Inland Seas Angler

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Special Report – Lake Erie

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Highlights of the Annual Lake Committee Meetings

Great Lakes Fishery Commission proceedings, Duluth, MN

This third of a series of annual special reports is an extensive summary of the Lake Erie annual Lake Committee. These lake committee reports are from the annual Lake Committee meetings hosted by the Great Lakes Fishery Commission of late March 2013. We encourage reproduction with the appropriate credit to the GLSFC and the agencies involved. Our thanks to the staffs of the GLFC, OMNR, USFWS, NYSDEC and Jeff Tyson, Ohio DNR; for their contributions to these science documents. Thanks also to the Great Lakes Fishery Commission, its staff, Chris Goddard & Marc Gaden, for their efforts in again convening and hosting the Lower Lake Committee meetings in Duluth.

Lake Erie

Index of Reports

Abbreviation	Expansion
CPH	Catch per hectare
CWT	Coded Wire Tag
DFO	Dept of Fisheries and Oceans
LEBS	Lake Erie Biological Station
MDNR	MI Dept of Natural Resources
ODNR	Ohio Dept Natural Resources
OMNR	ON Ministry Natural Resources
OSU	The Ohio State University
USFWS	US Fish and Wildlife Service
WTG	Walleye Task Group
YAO	age 1 and older
YOY	Young of the year (age 0)

Ohio Lake Erie Regulations, through April 2014

The following regulations are currently in effect for Ohio's portion of Lake Erie and its tributaries:

►Daily bag limit for yellow perch is 30 per day through April 30, 2014, in all Ohio waters of Lake Erie

►A 15" minimum size limit for walleye

►Walleye daily bag limit 6 fish per angler per day May 1, 2013 - February 28, 2014, then returning to a daily bag limit of 4 walleye per angler March 1-April 30, 2014, and March 1-April 30, 2014

►No harvest of smallmouth bass from May 1 until the last Saturday in June, after which a 14" minimum size limit and

daily bag of 5 bass (smallmouth + largemouth bass) is in effect on Lake Erie
►Steelhead and salmon (aggregate) daily bag limit of 5 May 16 - August 31, with the daily bag limit reduced to 2 in the aggregate during Sept. 1 - May 15. There is a 12" minimum size limit on trout and salmon
►Muskellunge bag limit 1 per day effective July 1, 2008
►Filleted fish rule changes: if you are filleting your catch away from home, you are reminded that a new rule states that you must keep the skin on the fillet, and they must be transported in a way that they can be easily identified and counted.
►Report the catch of a tagged fish here ✧

2013 Walleye and Yellow Perch Catch Levels recommended for Lake Erie

Recommended allowable walleye and yellow perch harvest to remain relatively stable in 2013

NIAGARA FALLS, NY – Fishery managers from Michigan, New York, Ohio, Ontario, and Pennsylvania, meeting as the Lake Erie Committee, recommended a 2013 total allowable catch (TAC) of 3.356 million walleye and 12.237 million pounds of yellow perch (see footnote). These recommended harvest levels represent a decrease in allowable walleye and yellow perch harvest for 2013 and reflect that fish hatches in recent years have been weak. These TAC recommendations were produced after extensive lakewide biological assessments, analysis, discussions, and consultations with stakeholders. The primary mechanism to discuss walleye and yellow perch management in Lake Erie is called the Lake Erie Percid Management Advisory Group, or LEPMAG. Through this process, stakeholder input directly informs the development of harvest strategies. This structured stakeholder engagement reflects the committee's interest in involving the fishing community in discussions related to management of the lake's walleye and yellow perch fisheries.

The Lake Erie Committee recommends establishing TACs at levels consistent with Lake Erie's biological conditions while also providing commercial and recreational fishers with a level of stability, as informed through LEPMAG discussions. However, as reported in previous years, the committee remains concerned about changing environmental conditions in Lake Erie and the potential for future production, particularly in western Lake Erie.

Walleye

Using an interim harvest policy developed through the LEPMAG process, the Lake Erie Committee recommended a 2013 walleye TAC of 3.356 million fish, compared to the TAC of 3.487 million fish in 2012. In 2013 it is anticipated that the 2010 year class will be the major contributor to the fishery, along with moderate contributions from other year classes including the exceptional 2003 cohort. Due to a series of poor year classes, the population in 2014 is expected to decline, potentially leading to lower TACs in future years as the fish from the strong year classes age and the total size of the walleye stock decreases. The decreased TAC recommendation for 2013 reflects the committee's goal to manage the lakewide fish stocks sustainably, recognizing stakeholder input.

The TAC is recommended by the Lake Erie Committee and is allocated to Ohio, Michigan and Ontario by an area-based sharing formula of walleye habitat within each jurisdiction in the western and central basins of the lake. Under a 2013 TAC of 3.356 million fish, Ohio will be entitled to 1.715 million fish, Ontario 1.445 million fish, and Michigan 0.196 million fish. The majority of harvest comes from the west end of Lake Erie and, as such, the walleye fisheries of eastern Lake Erie remain outside the quota management area. Harvest limits in that area are established separately by Ontario, Pennsylvania, and New York.

The recommended TAC is based on updated walleye abundance estimates (incorporating suggestions from LEPMAG) from the Walleye Task Group, comprising scientists and field biologists from Ontario and the Great Lakes states who work together to share data and reach consensus on biological conditions. Senior fishery managers consider the biological condition and socioeconomic factors in determining a TAC recommendation. Each jurisdiction is responsible for implementing the TAC.

Yellow Perch

The Lake Erie Committee recommended a 2013 binational TAC of 12.237 million pounds of yellow perch, a 10% decrease from last year's allocation of 13.637 million pounds. The Yellow Perch Task Group, made up of biologists from all jurisdictions on the lake, estimated yellow perch abundances in Lake Erie and reported to the Lake Erie Committee. As the Lake Erie Committee deliberated on the yellow perch TAC, it considered that harvestable stocks are lower than last year; the TAC for 2013 reflects the committee's consideration of the importance of relative stability of harvest.

The five jurisdictions on the lake divide Lake Erie's allocation of yellow perch based on formulas by management unit. Under the 2013 TAC recommendation, Ontario will receive 5.969 million pounds, Ohio 4.896 million pounds, Michigan 0.164 million pounds, New York 0.259 million pounds, and Pennsylvania 0.949 million pounds. ✧

Walleye Task Group Report, 2013 (LEC)

2012 Fishery Review

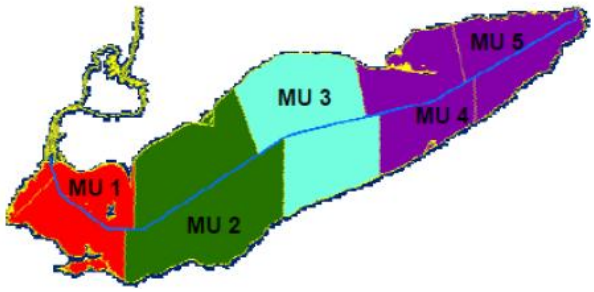


Fig 1-Lake Erie walleye management units

The total allowable catch (TAC) in quota area waters of the west and central basins for 2012 was 3.487 million fish. This allocation represented a 19% increase from the 2011 TAC of 2.919 million fish. In the TAC area, the total harvest was 2.364 million fish, or 68% of the quota (**Table 1**). Harvest in the non-TAC area of the eastern basin amounted to 110,031 fish. Lake-wide walleye harvest was estimated at 2.474 million fish for 2012. Sport fishery (1.138 million fish) and commercial fishery (1.338 million fish) harvest levels reported for 2012 were both below the long-term (1975-2011) means (2.407 and 2.083 million fish, respectively).

in number of fish	TAC Area (MU-1, MU-2, MU-3)				Non-TAC Area (MU-4 & MU-5)				All Areas
	Michigan	Ohio	Ontario	Total	NY	Penn.	Ontario	Total	Total
TAC	203,292	1,782,206	1,501,502	3,487,000	-	-	-	-	3,487,000
TAC % Share	5.83%	51.11%	43.06%	100.00%	-	-	-	-	100.00%
Harvest	86,658	921,390	1,355,522	2,363,570	36,975	44,796	28,260	110,031	2,473,601

Table 1- Summary of walleye harvest by jurisdiction in Lake Erie, 2012

Total commercial walleye fishery effort increased in 2012 compared to 2011 **(Table 2**). Commercial gill net effort in MUs 1, 2, and 3 increased (77%, 32% and 46% respectively), but declined in MUs 4&5 (28%). The total commercial effort of 9,804 km fished 49% below the long-term average (19,235 km). Commercial effort was greatest in the west basin, declining eastward in the lake. Sport fishery effort in 2012 increased relative to 2011 by 47% in Michigan waters, and by 49% and 62% in Ohio waters of MU1 and MU2, respectively (**Table 3**). Sport effort in the Ohio waters of MU3 declined by 16% compared to 2011. Sport effort increased in Pennsylvania (3%) and New York (17%) waters of MUs 4&5 (**Table 3).** The walleye sport effort in 2012 (2.597 million angler hours) represented 48% of the long-term average.

	Unit 1	Unit 2	Unit 3	Units 4 & 5
Effort (km)	4,674	2,480	2,298	352
change from 2011	77%	32%	46%	-28%

Table 2-Ontario walleye gillnet effort in 2012.

	Unit 1 - MI	Unit 1 - OH	Unit 2 - OH	Unit 3 - OH	Units 4&5- PA	Units 4&5- NY
Effort (1000s hrs)	242	1,283	560	182	160	169
change from 2011	47%	49%	62%	-16%	3%	17%

Table 3- Summary of sport fishery effort reported in thousands of hours for 2012.

Lake-wide catch rates in 2012 increased for the sport fishery (fish per hour) and declined for the commercial fishery (fish per kilometer of net fished). The 2012 catch rates in the sport fishery (0.42) were slightly below the long-term average but above the long-term average for the commercial fishery. Compared to 2011, the 2012 sport catch rates by MU increased by 67% in MU1, 40% in MU2, 24% in MU3 and 46% in MUs 4&5. Gill net catch rates decreased by 36%, 17%, and 28% in MU1, MU2, and MU3, respectively, and increased 36% in MU4 during 2012. Age distribution of fish in the harvest was dominated by walleye age 7-and-older (including the 2003 year class); lake-wide, they comprised 35% of the commercial fishery and sport fishery. The 2010 (age 2) and 2009 (age 3) year classes each represented 19% of the total harvest in 2012. Age 5 (2007 year class) fish contributed 16% to the total lake-wide harvest.

Catch-at-Age Analysis & Recruitment for 2013 and 2014

The WTG evaluated the suggested model changes and after reaching consensus, used these changes to the SCAA model (hereafter referred to as the integrated SCAA model) to estimate the abundance of walleye in the west and central basins (MUs 1 through 3) of Lake Erie in 2013. Based on the 2013 integrated SCAA model, the 2012 west-central population estimate was 22.183 million age 2 and older walleye **(Fig 3).** The estimated number of age 2 fish originating from the 2010 year class in 2012 was 9.097 million fish and represented 41% of the walleye (age 2 and older) in the population. The second most abundant age group (20%) was walleye age 7 and older, followed by age 5 and age 3 fish, 15 and 15%, respectively. Using the integrated SCAA model, the number of age 2 recruits entering the population in 2013 (2011 year-class) and 2014 (2012 year-class) will be 3.469 and 3.433 million walleye, respectively.

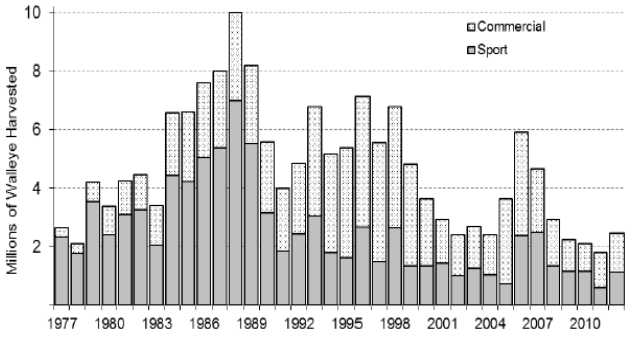


Fig 2-Lake-wide harvest of Lake Erie walleye by sport and commercial fisheries, 1977-2012.

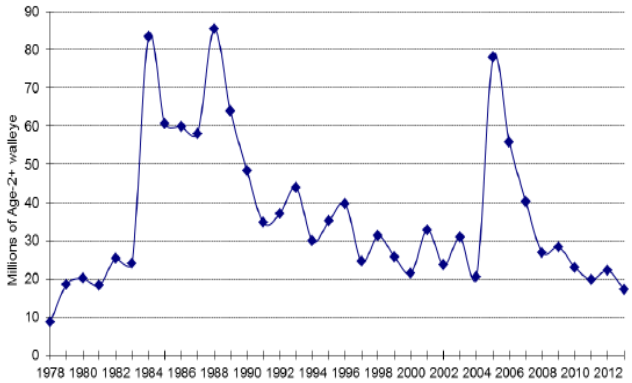


Fig 3 - Population estimate of Lake Erie walleye ages 2 and older from 1978-2012, and projection for 2013 from the integrated SCAA model

2013 Population Abundance

Using the 2013 integrated SCAA model, the projected abundance of walleye in the west-central population is 17.736 million walleye **(Table 4**). The most abundant (35%) year-class in the population is projected to be age 3 walleye from the 2010 cohort (6.274 million fish). Additionally, fish originating from the 2011 (age 2) and 2003 (age 7 and older) year-classes are expected to comprise substantial proportions of the population, 19% and 15%, respectively. Age 3 and older fish are expected to account for 80% of the 2013 population size. The spawning stock biomass (SSB) projected for 2013 is 21.700 million kilograms.

2013 Harvest Strategy and Recommended Allowable Harvest (RAH)

As a result of the LEPMAG meetings held during 2012, an interim harvest policy was used to calculate the 2013 recommended allowable harvest (RAH). The harvest policy utilizes reference points including a targeted fishing rate based on 60% of the fishing rate at maximum sustainable yield and a limit reference point of 20% of the unfished spawning stock biomass. For a complete description of the LEPMAG process and the harvest policy used to calculate the RAH for 2013, please refer to the complete version of the 2013 Walleye Task Group report. Using results from the 2013 integrated SCAA model, the harvest policy adopted for 2013, and selectivity values from the current fisheries, a mean RAH of 2.887 million fish was calculated for 2013 with a range of 2.419 to 3.356 million fish (**Table 4).**

