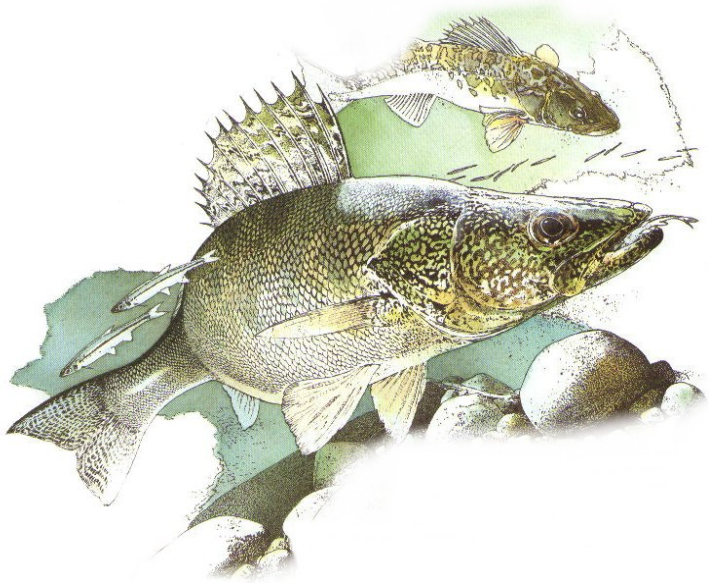
Report for 2011 by the

LAKE ERIE WALLEYE TASK GROUP

March 2012



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***Note**: Data and management summaries contained in this report are provisional. Every effort has been made to insure their correctness. Contact individual agencies for complete state and provincial data.*

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Charges to the Walleye Task Group, 2011-2012

The charges from the Lake Erie Committee's (LEC) Standing Technical Committee (STC) to the Walleye Task Group (WTG) for the period from March 2011 to February 2012 were to:

1. Maintain and update centralized time series of datasets required for population models and assessment including;
    a. Tagging and population indices (abundance, growth, maturity).
    b. Fishing harvest and effort by grid.
2. Improve existing population models to produce the most scientifically-defensible method for estimating and forecasting abundance, recruitment, and mortality. Continue to explore data pooling, catchability blocks, lambdas, and alternate selectivities to improve the existing model.
3. Report Recommended Allowable Harvest (RAH) levels for 2012.
4. Review jaw and PIT tagging study results and provide guidance/recommendations for future tagging strategies to the LEC.
5. Assist the STC with potential development of a new walleye exploitation strategy and with updating the Walleye Management Plan.

Review of Walleye Fisheries in 2011

Fishery effort and walleye harvest data were combined for all fisheries, jurisdictions and Management Units (Figure 1) to produce lake-wide summaries. The 2011 total estimated lake-wide harvest of walleye was 1.798 million walleye (Tables 1 and 2), with a total of 1.691 million walleye harvested in the total allowable catch (TAC) area. This harvest represents 58% of the 2011 TAC (2.919 million walleye) and includes walleye harvested in commercial and sport fisheries in Management Units 1, 2, and 3. An additional 105,748 walleye (6% of the lake-wide total) were harvested outside of the TAC area in Management Units 4 and 5 (referred to as Unit 4 in the Tables). The sport fish harvest of 0.593 million walleye in 2011 represents a 49% decrease from the 2010 harvest of 1.152 million, or a level of harvest that is 75% below the long-term (1975-2011) average of 2.407 million. The 2011 Ontario commercial harvest was approximately 1.208 million walleye lake-wide, with 1.179 million caught in the TAC area (Table 2). Ontario does not conduct angler creel surveys on an annual basis, thus recent estimates of harvest and effort for this fishery component are not available for Ontario waters. The most recent Ontario creels were completed in 2008, 2004, and 2003 in walleye MUs 1, 2 - 3, and 4 - 5, respectively. If the 2011 Ontario sport harvest was comparable to these earlier reference years, then Ontario lake-wide sport harvest would be approximately 48 thousand walleye, with 46 thousand harvested within the TAC area. Combined with reported commercial walleye harvest in the TAC area, this total harvest would remain unchanged at 97% of the Ontario TAC allocation of 1.256 million walleye. The Ontario commercial harvest was 26% higher than in 2010, and the 2011 harvest is 42% below the long-term average (1978-2011; Table 2, Figure 2).

Sport fishing effort decreased 33% in 2011 from 2010, to a total of 1.89 million angler hours (Table 3, Figure 3). Compared to 2010, sport effort in 2011 decreased in Management Units 1, 2 and 4, and was similar to the effort reported in Management Unit 3 in 2010. Lake-wide commercial gill net effort in 2011 (6,591 km) increased 34% from 2010 and is the 5th lowest observed effort since 1975 (Table 3, Figure 4).

Sport harvest per unit of effort (HUE, walleye/angler hour) decreased across all Management Units in 2011 compared to 2010. Management Unit 1 (0.27 walleye/angler hour), Management Unit 2 (0.30 walleye/angler hour), Management Unit 3 (0.41 walleye/angler hour) and Management Unit 4 (0.26 walleye/angler hour) decreased by 31%, 23%, 21% and 7%, respectively. In Management Unit 1, the sport harvest rate was 41% below the long-term average (0.46 walleye per angler hour; Table 4, Figure 5). The sport harvest rates in Management Unit 2 was slightly (6%) below the long-term mean of 0.32 walleye/angler hour, while Management Unit 3 (14%) and Management Unit 4 (24%) were both above the long-term means in 2011. The 2011 lake-wide average sport HUE of 0.29 walleye/angler hours was 33% lower than the long-term mean of 0.43 walleye/angler hour.

In 2011, total commercial gill net harvest per unit effort (HUE; 183.3 walleye/kilometer of net) decreased 6% relative to 2010, and was 50% above the long-term lake-wide average (122.2 walleye/kilometer; Table 4, Figure 5). When compared with 2010 commercial gill net harvest rates, they decreased in 2011 for Management Unit 1 (12%) and Management Unit 4 (38%) and increased in Management Unit 2 (3%) and Management Unit 3 (10%).

For the commercial and recreational fisheries, the harvest was dominated by walleye originating from the 2007 (age 4) and 2003 (age 7 and older) year classes. Ages 7-and-older walleye comprised 57% of the lake-wide sport fishery harvest and 38% of the total commercial fishery harvest (Tables 5 and 6). The 2007 year class (age 4 walleye) represented 22.0% of the total sport harvest and 26% of the total commercial harvest (Table 6). Lake-wide, ages 7-and-older fish accounted for 44% of the harvest, while the 2007 year class contributed 25%. The low contributions from the age 5, 6, and 7 cohorts (2006, 2005, and 2004 year classes, respectively) is an indication of their relatively lower abundance.

Across all jurisdictions, the mean age of walleye in the 2011 harvest ranged from 5.7 to 8.1 years old in the sport fishery, and from 4.9 to 8.3 years old in Ontario's commercial fishery (Table 7, Figure 6). In 2011, the mean age of walleye harvested increased in both the sport and commercial fishery. The mean age in the sport fishery was 6.7 years, above the long-term (1975-2011) mean of 4.2 years, and the highest recorded since 1975. In the commercial fishery, the mean age was 5.3 years, higher than the long-term (1975-2011) mean of 3.7 years, and is the highest value in the time series (1975-2011). The mean age of the total harvest (sport and commercial fisheries) in 2011 (5.8 years) was the highest in the time series (1975-2011). This reflects the continued dependence of the fisheries on the 2003 (age-7) and 2007 (age-4) year

classes, with little contribution to the fisheries from any other cohort in 2011.

Catch-at-Age Population Analysis and Abundance

The WTG continued to use the Automatic Differentiation Model Builder (ADMB) statistical catch-at-age (SCAA) analysis to estimate walleye population abundance from 1978 to 2011 (Walleye Task Group 2001). The model includes fishery data from the Ontario commercial fishery (west and central basins) and sport fisheries in Ohio (west and central basins) and Michigan (west basin). Since 2002, the standard WTG model has included 3 index gill net surveys. Over the years, evidence mounted that pooling the Michigan and Ohio gill net surveys had both a logical and statistical basis. In 2012, the Walleye Task Group continued the use the standard model configuration that was adopted in 2010 which uses the combined MI and OH index gill net survey data sets.

The model assumes log-normal distributions for catch-at-age (ages 2 through 7+, i.e., seven and older) and fishing effort. Natural mortality (M) is fixed in the model for all ages and years at 0.32. The key parameters, including age-2 recruitment and population size in the first year of the model, fisheries catchability, and selectivity, are estimated using a maximum likelihood approach with a concentrated likelihood configuration. The abundances-at-age were derived from the estimated parameters using an exponential survival equation. Since 2010, lambdas have been derived based on an expert opinion approach described in the ***Review of Lambda Weightings*** section of the 2010 Walleye Task Group Report (WTG 2010)**.**

The 2011 west-central population estimate from the 2012 WTG model was 20.4 million age 3 and older walleye (Table 8, Figure 7). The 2012 model estimate of age 2 fish in 2011 (2009 year class) was 13.575 million fish. The ADMB estimate of age-2 abundance in the last year of the model is known to have the highest error bounds, since the model contains little data about this year class. In 2010, the Quantitative Fisheries Center (QFC) at Michigan State University recommended that the WTG utilize the regression estimate of abundance derived from the age-0 interagency trawl catch rate for that cohort as the age-2 estimate. By consensus the WTG adopted that recommendation and will continue to use the regression estimate for the age-2 estimated abundance in the latest year of the fishery. See ***Recruitment Estimator for Incoming Age 2 Walleye and 2012 Population Size Projection*** section below for details on methodology. The regression estimate of age 2 fish in 2011 was 3.850 million fish (Table 9). The total 2011 west-central population estimate (age 2 regression estimate for the 2009 cohort plus age 3 and older walleye estimate from 2012 WTG model) was 24.3 million walleye (Table 8). Abundance of age-4 fish (2007 year class) was estimated at 7.97 million fish, while age 7 and older fish (mainly 2003 year class) abundance was estimated at 5.9 million. There were an estimated 14.8 million age 4 and older walleye in 2011.

Recruitment Estimator for Incoming Age-2 Walleye and 2012 Population Size Projection

A linear regression model was used to estimate age-2 walleye recruitment for 2011 and 2012. This regression utilizes estimates of age-2 walleye abundance from the catch-at-age analysis of the WTG model and walleye catches from pooled Ontario and Ohio bottom trawling reported as number of young-of-the-year walleye per hectare (Table 9, Figure 8). Linear regression used by the WTG to predict the abundance of these cohorts excludes the most recent ADMB age-2 estimate (the 2009 year class), as it has the widest estimation error due to the presence of only a single estimate of age in the model time series. The 2012 age-2 population estimate (2010 year class) from linear regression was 9.723 million walleye (Table 9, Figure 9).

Hypoxic conditions were observed present during the last three years of interagency bottom trawl assessment at a few of the sampling sites in the west basin. Due to concerns about the potential effects of hypoxia on the distribution of juvenile percids and other species, representatives from task groups, the Standing Technical Committee, researchers from the Quantitative Fisheries Center at Michigan State University and Ohio State University (OSU) developed an interim policy for the assignment of bottom trawl status. Informed by literature (Eby and Crowder 2002, Craig and Crowder 2005) and field study (Ohio DNR / OSU) concerning fish avoidance of hypoxic waters, an interim policy was agreed upon whereby bottom trawls that occurred in waters with dissolved oxygen less than or equal to 2 mg per liter would be excluded from analyses applied retroactively from 2009. This interim policy will be revisited in the future following an improved understanding of the relationship between dissolved oxygen and the distribution of fish species and their various among life stages in Lake Erie.

