Lake Erie Walleye Task Group *Executive Summary Report* - March 2008

Introduction

This year's Lake Erie Committee (LEC) Walleye Task Group (WTG) report represents a departure in format from previous years. This year the task group has produced an Executive Summary encapsulating information from the WTG annual report, owing to an earlier LEC meeting date and increased report production effort and costs. The complete WTG report is available from the GLFC's Lake Erie Committee Walleye Task Group website at http://www.glfc.org/lakecom/lec/WTG.htm or upon request from an LEC, Standing Technical Committee (STC), or WTG representative.

The Lake Erie WTG continues to partition the lake into five management units (MUs) for reporting, data analysis, and managing Lake Erie walleye (Figure 1, right). Population models are run for combined west-central (MUs 1-3) and eastern (MUs 4 & 5) units, while Recommended Allowable Harvest is determined only for the west-central portion of Lake Erie (MUs 1-3).

Figure 1. Lake Erie Walleye Management Units

Four charges were addressed by the WTG during 2007-2008: (1) Maintain a centralized time series of data required for population models and assessments; (2) Report RAH levels for 2008; (3) Review different methods for calculation of lambdas for use in catch-at-age analyses; and (4) Review jaw tagging and PIT tagging study results. Please see the full report for details of activities addressing all the charges. This year's executive summary will concentrate on the first two charges.

2007 Fishery Review

The total allowable catch (TAC) in the west and central basins for 2007 was 5.360 million fish. This allocation represented a 46% decrease from the 2006 TAC of 9.886 million fish. In MUs 1-3, the total harvest was 4.485 million fish or about 84% of the TAC (Table 1). Harvest in MUs 4 and 5 (the non-TAC area of the eastern basin) was 0.183 million fish. Lakewide walleye harvest was estimated at 4.669 million fish for 2007. Sport fishery (2.502 million fish) and commercial fishery (2.167 million fish) harvest levels seen in 2007 were near the mean value for the time period 1975-2007.

Table 1. Summary of walleye harvest by jurisdiction in Lake Erie, 2007.

in number	TAC Area (MU-1, MU-2, MU-3)				Non-TAC Area (MU-4 & MU-5)				All Areas
of fish	Michigan	Ohio	Ontario	Total	NY	Penn.	Ontario	Total	Total
TAC	284,080	2,755,040	2,320,880	5,360,000	-	-	-	-	5,360,000
Harvest	165,551	2,160,459	2,159,965	4,485,975	29,134	116,671	37,566	183,371	4,669,346

Commercial walleye fishery effort in 2007 declined from 2006 levels in all MUs (Table 2). The total commercial effort of 10,484 km fished was the lowest since 2004 and was just about half of the mean effort over the time period from 1975 to the present (20,701 km). Commercial effort was heaviest in the west basin and generally declined eastward in the lake. The sport fishery saw a general increase in effort in the Ohio waters of the lake and a slight decrease in effort in the eastern third of the lake and in Michigan (Table 3). Sport fishery effort for walleye on Lake Erie in 2007 was the highest since 1999.

Table 2. Ontario walleye gillnet effort in 2007.

	Unit 1	Unit 2	Unit 3	Units 4 & 5
Effort (km)	4,509	2,927	2,665	383
change from 2006	-21%	-27%	-26%	-53%

Table 3. Summary of sport fishery effort reported in thousands of hours for 2007.

	Unit 1 - MI	Unit 1 - OH	Unit 2 - OH	Unit 3 - OH	Units 4&5- PA	Units 4&5- NY
Effort (1000s hrs)	448	2,076	1,147	321	232	135
change from 2006	-24%	18%	28%	23%	-3%	-1%

Both commercial and sport fisheries' catches per unit of effort (CUEs) for 2007 expressed as harvested fish per hour or per km of net fished declined compared to the high values seen in 2006 (Figure 2). The 2006 values were some of the highest seen in the 32-year time series. Only the gillnet CUE from Unit 4 showed an increase, and CUE for Ohio sport anglers in Unit 1 was similar between 2006 and 2007. CUEs for both fisheries remain

above the long-term mean for the time series. The 2006 values were among the highest seen in the 32-year time series.