Year		TAC Area (MU-1, MU-2, MU-3) Michigan	Ohio	Ontario [a]	Total	Non-TAC Area (MUs 4&5) NY	Penn.	Ontario	Total	All Areas Total
1980	TAC	261,700	1,558,600	1,154,100	2,974,400				0	2,974,400
	Har	**183,140**	**2,169,800**	**1,049,269**	**3,402,209**				**0**	**3,402,209**
1981	TAC	367,400	2,187,900	1,620,000	4,175,300				0	4,175,300
	Har	**95,147**	**2,942,900**	**1,229,017**	**4,267,064**				**0**	**4,267,064**
1982	TAC	504,100	3,001,700	2,222,700	5,728,500				0	5,728,500
	Har	**194,407**	**3,015,400**	**1,260,852**	**4,470,659**				**0**	**4,470,659**
1983	TAC	572,000	3,406,000	2,522,000	6,500,000				0	6,500,000
	Har	**145,847**	**1,864,200**	**1,416,101**	**3,426,148**				**0**	**3,426,148**
1984	TAC	676,500	4,028,400	2,982,900	7,687,800				0	7,687,800
	Har	**351,169**	**4,055,000**	**2,178,409**	**6,584,578**				**0**	**6,584,578**
1985	TAC	430,700	2,564,400	1,898,800	4,893,900				0	4,893,900
	Har	**460,933**	**3,730,100**	**2,435,627**	**6,626,660**				**0**	**6,626,660**
1986	TAC	660,000	3,930,000	2,910,000	7,500,000				0	7,500,000
	Har	**605,600**	**4,399,400**	**2,617,507**	**7,622,507**				**0**	**7,622,507**
1987	TAC	490,100	2,918,500	2,161,100	5,569,700				0	5,569,700
	Har	**902,500**	**4,433,600**	**2,688,558**	**8,024,658**				**0**	**8,024,658**
1988	TAC	397,500	3,855,000	3,247,500	7,500,000				0	7,500,000
	Har	**1,996,788**	**4,890,367**	**3,054,402**	**9,941,557**	**85,282**			**85,282**	**10,026,839**
1989	TAC	383,000	3,710,000	3,125,000	7,218,000				0	7,218,000
	Har	**1,091,641**	**4,191,711**	**2,793,051**	**8,076,403**	**129,226**			**129,226**	**8,205,629**
1990	TAC	616,000	3,475,500	2,908,500	7,000,000				0	7,000,000
	Har	**747,128**	**2,282,520**	**2,517,922**	**5,547,570**	**47,443**			**47,443**	**5,595,013**
1991	TAC	440,000	2,485,000	2,075,000	5,000,000				0	5,000,000
	Har	**132,118**	**1,577,813**	**2,266,380**	**3,976,311**	**34,137**			**34,137**	**4,010,448**
1992	TAC	329,000	3,187,000	2,685,000	6,201,000				0	6,201,000
	Har	**249,518**	**2,081,919**	**2,497,705**	**4,829,142**	**14,384**			**14,384**	**4,843,526**
1993	TAC	556,500	5,397,000	4,546,500	10,500,000				0	10,500,000
	Har	**270,376**	**2,668,684**	**3,821,386**	**6,760,446**	**40,032**			**40,032**	**6,800,478**
1994	TAC	400,000	4,100,000	3,500,000	8,000,000				0	8,000,000
	Har	**216,038**	**1,468,739**	**3,431,119**	**5,115,896**	**59,345**			**59,345**	**5,175,241**
1995	TAC	477,000	4,626,000	3,897,000	9,000,000				0	9,000,000
	Har	**107,909**	**1,435,188**	**3,813,527**	**5,356,624**	**26,964**			**26,964**	**5,383,588**
1996	TAC	583,000	5,654,000	4,763,000	11,000,000				0	11,000,000
	Har	**174,607**	**2,316,425**	**4,524,639**	**7,015,671**	**38,728**	**89,087**		**127,815**	**7,143,486**
1997	TAC	514,000	4,986,000	4,200,000	9,700,000				0	9,700,000
	Har	**122,400**	**1,248,846**	**4,072,779**	**5,444,025**	**29,395**	**88,682**		**118,077**	**5,562,102**
1998	TAC	546,000	5,294,000	4,460,000	10,300,000				0	10,300,000
	Har	**114,606**	**2,303,911**	**4,173,042**	**6,591,559**	**34,090**	**124,814**	**47,000**	**205,904**	**6,797,463**
1999	TAC	477,000	4,626,000	3,897,000	9,000,000				0	9,000,000
	Har	**140,269**	**1,033,733**	**3,454,250**	**4,628,252**	**23,133**	**89,038**	**87,000**	**199,171**	**4,827,423**
2000	TAC	408,100	3,957,800	3,334,100	7,700,000				0	7,700,000
	Har	**252,280**	**932,297**	**2,287,533**	**3,472,110**	**28,599**	**77,512**	**67,000**	**173,111**	**3,645,221**
2001	TAC	180,200	1,747,600	1,472,200	3,400,000				0	3,400,000
	Har	**159,186**	**1,157,914**	**1,498,816**	**2,815,916**	**14,669**	**52,796**	**39,498**	**106,963**	**2,922,879**
2002	TAC	180,200	1,747,600	1,472,200	3,400,000				0	3,400,000
	Har	**193,515**	**703,000**	**1,436,000**	**2,332,515**	**18,377**	**22,000**	**36,000**	**76,377**	**2,408,892**
2003	TAC	180,200	1,747,600	1,472,200	3,400,000				0	3,400,000
	Har	**128,852**	**1,014,688**	**1,457,014**	**2,600,554**	**27,480**	**43,581**	**32,692**	**103,753**	**2,704,307**
2004	TAC	127,200	1,233,600	1,039,200	2,400,000				0	2,400,000
	Har	**114,958**	**859,366**	**1,419,237**	**2,393,561**	**8,400**	**19,969**	**29,864**	**58,233**	**2,451,794**
2005	TAC	308,195	2,988,910	2,517,895	5,815,000				0	5,815,000
	Har	**37,599**	**610,449**	**2,933,393**	**3,581,441**	**27,370**	**20,316**	**17,394**	**65,080**	**3,646,521**
2006	TAC	523,958	5,081,404	4,280,638	9,886,000				0	9,886,000
	Har	**305,548**	**1,868,520**	**3,494,551**	**5,668,619**	**37,161**	**151,614**	**68,774**	**257,549**	**5,926,168**
2007	TAC	284,080	2,755,040	2,320,880	5,360,000				0	5,360,000
	Har	**165,551**	**2,160,459**	**2,159,965**	**4,485,975**	**29,134**	**116,671**	**37,566**	**183,371**	**4,669,346**
2008	TAC	209,530	1,836,893	1,547,576	3,594,000				0	3,594,000
	Har	**121,072**	**1,082,636**	**1,574,723**	**2,778,431**	**29,017**	**74,250**	**34,906**	**138,173**	**2,916,604**
2009	TAC	142,835	1,252,195	1,054,970	2,450,000				0	2,450,000
	Har	**94,048**	**967,476**	**1,095,500**	**2,157,024**	**13,727**	**42,422**	**27,725**	**83,874**	**2,240,898**
2010	TAC	128,260	1,124,420	947,320	2,200,000				0	2,200,000
	Har	**55,248**	**958,366**	**983,397**	**1,997,011**	**36,683**	**54,056**	**23,324**	**114,063**	**2,111,074**
2011	Tac	170,178	1,491,901	1,256,921	2,919,000				0	2,919,000
	Har	**50,490**	**417,314**	**1,224,057**	**1,691,861**	**31,506**	**45,369**	**28,873**	**105,748**	**1,797,609**
2012	Tac	203,292	1,782,206	1,501,502	3,487,000				0	3,487,000
	Har	**86,658**	**921,390**	**1,355,522**	**2,363,570**	**36,975**	**44,796**	**28,260**	**110,031**	**2,473,601**

Table 4 -Annual Lake Erie walleye total allowable catch (TAC, top) and measured harvest (bottom, bold), 1980 2012

	Sport Fishery														Commercial Fishery					
	Unit 1				Unit 2			Unit 3			Units 4 & 5					Unit 1	Unit 2	Unit 3	Unit 4		Grand
Year	OH	MI	ON[a]	Total	OH	ON[a]	Total	OH	ON[a]	Total	ON[a]	PA	NY	Total	Total	ON	ON	ON	ON	Total	Total
1975	77	4	7	88	10	--	10	--	--	--	--	--	--	0	98	--	--	--	--	0	98
1976	605	30	50	685	35	--	35	--	--	--	--	--	--	0	720	113	44	--	--	157	877
1977	2,131	107	69	2,307	37	--	37	--	--	--	--	--	--	0	2,344	235	67	--	--	302	2,645
1978	1,550	72	112	1,734	37	--	37	--	--	--	--	--	--	0	1,771	274	60	--	--	334	2,106
1979	3,254	162	79	3,495	60	--	60	--	--	--	--	--	--	0	3,555	625	30	--	--	655	4,211
1980	2,096	183	57	2,336	49	--	49	24	--	24	--	--	--	0	2,409	953	40	--	--	993	3,402
1981	2,857	95	70	3,022	38	--	38	48	--	48	--	--	--	0	3,108	1,037	119	3	--	1,159	4,268
1982	2,959	194	49	3,202	49	--	49	8	--	8	--	--	--	0	3,259	1,077	134	2	--	1,213	4,470
1983	1,626	146	41	1,813	212	--	212	26	--	26	--	--	--	0	2,051	1,129	167	80	--	1,376	3,427
1984	3,089	351	39	3,479	787	--	787	179	--	179	--	--	--	0	4,445	1,639	392	108	--	2,139	6,584
1985	3,347	461	57	3,865	294	--	294	89	--	89	--	--	--	0	4,248	1,721	432	225	--	2,378	6,627
1986	3,743	606	52	4,401	480	--	480	176	--	176	--	--	--	0	5,057	1,651	558	356	--	2,565	7,622
1987	3,751	902	51	4,704	550	--	550	132	--	132	--	--	--	0	5,386	1,611	622	405	--	2,638	8,024
1988	3,744	1,997	18	5,759	584	--	584	562	--	562	--	--	85	85	6,990	1,866	762	409	--	3,037	10,026
1989	2,891	1,092	14	3,997	867	35	902	434	80	514	--	--	129	129	5,542	1,656	621	386	--	2,663	8,206
1990	1,467	747	35	2,249	389	14	403	426	23	449	--	--	47	47	3,148	1,615	529	302	--	2,446	5,595
1991	1,104	132	39	1,275	216	24	240	258	44	302	--	--	34	34	1,851	1,446	440	274	--	2,160	4,011
1992	1,479	250	20	1,749	338	56	394	265	25	290	--	--	14	14	2,447	1,547	534	316	--	2,397	4,844
1993	1,846	270	37	2,153	450	26	476	372	12	384	--	--	40	40	3,053	2,488	762	496	--	3,746	6,800
1994	992	216	21	1,229	291	20	311	186	21	207	--	--	59	59	1,806	2,307	630	432	--	3,369	5,176
1995	1,161	108	32	1,301	159	7	166	115	27	141	--	--	27	27	1,635	2,578	681	489	--	3,748	5,384
1996	1,442	175	17	1,634	645	8	653	229	27	256	--	89	39	128	2,671	2,777	1,107	589	--	4,473	7,143
1997	929	122	8	1,059	188	2	190	132	5	138	--	89	29	118	1,505	2,585	928	544	--	4,057	5,563
1998	1,790	115	34	1,939	215	5	220	299	5	304	19	125	34	178	2,641	2,497	1,166	462	28	4,153	6,793
1999	812	140	34	986	139	5	144	83	5	88	19	89	23	131	1,349	2,461	631	317	68	3,477	4,827
2000	674	252	34	961	165	5	170	93	5	98	19	78	29	125	1,354	1,603	444	196	48	2,291	3,645
2001	941	160	34	1,135	171	5	176	46	5	51	19	53	15	87	1,449	1,004	310	141	20	1,475	2,924
2002	516	194	34	744	141	5	146	46	5	51	19	22	18	59	1,000	937	309	146	17	1,409	2,409
2003	715	129	34	878	232	5	237	68	5	73	2	44	27	73	1,261	948	283	182	14	1,427	2,688
2004	515	115	34	664	272	2	274	72	0	72	2	20	8	30	1,040	866	334	175	11	1,386	2,426
2005	374	38	27	438	110	2	112	126	0	126	2	20	27	49	725	1,878	625	401	15	2,920	3,645
2006	1,194	306	27	1,526	503	2	505	170	0	170	2	152	37	191	2,392	2,137	784	545	66	3,532	5,924
2007	1,414	166	27	1,607	578	2	580	169	0	169	2	116	29	147	2,502	1,348	450	333	35	2,167	4,669
2008	524	121	44	689	333	2	335	225	0	225	2	74	29	105	1,354	954	335	241	35	1,565	2,919
2009	553	94	44	691	287	2	289	128	0	128	2	42	14	58	1,166	705	212	135	28	1,079	2,244
2010	587	55	44	686	257	2	259	114	0	114	2	54	37	93	1,152	607	184	147	23	962	2,115
2011	224	50	44	318	104	2	106	89	0	89	2	45	32	79	593	736	262	181	29	1,208	1,801
2012	596	87	44	726	233	2	235	93	0	93	2	45	37	84	1,138	834	285	191	28	1,338	2,476
Mean	1,594	280	40	1,913	278	10	284	168	13	178	8	69	36	56	2,407	1,434	444	291	31	2,083	4,490

Table 5-Annual harvest (thousands of fish) of Lake Erie walleye by gear, management unit, and agency; Means contain data from 1975 to 2011

http://www.glfc.org/lakecom/lec/WTG_docs/annual_reports/WTG_report_2013.pdf ✧

Yellow Perch Task Group Report, 2013 (LEC)

2012 Fisheries Review

The lakewide yellow perch total allowable catch (TAC) in 2012 was 13.637 million pounds. This allocation represented a 7.8% increase from a TAC of 12.650 million lbs in 2011. For yellow perch assessment and allocation, Lake Erie is partitioned into four management units (Units, or MUs; **Fig 1**). The 2012 allocation was 1.800, 4.000, 7.000, and 0.837 million pounds for Units 1 through 4, respectively. The lakewide harvest of yellow perch in 2012 was 10.786 million pounds, or 79.0% of the total 2012 TAC.

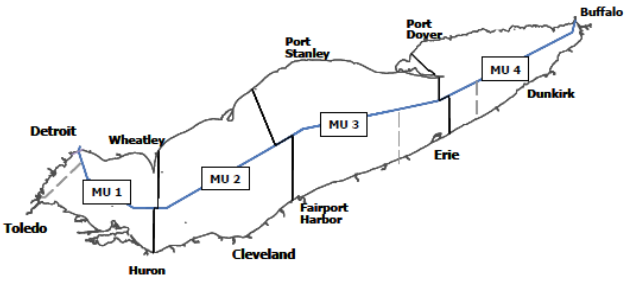


Fig 1-Yellow Perch Management Units (MUs) of Lake Erie

This was a 12.1% increase from the 2011 harvest of 9.620 million pounds. Harvest by Management Units 1 through 4 was 1.729, 3.729, 4.677, and 0.651 million pounds, respectively (Table 1). The portion of TAC harvested was 96.1%, 93.2%, 66.8%, and 77.7%, in MUs 1 through 4, respectively. In 2012, Ontario harvested 6.901 million pounds, followed by Ohio (3.482 million lbs.), Pennsylvania (203 thousand lbs.), New York (106 thousand lbs.), and Michigan (93 thousand lbs.).

MU	Harvest by jurisdiction (lbs)								Total (lbs)
	Michigan	Ontario	Ohio		Pennsylvania		New York		
	sport	all commercial*	sport	commercial trap net	sport	commercial trap net	sport	commercial trap net	
1	93,291	752,872	883,245	0					1,729,408
2		1,877,615	566,510	1,285,336					3,729,461
3		3,768,183	277,598	469,401	146,346	15,405			4,676,933
4		502,778			41,362	0	88,790	17,709	650,639
Total	93,291	6,901,448	1,727,353	1,754,737	187,708	15,405	88,790	17,709	10,786,441

Table 1-Lake Erie yellow perch harvest by jurisdiction and gear type for 2012.

Targeted gill net effort in Ontario waters in 2012 increased 9.5% in MU2, 28.8% in MU3, and 13.2% in MU4, but decreased 12.7%in MU1 from 2011. U.S. angling effort increased in 2012 from 2011 in MU1 (17.9%), MU2 (15.4%), and MU4 (9.3%), but decreased in MU3 (8.7%). U.S. trap net effort (lifts) in 2012 increased in MU2 (21.2%), MU3 (88.7%), and MU4 (11.7%) compared to 2011. There was no trap net effort in MU1 in 2012. Fishing effort by jurisdiction and gear type is presented in **Table 2**.

MU	Effort by jurisdiction							
	Michigan	Ontario	Ohio		Pennsylvania		New York	
	sport (angler hours)	commercial (km gill net)*	sport (angler hours)	commercial (trap net lifts)	sport (angler hours)	commercial (trap net lifts)	sport (angler hours)	commercial (trap net lifts)
1	128,013	2,244	896,083	0				
2		4,616	456,404	6,919				
3		7,847	154,474	2,074	98,234	87		
4		1,770			49,577	0	58,621	428
Total	128,013	16,477	1,506,961	8,993	147,811	87	58,621	428

Table 2-Lake Erie yellow perch fishing effort by jurisdiction and gear type for 2012

Catch-at-Age Analysis and Recruitment Estimate for 2013

Population size for 1975 to 2012 for each Management Unit was estimated by statistical catch-at-age analysis (SCAA) using modeling software Auto Differentiation Model Builder (ADMB). Stock size estimates for 2013 (ages 3 and older) were projected from catch-at-age analysis estimates of 2012 population size and age-specific survival rates in 2012. Age-2 yellow perch recruitment in 2013 was predicted by robust regression of juvenile yellow perch survey indices against catch-at-age analysis estimates of two-year-old abundance within each management unit.

