

# Currents



Photo by Barbara A. Branca

The comb jelly, *Mnemiopsis leidyi*

## Jellies with an Appetite for Clams

To the untrained eye, the transparent blob in the Petri dish doesn't look like much, but to former New York Sea Grant Scholar **Marianne McNamara** it's a catch of the day—a gelatinous comb jelly that she can measure and even see what it had for breakfast. With NYSG funding, she and **Dr. Darcy J. Lonsdale** and **Robert M. Cerrato** of the School of Marine and Atmospheric Sciences at Stony Brook University looked at the rates at which comb jellies (the ctenophore *Mnemiopsis leidyi*) feed on the larvae of bivalves in Long Island estuaries. Could these gelatinous predators negatively impact efforts to restore important commercial bivalve species like hard clams?

Long Island estuaries have historically supported an important commercial fishery for the hard clam *Mercenaria mercenaria* particularly in Great South Bay. After commercial landings as high as 700,000 bushels in 1976 there has been a significant and long-term decline in hard clam abundance despite reduced fishing pressure and ongoing restoration efforts. Clams in the larval stage are free swimming and subject to predation by jellyfish and finfish. In recent decades, Long Island and the region have experienced increases in ctenophore abundance. This may in part be due to localized warming of seawater and overfishing of the comb jelly's natural predators such as the butterfish.

During the 2006 field season, the researchers looked at the ctenophore *M. leidyi* in LI's Great South Bay and Peconic Bay. Sampling revealed that ctenophore abundance values

were a factor of two to five times greater than previous studies conducted two decades earlier and that there were much higher densities of *M. leidyi* in Great South Bay than in Peconic Bay.

The research team looked at the natural diets and feeding rates of *M. leidyi* on zooplankton in the two bays to determine mortality rates. By applying average daily ingestion rates the researchers calculated that at its highest densities *M. leidyi* can remove an overall average of 20 to 89 percent per day of zooplankton species including bivalve larvae (veligers) and other zooplankton such as copepods. Similar calculations showed that at high densities, populations of *M. leidyi* can potentially remove 94.1 percent and 58.5 percent of bivalve veligers per day in Great South Bay and Peconic Bay respectively.

The research team found that the greatest daily ingestion rates of bivalve larvae corresponded with peak abundance of *M. leidyi* in Great South Bay and at one of the Peconic Bay sampling sites. (In Peconic Bay, both populations overlapped, but the greatest abundances were displaced from each other by two weeks.)

Although the peak population density of *M. leidyi* seems to come earlier in the season in Long Island estuaries, the timing of hard clam spawning events in Great South Bay has remained unchanged for at least 30 years: late spring and summer. The researchers provided data to show that hard clam spawning events took place during the time of peak ctenophore

abundance in Long Island estuaries in 2006. This shifting ctenophore abundance has implications for top-down control of the entire plankton community.

Says the researchers, "Increasing ctenophore abundance, especially during a period when they were not historically abundant (June) may have significant consequences for species which spawn at this time. Current populations of *M. leidyi* represent a major source of larval mortality for bivalves which may inhibit recovery of shellfish populations and reinforce their low abundance state in Long Island estuaries."

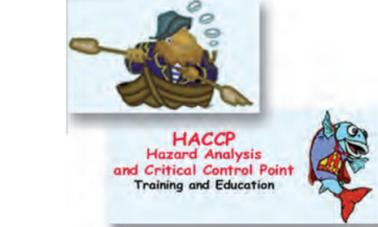
In his report to NOAA's Community-Based Habitat Restoration Program entitled *Restoring Hard Clams to Great South Bay*, **Carl LoBue**, senior marine scientist at The Nature Conservancy, writes "Researchers (McNamara 2010) have found evidence that ctenophores have increased in abundance in Long Island estuaries over the past two decades and suggest that this could have implications for predation rates on bivalve larvae." Says LoBue, "The researchers have generously been sharing information with us all along. It is generally known that due to predation pressure at early life stages of clams there needs to be bigger spawning events so that enough larvae and juveniles can escape predation pressure and survive to adulthood." And surviving to adulthood is a key ingredient in the recipe for rebuilding the clam population.

