

**Forage Task Group  
Executive Summary Report  
March 2009**

**Introduction**

This year's Lake Erie Committee Forage Task Group report addresses progress made by the task group on five 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 eastern and central Lake Erie, incorporating new methods in survey design and analysis as necessary to refine these programs. Promote the development of an acoustic survey for western Lake Erie.
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.
5. Reassess the bioenergetics model's status and its data needs.

The complete report is available from the Great Lakes Fishery Commission's, Lake Erie Committee Forage Task Group website at: <http://www.glfc.org/lakecom/lec/FTG.htm#pub>

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**East Basin Status of Forage**

Moderate (Ontario) to high (New York) abundance of eastern basin forage fish species during 2008 was largely due to rainbow smelt and round goby. Agency fall trawl surveys characterized the 2008 rainbow smelt year class as being average to above average strength. Yearling and older smelt were below average abundance throughout eastern Lake Erie. Age-0 yellow perch were exceptionally abundant in 2008 offshore trawl assessments. Round goby densities decreased in 2008 from record high numbers in 2007, but remained second highest year of abundance in time series. Age-0 white perch (New York) and Age-0 gizzard shad (Ontario) were notably more abundant in some eastern basin areas in 2008.

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 examined. Lake trout size-at-age remains stable and among the highest observed in the Great Lakes.

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**Central Basin Status of Forage**

In the central basin, overall forage abundance for age-0 and YAO increased from 2007 and was above a ten year mean. The increase in forage abundance was due to exceptional cohorts of age-0 rainbow smelt and YAO emerald shiners, both in the east areas of the basin. Since 2003 there has been a general trend in relative abundance of forage species being higher in the east relative to the west for both age-0 and YAO. White perch are the only exception to this trend. White perch relative abundance continues to be higher in the west relative to the east.

Walleye and white bass diets were primarily emerald shiners and rainbow smelt. Gizzard shad started to appear in walleye diets in August and in white bass diets in October. Smallmouth bass diets continue to be mostly round goby and gizzard shad from August through October. Yellow perch diets are primarily zooplankton and chironomids. Round gobies continue to be important diet items to walleye, white bass, yellow perch and smallmouth bass.

## **West Basin Status of Forage**

In 2008, forage abundance in the western basin declined slightly, but remained at moderate levels. Increases in western basin forage abundance were notable for age-0 rainbow smelt, spottail shiners, and white bass. Declines were noteworthy for Age-0 gizzard shad, emerald shiners, yellow perch, walleye, and YAO emerald shiners. Gobies and age-0 white perch declined in 2008, but remain well above long-term mean densities.

Adult and yearling walleye diets remained dominated by gizzard shad and emerald shiner. Diets of yearling and older (YAO) yellow perch in 2008 were dominated by benthos (mostly Chironomidae) in both spring and autumn. Average length of age-0 walleye, white bass, and smallmouth bass decreased in 2008 relative to 2007, while white perch and yellow perch lengths were up slightly.

## **Trawl Comparison**

In September 2008, ODNR, Scudder Mackey (Habitat Solutions NA), and USGS conducted tests to estimate trawl dimensions (vertical height and wing spread) using two types of assessment gear (side-scan sonar and Notus). These tests were similar to those run by the Michigan Department of Natural Resources in 2006. One of the end outcomes was to ascertain if the independent measurements (Notus vs. side-scan) are similar.

The results differed with the experience of both MDNR and NYS DEC in comparing bottom trawl measurements using Netmind acoustic mensuration gear and side-scan. Preliminary results may show sufficient evidence that the presence of Netmind sensors on the

wings has a more measurable effect on the small (7.9-11.6 m) trawls than the Notus sensors (7.9 m). Most confidence limits are overlapping for Notus measurements, which suggest that the observed differences might be due to error, not actual differences.

## **Summary of Species CPUE Statistics**

Interagency trawling has been conducted in Ontario, Ohio and Michigan waters of the western basin of Lake Erie in August of each year since 1987 to measure basin-wide recruitment of percids and forage species. Total forage abundance and biomass decreased in 2008, reaching a level similar to 2006.

