



Sea Grant Scholar Stuart Waugh brings up a box corer full of sediment.

Photo by Barbara A. Branca

## The Bottom is Tops:

### Looking at nitrogen in Peconic sediments

Paddle out into Great Peconic Bay, and you can often see bottom. “The bottom’s close to the top,” Dr. Robert Aller from Stony Brook University’s School of Marine and Atmospheric Sciences tells students. He explains that with light penetration allowing for photosynthesis deep into the water column and with worms, brittle stars and clams churning up the mud below, the shallow bay is a dynamic ecosystem driven by close coupling of the water column with the processes taking place in its bottom sediments. Aller and co-investigator Dr. Christopher Gobler are studying the role of sediments in nitrogen cycling and eutrophication in the Peconic Estuary, a system of bays on eastern Long Island. Over the last three decades, the bays have seen an increase in nuisance or harmful algal blooms—first brown tide and more recently, red tide. This may indicate that there are more nutrients in the water, perhaps caused by nitrogen-rich runoff and groundwater inputs which hasten the process of eutrophication and “feed” algal blooms.

As part of a two-year project funded by NYSG, the research team (including Sea Grant Scholars **Chuck Wall** and **Stuart Waugh**) is characterizing Great Peconic Bay and measuring remineralization and the amount of nitrogen gas produced in its bottom sediments. Nitrogen gas ( $N_2$ ) is produced during important microbial processes known as denitrification and *anammox*—the latter short for **anaerobic ammonium oxidation**. After the first sampling season, the team found that microbes in the sediment are mainly converting the proteins that come from decaying marine plankton into  $N_2$ , rather than from organic matter from the land.

This important finding indicates that the system is governed largely by chemical processes taking place in the water and not by an external supply of organic material in runoff from the land.

Preliminary research shows that most of the decomposition of organic material is initially through anaerobic pathways, that is, without oxygen. Then resulting products—ammonium and hydrogen sulfide (think rotten eggs)—are re-oxidized by the oxygen gas that penetrates the sediment. Says Aller, “The sediment is characterized by mud and sand riddled with tubes and worms creating a well-ventilated seabed. This makes for highly active benthic communities and efficient re-oxidation.” The researchers found the highest penetration of oxygen into the sediment was in the fall and winter.

Data so far indicate that as decomposition of marine plankton takes place during spring and summer, ratios of nitrogen and carbon remain steady, but in the fall there is a possible depletion of nitrogen relative to carbon, suggesting a sedimentary “sink” for nitrogen. The lowered nitrogen production rate during the fall depends on remineralization of organic material that has settled to the bottom previously. At this same time, there is decreased productivity in the water column as you would expect with the change of season. Says Aller, “We see evidence that in the fall, the sediment system begins to switch from a state of net  $N_2$  production (denitrification) to  $N_2$  fixation. In our second year of study spearheaded by Stuart Waugh, we are trying to confirm this apparent seasonal pattern.”

—Barbara A. Branca

## Researchers Identify Ways to Improve Lake Ontario Sportfishing

In a time when “tourist” anglers, those from out-of-state, are less likely to travel long distances to fish, researchers from two NYSG-funded studies agree that increasing the fishing activity of residents along New York’s Lake Ontario shoreline is especially important to sustaining the region’s coastal businesses.

Earlier this year, findings from one project were published in the *Tourism in Marine Environments* journal article “Assessing the Economic Importance of Recreational Fishing for Communities along Lake Ontario.” This article, based on 2007-09 research from Cornell University’s **Tommy L. Brown** (now retired) and **Nancy A. Connelly**, synthesizes results from a 2007 survey that found tourist anglers spent \$43 million in communities along the Lake’s shoreline. The estimated indirect and induced economic impacts of those recreational fishing expenditures to shoreline communities were on the order of \$60 million and were associated with approximately 1,000 jobs.

“Essentially, we assessed the last 30 years of data on human and biological factors that affect angler effort in order to develop the best possible understanding of what has most strongly influenced the Lake’s fisheries,” said Connelly. The team then modeled those factors to forecast the next three to five years of angler

effort, estimated at a loss of 32% over five years. “Armed with this information, local communities can choose to be proactive and try to counteract the trend predicted by the model,” said Connelly.

For example, NYS Department of Environmental Conservation biologists suggested that some anglers have adjusted their fishing techniques to catch more bass. Bass, which are in great abundance, feed in part on the plentiful round goby, an invasive species that anglers catch more times than they would like to. “If other anglers are able to change and adopt these new techniques,” Connelly suggested, “harvest of bass could increase, perhaps reducing the predicted decline from 32 to 19%.” Although this would still result in a predicted loss of \$11 million and 196 jobs, it’s considerably less than the \$19 million and 330 jobs estimated if no action were taken. Additional strategies for increasing sales revenues might be targeted at trout and salmon anglers to further reduce downward trends, since they make up a large percentage of Lake Ontario anglers.

