LAKE ERIE COMMITTEE
WALLEYE TASK GROUP
EXECUTIVE SUMMARY REPORT
MARCH 2020

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

Introduction

This summary report highlights elements of the 2019 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.

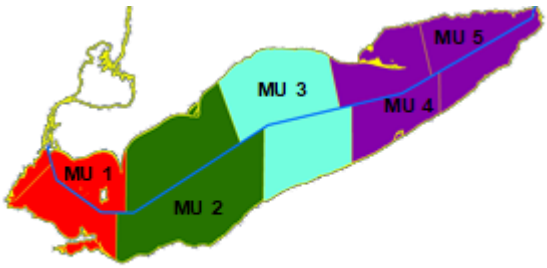

Figure 1. Lake Erie walleye management units

Two charges were addressed by the WTG during 2019-2020: (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.

2019 Fishery Review

The total allowable catch (TAC) for 2019 in the quota area (MUs 1 to 3) was 8.531 million fish. This allocation represented a 20% increase from the 2018 TAC of 7.109 million fish. Total harvest in the quota area was 6.074 million fish, or 71% of the 2019 TAC (Table 1). Harvest in the non-TAC area (MUs 4&5) was 0.824 million fish. Lake-wide Walleye harvest was estimated at 6.897 million fish. Both sport fishery (3.390 million fish) and commercial fishery (3.507 million fish) harvest were above long-term (1975-2018) averages(sport = 2.267 million fish and commercial = 2.074 million fish).

Table 1. Summary of walleye harvest by jurisdiction in Lake Erie, 2019.

in number of fish	TAC Area (MU-1, MU-2, MU-3)				Non-TAC Area (MU-4 & MU-5)				All Areas
	Michigan	Ohio	Ontario	Total	NY	Penn.	Ontario	Total	Total
TAC	497,357	4,360,194	3,673,449	8,531,000	-	-	-	-	8,531,000
TAC % Share	5.83%	51.11%	43.06%	100.00%	-	-	-	-	100.00%
Harvest	153,171	2,558,359	3,362,053	6,073,583	174,466	419,975	229,466	823,907	6,897,490
Harvest %TAC	30.8%	58.7%	91.5%	71.2%					

Total lake-wide commercial Walleye fishery effort was 14,285 km of gill net, which represented a 17% decrease from 2018 and was 31% below the 1975-2018 average (18,719 km). Commercial effort decreased in all MUs (Table 2). Historically MU 1 has been the largest component of the commercial effort, but in 2019 the greatest effort was in MU 2 (Table 2).

Table 2. Ontario walleye gillnet effort in 2019.

	Unit 1	Unit 2	Unit 3	Units 4 & 5
Effort (km)	4,165	6,365	2,402	1,353
change from 2018	-48%	-12%	-34%	-11%

Lake-wide sport effort was 4.083 million angler hours, which represented a 30% increase from 2018, but 23% below of the 1975-2018 average (5.015 million angler hours). Sport effort increased in Michigan (MU1), Ohio (MUs 1 and 2), PA and NY (MU 4&5) waters, but declined in Ohio MU3 waters from 2018 (Table 3).

Table 3. Summary of sport fishery effort reported in thousands of hours for 2019.

	Unit 1 - MI	Unit 1 - OH	Unit 2 - OH	Unit 3 - OH	Units 4&5- PA	Units 4&5- NY
Effort (1000s hrs)	265	1,739	1,036	307	439	297
change from 2018	2%	40%	27%	-13%	77%	29%

The 2019 harvest rates in the lake-wide sport fishery (0.81 fish/hour) remained steady and commercial fishery (245.5 fish/km gill net) increased from 2018, with both being well above long-term (1975-2018) averages (0.44 fish/hour and 123.1 fish/km gill net). Sport harvest rates remained consistent in all MUs (MU 1 = -4%; MU 2 = +12%; MU 3 = +3%; and MU4&5 = -2%) compared to 2018. Gill net catch rates increased in MU1 (37%), MU 2 (1%), and MUs 4&5 (21%), and declined slightly in MU3 (-6%). Age composition of harvested fish was dominated by age 4 (76%) and age 3 (8%) Walleye from the 2015 and 2016 year classes, respectively. In 2019, Age 7+ Walleyes represented 4% of the total lake-wide harvest.

