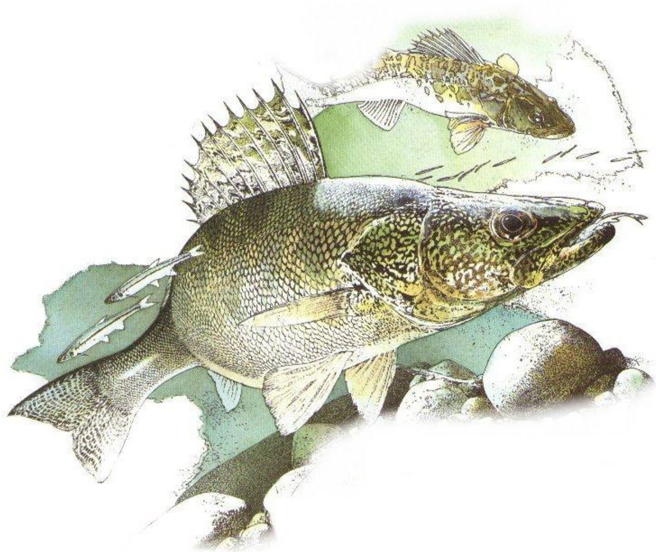
Report for 2012 by the

LAKE ERIE WALLEYE TASK GROUP

March 2013



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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.*

Charges to the Walleye Task Group, 2012-2013

The charges from the Lake Erie Committee's (LEC) Standing Technical Committee (STC) to the Walleye Task Group (WTG) for the period from April 2012 to March 2013 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 and reliable 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 2013.
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 2012

Fishery effort and walleye harvest data were combined for all fisheries, jurisdictions and Management Units (Figure 1) to produce lake-wide summaries. The 2012 total estimated lake-wide harvest of walleye was 2.474 million walleye (Table 1), with a total of 2.364 million walleye harvested in the total allowable catch (TAC) area. This harvest represents 68% of the 2012 TAC (3.487 million walleye) and includes walleye harvested in commercial and sport fisheries in Management Units 1, 2, and 3. An additional 110,031 walleye (4% 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; Table 1). The sport fish harvest of 1.138 million walleye in 2012 represents a two-fold increase from the 2011 harvest of 0.593 million, but this harvest is still 52% below the long-term (1975-2011) average of 2.407 million fish. The 2012 Ontario commercial harvest was approximately 1.338 million walleye lake-wide, with 1.310 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 compiled 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; assuming an average number of walleye were harvested by the sport fishery in Ontario during 2012 (i.e., 46,000 fish), the total harvest of walleye in Ontario waters was 1.356 million walleye, representing 90% of the 2012 Ontario TAC allocation of 1.502 million walleye. The lakewide Ontario commercial harvest was 11% higher than in 2011, and the 2012 harvest is 36% below the long-term average (1978-2011; Table 2, Figure 2).

Sport fishing effort increased 37% in 2012 from 2011, to a total of 2.597 million angler hours (Table 3, Figure 3). Compared to 2011, sport effort in 2012 increased in Management Units 1 (49%), 2 (62%) and 4 (9%), and decreased in Management Unit 3 (16%). Lake-wide commercial gill net effort in 2012 (9,804 km) increased 49% from 2011 and is the 11th lowest observed effort since 1976 (Table 3, Figure 4).

Sport harvest per unit of effort (HUE, walleye/angler hour) increased in Management Units 1, 2, and 3 in 2012 compared to 2011; the only decrease in harvest rates was observed in Management Units 4&5 (Table 4). Management Unit 1 (0.45 walleye/angler hour), Management Unit 2 (0.42 walleye/angler hour), and Management Unit 3 (0.51 walleye/angler hour) increased by 67%, 40%, and 24%, respectively, and decreased by 4% in Management Unit 4 (0.25 walleye/angler hour). In Management Unit 1, the sport harvest rate was slightly (2%) below the long-term average (0.46 walleye per angler hour; Table 4, Figure 5) and 31% and 42% above the long-term means in Management Units 2 and 3, respectively. The sport harvest rates in Management Units 4&5 were 19% above the long-term mean of 0.21 walleye/angler hour. The 2012 lake-wide average sport HUE of 0.42 walleye/angler hours was slightly (2%) lower than the long-term mean of 0.43 walleye/angler hour.

In 2012, total commercial gill net harvest per unit effort (HUE; 136.5 walleye/kilometer of net) decreased 26% relative to 2011, and was 12% above the long-term lake-wide average (122.2 walleye/kilometer; Table 4, Figure 5). When compared to 2011 commercial gill net harvest rates, the catch rates decreased in 2012 for Management Unit 1 (36%), Management Unit 2 (17%), and Management Unit 3 (28%) and increased in Management Unit 4 (36%).

For the commercial and recreational fisheries, the harvest was dominated by walleye originating from the 2010 (age 2), 2009 (age 3), and 2003 (age 9 in the ages 7 and older group) year classes (Tables 5 and 6). Ages 7-and-older walleye comprised 35% of the lake-wide sport and commercial fishery harvest. The 2010, 2009 and 2007 year classes represented 16, 20, and 16%, respectively, of the total sport harvest and 21, 17, and 16%, respectively, of the total commercial harvest. Lake-wide, walleye ages 7-and-older, dominated by the 2003 year class, and represented 35% of the total harvest for both fisheries lakewide. The proportion of older fish was greater in Management Unit 3 (64%) and Management Unit 4 (63%) compared to Management Unit 1 (27%) and Management Unit 2 (35%). The low contributions from the age 4, and 6 (2008 and 2006 year classes, respectively) are an indication of their relatively lower abundances.

Across all jurisdictions, the mean age of walleye in the 2012 harvest ranged from 4.5 to 8.9 years old in the sport fishery, and from 4.9 to 7.3 years old in Ontario's commercial fishery (Table 7, Figure 6). The change from 2011 in mean age of walleye harvested varied by fishery and Management Unit. The mean age in the sport fishery was 5.6 years, was above the long-term mean (1975-2011) of 4.2 years, and was the 4th highest on record since 1975. In the commercial fishery, the mean age was 5.3 years, higher than the long-term mean (1975-2011) of 3.7 years, and is the highest value in the time series. The mean age of the total harvest (sport and commercial fisheries) in 2012 (5.5 years) was the 2nd highest in the time series (1975-2012). This reflects the continued dependence of the fisheries on the 2003 (age-7+) and 2007 (age-5) year classes, with contributions to the fisheries from the 2010 (age-2) and 2009 (age-3) cohorts in 2012.

Walleye Management Plan and Lake Erie Percid Management 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, the STC conducted an internal review 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 management plans for walleye and yellow perch with increased stakeholder engagement and transparency, the LEC formed the Lake Erie Percid Management Advisory Group (LEPMAG). This group consists of stakeholders from all jurisdictions surrounding Lake Erie, Lake Erie managers, agency staff, and is being facilitated by Michigan State University's Quantitative Fisheries Center (QFC).

From November, 2010 through February, 2012, LEPMAG members were involved in a series of five facilitated workshops that defined common fisheries objectives for the Lake Erie walleye population, described the current assessment programs, data sources, stock assessment model and LEC harvest policy. At the final workshop of the first round of LEPMAG meetings in February 2012, a Technical Review Panel comprised of modeling and fisheries management experts reviewed the statistical catch at age (SCAA) stock assessment model and made recommendations for the LEPMAG to consider with respect to potential improvements within the stock assessment model. The QFC incorporated these recommendations into a formal walleye management strategy evaluation (MSE).

