



Behind-the-scene activities at Braun Seafood Company in Cutchogue, NY. A fisherman weighs and ices his catch while workers inspect and store tagged shellfish and carefully handle each seafood product—all to assure quality, safety and freshness for seafood consumers.

Making Your Seafood Safer

In April 2011, the U.S. Food and Drug Administration (FDA) released the first update in 10 years of its Fish and Fishery Products Hazards and Controls guidance (FDA Hazards Guide) for seafood processors. These changes – which describe appropriate science-based “HACCP” (pronounced hassip), or Hazard Analysis Critical Control Point, controls for various types of seafood products – impact our nation’s \$60 billion seafood industry, which employs some 250,000 workers.

Like Braun Seafood Company pictured above, all businesses that handle seafood after it is unloaded from the fishing vessel or harvested from a fish farm until it reaches the retail store or restaurant must apply HACCP principles and develop a plan to prevent or control any food safety hazards associated with their products and operation. “This system is designed to help food processors produce safer food products for consumers,” says New York Sea Grant’s Seafood Specialist **Ken Gall**.

Through proper training, seafood processors learn how to use the FDA guidance to identify which food safety hazards (eg., harmful microorganisms, toxic chemicals, additives, allergens, and/or physical contaminants) are likely to be associated with their products or processing operation. Based on this analysis, a system of controls is developed at Critical Control Points (CCPs), or those steps in the seafood processing operation – from receipt of raw materials to processing steps and storage – where food safety hazards must be prevented, eliminated, or reduced to an acceptable level.

While HACCP is not a “magic bullet” that will make all food safety problems disappear, Gall says, “The process is designed to help seafood businesses anticipate and prevent food safety problems before they occur, rather than trying to fix or correct these problems after they’ve already happened.”

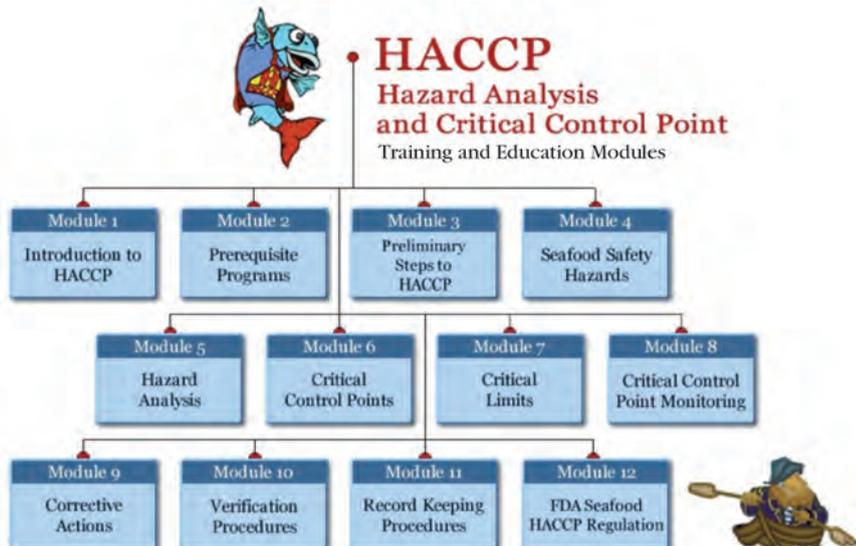
Working with the National Seafood HACCP Alliance, FDA, NOAA’s National Marine Fisheries Service, the U.S. Association of Food and Drug Officials (AFDO), the National Sea Grant network and numerous other partners, a standardized training program for the seafood industry and federal and state inspectors was developed in the mid-1990s. The original training program was a three-day workshop conducted by a team of instructors. Several thousand individuals completed one of these courses taught in NY by NYSG’s Ken Gall and trainers from the seafood industry, FDA and the NYS Department of Agriculture & Markets.

In 2000, Gall developed an alternative training format in which the first two days of standard training are replaced with an Internet course, a desirable alternative for businesses across the U.S. Gall reports over 5,800 people from all 50 states and 46 foreign countries have registered for the Alliance’s Internet course. In total, over 28,000 people have been trained through classroom and Internet courses since the program’s inception.

After completing the Internet course (Segment One), individuals must attend a one-day “live” Segment Two course to complete their training and receive a certificate from the AFDO to demonstrate that they meet the training

...Coast Watch

Continued from page 1



requirement of the FDA regulation. NYSG's Gall has taught at least four of these one-day courses each year for the past decade.