Age distribution of fish in the harvest was dominated by four-year-old walleye (2003 year class); lakewide, they comprised 83% of the commercial fishery and 78% of the sport fishery. Walleye ages 7 and older made up an appreciable portion of the eastern basin fishery at 23% of the estimated harvest. Mean age in the sport fishery was 4.62 yr in Unit 1, 4.79 yr in Unit 2, 4.89 yr in Unit 3, and 5.27 yr in Unit 4, with an overall weighted mean of 4.71 yr. This value was up from the 2006 value of 3.85 yr, and higher than the long term mean of 4.02 yr (Figure 3). The commercial fishery values for mean age in harvest were: 4.20, 4.29, 4.25, and 6.55 yr, respectively for Units 1-4. The overall mean age for walleye in the commercial fishery of 4.26 yr was one full year greater than last year's mean age of 3.26 yr, and was higher than the long term mean of 3.48 yr.

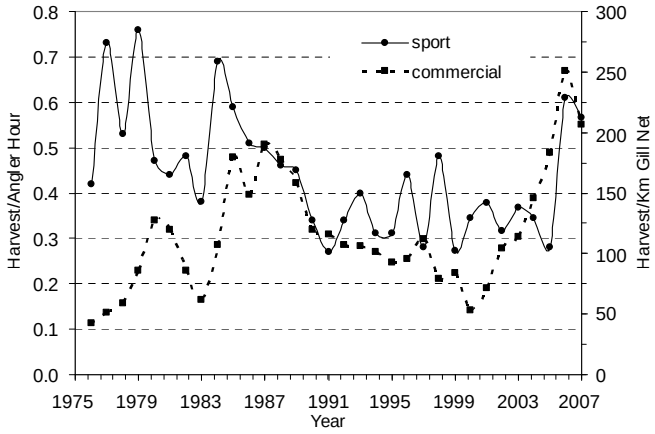

Figure 2. Lakewide walleye harvest rates for sport and commercial fisheries on Lake Erie.

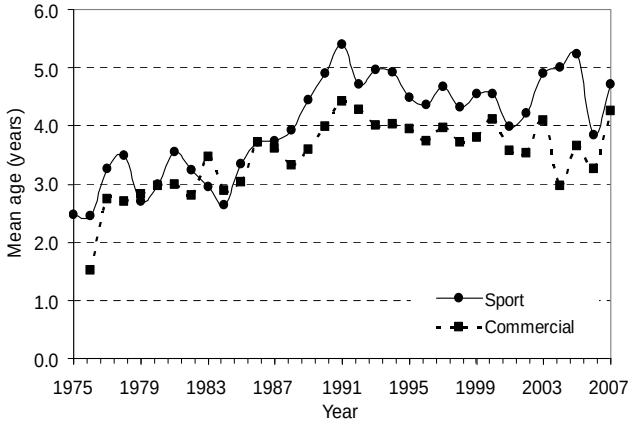

Figure 3. Mean age in harvest for sport and commercial walleye fisheries on Lake Erie.

ADMB Catch-at-Age Analysis and Recruitment Estimate for 2008

Population size for walleye in the west and central basins (Figure 4) was estimated by catch-at-age analysis using the Auto Differentiation Model Builder (ADMB) computer program. This year we incorporated model improvement suggestions from the Michigan State University Quantitative Fishery Center (QFC). We continue to incorporate three fishery components and three assessment surveys in the west and central basins model. A separate catch-at-age analysis was performed on eastern basin walleye data (MUs 4 and 5), and that model is still being developed to address migratory fish issues.

