



A Newsletter from the New Jersey Sea Grant Consortium

## New Year, New Research

The New Jersey Sea Grant Consortium (NJSJC) recently submitted its 2012-14 Sea Grant Omnibus Proposal to the National Sea Grant College Program to support its ongoing extension, education and communications activities. The proposal also requests funding for four new research projects focusing on issues of high priority to New Jersey's coast. Three involve work within Barnegat Bay and complement Governor Christie's Barnegat Bay Initiative. The four research projects included in the proposal are:

*The Decline of Winter Flounder: Influences of Changes in Connectivity Between Estuaries and the Inner Continental Shelf* submitted by Dr. Kenneth Able and Dr. Thomas Grothues, Rutgers University, Institute of Marine and Coastal Sciences. The overall goal is to enhance the understanding of winter flounder connectivity between estuarine and continental shelf habitats and address issues related to the decline of winter flounder and management of its habitats.

*Evaluating Ecological and Social Impacts of New Jersey Legislation Regulating Fertilizer Nitrogen Loads to Barnegat Bay - Little Egg Harbor Estuary by Using Isotopic Signatures, Seagrass Demographics, Social Response and Communications* submitted by Dr. Michael Kennish and Dr. Benjamin Fertig, Rutgers University, Institute of Marine and Coastal Sciences. The goal of this study is to assess the effectiveness of recent, unprecedented policy decisions and legislations (State

Legislative Bills S-1411 and A-2290) to reduce nutrient pollution to the Barnegat Bay–Little Egg Harbor Estuary from the adjoining watershed.

*The Influence of Estuary Geomorphology on Accretion of Coastal Wetlands: A Potential for Priority Planning for New Jersey's Coastal Areas Vulnerable to Sea Level Rise* submitted by Dr. David Velinsky and Dr. Tracy Quirk of the Academy of Natural Sciences. This research will allow for a projection of the wetlands which are potentially more vulnerable to a relative sea level rise increase. The study will contribute necessary information to make informed policy and land management decisions regarding the future of coastal wetlands in New Jersey under sea level rise scenarios.

*Economic Vulnerability to Climate Change on the Jersey Shore: Promoting Adaptation, Resilience and Sustainability in Coastal New Jersey* submitted by Dr. Robin Leichenko and Dr. Richard Lathrop, Rutgers University, Department of Geography. The goal of the project is to contribute to the understanding of economic vulnerability to climate change in coastal communities and identify adaptation options that will enhance local economic resilience to climate change. This will be achieved by developing community economic vulnerability profiles, stakeholder-based assessment of key climate impacts and adaptation options, and cost benefit assessment of these options.

## Desktop Calendars Celebrate New Year and New Jersey's Coast

In response to the overwhelming popularity of the print edition of its 2012 *Shore Shots* calendar, the New Jersey Sea Grant Consortium will celebrate the New Year by offering downloadable monthly desktop calendars showcasing the winning dozen photos from its New Jersey's Top Ten Beaches Photo Contest. The limited supply of special edition calendars ran out within two weeks of publication, so NJSJC will offer the images for download on its redesigned website [njseagrant.org](http://njseagrant.org), which will be launched in early January.

The print calendars, released at the organization's annual *Coast Day NJ* event in Cape May, became hot-ticket, highly sought after items.

"We were overwhelmed by the positive response to the calendars. What surprised us most was receiving requests for the calendar from states as far away as Michigan and Arizona," said Kim Kosko, Director of



Communications for NJSJC. "We're excited to offer the desktop version of the calendar for those who didn't get a print copy and even more excited to offer the downloadable images in conjunction with the launch of our new website."

Visitors will have several options for downloading the right size image to fit their computer screens and can read a brief bio of each of the featured photographers.

They can also support this and other NJSJC activities by [donating to the Consortium](#).



## New Jersey Clean Marina Program Welcomes Three New Certified Members



The New Jersey Clean Marina Program recently recognized three new additions to the state's growing roster of environmentally conscious marinas. The trio of newly designated facilities now brings the total of New Jersey Clean Marinas to 45. The three newest Clean Marina members are Curtin Marina in Burlington, Munro's Marina in Tuckerton and Long Key Marina in Waretown.

