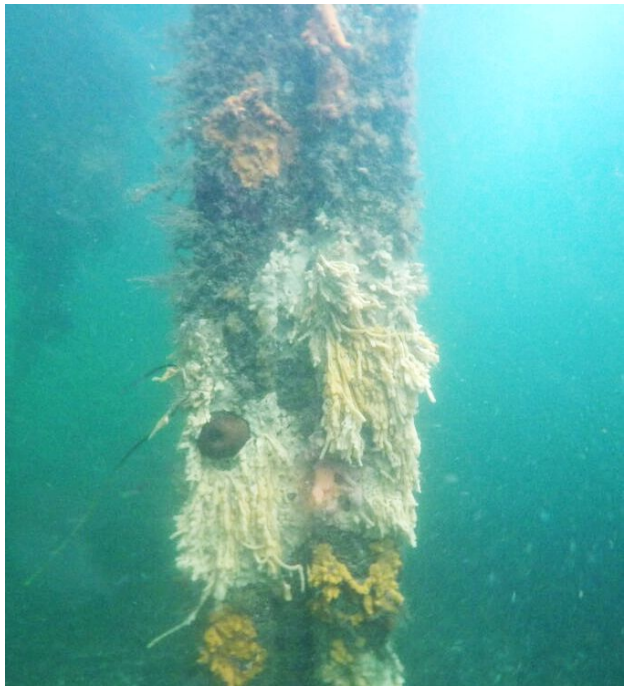
Photo: Alex Shure. Fouling community at the Public Pier in Beverly, MA on the 2023 RAS.

Monitoring introduced marine fouling species in the Gulf of Maine

Gulf of Maine Symposium
April 8, 2025

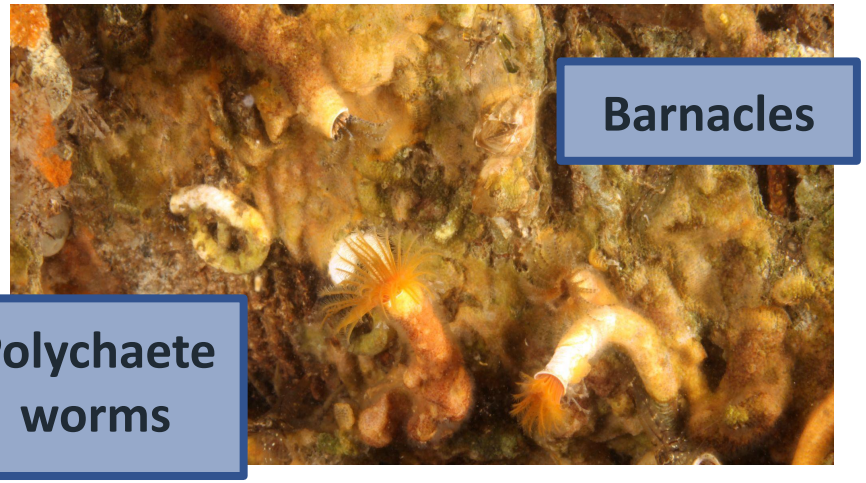
Lexie Neffinger
Coastal Habitat and Water Quality Specialist
Massachusetts Office of Coastal Zone Management

Marine Fouling Communities



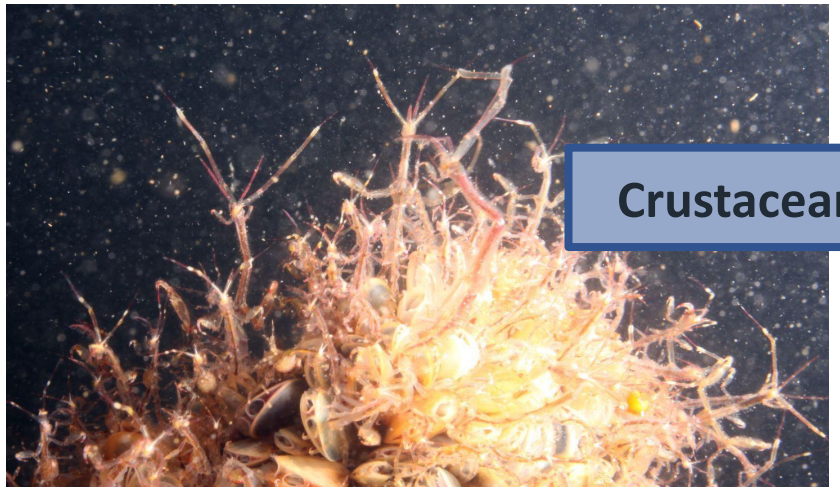
Floating docks, pilings, and other coastal structures

