner Long Point Bay area (Area 08; 4.532 fish per rod hour) (Table 3.7). The overall eastern basin Smallmouth Bass CPUE was 0.982 fish per rod hour; this was a decrease of 24% from the 2013 CPUE. Smallmouth Bass CPUE was highest in the Nanticoke area (Area 10; 1.604 fish per rod hour) (Table 3.6). The overall eastern basin Walleye CPUE was 0.251 fish per rod hour; this was a decrease of 27% from the 2013 CPUE (Figure 3.5). Walleye CPUE was highest in the Port Colborne area (Area 11; 0.271 fish per rod hour) (Table 3.6).

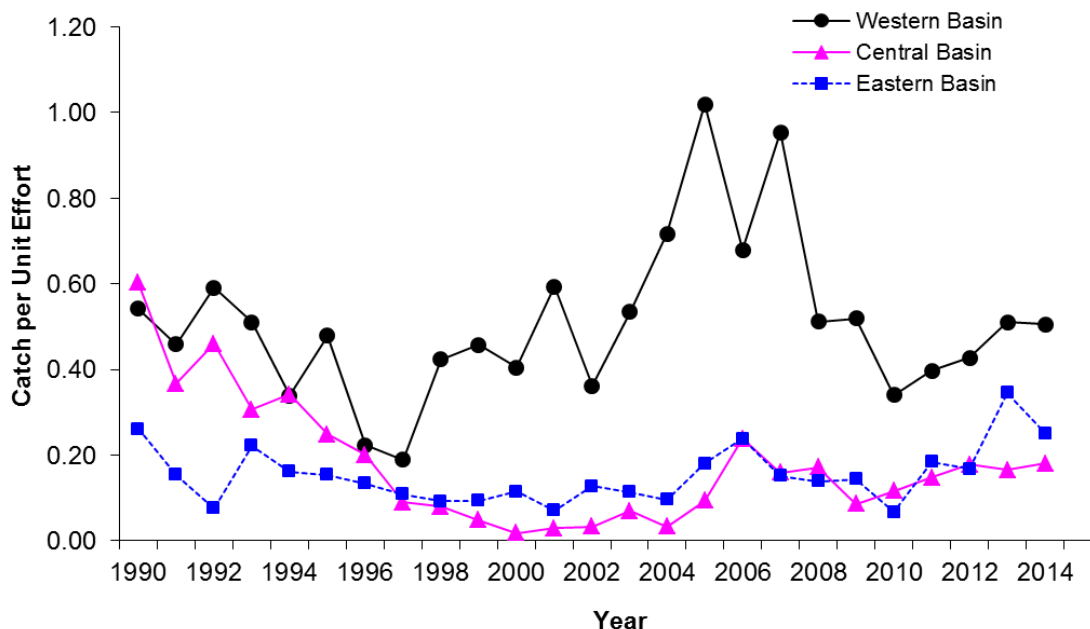


Figure 3.5 Walleye catch per unit effort (fish per rod hour) by basin, Lake Erie Sport Diary Program, 1990-2014.

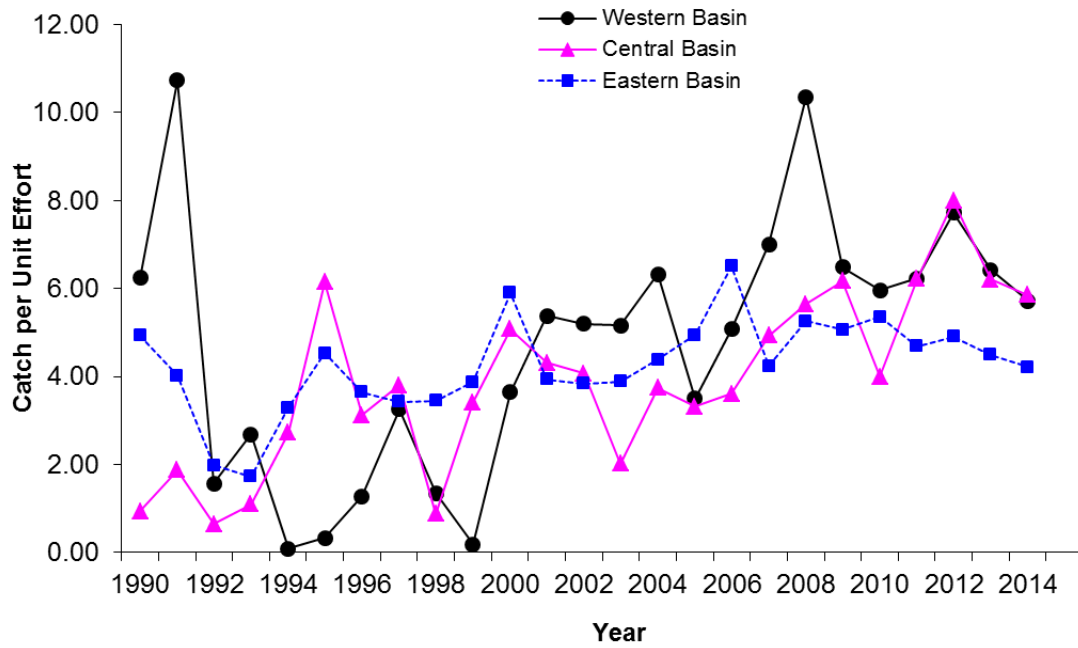


Figure 3.6 Yellow Perch catch per unit effort (fish per rod hour) by basin, Lake Erie Sport Diary Program 1990-2014.

Table 3.1 Total effort by survey area, reported by Sport Fishery Diary Program non-charter boat participants, 2014.

Survey Area	Number of Diarists	Number of Trips	Number of Rods per Trip	Total Rod Hours
Western Basin	13	70	3.9	1,165
West-Central Basin	11	48	6.2	1,389
East-Central Basin	15	99	4.2	1,852
Inner Long Point Bay	21	105	2.2	850
Long Point Bay	5	20	2.6	181
Nanticoke	8	92	2.2	658
Port Colborne	5	23	3.1	328
Total	54^a	457	3.4	6,423

^aDiarist 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, 1986-2014.

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
90-14 Avg.	24	149	1,678	32	219	4,310	31	203	3,150	45	266	2,700

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
90-14 Avg.	25	115	1,555	29	193	1,799	24	219	3,428	128	1,365	18,620

Table 3.3 Total catch and harvest reported by sport fishery diary non-charter boat participants, Lake Erie Sport Fishery Diary Program, 2014.

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
Bowfin							2								2	-
Chinook Salmon				1	1										1	1
Coho Salmon		1	1												1	1
Rainbow Trout		37	35	19	18	10	16				1	1			73	64
Brown Trout				1	1						1				2	1
Rainbow Smelt				5							1				6	-
Northern Pike	1		2				63	12	128	36	3	1			197	49
Muskellunge	2						1								3	-
Common Carp							15		1						16	-
Brown Bullhead							2		2		7				11	-
Channel Catfish	1			4			11				3				19	-
White Perch	69	1	20	16							4		24		133	1
White Bass	59		39	1	171	11					13	1	33		315	13
Rock Bass				2	2		180	33	10		63	4			255	39
Pumpkinseed											2				2	-
Blue Gill							3				1	1			4	1
Smallmouth Bass	4						493	232	63	9	229	58	16	2	805	301
Largemouth Bass			31				192	21	2						225	21
White Crappie											1				1	-
Black Crappie							1								1	-
Lepomis sp.							18				1				19	-
Yellow Perch	1,589	1,177	67	33	5,387	4,274	1,479	684	541	200	2,001	1,255	277	210	11,341	7,833
Walleye	476	445	198	196	220	219					7	7	67	58	968	925
Round Goby	4				69	55					21	3	16	8	110	66
Freshwater Drum	92	4	27		96	10	35	2	3		22		4		279	16
Total	2,297	1,627	422	266	5,991	4,591	2,511	994	750	245	2,381	1,331	437	278	14,789	9,332

Table 3.4 Angler success rates (CPUE) of non-charter boat angler diarists targeting particular species, western basin survey area, Lake Erie, 1990-2014^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%
90-14 Avg.	1,628	111	1,220	0.508	75%	30	297	4.718	12%

^aCPUE 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 angler diarists targeting particular species, west-central and east-central basins survey areas, Lake Erie, 1990-2014^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%
90-14 Avg.	4,273	166	3,432	0.169	79%	110	2,675	0.138	68%	18	194	4.451	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%
90-14 Avg.	3,101	150	2,457	0.195	75%	68	1,407	0.072	47%	44	547	3.568	22%

^aCPUE 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 angler diarists targeting particular species, Inner Long Point Bay and Long Point Bay survey areas, Lake Erie, 1990-2014^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%
90-14 Avg.	2,750	135	1,487	0.860	55%	70	699	4.948	28%	23	710	1.099	23%	27	261	0.452	9%

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%
90-14 Avg.	1,516	39	586	0.082	36%	63	928	0.079	46%	10	101	0.960	19%	20	224	1.090	21%

^aCPUE 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 angler diarists targeting particular species, Nanticoke and Port Colborne survey areas, Lake Erie, 1990-2014^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	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%
90-14 Avg.	1,778	87	623	4.384	49%	72	881	0.088	34%	21	241	0.062	13%	35	298	1.346	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%
90-14 Avg.	3,487	148	2,833	0.173	80%	46	460	0.979	12%	26	206	2.014	9%

^aCPUE 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). Field work 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 used 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 2014, 133 sites were fished across Lake Erie by 8 commercial fishing vessels including the Amanda May, Lincoln R, William TR, H & R, Carol Ann II, Cosley Bros, Nancy A Siddall, and the CJ Weaver (Figure 4.1.1). Extra sites within the Walleye Cap Area (east of 79° 40') were not fished during 2014. 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 2014 are made for index and auxiliary gear. Also in 2014, 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 inches (57 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 were approximately 24 hours in duration.

Nets were set at randomly selected sites within the designated depth strata. The number of sites within each stratum was proportional to lake area. 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. The number of locations fished in the west, west-central, east-central, Pennsylvania Ridge and east basin surveys were 22, 36, 36, 9 and 30 respectively.

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 in the thermocline in 2014 at sites with depths sufficient for a hypolimnion (cold bottom layer) to exist.

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 Yellow Perch, Walleye, 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. In 2014, 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 August 31 in Pennsylvania Ridge and ran until the east basin survey was completed on September 9, 2014. Fishing began in the western basin on September 12, 2014 and was completed by September 18, 2014. The west-central basin survey started on October 13 after fall turnover and was finished by October 22, 2014. Index fishing continued in the east-central basin survey from October 23 to November 2, 2014.

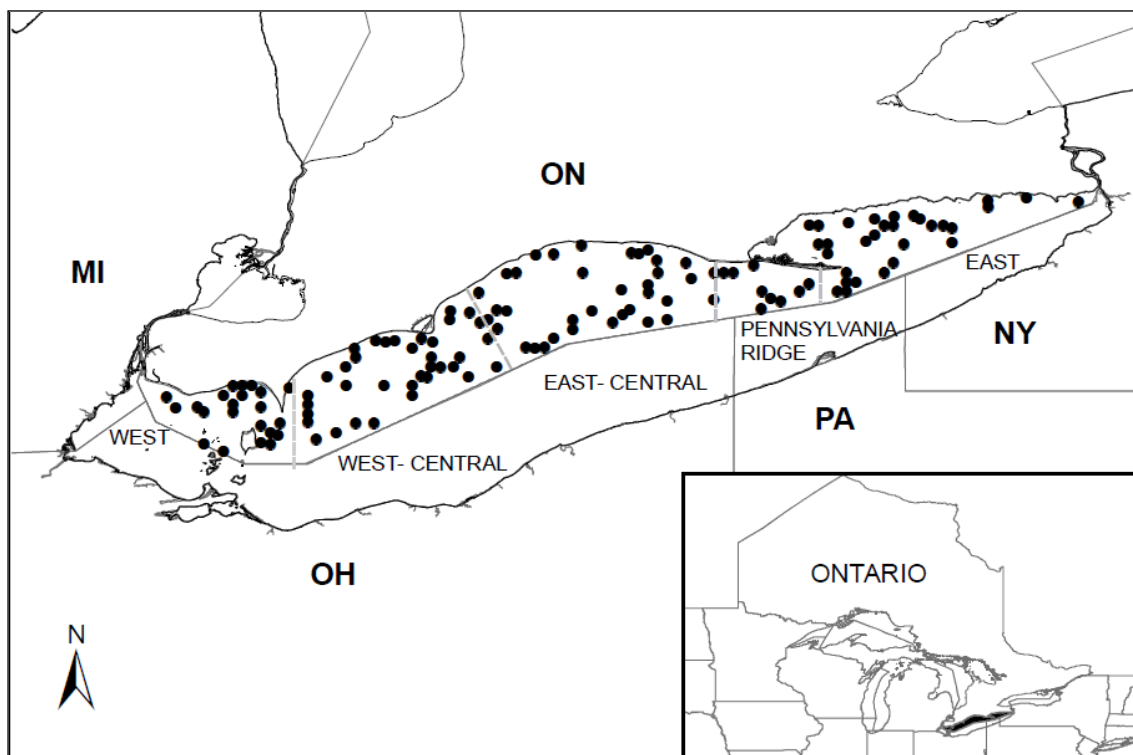


Figure 4.1.1 Lake Erie Partnership Index Fishing gill netting locations fished in 2014.

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 basin 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 1999. 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 (1989-2000) and Table 4.1.6b (2001-2014) with corresponding sampling effort by gear.

Alewife abundance in Lake Erie was depressed since 2003, then increased in 2012 and was above average by 2013. In 2014 surveys, only one Alewife appeared in nets lakewide; the adult Alewife was caught in the east basin survey (Tables 4.1.1 – 4.1.6). Gizzard Shad abundance indices were below average in the west and west-central basin surveys sparsely distributed in east-central and Pennsylvania Ridge areas and absent from the east basin survey (Tables 4.1.1 - 4.1.5). Length distributions indicated young-of-the-year (YOY) represented 92%, 88% and 79% of Gizzard Shad caught in the west, west-central and east-central basin surveys, respectively. The single Gizzard Shad caught on Pennsylvania Ridge was an adult.

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 survey (Tables 4.1.1, 4.1.3). By 2000, they were present in the east basin survey (Table 4.1.5). Lakewide, the catch of Round Gobies in 2014 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 2014 were moderate lakewide but differed regionally (Table 4.1.6). In the west basin, total catch was above average while catches in the west-central and east-central basin surveys were below average (Tables 4.1.1 to 4.1.3). Albeit with fluctuations between years, Freshwater Drum catches exhibited a gradual decline over the time series in the east basin where catches attained moderately low numbers in 2014 (Table 4.1.5). In 2014, Freshwater Drum catches were above average in the Pennsylvania Ridge where habitat transition may contribute to high fish concentrations (Table 4.1.4). Although YOY Freshwater Drum were present in west basin catches during 2014 based on length frequencies, recruitment has been depressed during recent years. Correspondingly, mean length of Freshwater Drum has trended upwards over time series throughout Lake Erie.

Burbot catch (9) in index gear during 2014 was the third lowest catch in the 26 year time series, but was slightly higher than 2013 (7) (Tables 4.1.4 - 4.1.6). Catches in index gear were distributed across Lake Erie in the following manner: west-central (2), east-central (1), Pennsylvania Ridge (1) and east basin (5). Three additional Burbot were caught in auxiliary 121 mm gill nets in the west-central basin. Of the 9 Burbot caught in index gear, 2 were mature females and 7 were mature males. Eggs in one female caught in the east basin were few, clumped and hardened. No Sea Lamprey wounds or scars were observed. Burbot abundance peaked in 1998 and has continued to decline since then due to poor recruitment.

In 2014, a total of twenty five (25) Lake Trout were caught, distributed among surveys as follows: east-central basin (1), Pennsylvania Ridge (6) and the east basin (18). Twenty one (21) Lake Trout were caught in nets fished on bottom while four Lake Trout were caught in canned nets fished in the east-central (1), Pennsylvania Ridge (1) and east basin (2) surveys. Depths at which Lake Trout were caught ranged from 9 to 49 m (mean=28 m). Water temperatures at which Lake Trout were caught ranged from 4.6 °C to 21.8 °C (mean=11.1 °C) with warmer temperatures associated with capture in suspended gill nets. In 2014, no Lake Trout were caught in auxiliary 121 mm gear. The

east basin Lake Trout index dropped from 2013 to just below the time series mean (Table 4.1.5). Lake Trout are stocked in Lake Erie by U.S. agencies and Ontario Ministry of 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. Of the 25 Lake Trout caught in index nets, 23 had adipose fin clips while two were not fin clipped and lacked a coded wire tag (CWT). Strains were identified for 21 Lake Trout from their coded wire tags. The number of Lake Trout by strain in 2014 was Slate Island (8), Lake Champlain (10) and Finger Lakes (3). Lake Trout caught in 2014 had total lengths ranging from 405-759 mm with a mean length of 631 mm. The fraction of Lake Trout observed with wounds was 0.16 and the fraction with scars was 0.20. The wounding rate (wounded Lake Trout per 100 examined) of type A1, A2 or A3 was observed to be 2/22 or (0.09) on adult Lake Trout with total lengths greater than or equal to 532 mm. Of the 8 Slate Island strain Lake Trout caught, 1 had A1-A3 wounds (0.13) and none had A4 wounds while 3 (0.38) were scarred. Of the 10 Lake Champlain strain Lake Trout caught, 1 had A1-A3 wounds (0.10) while 2 had A4 wounds (0.20) and 3 had scars (0.30). One of three (0.33) Finger Lakes strain Lake Trout had scars but none had wounds. One (1) of the four Lake Trout lacking a coded wire tag had an A4 wound (0.25).

In the west basin survey, one (1) Lake Sturgeon was caught in index gill nets during 2014 (Table 4.1.1). One (1) additional Lake Sturgeon was also caught in auxiliary 121 mm canned nets fished in the west basin. Both fish were identified and released unharmed. 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 2014, sixteen (16) Silver Chub were caught in the west basin whereas three (3) were caught in the east-central basin Partnership survey. The Silver Chub ranged from 125 to 219 mm total length with a mean length of 188 mm. Lake Erie is in the northern part of the geographic range of Silver Chub. The status of Silver Chub is currently listed as *Special Concern* under the Endangered Species Act of Ontario.

Lakewide Rainbow Trout (or Steelhead) catch (8) during Partnership index gill netting was below average in 2014 (Table 4.1.6b). Rainbow Trout were distributed among standard canned nets, canned nets fished in the thermocline and in nets fished on bottom in the east basin and Pennsylvania Ridge surveys. Catches in thermocline nets are not reported in the Pennsylvania Ridge and east basin survey Tables 4.1.4 and 4.1.5 due to periodic use of this gear over time. All catches of Rainbow Trout in index gear are included in the lakewide summary Table 4.1.6. One additional Rainbow Trout was caught in auxiliary 50 mesh 121 mm nets fished in the Pennsylvania Ridge area. One of 9 Rainbow Trout had a Sea Lamprey wound (A3). 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 (610 mm total length, 3,149 g) was caught in the east 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 2014 (64 kg / gang) was ranked 58th percentile in the time series, just above the basin average (60 kg / gang). In contrast, west-central biomass in 2014 (38 kg / gang, 29th percentile) was below the time series average (56 kg / gang). Similarly, east-central (28 kg / gang, 28th percentile) and east basin (14 kg / gang, 24th percentile) biomass catch rates were both below their respective time series means (39, 20 kg / gang). Biomass in the Pennsylvania Ridge survey in 2014 (39 kg / gang) was 61st percentile and above the average for this area (31 kg / km). Mean fish biomass per gang of all fish species caught was greatest in the west basin in 2014, followed by

Pennsylvania Ridge, west-central, east-central and east basins.

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 2014 surveys.

Fish biomass in the 2014 west basin survey increased 31% from 2013, and consisted of White Perch (25%), Yellow Perch (20%), Freshwater Drum (14%), Walleye, (10%), Channel Catfish (10%), White Bass (10%), Gizzard Shad (8%) and other species (3%). White Suckers (1%) and Shorthead Redhorse Suckers (1%) also contributed significantly to west basin biomass in 2014. White Perch, Channel Catfish and Freshwater Drum attained record high biomass in 2014 for each of their respective time series. Similarly, White Bass biomass in 2014 was the second highest observed in the west basin time series. Yellow Perch biomass in 2014 was moderate (58th percentile) while Gizzard Shad and Walleye biomass levels were low compared to previous years (13th and 4th percentiles respectively). Alewife biomass was zero in the 2014 west basin survey. Smallmouth Bass historically accounted for more than 1% of all biomass but represented less than 1% in 2014 and 2014 biomass ranked 25th percentile over the 1990-2014 west basin time series. Shorthead Redhorse and Quillback Carpsucker biomass exceeded 70th percentiles in 2014 while White Sucker biomass was 17th percentile in 2014. Goldfish biomass was 2nd highest in the time series in 2014.

West-central basin total biomass per gang in 2014 was 43% lower than 2013. Mean biomass per gang in 2014 was dominated by Yellow Perch (35%), White Perch (26%), Walleye (12%), Freshwater Drum (11%), White Bass (7%), and Gizzard Shad (3%) leaving 6% attributed to other species. White Bass biomass in 2014 was 88th percentile in the time series. Moderate levels of biomass in 2014 relative to each respective time series were observed for White Perch (54th percentile), Yellow Perch (42nd percentile) and Walleye (38th percentile). Mean biomass for Gizzard Shad and Freshwater Drum in 2014 ranked 4th in percentiles for both species while Alewife biomass was zero in 2014. White Suckers (2% of total biomass) and Channel Catfish (3% of total biomass) represented 42nd and 92nd percentiles in their time series respectively.

In the east-central basin survey, mean biomass per gang of all species in 2014 decreased 21 % from 2013. East-central basin biomass in 2014 consisted of Yellow Perch (57%), White Perch (18%), Walleye (9%), Freshwater Drum (7%), and White Bass (5%) with minimal Gizzard Shad biomass (<1%) and no Alewife biomass (0%). Other species accounted for 3% of biomass in 2014. Moderate or better levels of biomass were observed for White Bass, Yellow Perch, Walleye and White Perch in 2014. Biomass ranked low in 2014 for Gizzard Shad, Alewife and Freshwater Drum relative to 1989-2014.

In the east basin survey, mean biomass per gang of all species in 2014 declined 29% from 2013. The species composition of eastern Lake Erie consists of warm, cool, and cold water fish communities. Eight species represented 97% of the fish biomass in 2014 including Walleye (27%). Yellow Perch (17%), White Bass (17%), Freshwater Drum (16%), Smallmouth Bass (6%), Lake Trout (6%), White Perch (4%) and Burbot (1%). Alewife and Gizzard Shad each represented less than 1% of the east basin biomass in 2014. White Bass biomass in 2014 was the highest observed in the east basin time series. Mean Walleye biomass was 3rd highest in the east basin time series. Freshwater Drum, White Perch and Lake Trout biomass levels were greater than 2/3 of values in each respective time series. Freshwater Drum contributed more to biomass than numerically as they were composed of large fish. Yellow Perch (35th), White Sucker (30th), Smallmouth Bass (13th) and Burbot (4th) ranked lower in biomass percentiles in 2014 compared to 1989-2013. Alewife and Gizzard Shad biomass levels in 2014 represented the lowest values in each species time series. Other species that contributed significantly to total biomass in 2014 were Rock Bass (1%), Rainbow Trout (1%) and Rainbow Smelt (1%). Lake Whitefish biomass in the east basin survey was zero in 2014. Numbers were rounded to the nearest percentage.

Yellow Perch

In 2014, Yellow Perch catch rates (all ages) increased significantly in the west (122%) and east-central (89%) basin surveys but increased only minimally (5%) in the west-central basin (Figure 4.1.3). In contrast, catch rates of Yellow Perch decreased in the Pennsylvania Ridge (from 2012) (46%) and east basin (36%) surveys. Yellow Perch catch rates (all ages) in 2014 ranked 83rd, 46th, 67th, 50th and 35th in percentiles for the west, west-central, east-central, Pennsylvania Ridge and east basin surveys respectively. Ages 2 and older abundance ranked 29th, 50th, 71st, 50th and 35th percentiles for the west, west-central, east-central, Pennsylvania Ridge and east basins 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.

Ages 1 to 8 were present in the 2014 west basin survey with age 1 Yellow Perch being the most abundant age group (2013 year class; 52%) followed by age 4 (2010 year class; 17%) and age 2 (2012 year class, 16%) (Figure 4.1.3). In the 2014 west-central basin survey, the Yellow Perch age composition included ages 1 to 11 with age 2 (2012 year class 58%), age 3 (2011 year class 17%) and age 4 (2010 year class 12%) most abundant. East-central Yellow Perch catches consisted of fish ages 1 to 11 with age 2 (2012 year class, 39%), age 3 (2011 year class, 22%) and age 4 (2010 year class, 17%) representing 78% of the catch. The east basin survey was composed of Yellow Perch age 2 (2012 year class, 64%), age 3 (2011 year class, 14%) and age 4 (2010 year class, 14%) with ages ranging from 1 to 11. In contrast, Pennsylvania Ridge catches were comprised of Yellow Perch age 6 (2008 year class, 21%) with significant contributions from ages 2 (15%), 3 (19%) and 4 (16%).

The cohort strength of the 2013 year class was assessed as strong in the west basin (92nd percentile) and to a lesser degree, in the Pennsylvania Ridge survey (75th percentile) (Figure 4.1.3). Yearling Yellow Perch were less prominent in central and east basin surveys, with catch rates in 2014 ranking 29th, 25th and 22nd percentiles for the west-central, east-central and east basins respectively. The abundance index of Yellow Perch ages 6 and older in 2014 was the highest in the Pennsylvania Ridge survey where they represented 41% of Yellow Perch caught. Ages 6 and older Yellow Perch were also significant in the 2014 east-central basin survey, accounting for 19% of Yellow Perch caught. The contribution of age 6 and older Yellow Perch in the west-central and east basin surveys was similar (7%) but was less significant in the west basin survey (3%).

The mean age of Yellow Perch caught reflects differences in age composition between surveys with the highest value in the Pennsylvania Ridge survey (3.9) and the lowest value in the west basin (2.4) (Figure 4.1.4). Yellow Perch sex ratios remained relatively stable over the time series to 2014, during which females represented 45% to 57% 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 2014 with 95% confidence limits to compare with the time series average up to 2013 (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 and weight at age in 2014 appeared to be above average for ages 1, 2 and 3 in the west and east basins but closer to average in both central basin surveys. Mean size of ages 5 and older Yellow Perch in central and east basin surveys were generally below time series means in both length and weight. 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 with general upward trends most evident in the west and east basin surveys. Change in mean size from 2013 differed by area; west and east survey mean length remained similar or increased in 2014. Decreased mean length at age in 2014 was evident for some ages compared to 2013 in both central basin surveys (Figure 4.1.7).

All Yellow Perch caught during the 2014 fall Partnership gill net survey were scanned for passive integrated transponder tags (PIT) which have been applied by Ontario MNRF since 2009 and by Ohio Department of Natural Resources (ODNR) since 2013. Of Yellow Perch 17 cm and larger, 18,226 Yellow Perch (2,448 kg) 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 2014.

Walleye

Abundance indices of Walleye in 2014 followed a gradient in relative status which improved from west to east across Lake Erie, albeit with differences in age composition among areas assessed. Walleye catch rates in 2014 represented 17th, 25th, 46th, 73rd, and 83rd percentiles in the west, west-central, east-central, Pennsylvania Ridge and east basin surveys respectively (Figure 4.1.8). Similarly, indices of Walleye relative abundance for ages 2 and older increased from west to east described by percentiles for each survey: west (8th), west-central (46th), east-central basin (68th), Pennsylvania Ridge (82nd), and east basin (92nd).

Walleye catch rates in 2014 increased from 2013 in the west (20%), west-central (8%) and east-central basin surveys (9%) and 100% in the east basin survey (Figure 4.1.8). The Pennsylvania Ridge was not assessed in 2013 but Walleye catch rates in 2014 exceeded 2012 by 88%. The increase in the west survey catch rates was attributed to the presence of abundant young-of-the-year (YOY). Increased Walleye catch rates in the east basin survey was attributed to catches of Walleye ages 2 and 4 but also to older age groups present including age 11 (2003 cohort) which accounted for 11% of Walleye caught.

Ages ranged from 0-15, 0-22, 0-20, 1-13 and 2-22 in the west, west-central, east-central, Pennsylvania Ridge and east basins surveys respectively. Young-of-the-year Walleye catch rates were high in the west (96th percentile), west-central basin (88th percentile) and east-central (75th percentile) basin surveys but were absent in the Pennsylvania Ridge and east basin surveys (Figure 4.1.8). Age 1 Walleye indices were moderate in the west (42th percentile) and west-central basin (38th, percentiles) and Pennsylvania Ridge surveys (55th percentile), but were weaker in the east-central basin (4th percentile) and absent in the east basin assessment. Age 2 Walleye catch rates in 2014 were moderate throughout Lake Erie except in the east basin survey where the 2014 catch rate ranked 91st percentile in the times series. Age 3 catch rates were moderate in the west but higher in surveys eastward with percentiles ranging from 50 to 75 with the exception of the Pennsylvania Ridge survey where age 3 catches were 95th percentile in the time series. Catch rates of age 4 Walleye in 2014 were also moderate in most surveys, with the exception of the Pennsylvania Ridge and east basin surveys catch rates which ranked 80th and 96th percentiles respectively. Walleye ages 5 and 6 contributed minimally to catches in the west and central basin surveys and ranked from 4th to 38th percentile in their respective time series. In the Pennsylvania Ridge and east basin surveys, catch rates for Walleye ages 5 and 6 in 2014 were higher in their time series (Pennsylvania Ridge: 65th, 75th percentiles) and (east: 74th, 91st percentiles) respectively and also represented larger fractions of Walleye caught in 2014. Catch rates of age 7 and older Walleye were relatively abundant in all surveys, each representing the 75th, 83rd, 92nd, 95th and 96th percentiles in the west, west-central, east-central, Pennsylvania Ridge and east basin surveys respectively. The 2003 year class represented 2, 11, 27, 19, and 11% of walleye caught in west, west-central, east-central, Pennsylvania Ridge and east basins respectively.

The mean age of Walleye caught in 2014 was lowest in the west (1.2), followed by the west-central (3.6) and east-central basins (5.5), east basin (6.0) and Pennsylvania Ridge surveys (6.6) (Figure 4.1.9). Walleye mean age in 2014 was influenced by the strength of the 2014 year class (age 0) at magnitudes that declined eastward.

The percentage of age 2 and older Walleye caught that were female in 2014 surveys ranged from 53% to 74% in surveys. In 2014, the proportion of age 2 and older Walleye that were female was above average in all surveys, with the proportion of females caught in the 2014 west-central basin survey (53%) exceeding the mean (51%) only slightly.

Mean total length (mm) and weight (g) with 95% confidence limits for each sex was plotted by basin for Walleye collected in 2014. 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 were generally above or near average in length and weight for ages 1 to 6 in the west and west-central basin surveys (Figure 4.1.11). In the east-central and east basin, Walleye size at age appeared near average. Mean weight at age for older Walleye generally appeared near or below average; however this could be attributed in part to using different age structures over time. Figure 4.1.12 illustrates that in 2014 and recent years, Walleye mean lengths for ages 1 to 3, were high relative to the time series in the west and central basin surveys in particular.

Walleye index gill net catch rates were greater in bottom nets compared to standard canned index nets in 2014 for all surveys except the east-central basin survey where the reverse was observed (Figure 4.1.13). Catch rates in auxiliary index nets fished at 1 fathom (1.8 m) depths in the west-central basin were lower than for standard canned and bottom nets but catch rates were higher in 1 fathom nets than both gear configurations in the east-central basin survey (Figure 4.1.13). In the east basin survey the Walleye catch rate in nets fished within the thermocline (2.2 Walleye / gang) exceeded the catch rate of standard canned nets (1.5 Walleye / gang) but was less than nets fished on bottom (3.2 Walleye / gang).

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), followed by the east-central basin (1.0), east basin (0.8) and in the western basin at standard canned depths (0.1) (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 (2 m). Total lengths of Walleye caught in index nets ranged from 15 to 77 cm whereas commercial style 4¾" nets caught Walleye 46 cm to 73 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 2014 were the lowest observed for both the pooled west-central and east basin series since 2003 (Figures 4.1.15 and 4.1.16). Ages in the west and central surveys ranged from 2 to 15 with ages 11 (27%), 4 (19%) and 7 (18%) most common. In the east basin, Walleye ages ranged from 4 to 13 with ages 11 (27%), 4 (20%) and 7 (20%) most abundant. Walleye ages 7 and older accounted for 52% of Walleye caught in the west and central areas compared to 60% of Walleye caught in the east basin (Figures 4.1.14 and 4.1.15).

All 1,350 Walleye caught and sampled during Partnership surveys were scanned for PIT tags in 2014. 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.

Nine (9) Lake Whitefish were caught in Partnership index gear in 2014. Catches were distributed between the west-central basin (7) and east-central basin (2). One additional Lake Whitefish was caught in auxiliary 121 mm canned nets in the west-central basin in 2014.

Lake Whitefish indices (LWF / gang) remained low in 2014; catch rates by basin were: west-central (0.1), east-central (0.03), Pennsylvania Ridge (0) 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 2014 composite index was the 2nd lowest over the time series presented, marginally higher than the lowest value observed in 2013.

The age composition of Lake Whitefish caught in Partnership index gear in 2014 included ages 4 to 14, with age 11 (2003 year class) Lake Whitefish caught most frequently. A male Lake Whitefish caught in auxiliary 121 mm gear was age 17. The presence of age 4 and 5 Lake Whitefish in surveys is a positive sign with unclear significance as they were the only two young fish caught. None of the 10 Lake Whitefish sampled had Sea Lamprey wounds or scars.

The mean age in the Lake Whitefish population began a trend upward with the recruitment of the 2003 year class at age 2. In 2014, the mean age dropped slightly from 2013 due primarily to contributions of age 4 and 5 Lake Whitefish in 2014 (Figure 4.1.17). The lengths and weights of Lake Whitefish at age caught in index gill nets during 2014 are presented in Figure 4.1.18 along with mean size at age over the time series. Only one Lake Whitefish caught in 2014 was female. Based on 9 Lake Whitefish sampled from index nets, mean length and weight at age by sex appeared close to or above average levels.

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). Partnership index catch rates in 2014 increased marginally from 2013 but remained below the long term means for both the west and east basin (Table 4.1.1, Table 4.1.5, Figure 4.1.19). West basin Smallmouth Bass age composition ranged from 1 to 10 whereas east basin ages ranged from 1 to 12. Age 1 and 2 accounted for the largest fraction of Smallmouth Bass caught in the west basin survey. Eastern Smallmouth Bass age composition was more evenly distributed, with age 2 being the most abundant cohort (2012). Mean length and weight at age in 2014 was most often near or above average for male Smallmouth Bass while female mean size at age was distributed equally above and below long term means for length and weight in the west basin survey. In the east basin survey, male and female Smallmouth Bass sizes at age were generally near the long term means with several exceptions for older fish with smaller sample sizes.

White Perch

Temporal trends in White Perch catch rates differed across Lake Erie. Catch rates in 2014 increased in the west (from 2013) and Pennsylvania Ridge (from 2012) surveys but decreased from 2013 in the central and east basin surveys (Tables 4.1.1 – 4.1.5). White Perch catches in 2014 were above average in the west basin and Pennsylvania Ridge but were moderate in central and east basin surveys relative to their respective times series (Tables 4.1.1 – 4.1.5). White Perch ages ranged from 1 to 8 in the west, 0 to 9 in the west-central, 1 to 9 in the east-central, 0 to 7 in the east and 2 to 6 in Pennsylvania Ridge surveys. In all surveys, ages 2 (2012 year class) and 3 (2011 year class) represented the majority of White Perch caught in 2014 (Figure 4.1.21). Mean lengths and weights at age were near or above average in all basins surveyed in 2014 (Figure 4.1.22).

White Bass

White Bass abundance indices were above average in all surveys except for the east-central basin survey (Tables 4.1.1 - 4.1.6). Catch rates increased in the west basin and Pennsylvania Ridge surveys but decreased in the central and eastern surveys (Figure 4.1.23). White Bass ages ranged from 0 to 8 in the west, 0 to 6 in the west-central, 2 to 5 in the east-central, 2 to 7 in Pennsylvania Ridge and 2 to 8 in the east basin surveys (Figure 4.1.23). Age 2 (2012 cohort) White Bass dominated all surveys, representing from 69% to 89% of White Bass caught. Mean weight at age was often below average for White Bass ages 2 and older in the west and central basin surveys (Figure 4.1.22). This trend was not as apparent for length at age among basins nor for weight at age of White Bass caught in the east basin.

Table 4.1.1 Total numbers of each species caught during western basin Partnership Index Fishing, Lake Erie, 1990-2014. Numbers are standardized to 44 gangs. Average catch from 1990-2014 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	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	0.1
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	1.8
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	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	1	0	0	0	7	249	0	416.9
Gizzard Shad	718	7,729	2,856	4,103	5,844	6,624	1,118	1,416	2,873	8,542	2,838	4,066	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	4,818.3
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
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
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	0.3
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
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	0.8
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	7.7
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
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	9.8
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	75.5
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	0.2
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	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	26.2
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	0.8
Goldfish	0	0	0	0	0	1	0	0	0	2	4	0	0	0	4	1	8	3	3	5	2	0	0	0	12	1.1
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	6.9
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	54.9
Hornhead 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
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	0.1
Spottail Shiner	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	0.2
Brown Bullhead	0	0	1	0	0	0	0	0	0	0	3	1	1	0	0	2	0	0	1	0	0	0	2	0	1	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	122.0
Stoner Cat	1	1	0	1	0	0	1	0	2	2	0	0	0	0	0	0	0	0	1	0	0	0	1	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	0.3
Bridled 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
Burbot	0	0	0	0	1	0	0	0	0	0	0	0	1	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	0.4
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	2,217.5
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	355.9
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	9.6
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	0.2
Blue Gill	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
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	79.0
Largemouth 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
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	0.2
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	4,529.3
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	1,023.5
Round Goby	0	0	0	0	0	0	0	0	5	3	5	4	4	4	10	2	0	0	0	12	5	1	1	0	3	2.6
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	504.6
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	0.2
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	13,802	14,270
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
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	43

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

Table 4.1.2 Total numbers of each species caught during west-central basin Partnership Index Fishing, Lake Erie, 1990-2014. Numbers are standardized to 72 gangs. Average catch from 1990-2014 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	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	0.1
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	0.1
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	1,887.7
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	3,438.7
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	0.1
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	0.5
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	0.8
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	23.2
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	278.5
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	0.3
Quillback	0	0	0	0	0	0	0	0	0	1	0	0	0	1	2	0	1	1	1	1	0	0	0	0	0	0.0
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	57.4
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
Silver Sucker	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
Silver Redhorse	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	0.2
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	0.1
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	2.0
Goldfish	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	0.1
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	1.2
Silver Chub	2	5	15	0	0	1	0	0	3	4	3	0	2	0	0	1	0	0	1	5	3	0	1	0	0	1.8
Emerald Shiner	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0.2
Spottail Shiner	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
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	0	0	0.0
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	30.0
Stonercat	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
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	0	2.2
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
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	4,036.2
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	454.3
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
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
Blue Gill	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
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	0.5
Largemouth Bass	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	0.1
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	7,885.8
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	481.0
Round Goby	0	0	0	0	0	0	0	0	1	8	37	19	13	10	24	15	9	17	4	49	11	7	8	1	4	9.6
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	1,649.5
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	0.2
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	20,243
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
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	71

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

Table 4.1.3 Total numbers of each species caught during east-central basin Partnership Index Fishing, Lake Erie, 1989-2014. Numbers are standardized in 2014 to an effort of 72 gangs. Average catch from 1989-2014 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	Average	
Lake Sturgeon	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	
Alewife	677	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	0	1	35	1,058	3,497	0	1,978.4
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	1,298.7	
Chin Salmon	1	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	
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	0.5	
Rainbow Trout	3	0	1	2	1	0	2	2	2	1	0	2	0	1	0	0	1	0	1	1	0	0	0	0	0	0.8	
Lake Trout	1	0	1	2	0	2	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	1	0.5	
Lake Whitefish	5	2	2	4	41	21	24	142	46	33	21	11	21	27	14	43	36	13	6	13	9	2	1	0	2	21.6	
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	618.4	
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	0.5	
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	2.1	
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	63.1	
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	0.1	
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	0.2	
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	2.7	
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	0.1	
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	0.1	
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	0.8	
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	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	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	0.1	
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	1.7	
Noropsis sp.	9	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	
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	12.3	
Stoner Cat	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	0.1	
Tadpole 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	
Burbot	31	13	9	19	20	19	14	25	36	15	2	12	9	0	1	3	2	1	2	0	2	1	0	2	1	9.6	
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	3.8	
White Perch	7,621	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	2,563.5	
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	383.0	
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	0.3	
Blue Gill	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	0.1	
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	0.8	
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	
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	
Yellow Perch	3,332	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	5,829.0	
Walleye	465	118	207	276	367	366	237	82	70	17	29	27	99	68	639	473	310	63	45	81	33	152	108	92	97	180.8	
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	39.0	
Freshwater Drum	3,612	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	1,325.5	
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	14,343	
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	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	66	

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

Table 4.1.4 Total numbers of each species caught during Pennsylvania Ridge Partnership Index Fishing, Lake Erie, 1991-2014. Numbers are standardized to an effort of 18 gangs. Average catch from 1991-2014 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 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	
Alewife	740	1,530	0	16	133	605	69	2,284	42	1,076	0	0	0	0	489	0	0	0	11	2	263	345.7
Gizzard Shad	16	20	36	531	95	96	101	515	141	374	15	17	2	163	20	85	48	98	306	246	1.0	139.3
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	1.0	5.4
Lake Trout	1	2	8	5	9	3	2	0	5	4	1	10	3	4	2	1	2	3	5	4	6.0	3.8
Lake Whitefish	13	17	33	15	53	59	1	1	14	1	9	3	12	1	115	43	11	0	0	2	0.0	19.2
Rainbow Smelt	179	22	38	38	60	40	14	8	111	21	54	80	9	16	630	183	86	6	10	489	3.0	99.9
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	6.0	1.7
White Sucker	18	20	12	15	15	62	11	9	65	10	24	16	13	19	7	12	72	40	37	15	12.0	24.0
Silver Redhorse	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	3	1	0.0	0.3
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	4.0	8.5
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	0	4	2	1	5	2	0	1	0	1	2	1	0	10	1	2.0	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	1.0	28.8
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	218.0	138.7
White Bass	55	63	7	4	84	35	20	36	26	5	6	5	3	103	20	34	18	21	106	9	146.0	38.4
Rock Bass	1	1	0	1	1	13	7	2	9	1	0	0	0	2	0	1	0	2	3	0	0.0	2.1
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	2,595.0	2,374.3
Walleye	13	34	23	27	47	19	12	7	13	7	14	9	102	30	7	39	31	18	20	17	30.0	24.7
Round Goby	0	0	0	0	0	0	2	19	30	38	37	4	9	146	95	67	28	25	22	3	1.0	25.0
Freshwater Drum	285	118	43	142	88	103	41	62	74	56	39	15	9	21	14	37	127	56	98	3	120.0	73.8
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	3,359.2
Number of Sites	9	9	9	9	9	9	9	9	9	9	9	9	9	9	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	18	18	18	18	18	18	18	17.5

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

Table 4.1.5 Total numbers for each species caught during eastern basin Partnership Index Fishing surveys, Lake Erie, 1989-2014. Numbers are standardized to an effort of 60 gangs. Average catch from 1989-2014 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.

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	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
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	0.2
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	732.6
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	267.8
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	0.3
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	0.6
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	0.2
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	3.9
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	1.5
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	23.1
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	18.4
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
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	198.1
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	0.1
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	0.1
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	1.7
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	81.8
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
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	0.5
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	22.1
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	0.2
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	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
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
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	0.3
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	7.2
Stoner Cat	12	3	6	3	7	0	0	0	10	2	3	0	0	0	0	0	0	0	0	1	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	68.2
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	0.2
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	363.6
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	86.8
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	89.0
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	0.6
Blue Gill	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0.1
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	264.6
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	0.2
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	0.3
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	1,860.7
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	
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	27.0
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	252.4
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	4,378
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	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	53

Note: Values are continually corrected for errors and may be different 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, 1989-2000.

Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Silver Lamprey	-	-	-	-	-	-	-	-	-	-	-	-
Sea Lamprey	-	-	-	-	-	-	-	-	-	-	-	-
Lake Sturgeon	-	-	-	1	1	1	1	2	1	2	-	3
Longnose Gar	1	-	-	1	-	1	-	-	-	2	9	4
Alewife	2,498	5,322	27,914	5,799	2,601	3,534	6,270	890	212	6,696	15,805	16,499
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
Pink Salmon	-	-	4	1	1	-	-	-	-	-	1	-
Coho Salmon	8	1	6	1	4	-	-	-	-	-	7	3
Chinook Salmon	-	-	4	1	1	2	3	-	11	1	2	1
Rainbow Trout	4	7	6	8	4	1	5	-	2	9	101	65
Atlantic Salmon	-	-	-	-	-	-	-	-	-	-	-	-
Brown Trout	1	-	-	1	-	-	-	-	-	3	-	1
Lake Trout	14	7	9	6	24	21	10	-	-	15	13	21
Lake Whitefish	21	47	46	34	71	41	105	15	192	258	89	74
Cisco	-	1	-	-	-	-	-	-	-	-	-	-
Rainbow Smelt	1,005	1,027	1,099	537	531	574	2,409	435	615	1,296	1,021	483
Northern Pike	-	8	1	-	-	-	-	-	-	-	-	-
Muskellunge	-	-	-	-	-	-	1	-	-	-	-	-
Mooneye	-	-	-	1	-	-	-	-	-	-	-	-
Quillback	3	-	1	5	22	12	6	12	5	5	16	19
White Sucker	271	284	264	316	260	211	178	98	142	244	261	324
Spotted Sucker	-	-	-	-	-	-	-	-	-	-	-	1
Silver Redhorse	-	-	-	-	-	-	-	-	-	2	-	5
Golden Redhorse	-	-	-	-	-	-	-	-	19	-	2	23
Shorthead Redhorse	33	86	23	57	73	27	19	15	52	63	45	116
Redhorse sp.	-	-	-	-	-	-	-	-	-	1	-	-
Goldfish	-	-	-	-	-	-	2	-	-	-	2	4
Lake Chub	-	-	-	2	-	-	-	-	-	-	-	-
Common Carp	18	28	25	6	11	3	5	8	4	2	4	28
Silver Chub	-	25	35	150	115	59	97	89	73	90	203	154
Hornyhead Chub	-	1	-	-	-	-	-	-	-	-	-	-
Emerald Shiner	-	-	-	-	12	1	3	1	-	-	-	1
Common Shiner	-	-	-	-	-	-	-	-	-	-	-	-
Spottail Shiner	-	1	1	4	2	-	-	-	2	-	19	-
Notropis sp.	7	-	2	-	-	-	-	-	-	-	-	-
Brown Bullhead	-	1	-	1	-	1	-	-	-	-	2	4
Channel Catfish	13	76	134	79	132	66	89	86	48	56	79	88
Stonecat	10	4	6	2	5	1	1	1	-	3	12	2
Tadpole Madtom	-	-	6	1	-	-	-	-	-	-	-	-
Brindled Madtom	-	-	-	-	-	1	-	-	-	-	-	-
Burbot	47	25	40	36	46	57	41	2	31	348	266	277
Trout-perch	2	4	1	16	10	2	1	-	3	6	1	2
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
White Bass	710	483	642	283	160	741	539	439	1,622	542	941	1,135
Rock Bass	171	63	51	83	97	97	27	12	9	77	323	553
Pumpkinseed	-	1	-	-	7	-	-	2	-	-	-	1
Blue Gill	-	-	-	-	-	-	-	-	-	-	-	-
Smallmouth Bass	112	288	130	296	405	466	187	249	163	457	338	1,100
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
Walleye	519	1,168	2,232	2,275	2,641	1,513	2,500	1,348	1,709	900	990	1,745
Round Goby	-	-	-	-	-	-	-	-	1	13	82	113
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
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
Sites	60	107	124	116	115	103	99	58	91	121	133	142
Canned Gangs	54	98	118	114	112	103	99	58	91	121	133	142
Bottom Gangs	60	107	124	116	115	103	99	58	91	121	133	142
Thermocline Gangs	10	4	-	-	-	-	-	-	-	-	25	23
Aux Central 1 fa Canned Gangs	-	-	-	-	-	-	-	-	-	-	-	-
2m Above Thermocline Gangs	-	-	-	-	-	-	-	-	-	-	25	-
Total Gangs	124	209	242	230	227	206	198	116	182	242	316	307

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, 2001-2014. Average catches presented for 2001-2014.

Species	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Average
Silver Lamprey	1	-	-	1	-	-	-	-	-	1	-	-	-	-	0
Sea Lamprey	-	-	-	-	-	-	-	-	-	1	1	1	-	-	0
Lake Sturgeon	-	2	5	8	1	1	10	2	-	2	2	1	4	1	2
Longnose Gar	1	-	1	-	-	1	-	-	1	2	-	4	2	1	1
Alewife	1,477	25,749	9	127	81	2,482	34	13	5	199	135	2,954	10,703	1	5,308
Gizzard Shad	7,520	29,523	9,866	9,131	22,246	12,510	7,790	4,211	3,685	16,607	12,524	23,350	4,783	2,294	9,771
Pink Salmon	-	-	-	1	-	-	-	-	1	2	-	3	-	-	1
Coho Salmon	5	9	1	-	1	1	-	1	1	-	1	2	1	-	2
Chinook Salmon	1	4	-	1	2	-	-	-	1	2	1	-	-	-	1
Rainbow Trout	60	96	49	22	111	58	4	14	42	39	34	15	20	8	30
Atlantic Salmon	-	-	-	-	1	-	-	-	-	-	-	-	-	-	0
Brown Trout	1	23	2	3	3	-	-	2	4	1	5	-	1	1	2
Lake Trout	43	23	38	32	23	44	16	23	39	68	115	108	45	25	30
Lake Whitefish	39	58	82	35	153	168	104	170	99	85	11	14	2	9	78
Cisco	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Rainbow Smelt	1,770	1,262	489	1,629	910	745	1,688	2,556	2,766	1,023	1,464	1,184	1,924	749	1,200
Northern Pike	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Muskellunge	-	-	-	-	-	-	-	-	1	-	-	-	-	1	0
Mooneye	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Quillback	43	26	27	19	14	16	13	14	14	3	29	16	8	19	14
White Sucker	356	439	255	354	380	368	203	228	453	343	539	268	199	179	285
Spotted Sucker	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Silver Redhorse	-	2	-	5	-	-	-	-	-	-	3	1	-	-	1
Golden Redhorse	6	-	-	-	-	-	-	-	-	1	-	-	-	-	2
Shorthead Redhorse	90	22	55	51	17	20	70	48	146	41	111	45	29	48	54
Redhorse sp.	-	25	-	-	-	-	-	-	1	-	-	-	-	-	1
Goldfish	-	-	-	-	6	-	-	5	2	-	-	-	-	12	1
Lake Chub	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Common Carp	28	8	2	5	2	11	8	4	5	2	7	9	4	4	9
Silver Chub	72	52	52	85	26	41	12	9	8	2	11	4	6	19	57
Hornyhead Chub	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Emerald Shiner	-	1	4	3	-	3	-	2	5	5	4	3	1	-	2
Common Shiner	-	-	2	-	-	-	-	-	-	-	-	-	-	-	0
Spottail Shiner	-	10	-	10	-	3	1	-	-	2	2	-	-	1	2
Notropis sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Brown Bullhead	2	1	-	-	-	2	1	1	-	-	-	3	1	1	1
Channel Catfish	129	126	156	131	271	234	313	131	221	190	356	357	294	415	164
Stonecat	3	-	-	-	-	-	1	-	-	1	-	1	-	-	2
Tadpole Madtom	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Brindled Madtom	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Burbot	222	223	284	176	148	105	70	56	54	19	48	12	7	9	102
Trout-perch	22	6	14	7	1	3	1	5	2	1	2	1	-	-	4
White Perch	4,489	8,472	8,212	11,504	17,150	19,774	12,492	11,996	9,940	10,212	14,762	14,622	15,127	9,052	8,761
White Bass	617	1,036	889	1,287	1,362	2,668	1,762	1,339	1,291	1,448	4,080	4,792	3,991	2,589	1,438
Rock Bass	174	30	39	51	31	21	103	11	76	54	6	32	10	88	88
Pumpkinseed	1	-	-	3	-	1	-	-	-	1	-	-	-	-	1
Blue Gill	-	-	3	-	-	1	-	1	-	-	2	-	-	-	0
Smallmouth Bass	442	234	267	232	320	445	614	332	289	178	64	143	106	113	307
Largemouth Bass	-	-	4	1	-	-	2	-	-	-	1	-	-	-	0
Black Crappie	-	-	-	1	-	2	-	-	-	-	1	-	1	-	0
Yellow Perch	31,305	30,226	30,870	42,626	33,730	32,913	34,412	40,323	37,662	28,524	30,750	26,779	14,166	22,785	21,456
Walleye	909	1,118	1,804	4,469	4,052	2,316	1,303	1,443	1,743	1,429	3,168	1,842	1,202	1,209	1,829
Round Goby	101	399	247	161	196	260	106	200	205	173	140	81	45	62	99
Freshwater Drum	3,509	6,804	3,800	4,631	4,789	4,315	2,554	2,858	3,610	2,038	3,562	3,613	3,240	1,788	3,499
Goldfish-Carp hybrid	-	-	-	-	-	-	1	1	2	2	-	1	3	-	0
Total Number of Fish	53,438	106,009	57,528	76,802	86,029	79,530	63,688	65,999	62,374	62,701	71,941	80,261	55,925	41,484	54,609
Sites	142	144	144	143	144	140	119	143	143	141	144	142	122	133	124
Canned Gangs	142	144	144	143	144	140	119	143	143	141	144	142	122	133	123
Bottom Gangs	142	144	144	143	144	140	119	143	143	141	144	142	122	133	124
Thermocline Gangs	26	34	29	26	13	20	-	26	24	19	24	21	12	16	14
Aux Central 1 fa Canned Gangs	-	-	-	24	24	24	24	25	24	24	24	24	24	24	10
2m Above Thermocline Gangs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Total Gangs	310	322	317	336	325	324	262	337	334	325	336	329	280	306	271

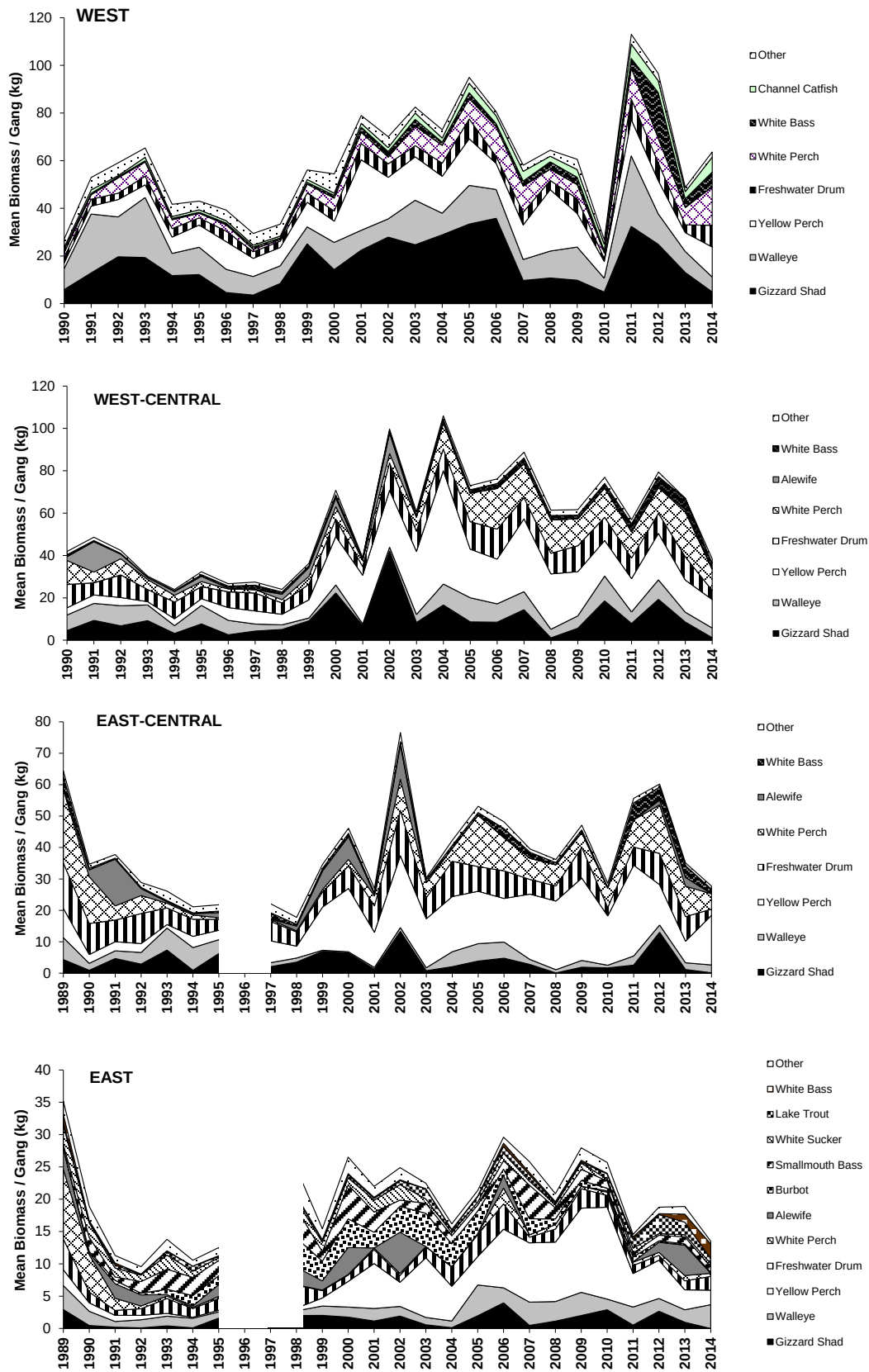


Figure 4.1.2

Mean species biomass (kg / gang) by basin, Partnership Index Fishing, 1989-2014. 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, 1999-2014) 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.

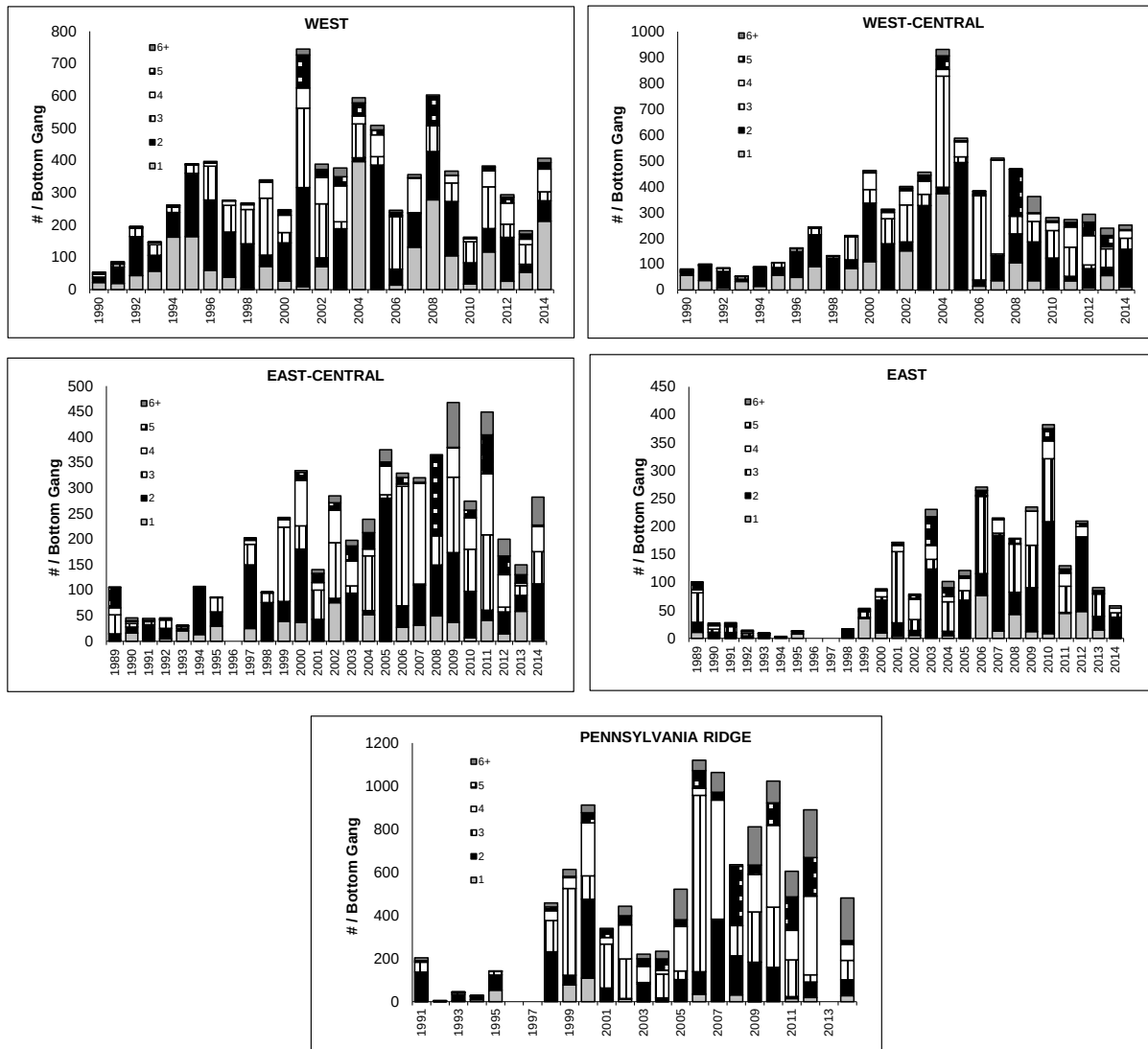


Figure 4.1.3 Yellow Perch catch at age (number) per bottom gang of Partnership index gill nets, by basin. Time frames and axes differ among basins. Absent bars indicate when studies were not done. Ages 6 and older pooled. East basin results include depths 30 m or less. Walleye Cap Areas surveys were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

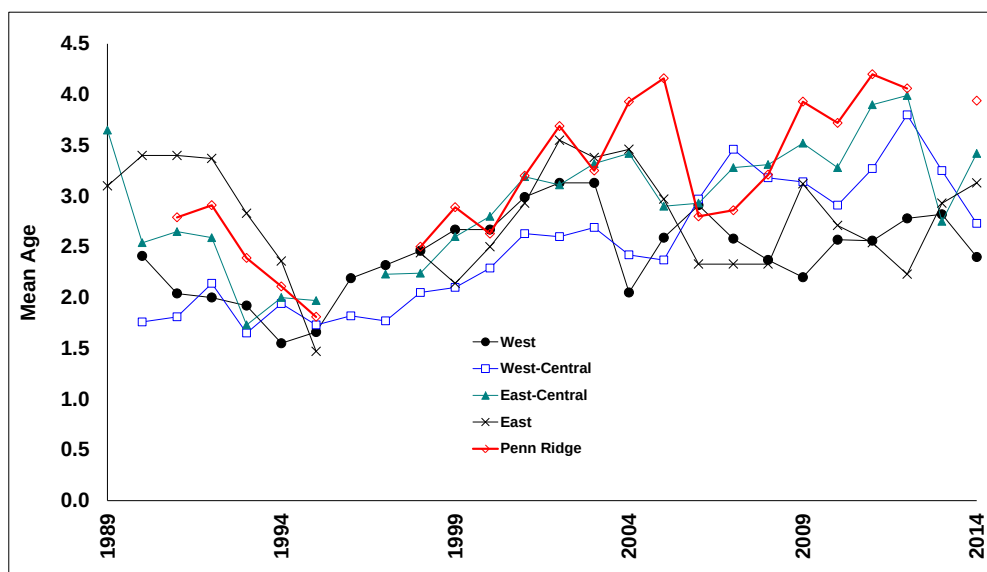


Figure 4.1.4 Mean age of Yellow Perch caught in Partnership index gill nets by basin, 1989-2014. All age groups included in calculations. Ages based on scales and otoliths since 2005.

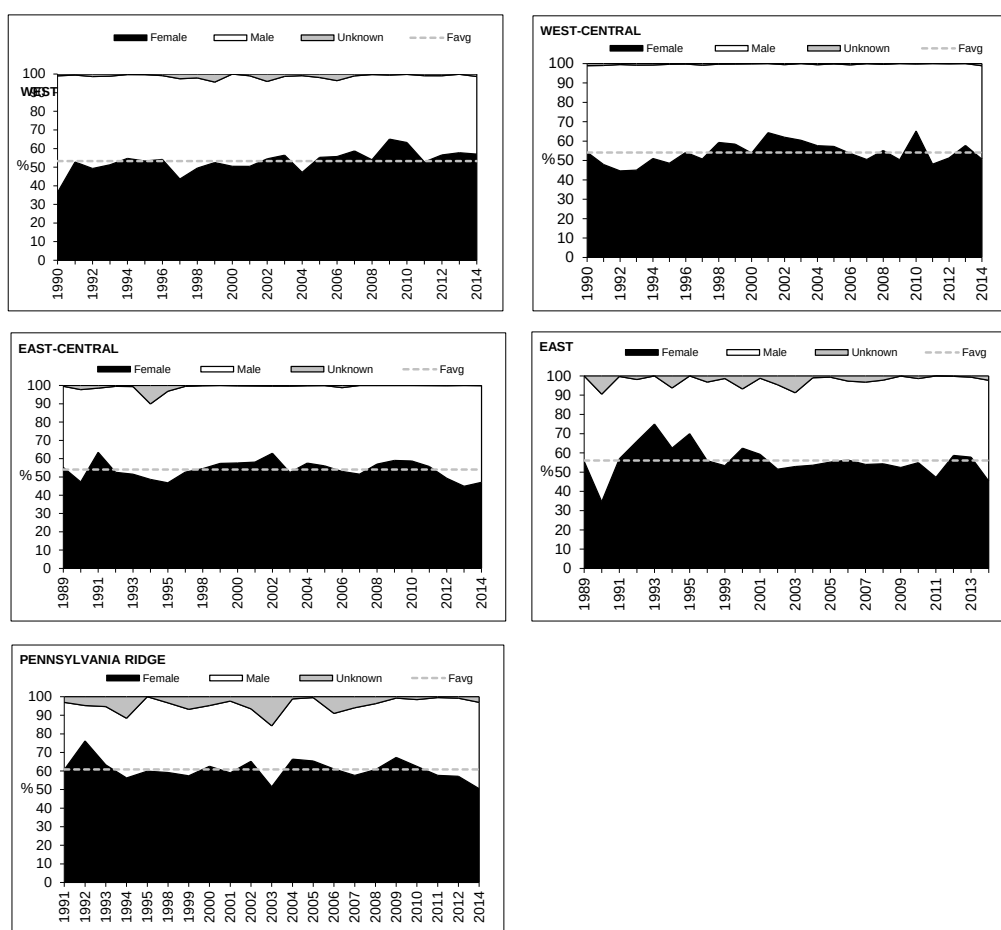


Figure 4.1.5 Proportion of Yellow Perch ages 2 and older represented by each sex caught in fall. Partnership index gill netting, 1989-2014. Note absent years in east-central, and east basin time series. Dashed line represents average fraction of females over the time series. Pennsylvania Ridge survey not done in 2013.

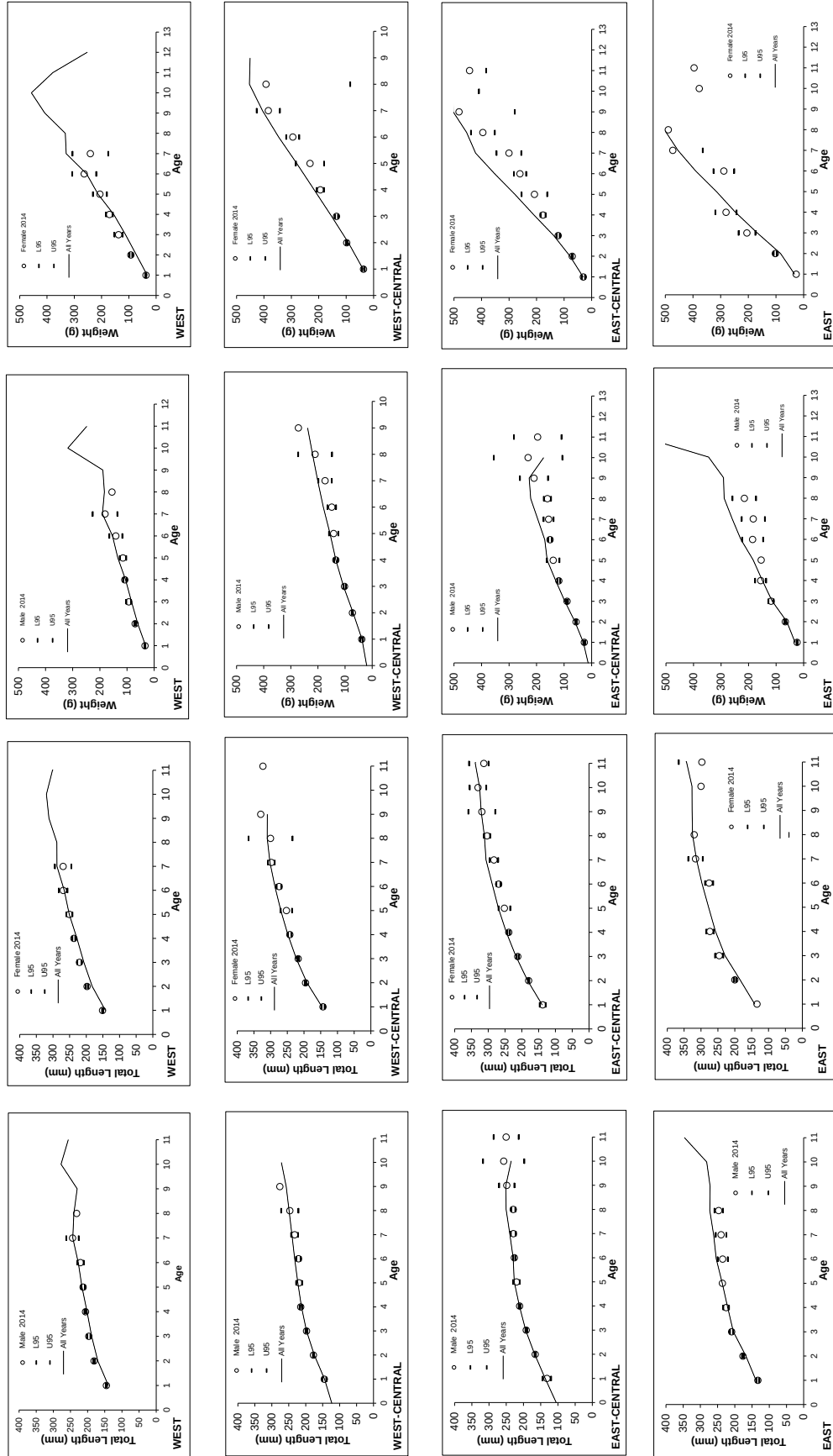


Figure 4.1.6 Yellow Perch mean total length (mm) and weight (g) at age for the west (top row), west-central, east-central and east (bottom row) basins in 2014 (circles). 95% confidence limits shown. Dotted line represents mean size at age for all years to 2013. Partnership Index Fishing, 1989-2014.

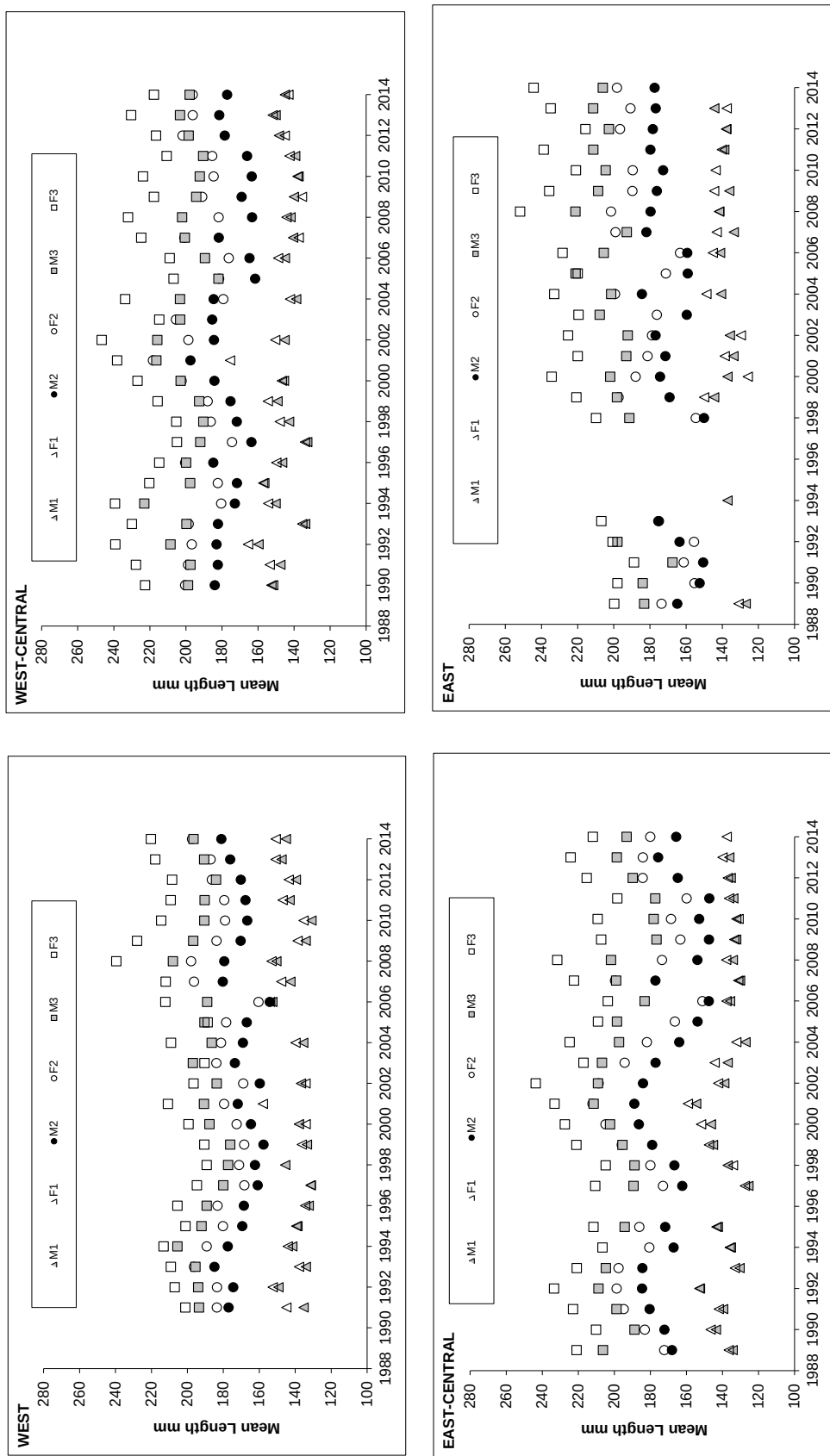


Figure 4.1.7 Mean total length (mm) of Yellow Perch ages 1, 2, and 3 by sex in the west, west-central, east-central and east basin surveys. East includes the Walleye Cap Area sites. M=male F=female. Samples with less than 6 fish were excluded. Mean is weighted by relative effort among mesh sizes. Samples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

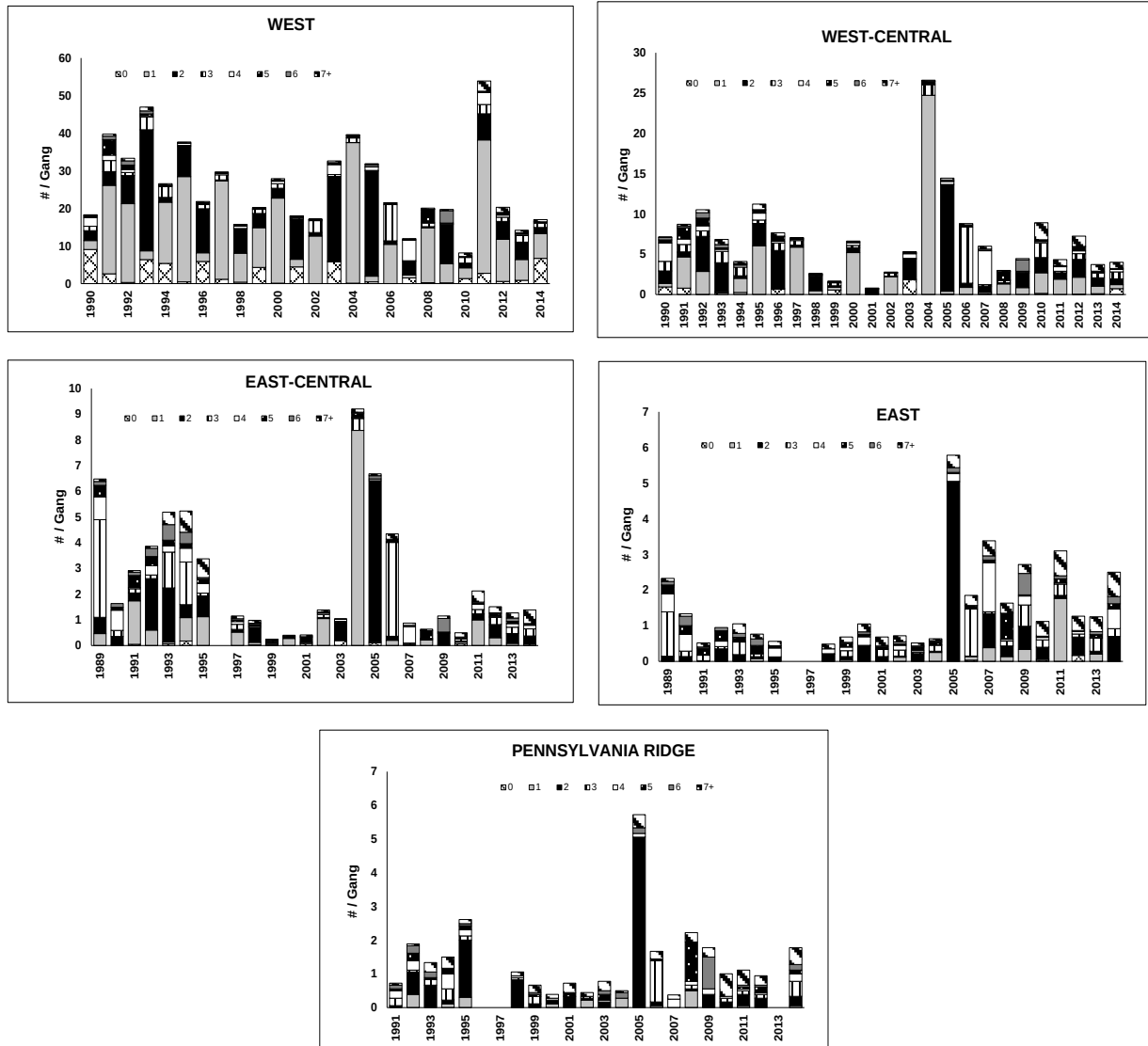


Figure 4.1.8 Walleye catch at age (numbers) per gang of index gill nets (canned and bottom), in the west, west-central, east-central, Pennsylvania Ridge and east basin Partnership surveys. Only standard canned sets are included in east basin graphs. Note that catch rate and time axes differ among basins. 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, and 2013. East basin survey was not done in 1996 and 1997. East basin survey had low sample size in 1995.

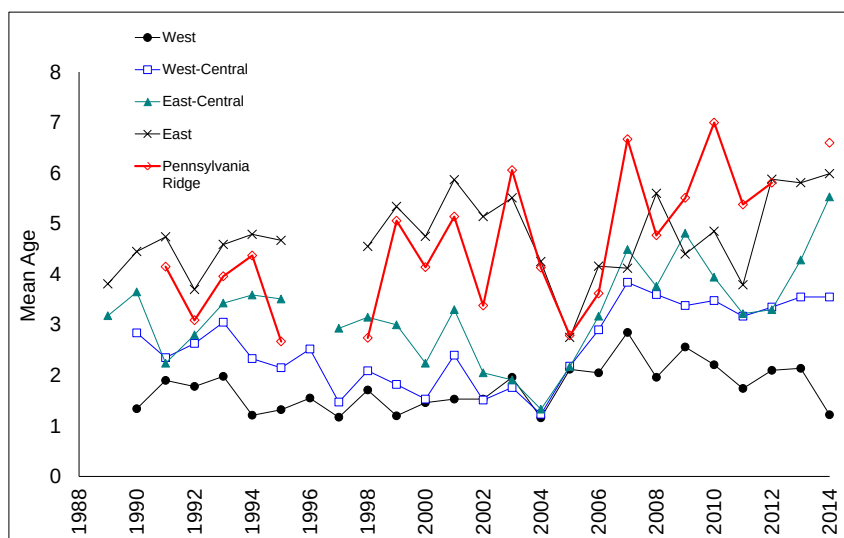


Figure 4.1.9 Mean age of Walleye caught in Partnership index gill nets by basin, 1989-2014.

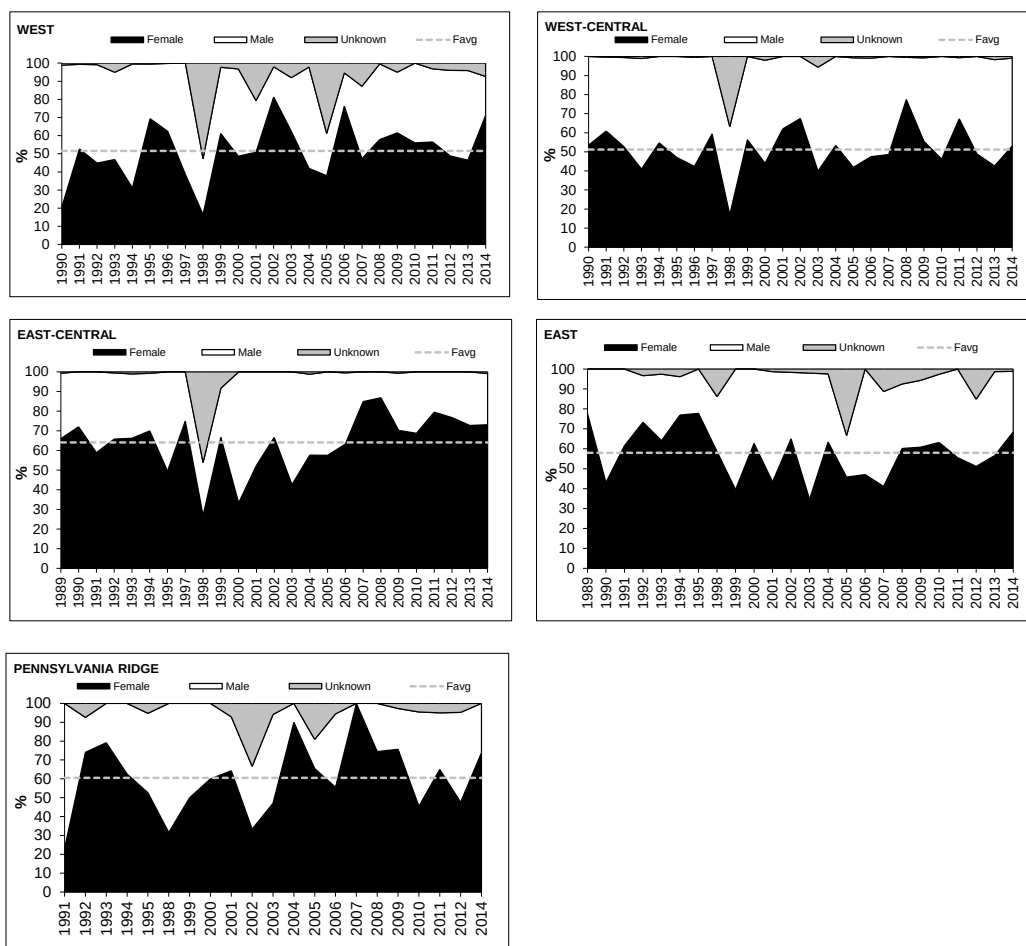


Figure 4.1.10 Proportion of Walleye ages 2 and older represented by each sex caught in fall Partnership index gill netting, 1989-2014. Note absent years in east-central and east basin time series. Dashed line represents average proportion of females over the time series. Pennsylvania Ridge not fished in 2013.

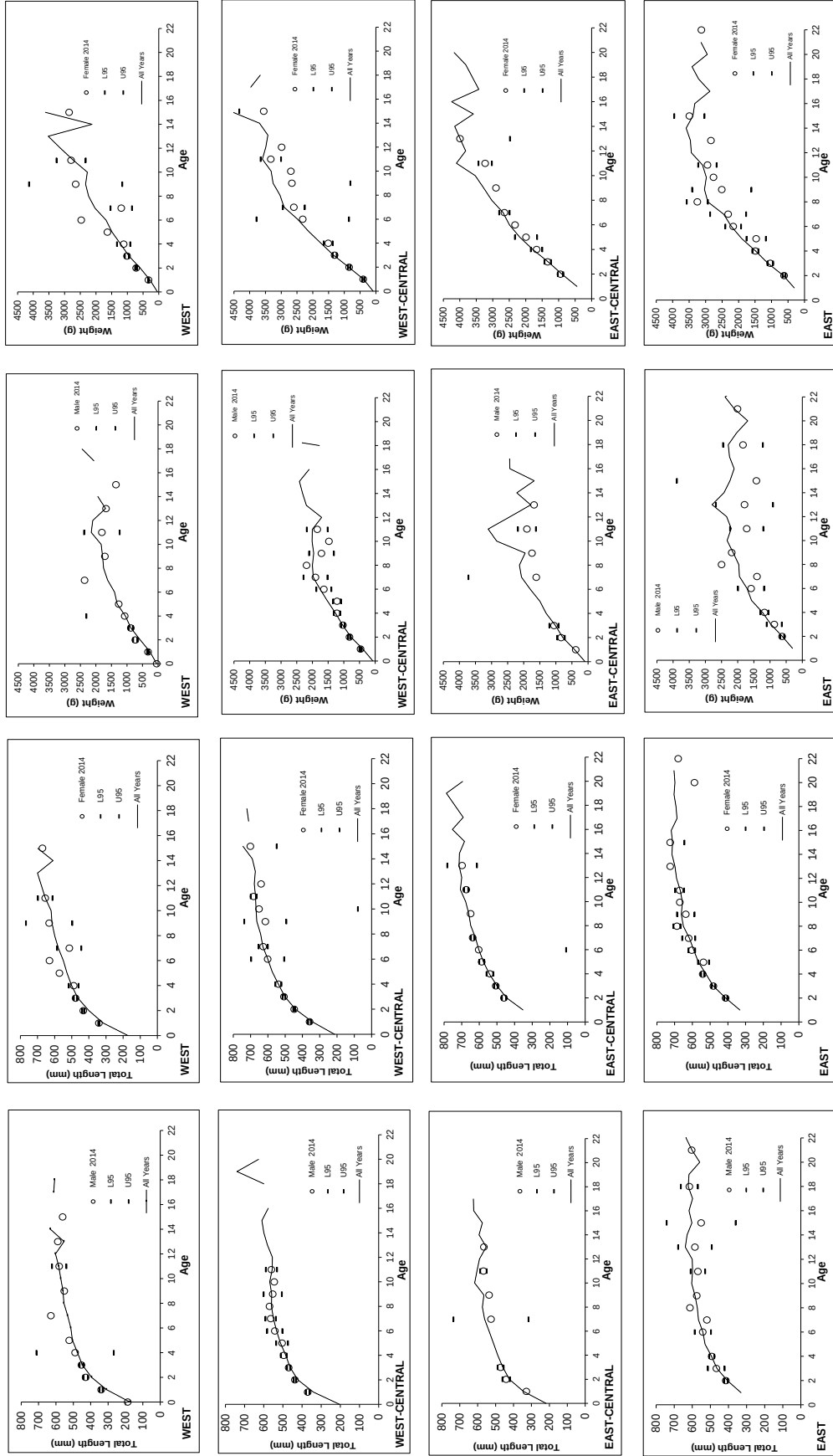


Figure 4.1.11 Walleye mean total length (mm) and weight (g) of males and females at age for the west (top row), west-central, east-central and east (bottom row) basins in 2014 (circles). 95% confidence limits shown. Dotted line represents mean size at age for all years to 2013. Partnership Index Fishing, 1989-2014.

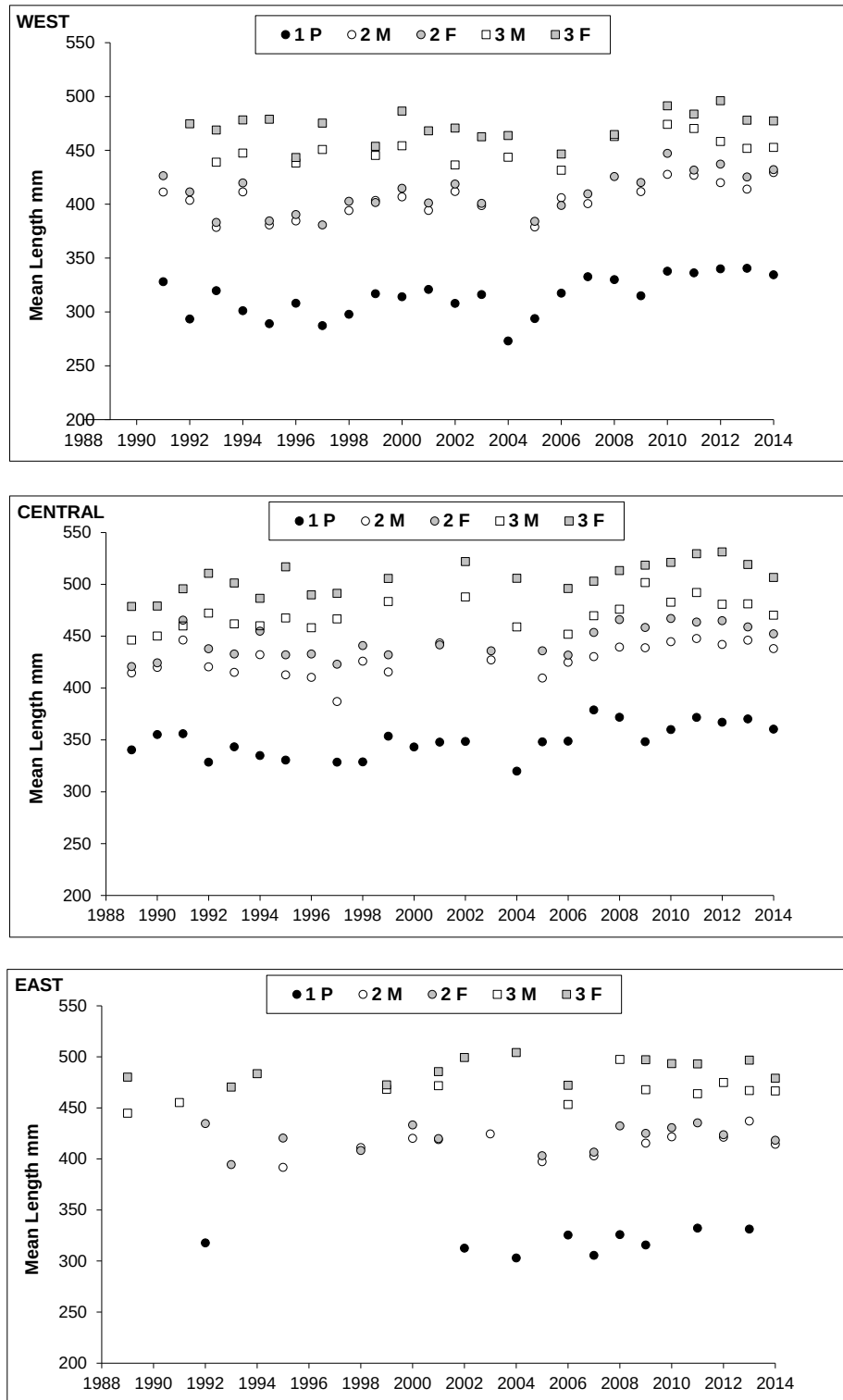


Figure 4.1.12 Mean total length (mm) of Walleye ages 1, 2, and 3 by sex in the west, central and east basin surveys. Central includes west-central and east-central basin surveys. East includes Pennsylvania Ridge, east, and Walleye Cap Area surveys. M=Male F=Female P=sexes pooled. Age 1 includes both sexes due to the large fraction of yearlings with sex undetermined. Samples with less than 6 fish were excluded. Samples restricted temporally for west (September), west-central ($\geq$ October), east-central ($\geq$ October), and east basin ($\leq$ September) surveys to negate bias due to interannual differences between sampling periods.

