AFS - New York Chapter Newsletter -- August, 1999

Editor's Note

I hope you enjoy your summer issue of the NY Chapter newsletter. Please help contribute by sending material of interest. I will be featuring graduate students and their research, program updates, and other appropriate articles. Student research need not be completed and can focus more on ideas, plans, methods, and anticipated results. Let your colleagues know where you are and what your up to through the newsletter.

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President's Corner

Well, it is the middle of another summer and I hope you are all having fun with your field work. I imagine the greatest challenge this year is finding any water.

Things have been fairly active in the Chapter since our last newsletter. Several members, including me, attended the Northeast Fish and Wildlife Conference in New Hampshire. It was nicely done and well worth attending (as usual). It was interesting to note that the really hot sessions were the amphibian sessions. Apparently suburban sprawl around breeding ponds is a real issue. Those sessions were standing room only with long discussions spilling over into the hallways. Doug Stang and Barb Knuth continue their leadership roles in the NED and are to be complimented for their commitment.

On March 29, we sent letters to our Congressional delegation urging their support for the Conservation and Reinvestment Act (CARA). That Act directs a percent of offshore oil and gas revenues to fish and wildlife conservation each year. Although CARA is not yet law, I did receive a letter from Congressman Boehlert on July 25 informing me that the House of Representatives has apportioned $30 million from that offshore fund towards State conservation projects in the Federal 2000 budget.

Also, on May 14, the Chapter submitted a resolution to the International Joint Commission (IJC) urging them to provide funding for their proposed study of the environmental effects of the present water level management practices on Lake Ontario and the St. Lawrence River. On July 1, I received a letter from the IJC informing me that they appointed a work group on May 31 to prepare the detailed Study Plan which will allow them to seek funding from Congress.

On May 27, The Chapter submitted it's IJC resolution to the National AFS office for consideration as a National AFS resolution in support of Congressional funding of these studies. That proposal was supported by the NED and the national resolutions committee and is awaiting final approval by the Governing Board before being submitted to the membership at the annual meeting in Charlotte this fall. By the way, ours is the only resolution being considered by the national membership this year. We are now working on a resolution directing all Lake Ontario cormorants and zebra mussels to proceed in an orderly manner to the Canadian side of the lake!

Much work proceeds on the 3-way annual meeting with the Foresters and Wildlifers. The other two societies have really thrown themselves into this effort. In fact, without Margaret Murphy's efforts to secure a contract for the hotel in Syracuse, I would say they were running circles around us on this one. If anyone out there would like to help us organize, we could sure use the help!
Call me at 607-762-7072.

Enjoy the rest of your summer!

Allen Peterson

Chapter News

Roosevelt Wild Life Station Revitalized

Dr. Neil Ringler (nmringle@mailbox.syr.edu; (315) 470-6770), currently Director of the Roosevelt Wild Life Station at SUNY ESF, announced that the Station is being revitalized, with expanding initiatives in research, teaching, and outreach. Research themes are the maintenance and restoration of biological diversity in New York State, including ecological relationships of exotic species. The Station, established in 1919 as a Memorial to President Theodore Roosevelt, has won funding from the New York State Legislature and the Niagara Mohawk Corporation. Funding will facilitate graduate student projects, undergraduate internships, and space and facilities expansion at ESF. Scientists from institutions throughout New York are encouraged to collaborate in Station activities.

Water Chestnut Invasion in Oneida Lake

An unwanted invading plant pest in Oneida Lake Water chestnut was first identified in waters of Oneida Lake on July 19, 1999 in a bay just west of the Rt 81 overpass near Brewerton. The infestation at this site is dense and appears to have been established for several years. Water chestnut is a major impediment to recreational boating where it occurs and the seed or nut has four very sharp spines that can cause serious injury if one goes barefoot in the lake. Interestingly, its scientific name is *Trapa* derived from the calcified trapa, a four spined iron sphere used in Roman times to injure calvary horses feet. The weed can totally dominate shallow waters and bays such as those in Oneida Lake and appears to shade out native submerged plants. Water chestnut is generally found in shallow mud bottom habitats and in still or slowly moving water. This aquatic weed is native to temperate southern Europe and Asia and became naturalized in the eastern United States in the late 1800s. The plant is not new to New York State as it is now present in the lower Mohawk River and south through the Hudson River to Iona Island, Rockland County. Water chestnut has also been reported this summer in nearby Seneca River and has been in the Oswego River for several years. Where water chestnut may be in the earliest stage of infestation and plant density is low in the lake, Oneida Lake residents should remove this plant including leaves, stems, roots, and seeds immediately from the lake.

