

LAKE ERIE COMMITTEE WALLEYE TASK GROUP EXECUTIVE SUMMARY REPORT MARCH 2017

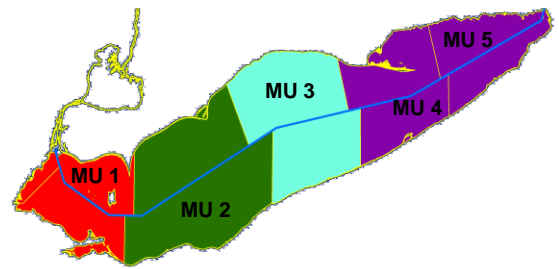


Figure 1. Lake Erie walleye management units

Introduction

This summary report highlights elements of the 2017 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 2016-2017: (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 while continuing to explore additional recruitment indices for incorporating into the SCAA and ways to account of tag loss and non-reporting in natural mortality (M) estimates; (3) Report RAH levels for 2017; (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.

2016 Fishery Review

The total allowable catch (TAC) in quota area waters of the west and central basins for 2016 was 4.937 million fish. This allocation represented a 20% increase from the 2015 TAC of 4.114 million fish. In the TAC area, the total harvest was 2.881 million fish, or 58% of the quota (Table 1). Harvest in the non-TAC area of the eastern basin amounted to 0.197 million fish. Lake-wide Walleye harvest was estimated at 3.078 million fish in 2016. Sport fishery (1.090 million fish) and commercial fishery (1.988 million fish) harvest levels reported for 2016 were both below the long-term (1975-2015) means (2.302 and 2.008 million fish, respectively).

Table 1. Summary of Walleye harvest by jurisdiction in Lake Erie, 2016.

| in number of fish | TAC Area (MU 1, MU 2, MU 3) | | | | Non-TAC Area (MU 4&5) | | | | All Areas |
|----------------------|-----------------------------|-----------|-----------|-----------|-----------------------|--------|---------|---------|-----------|
| | Michigan | Ohio | Ontario | Total | NY | Penn. | Ontario | Total | Total |
| TAC | 287,827 | 2,523,301 | 2,125,872 | 4,937,000 | - | - | - | - | 4,937,000 |
| TAC % Share | 5.83% | 51.11% | 43.06% | 100.00% | - | - | - | - | 100.00% |
| Harvest | 65,816 | 855,820 | 1,959,573 | 2,881,209 | 50,963 | 32,937 | 112,743 | 196,643 | 3,077,852 |
| Harvest %TAC | 22.9% | 33.9% | 92.2% | 58.4% | | | | | |

Total lakewide commercial Walleye fishery effort increased 7% in 2016 from 2015. Commercial gill net effort remained the same in MU 1 (0%), increased in MU 2 (23%) and MU 4&5 (83%) and decreased in MU 3 (-16%). Historically MU 1 has been the largest component of the commercial effort, which changed in 2016 when it was surpassed by the effort in MU 2 (Table 2). The total commercial effort of 20,920 km of gill net fished during 2016 was 12% above the long-term average (18,659 km). Across the lake, 2016 sport fishery effort increased 2% relative to 2015. Sport effort in MU 1 increased in Michigan waters by 43%, and in Ohio by 6%. Central basin sport effort was mixed, with a 22% decrease in Ohio waters of MU 2, and a 16% increase in effort in Ohio waters of MU 3. Sport effort decreased in Pennsylvania (13%) and increased (1%) in New York waters of MUs 4&5 (Table 3). The 2016 Walleye sport effort (2.944 million angler hours) was 57% of the long-term mean (5.155 million angler hours).

Table 2. Ontario Walleye gillnet effort in 2016.

| | MU 1 | MU 2 | MU 3 | MU 4 & 5 |
|------------------|-------|-------|-------|----------|
| Effort (km) | 6,980 | 7,969 | 4,523 | 1,448 |
| change from 2015 | 0% | 23% | -16% | 83% |

Table 3. Summary of sport fishery effort reported in thousands of hours for 2016.

| | MU 1 - MI | MU 1 - OH | MU 2 - OH | MU 3 - OH | MU 4&5- PA | MU 4&5- NY |
|--------------------|-----------|-----------|-----------|-----------|------------|------------|
| Effort (1000s hrs) | 236 | 1,514 | 439 | 397 | 141 | 217 |
| change from 2015 | 43% | 6% | -22% | 16% | -13% | 1% |

The 2016 catch rates in the lake-wide sport fishery decreased to 0.34 fish/hour and increased in the commercial fishery (95.0 fish/km gill net) which are below the long-term means (0.43 fish/hour and 120.6 fish/km gill net). Compared to 2015, the 2016 sport catch rates decreased in all MU's (MU 1 = -28%; MU 2 = -5%; MU 3 = -114%; and MU4&5 = -13%). Gill net catch rates increased in MU 1 (49%), MU 2 (37%), MU 3 (28%) but decreased in MU 4&5 (-29%). Age distribution of fish in the harvest was dominated by age 3 and younger Walleye from the 2014 (age 2, 32%), 2015 (age 1, 15% and 2013 (age 3, 14%) year classes. This marks the first time since the 2003 year class (age 7 and older group in 2016) fully recruited to the fishery (in 2005) that it was not the greatest proportion of the fishery (21% in 2016). The 2012 (age 4), and 2010 (age 6) year classes represented 6% each and the 2011 (age 5) year class, 7% of the total harvest in 2016.

