January 01, 2009

The Rising Tide: Winter 2009

Marine Science Center

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Northeastern University's Marine Science Center

Winter 2009

Alumni Voices: A Visit to the MSC

This fall, the Rising Tide *caught up with alumnus Charles Terrell, who shares his memories of a past visit to the Marine Science Center for Doc Riser's 85th birthday celebration.*

"Having operated a bed & breakfast on Cape Cod for the past 19 seasons, my wife, Sandy, and I have led something of a 'gypsy' life. Every six months we would migrate between our antique summer home on Cape Cod and our winter home in Fairfax, Virginia. After having arrived on Cape Cod in April, 2005, Sandy and I revisited Northeastern University's Marine Science Center. It was the occasion of the annual Riser Lecture Series, except that this time it was special because it was 'Doc' Riser's 85th birthday celebration. The lecture series was named for my Master's Professor, Dr. Nathan W. Riser, who guided me through three years at Northeastern.

"It had been about 35 years since the last time I had seen East Point. As we drove toward Nahant from Cape Cod, the recurring thought in the back of my mind was that Doc Riser wouldn't remember me. After all, for a professor who had taught hundreds of students, even at the graduate level, why should he remember me among the multitude?

"As we drove through the gate, I recalled the first time I had been there. It was 1966. Since Northeastern had only recently acquired the property from the Federal Government, I was the first student ever to be there. The property formerly had been a 'Nike Site,' where in huge, deep bunkers during the Cold War were poised Nike Rockets, ready to be fired at any invader aircraft. Doc Riser had given me a note that I was to present to the guard, who would let me onto the property, and then I could start my intertidal research around East Point's peninsula.

"Sandy and I walked to the 'block house,' which in 1966 had been the only building standing on the property. Now, the building was three times larger, and people were going inside. In the foyer, others milled about, but no sign of Doc Riser. Sandy whispered, 'Look for the pipe! He was never without his smoking pipe!' Finally, there at the end of the foyer was Doc. He saw me at about the

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Three Seas Turns 25

This academic year marks two noteworthy and exciting milestones for the Three Seas Program. First and foremost, we are thrilled to celebrate the 25th anniversary of our program. Launched in 1983, the Three Seas Program has provided hundreds of students the unique opportunity to study marine biology in three beautiful and distinct environments: New England, the South Pacific, and Santa Catalina Island, California.

The program, it would seem, is improving with age; we evolve and expand every year. For example, Matt Bracken and Steve Vollmer have joined our fall faculty, offering new courses in *Marine Ecology* and *Molecular Ecology & Evolution*, respectively. Furthermore, daily shuttle services from Northeastern's main campus enable all students of the University to benefit from the "hands on" course offerings at the MSC. In addition, we will begin offering a stand-alone fall semester option for students from other universities wishing to join us in Nahant.

Our second milestone is the fifth anniversary of the Professional MS in Marine Biology. This is an extremely popular program, filled to capacity again this year!

For more information about Three Seas, email s.genovese@neu.edu

Outreach

The MSC's Outreach Program goes far beyond the typical "show n' tell" science education. This August, for example, the *Coastal Ocean Science Academy* took high school students on a "Bio Blitz," giving them the opportunity to observe wildlife along the shores of the spectacularly beautiful Boston Harbor Islands. This is always an exciting adventure for our students, as they compare species diversity in such intertidal habitats as permanent rocky outcrops, cobble beaches, salt marshes, and mud flats.

Outreach Coordinator Tracy Hajduk recently accepted an appointment to the Massachusetts Marine Educators Board of Directors. Congratulations, Tracy!

We would like to invite you to join us for our signature Evening Lecture Series, which brings wonderful guest speakers (and large crowds) to the grounds of the MSC. This spring, we'll cover such topics as polar bears, ocean climates and the geology of Iceland. Please feel free to contact us for more information. We hope to see you there!

