

QUARTERLY NEWSLETTER OF THE JACQUES COUSTEAU NATIONAL ESTUARINE RESEARCH RESERVE

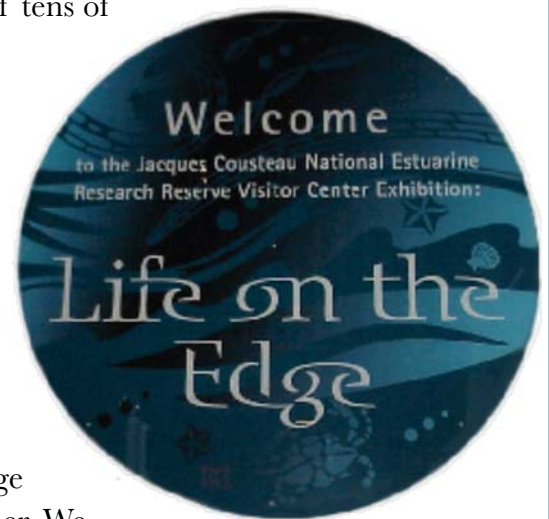
LIFE ON THE *edge*

Van Sickle and Rolleri, Ltd will design the new Life on the Edge Exhibit

Since the last newsletter, time has been spent finding the perfect match to work with the JC NERR in the development of the new exhibit. At first this process seemed as if it could become akin to a speed-dating frenzy, due to a very robust response to the Request for Proposals [RFP] sent to 12 design firms. It was up to these firms to put together a team of designers, planners, writers, multi-media and construction experts and to submit a proposal that would excite and inspire the JC NERR Exhibit steering committee.

All the firms attended the on-site visit to the present exhibit space. By the Oct. 31 deadline, we had received collectively plans, descriptions and images of tens of thousands of square feet of exhibits from the many proposals. Our attention then turned to creating a short-list of firms that would be invited for an interview. This was the stage at which we realized the effort and passion that had gone into these proposals. The exhibit designers, along with their project partners, had all embraced a desire to create an inspiring experience that would enhance public appreciation of the intrinsic value and beauty of New Jersey's coastal community. One of the unexpected consequences of seeking a design firm for our redesign/build project was a recognition of how deeply each team demonstrated the possibility of a meaningful collaboration with the JC NERR. They all provided a generous sharing of knowledge with us, along with displaying a non-competitive spirit toward each other. We were all enriched with the variety of interpretive and design ideas, making the calls to the eliminated firms all the harder.

A unanimous final choice was made, following careful evaluation of the RFP submittal requirements: qualifications, experience, methodology, references and financials. The selected firm, VSR [Van Sickle and Rolleri], will be responsible for all the exhibit design tasks and managing the design/build project. The JC NERR, as described by Dennis Van Sickle and Andrea Rolleri [principals of VSR], are tightly braided into this joint project "as the content experts, with the power to educate and inspire."



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During our pre-design workshop, the participants will be asked the following about the purpose of a re-designed exhibit:

-“You should see this exhibit because...”

-“I never knew...”

-“I saw the exhibit two months ago and I still remember...”

Success of this project might be measured by whether, two months after visiting the exhibit, each visitor’s memory is a renewed viewpoint of responsibility and stewardship of the estuary, one which stirs deep within each one: “

Now it’s up to me!”

(Continued from page 1)

During the preliminary stage, together we will hone in how to best distill and illuminate the story of this estuary as a special place. How the storyline, themes, key messages and issues are communicated, by the use of various interpretation and presentation techniques, will determine the degree of appreciation and responsibility that can guide visitors to take right and good actions that support both local and global environmental conservation. This renewed exhibit can provide a sense of place through promoting understanding of and

appreciation for the characteristics of the estuary. These characteristics can range from the tangible, such as the resources the bay provides, to the intangible, such as a feeling of connection and belonging to the community. Characteristics that make a place significant emerge through the knowledge of the history, geography and geology of a place, its flora and fauna, shared experiences and perceptions. Memories of personal and cultural experience make a place special. This emotional attachment over time makes it meaningful and worthy of protection.