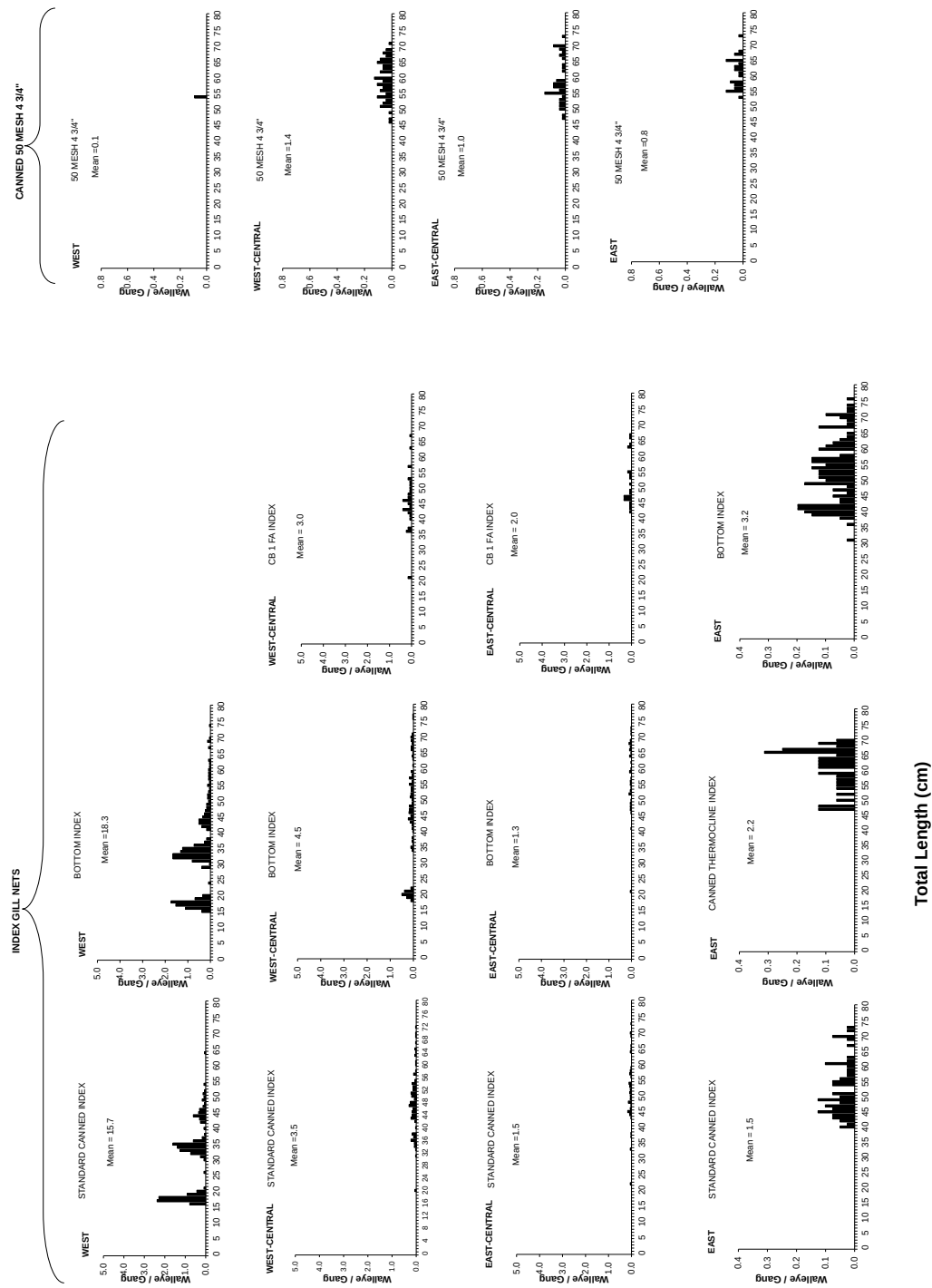


Figure 4.1.13 Walleye catch rates in 2014 by 1 cm length intervals in west basin (top row), west-central (2nd row), east-central (3rd row) and east basin (bottom row) in standard index canned gill nets, bottom nets, central basin 1 fathom canned nets, canned thermocline nets (east only) and in 50 mesh 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, 2014. 50 Mesh nets were not fished in the thermocline in 2014.

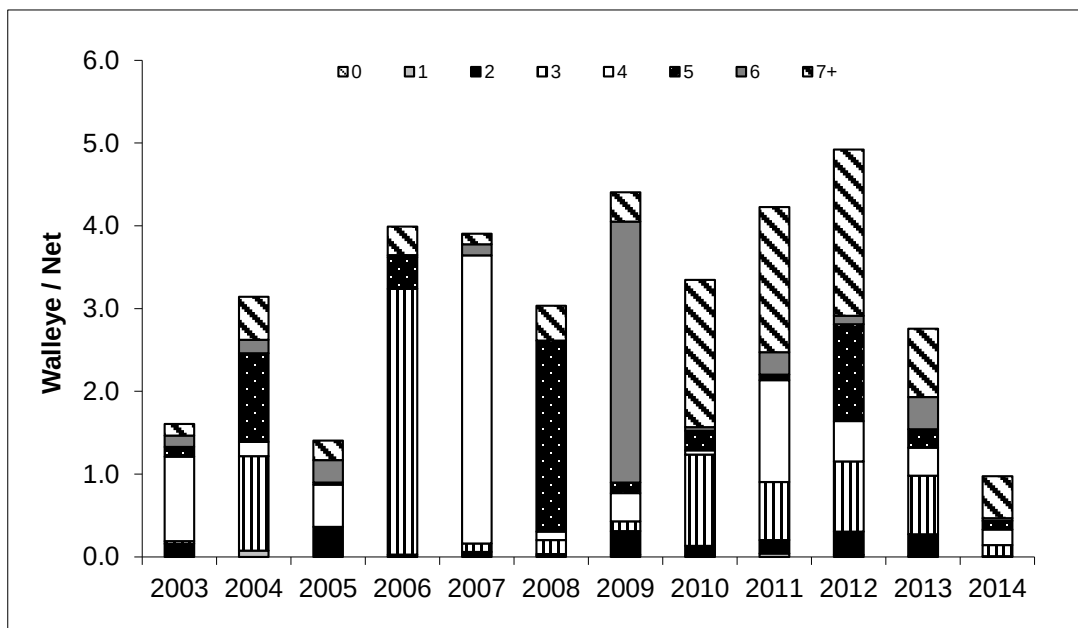


Figure 4.1.14 Walleye catch at age per 50 mesh deep 121 mm, 34 m canned gill net fished adjacent to index gill nets in the west, west-central, and east-central basins. All canned depths were included.

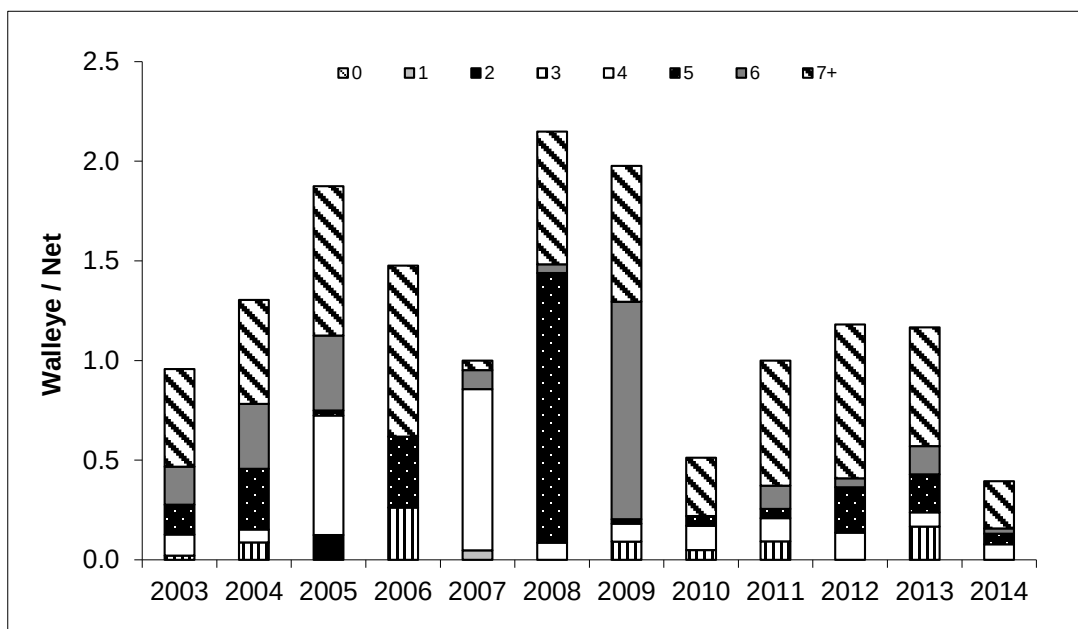


Figure 4.1.15 Walleye catch at age per 50 mesh deep 121 mm, 34 m canned gill net fished adjacent to index gill nets in east basin surveys. This graph excludes Pennsylvania Ridge and Walleye Cap Area surveys. All canned depths included.

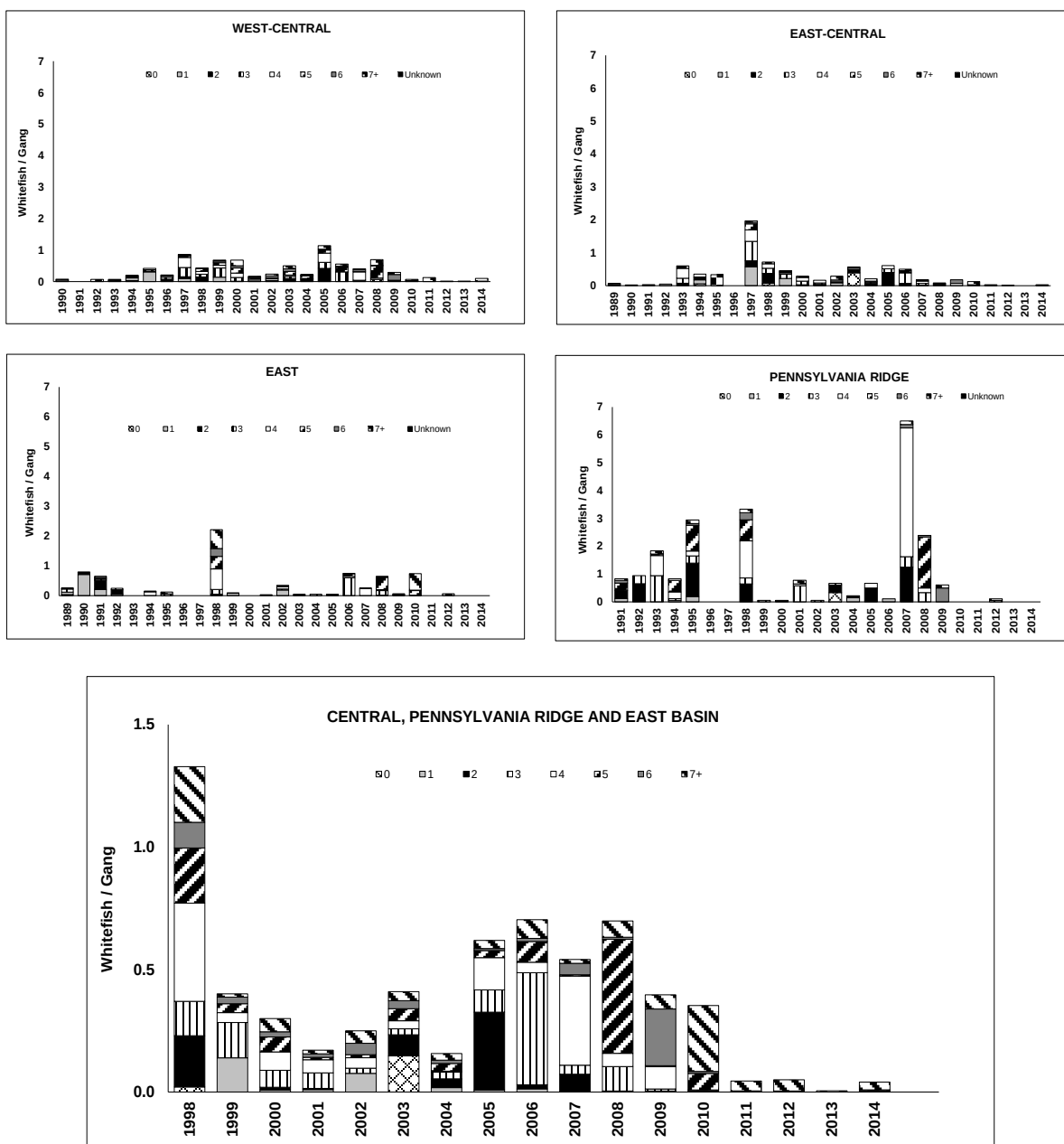


Figure 4.1.16 Lake Whitefish catch at age (numbers) per gang of index gill nets (canned and bottom), in the west-central, east-central, Pennsylvania Ridge, east basin and with basins pooled. Only standard canned sets included in east basin and Pennsylvania Ridge graphs. Lake Whitefish samples lacking 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 not fished in 2013.

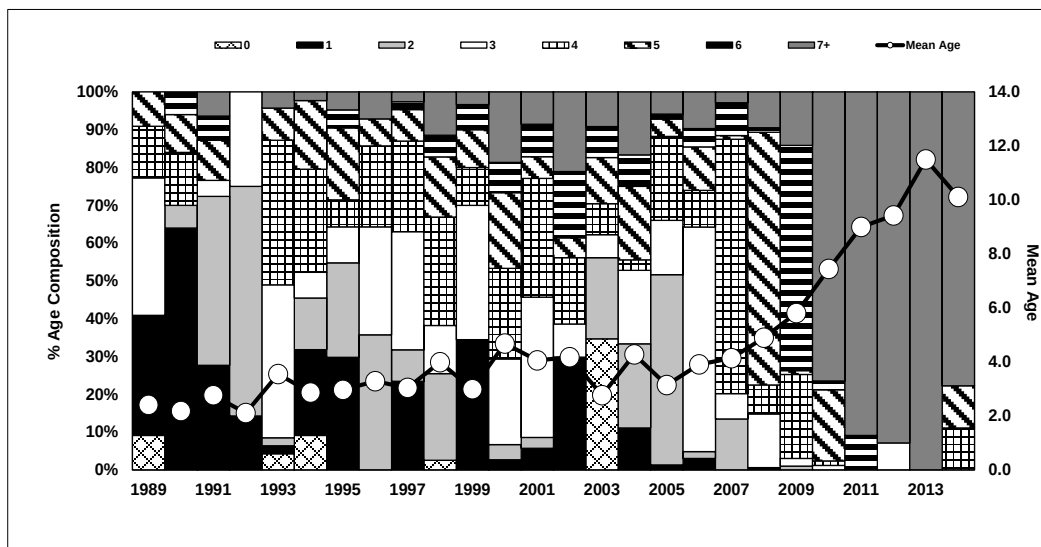


Figure 4.1.17 Lake Whitefish age composition and mean age (line) from Partnership Index Fishing, all basins combined, all index gear included. Ages 7 and older pooled in 7+ group. Otolith and scale ages were determined in 2014.

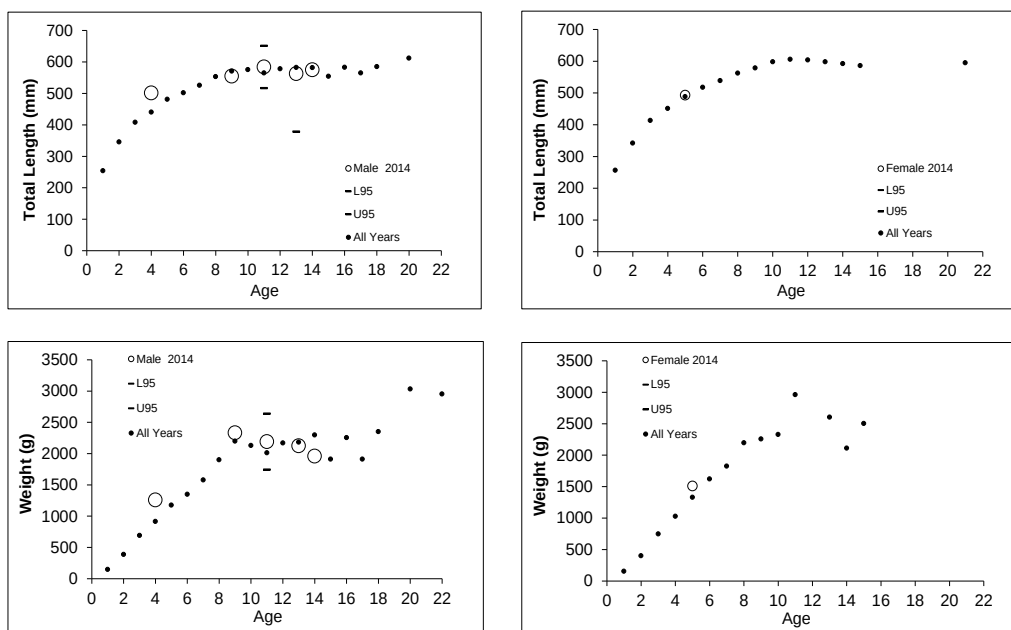


Figure 4.1.18 Mean length (top) and weight (bottom) at age for male (left) and female (right) Lake Whitefish, 2014 (circles). 95% confidence limits shown. Dotted line represents mean size at age 1989-2013, combined. Ages based on scales prior to 2006. Partnership Index Fishing 1989-2014.

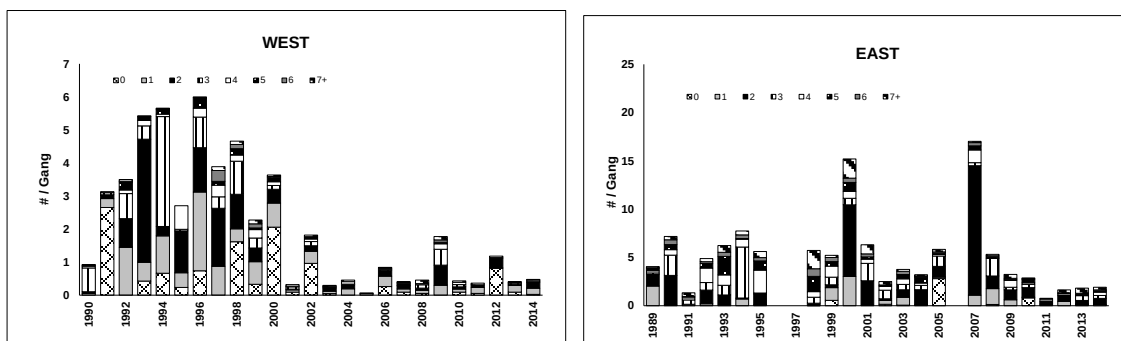


Figure 4.1.19 Smallmouth Bass catch at age (numbers) per gang of index gill nets (canned and bottom), in the west and east basin Partnership surveys 1989-2014. Only standard canned sets are included in east basin graph. Absent bars indicate years when study was not done. East includes extra Walleye Cap Area sites.

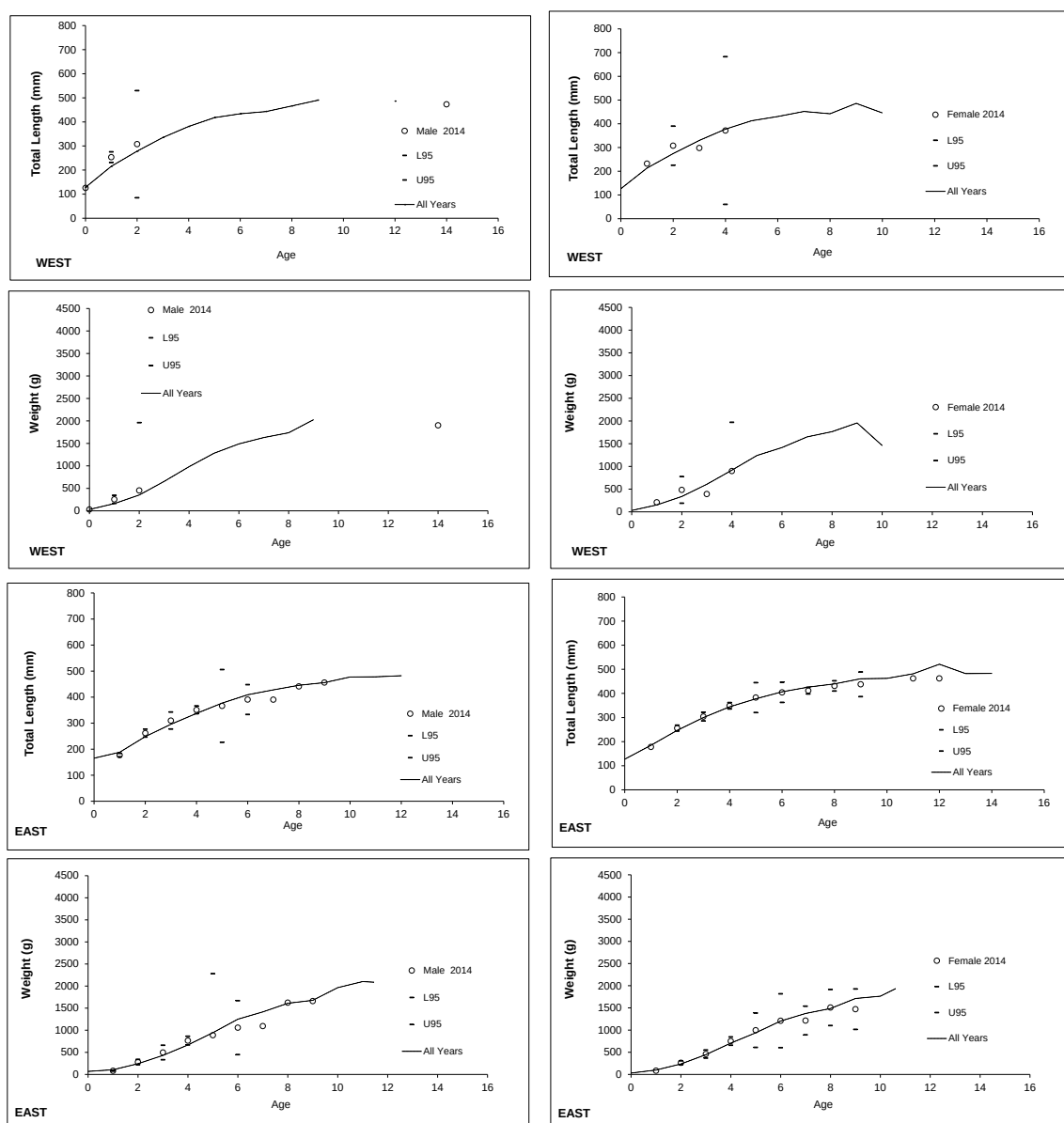


Figure 4.1.20 Smallmouth Bass mean total length (mm) and weight (g) of males and females at age for the west (top four graphs) and east (bottom four graphs) basins in 2014 (circles). 95% confidence limits shown. Dotted line represents size at age for all years to 2013. Partnership Index Fishing, 1989-2014.

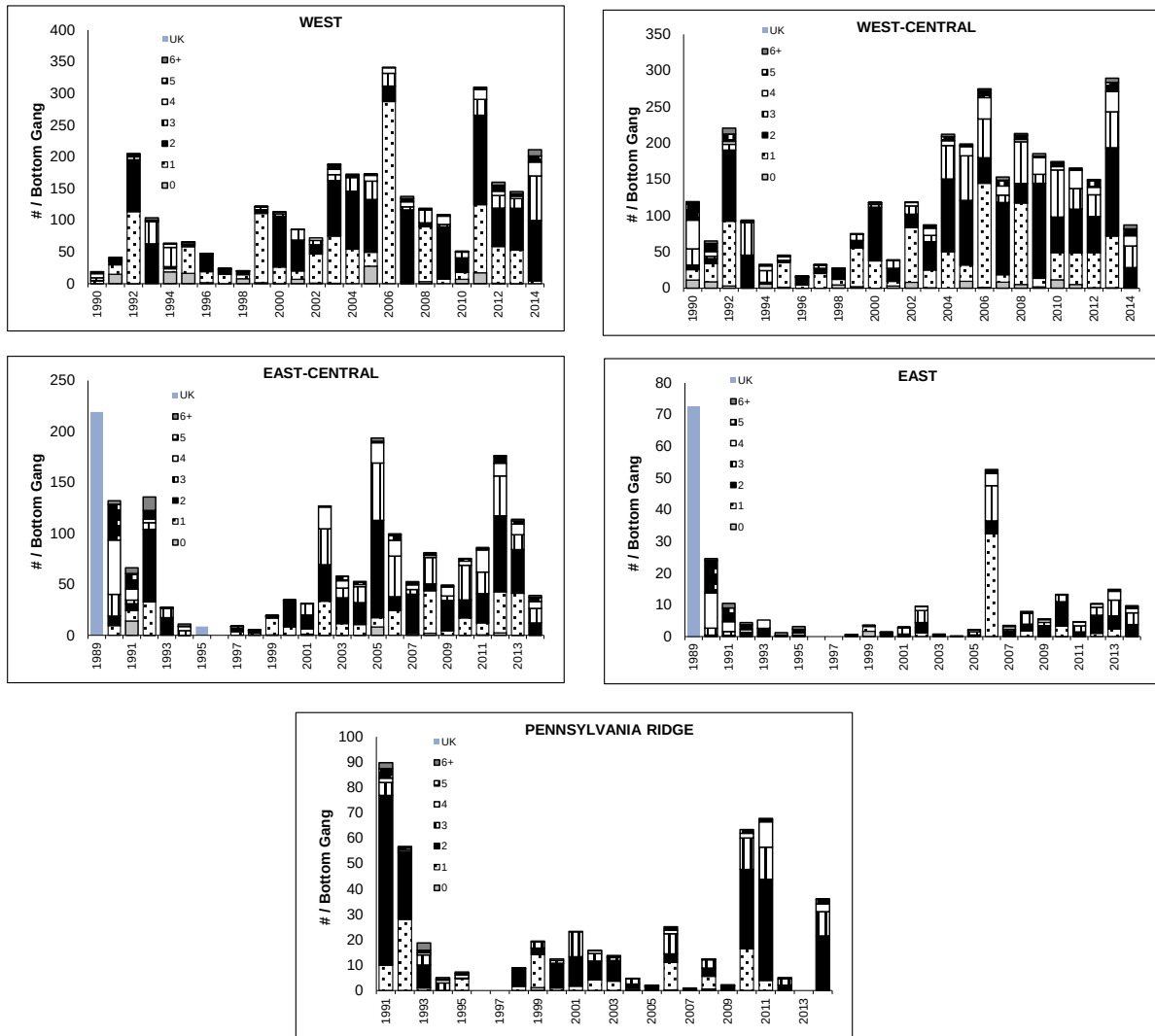


Figure 4.1.21

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, 1997 and 2013. UK indicates ages unknown.

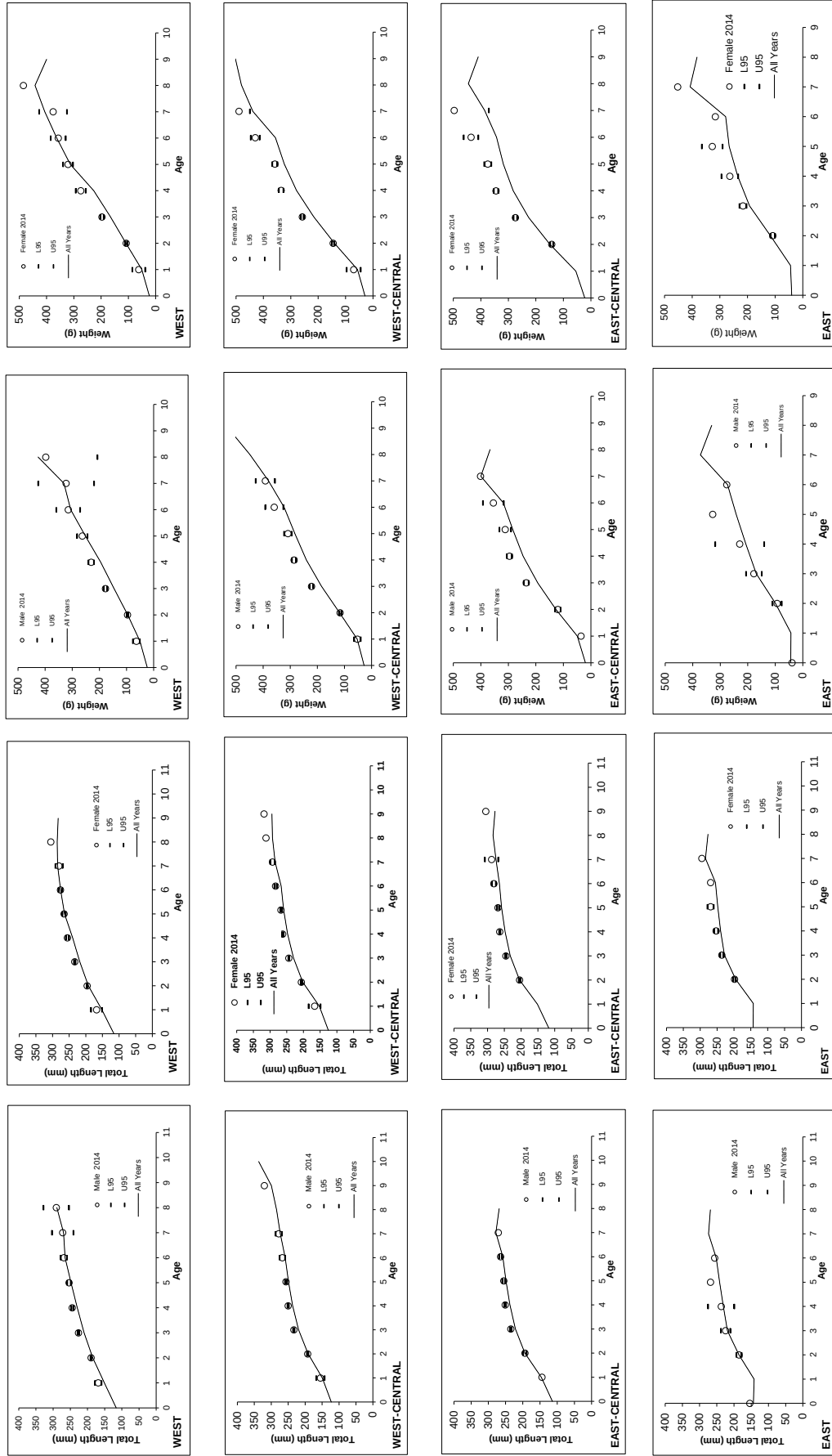


Figure 4.1.22 White perch mean total length (mm) and weight (g) of males and females at age for the west (top row), west-central, east-central and east (bottom row) basins in 2014 (circles). 95% confidence limits shown. Dotted line represents mean size at age for all years to 2013. Partnership Index Fishing, 1989-2014.

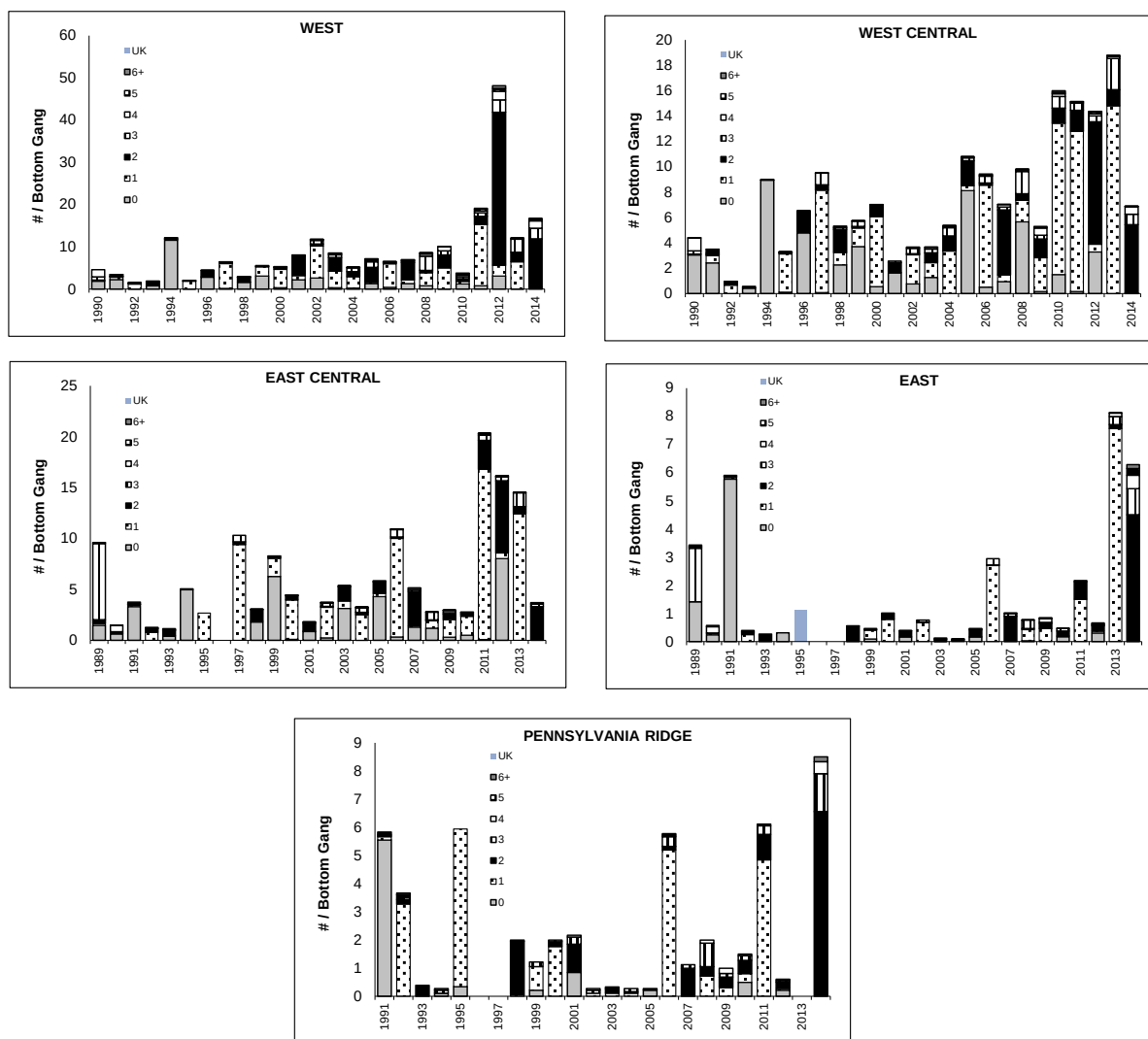


Figure 4.1.23

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, 1997 and 2013. UK indicates ages unknown.

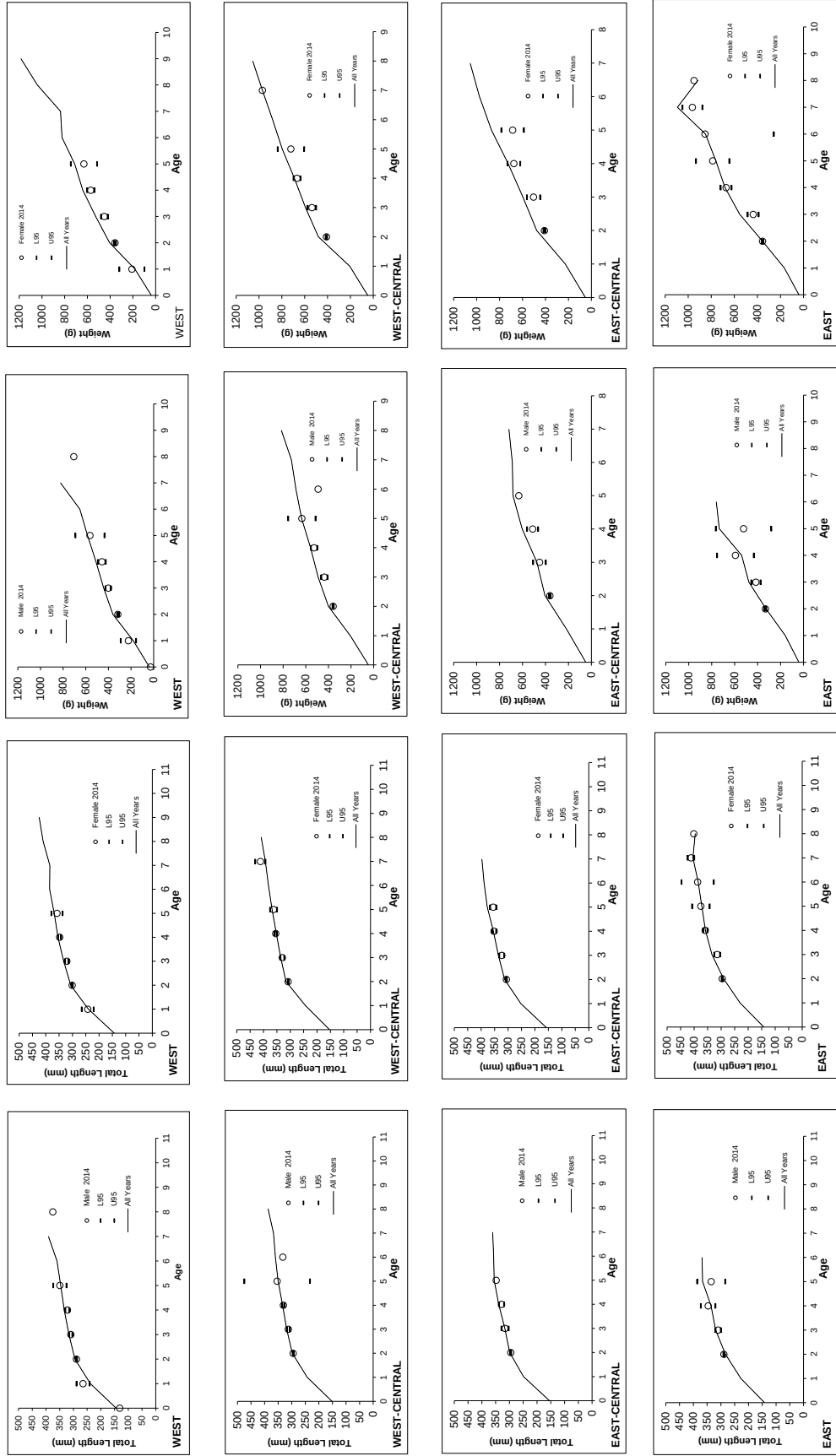


Figure 4.1.24 White Bass mean total length (mm) and weight (g) of males and females at age for the west (top row), west-central, east-central and east (bottom row) basins in 2014 (circles). 95% confidence limits shown. Dotted line represents mean size at age for all years to 2013. Partnership Index Fishing, 1989-2014.

4.2 Index Trawling: Western Lake Erie

West Basin Bottom Trawling

The western basin interagency trawling index, conducted by Ontario and Ohio, was completed during August, 2014. The study is used to assess year class strength of species based on catches of young-of-the-year, yearling and older fish. Ontario survey results describe cohort strength by species as observed in Ontario waters. Data from Ontario and Ohio Department of Natural Resources (ODNR) are combined into a 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. Species composition and trends in forage abundance are also described by index trawling. Length and weight measurements were recorded to describe trends in growth. Subsamples of Yellow Perch were aged using otoliths.

The gear used was a two seam, 33' Biloxi bottom trawl (38' ground line) with a ½" cod end liner. Trawls in Ontario waters of western Lake Erie took place over two weeks from August 11 to August 20, 2014 (Figure 4.2.1). In 2014, efforts were made to assess the variability of trawl mensuration gear measurements by securing sensors to a frame at known distances apart over a variety of specified angles. The study was incomplete due to the failure of internal batteries retaining their charge. Preliminary work indicated that depth and temperature measurements of sensors showed some disagreement with limnology equipment. This exercise may be repeated in the future in order to better understand the value of this gear for trawl assessment.

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 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 (Ohio DNR / 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 prevail in the west basin during the 2014 trawl survey.

To address effects on fish distribution when hypoxia prevails, Ontario Ministry of Natural Resources and Forestry (OMNRF) continued a midwater trawl study that began in 2012. The study occurred during the last week of August 2014. Methodology and results for this study are described following the results of bottom trawls.

Bottom trawl indices of abundance expressed as number caught per hectare (CPHA) are presented for young-of-the-year (YOY) fish, yearling-and-older (YAO) and small bodied fish with age groups pooled (all ages) for the period 1988-2014 (Table 4.2.1). Decade (2005-2014) and time series (1988-2014) means are presented for comparison. Additional summaries are presented for yearling Yellow Perch and Walleye which used length and age data for age classification.

Although catches of young-of-the-year (YOY) White Perch were the highest of all species and represented 43% of all fish caught, the catch rate in 2014 (1,696 CPHA) was considered moderate compared to the entire time series and for the recent decade (Table 4.2.1). Yellow Perch YOY were the second most abundant species at any life history stage in bottom trawls (Table 4.2.1). The YOY Yellow Perch index in 2014 (1,551 YOY / ha) ranked 91st percentile over the 1988-2014 time series, and was the highest catch rate during the recent decade (Figure 4.2.2). The YOY Walleye catch rate in 2014 (33.9 YOY / ha) was 81st percentile in Ontario's 1988-2014 time series and the highest catch rate in the recent decade (Figure 4.2.3).

YOY Gizzard Shad abundance was low in comparison to the entire time series (8th percentile) and the recent decade (22nd percentile). White Bass YOY abundance in 2014 was the lowest on record. Smallmouth Bass young-of-the-year were weakly represented in 2014 trawls, as were other Centrarchids.

Compared to catch rates over time for species ages yearling and older (YAO), Channel Catfish were abundant in 2014 trawls (Table 4.2.1). Moderate YAO indices were observed in 2014 for Yellow Perch, White Perch, White Bass, Common Carp and White Suckers. Walleye, Freshwater Drum, Gizzard Shad, Smallmouth Bass and remaining species at ages YAO were caught in low numbers relative to their respective time series (Table 4.2.1).

Catch rates for yearling Yellow Perch were parsed from YAO catches using length frequency and age data. The yearling Yellow Perch catch rate in 2014 was 81nd percentile and above the long term mean (Figure 4.2.4). In 2014, the yearling Walleye catch rate was 27th percentile and below the 1988-2014 mean (Figure 4.2.5). 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.

The composition of forage species, (which remain potential prey for the duration of their life histories), was composed mostly of Rainbow Smelt (36%), Trout-perch (26%), Emerald Shiners (19%), Round Goby (10%) and juvenile Cyprinids which could not be identified to species in the field (6%)(Table 4.2.1). Logperch, Mimic Shiners, Spottail Shiners and Silver Chub each accounted for 1% or less of forage fish caught in 2014 (Table 4.2.1). Rainbow Smelt abundance in 2014 was highest recorded in the time series and consisted primarily (99%) of YOY. The Logperch catch rate in 2014 (4.0) was above means for both the entire time series and the recent decade. Mimic Shiner catch rates in 2014 (2.4 / ha) were above the long term mean (1.0 / ha) but below the recent decade mean (2.6 / ha). Abundance indices in 2014 were moderate or below for Emerald Shiners, Round Gobies and Troutperch. Alewife catch was zero in 2014, representing the 7th occasion in which none were caught over the 27 year time series. Alewives were scarce or absent after 2003 until 2012–2013 at which time they recovered briefly. Silver Chub abundance in 2014 (1.6 / ha) was below the long term mean (5.1 / ha) but was near the recent decade mean (1.9 / ha) in Ontario waters of western Lake Erie. The Silver Chub is currently listed as *Special Concern* 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. Seven large Goldfish ranging in total length from 318 to 353 mm were caught in 2014. Also, one juvenile Muskellunge with a total length of 404 mm was caught in a trawl during 2014.

In 2014, the average total length of YOY Yellow Perch (66 mm) was slightly above the 1988-2014 mean (65 mm) (Figure 4.2.6). YOY Yellow Perch mean weight in 2014 was 2.64 g (STD=1.1) which was similar to the mean weight since 1998 (2.7 g). The average total length of YOY Walleye in 2014 (134 mm) was equal to the time series average (Figure 4.2.7). The mean weight of YOY Walleye in August, 2014 was 17.3 g (STD=5.3), which was below the average weight since 1998 (19.4 g). The average length of yearling Yellow Perch (144 mm) remained above average in 2014 (Figure 4.2.8) as did mean weight in 2014 (33.7g). Although average total length of yearling Walleye (298 mm) was less than 2013, it was above the time series average (275 mm) (Figure 4.2.9).

West Basin Midwater Trawling

In recent years, some of the west basin interagency trawl locations were observed as hypoxic near the lake bottom. To address the variability of bottom trawl abundance indices associated with changing environmental conditions, the midwater trawl study commenced in 2012. Field work took place from August 25 to August 27 in 2014.

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 5 stations: 8, 12, 18, 22, 24 ≥ 9m) for a total of 19 samples (Figure 4.2.10). 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 / 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 while volumetric subsamples were taken, and then expanded for small bodied forage species.

Go Pro cameras were attached to the net during some midwater trawls to monitor gear performance and possibly gear avoidance. Observations were often limited by poor water clarity. Net avoidance by adult Smallmouth Bass was observed during one trawl but this behavior was not seen for other species in 2014.

