Eelgrass

Frenchman Bay Partners

Frenchman Bay's eelgrass beds are important contributors to a healthy coastal marine ecosystem. Historically, Frenchman Bay contained abundant eelgrass populations that helped keep life in the Bay thriving and maintain food an nutrient cycles in the ocean.

The benefits of eelgrass are many. Commercially important organisms such as winter flounder, striped bass, and Atlantic cod, as well as juvenile crustaceans, utilize the beds as nursery grounds. Thick mats of roots anchor eelgrass to the ocean bottom, stabilizing sediment, and reducing erosion. Eelgrass improves water quality by mitigating wave energy and helping sediment settle out.

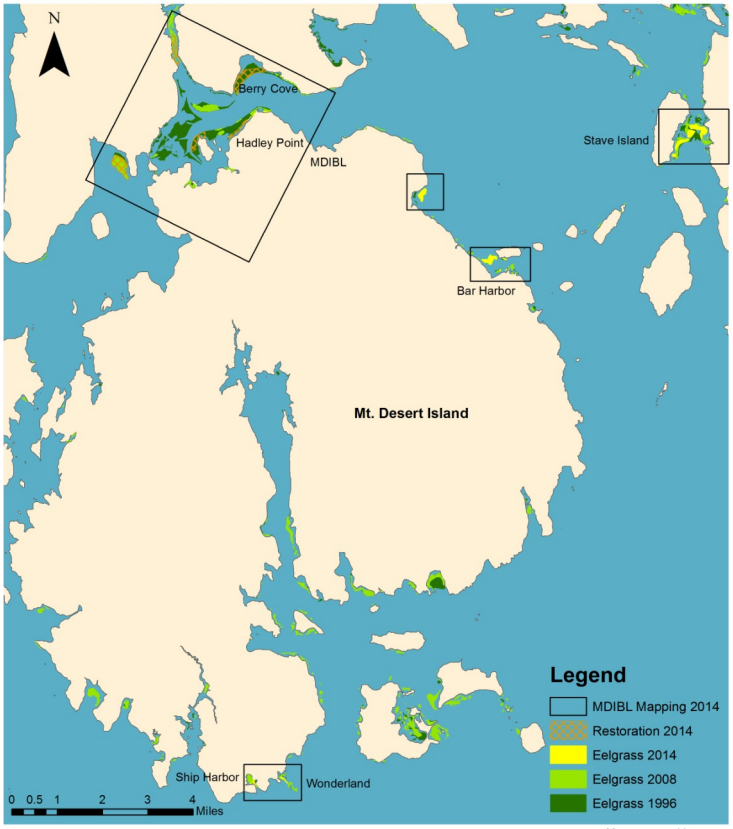
Researching eelgrass and observing changes in the habitat leads to a greater understanding of eelgrass loss and the relationships between variables.

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

Frenchman Bay Eelgrass 1996- 2014



Data Sources:
MDI Biological Laboratory
Maine DMR
ME Office of GIS

Map prepared by
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2014

Eelgrass in Frenchman Bay

Eelgrass has been declining in Frenchman Bay since it was originally mapped by Maine DMR in 1996. In 2007, a variety of community partners began working together to restore eelgrass in the bay.

At the end of 2012, all eelgrass died back in upper Frenchman Bay and did not re-emerge throughout the entire 2013 growing season. This included restored eelgrass as well as naturally occurring eelgrass.

2014 saw the reemergence of eelgrass at different areas of upper Frenchman Bay. Eelgrass seedlings were observed at Hadley Point and Berry Cove, in many cases overlaying restoration areas from previous years.

FBP efforts to restore eelgrass beds

There are strong economic, environmental, and social incentives for restoring eelgrass in Frenchman Bay. MDI Biological Laboratory, working together with various community partners, began restoration efforts in a 14 acre area at Hadley Point in 2007. In 2013, they set goals to **restore eelgrass at Hadley Point, Thomas Island, Berry Cove, and Jordan River to 1996 levels by 2030 and maintain good water quality (3-4 m transparency) and keep it at that level**.

The basic model for restoring eelgrass in Frenchman Bay involves collecting plants from the subtidal area of Stave Island, which hosts an expansive eelgrass bed. The plants are transplanted to a variety of areas using different methods.

