

FORAGE TASK GROUP EXECUTIVE SUMMARY REPORT MARCH 2014



Introduction

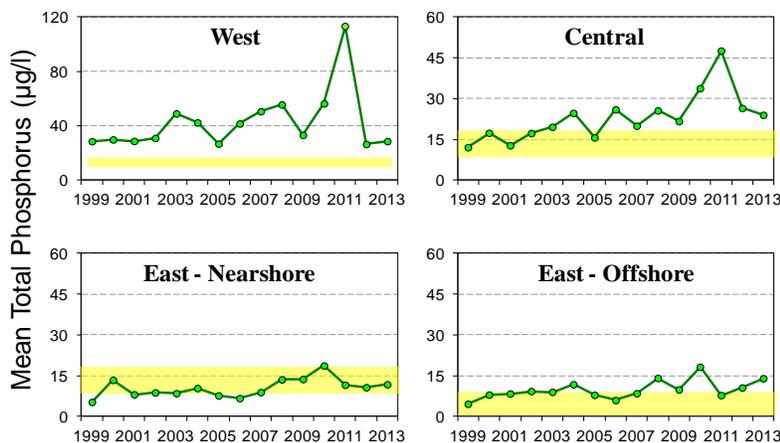
The Lake Erie Committee Forage Task Group report addresses progress made in 2013 on five charges:

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 Goals and Objectives.
2. Describe the status and trends of forage fish in each basin of Lake Erie.
3. Continue hydroacoustic 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 Hydroacoustic Standard Operating Procedures where possible/feasible.
4. Report on the use of forage fish and new invasive species in the diets of selected commercially or recreationally important Lake Erie predator fishes.
5. Continue the development of an experimental design to facilitate forage fish assessment and standardized interagency reporting.

The complete report is available from the Great Lakes Fishery Commission's Lake Erie Committee Forage Task Group website (<http://www.glfrc.org/lakecom/lec/FTG.htm#pub>) or upon request from an LEC, STC, or FTG representative.

Interagency Lower Trophic Level Monitoring

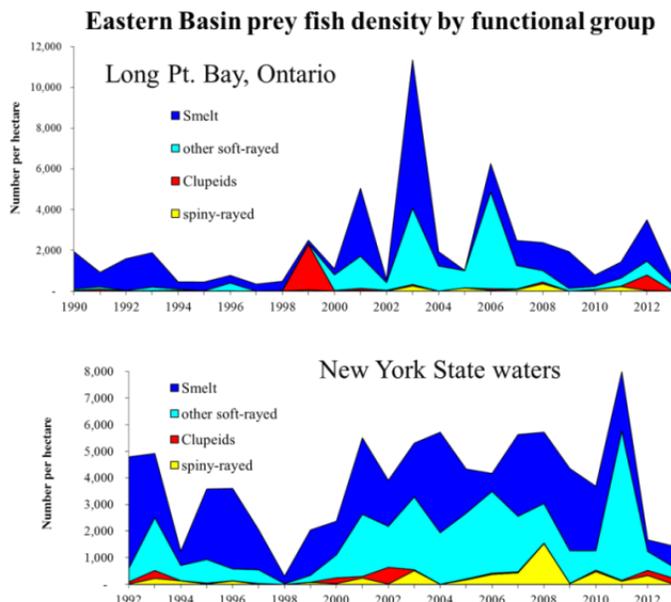
The lower trophic level monitoring (LTLA) program has measured nine environmental variables at 18 stations around Lake Erie since 1999 to characterize ecosystem change. In 2013, measures of total phosphorus remained above target levels in both the western and central basins. Water transparency was below targets in the western basin but near or within targets elsewhere. Trophic class metrics indicate that the western basin is within eutrophic status, which favors centrarchid species; the central and nearshore eastern basin waters are within targeted mesotrophic status, which favors percid production. The offshore eastern basin waters remain near targeted oligotrophic status. Low hypolimnetic dissolved oxygen continues to be an issue in the central basin during the summer months, and an occasional problem in the western basin. The zooplanktivory index indicates that predation on zooplankton is low in both the western and central basins, and average in the eastern basin.