The standard process for projecting age-3 and older abundance for the year in which RAH is reported (i.e., 2012 in this case) involves applying statistical catch-age analyses (SCAA) survival estimates from the last year in the ADMB model to the abundance estimate of age-2 and older walleye in the last year (2011). Estimated age-specific survival is a function of estimated instantaneous fishing mortality (F), selectivity, and assumed natural mortality (M, 0.32) during 2011.

The 2012 estimated abundance of age-2 and older walleye is approximately 26.1 million (Table 10, Figure 10). It is projected that the 2003 year class (age-7) and older cohorts will represent 17% (4.382 million), whereas the 2007 year class will comprise 20% (5.319 million) of the population in 2012. Based on the projected abundance in 2012, walleye spawner abundance (ages-4 and older) in 2012 is estimated to be 13.6 million fish. This is in the 65th percentile of spawner abundance values for the time series 1978-2012. However, the spawner-recruit relationship for Lake Erie walleye is poorly understood, with recruitment likely influenced by a combination of abiotic and biotic factors. Thus, it is difficult to predict how many recruits (young-of-year) will be produced in 2012 based solely on abundance of spawning adults.

Harvest Policy and Recommended Allowable Harvest for 2012

The RAH is determined by the harvest policy, along with population and parameter estimates produced by the WTG 2012 model. The harvest management policy adopted by the LEC in the Walleye Management Plan (WMP; Locke et al. 2005) is a sliding F-scale that has a feedback or state-dependent approach, and varies targeted fishing mortality rate based on population abundance (Figure 11). The policy stipulates that when walleye abundance is 20-40 million walleye, the targeted fishing mortality rate should be between F=0.20 and F=0.35, and when abundance is between 15-20 million walleye, the fishing rate should be between F=0.1 and F=0.2 (Figure 11; Locke et al. 2005). Using results from the WTG 2012 model, the estimated abundance of 26.1 million walleye in 2012, and the sliding-F harvest policy of F=0.246, the calculated mean RAH for 2012 is 3.487 million walleye, with a range from 2.191 (minimum) to 5.326 (maximum) million walleye (Table 11).

East Basin Walleye Assessment

1) Mixed adult walleye populations

During past years, the WTG attempted a broad-based assessment of the walleye resource in the east basin using a cohort-based stock assessment model, i.e. statistical catch-at-age analysis (SCAA) using the AD Model Builder platform, similar to the walleye assessment in the west and central basin. The assessment provided abundance estimates of the east basin walleye population from 1993 to 2009. These previous efforts were especially helpful for assembling walleye fishery and survey data from all east basin jurisdictions to support a more comprehensive assessment than had previously been possible. Additionally, the east-basin SCAA model was expected to provide a coarse scale for describing east basin walleye abundance relative to the resource in the quota management area.

The SCAA model depends on the catch-at-age information collected from fisheries and surveys and assumes the same cohorts are tracked through time. However, many studies have shown the walleye resource in the east basin during harvest season is a mixture of walleye sub-populations from both west basin and east basin (Einhouse and MacDougall 2010). In a recent study, Zhao et al (2011) used a mark-recapture analysis to quantify the contribution of both sources. They estimated that, on average, about 90% of walleyes harvested in the east basin were seasonal migrants from the west basin. However, there exists a large amount of uncertainty and variation associated with the annual age and size structure of the walleye population migrating from the west basin. Further, it is unlikely that this migration occurs in a consistent way by exactly the same segment of the population each year. The study suggests that catch-at-age information cannot track the same cohort of walleye from year to year in the east basin and the core assumption of tracking cohorts in a cohort-based model is likely violated. Therefore, beginning with the report for 2010, the WTG removed the East Basin ADMB abundance estimates from the WTG report.

The WTG member agencies from the east basin continue assessment surveys to track changes in the abundance of walleye population, and walleye fisheries are closely monitored and regulated in the east basin. In the future, WTG members will continue to examine the walleye resource inhabiting eastern Lake Erie to develop a multi-jurisdictional assessment that recognizes both expansive seasonal movements from the west-central quota management area, as well as the dynamics of smaller and localized east basin spawning stocks. This may necessarily include a stock assessment approach that does not utilize a catch-at-age modeling of absolute abundance.

2) Basin-Wide Juvenile Walleye

A preliminary consideration of the dynamics, production and relative abundance of localized east basin stocks was undertaken in 2011 by utilizing data from comparable components of Ontario (ON Partnership) New York (NYDEC warmwater) and Ohio (ODNR) gillnet assessment programs. Based on the assumption that young walleye do not undertake large migrations from their point of origin, the abundance and location of yearling walleye in the eastern basin was plotted and considered relative to yearling walleye from other basins (Figure 12). This approach allows us to consider recruitment success between basins (e.g. west basin and east basin had large densities of yearlings compared to that of the central basin in 2011) and within the east basin (e.g. highest densities along the south and far eastern shorelines in 2011). This approach has notable limitations (lack of suspended gillnet data in NY; evidence for suspended yearling catches in Ontario waters; difficulty standardizing / incorporating data from other jurisdictions in the lake) however we present this as another step toward assessment of the eastern basin walleye resource. We will continue to explore ways of standardizing assessment data, modifying methodologies, and examining historic data in the coming year.

Other Walleye Task Group Charges

Centralized Databases

Walleye Task Group members currently manage several databases. These databases consist of harvest and population assessment surveys conducted by the respective agencies that manage the walleye population in Lake Erie. Annually, information from these surveys is compiled to assist WTG members in the decision-making process regarding recommended harvest levels and current status and trends of the walleye population. Use of WTG databases by non-members is only permitted following a specific protocol established in 1994, described in the 1994 WTG Report, and reprinted in the 2003 WTG Report (Walleye Task Group 2003).

The Lake Erie Walleye Tagging database consists of biological information collected from walleye tagged in the tributaries and main lake areas of Lake Erie. The tagging program dates back to 1986, and has been maintained at the Lake St. Clair Fisheries Research Station of the MDNR. Annually, agencies submit information regarding tagging activities in their jurisdictions. In addition to updating the database with new tagging information, the database also maintains a record of the tagged walleye which

are reported as harvested in a given year. The information is used to estimate the movements of different spawning stocks within the lake proper and connecting waters of Lake Erie. Estimates of survival and exploitation are also generated with this information. The Lake Erie Walleye Tagging database is maintained at the Sandusky office of the Ohio Department of Natural Resources, Division of Wildlife.

Fishery harvest and population assessment survey information are annually compiled by the WTG and are used for estimating the population abundance of walleye in Lake Erie via SCAA analysis (Deriso et al. 1985). A spatially-explicit version of agency-specific harvest data (e.g., harvest-at-age and fishery effort by management unit) and population assessment (e.g., the interagency trawl program and gill net surveys) databases are maintained by the WTG. Annual population abundance estimates are used to assist LEC members with setting TACs for the upcoming year as well as to evaluate past harvest policy decisions.

Walleye Spatial Ecology Study

In 2010, an inter-lake walleye spatial ecology study was initiated between the Michigan Department of Natural Resources, Ohio Department of Natural Resources, United States Geological Survey, Carlton University, and Great Lakes Fishery Commission. The objectives of the study are to 1) determine the proportion of walleyes spawning in the Tittabawasse River or in the Maumee River that reside in the Lake Huron main basin population, move into and through the Huron-Erie-Corridor, and reside in Lake Erie, 2) identify the environmental characteristics associated with the timing and extent of walleye movement from riverine spawning grounds into Lake Huron and back again, 3) determine whether walleye demonstrate spawning site fidelity, and 4) compare unbiased estimates of mortality parameters of walleyes from Saginaw Bay and the Maumee River.

Acoustic telemetry tags, 200 tags per river, were implanted into walleye spawning in the Tittabawassee River, Lake Huron, and Maumee River, Lake Erie, during the spring of 2010. In addition to the internal acoustic tags, each walleye was tagged with an external orange tag and a $100US reward is being offered for reporting and returning the acoustic tag. In the event one of these fish is harvested, individuals are encouraged to report this to the Hammond Bay Biological Station at 989-734-4768 or contact the Ontario Ministry of Natural Resources or Ohio Department of Natural Resources.

Walleye Management Plan and Lake Erie Percid Advisory Group

In 2005, the Lake Erie Walleye Task Group and LEC completed the Lake Erie Walleye Management Plan (WMP; Locke et al. 2005). Within this plan, it was recommended that the actions, and the outcomes of these actions, be reviewed on a five-year basis in order to measure the success of the plan and evaluate its objectives. In 2010-2011, a review was completed which concluded that the performance of the WMP varied. While some fishery catch rate objectives were achieved, other factors such as instability in

harvest and TAC, due in part to recruitment patterns, caused concern for fisheries managers and stakeholders.

In order to move forward with updating the WMP, the LEC formed the Lake Erie Percid Management Advisory Group (LEPMAG). This group consists of stakeholder groups from all jurisdictions surrounding Lake Erie , Lake Erie managers, agency staff, and is being facilitated by Michigan State University's Quantitative Fisheries Center. The LEPMAG forum offers an opportunity for stakeholders to have direct input into the LEC process. The purpose of this group is to discuss fishery objectives, options, and uncertainties around the management of Lake Erie fisheries, and advise Lake Erie managers on potential exploitation policies for walleye. In 2011-2012, LEPMAG members were involved in a series of five facilitated workshops in order to determine fisheries objectives for the Lake Erie walleye population, examined variations of the walleye assessment model, and considered several types of management options for the fishery. The QFC has progressed with the technical work on developing management strategy evaluation (MSE) models incorporating input from the LEPMAG workshops. The MSE will help LEPMAG develop, test, and compare performance of various harvest policies while recognizing key uncertainties. Ultimately a new harvest policy for walleye will be developed for the 2013 season. The future of the WMP is dependent on the LEPMAG process and LEC review.

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The WTG would also like to thank the members of the Habitat Task Group for their work addressing the walleye habitat charge.

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Table 1. Annual Lake Erie walleye total allowable catch (TAC, top) and measured harvest (Har; bottom, bold), in numbers of fish from 1980 to 2011. TAC allocations for 2010 are based on water areas: Ohio, 51.11%; Ontario, 43.06%; and Michigan, 5.83%. New York and Pennsylvania do not have assigned quotas but are included in annual total harvest.

		TAC Area (MU-1, MU-2, MU-3)				Non-TAC Area (MUs 4&5)				All Areas
Year		Michigan	Ohio	Ontario [a]	Total	NY	Penn.	Ontario	Total	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**

[a] Ontario sport harvest values were estimated from the most recent creel surveys in each basin; 2008 in Unit 1, 2004 in Units 2 and 3, and 2003 in Unit 4. These values are included in Ontario's total walleye harvest, but are not used in catch-at-age analysis.

Table 2. Annual harvest (thousands of fish) of Lake Erie walleye by gear, management unit, and agency. Means contain data from 1975 to 2011.

	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
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

[a] Ontario sport harvest values were estimated from the most recent creel surveys in each basin; 2008 in Unit 1, 2004 in Units 2 and 3, and 2003 in Unit 4. These values are included in Ontario's total walleye harvest, but are not used in catch-at-age analysis.

Table 3. Annual fishing effort for Lake Erie walleye by gear, management unit, and agency. Means contain data from 1975 to 2011.

