

Eye on Graduate Student Research in Great Bay

Many regular Great Bay Matters readers may realize that government and university scientists are involved in research in Great Bay. But are you aware that graduate students also consistently use Great Bay as their research lab? New knowledge generated by these students advances our understanding of the Great Bay ecosystem and the human activities that affect it. This article introduces five UNH students whose research is currently supported by the Great Bay NERR or Great Bay Stewards.

Wan-Jean Lee and Jeremy Nettleton are Graduate Research Fellows with the GBNERR. Jean is a fourth-year Ph.D. student in the zoology department. Jean's research elucidates the ecological role of horseshoe crabs in Great Bay. Horseshoe crabs burrow into mud to feed, spawn, and rest. Jean has found that horseshoe crabs modify the grain size of the sediment as they dig pits and that new pits contain 50% fewer invertebrates than undisturbed areas. Since their digging can affect entire mudflats, horseshoe crabs significantly shape biological communities in Great Bay's tidal flats. Follow-up investigations will study biological recovery from these disturbances. By linking the biological and physical effects of horseshoe crabs' digging behavior, Jean's research advances our understanding of how communities in Great Bay's mudflats are structured.

Jeremy is a first-year Ph.D. student in the biological sciences department. His research focuses on macroalgae as indicator organisms of water quality changes related to eutrophication in Great Bay. Jeremy compares historical to present-day green algae community structure to detect changes in species composition. He relates the abundance and distribution of ulvoid algae to major patterns of eutrophication within the Great Bay Es-

tuary to understand how the distribution of species may change due to nutrient concentrations. Further, Jeremy compares nutrient levels in algae tissues versus the surrounding waters to determine algal uptake of nitrogen and phosphorus. His research will demonstrate the biological consequences of eutrophication in Great Bay.

Erika Washburn is a Social Science Fellow supported by the NERR System. She is a third-year Ph.D. student in the natural resources department. Erika's work focuses on the social landscape of decision-making in coastal New Hampshire. A quadrupling of population since 1940 resulted in significant land use change. Calls for strategies to address growth, development and land use planning have emerged in all six of Great Bay's sub-watersheds. Erika's research focuses on communities within the Lamprey River watershed. She investigates questions such as: Do towns communicate about land use decisions? Are cumulative effects considered when debating development proposals? Erika will build a framework describing the understanding, challenges, communication networks and cooperation potential among towns in the watershed.

Each year, the Great Bay Stewards support two graduate students conducting research in Great Bay. The most recent recipients of these awards are Linda Auker and Megan Striplin. Linda is a third-year Ph.D. student. Her research focuses on a sea squirt, *Didemnum vexillum*, that has invaded the Gulf of Maine. *Didemnum* overgrows shellfish, possibly limiting their food intake and even smothering them. Linda's research seeks to quantify the effects of this overgrowth on the blue mussel, *Mytilus edulis*, by measuring changes in their growth, shell thickness, and gonad index. She also



Wan-Jean Lee collects a sample of sediment and invertebrates from a horseshoe crab pit.

considers potential ecological effects of *Didemnum* growth on mussels: Will predators prefer clean mussels to overgrown mussels? Will overgrowth inhibit a mussel's ability to prevent a predator's attack? These studies will help determine whether *Didemnum* overgrowth is detrimental to mussel populations and may aid shellfish aquaculture management.

Megan Striplin is a second-year M.S. student in the Department of Molecular, Cellular, and Biomedical Sciences. Megan studies the distribution of three bacterial species – *Vibrio parahaemolyticus*, *Vibrio vulnificus*, and *Vibrio cholerae* – in oysters, water, and sediment from the Great Bay Estuary. These species of *Vibrio* are innocuous inhabitants of estuarine waters, yet certain pathogenic strains can cause human sickness. Megan's project examines their abundance and distribution within the Estuary in relation to the effects of climate change. As ecological dynamics change due to increased temperatures and lower salinity, typically nonpathogenic strains of *Vibrio* may become more virulent. Knowledge of potentially pathogenic strains of *Vibrio* could prevent food borne illnesses due to consumption of raw oysters.

