Benthic Habitats

Frenchman Bay Partners

Subtidal benthic habitats include a range of seabed habitat types (e.g. rocky, muddy, sandy, reefs) and support commercially important bottom-dwelling species, including lobsters, groundfish, sea cucumbers, urchins, scallops, shrimp, and mussels. In the past, Frenchman Bay was home to a lively fishing industry, which has since declined from dozens of commercial species to only a handful.

Organisms in the benthos play critical roles in many ecosystem processes, from being a food source for other marine species to cycling nutrients. One of the greatest threats to benthic habitats is commercial fishing. Legal but unsustainable practices lead to habitat modification and overharvesting.

A detailed knowledge of benthic habitats and communities in the bay will help researchers and citizen scientists track changes from an established baseline and identify potential sources of change.

FBP efforts to document benthic habitats

The ecological health of subtidal benthic habitats is integral to marine livelihoods in Frenchman Bay. Setting goals for this conservation target will benefit multiple species and habitats in Frenchman Bay.

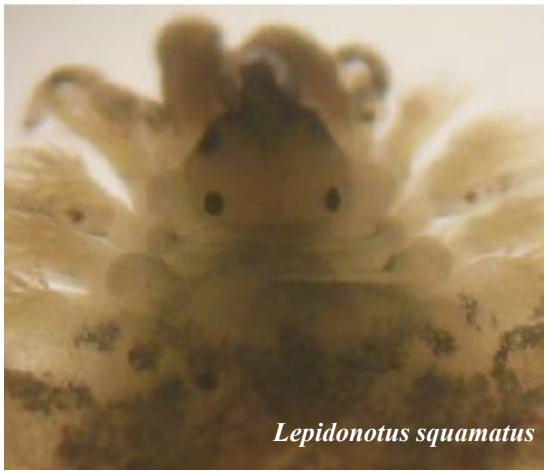
At this point, no specific goals have been outlined by the Frenchman Bay Partners. The first step in goal-setting will be identifying the spatial variation within the bay: what types of habitats and organisms do we have?

Efforts toward collecting benthic community data began in summer 2013 with a series of samplings. Data from surveys conducted in the 1920s, and historic fishing data dating as far back as the 1880s will help inform our knowledge of the diversity and distribution of habitats and species in the bay.

Factsheet

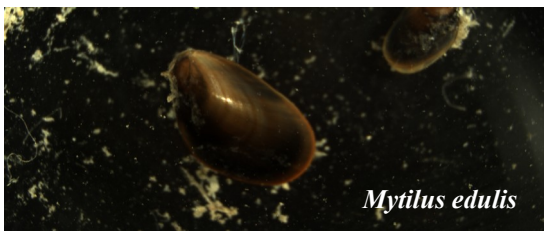
The Frenchman Bay Partners are guided by a conservation plan, the *Frenchman Bay Action Plan*, which identifies four conservation priorities:

1) Eelgrass
2) **Benthic Habitats**
3) Mudflats
4) Diadromous Fish



Lepidonotus squamatus

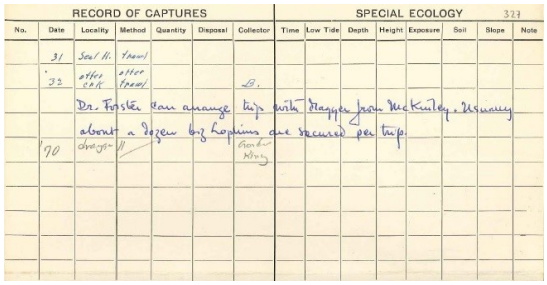
Polydora cornuta



Mytilus edulis

Benthic surveying

In the summer 2013, using a Remotely Operated Vehicle (ROV) to collect video footage as well as a grab sampler, the MDI Biological Laboratory worked with Southern Maine Community College to collect benthic community data from historically important fishing grounds as well as sites that were surveyed in the late 1920s by William Procter.


RECORD OF CAPTURES — SPECIAL ECOLOGY

MDI Biological Laboratory historical species data

The survey revealed the presence of horse mussels, invasive tunicates, scallops, sand dollars, crabs, and anemones, but no fish. In comparing Procter's data from Bald Rock and the data from this survey, nearly a century later, there was only one species cross-listed, the chalky bivalve.