During the midwater trawl study, bottom dissolved oxygen concentrations ranged from 6.8 to 9.1 mg/l and bottom temperatures were from 22.3 to 24.0 °C. Suitable oxygen conditions did not allow us to compare the response of species' vertical distributions to hypoxia, but did allow us to further define 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 or "All") in Table 4.2.3. Catch rates of all species and age groups combined were similar throughout the water column but were highest in pelagic trawls (top of water column: 3,980 fish / ha, middle of the water column: 3,707 fish / ha) compared to bottom trawls (3,453 fish / ha). This was due to the dominance of Emerald Shiners in all fishing modes, but with much higher catches in pelagic trawls. YOY Walleye were caught exclusively in trawls fished on bottom. Yearling Walleye were caught on bottom (0.8 YRL / ha) more so than in the middle (0) and upper portion of the water column (0.6 / ha). Walleye ages 2 and older were caught only in bottom trawls (0.5 / ha). YOY Yellow Perch were caught mostly on bottom (1,305 YOY / ha) with smaller catches in the top of the water column (2.7 YOY / ha). Yearling and older (YAO) Yellow Perch were caught exclusively on bottom (2.5 YAO / ha) in 2014.

The majority of fish caught in the 2014 study were Emerald Shiners (68%), YOY Yellow Perch (13%), YOY Gizzard Shad (8%), Rainbow Smelt (6%), YOY White Perch (4%) and Brook Silversides (1%) (Table 4.2.3). Emerald Shiners and YOY Gizzard Shad were among the few species more abundant in the upper layers of the water column. A single Logperch was caught only in the middle of the water column, but this seems likely to be an anomalous event or may be an indication that the trawl was near bottom. White Bass YOY were distributed evenly throughout the water column. The remaining species-age groups were caught more frequently 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 1988-2014 by the OMNRF Lake Erie Management Unit. Means are presented for 2005-2014 and 1988-2014. 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	Average 05-14	88-14	
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	1,184	1,244	232.9	888.3	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	2,279.0	2,193.5	
Gizzard Shad	956.4	1,197.1	1,099.6	590	260.4	826.4	103.9	81.6	2,409.1	338	413.3	214.0	1,646.5	2,224.8	47.2	436.0	234	152.7	174.1	340.0	2.6	793.8	47.8	22.8	291.3	12.7	14.7	185.2	514.3	
Yellow Perch	202.1	513.7	470.9	72.4	173.9	499.3	554.8	741.4	1,914.9	71.6	198.1	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	1,560.7	383.4	470.4	
White Bass	23.1	67.9	64.7	138	14.9	124.0	36.9	51.1	125.3	327.3	24.5	152.0	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	69.3	102.2	
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	4.5	19.9	
Walleye	14.1	1.4	35.1	49.4	0.2	8.4	19.5	0.9	350	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	7.3	15.9	
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	1.7	1.8	
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	0.4	
yearling-and-older																														
Yellow Perch	169.4	7.8	52.0	89.3	70.7	99.3	68.3	137.5	374.7	74.1	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	211.2	185.0	
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	109.1	129.8	
Freshwater Drum	143.9	0.1	22.2	36.6	20.2	37.5	9.5	17.2	396.6	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	47.3	46.0	
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	4.0	8.6	
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	2.6	2.5	
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	2.1	
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	1.4	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	0.6	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	1.1	0.8	
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	0.3	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	0.5	0.5	
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	0.3	
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	-	0.3	338.2	
Troutperch	213.3	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	176.6	206.1	
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	153.4	113.3	
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	86.2	60.0	
Spiral 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	18.9	44.0	
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	46.9	27.3	
Cyprinidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	15.7	14.2	-	23.2	0.4	6.5	214.8	19.5	22.3	11.7	
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	1.9	5.1	
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	3.0	3.2	
Mimic Shiner	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	21.3	-	-	1.0	0.7	0.3	0.6	0.2	2.4	2.6	1.0
Total	7,869	8,296	10,350	5,095	5,600	5,254	2,147	1,969	7,218	956	1,192	1,923	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	3,833	4,908	
# 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	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 1988-2014 by the OMNRF Lake Erie Management Unit. Means are presented for 2005-2014 and 1988-2014. 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	Average			
																												05 - 14	88 - 14		
young-of-the-year																															
Largemouth Bass	-	-	-	4.59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	-	0.11	-	-	-	-	0.02	0.18		
Quillback	1.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05		
Channel Catfish	-	-	-	0.31	-	-	0.29	-	-	-	-	-	0.11	-	-	-	-	-	-	-	-	-	-	-	0.26	-	-	0.03	0.04		
Bluegill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	0.12	-	-	0.03	0.01			
Morone sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-	-	-	-	-	0.10	0.03			
Pumpkinseed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00		
Black Crappie	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	-	-	-	-	-	-	0.01	0.00		
White Sucker	-	-	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	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	-	-	0.16	0.13	
Largemouth Bass	-	-	-	1.77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.07	
Lake Sturgeon	-	-	-	-	-	-	0.18	-	-	0.12	-	-	-	-	0.10	0.11	-	-	-	0.10	-	-	0.11	0.12	-	-	-	0.03	0.03		
Golden Redhorse	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.51	-	-	-	-	-	0.05	0.02		
Silver Redhorse	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	-	-	-	-	-	-	-	0.13	-	0.12	0.11	-	-	0.04	0.02		
Silver Lamprey	-	-	-	-	-	-	-	-	-	0.12	-	-	-	-	-	-	-	0.11	-	-	-	-	0.21	-	-	-	-	0.03	0.02		
Black Crappie	0.10	-	-	-	-	-	-	-	0.09	-	-	-	-	-	-	-	-	-	0.25	-	-	-	-	-	-	-	-	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	-	0.02	0.01		
Muskellunge	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.11	-	-	-	-	-	0.10	0.02	0.01		
Lake Whitefish	-	-	-	-	-	-	-	-	-	-	-	-	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00		
White Crappie	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00		
Northern Pike	-	-	-	-	-	-	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00		
Longnose Sucker	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.10	-	-	-	-	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		
Nocomis sp.	0.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.01		
Tubenose Goby	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.00		
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	0.86	0.95		
# 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	35	35.04		

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 catch per hectare in mid-water trawl gear fished on bottom and suspended in the middle and top of the water column at 7 sites in 2014. Depths were adequate at 5 sites to fish at 3 depths.

Species and Age Group	Area in Water Column			
	Bottom	Middle	Top	All
Emerald Shiner	949.1	3,594.7	3,340.3	2,526.3
Young of the Year Yellow Perch	1,305.1	-	2.7	481.9
Young of the Year Gizzard Shad	219.7	86.9	556.7	308.9
Rainbow Smelt	497.3	19.9	59.3	210.3
Young of the Year White Perch	401.0	-	-	147.7
Brook Silverside	61.4	-	16.6	28.7
Young of the Year White Bass	3.7	3.4	3.5	3.5
Yearling and Older White Bass	4.0	1.7	-	1.9
Young of the Year Walleye	5.0	-	-	1.9
Yearling and Older Yellow Perch	2.5	-	-	0.9
Yearling and Older Freshwater Drum	1.8	-	-	0.7
Yearling Walleye	0.8	-	0.6	0.5
Yearling and Older White Perch	0.8	-	-	0.3
Logperch	-	0.8	-	0.2
Walleye Ages 2 and Older	0.5	-	-	0.2
Spottail Shiner	0.5	-	-	0.2
Total	3,453	3,707	3,980	3,714
Samples	7	5	7	19

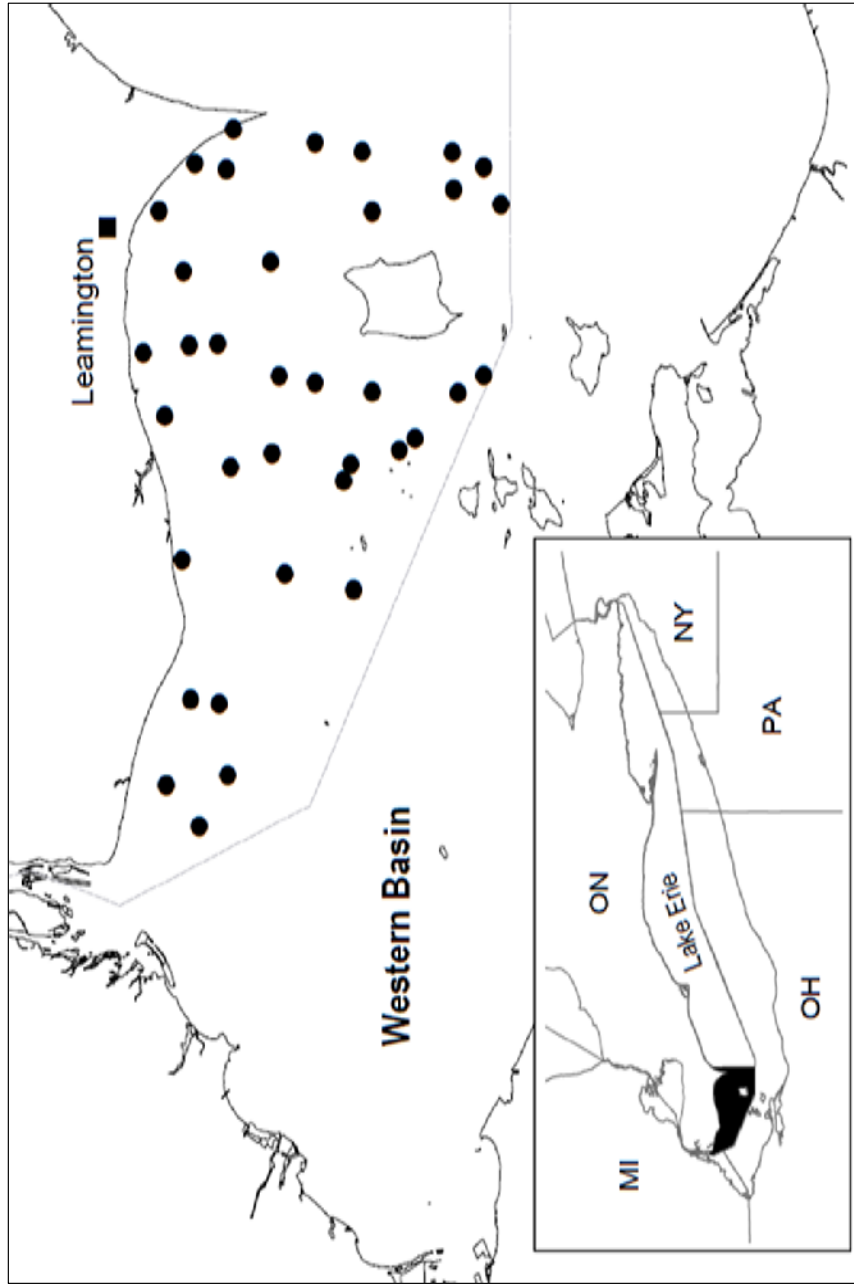


Figure 4.2.1 Ontario bottom trawl index locations fished in the western basin of Lake Erie during August 2014. Thirty-six (36) stations were completed. No sites were excluded in 2014 due to hypoxia.

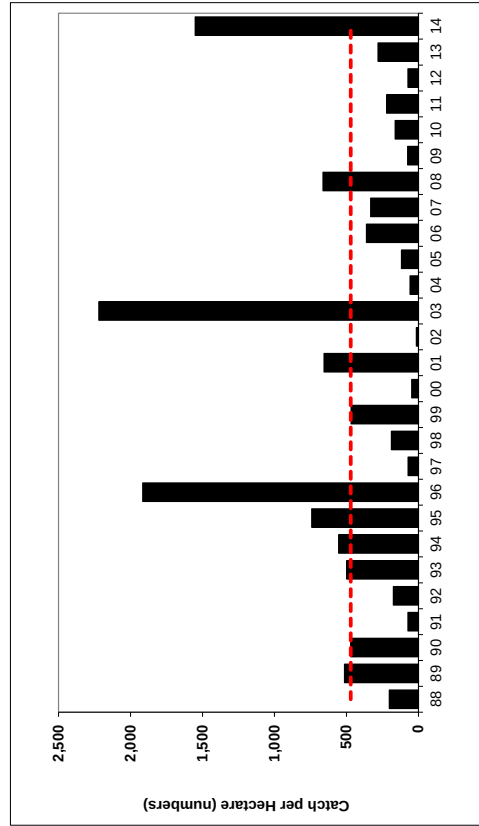


Figure 4.2.2 Number of young-of-the-year Yellow Perch caught per hectare during interagency trawling (1988-2014) in western Lake Erie. Horizontal line indicates 1988-2014 average catch per hectare.

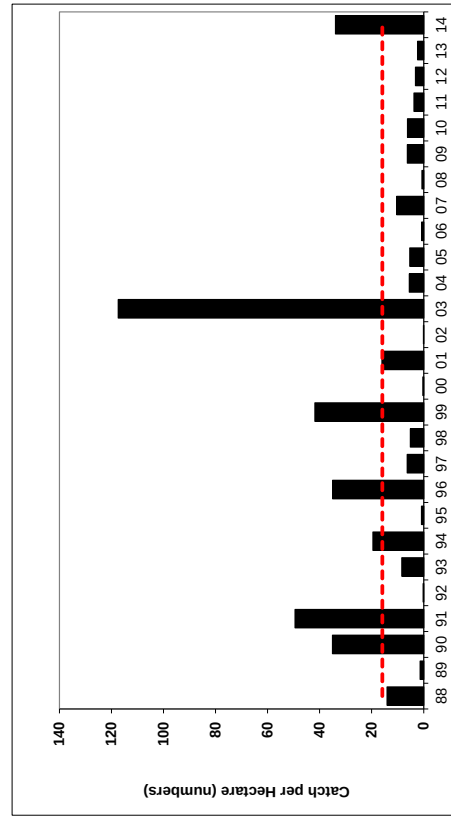


Figure 4.2.3 Number of young-of-the-year Walleye caught per hectare during interagency trawling (1988-2014) in western Lake Erie. Horizontal line indicates 1988-2014 average catch per hectare.

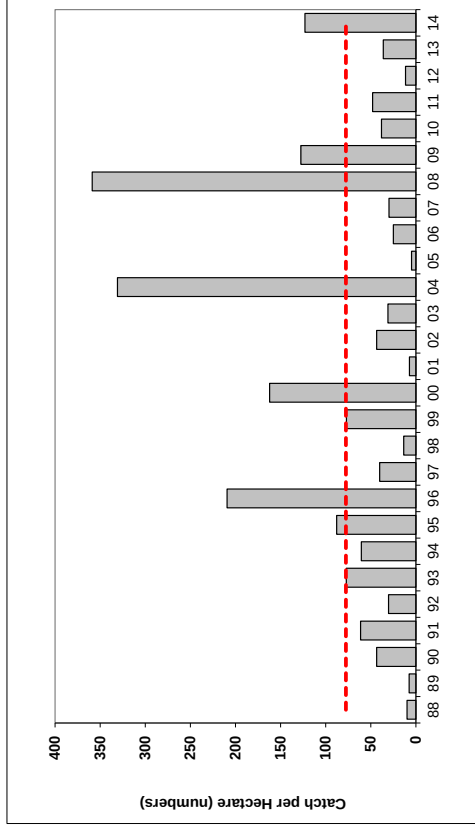


Figure 4.2.4 Number of yearling Yellow Perch caught per hectare during interagency trawling (1988-2014) in western Lake Erie. Horizontal line indicates 1988-2014 average catch per hectare. Corrections to 1988-1997 catch rates from previous report.

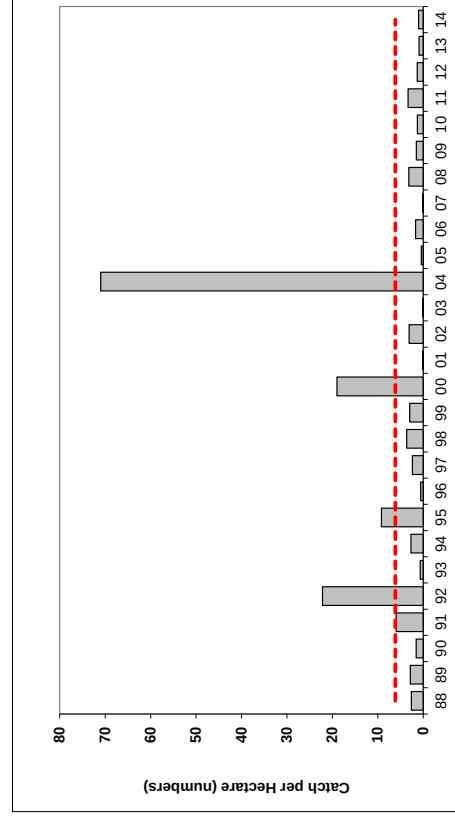


Figure 4.2.5 Number of yearling Walleye caught per hectare during interagency trawling (1988-2014) in western Lake Erie. Horizontal line indicates 1988-2014 average catch per hectare.

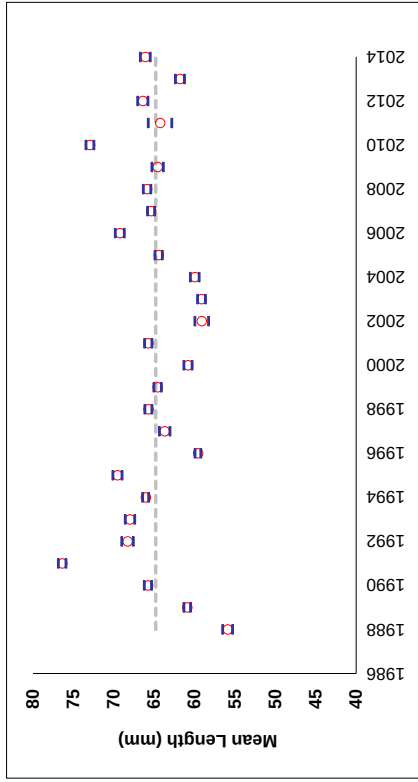


Figure 4.2.6 Mean total length of young-of-the-year (YOY) Yellow Perch with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2014. Horizontal broken line indicates the average of the time series.

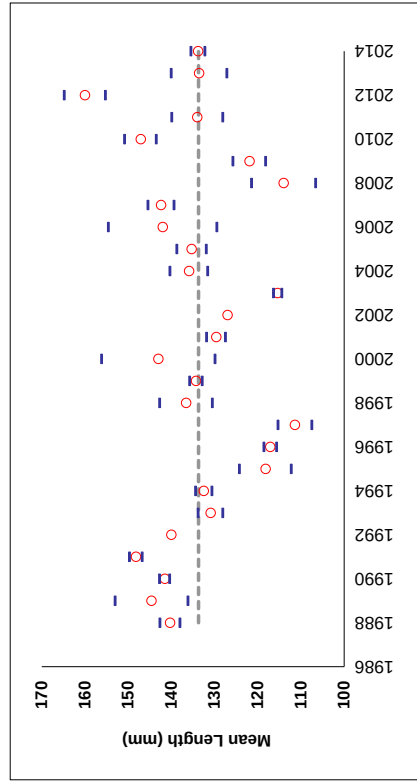


Figure 4.2.7 Mean total length of young-of-the-year (YOY) Walleye with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2014. Horizontal broken line indicates the average of the time series. Two (2) YOY were caught in 1992 and one (1) in 2002.

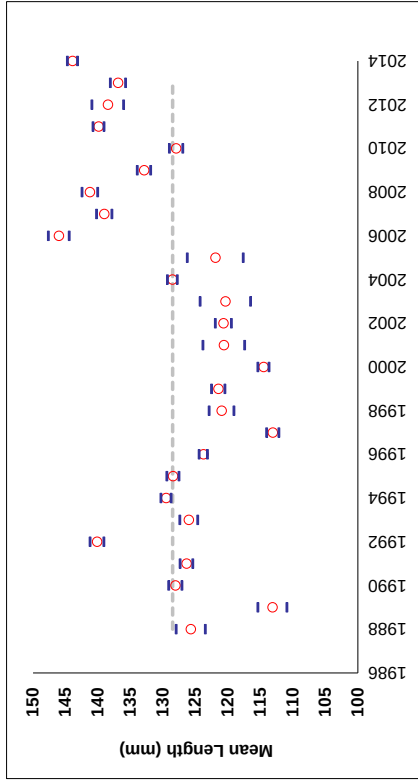


Figure 4.2.8 Mean total length of yearling Yellow Perch with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2014. Horizontal broken line indicates the average of the time series.

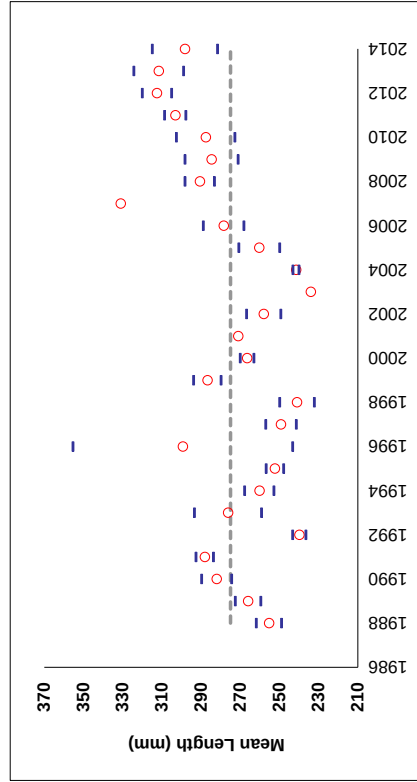


Figure 4.2.9 Mean total length of yearling Walleye with 95% confidence limits. Interagency trawling, Ontario waters of western Lake Erie, 1988-2014. Horizontal broken line indicates the average of the time series. In 2007 one (1) yearling walleye was caught.

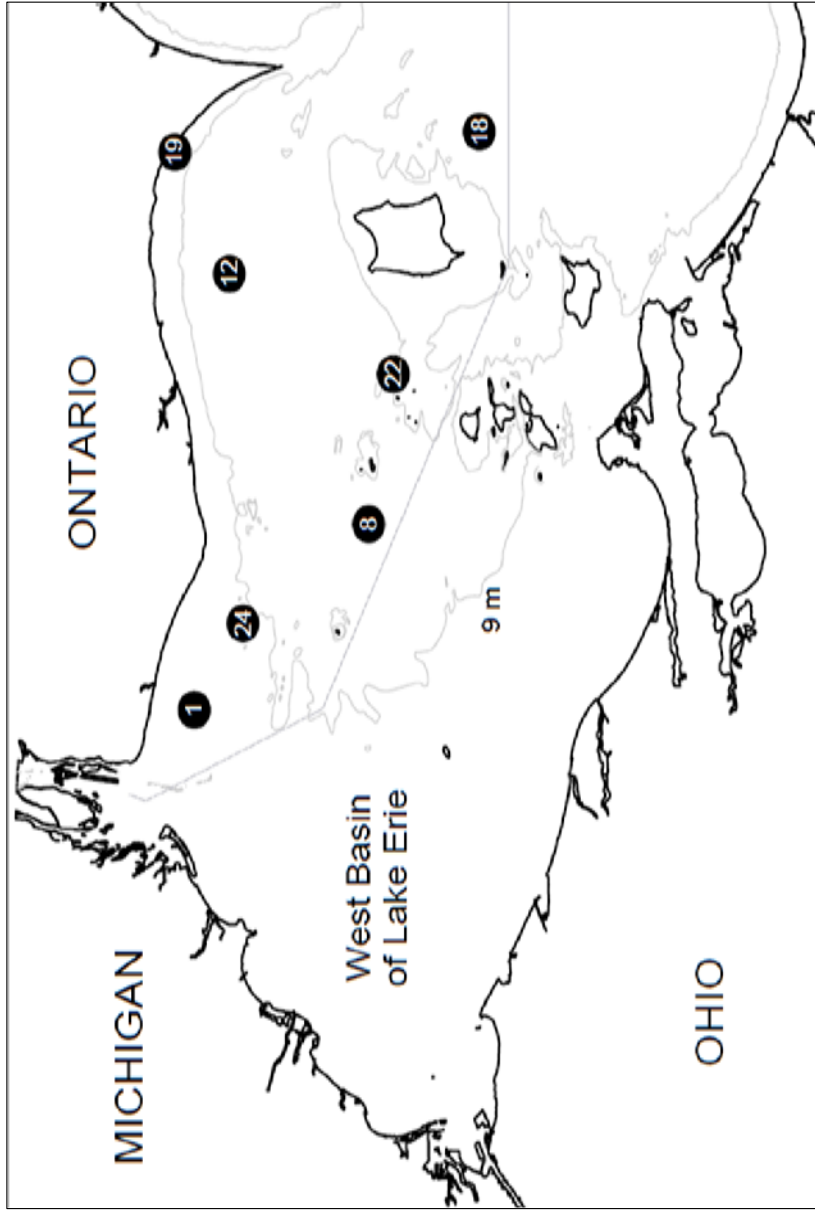


Figure 4.2.10 Ontario midwater trawl locations fished in the western basin of Lake Erie during August 2014. Seven sites were selected from the bottom trawl survey which took place during the previous 2 weeks. Site numbers are visible. Trawls were fished near the surface and on bottom at all sites. At depths close to 9 m or greater, trawls were also fished in the middle of the water column (sites 8, 12, 18, 22, 24).

4.3 Long Point Bay Index Trawl Surveys

Current 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 at up to four fixed locations annually since 1980 in Inner Long Point Bay (Inner Bay Trawl Assessment) and the inshore waters of outer Long Point Bay (Nearshore Outer Bay Trawl Assessment) with a 6.1m modified Biloxi bottom trawl. A third trawl survey was initiated in 1984 to measure recruitment of Rainbow Smelt. In this survey, a 10m Biloxi bottom trawl was fished at four fixed stations in the offshore waters of Outer Long Point Bay (Offshore Outer Bay Trawl Assessment).

Trawling at all nearshore index stations was conducted weekly during September and October from 1980 to 2010. Beginning in 2011, nearshore trawling during October was discontinued necessitating an adjustment of the standard survey period from eight to four or five weekly sample events from August 26th to October 5th across the entire time series. Total annual trawling effort for the Inner Bay and Nearshore Outer Bay assessments was approximately 640 and 480 minutes, respectively during the survey years to and including 2010. Total annual trawling effort was reduced to 400 and 300 minutes, 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, September trawling was suspended and all future 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 lengths 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.

A new index of age 0 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 age 0 Yellow Perch abundance was created to better reflect the overall abundance of YOY Yellow 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 age 0 Yellow Perch composite index in year i, and OOB_i, IB_i and NOB_i are the age 0 Yellow 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 robust 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. This survey applies a systematic design to establish potential sample locations based on a UTM grid and as such provides a secondary benefit of evaluating the effectiveness of the existing standard trawl assessment programs that feature multiple weeks of sampling at a few fixed locations in Long Point Bay (Figure 4.3.1A).

The UTM Grid based bottom trawl survey (LPB Grid Trawl Assessment) has been completed in each of the last seven years, but only the second time featured in this report. Target sample locations were established on a UTM Grid covering the offshore waters of outer Long Point Bay deeper than 5 meters (Figure 4.3.1B). Thirty-six (36) 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 meters and deeper. A greater sampling resolution was applied in areas ≥ 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 the last 10 years.

Grid trawling was completed over a three to five day period during mid to late October each year. The 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 could 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 2014 survey was accomplished in three days On October 27th, 28th, and 30th, and for the second year in a row, all 36 target stations were sampled. LPB Grid Trawl Assessment results are described separately from species reports below.

Yellow Perch

Age 0 Yellow Perch abundance increased in all survey areas of Long Point Bay during 2014 (Tables 4.3.1 to 4.3.3). For the second year in a row, YOY Yellow Perch were more abundant nearshore than offshore. During seven of the past 12 years and most recently in 2012, age 0 Yellow Perch mean densities (NpHa) were higher offshore than nearshore. Age 0 Yellow Perch densities during 2014 averaged 4.7, 80.1 and 24.6 Yellow Perch/ha in the Inner Bay, Nearshore Outer Bay and Offshore Outer Bay trawl assessment areas, respectively. The two outer Long Point Bay trawl assessments rank the 2014 year class 9th highest since 1984 (73 percentile), suggesting above average abundance (Tables 4.3.2 and 4.3.3). The Long Point Bay composite index, which takes into consideration all trawl locations, indicates the 2014 year class was only moderate strength (NpHa=28.4) compared to the long term average (1984-2013 avg. NpHa=64.7). According to the composite index, the period since 2002 has featured four of the weakest (2002, 2004, 2009, 2013) and four of the strongest (2003, 2005, 2008, 2011) Yellow Perch year classes observed since 1984 (Figure 4.3.2).

In general, mean size of age 0 Yellow Perch has increased over time in the nearshore trawl assessment areas with maximum size observed in 2005 (Figure 4.3.3). Age 0 Yellow Perch mean size decreased substantially in 2014, falling below average length and weight for the first time since 2006 (Figure 4.3.3).

A meager total of 17 YAO Yellow Perch were captured in the three trawl assessment areas during 2014. The weak 2013 Yellow Perch year class (age 1) was represented by a single fish, the 2012 year class (age 2) by 5 fish (29% of YAO catch), and the largest YAO cohort were 3 year olds (65%) from the 2011 year class (Table 4.3.4).

Rainbow Smelt

Recruitment of age 0 Rainbow Smelt increased from 2013 (NpHa=217.9); the 2014 year class (NpHa=1002) was above average strength, 11th highest (67th percentile) among all years surveyed

since 1984, and about 5 percent greater than the long term average (1984-2013 avg. NPHa=950; Table 4.3.3).

YAO Rainbow Smelt abundance decreased to record low density in 2014 (NPHa=4.6; Table 4.3.5). YAO Rainbow Smelt densities have remained below average in each of the last five years (1984-2013 avg. NPHa=437.2). Age 1 Rainbow Smelt from the moderately weak 2013 year class accounted for 89% of the 2014 YAO Rainbow Smelt catch in number (Table 4.3.5).

Age 0 Rainbow Smelt mean length and weight decreased substantially in 2014 to the third lowest mean size observed in the 31 year history of the Offshore Outer Bay Trawl Assessment (Figure 4.3.4). Age 1 Rainbow Smelt were average size in 2014 (Figure 4.3.4).

Smallmouth Bass

Age 0 Smallmouth Bass abundance decreased in 2014 (NPHa=4.7), and remained below the long term average density of 15.6 Smallmouth Bass/ha for the fifth consecutive year (Table 4.3.1). Mean total length of age 0 Smallmouth Bass has fluctuated between 60 and 90 mm during the 35 year time series of the Inner Bay Trawl Assessment (Figure 4.3.5). Age 0 Smallmouth Bass mean length and mean weight decreased but remained above average in 2014. In general, YOY Smallmouth Bass have been near or above average size during most years since 1998.

Round Goby

Round Gobies were first observed in Long Point Bay index trawl catches in 1999 (Tables 4.3.1 to 4.3.3). Abundance of this invasive species increased rapidly, reaching peak density within the first 10 years following colonization in all three Long Point Bay trawl assessment areas, firstly in the nearshore waters of the outer bay (2001), then in the offshore waters (2007), and lastly in Inner Bay (2009). On average, Round Goby mean densities (all ages) have been highest in the Offshore Outer Bay Trawl Assessment area (1999-2013 avg. NPHa=175.9), followed by the Inner Bay trawl Assessment area (1999-2013 avg. NPHa=105.3), and Nearshore Outer Bay Trawl Assessment area (1999-2013 avg. NPHa=79.0) (Tables 4.3.1 to 4.3.3). In 2014, Round Goby catch rates were above average in Inner Long Point Bay (NPHa=95.4) and nearshore waters of Outer Long Point Bay (NPHa=98.5) but was below average in the offshore waters of Outer Long Point Bay (NPHa=0.5).

Other YOY Species

Spottail Shiners were an important component of the nearshore forage fish community in Long Point Bay during the 1980's and 90's, but age 0 recruitment decreased sharply after 2000 (Tables 4.3.1 and 4.3.2). For instance, age 0 densities of Spottail Shiner in the Nearshore Outer Bay Trawl Assessment averaged 632/ha from 1980 to 2000 and only 27.1/ha since 2001 (Table 4.3.2). A few age 0 Spottail Shiners were captured in the Nearshore Outer Bay Trawl Assessment during 2014 (5.0/ha), but there hasn't been a single age 0 Spottail Shiner captured in the Inner Bay Trawl Assessment in the last seven years (Table 4.3.1).

Banded Killifish density decreased in 2014 after a short lived increase in 2013 that followed several years of low abundance (Table 4.3.1). The 2014 year class of Banded Killifish was the 16th largest observed in 35 years. YOY recruitment indices for Rock Bass (NPHa=0.5) and Lepomis (sunfish) species (NPHa=0.1) remained low in 2014, continuing a trend that began around 2000 (Table 4.3.1).

Age 0 White Bass and White Perch were completely absent in the nearshore and offshore trawl assessments of outer Long Point Bay during 2014 (Tables 4.3.2 and 4.3.3). Juvenile clupeid species were scarce in 2014; zero age 0 Alewife and only two age 0 Gizzard Shad were captured in some 30 nearshore and 40 offshore trawl tows in outer Long Point Bay (Tables 4.3.2 and 4.3.3). Emerald Shiner abundance decreased in offshore areas (Table 4.3.3), but increased near shore during 2014 (Tables 4.3.2).

Species Spatial/Depth Distribution, Grid Trawl Assessments, 2008-2014

In 2014, all 36 target grid trawl locations were sampled (Table 4.3.6) equaling an effort that was achieved in only one other year (2013) during the 7 year history of this young trawl assessment program. A principal objective of the grid trawl survey was to examine the spatial/depth distribution of juvenile Yellow Perch. Beginning about 2003, age 0 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 spatially robust grid trawl survey with time averaged, site specific age 0 Yellow Perch abundance indices from the three standard long-term trawl assessments (mean species abundance at fixed trawl stations sampled during 4 to 5 week period). Age 0 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 2008, 2010 to 2012, and 2014 age 0 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 Inner Bay. The 2014 mean density estimate of age 0 Yellow Perch was the second highest (NPHA=32.3) in the 7 year time series of the Grid Trawl Assessment (Table 4.3.6). However, 93% of the 2014 total age 0 Yellow Perch catch was captured in a single deep water (35 m bottom depth) trawl tow near the survey's eastern boundary (Figure 4.3.6). Age 0 Yellow Perch were absent or observed in very low densities across the remaining 35 trawl stations; 30 of the 36 grid trawl tows failed to capture any YOY Yellow Perch. Four of the six trawl tows capturing juvenile Yellow Perch accounted for 99.7% of the YOY Yellow Perch catch and all were located at bottom depths from 31.5 to 34.9 meters (Figure 4.3.6). In previous years, the majority of juvenile Yellow Perch were captured offshore in bottom depths from 15 to 35 meters and a few have even been observed out to depths of 45 meters (Figure 4.3.6).

The complete sampling of all 36 grid trawl stations over a relatively brief period (4 days) in 2014, achieved the desired "snap shot" perspective for examining abundance and distribution in all fish species (Table 4.3.6). For example, the distribution pattern of Rainbow Smelt (all ages), despite general low densities in 2014, was similar to 2013 when densities were much higher (Figure 4.3.7). The largest Rainbow Smelt (all ages) densities were observed at depths >25 m in 2014 and 2013, in a region of the bay that is deeper and farther east than that sampled by the Offshore Outer Bay Trawl Assessment. Mean density of age 0 Rainbow Smelt in 2014 was 26.6 times greater in the Offshore Outer Bay Trawl Assessment (NPHA=1001.6) than in the Grid Trawl Assessment (NPHA=37.7). YAO Rainbow Smelt densities were low in Long Point Bay during 2014. This was evident in both the Grid Trawl Assessment (NPHA=37.9; Table 4.3.6) and the Offshore Outer Bay Trawl Assessment (NPHA=4.6; Table 4.3.5).

Round Gobies were the third most abundant species captured in the Grid Trawl Assessment, averaging 9.5 Round Gobies/ha across all 36 stations during 2014 (Table 4.3.6). This was the lowest mean Round Goby density observed during the survey's 7 year history. Four grid trawl stations accounted for 97.6% of the total Round Goby catch; all were situated at bottom depths from 31.7 to 34.9 meters (Figure 4.3.7). In 2013, Round Goby were much more abundant and concentrated in the southwest corner of Long Point Bay from 26 to 32 m bottom depth (Figure 4.3.7). The Offshore Outer Long Point Bay Trawl Assessment also ranked 2014 Round Goby abundance (NPHA=0.5) the lowest since 2008 (Table 4.3.3).

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, 1980-2014.

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
Avg. for 1980-2013		248.3	16.8	15.6	12.7	155.5	17.6	10.2	28.4	46.5

^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, 1980-2014.

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
Avg. for 1980-2013		74.5	14.7	7.8	62.8	12.3	14.3	394.4	35.9

^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, 1884-2014.

Year	Effort (min.)	Rainbow Smelt	White Perch	White Bass	Yellow Perch	Alewife	Gizzard Shad	Emerald Shiner	Round ^a Goby
1984	320	2206.3	13.7	166.2	7.3	22.4	14.6	0.1	0.0
1985	394	84.0	12.9	8.1	1.6	0.5	0.4	0.8	0.0
1986	380	2979.8	0.2	32.7	0.0	16.6	77.1	2.4	0.0
1987	440	267.6	0.7	0.1	0.0	19.8	0.8	46.2	0.0
1988	480	972.8	3.5	0.1	0.4	21.8	3.1	42.8	0.0
1989	400	1158.4	1.3	5.5	0.4	36.4	0.2	9.0	0.0
1990	400	1194.3	0.9	7.9	0.0	30.6	0.6	7.4	0.0
1991	400	54.4	13.3	3.8	0.7	82.0	2.1	12.0	0.0
1992	400	1468.8	0.0	0.0	0.0	4.8	0.0	5.5	0.0
1993	400	203.6	0.3	4.2	2.9	10.2	1.0	8.9	0.0
1994	400	341.9	0.8	2.1	10.6	8.3	18.6	55.3	0.0
1995	400	84.0	0.9	0.3	4.0	0.6	0.0	9.1	0.0
1996	240	353.2	0.3	0.3	7.9	0.0	0.3	390.7	0.0
1997	400	154.4	0.0	0.0	0.0	0.1	0.0	0.1	0.0
1998	400	422.5	0.5	0.1	8.1	1.4	4.9	19.6	0.0
1999	310	40.3	1.0	40.0	15.5	2174.5	65.2	15.1	0.2
2000	400	259.9	0.0	2.0	3.0	25.6	0.3	3.3	50.8
2001	400	2633.3	6.1	19.4	13.8	81.1	16.0	12.7	69.0
2002	400	142.5	0.0	0.0	0.0	35.3	3.2	9.5	127.0
2003	400	7058.1	16.2	2.0	240.6	0.5	68.6	3388.0	158.8
2004	400	132.2	0.0	0.0	0.1	0.3	0.2	20.3	323.8
2005	400	0.9	0.1	1.1	156.2	0.1	1.7	645.7	66.9
2006	400	1256.0	0.9	0.3	38.0	78.6	1.4	452.3	93.3
2007	400	991.3	0.1	0.2	70.0	1.0	34.6	29.3	973.2
2008	400	1293.0	5.4	1.3	356.0	2.3	86.5	16.0	452.6
2009	400	148.2	0.6	0.2	0.3	0.1	0.4	54.8	43.6
2010	400	326.9	1.6	0.4	63.5	0.9	13.3	117.6	9.7
2011	400	509.2	0.0	0.2	224.6	2.1	18.9	70.3	125.4
2012	400	1657.7	0.8	0.2	33.2	707.3	47.6	438.3	129.0
2013	400	217.9	0.0	0.0	0.1	17.7	0.0	58.7	14.5
2014	400	1001.6	0.0	0.0	24.6	0.0	0.0	2.9	0.5
Avg. for 1984-2013		953.8	2.7	10.0	42.0	112.8	16.1	198.0	87.9

^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 Long Point Bay, Lake Erie, September, 1980-2014.

	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
	Avg. for 1980-2013		248.3	43.4	29.2	17.3
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
	Avg. for 1980-2013		74.5	21.8	8.7	7.8

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 1984-2014.

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
Avg. for 1984-2013		953.8	374.3	52.8	437.2

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, 2008-2014.

Species	Age Group	Survey Year							2008-2013 Avg.	
		2008	2009	2010	2011	2012	2013	2014		
Yellow Perch	YOY	30.5	0.1	6.0	6.9	36.0	0.9	32.5	15.9	
Yellow Perch	YAO	27.1	2.4	0.8	1.4	2.8	3.9	1.8	6.9	
Yellow Perch	ALL	57.6	2.5	6.7	8.2	38.8	4.8	34.3	22.8	
Rainbow Smelt	YOY	104.1	93.4	97.1	314.6	449.2	87.7	37.7	211.7	
Rainbow Smelt	YAO	63.8	508.6	320.2	263.3	309.1	327.2	37.9	293.0	
Rainbow Smelt	ALL	167.9	602.0	417.3	577.8	758.3	414.9	75.5	504.7	
Emerald Shiner	YOY	93.7	19.7	89.8	297.0	103.5	270.8	0.4	120.7	
Emerald Shiner	YAO	16.3	16.6	16.6	873.0	45.6	96.3	0.6	193.6	
Emerald Shiner	ALL	110.0	36.2	106.5	1170.0	149.1	367.1	0.9	314.4	
White Perch	YOY	1.6	0.1	0.1	0.1	0.8	0.4	0.0	0.5	
White Perch	YAO	1.0	0.1	0.2	0.0	0.3	10.6	0.0	2.0	
White Perch	ALL	2.6	0.2	0.4	0.1	1.2	11.0	0.0	2.6	
White Bass	YOY	0.4	0.0	0.5	0.0	0.4	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	
White Bass	ALL	0.4	0.0	0.5	0.0	0.5	0.2	0.0	0.3	
Alewife	YOY	9.2	0.1	0.6	3.2	29.7	10.0	0.0	8.8	
Gizzard Shad	YOY	0.4	0.1	1.9	1.1	0.7	0.5	0.0	0.8	
Round Goby	ALL	325.8	78.2	20.0	128.7	88.9	341.4	9.5	163.8	
Trout Perch	ALL	0.4	0.6	0.1	0.1	0.3	0.4	0.0	0.3	
No. Stations sampled		27	26	29	30	25	36	36	28.8	
Total Effort (min)		270	260	290	300	250	360	360	288.3	

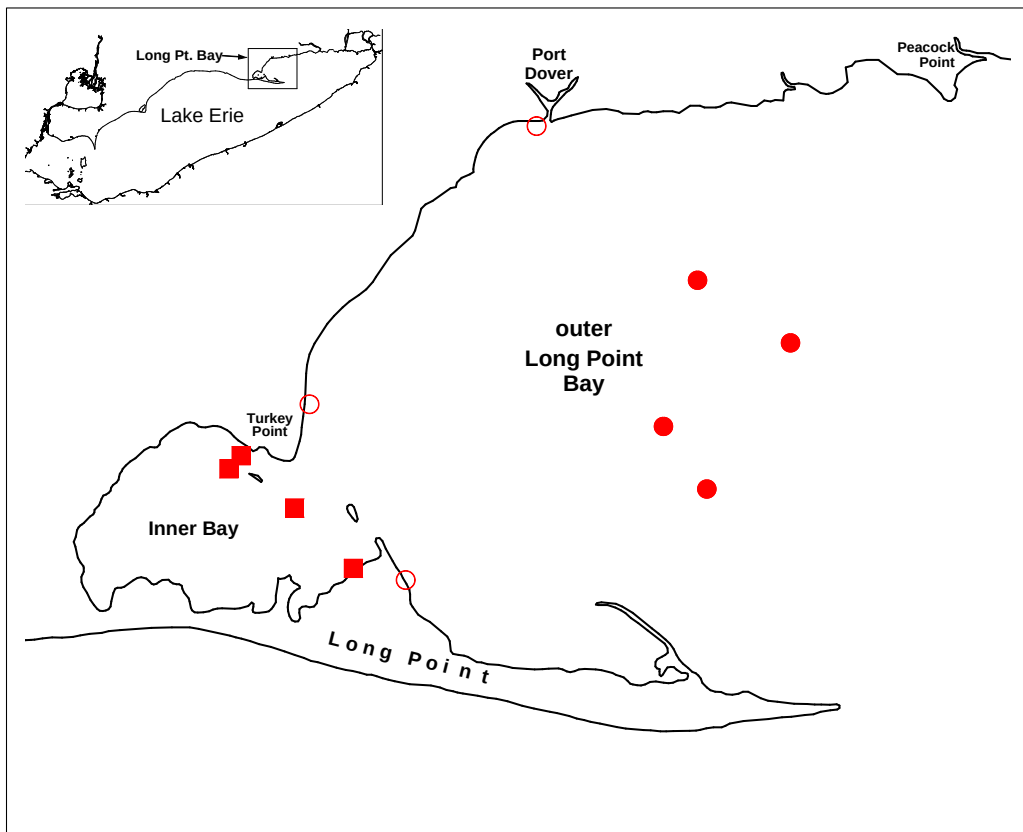


Figure 4.3.1A Location of trawl stations where bottom trawling was conducted in Inner Bay (■), and the nearshore (○) and offshore (●) waters of Long Point Bay, Lake Erie.

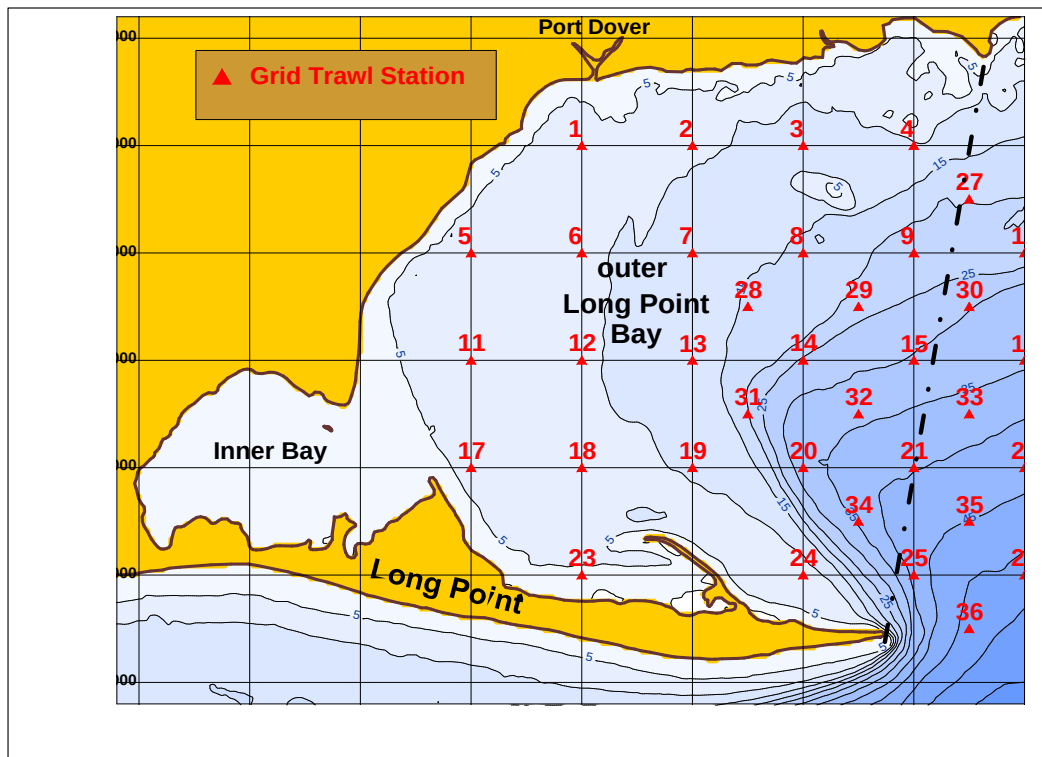


Figure 4.3.1B Target bottom trawl stations (1 to 36) sampled annually during October to examine the spatial distribution of juvenile Yellow Perch and forage fish species in outer Long Point Bay, Lake Erie. Map axis are 5 km UTM grid units.