Walleye Stock Assessment Model

The LEPMAG continued work on MSE for walleye during the 2012-2013 work cycle. Meetings were held in June 2012, August 2012, October 2012 and January 2013. Stakeholders were provided a range of alternatives to consider in moving forward on a new management strategy for Lake Erie walleye. Options specific to the SCAA model included changes to catchability (random walk vs. fixed time blocked), selectivity (estimated within the model across all ages vs. fixed), treatment of catch-at-age data (multinomial distribution vs. lognormal distribution), natural mortality (age specific M vs. M=0.32 for all ages) and using an integrated modeling approach to estimate incoming age 2 recruits (vs. estimating recruitment outside the model via the age 0 trawl regression method).

Based on these alternatives, a questionnaire was distributed to the LEPMAG that listed these options and provided recommendations with accompanying rationale for each of these options. Individual LEPMAG representatives were provided an opportunity to vote and give comment on the recommendations detailed in the MSE. Results of the questionnaires were summarized by the QFC and submitted to the LEC as formal recommendations for consideration of prospective walleye management options. A synopsis of the alternatives to the 2012 stock assessment model is provided below.

Catchability was estimated in the 2012 SCAA model using time blocks, which set catchability over a specified period of years. The alternative, allowing constrained catchability to vary from year to year using a random walk, was also explored. LEPMAG recommended that the LEC adopt the alternative method for estimating catchability because alternative model results fit the data better and this method avoids the subjectivity of deciding where to assign the time blocks.

Selectivity is a measure of both walleye vulnerability and availability to the gear, as a function of age. The 2012 SCAA model estimates selectivity in the assessment model assuming certain ages are known. The alternative approach allows selectivity to vary without the assumption that selectivity at certain ages is known. LEPMAG recommended that the LEC adopt the alternative method because the alternative method appears to remove the issue of patterns in the residuals, which was an issue with the 2012 SCAA model. Additionally, the model which estimated selectivity within the model without assumptions of known selectivity at age fit the data better.

The 2012 SCAA model used log-normally distributed catch-at-age data. The alternative approach, using a multinomial distribution for the age composition data was also explored. LEPMAG recommended that the LEC adopt the alternative method as this method is more commonly used in contemporary fisheries stock assessment models and appears to address some of the retrospective modeling issues associated with using the lognormal approach.

Estimates of age 2 and age 3 abundance in the 2012 SCAA model were calculated outside of the model using the regression of age 0 trawl catches to estimates of age 2 abundance. The alternative approach considered by LEPMAG was an integrated approach, in which age 0 abundance indices were integrated directly into the stock assessment model. Retrospective simulations of an integrated SCAA model by the QFC showed using an integrated approach increases the precision of age 2 recruitment estimates and reduces age 2 projection errors. Additionally, the alternative approach did not introduce undesirable retrospective patterns in the abundance time series, which was often the case with the non-integrated method. Therefore, LEPMAG recommended that the LEC adopt the alternative approach to estimation of recruitment of age 2 walleye.

In addition to the above LEPMAG recommendations, there were three areas that were suggested as meriting further exploration. First, LEPMAG recognized that there were a number of other walleye recruitment indices available for estimating incoming age 2 abundance. Therefore, LEPMAG recommended that the LEC explore additional data sets for inclusion in the assessment model to estimate incoming age 2 recruits. These datasets include additional age 0 trawl survey abundance indices, age 1 trawl survey abundance indices, and age 1 gill net survey abundance indices.

Second, LEPMAG was provided with information and analysis from a recently completed interagency tagging study on Lake Erie. This tagging survey, which used different tagging methodologies, indicated that the historic tagging studies used to estimate instantaneous natural mortality rates (M) may be improved by recognizing tag loss and variable non-reporting rates across fisheries. Based upon historic tagging results, which did not recognize the effects of tag loss and variable non-reporting rates across fisheries (and years); M is assumed to be a constant at 0.32. The more recent tagging results, which demonstrate that tag loss and variable non-reporting rates occur, suggest that an exploration of methods to estimate M incorporating this information is more accurate. These analyses suggested that allowing M to vary by age fit the data much better. LEPMAG agreed that while it is unrealistic that M is constant across ages and through time, additional analyses were necessary to determine how to capture information on tag loss and variable non-reporting rates in the stock assessment model.

Third, LEPMAG discussed walleye in the eastern basin, which are comprised of resident stocks along with an annual migration of western basin stocks. This migration, and uncertainty about dynamics that affect walleye movements, increase the complexity of conducting a viable independent stock assessment. Additionally, population parameters may be affected, such as *M*. As a result, the eastern basin has not yet been formally incorporated into LEC harvest decisions. LEPMAG recognized the importance of pursuing a more integrated approach to assessment and management of walleye lake-wide, and recommended exploration of eastern basin walleye datasets to achieve a broader based approach to walleye assessment and management in the east basin.

Walleye Management Strategy Evaluation

Concurrent with the above detailed activities addressing the stock assessment model recommendations, LEPMAG also developed a range of harvest policies based upon various reference points and simulations were used to evaluate the performance of each harvest policy based upon a number of jointly developed performance indicators. The harvest strategies included a range of Targeted Reference Points (TRP) based on the maximum sustainable yield ($F_{40\%MSY,}$ $F_{60\%MSY,}$ $F_{80\%MSY,}$ $F_{100\%MSY}$), a Limit Reference Point (LRP) of (20% or 40%) of the unfished spawning stock biomass (SSB_0). When spawning stock biomass falls below this reference point target fishing rates will decrease. LEPMAG also considered an inter-annual constraint on TAC in the range of 10% to 20% and an unconstrained harvest policy. Lastly, the QFC presented a means for implementing a probabilistic control rule (or P-star, P*). A probabilistic control rule accounts for uncertainty in determining the risk of a harvest decision. This control rule calculates the probability that the spawning stock biomass will go below the SSB_0 threshold based on the TAC decision implemented. P* can be viewed as an evaluation of the risk of exceeding the 20 % of SSB_0 threshold based on the decision of where the TAC is set. It was suggested that a P* of 0.05 (no more than a 5% chance that SSB (spawning stock biomass) would go below 20 % of SSB_0 based on the TAC) be used as a reference point. All harvest policies were evaluated by running 250 simulations over 100 year time period and information was summarized for each performance metric and presented to LEPMAG.

LEPMAG was asked to contemplate the performance of the above suite of harvest policies/reference points with respect to the performance metrics developed and provide feedback on the most suitable reference points/harvest policy. Given the varied comments from LEPMAG, at the October, 2012 meeting the QFC presented a recommendation (strawman) to the group; a TRP (maximum fishing rate) of $F_{60\%msy}$, a LRP (Limit Reference Point) of 20% of SSB_0 (a biomass below this reference point results in a decrease of the target fishing rate), and a 20% constraint to the inter-annual change in total allowable catch. LEPMAG committed to further contemplating the harvest strategies and reference points and responding individually to the QFC via an electronic ballot.

Complete consensus was not achieved on any of the QFC recommended harvest control rules. A TRP of $F_{60\%MSY}$ was endorsed by 11 LEPMAG members and rejected by 6 LEPMAG members. Disapproving votes were not unanimous in the direction of recommended maximum fishing rate change. The LRP of 20%SSB_0 (unfished biomass) was endorsed by 14 LEPMAG members and rejected by 3 members. The 20% inter-annual constraint on TAC was endorsed by 15 LEPMAG members and rejected by 2 LEPMAG members. LEPMAG also voted on the use of a probabilistic control rule with a P*= 0.05. This was endorsed by 15 LEPMAG members and rejected by 1 LEPMAG member.