Samples from benthic grab sampler

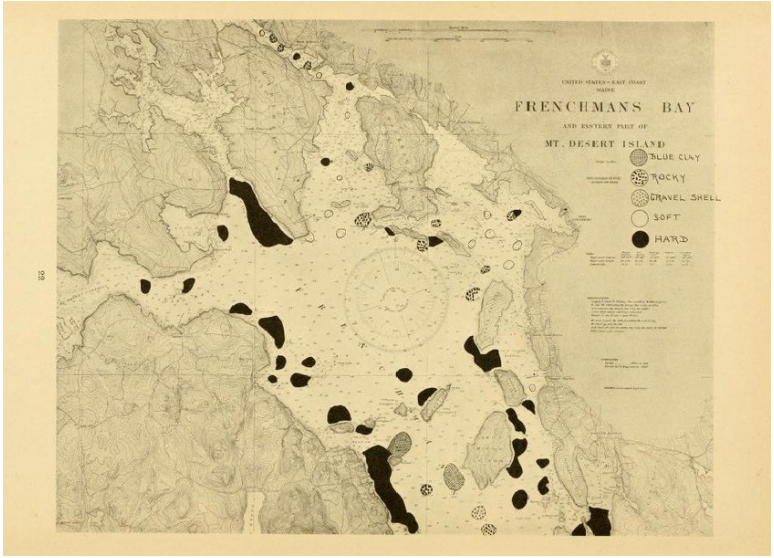
These data will be used to examine changes in marine communities at these sites over time and will also provide valuable baseline information for creating maps of the subtidal benthic habitats and communities in Frenchman Bay, which will help to inform goal-setting. Additional surveys will be necessary to increase our knowledge of the diversity and distribution of habitats and species in the bay.

Sea Anemone

Historical surveys

From 1790 to the Civil War, the cod population in Frenchman Bay was extensive. Federal support of the cod fishery required fishermen to keep meticulous records, which remain in archives. These data give us great insight into historical species and population numbers in Frenchman Bay.

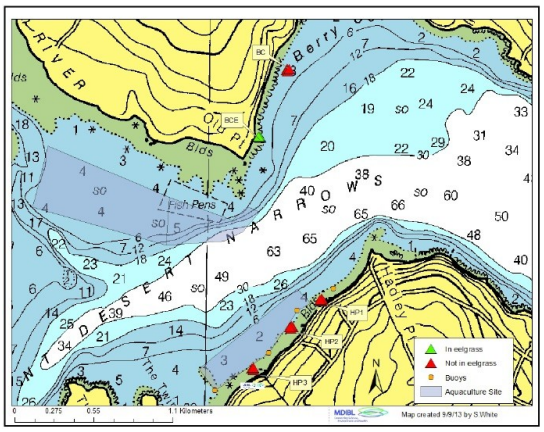
William Procter, an investment banker and naturalist who worked independently and with the MDI Biological Laboratory in the 1920s, conducted a biological survey of the Mount Desert region, cataloguing an incredible diversity of ground fish, mollusks, and more in the bay. The chart at right was published in Procter's study, and shows bottom sediment types in Frenchman Bay.



http://www.biodiversitylibrary.org/item/29112#page/26/mode/1up

Baseline sediment data

In 2013, the Community Environmental Health Lab (CEHL) launched a study to understand how restored eelgrass functions as habitat in comparison with bare sediment. Due to the 2013 disappearance of eelgrass in upper Frenchman Bay, the study focused on sampling organisms living in the sediment (infauna), which provided an array of baseline sediment data. The map at right shows survey sample sites.



Field Sampling

Twelve sediment cores, 15 cm long, were collected at each of three sample sites, for a total of 36 cores. Samples were sieved and rinsed with seawater, sorted under dissecting microscopes, identified, and recorded. Figures on next page shows species richness and average number of individuals by site.

The following table lists organisms from ocean bottom sediments identified during the 2013 survey. Presence at each site denoted by x for Berry Cove (BC), Hadley Point (HP1-3), Berry Cove Eelgrass (BCE), and Bar Island (BI).