Six years ago, the NJSJC and the New Jersey Department of Environmental Protection's Office of Coastal Management and Watershed Restoration teamed up to launch the state's Clean Marina Program to help marinas adopt programs and practices that protect the environment. Each is evaluated for compliance with federal and state regulations and required to incorporate voluntary best management practices (BMPs) into everyday operations.

NJSJC Extension Program Assistant Director Michael Danko,

who oversees the New Jersey Clean Marina Program, is extremely pleased with the growth of the New Jersey Clean Marina Program and hopes to hit the 50 Clean Marinas mark by next spring.

According to Ellie Curtin, co-owner of Curtin Marina, theirs is now the second freshwater operation and the first facility on the Delaware River to be officially awarded Clean Marina status. "We're really happy to be recognized and certified as a New Jersey Clean Marina and always aim to implement innovative procedures and improvements that will benefit the environment. For example, when we built our new docks we used recycled plastic decking and old fire hoses given to us by a local fire department for the rub rail on the edge of the dock." NJSJC's Danko acknowledged and praised Curtin Marina for exceeding expectations and requirements to comply with BMPs for the certification process.

## Selling Consumers on Community Supported Fishery Products

The New Jersey Sea Grant Consortium Extension Program is currently collaborating with Rutgers Cooperative Extension of Ocean County to develop a pilot community-supported fishery (CSF) project in New Jersey. CSFs have been growing in popularity in coastal areas around the country as a way to strengthen direct connections between fishermen and seafood consumers. Modeled after community supported agriculture (CSA) programs, community members can buy "shares" of fresh seafood directly from local fishermen, which they will receive on a regular basis for an entire season. CSFs result in increased access to local markets by commercial fishermen and improved relationships between fishermen and their surrounding communities.

The project will try to hook up seafood shares with existing CSAs throughout the state to better integrate land- and sea-based local food initiatives. The project will also create a number of educational opportunities for shareholders and other community members. They'll be invited to participate in workshops and tours of fishing docks to learn about catch methods, fisheries regulations, processing and preparing seafood and fisheries management strategies.

Not only do CSF projects have positive economic results for local fishermen, they also help to build communities, promote the sustainable production and consumption of seafood and increase local access to fresh, healthy, sources of protein.

## Rain Gardens Reduce Nitrogen

Barnegat Bay suffers from degraded water quality because nutrients, nitrogen in particular, are washed into the bay via stormwater runoff. But what if nutrient laden runoff could be captured at the source and treated to remove nitrogen? New Jersey Sea Grant Consortium (NJSJC) Water Resources Agents, Amy Boyajian and Jillian Thompson, hope to have an answer soon. Working with colleagues, Dr. Steven Yergeau and Ben Pearson from the Rutgers Cooperative Extension (RCE) Water Resources Program, they recently installed a rain garden (a landscaped, shallow depression that captures, filters and infiltrates stormwater runoff) in the Barnegat Bay Watershed specifically designed to remove nitrogen.

Dr. Yergeau and Pearson collaborated with long-time New Jersey Sea Grant researcher Dr. Louise Wootton, Professor and Director of Sustainability at Georgian Court University (GCU), on this innovative initiative. Wootton worked with them to identify potential locations for a rain garden at the GCU's Lakewood campus. Yergeau and Pearson then designed a rain garden that would be more efficient at removing nitrogen found in stormwater runoff. Since studies show nitrogen loads originating from the Barnegat Bay Watershed degrade the water quality and habitats of the bay, rain gardens seem a likely way to help restore its water quality.

The rain garden, installed in early December on the GCU campus, is different because it holds runoff in an anaerobic environment for an extended period of time to enhance the removal of nitrogen. This was accomplished by installing a plastic liner, underdrain pipes, and gravel layers to hold the stormwater runoff. Previous rain garden designs have been effective at removing nitrogen, but this one is expected to achieve an even higher level of nitrogen removal. The project will be monitored closely to test the nitrogen removal efficiency of the advanced design.

