

QUARTERLY NEWSLETTER OF THE JACQUES COUSTEAU NATIONAL ESTUARINE RESEARCH RESERVE

LIFE ON THE *edge*

CREATING AN ENVIRONMENTALLY LITERATE SOCIETY THROUGH TEACHER EDUCATION

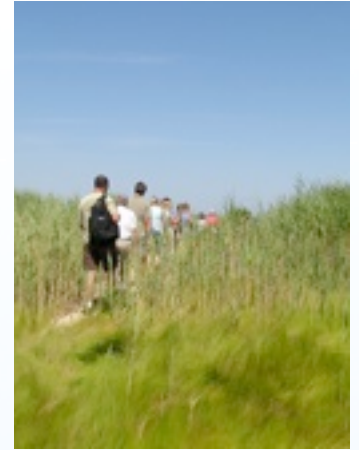
Teach kids how to think, how to evaluate and judge, how to process information and come to rules and conclusions about the world. Get that right and they will be armed with a powerful set of tools that will literally last them a lifetime, and frankly it's hard to see how that cannot be good. ~David Hone, The Importance of Science Education for Children

The 21st century has brought to light a number of serious local and global issues that communities will be forced to deal with over the next decade--resource depletion, a changing climate, toxins and chemical pollutants to name a few. Recognizing the challenging social, economic and political questions that lie ahead, how do we create an environmentally and scientifically literate citizenry capable of making informed decisions that lead to a sustainable relationship with the natural world? How do we provide today's students with an understanding of environmental and scientific principles to allow them to be active and informed participants in their communities? How do we teach the critical thinking skills needed to assess news stories, and contribute to local and global conversations? At the Jacques Cousteau Reserve, we believe a good portion of the answer lies in our Professional Development Program for teachers.

Multiple studies have shown that students spend too little time focusing on science, and that teachers often do not possess the content knowledge, tools or materials needed to present science in innovative ways to capture student interest. The Professional Development Program at the Cousteau Reserve strives to fill this gap by providing teachers with science-based workshops designed to increase their content knowledge on such topics as estuaries and coastal watersheds, ocean exploration, and climate and science literacy while providing teachers with inquiry-based activities and high quality resource materials. Hands-on field enrichment opportunities immerse teachers in scientific research at the Reserve and the use of science data and new technologies with practical applications for the classroom.

Our children's future will be filled with incredible, advanced technologies—the likes of which we can only dream of today.... Science literacy, therefore, will no longer be an advantage, but an absolute necessity for success. ~Arnold Beckman

Throughout the school year and into the summer, the Cousteau Reserve develops and hosts a variety of workshops geared toward the specific needs of New Jersey teachers. The most recent offering was a one-day, *Learning Ocean Science through Ocean Exploration Curriculum*



JC NERR offers a variety of habitat workshop and other professional development opportunities, providing educators the opportunity to build on science literacy principles and uncover the mysteries of the varied habitats within the Reserve and beyond.

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Teacher Education

(continued from page 1) through NOAA's Office of Ocean Exploration and Research which brought together 30 teachers from the tri-state area to perform inquiry and standards-based activities tied directly to actual ocean expeditions. These activities will allow students to travel from their classrooms to the Galapagos Rift and Arctic Ocean, to Alaskan seamounts and the Hawaiian Islands while exploring manned submersibles and remotely operated vehicles. They will discover the world they live in, how the ocean impacts them and how they in turn impact the ocean.

During the summer months, a variety of habitat workshops that build on science literacy principles will be offered to uncover the mysteries of the diverse habitats within the Reserve. By promoting awareness of these habitats as well as their value, not only to the local flora and fauna, but also to themselves, teachers learn how their own choices, and those of their students, directly affect the environment. This knowledge then gets carried back into the classroom and is passed on to their students, our future decision makers.

For human societies to achieve a productive, healthful, and sustainable relationship with the natural world, the public and private sectors must make environmental considerations as integral part of decision making. (National Academy of Sciences, 1997)

Research continues to demonstrate the importance of a healthy environment and science will play an increasingly vital role in our environmental decision-making. This makes the need for a scientifically literate public more important than ever before. To this end, the Jacques Cousteau Reserve will continue to develop an environmentally literate citizenry by providing teachers with the awareness, content knowledge and skills needed to actively promote the protection of coastal and estuarine resources with their students today and into the future.