Edited by Kathy Mills, with contributions from Linda Auker, Wan-Jean Lee, Jeremy Nettleton, Megan Striplin, and Erika Washburn.

The Evelyn Browne Conservation Award

Jay Diener of Hampton is the winner of the 2008 Evelyn Browne Conservation Award. Jay has been on the Great Bay Steward's Board since 2003 and now holds the position of Vice President. He has been race director for the Great Bay 5K since its inception in 1998. Under his leadership, this important fund raiser has grown to close to a thousand runners. Jay is responsible for upgrading the Steward's brochure, website, display, and assisting with scholarships and fundraising. He enthusiastically participates in many coastal initiatives, programs and workshops, and has helped the Reserve in planning large events such as the Art Show and this summer's Celebrate the Bay weekend. Jay has had a tremendous impact on the quality and effectiveness of Stewards efforts over the last ten years, positively enhancing the mission of the Reserve.

For the past 5 years, Jay has also served on his town's Conservation Commission, and was instrumental in leading the effort to acquire the Ice Pond for the town of Hampton. Through the many hours he has devoted to the Stewards and other conservation activities throughout the Seacoast, he has shown his dedication and commitment for Great Bay and the environment. Congratulations, Jay!

forms classical and some lighter musical fare at four concerts a year. The Community Chorus of South Berwick is another local group that includes some of our volunteers.

There are many other groups that one can join such as Voices from the Heart in Portsmouth, an all women's group of 200 singers; Amare Cantare in Durham; Rock My Soul, a gospel group which meets locally; Sounds of the Seacoast in Newington, women's barbershop music; The Yankee Clipper Chorus, all men's barbershop music; Portsmouth Pro Musica and others. One of our volunteers, Carol Seeley, directs a chorus at RiverWoods, a retirement facility in Exeter. All these local groups need more voices and welcome new singers. You can find out more about these groups by visiting their websites.

Music is good for you. This coming new year make a resolution to join a group or to attend the many local concerts given by the various groups in the Seacoast area. The words from a Canadian folk song, "But for me my troubles end, when I'm singing with my friends, sharing the music of our lives" can be true for all of us.

Sheila Roberge
Volunteer Coordinator, GBNER



Peter Wellenberger presents the 2008 Evelyn Browne Award to Jay Diener.

© PETER ELYN PHOTO

"Music hath charms"

Every year school districts are faced with cutting the budget. As school boards are deciding what programs to cut, music and art programs are usually the first to be eliminated. When my children were in school, I always fought these cuts. It always seemed that the arts were expendable while athletics were not. Parents and coaches would argue that the kids needed sports and that being athletic was good for the health and happiness of kids while they were in school and later on in life. I would argue that music and art are important for kids all their lives especially when they grew older. Rather than become armchair football fans, people could actively be involved in music programs even as senior citizens.

Well, the movie, *Young at Heart*, proves that I am right. This documentary follows a group of senior citizens from Northhampton, MA who belong to a local chorus. It details six weeks of rigorous rehearsals, leading up to a sold out concert. We learn a lot about the various members of the group whose average age is 81. Their conductor does not let them sing just "oldies but goodies." Their musical repertoire goes from classic to rap and "pop". It is an incredible movie and underscores the importance of music in our lives and proves, "The singer has everything within him. The notes come out from his very life."

Music plays an important role for many of our volunteers as well. The Marine Docent Chantey singers have been performing for 20 years. The 20 plus members perform concerts at local venues such as libraries, nursing homes, public events and for Docent celebrations.

Other volunteers belong to the Rockingham Choral Society which meets in Exeter in the Academy music building each Tuesday evening. This group just celebrated its 50th anniversary and per-