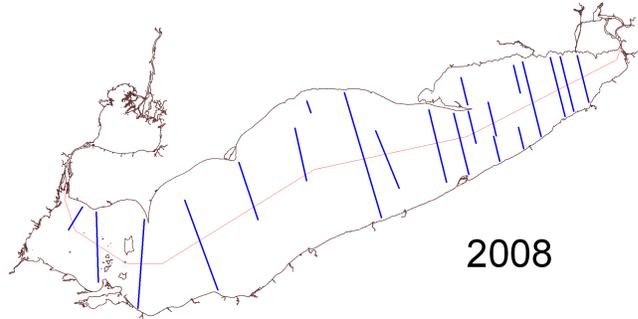
## **Hydroacoustic Assessments**

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, followed by more recent expanded coverage to the central (2000) and western (2004) basins. 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, and typically employs at least two agency research vessels, one to collect the electronic acoustic data, the other to obtain mid-water trawl catch samples to characterize fish species composition.

Beyond maintaining the standardized July survey effort, the FTG has been very actively pursuing

initiatives to address survey design and analysis procedures to maintain an up-to-date and defensible scientific method 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.glf.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.



Interagency acoustic survey transects in Lake Erie, 2008

The table and figure below provide a summary of the three Lake Erie basin acoustic surveys in 2008.

Survey Descriptor	2008 Acoustic Surveys by Basin		
	West	Central	East
Survey Period; (No. Nights)	July 14-18; (3)	July 7-11; (3)	July 23-Aug 1; (6)
No. Transects; (total km)	3; (109)	6; (233)	12; (344)
Echosounder - make / model	BioSonics DT-X	BioSonics DT-X	Simrad EY60
- beam type	Split beam	Split beam	Split beam
- frequency	201 kHz	129 kHz	120 kHz
Transducer; beamwidth	BioSonics; 6.8°	BioSonics; 6.9°	ES120-7c; 7 °
No. mid-water trawl samples	0	49	9
No. water temperature profiles	3	22	37
Approx. kilobytes recorded	2,141,000	6,156,258	750,000

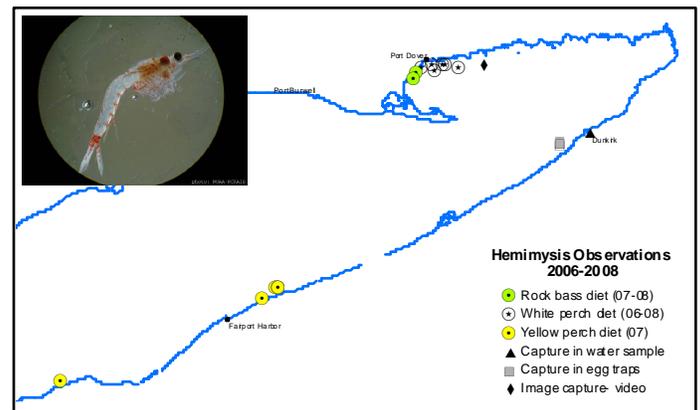
## Interagency Lower Trophic Level Monitoring Program

The lower trophic level monitoring (LTLA) measures nine variables at 18 stations around Lake Erie to characterize ecosystem change. The last nine years of data are summarized for five variables: epilimnetic temperature, hypolimnetic or bottom dissolved oxygen, grazing pressure (chlorophyll *a* and total phosphorous) and a planktivory index. In 2008, the mean epilimnetic temperature was similar to the long term average for all three basins. Predicted values of chlorophyll *a* were higher than observed in all three basins, indicating high grazing pressure throughout the lake. In addition to chlorophyll *a*, the zooplanktivory index calculated from available data on zooplankton size up to 2007 suggests that predator demand continues to be high in the east and west in most years.

### *Hemimysis anomala* Distribution

*Hemimysis anomala*, commonly called the bloody-red shrimp, is a small shrimp-like mysid crustacean native to European waters, primarily the Black Sea, the Azov Sea, and the Caspian Sea. It was first detected in the Great Lakes in 2006, likely as a result of introduction via ballast water from ocean-going ships. Targeted sampling for *H. anomala*,

conducted by the Canadian Department of Fisheries and Oceans (GLLFAS), along the north shore during 2007 and 2008, regularly found *Hemimysis* in large numbers in all three lake basins (K. Bowen, Dept. of Fisheries and Oceans, GLLFAS, pers comm.). There is no doubt that the species is now well established in Lake Erie.



Locations of *Hemimysis anomala* in Lake Erie 2006-2008

The impact of this species on Lake Erie and the other Great Lakes is unknown, but based on its history of invasion across Europe, significant impacts are possible. If integrated into the current lake ecosystem, this species has the potential to alter food webs by serving as both a high-energy food source and a consumer of zooplankton resources.