

# Maine Coastal Program's Mapping Initiative

## Maine Coastal Program and Maine Geological Survey

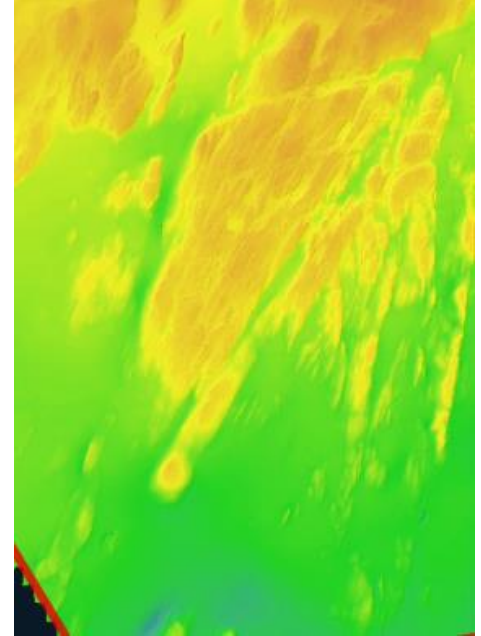
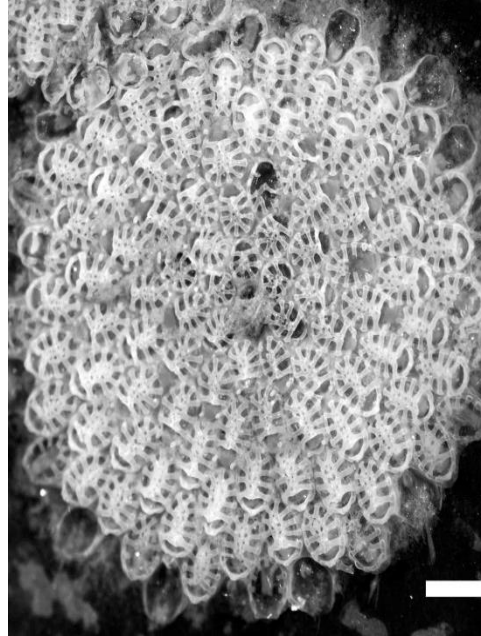
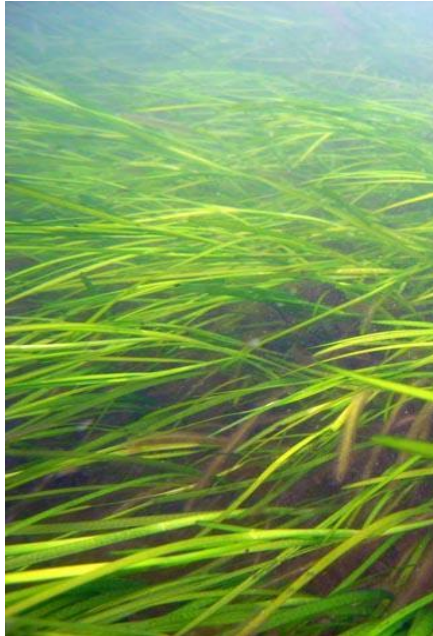
*Claire Enterline, Research Coordinator*

*Dr. Thomas Trott, Benthic Ecologist*

*Stephen Dickson, Marine Geologist*

*Benjamin Kraun, Hydrographer*

# Casco Bay 2019 Season Objectives

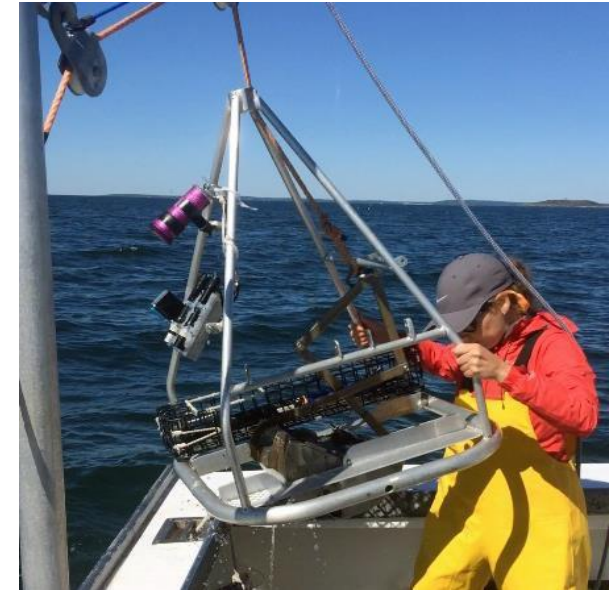


- Multibeam Echosounder (MBES) mapping in the outer bay: bathymetry, backscatter (bottom hardness), and ground truthing
- Invasive species methods comparison
- Non-native species identification and spatial extent investigations
- Cable Area Investigations





# EELGRASS AND NON-NATIVE SPECIES



## Physical Parameters

- Water Quality (ODO, Temperature, pH, Chlorophyll, Salinity, Depth)
- Sediment Grain Size

