

LAKE ERIE COMMITTEE WALLEYE TASK GROUP EXECUTIVE SUMMARY REPORT MARCH 2022



Introduction

This summary report highlights elements of the 2022 Walleye Task Group (WTG) annual report. The complete WTG report is available from the Great Lakes Fishery Commission's Lake Erie Committee website at <http://www.glfcc.org/lake-erie-committee.php>, or upon request from a Lake Erie Committee, Standing Technical Committee, or WTG representative.

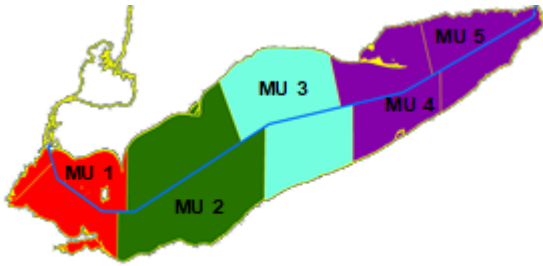


Figure 1. Lake Erie walleye management units

The WTG partitions the lake into five management units (MUs) for data analysis and managing Walleye (Figure 1). A statistical catch-at-age (SCAA) model is run for a combined west-central area (MUs 1 to 3) to produce abundance 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 around the mixing of western and eastern basin populations.

2021 Fishery Review

The total allowable catch (TAC) for 2021 in the quota area (MUs 1 to 3) was 12.284 million fish. This allocation represented a 20% increase from the 2020 TAC. Total harvest in the quota area was 7.611 million fish, or 62.0% of the 2021 TAC (Table 1). Harvest in the non-TAC area (MUs 4&5) was 0.362 million fish. Lake-wide Walleye harvest was estimated at 7.973 million fish. Both sport fishery (2.944 million fish) and commercial fishery (5.042 million fish) harvest were above long-term (1975-2020) averages (sport = 2.297 million fish and commercial = 2.144 million fish). Total lake-wide commercial fishery effort was 18,212 km of gill net, which increased from 2020 but was below the 1975-2020 average (18,585 km). Commercial effort increased in MU1 and MU3 but decreased elsewhere (Table 2). Historically MU 1 has been the largest component of the commercial effort, which was the case in 2021 (Table 2). Lake-wide sport effort was 3.933 million angler hours, which was below the 1975-2020 average (4.978 million angler hours). Sport effort increased in the western basin (MU1), declined elsewhere in the lake (Table 3). The 2021 harvest rates in the lake-wide sport fishery (0.73 fish/hour) remained high, as did those for the commercial fishery (276.9 fish/km gill net). Sport harvest rates increased in all MUs except MUs 4&5, where it remained virtually unchanged relative to 2020. Similarly, gill net catch rates increased in all MUs. In all gear types combined, age 6 (32%; 2015 year class) and age 3 (25%; 2018 year class) Walleye were the two most commonly harvested ages lake-wide, although fish from the 2019 (19%; age 2) year class contributed as well.

Table 1. Summary of walleye harvest by jurisdiction in Lake Erie, 2021.

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	716,157	6,278,352	5,289,490	12,284,000	-	-	-	-	12,284,000
TAC % Share	5.83%	51.11%	43.06%	100.00%	-	-	-	-	100.00%
Harvest	177,948	2,492,386	4,940,829	7,611,163	43,772	145,261	173,205	362,238	7,973,401
Harvest %TAC	24.8%	39.7%	93.4%	62.0%					

Table 2. Ontario walleye gillnet effort in 2021.

	Unit 1	Unit 2	Unit 3	Units 4 & 5
Effort (km)	7,279	6,528	3,168	1,236
change from 2020	26%	-1%	4%	-29%

Table 3. Summary of sport fishery effort reported in thousands of hours for 2021.