	Sport Fishery [a]															Commercial Fishery [b]				
	Unit 1				Unit 2			Unit 3			Units 4 & 5					Unit 1	Unit 2	Unit 3	Unit 4	
Year	OH	MI	ON[c]	Total	OH	ON[c]	Total	OH	ON[c]	Total	ON[c]	PA	NY	Total	Total	ON	ON	ON	ON	Total
1975	486	30	46	562	61	--	61	--	--	--	--	--	--	0	623	--	--	--	--	--
1976	1,356	84	98	1,538	163	--	163	--	--	--	--	--	--	0	1,701	1,796	1,933	--	--	3,729
1977	2,768	171	130	3,069	151	--	151	--	--	--	--	--	--	0	3,220	4,282	1,572	--	--	5,854
1978	2,880	176	148	3,204	154	--	154	--	--	--	--	--	--	0	3,358	5,253	436	--	--	5,689
1979	4,179	257	97	4,533	169	--	169	--	--	--	--	--	--	0	4,702	5,798	1,798	--	--	7,596
1980	3,938	624	92	4,654	237	--	237	187	--	187	--	--	--	0	5,078	6,229	1,565	--	--	7,794
1981	5,766	447	138	6,351	264	--	264	382	--	382	--	--	--	0	6,997	6,881	2,144	622	--	9,647
1982	5,928	449	108	6,484	223	--	223	114	--	114	--	--	--	0	6,821	10,531	2,913	689	--	14,133
1983	4,168	451	118	4,737	568	--	568	128	--	128	--	--	--	0	5,433	11,205	5,352	5,814	--	22,371
1984	4,077	557	82	4,716	1,322	--	1,322	392	--	392	--	--	--	0	6,430	11,550	6,008	2,438	--	19,996
1985	4,606	926	84	5,616	1,078	--	1,078	464	--	464	--	--	--	0	7,158	7,496	2,800	2,983	--	13,279
1986	6,437	1,840	107	8,384	1,086	--	1,086	538	--	538	--	--	--	0	10,008	7,824	5,637	3,804	--	17,265
1987	6,631	2,193	84	8,908	1,431	--	1,431	472	--	472	--	--	--	0	10,811	6,595	4,243	3,045	--	13,883
1988	7,547	4,362	87	11,996	1,677	--	1,677	1,081	--	1,081	--	--	462	462	15,216	7,495	5,794	3,778	--	17,067
1989	5,246	3,794	81	9,121	1,532	77	1,609	883	205	1,088	--	--	556	556	12,374	7,846	5,514	3,473	--	16,833
1990	4,116	1,803	121	6,040	1,675	33	1,708	869	83	952	--	--	432	432	9,132	9,016	5,829	5,544	--	20,389
1991	3,616	440	144	4,200	1,241	79	1,320	724	155	880	--	--	440	440	6,840	10,418	5,055	3,146	--	18,619
1992	3,955	715	105	4,775	1,169	81	1,249	640	145	786	--	--	299	299	7,109	9,486	6,906	6,043	--	22,435
1993	3,943	691	125	4,759	1,349	70	1,418	1,062	125	1,187	--	--	305	305	7,669	16,283	11,656	7,420	--	35,359
1994	2,808	788	125	3,721	1,025	65	1,090	599	130	729	--	--	355	355	5,894	16,698	9,968	6,459	--	33,125
1995	3,188	277	125	3,589	803	65	868	355	130	485	--	--	259	259	5,201	20,521	12,113	7,850	--	40,484
1996	3,060	521	125	3,706	1,132	65	1,197	495	130	625	--	316	256	572	6,101	19,976	15,685	10,990	--	46,651
1997	2,748	374	88	3,210	864	45	909	492	91	583	--	388	273	661	5,363	15,708	11,588	9,094	--	36,390
1998	3,010	374	103	3,487	635	51	686	409	55	464	217	390	280	887	5,524	19,027	19,397	13,253	818	52,495
1999	2,368	411	--	2,779	603	--	603	323	--	323	--	397	171	568	4,699	21,432	10,955	7,630	1,444	41,461
2000	1,975	540	--	2,516	540	--	540	281	--	281	--	244	177	421	3,757	22,238	11,049	7,896	1,781	43,054
2001	1,952	362	--	2,314	697	--	697	261	--	261	--	241	163	404	3,676	9,372	5,746	5,021	639	20,778
2002	1,393	606	--	1,999	444	--	444	246	--	246	--	130	132	262	2,951	4,431	4,212	4,427	445	13,515
2003	1,719	326	--	2,045	675	--	675	236	--	236	30	159	162	351	3,307	4,476	3,946	3,725	365	12,512
2004	1,257	504	--	1,761	736	27	763	178	7	185	--	88	101	189	2,898	3,875	2,977	2,401	240	9,493
2005	1,180	212	40	1,392	573	--	573	261	--	261	--	109	142	251	2,477	7,083	4,174	4,503	174	15,934
2006	1,757	587	--	2,344	899	--	899	260	--	260	--	239	137	376	3,879	5,689	4,008	3,589	822	14,107
2007	2,076	448	--	2,524	1,147	--	1,147	321	--	321	--	232	135	367	4,358	4,509	2,927	2,665	383	10,484
2008	1,027	392	63	1,419	809	--	809	356	--	356	--	187	156	343	2,927	4,990	3,193	1,909	497	10,590
2009	1,063	310	--	1,373	777	--	777	289	--	289	--	124	100	224	2,663	3,537	2,164	1,746	478	7,925
2010	1,403	226	--	1,629	652	--	652	219	--	219	--	188	140	328	2,828	1,918	1,371	1,401	247	4,937
2011	862	165	--	1,026	346	--	346	217	--	217	--	156	145	301	1,891	2,646	1,884	1,572	489	6,591
Mean	3,148	741	102	3,959	781	60	799	429	114	469	124	224	241	260	5,434	9,281	5,681	4,675	630	19,235

[a] Sport units of effort are thousands of angler hours.

[b] Estimated Standard (Total) Effort in kilometers of gill net = (walleye targeted effort x walleye total harvest)/ walleye targeted harvest.

[c] Ontario sport fishing effort was estimated from the most recent creel surveys in each basin; 2008 in Unit 1, 2004 in Units 2 and 3, and 2003 in Unit 4.

Table 4. Annual catch per unit effort for Lake Erie walleye by gear, management unit, and agency. Means contain data from 1975 to 2011.

	Sport Fishery [a]															Commercial Fishery [b]				
	Unit 1				Unit 2			Unit 3			Units 4 & 5					Unit 1	Unit 2	Unit 3	Unit 4	
Year	OH	MI	ON[c]	Total	OH	ON[c]	Total	OH	ON[c]	Total	ON[c]	PA	NY	Total	Total	ON	ON	ON	ON	Total
1975	0.16	0.13	0.16	0.16	0.17	--	0.17	--	--		--	--	--		0.16					
1976	0.45	0.36	0.50	0.45	0.22	--	0.22	--	--		--	--	--		0.42	63.0	22.9			42.2
1977	0.77	0.62	0.53	0.75	0.24	--	0.24	--	--		--	--	--		0.73	54.9	42.6			51.6
1978	0.54	0.41	0.76	0.54	0.24	--	0.24	--	--		--	--	--		0.53	52.2	138.2			58.8
1979	0.78	0.63	0.81	0.77	0.36	--	0.36	--	--		--	--	--		0.76	107.9	16.7			86.3
1980	0.53	0.29	0.62	0.50	0.21	--	0.21	0.13	--	0.13	--	--	--		0.47	153.0	25.3			127.3
1981	0.50	0.21	0.51	0.48	0.14	--	0.14	0.12	--	0.12	--	--	--		0.44	150.7	55.4	4.9		120.1
1982	0.50	0.43	0.45	0.49	0.22	--	0.22	0.07	--	0.07	--	--	--		0.48	102.2	45.9	2.8		85.8
1983	0.39	0.32	0.34	0.38	0.37	--	0.37	0.20	--	0.20	--	--	--		0.38	100.7	31.2	13.7		61.5
1984	0.76	0.63	0.48	0.74	0.60	--	0.60	0.46	--	0.46	--	--	--		0.69	141.9	65.3	44.4		107.0
1985	0.73	0.50	0.68	0.69	0.27	--	0.27	0.19	--	0.19	--	--	--		0.59	229.6	154.5	75.6		179.1
1986	0.58	0.33	0.49	0.52	0.44	--	0.44	0.33	--	0.33	--	--	--		0.51	211.0	99.0	93.7		148.6
1987	0.57	0.41	0.61	0.53	0.38	--	0.38	0.28	--	0.28	--	--	--		0.50	244.2	146.5	133.1		190.0
1988	0.50	0.46	0.21	0.48	0.35	--	0.35	0.52	--	0.52	--	--	0.18	0.18	0.46	249.0	131.4	108.2		177.9
1989	0.55	0.29	0.17	0.44	0.57	0.45	0.56	0.49	0.39	0.47	--	--	0.23	0.23	0.45	211.1	112.7	111.2		158.3
1990	0.36	0.41	0.29	0.37	0.23	0.42	0.24	0.49	0.28	0.47	--	--	0.11	0.11	0.34	179.1	90.7	54.5		120.0
1991	0.31	0.30	0.27	0.30	0.17	0.30	0.18	0.36	0.28	0.34	--	--	0.08	0.08	0.27	138.8	87.0	87.1		116.0
1992	0.37	0.35	0.19	0.37	0.29	0.69	0.32	0.41	0.18	0.37	--	--	0.05	0.05	0.34	163.1	77.3	52.3		106.8
1993	0.47	0.39	0.30	0.45	0.33	0.37	0.34	0.35	0.09	0.32	--	--	0.13	0.13	0.40	152.8	65.4	66.8		106.0
1994	0.35	0.27	0.17	0.33	0.28	0.31	0.28	0.31	0.16	0.28	--	--	0.17	0.17	0.31	138.2	63.2	66.9		101.7
1995	0.36	0.39	0.25	0.36	0.20	0.12	0.19	0.32	0.21	0.29	--	--	0.10	0.10	0.31	125.7	56.2	62.2		92.6
1996	0.47	0.34	0.13	0.44	0.57	0.13	0.55	0.46	0.21	0.41	--	0.28	0.15	0.22	0.44	139.0	70.6	53.6		95.9
1997	0.34	0.33	0.10	0.33	0.22	0.04	0.21	0.27	0.06	0.24	--	0.23	0.11	0.17	0.28	164.6	80.1	59.8		111.5
1998	0.59	0.31	0.33	0.56	0.34	0.10	0.32	0.73	0.08	0.65	0.09	0.32	0.12	0.18	0.48	131.3	60.1	34.8	34.2	79.1
1999	0.34	0.34	--	0.34	0.23	--	0.23	0.26	--	0.26	--	0.22	0.14	0.22	0.27	114.8	57.6	41.6	47.4	83.9
2000	0.34	0.47	--	0.37	0.31	--	0.31	0.33	--	0.33	--	0.32	0.16	0.32	0.34	72.1	40.2	24.8	27.1	53.2
2001	0.48	0.44	--	0.48	0.25	--	0.25	0.18	--	0.18	--	0.22	0.09	0.22	0.38	107.1	54.0	28.1	32.1	71.0
2002	0.37	0.32	--	0.36	0.32	--	0.32	0.19	--	0.19	--	0.17	0.14	0.17	0.32	211.5	73.4	33.0	37.4	104.3
2003	0.42	0.40	--	0.41	0.34	--	0.34	0.29	--	0.29	0.07	0.28	0.17	0.21	0.37	211.8	71.7	48.9	38.4	114.1
2004	0.41	0.23	--	0.36	0.37	0.06	0.36	0.40	--	0.40	--	0.23	0.08	0.15	0.35	223.5	112.2	73.0	45.3	146.0
2005	0.32	0.18	0.67	0.31	0.19	--	0.19	0.48	--	0.48	--	0.18	0.19	0.19	0.29	265.2	149.8	89.1	86.4	183.2
2006	0.68	0.52	--	0.64	0.56	--	0.56	0.65	--	0.65	--	0.63	0.27	0.50	0.61	375.7	195.6	151.9	80.8	250.4
2007	0.68	0.37	--	0.63	0.50	--	0.50	0.53	--	0.53	--	0.50	0.21	0.40	0.57	298.9	153.8	124.9	91.4	206.7
2008	0.51	0.31	--	0.45	0.41	--	0.41	0.63	--	0.63	--	0.40	0.19	0.30	0.45	191.2	104.9	126.2	70.4	147.8
2009	0.52	0.30	--	0.47	0.37	--	0.37	0.44	--	0.44	--	0.34	0.14	0.25	0.42	199.2	97.9	77.1	58.0	136.1
2010	0.42	0.24	--	0.39	0.39	--	0.39	0.52	--	0.52	--	0.29	0.26	0.28	0.39	316.7	134.5	105.0	94.5	194.9
2011	0.26	0.31	--	0.27	0.30	--	0.30	0.41	--	0.41	--	0.29	0.22	0.26	0.29	278.3	138.9	115.0	59.0	183.3
Mean	0.48	0.37	0.40	0.46	0.32	0.27	0.32	0.37	0.19	0.36	0.08	0.31	0.15	0.21	0.43	174.16	86.74	69.81	57.31	122.19

[a] Sport CPE = Number/angler hour

[b] Commercial CPE = Number/kilometer of gill net

[c] Ontario sport fishing CPE was estimated from the most recent creel surveys in each basin; 2008 in Unit 1, 2004 in Units 2 and 3, and 2003 in Unit 4.