## Biological Parameters

- Species Assemblage
- Species Diversity
- Preferred habitat

## Spatial Parameters

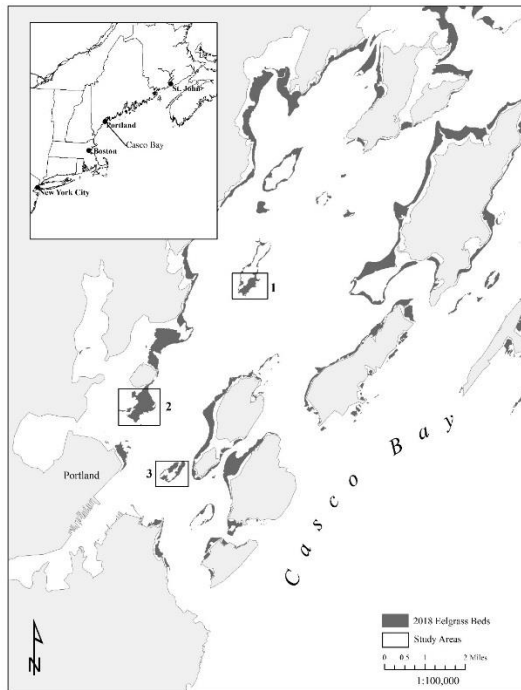
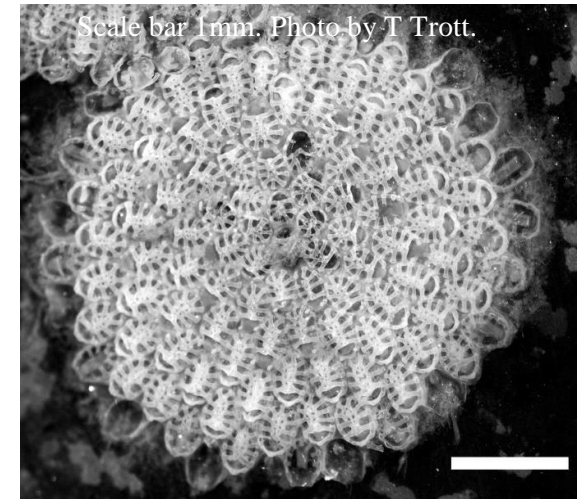
- Spatial Distribution
- Outer Bay vs. Inner Bay

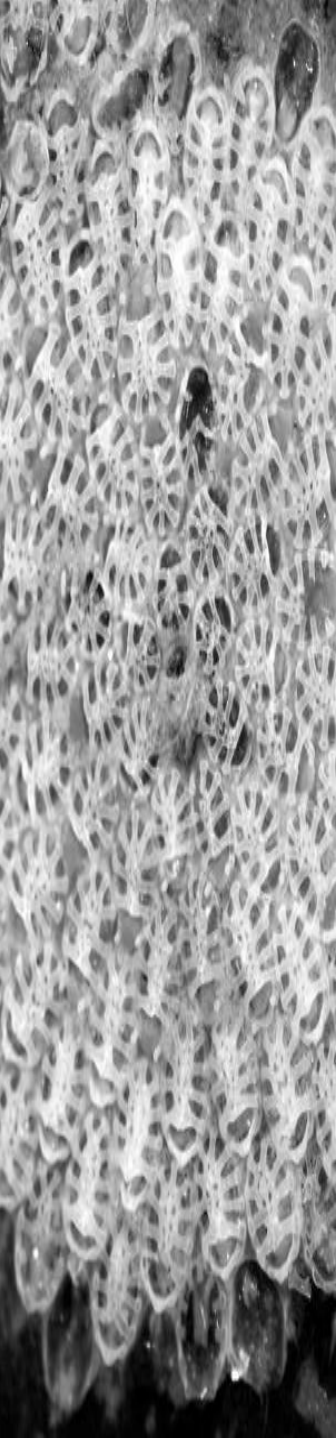




# *Cribulina mutabilis*, new observation for Northwest Atlantic

- Encrusting bryozoan native to Japan
- Light pink, flat, circular colonies
- Three kinds of zooids, the frequency of each varying with season in Japan
- Eelgrass obligate, but found on fucoid and laminarian algae in other introduced regions





## *Grandidierella japonica*, New Observation for the Northwestern Atlantic

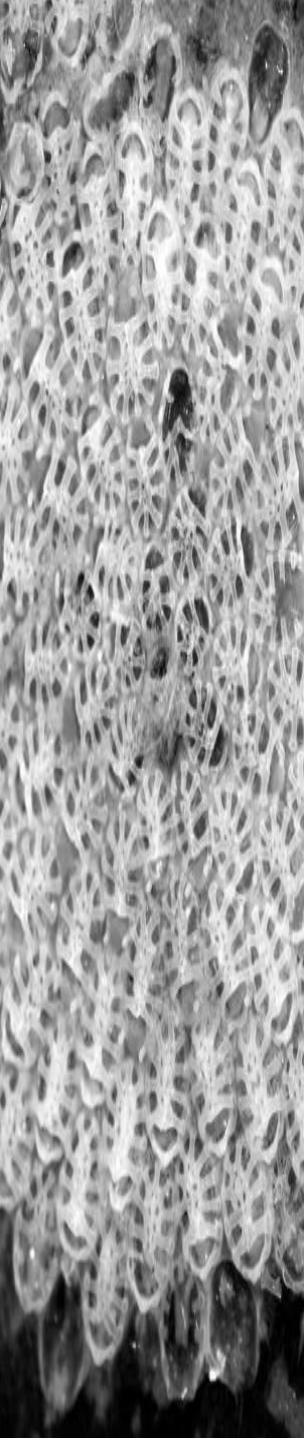


- Estuarine gammarid amphipod native to Japan, China, and Russia
- Builds U-shaped tubes on muddy substrates
- Introduced populations are known from the West coast of North America, Australia, England and France
- Impacts on US West coast not well studied
- **Analysis of 2019 samples for spatial distribution is currently ongoing**