Submitted by Dr. Ed Mills, Director, Cornell Biological Field Station

Upcoming events

Aug 29-Sep 2,1999-129th AFS Annual Meeting, Adam's Mark Hotel, Charlotte, North Carolina. Contact Betsy Fritz, (301) 897-8616, ext. 212; bfritz@fisheries.org. http://www.fisheries.org/annual99/index.html.

Sep 9, 1999-NY Chapter AFS Aquatic Macrophyte Identification and Ecology Workshop, Tunsion Laboratory, Cortland NY. Contact John Farrell, (315) 470-6990, jmfarrel@mailbox.syr.edu

Sep 17, 1999-1st Annual Onondaga Lake Scientific Forum, "Research Findings for Onondaga Lake: Critical Information for Resource Managers" Carousel Mall Skydeck, Syracuse, NY. Contact: Upstate Freshwater Institute (315) 466-1309; www.upstatefreshwater.org; Poster Presenters contact Bob Hennigan (315) 422-7811

Jan 26-29, 1999-Joint Annual Meeting of the NY Chapter AFS, The Wildlife Society, and the Society of American Foresters "Strategies for Stewardship of NY's Natural Resources" Syracuse Marriott Inn and Conference Center, Carrier Parkway 315/432-0200. Contact Don Stewart (315) 470-6924; djstewar@mailbox.syr.edu, Allen Peterson (607) 762-7072; ampeterson@nyseg.com, or Dan Josephson (315) 369-6781; dcj3@cornell.edu

Wanted

Annual Meeting Volunteers

We will be looking for a number of student volunteers to run the audiovisuals at the next annual meeting. We will provide some financial help for the volunteers (registration or part of room cost). First come first serve. Please get you name on the list by contacting Lars Rudstam (rudstam@cornell.edu)

Miscellaneous

Best Friend

My best friend is a fishin' pole, he doesn't say too much, but teaches me important things 'bout growing up and such.

Like how to sit so patiently when casting out my bait, he knows that there are things in life for which I need to wait.

And how to pay attention while I'm waiting for a fish, 'cause boys with minds that wander often do not get their wish.

He teaches me so many things, I scarce can name them all, like when to strike, and how to fight, and mercy for the small.

But most of all he teaches me this most important rule, that little boys, like little fish, do best to stay in school!

Recent Thesis Abstracts

The Biological and Physical Interactions of *Mysis Relicta* in Lake Ontario

Gideon Gal
Cornell University

Understanding and quantifying the impact of biological and physical factors on *M. relicta* in the Lake Ontario food web requires information on *Mysis* interactions with it's physical and biological environment. The primary objective of this study was to determine the trophic interactions between *M. relicta* , it's prey and predators. This was performed by first determining the biological and physical factors governing *M. relicta* distribution in Lake Ontario. Consequentially, I compared the direct effects mysids have on zooplankton with the direct and indirect effects planktivorous fish have on zooplankton in the lake. The triangular trophic interactions between mysids, planktivorous fish and zooplankton were examined by determining the portion of zooplankton biomass consumed by fish and mysids (direct effects) and the impact that the presence of predators has on the potential consumption of zooplankton by mysids (indirect effect). Models developed for acoustically determining mysid abundance and for predicting mysid diel vertical migration were used in conjunction with bioenergetics and functional response models to estimate the consumption of zooplankton by mysids. Fish consumption of zooplankton was estimated by using acoustically determined fish abundance estimates and bioenergetic models. In the acoustic studies, mysid acoustic target strength (TS) was found to be higher than organisms of similar shape and size in marine systems. Modeled TS values matched those measured in the field. In the DVM studies, the model accurately predicted the mysid vertical distribution at two stations, during three seasons. Although mysids displayed a preference for relatively narrow range of light and temperature conditions, their vertical distribution was found to be determined predominately by the position of the thermocline in the water column. In contrast to previous studies, mysids were found to consume zooplankton at rates comparable to and at times exceeding those estimated for planktivorous fish. This suggests that mysids and zooplankton cannot be combined as a single trophic level available to planktivores in the Lake Ontario food web. Moreover, it was clear from the results that the indirect effects exhibited by the fish on zooplankton cannot be neglected. Any future changes to the Lake Ontario community structure, especially to the planktivores in the lake may have a significant impact on the flow of energy through the food web.

