



Narragansett Bay Research Reserve



2011 Summer Newsletter

NBNERR NEWS

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Volume 13.

Creeping, Crawling Critters in the Bay

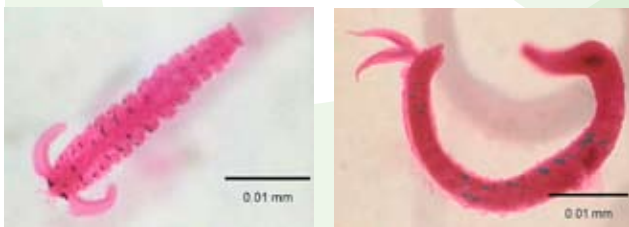
by Daisy Durant, Ph.D., Marine Research Specialist II



Above: A bottom-dwelling segmented polychaete worm

You are no doubt familiar with the bay scallop (*Argopecten irradians*), American oyster (*Crassostrea virginica*), quahog (*Mercenaria mercenaria*), soft-shelled clam (*Mya arenaria*), and blue mussel (*Mytilus edulis*). But did you know there are loads of other bottom-dwelling (also called benthic) organisms in Narragansett Bay?

Shrimp-like amphipods, predatory worms and sluggish nematodes might not be as familiar to you because they live buried in the muck (also known as sediment) at the bottom of the Bay. Scientists describe these creatures as benthic infauna. Many of these animals are so small that we need a microscope to see them. This wealth of benthic life plays an important role in the ecology of the Bay.



Above: Segmented polychaete worms

Perhaps most importantly, benthic infauna is an essential part of the food chain sustaining larger shrimp, crabs and fish. These critters also clean up our waters by filtering and removing particles. In addition, benthic infauna recycle nutrients and pump oxygen into the Bay bottom as they burrow; somewhat like earthworms back up on terra firma.

Generally, mud-bound benthic animals are not free-moving and cannot swim away to avoid polluted conditions or low oxygen levels in the water or bottom sediments of the Bay. They are also year-round Bay residents, diverse, abundant, and largely left alone by people. These factors make the critters an excellent indicator of the health of the Bay. If certain infauna species are thriving while others are dying from environmental changes, then the whole benthic



Above: One of many microscopic amphipod crustaceans living in the bottom of the Bay

community will change as a result. Scientists can monitor and study these changes to get a handle on the Bay's condition and ultimately find out how to better manage the Bay. Examining the benthic infauna is like taking the pulse of the Bay.

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Scientists Travel to Study on Prudence Island

by Kenny Raposa Ph.D., Research Coordinator

One important function of the Narragansett Bay Research Reserve is to support the work of visiting scientists. Over the years, the Reserve has attracted researchers nationwide and as far away as Denmark and Argentina. Scientists conduct their research in the Reserve to take advantage of its protected habitats and its laboratory facilities. In 2011, the Narragansett Bay Reserve is supporting at least seven different visiting researchers from all over the country.

Researchers and their projects include:

Mark Bertness, Ph.D. **Brown University**

Dr. Bertness and his team have been conducting research on the ecology of cobble beaches and salt marshes on Prudence Island for over a decade. Currently, Dr. Bertness is examining the interactive effects of global climate change and sea level rise on salt marsh habitats and plants.

Joanna Carey **Boston University**

Ms. Carey is a Ph.D. student and recipient of the NERRS 2010 Graduate Research Fellowship, which will fund her research for three years. Joanna's research focuses on examining the cycling of silica (an essential nutrient for phytoplankton and salt marsh plants) in Narragansett Bay and Research Reserve salt marshes.

Sarah Corman **Brown University**

Ms. Corman is a first-year Ph.D. student who received Graduate Research Fellowship funding for three years based at the Waquoit Bay Reserve in Massachusetts. Sarah is using multiple Reserves, including the Narragansett Bay Reserve on Prudence Island, to examine the effects of increasing temperatures due to climate change on salt marsh productivity and marsh grass grazers.



Steve D'Hondt, Ph.D. **University of Rhode Island**

Dr. D'Hondt is a leading global climate researcher who is currently modeling trends in ocean acidification as it relates to global climate change. He is using data from many Research Reserves around the country, but the bulk of his work is being conducted in the Narragansett Bay Reserve on Prudence Island.

Courtney Schmidt **University of Rhode Island**

Ms. Schmidt is a Ph.D. student and recipient of the NERRS 2009 Graduate Research Fellowship, which is funding her research for three years. Courtney's studies explore the potential impacts of advanced wastewater treatment in Narragansett Bay on phytoplankton and secondary production.

