Sea Grant
New York

Big Fish, Little Fish

Each fall, thousands of recreational anglers come to fish the stocked salmon and trout in Lake Ontario. "One of the essential ingredients in managing a fishery is gathering data that will help maintain the delicate balance between the numbers of prey and stocked predator fish," says NYSG's Fisheries Specialist **Dave MacNeill.**

"Anglers want more fish," says **Steven LaPan**, NYS Dept. of Environmental Conservation's (NYSDEC) Lake Ontario Unit Leader at the Cape Vincent Fisheries Station. "And we're doing all we can to improve the survival of stocked fish. In addition, production of wild Chinook salmon has increased." But do those potential trophy fish have enough alewife, smelt and other small forage fish to eat?

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COASTLINES

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Big Fish,

The US Geological Survey's *R/V Kaho* was used during the fisheries assessment study in Lake Ontario. *Kaho* is currrently being used by NYSG-funded researcher Lars Rudstam for a Lake Ontario study on *Mysis relicta*, the most recent in a series of declining native species. *Mysis* is one of the most important prey for forage fish such as alewife and smelt. It is also a major predator on zooplankton, a primary food source for alewife and sportfish such as walleye and yellow perch.

Six species of salmon are stocked in Lake Ontario by New York State and province of Ontario – Chinook, Atlantic and coho salmon, and lake, rainbow, and brown trouts. Numbers stocked peaked at nearly eight million fish per year in the mid to late 1980s, lowering to about five million per year since the 1990s. "Fisheries assessment data at the time of peak stocking levels suggested there may be a risk of an alewife population decline," says MacNeill. "So, in an effort to prevent an alewife population collapse, stocking levels were reduced under the suggestion of the scientific community. Stocking levels were slightly increased, though, once survey information showed that alewife were a bit more resilient than previously suggested."

Adjusting stocking levels can be a sensitive issue for some, though, especially recreational fishermen. Because Mother Nature is in the driver's seat when it comes to many of the lake's ecosystem changes – those brought on by reductions in nutrient levels or by the actions of zebra mussels and other aquatic invaders – MacNeill says, "adjustment of stocking rates is one of the few management options that fisheries managers can utilize in an effort to manage the lake. But, the effect is at the whim of nature."

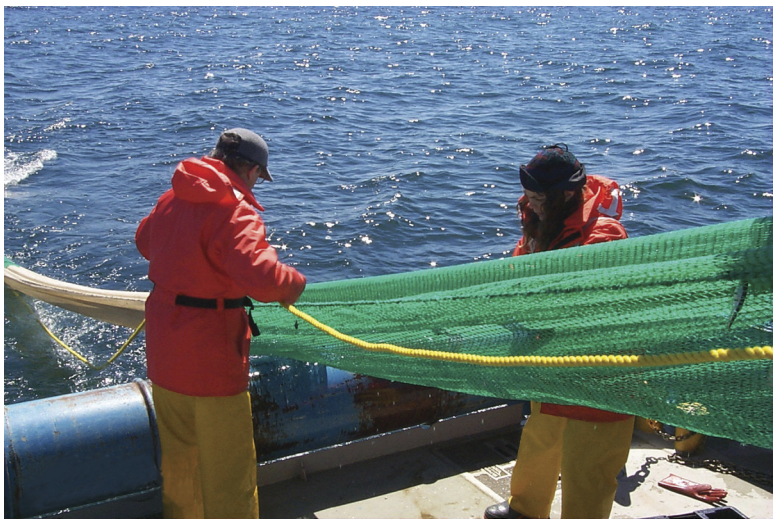
So, with salmonid stocking numbers driven by NYSDEC, using United States Geological Survey (USGS) data on alewife and other forage fish, a technical review of this process began in the Fall 2002. On the request of New York State Senator **George Maziarz**, New York Sea Grant conducted an advisory meeting in October 2002 to discuss an evaluation strategy with biologists from the US Geological Survey (USGS), NYSDEC, Ontario Ministry of Natural Resources (OMNR) and Cornell University.

