SECTION SIX

# Living Resources/ Indicator Species

Michelle Kinsey Bruns

## Introduction

Protecting the quality and quantity of habitat is necessary to maintain biological diversity in and around Casco Bay. It is individual species, however, that often capture our attention and provide daily reminders that natural communities are in balance. Certain species, due to their unique habitat requirements or role within ecological communities, serve as broader indicators of the health of natural systems. Section Six addresses the following indicator species assemblages:

- **Eelgrass.** Eelgrass beds provide critical habitat for several commercially important fisheries. Eelgrass is a key biological indicator of the Bay's water quality because it both contributes to and depends upon good water quality. Monitoring eelgrass status provides information about physical/chemical conditions and ecological health in Casco Bay.
- **Waterbirds.** Estuaries are important seasonal stopovers in the Atlantic Flyway for migratory birds and provide essential habitat for several migratory and resident species. Waterbirds are among our most observable and charismatic fauna, and monitoring their status in Casco Bay serves as an important and visible indicator of estuarine and watershed health.
- **Marine invasive species.** Marine invasive species threaten to irreversibly change the structure of marine communities in Casco Bay and the Gulf of Maine, with significant implications for marine-based industry. Tracking the status and trends of these exotic species provides information about threats to the marine ecosystem.

INDICATOR 14

# Has eelgrass habitat in Casco Bay changed over time?

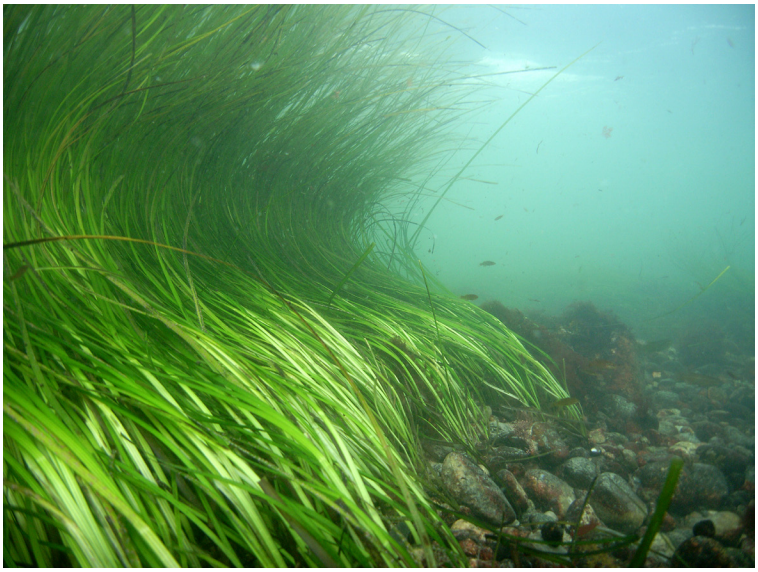
CBEP Goal: Minimize adverse environmental impacts to ecological communities from the use and development of land and marine resources.

## Why Is Eelgrass Habitat Important?

Eelgrass (*Zostera marina*) is a flowering seagrass that lives in low intertidal and subtidal marine environments. It forms extensive beds that provide critical habitat for fish, shellfish and other marine organisms throughout Casco Bay. Eelgrass leaves filter nutrients and suspended particles from the water column, and its root system stabilizes sediments. As a primary producer, eelgrass forms part of the base of estuarine food webs, and provides nursery habitat for a variety of commercially important species, as well as food for migratory winter waterfowl and fish.

In addition to their habitat values, eelgrass beds are an important indicator of the health of an estuarine ecosystem because they both contribute to – and depend upon – good water quality. Eelgrass flourishes where water quality conditions permit adequate light to penetrate to its slender leaves. Excess nutrient levels (nitrogen), along with suspended sediments from natural sources, or associated with coastal development, can lead to decreased water clarity, and increase epiphytic macroalgae growth, both of which stress individual plants.

Portland Harbor is a local example of how turbidity, and subsequent poor light penetration through the water column, can lead to the decline and loss of eelgrass beds (Tyrell 2005). Damage from dredging, boat propellers, moorings and mooring chains, anchors, docks, and shellfish dragging are additional anthropogenic causes of eelgrass decline and loss. Eelgrass beds are also susceptible to periodic infestation by slime molds, sometimes referred to as eelgrass wasting disease. Concerns are also emerging in southeastern New England about threats to eelgrass by invasive marine tunicates, which have been documented in eelgrass beds off Martha's Vineyard by scientists at the Woods Hole Oceanographic Institution (Carmen and Grunden 2010).

