LAKE ERIE COMMITTEE
WALLEYE TASK GROUP
EXECUTIVE SUMMARY REPORT
MARCH 2019

Lake Erie Committee
REPRESENTING THE FISHERY MANAGEMENT AGENCIES OF LAKE ERIE & LAKE ST. CLAIR

Introduction

This summary report highlights elements of the 2018 Walleye Task Group (WTG) annual report. The complete WTG report is available from the Great Lakes Fishery Commission's (GLFC) Lake Erie Committee website at http://www.glfc.org/lake-erie-committee.php, or upon request from a 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). A statistical catch-at-age analysis (SCAA) population model is run for a combined west-central area (MUs 1 to 3) to produce estimates that are used with a harvest control rule to generate a Recommended Allowable Harvest (RAH). The WTG assesses the status of Walleye and their resulting fisheries in MUs 4&5, but it does not generate an RAH due to uncertainties concerning mixing of western and eastern basin walleye populations.

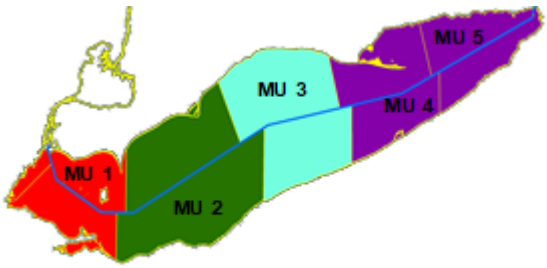

Figure 1. Lake Erie walleye management units

Two charges were addressed by the WTG during 2018-2019: (1) Maintain and update the centralized time series of datasets required for bi-national population models and produce the annual Recommended Allowable Harvest; (2) Maintain working knowledge of current research related to Lake Erie Walleye population assessment including: abundance, age/size/spatial stock structure (migration rates), recruitment, and natural mortality (M) in order to provide critical guidance for incorporating new research into Lake Erie Walleye management. Please see the full report for details of activities addressing all of these charges. This executive summary will focus on WTG charge 1.

2018 Fishery Review

The total allowable catch (TAC) for 2018 in the quota area (MUs 1 to 3) was 7.109 million fish. This allocation represented a 20% increase from the 2017 TAC of 5.924 million fish. Total harvest in the quota area was 5.627 million fish, or 79% of the 2018 TAC (Table 1). Harvest in the non-TAC area (MUs 4&5) was 0.644 million fish. Lake-wide Walleye harvest was estimated at 6.271 million fish. The reported sport fishery (2.627 million fish) and commercial fishery (3.657 million fish) harvest were above the 1975-2017 time series mean 2.259 million fish and 2.037 million fish, respectively.

Table 1. Summary of walleye harvest by jurisdiction in Lake Erie, 2018.

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	414,455	3,633,410	3,061,135	7,109,000	-	-	-	-	7,109,000
TAC % Share	5.83%	51.11%	43.06%	100.00%	-	-	-	-	100.00%
Harvest	176,089	1,972,295	3,478,713	5,627,097	123,503	270,189	250,345	644,037	6,271,134
Harvest %TAC	42.5%	54.3%	113.6%	79.2%					

Total lake-wide commercial Walleye fishery effort was 17,168 km of gill net, which represented a 16% decrease from 2017 and was 8% below the 1975-2017 time series mean (18,755 km). Commercial effort decreased in MU 1 and MU 3 and increased in MU 2 and MUs 4&5 (Table 2). Historically MU 1 has been the largest component of the commercial effort, but in 2018 the greatest effort was in MU 2 (Table 2). Lake-wide sport effort was 3.144 million angler hours which represented a 2% increase from 2017, but 38% below of the 1975-2017 time series mean (5.059 million angler hours). Sport effort increased in Michigan (MU1), Ohio (MU 2), PA and NY (MU 4&5) waters but declined in Ohio MU1 and MU3 waters from 2017 (Table 3).

Table 2. Ontario walleye gillnet effort in 2018.

	Unit 1	Unit 2	Unit 3	Units 4 & 5
Effort (km)	5,215	7,421	2,636	1,896
change from 2017	-35%	3%	-28%	24%

Table 3. Summary of sport fishery effort reported in thousands of hours for 2018.

	Unit 1 - MI	Unit 1 - OH	Unit 2 - OH	Unit 3 - OH	Units 4&5- PA	Units 4&5- NY
Effort (1000s hrs)	261	1,239	813	354	248	229
change from 2017	39%	-8%	12%	-29%	9%	8%

The 2018 harvest rates in the lake-wide sport fishery (0.81 fish/hour) and commercial fishery (213 fish/km gill net) increased from 2017 and are above 1975-2017 time series mean (0.43 fish/hour and 121.0 fish/km gill net). Sport harvest rates increased in all MUs (MU 1 = 79%; MU 2 = 88%; MU 3 = 41%; and MU4&5 = 56%) compared to 2017. Gill net catch rates increased in MU1 (36%), MU 2 (52%), MU3 (22%), and MUs 4&5 (73%). Age composition of harvested fish was dominated by age 3 (73%) and age 4 (15%) Walleye from the 2015 and 2014 year classes, respectively. In 2018, Age 7 and older Walleyes, represented 5% of the total lake-wide harvest.

