INSIDE SCIENCE: Restoring estuaries can save fish

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JOHN SLADEWSKI/ The Standard-TimesBrian Howes shows communities how nitrogen runoff is degrading estuaries.

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Brian Howes is a professor in the Department of Estuarine and Ocean Sciences at the School for Marine Science and Technology at UMass Dartmouth. He is also a program manager for the Massachusetts Estuaries Project. An estuary is the zone where ocean waters meet the mouth of a river. In southeastern Massachusetts, estuarine ecosystems provide important habitat for shellfish and eel grass, and breeding grounds for offshore marine fisheries. But rapid development in the region has led to excessive amounts of nutrients such as phosphorous and nitrogen leaching into estuaries, acting as a fertilizer for invasive weeds and algae. The result has been a die-off in fish, closure of shellfish beds and a range of economic consequences.

The Massachusetts Estuaries Project is a $12.5 million collaboration between SMAST, the state Department of Environmental Protection and towns across the region. Together, they have conducted water quality assessment of 89 estuaries in southeastern Massachusetts since 2001. The goal is to help communities improve water quality in local rivers and estuaries by limiting the amount of nitrogen and other pollutants from wastewater.

How is nitrogen runoff from agriculture, wastewater treatment plants

and septic systems affecting local estuaries?

In this region, population increases have been almost entirely in non-urban areas over the past few decades. The demands on estuaries has been profound. Two-thirds to three-fourths of the coast, the estuaries, are showing signs of degradation. In some cases, estuaries are totally impaired: there's been a loss of shellfish, fin fisheries and eel grass beds. If this was happening on the land where people could see it, it would be like clear cutting in forests. In a lot of systems we're beyond the subtle shift stage. Over half the eel grass we've had in this region is gone now through this process, and the organisms associated with it are gone.

What made the Estuaries Project possible, and has it been emulated elsewhere?

The circumstances here in Massachusetts at the time were unique. It was a critical point in time when we finally had the technological tools to do this. The instrumentation wasn't there before; the manpower needed to do this project would have been impossible 20 years ago. But with the new kinds of computers and instrumentation we now have, we can do it with higher accuracy and much less effort. It's also unique because of the collaboration between regulators and scientists. You don't usually find that kind of collaboration. When we present our work in other areas of the country to agencies in charge of resource protection, those agencies are sort of amazed that it's being done and they want to know how they can do it. Nutrient loading in estuaries is a serious problem worldwide. It means we can do work with global importance, but we can do it here in our own backyard.

Why is there such public will to do something now, given the amount of degradation that's already occurred?

There are still enough people in this region who remember how it used to be, and that memory is still there. When you have people still young enough to remember, it's a chance to get it restored. Once you lose the people who know how it used to be, people just think, oh, that's the way it is, and the desire to improve it is gone, because they don't know it's gone — they never had it. So this is a critical juncture where we're going to fix it now or it's not going to happen. It'll be gone.

What have been some of the tangible results of this project so far?

The water monitoring and analysis is helping make better city planning decisions, and that saves money. We identify every parcel of land in every watershed. That gives us tremendous accuracy and that's driving this process. Another really exciting thing is the acceptance of wetland, pond and river restoration as a way to enhance nitrogen removal. We restore them so we don't have to spend money on removing nitrogen.

Inside Science is a regular column designed to help the general public learn more about the science going on around them on the SouthCoast. This is particularly important as high school students now face a science MCAS graduation requirement this spring.

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