

Studying how marshes respond to sea-level rise

September 10 2014, by Miles O'brien



The cordgrass all around Cape Cod has been slowly disappearing for decades. The grass that's being destroyed is the foundation species that builds salt marshes, explains marine ecologist Mark Bertness of Brown University who studies this critical ecosystem. It's an ecosystem being thrown out of balance, according to Bertness who's researching a possible link between overfishing and the die off of New England salt marshes. He says the marshes are being overrun by purple marsh crabs because their main predators, blue crab and finfish, are being overfished. So, the purple marsh crabs are free to gorge on healthy fields of cordgrass and once done feeding, they leave behind nothing but lumpy fields of mud. Credit: Science Nation, National Science Foundation

At the Plum Island Sound estuary in northeastern Massachusetts, the marsh floods like clockwork. At high tide, you can pass over the

mudflats into the grass in a boat. At low tide, the ocean waters recede, leaving behind fresh deposits of nutrient-rich food for the birds and other wildlife, including juvenile game fish such as striped bass.

It's an ecosystem that is at once both hardy and fragile. The estuary is part of the Plum Island Ecosystems LTER; LTER stands for "Long Term Ecological Research." The LTER Network was created by the National Science Foundation (NSF) in 1980 to conduct research on ecological issues that can last decades and span huge geographical areas.

The Plum Island Ecosystems LTER was established in 1998 and, like other LTER sites, this one is focused on the long view. The research is expected to continue for a generation or more.

Biogeochemist Anne Giblin, of the Marine Biological Laboratory, is leading a team of researchers who are studying the Plum Island salt marshes to determine how this 2,000-year-old ecosystem is holding up under climate change, land use changes and sea-level rise.



Villanova University marine scientist Nathaniel Weston studies how both land use and climate change can impact habitat in tidal marshes, including how rising

sea levels may affect microbes and other plants and animals. Rising sea levels can actually cause marshes to grow in very different ways. His experiments are already simulating different amounts of sea-level rise in several tidal creeks in the Delaware River estuary. Marshes are fairly resilient to change; they deal with a changing environment day to day because of tides, and additional changes with each season. In a freshwater system, adding even a little bit of salt can be a big change for the organisms living there, from plants to animals, to even bacteria.

"The Plum Island Estuary LTER has given us some valuable insights about how marsh systems will respond to future climate and environmental changes," says David Garrison, a program director in the NSF Directorate for Geosciences. "These findings would have not been possible without the funding commitment to collect long-term observations."

Provided by National Science Foundation

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