

# Helping Municipalities Use Science

The mission of the GBNERR Coastal Training Program (CTP) is to help drive informed decision making by transferring technical information and science-based training to target audiences. The overarching goal of the GBNERR and the CTP is to establish a sustainable Great Bay Ecosystem that provides abundant natural resources for society and nature. The primary issues challenging this are development, population growth and climate change. New Hampshire has been and is projected to remain the fastest growing state in New England. From 1995 to 2005 population growth was about 16.5%, and the projection for the next three decades is 25.3%. The coastal and southern counties of Rockingham and Strafford, which cover the majority of the Great Bay Watershed, are a major portion of the fastest growing area in the state. Development or land use change, increased stormwater loads, and increased nutrient pollution are all fueled by this growth.

Climate change is now exerting its effects on all human and natural systems. In NH it is dramatically expressed in changes in seasonal rates of precipitation and volume of water released per storm, accelerated rates of sea level rise and range expansion of invasive species including diseases and their vectors. In NH the challenges of managing the effects of climate change fall mainly on municipal governments. Municipalities must begin preparing for the unavoidable effects of climate change or suffer repeated potentially catastrophic economic loss.

The GBNERR CTP has been actively engaged in several collaborative efforts to develop new methods and resources to help municipal governments meet these challenges. Recently the Reserve, as part of a comprehensive

team, was awarded three new grants by the National Estuarine Research Reserve Science Collaborative (the Science Collaborative). The Science Collaborative administers an annual Request for Proposals (RFP) that awards an average of \$4 million annually to projects that incorporate collaboration and applied science to address a coastal management problem identified as a priority by a Reserve and the community it serves. The three projects funded in this area are briefly described below:

- The Massachusetts Institute of Technology will work with the four New England Reserves (Narragansett RI, Waquoit MA, Great Bay NH and Wells ME) to engage four New England communities in testing the use of role-play simulations to help them explore ways to enhance resilience against the impacts of climate change. In NH the project will occur in the City of Dover. The first step is to prepare risk assessments that highlight critical vulnerabilities and opportunities to enhance resilience. The assessments will inform stakeholder interviews that allow the team to understand how these impacts affect different members of the community, their views on climate adaptation, and barriers to action. This information will be used to design the role-play simulations which will be used to create broad community dialog.
- A multi-disciplinary team from UNH leads the second project. This project will use the principles of participatory action research to design a water resources focused climate adaptation plan exclusively for the town of Exeter. Working with Exeter staff, boards and

commissions, as well as broad representation from citizen groups, the team will develop an integrated climate adaptation plan that will feature management of stormwater, non-point source pollution, land use and habitat change and restoration.

- The third project will work throughout the coastal watershed. This project led by researchers from UNH will create a framework of resources to manage stormwater and runoff that will build resilience and municipal capacity in coastal watershed towns. The project will offer a variety of tools and resources to assist municipalities to enhance and better utilize ecosystems services. The project will help municipalities to reduce non-point source pollution and help them meet their stormwater permit compliance requirements. Municipalities will be able to apply for the no-cost assistance on a competitive basis, with the team hoping to work with as many communities as possible.

The Reserve, along with its many partners, is working hard to meet the needs of municipal governments in the watershed. The Great Bay Stewards have been critical to securing these grants by helping administer the funds and hiring a part time contractor, Chris Keeley, to assist in getting the work done. These projects represent part of the tools and resources we help to bring to the area. Establishing a sustainable Great Bay Ecosystem for this and future generations requires long term thinking starting today. Visit [neers.noaa.gov/ScienceCollaborative.aspx](http://neers.noaa.gov/ScienceCollaborative.aspx) to learn more about these projects.

Steve J. Miller  
CTP Coordinator, GBNERR

# New Estuary Science Curriculum for Middle School Students

The National Estuarine Research Reserve (NERR) education programs are pleased to announce the release of a new online, multi-media product for educators; *Estuaries 101 Middle School Curriculum*. The free curriculum provides interactive learning tools that teach fundamental concepts in science and develop scientific thinking skills, while helping students discover and explore our nation's biologically rich estuaries.