Table 5. Catch at age of walleye harvest by management unit, gear, and agency in Lake Erie during 2011. Units 4 and 5 are combined in Unit 4.

		Commercial	Sport					All Gear
Unit	Age	Ontario	Ohio	Michigan	New York	Pennsylvania	Total	Total
1	1	34,608	0	3	--	--	3	34,611
	2	79,176	12,221	7,397	--	--	19,618	98,794
	3	147,538	27,609	14,563	--	--	42,172	189,710
	4	210,112	70,483	16,844	--	--	87,327	297,439
	5	8,367	5,784	159	--	--	5,943	14,310
	6	25,800	6,405	1,546	--	--	7,951	33,751
	7+	230,786	101,009	9,977	--	--	110,986	341,772
	Total	736,387	223,511	50,490	--	--	274,001	1,010,388
2	1	14,178	0	--	--	--	0	14,178
	2	35,699	5,885	--	--	--	5,885	41,584
	3	39,087	4,622	--	--	--	4,622	43,709
	4	51,655	16,710	--	--	--	16,710	68,365
	5	4,630	1,718	--	--	--	1,718	6,348
	6	6,270	3,814	--	--	--	3,814	10,084
	7+	110,271	71,700	--	--	--	71,700	181,971
	Total	261,790	104,449	--	--	--	104,449	366,239
3	1	429	0	--	--	--	0	429
	2	883	815	--	--	--	815	1,698
	3	4,140	2,453	--	--	--	2,453	6,593
	4	49,831	10,383	--	--	--	10,383	60,214
	5	9,159	1,047	--	--	--	1,047	10,206
	6	15,668	3,728	--	--	--	3,728	19,396
	7+	100,770	70,929	--	--	--	70,929	171,699
	Total	180,880	89,355	--	--	--	89,355	270,235
4	1	0	--	--	0	0	0	0
	2	0	--	--	239	997	1,236	1,236
	3	53	--	--	4,786	1,246	6,032	6,085
	4	1,558	--	--	1,994	3,241	5,235	6,793
	5	3,520	--	--	4,707	997	5,704	9,224
	6	5,008	--	--	1,276	1,745	3,021	8,029
	7+	18,734	--	--	18,504	37,143	55,647	74,381
	Total	28,873	--	--	31,506	45,369	76,875	105,748
All	1	49,215	0	3	0	0	3	49,218
	2	115,758	18,921	7,397	239	997	27,554	143,312
	3	190,818	34,684	14,563	4,786	1,246	55,279	246,097
	4	313,156	97,576	16,844	1,994	3,241	119,655	432,811
	5	25,676	8,549	159	4,707	997	14,412	40,088
	6	52,746	13,947	1,546	1,276	1,745	18,514	71,260
	7+	460,561	243,638	9,977	18,504	37,143	309,262	769,823
	Total	1,207,930	417,315	50,490	31,506	45,369	544,680	1,752,610

[a] Ontario sport harvest values were not estimated from creel surveys in 2011; they are not used in catch-at-age analysis.

Table 6. Age composition (in percent) of walleye harvest by management unit, gear, and agency in Lake Erie during 2011. Units 4 and 5 are combined in Unit 4.

		Commercial	Sport					All Gears
Unit	Age	Ontario	Ohio	Michigan	New York	Pennsylvania	Total	Total
1	1	4.7	0.0	0.0	--	--	0.0	3.4
	2	10.8	5.5	14.7	--	--	7.2	9.8
	3	20.0	12.4	28.8	--	--	15.4	18.8
	4	28.5	31.5	33.4	--	--	31.9	29.4
	5	1.1	2.6	0.3	--	--	2.2	1.4
	6	3.5	2.9	3.1	--	--	2.9	3.3
	7+	31.3	45.2	19.8	--	--	40.5	33.8
	Total	100.0	100.0	100.0	--	--	100.0	100.0
2	1	5.4	0.0	--	--	--	0.0	3.9
	2	13.6	5.6	--	--	--	5.6	11.4
	3	14.9	4.4	--	--	--	4.4	11.9
	4	19.7	16.0	--	--	--	16.0	18.7
	5	1.8	1.6	--	--	--	1.6	1.7
	6	2.4	3.7	--	--	--	3.7	2.8
	7+	42.1	68.6	--	--	--	68.6	49.7
	Total	100.0	100.0	--	--	--	100.0	100.0
3	1	0.2	0.0	--	--	--	0.0	0.2
	2	0.5	0.9	--	--	--	0.9	0.6
	3	2.3	2.7	--	--	--	2.7	2.4
	4	27.5	11.6	--	--	--	11.6	22.3
	5	5.1	1.2	--	--	--	1.2	3.8
	6	8.7	4.2	--	--	--	4.2	7.2
	7+	55.7	79.4	--	--	--	79.4	63.5
	Total	100.0	100.0	--	--	--	100.0	100.0
4	1	0.0	--	--	0.0	0.0	0.0	0.0
	2	0.0	--	--	0.8	2.2	1.6	1.2
	3	0.2	--	--	15.2	2.7	7.8	5.8
	4	5.4	--	--	6.3	7.1	6.8	6.4
	5	12.2	--	--	14.9	2.2	7.4	8.7
	6	17.3	--	--	4.1	3.8	3.9	7.6
	7+	64.9	--	--	58.7	81.9	72.4	70.3
	Total	100.0	--	--	100.0	100.0	100.0	100.0
All	1	4.1	0.0	0.0	0.0	0.0	0.0	2.8
	2	9.6	4.5	14.7	0.8	2.2	5.1	8.2
	3	15.8	8.3	28.8	15.2	2.7	10.1	14.0
	4	25.9	23.4	33.4	6.3	7.1	22.0	24.7
	5	2.1	2.0	0.3	14.9	2.2	2.6	2.3
	6	4.4	3.3	3.1	4.1	3.8	3.4	4.1
	7+	38.1	58.4	19.8	58.7	81.9	56.8	43.9
	Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 7. Annual mean age (years) of Lake Erie walleye by gear, management unit, and agency. Means include data from 1975 to present.

	Sport Fishery															Commercial Fishery					All Gears
	Unit 1				Unit 2			Unit 3			Units 4 & 5					Unit 1	Unit 2	Unit 3	Unit 4		
Year	OH	MI	ON	Total	OH	ON	Total	OH	ON	Total	ON	PA	NY	Total	Total	ON	ON	ON	ON	Total	Total
1975	2.53	2.53	3.26	2.59	1.53	--	1.53	--	--	--	--	--	--	--	2.48	--	--	--	--	--	2.42
1976	2.49	2.49	2.35	2.48	2.05	--	2.05	--	--	--	--	--	--	--	2.46	1.51	1.51	--	--	1.51	2.29
1977	3.29	3.29	2.64	3.27	2.44	--	2.44	--	--	--	--	--	--	--	3.26	2.74	2.74	--	--	2.74	3.21
1978	3.50	3.62	3.07	3.48	3.33	--	3.33	--	--	--	--	--	--	--	3.48	2.69	2.69	--	--	2.69	3.37
1979	2.71	2.71	2.67	2.71	2.29	--	2.29	--	--	--	--	--	--	--	2.70	2.83	2.83	--	--	2.83	2.72
1980	3.00	3.00	2.84	3.00	2.92	--	2.92	2.65	--	2.65	--	--	--	--	2.99	2.96	2.96	--	--	2.96	2.98
1981	3.61	2.97	3.47	3.59	2.62	--	2.62	2.72	--	2.72	--	--	--	--	3.56	3.00	3.00	2.99	--	3.00	3.41
1982	3.25	3.25	2.76	3.24	2.58	--	2.58	2.51	--	2.51	--	--	--	--	3.23	2.81	2.81	2.81	--	2.81	3.12
1983	3.03	3.03	3.17	3.03	2.25	--	2.25	2.07	--	2.07	--	--	--	--	2.94	3.47	3.47	3.47	--	3.47	3.15
1984	2.64	2.64	2.90	2.64	2.61	--	2.61	2.68	--	2.68	--	--	--	--	2.64	2.89	2.89	2.89	--	2.89	2.72
1985	3.36	3.36	3.17	3.36	3.24	--	3.24	3.58	--	3.58	--	--	--	--	3.35	3.04	3.04	3.04	--	3.04	3.24
1986	3.73	3.61	3.54	3.71	3.69	--	3.69	4.08	--	4.08	--	--	--	--	3.72	3.61	3.70	4.22	--	3.71	3.72
1987	3.83	3.32	3.78	3.73	3.68	--	3.68	4.10	--	4.10	--	--	--	--	3.73	3.71	3.47	3.40	--	3.61	3.69
1988	3.97	3.43	4.58	3.78	3.81	--	3.81	5.37	--	5.37	--	--	4.87	4.87	3.93	3.27	3.15	3.89	--	3.32	3.74
1989	4.48	3.75	4.29	4.28	4.65	4.29	4.64	5.13	4.29	5.00	--	--	5.59	5.59	4.44	3.49	3.51	4.22	--	3.60	4.16
1990	4.44	4.64	5.00	4.52	5.31	5.41	5.31	6.41	5.41	6.36	--	--	5.70	5.70	4.90	3.91	3.90	4.60	--	3.99	4.49
1991	4.91	5.29	5.01	4.95	6.22	6.03	6.20	6.70	5.91	6.58	--	--	6.36	6.36	5.41	4.21	4.63	5.14	--	4.41	4.85
1992	4.60	3.49	3.45	4.43	4.89	6.72	5.15	5.67	6.42	5.73	--	--	6.35	6.35	4.71	4.03	4.23	5.49	--	4.27	4.46
1993	4.60	4.41	4.09	4.57	5.79	6.45	5.83	5.98	6.17	5.99	--	--	6.15	6.15	4.96	3.64	4.38	5.21	--	4.00	4.42
1994	4.53	4.19	5.84	4.49	5.38	6.41	5.45	6.22	6.85	6.28	--	--	6.49	6.49	4.93	3.65	4.36	5.60	--	4.03	4.32
1995	4.04	3.55	4.74	4.02	6.07	7.29	6.12	6.08	7.17	6.33	--	--	6.80	6.80	4.48	3.38	4.63	5.92	--	3.94	4.08
1996	3.98	3.46	4.31	3.93	4.22	7.22	4.26	6.06	7.57	6.22	--	--	6.47	6.47	4.35	3.57	3.36	5.21	--	3.73	3.91
1997	4.21	3.99	4.21	4.18	5.30	5.30	5.30	6.27	6.27	6.22	--	--	6.25	6.25	4.67	3.87	3.68	4.83	--	3.96	4.11
1998	3.74	3.13	3.15	3.69	4.66	8.09	4.74	4.64	7.81	4.69	9.55	--	10.13	9.92	4.32	3.26	4.00	5.26	7.00	3.72	3.82
1999	3.72	3.16	3.43	3.63	5.35	9.17	5.48	5.95	10.00	6.18	8.15	--	10.29	9.32	4.55	3.41	4.29	5.28	6.76	3.81	3.89
2000	3.94	3.27	--	3.76	4.12	--	4.12	6.36	--	6.36	--	--	9.75	9.75	4.55	3.69	4.67	5.65	6.46	4.11	4.12
2001	3.66	3.02	--	3.57	4.09	--	4.09	6.14	--	6.14	--	7.70	9.09	8.01	3.99	3.19	3.77	5.52	6.00	3.57	3.75
2002	3.80	3.83	--	3.81	4.57	--	4.57	5.46	--	5.46	--	6.59	8.05	7.25	4.21	3.22	3.50	5.37	5.80	3.54	3.78
2003	4.67	4.16	--	4.59	4.67	--	4.67	5.87	--	5.87	3.35	7.50	10.01	8.31	4.90	3.68	4.36	5.58	6.59	4.09	4.46
2004	4.77	4.41	--	4.70	5.11	6.56	5.12	6.42	--	6.42	--	5.86	11.11	7.41	5.01	2.96	2.59	3.49	6.07	2.96	3.82
2005	5.33	4.26	3.35	5.12	4.21	--	4.21	5.53	--	5.53	--	6.61	6.72	6.68	5.15	3.61	3.16	4.64	4.70	3.66	3.96
2006	3.86	3.24	--	3.73	3.68	--	3.68	4.57	--	4.57	--	4.10	6.38	4.55	3.85	3.19	3.19	3.44	4.82	3.26	3.50
2007	4.64	4.42	--	4.62	4.79	--	4.79	4.89	--	4.89	--	4.89	6.80	5.27	4.71	4.20	4.29	4.25	6.55	4.26	4.50
2008	5.42	5.60	--	5.46	5.90	--	5.90	5.21	--	5.21	--	5.67	7.21	6.10	5.57	5.21	5.38	5.06	8.28	5.29	5.42
2009	5.39	4.78	--	5.30	6.14	--	6.14	6.43	--	6.43	--	6.47	6.84	6.56	5.70	4.67	5.17	5.40	7.45	4.93	5.33
2010	5.72	5.38	--	5.69	6.37	--	6.37	7.30	--	7.30	--	7.16	7.16	7.16	6.12	4.11	4.82	6.14	7.79	4.64	5.44
2011	5.98	4.35	--	5.68	7.79	--	7.79	8.03	--	8.03	--	8.40	7.76	8.13	6.74	4.86	5.26	6.73	8.33	5.31	5.78
Mean	4.04	3.70	3.66	3.98	4.28	6.58	4.30	5.22	6.72	5.24	7.02	6.45	7.43	6.89	4.23	3.49	3.70	4.67	6.61	3.66	3.90