—Barbara A. Branca

## Online Training Ensures Seafood Safety

Ah, summer. Time to put shrimp on the barbeque or maybe hold a clam bake or a fish fry. We rely on and expect that New York has a safe and sustainable seafood supply. To remain competitive and prosper, the State's multi-billion dollar seafood industry that employs thousands of New Yorkers must use science-based systems to maximize the safety and quality of its products. **Ken Gall**, New York Sea Grant's seafood safety specialist, collaborates with businesses, regulatory agencies, the national Sea Grant network and universities to conduct on-site and distance education training programs and workshops to assist the seafood industry in its pursuit of freshness and quality.

Gall reports that in 2009, more than 1,000 individuals from seafood companies and state or federal regulatory agencies participated in food safety training programs conducted or managed by New York Sea Grant. In that same timeframe, nearly 750 individuals enrolled in the Internet-based course that enables them to meet the training requirement of the Food and Drug Administration's seafood HACCP (Hazard Analysis Critical Control Point) regulation. Another online course, Good Manufacturing Practices, trained 150 individuals on basic food safety practices for food processors, wholesalers and warehouses. Since these two courses were created, more than 4,500 people have received instruction.



NYSG is also developing training resources and expertise for the future; it is one of four Sea Grant programs that received a \$600,000 grant from USDA's National Integrated Food Safety Initiative in 2009 to update the national Seafood HACCP Alliance training program. The program, developed in 1995, incorporates new scientific findings and regulatory requirements for a national network of qualified trainers. In 2009, NYSG was among key members of a national team that developed a new training manual and teaching modules. NYSG also helped conduct a train-the-trainer course for 25 food safety inspectors from 14 different states that will qualify them to conduct Seafood HACCP training in their state or region.

—Ken Gall and Barbara A. Branca



## A Flat Fish, a Flatter Population: How Genetic Tools Help Management

Current winter flounder populations in our region, from Maine to the mid-Atlantic, are now at or near all-time lows of abundance when once they were a very common bottom-dwelling fish. In order for such an economically significant species to be managed effectively, agencies require detailed knowledge of their stock structure so that, if appropriate, managers might consider more stringent conservation action where the stocks are most vulnerable.

Currently, winter flounder are managed coast-wide as three stocks: north of Cape Cod in the Gulf of Maine, south of Cape Cod in southern New England and the mid-Atlantic Bight, and offshore at Georges Bank. Using two different state-of-the-art genetic approaches—microsatellite and single nucleotide polymorphism (SNP) analyses—**Dr. Isaac Wirgin** of NYU Medical Center investigated the coastwide stock structure of winter flounder to elucidate the genetic relatedness of populations and the extent of gene flow among them.

Wirgin's results suggest that stock structure in winter flounder is similar to that of the management paradigm, that is, they show strong differentiation between most populations north and south of Cape Cod and between Georges Bank and almost all other populations. They also found that individual estuarine populations south of Cape Cod (for example, Long Island's north shore as compared to LI's south shore) are not as reproductively isolated as some groups had thought. The results from this work provide valuable information about the genetic stock structure of this valuable fishery that will be useful for researchers and managers. However, questions still remain about the long term management of the fishery.

Says **Antoinette Clemetson**, NYSG's marine fisheries specialist, "Although different conservation practices and regulations are in place for these different regions, whatever factors are responsible for the decline appear to be working across the geographic range of the species."

—Barbara A. Branca and Lane Smith



The researchers have presented their findings at the Eleventh Flatfish Biology Conference, the 66th Northeast Fish and Wildlife Conferences, and anticipate presenting at the next Groundfish Stock Assessment Review Committee for winter flounder in 2011.

# Last Wave

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## Journal Reprints

Beck, A.J., J.K. Cochran, and S.A. Sañudo-Wilhelmy. 2010. Temporal trends of dissolved trace metals in Jamaica Bay, NY: Importance of waste water input and submarine ground water discharge in an urban estuary. *Estuaries and Coasts* 32: 535-550.

Dahl, S.F., J. Thiel, and B. Allam. 2010. Field performance and QPX disease progress in cultured and wild-type strains of *Mercenaria mercenaria* in New York waters. *Journal of Shellfish Research* 29(1): 83-90.

Hattenrath, T.K., D.M. Anderson, and C.J. Gobler. 2010. The influence of anthropogenic nitrogen loading and meteorological conditions on the dynamics and toxicity of *Alexandrium fundyense* blooms in a New York (USA) estuary. *Harmful Algae* 9(4): 402-412.