Attendees at the Spring 2011 courses held in NYC's FDA offices included **Philip Karlin**, founder of PE & DD Seafood in Riverhead, NY and a 43-year commercial fisherman. This small, family-owned commercial fishing operation offers wild-caught fish and seafood and is one of a handful of local companies that sell their catch at NYC's Greenmarkets. **Johnny Ortiz** from the Bronx's Nebraskaland received training, too. Since its 1989 start, Nebraskaland has rapidly grown into the largest meat and fish distributor in the NY metropolitan market, bringing it recognition in of *Crain's Business Weekly* as one of the top 200 privately-held companies.

Attendee **Nellie Wu**, General Manager at W&T Seafood, a family-owned and operated Brooklyn company, carries an array of fresh and frozen fish, shrimp, and shellfish. "We only build partnerships with the producers, farmers, and suppliers who are committed to our quality standards," says Wu. "In addition to focusing on our selection of product, our primary concern is the health and safety of our customers. We adhere to the FDA's strict HACCP guidelines to ensure the safety of our facilities and products."

The new edition of FDA's Hazards Guide—a 450-page document—contains significant changes in control strategies for various seafood safety hazards that needed to be shared with the Alliance's network of trainers as well as with the seafood industry and government inspectors. In Summer 2011 the Alliance developed a half-day workshop designed to explain the changes in the new FDA Hazards Guide and help businesses incorporate the latest control strategies into their HACCP food safety control plans and show inspectors how to evaluate these new plans. Gall, who helped develop the workshop, taught the course in San Francisco, CA and Providence, RI.

With the release of the new edition of FDA's Hazards Guide, the National Seafood HACCP Alliance updated

all of its training materials with Gall playing a lead role in their production. These new training materials will be used across the U.S. and in countries that export seafood to the U.S. for the next decade.

The Alliance is also conducting a series of trainer requalification programs for the several hundred trainers across the U.S. to introduce them to the new course training curriculum and teaching modules. Gall says, "The Alliance's intent is to establish a uniform and standard training format for the seafood processing and importing industry and U.S. regulatory officials based on qualified trainers, current training materials, and approved courses."

The NYS Department of Agriculture & Markets inspects seafood processors and recently adopted the FDA's guidelines as state regulation. "State inspectors are required to complete seafood HACCP training before inspecting seafood processing firms, and so we use the course that Ken Gall teaches to fulfill this requirement," says Erin Sawyer, Director of Field Operations for the department.

With many foreign seafood firms exporting their products to the U.S., Alliance training on HACCP-based FDA regulation compliance is crucial in other countries as well. In August 2011, Gall travelled to China with Dr. Steve Otwell of Florida Sea Grant and an AFDO representative to conduct a basic HACCP course and a train-the-trainer course that will qualify instructors to deliver Alliance training in China.

"Seafood is a complex commodity, the HACCP concept can be difficult for some to grasp, and the FDA guidance can be overwhelming for those who don't know how to use it," says Gall. "The Alliance training program provides seafood businesses with the knowledge they need to understand HACCP and the FDA's regulatory requirements, and the skills needed to identify which food safety hazards are associated with their products and how they can be effectively controlled."

— Paul C. Focazio

Currents

Genome Sequence Favors Brown Tide



Brown tide lives up to its name. Quantuck Bay on eastern Long Island under normal conditions (left) and under brown tide conditions when the brown tide alga dominates.

The year 2011 has been a banner one for the single-celled alga *Aureococcus anophagefferens* whose prolific blooms are known as “brown tide.” With concentrations in excess of 2 million cells per milliliter in some Long Island bays, this alga turned the waters brown from western Shinnecock Bay to eastern Moriches Bay, making for intense, though localized, brown tide conditions.

While not harmful to humans, concentrated brown tide blooms make it difficult for bivalves to feed and can kill juvenile clams and scallops. “This marks the fifth consecutive year of a bloom of over 1 million cells per milliliter in this particular area,” said **Dr. Christopher Gobler** of the School of Marine and Atmospheric Sciences at Stony Brook University.

Dr. Gobler keeps a close watch on brown tide—from the color of the water right down to its DNA sequence. In the February 21 online *Proceedings of the National Academy of Sciences*, he and his research team announced a “first.” They had sequenced and annotated the first complete genome of a harmful algal bloom species, *Aureococcus anophagefferens*.