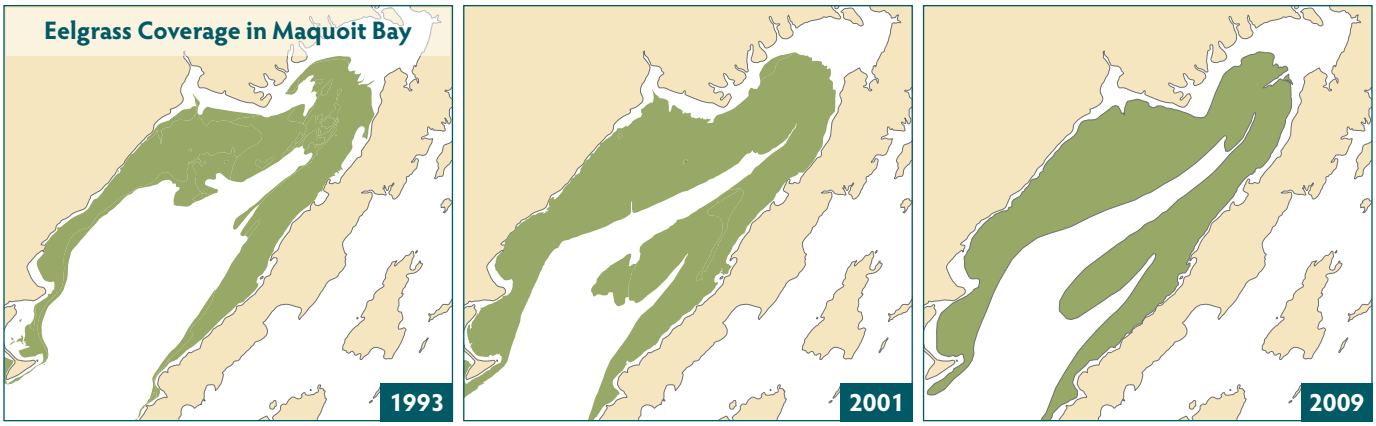


www.SeagrassLI.org

Beds of eelgrass serve as an important habitat for fish and source of food for waterfowl.

John Sowles

Healthy eelgrass beds like those off Little Flying Point in Maquoit Bay depend on good light penetration through the water column. Excess sediments create turbid water conditions and reduce water clarity, causing stressed eelgrass plants to grow long and thin, stretching toward the surface to reach adequate sunlight.




Data: 1993/2001 - Maine DMR; 2009 - J. Sowles. 2009 photointerpretation by S. Barker, Maine DMR.

## Status and Trends

### Maquoit Bay

Resource managers have not conducted a Casco Bay-wide assessment of eelgrass coverage since the 2005 *State of the Bay* report, but aerial photographs of Maquoit Bay in November 2009 provide a snapshot of coverage in one of Casco Bay's most significant eelgrass beds. Although it is not possible to fully characterize the density or percentage of cover using those photographs – which encompass the southernmost tip of Little Flying Pont across to the southernmost tip of Mere Point – there appears to be little overall change in distribution of eelgrass in Maquoit Bay since the previous analysis in 2001 (Barker 2010).

Hillary Neckles, of USGS Patuxent Wildlife Research Center, deploys an underwater video camera to measure eelgrass cover.

In 2009, a collaborative team, comprising Friends of Casco Bay, the Casco Bay Estuary Partnership, the US Geological Survey, and Bates College, began to develop a baseline of boat-based rapid assessment eelgrass data at randomly selected monitoring stations within Maquoit Bay and off Mackworth Island. Initial analysis of the 2009 data provided valuable information to help guide future eelgrass surveys in Casco Bay, and generally suggested that eelgrass is present and healthy where expected, based on previous macro-scale assessments and habitat modeling. Additional boat-based data collection should expand understanding of eelgrass conditions within Casco Bay.

## Solution and Actions

Eelgrass is vulnerable to a number of human activities, including boating. In Casco Bay, sheltered coves and bays that provide excellent mooring conditions often also support eelgrass beds. As chains drift during tide cycles, however, scour can leave a circular scar on eelgrass beds. That scouring effect can also increase turbidity in the water column, decreasing available light to adjacent plants. Although individual mooring impacts to eelgrass beds may seem insignificant, the cumulative impact of a mooring field can be locally damaging.