As a result of these ongoing discussions with LEPMAG, the Lake Erie Committee has chosen to adopt an interim harvest policy in 2013. This interim policy will employ a TRP of $F_{60\%MSY}$, a LRP of $20\%SSB_0$, an inter-annual constraint on TAC changes of 20% and a probabilistic control rule (i.e., P*) for implementing the LRP. Discussions about a final LEC harvest policy for walleye continue with the LEPMAG because the LEC believes that additional input from LEPMAG is necessary to establish a long-term harvest strategy that ensures responsible management of the Lake Erie walleye resource, while meeting stakeholder needs. The LEC believes that additional stakeholder input will be useful for selecting a policy that meets most needs and recognizes the tradeoffs among jurisdictions and user groups. The LEC is planning to convene another LEPMAG workshop on June 26-27, 2013 to seek additional input from stakeholders and will make a final decision on the strategy after this meeting.

In addition, the LEC recognizes that the MSE is still under development, and that additional changes to the assessment model may also occur as a result of LEPMAG recommendations and future QFC and Walleye Task Group dataset incorporation. The current model structure and outcomes, and the resulting MSE process, should be viewed as important steps towards improved walleye population evaluation and harvest strategies.

Catch-at-Age Population Analysis and Abundance

The WTG uses a SCAA model to estimate the abundance of walleye in Lake Erie between the 1978 and 2012 time period (Walleye Task Group 2001). The stock assessment model estimates population abundance utilizing both fishery dependent and independent data sources. The model includes fishery-dependent data from the Ontario commercial fishery (Management Units 1-3) and sport fisheries in Ohio (Management Units 1-3) and Michigan (Management Unit 1). Since 2002, the WTG model has included data collected from three fishery-independent, gill net assessment surveys (i.e., Ontario Partnership, Michigan and Ohio). Due to similarities between Michigan and Ohio surveys and the desire for improved precision, Michigan gill net survey data were pooled with Ohio's data in the SCAA model. As stated earlier, *M* is assumed to be constant (0.32) among years (1978-2012) and ages (ages 2 through 7+, i.e., seven and older). The abundances-at-age were derived from the estimated parameters using an exponential survival equation.

During the LEPMAG process the WTG was asked by the LEC to evaluate the four potential changes to the current SCAA model (listed above in *Walleye Stock Assessment Model*). The WTG evaluated the model changes and considered the proposed assessment model to be a viable alternative to the current model structure (i.e., 2012 SCAA model) and the updated SCAA model (hereafter referred to as the integrated SCAA model) was used to estimate the abundance of walleye in the west and central basins of Lake Erie in 2013.

Based on the 2013 integrated SCAA model, the 2012 west-central population (Management Units 1-3) estimate was 22.183 million age 2 and older walleye (Table 8, Figure 7). 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. Based on the integrated 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 (Table 9; Figure 8). The projected abundance of age 2 and older walleye in the west-central population in 2013 is 17.736 million fish (Table 8; Figure 7).

Harvest Policy and Recommended Allowable Harvest for 2013

Using results from the 2013 integrated SCAA model, the estimated abundance of 17.736 million age 2 and older walleye in 2013, and the interim harvest policy (TRP $=F_{60\%MSY}$; LRP $=20\%SSB_0$), the calculated mean RAH for 2013 is 2.887 million walleye, with a range from 2.419 (minimum) to 3.356 (maximum) million walleye (Table 10). The target fishing rate, ($F_{60\%MSY}=0.296$) in the harvest policy was applied since the probability that the projected spawner biomass in 2014 (17.351 million kg) could fall below the limit reference point ($SSB_{20\%}$ = 8.561 million kg) after fishing at $F_{60\%MSY}$ in 2013 was less than 5% (P=0.0001). Thus the probabilistic control rule that may reduce the target fishing rate to conserve spawner biomass, was not invoked in 2013.

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).

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.

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 is currently maintained at the Sandusky office of the Ohio Department of Natural Resources, Division of Wildlife. 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. In 2012, Vandergoot et al. (2012) published the findings of an interagency tag-loss study conducted between 2005 and 2009. Additionally, Vandergoot et al. (2012) estimated fishery and regions specific jaw-tag reporting rates from the high-reward tagging studies conducted in 1990 and 2000. The results of this study were used to generate spatially explicit mortality parameters for Lake Erie walleye and a manuscript describing this work has been submitted for peer review.

Additional Walleye Task Group Activities and Endeavors

Investigating auxiliary recruitment indices and gear standardization

In 2012, the WTG used comparable components of the Ontario (ON Partnership), New York (NYDEC warmwater) and Ohio (ODNR) bottom monofilament gillnet assessment programs to investigate the dynamics, production and relative abundance yearling walleye throughout the lake. The WTG expanded this exercise in 2013 to include yearling catches observed in the kegged monofilament gillnet assessment conducted by the ON Partnership and the kegged multifilament gillnet assessments from the combined ODNR and Michigan (MDNR) survey (Figure 9). Results from this exercise show that although yearling walleye (originating from the 2011 year class) were found in the eastern basin, the highest densities were observed in the western basin, with smaller catches in the central basin. It should be noted that this approach has notable limitations (lack of suspended gillnet data in NY; difficulty standardizing the catches across jurisdictions; trends in growth rates), but that this endeavor represents another step toward identifying auxiliary data sources for assessing the status of the walleye resource. A collaborative gillnet comparison study between the ODNR and United States Geological Survey, Lake Erie Biological Station, has been underway in Ohio waters of Lake Erie since 2010. In 2012, the scope of this study was expanded into Ontario waters of Lake Erie with the participation of the ON partnership survey. Results of this collaborative study may provide the WTG with a method of standardizing the current assessment surveys into the future. We will continue to explore ways of standardizing assessment data, modifying methodologies, and examining historic data in the coming year.

East Basin Walleye Assessment

Catch-at-age assessment models assume that information collected from fisheries and surveys track the same cohorts 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.

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. 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 include a stock assessment approach that does not utilize a catch-at-age modeling of absolute abundance.

Walleye Spatial Ecology Study

In 2010, an inter-lake walleye spatial ecology telemetry 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.

A similar spatial ecology study will be initiated during the spring of 2013. In addition to the fish released with acoustic transmitters in the 2010 study (n=200), walleye (n=200) will be collected during the spawning period from a western basin reef spawning stock and implanted with acoustic transmitters. The objectives of this study are to: 1) determine the proportion of walleye originating from two western basin spawning stocks (i.e., Toussaint Reef and Maumee River) that migrate out of the western basin of Lake Erie after spawning, 2) compare spawning site fidelity rates between these two spawning stocks, 3) determine if female walleye from these spawning stocks are annual spawners, and 4) compare total mortality rates (i.e., fishing and natural) for these spawning stocks. The 2013 study is funded by the Great Lakes Fishery Commission, Ohio Department of Natural Resources and the Ontario Ministry of Natural Resources and will be a collaborative effort of the LEC agencies, the United States Geological Survey and Carlton University.