Methods for restoring

Methods for transplanting have evolved to fit the scale of the restoration. Transplanting is accomplished a variety of ways:

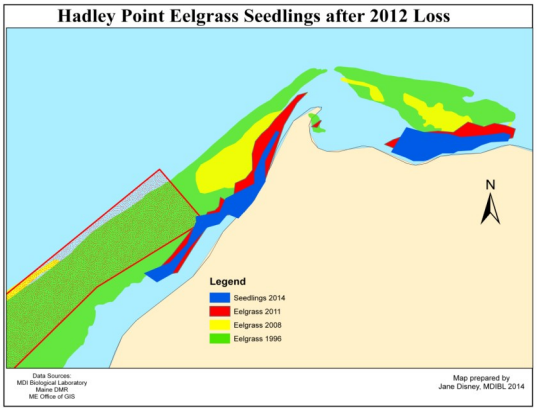
1. **Grids**: this proven (though time consuming) method has evolved into its current model, a biodegradable 2' x 2' frame. Eelgrass is either tied onto twine strings or woven through burlap.
2. **Weights**: eelgrass plants are tied onto metal washers, rocks, or ceramic weights that sink the eelgrass transplants to the ocean bottom where they root and spread.
3. **Restoration runners**: eelgrass is woven into strips of burlap weighed down by sandbags.
4. **Seeding methods** are in the works.

In 2014, 8,000 vegetative eelgrass plants were transplanted into five different areas of upper Frenchman Bay, including Berry Cove, Hadley Point, Thomas Island, Jordan River, and Goose Cove in Trenton using the various methods described above.

Seeding

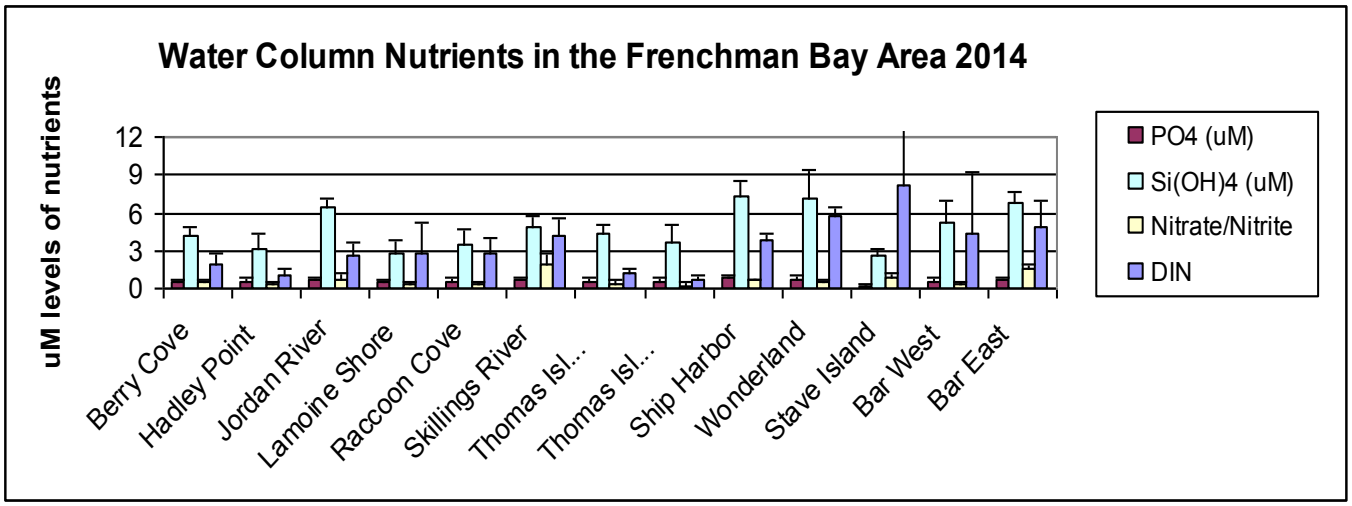
Inconsistent success with seeding efforts in the past lead to little emphasis on seeding as a viable restoration technique. However, late in the 2014 season, the discovery of small

eelgrass plants poking through the mud at Hadley Point and Berry Cove indicate seed banks can and do play a part in eelgrass area maintenance. The emergence of these plants followed the 2012 decline and 2013 disappearance of eelgrass in these areas. It can be concluded that the Hadley Point seed bank, which overlays previous years' restoration efforts, lay dormant for at least two years, underscoring the importance of protecting eelgrass areas, even when eelgrass is not present.