By Ida Louise Scott, Interpreter

From the Interpreter

Visit the Life on the Edge Exhibit at the Tuckerton Seaport!

New Staff at the JC NERR



Robert Koch - GIS/Stewardship Coordinator

Robert is responsible for the development GIS applications at Jacques Cousteau National Estuarine Research Reserve (JC NERR). He also serves as stewardship coordinator and is responsible for handling resource management issues, questions, or projects, and their impacts on or relationship to the Reserve. His background primarily focused on development of applications in geographic information systems (GIS) for spatial analyses to map, model, and problem solving. Prior to working for the JC NERR, Robert served as a Geospatial Analyst for the Richard Stockton College Coastal Research Center from 2006-2011. He received B.A and Master degrees from the Richard Stockton College of NJ and his GIS certification from the University of California.

Kimberly Capone - Volunteer Coordinator

As the Volunteer Coordinator for the JC NERR, Kim organizes and manages the volunteer base who devote their time to education, administration, and research projects at the Cousteau Coastal Center and the Rutgers University Marine Field Station (RUMFS). Kim received a Masters degree in Marine Science in New Zealand. Upon returning to the U.S., she worked as a Marine Research Technician at RUMFS for a year before joining the team at JC NERR as the Volunteer Coordinator.



Andrea Spahn - Communications Coordinator

Andrea Spahn works as a liaison between the National Park Service, Fish and Wildlife Service, JC NERR, and Rutgers University. Her responsibilities include raising awareness of JC NERR programs, activities, and services and organizing geomorphological monitoring for the Northeast Coastal Barrier Network. Andrea’s office is off-site and located at the Sandy Hook National Recreation Area. Prior to working with JC NERR, she worked as a Research Assistant on Sandy Hook collecting coastal topography and shoreline change data (2006-2011); and served as a NJ Watershed Ambassador in 2009. She received a B.A. in Biology and Environmental Science from McDaniel College and a GIS certificate from Penn State University.





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Managers message

A Message from the JC NERR Manger ~March 2012

The JC NERR **Sentinel Site** Program currently focuses on delivering science-based information and training to help mitigate impacts of climate change, especially sea level rise. Primary audiences are the traditional coastal management, local municipal and educational communities. In the near future, reserve staff will explore how the reach of the Sentinel Site effort can be expanded to deliver science-based information at broader spatial scales to a new suite of coastal interests such as fishery managers and weather forecasters. Of particular interest are data streams that can engage citizen scientists and volunteers, and integrate data from other science-based networks such as the National Association of Marine Laboratories, Fish and Wildlife Refuges and coastal parks of the National Park Service. For example, two data streams that are candidates for national scale programs are already in place at the JC NERR, ichthyoplankton surveys and monitoring of finfish dynamics through acoustic tracking. In addition, a partnership with the broadcast meteorological community will be developed to enable broader use of weather and other NERRS data for distribution during nightly newscasts and websites maintained by news organizations. A national workshop will be held at the JC NERR to develop a blueprint for broader use of these and other reserve data, greater awareness of coastal and estuarine issues, and opportunities for citizen science and stewardship. One of the expected outcomes will be an opportunity for volunteers and friends groups to get involved with this initiative at each of the 28 reserves throughout the nation.

Mike De Luca



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BARNEGAT BAY-LITTLE EGG HARBOR ESTUARY: ECOSYSTEM IMPACTS

The Barnegat Bay-Little Egg Harbor (BB-LEH) Estuary is subject to multiple human impacts associated with expanding population growth and development in the surrounding Barnegat Bay Watershed. The major population impacts occur in the northern part of the Barnegat Bay, north of the Jacques Cousteau National Estuarine Research Reserve. Among the number of adverse human effects, eutrophication poses the most serious threat to the long-term health and function of the estuary, impacting essential habitats (e.g., seagrass and shellfish beds), finfish nursery areas, and biotic communities.