Table 8. Estimated abundance at age, survival (S), fishing mortality (F) and exploitation (u) for Lake Erie walleye, 1980-2011 (from ADMB WTG 2012 catc at age analysis, M=0.32). 2011 and 2012 age-2 are from the regression of pooled trawl YOY data and ADMB age-2 walleye abundance (see Table 9). Projected 2012 ages 3 to 7+ population is based on survival from 2011.

	Age							Ages 2+		
Year	2	3	4	5	6	7+	Total	S	F	u
1980	10,224,900	9,824,780	725,880	1,235,440	374,283	79,437	22,464,720	0.586	0.215	0.166
1981	6,920,460	6,695,790	5,190,710	382,755	651,448	239,801	20,080,964	0.470	0.435	0.305
1982	11,583,900	4,150,020	2,692,330	2,081,970	153,521	359,102	21,020,843	0.537	0.301	0.224
1983	7,572,000	7,148,580	1,825,140	1,180,900	913,183	227,715	18,867,518	0.590	0.208	0.162
1984	54,584,400	4,996,620	3,882,780	987,420	638,879	620,571	65,710,670	0.637	0.130	0.105
1985	5,246,740	35,905,100	2,684,770	2,079,050	528,718	682,260	47,126,638	0.618	0.161	0.128
1986	20,072,100	3,597,260	21,882,400	1,633,140	1,264,680	741,973	49,191,553	0.614	0.167	0.132
1987	19,314,800	13,475,300	2,072,130	12,569,900	938,127	1,160,760	49,531,017	0.615	0.166	0.131
1988	46,242,400	12,978,500	7,807,590	1,198,030	7,267,490	1,223,260	76,717,270	0.617	0.163	0.129
1989	11,589,400	30,498,900	7,169,990	4,302,890	660,255	4,690,500	58,911,935	0.591	0.207	0.161
1990	9,711,350	7,741,680	17,422,000	4,086,100	2,452,170	3,092,250	44,505,550	0.620	0.158	0.126
1991	5,512,620	6,612,170	4,669,800	10,485,300	2,459,170	3,365,520	33,104,580	0.631	0.141	0.113
1992	13,930,900	3,793,480	4,092,800	2,882,970	6,473,240	3,632,900	34,806,290	0.624	0.151	0.120
1993	19,728,700	9,425,760	2,234,140	2,402,590	1,692,390	5,979,960	41,463,540	0.594	0.201	0.157
1994	3,739,560	12,922,600	5,040,400	1,188,480	1,278,090	4,195,530	28,364,660	0.571	0.240	0.184
1995	13,865,500	2,479,540	7,171,960	2,782,570	656,105	3,106,290	30,061,965	0.587	0.213	0.165
1996	15,327,900	9,048,810	1,310,540	3,765,770	1,461,040	2,049,760	32,963,820	0.530	0.315	0.233
1997	2,049,630	9,488,760	4,085,730	586,247	1,684,550	1,630,070	19,524,987	0.525	0.325	0.239
1998	14,027,200	1,321,370	4,840,710	2,069,090	296,887	1,720,550	24,275,807	0.551	0.275	0.207
1999	6,284,800	8,709,950	601,434	2,184,440	933,710	956,773	19,671,107	0.545	0.288	0.215
2000	5,647,790	4,022,680	4,349,430	298,041	1,082,500	962,011	16,362,452	0.546	0.285	0.214
2001	17,518,000	3,605,800	2,002,470	2,149,400	147,286	1,034,350	26,457,306	0.625	0.150	0.120
2002	1,430,490	11,596,700	1,989,610	1,100,310	1,181,040	665,576	17,963,726	0.617	0.162	0.129
2003	13,661,500	979,205	7,090,910	1,213,270	670,970	1,133,590	24,749,445	0.629	0.144	0.115
2004	293,806	9,175,680	564,255	4,070,130	696,406	1,053,190	15,853,467	0.628	0.145	0.116
2005	72,989,000	206,523	5,751,460	352,895	2,545,530	1,104,230	82,949,638	0.663	0.091	0.075
2006	2,068,520	49,371,500	116,215	3,218,490	197,479	2,066,070	57,038,274	0.638	0.129	0.104
2007	3,589,460	1,462,750	31,364,300	73,706	2,041,230	1,450,310	39,981,756	0.631	0.141	0.113
2008	1,205,880	2,522,570	913,517	19,544,600	45,930	2,189,270	26,421,767	0.621	0.156	0.124
2009	17,299,900	844,176	1,559,110	563,178	12,049,100	1,401,370	33,716,834	0.672	0.077	0.064
2010	7,867,380	12,219,100	537,145	990,253	357,696	8,553,920	30,525,494	0.668	0.083	0.068
2011	3,849,756	5,590,530	7,966,310	349,716	644,718	5,853,690	24,254,720	0.677	0.071	0.059
2012	9,723,235	2,734,667	3,739,957	5,318,660	233,486	4,381,851	26,131,857			

Table 9. Data used to estimate the recruitment of age-2 walleye by linear regression. Y is the ADMB WTG 2012 model estimate of age-2 walleye and X is the mean catch per hectare of age-0 walleye for combined OH and ON August trawls. Values in bold are the regression estimates and are used for RAH projections in 2012 and forecast estimates of recruits in 2012 and 2013. Regression statistics are given at the bottom of the page.

Year Class	Year of Recruitment to Fisheries	OH+ONT Trawl Age-0 CPHa	ln (OH+ONT Trawl CPHa)	ADMB-estimated Age-2 walleye recruits (in millions)	ln (ADMB-estimated Age-2 walleye recruits in millions)
1988	1990	18.280	2.906	9.711	2.273
1989	1991	6.094	1.807	5.513	1.707
1990	1992	39.432	3.675	13.931	2.634
1991	1993	59.862	4.092	19.729	2.982
1992	1994	6.711	1.904	3.740	1.319
1993	1995	108.817	4.690	13.866	2.629
1994	1996	63.921	4.158	15.328	2.730
1995	1997	2.965	1.087	2.050	0.718
1996	1998	85.340	4.447	14.027	2.641
1997	1999	24.185	3.186	6.285	1.838
1998	2000	14.313	2.661	5.648	1.731
1999	2001	44.189	3.788	17.518	2.863
2000	2002	4.113	1.414	1.430	0.358
2001	2003	28.499	3.350	13.662	2.615
2002	2004	0.139	-1.973	0.294	-1.225
2003	2005	183.015	5.210	72.989	4.290
2004	2006	5.402	1.687	2.069	0.727
2005	2007	12.665	2.539	3.589	1.278
2006	2008	2.051	0.718	1.206	0.187
2007	2009	25.408	3.235	17.300	2.851
2008	2010	7.238	1.979	7.867	2.063
2009 [1]	2011	7.107	1.961	**3.850**	
2010 [2]	2012	26.260	3.268	**9.723**	
2011 [3]	2013	6.502	1.872	**3.614**	

[1] The latest ADMB age-2 estimate has the widest error bounds and is not used in the recruitment estimator.

[2] This regression estimate is for 2012 age-2 recruitment projection.

[3] This regression estimate is for 2013 age-2 recruitment projection.

Note: The regression equation, with standard errors in parentheses, was,

$\ln(Y) = 0.7089\ (0.0580)\ \ln(X) - 0.0422\ (0.1817)$

with $n = 21$, $F = 149$, $p < 0.0001$ and $r^2 = 0.887$.

Table 10. Estimated population of Lake Erie walleye for 2012 based on fishing mortality (F) and survival (S) at age from ADMB WTG 2012 model. Age-2 walleye estimates for 2011 and 2012 are from regressions presented in Table 9.

	2011 Parameters			Rate Functions					2012 Parameters			
	Stock Size (numbers)			Mortality Rates				Survival		2012 Stock Size (mils of fish)		
Age	**Mean**	**Min.**	**Max.**	**(F)**	**(Z)**	**(A)**	**(u)**	**(S)**	**Age**	**Mean**	**Min.**	**Max.**
2	3.850	2.865	5.174	0.022	0.342	0.290	0.019	0.710	2	9.723	6.706	14.097
3	5.591	4.273	6.908	0.082	0.402	0.331	0.068	0.669	3	2.735	2.035	3.675
4	7.966	6.365	9.567	0.084	0.404	0.332	0.069	0.668	4	3.740	2.859	4.621
5	0.350	0.286	0.414	0.084	0.404	0.332	0.069	0.668	5	5.319	4.250	6.388
6	0.645	0.533	0.756	0.084	0.404	0.332	0.069	0.668	6	0.233	0.191	0.276
7+	5.854	4.930	6.777	0.073	0.393	0.325	0.060	0.675	7+	4.382	3.684	5.080
Total	24.255	19.252	29.596	0.071	0.391	0.323	0.059	0.677	Total	26.132	19.725	34.137
(3+)	20.405	16.388	24.422	0.080	0.400	0.330	0.066	0.670	(3+)	16.409	13.018	20.040

Table 11. Estimated harvest of Lake Erie walleye for 2012 and population projection for 2013. Fishing mortality for the fully-selected age groups is derived from the regression equation described in the Harvest Policy section of this report. Abundance of age 2 and older walleye is from ADMB WTG 2012 model catch-age results, and trawl regressions. Stock size and catch in numbers are in millions of fish.