In a current two-year investigation, researchers **Diane Kuehn** and **Valerie Luzadis**, and Sea Grant Scholar **Matthew Brincka** at the SUNY College of Environmental Science and Forestry in Syracuse, NY are targeting 7,000 residents who fish within the seven counties bordering Lake Ontario.

## Scientists and managers discuss nitrogen in NY Bight at workshop

The New York Bight ranges from Cape Cod, MA, to Cape May, NJ and includes New York Harbor and a large number of estuaries. Each of these water bodies is unique; collectively, they make the region America’s “urban sea.” Over the last 50 years the Bight region has experienced varying degrees of negative impacts from anthropogenic nitrogen loading from sewage treatment plants, stormwater runoff, groundwater input, and atmospheric nitrogen. While many nitrogen controls are in place, improvements have been limited and many additional controls would require major investments.

In a two-day workshop held in Manhattan in July 2010, scientists and managers discussed the issues surrounding nitrogen and nitrogen controls in the New York Bight and its associated estuaries. The workshop was planned by the New York Bight Regional Ocean Science Council which is charged with developing a research plan that coordinates and integrates regional research activities within the New York

Bight. The workshop was led by **Jim Ammerman**, New York Sea Grant Director and chair of the workshop committee.

Said Ammerman, “Scientists need to know if they are providing the right information to managers of our coastal resources. By structuring our meeting with both scientific and management presentations as well as breakout group discussions, the managers in attendance were able to form new partnerships with the scientists.”

There were 15 presentations and two breakout sessions, the first session limited to scientists or managers, and second a combination of the two groups of attendees. Many presenters gave overviews of the major scientific or management concerns of particular estuaries, including the NY/NJ Harbor Estuary, the Long Island South Shore Estuaries, the Peconic Estuary, Long Island Sound, and others. Most presentations focused on nitrogen inputs and impacts for each estuary,



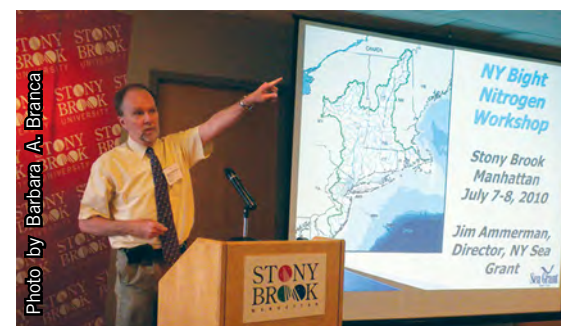
Largemouth bass

“We’re providing information to coastal businesses and tourism promoters about the fishing preferences and motivations of Lake Ontario resident anglers that can be used to help increase fishing activity,” said Kuehn.

Preliminary data indicate that, of the responding anglers who identified a preference for a type of fish, smallmouth bass and largemouth bass are the preferred species to catch. “Because of its existing popularity with residents, bass fishing provides an excellent opportunity for businesses and tourism promoters to tap into the large resident market group,” said Kuehn. Redirecting promotional and business efforts to further increase the activities of these anglers, therefore, is key.

Further analysis is underway to estimate the percentage of residents who fish or may be interested in fishing in the future, the fishing-related expenditures of resident anglers in 2009, and the factors that motivate and constrain the fishing activities of resident anglers. A Sea Grant fact sheet containing the results of the study will be available next summer.

—Paul C. Focazio



NYSG Director James Ammerman at the podium during the NY Bight Nitrogen Workshop

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## Journal Reprints

Connelly, N., and T.L. Brown. 2010. Sportfishing participation on Lake Ontario: modeling the past predicting the future. *North American Journal of Fisheries Management* 30(3): 821-830.

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## NYSG Hosts Climate Science Workshop for Extension Educators

As part of its Coastal Climate Change Adaptation Initiative (CCCAI), New York Sea Grant (NYSG) organized a two-day workshop for 40 Cornell Cooperative Extension (CCE), New York and Lake Champlain Sea Grant Extension and NOAA/National Weather Service staff on how to integrate climate science into Extension’s everyday education outreach.

“This in-depth training provided a comprehensive overview on the climate system, how it may be changing, how these changes could potentially affect Extension audiences and some recommended guidelines for how Extension educators could communicate climate science information to their audiences,” said workshop co-organizer **David MacNeill** of New York Sea Grant’s Oswego office.

Cornell University faculty, Cornell Cooperative Extension staff, and National Weather Service and Northeast Regional Climate Center (NRCC) meteorologists presented both the science of climate, weather, and water systems, and how to communicate climate-related impacts through easily-understood, fact-based messages of relevance to stakeholder groups. NRCC Director **Dr. Arthur DeGaetano** said, “We are interested in creating new models and products based on needs identified by Extension and stakeholders.”

