

# NATIONAL SEA GRANT PROGRAM WRITES THE BOOK ON COMBATING INVASIVE SPECIES

By Moira Harrington, Wisconsin Sea Grant

All good books have a defined beginning, middle and end. The opening chapter of the nation's coastal environments is a read on economic plenty, recreational pleasure and natural beauty. Increasingly, though, invasive species have brought about some nasty plot twists.

Identifying, studying and educating on invasive species have long been part of the National Sea Grant Program mission. Now, the Program is working to turn the page on the impact of invasives with stepped-up regional prevention and control goals.

Sea Grant is administered through the National Oceanic and Atmospheric Administration (NOAA) and supports programs in 31 coastal states and Puerto Rico. In 2010-11, the Program will devote up to \$4 million for regionally based invasive-species initiatives. This funding is in addition to the projects outlined in individual state work plans.

## Sea Grant equals water

Data from the U.S. Geological Survey indicates shipping is the No. 1 path of introduction for invasives into the U.S. Water certainly plays to Sea Grant's strength.

Plus, Sea Grant's vast and collaborative networks with coastal resource managers, commercial businesses, scientists, non-governmental agencies and the public means it has the connections to counter invasives.

"Sea Grant certainly has a history of identifying a problem with invasive species, and sometimes identifying a problem before it even exists, and then running it to ground," Sea Grant Research Director Dorn Carlson said. Along with that ability, he said, "Is one of the most compelling things about Sea Grant—its ability to mobilize for outreach work."

Dr. David Reid, NOAA Great Lakes Environmental Research Laboratory emeritus scientist, notes another attribute, "Sea Grant has a mission to support research within the academic community, the largest pool of scientific capability in the U.S. (and most countries). Government scientists are limited in numbers."

He continued, "Engagement (support) of the academic scientific community is essential for the scientific progress needed to understand and address the root causes of and solutions for the broader issue."



The broader issue is that without attention and action, invasives—either plant, animal or even viral—can continue a march, easily transferring from watershed to watershed. The costs are astronomical. Four years ago, Cornell University researchers pegged the annual price tag of environmental losses and damage due to all invasives at nearly \$120 billion. That figure has likely climbed given an accelerated rate of spread and increased amount of species that have made their way into the U.S.

Those same researchers further reported that 42 percent of the species on the threatened or endangered species lists are at risk primarily because of invasives. The indigenous species must compete with the newcomers or have become the prey of the interlopers.

## Unhappy beginnings with happy endings

Here are some specific middle-narrative challenges, with Sea Grant contributing to happy endings:

- Some estuaries along the Pacific coast have become choked with a tall, quickly spreading plant called cordgrass that migrated from the Eastern U.S. when used as seafood packing material. Now, birds and small crustaceans can't get enough to eat because cordgrass is altering the habitat. Plus, cordgrass can disrupt water flow, leading to floods.

*Sea Grant researchers introduced a plant-hopping insect that finds cordgrass seed to be a delicacy. In areas where the bugs established, scientists noted a 90-percent reduction in the seeds. This is a cost-effective and sustainable solution to the invasion.*

- The Mid-Atlantic and New England intertidal areas have an unwelcome inch-long transplant that first rushed out of Japanese ships' ballast water more than 20 years ago. Now, Asian shore crabs are greedily consuming young oysters, mussels and clams that native shorebirds and fish generally eat or that shellfish farmers have been trying to bring to maturity.

*In one Mid-Atlantic state, Sea Grant staff members worked closely with a research institution and the state's lead environmental agency to develop a blueprint for*

*management, research and outreach on aquatic invasive species, including the Asian shore crab. The plan lays out rapid-response containment and eradication protocols, and policy and legislative needs.*

- The Illinois River, which in the past was a haven for water sports and recreational fishermen, is now teeming with Asian carp. These are the offspring of escaped fish originally brought to Southern aquaculture operations to keep ponds clean. When startled by boat motors, the invasive fish can leap up to 10 feet into the air and have been known to injure people. Asian carp have used the river as a highway toward the Great Lakes, threatening a \$7 billion fishing and \$16 billion recreational industry.

*Sea Grant biologists have devoted countless hours to monitoring the river and surrounding habitats. They also provide extensive education about the threat of Asian carp migration into the world's largest freshwater system. One Sea Grant biologist even served as the first manager of a project to erect an electric barrier in the Chicago Sanitary and Ship Canal to repel foreign fish. As the situation continues to unfold, Sea Grant will be integral to assessments and the search for a viable evidence-based mitigation plan.*

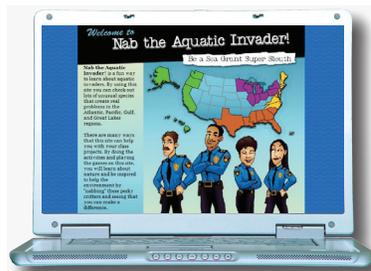
## There is more to the story: Sea Grant educates and raises awareness

An informed and engaged public is an effective first line of defense against invasive species. Sea Grant has unleashed an army in this fight, an army of children who are meeting the enemy on their own virtual turf—online. It's through a game at [www.sgnis.org/kids/](http://www.sgnis.org/kids/) called "Nab the Aquatic Invader."

"This is a great way to deliver messages on how people can reduce invasive species. It's all science-based," said Sea Grant's Robin Goettel who spent several years developing content for the resource-laden site.

"Nab the Aquatic Invader" launched in 2005 with expansions in the two succeeding years to incorporate the top-ten invaders in all U.S. marine and Great Lakes environments. Now, it is truly a nationwide awareness-raising tool reaching an audience of children, and their teachers, which encompasses classroom- and service-learning. In 2009, the site logged nearly 90,400 visits and is on pace to attract even more would-be invasive fighters in 2010.

Getting out of classrooms, the site is also featured in a special kiosk setup at the Smithsonian National Museum of Natural History. Kiosks are also sprouting up at a growing



network of aquariums across the country. This network provides opportunities for 20 to 30 million people to learn more, and ultimately do more, about invasives.

Continuing on the theme of public education and outreach, Sea Grant staff members regularly conduct workshops. In one regional instance, the topic is an invasive pathogen that can sicken or even kill fish. The virus is a growing problem for Great Lakes states. Sea Grant staff target aquaculture businesspeople who raise baitfish with information about viral hemorrhagic septicemia.

## Telling a research tale

It would be unfortunate to rid or reduce the effects of an invasive species in a given ecosystem and then find out that the method for doing so was itself harmful. That is just what Sea Grant researchers discovered when they collected data on a commonly used toxin used to minimize invasive sea lamprey larvae. Scientists learned the chemical harms other organisms.

This finding led to two outcomes—a more intense search for a new way to treat against sea lamprey and a regional educational campaign. That widespread campaign involved more than 400 radio stations, 5,300 Web site visits and the distribution of 3,500 publications.

Telling stories like these is important because, as the emeritus scientist Reid noted, "We've seen an exponential increase in the number of reported non-indigenous species in our coastal ecosystems. As globalization of commerce has taken place, many more potential sources of live organisms are being connected by these trade activities."

As the book on research and education efforts fills volume one, Sea Grant is looking toward writing the sequel on successfully stamping out, controlling or simply preventing the introduction invasive species. ❖