“*Aureococcus* has contributed to major declines in the Long Island shellfish industry over the past 25 years,” said **Dr. Jim Ammerman**, Director of New York Sea Grant. “For the past 15 years, Sea Grant has supported a number of Dr. Gobler’s ecological studies of *Aureococcus*, several through the Brown Tide Research Initiative launched in 1996 and funded by NOAA’s Ecology and Oceanography of Harmful Algal Blooms program. More recently, we have directly funded Gobler’s brown tide genomic research which suggests that *Aureococcus* is potentially well-adapted to exploit current coastal conditions of increased turbidity, metals, and organic compounds.”

The 56-million base pair *Aureococcus* genome was sequenced in 2007 by the Department of Energy’s Joint Genome Institute from a culture isolated from the shores of Long Island, one of the regions most affected by the alga since it first appeared in 1985 along the east coast. Gobler’s team then analyzed what the sequence means. “Compared to other phytoplankton inhabiting the same estuaries, *Aureococcus*, which outcompetes them, shows several genome-encoded advantages” says Gobler. For example, the genomic study revealed that *Aureococcus* had 62 light-harvesting genes whereas its competitors had a couple of dozen of these genes on average, making this microalga well-adapted to low light or even no-light conditions. “*Aureococcus* also produces a large number of enzymes which rely on metals and can use organic compounds that are abundant in shallow estuaries,” notes Gobler. Chalk up two more genetic advantages.

The study provides a greater understanding of this microalga and how the information can be used to protect our waters. “We now know that this organism is genetically predisposed to exploit certain characteristics of coastal ecosystems,” notes Dr. Gobler. “But we also know the characteristics are there because of human activities. If we continue to increase, for example, organic matter in coastal waters, then it’s going to continue to favor brown tides since it is genetically predisposed to thrive in these conditions. We believe the same genome-enabled approach used for this study can be applied to other harmful algal blooms in the future.”

—Barbara A. Branca and Paul C. Focazio



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Alternative Marketing for Fish Catch

For many years, small farmers sold shares of their crops to the public in exchange for labor to help bring in the harvest. Fishermen across the country have been adapting this type of direct marketing strategy by establishing Community Supported Fisheries (CSF) programs.

Unlike the farm model, the CSF is primarily a financial agreement where customers prepay to receive a fresh catch. In these types of programs, subscribers share the same risks associated with many fishing businesses. Unlike farming, fishermen cannot always guarantee the catch and share holders are usually willing to accept the “day’s catch.” The CSF concept has grown in popularity in the past five years and more than 20 programs are active across the country, selling a variety of catch to the public.

On Long Island, there has been some level of interest being expressed towards establishing CSFs. In 2010, Sea Grant facilitated a forum to educate stakeholders about CFSs that are being administered in Massachusetts. The 2011 Long Island Small Farms Summit

featured two panel discussions highlighting the CSF movement and similarities with values adopted by SlowFood and other movements that support small local producers.

Ann Rathkopf, President of SlowFood Hunting Chapter said, “The guarantee of freshness and connection with the people who produce our food has become an important part of how we eat. The local food movement would willingly support our fishermen by buying catch directly from them.”

Long Island does present several challenges that must be addressed in order for fishermen to implement their own CFS. **Kris Vanderslice**, a marketing consultant has teamed up with her brother, Mike, who is a fisherman, to conduct an online survey to measure public interest in establishing CSFs in New York as a means to promote local catch.

Sea Grant appreciates the potential benefits of CSFs in fishing communities and we are willing to work with the fishing industry and the public to identify and address the challenges that lay ahead.

— Antoinette Clemetson
Marine fisheries specialist



Visitors enjoy the recently expanded walkway along the Rondout Creek in Kingston, NY. Rondout Creek is a tributary to the Hudson located at Kingston, one of the communities that participated in the NYSG study.

Hudson Tourism

Ah, summer on the Hudson River. There are many opportunities for both residents and tourists to engage in cultural, nature-based and water recreation activities. A NYSG-funded study by **Drs. Rudy Schuster** and **Diane Kuehn** from SUNY ESF looked at nature and heritage tourism in NY’s Hudson River Valley communities and provided representative communities with information concerning the image that tourists and residents hold of the destination. Study results were described in a recently-published symposium proceedings (see page 5).

“The study was welcomed by local partners as Hudson River communities continue to search for the best ways to incorporate nature-based tourism,” said **Nordica Holochuck**, NYSG’s Hudson Estuary specialist. “Our region is home to unique cities and villages and local residents enthusiastically reported both positive and negative attributes defining their sense of place, certainly helping the researchers understand and communicate acceptable change.” Study results have been used by one Hudson Valley village in its master planning process and have generated interest by county tourism directors, city planning offices and local chambers of commerce.

