

Tracking the Spread of Invasive Species

Casco Bay Estuary
PARTNERSHIP

The aggressive spread of non-native species like European green crabs and colonial tunicates is disrupting Casco Bay's ecosystems and fishery resources.



Michael Barriault, The Forecaster

▲ *Botrylloides violaceus*, an invasive colonial tunicate or “sea squirt” found in Casco Bay.

◀ Dr. Larry Harris of the University of New Hampshire identifies introduced, cryptogenic, and native species at the Spring Point Marina in South Portland during a summer 2013 rapid assessment.

The Importance of Identifying New Arrivals

Non-native species enter Casco Bay through a variety of pathways or vectors, and many become established—having a detrimental effect on marine habitats, economies and even public health (Pappal 2010). These species can outcompete and displace native species, becoming invasive and difficult to contain or eradicate. Identifying the vectors by which these species arrive can help anticipate future invasions, and early detection of new invaders can help shape effective management responses.

Twenty Introduced Species Found in Recent Casco Bay Assessment

Compiling findings from several studies, the *2010 State of the Gulf of Maine Report* lists 64 non-native species that have been observed in the Gulf of Maine (not counting the numerous cryptogenic species whose origins are unclear; Pappal 2010). Within Casco Bay, there's limited information about the distribution and abundance of many of these introduced species, although there's been intensive monitoring in recent years of the European green crab (*Carcinus maenas*) due to its potential impact on vital marine habitats. A 2013 rapid assessment of fouling organisms on docks and piers, led by the Massachusetts Office of Coastal Zone Management and M.I.T. Sea Grant, identified 20 introduced species, 11 cryptogenic species, and 84 native species at two Casco Bay sites (Spring Point Marina in South Portland and Brewer South Freeport Marine in Freeport). The introduced species included one red alga, seven arthropods, three bryozoans, six tunicates, one anemone and two mollusks (Wells *et al.* 2014)

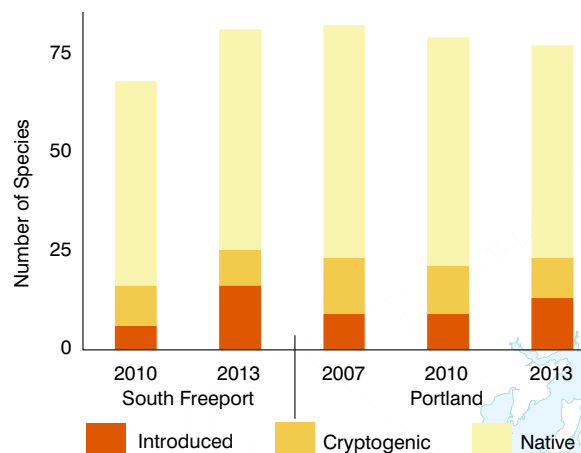
Established in 2004, the Maine Marine Invasive Species Collaborative (MMISCo) brings together staff from state and federal agencies, research institutions, and public, private, and industry organizations to collectively address marine invasive species issues and related impacts. The group collaborates to conduct research and outreach activities that generate, collect and disseminate information. It also helps inform marine and coastal resource management decisions at local, state, and regional levels.

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Numbers of Introduced Species Increasing Regionally

Bottom-dwelling (benthic) communities in the Gulf of Maine have been going through major shifts in species composition since the 1970s, and the introduction of non-native species has been a factor in these shifts (Harris 2009; Harris and Tyrell 2001).

Since 2000, scientists have conducted regional rapid assessment surveys throughout the Northeast roughly every three years. The graph at left compares results from the rapid assessments of fouling organisms conducted at the same two Casco Bay sites in 2007, 2010, and 2013 (site-by-site data from earlier surveys are unavailable). The data at both sites show increased numbers of invasive species found. Some of the apparent increase may reflect sampling variability, but also represents the arrival of several new invaders to the Bay, such as the Asian shore crab and the European rock shrimp.



communities about the issue. In 2014, scientists at the Wells National Estuarine Research Reserve teamed up with CBEP and local volunteers to establish two new MIMIC sites on Peaks Island and Chebeague Island, and plans are underway to add more MIMIC sites around Casco Bay in the next few years.

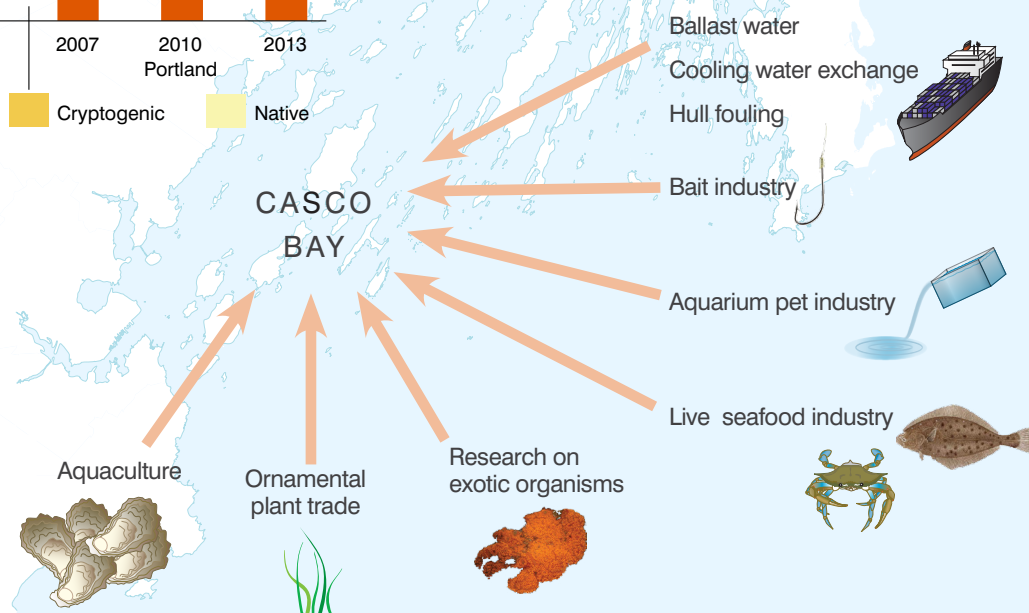
The Vital Signs program, established and managed by the Gulf of Maine Research Institute, works with citizen scientist volunteers (including students and teachers) to collect information on terrestrial, marine and freshwater aquatic invasives. A

participating class from South Portland was the first in the state to positively identify *Heterosiphonia japonica* on mainland sites in 2012, according to Maine Sea Grant.

For additional references and information, please view the Bibliography of the full *State of the Bay 2015* report at www.cascobayestuary.org/state-of-the-bay-2015.

Ongoing Monitoring Helps Detect Marine Invaders

The Marine Invader Monitoring and Information Collaborative (MIMIC), a network of New England scientists, natural resource managers, and more than 100 trained volunteers, has monitored marine invasive species at the Southern Maine Community College in South Portland since 2008. This program seeks to provide an “early detection system” for marine invaders, and to educate local



Invasive species enter Casco Bay waters through multiple pathways or vectors. Shipping is considered the most significant source (through ballast water exchange, exchange of cooling water and transport of organisms on ship hulls). Other vectors include accidental release of research organisms, release of exotic aquatic plants and animals, aquaculture of non-native species and release of non-native bait organisms.