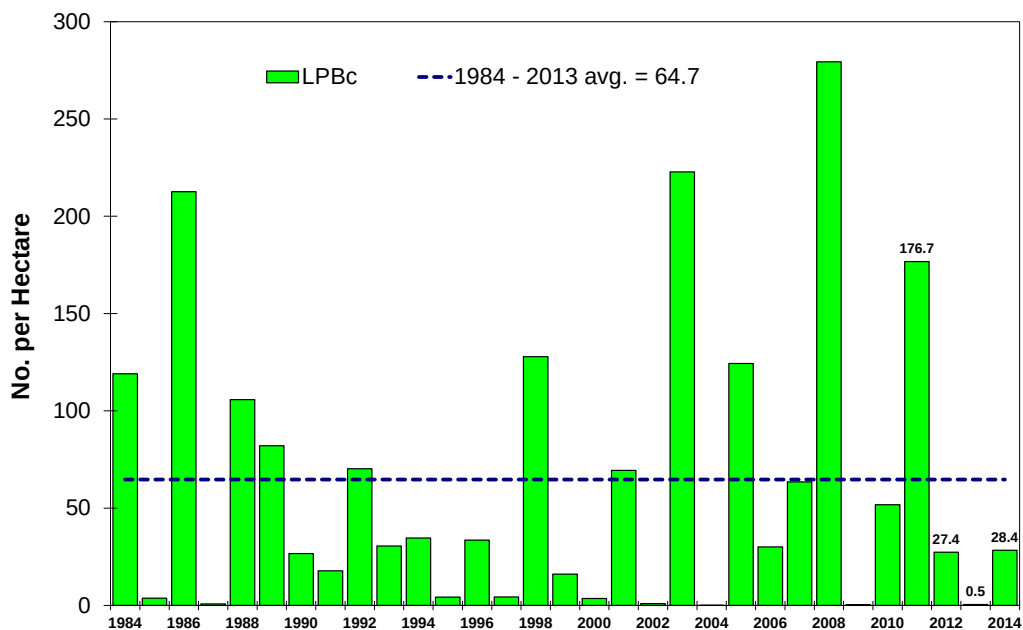


Figure 4.3.2 Relative abundance (mean number per hectare) of age 0 Yellow Perch from a composite index (LPBc) of three bottom trawl assessments in Long Point Bay, Lake Erie, during September-October, 1984-2014.

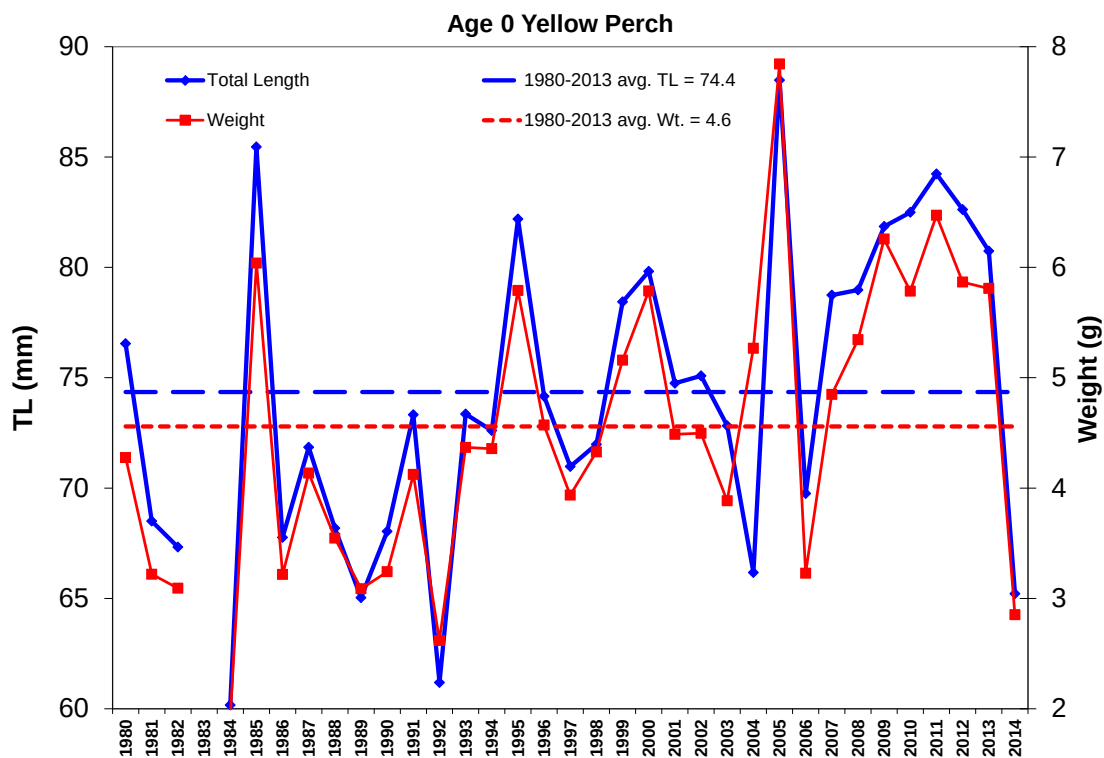


Figure 4.3.3 Mean total length (mm) and weight (g) of age 0 Yellow Perch from 6.1 m index trawl catches in the inshore waters of Long Point Bay (Inner and Outer Bays combined), Lake Erie, 1980-2014 (September data). No fish sampled in 1983.

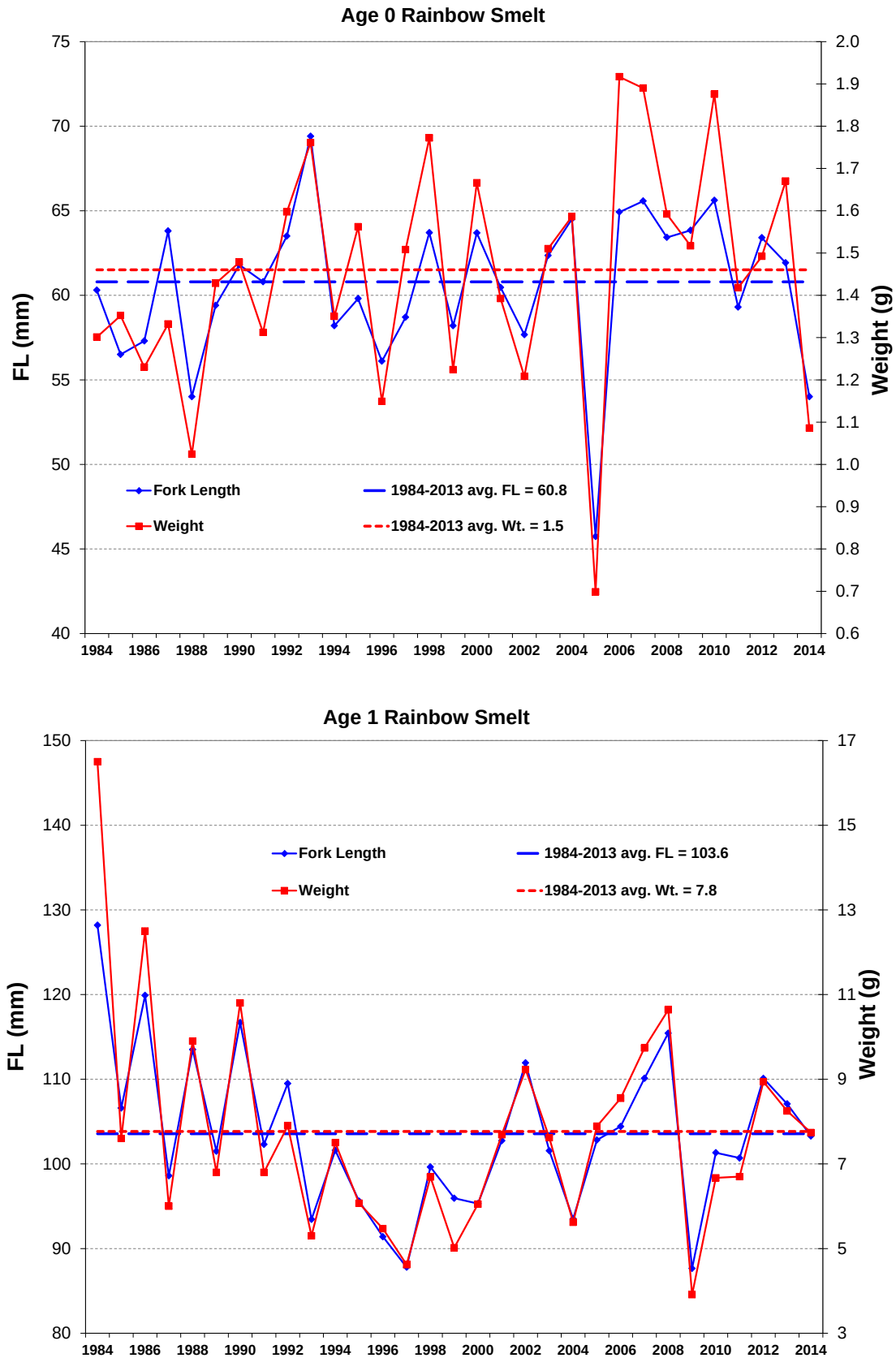


Figure 4.3.4 Mean fork length (mm) and weight (g) of age 0 (top graph) and age 1 (bottom graph) Rainbow Smelt from 10 m index trawl catches in the offshore waters of outer Long Point Bay, Lake Erie, 1984-2014 (October data).

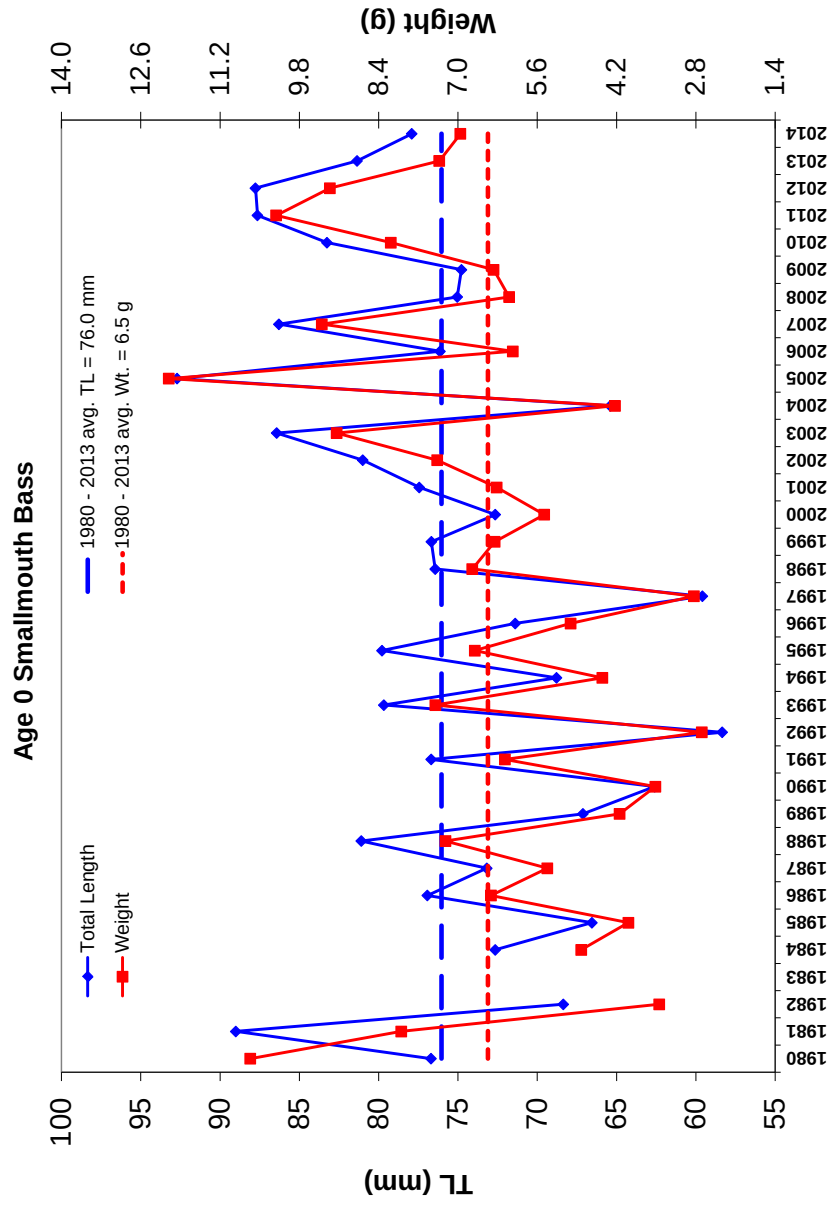


Figure 4.3.5 Mean total length (mm) and weight (g) of age 0 Smallmouth Bass from 6.1 m index trawl catches in Inner Bay of Long Point Bay, Lake Erie, 1980-2014 (September data). No fish sampled in 1983.

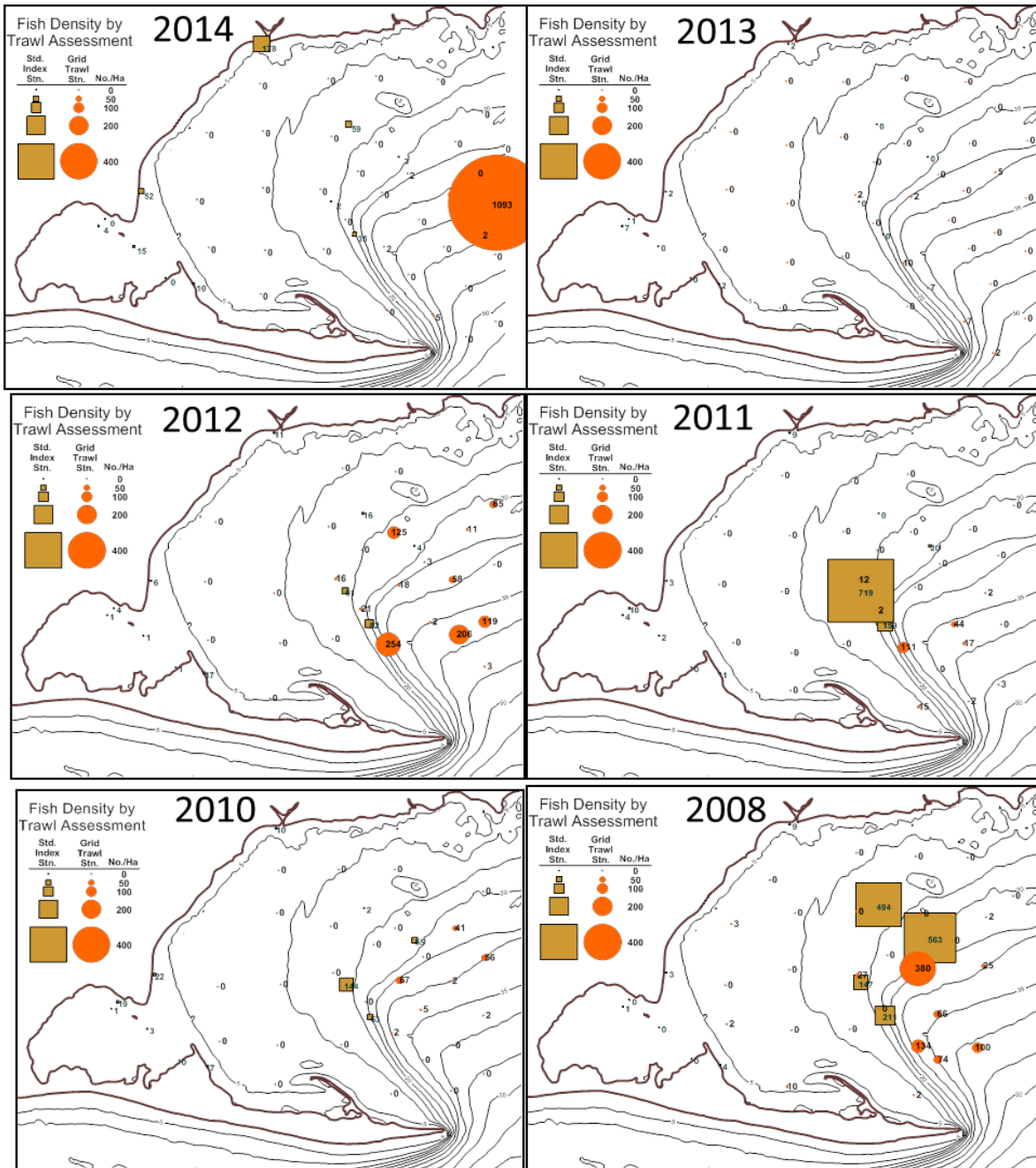


Figure 4.3.6 Relative abundance of age 0 Yellow Perch at up to 36 bottom trawl stations established within a 5 km UTM Grid design and sampled during 3 to 5 day period in October to examine species spatial/depth distribution in outer Long Point Bay, Lake Erie, 2008 to 2014 (2009 not shown). Size of shaded dots and associated values represent NPHA of age 0 Yellow Perch captured in a single 10 min tow at each Grid Station. Size of shaded squares and associated values represent the mean NPHA of age 0 Yellow Perch captured at standard index bottom trawl stations shown in Figure 4.3.1 (each square is an average of up to 40 10 min tows).

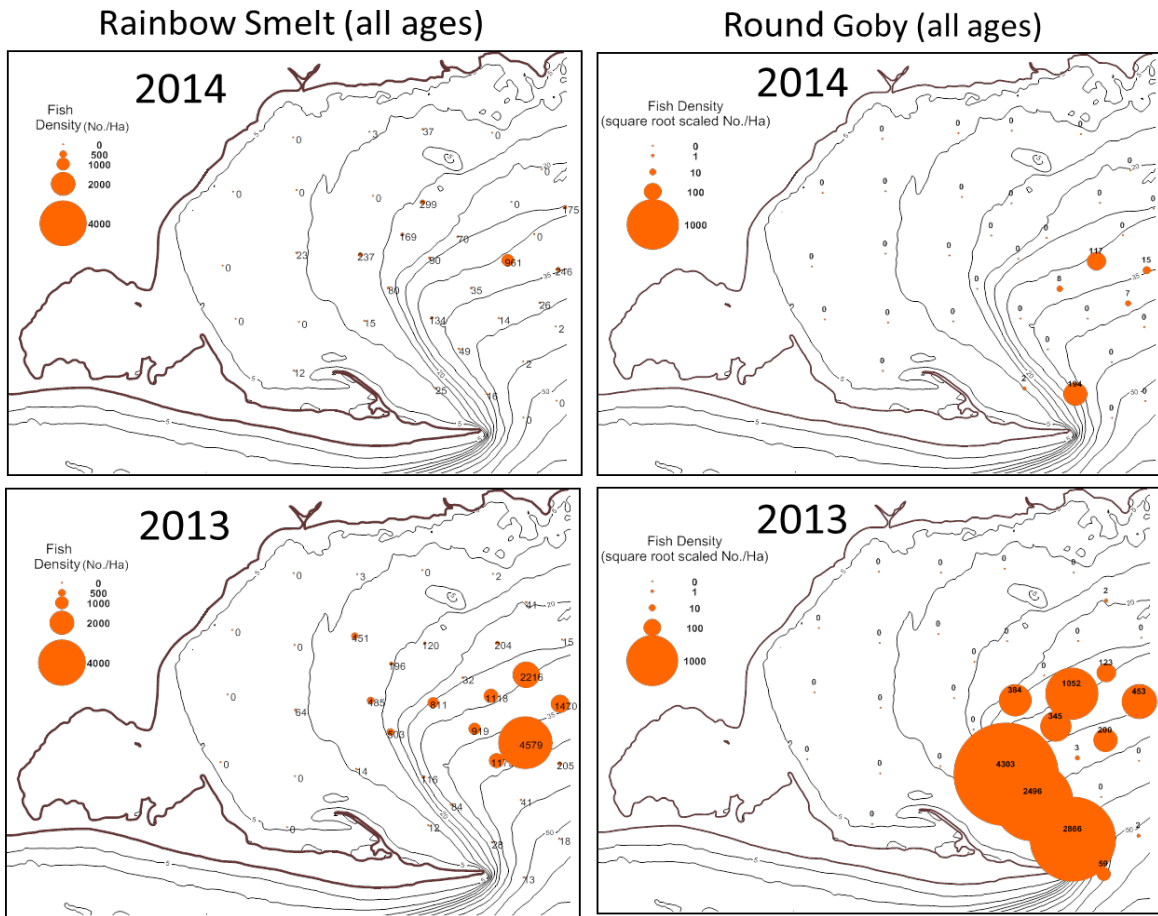


Figure 4.3.7 Relative abundance of Rainbow Smelt (top figure) and Round Goby (bottom figure) at 36 bottom trawl stations established within a 5 km UTM Grid design and sampled during a 3 day period in October 2014 to examine fish species spatial/depth distribution in outer Long Point Bay, Lake Erie. Size of shaded dots is square-root scaled and associated values represent NPHa of Rainbow Smelt and 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. Between 1991 and 1994, the program was expanded to include comparisons of the effectiveness of multifilament gear (used 1986-1994) and monofilament gear (used since 1991). The later gear type has been used in the commercial fishery and, more recently, in agency gill net assessment programs on Lake Erie. Comparisons of catches between mono and multifilament nets were completed in 1996, and species specific conversion ratios calculated. Species catches from multifilament nets (pre 1991) were adjusted to comparable efficiency of monofilament nets (by conversion ratio multipliers) to describe trends in abundance of major species across the entire time series (1986-2014). Monofilament nets have been used exclusively in this survey since 1995.

Study Area and Sampling Design

The standardized study area encompass 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. The survey period was from spring to fall during 1986 to 1993. This was reduced to June-August for the years 1994 and later. Two randomly selected sites were fished weekly in each depth stratum on at least 10 occasions during June to August. Only data from a comparable time period (June-August) for the entire time series (1986-2014) are reported below.

An additional depth stratum was sampled on an exploratory basis starting in 2011 and continued to 2014 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). Up to 20 additional sites were sampled with the standard index gill net gangs in the extra deep stratum, bringing the total number of gill net sets per year to 60 during each of the 2011 to 2013 surveys. In 2014 the tenth and final week of gill netting was not completed due to poor weather and conflicts with other sampling programs. The total number of gill net sets during 2014 was 36 in the standard survey area and 48 overall, including the extra deep depth stratum. To maintain continuity with previous year survey results, the findings from sampling of the extra deep stratum (in 2011 to 2013) are reported separately in Table 4.4.2.

Areas (1, 2, and 4) were sampled weekly on a rotational basis. Six randomly selected grid locations (two per depth stratum) were sampled in one of three survey areas per sample occasion. 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, 2.25, 2.5, 2.75, 3, 3.5, 4, 4.5, 5, 5.5 and 6" were set at each location. 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 weight (biomass, grams) per km net were calculated from the total catch in gangs excluding the catch in 5.5 and 6" mesh sizes.

Fish Community

Catch (all mesh sizes, standardized to 40 gill net sets) by species from 1995 to 2014 are summarized in Table 4.4.1. Yellow Perch once again was the most abundant species, accounting for 38% of the total fish catch in number during 2014; a prominent pattern in 14 of the last 20 survey years (Table 4.4.1). Alewife abundance in Long Point Bay has been episodic, accounting for approximately half or more of the total fish species catch in some years (1995, 1998, 2002, 2006, 2013) and almost nothing in other years (1996, 1997, 2004, 2014). The most recent example of this episodic nature occurred during the last two years. Record high numbers of Alewife ($N > 29,000$) were

caught during 2013 and none (zero) were netted in the following year (Table 4.4.1). Near record high numbers of Smallmouth Bass were caught during 2014, and they were the next most abundant species, representing 32% of the total catch. Freshwater Drum (8.8%), White Sucker (4.1%), and Rock Bass were the 3rd to 5th most abundant species caught in 2014. A record high number of Lake Trout were also captured in 2014, more than double the total catch from any previous year (Table 4.4.1).

Table 4.4.2 summarizes species catch by depth strata and includes fish captured during supplementary sampling of the extra deep stratum (>9.1-20 m). The three depth strata were sampled equally in 2014 with 18 sets each; species total catch were standardized to 20 sets (Table 4.4.2). Total species catch and composition varied with depth strata. Some 21 fish species totaling 2337 individuals were caught in the shallowest stratum (3.7-5.5 m) compared to 21 species in the >5.5-9.1 m (1857 total fish) and 19 species in the >9.1-20 m (1,100 total fish) depth strata, respectively. Yellow Perch, the most abundant species captured overall comprised 35, 42, and 49% of the total catch by depth strata from shallowest to deepest, respectively (Table 4.4.2). Yellow Perch numbers decreased but their relative contribution to the species composition increased with depth strata. Several other species exhibited decreased abundance with increased depth. These included Northern Pike, Freshwater Drum, Rock Bass, Brown Bullhead, Quillback, White Sucker, Redhorse Sucker, White Perch, Pumpkinseed and Smallmouth Bass (Table 4.4.2). Total catches (in number) of Lake Trout, Rainbow Smelt, and to some extent Walleye increased with depth strata; 20 of 46 total Lake Trout captured were taken in the >9.1-20 m depth stratum. Brown Bullhead and Channel Catfish were only captured in the two shallowest depth strata. Zero Bowfin, Rainbow Trout and Trout Perch were captured in 2014. More Walleye were captured in the >9.1-20 m depth stratum than the other two strata combined. Some 97% of the total Longnose Gar catch (N=130) during 2014 came from a single gill net set in the >5.5-9.1 m depth stratum near Long Point.

Trends in Abundance, Biomass and Growth of Yellow Perch 1986-2014

Yellow Perch were abundant in Long Point Bay during the late 80's (Figure 4.4.2). Population size decreased precipitously during the early 1990's and remained at low levels throughout the decade until 2000, when two year old Yellow Perch from the strong 1998 year class began to recruit into the population. The 1998 year class remained the dominant cohort of index gill net catches, contributing 88, 86, 70, and 41% of the annual survey total Yellow Perch catch (in number) in successive years from 2000 to 2003. In 2002, the year of highest Yellow Perch abundance, the 1998 year class accounted for 70 and 74% of the total Yellow Perch catch in number and biomass, respectively. In 2014, Yellow Perch abundance decreased slightly in number (-12.5%) to the lowest level observed since 1999 (Figure 4.4.2). Yellow Perch biomass decreased by some 17% from 2013 and more than half of the 2014 total biomass was age 6 and older fish. Age 4 fish from the 2010 year class accounted for 26% of the total number and 29% of the total biomass of Yellow Perch caught in 2014. Age 7 fish (2007 year class) represented 16% of the total catch in number and 21% of the Yellow Perch biomass in 2014 (Figure 4.4.2).

Yellow Perch mean size-at-age has increased over the survey's time series (Figure 4.4.4). A more recent trend of decreasing size-at-age is evident in age 4 and 5 Yellow Perch after 2001 to about 2008. The 2004 year class of Yellow Perch was relatively weak (Tables 4.3.1 to 4.3.3), and surviving members appear to have experienced rapid growth to age 3 in 2007, attaining a mean size similar to age 4 Yellow Perch from the very abundant 2003 year class. In 2008, ages 3, 4 and 5 Yellow Perch cohorts from the 2005, 2004 and 2003 year classes were all similar in size with estimated mean total length of 210, 210 and 215 mm, respectively (Figure 4.4.4). In 2009, ages 4 to 7 Yellow Perch cohorts from the 2002 to 2005 year classes were all between 240 and 256 mm mean total length. In 2010, only a few millimeters separated the mean lengths of ages 5 (256 mm TL), 6 (268 mm) and 7 (271 mm) Yellow Perch. In 2011, ages 2, 4, 5, and 7 Yellow Perch exhibited small to moderate decreases in mean size (Figure 4.4.4). In 2012, ages 2, 3, 4, and 7 yellow Perch all exhibited increased growth. In 2013 age 3 (2010 year class) and age 4 (2009 year class) Yellow Perch were the largest observed in the Long Point Bay time series (Figure 4.4.4). In 2014, the 2010 and 2009 year classes as 4 and 5 year olds were the largest or second largest observed in their respective age group time series. Age 3 Yellow Perch in 2014 were also near maximum size (3rd largest) for that age group (Figure 4.4.4).

Trends in Abundance, Biomass and Growth of Smallmouth Bass 1986-2014

Catch rates of Smallmouth Bass in Long Point Bay index gill nets has ranged between 20 to 50 Smallmouth Bass per km during most of the survey years between 1986 and 2003, indicating a relatively stable and healthy population during this time period (Figure 4.4.3). Comparatively low Smallmouth Bass abundance in 1998 was followed by a period of yearly increases that peaked in 2003 at 47 Smallmouth Bass/km. Numeric abundance and biomass of Smallmouth Bass decreased sharply in 2004 and again in 2005. The abundance trend reversed again in 2006 with consecutive year increases that peaked in 2007 at near record high mean numbers and biomass with an unexpected large contribution (56%) of age 2 Smallmouth Bass (Figure 4.4.3); a surprising observation considering that full vulnerability to the gear does not occur until age 3. The 2005 year class continued to dominate the annual total Smallmouth Bass catch through 2008 (79%), 2009 (59%), and 2010 (32%). In 2014, the 2005 year class (as 9 year olds) accounted for 6.2% of the total biomass of Smallmouth Bass, while representing only 3.1% of the total catch in number (Figure 4.4.3). Smallmouth Bass (all ages) reached record high biomass (60.6 kg/km) and the second highest abundance in numbers (93.7 Smallmouth Bass/mm) during 2014 (Figure 4.4.3). Age 4 Smallmouth Bass from the 2010 year class dominated the 2014 catch in number (45% of total) and biomass (37% of total). Age 6 Smallmouth Bass from the 2008 year class was the second most abundant cohort in the 2014 catch, contributing 13% in number and 18% in biomass.

Smallmouth Bass size at ages 2 through 7 has increased since about the late 90's (Figure 4.4.5). Most of these age groups have decreased in mean size during the recent time period, but have remained above average size in 2014 (Figure 4.4.5).

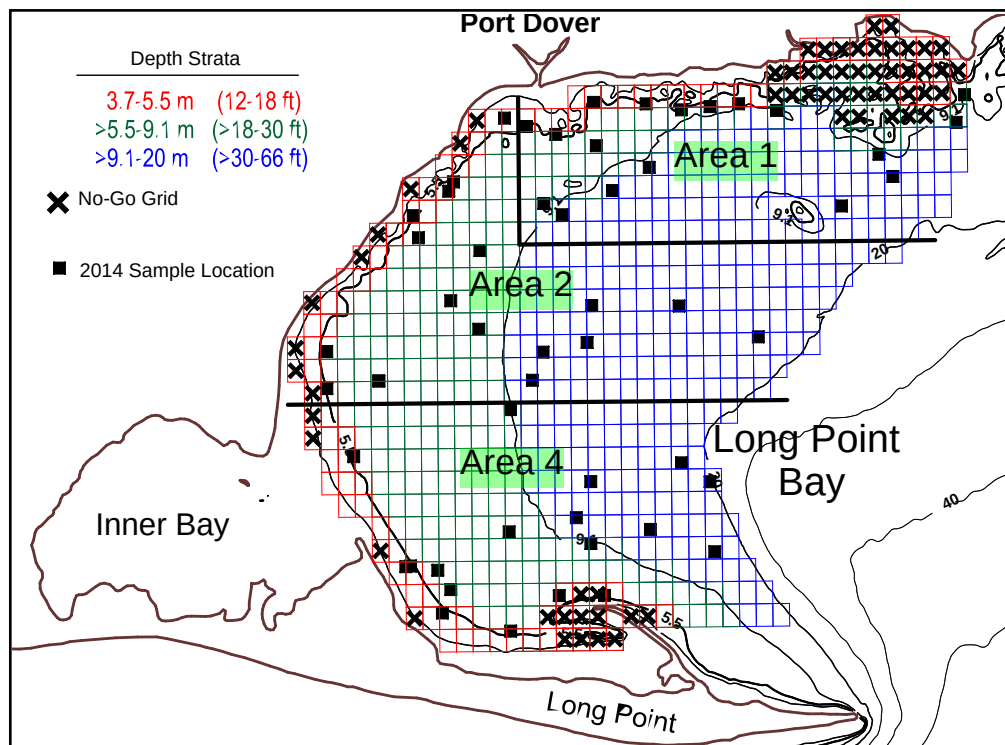


Figure 4.4.1 Long Point Bay gill net assessment study area showing potential sample grids by Spatial (Areas 1, 2, and 4) and Depth Strata. Grids sampled in 2014 and grids considered unfishable are indicated. The standard study area encompass sample grids in the 12-18 ft. (3.7-5.5 m) and the >18-30 ft. (>5.5-9.1 m) depth strata. An additional deeper depth stratum extending from the >30 to 66 ft. (>9.1-20 m) depth contour was sampled on a supplementary basis since 2011.

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Longnose Gar	85	31	159	5	260	30	5	0	0	28	31	161	10	6	12	61	0	33	15	130
Bowfin	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	3	3	0
Alewife	6,169	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
Gizzard Shad	56	47	114	19	185	531	81	503	227	122	60	483	447	104	53	452	80	1,788	354	3
Pink Salmon	0	0	0	0	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0
Rainbow Trout	1	1	2	5	1	0	0	0	6	0	0	2	2	1	0	1	2	2	0	0
Atlantic Salmon	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brown Trout	4	3	3	7	1	0	2	2	6	1	1	0	9	5	1	5	4	2	2	4
Lake Trout	0	1	0	1	0	0	0	0	0	2	1	2	0	0	0	5	7	7	10	26
Lake Whitefish	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rainbow Smelt	1	0	9	0	0	0	12	0	0	20	13	3	20	26	72	27	7	4	5	48
Northern Pike	5	1	9	7	47	6	7	7	19	10	1	2	4	6	6	9	4	6	61	11
Mooneye	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quillback	18	0	22	8	8	12	2	5	24	16	3	10	11	9	9	46	28	24	13	20
White Sucker	151	133	163	199	334	141	122	95	150	92	149	41	61	59	54	93	78	49	40	172
Northern Hog Sucker	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Redhorse Sucker	98	40	27	51	62	41	62	21	36	22	27	13	26	13	11	13	5	13	8	17
Common Carp	11	1	0	10	3	6	10	5	11	8	0	12	11	3	5	7	3	7	8	4
Golden Shiner	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emerald Shiner	0	0	0	0	0	5	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Spottail Shiner	0	0	4	0	0	2	4	2	0	2	2	2	0	0	0	0	0	0	0	0
Yellow Bullhead	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Brown Bullhead	4	9	1	2	36	0	1	12	24	81	35	32	50	38	53	69	75	87	89	20
Channel Catfish	0	0	7	5	1	5	1	0	2	2	1	3	0	2	4	0	0	5	10	3
Stonerat	8	6	10	4	3	19	15	3	0	0	0	0	0	0	0	0	0	0	0	0
Burbot	1	26	10	22	19	33	5	1	0	0	0	0	0	0	0	0	0	5	0	0
Trout-perch	0	0	0	0	0	0	0	2	0	2	0	0	2	0	0	2	2	0	0	0
White Perch	26	11	83	7	52	58	31	73	58	103	42	60	59	54	118	278	253	168	506	124
White Bass	21	4	37	3	26	16	2	19	42	11	4	50	34	19	19	71	38	90	226	80
Rock Bass	794	470	380	264	640	291	201	81	151	69	151	219	136	104	174	123	148	135	77	156
Pumpkinseed	85	41	52	139	62	5	16	2	7	3	9	9	25	5	2	12	1	54	8	11
Blue Gill	11	514	2	4	1	0	1	0	0	0	0	0	3	2	0	2	0	0	0	0
Smallmouth Bass	910	514	742	293	427	485	509	428	702	181	132	376	1,129	791	396	1,045	934	1,209	1,273	1,347
Black Crappie	5	1	6	5	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Perch	2,316	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
Walleye	16	11	20	4	14	3	4	5	27	40	23	18	13	31	23	78	30	35	48	26
Round Goby	0	0	0	0	8	68	708	2,399	424	391	134	275	172	222	89	47	70	48	39	22
Freshwater Drum	569	539	577	472	412	270	225	256	537	240	150	170	495	263	282	698	254	293	434	368
Totals	11,369	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
Actual Number of Sets	32	28	36	40	40	44	40	40	36	40	40	40	40	40	40	40	40	40	40	36

Table 4.4.2 Total numbers of each fish species caught by depth strata in monofilament nets during the Long Point Bay Index Gillnetting Survey, 2014. 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	4	126	0	130
Bowfin	0	0	0	0
Alewife	0	0	2	2
Gizzard Shad	2	1	6	9
Rainbow Trout	0	0	0	0
Brown Trout	1	3	3	8
Lake Trout	8	18	20	46
Rainbow Smelt	6	42	152	200
Northern Pike	8	3	0	11
Quillback	12	8	1	21
White Sucker	102	70	26	198
Redhorse Sucker	11	6	1	18
Common Carp	2	2	1	6
Brown Bullhead	16	4	0	20
Channel Catfish	1	2	0	3
Burbot	0	0	1	1
Trout-Perch	0	0	0	0
White Perch	89	36	13	138
White Bass	48	32	39	119
Rock Bass	127	29	3	159
Pumpkinseed	9	2	1	12
Smallmouth Bass	806	541	129	1476
Yellow Perch	816	786	542	2143
Walleye	12	13	34	60
Round Goby	12	10	8	30
Freshwater Drum	246	122	117	484
Total catch (No.)	2337	1857	1100	5293
No. species	21	21	19	23
Actual No. gillnet sets	18	18	18	60

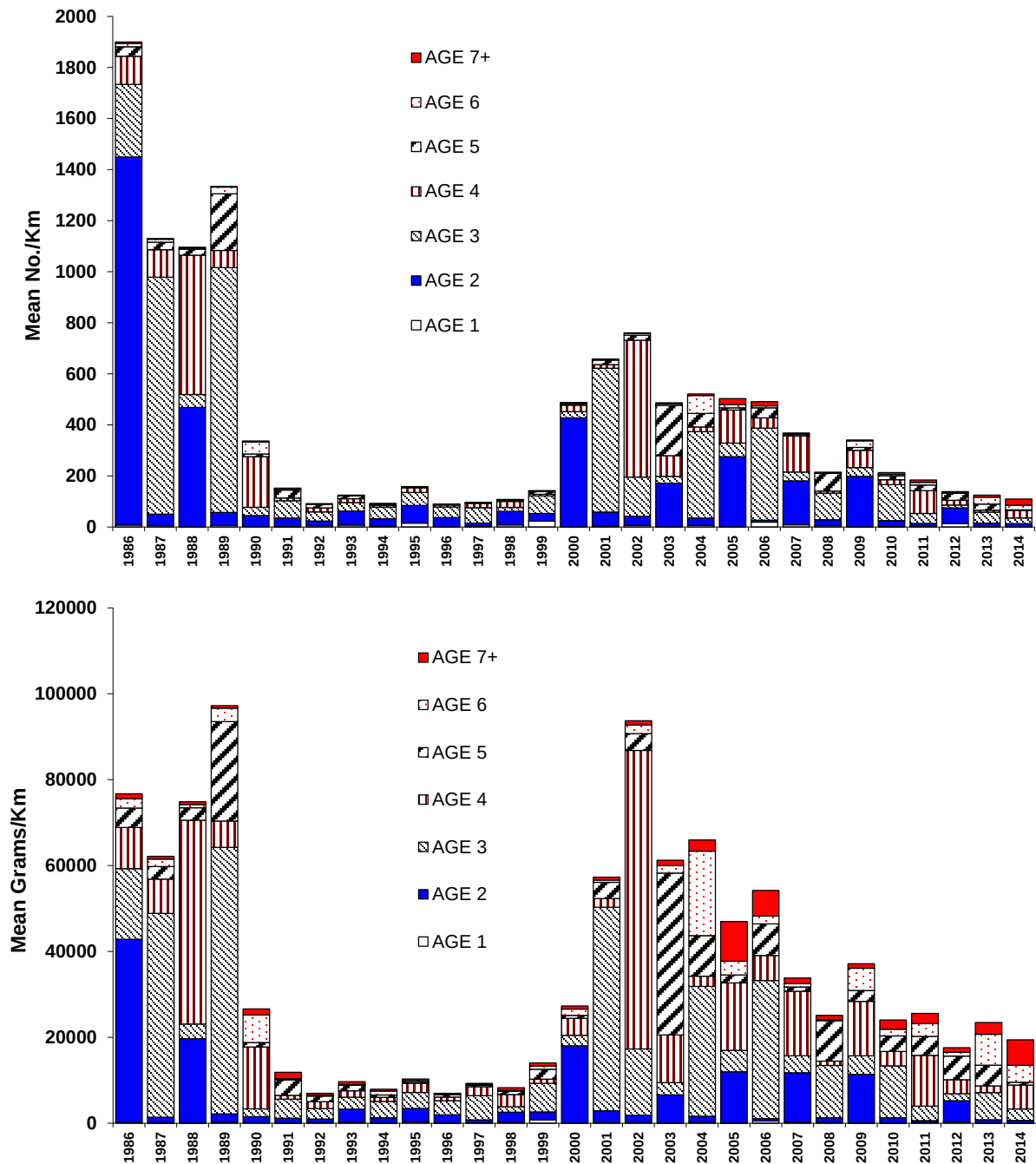


Figure 4.4.2 Catch at age of Yellow Perch in Long Point Bay Index gill nets set overnight at 12-30 ft. (3.7-9.1 m) depths during June-August, 1986-2014. Catch reported in Arithmetic Mean Number per Kilometre (top graph) and Arithmetic Mean Weight (g) per Kilometre (bottom graph). Age 7 and older Yellow Perch combined.

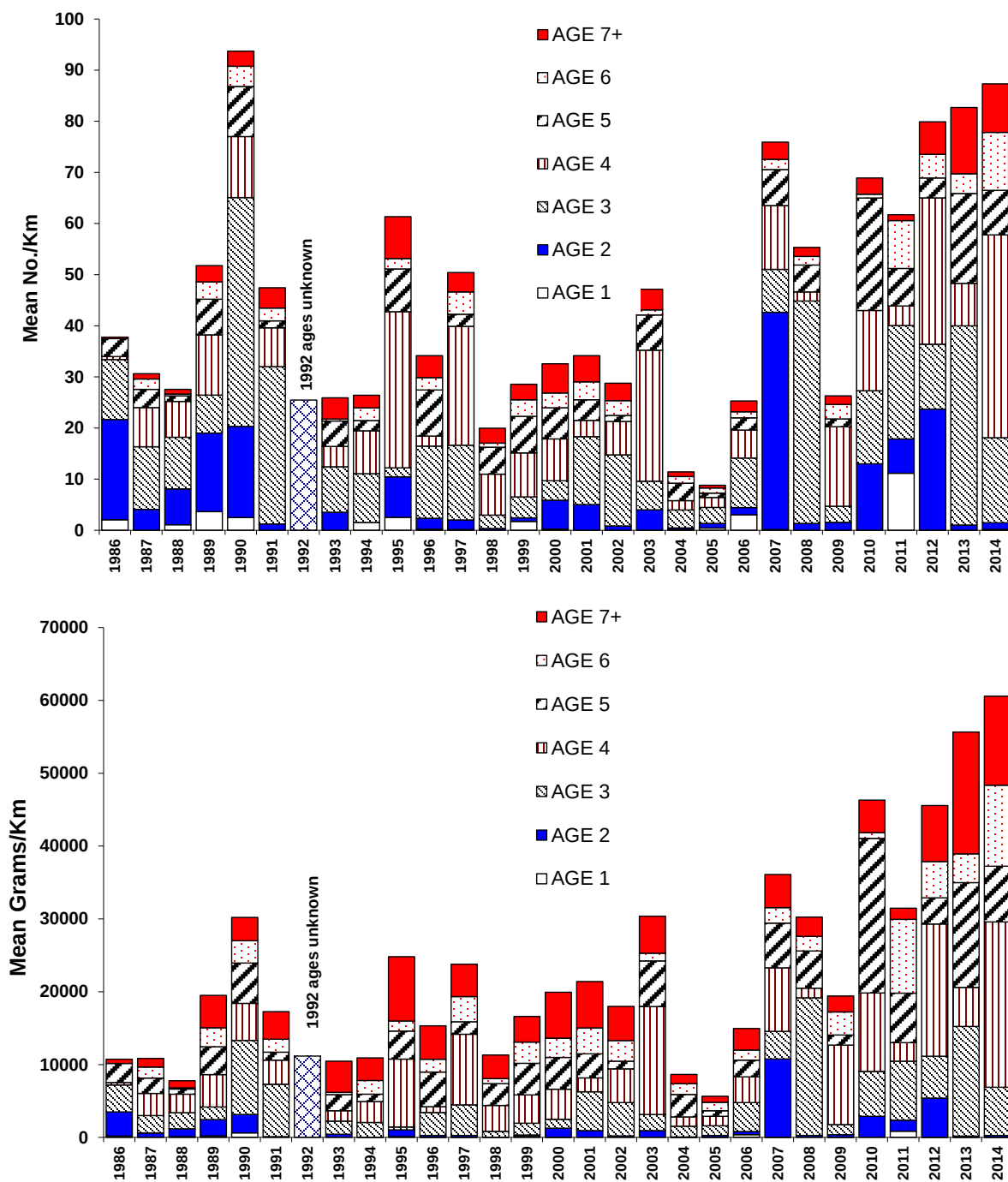


Figure 4.4.3 Catch at age of Smallmouth Bass in Long Point Bay Index gill nets set overnight at 12-30 ft. (3.7-9.1 m) depths during June-August, 1986-2014. Catch reported in Arithmetic Mean Number per Kilometre (top graph) and Arithmetic Mean Weight (g) per Kilometre (bottom graph). Age 7 and older Smallmouth Bass combined.