The RCE Water Resources Program team will continue their partnership with GCU by designing and installing other stormwater management initiatives in 2012. For more information visit [water.rutgers.edu](http://water.rutgers.edu). Amy Boyajian can be reached at [boyajian@envsci.rutgers.edu](mailto:boyajian@envsci.rutgers.edu) and Jillian Thompson can be reached at [jthompson@envsci.rutgers.edu](mailto:jthompson@envsci.rutgers.edu).



**Ben Pearson adds gravel to the engineered rain garden on the GCU campus.**



## Estuaries and Oil Spills Lesson Plan Made Available

Educators interested in helping their students better understand the marine environment and the impact humans have on it can now access *Estuaries and Oil Spills*, a lesson plan and activity guide developed by the staff of the NJSGC Education Program. The plan can be found in the education section of NJSGC's website along with dozens of other resources for educators interested in bringing the coastal environment into their classrooms.

*Estuaries and Oil Spills* is appropriate for grades 4 through 8 and

offers teachers detailed information on New Jersey's estuaries and how they would be affected by an oil spill. The plan also provides information on oil from its formation to its behavior when released into a marine environment. Students will especially benefit from the plan's description of how to set up a classroom activity during which an oil spill is simulated. Given the challenge of cleaning the spill, students work in groups to determine the materials that are most effective to get the job done.

## Making Space for Science Education

Claire Antonucci, NJSGC's Executive Director/ Director of Education and Diana Burich, K-12 Program Coordinator, were invited speakers at the fall Mid-Atlantic Region Space Grant Directors' Meeting in Princeton.

The New Jersey Space Grant Consortium was established in 1991 by a grant from NASA. There is a space grant consortium in every state, plus the District of Columbia and Puerto Rico, serving as an educational arm charged with progressing the goals of the National Space Grant program.

Presentations at this year's meeting



**Diana Burich, NJSGC Program Coordinator and Claire Antonucci, Executive Director /Director of Education**

ranged from overviews of state successes in space grant projects to complementary programs such as the New Jersey Sea Grant Consortium which brings environmental science in the classroom.

Antonucci and Burich talked about research, extension and education programs at the New Jersey Sea Grant Consortium including graduate student work in oyster research, after school programs that educate youngsters about the coast and successful public outreach events including *Ocean Fun Days* and *Coast Day NJ*.

## Geoscience Teacher Project Gets High Marks

A recent report issued by independent program evaluator HDR Inc. concluded that NJSGC's Geoscience Partnership Teacher Training program was an "unequivocal success." The week-long workshop, held in June for 22 educators and administrators from Red Bank, New Jersey, was a part of the ongoing partnership between NJSGC, Rutgers University and the Sandy Hook Foundation to bring geoscience research into classrooms throughout New Jersey. The partners received a grant from the National Science Foundation in 2010 to fund the multi-year project.

HDR was hired to measure the effectiveness of the Geoscience Partnership. They helped the partners develop quantitative and qualitative data collection tools to gather feedback from workshop participants. Tools included surveys and pre- and post-tests designed to measure changes in subject matter knowledge as well as attitudes towards teaching geoscience. HDR found that, among other accomplishments, the workshop significantly raised teacher confidence in ability to teach geoscience. A positive shift in comfort levels with specific program objectives was also reported. Objectives included incorporating new geoscience content into existing science programs and delivering in-service geoscience training programs to peers.

When surveyed regarding their satisfaction with the workshop, over 90% of the group gave the workshop with an "A." Many felt the



only improvement the workshop needed was additional days, especially to develop their own lesson plans for the classroom and to delve deeper into outdoor hands-on activities.

## NJSGC Named as Barnegat Bay Research Project Partner

The New Jersey Sea Grant Consortium (NJSGC) is one of six research institutions selected by the New Jersey Department of Environmental Protection (NJDEP) to help carry out ten separate studies of aspects of Barnegat Bay to get a comprehensive view of the health of the waterway. The NJDEP will invest \$1.2 million in the effort and the studies should be completed by 2014, although some results are expected earlier.