Marine Fouling Communities

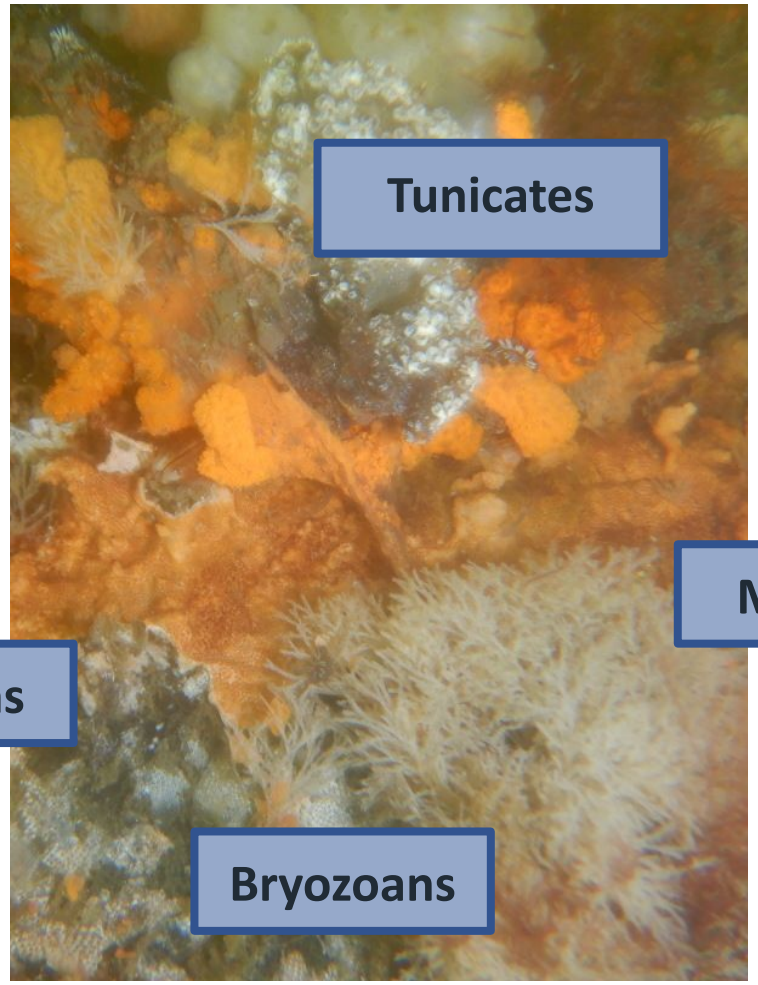


Barnacles

Polychaete worms



Crustaceans



Tunicates

Bryozoans

Anemones

Mussels

…and many other organisms!

