

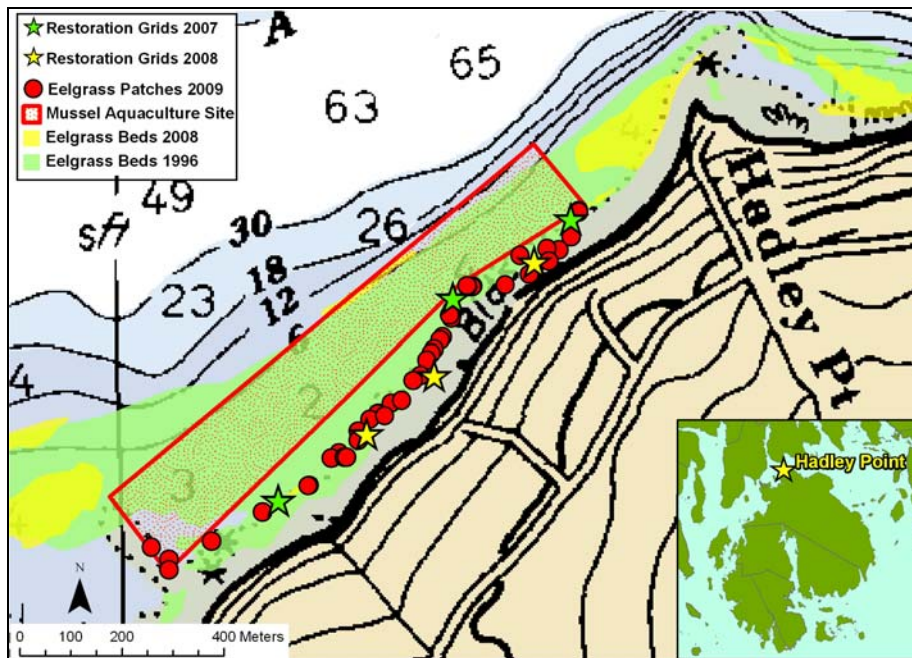
## Community-based eelgrass (*Zostera marina*) restoration in Frenchman Bay

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Eelgrass restoration over two summers at Hadley Point has resulted in a measurable increase in eelgrass coverage in upper Frenchman bay, as determined by video monitoring and area estimation. In the process, community involvement has resulted in a greatly increased appreciation for the value of this species.

Eelgrass (*Zostera marina* L.) is a flowering plant formerly occurring in widespread meadows in sub-tidal areas along the coast of Maine. Eelgrass beds are home for a diversity of marine organisms, and serve as a nursery for a variety of larval forms including winter flounder, hake, pollock, and cod, as well as larval lobsters, mussels, and crabs. As a primary producer, eelgrass helps fuel the food chain, feeding organisms like bacteria, worms, and a host of marine invertebrates. Eelgrass also curbs erosion by stabilizing bottom sediments and may improve water quality by filtering excess nutrients from runoff<sup>2</sup>. In Frenchman Bay, eelgrass has experienced significant declines, apparently related to dragging for mussels and other sessile species. At Hadley Point the bottom coverage was estimated at 60 - 80 % coverage in 1996<sup>1</sup>. By 2007, our pre-project underwater videography revealed that the coverage was down to <1 %.

