

# FORAGE TASK GROUP EXECUTIVE SUMMARY REPORT MARCH 2010



## Introduction

The Lake Erie Committee Forage Task Group report addresses progress made in 2009 on four charges:

1. Continue to describe the status and trends of forage fish and invertebrates in each basin of Lake Erie.
2. Continue the development of an experimental design to facilitate forage fish assessment and standardized interagency reporting.
3. Continue hydroacoustic assessment of the pelagic forage fish community in Lake Erie, incorporating new methods in survey design and analysis as necessary to refine these programs.
4. Continue the interagency lower-trophic food web monitoring program to produce annual indices of trophic conditions which will be included with the annual description of forage status.

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

## East Basin Status of Forage

Moderate (Ontario) to high (New York) abundance of eastern basin forage fish species during 2009 was largely attributable to especially abundant yearling-and-older (YAO) rainbow smelt. Age-0 rainbow smelt numeric indices were below long-term average across all regions of the east basin and record low densities were observed in New York. Average length of yearling smelt was a record minimum at 88 mm FL in Ontario's time series. The contribution of non-smelt fish species to the forage fish community of eastern Lake Erie was dominated by round gobies, emerald shiner, trout perch, and age-0 white perch. Round goby densities either decreased (ON & PA) or remained about the same as last year. New York's and Ontario's trawl assessments indicate the 2009 yellow perch year class was exceptionally weak. 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 sampled 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 the central basin, overall forage abundance for age-0 and YAO decreased in 2009 and were below a ten year mean. The decrease in forage abundance was generally due to very poor recruitment of age-0 forage species throughout the basin. The only notable increases in forage indices were for emerald shiners in Pennsylvania (both age-0 and YAO) and YAO smelt throughout the basin. Round goby abundance indices have decreased since 2007 in both Pennsylvania and eastern Ohio and are below the ten year mean. Round goby indices in western Ohio continue to fluctuate, with 2009 age-0 values above average, and YAO values below average.

Walleye and white bass diets continue to be comprised of gizzard shad, rainbow smelt and emerald shiners. For both species, gizzard shad were consumed in higher proportions by weight in the west relative to the east. Rainbow smelt and emerald shiners were the

highest proportions of the diets in the east. Round gobies continue to be important diet items to white bass and yellow perch in June and August, and are a primary component of smallmouth bass diets sampled in the fall.

## West Basin Status of Forage

Forage abundance in the west basin increased in 2009. Increases were notable for age-0 rainbow smelt, gizzard shad, emerald shiners, and yearling rainbow smelt and emerald shiners. Declines were noteworthy for age-0 spottail shiners, white perch, and all ages of round goby. Gobies and age-0 white perch remain above long-term mean densities. Predator recruitment remained low for walleye, yellow perch, and smallmouth bass, with white bass being the only exception. Adult and yearling walleye diets were dominated by gizzard shad, rainbow smelt, and emerald shiner. Diets of YAO yellow perch in 2009 were dominated by benthos (mostly Chironomidae) in both spring and autumn. Average length of age-0 predators declined relative to 2008.

## Interagency Standardization

Forage Task Group members from the east and central basin began planning a trawl comparison exercise for assessment vessels in either 2011 or 2012. This exercise would be similar to the one that took place in 2003 for west and central basin agencies, with the goal of developing fishing power correction formulas to standardize assessment catches lake-wide. This will allow for direct comparisons of fish catch between agencies, and allow for further standardization of reporting.

## *Hemimysis anomala*

The Forage Task Group continued to record sightings of this exotic invertebrate in 2009. 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. In 2009, *H. anomala* were found in the diets of white perch and rock bass in Long

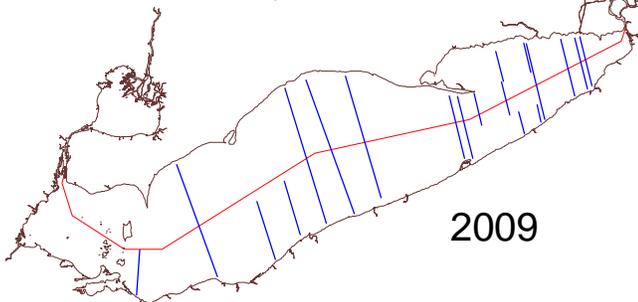
Point Bay, and in a white perch diet from near Pelee Island (the first observation in the west basin). Utilization of *H. anomala* by white perch in Long Point Bay has increased since 2006, and they were found in 14% of white perch diets in 2009. Incidental collections of *H. anomala* in 2009 were also made in Ashtabula Harbor, OH, and at Brocton Shoal near Dunkirk, NY.