	Unit 1 - MI	Unit 1 - OH	Unit 2 - OH	Unit 3 - OH	Units 4&5- PA	Units 4&5- NY
Effort (1000s hrs)	325	1,630	1,087	450	258	183
change from 2020	8%	47%	-28%	-32%	-35%	-34%

Catch-at-Age Abundance Estimate and Projected 2022 and 2023 Recruitment

Based on the 2022 SCAA model, the 2021 population estimate was 83.1 million age 2 and older Walleye (Figure 2). An estimated 38.2 million age 2 (2019 year class) and 18.3 million age 3 (2018 year class) were the most abundant year classes, with age 6 (2015 year class) remaining abundant (15.6 million fish). Using the 2022 SCAA model, the number of age 2 recruits entering the population in 2022 (2020 year class) and 2023 (2021 year class) were projected to be 21.1 million and 59.0 million fish, respectively. The projected abundance of age 2 and older Walleye in the MU 1 to 3 population is 75.749 million Walleye in 2022 (Table 4). The most abundant year class (35%) in the population is projected to be age 3 Walleye from the 2019 cohort (26.5 million fish). The next most abundant are age 2 (2020 year class) at 21.1 million fish (28%). Age 7 and older fish are expected to account for 16% of the 2022 population, largely driven by the 2015 year class. The projected spawning stock biomass (SSB) for 2022 is 73.575 million kilograms (Table 4).

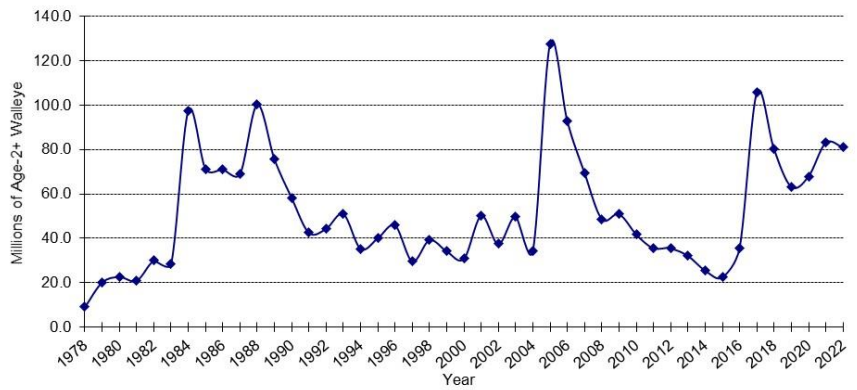


Figure 2. Population estimates of Lake Erie Walleye ages 2 and older from 1978 to 2021, and the projection for 2022, from the WTG's SCAA model.

2022 Harvest Strategy and Recommended Allowable Harvest (RAH)

Beginning in 2015, the current Walleye management plan was implemented and includes the WTG's SCAA 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%SSB₀). A probabilistic control rule, P-star (P*) was set at 0.05 and was incorporated to ensure that SSB in 2023 is not below the 20% SSB₀ threshold after fishing in 2022. 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 2022 SCAA model, the harvest policy, and selectivity estimates from the current fisheries, a mean RAH of 14.533 million fish was calculated for 2022, with a range of 11.498 to 17.568 million fish (Table 4). The TAC range for 2022 based on the SCAA model, the harvest policy, and the ± 20% TAC constraint from the previous year is 9.827 to 14.741 million fish.

Table 4. Estimated harvest of Lake Erie walleye for 2022, and population projection for 2023 when fishing with 60% F_{msy} .

The 2022 and 2023 projected spawning stock biomass values are from the ADMB-2022 recruitment-integrated model. The range in the RAH was calculated using ± one standard deviation from the mean RAH.

SSB₀= 62.350 million kilograms
 20% SSB₀= 12.470 million kilograms
 F_{msy} = 0.557

Age	2022 Stock Size (millions of fish)		Rate Functions				2022 RAH (millions of fish)			Projected 2023 Stock Size (millions)	
	Mean	60% F_{msy}	F	Sel(age)	(F)	(S)	(u)	Min.	Mean	Max.	Mean
2	21.085		0.274	0.091	0.663	0.075	1.170	1.580	1.990		59.002
3	26.480		0.933	0.312	0.532	0.231	4.894	6.119	7.344		13.973
4	11.473		0.990	0.331	0.522	0.243	2.220	2.790	3.360		14.079
5	2.819		0.950	0.317	0.529	0.235	0.519	0.662	0.804		5.984
6	1.415		0.916	0.306	0.535	0.228	0.251	0.322	0.393		1.491
7+	12.477		1.000	0.334	0.520	0.245	2.443	3.060	3.677		7.243
Total (2+)	75.749	0.334				0.192	11.498	14.533	17.568		101.772
Total (3+)	54.665						10.328	12.953	15.578		42.770
SSB	73.575	mil. kgs									65.047 mil. kgs

probability of 2023 spawning stock biomass being less than 20% SSB₀ = 0.000%