Pallaoor V. Sundareshwar, Ph.D. **S. Dakota School of Mines & Technology**

Dr. Sundareshwar is conducting a three-year research project at the Narragansett Bay Research Reserve with funding from the National Science Foundation. His project examines how salt and freshwater marshes respond to changing levels of nutrients from human sources.

Cheryl Writenaur **State University of New York**

Ms. Writenaur is a Ph.D. student at the SUNY College of Environmental Science and Forestry. She researches nutrients and microscopic algae mats that are essential for restoring salt marshes. Her Ph.D. research will take place in part at the Reserve on Prudence Island, and is primarily funded through a Graduate Research Fellowship from the Wells Research Reserve in Maine.

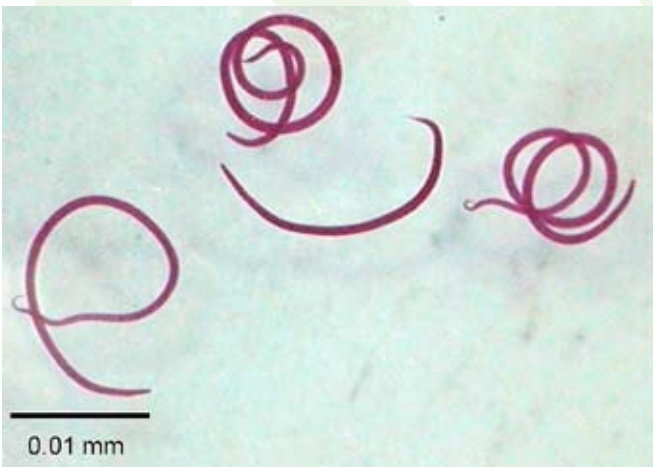
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Creeping, Crawling Critters in the Bay



Above: Shrimp-like amphipods (*Ampelisca* spp.)

In 2010, the Narragansett Bay National Estuarine Research Reserve started a long-term study of benthic infauna around Prudence Island. The goal of this program is to understand which species make up the benthic infauna communities in the sediments around the Island, and learn about how they are changing over time. The study sites are located at the same places where the Reserve is monitoring water quality as part of our national System Wide Monitoring Program (SWMP). This study is the first step in a process to study changes in benthic species of the Reserve over time.



Above: Worm-like nematodes

So how do Reserve scientists find, identify and record these bottom-dwelling life forms? Sampling takes place four times each year – once per season. Staff members go out on the Bay in a small boat with a device that grabs a sample of the bay bottom and containers for each sample. Each sediment sample is fixed with formalin (a preservative) and the whole thing is stained with a pink dye known as Rose Bengal. This turns the benthic infauna bright pink and makes them much easier to find under a microscope. In the winter samples of 2010, researchers found various species of polychaete worms, nematodes, and amphipods. Reserve scientists take digital photographs of the different organisms to build a photo library that will be a useful tool for educators and researchers.



Above: A segmented polychaete worm (*Nereis* spp.)

Over time, the Reserve will be able to determine where various benthic infauna species live and how many of them are present in each community, and track any changes in these communities. Reserve scientists will also be able to compare these community dynamics with long-term changes in the surrounding Bay environment caused by man-made impacts like climate change, pollution, and nutrients entering the Bay. 🌿

Reserve News

Facilities Upgrades at the Reserve

by Bob Stankelis, Reserve Manager

Funding from the National Oceanic and Atmospheric Administration (NOAA) has helped several planned upgrades to education facilities at the Reserve take shape. During the past year the Reserve has worked with architects and state officials to redesign and renovate the Estuary Ed Shed located at the T-Wharf. Included in this renovation will be new interior and exterior materials, new doors and windows and a modest expansion of the interior space. The roofline will be extended landward to create a covered deck area that will serve as a focal point for T-Wharf education programs and activities. The building will be ADA compliant and will allow full access for visitors with physical challenges. Seawater aquaria, touch tanks and new exhibits will also be added once the building is completed.

In addition to the Estuary Ed Shed renovations, we are currently working with architects to design a classroom and activity building to be located next to the Reserve's Lab & Learning Center. The Reserve will save money on construction by using an existing cement pad for the structure that will include a covered deck area for outdoor gatherings. While very simple, this new classroom and pavilion will provide the Reserve with much needed space for school groups and meetings. Outdoor kiosks and landscaping will highlight stormwater management and sustainable design. Walking paths demonstrating various types of permeable pavement and native plants will connect the new building to the existing Lab & Learning Center. In keeping with the Reserve's goal to reduce our carbon footprint, we hope to include solar panels or a small wind turbine on the building to supplement our electrical usage. The Reserve is very excited about these projects and will regularly update our progress through our eAlerts. For updates, join our electronic mailing list available on: www.nbnerr.org



Three National Estuarine Research Reserves in New England will offer Teachers on the Estuary (TOTE) workshops in 2011, thanks to a grant from NOAA's Bay Watershed Education Training program. The workshops will improve educators' and students' understanding of estuary environments using local research examples. The trainings will provide resources and experience to support the incorporation of water quality data and watershed topics into curricula.