McNamara, M.E., D.J. Lonsdale, and R.M. Cerrato. 2010. Shifting abundance of the ctenophore *Mnemiopsis leidyi* and the implications for larval bivalve mortality. *Marine Biology* 157(2): 401-412.

Raikow, D.F., J.F. Atkinson, and T.E. Croley. 2010. Development of resource shed delineation in aquatic ecosystems. *Environmental Science & Technology* 44(1): 329-334.

## Western New York News

Helen Domske, NYSG's Coastal Education Specialist and the Associate Director of University at Buffalo's Great Lakes Program, was recently named "Public Servant of the Year" by the Erie County Federation of Sportsmen's Clubs (ECFSC). Domske has worked first with retired Assemblyman Dick Smith and current Assemblyman Jack Quinn for many years to coordinate the State of the Lake Erie meetings, bringing in many quality speakers to help her ECFSC stakeholders and other Lake Erie anglers keep up with current events.

"The 'State of the Lake' is one of the most important programs in the state concerning the continued well being of Lake Erie," says Assemblyman Quinn. "Each year, it brings a variety of stakeholders, from anglers to biologists, under one roof for up-to-date reports on ecological information, current initiatives, and future plans. This event [held in early May] could never have been or continue to be such a great success without the commitment and effort of NYSG and Helen Domske."

Also in May, Domske (pictured far left) received the inaugural Douglas B. Seager Award for Outstanding Contributions to Science Education. Named after Seager, a dedicated science teacher and mentor for teachers, the award comes from science educators and those involved with science education professional development from Rochester to Buffalo.

—Paul C. Focazio

## NYSG Partners to Re-launch, Manage NYSMEA Web Site

NYSG partnered with the New York State Marine Education Association (NYSMEA) to re-launch the Association's Web site, [www.nysmea.org](http://www.nysmea.org). NYSMEA, which includes educators from all levels, promotes marine awareness and encourages the growth and exchange of instructional resources within the scientific, commercial, and educational communities.

The redesign offers teachers a more interactive experience, one that better connects them together throughout the State. Visitors can now easily become members, find more on upcoming events and sign up to receive alerts from NYSMEA's *Strandline* newsletter.

"The site is a valuable resource for New York teachers, featuring lesson plans, field trip destinations, job opportunities, and much, much more," says Larissa Graham, NYSG's Long Island Sound Study Outreach Coordinator.

Graham is a recent recipient of the 2010 Science Council of New York City (SCONYC) Jerry Resnick Memorial Presidential Award. She was nominated for the award by NYSMEA, a SCONYC-member association she has worked closely with for several years.

—Paul C. Focazio



NYSG's Helen Domske (left) with Deb Connolly-Seager, daughter of the Seager Award name sake and Nick Hejailey, President of the Western New York Science Assessment Liaison Network.

# ...CoastWatch

Continued from page 1

of concurrent stressors on the fish may be playing a role.”

In a currently-funded NYSG study, investigators led by Bowser and virologist **Dr. James W. Casey** are using genetic (quantitative RT-PCR) and cell culture techniques to determine whether fish are capable of passing VHSV on to their embryos. The team is evaluating the risk of egg infection from VHSV-infected walleye and zebrafish to identify better bio-safety protocols and effective disinfection methods. These are critically important to natural resource agencies that collect eggs from wild fish stocks and private aquaculture because the spread of the virus to a fish hatchery or an aquaculture facility could be devastating. So far, the virus has not been found in any such facility in North America.

To prevent VHSV infection, fish culturists use a disinfectant solution such as an iodophor to treat walleye and other fish eggs. Iodine is the active ingredient that kills bacteria and viruses. In some fish species there is an earlier step in the egg handling process that must be performed prior to the disinfection process. Fish such as walleye have eggs that are adherent. In nature, this provides the egg with the ability to attach to various substrates in a river or lake. “If a fish culturist were to place a number of fish eggs in a vertical jar incubator,” says Bowser, “those eggs would likely form a big clump because they are naturally sticky.” So, prior to disinfecting the eggs with an iodophor solution, tannic acid is commonly used to remove their adherent quality. The key, though, is to completely wash the eggs to remove all tannic acid before the iodophor disinfection step.

