LAKE ERIE COMMITTEE
WALLEYE TASK GROUP
EXECUTIVE SUMMARY REPORT
MARCH 2021

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

Introduction

This summary report highlights elements of the 2021 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.

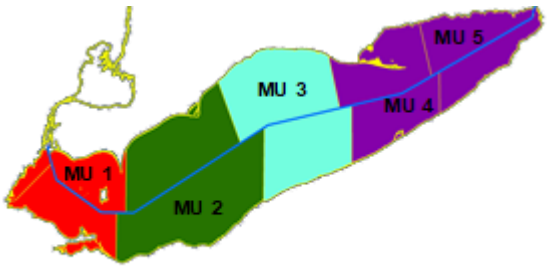

Figure 1. Lake Erie walleye management units

Two charges were addressed by the WTG during 2020-2021: (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.

2020 Fishery Review

The COVID19 pandemic impacted both the fisheries-dependent assessments that contribute data to the SCAA model. A full summary of these impacts and solutions for incomplete datasets are presented in the full task group report.

The total allowable catch (TAC) for 2020 in the quota area (MUs 1 to 3) was 10.237 million fish. This allocation represented a 20% increase from the 2019 TAC of 8.531 million fish. Total harvest in the quota area was 5.845 million fish, or 57.1% of the 2020 TAC (Table 1). Harvest in the non-TAC area (MUs 4&5) was 0.537 million fish. Lake-wide Walleye harvest was estimated at 6.381 million fish. Both sport fishery (2.542 million fish) and commercial fishery (3.839 million fish) harvest were above long-term (1975-2019) averages (sport = 2.292 million fish and commercial = 2.106 million fish).

Table 1. Summary of walleye harvest by jurisdiction in Lake Erie, 2020.

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	596,817	5,232,131	4,408,052	10,237,000	-	-	-	-	10,237,000
TAC % Share	5.83%	51.11%	43.06%	100.00%	-	-	-	-	100.00%
Harvest	191,490	1,973,038	3,680,335	5,844,863	84,615	208,760	243,175	536,550	6,381,413
Harvest %TAC	32.1%	37.7%	83.5%	57.1%					

Total lake-wide commercial Walleye fishery effort was 17,122 km of gill net, which represented a 20% increase from 2019 but was 8% below the 1975-2019 average (18,618 km). Commercial effort increased in all MUs (Table 2). Historically MU 1 has been the largest component of the commercial effort, but in 2019 and again in 2020 the greatest effort was in MU 2 (Table 2).

Table 2. Ontario walleye gillnet effort in 2020.

	Unit 1	Unit 2	Unit 3	Units 4 & 5
Effort (km)	5,759	6,576	3,049	1,738
change from 2019	38%	3%	27%	28%

In 2020, sport effort for Michigan and Ohio required data extrapolation resulting from COVID19 impacts to assessment programs, therefore estimates should be interpreted cautiously. Lake-wide sport effort was 4.257 million angler hours, which represented a 4% increase from 2019, but 15% below of the 1975-2019 average (4.994 million angler hours). Sport effort increased in Michigan (MU1), Ohio (MUs 2 and 3), but declined in Ohio MU1, PA MU4&5 and NY

MU4&5 waters from 2019 (Table 3).

Table 3. Summary of sport fishery effort reported in thousands of hours for 2020.

	Unit 1 - MI	Unit 1 - OH	Unit 2 - OH	Unit 3 - OH	Units 4&5- PA	Units 4&5- NY
Effort (1000s hrs)	301	1,111	1,511	659	395	279
change from 2019	14%	-36%	46%	114%	-10%	-6%

The 2020 harvest rates in the lake-wide sport fishery (0.58 fish/hour) remained steady and commercial fishery (224.2 fish/km gill net) decreased from 2020, but remained above long-term (1975-2019) averages (0.45 fish/hour and 125.9 fish/km gill net). Sport harvest rates declined in all MUs (MU 1 = -29%; MU 2 = -34%; MU 3 = -22%; and MU4&5 = -46%) compared to 2019. Gill net catch rates also decreased in all MUs (MU 1 = -16%, MU 2 = -7%, MU 3 = -1% and MUs 4&5 = -17%). Age composition of harvested fish was dominated by age 5 (59%) or the 2015 year class, but age composition for sport fisheries in Ohio and Michigan were impacted by COVID19 and estimates should be interpreted cautiously.