Evening Lecture Series, Spring 2009

January 13, 2009
Geology of Iceland
Dr. Malcolm Hill
Northeastern University

February 10, 2009
Polar bear populations, climate change & the Endangered Species Act
Dr. Hal Caswell
Woods Hole Oceanographic Institution

March 24, 2009
Some like it hot, some like it cold: Temperature and life in the ocean
Dr. Luke Miller
Northeastern University

Join the Friends of the MSC to support our ongoing research, education and outreach programs! To learn more, please contact Dr. Gwilym Jones at g.jones@neu.edu

Director's Note

As 2009 approaches, it is time to reflect on another successful year at the MSC. It was a year that witnessed major research developments and exciting breakthroughs by MSC faculty, along with some other interesting adventures.

Many of you are familiar with Joe Ayers and his robots. Joe continues to make important advancements in neurotechnology and hopes that this research could one day help stroke and head-trauma victims regain use of damaged appendages.

Steve Vollmer's study of White Band Disease of corals, presented in our April newsletter, demonstrated that 6% of the endangered staghorn corals are naturally resistant to the disease. Steve and his students are also making great strides in the search for the causative agent of this disease, which may help save this unique and important ecosystem.

Don Cheney, who was one of our Tuesday Night Lecture speakers this fall, has reported significant findings on the use of seaweed, *Ulva lactuca,* as a possible new approach for removing PCBs from shallow-water contaminated marine sediments.

The Vertebrate Collections, which welcomed 1900 visitors in 2008, were featured in the *Boston Globe North* this October. The article explained the collection and the importance of the assemblage for teaching and comparative anatomical studies.

Perhaps the most visible and unexpected adventure took place in June, when film director Martin Scorsese and his crew came to campus to film a segment of their upcoming film, *Shutter Island.* A temporary lighthouse was constructed on the MSC's southeastern rocky coast, facing Boston Harbor. Months of planning culminated in just three hectic days, as the project transformed East Point into a movie set, including a few star sightings. The MSC and the town of Nahant can take pride in the knowledge that our beautiful shores will soon make a splash on the silver screen in 2009.

On behalf of the faculty, students and staff, our best wishes for a happy and healthy New Year.

–Gwilym S. Jones, PhD, *Director*

Seaweed Soaks Up PCBs

Today, when one hears about algae, it's almost always in regard to "harmful algae." However, algae – particularly marine macroalgae or seaweeds – may have some valuable new and beneficial uses for mankind.

For example, the Cheney Lab has discovered a bloom of the common green macroalga *Ulva lactuca* flourishing in the upper portion of New Bedford Harbor, an area that has been designated an EPA Superfund Site since 1982, due to its high levels of polychlorinated biphenyls, or PCBs. PCBs are among the most hazardous pollutants in our coastal waters today; they pose serious health threats to marine mammals, birds and fish, as well as to humans.

Surprisingly, despite the PCB contamination, Cheney's lab found over 18 tons of *Ulva* growing along the western shore of New Bedford Harbor. What's more, they discovered the *Ulva* has taken up very high concentrations of PCBs: as much as 98 ppm PCBs in some places, which is 80 times greater than previously reported values for algae. Also, uptake experiments in the field have shown that *Ulva* takes up PCBs extremely rapidly, as much as 4 ppm in just 24 hours.

These discoveries could have some important environmental implications. First, that the *Ulva* bloom may be acting as a reservoir for PCBs in the New Bedford Harbor Superfund Site and, because it appears to be rarely eaten by grazers, the bloom likely reduces the amount of PCBs taken up by phytoplankton and transferred up the food chain. This would be the first time such a beneficial function has been described for seaweeds.

In addition, Cheney thinks that *Ulva* could provide a new, less expensive and more environmentally friendly approach for removing PCBs from other contaminated sites. It is thought that *Ulva* could be used as a "green mat," that could easily be dispersed and recovered after absorbing PCBs from the top layer of contaminated sediments.