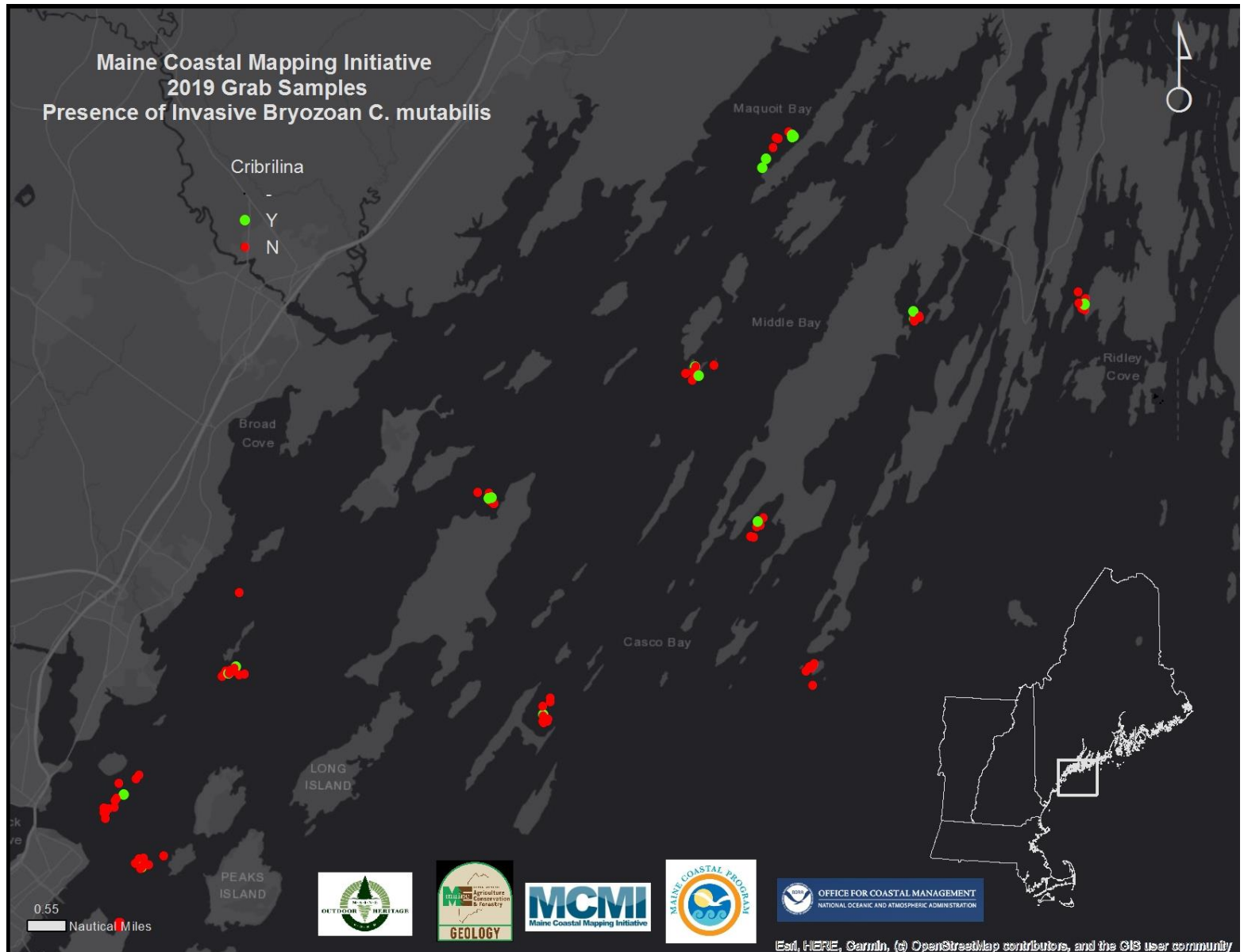
Photo by T. Trott

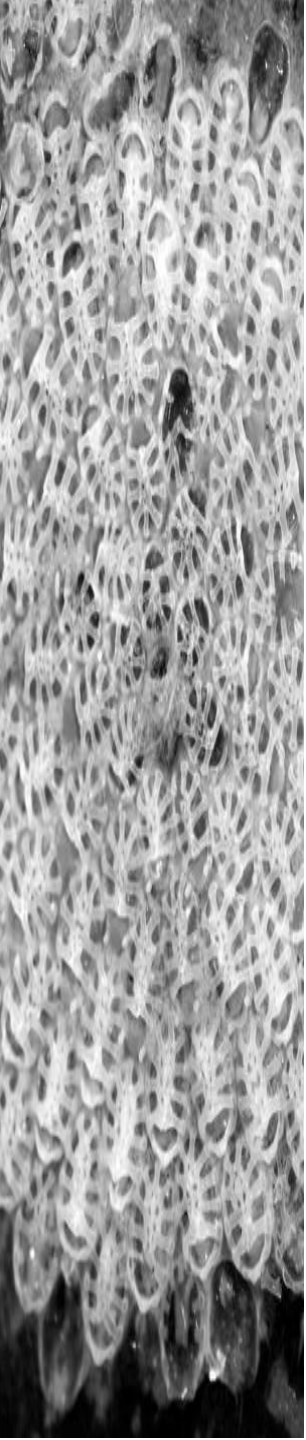




2019

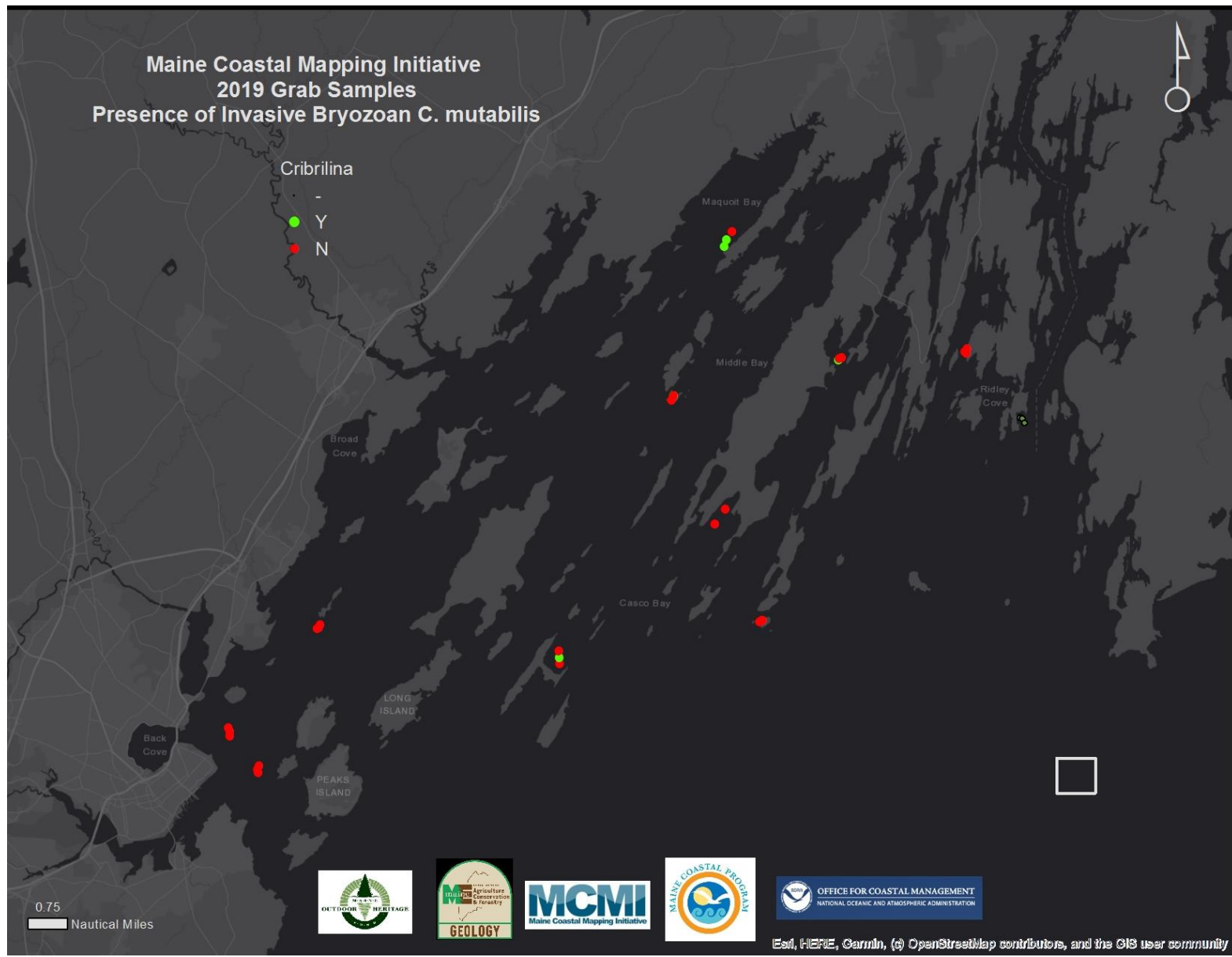
## C. MUTABILIS PRESENCE – JULY TO SEPTEMBER