Projected age-2 yellow perch recruitment from the 2011 year class was incorporated into the 2013 population estimate for age-3 and older fish in each Unit, producing the total standing stock of age-2-and-older fish in 2013 **(Table 3).** Abundance estimates of age-2-and-older yellow perch in 2013 are projected to decrease by 20.6%, 23.3%, 17.4%, and 19.0% in MUs 1 through 4 respectively compared to the 2012 abundance estimates. Age-2-and-older yellow perch abundance in 2013 is projected to be 23.3, 45.3, 56.9, and 20.6 million fish in Units 1 through 4, respectively **(Table 3)**. Using mean weight-at-age information from assessment surveys, in 2013 biomass estimates are projected to decline

in MU1 (9.8%), MU2 (17.9%), MU3 (14.7%), and MU4 (5.3%) compared to 2012.

Recommended Allowable Harvest (RAH) for 2013

Standard errors and ranges for population estimates were calculated for each age in 2012, and following estimated survival from catch-at-age, for 2013. RAH *min*, *mean*, and *max* values are based on mean population estimates minus or plus one standard deviation. Proposed target fishing rates for RAHs in 2013 are the same as 2012, and RAH ranges are presented in **Table 3** for Management Units 1 through 4.

MU	Fishing Rate	Recommended Allowable Harvest (millions lbs.)		
		MIN	MEAN	MAX
1	0.670	0.820	1.570	2.391
2	0.670	2.275	3.711	5.279
3	0.700	2.403	4.053	5.813
4	0.300	0.345	0.789	1.248
Total		5.842	10.122	14.731

Table 4-Lake Erie yellow perch fishing rates and RAH (in millions of pounds)

Table 3-Projection of the 2013 Lake Erie yellow perch population

MU	Age	2012 Mean Stock Size (millions fish)	Fishing Mortality (F)	Survival Rate (S)	2013 Mean Stock Size (millions fish)	Mean Weight in Population (kg)	Stock Biomass		
							2012 (millions kgs)	2013 (millions kgs)	2013 (millions lbs)
1	2	13.420	0.071	0.624	7.313	0.065	0.899	0.475	1.048
	3	5.883	0.268	0.513	8.379	0.100	0.553	0.838	1.848
	4	4.873	0.363	0.466	3.016	0.141	0.624	0.425	0.938
	5	3.813	0.407	0.446	2.272	0.168	0.618	0.382	0.842
	6+	1.282	0.409	0.445	2.272	0.251	0.291	0.570	1.257
	Total	*29.270*	*0.208*	*0.545*	*23.253*	*0.116*	*2.985*	*2.691*	*5.933*
2	2	17.786	0.074	0.623	13.178	0.074	1.476	0.975	2.150
	3	5.154	0.135	0.586	11.072	0.121	0.618	1.340	2.954
	4	18.329	0.297	0.498	3.018	0.153	2.768	0.462	1.018
	5	11.292	0.295	0.499	9.129	0.197	2.033	1.798	3.966
	6+	6.459	0.291	0.501	8.872	0.269	1.582	2.387	5.262
	Total	*59.020*	*0.209*	*0.544*	*45.269*	*0.154*	*8.477*	*6.962*	*15.351*
3	2	20.592	0.061	0.631	18.812	0.054	1.297	1.016	2.240
	3	2.095	0.148	0.578	12.986	0.108	0.247	1.402	3.093
	4	19.840	0.262	0.516	1.211	0.139	2.718	0.168	0.371
	5	11.017	0.267	0.513	10.234	0.182	1.796	1.863	4.107
	6+	15.387	0.252	0.521	13.671	0.260	3.324	3.554	7.838
	Total	*68.931*	*0.193*	*0.553*	*56.914*	*0.141*	*9.382*	*8.004*	*17.648*
4	2	12.631	0.036	0.647	4.973	0.096	1.099	0.477	1.053
	3	0.933	0.062	0.630	8.168	0.156	0.127	1.274	2.810
	4	6.130	0.124	0.592	0.588	0.232	1.294	0.136	0.301
	5	2.397	0.158	0.572	3.630	0.272	0.546	0.987	2.177
	6+	3.273	0.183	0.558	3.199	0.333	1.097	1.065	2.349
	Total	*25.365*	*0.087*	*0.614*	*20.557*	*0.192*	*4.162*	*3.941*	*8.689*

Table 5-Lake Erie yellow perch harvest in pounds by management unit (Unit) and agency, 2000-2012

		Ontario*		Ohio		Michigan		Pennsylvania		New York		Total
	Year	Harvest	%	Harvest	%	Harvest	%	Harvest	%	Harvest	%	Harvest
Unit 1	2000	980,323	47	1,038,650	50	67,010	3	--	--	--	--	2,085,983
	2001	813,066	45	915,641	51	70,910	4	--	--	--	--	1,799,617
	2002	1,454,105	50	1,316,553	45	147,065	5	--	--	--	--	2,917,723
	2003	1,179,667	44	1,406,385	53	84,878	3	--	--	--	--	2,670,930
	2004	1,698,761	59	1,090,669	38	94,732	3	--	--	--	--	2,884,162
	2005	1,513,890	60	965,231	38	49,485	2	--	--	--	--	2,528,606
	2006	1,325,464	54	1,055,378	43	62,854	3	--	--	--	--	2,443,696
	2007	727,678	41	982,677	55	62,815	4	--	--	--	--	1,773,170
	2008	580,050	56	409,705	39	47,934	5	--	--	--	--	1,037,689
	2009	853,137	61	463,564	33	87,319	6	--	--	--	--	1,404,020
	2010	879,358	47	889,512	48	83,725	5	--	--	--	--	1,852,595
	2011	870,802	48	796,447	44	145,960	8	--	--	--	--	1,813,209
	2012	752,872	44	883,245	51	93,291	5	--	--	--	--	1,729,408
Unit 2	2000	1,484,125	56	1,169,234	44	--	--	--	--	--	--	2,653,359
	2001	1,794,275	51	1,747,069	49	--	--	--	--	--	--	3,541,344
	2002	2,190,621	52	1,986,730	48	--	--	--	--	--	--	4,177,351
	2003	2,107,639	50	2,113,285	50	--	--	--	--	--	--	4,220,924
	2004	2,051,473	48	2,246,264	52	--	--	--	--	--	--	4,297,737
	2005	2,666,231	59	1,843,190	41	--	--	--	--	--	--	4,509,421
	2006	3,102,269	69	1,393,732	31	--	--	--	--	--	--	4,496,001
	2007	1,847,139	45	2,244,656	55	--	--	--	--	--	--	4,091,795
	2008	1,990,237	50	2,005,000	50	--	--	--	--	--	--	3,995,237
	2009	2,495,611	58	1,801,978	42	--	--	--	--	--	--	4,297,589
	2010	1,888,876	56	1,457,823	44	--	--	--	--	--	--	3,346,699
	2011	1,665,258	54	1,399,503	46	--	--	--	--	--	--	3,064,761
	2012	1,877,615	50	1,851,846	50	--	--	--	--	--	--	3,729,461
Unit 3	2000	771,646	62	443,250	36	--	--	32,613	3	--	--	1,247,509
	2001	999,450	64	464,811	30	--	--	91,211	6	--	--	1,555,472
	2002	1,192,691	60	640,104	32	--	--	140,821	7	--	--	1,973,616
	2003	1,667,133	72	481,558	21	--	--	177,516	8	--	--	2,326,207
	2004	1,453,419	62	659,447	28	--	--	244,063	10	--	--	2,356,929
	2005	1,771,800	75	457,593	19	--	--	142,028	6	--	--	2,371,421
	2006	3,451,499	90	271,144	7	--	--	106,260	3	--	--	3,828,903
	2007	2,997,101	84	391,285	11	--	--	193,065	5	--	--	3,581,451
	2008	2,200,168	74	629,366	21	--	--	155,014	5	--	--	2,984,548
	2009	2,266,727	74	597,214	20	--	--	190,742	6	--	--	3,054,683
	2010	3,370,099	85	476,808	12	--	--	117,640	3	--	--	3,964,547
	2011	3,366,412	81	636,686	15	--	--	153,233	4	--	--	4,156,331
	2012	3,768,183	81	746,999	16	--	--	161,751	3	--	--	4,676,933
Unit 4	2000	35,686	73	--	--	--	--	10,950	22	2,458	5	49,094
	2001	35,893	60	--	--	--	--	8,337	14	15,319	26	59,549
	2002	87,541	54	--	--	--	--	46,903	29	26,903	17	161,347
	2003	84,772	60	--	--	--	--	39,821	28	16,511	12	141,104
	2004	98,733	49	--	--	--	--	46,344	23	54,862	27	199,939
	2005	195,347	67	--	--	--	--	42,226	15	53,468	18	291,041
	2006	230,226	69	--	--	--	--	57,005	17	48,107	14	335,338
	2007	185,954	78	--	--	--	--	25,859	11	25,935	11	237,748
	2008	240,270	77	--	--	--	--	31,325	10	40,809	13	312,404
	2009	272,579	72	--	--	--	--	37,991	10	70,030	18	380,600
	2010	467,612	89	--	--	--	--	19,989	4	37,730	7	525,331
	2011	468,001	80	--	--	--	--	37,040	6	80,848	14	585,889
	2012	502,778	77	--	--	--	--	41,362	6	106,499	16	650,639
Lakewide Totals	2000	3,271,780	54	2,651,134	44	67,010	1	43,563	<1	2,458	<1	6,035,945
	2001	3,642,684	52	3,127,521	45	70,910	1	99,548	1	15,319	<1	6,955,982
	2002	4,924,958	53	3,943,387	43	147,065	2	187,724	2	26,903	<1	9,230,037
	2003	5,039,211	54	4,001,228	43	84,878	1	217,337	2	16,511	<1	9,359,165
	2004	5,302,386	54	3,996,380	41	94,732	1	290,407	3	54,862	<1	9,738,767
	2005	6,147,268	63	3,266,014	34	49,485	<1	184,254	2	53,468	<1	9,700,489
	2006	8,109,458	73	2,720,254	24	62,854	<1	163,265	1	48,107	<1	11,103,938
	2007	5,757,872	59	3,618,618	37	62,815	<1	218,924	2	25,935	<1	9,684,164
	2008	5,010,725	60	3,044,071	37	47,934	<1	186,339	2	40,809	<1	8,329,878
	2009	5,888,054	64	2,862,756	31	87,319	1	228,733	3	70,030	1	9,136,892
	2010	6,605,945	68	2,824,143	29	83,725	1	137,629	1	37,730	<1	9,689,172
	2011	6,370,473	66	2,832,636	29	145,960	2	190,273	2	80,848	1	9,620,190
	2012	6,901,448	64	3,482,090	32	93,291	1	203,113	2	106,499	1	10,786,441

Table 6-Estimated 2012 Lake Erie yellow perch harvest by age and numbers of fish by gear and management unit (Unit)

		Unit 1		Unit 2		Unit 3		Unit 4		Lakewide	
Gear	Age	Number	%	Number	%	Number	%	Number	%	Number	%
Gill Nets	1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	2	101,485	4.3	114,458	2.2	99,452	0.9	433,188	31.9	748,583	3.7
	3	182,941	7.8	180,192	3.5	246,279	2.2	57,959	4.3	667,371	3.3
	4	1,179,815	50.0	2,085,526	40.2	3,382,548	30.6	524,881	38.6	7,172,770	35.9
	5	643,360	27.3	1,660,757	32.0	3,458,591	31.3	193,180	14.2	5,955,888	29.8
	6+	250,698	10.6	1,142,324	22.0	3,877,171	35.0	149,069	11.0	5,419,262	27.1
	Total	2,358,299	*39.2*	5,183,257	*49.9*	11,064,040	*82.4*	1,358,277	*82.3*	19,963,874	*63.4*
Trap Nets	1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	2	0	0.0	18,823	0.5	32,348	2.5	0	0.0	51,171	1.0
	3	0	0.0	127,463	3.4	46,904	3.7	856	2.0	175,223	3.4
	4	0	0.0	1,710,098	45.5	499,769	39.0	17,696	41.3	2,227,563	43.8
	5	0	0.0	1,628,930	43.3	546,673	42.6	11,131	26.0	2,186,734	43.0
	6+	0	0.0	277,095	7.4	156,886	12.2	13,129	30.7	447,110	8.8
	Total	0	*0.0*	3,762,409	*36.3*	1,282,580	*9.5*	42,812	*2.6*	5,087,801	*16.2*
Sport	1	9,176	0.3	359	0.0	946	0.1	0	0.0	10,481	0.2
	2	650,474	17.8	70,542	4.9	64,973	6.0	26,428	10.6	812,417	12.6
	3	1,048,093	28.6	220,036	15.4	185,518	17.1	17,629	7.1	1,471,277	22.9
	4	1,117,685	30.5	572,435	39.9	370,061	34.0	107,888	43.2	2,168,069	33.7
	5	726,230	19.8	404,738	28.2	304,368	28.0	43,022	17.2	1,478,358	23.0
	6+	111,125	3.0	165,148	11.5	161,462	14.8	54,499	21.8	492,234	7.7
	Total	3,662,783	*60.8*	1,433,258	*13.8*	1,087,329	*8.1*	249,467	*15.1*	6,432,836	*20.4*
All Gear	1	9,176	0.2	359	0.0	946	0.0	0	0.0	10,481	0.0
	2	751,959	12.5	203,823	2.0	196,772	1.5	459,617	27.8	1,612,171	5.1
	3	1,231,034	20.4	527,691	5.1	478,701	3.6	76,444	4.6	2,313,871	7.3
	4	2,297,500	38.2	4,368,059	42.1	4,252,378	31.7	650,465	39.4	11,568,402	36.7
	5	1,369,590	22.7	3,694,425	35.6	4,309,632	32.1	247,334	15.0	9,620,980	30.6
	6+	361,823	6.0	1,584,567	15.3	4,195,520	31.2	216,697	13.1	6,358,606	20.2
	Total	6,021,082	19.1	10,378,924	33.0	13,433,949	42.7	1,650,556	5.2	31,484,511	100.0

http://www.glfc.org/lakecom/lec/YPTG.htm ✧

Habitat Task Group Report, 2013 (LEC)

Five charges were addressed by the HTG during 2012-2013: (1) Document habitat related projects. Identify and prioritize relevant projects to take advantage of funding opportunities; (2) Support Lake Erie GIS development and deployment; (3) Assist the Coldwater Task Group with the lake trout habitat assessment initiative; (4) With the assistance of the Walleye Task Group, identify metrics related to walleye habitat for the purpose of re-examining the extent of suitable adult walleye habitat in Lake Erie and (5) Develop strategic research direction for Environmental Objectives.

Habitat Project Documentation

Information pertaining to habitat related initiatives taking place throughout the Lake Erie and Lake St. Clair basins is compiled and made available as an interactive "clickable map" which allows for geographic sorting of projects (by watershed or lake basin). You can access the spatial inventory of projects at: www.glfc.org/lakecom/lec/spatial_inventory/inventoryindex.htm

Details of many notable projects can be found in the HTG Full Annual Report. The HTG is also developing a 'wish-list' of potential research and enhancement projects for this charge, which will be integrated into the spatial inventory. The HTG anticipates that organizations looking for opportunities to fund this type of work should find this list useful.

Lake Erie GIS

The Lake Erie GIS has been incorporated into a larger initiative, the Great Lakes Aquatic Habitat Framework (GLAHF). The GLAHF is a GIS database of geo-referenced data for Great Lakes coastal, large rivermouth, and open water habitats. The goal of the GLAHF is to develop a Great Lakes aquatic habitat database and classification framework to integrate and track data from habitat monitoring, assessment, indicator development, ecological forecasting, and restoration activities across the Great Lakes. Data from the Great Lakes GIS is being incorporated into the GLAHF.

In 2012 the updated substrate maps created by HTG was incorporated into GLAHF. The HTG recognizes the need for more regular updates to the lower trophic level and fisheries data components of the GLAHF and will be investigating ways of annually integrating data from LEC member agencies. The current plan is share a data table template with the LEC agencies. The data table template should allow for easy data preparation by agencies and quick incorporation into the GLAHF. Information about GLAHF, and the overall Great Lakes GIS initiative, can be found at: http://ifrgis.snre.umich.edu/projects/GLAHF/glahf.shtml

Identifying Potential Lake Trout Spawning Habitat

In 2012 direct actions related to this past work included: i) using areas identified as having spawning habitat potential to stock fish and ii) conducting gillnet surveys during lake trout spawning period (late fall) to document presence/absence of lake trout; as an indication of attraction to these areas (if not actual successful spawning).