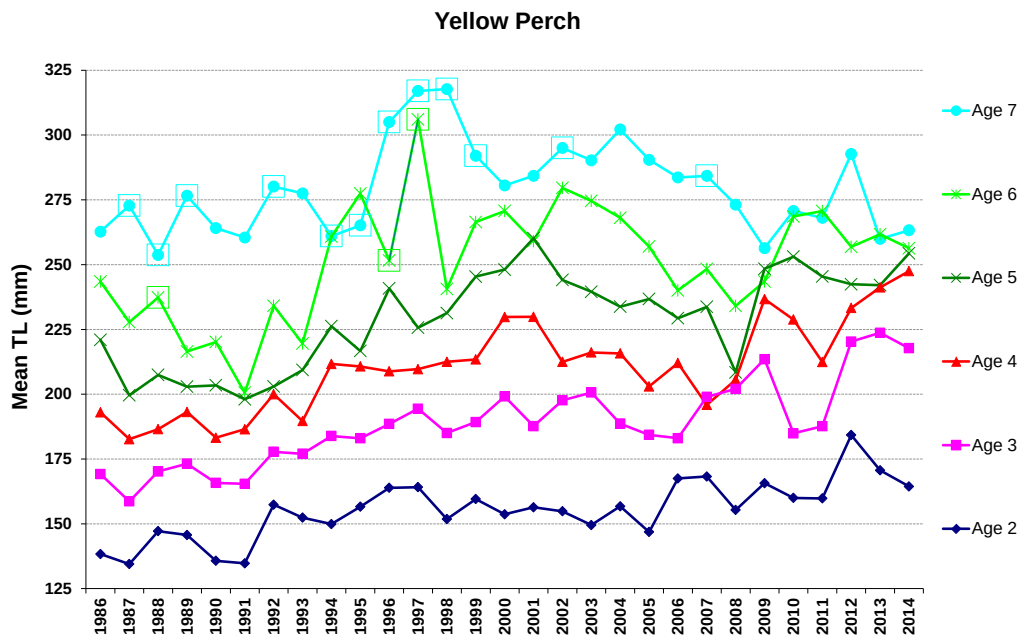


Figure 4.4.4 Yellow Perch mean total length (mm) at ages 2 to 7 in Long Point Bay Index gill nets set overnight at 12-30 ft (3.7-9.1 m) depths during June-August, 1986-2014. Males and females combined. Mean values outlined with a box were estimated from $N < 10$ samples.

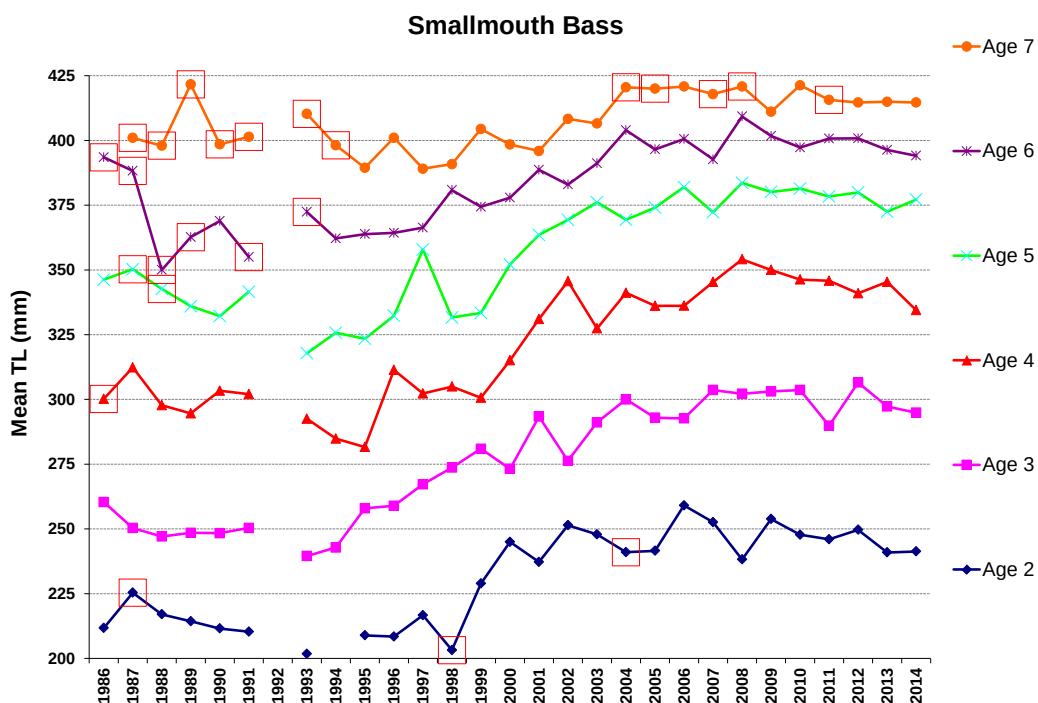


Figure 4.4.5 Smallmouth Bass mean total length (mm) at ages 2 to 7 in Long Point Bay Index gill nets set overnight at 12-30 ft (3.7-9.1 m) depths during mid-June to mid-September 1986-2014. Males and females combined. Mean values outlined with a box were estimated from $N < 10$ samples. Smallmouth Bass 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 were present in the Canadian waters of Lake Erie or the St. Clair System. This program continued in 2013 and 2014, with water samples tested for Bighead, Silver, and Grass Carp eDNA

The LEMU Asian Carp surveillance program occurred from May to July 2014, with some additional samples taken in August and September. Water samples were taken from 106 sites in Lake Erie, Lake Erie tributaries, Lake St. Clair, Thames River, Sydenham River, and Lake Huron tributaries (Figure 5.1.1). Eighty-seven 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 579 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 2014, five water samples were weakly positive for Asian Carp eDNA. One sample in the Canard River was positive for Bighead Carp. Two samples in the Ausable River were positive; one for Silver Carp and the other for Silver and Grass Carp. Two samples, taken at the same location during two different sampling events in the Grand River, were positive for Bighead Carp. Follow up sampling at each of these locations was performed by the Department of Fisheries and Oceans and LEMU. Additional sampling included fishing with trammel nets and electrofishing, along with supplementary eDNA testing. No Asian Carp were found during follow up sampling and it was determined that these positive detections pose no risk to the environment. These sites will continue to be monitored in future sampling.

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. Furthermore, 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 2014 there were approximately 37,000 km of gill nets deployed and 2,700 hours of trawling by the commercial fishery in Lake Erie. No Asian Carps were reported by the Ontario commercial fishery in Lake Erie.

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.

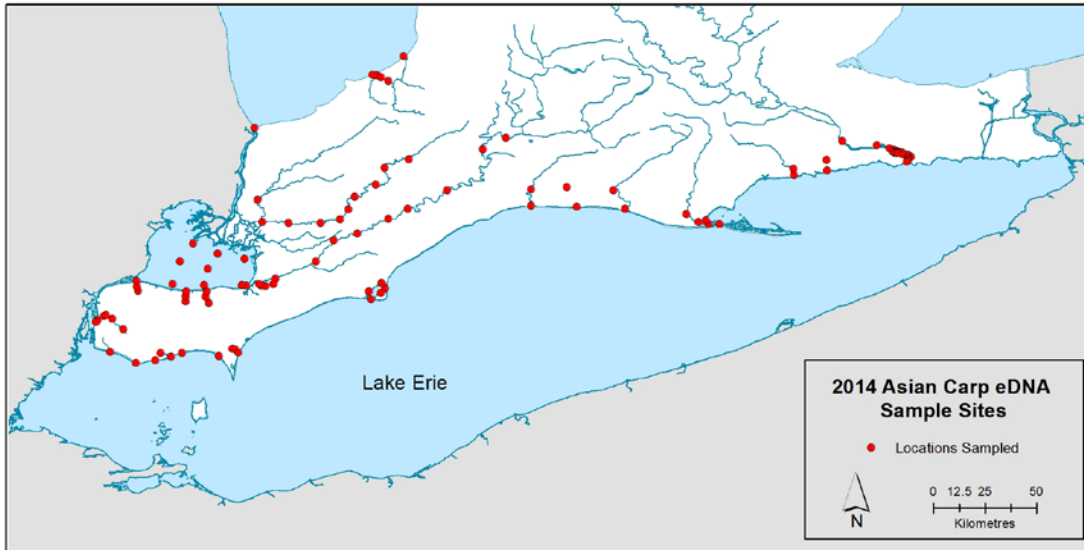


Figure 5.1.1 Location of sample sites for 2014 Asian Carp surveillance program.

5.2 Assessment of Bycatch in the Lake Erie Commercial Fishery

Bycatch can vary dramatically due to a number of factors, including selectivity of different gear types, varying fishing practices, fish community structure, season, location and habitats fished. The probability and impact of bycatch occurring in each fishery determines the level of risk the bycatch is having on the resource and subsequently the management actions that are required to deal with that risk. Understanding and mitigating the risks associated with bycatch is an essential component of Ministry of Natural Resources and Forestry's (MNRF) effective management of the Lake Erie commercial fishery, and will inform ongoing policy development. These policies will help ensure that the broader impacts of fisheries will be mitigated. Lake Erie consists of multiple fisheries however; this project will primarily focus on the continued monitoring of the Commercial Smelt Trawl fishery as well as the small and large mesh gill net fisheries.

This project aims to better assess the quantity of incidentally caught fish in commercial gear, to compare observed estimates of bycatch to reports of bycatch submitted on Daily Catch Reports. It will continue to assess the recruitment of commercially important species such as Lake Whitefish, and the presence of Species at Risk (SAR) in bycatch. The goal is to provide a better understanding of this issue to promote ecologically sustainable and socially acceptable fishing practices and contribute to the development of Ontario's bycatch management policies.

Four technicians working out of Wheatley, Ontario, rode aboard commercial vessels at random between June 3 and December 9, 2014. While on board the fishing vessels, all visible bycatch was recorded as it came in at the net puller. All species were further sorted, counted and weighed. Thirty individuals of each commercially important species were measured for total length. Biological attributes, including length, age and sex were taken for all Lake Whitefish harvested, while any juvenile Lake Whitefish and Lake Trout that were caught were brought back to the lab for further analysis. Additionally, some Lake Sturgeon caught were tagged and biological attributes were collected prior to release. Effort information was recorded from the Daily Catch Reports (DCRs) and all gill net strap locations start and end coordinates were obtained from handheld GPS units.

Between June 3 and December 9 a total of 58 daily fishing events and 81 fishing efforts were sampled (Figure 5.2.1) from 37 vessels. Results were analyzed according to target species and basin. Catch rates were calculated for all landed, discarded and released fish from DCRs that were

observed, and from those that were not. The proportion of catch from each category was then compared. In quota zone one, 120 km of Walleye targeted gill net was observed out of a total of 6,235 km fished. Observers reported discards of Freshwater Drum, Gizzard Shad, Channel Catfish, Suckers, and some birds (Grebes and Loons). In the released category, species included; Common Carp, Channel Catfish, Lake Whitefish and Lake Sturgeon. Similar trends were observed in the west basin for both landed and discarded fish, in both proportion of the catch and in species composition. As expected, more than half of the landed harvest was composed of Walleye (Figure 5.2.2), for both observed and non-observed DCRs, followed by White Bass and smaller portions of White Perch and Lake Whitefish. In the discard category approximately 40 percent of the catch was composed of Freshwater Drum for both observed and non-observed DCRs, while another 40% was made up of Gizzard Shad. In the observed portion of the DCRs suckers only made up 3% of the catch, while in the non-observed portion represented 12% (Figure 5.2.3). Differences here can be attributed to the taxonomic level of identification reported by MNRF technicians. On observed DCRs some suckers were identified to family and included in the "mixed" category of fish, whereas on non-observed DCRs they were all included as "Suckers". Results also indicate small differences in the "mixed" species category and in the proportion of "ducks" being reported. The greatest differences between observed and non-observed DCRs were in the released category for both species composition and proportion of the catch (Figure 5.2.4). Large portions of the non-observed released species were made up of Freshwater Drum, Gizzard Shad and Suckers (38%, 27% and 14% respectively). The differences could be attributed to the interpretation by MNRF observers as to what was considered "discard" and "released". Proportions of Lake Whitefish and Lake Sturgeon released were similar for observed and non-observed events.

In the central basin, 67 km of Walleye targeted gill net was observed out of a total of 3,239 km fished. Similar species composition was observed as bycatch discards in quota zone 2, including Freshwater Drum, Suckers, Gizzard Shad, Channel Catfish, Common Carp and White Perch with Common Carp, Channel Catfish, Suckers and Rainbow Trout as released species. Similar to the west basin, more than half of the landed harvest was composed of Walleye (54% for both observed and non-observed DCRs), followed again by White Bass and smaller portions of White Perch and Lake Whitefish (Figure 5.2.5). In the discard category the majority of the catch was composed of Freshwater Drum for both observed and non-observed DCRs (76% and 69% respectively), while the remainder was made up primarily of Gizzard Shad and Suckers (Figure 5.2.6). Small differences were noted in the observed vs. non-observed discarded mixed species composition. Observers noted that Rainbow Smelt comprised 3% of the discards, and Rainbow Trout and Coho Salmon were 0.2% of the discarded catch. The released category showed the biggest differences between observed and non-observed DCRs in species composition and proportion of catch (Figure 5.2.7). Most of the observed catch (86%) was composed of Rainbow Trout, while the non-observed DCRs indicated 76% of the catch was made up of Freshwater Drum and 17% of Gizzard Shad. Differences may again be attributed to small sample size and to classification by MNRF technicians of discarded and released fish.

In the west basin, 61 km of Yellow Perch targeted gill net was observed out of a total of 3,348 km fished in 2014. Bycatch consisted of White Perch, Freshwater Drum, Suckers, Gizzard Shad and Channel Catfish for both observed and non-observed DCRs in the discard and released categories. The landed portion of the catch for both observed and non-observed DCRs were very similar. Yellow Perch made up more than 75% of the harvest in the landed portion of the DCR for both observed and non-observed days, followed by White Perch at 19% and 20%, respectively (Figure 5.2.8). In the discarded portion of the DCR a large percentage of the catch was unmarketable White Perch for both observed and non-observed DCRs (83% and 72% respectively) (Figure 5.2.9). Suckers, Gizzard Shad and Freshwater Drum, were similar between observed and non-observed days, whereas small differences were attributed to the mixed species portion of the discard. The released section of the DCR once again showed major differences between observed and non-observed days (Figure 5.2.10). On observed days Channel Catfish made up 98% of the released fish, whereas on the non-observed days there was a greater diversity of species being released, with White Perch, Suckers, Freshwater Drum and Gizzard Shad making up the majority (51%, 18%, 15% and 8% respectively). Differences could again be attributed to small sample sizes and interpretation of discard and released fish categories by MNRF technicians.

In quota zone two, 88 km of Yellow Perch targeted gill net was observed out of a total of 6,556 km fished. In the central basin White Perch, Freshwater Drum, Suckers, Gizzard Shad, and Rainbow Smelt were all reported as discards, while Channel Catfish, White Perch, Freshwater Drum and Rock Bass were reported as released fish. There were major similarities between observed and non-observed DCRs for both landed and discarded species composition and proportion of catch for the central basin as well. As expected, over 80% of the landed harvest for both observed and non-observed days was Yellow Perch, followed by White Perch making up the majority of the remaining harvest (14% observed, 15% non-observed) (Figure 5.2.11). On non-observed days a small portion of White Bass contributed to the overall harvest as well. Similarities occurred in the discard category between observed and non-observed days, with 80% of the discards made up of unmarketable White Perch (Figure 5.2.12). Similarities in the portion of Freshwater Drum were also marked between observed and non-observed days (9% and 12% respectively). Small differences in the remaining discards could be attributed to small sample size. As with previous results, the released category showed the biggest differences in species composition and proportion of the catch between observed and non-observed days (Figure 5.2.13). When observers were present, 72% of the released fish were Channel Catfish, whereas on non-observed days, 98% of the released catch was White Perch. Some of the differences in the released category could be attributed to small sample size.

Overall, with few exceptions of coarse fish (Freshwater Drum and Gizzard Shad), observed bycatch in 2014 was low compared to harvest of target species. These results also indicate that only minor differences occurred between observed and non-observed DCRs for both landed and discarded species for Walleye and Yellow Perch targeted fisheries in quota zones 1 and 2. Major differences, however were noticed when it came to the released section of both the observed and non-observed DCRs. Many of these differences could be attributed to small sample sizes or in the differences of interpretation between MNRF technicians and fishers regarding discards and releases. Another possible explanation for some of the differences detected throughout the study can be credited to the fact that some fish units continue to be reported incorrectly on DCRs (numbers vs. weight), and similarly by MNRF technicians due to equipment failure, etc. Future studies may continue to monitor bycatch; however, it is recommended that in the future observer effort be concentrated in single quota zones each year for better accuracy.

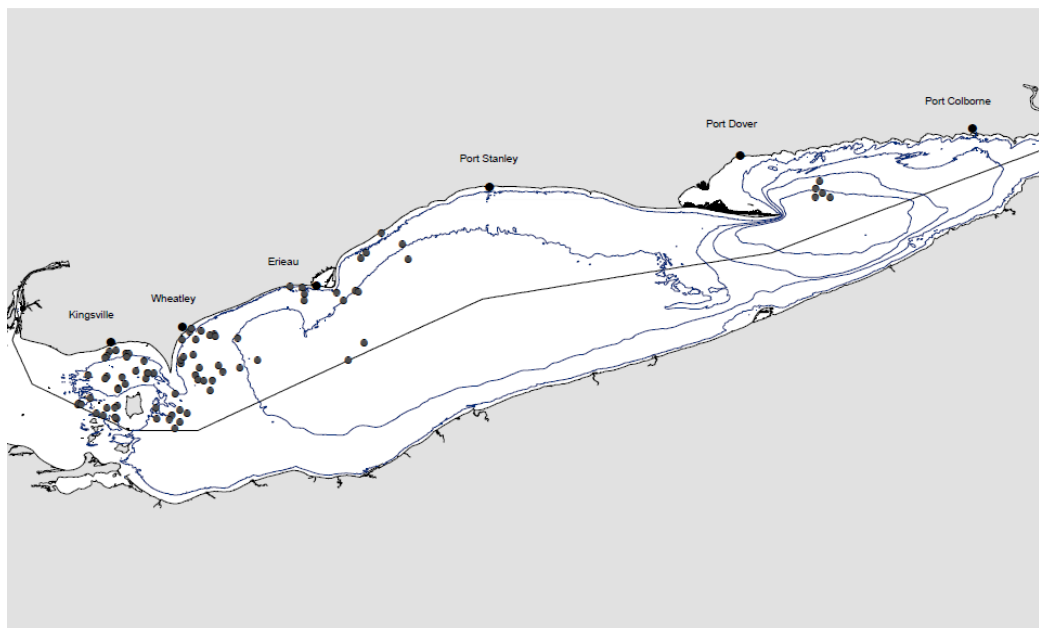


Figure 5.2.1 Observed fishing start locations for 2014.

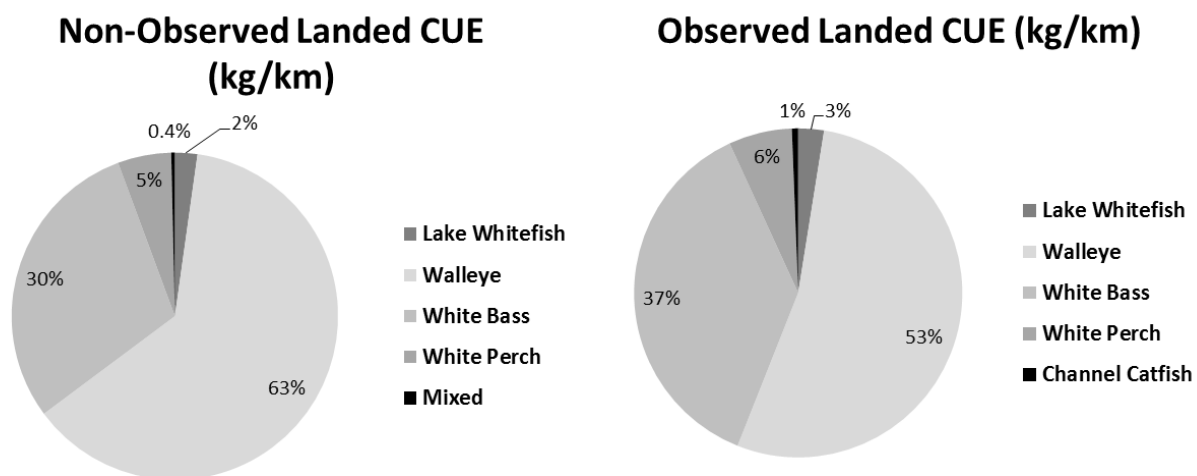


Figure 5.2.2 Landed fish for Non-Observed vs. Observed DCRs targeting Walleye in the west basin.

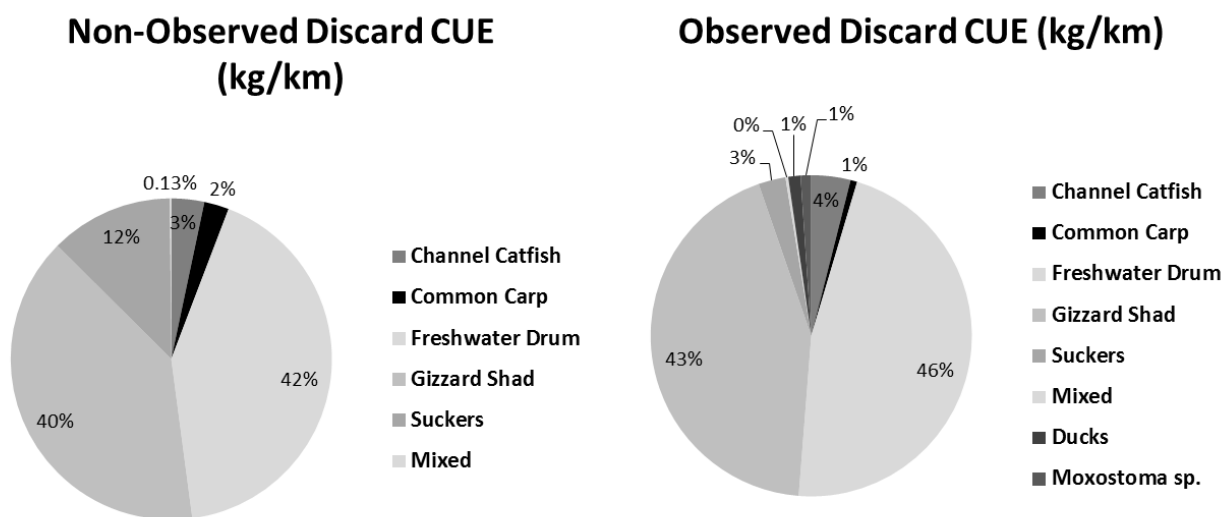


Figure 5.2.3 Discarded fish for Non-Observed vs. Observed DCRs targeting Walleye in the west basin.

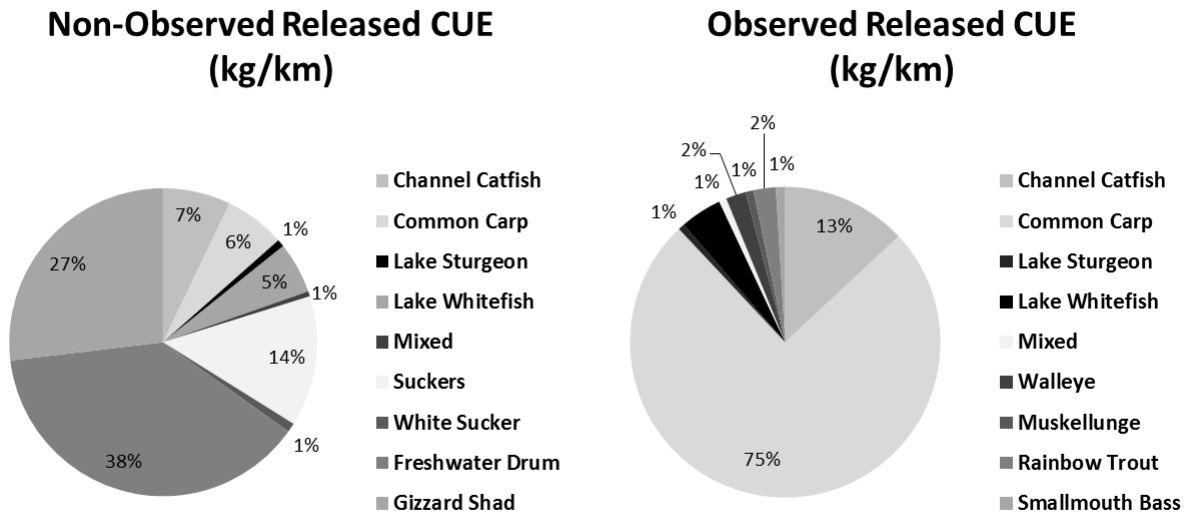


Figure 5.2.4 Released fish for Non-Observed vs. Observed DCRs targeting Walleye in the west basin.

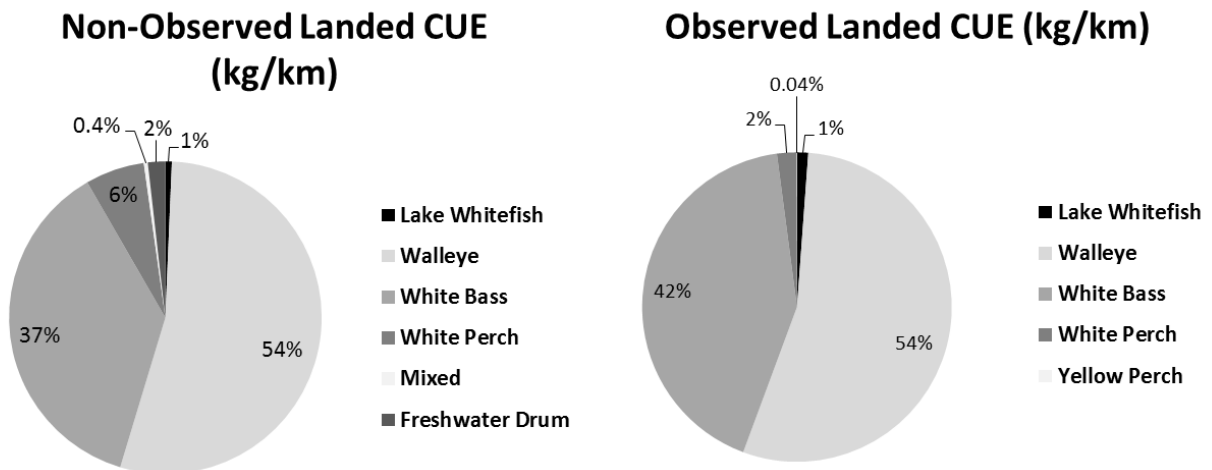
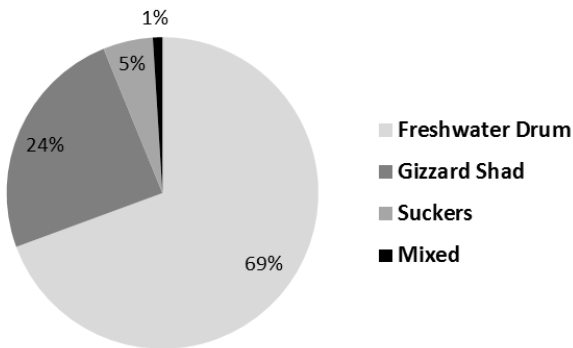


Figure 5.2.5 Landed fish for Non-Observed vs. Observed DCRs targeting Walleye in the central basin.

Non-Observed Discard CUE (kg/km)



Observed Discard CUE (kg/km)

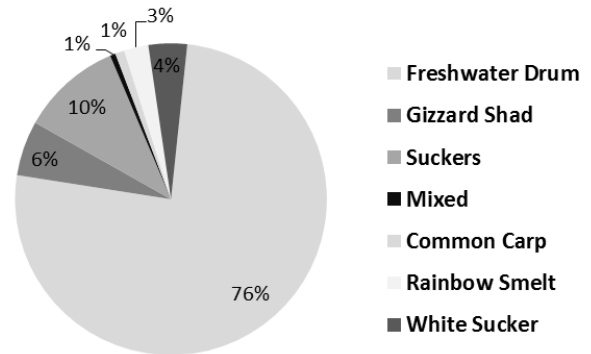
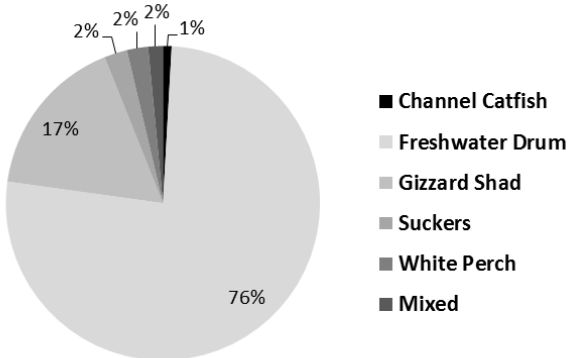


Figure 5.2.6 Discarded fish for Non-Observed vs. Observed DCRs targeting Walleye in the central basin.

Non-Observed Released CUE (kg/km)



Observed Released CUE (kg/km)

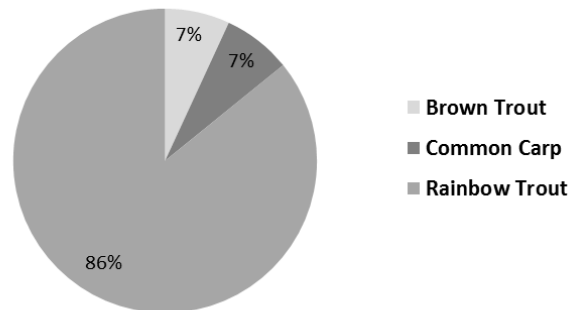


Figure 5.2.7 Released fish for Non-Observed vs. Observed DCRs targeting Walleye in the central basin.

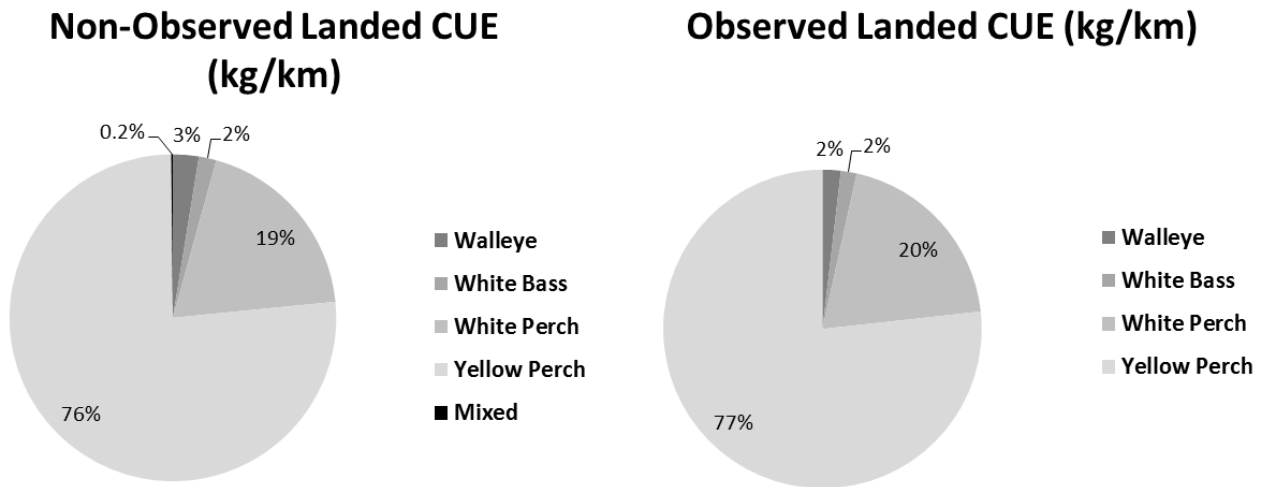


Figure 5.2.8 Landed fish for Non-Observed vs. Observed DCRs targeting Yellow Perch in the west basin.

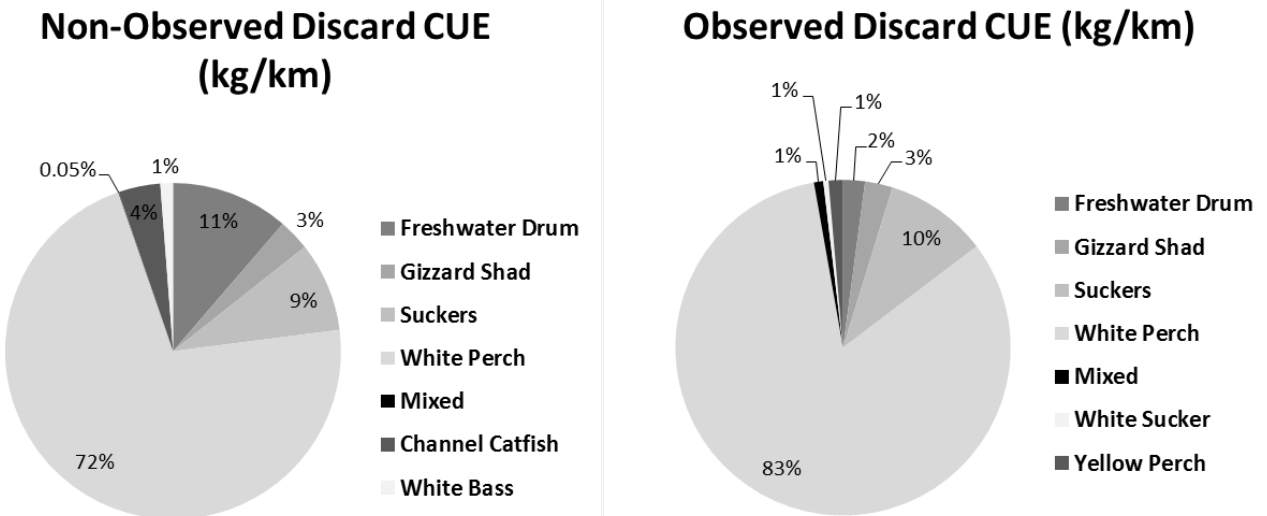


Figure 5.2.9 Discarded fish for Non-Observed vs. Observed DCRs targeting Yellow Perch in the west basin.

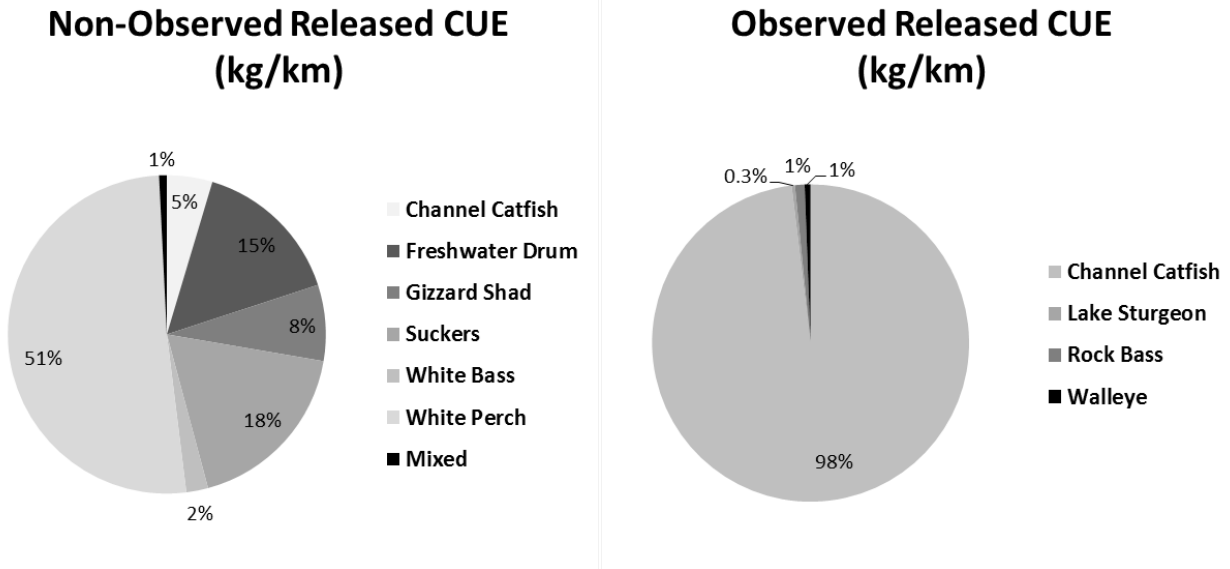


Figure 5.2.10 Released fish for Non-Observed vs. Observed DCRs targeting Yellow perch in the west basin.

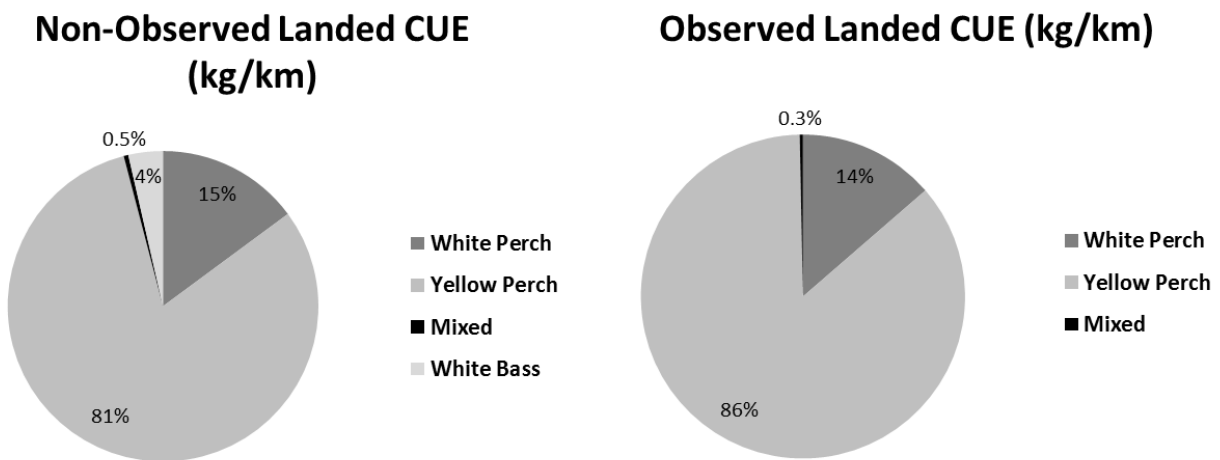


Figure 5.2.11 Landed fish for Non-Observed vs. Observed DCRs targeting Yellow Perch in the Central Basin

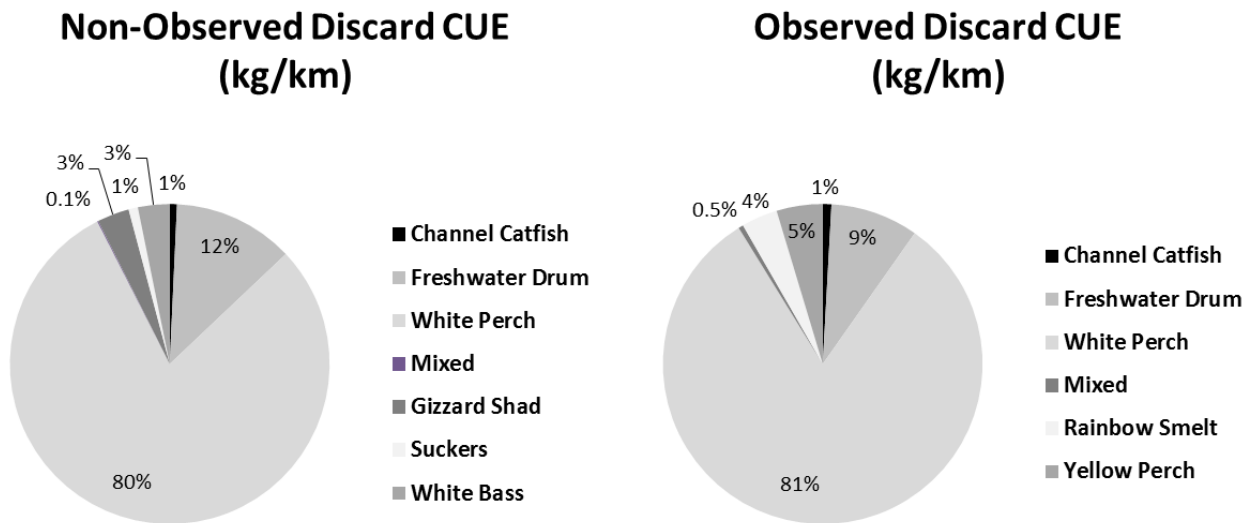


Figure 5.2.12 Discarded fish for Non-Observed vs. Observed DCRs targeting Yellow Perch in the central basin.

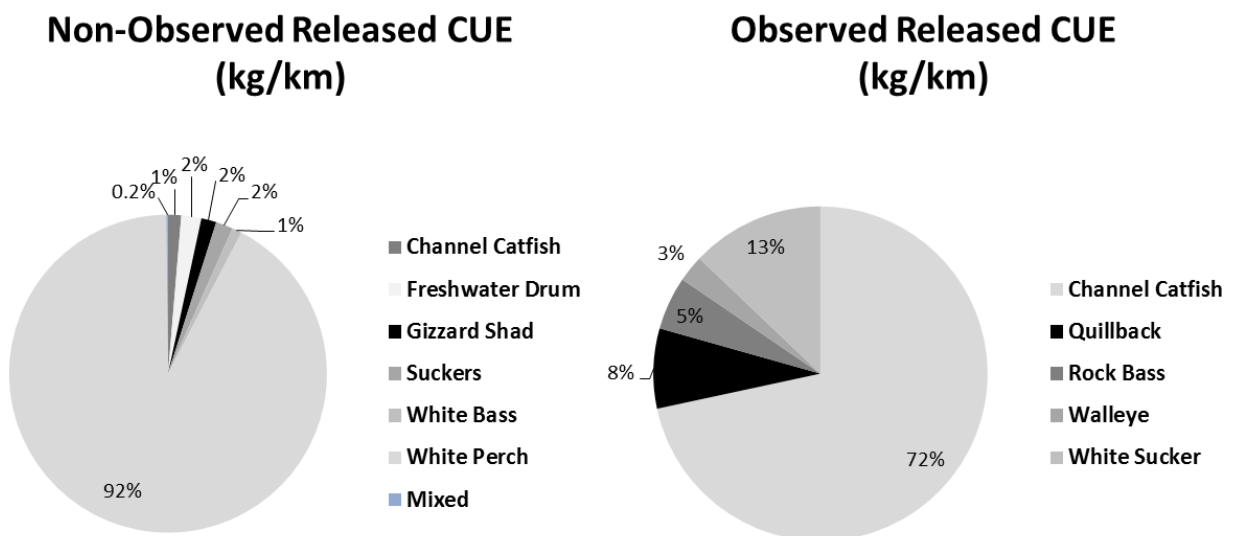


Figure 5.2.13 Released fish for Non-Observed vs. Observed DCRs targeting Yellow Perch in the central basin.

5.3 Lake Erie Aerial Creel

In summer 2014, an aerial creel survey was conducted in the Canadian waters of Lake Erie from June 1 to August 31. The primary objectives of the 2014 creel were to:

- 1) Contribute a standard set of sport fishery statistics to a time-series dataset of the summer recreational fishery.
- 2) Provide comparable estimates of angling effort, catch and harvest of recreationally important species spatially and temporally throughout the lake.
- 3) Evaluate preferred target species.
- 4) Estimate economic value of the recreational fishery in direct expenses incurred by anglers.
- 5) Gain insight into satisfaction and concerns with the recreational fishery

Using a 'stratified random' sample design the recreational fishery was divided into spatial and temporal units. The Canadian waters of Lake Erie were spatially divided into seven survey areas: Western Basin (Area 05); West-Central Basin (Area 06); East-Central Basin (Area 07); Inner Long Point Bay (Area 08); Long Point (Area 09); Outer Long Point Bay/Nanticoke (Area 10); Eastern Basin (Area 11) (see Figure 3.1, Section 3). The summer fishery (June-August) was temporally divided into seasons (months), day-type (weekday and weekends) and time-period within a day 0800-1100 hour; 1100-1400 hour; 1400-1700 hour; 1700-2000 hour. Aerial surveys from the mouth of the Detroit River to the head of the Niagara River counted actively fishing boats to provide instantaneous activity counts (n boats). Access point interviews were conducted at 19 boat ramps from Colchester to Crystal Beach (Figure 5.3.1). Access point interviews collected catch, harvest and effort (rod hours) data from individual anglers. During access interviews a survey was completed to collect information about economic value and anglers attitudes/opinions of the recreational fishery.

Results

Angling Effort

Lakewide, a total of 1,102 interviews were conducted. Anglers participated in an estimated 645,759 rod hours of effort from June 1 to August 31, 2014. This fishing effort represented an estimated 17,881 fishing trips averaging 4.8 hours in duration with 2.4 anglers, fishing 3.2 rods. Temporally, the greatest proportion of angling effort occurred in July (37%), then August (34%) and June (29%). During the 23 aerial survey flights, 5,295 observations of fishing boats were recorded. Lakewide, 64% of boats were observed on weekends with 24% between 0800-1100 and 16% between 1100-1400. The fewest boats (5%) were observed on weekdays from 1700-2000. Ninety-six percent (96%) of observed boats were within two 5 minute grids of a coast (including Pelee Island, excluding the tip of Long Point - no access points within 2 five minute grids) (Figure 5.3.1). Spatially the greatest proportion of the estimated effort occurred in western basin and east-central basin, each with 23% of the lakewide effort. The remaining proportions of effort were in: West-Central basin (19%), Inner Long Point Bay (13%), Eastern Basin (13%), Outer Long Point Bay/ Nanticoke (7%) and Long Point (1%).