Marine Bioinvasions: Impacts

Marine Bioinvasions: Impacts

Competition for food and space

Direct impacts to native species and habitats

Photo: Howarth et al. 2021

Impacts to coastal economies

CZM's Marine Invasive Species Program

Rapid Assessment Survey (RAS) Est. 2000

Scientific expert survey team

Identify all organisms encountered

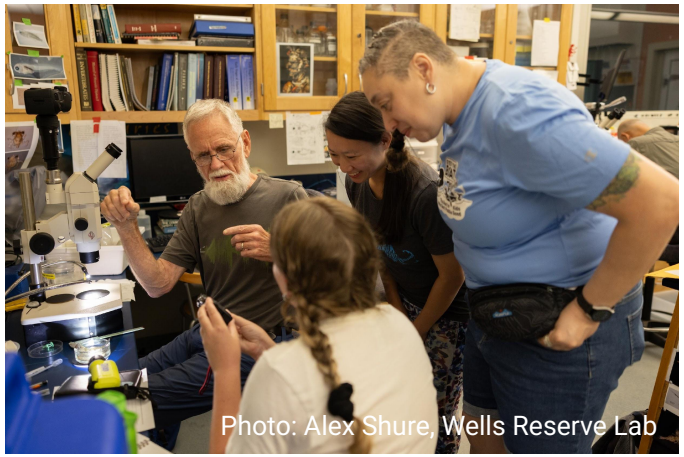
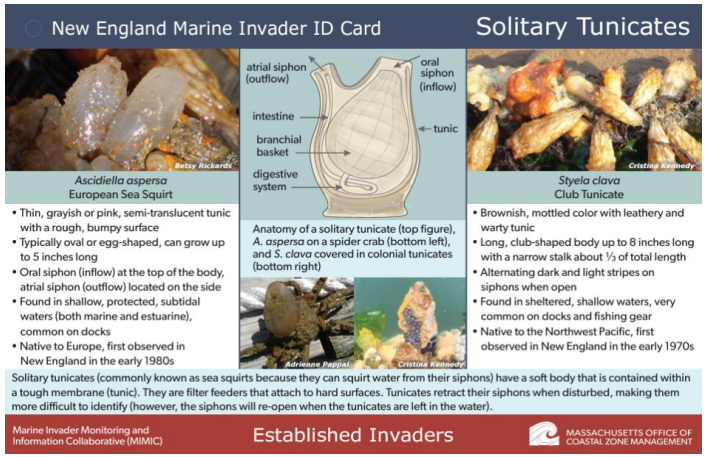


Photo: Alex Shure, Wells Reserve Lab

Marine Invader Monitoring and Information Collaborative (MIMIC) Est. 2006

Participatory science program

Monitor for 18 common invaders



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Detection
Richness
Precision

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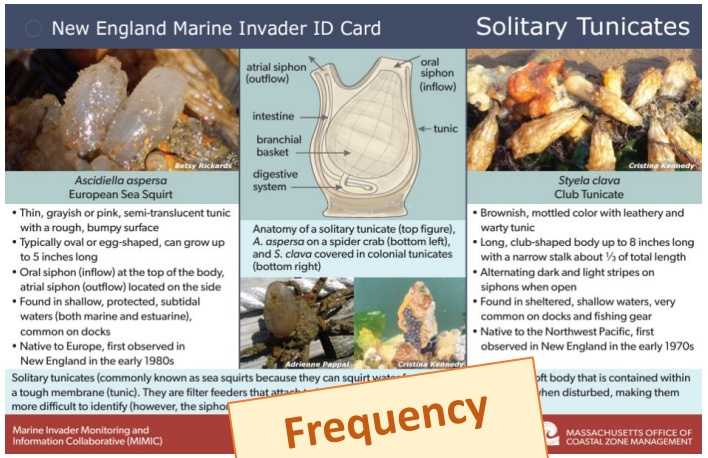

Frequency
Range
Accessibility

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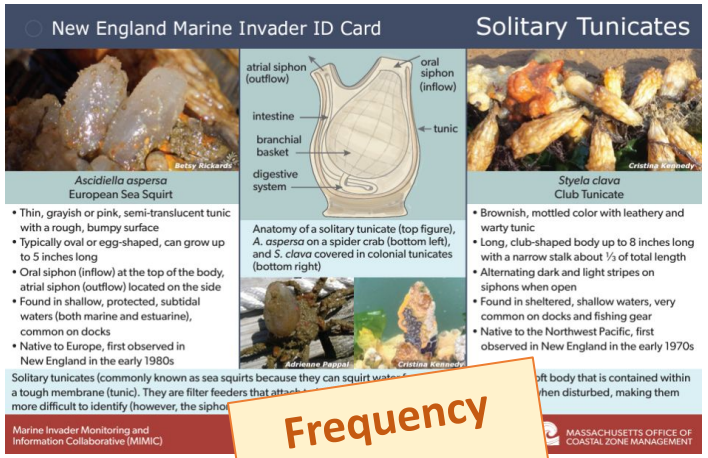