At the annual "Status, Trends, and Conservation of Eelgrass in Atlantic Canada and the Northeastern United States" workshop held in Portland in February 2009, attendees learned about new conservation mooring technologies that hold promise for reducing the impacts of moorings on eelgrass. Incorporating flexible rods, the moorings suspend mooring chains off the bottom to reduce scour. Under the Cooperative Habitat Protection Partnership, an initiative of the National Marine Fisheries Service, state and federal agencies are working with Massachusetts communities to promote use of the moorings, while studying their effectiveness at reducing the impacts of mooring fields on eelgrass beds. Researchers hope to determine whether the conservation moorings can indeed protect eelgrass, and whether resource managers should promote their use.

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INDICATOR 15

# What is the status of the waterbird populations of Casco Bay?

CBEP Goal: Minimize adverse environmental impacts to ecological communities from the use and development of land and marine resources.

## Why Is It Important to Monitor Waterbird Populations in Casco Bay?

Waterbirds are vulnerable to human disturbance, pollution, and the effects of a changing climate. Collecting data on the locations where waterbirds congregate to feed, rest, and reproduce improves our ability to protect those vital habitat areas from the effects of human actions. Studying population numbers, as well as how birds use the spots they return to yearly for wintering and breeding, helps us to assess environmental impacts on the birds. Comparing the waterbird populations of Casco Bay to those in other parts of Maine and New England can help to determine whether habitat threats are of local origin – such as oil spills or loss of key habitat – or originate in other parts of the birds' range.

In 2000, aerial surveys of Casco Bay waterbirds were conducted during the spring migration, nesting period, and

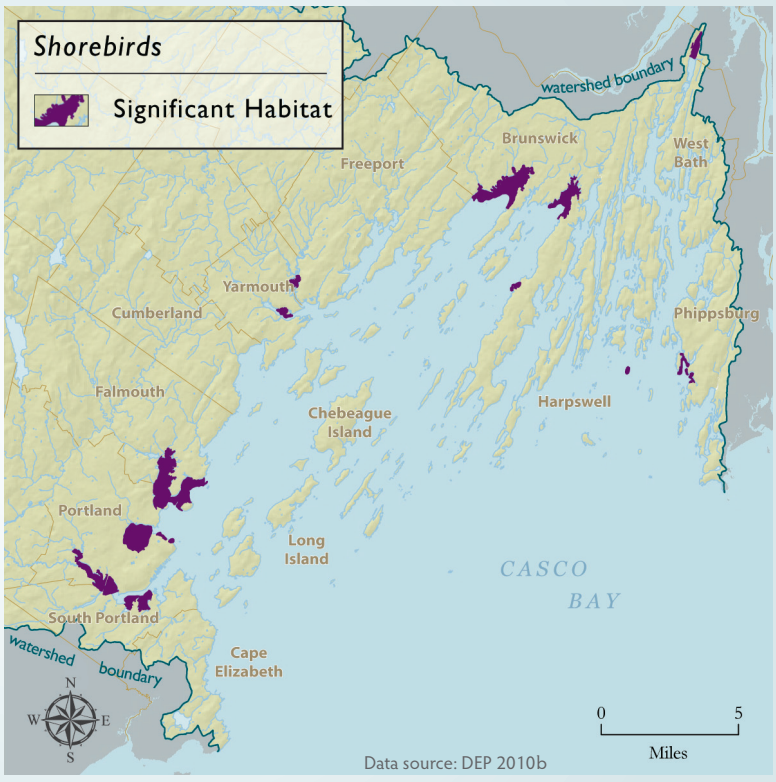
Tim Bowman

Semipalmated sandpiper (*Calidris pusilla*) ranked highest among shorebirds identified to species during a 2009 survey in Casco Bay (Biological Conservation 2009). The bird needs to double its body weight in Maine before it migrates south. One of the birds banded in Eastport, Maine was observed only 48 hours later in Suriname, South America (Maine Audubon 2009).

### State Protection of Significant Bird Habitats

MDIFW has identified and mapped Significant Wildlife Habitats including shorebird feeding and roosting areas; and inland and tidal waterfowl and wading bird habitat. In 2006, with modifications added in 2007, the DEP began regulating activities "in, on or over" those habitat areas, as well as in surrounding buffer zones

For example, more than 4,078 acres of shorebird feeding and roosting areas in the Casco Bay watershed now receive some protection from human disturbance (DEP 2007). The types of activities that require a permit within those habitats include residential and commercial development, road construction, the building of new wharves, and bridge construction. The permit may allow such activities if they are done in a way that minimizes harm to the birds and their habitat. Those protection measures support the survival and resilience of Casco Bay's waterbird populations.



fall migration. The results of those surveys are discussed in the 2005 *State of the Bay* report. Since then, CBEP and others have continued to study and monitor Casco Bay waterbirds including shorebirds (birds that feed in the intertidal such as plovers and sandpipers), island-nesting terns, and common eiders. This section focuses on those studies.