Nutrient loading, most notably nitrogen, has been linked to an array of cascading environmental problems in the estuary such as increased micro- and macroalgal growth, harmful algal blooms (HABs), bacterial and viral pathogens, high turbidity, altered benthic invertebrate communities, and reduced harvestable fisheries. The net effect of progressive eutrophication is the permanent alteration of biotic communities in the system. BB-LEH Estuary is now classified as a highly eutrophic estuary based on federal and scientific classifications. Because it is shallow, poorly flushed, and bordered by highly developed watershed areas, the estuary is particularly susceptible to nutrient loading. Based on studies of the US Geological Survey, most of this load (~66%) derives from surface water inflow, but substantial fractions also originate from atmospheric deposition (~22%), and direct groundwater discharges (~12%).

Other adverse effects on the estuary include nonpoint source inputs of pathogens and chemical contaminants, boat prop scarring of seagrass beds, as well as physical alteration of habitat due to bulkheading, diking and ditching, dredging, and lagoon construction. Point-source impacts of the Oyster Creek Nuclear Generating Station (i.e., biocidal releases, thermal discharges, impingement, and entrainment) increase mortality of estuarine and marine organisms in Barnegat Bay. Human activities in watershed areas, notably deforestation and infrastructure development, partition and disrupt habitats while also degrading water quality and altering biotic communities. Ongoing land development raises turbidity and siltation levels in tributaries of the estuary, creating benthic shading problems. Recommended management actions to restore vital estuary functions include the purchase of open space, improved stormwater controls, restoration of critical habitats, and implementation of smart development. (Continued on page 5)



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Barnegat Bay Research

(continued from page 4)

Since 2004, Rutgers' Institute of Marine and Coastal Sciences, in collaboration with Rutgers' Center of Remote Sensing and Spatial Analysis and the U.S. Geological Survey, has been conducting comprehensive studies assessing the overall ecosystem condition of the BB-LEH Estuary. Specific objectives of this study are:

- To document the influence of human altered land use on past and present nutrient export from the BB-LEH Watershed to the BB-LEH Estuary using physical and chemical watershed data and land-use patterns and spatially explicit models.
- To develop more sensitive modeling of nutrient loading and to determine relative contributions of nutrient loadings from lawn-care practices, protected riparian buffers, and stormwater management systems.
- To determine estuarine biotic responses to the loading of nutrients across a gradient of upland watershed development and associated estuarine nitrogen loading, and identify key biotic responses across a variety of estuarine organisms by examining shifts in phytoplankton, benthic macroalgae, seagrass, epiphytes, and shellfish structure and function.
- To delineate the current biotic and seagrass habitat conditions of the BB-LEH Estuary at the end of the investigation using the most recent biotic data collected (2011) and biotic index methods developed from data collected through 2010.
- To develop a biotic index of estuarine condition using water quality and biotic indicators to assess eutrophication, impairment, and overall ecosystem health of the BB-LEH estuary and formulate threshold levels of biotic decline and numeric loading criteria that can support an effective nutrient management plan.



Above: Research Field Team

Results of this study demonstrate conclusively that the condition of eelgrass beds in the estuary has decreased since detailed surveys were initiated in 2004 in response to ongoing nitrogen enrichment of the system and associated declines in light availability. This study also shows that the eelgrass beds have not yet recovered from a marked reduction of plant biomass, shoot density, blade length, and areal cover recorded by earlier annual surveys conducted in the estuary from 2004-2006. In 2010, eelgrass biomass decreased to its lowest level ever recorded in the estuary. The decline in plant parameters has been evident in all of the eelgrass beds investigated, indicating that an estuary-wide stressor is responsible, most notably nitrogen enrichment and escalating eutrophication. (Continued on page 6)

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Nitrogen over-enrichment causes significant disruption of ecosystem structure and function, leading to reductions in ecosystem services. There is growing concern that escalating eutrophication will result in severe, long-term degradation of the BB-LEH Estuary that will be intractable. With population growth in the watershed expected to increase from the current number of ~575,000 year-round residents (>1.2 million people during the summer tourist season) to ~850,000 people projected (~50% increase in year-round residents), aquatic environmental pressures will continue to increase, particularly as impervious cover and other land surface alteration in the watershed escalate and partition habitats, promoting greater input of nutrients and other pollutants to the estuary.