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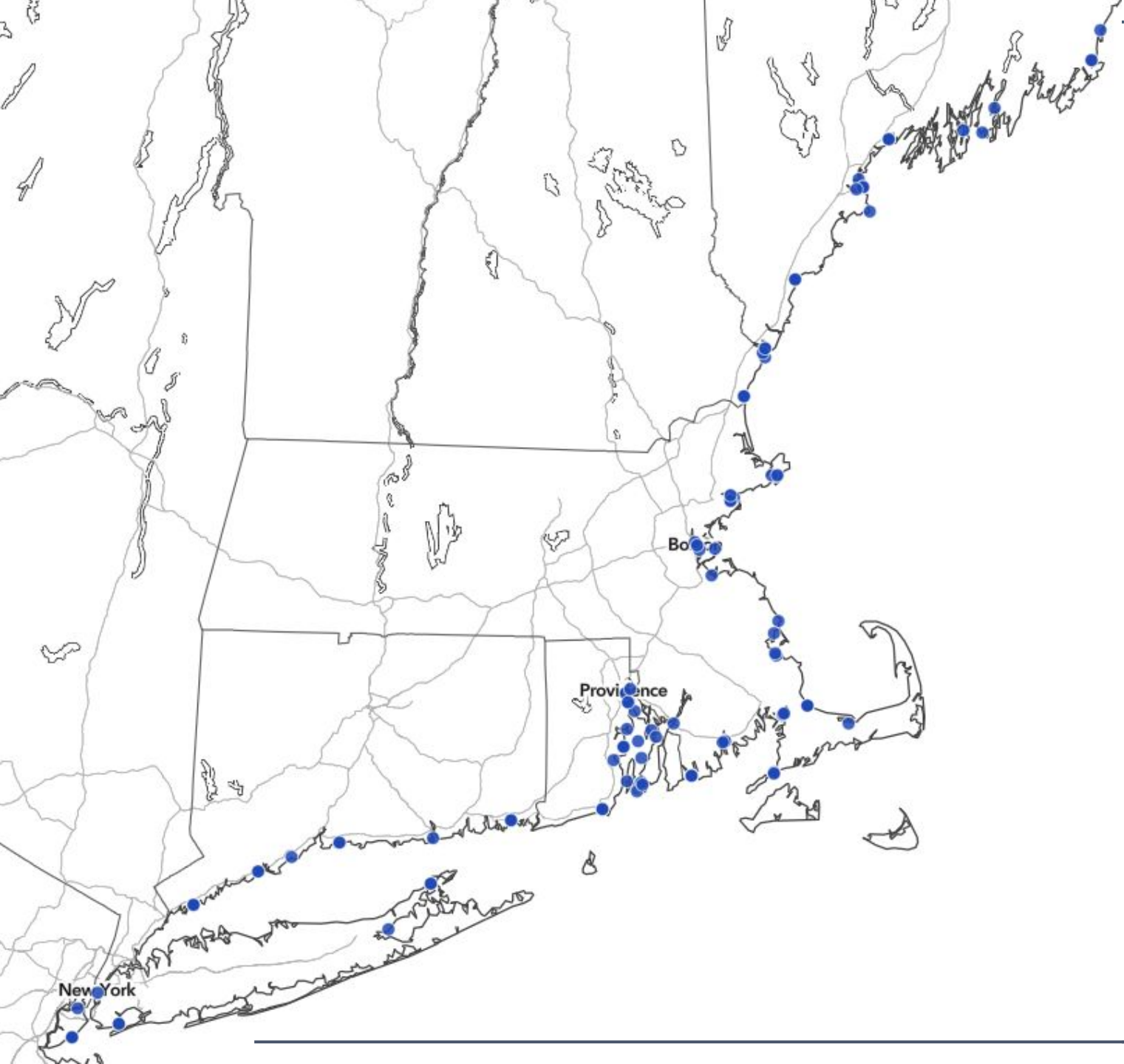


RAS Overview

STATS

Survey Years: 2000, 2003, 2007, 2010, 2013, 2018, *2019,* 2023, *2024*

Geographic Range: New York to Maine

Number of Sites: 72 (33 within the Gulf of Maine)

RAS: Selected Gulf of Maine Findings

2000

Caprella mutica
(Caprellid amphipod from NW Pacific)

Sites **from RI to MA**, no previous records from New England

2010

Palaemon elegans
(Shrimp from NE Atlantic)

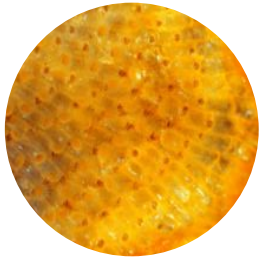
Salem, MA – first North American record

2013

Melita palmata
(Gammarid amphipod from NE Atlantic)