Mean total phosphorus in each basin of Lake Erie, 1999-2013. Target trophic ranges are in yellow.

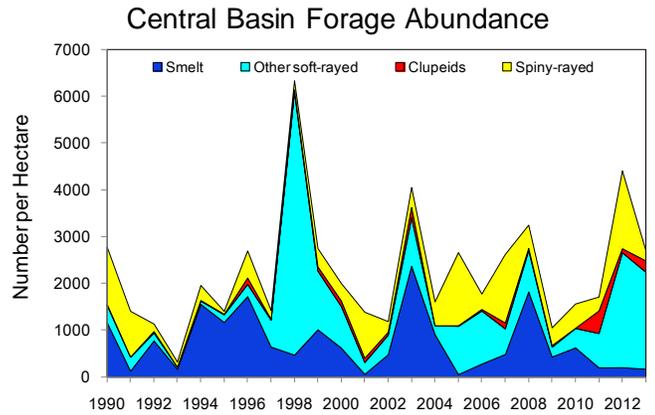
East Basin Status of Forage

Total prey fish species abundance was low throughout the east basin in 2013, decreasing by 81% and 14% in Ontario (ON) and New York (NY), respectively. Age-0 Rainbow Smelt abundance in 2013 was 2- (NY) to 6- (ON) times lower than agency-specific 10-year averages. Yearling-and-older (age-1+) Rainbow Smelt were less abundant than age-0 Rainbow Smelt, more so in NY than ON. Yearling-and-older Rainbow Smelt densities were 2- (ON) to 19- (NY) times lower than agency-specific 10-year averages. Age-0 and age-1 Rainbow Smelt were above average mean fork length in 2013. The contribution of non-smelt fish species to the forage fish community of eastern Lake Erie was dominated by Emerald Shiner, Alewife, Round Goby and Trout-perch. Emerald Shiner densities in 2013 were 4- to 5-times lower than agency-specific 10-year averages. Age-0 Alewife abundance was low in ON, but 3rd highest in NY's abundance index. Age-0 Gizzard Shad densities were low basin wide. Round Goby densities decreased in 2013 and remain low relative to 10-year average abundance. Predator diets were dominated by fish species, primarily Rainbow Smelt and Round Goby. Predator growth remains good. Age-2 to -6 Smallmouth Bass were above average size in east basin populations. Lake Trout size-at-age remains stable and among the highest observed in the Great Lakes.



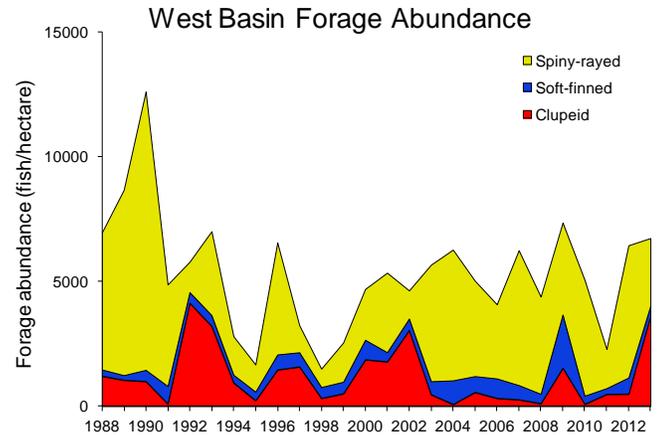
Central Basin Status of Forage

In 2013, overall forage abundance in the Ohio waters decreased from 2012 when forage indices were well above average. Clupeids were the only prey group that increased from 2012, and Rainbow Smelt indices remained about the same. The largest decline from 2012 was in the spiny-rayed group and was due specifically to an order of magnitude decrease in the age-0 White Perch cohort in western Ohio. Basin wide Rainbow Smelt abundance is about the same as in 2012, below the 10-year mean. Round Goby indices were below the 10-year mean throughout the basin, despite some modest increases from 2012. Young-of-the-year Alewives were captured in both Ohio and Pennsylvania trawl surveys. This is the first occurrence of the species being caught basin wide since 2002. Gizzard Shad indices increased in Ohio surveys from 2012 and were the second highest in the time series.