In addition to possessing an internal acoustic transmitter, each walleye was tagged with an external orange tag (located either in the dorsal musculature or abdominal cavity) and a $100US reward is being offered for reporting and returning the acoustic transmitter. Captured fish can be reported to the phone number listed on the internal or external tags, on the internet by logging onto http://data.glos.us/glatos , or by contacting one of the LEC agencies.

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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 2012. 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.

Year		TAC Area (MU-1, MU-2, MU-3)				Non-TAC Area (MUs 4&5)				All Areas
		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**
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**

[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
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

[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
2012	1,283	242	--	1,525	560	--	560	182	--	182	--	160	169	329	2,597	4,674	2,480	2,298	352	9,804
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
2012	0.46	0.36	--	0.45	0.42	--	0.42	0.51	--	0.51	--	0.28	0.22	0.25	0.42	178.4	114.8	83.1	80.3	136.5
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 2012. 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	19,108	0	0	--	--	0	19,108
	2	206,644	114,410	18,602	--	--	133,012	339,656
	3	166,238	149,880	19,469	--	--	169,349	335,587
	4	72,462	78,530	13,567	--	--	92,097	164,559
	5	133,257	92,830	15,612	--	--	108,442	241,699
	6	900	3,459	2,256	--	--	5,715	6,615
	7+	235,266	156,626	17,153	--	--	173,779	409,045
	Total	833,875	595,735	86,658	--	--	682,393	1,516,268
2	1	5,926	0	--	--	--	0	5,926
	2	54,576	31,317	--	--	--	31,317	85,893
	3	45,870	45,144	--	--	--	45,144	91,014
	4	27,338	24,042	--	--	--	24,042	51,380
	5	53,143	46,651	--	--	--	46,651	99,794
	6	1,889	1,218	--	--	--	1,218	3,107
	7+	95,902	84,766	--	--	--	84,766	180,668
	Total	284,644	233,138	--	--	--	233,138	517,782
3	1	501	0	--	--	--	0	501
	2	15,615	2,879	--	--	--	2,879	18,494
	3	14,232	4,855	--	--	--	4,855	19,087
	4	13,826	4,410	--	--	--	4,410	18,236
	5	29,649	14,076	--	--	--	14,076	43,725
	6	2,984	193	--	--	--	193	3,177
	7+	114,196	66,101	--	--	--	66,101	180,297
	Total	191,003	92,514	--	--	--	92,514	283,517
4	1	0	--	--	0	0	0	0
	2	2,550	--	--	6558	2,240	8,798	11,348
	3	707	--	--	574	2,240	2,814	3,521
	4	4,110	--	--	4,263	1,792	6,055	10,165
	5	2,816	--	--	2,951	5,823	8,774	11,590
	6	1,643	--	--	1,804	448	2,252	3,895
	7+	16,434	--	--	20,825	32,253	53,078	69,512
	Total	28,260	--	--	36,975	44,796	81,771	110,031
All	1	25,535	0	0	0	0	0	25,535
	2	279,385	148,606	18,602	6,558	2,240	176,006	455,391
	3	227,047	199,879	19,469	574	2,240	222,161	449,208
	4	117,736	106,982	13,567	4,263	1,792	126,604	244,340
	5	218,865	153,557	15,612	2,951	5,823	177,943	396,808
	6	7,416	4,870	2,256	1,804	448	9,378	16,794
	7+	461,798	307,493	17,153	20,825	32,253	377,724	839,522
	Total	1,337,782	921,387	86,658	36,975	44,796	1,089,816	2,427,598

[a] Ontario sport harvest values were not estimated from creel surveys in 2012; 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 2012. 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	2.3	0.0	0.0	--	--	0.0	1.3
	2	24.8	19.2	21.5	--	--	19.5	22.4
	3	19.9	25.2	22.5	--	--	24.8	22.1
	4	8.7	13.2	15.7	--	--	13.5	10.9
	5	16.0	15.6	18.0	--	--	15.9	15.9
	6	0.1	0.6	2.6	--	--	0.8	0.4
	7+	28.2	26.3	19.8	--	--	25.5	27.0
	Total	100.0	100.0	100.0	--	--	100.0	100.0
2	1	2.1	0.0	--	--	--	0.0	1.1
	2	19.2	13.4	--	--	--	13.4	16.6
	3	16.1	19.4	--	--	--	19.4	17.6
	4	9.6	10.3	--	--	--	10.3	9.9
	5	18.7	20.0	--	--	--	20.0	19.3
	6	0.7	0.5	--	--	--	0.5	0.6
	7+	33.7	36.4	--	--	--	36.4	34.9
	Total	100.0	100.0	--	--	--	100.0	100.0
3	1	0.3	0.0	--	--	--	0.0	0.2
	2	8.2	3.1	--	--	--	3.1	6.5
	3	7.5	5.2	--	--	--	5.2	6.7
	4	7.2	4.8	--	--	--	4.8	6.4
	5	15.5	15.2	--	--	--	15.2	15.4
	6	1.6	0.2	--	--	--	0.2	1.1
	7+	59.8	71.4	--	--	--	71.4	63.6
	Total	100.0	100.0	--	--	--	100.0	100.0
4	1	0.0	--	--	0.0	0.0	0.0	0.0
	2	9.0	--	--	17.7	5.0	10.8	10.3
	3	2.5	--	--	1.6	5.0	3.4	3.2
	4	14.5	--	--	11.5	4.0	7.4	9.2
	5	10.0	--	--	8.0	13.0	10.7	10.5
	6	5.8	--	--	4.9	1.0	2.8	3.5
	7+	58.2	--	--	56.3	72.0	64.9	63.2
	Total	100.0	--	--	100.0	100.0	100.0	100.0
All	1	1.9	0.0	0.0	0.0	0.0	0.0	1.1
	2	20.9	16.1	21.5	17.7	5.0	16.2	18.8
	3	17.0	21.7	22.5	1.6	5.0	20.4	18.5
	4	8.8	11.6	15.7	11.5	4.0	11.6	10.1
	5	16.4	16.7	18.0	8.0	13.0	16.3	16.3
	6	0.6	0.5	2.6	4.9	1.0	0.9	0.7
	7+	34.5	33.4	19.8	56.3	72.0	34.7	34.6
	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 2011.

	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
2012	4.97	4.46	--	4.91	5.78	--	5.78	8.13	--	8.13	--	8.92	7.65	8.35	5.60	4.86	5.33	7.15	7.25	5.34	5.47
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, 1980-2013 (from 2013 catch at age analysis recruitment integrated model, M=0.32).