In Rhode Island, Teachers on the Estuary will visit salt marsh habitats, the Roger Williams University aquaculture lab, learn about water quality data and will spend a day on Prudence Island.

Learn more about the Rhode Island workshop and about other workshops at the Research Reserves in Maine and Massachusetts by visiting:

www.nbnerr.org/tote.htm



Above and Below: Teachers exploring Narragansett Bay on-site and on-line



A Call for Volunteers

By Robin Weber, Natural Resources Specialist/GIS

Every year the Reserve utilizes volunteers to help with programs including the Woodcutting Stewards program, Alternative Spring Break, the Bay Block Party, the Sustainable Fishing Contest, and two annual Beach Clean-Ups. Right now the Reserve also needs volunteers to serve in the following capacities:

Tree Steward – The native tree and shrub seedlings that were recently planted in the North End forest restoration site require some dedicated care. Can you cut, remove and apply herbicide to invasive shrubs and vines to give our young seedlings a chance to grow? The trees could use your help.

Invasive Plant Removal – The Reserve has set a goal to rid the island of autumn olive plants as part of a “Prudence Island Cooperative Weed Management Area” project. Volunteer labor is critically needed at the island’s South End to continue the removal of these plants. You are invited to “Adopt-a-Spot” for autumn olive removal.

Butterfly Gardener – A modest garden area near the NBNERR Lab and Learning Center serves as certified wildlife habitat, an education resource, and a point of interest for visitors. Are there any keen gardeners out there who can help maintain and improve this garden? Tasks include buying and planting new native plants, weeding and deadheading.

Additional detail and an expanded list of volunteer opportunities are available on the Reserve’s website (see the “Get Involved!” page). If you are interested in volunteering you may visit the Reserve and complete a volunteer application form or contact Robin Weber directly by phone at 401-683-7369 or by email at robin@nbnerr.org.

Thank you to everyone who volunteered and supported NBNERR programs in the past year! Your contributions are very much appreciated.

Our Wish List

The Reserve needs basic supplies to continue to fulfill our mission. Please consider donating any of the following items. Your donation may be tax deductible through the Audubon Society of Rhode Island.

Please contact Nan Jurnak at nan@nbnerr.org or 401-683-4476

- Blade weed whacker (gas powered)
- Step ladder
- Mulch and/or topsoil
- 5-gallon buckets (with or without lid)
- Bicycles in good repair
- Power tools (skill saw, jig saw, sawzall, drill (cord or cordless), miter box, table saw)
- Wheelbarrow
- T Fence post driver (manual)
- Working fishing poles and gear
- Hand tools

What's Burning Down at the South End?

by Kit Van Wagner, Education Coordinator and Robin Weber, Natural Resources/GIS

On April 30 and May 1 of this year, the Narragansett Bay Research Reserve held controlled burns on the south end of Prudence Island. Also known as prescribed fires, these burns restore and preserve fire-adapted natural communities and safely reduce fuel loads in the forest. Fires are natural processes and yet a policy of fire suppression in natural areas was implemented across the United States for much of the 20th century. Historically, fires swept over the landscape and were only stopped by rain or snow, natural breaks, and less fire-prone ecosystems like wetlands. This led to a wonderful patchwork of habitat types with a high biological diversity of plants and animals. Within our pine barrens on Prudence Island, the frequency, location, and timing of prescribed fires can be staggered to imitate natural fire events on a more modest scale in order to maintain a similar biodiverse mosaic.



Above: Wildland firefighters at work on the South End

Certain plant species depend on fire for their survival. For example, pinecones of the pitch pine (*Pinus rigida*) will not release seeds unless the heat of a fire opens them. Fire also tends to open up the understory and overstory, which encourages the growth of important food sources, like highbush blueberries (*Vaccinium corymbosum*). Many animals have

evolved within these fire-dependent habitats and thus indirectly rely on fire for their survival. On Prudence Island, these include songbirds such as the pine and chestnut-sided warblers (*Dendroica spp.*), and several rare moths and beetles.



