LAKE ERIE COMMITTEE
WALLEYE TASK GROUP
EXECUTIVE SUMMARY REPORT
MARCH 2016

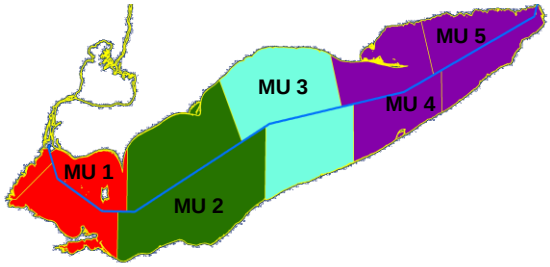

Figure 1. Lake Erie walleye management units

Introduction

This summary report highlights elements of the 2016 Walleye Task Group (WTG) annual report. The complete WTG report is available from the Great Lakes Fishery Commission's (GLFC) Lake Erie Committee (LEC) WTG website at http://www.glfc.org/lakecom/lec/WTG.htm, or upon request from an LEC, Standing Technical Committee (STC), or WTG representative.

The WTG partitions the lake into five management units (MUs) for data analysis and managing Walleye (Figure 1). Statistical catch-at-age (SCAA) population models are run for a combined west-central area (MUs 1 to 3) to produce estimates that are used with WTG Harvest Control Rules to generate a Recommended Allowable Harvest (RAH). The WTG assesses the status of Walleye and their resulting fisheries in MUs 4 and 5, but it does not generate an RAH due to uncertainties concerning stock delineation.

Four charges were addressed by the WTG during 2015-2016: (1) Maintain and update centralized time series of datasets and methodology required for population models and assessment; (2) Improve existing population models to produce the most scientifically-defensible and reliable method for estimating and forecasting abundance, recruitment, and mortality and continue to explore additional recruitment indices for incorporating into catch-at-age model and to explore ways to account of tag loss and non-reporting in natural mortality (M) estimates for statistical catch-at-age modeling; (3) Report RAH levels for 2016; (4) Review jaw and PIT tagging study results and provide guidance/recommendations for future tagging strategies to the LEC. Please see the full report for details of activities addressing all of these charges. This executive summary will focus on WTG Charges 1, and 3.

2015 Fishery Review

The total allowable catch (TAC) in quota area waters of the west and central basins for 2015 was 4.114 million fish. This allocation represented a 2% increase from the 2014 TAC of 4.027 million fish. In the TAC area, the total harvest was 2.522 million fish, or 61% of the quota (Table 1). Harvest in the non-TAC area of the eastern basin amounted to 191,606 fish. Lake-wide Walleye harvest was estimated at 2.713 million fish in 2015. Sport fishery (1.325 million fish) and commercial fishery (1.388 million fish) harvest levels reported for 2015 were both below the long-term (1975-2014) means (2.327 and 2.024 million fish, respectively).

Table 1. Summary of walleye harvest by jurisdiction in Lake Erie, 2015.

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	239,846	2,102,665	1,771,488	4,114,000	-	-	-	-	4,114,000
TAC % Share	5.83%	51.11%	43.06%	100.00%	-	-	-	-	100.00%
Harvest	65,740	1,073,263	1,382,600	2,521,603	55,201	46,523	89,882	191,606	2,713,209
Harvest %TAC	27.4%	51.0%	78.0%	61.3%					

Total commercial Walleye fishery effort increased in 2015 compared to 2014. Commercial gill net effort decreased in MU 1 (5%) but increased in MU's 2, 3 and 4, (47%, 85%, and 212% respectively, Table 2). The total commercial effort of 19,637 km of gill net fished was 5% above the long-term average (1975-2014: 18,634 km). Commercial effort was greatest in the west basin, declining eastward through the lake. Across the lake, sport fishery effort in 2015 decreased 2% relative to 2014. Sportfish effort in MU1 increased in Michigan waters by 26%, but decreased in Ohio by 8%. Central basin sportfish effort was mixed, with a 23% increase in Ohio's portion of MU2, but an equivalent decrease of 23% in effort in Ohio's MU3 waters. Sport effort decreased in Pennsylvania (5%) and increased (15%) in New York waters of MUs 4&5 (Table 3). The 2015 Walleye sport effort (2.876 million angler hours) was 55% of the long-term mean.

Table 2. Ontario walleye gillnet effort in 2015.

	Unit 1	Unit 2	Unit 3	Units 4 & 5
Effort (km)	6,980	6,487	5,379	792
change from 2014	-5%	47%	85%	212%

Table 3. Summary of sport fishery effort reported in thousands of hours for 2015.

	Unit 1 - MI	Unit 1 - OH	Unit 2 - OH	Unit 3 - OH	Units 4&5- PA	Units 4&5- NY
Effort (1000s hrs)	165	1,430	564	341	162	215
change from 2013	26%	-8%	23%	-23%	-5%	15%

Lake-wide catch rates in 2015 decreased for both the sport fishery (fish per hour) and for the commercial fishery (fish per kilometer of net fished). The 2015 catch rate in the sport fishery (0.43 fish/hour) is equal to the long-term average while

the catch rate in the commercial fishery (70.7 fish/km gill net) is lower than the long-term average. Compared to 2014, the 2015 sport catch rates by MU decreased in all MU's (10% MU1, 14% MU2, 17% MU3 and 34% MU's 4&5). Gill net catch rates also decreased across all MU's by 12%, 7%, 26% and 38% in MU1, MU2, MU3 and MUs 4&5 respectively. Age distribution of fish in the harvest was dominated by Walleye age 7-and-older (including the 2003 year class) and ages 4 and 5 (2011 and 2010 year classes); lake-wide, age 7-and-older, age 5, and age 4 Walleye comprised 40%, 16%, and 12% of the combined commercial fishery and sport fishery, respectively. The 2013 (age 2), 2012 (age 3) and 2009 (age 6) year classes each represented 5 to 10% of the total harvest in 2015. Age 1 (2014 year class) fish contributed 9% to the total lake-wide harvest.