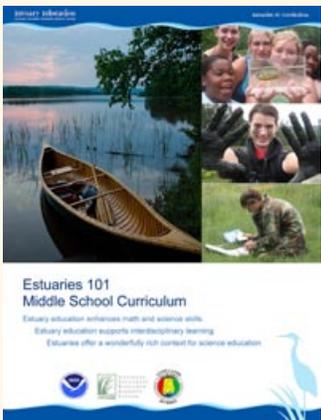
The curriculum engages students in real NERR research through interactive classroom activities and user-friendly real-time water quality and weather data exercises. Videos, simulations, teacher activity downloads and interactive maps

are all available to help students visualize the inner workings of an estuary.

The curriculum was written by NERR educators from around the country and is divided into six units based on six estuary literacy principles – earth science, physical science, life science, the need for research and monitoring, human interaction, and stewardship. Some of the fifteen activities in the curriculum focus on topics such as sharks in the estuary, oil spills, mangroves, and oysters. A number of activities also help students understand how climate change is affecting estuaries. The curriculum also meets National Science Education Standards for grades 5-8 and can be readily aligned to meet all state standards.

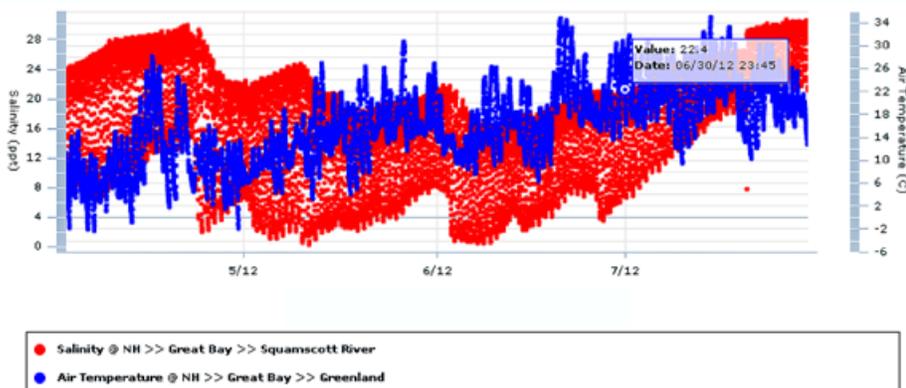
In addition to teachers, researchers will find the “graphing application” a wonderful resource for displaying water quality, weather and nutrient data in a way that is visually pleasing and easy to understand. To learn more about the curriculum visit <http://estuaries.noaa.gov/Teachers/Home.aspx>.

Kelle Loughlin  
Education Coordinator, GBNERR  
Director, Great Bay Discovery Center



*Estuaries 101 Middle School Curriculum provides a user-friendly website that is packed full of learning tools and materials for students and teachers including videos, maps and a graphing tool (below).*

## Salinity and Air Temperature in Great Bay: Summer, 2012



## The Evelyn Browne Conservation Winner

The 2012 Evelyn Browne Conservation winner was G. Ritchie White of Rye. As a saltwater angler for over 50 years, White has always been a persistent and staunch advocate for science-based management of marine resources. He is a founding member of the Coastal Conservation Association of NH and has served on its Board of Directors since its inception. Throughout the 1990's White served as the Coastal Commissioner for the NH Fish and Game Commission. He advocated for the Reserve very early on and helped to generate financial support for many of the early programs through the Wentworth Striped Bass Tournament.

In 2000 he was appointed to be NH's Governor's Appointee to the Atlantic States Marine Fisheries Commission and currently serves as the Chair of the Winter Flounder Board. He played an important role in garnering support for passage of the Atlantic Coastal Act. Most recently, he is a founding member of Rescue Great Bay an advocacy group to clean up the Great Bay Estuary and to protect it for future generations.