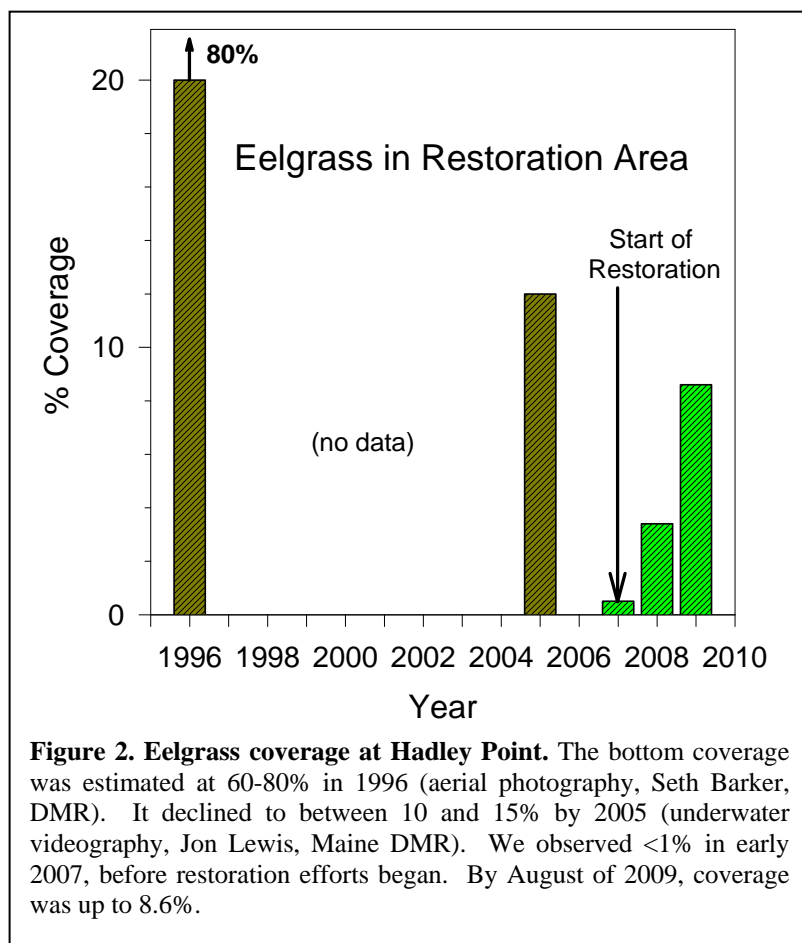


**Figure 1: Hadley Point Restoration Project:** Eelgrass patches were mapped using GPS during the summer of 2009. Coordinates were overlaid on eelgrass data collected in 1996 (green) and 2008 (yellow) by Seth Barker, Maine DMR. Hadley Point is located on Mount Desert Island in Hancock County, ME (inset).

Pre-restoration water quality analyses indicated that Hadley Point was a suitable site for transplanting eelgrass, with excellent values for all parameters measured. We used the Preliminary Transplant Suitability Index (PTSI) model of Short and Burdick<sup>4</sup> to confirm the suitability of the Hadley Point site.

In 2007 and 2008, multiple community groups and individual volunteers contributed to the restoration of eelgrass at Hadley Point. Plants were harvested from the Jordan River (located across the bay from Hadley Point) and tied to wire grids weighted with bricks in an adaptation of the TERFS

(Transplanting Eelgrass with Remote Frames) method<sup>3</sup>. The grids were placed in the shallow sub-tidal area, and removed ~10 months later after the eelgrass plants had taken root. Fifty grids, each 2' by 2' (~0.4 m<sup>2</sup>), were transplanted each year (Figure 1). The restoration site was monitored by underwater video transects; coverage being determined by the ratio of the time eelgrass was seen to the total transect time. Using this method, we have determined that eelgrass coverage has increased from <1% to 8.4% in the restoration area at Hadley Point with two years of restoration effort (Figure 2).



Eelgrass area expansion was also determined by using a measuring stick to roughly estimate the size of all eelgrass patches in the restoration area at low tide. GPS coordinates were recorded for eelgrass patches over 1 m<sup>2</sup> (Figure 1). We transplanted a total of 36.4 m<sup>2</sup> of eelgrass (100 grids) in 2007 and 2008; and measured >500 m<sup>2</sup> of coverage in 2009, nearly a 15-fold increase. In addition, new eelgrass beds have developed, apparently by seeding from the transplanted plants, in nearby sites, including the east side of Hadley Point and the Lamoine shoreline.

Most important in the long run may be the results of our public outreach and education programs. Local students have contributed to restoration and monitoring, learning that it requires a lot of work to restore habitat once it has been disrupted. In addition, we have educated hundreds of visitors at the Myers Marine Aquarium at MDIBL about the importance of eelgrass as habitat in subtidal areas of Frenchman Bay.

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