Catch-at-Age Analysis Population Estimate & Recruitment for 2016 and 2017

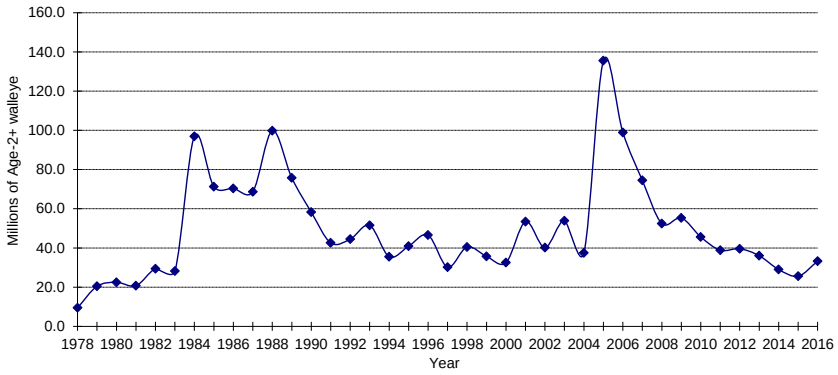

Figure 2. Population estimate of Lake Erie Walleye ages 2 and older from 1978 to 2015, and the projection for 2016 from the integrated SCAA model.

Based on the 2016 integrated SCAA model, the 2015 west-central population estimate was 25.604 million age 2 and older Walleye (Figure 2). The estimated number of age 7 and older fish (≥2007 year class) in 2015 was 6.178 million fish, and represented 24% of the Walleye (age 2 and older) in the population. The most abundant age group (26%) was age 2, age 4 fish comprise 16%. Using the 2016 integrated SCAA model, the number of age 2 recruits entering the population in 2016 (2014 year-class) and 2017 (2015 year-class) will be 16.538 and 38.233 million Walleye, respectively.

2016 Population Abundance

Using the 2016 integrated SCAA model, the projected abundance of Walleye in the west-central population is 33.246 million Walleye (Table 4). The most abundant year class (50%) in the population is projected to be age 2 Walleye from the 2014 cohort (16.538 million fish). The next most abundant year class is 2013 (age 3) at 14%. The 2012 (age 4), 2011 (age 5) and 2010 (age 6) year-classes are all expected to contribute proportions to the population ranging from 6%, 8%, and 7%, respectively. Age 7 and older fish are expected to account for 15% of the 2016 population size. The spawning stock biomass (SSB) projected for 2016 is 32.437 million kilograms.

2016 Harvest Strategy and Recommended Allowable Harvest (RAH)

The WTG implemented the Walleye Management Plan (2015-2019), which includes the integrated Walleye assessment model and a Walleye Harvest Control (HCR) rule. The HCR sets the target fishing rate at 60%Fmsy, with an accompanying limit reference point which will reduce the this target fishing rate beginning at 20% of the unfished spawning stock biomass ($20\%SSB_0$). This probabilistic control rule, P-star (P*), of 0.05 was incorporated to ensure that SSB in 2017 is not below the SSB_o threshold after fishing in 2016. In addition, there is a limitation of TAC variation from one year to the next of 20% to implement a measure of fishery stability. Using results from the 2016 integrated SCAA model, the harvest policy adopted for 2015, and selectivity values from the current fisheries, a mean RAH of 4.998 million fish was calculated for 2016, with a range of 3.799 to 6.197 million fish (Table 4). The TAC range for 2016 based on minimizing variation from the 2015 TAC, plus or minus 20%, would be 3.291 to 4.937 million fish.

	2016 Stock Size (millions of fish)	60% F_{msy}		Rate Functions			2016 RAH (millions of fish)			Projected 2017 Stock Size (millions)	
Age	**Mean**	**F**	**Sel(age)**	**(F)**	**(S)**	**(u)**	**Min.**	**Mean**	**Max.**	**Mean**	
2	16.538		0.296	0.094	0.661	0.077	0.941	1.274	1.607	38.233	
3	4.621		0.917	0.292	0.542	0.218	0.785	1.008	1.232	10.931	
4	2.078		0.947	0.301	0.537	0.224	0.359	0.466	0.574	2.507	
5	2.668		0.887	0.282	0.548	0.212	0.433	0.565	0.698	1.116	
6	2.465		0.918	0.292	0.542	0.218	0.412	0.538	0.665	1.461	
7+	4.876		1.000	0.318	0.528	0.235	0.871	1.146	1.422	3.913	
Total (2+)	33.246	0.318				0.150	3.799	4.998	6.197	58.161	
Total (3+)	16.708						2.859	3.725	4.590	19.928	
SSB	32.437	mil. kgs								38.887	mil. kgs
			probability of 2016 spawning stock biomass being less than 20% SSB_0 =							0.001%	

Table 4. Stock size estimates and RAH values for mean and ± one standard error.