“We found that any residual tannic acid will neutralize the iodophor and the expected disinfection step will not happen because of the interaction between the two,” says Bowser of his research team’s key finding to date. “Prior to our discovery, no one had described this adverse interaction between tannic acid and iodophor.”

One of Bowser’s graduate students, **Emily Cornwell**, was the lead author of a manuscript on this finding, one recently accepted for publication.

“Sometimes the benefit from a research project may come from an unexpected

direction. Our opinion is that this unexpected finding is absolutely critical to any egg disinfection process that involved tannic acid and an iodophor,” says Bowser.

NYSG Fisheries Specialist **Dave MacNeill** is providing outreach of these VHSV findings to his stakeholders concerned about Great Lakes fisheries. MacNeill is working with Bowser to develop a New York Sea Grant fact sheet on the strain of VHSV being studied in the Aquatic Animal Health Program at Cornell. Also, in December 2009, NYSG partnered with Lake Champlain and Pennsylvania Sea Grant programs to run a regional aquaculture workshop in Albany, New York, with a second workshop planned for Lamar, Pennsylvania in June, 2010. These workshops were funded by a grant from the Northeast Regional Aquaculture Center of the USDA.

At these meetings, MacNeill and others provided a summary of the VHSV disinfection containment and prevention protocol developed in Bowser’s lab as well as general bio-security measures that can be taken by the fish culturist.

“VHSV can cause serious fish losses as well as significant economic losses, especially to commercial aquaculture and bait dealers,” says MacNeill. “And so, we are taking steps to inform fish health professionals and hatchery operators about viral spread and containment policy in an effort to protect wild fish stocks and maintain the viability of aquaculture in the Northeast States.”

Based on workshop evaluations, 100 percent of workshop attendees indicated that they would utilize these guidelines in their own fish rearing facilities and share the information with other aquaculture practitioners.

—Paul C. Focazio

*Special thanks to Stephanie Specchio from Cornell University’s College of Veterinary Medicine Office of Communications for providing information on Bowser’s VHS research on Lake Superior as well as lab photos from his NYSG-funded study.*



... for more on VHSV related research, education efforts and lab photos.

# Coastlines

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## From the Director...

Welcome to New York Sea Grant’s (NYSG’s) summer *New York Coastlines* issue. I recently met with Stony Brook University **President Samuel Stanley** (pictured at right) to talk about NYSG and our important roles in coastal research and outreach in New York State. Since his arrival at Stony Brook nearly a year ago, President Stanley has prominently mentioned NYSG in several speeches and we greatly appreciate his support.

NYSG educators **Helen Domske** and **Larissa Graham** have both recently won awards for their outreach activities, as detailed on page 5. Helen’s work garnered two different awards from groups in the Buffalo region. Larissa, our Long Island Sound Study Outreach Coordinator, won an award for partnering NYSG with the New York State Marine Education Association to re-launch their website. The Northeast Sea Grant Programs recently held a regional meeting in the Hudson River Valley and I want to thank **Bob Kent** and **Nordica Holochuck** for planning and hosting this stimulating meeting. **Bonnie Biel**, our longtime main office administrative assistant, recently retired after nearly twenty years of exceptional service to NYSG and is greatly missed by our entire staff.



**Director Dr. James Ammerman (r.) presents SBU President Dr. Samuel Stanley with a poster of NYSG research efforts.**

This issue of *New York Coastlines* highlights the important subject of Viral Hemorrhagic Septicemia Virus (VHSV) in Great Lakes fish. VHSV has caused significant mortalities in several fish species, and has been an important focus of both NYSG research and outreach. Another article describes the increased abundance of ctenophores in Long Island’s Great South Bay, which when coupled with their high predation rates on clam larvae, suggests that ctenophores could limit the potential for recovery of the hard clam in this estuary. Finally, this issue concludes with short pieces describing NYSG’s online seafood safety courses and a NYSG-funded research project assessing winter flounder genetic stock structure using molecular methods. These are just the latest examples of how NYSG helps improve coastal New York living.