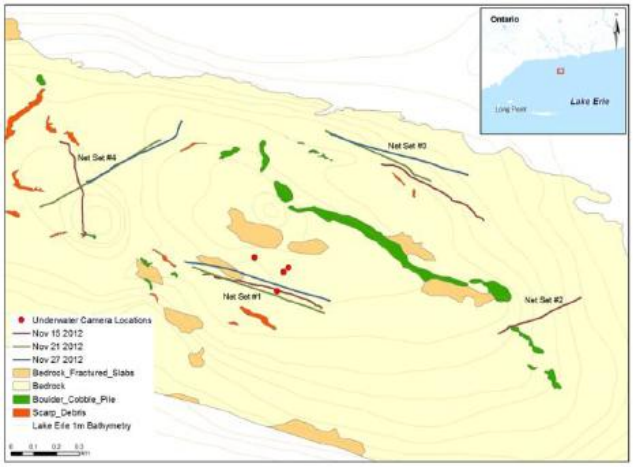


Fig 1-Locations of gillnet sets relative to key substrate and habitat features, during fall lake trout assessments at Nanticoke Shoal, ON, 2012

Nanticoke Shoal, Ontario

Boat stocking of yearling lake trout over Nanticoke Shoal occurred on April 17-19, 2012; representing the 5th consecutive annual stocking event at this location. Gillnetting during late fall, to detect the presence and condition of lake trout during spawning period, occurred for the third consecutive year at Nanticoke Shoal in November 2012. Gillnet locations were chosen based on the location of the cleanest cobble substrate, a shallow ridge that runs NW-SE across the shoal. Four gangs of gillnet were used to "surround" the ridge and fishing took place on three separate occasions (November 15, 21, and 27; **Fig 1)**

Lake trout were caught on the 15th and 21st; the first observations of lake trout since the fall assessment began at this location in 2010. Ten of the twelve lake trout captured were originally stocked at this location between 2008 and 2012. Male and female lake trout were sampled during gillnetting. Continuous underwater video logging which took place concurrent with gillnetting only captured smallmouth bass on camera (< 7 minutes of smallmouth bass occurrences in > 51 hours of surveillance)

18 Mile Creek Shoal, New York

Underwater video surveys revealed a potential high quality lake trout spawning area off Eighteen Mile Creek **(Fig 2).** This nearshore site is relatively large and appears to possess many of the necessary attributes that lake trout need for successful reproduction, including cobble sized rock piles, a substrate relatively clean of silt, and large interstitial spaces. However, it is subject to the strong westerly winds and waves that buffet the area during fall and winter months. Since this site is shallow and closer to the eastern end of the lake, it often becomes ice covered during winter, potentially diminishing some of these effects.

Fig 2-Underwater photo of bottom habitat off 18 Mile Creek in Lake Erie, July 2011

Fall gillnetting in both 2011 and 2012 found that spawning-phase lake trout visited this site, and while the numbers of lake trout caught were not as high as on other nearshore sites sampled in recent years, sampling confirmed that spawning lake trout did find this habitat and were apparently using it despite its distance (25 miles) from the nearest stocking locations. Moreover, the presence of ripe female lake trout indicates that it is a probable spawning area. To date, this site appears to have the best quality habitat for spawning lake trout that we have surveyed in the NY waters of Lake Erie.

Identify metrics related to walleye habitat

The fishery quota for Lake Erie walleye is currently allocated based on a sharing formula (% surface area) that defines walleye habitat as nearshore water (<13m deep) in Michigan, Ohio and Ontario (Management Units 1-3; **Fig 3**).

With the assistance of the Walleye Task Group and lead by researchers at the University of Windsor, we utilized a logistic regression approach to establish the relationships between a variety of abiotic conditions and the probability of occurrence of walleye (presence / absence) from a set of fishery and environmental variable linked datasets (Ontario Partnership Index Gillnet). Consistent with the literature, the probability of encountering walleye increased in shallower,

warmer and more turbid waters. In general, the west basin had more suitable habitat than the east basin. There was less of habitat in epibenthic waters compared to subsurface waters in the east, but there was little difference in the west.

Fig 3-Present quota sharing allocation (< 13m; light blue) by jurisdiction (red)

Strategic research direction for Lake Erie's Environmental Objectives (EOs)

The EO's for Lake Erie describe the ecological conditions necessary for realizing the lake's Fish Community Goals and Objectives. As part of a strategic approach to habitat management, the HTG is proposing to summarize the current state, trends, and potential threats for each of the Environmental Objectives in order to better understand the types of research questions and answers that will be required by the Lake Erie Committee to achieve the FCGOs.

In 2012, members of the HTG used a stressor matrix to identify factors influencing the current and future status of the EO's. Our results suggest that certain physical stresses on the EO's, particularly stress caused by climate change and anthropogenic sources, can be addressed directly through current authorities and programs. The HTG anticipates that it will focus on these physical stressors, identifying current knowledge and data gaps, and direct us towards designing an implementation strategy for in-water habitat enhancement. This will guide agencies and researchers to design data collection efforts to identify habitat projects, particularly in the Lake Erie nearshore, tributaries, and other priority habitats.

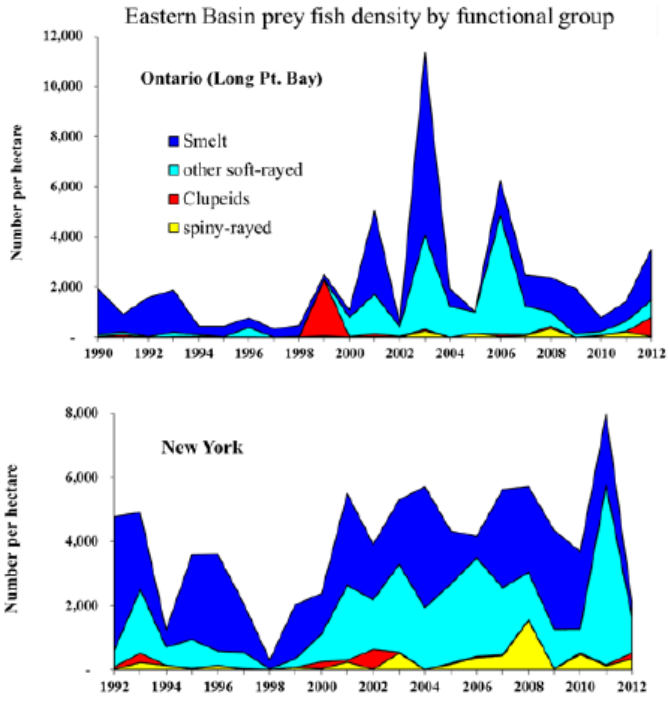
The HTG also recognizes that many non-fisheries agencies are not aware of the EO's. We anticipate the need to promote the consideration of the EO's among partner agencies for current and future restoration projects. This will require the development of a strong, science-based outreach strategy to be actively distributed to other agencies and programs.
The EO document can be found at:
http://www.glfc.org/lakecom/lec/lechome.php ✧

Forage Task Group, 2013 (LEC)

East Basin Status of Forage

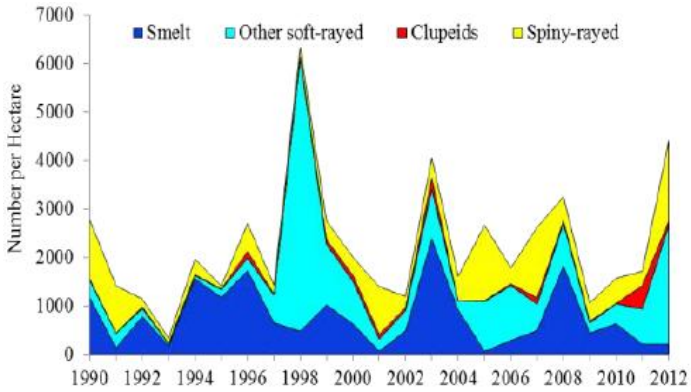
Total prey fish species abundance was high in Ontario, but below average in New York. Rainbow smelt was again the most abundant prey species. Age-0 rainbow smelt abundance increased 2.5-fold in Ontario, but decreased 74% in New York. Yearling-and-older (YAO) rainbow smelt were less abundant than age-0 smelt and densities were similar to (Ontario) or well below (New York and Pennsylvania) agency 10-year averages. Age-0 and -1 rainbow smelt mean fork length increased in 2012; both age groups were above average size.

The contribution of non-smelt fish species to the forage fish community of eastern Lake Erie was dominated by alewife, emerald shiner, trout-perch, round goby, and age-0 yellow perch. Age-0 alewife abundance was above average across all east basin jurisdictions and the second highest in Ontario's index trawl series. Round goby densities increased slightly in 2012 but remains well below the 10-year average in all east basin jurisdictions. Predator diets were dominated by rainbow smelt and round goby. Predator growth remains good. Age-2 to age-6 smallmouth bass were above average size. Lake trout size-at-age remains stable and among the highest observed in the Great Lakes.



Central Basin Status of Forage

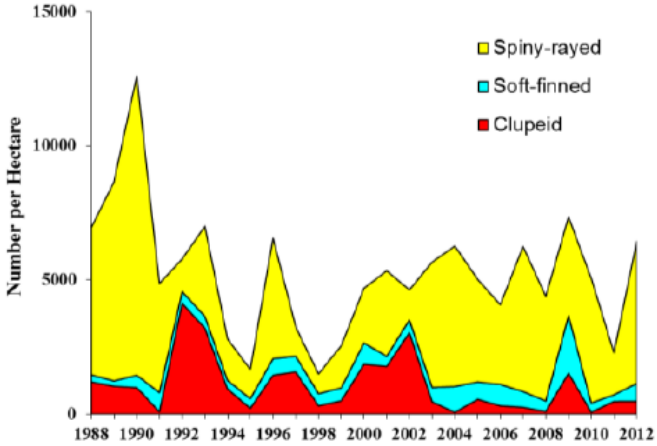
In the central basin, overall forage abundance in 2012 increased from 2011 and was well above average. The increase can be attributed to basin wide increases in age-0 white perch and increases of age-0 and YAO emerald shiners in Ohio. A strong year class of yellow perch occurred in all areas of the central basin in 2012, with the strongest cohort in Pennsylvania. Round goby indices for both age-0 and YAO were below average. The age-0 gizzard shad index in western Ohio decreased from a record high in 2011 and was below average. The eastern Ohio index increased from 2011 and was above average. The proportion of gizzard shad in the diets of adult walleye and white bass dramatically increased from 2011 in eastern Ohio samples. Rainbow smelt were absent in diet samples from eastern Ohio. Mean length of walleye in 2012 was above average up to age-6.



Central Basin prey density by functional group

West Basin Status of Forage

Low levels of dissolved oxygen at the bottom of the water column during the August survey were not an issue in 2012, representing the first time since 2008 that no sites were excluded from analysis due to DO levels. Total forage abundance increased to above-average levels in 2012, mainly attributed to increases in soft-finned and spiny-rayed fish groups. Clupeid densities were similar to 2011. Mean length of most age-0 sport fish were at or well above long-term averages. Spatial abundance contours showed soft-rayed fish were most abundant near the mouth of the Detroit River and east of Sandusky Bay, spiny-rayed abundance was highest at the center of the basin, and clupeid densities were highest around Sandusky Bay. Walleye diets were predominantly gizzard shad. Benthic invertebrates were the primary component of yellow perch diets in spring and fall.



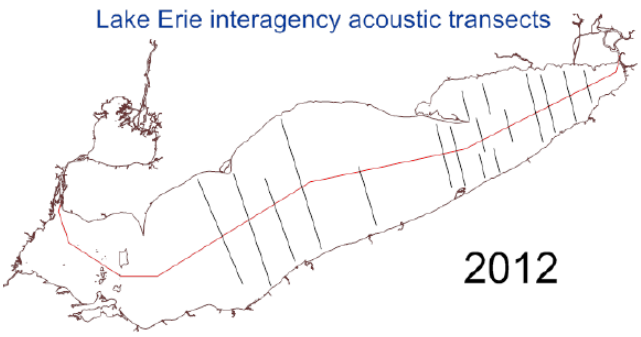
West Basin prey density by functional group

Hemimysis anomala

The Forage Task Group continued to record sightings of this exotic invertebrate in 2012. Native to the Black and Caspian Seas, this recent invader was first located in Lake Erie in 2006, and has the potential to alter lake foodwebs as both a food item and a consumer of zooplankton resources. In 2012, *H. anomala* continued to be found in the diets of white perch (10%) and rock bass (2%) in Long Point Bay (LPB), and in yellow perch and white perch in central and western basin waters. Occurrences of *H. anomala* in white perch diets tend to increase from west to east. *Hemimysis anomala* were first observed in white bass in LPB in 2010 (1% of fish examined). Absent in 2011, they were again observed in white bass in 2012 (3%). The first and only observation of consumption by white bass west of LPB was from one individual captured near Fairport OH, in 2011. Swarms of *H. anomala* were recorded 6.5 km offshore during underwater video surveillance of Nanticoke Shoal in the fall of 2012; the first noted occurrence beyond the nearshore of the eastern basin.

Hydroacoustic Assessments

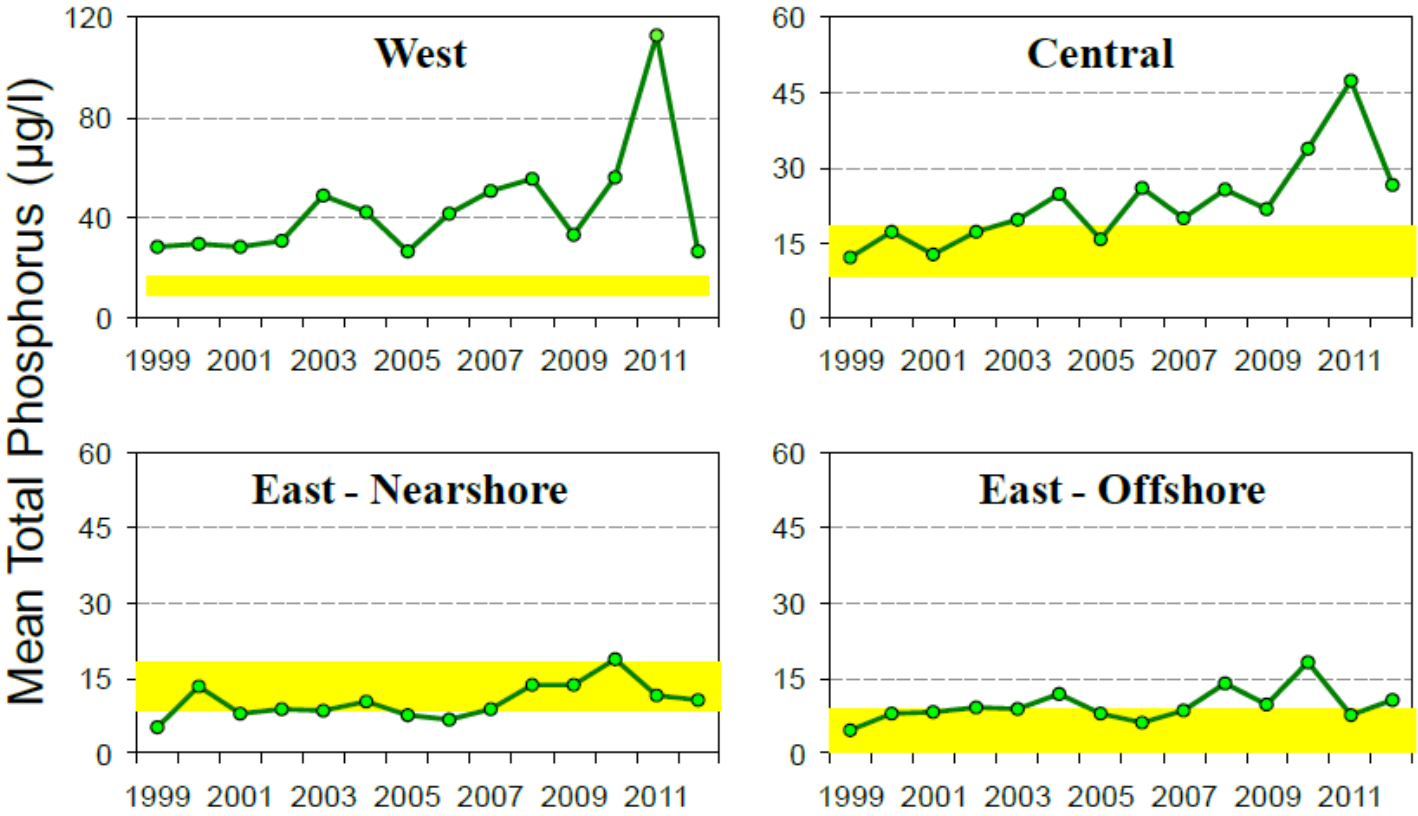
The Forage Task Group introduced fisheries hydroacoustic technology on Lake Erie to provide a more comprehensive assessment of pelagic forage fish species abundance and distribution. Beginning with surveys of the eastern basin in 1993, coverage was expanded to the central basin in 2000 and western basin in 2004. Recent year basin surveys have been accomplished as independent, approximately concurrent summer-time efforts during the new-moon phase in July. Participation in each basin acoustic survey has been shared among jurisdictional agencies with support from the USGS.