## Status and Trends

### Shorebird Surveys

In summer 2009, with funding from CBEP and Maine Coastal Program, Maine Inland Fish and Wildlife (MDIFW), US Fish and Wildlife Service (USFWS), Biological Conservation began a ground-based shorebird monitoring program focusing on a subset of state-designated habitat areas (see sidebar). The multiyear study will help to characterize habitat functions and identify trends in habitat usage. The data can be used to develop management strategies to promote the resilience of Casco Bay's shorebird populations as they respond to ecological stresses, including habitat loss and climate change.

The 2009 monitoring focused on areas designated by MDIFW as shorebird staging areas (areas where birds feed and rest during migration periods). In addition, the program examined sites on 15 Casco Bay islands and ledges to identify important roosting areas – where birds rest during high tide.

The results are indicated in the table. A total of 35 non-shorebird taxa were also identified during the shorebird surveys, including gulls, waterfowl and cormorants. Shorebirds were not common at island roosting sites, perhaps because the island roosting survey took place on just a single day. Data collected during that initial sampling season suggest that 2009 was not a typical year. Birds arrived in Maine late, and heavy rainfall caused high water conditions in early summer. Analysis of long term trends in shorebird abundance is likely to require many years of data collection, so that year to year variation can be taken into account. In 2010, scientists will both increase monitoring of state-designated roosting areas, and increase frequency of monitoring at selected sites.

Shorebirds observed at Casco Bay sites during July 23 – October 14, 2009 surveys of state-identified feeding areas. Each site was surveyed on six separate days at least one week apart, with the exception of Mackworth Flats, which was surveyed four times. The Presumpscot, Stroudwater and Mackworth areas had the greatest number of shorebirds observed at each site. ("Peeps" refers to small sandpipers not identified to species.) (Biological Conservation 2009).

| | Upper New Meadows | Maquoit Bay | Royal River | Presumpscot River | Mackworth Flats | Back Cove | Stroudwater River | Upper Fore River | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| Black-bellied plover | 0 | 155 | 17 | 118 | 0 | 83 | 0 | 21 | **394** |
| Semipalmated plover | 0 | 53 | 74 | 9 | 259 | 90 | 27 | 1 | **513** |
| Killdeer | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | **2** |
| Greater yellowlegs | 7 | 85 | 14 | 7 | 0 | 96 | 1 | 6 | **216** |
| Lesser yellowlegs | 0 | 33 | 6 | 3 | 1 | 2 | 3 | 2 | **50** |
| Yellowlegs spp. | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | **9** |
| Solitary sandpiper | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| Willet | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | **7** |
| Spotted sandpiper | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | **5** |
| Ruddy turnstone | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | **1** |
| Semipalmated sandpiper | 2 | 130 | 237 | 308 | 47 | 656 | 259 | 0 | **1639** |
| Western sandpiper | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **1** |
| Least sandpiper | 25 | 60 | 29 | 1 | 1 | 18 | 13 | 0 | **147** |
| White-rumped sandpiper | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | **2** |
| Baird's sandpiper | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | **1** |
| Pectoral sandpiper | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| Peeps | 0 | 0 | 307 | 2665 | 0 | 0 | 719 | 2 | **3693** |
| Dunlin | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | **18** |
| Short-bill. dowitcher | 0 | 76 | 0 | 13 | 2 | 1 | 0 | 1 | **93** |
| Dowitcher spp. | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | **1** |
| TOTAL | **36** | **627** | **688** | **3125** | **310** | **951** | **1023** | **33** | **6793** |

Phyllis Cooper

Common tern (*Sterna hirundo*).

### Restoring Island Nesting Terns

Common terns (*Sterna hirundo*), the most abundant tern species found in Casco Bay, breed on coastal islands and often return to the same site year after year. Once abundant, tern populations had fallen sharply by the late 1990s, largely due to gulls and other predators. Terns are now classified as a "species of special concern" by MDIFW. Colonies on Outer Green Island and Jenny Island are monitored and managed by National Audubon's Seabird Restoration Program headed by Dr. Steve Kress. CBEP has contributed funding to the effort. Those Casco Bay islands are among the few islands in Maine that still support hundreds of nesting pairs, making them especially important common tern nesting sites (MDIFW 2006).