*James W. Ammerman*  
COASTLINES 6 SUMMER 2010

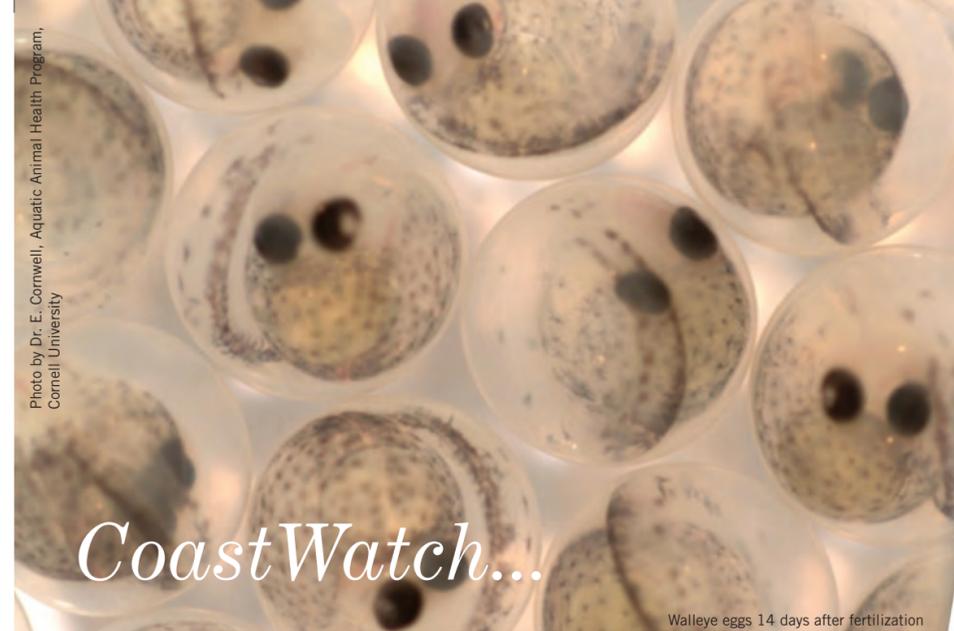


Photo by Dr. E. Cornwell, Aquatic Animal Health Program, Cornell University

## CoastWatch...

Walleye eggs 14 days after fertilization

## Under the Microscope with VHS

*New research to prevent and contain this serious fish pathogen*

“The emergence of VHSV [viral hemorrhagic septicemia virus] in the Great Lakes Basin is one of the most serious, if not *the* most serious fish health event that has ever occurred in North America,” says **Dr. Paul Bowser**, Professor of Aquatic Animal Medicine at Cornell University’s College of Veterinary Medicine Aquatic Animal Health Program. “I say that because of the diversity of fish species that is being infected and the degree to which the disease has impacted sportfisheries management.”

VHSV, which causes hemorrhaging, anemia and other signs of illness, has been identified in 28 freshwater fish species in the Great Lakes Basin. In New York, the non-treatable viral fish pathogen poses a potential threat to the sportfishing industry which contributes \$1.4 billion annually to the State’s economy, according to recent U.S. Census Bureau estimates.

Since 2005, the Great Lakes isolate of VHSV (VHSV Genotype IVb) has been linked to illness and significant mortalities in several Great Lakes fish species. The most dramatic mortality event involved the death of several hundred tons of freshwater drum in Lake Erie in 2006. Other fish species suffering serious losses have included round goby, gizzard shad, yellow perch,

muskelunge (a kind of pike), walleye, and smallmouth bass. Up through 2008, the virus was documented in all of the Great Lakes with the exception of Lake Superior. But, in 2009, Bowser says, “VHSV was found in fish from four locations in Lake Superior by two collaborating laboratories—Cornell and the U.S. Geological Survey’s Western Fisheries Research Center (USGS WFRC). Under newly-published OIE (World Organization for Animal Health) criteria, the work at Cornell and the USGS WFRC, combined with the existence of a connecting waterway to a location where VHSV is known to exist (Lake Huron), constitutes a confirmation of VHSV IVb in Lake Superior.” While no significant fish mortality events due to VHSV were observed in any of the Great Lakes in 2008 and 2009, the virus is still present in Great Lakes fish.

“It’s important to note that during 2008 and 2009 fish infected with VHSV IVb were found, but those fish showed no clinical signs of disease,” says Bowser. “Essentially the infection can be found but no mortalities were observed. This is important because it suggests that these infected fish may serve as a reservoir for the virus in the Great Lakes ecosystem. While we don’t fully understand the reasons for the lack of recent mortality events, the potential presence or absence

*Continued on page 2*