In 2012, the east basin acoustic survey was conducted from July 15-25. The central basin survey was conducted from July 16-22. The west basin was not surveyed in 2012 due to equipment malfunctions. Seventeen acoustic transects, 51 temperature and dissolved oxygen profiles and 36 midwater trawls were sampled in total during the 2012 basin surveys. Yearling-and-older size acoustic targets (all forage fish species) were found in high densities throughout the east basin, with the greatest concentrations in the warm water layer. In the central basin, emerald shiner and Age-0 rainbow smelt densities were high throughout the basin and YAO rainbow smelt were highest in the east and west transects.

Interagency Lower Trophic Level Monitoring

The lower trophic level monitoring (LTLA) program has measured nine environmental variables at 18 stations around Lake Erie since 1999 to characterize ecosystem change. In 2012, measures of total phosphorus remained above target levels in both the western and central basins. Water transparency was below targets in the western basin but near or within targets elsewhere. Trophic class metrics indicate that the western basin is within eutrophic status, which favors centrarchid species; the central and nearshore eastern basin waters are within targeted mesotrophic status, which favors percid production. The offshore eastern basin waters remain near targeted oligotrophic status. Low hypolimnetic dissolved oxygen continues to be an issue in the central basin during the summer months, and an occasional problem in the western basin. The zooplanktivory index indicates that predation on zooplankton is low in both the western and central basins, and average in the eastern basin.



Mean total phosphorus in each basin of Lake Erie, 1999-2012.

The complete report is available from the Great Lakes Fishery Commission's Lake Erie Committee Forage Task Group website http://www.glfc.org/lakecom/lec/FTG.htm#pub ✧

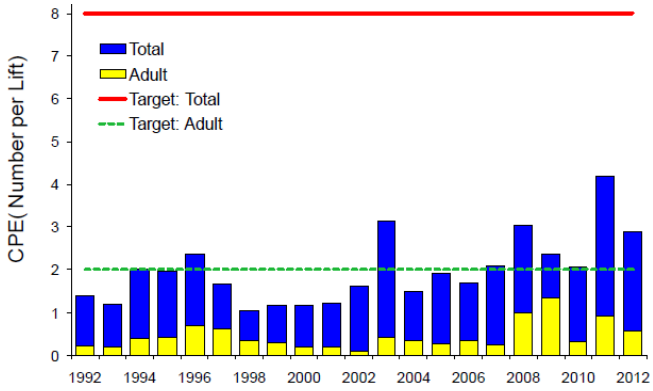
Coldwater Task Group, 2013 (LEC)

Seven charges were addressed by the CWTG during 2012-2013: (1) Lake trout assessment in the eastern basin; (2) Lake whitefish fishery assessment and population biology; (3) Burbot fishery assessment and population biology; (4) Participation in sea lamprey assessment and control in the Lake Erie watershed; (5) Maintenance of an electronic database of Lake Erie salmonid stocking information; (6) Steelhead fishery assessment and population biology, and (7) Development of a cisco management plan.

Lake Trout

A total of 677 lake trout were collected in 170 lifts across the eastern basin of Lake Erie in 2012. High lake trout catches were recorded in New York surveys but average catches were observed in both Ontario and Pennsylvania surveys. Young cohorts (ages 1-5) continue to dominate the catches with lake trout ages 10 and older only sporadically caught. Basin-wide lake trout abundance (weighted by area) was the fourth highest value in the time series, but remains below the rehabilitation target of 8.0 fish/lift. Adult (ages 5+) abundance decreased in 2012 and remains well below target. Recent estimates indicate very low rates of adult survival. Klondike, Finger Lakes, and Lake Champlain strain lake trout comprise the majority of the population. Natural reproduction has not been documented in Lake Erie despite more than 30 years of restoration efforts.

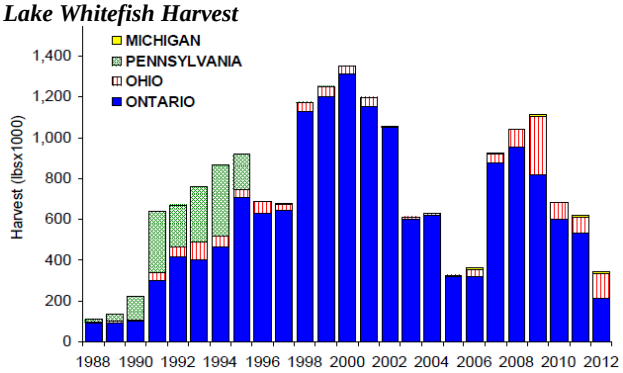
Basinwide Lake Trout Abundance



Lake Whitefish

Lake whitefish harvest in 2012 was 341,374 pounds, distributed among Ontario (63%), Ohio (35%), and Michigan (2%) commercial fisheries. The 2003 year class (age 9) dominated the population age structure in the observed harvest and assessment surveys in 2012. Ages present in the 2012 population ranged from 3 to 24, with no evidence of young-of-the-year or yearling whitefish in assessment surveys lake-wide. With recruitment sparse or absent, population abundance continues to decline. Fisheries in 2013 will continue to rely on the 2003 year class, followed by cohorts from other adjacent year classes. In 2012, mean condition factors of mature female and male whitefish were at or above the historic average.

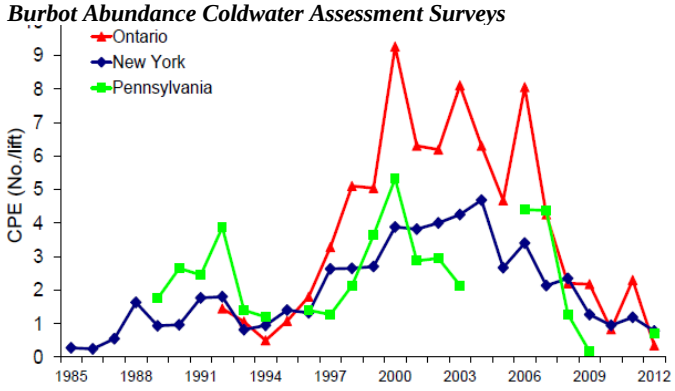
Lake Whitefish Harvest



Burbot

Total commercial harvest of burbot in Lake Erie during 2012 was 1,308 lbs, a 55% decrease from 2011. Burbot abundance and biomass indices from annual coldwater gillnet assessments decreased in 2012, continuing a downward trend observed across east basin areas following time-series maxima during the early- to mid-2000s. Agency catch rates during 2012 ranged from 0.35 (Ontario) to 0.78 (New York) burbot per lift, which are far lower than mean catch rates observed during 2000-2004 peak catches. Burbot catches ranged in age from 4 to 22 years, and 54% were age 13 and older in 2012. Rainbow smelt and round gobies continue to be the dominant prey items in burbot diets in eastern Lake Erie. Continued low catch rates of burbot in assessment surveys, combined with increasing age of adults and persistent low recruitment, signal continuing troubles for this population in Lake Erie.

Burbot Abundance Coldwater Assessment Surveys

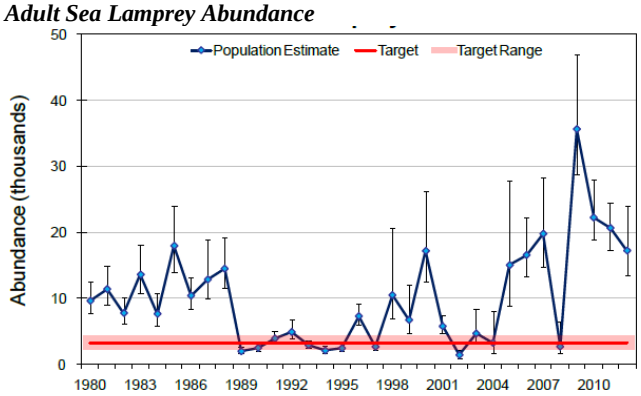


Sea Lamprey

The A1-A3 wounding rate on lake trout over 532 mm was 10.1 wounds per 100 fish in 2012. This was a 23% increase from the 2011 wounding rate of 8.2 wounds per 100 fish and the first increase in wounding rates since 2009. The 2012 wounding rate still exceeds the target rate of five wounds per 100 fish; wounding rates have been above target for 17 of the past 18 years. Large lake trout over 736 mm continue to be the preferred targets for sea lamprey. A1 wounding rates on lake trout were above average and were at their highest rate since 2007. A4 wounding rates decreased in 2012 to 31.6 wounds per 100 fish, the second lowest wounding rate

in the past eight years. A4 wounding rates on lake trout over 736 mm remained very high (148 wounds/100 fish). The estimated number of spawning adult sea lampreys decreased from 20,638 in 2011 to 17,211 in 2012. This is the third consecutive decline in the estimated adult sea lamprey population, but abundance remains well above targets. Comprehensive stream evaluations continued in 2012, including extensive surveys of Lake St. Clair and the Detroit River, to determine the source of the untreated Lake Erie population. A mark-recapture study was implemented to determine if juveniles can successfully migrate through Lake St. Clair into Lake Erie, and to quantify the relative contribution of St. Clair River sea lamprey to the Lake Erie adult population.

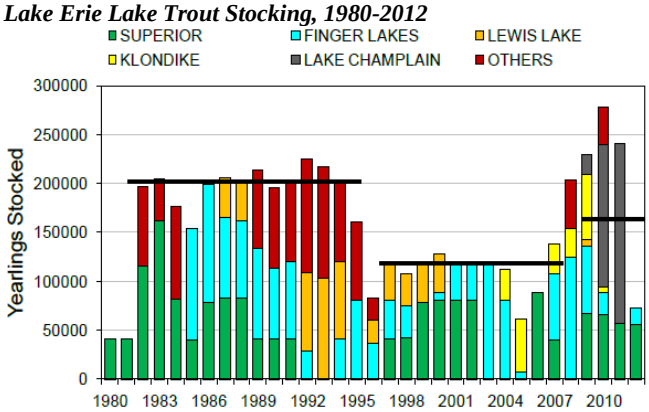
Adult Sea Lamprey Abundance



Lake Erie Salmonid Stocking

A total of 1,962,516 salmonids were stocked in Lake Erie in 2012. This was a 9% decrease in the number of yearling salmonids stocked compared to 2011 and the long-term average from 1989-2011. Declines were primarily due to temporary reductions in 2012 of lake trout and steelhead/rainbow trout stockings. By species, there were 72,473 yearling-equivalent lake trout stocked in Ontario and Ohio; 101,204 brown trout stocked in New York and Pennsylvania waters, and 1,788,839 steelhead/rainbow trout stocked in all five jurisdictional waters.

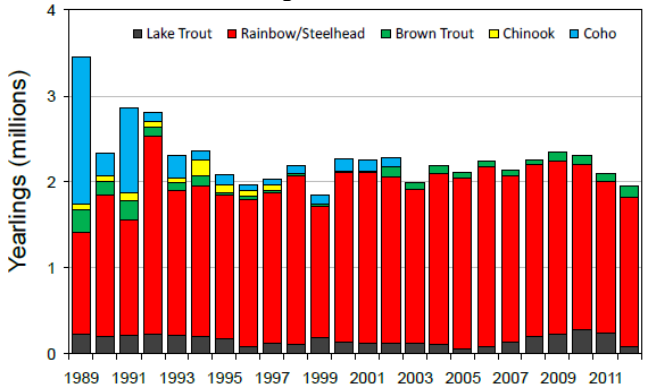
Lake Erie Lake Trout Stocking, 1980-2012



Steelhead

All agencies stocked yearling steelhead/rainbow trout in 2012. The summary of steelhead stocking in Lake Erie by jurisdictional waters for 2012 is: Pennsylvania (1,018,101; 57%), Ohio (425,188; 24%), New York (260,000; 15%), Michigan (64,500; 4%) and Ontario (21,050; 1%). Steelhead stocking in 2012 (1.789 million) represented a 2% increase from 2011, but was 2% below the long-term average. Annual stocking numbers have been consistently in the 1.7-2.0 million range since 1993.

Lake Erie Salmonid Stocking, 1989-2012



The summer open lake fishery for steelhead was again evaluated by Ohio, Pennsylvania and New York. Open lake harvest was estimated at 10,165 steelhead: Ohio, 6,865; Pennsylvania, 2,917; New York, 374; and Michigan, 9. Overall, this harvest was a 127% increase from the 2011 harvest, but 67% below the average harvest from 1999-2011. Open lake steelhead harvest increased in all jurisdictions from 2012, but was not assessed in a general creel survey in Ontario waters of Lake Erie. Catch rates in the open water fishery were lower in 2012 with the exception of Pennsylvania. Based upon creel surveys, the majority (>90%) of the fishery effort targeting steelhead occurs in the tributaries from fall through spring. Catch rates by tributary anglers in the New York cooperative diary program increased to 0.68 fish/hour in 2012, but in a general New York tributary angler survey, overall catch rate was 0.35 fish/hour.

Cisco

Cisco, considered extirpated in Lake Erie, have been reported in small numbers (1-6) in 11 of the past 15 years by Ontario commercial fishers; one age-3 cisco was captured in 2012. None were captured in 2012 in assessment gear. Preparation of a cisco management plan began in fall 2007; however, after several drafts, the exercise has stalled due to several key outstanding issues – mainly if a remnant stock still exists in Lake Erie, the abundance of the current population, and if and how to proceed with stocking – that remain unresolved. With these uncertainties, the task group was unable to define a plan to re-establish cisco in Lake Erie. Within review of the management plan, it was decided that the current plan be reworked into an Impediments document and presented to the LEC so these issues can be resolved. ✧

Fisheries Research of Lake Erie Biological Station, 2012 (USGS)

Executive Summary

In 2012, the USGS successfully completed large vessel surveys in all three of Lake Erie's basins. Our 2012 vessel operations began on April 3rd and concluded on December 4th with a total of 72 large vessel sampling days (86 total days). During this time, crews of the R/V Muskie, R/V Bowfin, and R/V Musky II deployed over 260 bottom trawls covering 165 km of lake-bottom, over 19 km of gillnet, collected hydroacoustic data that extended over 250 km of the central and eastern basins, and over 350 collective lower trophic level, benthos, and water quality samples.

This was a significant year for LEBS due to the acquisition of a new 70 ft research vessel, the R/V Muskie. The new vessel replaced the 45 ft R/V Musky II which had been in service at the station for 53 years and outlasted its 50 year service-life expectancy.

Abstract

The USGS completed its ninth consecutive year of a collaborative, multi-agency assessment of fish populations throughout the western basin of Lake Erie in 2012. In June we sampled 25 stations in Ontario and Michigan waters of the western basin, and in September we employed a new survey design with 41 sites in Ohio, Ontario, and Michigan waters of western and west-central Lake Erie. Each site was sampled with a bottom trawl, and we calculated catch per hectare (CPH) based on trawl area swept for fish species in western Lake Erie. We also examined stomach contents from age-2 and older white perch and yellow perch (see section 2.0). Here we report the historical trends of species captured during this trawl survey and present an analysis of spatial autocorrelation for the new survey design.