Reproduction and recruitment of fishes in hypereutrophic system (Onondaga Lake, New York)

Mark A. Arrigo
SUNY College of Environmental Science and Forestry

Reproduction of fishes was studied during 1993 and 1994 in hypereutrophic Onondaga Lake, New York. Onondaga Lake currently has levels of contaminants known to cause reproductive abnormalities in fish and a littoral zone that consists primarily of calcium carbonate industrial waste. Annual reproduction is highly variable and spatially limited within the lake. Nesting activity and young-of-year fish populations are mostly limited to the northern half of the lake. Sparse macrophyte growth may limit recruitment of juvenile fishes even in years when initial reproductive success is high. Littoral zone enhancements in the form of spawning structure and substrate, and aquatic vegetation nursery areas significantly increased density of centrarchid nests and juvenile fish abundance. Several large manipulation sites will need to be constructed to significantly influence target species. The results of this thesis provide a reference point for future remediation efforts in Onondaga Lake.

Feature Articles

The Role of Lake Ontario Embayments for the Production and Rearing of Larval Alewives (Alosa pseudoharengus) and Other Fishes

By

Robert A. Klumb
Cornell University

The Lake Ontario ecosystem is undergoing changes due to lake-wide reduction in nutrient inputs (mainly phosphorous) from pollution control efforts and the invasion of the exotic zebra mussel (Dreissena polymorpha). Changes in the lower trophic levels are anticipated to affect food web dynamics of zooplankton and the dominant planktivore the alewife (Alosa pseudoharengus). The alewife plays a dual role in the Lake Ontario food web as both an important predator and prey species. Zooplankton is the principal food of juvenile and adult alewives but alewives also prey on fish larvae of other species such as lake trout and yellow perch. Alewives are the principal prey of the five Lake Ontario salmonids that comprise a valuable sport fishery.

At the macro-habitat scale, three general habitat types exist in Lake Ontario: embayments, the nearshore zone, and the main lake (offshore). Adult alewives have been well studied in the offshore zone yet embayments and nearshore habitats may be critical to early life survival. Embayments are distinctive from nearshore habitats because they are insulated from main lake processes by a narrow inlet, which restricts water exchange from the main lake and reduces wave action. Embayments also have higher

nutrient concentrations, zooplankton densities, and seasonal water temperatures than the nearshore and offshore zones (Cornell Biological Field Station, unpublished data). The first objective of my project is to study the role Lake Ontario embayments and nearshore areas play as nursery habitat by comparing densities of spawning adults and larval alewives found in each habitat. Predator-prey dynamics, nutrient cycling within food webs and the food requirements of individual fish or populations are commonly studied using bioenergetics models. Bioenergetics models use a mass balance equation that sets the energy consumed in food equal to energy expended on growth, respiration (metabolism), egestion (solid waste), and excretion (nitrogenous waste). I propose to use a bioenergetics model to estimate and compare the consumption by larval alewives in embayments and the nearshore zone to available food resources in these habitats. A bioenergetics model for adult alewife exists and has been applied to larval alewife consumption. However, measurements of the respiration rates or swimming speeds of larval alewives have not been done. Using a model based on measurements from larger adult fish and applying this same model to much smaller larvae is not statistically valid and likely results in large errors in consumption estimates. The second objective of my project is to construct a new larval alewife bioenergetics model based on metabolic rates and swimming speeds I measure in the laboratory. I will also compare consumption estimated from my new model with estimates derived from the adult model.