NYSG Coastal Processes and Facilities Specialist **Jay Tanski** collaborated with DeGaetano to develop an East Coast Winter Storms website. At the August workshop, Tanski presented information on climate-related impacts on New York’s marine coast. Said Tanski, “There is still a great deal of uncertainty about the impact climate change will have on the coast. In terms of the physical processes, it won’t be creating new problems that we haven’t seen before, but it will exacerbate existing problems that we are already facing.”

The National Oceanic and Atmospheric Administration (NOAA) and National Sea Grant Program funded the CCCAI workshop and an April train-the-trainer workshop for NOAA’s North Atlantic Regional Team and Sea Grant Extension educators.

—Kara Lynn Dunn

Two ambitious NYSG activities shared a mission of safety this summer. Thanks to all our partners and participants for making these events a success!

From May to September, NYSG Recreation and Tourism Specialist **Dave White** embarked on the 2010 upstate NY tour of the *Discover Clean & Safe Boat* sponsored by Marathon Boat Group, the Boating Industries Association of Upstate NY, Great Lakes Seaway Trail, Morgan Recreational Supply, Taylor Made Products, NYS Parks and the NYS Environmental Facilities Corporation. The 19-ft “Made in New York” Grumman aluminum pontoon boat came off the assembly line in Marathon to educate boaters about required and recommended gear for safe and legal NY boating. NYSG equipped the boat with four types of personal flotation devices (PFDs), safety flares, chartbook, paddle, and a fuel nozzle bib to reduce fuel spills. The boat had two electric motors, a generator and a shoreline recharge plug-in. Boaters at the exhibit who pledged to be “clean, green and safe” spun a wheel for prizes such as a floating keychain, bilge sock, Nautical Seaway Trail Chartbook, poncho and life jacket.



Photo by Kara Lynn Dunn

Using funds from the NY Center for Agricultural Medicine and Health (NYCAMH), NYSG and its partners hosted a *Safety At Sea* (SAS) training workshop at Inlet Seafood Packing House in Montauk. During the free day-long training in June, 46 commercial fisherman and fisheries biologists learned at-sea lifesaving techniques. During a free raffle, the Long Island Occupational and Environmental Health Center (LIOEHC) donated 15 flotation bibs and **Dave Aripotch**, captain of the *Caitlin & Mairead*, won the immersion suit grand prize donated by IMP Marine Group of New Bedford, MA. Fishermen practiced safe water entry with immersion suits (pictured). Some fishermen brought their own suits for inspection and when one fifth of the suits failed, those seafarers decided to replace their defective equipment given its lifesaving role.

—Kara Lynn Dunn and Antoinette Clemetson



Photo by Paul C. Focazio



# ...CoastWatch

Continued from page 1



Photo by Paul C. Focazio

NYSG-funded researchers are studying alewives to, among other things, help improve fisheries managers' ability to optimize salmonid stocking rates.

For many of the teachers, the experience has been an ideal refresher course. "During this weeklong immersion in Great Lakes information, I've been surprised to find that my knowledge was out-of-date," said **Judy Gluchowski**, an enrichment specialist at a Rochester, NY elementary school. She's interested in connecting lessons on Lake Ontario to an existing fifth grade unit.

"In the fall, students begin their study of science with a unit on 'The Living Environment,' a New York State standard. During this unit, students study a pond or stream ecosystem on the school campus. But, because of this weeklong training, I'll build on that unit so that the students view our school's wetlands as part of Lake Ontario's watershed and, therefore, a larger ecosystem. My aim is that students walk away with a better understanding of ecosystems, an interest in science, and perhaps a grasp of the importance of stewardship for the Lake ecosystem."

"For me, the most memorable experience was seining in the Niagara River, said middle school teacher **Paulette Morein** (pictured center in large photo on page 1). "It has been a life-long dream to don hip waders and collect fish from the open waters." Added **Claire Faulring**, a teacher in Erie County's Springville, NY (pictured on page 1 at far right in large photo and at right in insert alongside researcher Dr. Snyder), "From my experiences, I have gained a greater appreciation for what is in my backyard."

Researcher Snyder helped Morein and the other teachers identify the fish they caught in their weighted seine nets for study before

releasing them back in the Niagara River. These included: juvenile rock bass, juvenile gar, red horse sucker, smallmouth bass, and white sucker.

Snyder is the project leader for a two-year NYSG project designed to improve understanding and accurate forecasting of the condition and growth of alewives (pictured above), an important component of the Great Lakes food web. "They are a great forage fish for Lake Ontario's salmon population," he said during his talk prior to the seining activity, "but unfortunately, that's based on both an invasive (alewife) and an introduced, stocked species (Pacific salmon)."