All 25 sites were successfully sampled in June and were the prescribed 10-minute duration. Catches of yearling-and-older (YAO) fishes have historically been dominated by four species: emerald shiner, trout-perch, yellow perch, and round goby (**Fig 1**). As an index of overall fish abundance in the spring, emerald shiner have been responsible for most of the variability in CPH, producing two primary peaks in 2006 and 2011 **(Fig 1).** In autumn, overall CPH for YAO fishes was typically lower than in the spring and primarily driven by round goby with a major peak in abundance in 2009 **(Fig** 1. Catches of young-of-year (YOY) fishes in autumn were dominated by 7 species: white perch, emerald shiner, trout-perch, spottail shiner, yellow perch, rainbow smelt, and gizzard shad. While the overall biomass of YOY fish indexed by CPH remained relatively constant, notable small peaks were observed in 2005 for white perch and in 2008 for white perch, yellow perch and rainbow smelt.

Table 1- ***Species by age group captured in Sept 2012 western basin forage survey, rank ordered by number and catch per hectare (CPH).***

Species	Total Catch	CPH
White Perch YOY	7917	506.0
Emerald Shiner YOY	6586	420.9
Gizzard Shad YOY	2337	149.4
Freshwater Drum YAO	717	45.8
Yellow Perch YAO	616	39.4
White Perch YAO	458	29.3
White Bass YOY	266	17.0
Emerald Shiner YAO	257	16.4
Yellow Perch YOY	227	14.5
Spottail Shiner YOY	217	13.9
Trout-perch YOY	190	12.1
Spottail Shiner YAO	177	11.3
Walleye YOY	66	4.2
Trout-perch YAO	63	4.0
Rainbow Smelt YAO	49	3.1
Round Goby	38	2.4
Channel Catfish YAO	37	2.4
Walleye YAO	34	2.2
Smallmouth Bass YOY	19	1.21
White Bass YAO	19	1.21
Silver Chub YAO	16	1.02
Brook Silverside YAO	13	0.83
Freshwater Drum YOY	7	0.45
White Sucker YAO	7	0.45
Rainbow Smelt YOY	6	0.38
Silver Chub YOY	6	0.38
Common Carp YAO	3	0.19
Brown Bullhead YAO	2	0.13
Quillback YAO	1	0.06
Rock Bass YAO	1	0.06
White Crappie YOY	1	0.06

The grid sampling captured 20,353 fish comprising 21 Catches were dominated by YOY white perch and emerald shiner. Gizzard shad, white bass, and yellow perch were the 3 next most abundant YOY groups in our catches**.** The new gear also captured large numbers of YAO fishes, and the 5 most abundant species were freshwater drum, yellow perch, white perch, emerald shiner and spottail shiner (**Table 1).** In most cases, CPH values were within the range or slightly greater than the CPH values obtained with the smaller gear over the past 9 years of the survey. One notable difference was round goby (all age groups combined), which was present in relatively low abundance in our September catches.

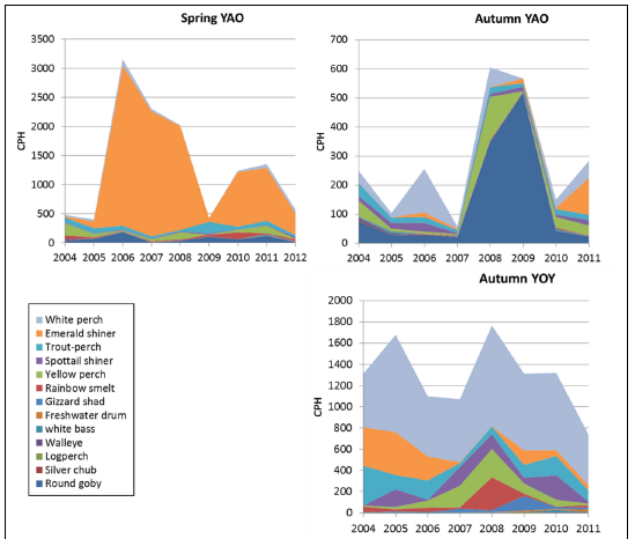


Fig 1-Average catch per hectare of young-of-year (YOY) and yearling-and-older (YAO) forage fish of the most common species captured in bottom trawls during Spring and Autumn in Ontario and Michigan waters of western Lake Erie. The order and colors in the stacked areas is the same in each panel and follows the key in the bottom left. Rainbow smelt, gizzard shad, freshwater drum, white bass, walleye, logperch, and silver chub are low in abundance and typically not distinguishable between yellow perch and round goby on the plots. For round gobies, all ages are combined under YAO.

Catches of the most abundant species across our spatial grid revealed patterns that emphasized the importance of including the Sandusky basin and the Camp Perry firing range for assessing abundance of some species, including economically significant percids. Yellow perch YOY and YAO were broadly distributed with higher catches in the northern half of the western basin and in the Sandusky basin. Walleye YOY were primarily centered around the Camp Ferry firing range during this time. For gizzard shad, white bass, and trout-perch, highest catches occurred immediately west of the Erie island archipelago. This area was also important for YOY white perch, YOY emerald shiner, with similar catches in the Sandusky basin and lower catches to the west. For other species/age-groups spatial patterns were weak (spottail shiner) or catches were higher in the Sandusky basin (YAO freshwater drum, and YAO emerald shiner.

One important conservation endeavor that has recently emerged from this work is assessment of the status of silver chub, which are listed as species of special concern in Canada, and the Canadian government is actively developing a recovery plan. In 2012, catch per hectare of silver chub adults and YOY remained high compared to levels during the period 1961-1997. Despite being considered extirpated from Ontario waters, our highest CPH of silver chub was in Ontario waters near the mouth of the Detroit River, where we captured 29 and 16 individual YAO in two trawl samples in June. Although catches from the two samples near the mouth of the Detroit River were comparatively high, our mean CPH values are a small fraction of the historical average CPH of 19-20 silver chub per 13-minute tow. A similar large aggregation of silver chub that produced 293 silver chub in 3 tows was reported 4 km north of the Mouth of Sandusky Bay in 1953. Kinney (1954) speculated he might have sampled a large school returning to the open lake following a springtime shoreward migration. Spawning is thought to be in open water, but this has never been verified. We continue to collaborate with DFO researchers to better understand silver chub biology and to assist in establishing a recovery plan for Ontario.

Diet Analysis of Western Basin Age-2-and-Older Yellow and White Perch

Spring sampling provided 105 age-2-and-older yellow perch stomachs from fish ranging between 130-270 mm in length. A total of 80 (76%) of the yellow perch stomachs contained prey. In spring 2012, benthic macroinvertebrates were present in almost all yellow perch stomachs (94.8%) and Chironomidae, *Dreissena* spp., and *Trichoptera* spp. were the most common benthic macroinvertebrates. Zooplankton and fish prey had low occurrence in yellow perch diets (3.9% and 6.5%, respectively) during spring. During autumn sampling, 108 age-2-and-older yellow perch stomachs were collected from fish ranging from 130-280 mm in length with 59 (55%) of the stomachs containing prey. Most of the autumn yellow perch stomachs contained benthic macroinvertebrates (71.2%), whereas zooplankton remained low at 3.4%. Occurrence of fish prey increased dramatically from spring to autumn for yellow perch. Fish occurred in 37.3% of yellow perch and round goby was the most common fish prey occurring in 11.9% of stomachs. *Hemimysis* sp. was only detected in spring yellow perch diets at very low occurrence (1.3%) and *Bythotrephes* sp. was only detected in autumn diets at low occurrence (1.7%).

Spring sampling provided 81 stomachs from age-2-and-older white perch with lengths between 110-250 mm. Fifty-seven (73%) stomachs contained prey items. In spring, zooplankton was present in 49.1% of samples with *Daphnia retrocurva* occurring most frequently (31.6%). Benthic macroinvertebrates occurred in 68.4% of spring stomach samples with Chironomidae being most common (50.9%). Fish were present in 12.3% of white perch stomachs during spring. Stomachs were collected from sixty-eight age-2-and-older white perch that ranged from 160-260 mm during autumn sampling. Only 31 (46%) contained prey items. Fish were the most common prey type in autumn (54.8%), which was mostly composed of unidentified fish remains and emerald shiners. Both zooplankton and benthic macroinvertebrates occurrence decreased from spring to autumnu. *Hemimysis* sp. was only detected in white perch diets at very low occurrence (1.8%) and *Bythotrephes* sp. was detected at low occurrence in spring (3.5%) and increased in autumn (16.1%).

Historically, zooplankton occurred more commonly in yellow perch diets in the spring than in autumn. However in 2012, zooplankton occurrence in spring and autumn were the

lowest ever observed in our data set (3.9% in the spring compared to 3.4% in autumn. For white perch, the historical trend of higher zooplankton occurrence in the spring compared to autumn remained consistent with zooplankton in 49.1% of stomachs in the spring and in only 29.0% of stomachs in autumn.

East Harbor Forage Fish Assessment

Abstract

We sampled three stations at 3.1, 4.5, and 6.1-m depths near East Harbor State Park with bottom trawls to index forage fish year class strength. Mean YOY densities of 10 species in 2012 were less than their 15-year means. Despite increases in 2011, densities of five species decreased to below their long-term mean including trout-perch, silver chub, and round goby. Mean densities of yellow perch and walleye declined for the second consecutive year to below their 15-year means. Conversely, catches of YOY gizzard shad and white bass increased to the highest densities in the 15-year time series. Mean total lengths of nearly all species of YOY fishes captured in 2012 were greater than their respective 20-year means.

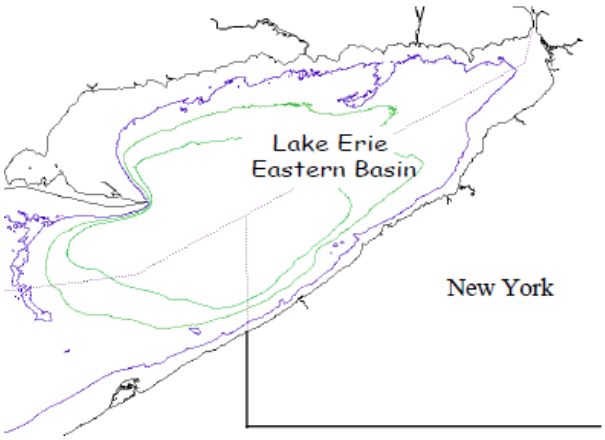
Results

Abundances in autumn 2012 for YOY of 10 of 13 target species were below their respective 15-year means. Abundance of YOY gizzard shad in 2012 increased for the second consecutive year to the highest level in its 15-year time series (730 individuals /ha), more than double the density in 2011 (517 individuals/ha). This was only the second time since 1998 that densities for YOY gizzard shad have been above their long-term mean. Young-of-year emerald shiner decreased in abundance in 2012 for only the third time since 2003. Mean density of spottail shiner in 2012 decreased for the fourth consecutive year since falling below the 15-year mean in 2009. Abundance of YOY trout perch declined nearly 93% to 4 individuals/ha in 2012 from 52 individuals/ha in 2011. After nearly a three-fold increase in 2011 and the second highest density in its 15-year time series, YOY silver chub were not captured in 2012.

Among five spiny-rayed species evaluated, mean densities of YOY white bass and white perch increased to the highest and second highest levels, respectively, in their 15-year time series, despite decreasing in 2011. White perch abundance increased from 1171 individuals/ha in 2011 to 1972 individuals/ha in 2012 and was the second highest in the 15-year time series. Mean density of YOY white bass in 2012 nearly doubled its previous high in 2010 and was only the second time densities were above its long-term mean since 2002. Abundances of YOY freshwater drum, yellow perch, and walleye in 2012 declined below their 15-year means. Yellow perch and walleye abundances declined for the second consecutive year while freshwater drum abundance fell to the second lowest in the 15-year time series.

Total lengths of all YOY species in 2012 except yellow perch were greater than their respective 20-year means, though yellow perch mean lengths were only slightly lower than the long-term mean. Lengths of YOY emerald shiner, spottail shiner, trout perch, white perch, and white bass were less than 10mm longer than their 20-year means while mean lengths for freshwater drum and walleye were 32 mm and 26 mm longer, respectively. ✧

NYS DEC Lake Erie 2012 Annual Report



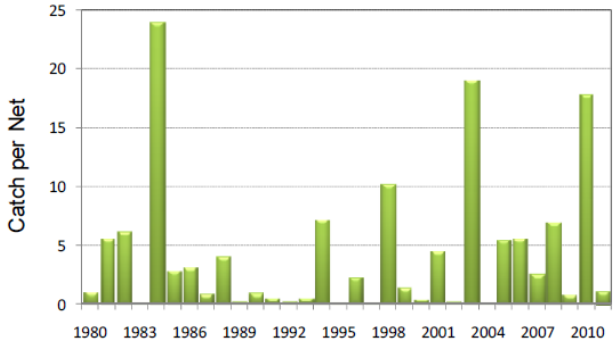
Program Highlights

Lake Erie Fisheries Unit is responsible for fishery research and assessment activities for one of New York's largest and most diverse freshwater fishery resources. A variety of annual programs are designed to improve our understanding of the Lake Erie fish community to guide fisheries management, and safeguard this valuable resource for current and future generations. This document shares just a few of the highlights from the 2012 program year. The complete annual report is available on DEC's website at *http://www.dec.ny.gov/outdoopor/32286.html*.

Walleye

Lake Erie's eastern basin walleye resource is composed of local spawning stocks, as well as contributions from summertime movements from western basin spawning stocks. The annual movement of western basin stocks is now well known via long-term tagging studies conducted throughout the lake. Walleye fishing quality in recent years has generally been very good and largely attributable to excellent spawning success observed in 2003. However, the dominant 2003 year class has now begun to wane. Nevertheless, walleye fishing activity and quality continues to be very good due to average to good spawning success that occurred from 2005 to 2008 and 2010. Our most recent juvenile walleye survey indicates only modest spawning success in 2011. However, overall good recruitment in recent years, especially from 2010, suggests adult walleye abundance in the eastern basin will be satisfactory over the next few years.

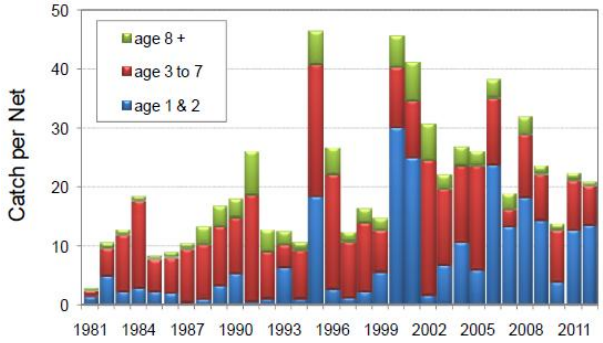
Age-1 Walleye Index 25



Smallmouth Bass

Lake Erie supports New York's, and perhaps the country's finest smallmouth bass fishery. Generally stable spawning success, coupled with very high growth rates and acceptable survival, produce high angler catch rates and frequent encounters with trophy-sized fish. However, our most recent bass monitoring indicates a decline in particularly larger and older individuals. Our juvenile abundance measures indicate excellent recruitment from the 2010 year class, and we expect these age-3 fish will be a very prominent component of the fishable population in 2013.

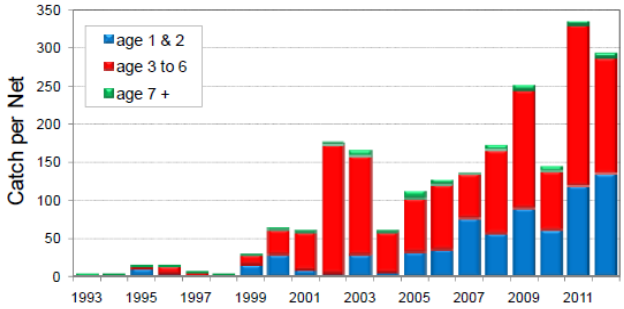
Smallmouth Bass Index



Yellow Perch

Lake Erie yellow perch populations have experienced wide oscillations in abundance over the last 30 years, from extreme lows in the mid-1990s, to an extended recovery that has now lasted over a decade. A large adult population continues to produce good angler catch rates, especially during spring and fall seasons. Abundance of juvenile perch in trawling and gill net surveys has been high in recent years, with record-high abundance of age-1 perch observed in 2011. Overall, this pattern of recruitment suggests that higher and more stable yellow perch abundance will extend at least another few years.