By Melanie Reding, Education Coordinator



If you would like to learn more about JC NERR Professional Development opportunities or join the JC NERR Professional Development email list, please contact Melanie Reding at reding@marine.rutgers.edu or 609-812-0649 ext. 206

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New Stormwater Management Planning Tool Available Online

The Barnegat Bay watershed has been in the spotlight since the beginning of 2011. In January, the Governor announced a ten-point plan for the Barnegat Bay. Much of the plan focuses on the impacts of non-point source pollution on bay water and habitat quality. Efforts by the JC NERR and its partners have helped to highlight the issues facing Barnegat Bay and its estuarine inhabitants.

One of the plan elements is to make \$10 million available to Barnegat Bay municipalities and County agencies to restore faulty stormwater basins. This funding initiative will benefit from an innovative planning tool developed by a team of scientists and educators at the JC NERR and Rutgers University. The Storm Water Management Planning Tool (SWMPPT) couples a watershed scale, 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 SWMPPT as a guide to retrofit failing stormwater basins. Such basins can be considered health hazards as they often contain standing pools of water



and thus become mosquito breeding habitat.

The tool was developed with support from the Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET). The project team developed and piloted the SWMPPT tool in Ocean County, New Jersey with input from local partners and stakeholders. The concept is transferable to other locations where stormwater basins and associated infrastructure are the first line of defense in controlling non-point runoff. The SWMPPT interactive mapping tool can be

accessed at <http://www.crssa.rutgers.edu/projects/coastal/stormwater/>

The Storm Water Management Planning Tool (SWMPPT) couples a watershed-wide, geospatial inventory of stormwater infrastructure such as catch-basins and detention ponds with hydrological models. Local officials can use SWMPPT to assess the potential impact of existing and proposed stormwater basins on local water resources.

By Lisa Auermuller, Watershed & CTP Coordinator



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A Winter of Volunteering at JC NERR

Volunteer activities during the fall and winter seasons primarily focused on free public programs at the JC NERR, including the Lunch n' Learn and Ecological Evening series. These programs featured guest speakers such as Olaf Jensen (Rutgers faculty), Dale Parsons and Fred Kalm (local clammers), and Ben Wurst (Conserve Wildlife Habitat Program Manager), to name a few. Topics discussed ranged from a global perspective of fisheries to clamming in Barnegat Bay to diamond back terrapins on Great Bay Boulevard – and there are still more programs planned including Great Bay seal research and how REMUS, an underwater vehicle utilized by Rutgers University works to track fish!

Reserve and University volunteers also assisted with the annual Shore Bowl, a high school ocean science competition. With an end to a snowy and rainy February, Reserve volunteers are looking forward to assisting with the upcoming spring and summer programs, which will include the Creature Features program as well as participation in a number of festivals, the first to come being the Annual Earth Day celebration sponsored by Atlantic County Utilities Authority, Ocean Fun Days at Island Beach State Park, and the Barnegat Bay Festival.

We are proud to say that over the course of 2010 a total of 1933.5 hours were contributed by volunteers, which included the help of 28 new volunteers that joined the Reserve, bringing the total number of volunteer members up to 140! In 2011, 5 new applicants have already contacted the Reserve and we are looking forward to further growth over the course of 2011 as new members of our community take interest in helping their hometowns and the surrounding coastal counties.



Congratulations to 2011 Shore Bowl winners from the Marine Academy of Science and Technology (MAST).

Forty five students representing 9 schools participated in the annual Shore Bowl competition hosted by JC NERR. Second place went to the Marine Academy of Technology and Environmental Science (MATES) and third place went to West Windsor-Plainsboro South. Congratulations to these talented student teams.