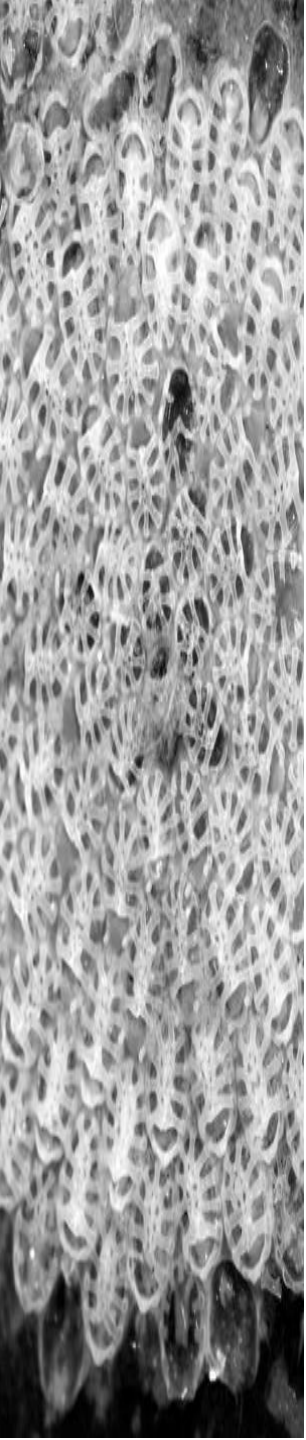


# JULY

## C. MUTABILIS PRESENCE

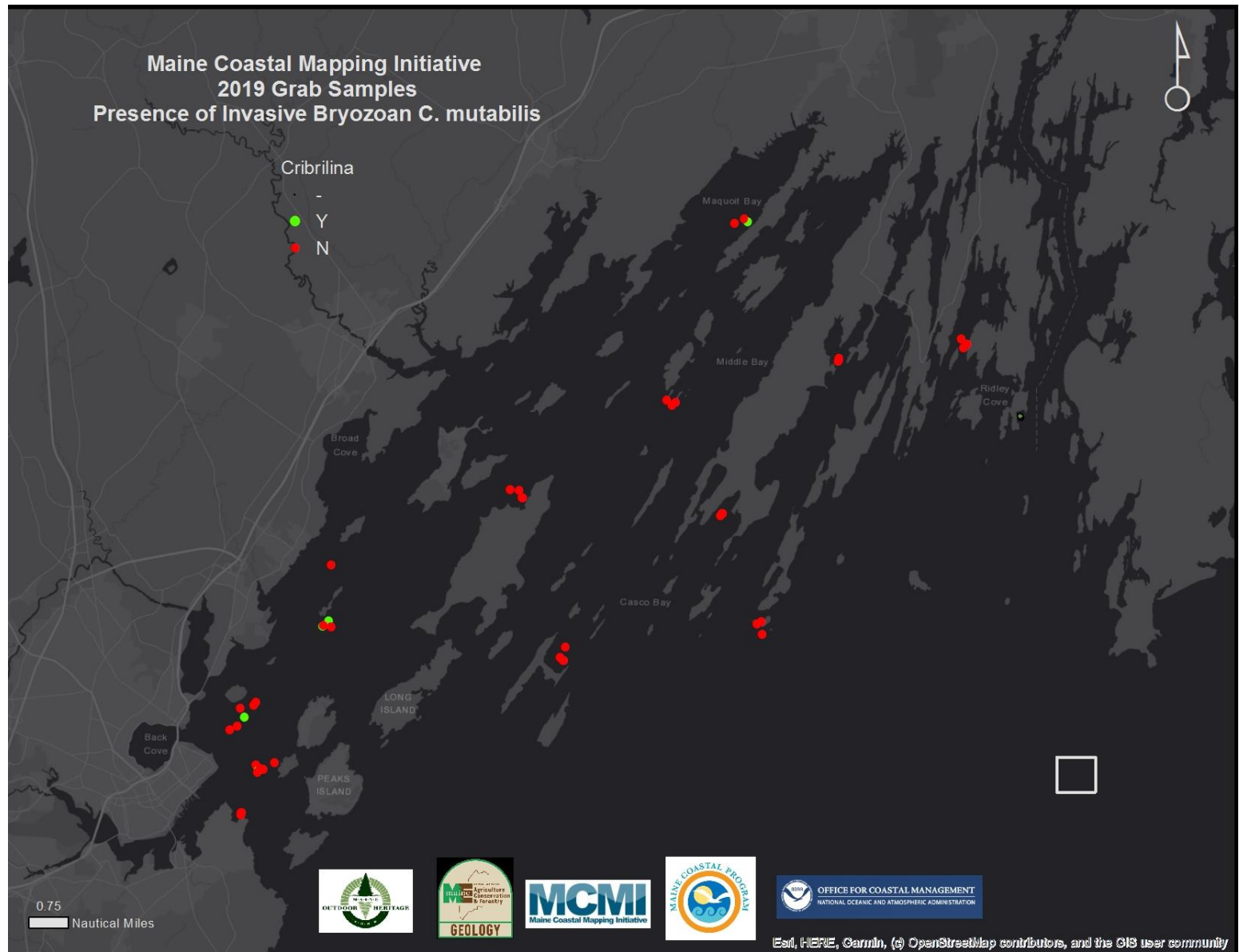


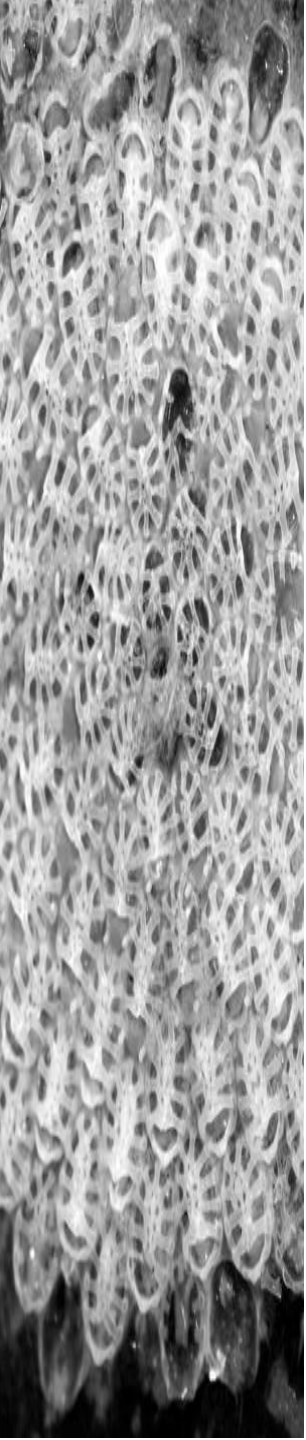




# AUGUST

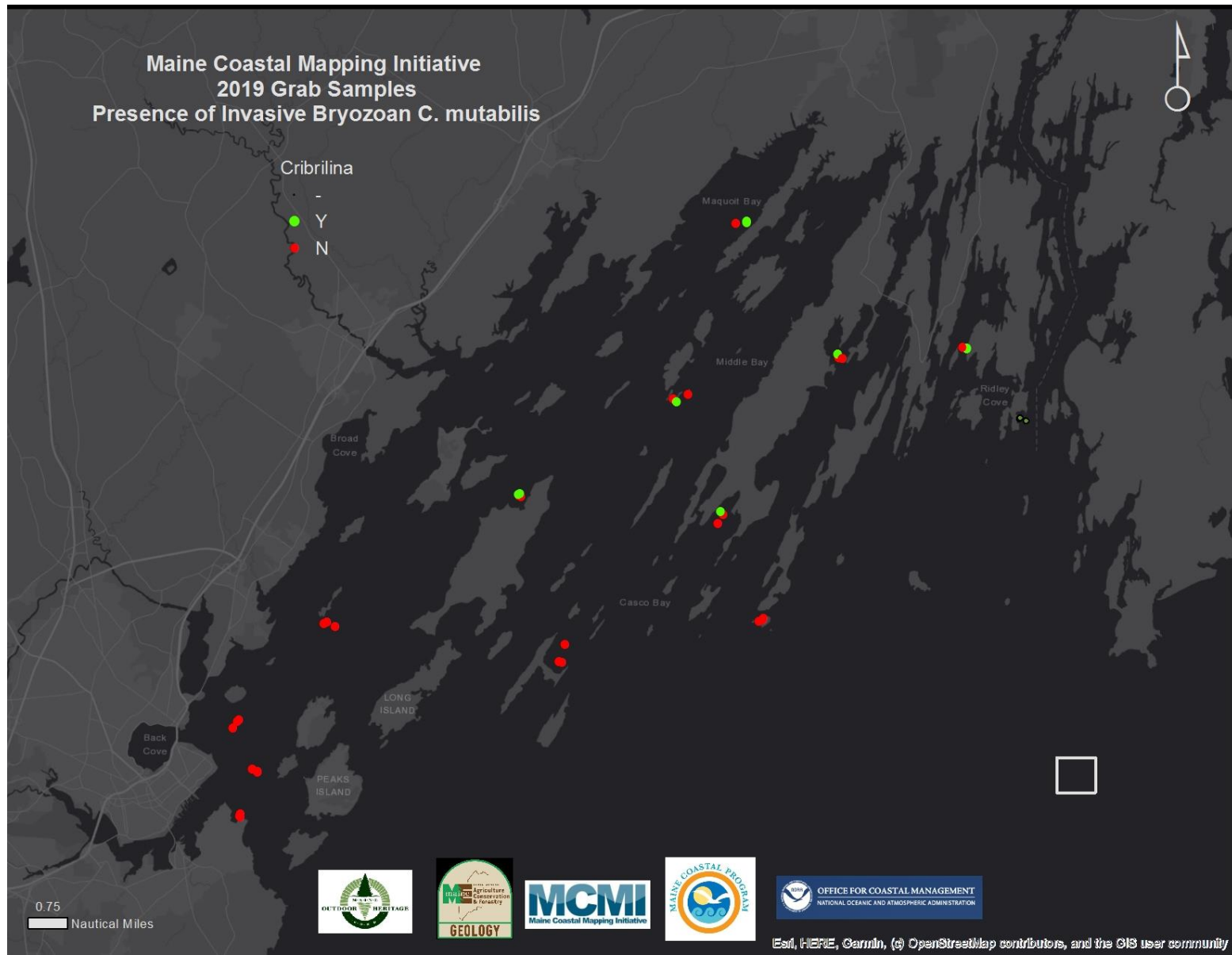
## C. MUTABILIS PRESENCE





# SEPTEMBER

## C. MUTABILIS PRESENCE

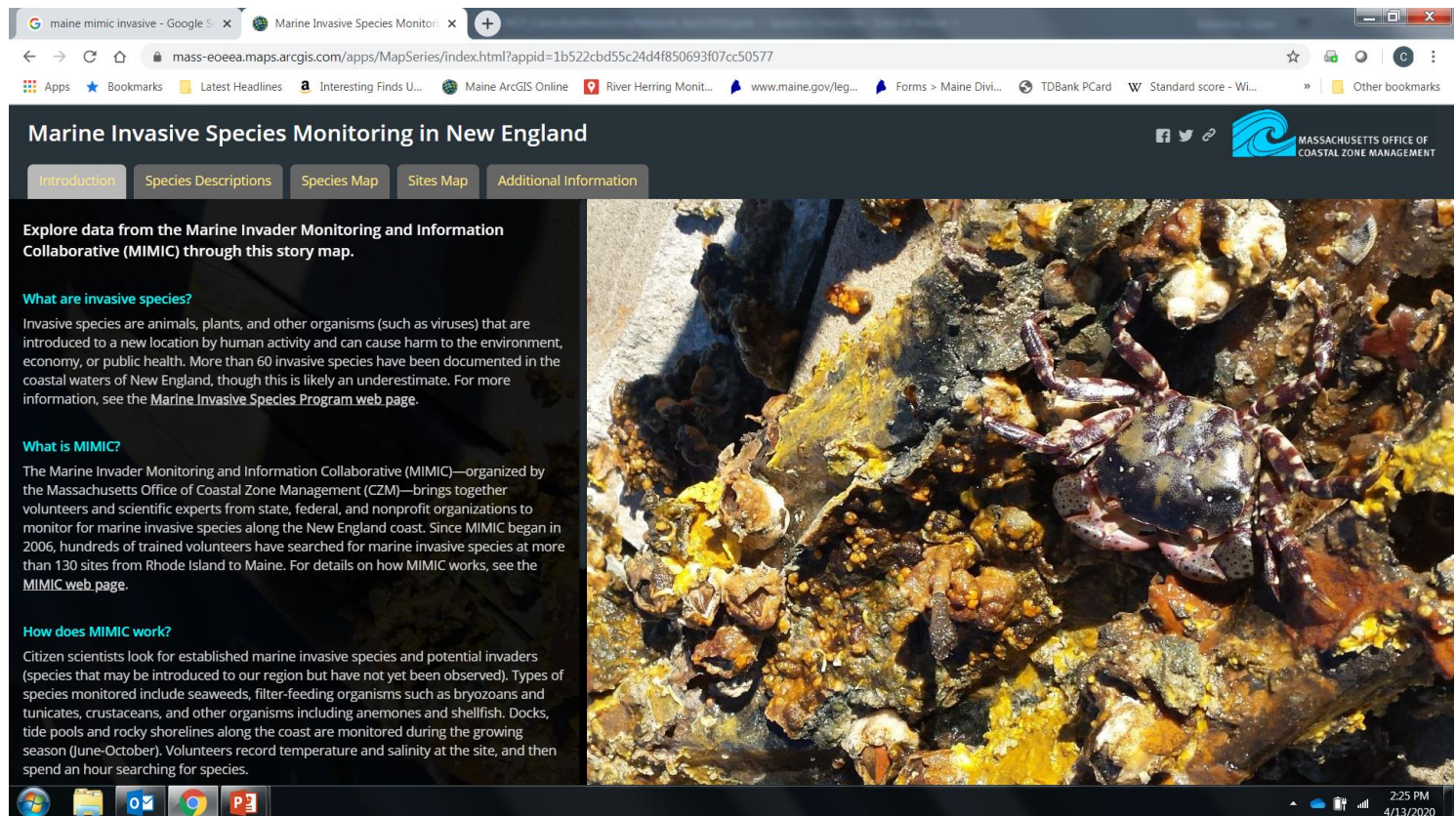





# Invasive Species: Methods Comparison

## Objective:

Evaluate the differences in detection of invasive species from dock-side, below dock (diving), and proximate “natural” benthic substrate



maine mimic invasive - Google S... Marine Invasive Species Monitor...  
mass-eoeea.maps.arcgis.com/apps/MapSeries/index.html?appid=1b522cbd55c24d4f850693f07cc50577

### Marine Invasive Species Monitoring in New England

Introduction Species Descriptions Species Map Sites Map Additional Information

Explore data from the Marine Invader Monitoring and Information Collaborative (MIMIC) through this story map.