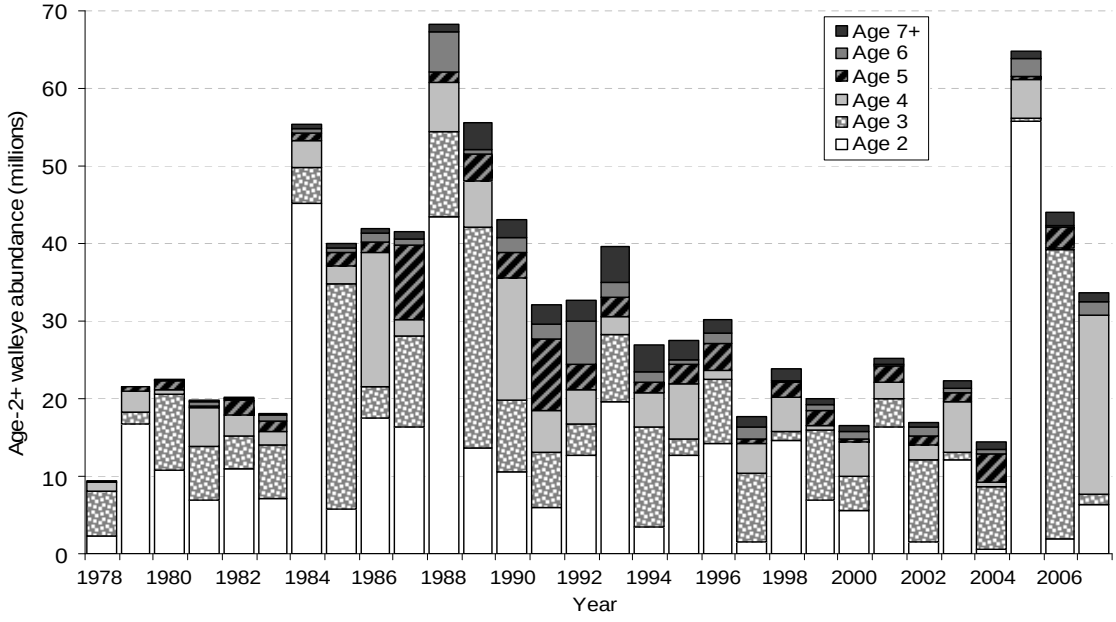

Figure 4. Abundance of age-2 and older walleye in Lake Erie west and central basins estimated from this year's ADMB model run, 1978-2007.

Age-2 walleye recruitment for 2008 in the west and central basin (MUs 1-3) was estimated as in past years; using least-squares linear regression of natural-logged catch rates from Ontario and Ohio interagency trawl indices of juvenile walleye against natural-logged values of abundance estimates of age-2 walleye from the ADMB catch-at-age analysis (Figure 5). The estimate of age-2 walleye recruitment for 2008 (the 2006 year class) is 1.596 million fish. This value is below the long term average, and is the third lowest in the 1989-2008 time series. The 2006 year class is expected to contribute minimally to fisheries in 2008 and beyond. Based on the 2007 assessment trawl values of young-of-the year walleye, a larger age-2 cohort is expected to recruit in 2009; it is currently estimated at 8.638 million fish.

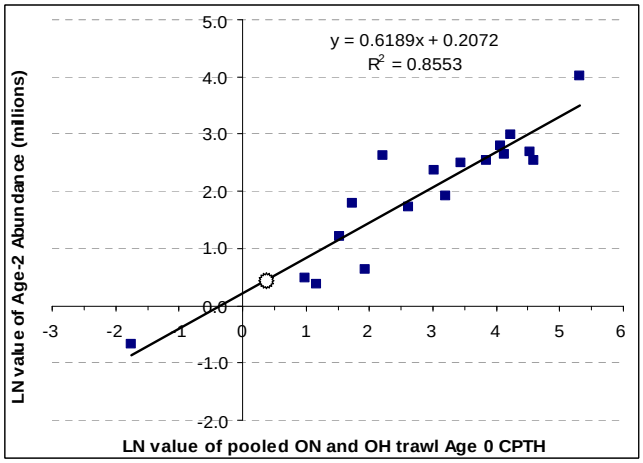

Figure 5. Age-2 walleye recruitment regression used to estimate incoming recruits. The open star is the value for the 2006 cohort.

2008 Population Abundance

Stock size estimates for 2008 (ages 3 and older) were projected from ADMB catch-at-age analysis estimates of 2007 population size and age-specific survival rates in 2007. Projected age-2 recruitment from the 2006 year class (method described above) was added to the 2008 population estimate for age 3 and older fish producing the total standing stock in 2008 of 22.651 million fish (Table 4). Stock size estimates projected for 2008 declined from those levels seen in 2007 due primarily to mortality exerted on the 2003 year class, but also due to the weaker than average incoming 2005 and 2006 year classes. Estimated abundance of walleye ages 2 and older in 2008 is at 67% of the 2007 abundance.

Table 4. Stock size estimates for 2007 and 2008 for Lake Erie walleye in the west and central basins from ADMB. The population of age-2 walleye in 2008 are estimated from the recruitment regression.

	2007 Stock Size (millions)	Rate Functions - from ADMB					Projected 2008 Stock Size (millions)
Age	**Mean**	**sel(age)**	**(F)**	**(Z)**	**(S)**	**(u)**	**Mean**
2	6.368	0.162	0.029	0.349	0.706	0.024	1.596
3	1.333	0.962	0.171	0.491	0.612	0.135	4.493
4	23.028	1.000	0.178	0.498	0.608	0.140	0.816
5	0.118	1.000	0.178	0.498	0.608	0.140	14.000
6	1.593	1.000	0.178	0.498	0.608	0.140	0.072
7+	1.157	0.973	0.173	0.493	0.611	0.136	1.675
Total	33.597						22.652
(3+)	27.229						21.056

2008 Harvest Strategy and Recommended Allowable Harvest (RAH)

With the implementation of the Walleye Management Plan in 2006, yield strategies and RAH are linked to age-2 and older walleye population levels of abundance. Based on the sliding-F scale harvest policy (Figure 6, right), and based on the abundance of 22.652 million fish, the fishing rate (F) for fully selected fish would be 0.220. Using the selectivity values from the current fisheries, the RAH of 3.594 million fish is recommended by the WTG for 2008. Derivation of the walleye RAH for 2008 and projected stock size for 2009 are presented in Table 5.