**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.

Beyond maintaining the standardized July survey effort, the FTG has been very actively pursuing initiatives to address survey design and analysis procedures to maintain up-to-date and defensible scientific methodology for the Lake Erie fisheries acoustic assessment program. Standard Operating Procedures (SOP) for hydroacoustic surveys on the Great Lakes were developed and recently published (<http://www.glfsc.org/pubs/pub.htm#pubs>) through a GLFC sponsored international working group comprised of Great Lakes agency biologists and academic experts. These new standard procedures are being applied in a re-analysis of the eastern basin 12-year series of split-beam acoustic data. Furthermore, upon completion of these new analyses, Forage Task Group acoustic survey investigators currently pursuing somewhat independent efforts in the eastern, central and western basins eventually expect to integrate analysis and results reporting to produce a lake wide July snapshot of pelagic fish density and distribution for Lake Erie.

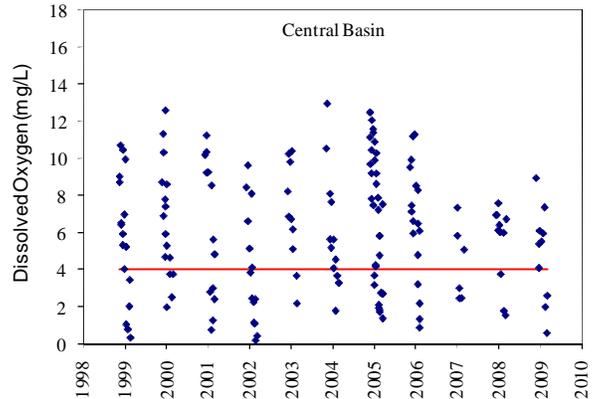
Lake Erie interagency acoustic transects



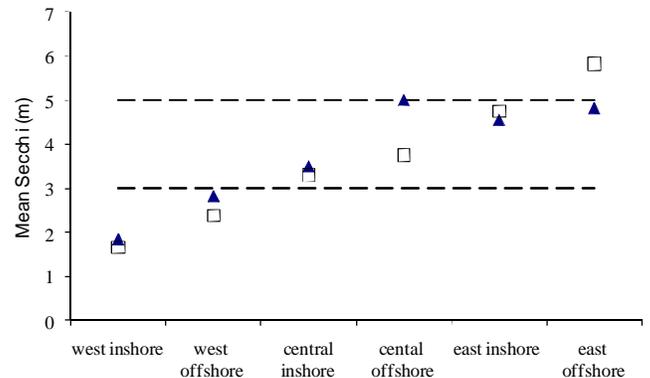
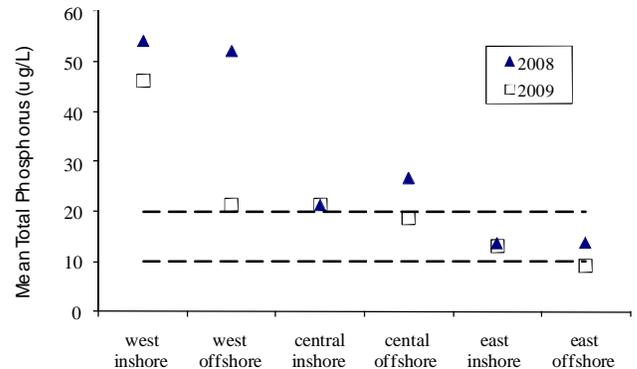
**Interagency Lower Trophic Level Monitoring**

The lower trophic level monitoring (LTLA) measures nine variables at 18 stations around Lake Erie to characterize ecosystem change. The last 11 years of data are summarized. In 2009, the mean epilimnetic water temperature was slightly lower than the long term

average in all three basins. The central basin hypolimnion continues to have very low oxygen levels in September. The fish community objective of mesotrophic conditions was far exceeded in the western basin, slightly eutrophic in the central basin, and met in the eastern basin in both 2008 and 2009. Grazing pressure was high throughout the lake in 2008, but low in 2009. Zooplanktivory is generally high throughout Lake Erie, but in 2008 it was low in the central basin, suggesting low predator demand that year.



Mean hypolimnetic dissolved oxygen (mg/L) in the Central basin of Lake Erie, 1999-2009. The horizontal line represents 4 mg/l of dissolved oxygen, a level below which oxygen becomes limiting for most freshwater fish.



Mean Phosphorus and Secchi depth by basin and location, 2008 and 2009. To meet the LEC goal of mesotrophic conditions in Lake Erie, phosphorus should range from 10 to 20 µg/L and summer water transparency measured using a Secchi disk should range from 3 to 5 meters.