First, the agencies agreed that an objective, comprehensive review of Lake Ontario's forage fish assessment program was needed. Several prominent scientists with successes in saltwater fish estimates were asked to model their studies for the review of this freshwater system. Reviewers included **Steven Murawski**, Chief of that National Marine Fisheries Service's Population Dynamics Branch in Woods Hole, MA, **Stephen Smith**, from Bedford Institute of Oceanography's Department of Fisheries and Oceans in Dartmouth, Nova Scotia, and **Jerald Ault**, Professor of Marine Biology and Fisheries at the University of Miami. **Lisa Kline**, Director of Research and Statistics at the Atlantic States Marine Fisheries Commission, served as facilitator for the review.

Their evaluation of USGS and NYSDEC data was discussed at an October 2003 meeting by Lake Ontario fisheries managers, researchers, agency biologists and elected officials. A number of areas were identified where forage fish survey design, implementation, and data analysis could be improved. Also, says LaPan, "it was recommended that scientists and managers collect additional data that would increase our understanding of the rapidly changing Lake Ontario ecosystem and improve our ability to predict the consequences of different fisheries management alternatives."

USGS biologists aboard the *R/V Kaho* set gillnets to gather lake trout.

Little Fish



A "cod-end" full of alewives being lifted aboard the aboard the ***R/V Kaho*** using the deck crane. The "cod end" refers to the portion of the net where all the fish collect, regardless of the species caught (front cover).

The crew back-hauls a bottom trawl for alewives (left) and lifts gillnets set for lake trout aboard the ***R/V Kaho*** (below).

"We should all commend the USGS and NYSDEC for their cooperation in this review process," says MacNeill, "as it is always a difficult situation to be under external scrutiny. Our effort was first and foremost to provide an objective and cordial forum for the review to be conducted."

"Overall, the reviewers spoke of how exemplary a job the USGS and NYSDEC have done collecting data given their budgetary and staff constraints," says MacNeill. Reviewers were favorably impressed with the overall collaboration between the agencies and considered the USGS and NYSDEC's 25-plus year long-term data sets as reliable indicators of trends in the relative abundance of alewife and other forage species in Lake Ontario.

Reviewers also made some constructive comments to improve the accuracy of fish abundance estimates and the amount of variability in the data. These comments were related to the methodology used in sampling fish populations, ways in which the data were analyzed and how the abundance data are used to make management decisions.

Adding more sampling locations or combining data from current sample points using state of the art hydroacoustic data were among the suggestions. Realistically, MacNeill says while it will never be known how many alewife are in the lake, "there are some practical means available to better estimate prey fish abundance."

Additional effort has been made to generate a common understanding of the forage fish count and salmon stocking issue with the different parties involved. "Fish assessment involves the assessment biologists conducting fish sampling to estimate overall population abundance, the research scientists specifically looking at ways to improve how assessment biologists do business, fisheries managers that use prey fish estimates in making management decisions and then you have the stakeholders whose economic interests are influenced by fisheries management decisions," says MacNeill. "It has been Sea Grant's intent to try and bring these elements together in terms of a shared understanding."

While the issues and suggestions for implementation surrounding fisheries assessment may cause differences in opinions between those involved, there is a lot of room for collaboration. So, leading up to this assessment, Sea Grant and the cooperating agencies have worked actively and effectively with sportfishing stakeholders at annual educational forums. This improved dialogue with resource users has provided stakeholders with a better understanding of fisheries dynamics and problems inherent in collecting fisheries data in assessment programs. "Thanks in part to our outreach efforts," says MacNeill, "I think that workshop participants came away with a better understanding of the inherent demands and difficulties associated with fish assessment conducted by USGS and NYSDEC."

The final report on Lake Ontario's forage fish assessment program is planned for early this fall. Discussions are underway to consider options for follow-up inter-agency meetings.

All photos courtesy of the USGS Lake Ontario Biological Station

— Paul C. Focazio