#### What are invasive species?

Invasive species are animals, plants, and other organisms (such as viruses) that are introduced to a new location by human activity and can cause harm to the environment, economy, or public health. More than 60 invasive species have been documented in the coastal waters of New England, though this is likely an underestimate. For more information, see the [Marine Invasive Species Program web page](#).

#### What is MIMIC?

The Marine Invader Monitoring and Information Collaborative (MIMIC)—organized by the Massachusetts Office of Coastal Zone Management (CZM)—brings together volunteers and scientific experts from state, federal, and nonprofit organizations to monitor for marine invasive species along the New England coast. Since MIMIC began in 2006, hundreds of trained volunteers have searched for marine invasive species at more than 130 sites from Rhode Island to Maine. For details on how MIMIC works, see the [MIMIC web page](#).

#### How does MIMIC work?

Citizen scientists look for established marine invasive species and potential invaders (species that may be introduced to our region but have not yet been observed). Types of species monitored include seaweeds, filter-feeding organisms such as bryozoans and tunicates, crustaceans, and other organisms including anemones and shellfish. Docks, tide pools and rocky shorelines along the coast are monitored during the growing season (June-October). Volunteers record temperature and salinity at the site, and then spend an hour searching for species.

2:25 PM  
4/13/2020

# METHODS COMPARISON

		Location					
		Spring Point, South Portland			Stone Pier, Chebeague Is		
		8/14/2019	8/14/2019	8/14/2019	8/14/2019	8/14/2019	8/14/2019
	Date						
	Effort Type	Dock-side	Dive - Dock	Dive - Eelgrass	Dock-side	Dive - Dock	Dive - Eelgrass
	Salinity	26.0	29.7	29.7	35.0	35.0	35.0
	Water Temp	19.0	18.0	18.0	18.0	18.0	18.1
Solitary Tunicates	Asciidiella aspersa (European Sea Squirt)	A	-	-	R	-	
	Styela clava (Club Tunicate)	A	A	Absent	R	C	
Colonial Tunicates	Botrylloides violaceus (Sheath Tunicate)	A	-	-	C	-	F
	Botryllus schlosseri (Golden Star Tunicate)	A	F	Absent	R	Absent	R
	Didemnum vexillum (Mystery Colonial Tunicate)		C/F	Absent	A	A	F
	Diplosoma listerianum (Diplosoma Tunicate)		-	-		-	
Crabs	Carcinus maenas (European Green Crab)		C/F	F		F	F
	Hemigrapsus sanguineus (Asian Shore Crab)		Absent	Absent		Absent	
Bushy Bryozoans	Bugula neritina (Purple Bushy Bryozoan)		Absent	Absent		Absent	
	Tricellaria inopinata (Unexpected Bryozoan)	C	-	-	C	-	
Other Fauna	Caprella mutica (Japanese Skeleton Shrimp)	A	-	-	C	-	
	Diadumene lineata (Orange-Striped Anemone)		-	-		-	
	Membranipora membranacea (Lacy Crust Bryozoan)	C	-	-	R	-	
	Ostrea edulis (European Oyster)		-	-		-	
	Palaemon elegans (European Rock Shrimp)		-	-		-	
Seaweeds (Marine Algae)	Codium fragile subsp. Fragile (Green Fleece)		Absent	Absent		Absent	
	Colpomenia peregrina (Sea Potato)		-	-		-	
	Grateloupia turuturu (Red Algae)		Absent	Absent		Absent	
Encrusting Bryozoan	Cribilina mutabilis						F





## Spring Point Marina Tandem Sampling 2

2D Stress: 0

MDS shows a clear separation in species assemblages at grabs taken inside the eelgrass beds and outside the beds

SPT205



SPT206



SPT208



SPT207



Location  
▲ Inside  
◆ Outside



1. Adequate spatial separation of “outside” locations
2. Eelgrass bed is small with a defined boundary. Note that no eelgrass was in the grab outside the bed.