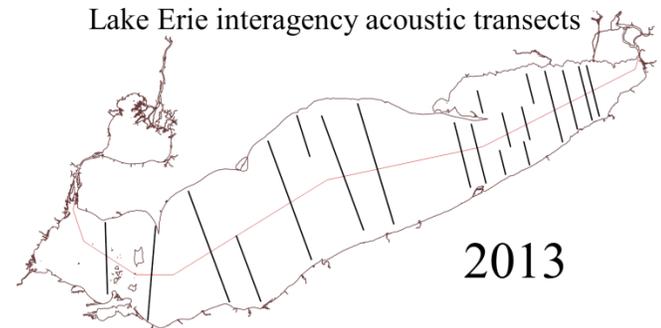
West Basin Status of Forage

In 2013, hypolimnetic dissolved oxygen levels were not below the 2 mg per liter threshold at any site during the August trawling survey. In total, data from 70 sites were used in 2013. Total forage abundance was above average in 2013, slightly higher (6%) than in 2012. Clupeid catches were highest along the south shore from Maumee Bay to Cedar Point. Soft-rayed fish were most abundant near the mouth of the Detroit River and near Sandusky Bay. Spiny-rayed abundance was highest near Maumee Bay. Young-of-the-year Yellow Perch (314.1/ha) increased sharply relative to 2012 while age-0 Walleye abundance (10.6/ha) doubled; both remain below long-term means. Catches of Round Goby (27.7/ha) decreased from 2012 and represent the second lowest abundance since their discovery in 1996.



Hydroacoustic Assessments

The Forage Task Group introduced fisheries hydroacoustic technology on Lake Erie to provide a more comprehensive assessment of pelagic forage fish species abundance and distribution. Beginning with surveys of the eastern basin in 1993, coverage was expanded to the central basin in 2000 and western basin in 2004. Recent year basin surveys have been accomplished as independent, approximately concurrent summer-time efforts during the new-moon phase in July. Participation in each basin acoustic survey has been shared among jurisdictional agencies with support from the USGS. In 2013, the east basin acoustic survey was conducted from July 4-12, the central basin survey from July 8-15, and the west basin survey from July 13-15. Twenty acoustic transects, 48 temperature and dissolved oxygen profiles and 38 midwater trawls were sampled in total during the 2013 basin surveys. East basin, age-1+ smelt-size forage fish (all species in cold-water habitat) densities were estimated at 2,728 fish/ha with the highest fish densities in Canadian waters south of Port Maitland and south of Long Point. Low densities were observed in Pennsylvania waters and in the deepest region of the basin. Central basin densities of age-1+ Rainbow Smelt were highest in the southern and eastern areas of the basin. Western basin forage fish density and biomass estimates were very high in 2013, averaging 25,474 fish per hectare and 44 kg per hectare.



Hemimysis anomala

The Forage Task Group continued to record sightings of this exotic invertebrate in 2013. Native to the Black and Caspian Seas, this recent invader was first located in Lake Erie in 2006, and has the potential to alter lake foodwebs as both a food item and a consumer of zooplankton resources. Diet analysis of 2013 Long Pointe Bay index gillnet samples found 24.4% of non-empty White Perch stomachs examined contained *H. anomala*, the highest proportion observed to date, comparable to that seen in 2009 (22.5%). Occurrences of *H. anomala* in White Perch diets tend to increase from west to east. In the central basin, *H. anomala* was found in diets of Yellow Perch and White Bass. *Hemimysis anomala* were not observed in the diets of any species examined in the west basin, despite increased spatial trawl coverage in June and September by the USGS-Lake Erie Biological Station.

