Local Students Get Hands Wet Learning About Eelgrass, Great Bay

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DURHAM, N.H.- A decade ago, children dangling their feet off a dock in the upper Piscataqua River might have come across eelgrass growing below the water's surface. Fast forward to today and the aquatic plant is unlikely to be discovered along the shores by curious kids.

Eelgrass is an aquatic plant with long, ribbon-like leaf blades that grows in estuaries including New Hampshire's Great Bay Estuary. It often grows in clusters called beds that fulfill a very important ecological niche: the roots help stabilize substrate, the leaves slow down wave action to protect shorelines from erosion, and the beds provide nursery habitat for juvenile fish and crustaceans. However, since 2002, eelgrass populations in the estuary have been steadily declining in distribution and density.

"It struck me that we have this decline in eelgrass in the bay but that message is not necessarily getting out to the public," explains Nora Beem, UNH graduate student in natural resources. "Most people aren't aware of the crisis that's occurring in the estuary."

Part of Beem's graduate work entails public outreach and education about local environmental issues, including eelgrass and water quality in the Great Bay estuary. With the help of Fred Short, UNH research professor of natural resources, a few volunteers and some funding from the UNH Marine Program and the Great Bay Stewards, Beem led an outreach event on June 4 and 5, 2008, for fifth graders from Oyster River Middle School. Students spent time at the University's Jackson Estuarine Laboratory learning about eelgrass and water quality first-hand.

"Outreach events like this provide students with the tools necessary and the understanding to be able to teach the community about the importance of eelgrass and of keeping the bay healthy," Beem notes. "Hopefully the students will be able to take some pride in what they're doing."

The students rotated through three stations where they conducted water sampling on the bay, learned about eelgrass ecology, and then compared the current water quality parameters with what is needed to maintain healthy eelgrass populations. Beem also addressed the positive and negative roles that humans have on the bay.

In the upcoming weeks, the students will be creating interpretive panels similar to research posters that will incorporate what they've learned and how to help, Beem says. They will then present their information to the Durham Conservation Commission and discuss personal and community-wide changes that can be made to improve the health of the estuary.

"We need to establish and maintain a relationship between the research community and the

public to keep people informed about what's happening with the bay's health," Beem adds. "Scientific information needs to be dispersed and shared to be truly meaningful."

Historically, eelgrass beds were located throughout the estuary, including Great Bay proper, the shorelines of Little Bay and the Piscataqua River, as well as in Portsmouth harbor, Short says. Currently, there are no eelgrass beds in Little Bay and very few in the upper Piscataqua River. Although the number of beds in Great Bay itself remains steady, the biomass of the plants in the beds continues to decline.

The crux of the problem includes nutrient inputs and suspended sediments in the water, Short explains. Nitrogen and phosphorus are coming into the estuary from septic systems, lawn fertilizers and sewage treatment plants in the area. Excess nutrients cause increased algal growth on the plant blades that prevents sunlight from reaching the plant.

Sediments are carried into the water when rain hits land being cleared for development or impervious surfaces like parking lots and enters the local waterways. The combination of increased nutrients and suspended sediments has led to degraded water quality and clarity.

The eelgrass beds in Great Bay have managed to survive because they grow on mud flats where the plants are exposed to direct sunlight at low tide, Short says. The deeper, murky waters of Little Bay and the Piscataqua allow less sunlight to reach the leaf blades and so very few plants remain there.

"It's incredibly frustrating," he acknowledges regarding the declines. He has spent years monitoring the estuary, trying to establish healthy eelgrass populations and working to spread the word about the bay's health.

Short also admits that convincing the general public to become involved in this issue is a hard sell, particularly for people who might not feel they have a direct connection to the estuary. But for those whose livelihoods depend on a healthy bay, the impacts could be detrimental.

"A large portion of the New Hampshire seacoast economy is supported by tourism," Short says. "We all want clean water, a nice place to fish and sail, clean beaches and a healthy environment for our children. If the bay continues to degrade, there could be a very negative direct impact on tourism and on the lives of local fishermen, and other indirect impacts on the rest of the public."

"Something needs to be done to reverse these trends before it's too late," Short adds. "Local towns and the public need to work together to implement ways to decrease the discharges into the local waterways."

Despite these challenges, Short and Beem remain upbeat about the potential to make a difference.

"This outreach event is a great start," Short says. "We are hoping to expand it to other schools around the bay."

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Photograph available to download:
http://www.unh.edu/news/cj_nr/2008/june/eelgrass_tanks.jpg
Caption: Students from Oyster River Middle School gather around a tank filled with eelgrass at

UNH's Jackson Estuarine Lab to learn about the importance of this aquatic plant in the Great Bay.
Credit: Rebecca Zeiber