Marine Biodiversity Declines

Assistant Professor Matthew Bracken's Lab Evaluates the Causes and Consequences of Changes in Biodiversity

Matthew Bracken Explores Seaweed Diversity

Marine biodiversity is influenced by both natural and man-made factors. For example, the number of seaweeds on rocky shorelines, like the beaches adjacent to the MSC, is determined by such factors as consumers, temperature stress, and nutrient availability. The Bracken Lab seeks to understand how these different factors influence biodiversity. Furthermore, in light of recent changes to biodiversity both locally and globally, the Lab seeks to understand the potential consequences on marine ecosystems.

Each organism uniquely influences the functioning of the ecosystem in which it lives. For example, each type of seaweed on a rocky shoreline uses nutrients in a slightly different way; some species prefer nitrate, whereas others prefer ammonium. Similarly, different animal species use different seaweed species for food or habitat. As seaweed diversity increases, nutrients are used more effectively, and more animals are present. In general, changes in biodiversity alter the functioning of marine ecosystems.

Through experiments, the Bracken Lab has discovered that the number of seaweed species in a tide pool has an important effect on the rate of nitrogen use by those seaweeds. Also, because each seaweed species on the shore occupies a slightly different living space, and because certain species buffer others against temperature and desiccation stress, there is a strong relationship between the number of seaweed species in an area and the productivity of that area. With seaweeds at the base of intertidal food chains, changes in seaweed diversity, growth, and productivity have important effects on the growth and success of many marine animals.

Alumni Voices: A Visit to the MSC

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same time that I saw him. His expression was an instant grin from ear to ear. Not only had he remembered me, but he also showed absolute joy at my presence. As I approached, he reached out with both arms and, as if being drawn in by some powerful magnet, he gave me a great big hug. He said, 'Charlie, you were the first one; you were the first student to be here at Nahant!' Boy, was I surprised. He had given me the warmest of welcomes, and clearly remembered more about me than I had ever thought.

"I introduced Sandy, and Dr. Riser said he remembered her from my grad school days. We chatted for a few minutes about some of the former professors, until it was announced that the group was to proceed across the lawn to the 'Bunker.' There, where the Nike missiles had been stored, was now a small lecture hall, ready to launch not a missile, but the annual Riser Lecture.

"Following the lecture, Sandy and I said our good-byes to Dr. Riser and left the hall. It was great to visit a wonderful teacher, who was such a great part of my education.

"As Sandy and I arranged ourselves in our van to make our way back to Cape Cod, Sandy said, 'Look there! It's Dr. Riser running down the hill from the Bunker.'

"Sure enough, there he was, high-stepping down the slope on his way back to the block house. At 85, he nevertheless seemed sprightly and sure-of-step; however, this was the first time that ever I had seen Doc Riser without his pipe!"

- Charles Terrell, MS'68

A photo taken at the Marine Science Center by Charles Terrell in 1967. He reflected, "Surf, rushing craggy ledges and spraying water in every direction, is photographer's delight. Taking time to watch such rugged majesty was one of the many pleasures of doing ecological research at the Marine Science Center."

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Annual MSC Open House

This September, the MSC once again opened its doors for the Annual Open House.

As a stroke of good luck, it was an absolutely perfect fall day. Bright sunshine illuminated the way as more than 800 guests combed through tide pools, cleaned the beach, and visited a "crime scene" to determine which predators were at work on local organisms.

Throughout the day, guided tours took visitors back through time. On one such tour, local historian Jerry Butler spoke about the Murphy Bunker's military use in WWII. Professor Malcolm Hill, in turn, taught participants about the geology of Nahant that reaches back 500 million years! And in the solar observatory, Dr. Peter Foukal gave curious explorers a close-up look at the sun.

As a new element this year, children received a Marine Science Center "Passport to Discovery." They eagerly traveled from exhibit to exhibit to speak with researchers and earn passport stamps along the way.

It was a full day of learning and exploring for participants of all ages. The Marine Science Center is grateful to the Eastern Bank Charitable Foundation for their support of this wonderful day.

www.marinescience.neu.edu

Marine Science Center Faculty:

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The Marine Science Center extends special gratitude to alumnus Charles Terrell for his stories and photos of the MSC.