March 2021

Forage Task Group Executive Summary

Lake Erie Committee

REPRESENTING THE FISHERY MANAGEMENT AGENCIES OF LAKE ERIE AND LAKE ST. CLAIR

Introduction

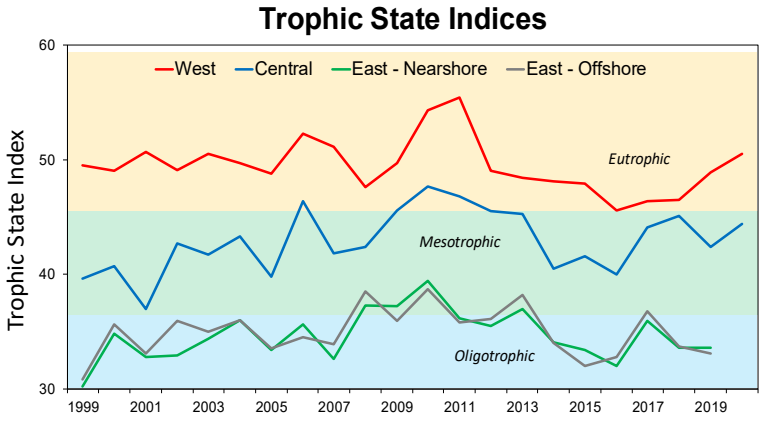
The Lake Erie Committee Forage Task Group (FTG) report addresses progress made on four charges:

1. Report on the results of the interagency lower trophic level monitoring program and status of trophic conditions as they relate to the Lake Erie Fish Community Objectives.
2. Describe the status and trends of forage fish in each basin of Lake Erie and evaluate alternate data sources and methods to enhance description of forage fish abundance.
    a. Describe forage fish abundance and status using trawl data.
    b. Report on the use of forage fish in the diets of selected commercially or recreationally important Lake Erie predator fish.
    c. Describe growth and condition of selected commercially or recreationally important Lake Erie predator fish
3. Continue hydro acoustic assessment of the pelagic forage fish community in Lake Erie, incorporating new methods in survey design and analysis while following the GLFC's Great Lakes Hydro Acoustic Standard Operating Procedures where possible/feasible. Support STC review of Hydroacoustics.
4. Act as a point of contact for any new/novel invasive aquatic species.

The complete report is available from the Great Lakes Fishery Commission's Lake Erie Committee Forage Task Group website (http://www.glfc.org/lake-erie-committee.php) or upon request from a Lake Erie Committee, STC, or FTG representative.

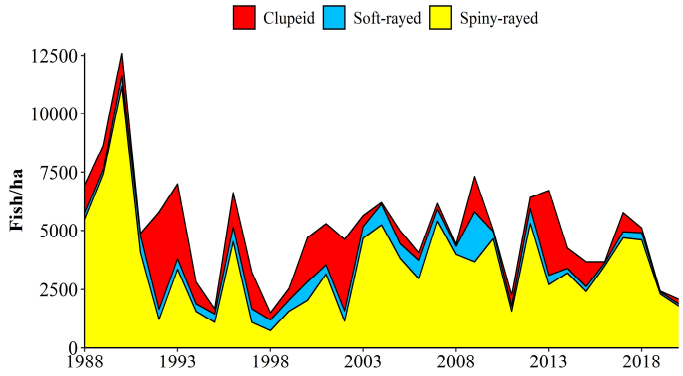
Interagency Lower Trophic Level Monitoring

The Lower Trophic Level Assessment (LTLA) monitoring program has measured nine environmental variables at 18 stations around Lake Erie since 1999 to characterize ecosystem trends. 2020 sampling was limited to only a few stations due to COVID-19 issues. The Trophic State Index, which is a combination of phosphorus levels, water transparency, and chlorophyll a measures, indicate that the west basin was above the targeted mesotrophic status in 2020, while the central basin was within targeted mesotrophic status (favoring percid production). The east basin was not sampled in 2020. Trends across Lake Erie indicate that overall productivity has increased in recent years. Low hypolimnetic dissolved oxygen continues to be an issue in the central basin during the summer months.



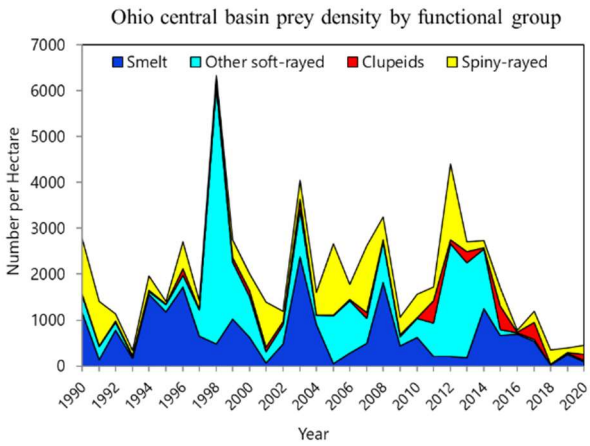
West Basin Status of Forage

In 2020, data from 66 trawl tows were used (up from 56 in 2019). Total forage density averaged 2,087 fish per hectare across the west basin, a decline of 14% from 2019 and under half of the ten-year mean (4,538 fish/ha). Age-0 Walleye relative abundance in 2020 fell from the historic 2018 and 2019 year classes but remained high (97/ha). Age-0 Yellow Perch (548/ha) was similar to 2019 and above the ten-year average (407/ha). Age-0 White Perch (1,031/ha) declined 50% from 2019, the lowest since 2002. Age-0 White Bass (61/ha) was similar to 2019 and below the ten-year mean (126/ha). Age-0 Gizzard Shad abundance (192/ha) rebounded but remained below the ten-year mean (765/ha). Densities of age-0 (0.2/ha) and age-1+ Emerald Shiners (0.1/ha) have remained very low for six years.