Boston, MA – one individual from Rowes Wharf marina; establishment unknown

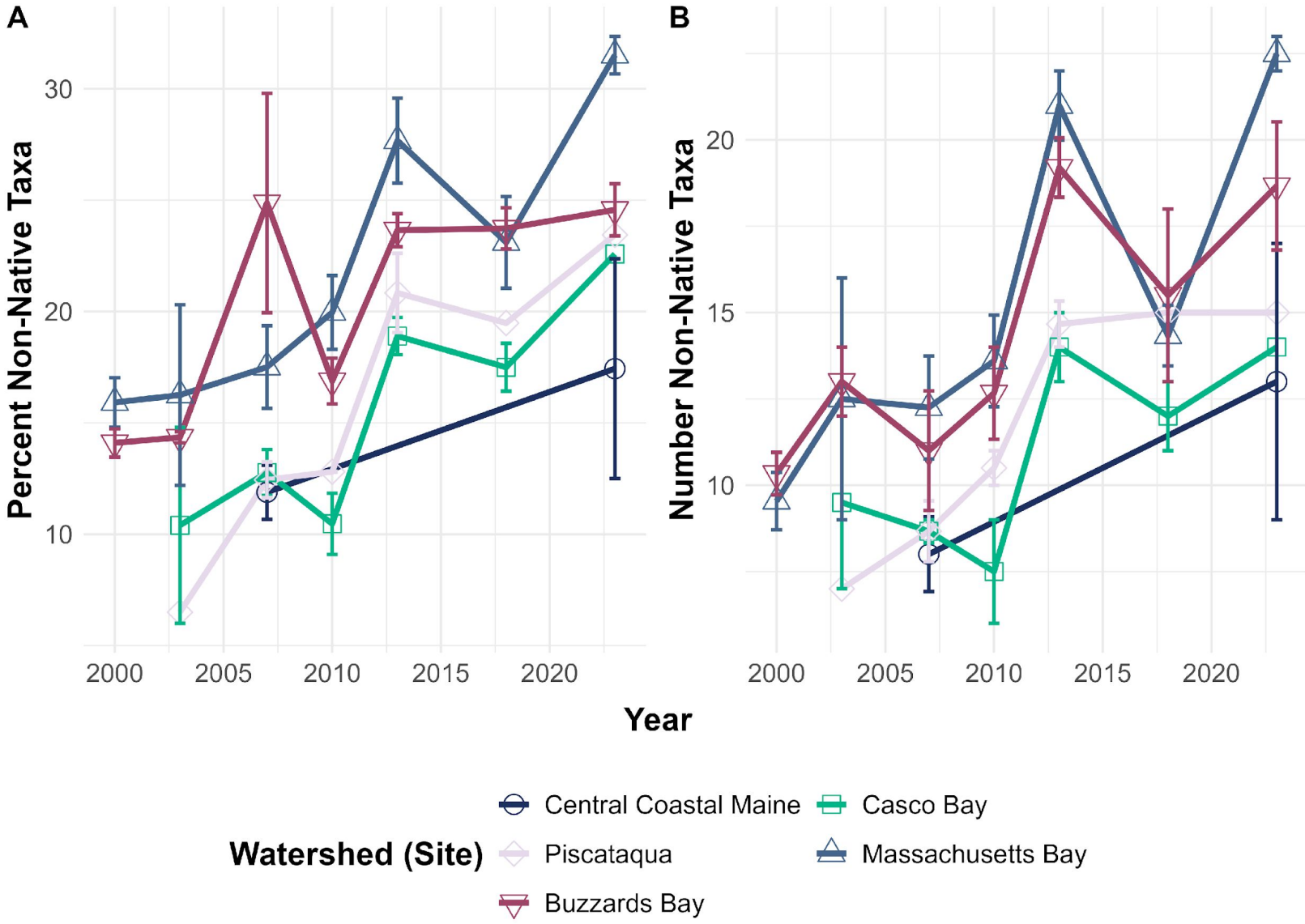
2023



Schizoporella japonica
(Bryozoan from NW Pacific)