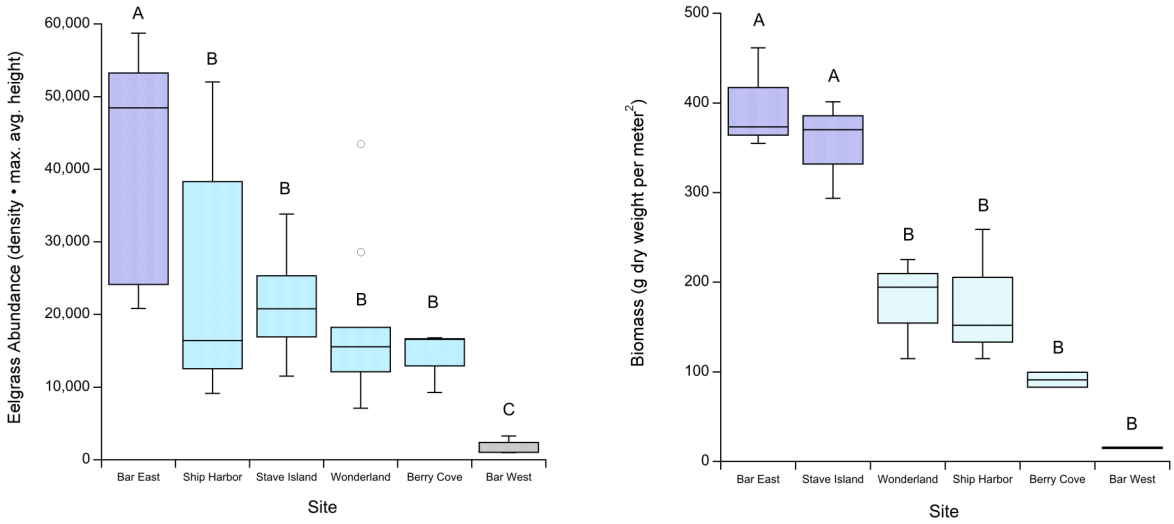
Understanding eelgrass loss

Eelgrass does well at outer island sites despite warming trends in the Gulf of Maine and a population increase of the invasive green crab. In 2014, scientists and interns at the Community Environmental Health Laboratory (CEHL) at MDI Biological Laboratory attempted to determine what is different at outer island sites, as compared to upper Frenchman Bay. They looked at water quality, plant strength, plant abundance, density, biomass, and composition, and green crab type and abundance. Variables were looked at individually and relationally in an attempt to understand eelgrass loss.



Water quality monitoring was one such variable; its importance is two fold: eelgrass improves water quality and plays a valuable role in nutrient cycling in the coastal ecosystem. As such, eelgrass health can be used as an early warning sign of deteriorating water quality. In 2014, nine water quality variables at 12 sites (upper and outer bay) were tested for a total of 720 water quality assessments. There were significant differences in silicate and nitrogen across sites. There was significantly less silicate and nitrogen (in the form of nitrate and nitrite) at sites where eelgrass loss was documented (Berry Cove, Hadley Point, Jordan River, Lamoine Shore, Thomas Island, and Bar West) than sites where eelgrass still thrived (Bar East, Stave Island, Wonderland, and Ship Harbor).

Eelgrass biomass, abundance, plant strength, and density were determined for six locations in upper and outer Frenchman Bay. Plant density, abundance and biomass varied significantly across sample sites, as did plant strength.



Eelgrass abundance and biomass differed significantly across sample sites. The boxplots show the median, the first and third quartiles, and the lower and upper extremes. Different letters indicate significant differences between means.

Next steps

- Work with collaborators throughout the Northeast carrying out parallel studies on variables such as water quality, green crabs, and sediments.
- Create new and revise existing restoration methods.
- Complete a comparative restoration study in the region to see if method success is area specific.
- Refine eelgrass mapping techniques, and generate maps for Frenchman Bay annually or biennially.
- Define new parameters to take a closer look at eelgrass populations from southern to northern Maine.

Partners

Collaboration is critical to any Frenchman Bay Partner undertaking. Key partners on eelgrass projects include: MDI Biological Laboratory, Maine Coast Heritage Trust, and 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.