This study has established indicators of ecosystem condition for BB-LEH. The establishment of appropriate indicators/indices of condition will aid the State of New Jersey in identifying where environmental impairments exist in the estuary and in targeting resources to address these impairments. The indicators include both physico-chemical (e.g., dissolved oxygen, chlorophyll *a*, water clarity, nutrient concentrations) and biotic (e.g., algal blooms, seagrass biomass and other metrics, epiphytic overgrowth, and benthic invertebrates) components. The development and application of biotic indicators of ecosystem condition have not been previously attempted for BB-LEH. A long-term goal is to extend this type of ecosystem assessment to all estuarine waters of New Jersey to protect biotic communities, recreational and commercial fisheries, benthic habitats, and water quality. It will provide a framework for effective assessment of ecosystem structure and function. Therefore, it will be valuable for management programs of government agencies tasked with protecting coastal resources.

By Michael J Kennish, Research Coordinator

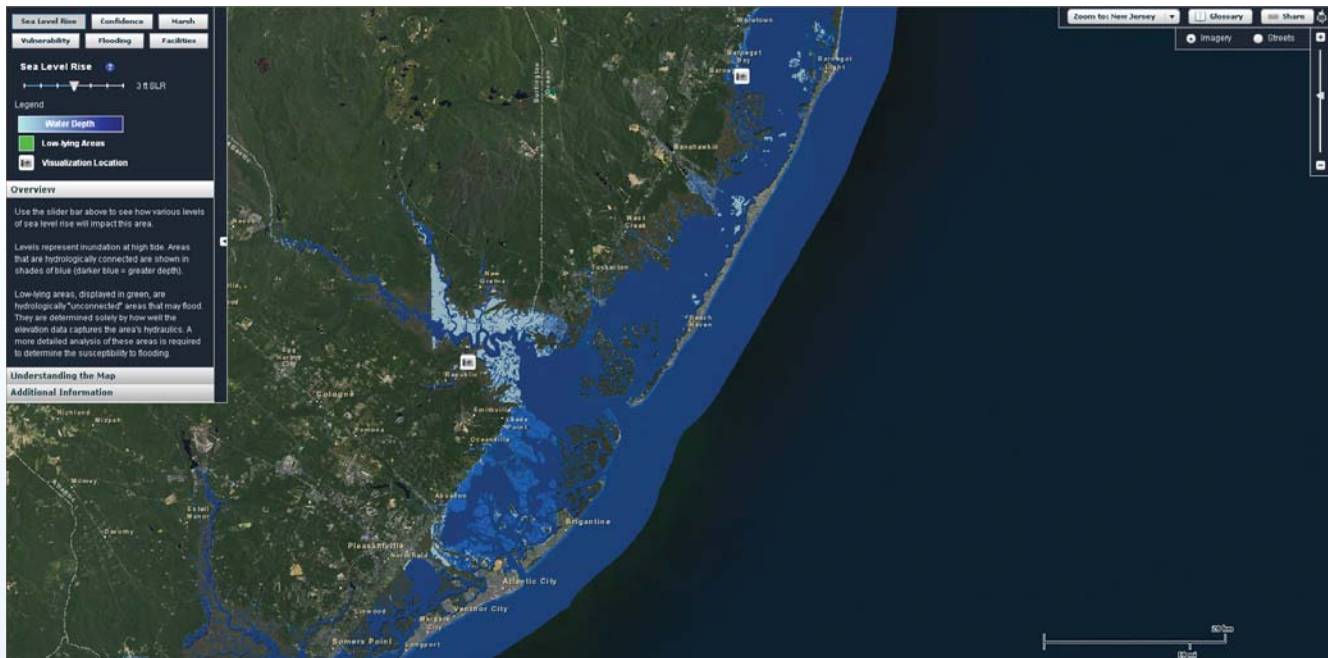
What's an Autonomous Underwater Vehicle (AUV) got to do with it?