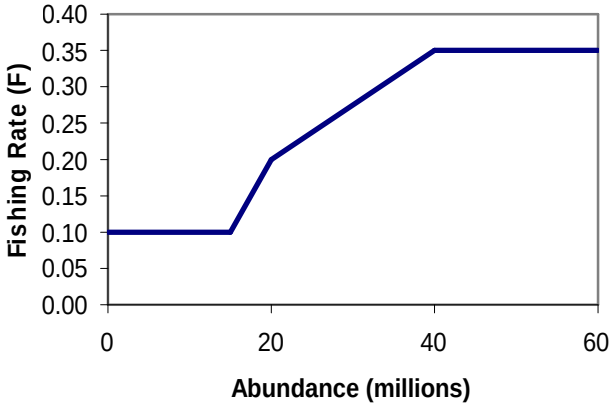

Figure 6 (right). The Lake Erie walleye sliding-F fishing policy.

Table 5. Estimated harvest of Lake Erie walleye for 2008 and population projection for 2009. Fishing mortality for the fully-selected age groups is derived from the regression equation described in the Harvest Policy section of the WTG report. Abundance of age 2 and older walleye is from ADMB catch-age results and trawl regressions. Stock size and RAH in numbers are presented in millions of fish.

	2008 Stock Size (millions)		Rate Functions					2008 RAH (millions of fish)	Projected 2009 Stock Size (millions)
Age	**Mean**	**F**	**sel(age)**	**(F)**	**(Z)**	**(S)**	**(u)**	**Mean**	**Mean**
2	1.596		0.162	0.036	0.356	0.701	0.030	0.048	8.638
3	4.493		0.962	0.212	0.532	0.588	0.164	0.738	1.118
4	0.816		1.000	0.220	0.540	0.583	0.170	0.139	2.640
5	14.000		1.000	0.220	0.540	0.583	0.170	2.380	0.476
6	0.072		1.000	0.220	0.540	0.583	0.170	0.012	8.159
7+	1.675		0.973	0.214	0.534	0.586	0.166	0.278	1.024
Total	22.652	0.220					0.159	3.594	22.054
(3+)	21.056								13.416

Lake Erie Walleye Tagging Study

In 2005 a lake-wide research tagging initiative was undertaken by the WTG. The project was funded by the United States Fish and Wildlife Services (USFWS) Restoration Act Program through 2006 and an additional year of funding (2007) was provided by the respective Lake Erie Committee agencies. The objectives of the study were to: 1) assess the use of Passive Integrated Transponder (PIT) tags as an alternative to jaw tags in estimating walleye exploitation rates in Lake Erie and Saginaw Bay, Lake Huron, in terms of tag retention, cost/benefit analysis, sample size considerations, and precision of exploitation estimates, 2) assess temporal patterns in loss rates of jaw and PIT tags through double-tagging for use in correcting exploitation estimates, 3) determine walleye exploitation rates for different fishery components (i.e., commercial, private, and charter) and determine individual stock contribution to each fishery and 4) obtain additional information regarding walleye movement patterns in each lake through recapture of tagged walleyes by fishers.

Since 2005, 31,242 walleye were tagged with PIT tags on Lake Erie. A subset of PIT-tagged walleye was double-tagged with jaw tags to assess tag loss rates for both jaw and PIT tags. To date 263,022 walleye harvested from Lake Erie were examined for the presence of a PIT tag. The final report for this project is due to the USFWS during the fall of 2008. Chris Vandergoot, a fisheries biologist with the Ohio Department of Natural Resources, will be evaluating the potential use of PIT tags for estimating walleye exploitation in Lake Erie through the Quantitative Fisheries Center at Michigan State University. Another aspect of this study will focus on estimating jaw tag loss rates. This will enable the WTG to adjust previous estimates of exploitation using the jaw tag database.

The complete WTG report is available from the GLFC's Lake Erie Committee Walleye Task Group website at: http://www.glfc.org/lakecom/lec/WTG.htm