

The environmental, and economic, costs of invasive species

Ignoring the impacts of ecosystem changes comes with a price tag

BY ALEXANDRA PECCI

The tunicate is a spineless marine animal that's better known by another name -- sea squirt, which sounds like a cute little creature that might be the best friend of a cartoon mermaid. But Larry Harris has a nickname for didemnum, one particular kind of sea squirt that is anything but cute.

"My term for it is the tunicate from hell," says Harris, professor and chair of the department of biological sciences at the University of New Hampshire.

That's because didemnum grow in thick, sheet-like colonies that cover moorings, pilings, float bottoms and anything else they can get a hold of. In New Hampshire, it's a serious marine pest.

Didemnum is one of many non-native, invasive species that dominate the coastal waters of New Hampshire and New England. Invasive marine species like didemnum do more than simply take over their new environments.

"It does have economic impacts,"

Harris says. "Everything from clogging intakes to cooling systems of water treatment plants to having a negative impact on aquacultures."

Harris was part of a team of researchers who participated in an August 2013 coastal sweep of several sites on the New England shoreline, including two in New Hampshire, which searched for non-native plants and animals.

The one-day New Hampshire effort included stops at the Hampton River Marina and the Coastal Marine Laboratory, a UNH facility in New Castle.

Researchers have been conducting the sweeps every three years since 2000, trying to discover newly introduced species, as well as see which ones are thriving and becoming dominant.

Using their hands and nets, researchers scraped their way across bottoms of docks, pulling off whatever they could find.



UNH professor Larry Harris says invasive species found in New Hampshire waters, like the didemnum, have economic impacts, 'from clogging intakes to cooling systems of water treatment plants to having a negative impact on aquacultures.'

There were also researchers in wetsuits who were snorkeling to collect extra specimens.

“You’re trying to collect anything and everything that’s alive,” Harris says, so it can be identified later at a lab. “What you’re looking for is anything that hasn’t been found before, and also looking for patterns of change.”

In the most recent sweep, Harris says the team didn’t find any new introduced species, but saw that the relative abundances of some species are higher than before, so “the composition of the communities is changing.”

Harris says marinas are great places to look for new invasive species that are often carried around on the bottom of boats and in ballast water. Once these stowaways arrive in a marina, they get a foothold in the new environment by clinging under and around docks and piers.

“Floating docks are sort of like little islands because they’re isolated from the bottom, and that means there are not as many predators,” Harris says.

Another invasive sea squirt that’s found in New Hampshire waters is called ciona, which has become a dominant species at places like the Hampton River Marina.

“Especially in Hampton, the density of these ciona is just pretty mind-boggling. You reach under the floats and they’re essentially the most common animal,” Harris says. “They are the bane of the existence of aquaculture operations all over the world. They clog nets, they foul the netting of cages and such, they overgrow mussels, compete for food.”

Overtaking waterways

Non-native species travel around the world in a number of ways, including attaching themselves to the bottoms of boats and hitchhiking in ballast water that helps large cargo ships stay stable at sea.

Harris says Japanese scientists likely brought didemnum and botrylloides, another common species in New Hampshire, as aquaculture stowaways in the 1940s.

The threat of invasive species is starting to get the attention it deserves, partly thanks to zebra mussels, which have been overtaking North American waterways since they were first introduced to the Great Lakes in the late 1980s.

“Before zebra mussels appeared in the Great Lakes, there weren’t a lot of people paying attention to invasive species the way they are now,” Harris says. Zebra mussels, which the U.S. Geological Survey says are native to the Black, Caspian and Azov seas, probably arrived in North America from a ship emptying its ballast water in one of the lakes.

“How do you restore fish populations in an environment that you don’t understand?” Harris asks.

Now they’ve become “a serious pest, clogging intake lines for power plants,” Harris says.

Today, there are some efforts to stem the tide of invasive species. For instance, last year the Coast Guard issued stricter rules about cleaning ballast water in commercial ships. And Harris adds that boat ramp monitors are increasingly inspecting boats and trailers in freshwater systems to make sure they’re not carrying new water weeds.

But there’s still not enough action, Harris says.

“There’s not a whole lot being done other than trying to increase awareness,” Harris says. “There’s no systematic monitoring of the marine environment for invasive species.”

And what we don’t know can hurt us. For example, because new, invasive species now dominate the ocean bottom where groundfish feed, they’re also perhaps standing in the way of local efforts to manage fisheries and restore populations of groundfish, such as cod.

“Somebody always benefits and somebody loses with system changes,” he says. “You can guess that lobsters are benefiting and some of the other groups of animals are not, and fish seem to be one of those.”

The impact that these species will have on food webs is unclear, but ignoring the potential impact of the new ecosystem might waste a lot of money and time: “How do you restore fish populations in an environment that you don’t understand?” Harris asks.

“It’s very frustrating because there’s really no interest in dealing with this,” says Harris. “I’ve seen how funding agencies go dead silent when you talk about the need to understand what’s going on [at] the bottom.”

After decades of studying and diving in New England waters, Harris says the major changes he’s seen in the ecosystem are astounding.

“We’re looking at communities that are so different,” Harris says. “It’s almost like going back to kindergarten.”