— Barbara A. Branca and Nordica Holochuck

NOAA’S Lubchenco visits Sea Grant at Stony Brook

In May 2011, New York Sea Grant held a “meet and greet” event in honor of **Dr. Jane Lubchenco**, Undersecretary of Commerce for the air and oceans and administrator of the National Oceanographic and Atmospheric Administrator. She came to Stony Brook University’s School of Marine and Atmospheric Sciences where she met New York Sea Grant staff and many of the faculty members and their graduate students many of whom are Sea Grant-supported scholars. She caught a first-hand glimpse at some of the exciting research and outreach projects NYSG and its partners are undertaking to address some of the critical issues that face our coastal waters. She also had an opportunity to meet some of the staff and researchers as New York Sea Grant celebrates its 40th year of “Bringing Science to the Shore”



“NOAA’s focus is on oceans and atmosphere, and so that’s a really nice fit for the areas of expertise that many of you bring,” said Dr. Lubchenco, addressing the crowd. “Our mission for creating and using science to develop services and to provide stewardship responsibility makes it really important that we have good partners. Sea Grant is clearly one of our very important partners, but other parts of the academic community are as well. So, I welcome any opportunity to learn about the latest, coolest, most intriguing or puzzling things that you all are working on.”

And so Dr. Lubchenco circulated among the researchers, students and staffers who gave her a concise version of their recently or currently funded research on topics like harmful algal blooms, storm surges, hard clam and hypoxia—all topics that have impacts on environmental as well as economic health.



“New York Sea Grant’s NOAA funding enables us to address the important economic and environmental issues confronting New York marine and Great Lakes coastal communities,” says New York Sea Grant director **Dr. Jim Ammerman**. “Important problems like water quality, hazard resilience, and sustainable fisheries and coastal development will all benefit from New York Sea Grant’s research, education, and outreach efforts.”

All the while, Dr. Lubchenco, an administrator with a keen interest in her role as a marine ecologist, remained engaged. Thanks for taking the time to visit us! To get the whole story, watch the YouTube video.

— Barbara A. Branca



Dr. Jane Lubchenco discusses harmful algal blooms with Dr. Christopher Gobler (far left), learns about fisheries and seafood issues from NYSG’s Antoinette Clemetson and Ken Gall (center column) and NYSG’s past and current research projects from NYSG Assistant Director Cornelia Schlenk during her visit to New York Sea Grant at Stony Brook University. All photos by Jake Gorst

Last Wave

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Journal Reprints

Dahl, S., M. Perrigault, Q. Liu, J.L. Collier, D.A. Barnes, and B. Allam. 2011. Effects of temperature on hard clam (*Mercenaria mercenaria*) immunity and QPX (Quahog Parasite Unknown) disease development: I. Dynamics of QPX disease. *Journal of Invertebrate Pathology* 106(2): 314-321.

Gobler, C.J., D. Berry, S. Dyhrman, and S. Wilhelm. 2011. Niche of harmful alga *Aureococcus*

anophagefferens revealed through ecogenomics. *Proceedings of the National Academy of Sciences of the United States of America* 108(11): 4352-4357.

Perrigault, M., S.F. Dahl, E. Pales Espinosa, L. Gambino, and B. Allam. 2011. Effects of temperature on hard clam (*Mercenaria mercenaria*) immunity and QPX (Quahog Parasite Unknown) disease development: II. Defense parameters. *Journal of Invertebrate Pathology* 106(2): 322-332.

Sullivan, L.E., R.M. Schuster, D.M. Kuehn, C.S. Doble, and D. Morais. 2010. Building Sustainable Communities Using Sense of Place Indicators in Three Hudson River Valley, NY, Tourism Destinations: An Application of the Limits of Acceptable Change Process. Pages 173-179 in C. Watts, editor. *Proceedings of the 2009 Northeastern Recreation Research Symposium*; 2009 March 29-31; Bolton Landing, NY. GTR-NRS-P-66. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station.

Making Sea Grant research accessible in new media

With the launch of a new feature on New York Sea Grant's Web site, we are now happy to provide visitors the ability to search our NYSG projects portfolio. You will find this search facility to be a user-friendly and powerful tool to find information about our funded research projects from 1990 to the present. Through this tool you will soon learn that NYSG research is diverse in topics and geography and has a distinguished history in helping New York use and manage our coastal resources for the benefit of all New Yorkers and beyond. This is a living database that will grow and evolve as we add new projects and update the impacts of older projects. We invite you to explore our legacy of "Bringing Science to the Shore."