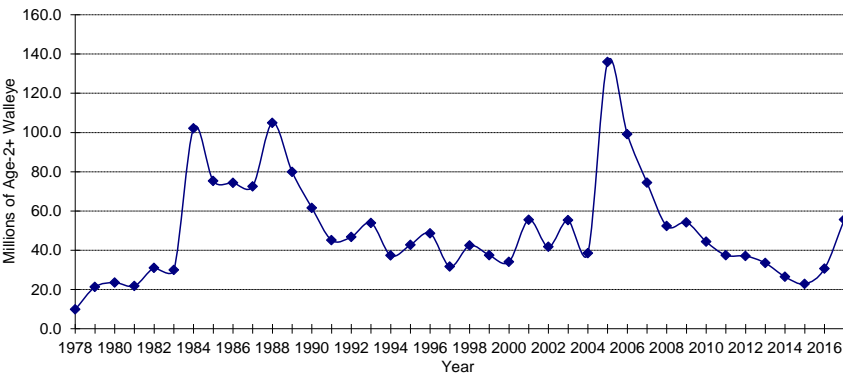


Figure 2. Population estimate of Lake Erie Walleye ages 2 and older from 1978 to 2016, and the projection for 2017 from the integrated SCAA model.

Catch-at-Age Analysis Population Estimate & Recruitment for 2017 and 2018

Based on the 2017 integrated SCAA model, the 2016 west-central population estimate was 30.626 million age 2 and older Walleye (Figure 2). The estimated number of age 7 and older fish (\leq 2009 year class) in 2016 was 4.589 million fish, and represented 15% of the Walleye (age 2 and older) in the population. Age 2 was the most abundant age group (52%). Using the 2017 integrated SCAA model, the number of age 2 recruits entering the population in 2017 (2015 year-class) and 2018 (2016 year-class) will be 35.384 million and 6.121 million Walleye, respectively.

2017 Population Abundance

Using the 2017 integrated SCAA model, the projected abundance of Walleye in the west-central population is 55.573 million Walleye (Table 4). The most abundant year class (64%) in the population is projected to be age 2 Walleye from the 2015 cohort (35.38 million fish). The next most abundant year class is 2014 (age 3) at 20%. The 2013 (age 4), 2012 (age 5) and 2011 (age 6) year-classes are expected to contribute 4%, 2%, and 3% to the population, respectively. Age 7 and older fish are expected to account for 7% of the 2017 population size. The projected spawning stock biomass (SSB) for 2017 is 37.583 million kilograms.

2017 Harvest Strategy and Recommended Allowable Harvest (RAH)

Beginning in 2015, the WTG implemented the Walleye Management Plan (2015-2019), which includes the integrated Walleye assessment model and a Walleye Harvest Control rule (HCR). The HCR sets the target fishing rate at $60\%F_{msy}$, with an accompanying limit reference point which will reduce the target fishing rate beginning at 20% of the unfished spawning stock biomass ($20\%SSB_0$). This probabilistic control rule, P-star (P^*) was set at 0.05 and incorporated to ensure that SSB in 2018 is not below the SSB_0 threshold after fishing in 2017. 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 2017 integrated SCAA model, the harvest policy used for 2017, and selectivity values from the current fisheries, a mean RAH of 6.965 million fish was calculated for 2017, with a range of 5.180 to 8.751 million fish (Table 4). The TAC range for 2017 based on minimizing variation from the 2016 TAC, \pm 20%, would be 3.950 to 5.924 million fish.

| Age | 2017 Stock Size (millions of fish) | | 60% F_{msy} | Rate Functions | | | 2017 RAH (millions of fish) | | | Projected 2018 Stock Size (millions) |
|-------------------|------------------------------------|-----------------|---------------|----------------|-------|-------|-----------------------------|--------------|--------------|--------------------------------------|
| | Mean | F | | Sel(age) | (F) | (S) | (u) | Min. | Mean | |
| 2 | 35.384 | | 0.322 | 0.093 | 0.662 | 0.076 | 1.962 | 2.690 | 3.418 | 6.121 |
| 3 | 10.935 | | 0.977 | 0.282 | 0.548 | 0.212 | 1.765 | 2.316 | 2.867 | 23.417 |
| 4 | 2.473 | | 1.000 | 0.289 | 0.544 | 0.216 | 0.400 | 0.535 | 0.669 | 5.990 |
| 5 | 1.087 | | 0.929 | 0.268 | 0.555 | 0.203 | 0.162 | 0.220 | 0.278 | 1.346 |
| 6 | 1.492 | | 0.937 | 0.270 | 0.554 | 0.204 | 0.224 | 0.305 | 0.386 | 0.603 |
| 7+ | 4.202 | | 0.989 | 0.285 | 0.546 | 0.214 | 0.667 | 0.900 | 1.133 | 3.120 |
| Total (2+) | 55.573 | 0.289 | | | | | 5.180 | 6.965 | 8.751 | 40.598 |
| Total (3+) | 20.189 | | | | | | 3.218 | 4.275 | 5.333 | 34.477 |
| SSB | 37.583 | mil. kgs | | | | | | | | 44.182 mil. kgs |

probability of 2017 spawning stock biomass being less than $20\%SSB_0 = 0.000\%$

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