In 2009, despite 26 inches of rain, 837 nesting pairs of common terns at Outer Green Island achieved the third-highest productivity (hatchlings fledged per nest) in the Gulf of Maine. The field crew is now using vegetation management to ensure bare-ground habitat remains available for nesting. On Jenny Island in 2009, the 578 nesting pairs of common terns had the highest productivity seen there since 1997, largely due to the absence of predators and abundant herring in the diet of chicks (National Audubon Seabird Restoration Program 2009).

### Common Eiders on Flag Island, Casco Bay

Flag Island in Harpswell is one of the most significant seabird nesting islands in Casco Bay, a premier coastal nesting site for common eiders (*Somateria mollissima dresseri*). The island was permanently protected in 2002 by the cooperative efforts of a federal, state and private partnership that included CBEP and the US Fish and Wildlife Service Gulf of Maine Coastal Program. The Rhode Island North Cape Oil Spill settlement provided major funding for the effort.

A survival and productivity study conducted on the island from 2003-2008 revealed that Flag Island eiders rely on important brood-rearing habitats in eastern Casco Bay, including Sebasco Harbor in Phippsburg and Cundy's Harbor. The nesting eider population on the island during the study period was fairly stable except for 2006, when only 200 pairs nested, perhaps related to a virus that affected eiders overwintering in Massachusetts. In 2008, 500 pairs were nesting (Allen *et al*. 2008). Pond Island and Ragged Island are also sizeable eider nesting islands in East Casco Bay.

Tim Bowman

Common eider (*Somateria mollissima dresseri*).

## Solutions and Actions

Protecting the habitat of Casco Bay's waterbirds is key to improving the birds' ability to survive human and environmental stresses. CBEP plans to continue the shorebird monitoring surveys over the next several years. The results of those surveys will help MDIFW evaluate the accuracy of their maps of Significant Wildlife Habitat, and will aid DEP in implementing regulatory protections under the National Resources Protection Act.

Oil spills are one of most dramatic impacts that waterbird populations periodically confront, causing short-term damage from the oil itself and long-term health effects related to toxic PAHs (polycyclic aromatic hydrocarbons) that can linger in the environment. DEP has developed Environmental Vulnerability Index Maps that identify coastal resources at risk from marine oil spills, including Significant Wildlife Habitat areas for waterbirds. The maps provide first responders with a tool for prioritizing and targeting protection of vulnerable habitat during the event of an oil spill (DEP 2010a).

Ongoing programs such as the monitoring, restoration and protection efforts described above are helping to ensure that the waterbird populations of Casco Bay and the larger Gulf of Maine will have the resilience to survive and remain healthy well into the 21st century.

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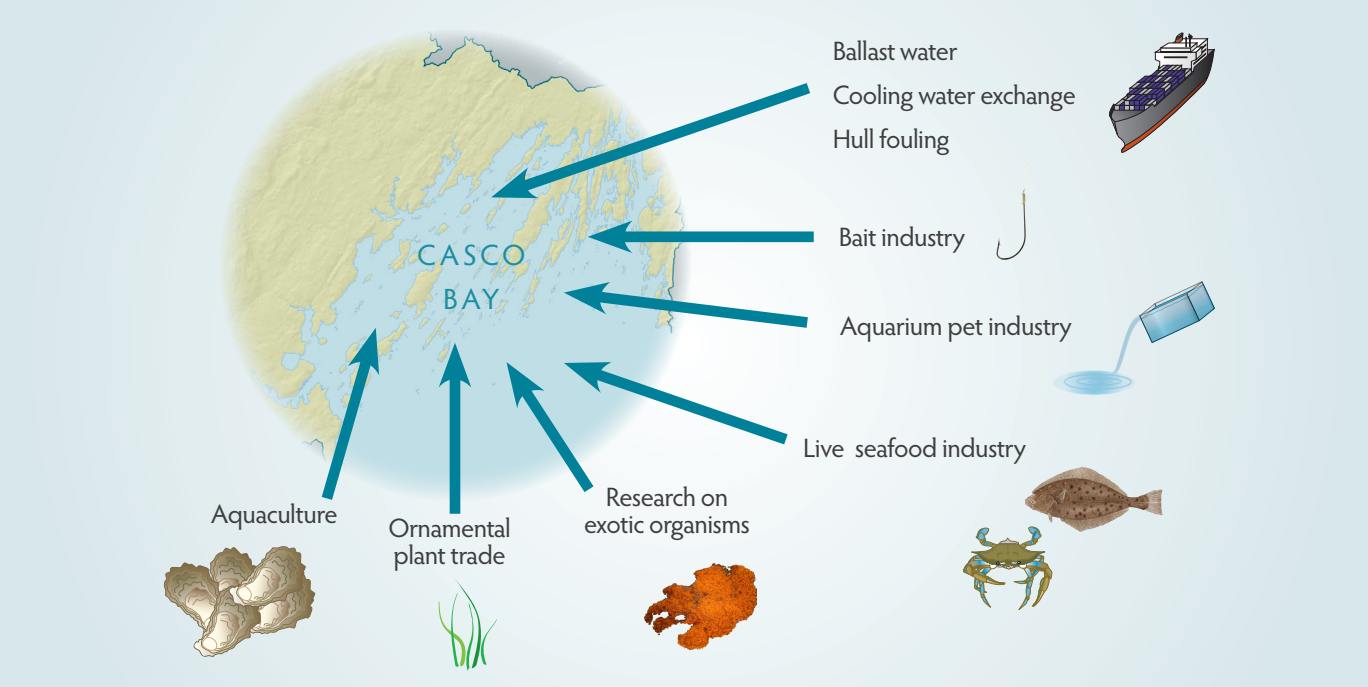
INDICATOR 16