Sandwich, MA & Rockland, ME – first records from Gulf of Maine

RAS: Temporal Trends



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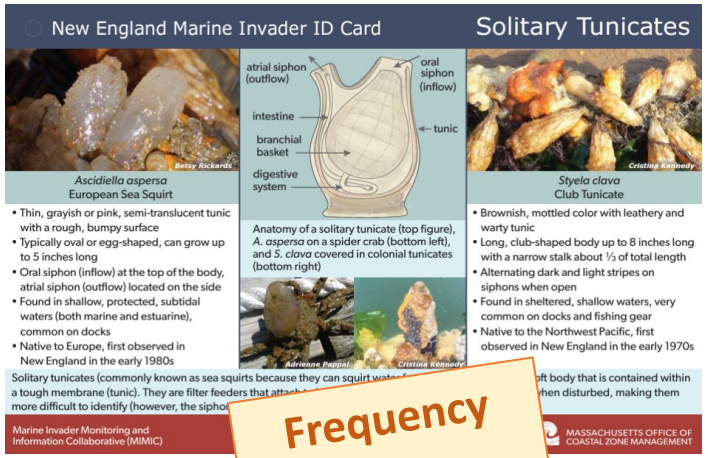


Frequency
Range
Accessibility

MIMIC Overview

STATS

Geographic Range:
Rhode Island to New Brunswick

All time (2008 – 2024)
- **181 sites**
- **32 monitoring groups**
- **1000+ individual participants**

2024 Monitoring Season
- *89 sites*
- *20 monitoring groups*
- *300+ individual participants*

MIMIC Species

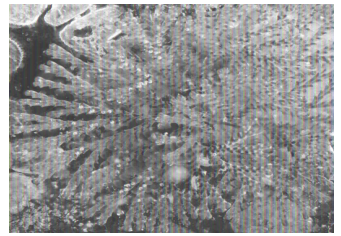
Conditions: Can be identified in the field by non-expert, trained participants