This summer, the Jacques Cousteau Reserve is hosting its first professional development workshop to introduce new technologies such as AUVs to formal and informal educators. The workshop will take place the week of August 6th, 2012, in partnership with Stockton College at the Cousteau Coastal Center in Tuckerton, NJ. This multi-day workshop will introduce participants to a variety of new technologies being used to study our marine and coastal environments, including remotely operated vehicles, autonomous underwater vehicles, and Light Detection and Ranging (LIDAR) mapping. The workshop includes hands on training with these new technologies as well as lessons to help teachers bring these technologies back to the classroom. For more information contact Melanie Reding at reding@marine.rutgers.edu or 609-812-0649 ext. 206



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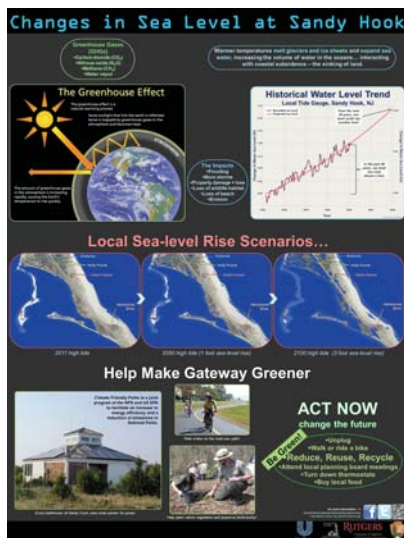
Coming Soon: NJ Coastal Sea Level Rise Viewer Website



Through a partnership with the JC NERR and Rutgers Center for Remote Sensing and Spatial Analysis, an online NJ-specific sea level rise viewer is being developed. The website is being modeled after a similar effort developed for the Gulf coast, by NOAA's Coastal Services Center. The new website, Google Maps-based, expected to be live this summer, will allow users to view sea level rise scenarios from 0 to 6 feet, while overlying GIS layers such as critical municipal facilities, evacuation routes and floodplain layers. Site-specific built infrastructure, and economic and social vulnerability indices will eventually be available for viewing through the site.

Funding for the development of the website was made possible by NOAA's Cooperative Institute for Coastal and Estuarine Environmental Technologies (CICEET).

Educational Sea-Level Rise Displays from Sandy Hook, NJ



The National Park Service, in partnership with Rutgers University and The Sandy Hook Foundation, has been awarded a grant from the Unilever Foundation to create a series of public displays conveying the science of climate change and sea-level rise in Gateway National Recreation Area. The displays will be placed in each of the three units of Gateway NRA: Sandy Hook, Staten Island, and Jamaica Bay. They incorporate general information as well as site specific current and future impacts of sea level. The 4 paneled displays address the science of climate change and sea level rise, highlight local impacts of sea level rise, and describe a variety of actions Gateway NRA and the public can take to mitigate the effects of climate change. A condensed version of the panels will soon be available for classroom and other educational facilities via the National Park website or from the NJ Sea Grant Consortium.

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Stormwater Management Planning Tool gets New Web Address

Recently, the Stormwater Management Planning Tool (SWMPT) website address was simplified to www.BarengatBayBasins.rutgers.edu. This online, interactive tool couples a watershed-wide, geospatial inventory of stormwater infrastructure such as catch-basins and detention ponds with hydrological models that local officials can use to assess the potential impact of existing and proposed stormwater basins on water resources. Officials also can use SWMPT as a guide to mitigate failing stormwater basins.