	Age							Ages 2+		
Year	2	3	4	5	6	7+	Total	S	F	u
1980	9,475,420	8,229,870	497,291	1,333,880	447,178	82,124	20,065,763	0.583	0.220	0.170
1981	6,559,090	5,961,700	4,521,350	263,177	692,357	258,326	18,256,000	0.542	0.292	0.219
1982	15,513,000	4,006,980	3,098,620	2,243,780	127,459	418,961	25,408,800	0.590	0.207	0.161
1983	8,980,850	9,759,560	2,186,450	1,635,340	1,165,450	247,954	23,975,604	0.606	0.180	0.142
1984	68,910,600	5,879,740	5,690,480	1,254,530	933,917	781,011	83,450,278	0.657	0.101	0.082
1985	5,886,290	46,043,900	3,591,810	3,424,370	750,745	979,523	60,676,638	0.640	0.127	0.102
1986	21,083,100	4,009,620	29,362,600	2,260,200	2,142,360	1,034,430	59,892,310	0.621	0.156	0.124
1987	20,894,200	14,032,100	2,438,300	17,557,000	1,350,680	1,827,080	58,099,360	0.626	0.148	0.118
1988	49,021,500	13,939,600	8,591,790	1,467,410	10,575,800	1,816,590	85,412,690	0.625	0.151	0.120
1989	10,598,500	32,180,000	8,266,380	4,994,450	859,294	7,053,210	63,951,834	0.618	0.161	0.128
1990	8,833,700	7,096,960	19,808,800	5,015,610	3,052,860	4,573,330	48,381,260	0.627	0.147	0.118
1991	4,396,890	5,970,550	4,423,270	12,230,900	3,114,780	4,584,730	34,721,120	0.637	0.131	0.106
1992	14,895,400	3,006,850	3,800,990	2,798,490	7,753,940	4,751,240	37,006,910	0.633	0.137	0.110
1993	20,422,500	10,035,500	1,852,630	2,324,290	1,718,110	7,493,950	43,846,980	0.608	0.178	0.140
1994	3,261,270	13,385,200	5,788,920	1,060,950	1,339,940	5,067,360	29,903,640	0.590	0.207	0.161
1995	17,475,700	2,156,460	7,845,260	3,379,140	624,978	3,650,080	35,131,618	0.601	0.189	0.148
1996	18,469,800	11,332,200	1,201,410	4,362,830	1,898,160	2,313,150	39,577,550	0.567	0.248	0.189
1997	2,106,080	11,578,500	5,842,750	617,435	2,272,330	2,114,650	24,531,745	0.544	0.289	0.216
1998	17,901,700	1,344,100	6,233,110	3,133,390	334,653	2,303,270	31,250,223	0.558	0.264	0.200
1999	8,284,050	10,963,200	654,685	3,028,660	1,546,350	1,230,780	25,707,725	0.565	0.252	0.192
2000	6,993,350	5,264,130	5,822,050	347,121	1,628,070	1,454,650	21,509,371	0.573	0.236	0.181
2001	20,454,500	4,481,980	2,851,710	3,150,510	190,729	1,655,680	32,785,109	0.649	0.112	0.091
2002	2,327,620	13,773,900	2,752,240	1,740,030	1,930,710	1,087,020	23,611,520	0.645	0.119	0.096
2003	15,636,700	1,598,250	8,837,470	1,757,610	1,117,240	1,909,200	30,856,470	0.660	0.096	0.079
2004	207,142	10,714,700	1,021,460	5,616,050	1,119,630	1,878,120	20,557,102	0.653	0.106	0.087
2005	64,655,900	145,931	7,023,260	666,042	3,670,520	1,916,920	78,078,573	0.686	0.057	0.047
2006	2,305,620	45,006,200	93,315	4,484,610	427,192	3,544,890	55,861,827	0.640	0.127	0.102
2007	4,457,150	1,610,070	28,752,300	59,302	2,859,490	2,454,110	40,192,422	0.639	0.128	0.103
2008	1,194,140	3,120,460	1,028,710	18,220,400	37,600	3,279,950	26,881,260	0.644	0.121	0.098
2009	10,991,500	835,220	2,008,810	659,529	11,725,100	2,073,820	28,293,979	0.666	0.087	0.071
2010	4,166,710	7,717,560	542,772	1,299,140	427,634	8,852,700	23,006,516	0.658	0.099	0.080
2011	4,647,660	2,942,500	5,089,550	355,896	852,472	5,898,380	19,786,458	0.661	0.093	0.077
2012	9,096,540	3,260,890	1,923,730	3,321,740	233,216	4,347,110	22,183,226	0.643	0.121	0.098
2013	3,468,990	6,274,430	2,015,130	1,183,840	2,054,890	2,738,960	17,736,240			

Table 9. Table showing the western basin age 0 walleye recruitment index observed in bottom trawls by the Ontario Ministry of Natural Resources (ONT) and Ohio Department of Natural Resources (OH) between 1988 and 2012. Also shown is the number of Age-2 recruits (in millions) produced by the 1988 through 2009 cohorts from the 2013 statistical catch at age model (SCAA). Age-2 recruitment estimates subject to change with successive model runs.

Year Class	Year of Recruitment to Fisheries	OH+ONT Trawl Age-0 CPHa	SCAA estimate Age 2 walleye recruits (in millions)
1988	1990	18.280	8.834
1989	1991	6.094	4.397
1990	1992	39.432	14.895
1991	1993	59.862	20.423
1992	1994	6.711	3.261
1993	1995	108.817	17.476
1994	1996	63.921	18.470
1995	1997	2.965	2.106
1996	1998	85.340	17.902
1997	1999	24.185	8.284
1998	2000	14.313	6.993
1999	2001	44.189	20.455
2000	2002	4.113	2.328
2001	2003	28.499	15.637
2002	2004	0.139	0.207
2003	2005	183.015	64.656
2004	2006	5.402	2.306
2005	2007	12.665	4.457
2006	2008	2.051	1.194
2007	2009	25.408	10.992
2008	2010	7.238	4.167
2009	2011	7.107	4.648
2010 [1]	2012	26.260	9.097
2011 [1]	2013	6.502	3.469
2012 [1]	2014	6.417	3.433

[1] estimates of age-2 recruits from these year-classes may be imprecise because it is the first time the SCAA model has estimated the abundance of these cohorts.

Table 10. Estimated harvest of Lake Erie walleye for 2013 and population projection for 2014 for fishing scenarios of 60% of Fmsy. 2013 and 2014 projected spawning stock biomass is from 2013 recruitment integrated model.

SSB_0=	42.807	million kilograms
20 % SSB_0=	8.561	million kilograms
F_{msy} =	0.493	

	2013 Stock Size (millions of fish)	60% F_{msy}		Rate Functions			2013 RAH (millions of fish)			Projected 2014 Stock Size (millions)	
Age	**Mean**	**F**	**sel(age)**	**(F)**	**(S)**	**(u)**	**Min.**	**Mean**	**Max.**	**Mean**	
2	3.469		0.235	0.069	0.677	0.058	0.164	0.200	0.235	3.433	
3	6.274		0.779	0.230	0.577	0.177	0.946	1.111	1.277	2.350	
4	2.015		0.813	0.240	0.571	0.184	0.313	0.371	0.429	3.619	
5	1.184		0.789	0.233	0.575	0.179	0.179	0.212	0.246	1.151	
6	2.055		0.837	0.248	0.567	0.189	0.327	0.388	0.450	0.681	
7+	2.739		1.000	0.296	0.540	0.221	0.491	0.605	0.719	2.644	
Total (2+)	17.736	0.296				0.163	2.419	2.887	3.356	13.878	
Total (3+)	14.267						2.256	2.688	3.120	10.444	
SSB	21.700	mil. kgs								17.351	mil. kgs
			probability of 2014 spawning stock biomass being less than 20% SSB_0 =							0.011%	