# Are marine invasive species present in Casco Bay, and are they increasing?

CBEP Goal: Minimize adverse environmental impacts to ecological communities from the use and development of land and marine resources.




Invasive species enter Casco Bay's waters through multiple vectors – methods and mechanisms of transport. Shipping is considered the most significant source of invasive species, through ballast water exchange, exchange of cooling water, and transport of fouling organisms on the hulls of ships. Other vectors include accidental release of research organisms, release of exotic aquatic plants and animals, aquaculture of non-native species and related introduction of non-native fouling organisms, and release of non-native bait organisms.

## Why Is It Important to Monitor Marine Invasive Species?

The bottom-dwelling (benthic) communities of the Gulf of Maine have been going through major shifts in species composition since the 1970s (Harris 2009). The factors influencing those shifts include the introduction of non-native species (see the vector diagram above). When a non-native species succeeds in establishing a reproducing population – and has a negative impact on the native plant and animal community or habitat – it is called "invasive."

Disturbance of the natural community can lead to successful invasion by non-native species. For example, overfishing of predatory groundfish in the Gulf of Maine led to a boom in green sea urchins around 1980, replacing many of the kelp beds that had dominated hard bottom habitats with urchin barrens (areas grazed bare by the urchins). When the urchins were intensively fished starting in 1987, a shift occurred in the bottom community towards previously rare species. The new community was dominated by introduced species such as the green alga *Codium fragile*, colonial tunicates like *Didemnum vexillum* and *Botrylloides violaceous,* and the encrusting bryozoan *Membranipora membranacea* (Harris 2009). Those organisms are now considered to be invasive in Maine (Maine DMR 2006).

Marine communities face multiple stressors. Already affected by overfishing and introduced species, they now also experience warming waters due to climate change (see Section 7). Those elements may act together to allow non-native organisms to spread into new habitats (Harris and Tyrell 2001; Harris 2009). Once introduced species become well established, containment or eradication can become difficult or impossible because wind and currents and other vectors can quickly transport larvae and organisms over a wide range. Programs that regularly monitor the abundance and geographic extent of introduced and invasive species are key to successful management (Maine DMR 2006).