Walleye was the most targeted species with 51% of total lakewide effort (Table 5.3.1). Yellow Perch was the second most targeted species with 34% of total effort. Targeted effort towards Smallmouth Bass and Rainbow Trout were both 11% of the total effort. Largemouth Bass and Northern Pike targeted effort were 2% of total effort. Targeted effort for White Perch, White Bass, Freshwater Drum, and Rock Bass, were 1% of the total effort. Each of the following fish species were targeted <1% of the total effort: Chinook Salmon (0.48%), Black Crappie (0.40%), Blue Gill (0.34%), Pumpkinseed (0.31%), Lake Trout (0.10%), Green Sunfish (0.05%) and Muskellunge (0.05%). About 2% of the lakewide fishery was untargeted effort.

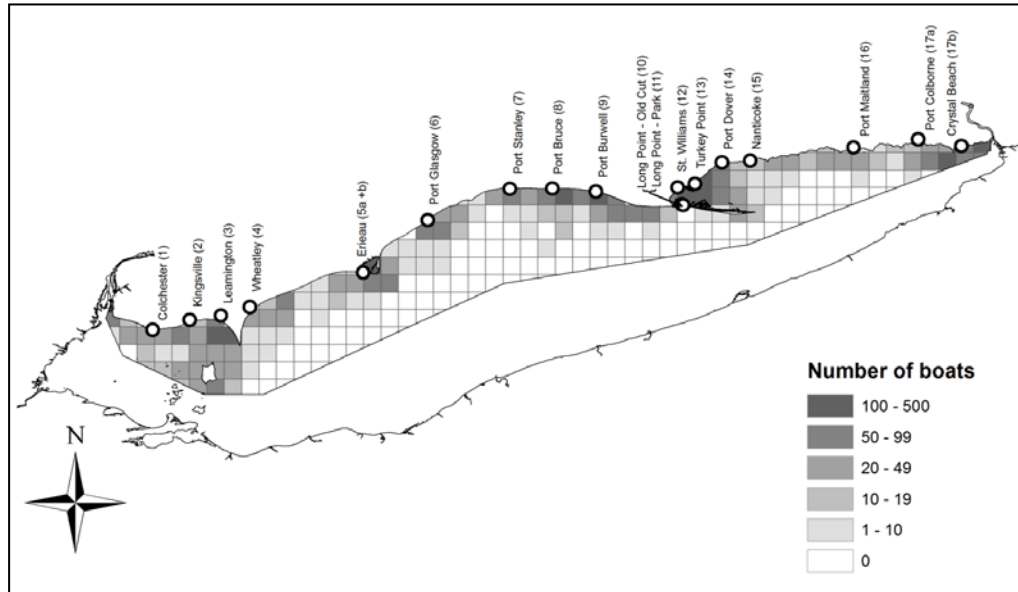


Figure 5.3.1 Map of total boats counted by 5 minute grid during 23 survey flights from June 1 to August 31, 2014 across Lake Erie.

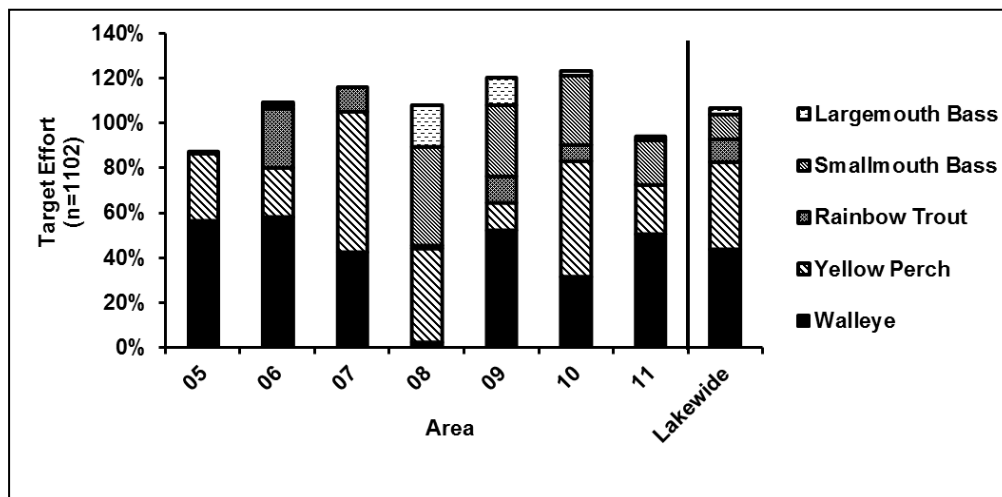


Figure 5.3.2 Top target species by area based on targeted effort in the 2014 Lake Erie Creel Survey. Percentages exceed 100% because anglers can target more than one species at a time.

Capture, Harvest and CPUE

Lakewide

In 2014, there was an estimated $1,070,275 \pm 128,433$ (12%, RSE) fish caught lakewide with 53% (or 567,770 fish) harvested by anglers. Yellow Perch represented the majority (58%) of estimated fish caught lakewide (Table 5.3.1). White Bass and Freshwater Drum each composed approximately 9% of the fish captured lakewide. Walleye composed 8% of the estimated fish captured lakewide. Smallmouth Bass and Round Gobies each composed 5% and White Perch 2% of lakewide captures. Largemouth Bass, Rock Bass and Channel Catfish each composed 1% of the lakewide captures. The following species composed <1% of the lakewide captures: Blue Gill (0.49%), Rainbow Trout (0.43%). Pumpkinseed (0.37%), Northern Pike (0.31%), Rainbow Smelt (0.21%), Black Crappie (0.06%), Brown Bullhead (0.03%), Longnose Gar (0.01%), Common Carp (0.01%), and Chinook Salmon (0.01%). The lakewide catch per unit effort (CUE) for all species was 1.7 fish per rod hour.

Consistent with the numbers of fish captured, Yellow Perch formed the majority (76%) of the lakewide recreational harvest (Table 5.3.1). Walleye was the second most commonly harvested fish with 15% of lakewide harvest. Smallmouth Bass and White Bass each composed 3% of the lakewide harvest. Rainbow Trout and White Perch composed 1% of the lakewide harvest. Each of the following species composed <1% of the lakewide harvest: Rock Bass(0.48%), Largemouth Bass (0.37%), Freshwater Drum (0.24%), Rainbow Smelt (0.14%), Green Sunfish (0.13%), Blue Gill (0.10%), Black Crappie (0.09%), Round Gobies (0.05%), Channel Catfish (0.03%), Brown Bullhead (0.02%), Pumpkinseed (0.01%), Chinook Salmon (0.01%), and Northern Pike (0.01%).

Walleye

Walleye were the most preferentially targeted species but represented the second most commonly harvested and fourth most commonly caught species lakewide (Table 5.3.1). In 2014, an estimated 88,732 Walleye were caught from June 1 to August 31 with 95% (or 84,635) harvested (Table 5.3.2a). Temporally, relative effort (June=38%, July=40%, August=22% of total targeted effort), catch (June=33%, July=39%, August=28%, of estimated catch) and harvest (June=33%, July=40%, and August=27% (estimated harvest) were similar. The majority (52%) of Walleye were caught in western basin (Table 5.3.2a). This area also saw the highest estimated CUE with 0.4 Walleye caught per targeted rod hour. West-central and east-central basins contained 16% and 15% of Walleye caught lakewide, respectively. Eastern basin contributed 11% of Walleye caught. The estimated CUE lakewide was 0.3 Walleye per targeted rod hour.

Yellow Perch

Yellow Perch was the most commonly caught and harvested species lakewide with the second highest targeted effort (Table 5.3.1). An estimated 616,830 Yellow Perch were caught from June 1 to August 31, 2014 with 70% (or 432,943) harvested (Table 5.3.2b). The majority of effort for Yellow Perch was during June (44%) with smaller components in August (30%) and July (26%). Temporally, catch and harvest reflect the targeted effort (June=42%, July=28% and August=30% estimated catch; June 42%, July 27% and August 30% estimated harvest). The majority (62%) of the Yellow Perch were caught and harvested in east-central basin (Table 5.3.2b). This area also saw the highest estimated effort (39%) and CUE of 4.3 Yellow Perch caught per targeted rod hour. Western basin was a secondary source of Yellow Perch with 16% of catches, 19% of harvest and 17% of the targeted effort lakewide. The estimated lakewide CUE was 2.7 Yellow Perch per targeted per rod hour.

Economic Value of the Fishery

The average number of fishing trips on Lake Erie during 2014 was 10-21, representing 70 to 75% of total fishing activity. Based on responses from anglers during the creel interviews, the total Lake Erie recreational fishery was worth an estimated \$3.25 million in direct expenses: fuel/travel costs, fishing equipment (e.g. tackle, bait), boat costs (e.g. insurance, upkeep), fees (e.g. launch fees), rentals (e.g. campsite, cabin, cottage). Estimates suggest the average yearly expense of Lake Erie anglers was \$2,210 to \$2,970. Estimated average daily expense of anglers was \$69-\$84. Based on these

estimates each Lake Erie angler spent approximately \$5.04 per rod hour. Caution should be used if using this estimated cost per effort to extrapolate value (in direct expenses) of the species specific fisheries as such estimates would be prone to significant errors because of overlapping expenses among species. For example multiple species can be simultaneously targeted over the course of a single fishing trip and using the same gear.

Angler Opinion of the Fishery

Overall 81% of anglers on Lake Erie appear to be satisfied with the recreational fishing opportunities. Based on survey responses, anglers were more concerned about invasive species and the overall health of the lake ecosystem than abundances and size of sport fish caught. However there were some concerns of possession limits being too low. Safe consumption of sport fish was also identified as a concern of recreational anglers. The majority (86%) of anglers were satisfied with current fishing regulations on Lake Erie. The biggest issue identified by people unsatisfied with current regulations was possession limits (53%) with comments about Walleye and Yellow Perch possession limits being too low. Forty-four percent (44%) of people unsatisfied with current regulations had other issues including rod limits (10%) and a proposed regulation change that would require seniors (age 65+) to buy fishing licences (13%).

Note: This is a summary of the 2014 creel survey including selected results please refer to the Lake Erie Aerial Creel Survey 2014 report for full results.

Table 5.3.1 Summary of lakewide targeted effort, catch and harvest estimates by species for the 2014 Lake Erie Creel Survey.

Species	Effort			Catch			Harvest			CPUE (Fish/Rod Hour)		
	Rod Hours	% RSE	% Target	n	% RSE	% Target	% Kept	n	% RSE	Observed	Observed Targeted	Estimated Targeted
Longnose Gar	0	-	0%	131	113%	0%	0%	0	-	0.0002	-	-
Bowfin	0	-	0%	44	91%	0%	0%	0	-	0.0001	-	-
Chinook Salmon	3,084	55%	<1%	77	65%	100%	100%	77	65%	0.0002	0.02	0.0001
Rainbow Trout	71,640	21%	11%	4,613	24%	87%	90%	4,165	24%	0.01	0.05	0.01
Lake Trout	669	123%	<1%	0	-	-	-	0	-	-	-	-
Rainbow Smelt	0	-	0%	2,224	60%	0%	35%	786	50%	0.0002	-	-
Northern Pike	9,825	41%	2%	3,277	46%	53%	2%	71	99%	0.0002	0.1	0.01
Muskellunge	300	117%	<1%	50	80%	0%	0%	0	-	0.0001	-	0.0001
Common Carp	0	-	0%	88	85%	0%	0%	0	-	0.0001	-	-
Brown Bullhead	0	-	0%	357	71%	0%	27%	98	116%	0.0001	-	-
Channel Catfish	0	-	0%	5,428	34%	0%	3%	157	55%	0.01	-	-
White Perch	3,504	80%	1%	22,215	31%	0%	13%	2,982	55%	0.03	0.05	0.03
White Bass	8,016	42%	1%	95,000	20%	4%	17%	16,253	25%	0.16	0.62	0.15
Rock Bass	3,233	52%	1%	15,203	25%	6%	18%	2,746	34%	0.02	0.28	0.02
Green Sunfish	352	110%	<1%	7,553	42%	17%	10%	728	88%	0.01	4.6	0.01
Pumpkinseed	1,980	61%	<1%	3,978	32%	21%	2%	82	76%	0.01	0.37	0.01
Blue Gill	2,220	62%	<1%	5,222	36%	11%	11%	554	57%	0.01	0.24	0.01
Smallmouth Bass	70,421	16%	11%	48,779	23%	86%	35%	17,263	31%	0.05	0.52	0.08
Largemouth Bass	14,604	26%	2%	9,463	30%	53%	22%	2,075	48%	0.01	0.29	0.01
Black Crappie	2,567	102%	<1%	682	84%	67%	76%	521	108%	0.001	1.49	0.001
Yellow Perch	221,342	11%	34%	616,830	16%	98%	70%	432,943	17%	0.98	3.23	0.96
Walleye	327,959	12%	51%	88,732	13%	97%	95%	84,635	13%	0.13	0.2	0.14
Round Goby	-	-	0%	49,157	24%	0%	1%	263	96%	0.07	-	-
Freshwater Drum	3,357	65%	1%	91,170	17%	1%	2%	1,372	39%	0.12	0.32	0.14
Untargeted Effort	13,147	30%	2%	-	-	-	-	-	-	-	-	-
All Species	675,759*	9%	-	1,070,275	12%	-	53%	567,770	-	1.62	-	1.66

* Total effort is not a summation of targeted effort because multiple species can be targeted at the same time

Table 5.3.2a Summary of Walleye targeted effort, catch and harvest estimates by season and area for the 2014 Lake Erie Creel Survey.

Summary	Effort			Catch			Harvest			CPUE (Fish/Rod Hour)		
	Rod Hours	% RSE	% Target	n	% RSE	% Target	% Kept	n	% RSE	Observed	Observed Targeted	Estimated Targeted
Lakewide	327,959	12%	51%	88,732	13%	97%	95%	84,635	13%	0.13	0.2	0.14
Season												
June	71,204	20%	38%	29,147	26%	94%	97%	28,230	26%	0.13	0.32	0.16
July	132,396	15%	55%	35,045	17%	98%	96%	33,524	17%	0.13	0.19	0.15
August	124,359	24%	57%	24,540	26%	98%	93%	22,880	25%	0.11	0.17	0.11
Area												
Western Basin	100,840	19%	67%	46,229	20%	95%	98%	45,232	20%	0.26	0.35	0.31
West-Central Basin	84,598	26%	67%	14,343	26%	98%	92%	13,219	25%	0.11	0.15	0.11
East-Central Basin	71,382	27%	48%	13,652	29%	98%	98%	13,326	28%	0.09	0.16	0.09
Inner Long Point Bay	1,232	73%	1%	133	114%	100%	0%	0	-	0	0.08	0
Long Point	4,992	33%	61%	1,875	39%	100%	100%	1,875	39%	0.16	0.33	0.23
Outer Long Point Bay/Nanticoke	16,437	36%	39%	2,296	42%	100%	84%	1,934	37%	0.04	0.11	0.05
Eastern Basin	48,478	30%	59%	10,203	37%	100%	89%	9,050	36%	0.12	0.17	0.12

Table 5.3.2b Summary of Yellow Perch targeted effort, catch and harvest estimates by season and area for the 2014 Lake Erie Creel Survey.

Summary	Effort			Catch			Harvest			CPUE (Fish/Rod Hour)		
	Rod Hours	% RSE	% Target	n	% RSE	% Target	% Kept	n	% RSE	Observed	Observed Targeted	Estimated Targeted
Lakewide	221,342	11%	34%	616,830	16%	98%	70%	432,943	17%	0.98	3.23	0.96
Season												
June	97,093	16%	52%	259,617	24%	98%	71%	183,870	24%	1.23	2.52	1.39
July	57,083	19%	24%	174,889	25%	98%	67%	117,948	28%	1	4.32	0.73
August	67,167	21%	31%	182,325	35%	97%	72%	131,125	35%	0.81	2.91	0.84
Area												
Western Basin	37,206	24%	25%	101,509	38%	95%	81%	82,233	39%	0.55	1.87	0.67
West-Central Basin	22,460	23%	18%	36,539	35%	95%	55%	19,977	35%	0.23	1.6	0.29
East-Central Basin	86,831	20%	58%	381,520	23%	99%	70%	267,289	23%	2.47	5.08	2.57
Inner Long Point Bay	39,659	24%	45%	54,931	37%	90%	53%	29,325	53%	0.61	1.21	0.63
Long Point	1,936	19%	24%	4,033	3%	69%	47%	1,902	7%	0.09	0.77	0.49
Outer Long Point Bay/Nanticoke	18,578	27%	44%	16,854	37%	97%	68%	11,466	41%	0.5	1.37	0.4
Eastern Basin	14,673	33%	18%	21,445	63%	97%	97%	20,750	65%	0.17	1.55	0.26

5.4 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 U.S. fisheries management agencies (YPTG 2014). The rationale for Yellow Perch management unit delineation was based upon real or perceived differences in Yellow Perch populations and / or historical harvest districts (YPTG 1984). Yellow Perch biological characteristics (growth rates, parasites), harvest densities and / or 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 2014).

This study addresses uncertainties concerning the spatial management of Lake Erie Yellow Perch by inferring movement from a broad scale mark-recapture experiment spanning six years to date (2009–2014). 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 in MU3 in Ohio. Although this report focuses exclusively on results of Yellow Perch movement, the study expanded in 2013 in cooperation with Ohio DNR, USGS, Ohio State University 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 2014, Yellow Perch were caught 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 usually lasted 10 minutes at 1.6 knots using a 2 seam 10 m Biloxi trawl with a 11.6 m ground line and ½" cod end. Average trawl depth from 2009–2014 was 10.4 m with a range of 3.7 m to 19.4 m. 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 (Dextron 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 tagged Yellow Perch were released into two types of cages to assess mortality. In April, tagged Yellow Perch were retrieved dead from a floating cage. Starting in May 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 for 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. In 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. 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 6.5.1. To date, the numbers of Yellow Perch PIT tagged since 2009 were 10,395, 3,080 and 6,896 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 6.5.1). 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 6.5.1). Tagging in Ohio waters began in 2013, taking place exclusively in MU3. From 2009 to 2014, 20,371 Yellow Perch were tagged with PIT tags. 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 6.5.2). During 2013 in MU2, 19% and in 2014 (MU3), 26%, of Yellow Perch tagged were females, in contrast with other years (Table 6.5.2). Mean lengths of Yellow Perch tagged in the central basin (MUs 2 and 3) were generally larger than those tagged in the west basin (MU1).

From 2009 to 2014, the quantity of Yellow Perch scanned ranged from 938,703 pounds in 2009 to 2,269,693 pounds in 2012 (Table 6.5.3). The majority of Yellow Perch were scanned in commercial fish processing plants and dockside at commercial fishing ports. Since the inception of the study, 10.2 million pounds of Yellow Perch caught in Ontario waters of Lake Erie have been scanned (Table 6.5.3). The amount of Ontario Yellow Perch harvest scanned was greatest in MU3, followed by MU2, MU1 and MU4 (Table 6.5.3). The spatial distribution of Yellow Perch scanned in Ontario by weight from 2009 to 2014 is presented in Figure 6.5.2 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. Duplication of scanned harvest was excluded from this report in tables, figures and analyses.

The number of recaptured Yellow Perch detected in fisheries and surveys combined is presented by jurisdiction and year of recapture for each annual, MU - specific, tagging exercise (Table 6.5.1). From 2009 to 2014, Ontario scanning efforts detected 345 PIT tags while Ohio's participation since 2013 recovered 94 PIT tags for a total of 439 recaptures (Table 6.5.1). Cumulative PIT tag recapture rates ranged from 1.3 % to 4.8 % for tagged cohorts and 2.2% overall (Table 6.5.1).

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 6.5.4). 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 6.5.4). No recaptures were detected in MU4.

The mean distance between tag and recapture locations for all jurisdictions and management units where tagging occurred was 33.5 km with a range of 1.7 to 167.5 km (Table 6.5.5). For all recaptures in Ontario waters only, mean distance was 31.0 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 42.7 km with a range of 2.6 to 136.0 km. Mean distance was lowest for Yellow Perch tagged in MU1 (19.4 km),

followed by MU2 (38.2 km) and MU3 (53.5 km). Linear regression indicated that distance was dependent on length at tagging ($P=0.0003$) but the relationship was very weak ($R^2=0.03$). Distance was not dependent on number of days at large ($P=0.0702$). Mean distance was not significantly different between sexes based on analysis of variance (Male: 31.96 km Female: 23.51 km Unknown: 34.45 km $P=0.3673$).

Trajectories (or vectors) for each recaptured Yellow Perch (2009–2014) from the origin of tagging to the site of recapture are presented in Figure 6.5.3 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 6.5.6. 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 6.5 km @ 101°) (Table 6.5.6 and Figure 6.5.3). The mean recapture vector for Yellow Perch tagged in MU2 was 6.2 km @ 90° . Most (78) recaptures of Yellow Perch tagged in MU2 occurred in Ontario waters where the mean vector was only 3.6 km @ 69° , reflecting a comparable tendency for Yellow Perch tagged near Erieau to be recaptured east or west of Erieau (Table 6.5.6). Yellow Perch recaptured that were tagged in MU3 near Fairport, Ohio had a mean vector of 24.9 km @ 345° . This differed by recapture jurisdiction however, with more Ohio recaptures occurring slightly east of the Fairport tagging site (mean distance 12.7 km @ 52°) compared to recaptures in Ontario waters which had a mean vector of 66.9 km with direction 325° (Table 6.5.6, Figure 6.5.3). 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 (2009-2014) (Table 6.5.7). The highest mean number of days until recapture among tagging- MUs occurred in MU1 (394 days), followed by MU2 (349 days) and MU3 (206 days) (Table 6.5.7). 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.

Release of tagged Yellow Perch in 2013 and 2014 using deployment cages indicated mortality rates of 32% and 35% respectively. Some of this mortality may be attributed to barotrauma associated with depressurization during trawl retrieval. Use of Go Pro cameras in 12 cage deployments during 2014 revealed additional mortality that was not accounted for by counting dead fish in cages retrieved. The average percentage of dead or dying Yellow Perch that left the cage near the lake bottom was 1.8% with a range of 0% to 11.8% of the tagged fish considered to be at large. 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. These 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 interpretation described by this study is 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 / or 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 lower scanning effort. Historic tagging studies (OMNR 1987) documented movement of Yellow Perch from Long Point Bay towards the central basin.

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Table 5.4.1 Number of Yellow Perch tagged and recaptured by year of tagging, jurisdiction, management unit (MU), and year of recapture from 2009-2014. Percentage of each tagging cohort caught by jurisdiction.

Tag Year	Tagging Jurisdiction	Tag MU	# Tagged	Ontario Recaptures by Year of Recapture						Ohio Recaptures By Year			Ontario and Ohio Recaptures		
				2009	2010	2011	2012	2013	2014	All Years	%	2013	2014	All Years	%
2009	ON	1	3,557	44	12	13	4	1	0	74	2.1%	0	0	0	0.0%
2010	ON	1	3,782		15	17	14	2	0	48	1.3%	0	0	0	0.0%
2011	ON	2	1,875			10	27	6	3	46	2.5%	1	2	3	0.2%
2012	ON	1	2,837				45	28	16	89	3.1%	1	0	1	0.0%
	ON	2	124				2	3	1	6	4.8%	0	0	0	0.0%
2013	ON	1	219					5	4	9	4.1%	0	0	0	0.0%
	ON	2	294					10	3	13	4.4%	0	0	0	0.0%
	OH	3	6,258					28	19	47	0.8%	50	32	82	1.3%
2014	ON	2	787						13	13	1.7%		0	0	0.0%
	OH	3	638						0	0	0.0%		8	8	1.3%
All Tag Years	ON	1	10,395	44	27	30	63	36	20	220	2.1%	1	0	1	0.0%
	ON	2	3,080			10	29	19	20	78	2.5%	1	2	3	0.1%
	OH	3	6,896					28	19	47	0.7%	50	40	90	1.3%
	ON OH	All MUs	20,371	44	27	40	92	83	59	345	1.7%	52	42	94	0.5%
												135	101	439	2.2%

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

Recaptures exclude 4 ON recaptures that could not be associated with a source tag. Duplicate detections and agency tagging recaptures were also excluded.

Table 5.4.2 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		% Female
			Mean	N	Mean	N	Mean	N	Mean	N	
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%
	ON	2	191	100	216	8	177	16	191	124	6%
2013	ON	1	190	53	248	4	197	162	197	219	2%
	ON	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%
All Years	ON	1	172	3,321	230	49	168	7,021	170	10,391	0%
	ON	2	193	2,344	238	211	186	523	195	3,078	7%
	OH	3	223	6,442	241	436	251	15	225	6,893	6%
	ON OH	All	204	12,107	239	696	170	7,559	192	20,362	3%

Table 5.4.3 Yellow Perch scanned (pounds) for PIT tags by management unit and source (Ontario) from 2009 to 2014.

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	836,881	960,949	8,962	2,133,687
	2014	306,090	746,881	910,953	-	1,963,924
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
Partnership Surveys	2009	994	2,769	4,846	2,497	11,106
	2010	509	2,176	3,745	1,847	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
All (Ontario)	2009	250,522	483,873	201,737	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	839,573	962,497	9,589	2,139,434
	2014	306,794	748,469	914,073	520	1,969,856
Total		3,586,909	7,842,527	8,938,068	63,916	10,215,710

Table 5.4.4 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					% of Yellow Perch Recaptured						
TAG MU	Recapture MU				All	TAG MU	Recapture MU				All
	1	2	3	4			1	2	3	4	
1	166	47	8	0	221	1	75%	21%	4%	0	100%
2	7	32	42	0	81	2	9%	40%	52%	0	100%
3	1	49	87	0	137	3	1%	36%	64%	0	100%
Total	174	128	137	0	439	All MUs	40%	29%	31%	0%	100%

Table 5.4.5 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.

Year of Tagging	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	88.5	74.8	95.5	3	42.0	6.1	95.5	49
2012	1	14.8	2.4	101.4	89	136.0	136.0	136.0	1	16.2	2.4	136.0	90
	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	28.5	7.6	53.0	13					28.5	7.6	53.0	13
	3	79.1	44.0	98.7	47	41.2	2.6	84.1	82	55.0	2.6	98.7	129
	All	60.8	5.5	98.7	69	41.2	2.6	84.1	82	50.2	2.6	98.7	151
2014	2	28.7	6.5	70.8	13					28.7	6.5	70.8	13
	3					28.9	11.1	55.0	8	28.9	11.1	55.0	8
All Tagging Years	1	18.9	1.7	167.5	220	136.0	136.0	136.0	1	19.4	1.7	167.5	221
	2	36.2	6.1	86.1	78	88.5	74.8	95.5	3	38.2	6.1	95.5	81
	3	79.1	44.0	98.7	47	40.1	2.6	84.1	90	53.5	2.6	98.7	137
	All	31.0	1.7	167.5	345	42.7	2.6	136.0	94	33.5	1.7	167.5	439

Table 5.4.6 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	5.9	102	220
1	Both	6.5	101	221
2	OH	87.5	112	3
2	ON	3.6	69	78
2	Both	6.2	90	81
3	OH	12.7	52	90
3	ON	66.9	325	78
3	Both	24.9	345	137

Note: 0° or 360° is North

Table 5.4.7 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						482	309	46	1,153	49						482	309	46	1,153	49
2012	354	272	16	924	90	392	235	79	728	6						356	269	16	924	96
2013	292	194	91	563	9	131	155	20	412	13	217	162	18	490	129	214	165	18	563	151
2014						42	34	5	118	13	37	34	5	102	8	40	34	5	118	21
All	394	308	12	1,470	221	349	314	5	1,153	81	206	163	5	490	137	327	284	5	1,470	439

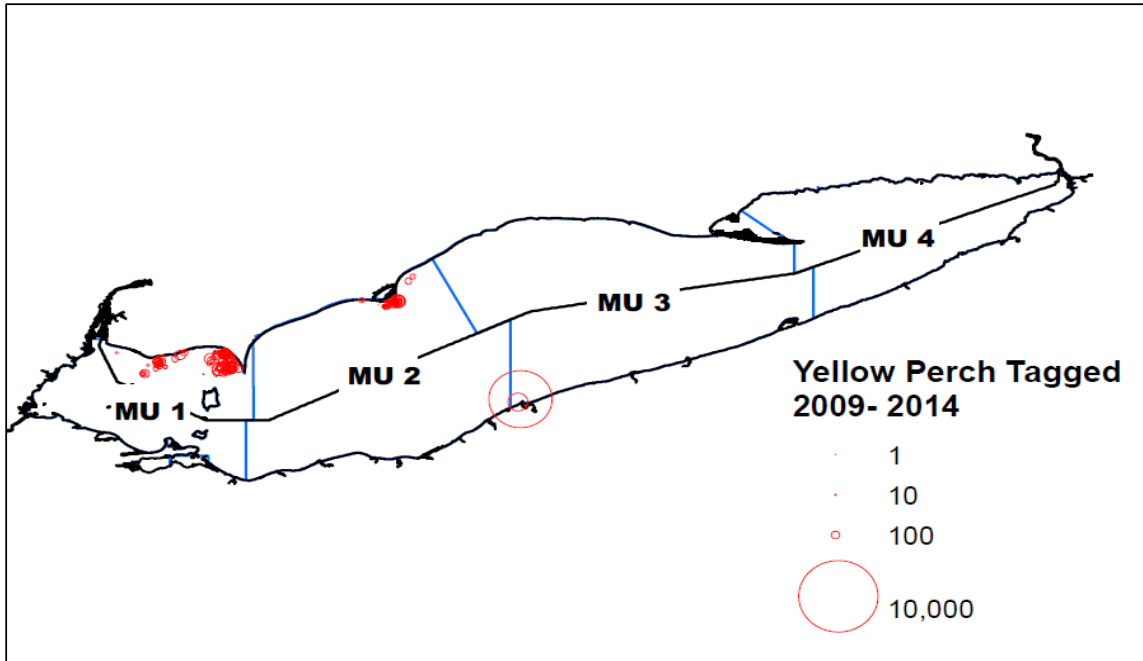


Figure 5.4.1 Number of Yellow Perch PIT tagged in Ontario and Ohio from 2009-2014.

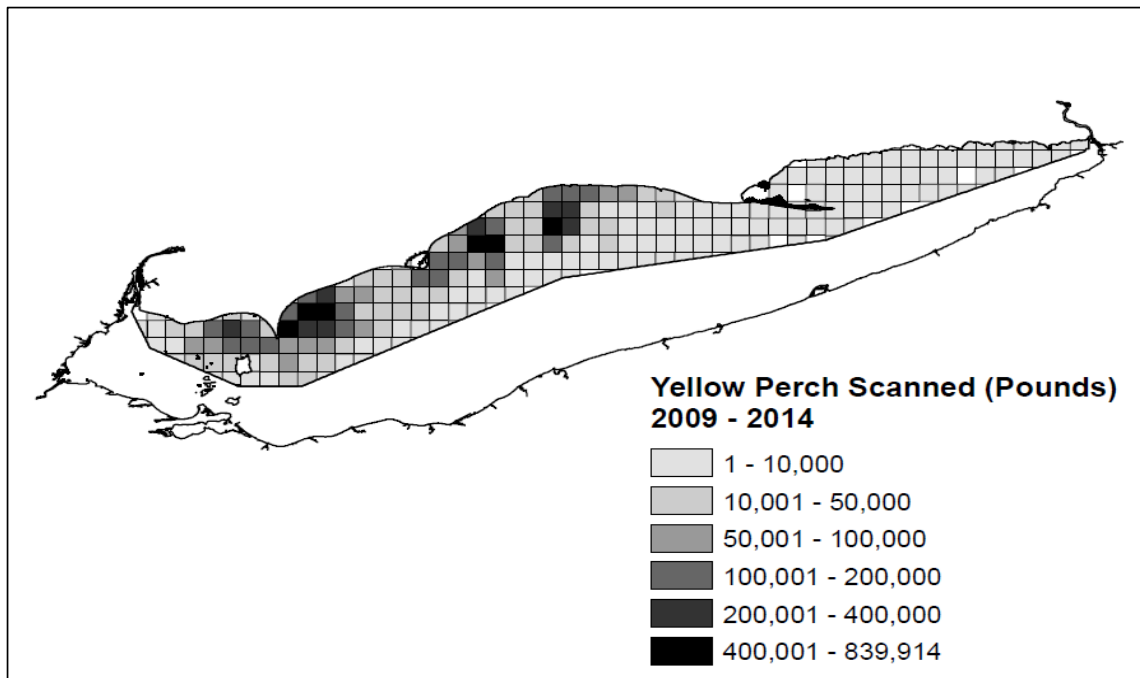


Figure 5.4.2 Ontario Yellow Perch (pounds) scanned from commercial harvest and from the Partnership gill net surveys by 5 minute grid 2009-2014.

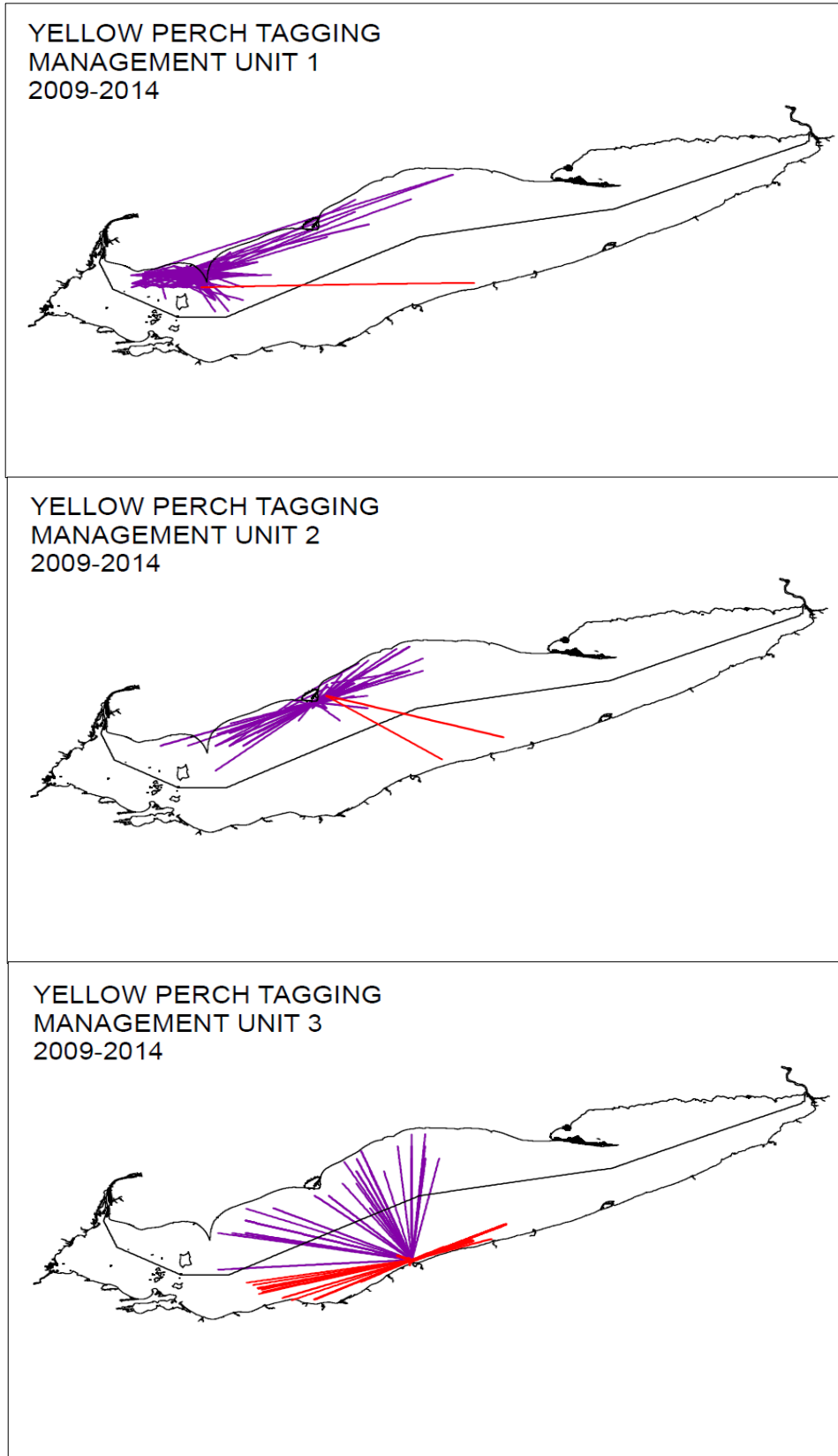


Figure 5.4.3 Vectors for individual PIT tag detections from tag locations in management unit (MU)1 (top), MU2 (middle) and MU3 (bottom) to recapture locations, 2009-2014. Note that some lines overlap, obscuring multiple recaptures (i.e.: MU2 tagging resulted in 3 recaptures in Ohio waters with only 2 lines visible).

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 2014, 57 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. Lake Erie Management Unit (LEMU) collected information from Ontario anglers, while the Michigan Department of Natural Resources collected data from Michigan anglers. There were 35 participants in Lake St. Clair, 31 participants in the Detroit River, and 18 participants in the St. Clair River (some anglers' fish in more than one area). The number of participants increased in Lake St. Clair (from 32 participants in 2013) and St. Clair River (from 12 participants in 2013), and was the same in Detroit River (31 participants in 2013).

In total there were 867 fishing trips by angler diarists in the St. Clair System (Table 6.1.1). The total effort was 9,088 rod hours, with 64% of effort in Lake St. Clair, 27% in the Detroit River and 9% 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 in 2014.

Survey Area	Number of Diarists	Number of Trips	Number of Rods per Trip	Total Rod Hours	Hours per Trip
Lake St. Clair	35	485	2.6	5,803	4.6
Detroit River	31	297	2.0	2,467	4.2
St. Clair River	18	85	2.4	818	4.0
Total	57^a	867	2.4	9,088	4.4

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

Lake St. Clair

Lake St. Clair diarists fished 5,803 rod hours of effort over 485 fishing trips (Table 6.1.1). In 2014, 45% of diary participant effort in Lake St. Clair was directed towards Walleye, 36% of effort was directed towards Yellow Perch, 24% of effort was directed towards Smallmouth Bass, and 7% 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: Pumpkinseed (3%), Largemouth Bass (2%), Northern Pike (2%), and White Bass (1%).

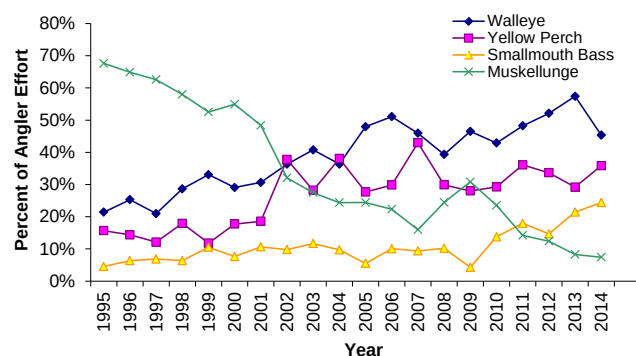


Figure 6.1.1 Percent of angler diarist effort in Lake St. Clair by species 1995-2014.

The 2014 Walleye catch rate (0.445 fish per rod hour) decreased 9% percent from the 2013 catch rate (Table 6.1.2). The Smallmouth Bass catch rate (0.296 fish per rod hour) decreased 52% from 2013. In 2014, 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 (1.907 fish per rod hour) decreased 14% from the 2013 catch rate. The Yellow Perch catch rate in Lake St. Clair was higher than Yellow Perch catch rate in the Detroit River (Figure 6.1.5). The 2014 Muskellunge catch rate (0.044 fish per rod hour) decreased 33% from 2013 (Table 6.1.2). In the Sport Fishery Diary Program, the trend in Muskellunge catch rate has been declining over time; however fewer Muskellunge anglers are participating in this program than in previous years which may account for this trend.

Detroit River

Detroit River diarists fished 2,467 rod hours of effort over 297 fishing trips (Table 6.1.1). In the Detroit River, 94% of diary participant effort was directed towards Walleye, 12% of effort was directed towards Smallmouth Bass, and 8% of effort was directed towards Yellow Perch, (Table 6.1.2, Figure 6.1.2). Additional species targeted with more than one percent of the effort included: Rock Bass (7%), Largemouth Bass (5%), White Bass (2%), and Channel Catfish (1%).

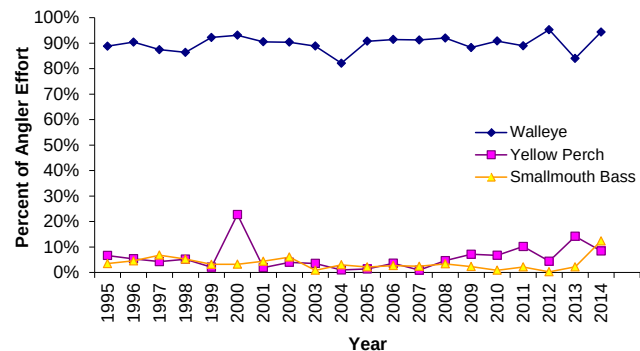


Figure 6.1.2 Percent of angler diarist effort in the Detroit River by species 1995-2014.

The 2014 Walleye catch rate (0.614 fish per rod hour) decreased 6% percent from the 2013 catch rate (Table 6.1.2). The Yellow Perch catch rate (0.785 fish per rod hour) decreased 83% from the 2013 catch rate. The Smallmouth Bass catch rate (0.079 fish per rod hour) decreased 81% from 2013.

St. Clair River

St. Clair River diarists fished 818 rod hours of effort over 85 fishing trips (Table 6.1.1). In the St. Clair River, 55% of diary participant effort was directed towards Walleye, and 2% of effort was directed towards Rainbow Trout, (Table 6.1.2, Figure 6.1.3). Additional species targeted with at least one percent of the effort included: Smallmouth Bass (9%), and Channel Catfish (4%).

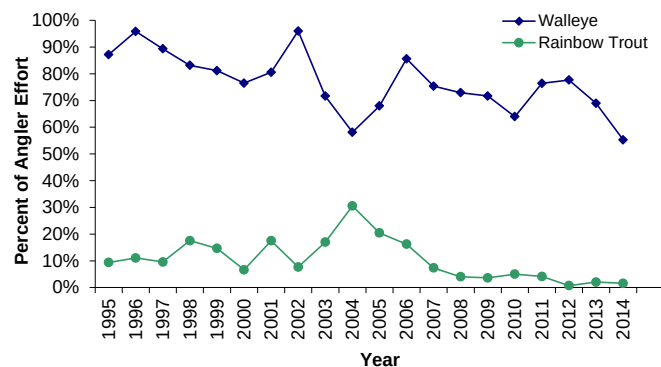


Figure 6.1.3 Percent of angler diarist effort in the St. Clair River by species 1995-2014.

The 2014 Walleye catch rate (0.840 fish per rod hour) increased 37% and was similar to the 2013 Walleye catch rate (0.845 fish per rod hour; Table 6.1.2). 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).

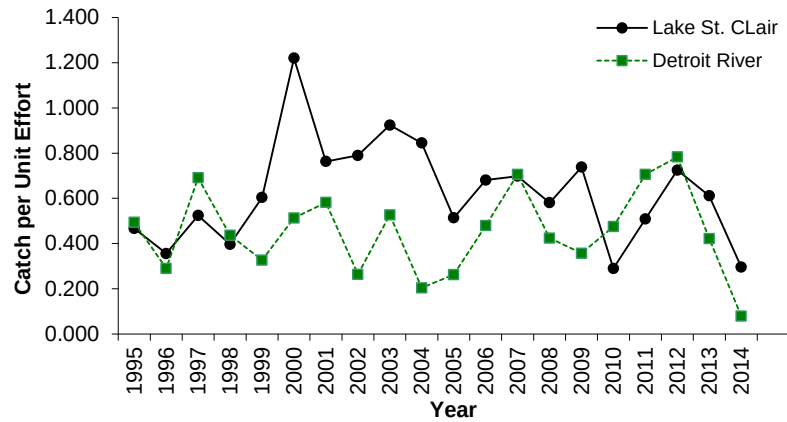


Figure 6.1.4 Smallmouth Bass catch per unit effort (fish per rod hour) in Lake St. Clair and the Detroit River, Sport Fish Diary Program 1995-2014.

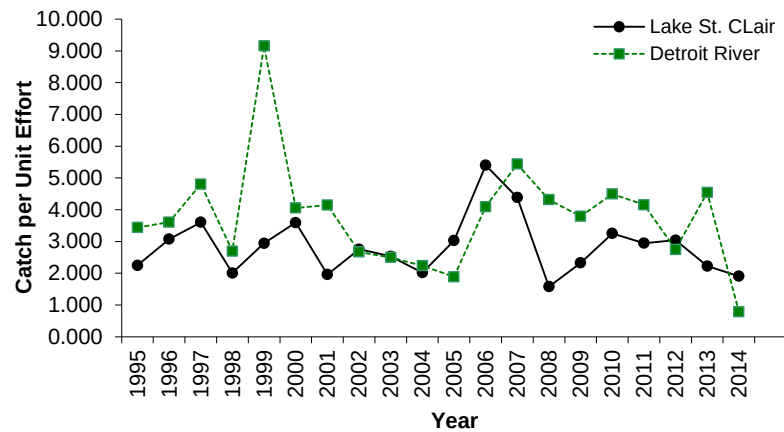


Figure 6.1.5 Yellow Perch catch per unit effort (fish per rod hours) in Lake St. Clair and the Detroit River Sport Fish Diary Program 1995-2014.

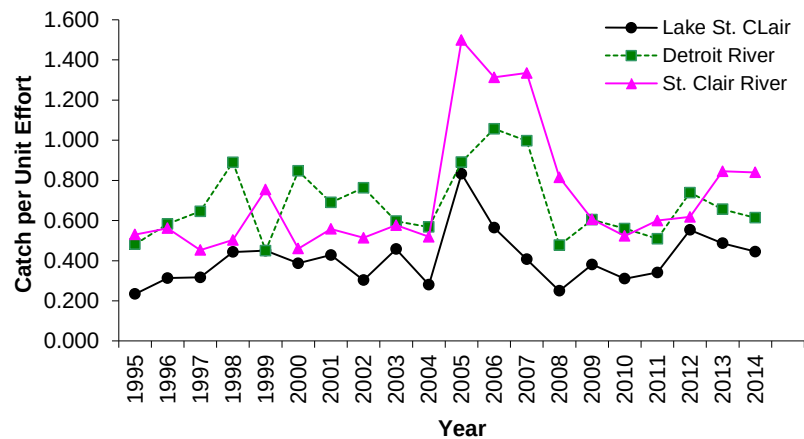


Figure 6.1.6 Walleye catch per unit effort (fish per rod hour) in Lake St. Clair, Detroit River and the St. Clair River Sport Fish Diary Program 1995-2014.