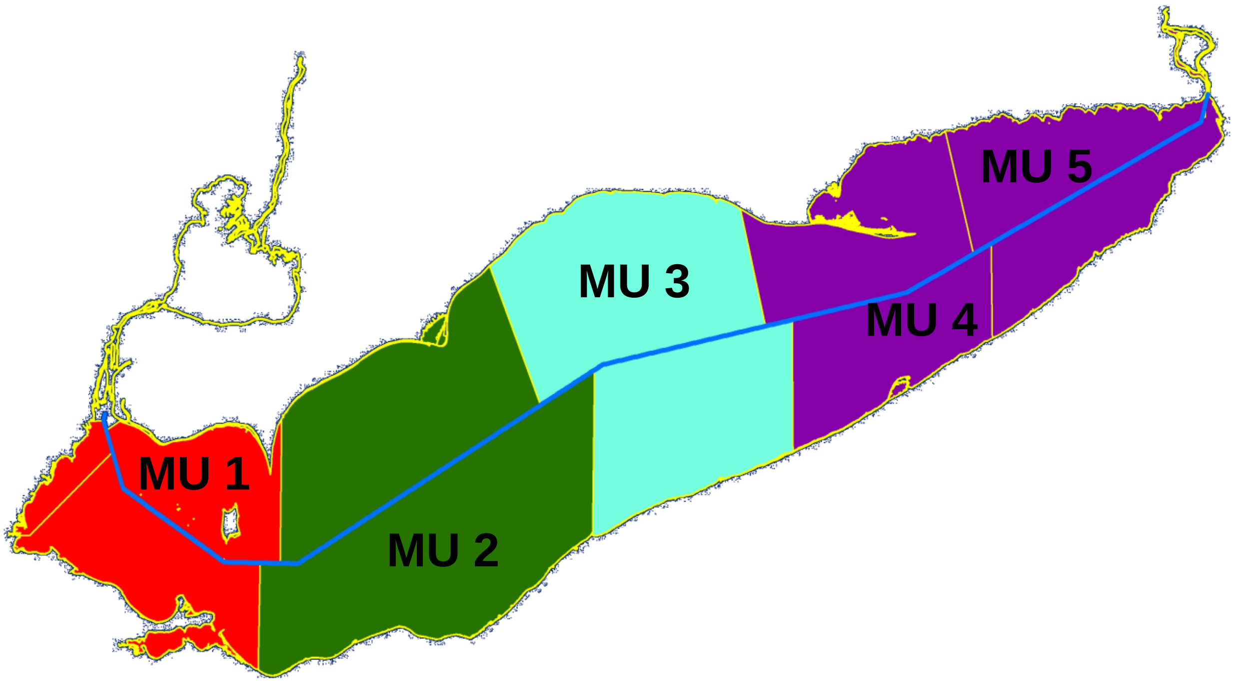

Figure 1. Map of Lake Erie with management units recognized by the Walleye Task Group for interagency management of walleye.

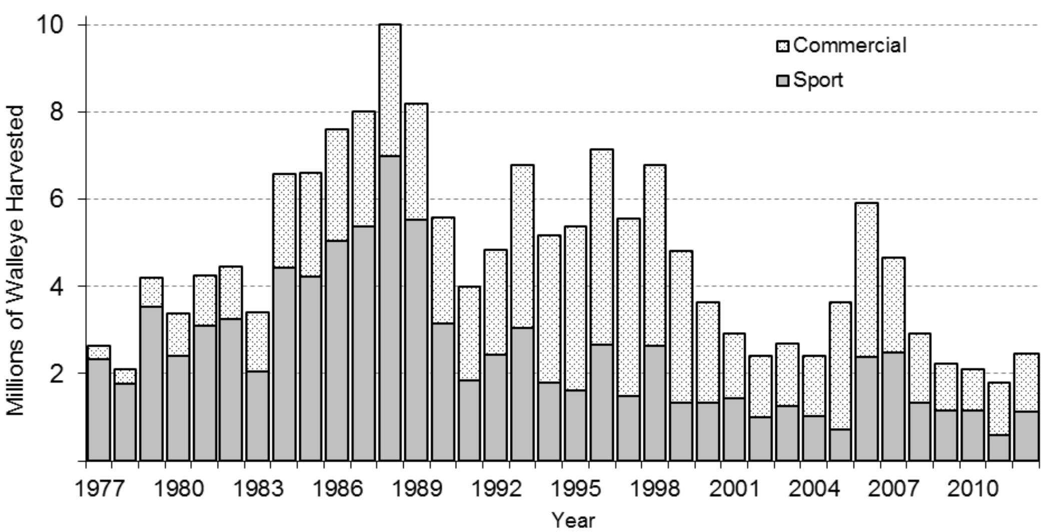

Figure 2. Lake-wide harvest of Lake Erie walleye by sport and commercial fisheries, 1977-2012.

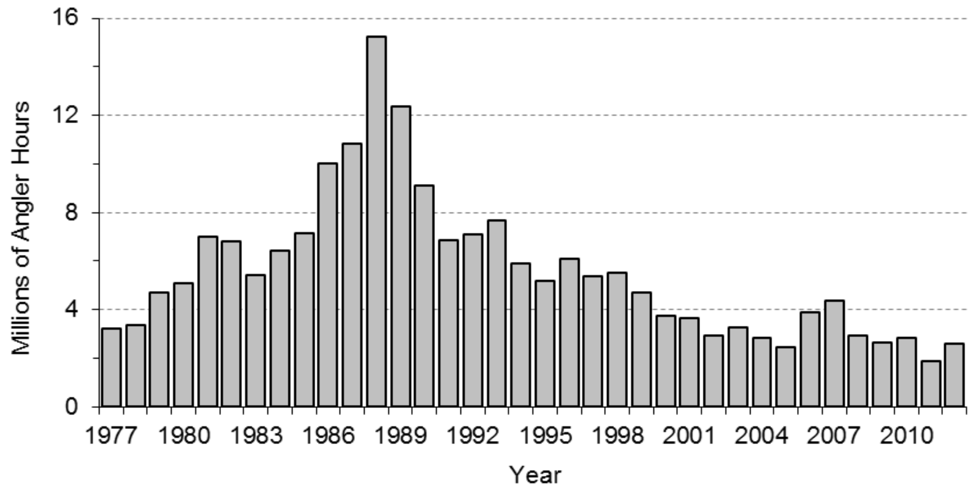

Figure 3. Lake-wide total effort (angler hours) by sport fisheries for Lake Erie walleye, 1977-2012. Years 1999-2012 exclude Ontario sport effort.

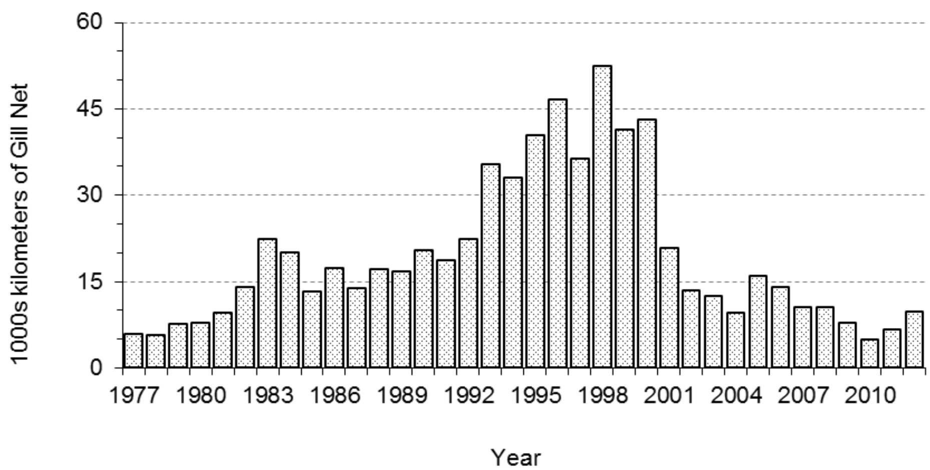

Figure 4. Lake-wide total effort (kilometers of gill net) by commercial fisheries for Lake Erie walleye, 1977-2012.