Figure and research credit: Thomas

## Chebeague Island Tandem Sampling 2

MDS shows less clear a separation of  
species assemblages inside vs outside

2D Stress: 0

CHT207



Location

▲ Inside

◆ Outside

CHT205



CHT206



CHT208



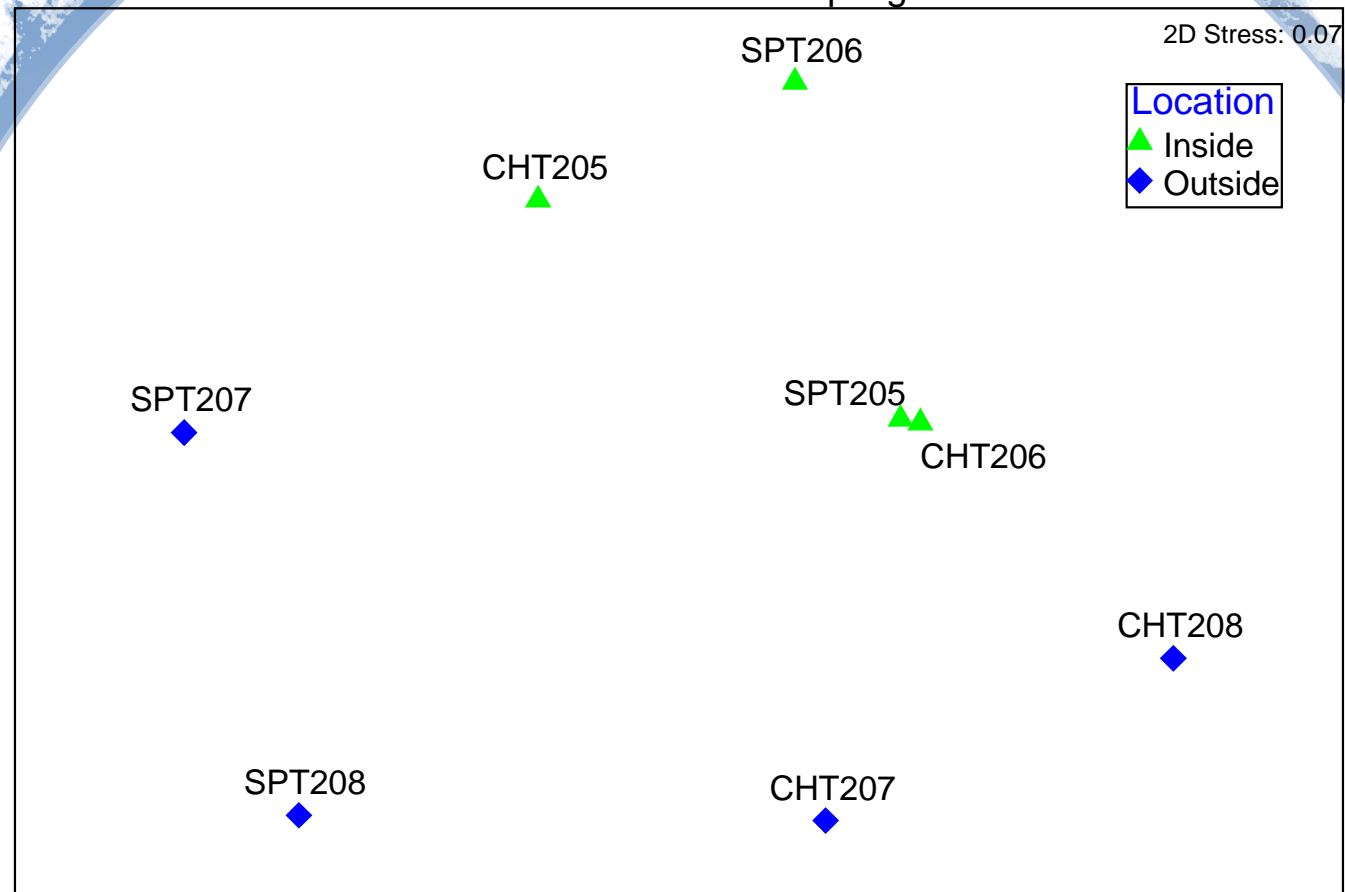
1. Grabs were not taken far enough outside  
show a clear difference
2. The bed has a diffuse boundary extending  
the area of greatest plant density  
Because *Cribrilina* was found on eelgrass in  
grabs taken outside the bed supports these



Figure and research credit: Thor



## Chebeague Island and Spring Point Marina Combined Tandem Sampling 2



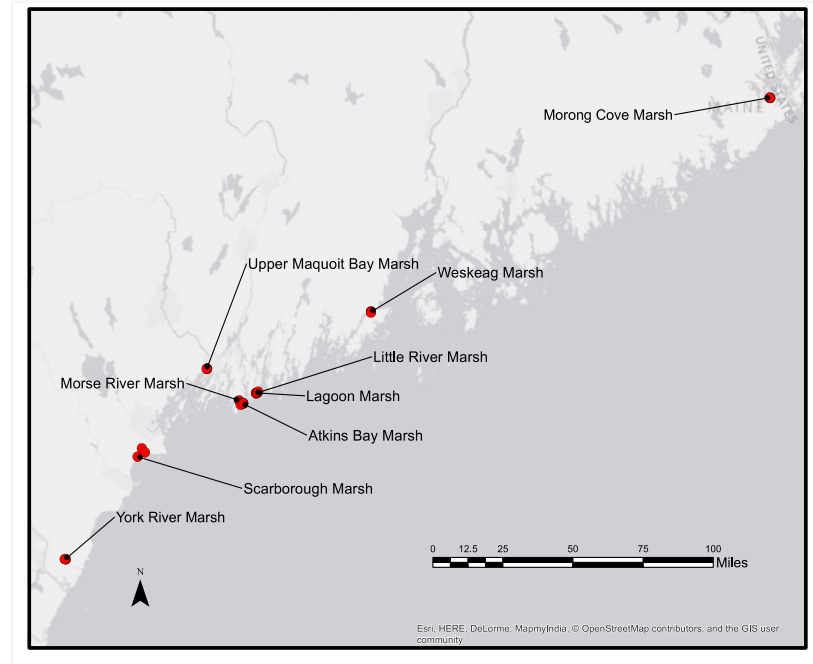
**Species assemblages sampled inside both sites are more similar to each other than the ones sampled outside both sites.**

- Clear separation between Spring Point Marina and Chebeague Island grabs outside the beds.
- In comparison, grabs taken inside beds at both sites are clustered closer together meaning they are more similar to each other.

*Figure and research credit: Thor*

# Monitoring Tidal Marsh Resilience

- Marsh Resilience Monitoring
  - RSET elevation (2 years)
  - Plant Community Analysis (2020 first data collection)
  - Water level monitoring (2019 pilot, 2020 first data collection)
- Tidal Restriction Database
- CoastWise







# Questions?

## MaineCoastalProgram.org