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, 1995-2014^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%
95-14 Avg.	12,754	419	4,361	0.409	39%	233	2,920	2.841	22%	124	1,166	0.627	8%	187	5,533	0.088	47%

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%
95-14 Avg.	3,268	414	2,928	0.681	90%	19	194	3.779	6%	15	122	0.451	4%	8	74	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%
95-14 Avg.	1,335	155	1,061	0.721	77%	12	155	0.054	10%	17	188	0.124	11%

^aCPUE 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. Luke's. 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 2014, all three sites were fished each year, with the exception of 1999, 2002, and 2010 when no fishing occurred.

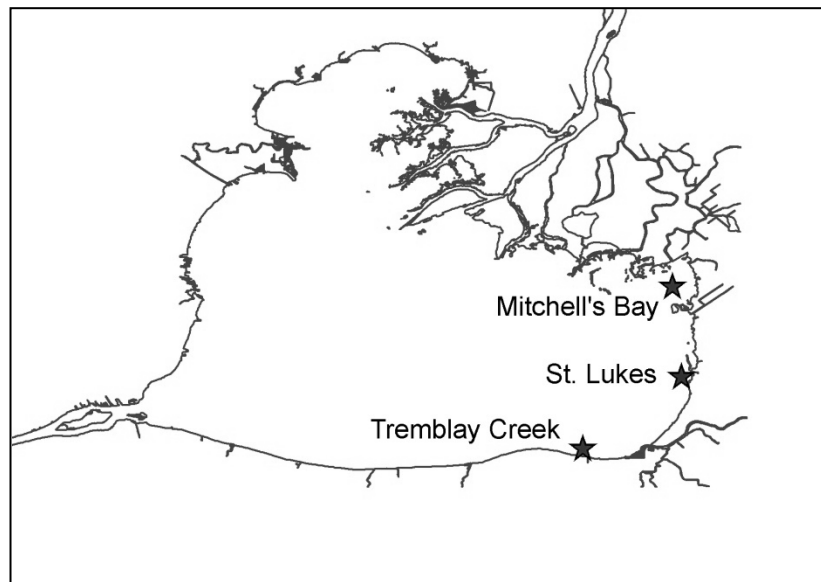


Figure 6.2.1 Lake St. Clair Fall Trap Net Index site locations.

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 2014, the nets were set from September 29 to November 10. 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 2014 are preliminary.

In 2014, there was a total of 124 net nights of effort (Figure 6.2.2). There were 39.9 net nights of effort at Mitchell's Bay, 42.0 nights of effort at St. Luke's, and 42.0 nights of effort at Tremblay Creek. Two 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 2014, 24 species were caught. The most commonly caught species were Freshwater Drum (33% of the catch) and Channel Catfish (24%) (Figure 6.2.3).

The total catch per net night at all three sites combined, was 11.9 fish in 2014; this was a decrease of 18% from 2013 (Figure 6.2.3). At Mitchell's Bay the catch rate was 5.1 fish per net night, a decrease of 52% from 2013 (Table 6.2.1). The St. Luke's catch rate decreased 47% in 2014 to 9.1 fish per net night (Table 6.2.2). At Tremblay Creek the catch rate was 18.4 fish per net night, an increase of 47% from 2013 (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 5.3 fish per net night, this decreased to an average of 1.1 fish per net night from 1991-2013 at the Tremblay Creek and Mitchell's Bay sites combined (standard north and south sites fished from 1974 to present). In 2014, the mean Walleye CPUE was 0.47 fish per net night (at all sites combined), and Walleye comprised 4.3% of the catch. The long term (1986 to 2013) average CPUE at all sites combined was 1.9 fish per net night and Walleye comprised 8% of the catch on average. In 2014, the highest catch rates of Walleye were at the Tremblay Creek site (Figure 6.2.4).

In 2014, only 14 Yellow Perch were caught during the program. The highest Yellow Perch catch rate was at Tremblay Creek (0.19 fish per net night) (Figure 6.2.5). The overall 2014 catch rate (0.11 fish per net night) was less than the long term average (0.30 fish per net night), and Yellow Perch comprised only 1.0% of the catch compared to the 1986 to 2013 average value of 1.8%.

In 2014, both St. Luke's and Tremblay Creek had the same catch rate of Smallmouth Bass (0.29 fish per net night) (Figure 6.2.6). The average 2014 Smallmouth Bass catch rate at all sites combined (0.20 fish per net night) was less than the long term average (0.60 fish per net night). Smallmouth Bass comprised only 1.8% of the total catch in 2014 which was below 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).

YEAR	CATCH PER NET NIGHT																											TOTAL						
	Freshwater Drum	Walleye	Yellow Perch	Black Crappie	Largemouth Bass	Smallmouth Bass	Blue Gill	Pumpkinseed	Rock Bass	White Bass	White Perch	Burbot	Stonecat	Channel Catfish	Brown Bullhead	Common Carp	Shorthead Redhorse	Sucker	Golden Redhorse	Silver Redhorse	Spotted Sucker	Bigmouth Buffalo	White Sucker	Quillback Carpsucker	Mooneye	Muskellunge	Northern Pike		Gizzard Shad	Bowfin	Longnose Gar	Others*		
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	-	-	0.6	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	0.1	-	-	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	-	-	-	-	-	-	0.1	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	-	-	0.6	-	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	-	-	0.4	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	0.1	0.0	-	-	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	0.1	0.1	-	-	0.3	0.1	-	-	0.7	0.0	0.3	-	-	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	-	-	-	0.1	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	0.1	-	-	-	-	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	0.1	-	-	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	0.1	-	-	0.0	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	-	-	0.0	0.1	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	0.1	-	-	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	0.1	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	-	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	0.0	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	0.1	-	-	0.3	0.0	0.1	0.3	0.3	0.0	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	0.0	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	0.1	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	0.1	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	0.0	0.2	-	-	-	0.0	-	-	0.1	0.7	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	-	-	0.0	0.3	-	0.2	-	0.0	5.1	
Mean	2.8	1.4	0.3	3.5	0.3	0.3	1.2	2.8	0.6	0.2	0.4	0.0	-	1.0	0.6	1.5	0.2	0.1	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	19.2	

*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	Blue Gill	Pumpkinseed	Rock Bass	White Bass	White Perch	Burbot	Stonecat	Channel Catfish	Brown Bullhead	Common Carp	Shorthead Redhorse	Sucker	Golden Redhorse	Silver Redhorse	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	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	0.7	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	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	-	-	-	-	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	0.0	0.1	0.9	-	0.0	0.2	-	0.0	-	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	-	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	0.1	0.1	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	0.2	-	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	-	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	-	0.1	0.0	0.0	0.1	-	0.0	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	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	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	-	-	0.1	0.0	-	0.0	0.2	0.0	0.1	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	0.2	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	-	-	0.0	-	2.7	-	0.0	-	-	-	0.1	0.2	0.1	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	0.3	-	0.0	-	2.2	-	0.0	0.1	0.0	-	0.1	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	0.1	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	-	0.0	-	0.1	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	-	0.0	-	0.1	-	0.1	0.0	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	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	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	0.1	9.1	
Mean	8.8	1.9	0.3	0.2	0.1	0.7	0.1	0.2	0.8	1.0	3.6	0.0	0.0	3.5	0.1	0.6	0.3	0.2	0.4	0.0	0.0	0.0	0.1	1.3	0.0	0.0	0.2	0.0	0.0	0.1	0.1	0.1	24.1	

*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	Blue Gill	Pumpkinseed	Rock Bass	White Bass	White Perch	Burbot	Stonecat	Channel Catfish	Brown Bullhead	Common Carp	Shorthead Redhorse	Sucker	Golden Redhorse	Silver Redhorse	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	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	-	0.0	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	0.1	0.1	0.0	0.0	0.0	0.0	0.1	41.3
1979	11.3	12.8	0.1	0.0	-	0.4	-	-	0.8	2.9	-	-	-	4.3	-	0.9	1.7	0.3	0.1	-	0.0	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	-	0.0	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	0.1	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	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	0.2	0.0	-	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	0.0	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	0.0	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	-	-	-	-	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	-	0.0	0.1	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	0.0	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	-	-	-	-	0.0	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	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	0.0	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	0.0	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	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	-	-	-	-	-	-	-	0.1	-	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	0.1	-	-	0.0	0.2	0.0	-	-	-	-	26.7
1997	3.1	1.5	0.1	0.0	0.0	1.6	-	0.0	0.3	0.1	2.9	-	-	3.2	0.1	0.1	0.3	0.1	0.1	-	-	0.0	0.2	0.0	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	0.1	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	-	-	1.6	-	-	1.0	0.5	6.8	-	-	7.3	-	0.0	0.3	-	0.1	-	-	0.0	0.2	0.0	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	-	-	-	-	0.1	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	-	-	-	-	0.0	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	-	0.2	-	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	-	-	-	0.9	-	0.1	0.2	0.3	0.0	0.1	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	0.1	-	-	0.0	0.0	0.0	18.4
Mean	7.8	4.7	0.6	0.0	0.0	0.6	0.0	0.0	1.3	1.3	4.5	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	0.0	0.1	26.9	
Others include: Goldfish, Sauger, Lake Sturgeon, Rainbow Trout, Silver Lamprey, Lake Whitefish, Alewife, and Flathead Catfish.																																	

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

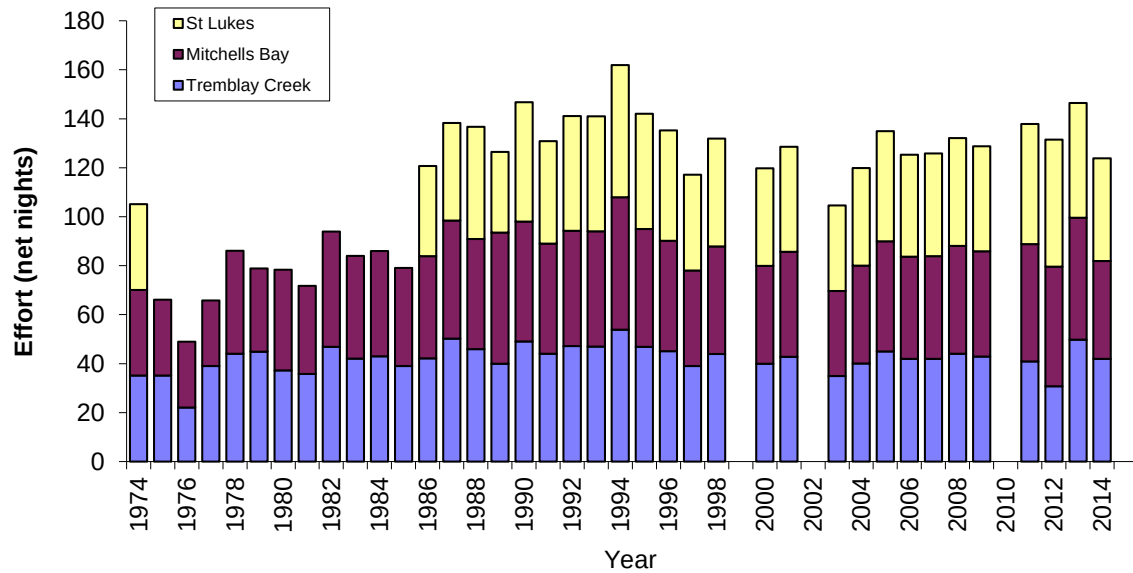


Figure 6.2.2 Total effort for the Lake St. Clair Fall Trap Net Index by site, 1974 to 2014 (St. Luke's was not fished from 1975 to 1985).

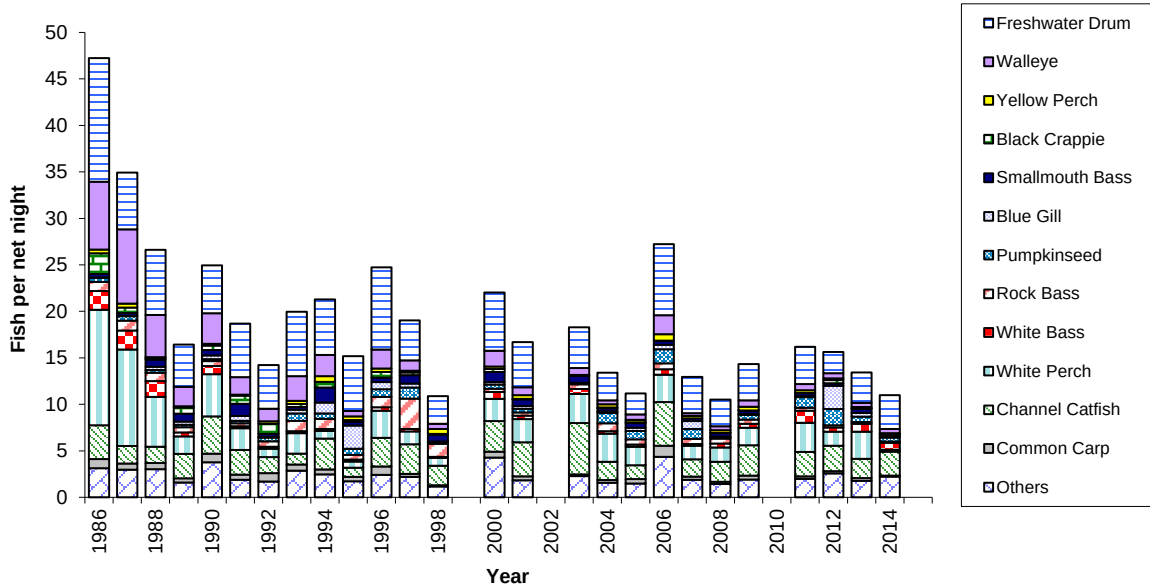


Figure 6.2.3 Catch per net night by species for all sites combined (Mitchell's Bay, St. Luke's, Tremblay Creek), 1986 to 2014.

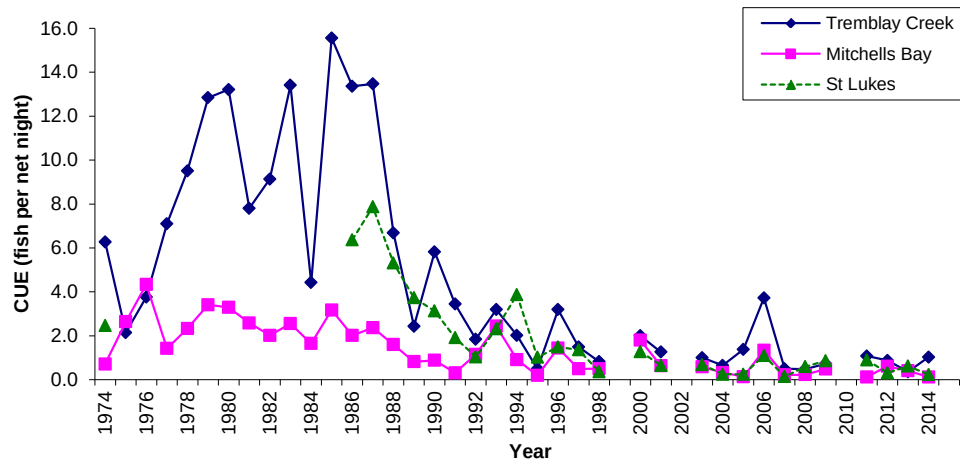


Figure 6.2.4 Catch per net night of Walleye at Tremblay Creek, Mitchell's Bay and St. Luke's sites, 1974 to 2014.

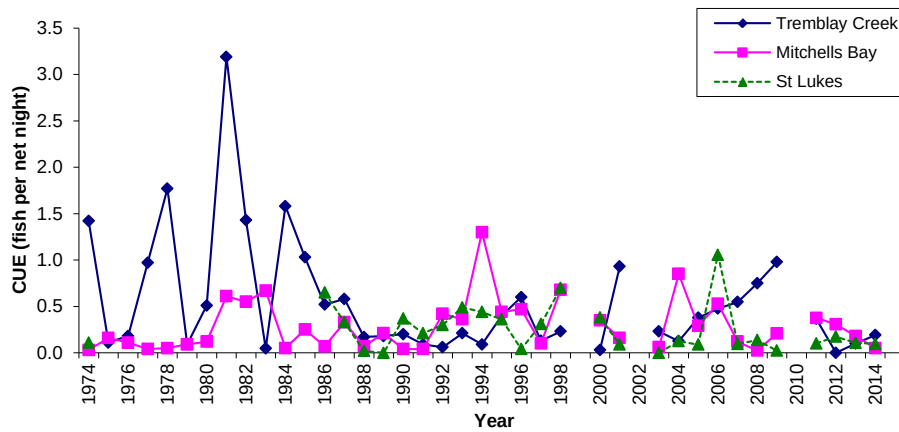


Figure 6.2.5 Catch per net night of Yellow Perch at Tremblay Creek, Mitchell's Bay and St. Luke's sites, 1974 to 2014.

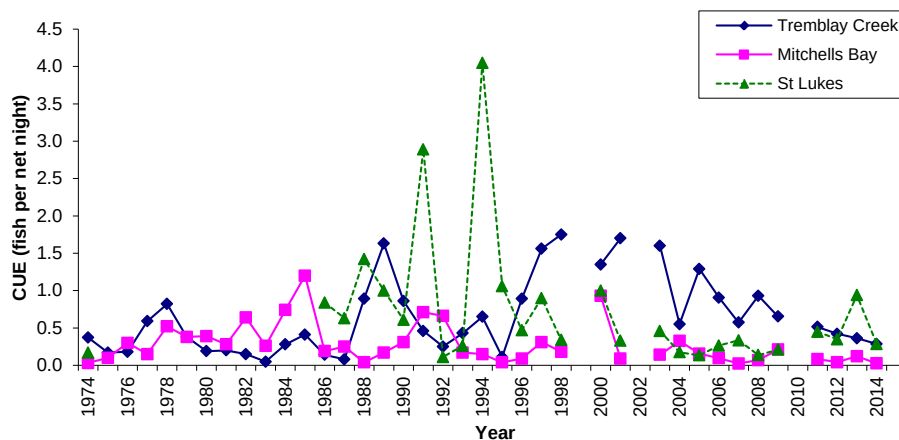


Figure 6.2.6 Catch per net night of Smallmouth Bass at Tremblay Creek, Mitchell's Bay and St. Luke's sites, 1974 to 2014.

6.3 Lake St. Clair Nearshore Index Fishing Program

Lake St. Clair is among the most biologically diverse ecosystems in North America. The lake is host to an abundant and diverse population of warm water and cool water fish species, and it provides critical spawning and nursery areas for many species. These species include several economically important species and some species at risk.

Surveys of young-of-the-year fish in Lake St. Clair have been carried out by the Ontario Ministry of Natural Resources and Forestry, intermittently since 1979. Recently the survey has been completed each year from 2007 to 2014. The primary objective of the Lake St. Clair nearshore index fishing program is to assess the nearshore fish community along the southern shoreline of the lake. The survey is also used to assess the abundance of current year classes for target sport and commercial fish species. In addition the program has the ability to track and identify invasive species and listed species at risk.

For this study, young-of-year fish from eight fixed sites (Figure 6.3.1) along the Canadian shores of Lake St. Clair were captured over a nine week time period, from June 1 to July 31, 2014. The survey is carried out using a small mesh beach seine that is dragged twice for 30 meters at each site. Catches are standardized across species and sampling years using the catch-per-unit effort (CPUE) statistic (defined as: number of fish caught/seine haul). Species richness and the Shannon-Wiener index are used as measures of biodiversity.

A total of 131 seine hauls were performed over the 2014 sampling period. The nearshore habitats of Lake St. Clair vary between sample sites and include a range of habitats from open sandy areas to areas with dense vegetation. For the 2014 sample year, mean site depth fished across the lake was 0.60 m, ranging from 0.2 to 1.0 m. Mean secchi disk transparency depths ranged from 0.1m to 1.0 m and averaged 0.6 m across the sites. On average, 2014 had both warmer air and water temperatures than 2013. Ambient air temperature averaged throughout the 2014 survey period was 26°C, and ranged from 20°C to 32°C. Average water temperature of Lake St. Clair during the 2014 study period was 24°C, and ranged from 19°C to 31°C.

The survey yielded a total of 43,007 fish, up 14% from 2013. The survey represented 49 different species, from 14 families (Table 6.3.1). Of the total catch lakewide, 80% (34,528 fish) were young-of-year fishes. Spottail Shiners, Brook Silversides, and Larval Cyprinids were the predominant fish caught throughout the sampling period. Species richness varied from 14 to 35 by site, but the lakewide total was 49. Shannon-Wiener diversity scores ranged from 1.22 to 2.49 with a lakewide average of 2.15. Average lakewide CPUE was 328 fish/seine haul an increase of 24% over the 2013 CPUE. Five types of invasive species were captured throughout the sample period; Goldfish, Common Carp, White Perch, and Round and Tubenose Goby, all of which have been previously reported in the waters of Lake St. Clair.

Catch of sport fish was moderate, with 201 YOY Yellow Perch, an increase of 29% over last year. Six YOY Walleye were caught, doubling the catch observed in 2013. The 2014 sampling season produced 1 YOY Muskellunge, a species that has been caught sporadically and in relatively small numbers throughout the history of this survey; this is also similar to 2013 observations. YOY Smallmouth Bass abundance was relatively weak accounting for only 0.1% of the total YOY catch. Whereas YOY Largemouth Bass catch rates saw a 400% increase from 2013, with over 1,100 individuals captured in 2014. Two species at risk, Pugnose Shiner (*Notropis anogenus*) and Silver Chub (*Macrhybopsis storeriana*) were captured during the 2014 survey period. Fifteen Pugnose Shiners were captured all from the St. Lukes site, and one Silver Chub was caught at the Bradley Marsh site, all fish were preserved and verified by the ROM.

Historically, this program has not captured high numbers of YOY Walleye, Yellow Perch or Muskellunge even in years of known strong year classes. Due to the temporal patchiness of the dataset, clear relationships between littoral zone sportfish YOY abundance and recruitment indices have not been determined. Future work will address this information gap and provide a predictive tool for assessing year class strength of sportfish on Lake St. Clair. Overall, the irregular nature of historical sampling in the Lake St. Clair Young-of-Year Index Survey has prevented reporting on trends in the dynamics of the nearshore fish community. Continued annual sampling will enable us

to quantify observed changes in this important ecosystem and will be a valuable tool for assessing both recruitment of economically important species and the state of the forage fish base.

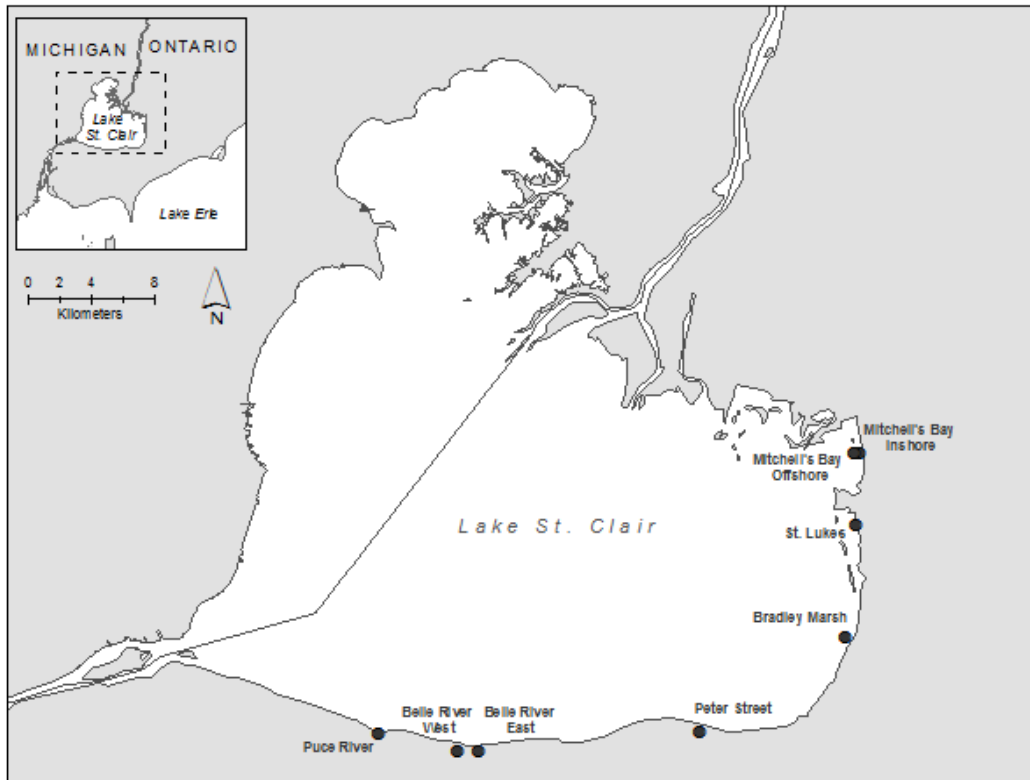


Figure 6.3.1 Location of eight fixed sites on Lake St. Clair of the Lake St. Clair Nearshore Index Fishing Program.

Table 6.3.1 Catch summary for all species caught in Lake St. Clair, 2014.

Common Name	Scientific Name	Trophic Guild	Total YOY	Total Adult	Total Catch	Total C.U.E. (# of fish/seine haul)	Relative Abundance %
Longnose Gar	<i>Lepisosteus osseus</i>	Piscivore		5	5	0.04	<0.01
Herring spp	<i>Clupeidae spp</i>	-	1338		1338	10.21	3.1
Gizzard Shad	<i>Dorosoma cepedianum</i>	Planktivore	1955	6	1961	14.97	4.6
Northern Pike	<i>Esox lucius</i>	Piscivore		1	1	0.01	<0.01
Muskellunge	<i>Esox masquinongy</i>	Piscivore	1		1	0.01	<0.01
Mooneye	<i>Hiodon tergisus</i>	Planktivore	10		10	0.08	<0.01
Sucker spp	<i>Catostomid spp</i>	-	288		288	2.20	0.7
Quillback	<i>Carpoides cyprinus</i>	Benthivore	16	3	19	0.15	<0.01
White Sucker	<i>Catostomus commersonii</i>	Benthivore	5		5	0.04	<0.01
Bigmouth Buffalo	<i>Ictiobus cyprinellus</i>	Benthivore	1		1	0.01	<0.01
Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>	Benthivore	16	31	47	0.36	0.1
Redhorse spp	<i>Moxostoma spp</i>	Benthivore		1	1	0.01	<0.01
Buffalo spp	<i>Ictiobus spp</i>	Benthivore	1		1	0.01	<0.01
Minnow spp	<i>Cyprinid spp</i>	-	4701	1	4702	35.89	10.9
Goldfish	<i>Carassius auratus</i>	Benthivore	99	2	101	0.77	0.2
Common Carp	<i>Cyprinus carpio</i>	Benthivore	4	1	5	0.04	<0.01
Silver Chub	<i>Macrhybopsis storeriana</i>	Planktivore		1	1	0.01	<0.01
Golden Shiner	<i>Notemigonus crysoleucas</i>	Planktivore	112	4	116	0.89	0.3
Pugnose Shiner	<i>Notropis anogenus</i>	Planktivore		15	15	0.11	<0.01
Emerald Shiner	<i>Notropis atherinoides</i>	Planktivore	2340	1974	4314	32.93	10.0
Blacknose Shiner	<i>Notropis heterolepis</i>	Planktivore	113	126	239	1.82	0.6
Spottail Shiner	<i>Notropis hudsonius</i>	Planktivore	16077	725	16802	128.26	39.1
Spotfin Shiner	<i>Cyprinella spiloptera</i>	Planktivore		57	57	0.44	0.1
Sand Shiner	<i>Notropis stramineus</i>	Planktivore	4	3794	3798	28.99	8.8
Mimic Shiner	<i>Notropis volucellus</i>	Planktivore	102	160	262	2.00	0.6
Bluntnose Shiner	<i>Pimephales notatus</i>	Planktivore	23	103	126	0.96	0.3
Ghost Shiner	<i>Notropis buechanani</i>	Planktivore		11	11	0.08	<0.01
Channel Catfish	<i>Ictalurus punctatus</i>	Benthivore	3	32	35	0.27	0.1
Banded Killifish	<i>Fundulus diaphanus</i>	Benthivore	27	409	436	3.33	1.0
Trout-perch	<i>Percopsis omiscomaycus</i>	Benthivore	2	1	3	0.02	<0.01
Temperate Bass spp	<i>Percichthyid spp</i>	Benthivore	171		171	1.31	0.4
White Perch	<i>Morone americana</i>	Benthivore	322	78	400	3.05	0.9
White Bass	<i>Morone chrysops</i>	Piscivore	159	1	160	1.22	0.4
Sunfish spp	<i>Centrarchid spp</i>	-	333		333	2.54	0.8
Rock Bass	<i>Ambloplites rupestris</i>	Benthivore	32	12	44	0.34	0.1
Pumpkinseed	<i>Lepomis gibbosus</i>	Benthivore		96	96	0.73	0.2
Blue Gill	<i>Lepomis macrochirus</i>	Benthivore	48	32	80	0.61	0.2
Smallmouth Bass	<i>Micropterus dolomieu</i>	Piscivore	63		63	0.48	0.1
Largemouth Bass	<i>Micropterus salmoides</i>	Piscivore	1165	12	1177	8.98	2.7
White Crappie	<i>Pomoxis annularis</i>	Benthivore	1		1	0.01	<0.01
Black Crappie	<i>Pomoxis nigromaculatus</i>	Benthivore	15		15	0.11	<0.01
Yellow Perch	<i>Perca flavescens</i>	Piscivore	201	134	335	2.56	0.8
Walleye	<i>Stizostedion vitreum</i>	Piscivore	6		6	0.05	<0.01
Logperch	<i>Percina caprodes</i>	Benthivore	3	145	148	1.13	0.3
Blackside Darter	<i>Percina maculata</i>	Benthivore	2		2	0.02	<0.01
Brook Silverside	<i>Labidesthes sicculus</i>	Planktivore	4564	385	4949	37.78	11.5
Round Goby	<i>Neogobius melanostomus</i>	Benthivore	149	40	189	1.44	0.4
Tubnose Goby	<i>Proterorhinus marmoratus</i>	Benthivore	54	77	131	1.00	0.3
Freshwater Drum	<i>Aplodinotus grunniens</i>	Benthivore	2	4	6	0.05	<0.01
Totals			34,528	8,479	43,007	328.30	100.0

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 Chancel 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 in the same manner continued in 2014 on the Thames River. 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 (OMNRF) Lake Erie Management Unit's 2013 Status of Major Stocks. Results from tagging Walleye on the Thames (2014) and Sydenham (2013) Rivers are reported here.

Walleye were collected from April 1 to May 1, 2014 on the Thames River by electrofishing from a 21 foot Smith Root vessel operating between 11-18 amps at 350-500 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 behind 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 HPR plus and Dextron 2001F-ISO readers. Total lengths were measured and sex and reproductive state were recorded. Several anterior dorsal spines were removed for aging tagged Walleye. Environmental conditions and measurements were documented at locations where tagging took place.

In 2014, 253 Walleye were tagged on the Thames River (Table 6.4.1). The age composition of tagged Walleye by sex is presented in Figure 6.1.1, along with mean length at age by gender. Males represented 54% of Walleye tagged, while females and Walleye of undetermined sex accounted for 13% and 33% respectively. Ages of tagged Walleye ranged from 3 to 11, with age 5, the 2009 year class, being most prominent. While collecting Walleye for tagging by electrofishing in 2014, only one tagged Walleye was recaptured.

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 harvest rates of tagged Walleye in 2014. All Thames River Walleye recaptured in 2014 (10) were from the recreational fishery, with most (8) caught by Michigan anglers and two (2) caught by Ontario residents. Recapture rates were comparable for non-reward (3.9%) and reward (4.1%) tags and highest for females tagged with non-reward tags (9.1%). Walleye tagged in the Thames River were caught as far as 121 km away in the St. Clair River (Figure 6.4.2). Angler recaptures also occurred in the Thames River and on Lake St. Clair. Thames River Walleye were recaptured during May, June, July and December in 2014 (Figure 6.4.4).

Since Walleye were tagged in the Sydenham River during spring of 2013, 19 recaptures were reported (Table 6.4.2). The number of recaptures in 2014 (9) was comparable to 2013 (10), with higher recapture rates for reward tags than non-reward tags in 2013 (4.3% vs 1.5%) and 2014 (2.9% vs 1.9%). Walleye tagged in the Sydenham River were caught by anglers in the Sydenham River, Chancel Ecarte, Lake St. Clair and the St. Clair River (Figure 6.4.3). Recaptures of Sydenham River Walleye took place during all seasons in 2013 and 2014, with the highest number caught during May in both years (Figure 6.4.4). In contrast to Thames River recaptures, from 2013 to 2014, Ontario anglers caught more Walleye that were tagged in the Sydenham River (14) than Michigan sport fishers (5).

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

Sex	Tagged			Recaptured			Recaptured / Tagged		
	NR	R	Total	NR	R	Total	NR	R	Total
Male	107	29	136	2	1	3	1.9%	3.4%	2.2%
Female	27	6	33	3	0	3	11.1%	0.0%	9.1%
Unknown	70	14	84	3	1	4	4.3%	7.1%	4.8%
ALL	204	49	253	8	2	10	3.9%	4.1%	4.0%

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 and 2014. NR = Non Reward Jaw Tag R = Reward Jaw Tag

Sex	Tagged 2013			Recaptured 2013			Recaptured 2013/Tagged		
	NR	R	Total	NR	R	Total	NR	R	Total
Male	230	96	326	3	4	7	1.3%	4.2%	2.1%
Female	12	4	16	0	1	1	0.0%	25.0%	6.3%
Unknown	19	38	57	1	1	2	5.3%	2.6%	3.5%
ALL	261	138	399	4	6	10	1.5%	4.3%	2.5%

Sex	Recaptured 2014			Recaptured 2014 / Tagged		
	NR	R	Total	NR	R	Total
Male	5	1	6	2.2%	1.0%	1.8%
Female	0	1	1	0.0%	25.0%	6.3%
Unknown	0	2	2	0.0%	5.3%	3.5%
ALL	5	4	9	1.9%	2.9%	2.3%

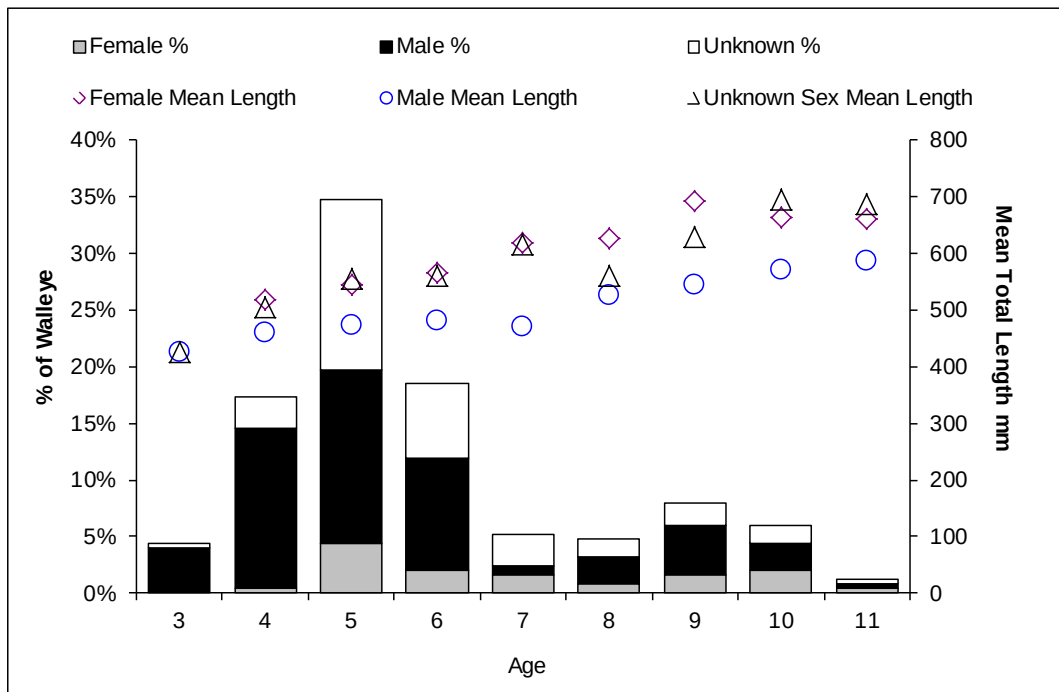


Figure 6.4.1 Age composition of Walleye tagged on the Thames River in 2014 by sex. Mean total length (mm) at age (dorsal spines) by sex on second Y axis.

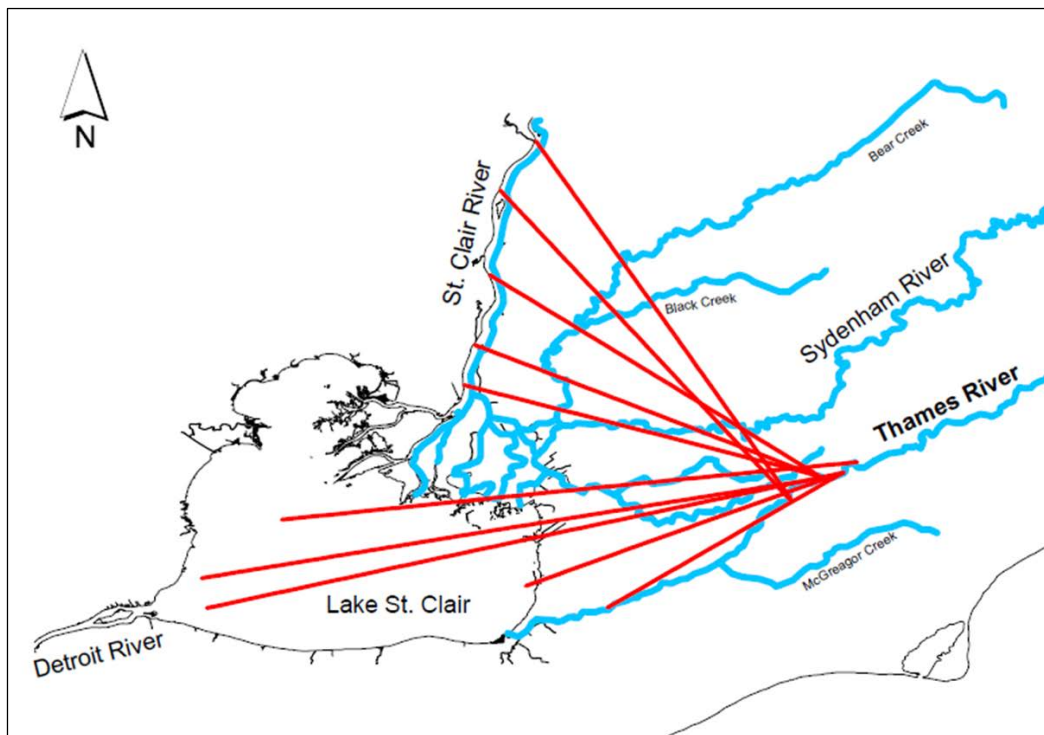


Figure 6.4.2 Lines joining recapture locations in 2014 to corresponding sites where PIT and jaw tags were applied to each Walleye in the Thames River, 2014.

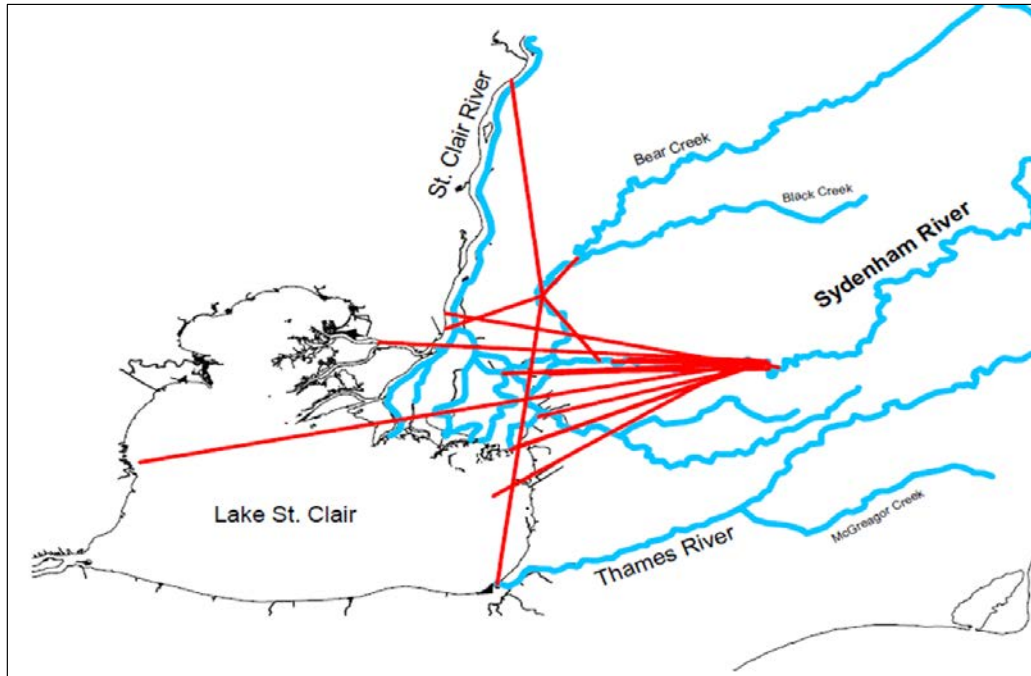


Figure 6.4.3 Lines joining recapture locations in 2013, 2014 to corresponding sites where PIT and jaw tags were applied to each Walleye in the Sydenham River, 2013. Note that 5 Walleye recaptured were tagged in Bear Creek, which, enters the Sydenham River in Wallaceburg.

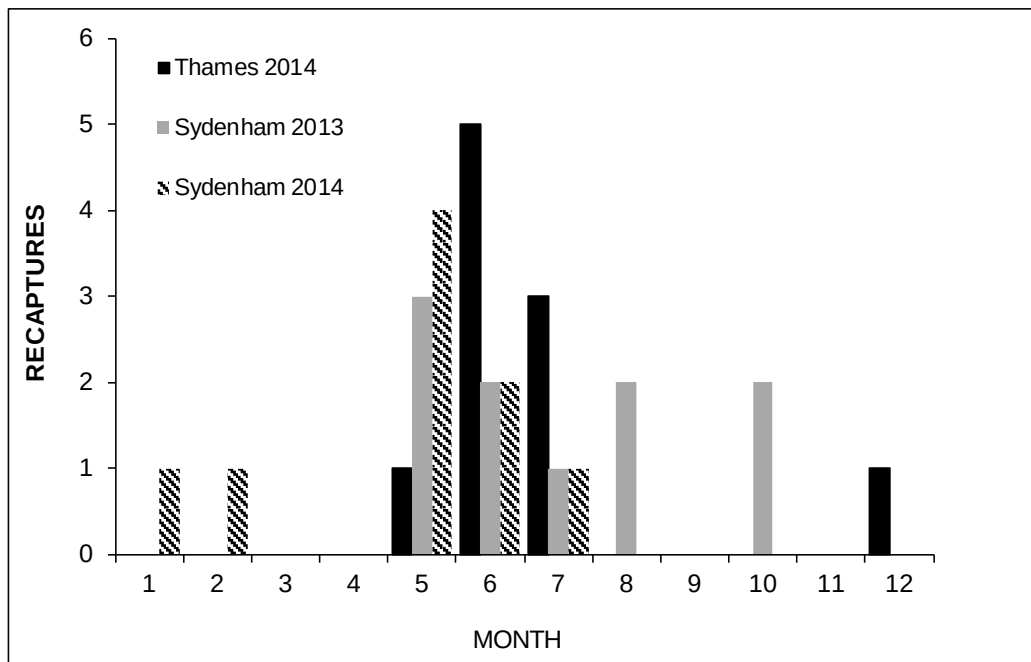


Figure 6.4.4 Monthly recaptures of Walleye in 2013 and 2014 from tags applied in the Thames (2014) and Sydenham (2013) Rivers.

APPENDIX A **Operational Field and Lab Schedule 2014**

Field and Lab Projects	Dates	Species Assessed, Monitored, or Stocked	Project Lead	Location	Funding Source
Thames River Walleye Tagging	Mar-Apr	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	Multiple Species	Belore	Wheatley	SPA
Yellow Perch Tagging	May	Yellow Perch	Cook	Wheatley	SPA
Sturgeon Tagging	May, Sept	Lake Sturgeon	Drouin	Wheatley	COA
Lake Erie Limnology	May-Oct	Limnology	MacDougall	Wheatley	SPA
Lake St. Clair Limnology	May-Sept	Limnology	Soper	Wheatley	SPA
Asian Carp eDNA Monitoring	May-Jul	Asian Carp	Belore	Wheatley	COA
Lake St. Clair YOY Index	Jun-Jul	Multiple Species	Soper	Wheatley	SPA
Bycatch Monitoring	Jun-Dec	Multiple Species	Soper	Wheatley	COA/CRF
Lake Erie Aerial Creel	Jun-Aug	Multiple Species	Marklevitz	Wheatley	COA
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
Lake St. Clair Fall Index	Sept-Nov	Multiple Species	Cook	Wheatley	SPA/CRF
Age and Growth	Continuous	Multiple Species	Belore	Wheatley	SPA
Lake Erie Limnology	May-Oct	Chlorophyll, Zooplankton	Multiple	Wheatley	SPA
Long Point Bay Roving Creel Survey	Jun-July	Multiple Species	MacDougall	Pt. Dover	SPA
Contaminant Sampling- LPB & Eastern Basin	Apr-Nov	Multiple Species	Multiple	Pt. Dover	SPA
Long Point Bay Temperature Loggers	Mar-Oct	Water temps - L. P. Bay, Pt. Dover Intake, 2 Gas Wells	Greenwood	Pt. Dover	SPA
Grand River Walleye Tagging	April	Walleye	Witzel	Pt. Dover	SPA
Lake Trout Stocking	April	Lake Trout	MacDougall	Pt. Dover	SPA/COA/GLFC
Lake Trout Gill Netting	Oct-Nov	Lake Trout	MacDougall	Pt. Dover	SPA/COA
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 2014

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Acronyms Reference:

A/ - Acting
C.O.A. – Canada Ontario Agreement
SEP – Summer Experience Program

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