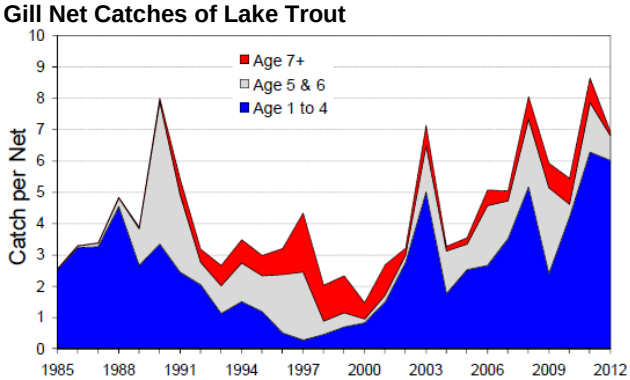
Gill Net catches of Yellow Perch



Lake Trout Restoration

Re-establishing a self-sustaining lake trout population in the eastern basin of Lake Erie continues to be a major goal of New York's Great Lakes coldwater fisheries management program. Lake trout have been stocked annually since 1978 and assessment programs monitor the status of progress. A revised lake trout rehabilitation plan was completed in 2008 and will guide future recovery efforts. Overall abundance of lake trout in the New York waters of Lake Erie remained high in 2012. The majority of the catch was young lake trout ages 1-4, mainly due to increased stocking levels over the past 5 years. Adult stocks (age 5 and older) remain at relatively low levels; survival of adults is low due to high sea lamprey predation on lake trout. Lakewide abundance estimates for all age groups still remain well below targets. Natural reproduction has not been detected in Lake Erie, and continued stocking and effective sea lamprey control are needed to build adult lake trout populations to levels where natural production is viable.

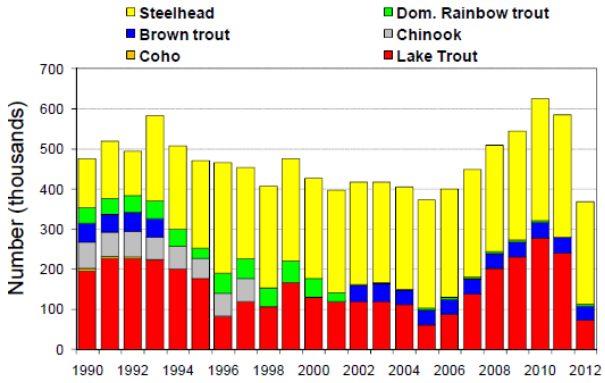
Gill Net Catches of Lake Trout



Salmonid Management

New York annually stocks approximately 270,000 steelhead and 35,000 brown trout into Lake Erie and its tributaries to provide recreational opportunities for both lake and stream anglers. Wild reproduction of steelhead also occurs which contributes to the fishery as well. Fall juvenile assessments conducted since 2001 confirmed substantial numbers of young-of-year steelhead present in many tributaries. Tributary angling for steelhead, assessed through an angler diary program, showed a sharp decline in fishing quality in 2010, but an increase in 2011. A tributary angler survey conducted during the 2011-12 fishing season on the major Lake Erie tributaries showed a 42% decline in salmonid catch rates and a 47% decline in overall catch compared to the 2007-08 survey.

Trout & Salmon Stocking in NY



Steelhead remain the most numerous salmonid species stocked in NY's portion of Lake Erie with 255,000 yearlings stocked in 9 tributaries in 2012. All tributaries achieved their stocking target in 2012; additional surplus steelhead were stocked in the South Branch Eighteen Mile Creek (2,000 surplus fish) and Cattaraugus Creek (18,000 surplus fish). All stocked steelhead were Washington strain fish; no Skamania strain steelhead were available in 2012. In addition to the steelhead, a small number of domestic rainbow trout yearlings (5,000) were also stocked at Erie Basin Marina in Buffalo, NY, and near the mouth of the Buffalo River.

A total of 35,480 yearling brown trout were split between Barcelona Harbor, Dunkirk Harbor, the lower reach of Cattaraugus Creek, and Point Breeze Marina. This total did not meet the stocking goal of 45,000 yearlings due to shortages within the state hatchery system. Shortages of brown trout are also expected in 2013 due to an outbreak of furunculosis and issues with poor quality feed.

Angler Diary Program

A total of 55 diaries were issued in 2011, the lowest number of diaries issued in the last ten years and below the time series average of 75. Of these, 34 diarists (60%) reported fishing specifically for trout and salmon in Lake Erie. A total of 32 anglers reported tributary angling while only six anglers reported angling on the open lake. Four anglers reported directed trips in both components of the fishery. Stream angling, primarily for steelhead, continues to dominate diarist effort.

Open Lake Waters

Six diarists spent a total of 307 angler hours on 49 trips targeting salmonids in Lake Erie in 2011. Both trips and angler hours were below average for the 12th consecutive year, and this was the 6th lowest angler effort in the 28 year series. The average trip consisted of 6.3 angler-hours, which was also below average (7.1 angler-hours).

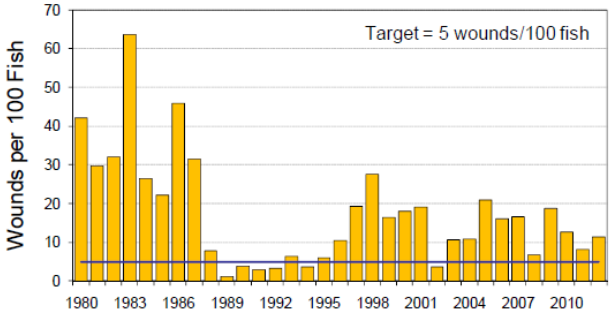
Only two of the six open water diarists reported landing fish in 2011. However, these two anglers were very successful, landing a total of 36 steelhead, 21 brown trout, and 24 lake trout. The average total length (TL) of the steelhead was 21.3 inches, brown trout 22.6 inches, and lake trout 21.1 inches. Of the 81 trout caught, 37 (46%) were harvested.

Overall mean targeted trout catch-per-unit effort (CPE) for 2011 was 0.26 fish/hour, which was above average (0.20 fish/hour) for the series. CPE for the individual anglers ranged from 0.00 to 0.50 salmonids per hour. Similar to previous years, effort and catch was highest in Dunkirk Harbor, with lesser effort directed at Barcelona and Sturgeon Point.

Sea Lamprey

Sea lamprey invaded Lake Erie and the Upper Great Lakes in the 1920s and have played an integral role in the failure of many native coldwater fish populations. Sea lamprey control in Lake Erie began in 1986 in support of lake trout rehabilitation efforts, and regular treatments are conducted to control lamprey populations. Annual monitoring consists of observations of sea lamprey wounds on lake trout and other coldwater fish species, and lamprey nest counts on standard stream sections. Wounding rates on lake trout increased in 2012 and nest counts continue to remain very high, indicative of a high sea lamprey spawning population. Surveys indicate that the consecutive lampricide treatments of all key Lake Erie tributaries in 2008 and 2009 were successful in those streams, but the sea lamprey population remains high due to an unknown source of production.

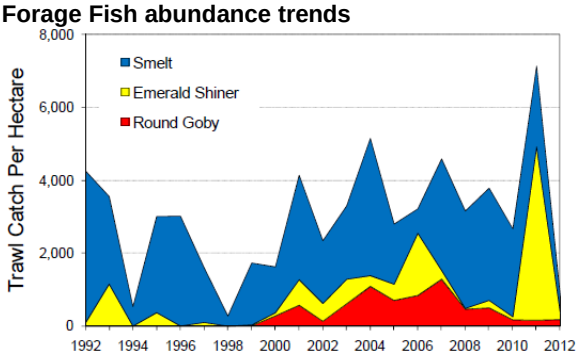
Sea Lamprey wounding rate on Lake Trout ›21"



Prey Fish

The Lake Erie Unit conducts a number of surveys to assess forage fishes and components of the lake's lower trophic ecosystem. These programs include trawl, sonar surveys of prey fishes, predator diet studies, and lower food web monitoring. A variety of prey fish surveys beginning approximately 20 years ago found rainbow smelt as the dominant component of the open lake forage fish community. Beginning in 2000, there has been a notable increase in prey species diversity accompanied by somewhat lower smelt abundance, and in some years especially high abundances of round gobies and emerald shiners were encountered in both prey fish collections and predator diets. In recent years, overall prey fish abundance trended slightly downward, particularly the contribution by gobies in trawl surveys. In 2012, emerald shiner and rainbow smelt abundance decreased sharply while gobies remained stable at lower abundance. Lower food web monitoring indicated the eastern basin was in its targeted mesotrophic status favorable for percid production. Over time we expect these investigations to be useful in furthering our understanding of factors shaping the fish community.

Forage Fish abundance trends

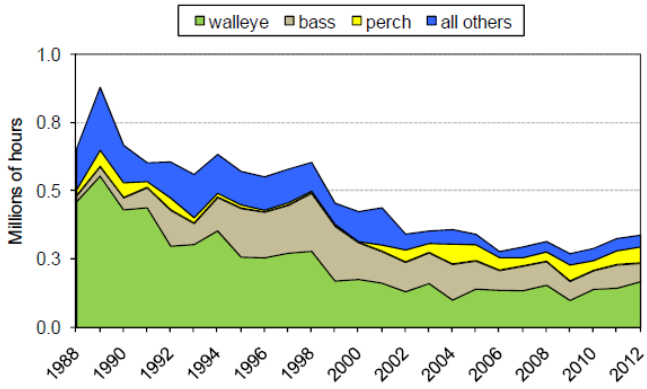


Open Lake Sport Fishing Survey

Overall 2012 open water sport fishing effort in New York waters of Lake Erie was estimated at 337,770 angler-hours. Peak fishing activity occurred during July and the most frequently used site was the Buffalo Small Boat Harbor, which accounted for about 30 % of measured boat fishing effort in 2012. The remaining four major access harbors each had similar angler effort totals.

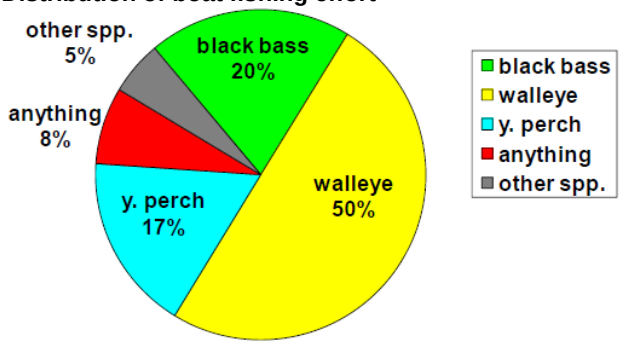
The 2012 fishing effort estimate was the highest total measured total since 2005; but only a slight increase (4 %) from 2011. This was also the third consecutive year boat fishing effort increased on Lake Erie. The overall boat fishing effort in 2012 ranked as the 19th highest of 25 observations from 1988 to 2012.

Overall Sport fishing effort



During the 2012 fishing season, walleye angling was the largest component of the boat fishery accounting for 50% of the overall angling effort. Smallmouth bass angling ranked second in boat fishing effort with 20 percent of the total. Among the remaining effort, anglers fishing for yellow perch contributed 17% of the overall effort. Most of the remaining 2012 fishing effort was by anglers fishing for "anything"

Distribution of boat fishing effort



In 2012 the total estimated daytime walleye harvest was 36,973 fish, the second highest total during the last 6 years, but near the 25-year survey series average. Estimated 2012 walleye fishing effort was 168,622 angler-hours, above the previous 10 year average. Walleye fishing effort over the last 10 years has been low relative to earlier observations. ✧

Status of the Fisheries in Michigan Waters of Lake Erie and Lake St. Clair, 2012

Highlights

The purpose of this report is to provide an update on the status of the fisheries in the Great Lakes and connecting waters of Southeast Michigan. Sources of information used in compiling this report include creel surveys, charter boat reports, an angler diary program, the Master Angler program, and commercial fishery records, as well as fisheries survey results.

Some highlights described in detail include:

● 2012 non-charter angler harvest rate for Lake Erie yellow perch was above the long-term average, while the walleye harvest rate was just below the long-term average.

● Michigan non-charter anglers on Lake Erie caught 98,296 walleye and harvested 77,448 of those fish. Anglers reported releasing higher numbers of sub-legal size walleye in 2012.

● Charter boat harvest rates for Lake Erie walleye were more than 4 times those estimated for noncharter anglers, while yellow perch charter boat harvest rates were 19% higher than those estimated for non-charter anglers.

● Lake St. Clair continues to be the premier Michigan water for trophy muskellunge and smallmouth bass based on the number of entries recorded in the Master Angler program in 2012.

● 2012 Lake Erie index gill net catch rates for Michigan waters were 142% higher than 2011, but remained below the 1978-2011 average.

● Rock bass, smallmouth bass, and channel catfish were the dominant species in the Lake St. Clair trap net survey in 2012. Over 18% of the channel catfish exceeded Master Angler minimum length.

● Long-term tagging studies on Lake Erie walleye stocks clearly illustrate the important contribution of Lake Erie walleye to the Great Lakes sport fishery of Southeast Michigan, from Port Huron to Toledo.

● Tagging studies of lake sturgeon in the connecting waters since 1997 have demonstrated that lake sturgeon routinely move between Lake St. Clair and the St. Clair River. Longer range movements between the St. Clair system and southern Lake Huron are also frequent.

Fishery Forecast for 2013

Harvestable-size yellow perch abundance is forecasted to be lower in 2013 than last year in Lake Erie, with strong contributions from the 2009 and 2010 year classes expected. Lake Erie walleye abundance is also expected to decline in 2013. Michigan anglers will find fewer walleye from the strong 2003 year class as the summer progresses and the fishery will rely on contributions from the 2011, 2010, and 2007 year classes. The comparatively weak 2008 and 2009 year classes are expected to contribute little to the fishery. Muskellunge and smallmouth bass numbers tend to remain more stable from year to year and both species should continue to provide excellent fishing opportunities in 2013, particularly in Lake St. Clair and the Detroit River. Still, weather conditions can affect sport fishing success as much as fish abundance. Therefore it is difficult to predict fishing success. Water levels in Lake St. Clair, the connecting rivers, and Lake Erie are forecasted to remain below the long term average in 2013. Thus shallow waters may continue to restrict angler access to some fishing areas in the connecting waters.

Sport Fishery Summary

An on-site creel survey conducted by the Michigan DNR produced a total harvest estimate of 424,130 fish for Michigan's 2012 Lake Erie sport fishery (non-charter). In combination, walleye and yellow perch accounted for 89% of the total harvest, reflecting their importance in the sport fishery. Non-charter anglers caught an estimated 98,296 walleye in Michigan waters of Lake Erie, and harvested 77,448 (79%) of those fish. The percentage of walleye released suggests that the 2010 and 2011 year classes will contribute to the harvest in future years. Although few bass are harvested by Michigan's Lake Erie anglers, over 19,000 legal-size largemouth and smallmouth bass were reported caught and released. Estimated angler effort in 2012 increased 27% from the all-time low recorded in 2011 (**Fig 1**). The walleye harvest rate in 2012 increased 15% from 2011, but remained well below the long-term mean of 0.22 walleye per angler hour (**Fig 2).** The yellow perch harvest rate decreased 73% in 2012, but remained well above the long-term mean of 0.55 yellow perch per angler hour.

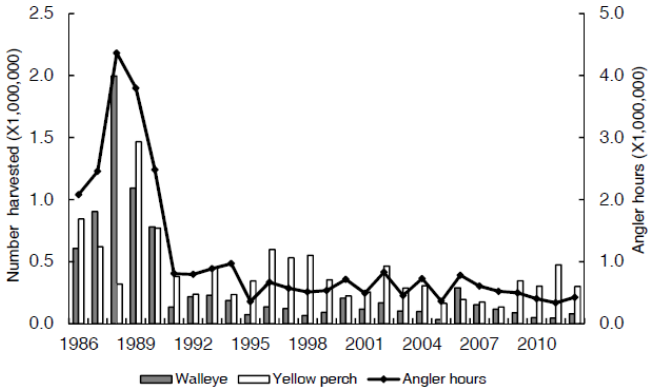


Fig 1- Estimated harvest and effort for Michigan's Lake Erie sport fishery, 1986-2012

The age composition of harvested walleye was rather evenly distributed across ages 2, 3, 4, and 5 (2010, 2009, 2008, and 2007 year classes), which collectively accounted for 78% of the harvest (**Fig 3**). The 2003 year class (age 9) remained a strong contributor, with age 9 and older walleye accounting for 10% of the harvest. The average length of walleye harvested in the sport fishery in 2012 was 481 mm (18.9 in.).