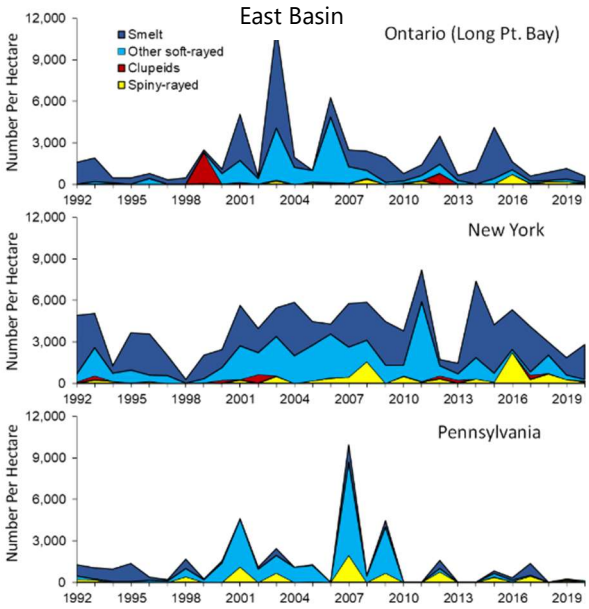
Central Basin Status of Forage

In 2020, 59 trawl tows were completed in the central basin with 6 in Pennsylvania and 53 in Ohio. Forage abundance in both jurisdictions was similar to 2019 and primarily composed of Rainbow Smelt and spiny-rayed species; densities remain well below long-term means. Age-0 Rainbow Smelt indices decreased in all areas of the central basin in 2020 and were below long-term means. In contrast, age-1+ Rainbow Smelt in Ohio indices increased from 2019 and were at the highest density since 2015. Round Goby age-0 indices decreased across the basin and were below long-term means. Gizzard Shad indices increased in all areas of the basin and were above the long term-mean in Pennsylvania, but below the long-term mean in both Ohio indices. Emerald Shiner abundance increased slightly in Ohio indices, but remain well below long-term means across the basin. Yellow Perch age-0 relative abundance increased in West Ohio but declined in East Ohio and Pennsylvania surveys. The only age-1+ index that increased from 2019 was in Pennsylvania. All Yellow Perch indices were below long-term means.



East Basin Status of Forage

Total forage fish abundance in 2020 decreased in Ontario from levels seen in 2019 and remains well below the long-term mean. Abundance increased in New York but remains below average. Total forage fish abundance remains at very low values in Pennsylvania waters. Catches of age-0 Rainbow Smelt were below long-term means in all jurisdictions. Catches of age-1+ Rainbow Smelt were low in Ontario and Pennsylvania, but very high in New York. Emerald Shiner catches of both age-0 and age-1+ were low in all jurisdictions. Round Goby densities were below long-term means in all jurisdictions. Gizzard Shad abundance was above average in Ontario and New York. Catches of all other species were low.



Hydroacoustic Assessments

The primary purpose of Lake Erie hydroacoustic surveys is to estimate densities of important forage fishes in each basin of Lake Erie in July during the new moon. The previous survey designs incorporated spatially-intensive cross-basin transects and strict operating requirements that have routinely limited the completion of the full survey in all basins. However, with existing data from hydroacoustic and trawl surveys, we now have the ability to assess efficiency of the previous survey designs. In 2019, alternative survey design talks began, targeting a survey that limits logistical challenges, promotes survey completion, and produces rigorous forage fish abundance estimates. In this summary report we: 1) evaluate hydroacoustic sampling efficiency using historic density estimates, 2) develop sampling strata using coupled and supplemental trawl and environmental data, and 3) recommend a survey design that balances logistical constraints and desired survey outcomes (e.g., ability to complete and target accuracy/precision). Preliminary assessments show lower effort may be possible within each basin (100 km in West Basin, 100 km in Central Basin, and 300 km in East Basin). In addition, randomly selected grids (5-min grids in West Basin, and 10-min grids in Central and East basins) and short transects (5 km) that intersect the grid centroid show promise for future survey design. In 2020, a hybrid hydroacoustic survey took place in each basin to begin comparison of the new survey design with the old. Surveys in 2021 and beyond will continue this evaluation work.

Aquatic Invasive Species

No new invasive fish species were reported in Lake Erie or its connected waterways in 2020. Grass Carp reporting is now handled by the Grass Carp Working Group, which includes representatives from all Lake Erie jurisdictions and participating agencies. We continue to track populations of Rudd in the Lake Erie watershed. Tench is an emerging species of concern given its rapid expansion in the St. Lawrence River and recent entrance into Lake Ontario.