Other new features include a YouTube tutorial video found on the website's homepage that instructs new users on the overall use and functionalities of the website. The tool has also undergone additional changes and improvements based on feedback from users. Some of these enhancements include basin ownership information, a clear delineation between basin types,

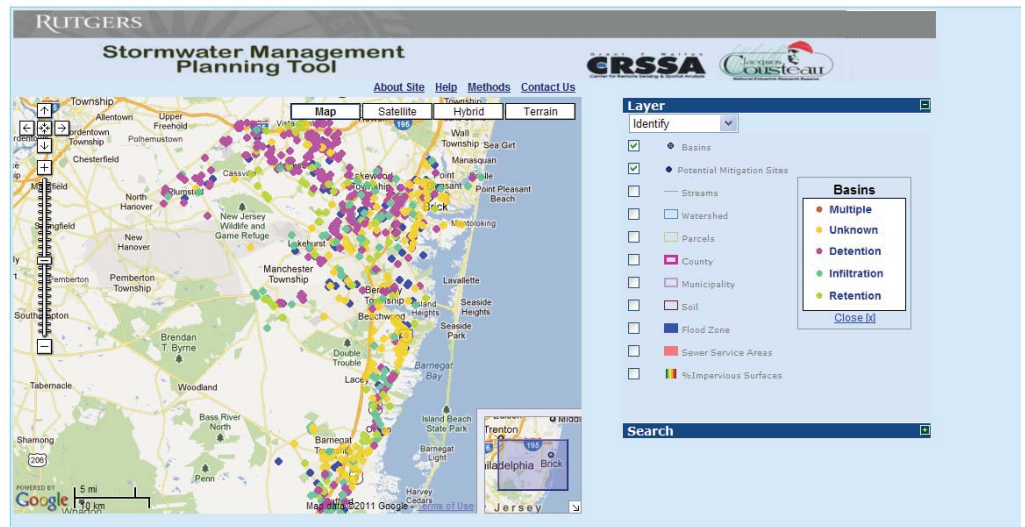
and new report generating capabilities.

The tool was developed by a team of scientists and educators from the JC NERR and the Center for Remote Sensing and Spatial Analysis with support from the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET). The project team developed and launched the SWMPT tool in Ocean County, New Jersey, with input from local partners and stakeholders. Local officials can use SWMPT to assess the potential impact of existing and proposed stormwater basins on local water resources. The concept

is transferable to other locations where stormwater basins and associated infrastructure are the first line of defense in controlling runoff.

By Lisa Auermuller, Watershed& CTP

JC NERR received \$29,988 from Sustainable Jersey to create an online version of the "Getting to Resilience" handbook. This online version will allow local communities to assess their coastal hazard vulnerabilities along with their local planning documents, and relate these to points that can be received through programs like the Community Rating System and the Sustainable Jersey program. The funding will also be used to create an inland version of the "Getting to Resilience" handbook so that inland communities can benefit from the planning information as well.



Coastal Training Programs will be offering workshops and courses on the following topics in 2012:

Bay Friendly Landscaping and Turf Management • Stormwater Basin Retrofitting • Adaptation Planning for Coastal Communities • Flooding Risk and Hazard Planning

More information can be found online at: www.jcnerr.org/education/coastaltraining

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Thanking Our Volunteers at JC NERR

We say it often here at JC NERR, 'We could not do all that we do without volunteers', but we cannot emphasize enough how much the time and effort of volunteers benefits the Reserve and the work that we do. Our volunteer base is continually growing and in 2011, 1910.75 hours were contributed to the Reserve. The hard work and commitment of volunteers are vital in supporting our mission to improve management of New Jersey coastal environments through science, education, and stewardship.

Last winter and early spring of 2011 were busy at the Rutgers University Marine Field Station (RUMFS) where volunteers assisted with weekly larval fish sampling. This sampling is colloquially known as 'bridgenetting' as it takes place in our Reserve right on one of the bridges on Great Bay Boulevard. From May 2010 to April 2011, bridgenetting got a monthly boost and transformed into 'Super bridgenetting', which included more sampling sites for a graduate student's research. 'Super bridgenetting' required a full crew for multiple bridges, with about 4 – 8 volunteers coming out for each sampling event. JC NERR volunteers were a huge help with this sampling and always faced the long hours of field work with a smile and positive attitude. As spring came to an end volunteer activities were off full steam ahead with black sea bass fishing for a new research project on black sea bass sex change and reproduction. Volunteers contributed long hours, angling skills and a love of fishing to help catch and tag over 1000 black sea bass!