For Morien, all this lake learning has her energized. "I currently have no lessons on the Great Lakes, but I plan on developing a unit of study for my classroom." A few of the "big ideas" she will incorporate: lessons on identifying and naming the Great Lakes, their size, volume and depth as well as native and invasive species and what students can do to "preserve the splendor of the Great Lakes."

"They shared the spirit and dedication of other educators," said Domske. "These teachers were inspired by each other's enthusiasm and zest for learning and they've made connections that will last for years to come."

—Paul C. Focazio



... for more on this and other stories in the issue, as well as some Web-only extras.

# Coastlines

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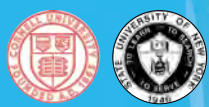
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## From the Director...

Welcome to New York Sea Grant's (NYSG's) fall *New York Coastlines* issue. It has been a busy summer at NYSG, as highlighted in this issue. In late July, NYSG educator **Helen Domske** led a group of 4th-10th grade teachers on a learning tour of New York's upstate shorelines. This tour was part of COSEE Great Lakes, a program funded by the National Science Foundation which helps NYSG to connect Great Lakes scientists with educators. It is an important part of our educational outreach in the Great Lakes region.

Nitrogen in coastal environments is another important focus of this issue, including a description of a NYSG-funded project on nitrogen in Peconic Bay sediments. In addition, there is a summary of a workshop on coastal nitrogen issues in the New York Bight region which I recently convened as part of a regional planning effort.

The results from two NYSG-funded projects on Lake Ontario sportfishing predict a decline in future fishing activity and also address ways to counter this trend. Angling provides important economic inputs to shoreline communities and such a decline is of great concern because of the potential for reduced income from angling. In another fishing-related activity, "The End" of Long Island—

Montauk—was the site of a *Safety At Sea* workshop organized by NYSG's **Antoinette Clemetson** for local commercial fishermen. Upstate, NYSG's **Dave White** toured several Lake Ontario harbors with the *Discover Clean & Safe Boat* program. **Dave MacNeill**, our upstate specialist involved with climate change, convened a climate science workshop at Cornell University to help extension educators integrate climate science into their regular outreach activities. **Jay Tanski**, our Long Island coastal processes specialist also participated.

On a personal note, I am sad to report that **Bonnie Biel** (photo at right), our senior administrative assistant who gave a friendly greeting to anyone visiting, passed away in July following a long illness. She was active in the office until late March and is greatly missed by me, the rest of the staff, and the NYSG community. Our thoughts are with her family and friends.



Bonnie Biel

*James M. Ammerman*  
NEW YORK COASTLINES 6 FALL 2010



Seining for fish in the Niagara River



## CoastWatch...

### A WWWeb of Lake Ontario Learning

After a week along Lake Ontario, the fifteen 4th – 10th grade teachers on this past summer's Centers for Ocean Sciences Education Excellence (COSEE) Great Lakes tour have learned a great deal. They've been all along New York's lakeshore, from seining on the Niagara River with Buffalo State College biologist **Dr. Randy Snyder** to experiencing the Salmon River and sand dunes of Black Pond Wildlife Management Area east of Oswego with New York Sea Grant (NYSG) Dune/River Steward Coordinator **Mary Penney**. Now back in the classroom, the educators are sharing this new wealth of hands-on knowledge with their students.

Most of the teachers came from the areas bordering Lake Ontario or Lake Erie, from schools near Buffalo, Rochester and Oswego. "This group of educators and the dedicated scientists and researchers made every moment of planning well worth the effort," said NYSG Coastal Education Specialist **Helen Domske**, leader of the exploration workshop.

On the final morning of their journey, the teachers gathered to discuss how they planned to incorporate their Great Lakes experiences into their curricula and to share some "wow" moments from along the way. NYSG's Web Content Manager **Paul Focazio** documented the journey in a blog at <http://coseegreatlakes.net/weblog>

(go to "2010 Lake Ontario Exploration Workshop").

"I want to give my students a better understanding of the Great Lakes based on my experiences and learning," said middle school teacher **Erik Bauerlein**, "from invasive species and how they are being managed to understanding the food chain in the Great Lakes and how humans have impacted it." Bauerlein will use this information to supplement the water unit in his classroom.

The round goby is just one of the invasives that has had a significant impact in the Great Lakes. SUNY College at Buffalo biologist **Dr. Christopher Pennuto**, whose graduate students met with the teachers at a stop in the Buffalo area, is the project leader for a recently-completed two-year NYSG project on the goby's ecological impact to tributary streams and how readily it will expand upstream. "Our assessment of round goby swimming performance should enable us to collaborate with engineers in developing fish passage designs to minimize the goby's impact," says Pennuto.

"I have taken these wonderful, inland seas for granted," said high school teacher **Unice Reinhold**. "But, I now feel renewed from what I learned about the ecology and geology of the Great Lakes and I want to share this enthusiasm with my students."

Continued on page 2

Photo by Paul C. Focazio