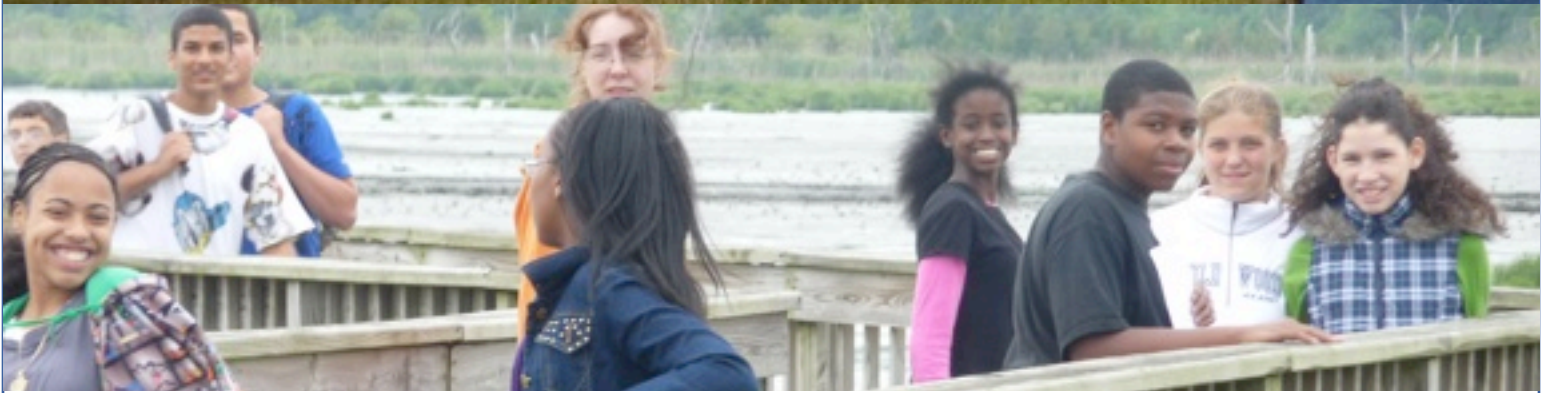


JC NERR Hosts Annual Shore Bowl

The JC NERR hosted the annual Shore Bowl at the Rutgers University Douglas Campus Center on February 5, 2011. Shore Bowl is the New Jersey and Eastern Pennsylvania regional competition of the The National Ocean Sciences Bowl® (NOSB). The NOSB is a nationally recognized and highly acclaimed high school academic competition that provides a forum for talented students to test their knowledge of the marine sciences including biology, chemistry, physics, and geology.

After a long day of round robin and double elimination tournaments the Marine Academy of Science and Technology (MAST) came in first place and will represent the region at the national competition scheduled for April in Galveston, Texas. Second place went to the Marine Academy of Technology and Environmental Science (MATES) and third place went to West Windsor-Plainsboro South High School. Congratulations to these talented student teams.

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Redefining Space, Planning for a New Life on the Edge Exhibit

The “From the Interpreter” column is following the renovation of the Life on the Edge Exhibit. In the fall newsletter it described how an exhibit and visitor evaluation was conducted in partnership with staff of the Franklin Institute. The final outcome was a concept document that provides a framework for re-interpreting the place-based habitat exhibit. Our JC NERR exhibit team is committed to creating an inspiring and memorable experience to better interpret the ecological, recreational, economic and cultural attributes of the Reserve and to enhance public stewardship of its value and beauty. The exhibition goals, intended outcomes and interpretive approaches were defined and scoped, and the potential visitor experience has been illustrated with bubble plans. The “big idea” for the renewed exhibition is “This Estuary is a special place, constantly changing in response to humans and natural events - let’s protect and preserve it together!”

The NERR system is committed to community education of local estuarine hazards and vulnerabilities in informal settings such as at interpretive visitor centers. The renovated exhibition will include vignettes from people whose lives are intertwined with both the benefits/threats of the Mullica River/Great Bay/

Barnegat Bay Estuary systems. An emphasis will be placed on shared community values when addressing the natural processes vs. human impacts. The interpretive modalities addressing impacts of local climate change, sea level rise, habitat loss, invasive species, bio-diversity/ecological balance will be presented. The exhibit design aims to take visitors from attaining new knowledge to a feeling of taking responsibility by informing them what they can do about an issue.

As part of the initial steps in the Life on the Edge re-design, the primary visitor group or groups have been identified - their ages, demographics, prior knowledge level and so on. John Falk, in his latest book on visitor studies *Identity and the Museum Visitor Experience*, states, “There is no such thing as the “public” – there are only collections of visitors and they visit museums to fulfill their own needs – these may not have anything to do with the institution’s own mission. Therefore there is a need to start from the sovereign visitors’ perspective, not ours. By understanding museum visitors’ motivations we can customize experiences to provide them with what they want. It is not just about creating different exhibits and programs – it’s about creating different visitor experiences.”

If we better understand visitor needs and make the interpretive goals fit in with common community values, the Life on the Edge exhibit can be a catalyst for

J. Falk and J. Covell [Monterey Bay Aquarium] have created a universal profile of visitor motivations at interpretive visitor centers and museums everywhere—whether individuals, families or groups.

- *Explorer- motivated by personal curiosity*
- *Facilitator - also known as the sweater holder - motivated by other people, especially allowing the children be the primary focus*
- *Experience seeker - motivated by desire to see and experience place [tourist]*
- *Recharger/Spiritual pilgrim – motivated by contemplative or restorative experience*
- *Professional/Hobbyist- motivated by specific knowledge or related interest*

change by delivering a message that encourages people to think differently about their relationship with their local coastal community. One way to view visitors is through an ecosystem approach. View the community of visitors as interconnected, similar to an ecosystem of habitats; in the same way that the JC NERR views the Life on the Edge Exhibition as the gateway to the Reserve by being the “front porch” view of what is special about this place - the Pine Barrens, Marshes and Bays, Barrier Islands and Ocean. Four habitats connected by a common shared water system.