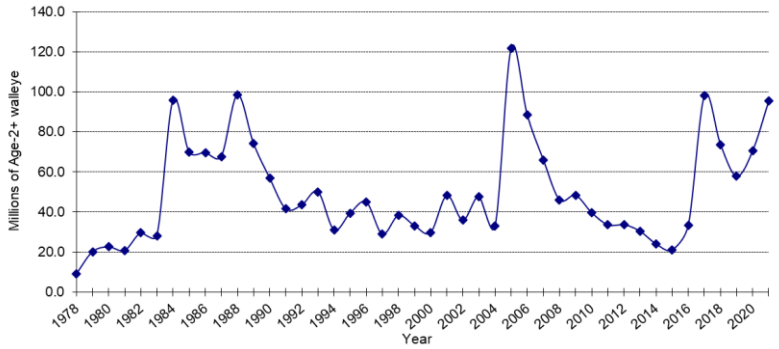

Figure 2. Population estimates of Lake Erie Walleye ages 2 and older from 1978 to 2020, and the projection for 2021, from the integrated SCAA model.

Catch-at-Age Analysis Population Estimate and Projected 2021 and 2022 Recruitment

Based on the 2021 integrated SCAA model, the 2020 MU 1 to 3 population estimate was 70.6 million age 2 and older Walleye (Figure 2). An estimated 32.779 million age 2 (2018 year class) and 22.248 million age 5 (2015 year class) fish comprised 46% and 32% of the population, respectively. Using the 2021 integrated SCAA model, the number of age 2 recruits entering the population in 2021 (2019 year-class) and 2022 (2020 year-class) will be 48.7 million and 24.6 million, respectively.

Using the 2021 integrated SCAA model, the projected abundance of age 2 and older Walleye in the MUs 1 to 3 population is 95.514. million Walleye in 2021 (Table 4). The most abundant year class (51%) in the population is projected to be age 2 Walleye from the 2019 cohort (48.7 million fish). The next most abundant are age 3 (2018 year class), 22.825 million fish (24%). Age 7 and older fish are expected to account for 4% of the 2021 population size. The projected spawning stock biomass (SSB) for 2021 is 70.736 million kilograms.

2020 Harvest Strategy and Recommended Allowable Harvest (RAH)

Beginning in 2015, the current Walleye management plan was implemented and includes the integrated Walleye assessment model and a probabilistic 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 was incorporated to ensure that SSB in 2022 is not below the 20% SSB_0 threshold after fishing in 2021. 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 2021 integrated SCAA model, the harvest policy, and selectivity estimates from the current fisheries, a mean RAH of 15.218 million fish was calculated for 2021, with a range of 11.891 to 18.544 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 8.190 to 12.284 million fish.

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

	2021 Stock Size (millions of fish)	60% F_{msy}		Rate Functions			2021 RAH (millions of fish)			Projected 2022 Stock Size (millions)	
Age	**Mean**	**F**	**Sel(age)**	**(F)**	**(S)**	**(u)**	**Min.**	**Mean**	**Max.**	**Mean**	
2	48.700		0.270	0.096	0.659	0.079	2.848	3.843	4.838	24.573	
3	22.825		0.923	0.330	0.522	0.243	4.434	5.537	6.640	32.111	
4	4.179		0.972	0.348	0.513	0.254	0.839	1.060	1.280	11.917	
5	1.899		0.930	0.332	0.521	0.244	0.364	0.464	0.564	2.144	
6	14.118		0.893	0.319	0.528	0.236	2.632	3.329	4.027	0.989	
7+	3.792		1.000	0.358	0.508	0.260	0.774	0.985	1.196	9.376	
Total (2+)	95.514	0.358				0.159	11.891	15.218	18.544	81.110	
Total (3+)	46.813						9.043	11.375	13.707	56.537	
SSB	70.736	mil. kgs								74.621	mil. kgs

probability of 2022 spawning stock biomass being less than 20% SSB_0 = 0.000%