## Status of Invasive Species in Casco Bay

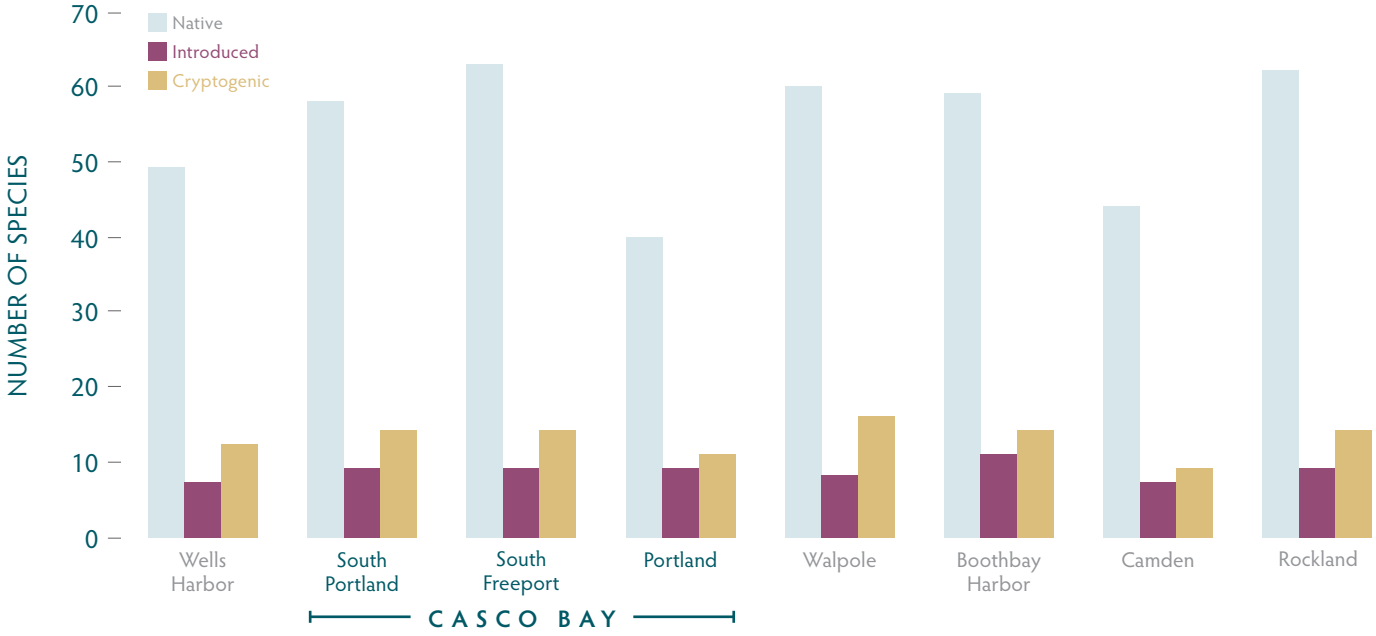
Invasive species can have significant economic and environmental impacts on fishery resources, ecosystem functions and human welfare in Casco Bay. The European green crab (*Carcinus maenus*), for example, is perhaps the most destructive established invader, responsible for reducing populations of soft-shell clams. The crab arrived in the 1800s in ballast water from the Baltic and North Seas and has become well-established in Casco Bay and throughout Maine. The invasive Asian shore crab (*Hemigrapsus sanguineus*), first reported in Casco Bay in 2001, is slowly spreading through Maine waters, and replacing native species (Maine DMR 2006). Tunicates like *D. vexillum* are spreading on bottom areas, and competing with juvenile fish and scallops for habitat and food. *Styela clava*, a clubbed tunicate from the western Pacific, fouls gear and moorings, and smothers shellfish. The spongy alga *Codium fragile* or deadman's fingers, likely introduced from Asia, is another invader that can smother shellfish beds. The bryozoan *M. membranacea* can damage kelp beds, which provide a valuable source of food and habitat, allowing *Codium* to recruit and replace the kelp (Maine DMR 2006).

In 2003 and 2007, MIT Sea Grant and the northeastern National Estuary Programs organized a weeklong "rapid assessment survey" (RAS) to examine the fouling organisms on floating docks and piers in areas with likely exposure to invaders, such as those near shipping ports. The August 2003 Casco Bay sites were Port Harbor Marine in South Portland, Portland Yacht Services, and Brewer South Freeport Marine. Of 29 introduced species identified in 2003 from across the region, 14 were present at the Casco Bay sampling sites (Pederson *et al.* 2005). In July 2007, the RAS revisited Port Harbor Marine and Brewer South Freeport Marine and added the Maine Yacht Center in Portland. The results of the 2007 RAS in coastal Maine are summarized in the following table. There was another RAS at Casco Bay sites in summer 2010, but the data are not yet available.

Gretchen Lambert

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

**Results of the 2007 Rapid Assessment Survey in Maine.** Scientists with expertise in native, introduced, and cryptogenic (not demonstrably native or introduced) species monitored the abundance of all three types of organisms at several sites (Pederson 2010). The most common non-native species in 2007 were two colonial tunicates, *Botryllus schlosseri* and *Botrylloides violaceus* and the bryozoan, *M. membranacea* , which appeared in all the stations. Other common non-native species included the club tunicate, *Styela clava*, and the European green crab. A total of 200 species were identified in the eight Maine sites, with an average of two fewer non-native species in Maine than in Massachusetts and New Hampshire sites (Pederson 2010).



## The Vital Signs Program

Students and the Public Collect and Share Data on Invasive Species and Vulnerable Habitats

In partnership with scientists, resource managers and classroom educators, the Gulf of Maine Research Institute (GMRI) developed Vital Signs, a science learning environment investigating invasive species. Vital Signs challenges middle school students to ask questions about their local habitats, find and document both native and non-native species, and share their findings with one another and with professional scientists on the program website, www.vitalsignsme.org. Vital Signs focuses on contributing to statewide efforts to document invasive species and vulnerable native species and habitats, including lakes, forests, trout streams, wetlands, fields, salt marshes, and rocky intertidal zones. Program outcomes include increased research capacity for scientists and an opportunity for students and the public to learn and to participate in scientific research.