No information currently exists regarding how larval fish and zooplankton are spatially distributed within Lake Ontario embayments and nearshore zones. I will use a geographic information system (GIS) to create maps of fish and zooplankton densities and investigate potential inshore/offshore gradients of larval fish and zooplankton within each habitat. My third objective is to ascertain what physical habitat or spatial features within embayments and nearshore areas influence larval fish densities. Specifically, I hypothesize that larval fish and zooplankton densities will increase proximate to rivers and wetlands because of nutrient inputs from the watershed. Densities of larval alewives and growth rates will be used to compare embayment and nearshore habitats for their role as nursery areas. Chaumont and Sodus bays were sampled in 1997 biweekly from May to August and once in September. In 1998, we sampled at Irondequoit Bay from June to August and Chaumont Bay once in early July. Larval fish were collected using plankton nets (500 and 750 um mesh) towed behind a boat. Vertical zooplankton tows (153 um mesh) were conducted in both habitats. Larval and adult fish densities were also determined using split-beam hydroacoustics (70 kHz). Larval alewife densities throughout the summer will be compared for the two habitats. Daily growth rings in otoliths will be used to determine hatching dates and calculate growth rates of alewife larvae captured in the two habitats.
To build a new larval alewife bioenergetics model, I will determine in the laboratory their respiration rates and swimming speeds. Two methods will be used to obtain larval alewives for this laboratory study. First, I will attempt to raise larvae from eggs hatched in the laboratory using fertilized gametes collected from spawning adults in the field. Spawning adult alewives will be collected with seines. Secondly, because alewife larvae are attracted to light, live larvae will be captured in the field using light traps with either electric bulbs or photochemical illumination. Respiration rates for different sizes of larval alewives will be measured either with a dissolved oxygen meter or using Winkler titrations to determine the amount of oxygen consumed by the fish over time. The effect of water temperature on the respiration rates of larval alewife will be assessed for temperatures encountered in Lake Ontario embayments and the nearshore zone during late spring to summer (10, 17, 20, 24 °C). Swimming speeds will be assessed by filming larvae and juveniles in the laboratory and in the field with hydroacoustics in lakes dominated by alewife (e.g. Conesus and Cayuta lakes, NY). To compare distributions of larval fishes between embayments and nearshore waters, I will use a GIS to map fish densities determined from larval fish tows and hydroacoustic surveys in each habitat. To study spatial trophic interactions, a two dimensional map of zooplankton and larval fish densities will be created to correlate larval fish with zooplankton distributions. So far, instantaneously corrected global positioning system (GPS) coordinates of 10 m accuracy have been collected for each larval fish or zooplankton sample using the Differential Global Positioning System service provided by the U.S. Coast Guard. GPS coordinates were also recorded continuously during the survey by the hydroacoustics software and placed in the same computer file as the data for the acoustic echoes of fish. Coordinate data will be used to generate a GIS map of fish and zooplankton density throughout an entire embayment and a portion of the nearshore. The depth, bottom aspect, and proximity to inlets and wetlands will be studied for possible influences on larval fish and zooplankton distributions in embayments and nearshore habitats.

The fundamental goal and significance of my research is an improved understanding of the Lake Ontario food web on a spatial scale. Past production and consumption (bioenergetics) models for the Great Lakes have generally not included embayments and nearshore habitats due to their relatively small area in relation to the entire lake. The prevalence of offshore estimates of alewife biomass from trawling or hydroacoustic surveys has focused modeling attempts offshore. If embayments or the nearshore are critical production areas for zooplankton and larval alewife, then past modeling simplifications that

ignored these habitats probably did not provide an accurate picture of the food web dynamics in Lake Ontario.

Biographical Sketch:

My hometown is Milwaukee, Wisconsin and I'm a life long Green Bay Packers Fan by birth. I graduated from the University of Wisconsin Milwaukee in 1990 with a Bachelors of Science in Biological Science and Biological Aspects of Natural Resource Conservation. Following graduation, I worked as both a microbiologist and chemist in industry before starting a Master's degree program at the University of Wisconsin Stevens Point in Natural Resources in 1993. My master's research focused on back-calculation models used to estimate historic growth of fishes from bony structures. Before completing my Master's degree in 1997, I worked 10 months as a fisheries technician for the Idaho Department of Fish and Game in McCall and Salmon, ID. My doctoral research on Lake Ontario embayments at Cornell started in April 1997 under the advisement of my committee co-chairs Drs. Ed Mills and Lars Rudstam.