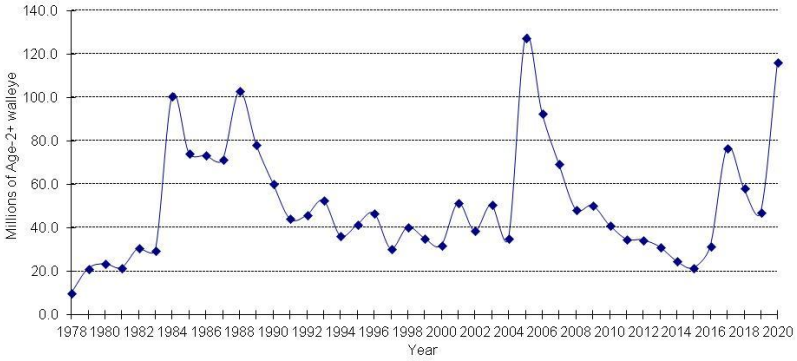

Figure 2. Population estimate of Lake Erie Walleye ages 2 and older from 1978 to 2019, and the projection for 2020, from the integrated SCAA model.

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

Based on the 2020 integrated SCAA model, the 2019 MU 1 to 3 population estimate was 47.132 million age 2 and older Walleye (Figure 2). An estimated 24.617 million age 4 (2015 year class) fish comprised 52% of the age 2 and older Walleye population. Age 2 (2017 year class) represented the second largest (21%) and age 5 (2014 year class) the third largest (10%) components of the population. Using the 2020 integrated SCAA model, the number of age 2 recruits entering the population in 2020 (2018 year-class) and 2021 (2019 year-class) will be 86.404 million and 77.942 million, respectively.

Using the 2020 integrated SCAA model, the projected abundance of age 2 and older Walleye in the MUs 1 to 3 population is 116.354. million Walleye in 2020 (Table 4). The most abundant year class (74%) in the population is projected to be age 2 Walleye from the 2018 cohort (86.404 million fish). The next most abundant are age 5 (2015 year class),15.217 million fish (13%). Age 7 and older fish are expected to account for 2% of the 2020 population size. The projected spawning stock biomass (SSB) for 2020 is 61.782 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 2021 is not below the 20% SSB_0 threshold after fishing in 2020. 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 2020 integrated SCAA model, the harvest policy, and selectivity estimates from the current fisheries, a mean RAH of 13.466 million fish was calculated for 2020, with a range of 10.012 to 16.921 million fish (Table 4). The TAC range for 2020 based on the integrated SCAA model, the harvest policy, and the ± 20% TAC constraint from the previous year is 6.825 to 10.237 million fish.

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

	2020 Stock Size (millions of fish)	60% F_{msy}		Rate Functions			2020 RAH (millions of fish)			Projected 2021 Stock Size (millions)	
Age	**Mean**	**F**	**Sel(age)**	**(F)**	**(S)**	**(u)**	**Min.**	**Mean**	**Max.**	**Mean**	
2	86.404		0.285	0.094	0.661	0.077	4.862	6.673	8.484	77.942	
3	6.797		0.952	0.315	0.530	0.233	1.223	1.584	1.945	57.094	
4	2.778		1.000	0.331	0.522	0.243	0.514	0.675	0.836	3.603	
5	15.217		0.894	0.296	0.540	0.221	2.542	3.358	4.175	1.449	
6	3.033		0.903	0.298	0.539	0.223	0.504	0.675	0.846	8.223	
7+	2.125		0.964	0.319	0.528	0.236	0.367	0.501	0.635	2.756	
Total (2+)	116.354	0.331				0.116	10.012	13.466	16.921	151.067	
Total (3+)	29.951						5.150	6.793	8.437	73.125	
SSB	61.782	mil. kgs								96.566	mil. kgs
				probability of 2020 spawning stock biomass being less than 20% SSB_0 =						0.000%	