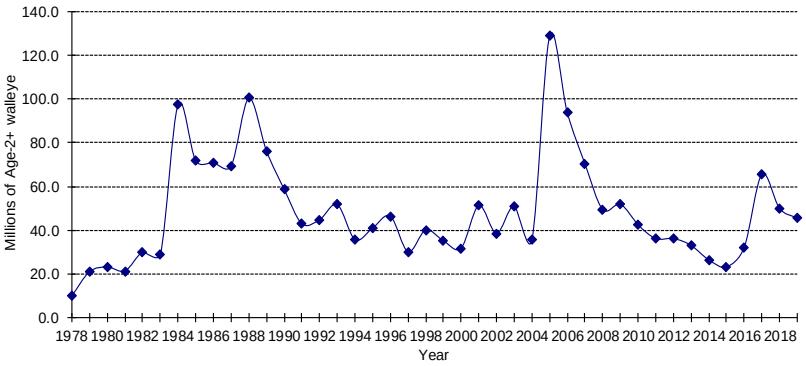

Figure 2. Population estimate of Lake Erie Walleye ages 2 and older from 1978 to 2018, and the projection for 2019, from the integrated SCAA model.

Catch-at-Age Analysis Population Estimate and Projected Recruitment for 2019 and 2020

Based on the 2019 integrated SCAA model, the 2018 MU 1 to 3 population estimate was 49.848 million age 2 and older Walleye (Figure 2). An estimated 30.625 million age 3 (2015 year class) fish comprised 61% of the age 2 and older Walleye population. Age 4 (2014 year class) represented the second largest (15%) and age 2 (2016 year class) the third largest (12%) components of the population. Using the 2019 integrated SCAA model, the number of age 2 recruits entering the population in 2019 (2017 year-class) and 2020 (2018 year-class) will be 13.514 million and 94.071 million, respectively.

Using the 2019 integrated SCAA model, the projected abundance of age 2 and older Walleye in the MUs 1 to 3 population is 45.338. million Walleye in 2019 (Table 4). The most abundant year class (43%) in the population is projected to be age 4 Walleye from the 2015 cohort (19.3 million fish). The next most abundant are age 2 (2017 year class),13.514 million fish (30%). The age 3 (2016 year class), age 5 (2014 year class) and age 6 (2013 year class) are expected to contribute 9%, 10%, and 2% to the population, respectively. Age 7 and older fish are expected to account for 6% of the 2019 population size. The projected spawning stock biomass (SSB) for 2019 is 49.777 million kilograms.

2019 Harvest Strategy and Recommended Allowable Harvest (RAH)

Beginning in 2015, the current Walleye management plan was implemented, which includes the integrated Walleye assessment model and a Walleye harvest control rule (HCR). The HCR sets the target fishing rate at 60% of F_{msy}, with an accompanying limit reference point that will reduce the target fishing rate beginning at 20% of the unfished spawning stock biomass (20%SSB_0). A probabilistic control rule, P-star (P*) was set at 0.05 and incorporated to ensure that SSB in 2020 is not below the 20% SSB_0 threshold after fishing in 2019. 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 2019 integrated SCAA model, the harvest policy, and selectivity estimates from the current fisheries, a mean RAH of 8.683 million fish was calculated for 2019, with a range of 6.504 to 10.861 million fish (Table 4). The TAC range for 2019 based on the integrated SCAA model, the harvest policy, and the ± 20% TAC constraint from the previous year is 6.504 to 8.531 million fish.

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

	2019 Stock Size (millions of fish)	60% F_{msy}		Rate Functions			2019 RAH (millions of fish)			Projected 2020 Stock Size (millions)	
Age	**Mean**	**F**	**Sel(age)**	**(F)**	**(S)**	**(u)**	**Min.**	**Mean**	**Max.**	**Mean**	
2	13.514		0.300	0.100	0.657	0.082	0.809	1.105	1.401	94.071	
3	4.233		0.970	0.324	0.525	0.239	0.768	1.010	1.252	8.878	
4	19.300		0.978	0.326	0.524	0.240	3.508	4.638	5.769	2.224	
5	4.629		0.913	0.305	0.535	0.227	0.781	1.049	1.317	10.113	
6	1.027		0.921	0.307	0.534	0.228	0.172	0.235	0.297	2.478	
7+	2.635		1.000	0.334	0.520	0.245	0.466	0.645	0.825	1.919	
Total (2+)	45.338	0.334				0.192	6.504	8.683	10.861	119.684	
Total (3+)	31.824						5.695	7.577	9.460	25.613	
SSB	49.777	mil. kgs								56.410	mil. kgs
				probability of 2020 spawning stock biomass being less than 20% SSB_0 =						0.000%	