More than 2,000 students, 15 scientists, 47 educators, and many local citizens have taken part: downloading data sheets and taxonomic resources from the website; collecting written observations and water quality measurements; documenting species with digital cameras; and referencing their data with GPS positions. Scientists, educators, and others provide feedback on their findings, and experts check the species identifications (Thus far, the participants have an 84 percent accuracy rate.) All data and resources, scientific and educational, are publicly available online. The Maine DEP and the Invasive Plant Atlas of New England, based at the University of Connecticut, are two of Vital Signs' early partners, recognizing the program's potential to focus efforts of motivated citizens and ultimately to help scientists address the diverse challenges of invasive species monitoring and research.

## Trends/Indicator Development

Maine Marine Invasive Species Working Group (MMISWG), a stakeholder committee comprising government, non-profit and academic members, has been exploring development of an indicator for the invasive tunicate *Didemnum vexillum*. As part of the state's annual May/June sea urchin dive surveys along the Maine coast, Maine Department of Marine Resources (DMR) has been collecting spring data on invasive *Didemnum* abundance since 2007. *Didemnum* typically reaches its maximum density in the fall and dies out over the winter. CBEP and Maine Department of Environmental Protection (DEP) provided funding to test the capacity of the spring data to predict fall abundance and distribution of *Didemnum* by repeating the survey in September, 2009 at twelve sites in Casco Bay and Boothbay Harbor. The data suggest that while there is a significant correlation between spring and fall abundance, there were many sampling sites where *Didemnum* was absent in the spring, but had appeared by September. In Casco Bay, *Didemnum* was not as abundant as some other areas of the coast. Additional studies will be required to establish local spring/fall abundance relationships to determine whether spring data can serve as an indicator for the extent and biomass of *Didemnum*.

Woods Hole Science Center, USGS

*Didemnum vexillum*, a harmful colonial tunicate that has invaded Casco Bay waters.

## Solution and Actions

The most effective ways to minimize problems with invasive species rely on source prevention strategies such as ballast water and fouling organism management programs. Ballast water management is now addressed in US Coast Guard (USCG) regulations requiring mid-ocean ballast water exchange and in the Vessel General Permit (VGP) issued to commercial vessels under the federal Clean Water Act. The VGP requires, for example, that vessels avoid discharging into sensitive areas (such as shellfish beds); clean tanks in mid-ocean or in dry dock; and discharge the minimum amount required for operation. The permit also requires disposal of fouling organisms from anchor chains and seawater


The US Coast Guard has proposed strict regulation of ballast water discharges based on treatment to meet numeric standards.

piping, and management of hull-cleaning away from sensitive areas (VGP 2009). USCG (2009) has proposed new national regulations requiring treatment of ballast water to reach strict numeric standards for organisms discharged and is currently working on both treatment and testing protocols. (While the majority of ships coming into Casco Bay do not discharge ballast water in port, there are some discharges every year.)

The Northeast Aquatic Nuisance Species Panel (NEANS), consisting of state and federal representatives from throughout the northeast region, is addressing non-shipping vectors through educational programs and materials for industries that import non-local marine organisms such as the hatchery, fish-farming, and bait industries; the exotic pet industry; and aquatic pet owners (Weigle 2007). Public education programs in Casco Bay include the Gulf of Maine Research Institute's Vital Signs program (see sidebar). Maine Sea Grant, working with the MMISWG and others, has distributed a brochure (2008) and a poster (2009) encouraging fishermen and others to report invasive species, including two that have not yet made it to New England: the Chinese mitten crab (see photo) and the Rapa whelk (*Rapana venosa*), which preys voraciously on several commercially important shellfish species. Early detection and reporting may make control of those invaders possible.

Actions under the State of Maine 2002 *Action Plan for Managing Aquatic Invasive Species* (DEP 2002) have been focused on managing the introduction of freshwater plants. To address marine species, the state is participating in the regional NEANS panel as well as the MMISWG. The members of MMISWG, including CBEP, are continuing to work together on invasive species indicators, as well as on the tools and strategies needed for early detection and rapid response.

Christian Fischer

The Chinese mitten crab, *Eriocheir sinensis*, is found in both estuarine and fresh waters (but not yet in Maine!). This dinner-plate sized crab burrows into muddy banks and can accelerate shoreline erosion. To report sightings, call Maine DMR 207-633-9539.


Educational poster from Maine Sea Grant.

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