Next steps are to solicit RFP’s from exhibit design studios, multimedia experts and fabrication facilities.

By Ida Louise Scott, Interpreter

From the Interpreter

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Education Programs and Series

Lunch and Learn Series

April 13, 2011—The Great Bay Seal Study

If you have ever wondered what you can learn from seal scat, here's your chance! Stockton College has been studying seals that winter in Southern New Jersey waters since 1994. The study documents such things as seal abundance, species, basic behavior, as well as their diet. Come discover what their research is finding and learn about one of Great Bay's best kept winter secrets.

May 11, 2011—The Art of Scrimshaw

Join Dick Updike, local expert on Ocean County maritime artifacts, for an exciting program on the maritime art of scrimshaw! View items and hear stories about his rich collection of scrimshaw, and US Lifesaving Service artifacts.

Ecological Evenings

April 21, 2011—What is the System-Wide Monitoring Program (SWMP) and What it Can Do for You!

Join us for this overview of the SWMP program at the Jacques Cousteau Reserve. Discover how and what data is collected, how it is used, and how this data can benefit and be accessed by YOU! Speaker: Gregg Sakowicz.

Professional Development

August 9-10, 2011—Shallow Bays Workshop

Join us for this two-day workshop focusing on New Jersey's Bays with special emphasis on Great Bay and Barnegat Bay. This two day workshop will combine classroom and field experiences that will increase your confidence with habitat-based science content. Participants will enjoy inquiry-based activities and practice a variety of teaching strategies. Participants will also receive high quality resource materials to facilitate their science teaching. To register visit www.jcnerr.org or call Melanie at 609-812-0649 ext. 206



Launching the autonomous underwater vehicle REMUS.

Eye on Research: Fish Tracking with an Autonomous Underwater Vehicle

Rutgers scientist have been employing an autonomous underwater vehicle (AUV) (REMUS, Remote Environmental Measuring Units, Hydroid LLC) to acoustically map fish and their critical habitats. Recent studies used the method to survey Atlantic sturgeon in the Delaware River. The vehicle supports a sidescan sonar system and a suite of other sensors that enable the detection of multiple fish in their habitat, while simultaneously mapping the bathymetry, benthic habitat features, hydrography (salinity, temperature with respect to depth), flow, and dissolved oxygen of the habitat where sturgeon were detected. The methodology allows for a rapid survey of wide areas and offers a resolution sufficient to visualize individual sturgeon. Hundreds of sturgeon-like targets were detected during ten hours of AUV sidescan missions in the Delaware River. Sturgeon presence in the area was confirmed by acoustic tracking and gill net sampling. The investigation demonstrated the value of REMUS as a tool to advance research efforts on this rare and threatened species.

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Managers message



A Message from the JC NERR Manger ~March 2011

Two distinct estuarine systems comprise the JC NERR—the Mullica-Great Bay (MRGB) estuary and the Barnegat Bay-Little Egg Harbor estuary (BB-LEH). Although similar in function, they differ greatly in structure. The MRGB watershed is largely undeveloped and is generally considered a “pristine” estuarine system. The BB-LEH watershed is characterized by increasing urbanization and consequent impacts such as loss of habitat and declining water quality. Over the past several years, the JC NERR and its partners have devoted considerable time and effort to develop a blueprint for research, monitoring and restoration of the BB-LEH estuary. One promising result of this effort is the Governor’s 10-point plan to restore the ecological health of this valuable ecosystem. For this effort to be successful, keystone investments must be made to develop a comprehensive monitoring network and a general circulation model to understand the sources and sinks of nutrients and contaminants. These research capabilities are essential for coastal managers to develop suitable science-based tools and strategies to enhance resilience and sustain economic activity of the BB-LEH estuary. Contact the reserve for more information on stewardship efforts to restore the estuary.

Another item of note is that the JC NERR soon will have a “Friends” group similar to what exists at many of the other 27 reserves in the national system. These groups typically raise awareness of reserve programs, sponsor fund raising events, and solicit support from public and private organizations on behalf of reserve priorities.

Friends of the JC NERR expect to be organized as a nonprofit organization by the end of 2011, and will have a statewide mandate thus enabling it to support partnership programs located at Sandy Hook and Bridgeton in addition to the core program based at Tuckerton. Please do contact me if you have interest and want additional details.

Mike De Luca



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JC NERR Partners

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

Wildlife • Richard Stockton College of New Jersey • Tuckerton Seaport • The Cooperative Institute of Coastal and Estuarine Environmental Technology

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



JACQUES COUSTEAU COASTAL CENTER

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