– Lane Smith and Paul C. Focazio

Get started by following this sample search:

1 From www.nyseagrant.org follow the "Projects" link through the "Research" tab and click on the "Searchable Database." Our sample search is for the Investigator, Dr. Christopher J. Gobler (highlighted in orange).

2 A listing of Dr. Gobler's research projects is then displayed. For this sample the first project on climate change was selected (highlighted in orange).

3 The entire project is then displayed.

| Project Number | Project Title | Investigators |
|----------------|--|---|
| RCMB-36-NYCT | Impacts of climate change on the export of the spring bloom in Long Island Sound | Dr. Christopher J. Gobler, Dr. Darcy J. Lonsdale |
| RCMB-36-NYCT | Impacts of climate change on the export of the spring bloom in Long Island Sound | Dr. Christopher J. Gobler, Dr. Darcy J. Lonsdale |
| RCMB-37-NYCT | The distribution, causes, and impacts of <i>Alexandrium fundulense</i> blooms in coves, near shore, and open water regions of Long Island Sound | Dr. Christopher J. Gobler |
| RCMB-34-Y1 | Cumulative impacts of multiple stressors on estuarine populations in New York estuaries | Dr. Bradley Peterson, Dr. Christopher J. Gobler, Dr. Jackie Collier |
| RCMB-34-Y2 | Cumulative impacts of multiple stressors on estuarine populations in New York estuaries | Dr. Bradley Peterson, Dr. Christopher J. Gobler |
| RCMB-32-Y1 | Managing brown tide: nitrogen physiology of <i>Aureococcus anophagefferens</i> within the plankton community context | Dr. Christopher J. Gobler, Dr. Jackie Collier |
| RCMB-32-Y2 | Managing brown tide: nitrogen physiology of <i>Aureococcus anophagefferens</i> within the plankton community context | Dr. Christopher J. Gobler, Dr. Jackie Collier |
| RCMC-9-Y2 | The role of sediments in nitrogen cycling and eutrophication in the Peconic estuary | Dr. Christopher J. Gobler, Dr. Robert Allen |
| RCMC-9-Y1 | The role of sediments in nitrogen cycling and eutrophication in the Peconic estuary | Dr. Christopher J. Gobler, Dr. Robert Allen |
| RCMB-31 | Assessing the effects of nutrients on the bloom dynamics and toxicity of <i>Alexandrium</i> , the causative agent of Paralytic Shellfish Poisoning (PSP), in Long Island's south shore and east end inshore waters | Dr. Christopher J. Gobler |
| RNG-18 | Sponsorship of the <i>Aureococcus</i> Genome Consortium Symposium | Dr. Christopher J. Gobler |

3 The entire project is then displayed.



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From the Director...

Welcome to the Summer/Fall 2011 issue of **New York Coastlines**. It has been very busy and productive summer for New York Sea Grant (NYSG). It began when NOAA Administrator **Dr. Jane Lubchenco** received an honorary degree from Stony Brook University and used the occasion to visit our NYSG program (see article on page 4). It was also a summer that saw a great deal of the subject of much NYSG research—brown tide in Long Island waters (page 3). Now in the waning days of the season we are selecting our next new suite of peer-reviewed research projects.

In these last few months, **Dr. Kathy Bunting-Howarth** took up the reins of our NYSG Extension program by traveling from one part of the state to another, meeting with extension specialists and their stakeholders. Many of our extension activities are documented on our Web site which was upgraded early this summer. In fact, you can now click on the orange RSS feed icon  on our home page to keep up with our latest events, press releases and funding opportunities.

The goal of this newsletter has always been to create a balance of stories about NYSG's research and outreach efforts from both New York's marine and Great Lakes districts. So we are especially proud to announce that in June,

New York Coastlines won a Gold Award from the Association for Communication Excellence (ACE) for writing with a specialized publication.

It is fitting that our flagship publication won gold as we celebrate 40 years of "Bringing Science to the Shore." In a field of over 200 public sector publications, the judge said there were "excellent examples of solid writing techniques that can keep a diverse audience engaged in a science and technical based newsletter."

Congratulations to Communications Manager **Barbara Branca** and Web Content Manager **Paul Focazio** who do the majority of the newsletter's writing, to **Sharon O'Donovan** for layout, and especially to **Susan Hamill**, longtime Communications administrative assistant who has been the guardian of NYSG publications for over 20 years. After all these years of dedicated service, Sue retired at the end of July. Join us as we wish her good luck in her retirement. Thanks and we will miss you. At the same time, we now welcome our new administrative assistant, **Leigh Hubbard**.



Susan M. Hamill