Above: Rapid regrowth after the prescribed fire

When the Narragansett Bay Research Reserve and its partners plan for a prescribed fire, the safety of the fire crews and neighboring homes is of primary importance. During the planning process, many factors have to be considered; these include crew experience, available equipment, soil and fuel moisture, and current weather information. The Reserve was fortunate to be able to hire the services of a burn boss and senior crew through Northeast Forest and Fire Management LLC to plan for and coordinate these burns and to provide wildland firefighter training to volunteers of the Prudence Island Volunteer Fire Department (PIVFD). The Reserve particularly wishes to thank the PIVFD for their equipment support and volunteer assistance.

Until the next burn, Reserve staff members will monitor the vegetation and bird communities to assess the changes that have occurred after the fire, and to evaluate if the management goals of these fires were met. We appreciate your support of our efforts to preserve this unique pine barren habitat.



To receive periodic project updates, consider becoming a “fan” of [NBNERR Stewardship](#) on Facebook.

Can “Low Impact Development” Protect the Bay?

by Jennifer West,
Coastal Training Program Coordinator

Did you know that water flowing across the landscape during and after a storm (also known as stormwater runoff) is the primary way pollutants enter Narragansett Bay?

When rain or snow falls on a forest, field, or other unpaved area, it seeps into the ground topping off groundwater supplies and allowing any pollutants to filter out as the water passes through layers of soil. On the other hand, when rain or snow hits solid surfaces – like roofs, sidewalks, parking lots, and driveways – water runs off the surface, collecting pollutants, bacteria, and solid waste as it drains into streams, rivers, ponds and eventually Narragansett Bay. Stormwater runoff also causes widespread flooding and degrades the clarity and purity of the water in streams. When the dirty streams reach the Bay they often cause beach and shellfish harvesting closures.

The negative impacts of stormwater runoff can be traced directly to growth and development in our communities. The more surfaces we pave over, the more polluted runoff drains into the Bay instead of seeping into the ground. While it is clear that past development in the Bay’s drainage basin has degraded the Bay’s health, future development patterns don’t have to follow suit. The process of low impact development (LID) allows new growth to happen while preserving our natural resources and quality of life.

LID uses site planning and design techniques that allow water to filter into the ground instead of into a storm drain and eventually the Bay. Throughout a LID development, stormwater is managed by small, cost-effective treatment practices rather than being funneled into large, costly storm ponds. In addition to keeping polluted runoff out of the Bay, LID techniques can save money by reducing the cost of traditional infrastructure, preserving community character, and reducing flooding. All of this also increases property values. This new approach to development follows three broad steps:

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Avoid the Impacts: An important first step in dealing with stormwater is to preserve, and if possible, restore natural features.

Reduce the Impacts: The next step is to reduce the area impacted by development by reducing the size of new roads, driveways, sidewalks, and parking areas.

Manage the Impacts: The final step is to manage the remaining stormwater runoff through alternative systems like rain gardens instead of conventional “pipe-to-pond” management.

Communities can employ their land use regulations to avoid and reduce the stormwater impacts of development. The RI Department of Environmental Management (DEM) and the RI Coastal Resources Management Council (CRMC) recently revised the *Rhode Island Stormwater Design and Installation Standards Manual* (Stormwater Manual). This document explains how to manage the impacts of stormwater through engineered solutions. A companion guide has also been developed by DEM and CRMC entitled, *Rhode Island Low Impact Development Site Planning and Design Guidance Manual* (LID Manual). The LID Manual provides over 45 specific techniques for local planning officials to use. They range from describing how to make minor adjustments to existing regulations, to how to develop and adopt new ordinances that help avoid and reduce negative development impacts.

The Narragansett Bay Research Reserve’s Coastal Training Program and the DEM have delivered six workshops to date on the LID Manual, reaching over 150 local planning officials. Additional workshops will be offered in the fall of 2011. These will focus on specific LID site planning and design techniques such as landscaping, site clearing, roadway design and parking guidance.

Check the [Coastal Training Program](http://www.nbwctp.org) website for workshop information: www.nbwctp.org

Reserve News



Narragansett Bay Block Party

Saturday, July 16, 2011 - Noon to 3pm

Lab & Learning Center, South End, Prudence Island

**Featuring live music, food, kids activities,
Bay critter touch tank, local exhibitors, crafts,
and an island art show by Martha Antaya**

For more information contact Jenny by email at jenny@nbner.org or by phone at 401-683-1893



Narragansett Bay Research Reserve

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BE GREEN !

*Please circulate this newsletter
around your home and office.*

The Narragansett Bay Research Reserve is funded by NOAA and RIDEM and works in close partnership with the Audubon Society of Rhode Island.