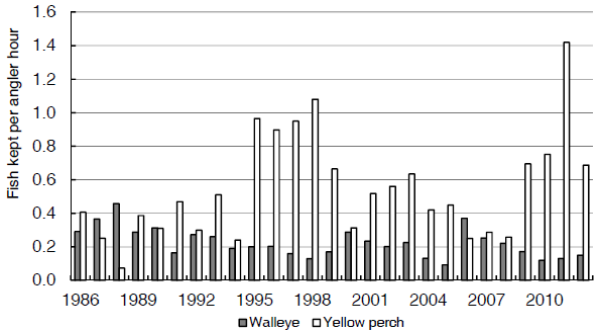


Fig 2-Walleye and yellow perch harvest rates for Michigan's Lake Erie sport fishery, 1986-2012.

Yellow perch harvest was dominated by age 3 fish (2009 year class), which accounted for 47% of the total harvest (**Fig 3).** Age 2 fish (2010 year class) and age 4 fish (2008 year class) were also important and in combination, accounted for 45% of the total harvest. Average lengths of harvested age 2, 3, and 4 yellow perch were 201mm (7.9

in.), 220 mm (8.7 in.), and 237 mm (9.3 in.). The overall average length of yellow perch harvested in the sport fishery in 2011 was 223 mm (8.8 in.). Observed mean length-at-age for yellow perch taken in the Michigan sport fishery was relatively stable for age 2, 3, and 4 fish in 2012.

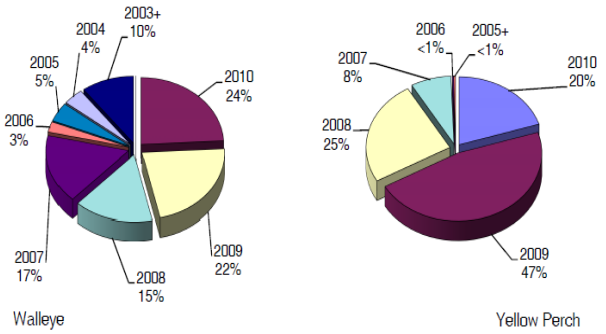


Fig 3-Year class contribution to Michigan sport harvest for walleye and yellow perch from Lake Erie in 2012

Charter Boat reporting

In 2012, Michigan charter boat anglers reported a harvest of 30,111 fish from Lake Erie. In combination, walleye (43%) and yellow perch (54%) accounted for 97% of the total harvest. The walleye harvest rate in 2012 increased 20% from 2011 and was only slightly below the long-term mean harvest rate of 0.73 walleye per hour. Yellow perch harvest rate increased by 9% from 2011, exceeding the long-term mean of 0.60 yellow perch per hour for the 3rd consecutive year. The charter boat walleye harvest rate (0.67) was about 4.5 times higher than those estimated for non-charter anglers (0.15) in 2012, while the yellow perch charter harvest rate (0.85) was about 19% higher than the rate for non-charter boat anglers (0.69).

For Lake Erie, charter operators reported releasing 6,297 fish. About 61% of the released fish were from the "other species" category, which generally is composed largely of white perch, white bass, freshwater drum, and channel catfish.

For the St. Clair-Detroit River system, charter boat anglers reported a harvest of 7,839 fish. Yellow perch (26%), walleye (52%), and smallmouth bass (18%), made up the bulk of the harvest. In 2012, charter boat harvest rates for walleye increased by 68% from 2011, and were slightly higher than the long-term mean walleye harvest rate of 0.20 walleye per hour. Yellow perch harvest rate declined 45% in 2012 to the lowest level recorded since the Charter Boat reporting system was established in 1990.

Charter operators on the St. Clair-Detroit River system reported releasing 13,837 fish. Smallmouth bass (70%) and muskie (8%) accounted for the majority of the fish caught-and released. For smallmouth bass, charter operators released 87% of the 11,134 smallmouth bass caught in 2012. Of the 1,159 muskellunge reported caught, only 2 were harvested, for a release rate of 99.8%.

Over the last 10 years, the walleye charter harvest rate for Lake Erie has generally been about 2 to 3 times higher than the St. Clair-Detroit River system rate. In 2012, the Lake Erie walleye charter harvest rate was 3 times higher than the Lake St. Clair charter harvest rate for walleye. Overall, the lower harvest rate typical for the St. Clair system is a result of lower walleye densities. Both the decline of the Thames River walleye population and lower numbers of walleye migrating from Lake Erie spawning sites through the St. Clair-Detroit River system have been contributing factors in lower walleye abundance in St. Clair-Detroit River system since 1990.

The number of reported Lake Erie charter excursions increased 16% in 2012 **(Fig 4),** but remained well below the levels reported prior to 2004. In 2012, charter boat excursions on the St. Clair-Detroit River system increased 1% from 2011.

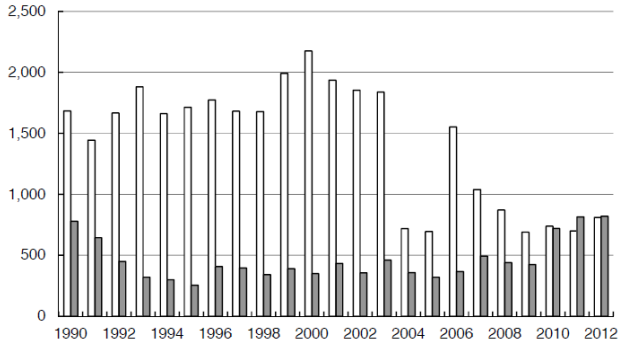


Fig 4-Reported charter boat excursions on Lake Erie and the St. Clair-Detroit River system, 1990-2012

Muskellunge catch rates in 2012 increased to the highest point observed since the diary program was founded in the early 1980's **(Fig 5).** The large increase in muskie catch rates for 2012 continues a pattern of increased variability in catch rates over the past 12 years. We suspect this increased variability may be more reflective of the lower number of muskellunge anglers involved in the diary program, than of actual changes in the muskellunge population.

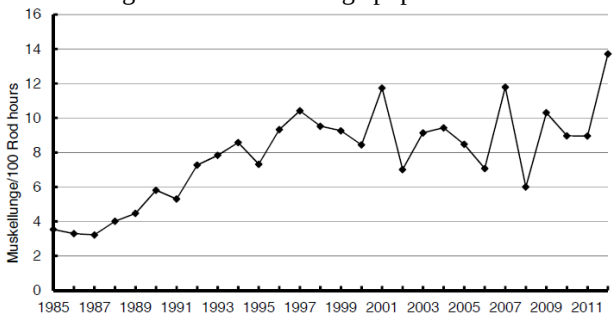


Fig 5-Lake St. Clair muskellunge catch rate from Angler Diary Program, 1985-2012

Master Angler Program

Lake St. Clair continued to dominate the statewide Master Angler entries for muskellunge in 2012, with 24 of the 40 total entries originating from the St. Clair system. However,

the number of Lake St. Clair muskellunge Master Angler entries has generally declined since 2000. By all accounts, the muskellunge population continues to provide excellent fishing opportunities.

Statistics from the Master Angler program indicate that Lake St. Clair is one of the premier waterbodies in the state for trophy smallmouth bass. Lake St. Clair accounted for 39% of all smallmouth bass entries statewide in 2012 (catch/keep and catch/release programs combined). Since the early 1990's, both catch/keep and catch/release Master Angler smallmouth bass entries from Lake St. Clair have exhibited an increasing trend (**Fig 6).** Catch/release entries have outnumbered catch/keep entries for the last 13 years. The strong representation of Lake St. Clair smallmouth bass in the statewide Master Angler Program is likely a reflection of an abundance of trophy-size smallmouth bass in the lake, a high degree of angler effort targeting the species, and widespread practice of catch-and-release among smallmouth bass anglers.

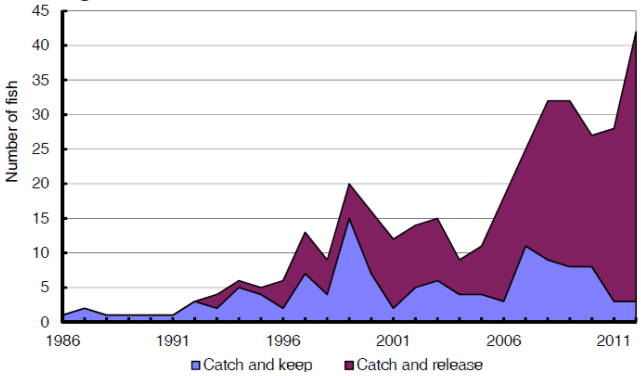


Fig6-Lake St. Clair smallmouth bass entered in the Michigan DNR Master Angler Program, 1986-2012

Commercial Fishery Summary

In 2012, three Michigan commercial fishing licenses were active on Lake Erie. The 2012 commercial harvest included 13 types of fish for a total of 1,424,323 pounds. In combination, common carp (36%), buffalo (16%), freshwater drum (10%), and channel catfish (9%) accounted for 71% of the total harvest by weight. The major species in the trap net harvest included white bass, freshwater drum, quillback, and buffalo. The harvest of channel catfish and white bass in 2012 was also near record harvests observed for those species since 1981. The total value of the 2012 Lake Erie commercial harvest from Michigan waters was estimated at $530,115**.**

Summary of Netting Surveys

In 2012, the MDNR surveyed adult fish populations in Lake St. Clair with trap nets. A total of 4,262 fish representing 22 species were captured during the survey. Rock bass were numerically dominant, accounting for 73% of the total (Figure 11). Other common species in the nets included smallmouth bass (8%), channel catfish (5%), and white bass (3%). For the first time since the current survey period started in 2002, no muskellunge were caught in the index trap nets.

The dominant walleye cohort was the 2010 year class (Age 2), accounting for 29% of the total catch. The 2009 year class (Age 3) was also a major component of the walleye catch, accounting for 25% of the total. For smallmouth bass, the 2005 (15%), 2006 (16%), 2007 (24%), and 2008 (22%) year classes accounted for 77% of the total trap net catch. A total of 337 smallmouth bass were tagged and released at the Anchor Bay trap net site in 2012.

The forage fish community of Lake St. Clair was dominated by spottail shiner and yellow perch. The species with highest mean densities in the fall samples were sand shiner, logperch, and spottail shiner. Alewife catches have been low since 2003, likely a result of the alewife population crash in Lake Huron. Yellow perch age-specific catch rates from the trawl survey indicate highly variable recruitment in Lake St. Clair (**Fig 7**). Yellow perch recruitment in 1998, 2003, 2007, and 2008 was strong, with total CPE values for those year classes all over 1,300 fish. Anglers will find the strength of the 2007 and 2008 year classes clearly illustrated by the number of yellow perch in the 7 to 9 inch size range in 2013.

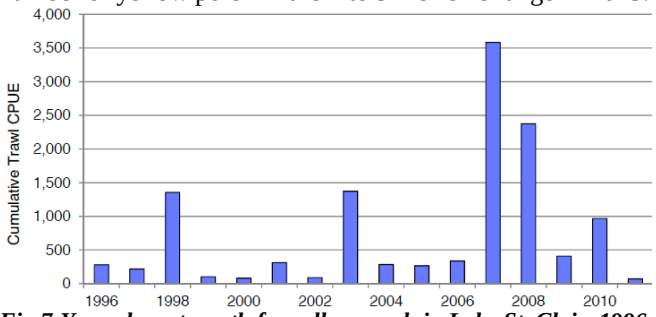


Fig 7-Year-class strength for yellow perch in Lake St. Clair, 1996 to 2012

A total of 189 lake sturgeon were collected during assessment surveys on Lake St. Clair and the St. Clair River in 2012. Sturgeon captured averaged 1,153 mm (45.4 in.) in total length, with a range from 262 mm (10.3 in.) to 1,778 mm (70.0 in.) Combined age samples for sub-40 inch lake sturgeon from 1997-2012 suggest recruitment has been fairly stable since the early 90's with strongest cohorts produced in 1993, 2000, 2001, and 2003. Survey setlines were modified in 2003 to include small hooks, providing a less biased sample of the sturgeon population.

Fish Tagging Studies

In 2012, Michigan tagged a total of 337 smallmouth bass with non-reward jaw tags in Anchor Bay of Lake St. Clair. Walleye captured during the spring trap net survey were not tagged. A total of 32 non-reward tags placed on smallmouth bass in 2012 were recovered by fisherman for a single season reporting rate of 9.5%, nearly two percentage points higher than the 7.6% reporting rate observed in 2011 and triple the reporting rate of 3.1% observed in 2010. Ten walleyes that were tagged in previous years were reported in 2012.

Since 2002, a total of 1,349 legal size walleye and 4,295 smallmouth bass captured in survey trap nets in Anchor Bay

have been tagged and released. Maps showing the geographical distribution of walleye and smallmouth bass tag recoveries since 2003 for fish tagged in Anchor Bay through 2012 are presented in **Fig 8**.

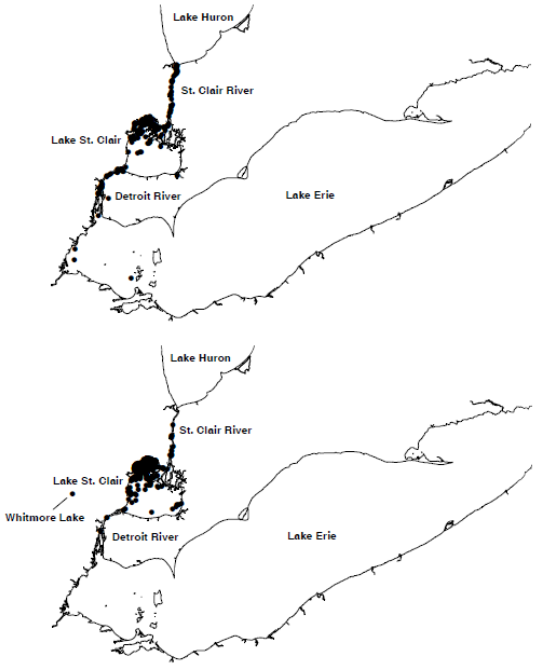


Fig 8-Geographical distribution of walleye tag recoveries (top map) and smallmouth basstag recoveries (bottom map) for fish tagged during 2002-2012 at the Anchor Bay site in Lake St.Clair. Black dots represent the recovery location of individual fish

End

A total of 2,577 lake sturgeon have been tagged and released in the St. Clair River and Lake St. Clair since 1996. To date, 430 tagged lake sturgeon have been recaptured with survey gear or reported by fishermen. A total of 288 tagged sturgeon have been recovered with survey setlines in the North Channel. One was recovered in a survey trap net in Anchor Bay, while 11 have been recaptured in assessment trawls on Lake St. Clair. Sport anglers have reported 103 recoveries, nearly all from the St. Clair River North Channel, except for one reported from Lake Erie, near Huron, Ohio. Twenty-one recoveries have been reported from the Ontario commercial trap net fishery in southern Lake Huron, approximately 70 km (43.5 mi) from the tag site. All other recaptures have occurred within 10 km (6.2 mi) of the tag sites. Trawling has accounted for the capture of 36% of the sturgeon tagged and released during this study, but only 31 recoveries (7%) have been fish originally caught in a trawl on Lake St. Clair.

Sport Fishing Regulations

The Michigan walleye daily possession limit at 6 fish from May 1, 2013 to April 30, 2014. Effective April 1, 2013, the statewide daily possession limit for muskie in Michigan has been changed to 1 harvested fish per angler per year. This statewide regulation covers the Great Lakes and connecting waters of Southeast Michigan and has implications for catch-and release format tournaments where fish are possessed. A non-transferable muskellunge harvest tag is required to harvest any muskellunge. The tag is free and is available at all license vendors. A harvested muskie shall be immediately tagged with a validated muskie harvest tag. ✧