The summer months brought numerous environmental festivals and educational programs in which volunteers helped us to educate children and the public about the Reserve and our research. These events included the Barnegat Bay Festival, Cape May Harborfest and Coast Day and the Cattus Island Nature Festival. Volunteers also contributed their time to help with summer educational

programs, particularly 'Creature Features', which teaches children through hands-on lessons about a new 'creature' each session. As the summer came to a close volunteers provided assistance with RUMFS long-term otter trawling. This is long-term research project that volunteers look forward to every year that assesses the abundance and diversity of fish and crab species in Great Bay and the Mullica River.

We kicked off fall with the RUMFS annual Open House where volunteers acted as lab tour guides, ran the fish printing, sales and informational tables and helped us make the day a success by making sure everything ran smoothly! As

2011 came to a close, RUMFS began conducting extra larval fish sampling as part of research on Barnegat Bay in accordance with Governor Christie's '10 Point Action Plan. In addition to their regular sampling on Great Bay Boulevard, volunteers have also accompanied technicians to Oyster Creek, Point Pleasant and Toms River to assist with fish sampling. We hope to continue this volunteer involvement with the Barnegat Bay project this year.



As always, throughout the year we had continuous help from volunteers providing administrative, computer, database, library, office and program support. And our dedicated volunteer educators support the 'Life on the Edge' interpretative exhibit by interacting with and informing the public about the JC NERR and the value of estuaries. All of us at JC NERR wish to extend our sincerest gratitude and appreciation for all of the work that our volunteers do. Thank you for your dedication and service to the Jacques Cousteau Reserve! *By Kim Capone, Volunteer Coordinator*



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Education Programs and Series

Lunch and Learn Series

Fish Tracking by Underwater Robot - February 8, 2012

Frogs & Toads of the Mullica River Basin - March 14, 2012

Sea Nettles in the Bay - April 11, 2012

Eel Migration in NJ Waterways - May 9, 2012

Shore Bowl

Shore Bowl, a regional competition of the National Ocean Science Bowl (NOSB), on March 3, 2012 at Rutgers University, Busch Campus.

Ecological Evenings

“New Jersey Vultures” - March 7, 2012 7:00-8:00pm

Explore the world of New Jersey’s vultures! Presentation will include information on their biology, damage that they can create and how that damage is mitigated.

Speaker: Kimberley Gurlavich, Wildlife Biologist, USDA

Family Fun

Build a Better Backyard by Building a Bird House - March 24, 2012 10:00 am- Noon

Come discover how you can make a difference in your own backyard. Learn ways to help protect our feathered friends. Then we’ll make a treat for the birds and build a bird house you can take home. Don’t forget your hammer!

Space is limited!

Registration is required for all programs by calling Melanie at 609-812-0649 ext 206 or visit us online at www.jcnerr.org

For the most up-to-date information about JC NERR follow us on Twitter and Facebook!



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JC NERR Partners

Estuarine Reserve Division, National Oceanic and Atmospheric Administration, NOAA • NOAA Coastal Services Center • Institute of Marine and Coastal Sciences, Rutgers, The State University of New Jersey • New Jersey Department of Environmental Protection • New Jersey Pinelands Commission • Edwin B. Forsythe National

Wildlife Refuge • Richard Stockton College of New Jersey • Tuckerton Seaport • The NERRS Science Collaborative • Barnegat Bay Partnership

The JC NERR promotes informed use and management of the Barnegat Bay and Mullica River—Great Bay Estuaries through scientific research, education, and stewardship.



JACQUES COUSTEAU COASTAL CENTER

*130 Great Bay Blvd
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