	2012 Stock Size (millions)				Rate Functions						2012 RAH (millions of fish)			Projected 2013 Stock Size (millions)
Age	**Min**	**Mean**	**Max**	**F**	**sel(age)**	**(F)**	**(Z)**	**(S)**	**(u)**		**Min**	**Mean**	**Max**	**Mean**
2	6.706	9.723	14.097		0.258	0.063	0.383	0.681	0.053		0.282	0.513	0.918	3.614
3	2.035	2.735	3.675		0.980	0.241	0.561	0.571	0.185		0.304	0.505	0.821	6.626
4	2.859	3.740	4.621		1.000	0.246	0.566	0.568	0.188		0.436	0.703	1.051	1.560
5	4.250	5.319	6.388		1.000	0.246	0.566	0.568	0.188		0.648	0.999	1.453	2.124
6	0.191	0.233	0.276		1.000	0.246	0.566	0.568	0.188		0.029	0.044	0.063	3.020
7+	3.684	4.382	5.080		0.867	0.213	0.533	0.587	0.165		0.493	0.724	1.020	2.703
Total	19.725	26.132	34.137	0.246					0.133	**RAH 2+**	2.191	3.487	5.326	19.648
(3+)	13.018	16.409	20.040							**RAH 3+**	1.910	2.974	4.408	16.033
										F	0.195	0.246	0.306	

	2013 Stock Size (millions)		Rate Functions						Projected 2013 RAH (millions of fish)	Projected 2014 3+ Stock Size (millions)
Age	**Mean**	**F**	**sel(age)**	**(F)**	**(Z)**	**(S)**	**(u)**		**Mean**	**Mean**
2	3.614		0.258	0.050	0.370	0.691	0.042		0.150	*
3	6.626		0.980	0.189	0.509	0.601	0.148		0.982	2.497
4	1.560		1.000	0.193	0.513	0.599	0.151		0.236	3.983
5	2.124		1.000	0.193	0.513	0.599	0.151		0.321	0.934
6	3.020		1.000	0.193	0.513	0.599	0.151		0.456	1.271
7+	2.703		0.867	0.167	0.487	0.614	0.132		0.358	3.469
Total	19.648	0.193					0.127		2.503	--
(3+)	16.033									12.154

* No estimate of the 2012 cohort recruiting in 2014 is available.

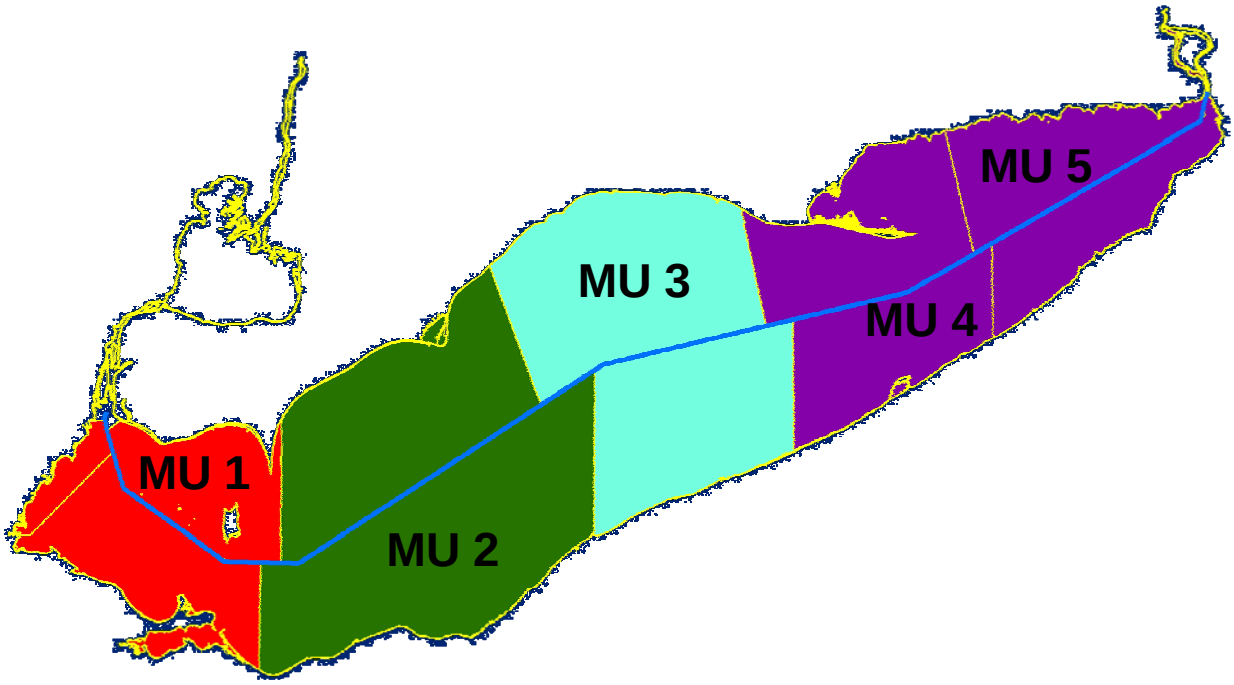

Figure 1. Map of Lake Erie with management units recognized by the Walleye Task Group for interagency management of walleye.

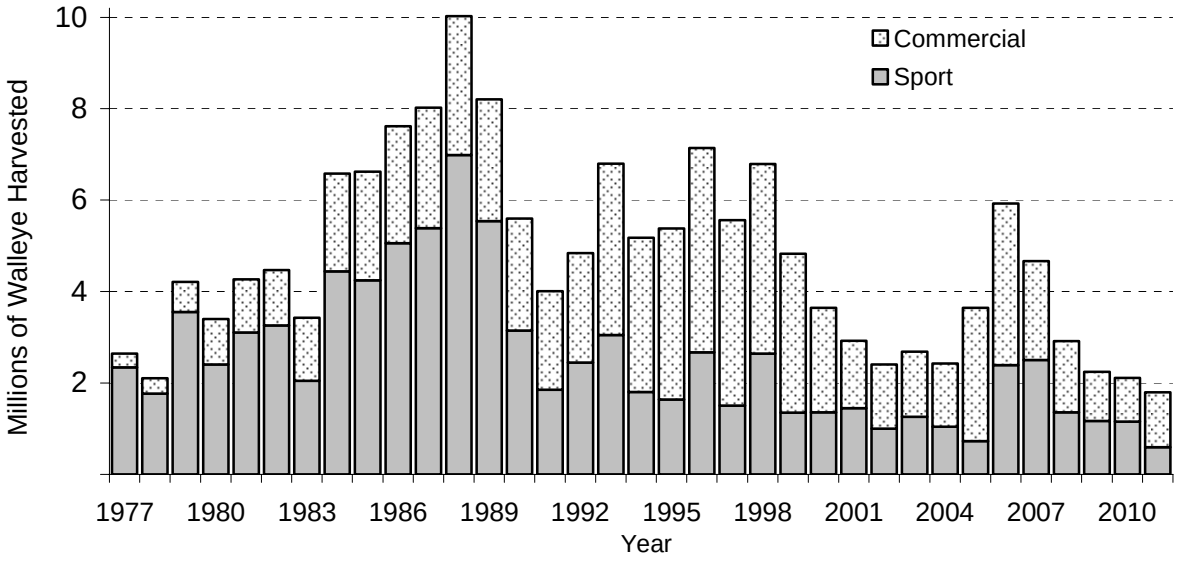

Figure 2. Lake-wide harvest of Lake Erie walleye by sport and commercial fisheries, 1977-2011.

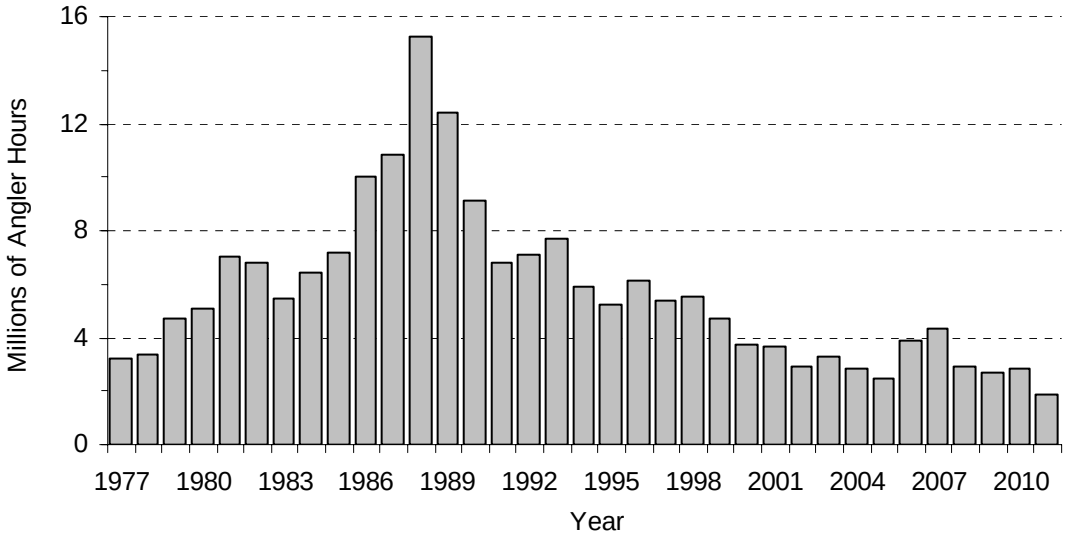

Figure 3. Lake-wide total effort (angler hours) by sport fisheries for Lake Erie walleye, 1977-2011. Years 1999-2011 exclude Ontario sport effort.

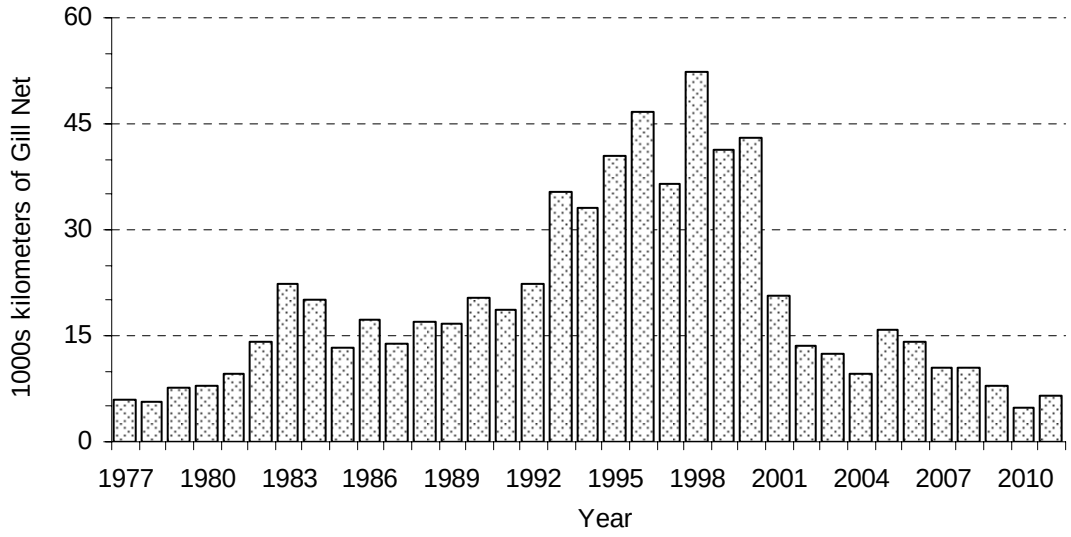

Figure 4. Lake-wide total effort (kilometers of gill net) by commercial fisheries for Lake Erie walleye, 1977-2011.