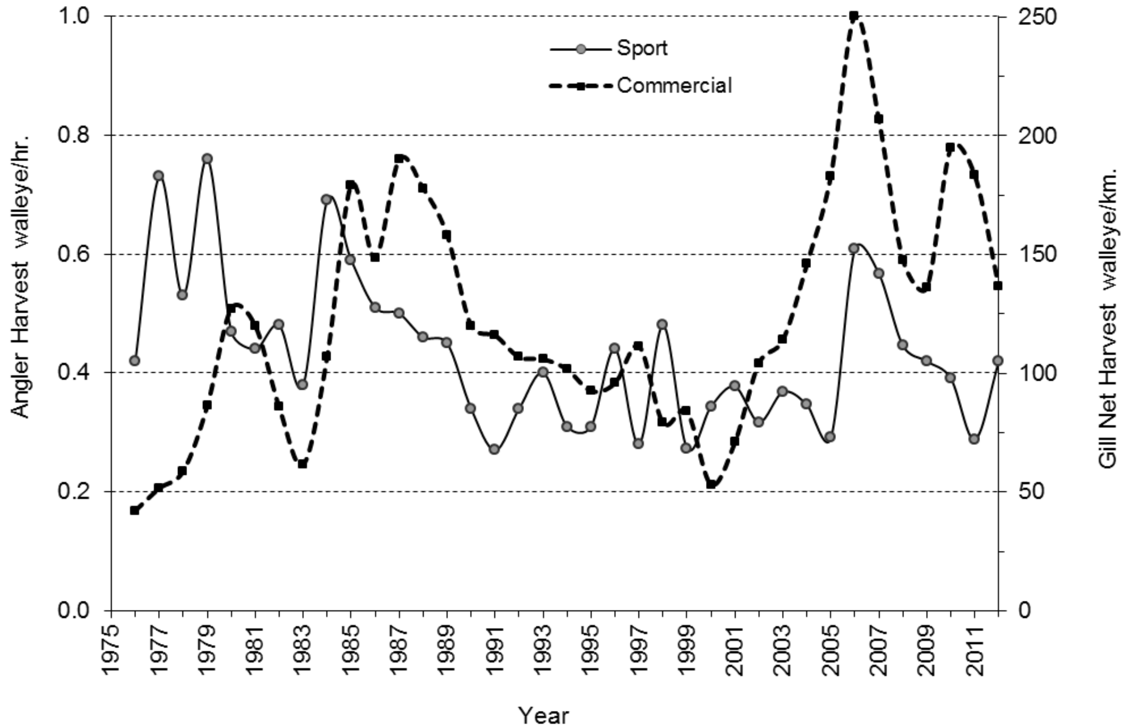

Figure 5. Lake-wide harvest per unit effort (HPE) for Lake Erie sport and commercial walleye fisheries, 1975-2012.

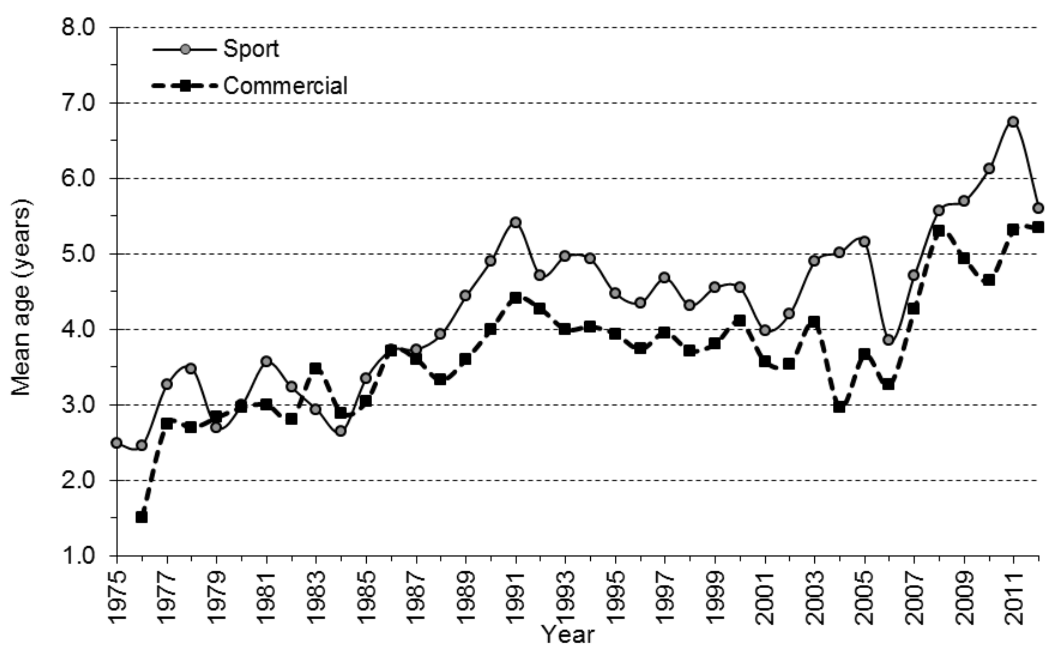

Figure 6. Lake-wide mean age of Lake Erie walleye in sport and commercial harvests, 1975-2012.

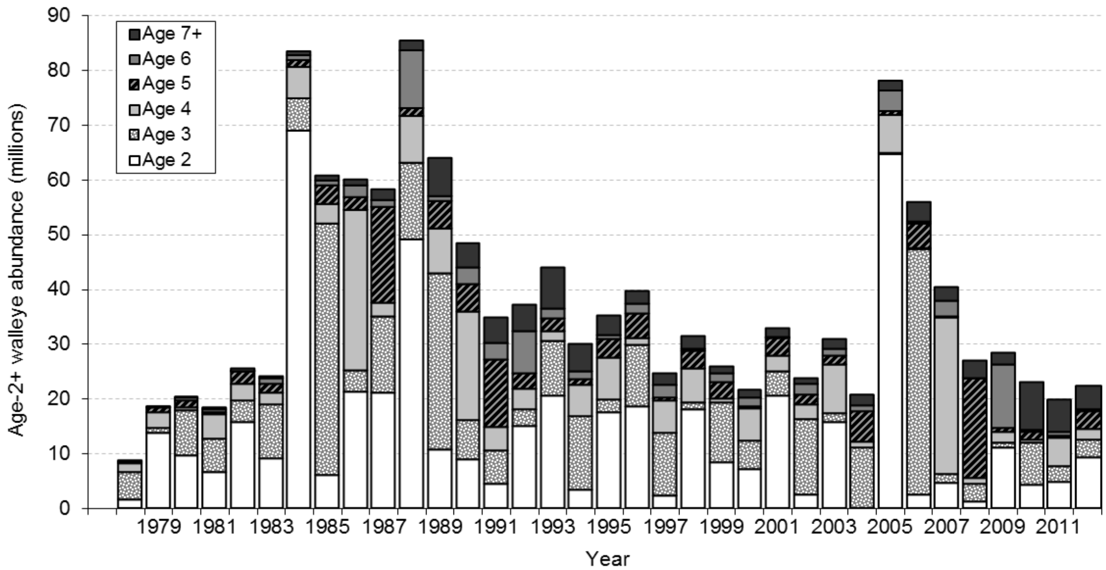

Figure 7. Estimates of abundance by age of Lake Erie walleye 1978-2012. 2013 ADMB statistical catch at age model. Data shown are from Table 8.