The projects NJSGC will be involved in are:

### **Barnegat Bay Diatom Nutrient Inference Model**

*Partners: New Jersey Sea Grant Consortium, Academy of Natural Sciences*

DEP water quality monitoring of Barnegat Bay for nitrogen and phosphorus did not start until 1989, but salt marsh sediments hold signatures of nutrient loadings going back hundreds of years in the form of diatoms from past algae blooms. This study will evaluate these clues for the development of biologically-defensible nutrient criteria for New Jersey's bays.

### **Baseline Characterization of Phytoplankton and Harmful Algal Blooms**

*Partners: New Jersey Sea Grant Consortium, Academy of Natural Sciences*

Phytoplankton consists of microscopic plants that float in the water column or live on the bottom, forming the base of a complex food web. This study will investigate the interactions between nutrient loadings, phytoplankton responses, and harmful algae

### **Baseline Characterization of Zooplankton in Barnegat Bay**

*Partner: Monmouth University*

Zooplankton includes larval fish and other species that form an important food web link to other species such as crabs, clams and fish.

However, the last definitive studies of zooplankton in the bay were conducted in the 1970s in conjunction with operations at the Oyster Creek Nuclear Power Plant. New information will be needed on the abundance and distribution of these organisms as a baseline for comparison once the plant shuts down blooms.

### **Ecological Evaluation of Sedge Island Marine Conservation Area in Barnegat Bay**

*Partner: Rider University*

Shallow water surrounding the Sedge Islands in the bay off Island Beach State Park serves as a nursery for blue claw crabs, hard clams and fish. This study will evaluate the effectiveness of the state's Sedge Island Marine Conservation Zone, established to protect ecologically sensitive marshlands, tidal creeks and open water from damage from motorboats and personal water craft.

### **Tidal Freshwater and Salt Marsh Wetland Studies of Changing Ecological Function and Adaptation Strategies**

*Partners: New Jersey Sea Grant Consortium, Academy of Natural Sciences*

More than 28 percent of Barnegat Bay's tidal marshes were lost to development between 1940 and 1970. However, recent studies show that wetlands in Barnegat Bay can remove some 80 percent of the nitrogen that flows into it from the land. This study will improve understanding of this process and how wetlands can prevent algae blooms, low oxygen conditions and fish kills.

DEP Commissioner Robert Martin called Barnegat Bay "an ecological treasure and tourism asset that is important to all of New Jersey." He also noted that together the collective group of ten research projects will form the most detailed study ever done of the bay.

## CURRENT EVENTS

### Stew Tweed Fisheries Scholarship Offered

The NJSGC has opened its search for applicants for the 2012 Stew Tweed Fisheries and Aquaculture Scholarships. Now in its fifth year, the scholarship program was established in memory of Stew Tweed, a twenty-seven-year veteran of the New Jersey Sea Grant Extension Program, who passed away in early 2007. The application deadline for this year's scholarships is March 30, 2012.

The scholarship program has become increasingly competitive and attracts applicants from all over New Jersey. Graduating high school seniors as well as undergraduate- and graduate-level students with an interest in pursuing studies, research or a career focused in fisheries or

aquaculture are eligible. The scholarship program awards \$1,000 to a graduating New Jersey high school senior; undergraduate/graduate students who are New Jersey residents but who may or may not be studying out of state are awarded \$1,500. The scholarships are traditionally presented by Congressman Frank Pallone (6<sup>th</sup> District) at *Ocean Fun Days*, NJSGC's annual late spring outreach event at Sandy Hook.

Scholarship applicants can download the application forms and anyone interested in supporting the scholarship project can visit the Consortium's website or go directly to [StewTweed.org](http://StewTweed.org).



22 Magruder Road  
Fort Hancock, NJ 07732  
732-872-1300  
Fax 732-291-4483  
[njseagrant.org](http://njseagrant.org)

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