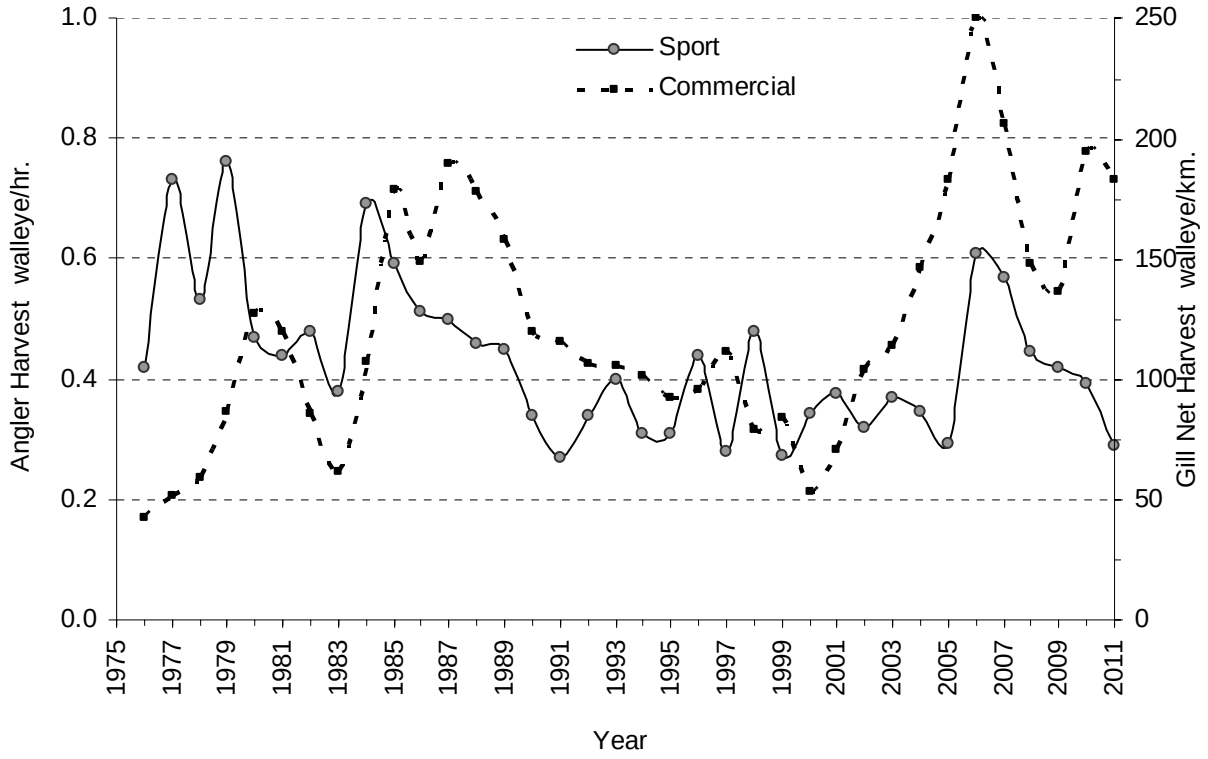

Figure 5. Lake-wide harvest per unit effort (HPE) for Lake Erie sport and commercial walleye fisheries, 1975-2011.

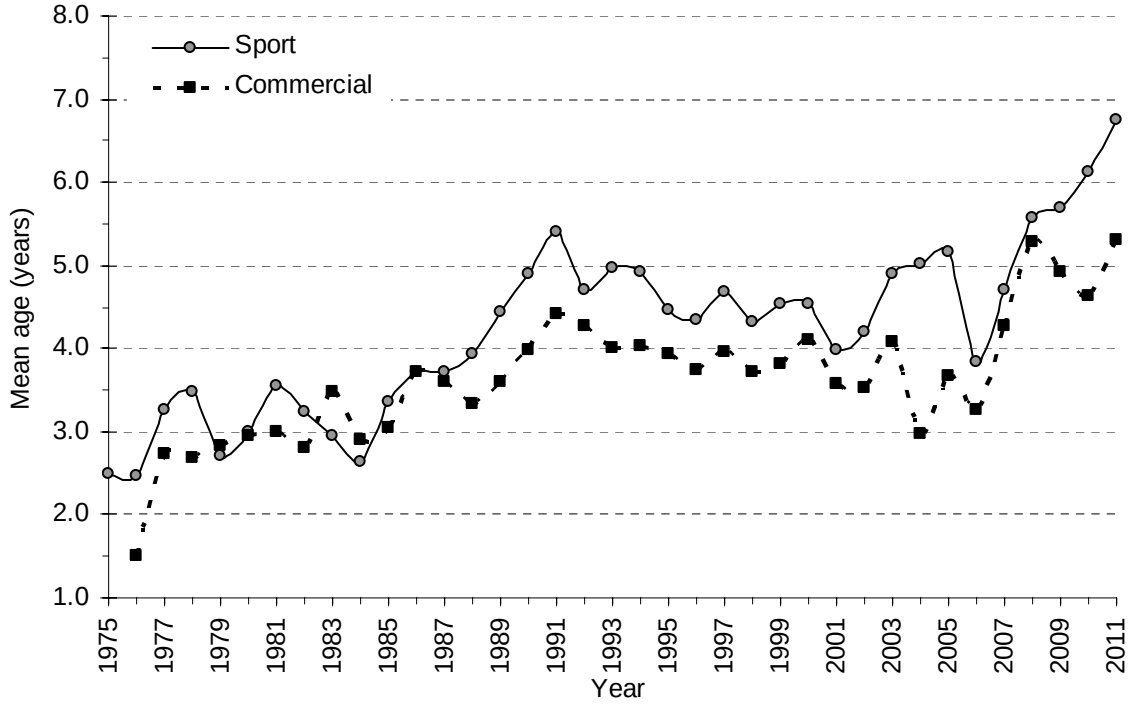

Figure 6. Lake-wide mean age of Lake Erie walleye in sport and commercial harvests, 1975-2011.

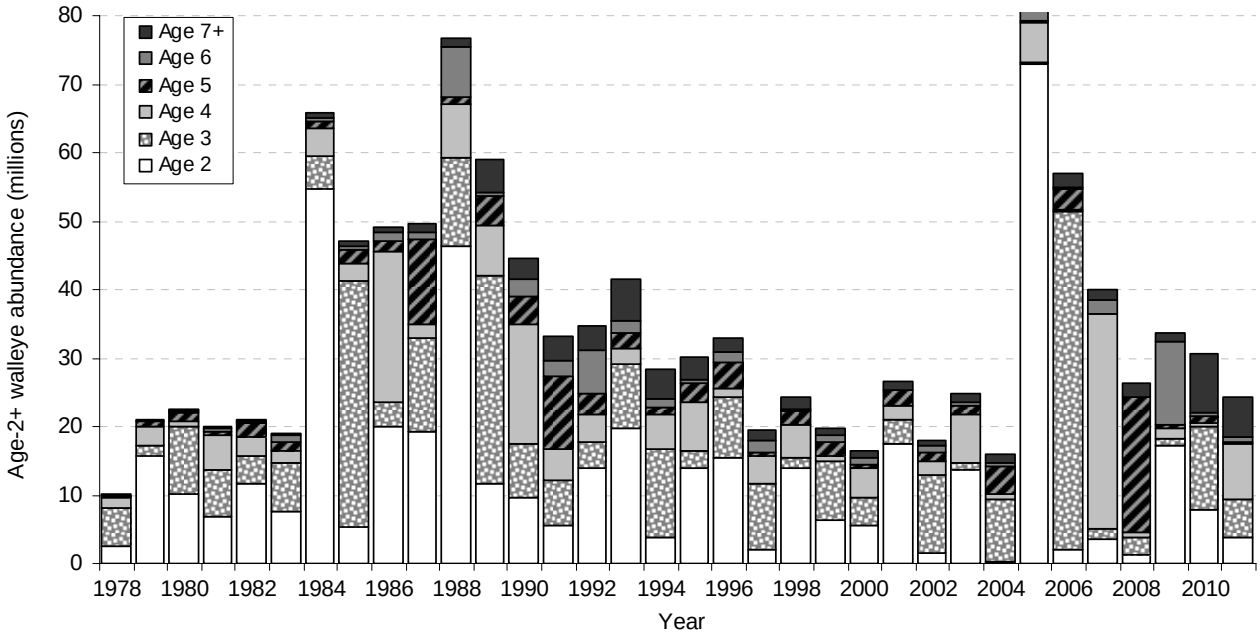

Figure 7. Estimates of abundance by age of Lake Erie walleye 1978-2011. Age-2 estimate in 2011 from regression. Data are from Table 8.

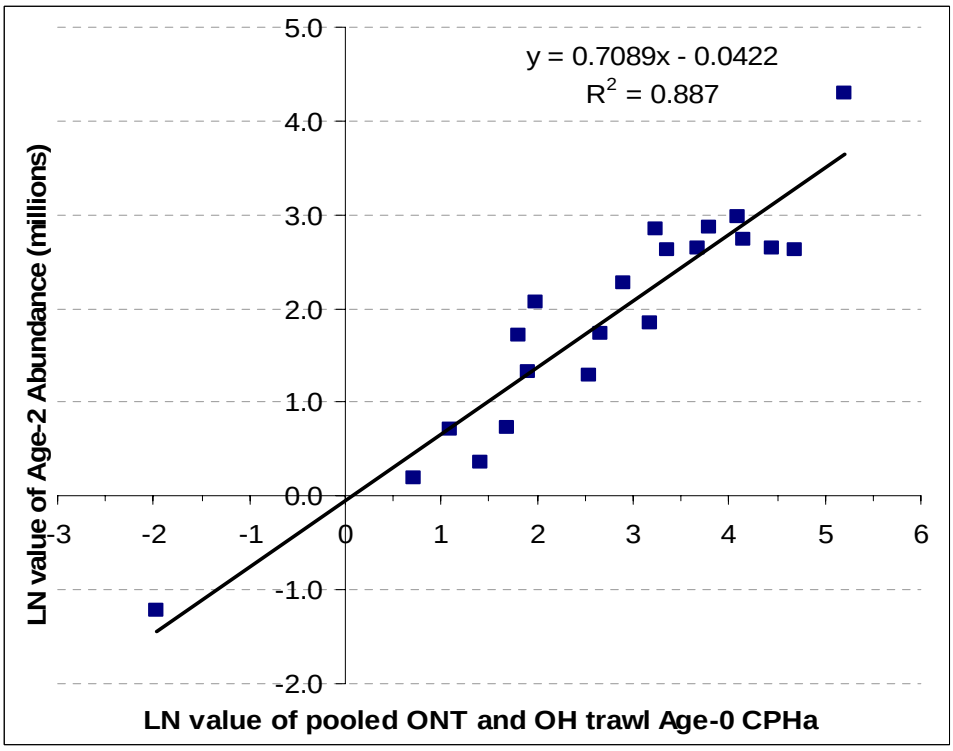

Figure 8. Regression used for estimates of abundance for age-2 Lake Erie walleye using natural logarithm transformed ADMB 2012 model catch-at-age estimates (y) and pooled Ontario and Ohio young-of-the-year trawl indices (x).