Phylum	Class	Family	Taxon identified	BC	HP1	HP2	HP3	BCE	BI
Arthropoda	Malacostraca	Ampeliscidae	*Ampelisca macrocephala*			x			
Arthropoda	Malacostraca	Ampeliscidae	*Ampelisca vadorum*			x			
Arthropoda	Malacostraca	Ampeliscidae	*Ampelisca verrilli*	x					
Annelida	Polychaeta	Arenicolidae	*Arenicola* spp.						x
Nemertea	Anopla	Lineidae	*Cerebratulus lacteus*	x					
Annelida	Clitellata	Tubificidae	*Clitellio arenarius*	x	x	x	x		x
Arthropoda	Maxillopoda		Copepoda unid					x	
Annelida	Polychaeta	Phyllodocidae	*Eteone* sp.					x	
Annelida	Polychaeta	Maldanidae	*Euclymene zonalis*				x		
Annelida	Polychaeta	Glyceridae	*Glycera dibranchiata*				x		
Annelida	Polychaeta	Nereididae	*Hediste diversicolor*					x	
Annelida	Polychaeta	Polynoidae	*Lepidonotus squamatus*				x		
Mollusca	Gastropoda	Littorinidae	*Littorina littorea*						x
Annelida	Polychaeta	Lumbrineridae	Lumbrineridae unid.		x				
Annelida	Polychaeta	Maldanidae	Maldanidae unid.			x			
Mollusca	Bivalvia	Myidae	*Mya arenaria*				x		
Arthropoda	Malacostraca	Mysidae	*Mysis stenolepis*		x				
Mollusca	Bivalvia	Mytilidae	*Mytilus edulis* seed					x	
Nematoda			Nematodes		x		x	x	x
Nemertea			Nemertea unid.			x	x		
Annelida	Polychaeta	Nephtyidae	*Nephtys caeca*		x				
Annelida	Polychaeta	Nereididae	Nereididae unid.					x	
Annelida	Polychaeta	Nereididae	*Nereis pelagica*	x	x	x	x		x
Annelida	Polychaeta	Lumbrineridae	*Ninoe nigripes*	x	x	x	x		
Annelida	Polychaeta	Pectinariidae	*Pectinaria gouldii*	x					
Annelida	Polychaeta	Flabelligeridae	*Pherusa plumosa*				x		
Annelida	Polychaeta		Polychaete unid.			x	x	x	
Annelida	Polychaeta	Spionidae	*Polydora cornuta*	x	x	x	x		
Annelida	Polychaeta	Spionidae	*Prionospio heterobranchia*	x	x	x	x		
Annelida	Polychaeta	Lumbrineridae	*Scoletoma acicularum*				x		
Annelida	Polychaeta	Lumbrineridae	*Scoletoma fragilis*			x			
Annelida	Polychaeta	Spionidae	*Spio setosa*	x	x				
Annelida	Polychaeta	Spionidae	Spionidae unid.			x			
Annelida	Polychaeta	Spionidae	*Spiophanes bombyx*	x				x	
Annelida	Clitellata	Tubificidae	*Tubificoides benedii*	x			x		
Tracheophyta	Liliopsida	Zosteraceae	*Zostera marina* seed			x	x	x	

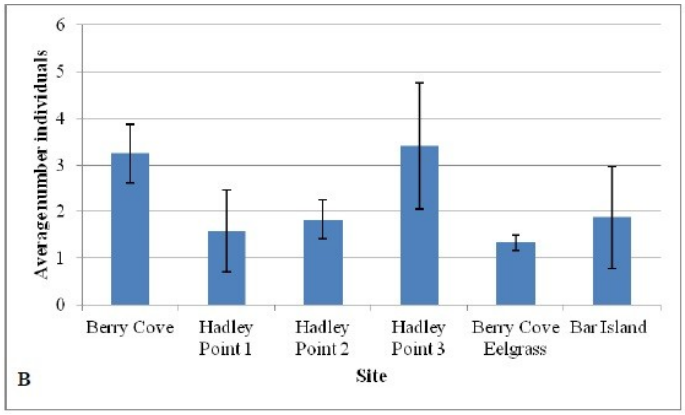


Figure 1. Average number of individuals per sample by site for infaunal organisms in cores that were ~5cm in diameter and went 15cm into the sediment (excluding mussel seed).

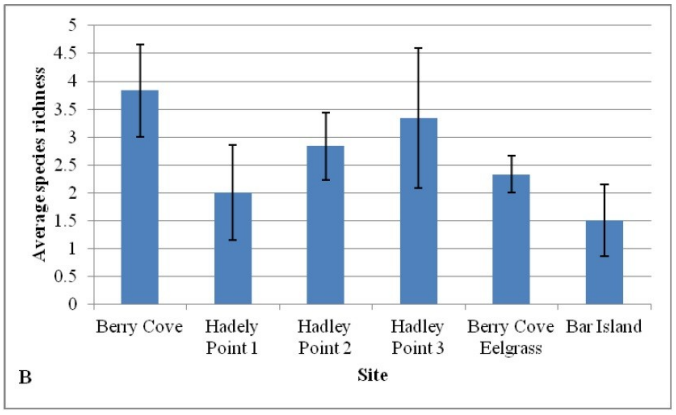


Figure 2. Average species richness per sample by site for infaunal organisms in cores that were ~5cm in diameter and went 15cm into the sediment. One sample is the average of two cores.

Next Steps

- Set specific goals for subtidal benthic habitats that will benefit multiple species.
- Develop a benthic monitoring program to help track changes from an established baseline.
- Establish a mixture of historic, unique, and random monitoring sites in the bay to provide a broad picture of Frenchman Bay.

Partners

Collaboration is critical to any Frenchman Bay Partner undertaking. Key partners on eelgrass projects include: Southern Maine Community College, Mount Desert Island Biological Laboratory, Bangor High School, College of the Atlantic.

For more information

For more information about our partners, projects, and events, visit our website at www.frenchmanbaypartners.org or call FBP President Jane Disney at 207.288.3605 x 429.

Frenchman Bay Partners

The mission of the Frenchman Bay Partners is to ensure that the Frenchman Bay area is ecologically, economically and socially healthy and resilient in the face of future challenges.