Colonial and Solitary Tunicates



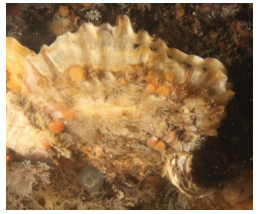

Crustaceans


Bryozoans

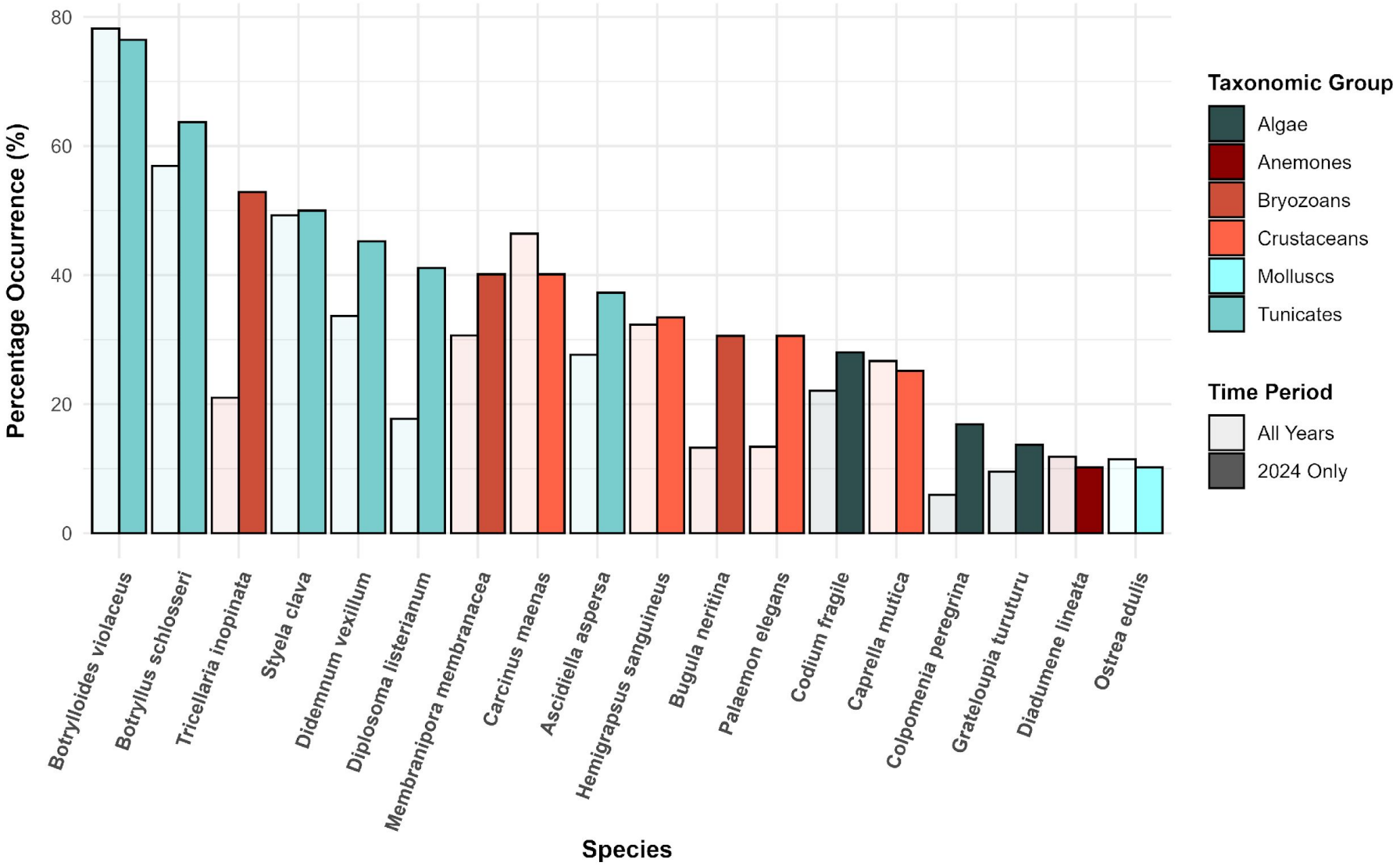


Seaweeds

Other



MIMIC Species Occurrence



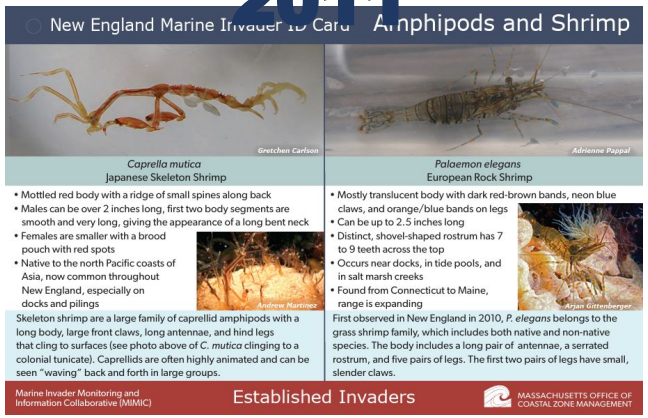
MIMIC Temporal Trends

RAS & MIMIC

2010 RAS

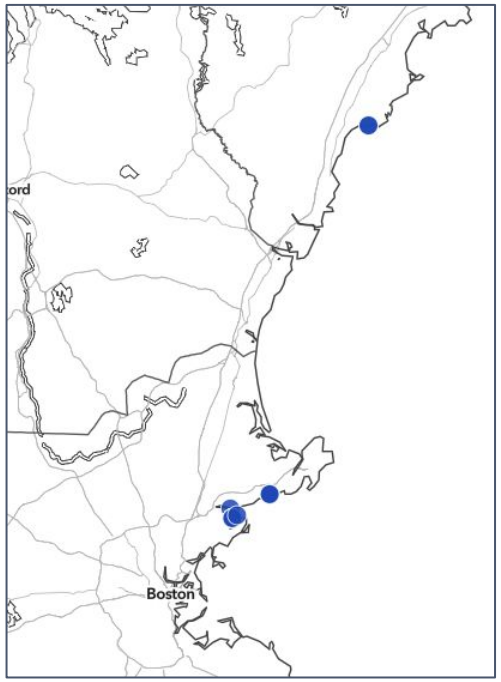
Palaemon elegans is identified at Hawthorne Cove Marina in Salem, MA

2010 – 2011



Palaemon elegans is added to the MIMIC species list

2011 MIMIC Season



Palaemon elegans is found at 5 sites, as far north as Kennebunk, ME

Program Impacts

RAS

- Comprehensive, long-term dataset of fouling communities
- Identify new species introductions
- Track range expansions of introduced species over time
- Reclassify species invasion status through time
- Inform MIMIC species list

MIMIC

- Track established species distribution and abundance more frequently across a larger geographic range
- Increase awareness of MIS issues in coastal communities
- Connect communities to the coast through participatory science

THANK YOU!

And thank you to the many, *many* MIMIC and RAS co-organizers, collaborators, participants, and funders!