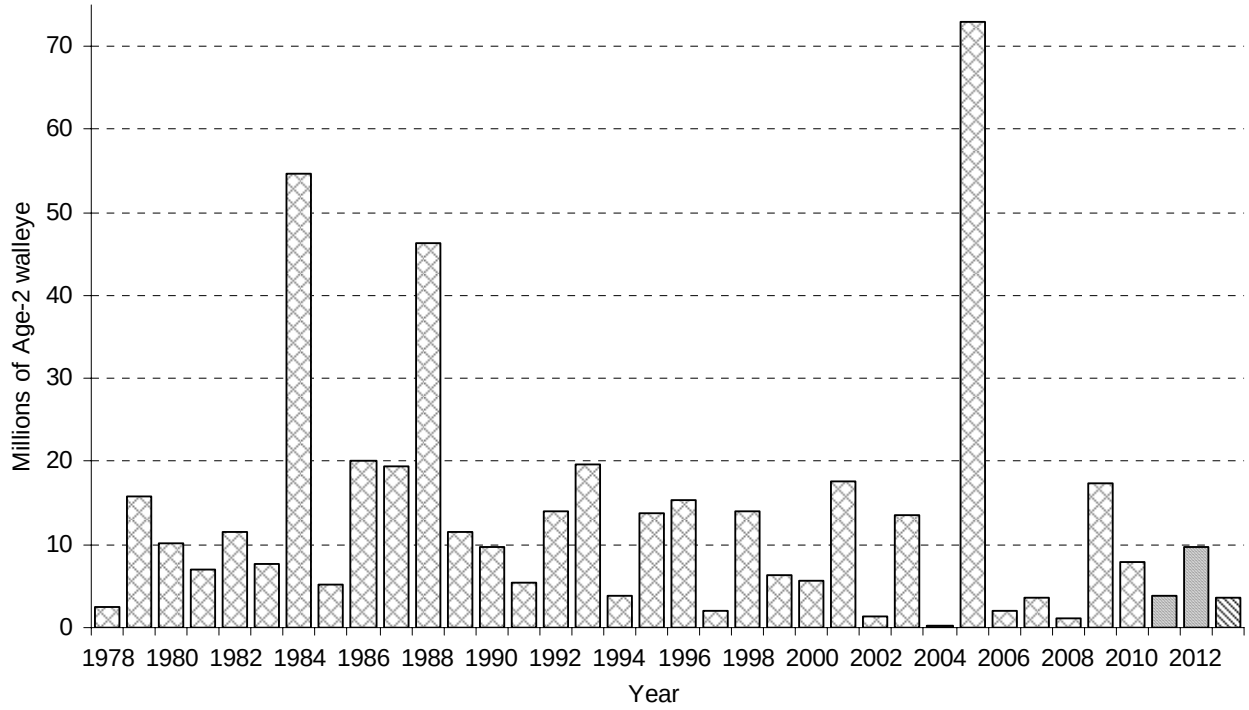

Figure 9. Abundance estimates (from the ADMB WTG 2012 model) of age-2 Lake Erie walleye for 1978 to 2010. Estimates for 2011, 2012 and 2013 are from the regression of YOY catch per hectare and numbers of age-2 from catch-at-age analysis (see Table 9 and Figure 8).

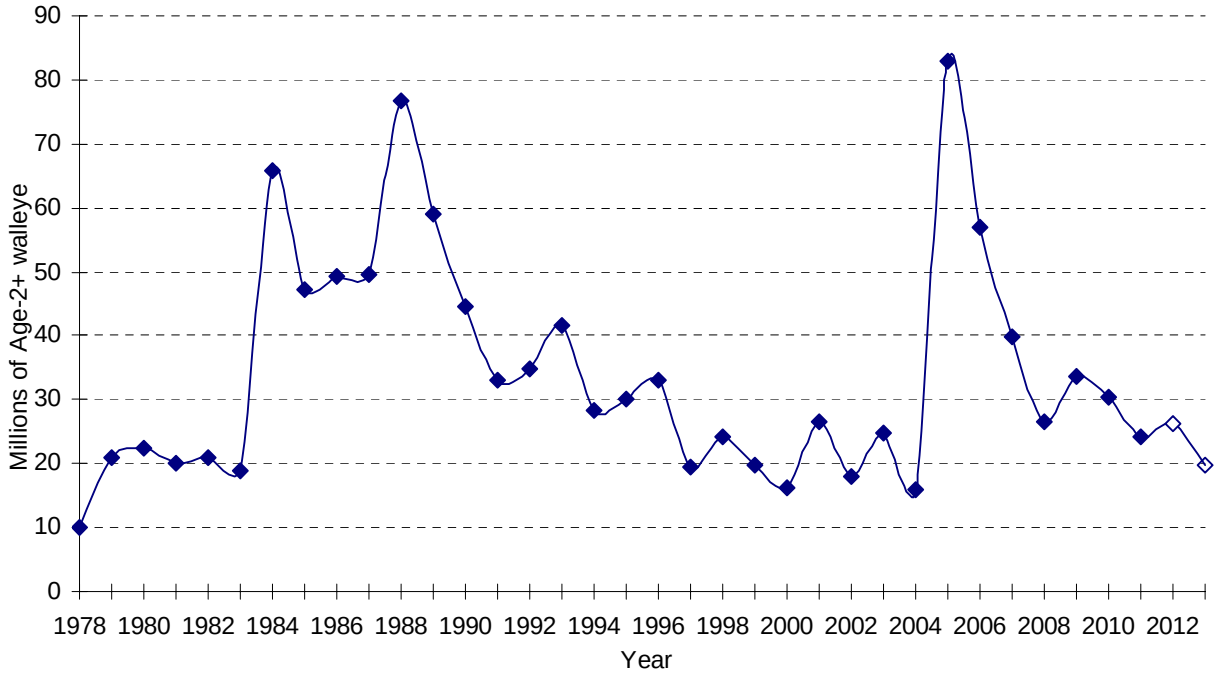

Figure 10. Abundance of Lake Erie walleye (from the ADMB WTG 2012 model) from 1978-2013, forecasting two years of population abundance from regressions (open diamonds).

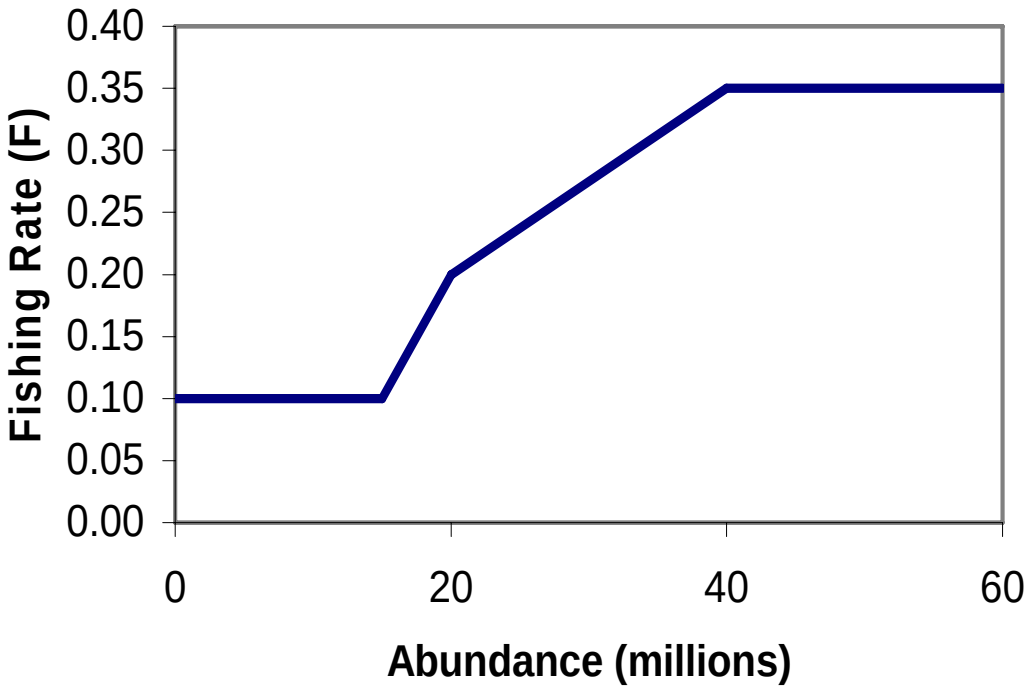

Figure 11. Lake Erie walleye harvest policy for age-2 and older walleye: below 15 million fish, F=0.1; between 15 and 20 million fish, F= 0.02(N)-0.02 (N is abundance in millions of fish); between 20 and 40 million fish, F= 0.0075(N)+0.05; and at 40 million fish and above, F=0.35.

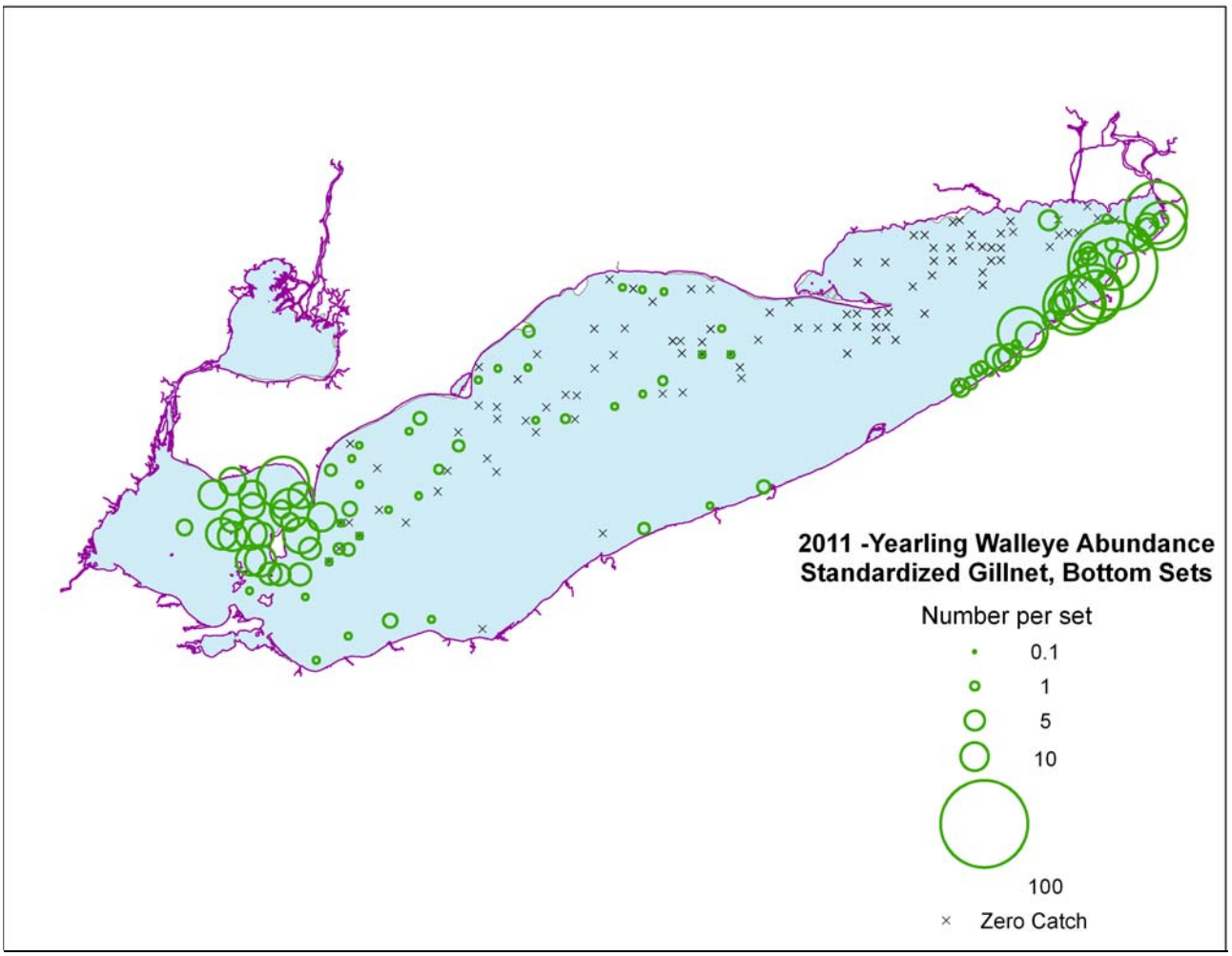

Figure 12. Relative abundance of yearling walleye captured in bottom-set gillnets from Ohio, New York and Ontario waters in 2011. Catches have been adjusted to reflect panel length (standardized to 50ft panels of monofilament) and differences in the presence of large mesh (>5") panels were assumed not to affect catches of yearling sized walleye.