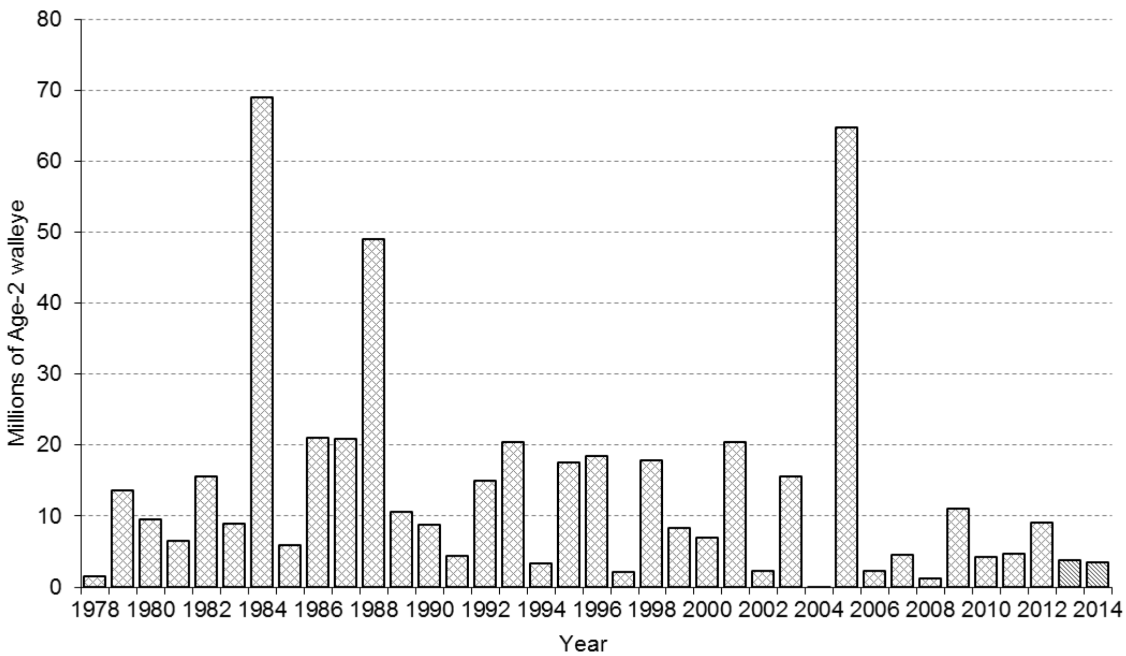

Figure 8. Estimated (1978 – 2012) and projected (2013 and 2014) number of age 2 walleye in the west-central Lake Erie walleye population between using the 2013 ADMB statistical catch at age model.

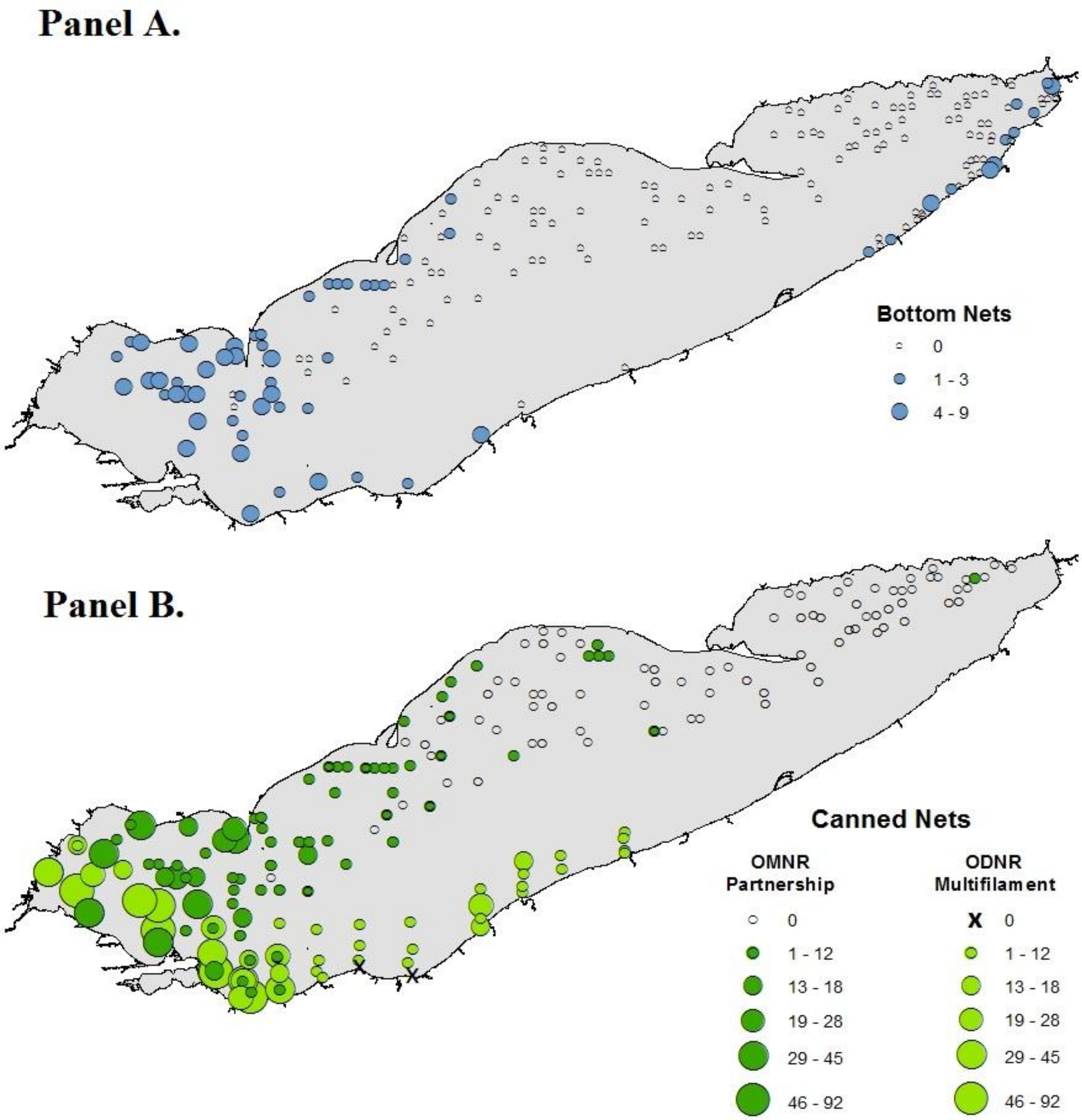

Figure 9. Relative abundance of yearling walleye captured in bottom-set (Panel A) and suspended or kegged multifilament (Panel B) gillnets from Michigan, Ohio, New York, and Ontario waters in 2012. Catches in the bottom-set nets have been adjusted to reflect panel length (standardized to 50ft panels of monofilament) and differences in the presence of large mesh (>5”) panels were assumed not to affect catches of yearling sized walleye. Catches in the kegged multifilament gillnets are the observed catches. Nets similar to the OMNR Partnership gill nets were fished by the United States Geological Survey in Ohio waters in 2012 as part of a comparative gillnet comparison study.