

Are Green Crabs Responsible for Eelgrass Loss in Frenchman Bay, ME?

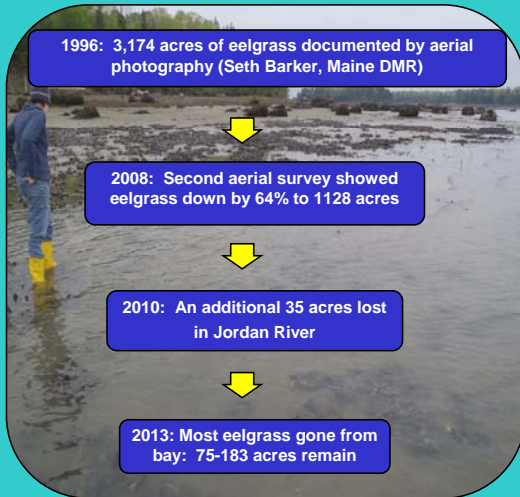


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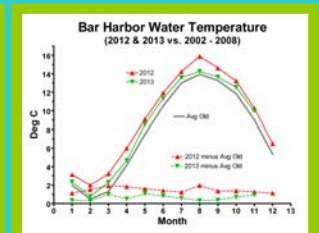
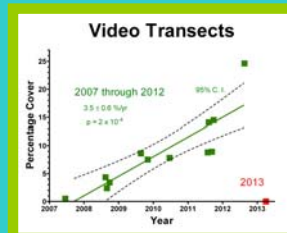
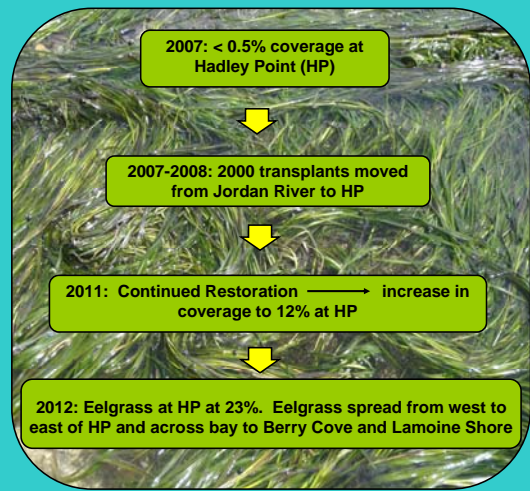
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Eelgrass Decline Over 17 Years



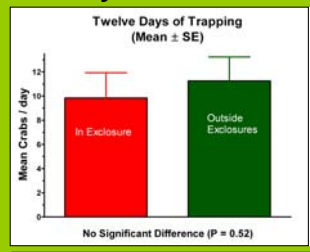
Eelgrass Restoration 2007-2012



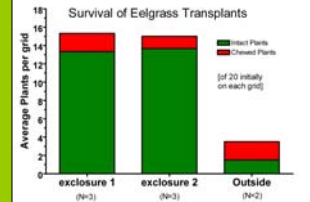
Eelgrass loss in Frenchman Bay, Maine since 2010. Inset shows location in relation to the Mount Desert Island area and mid-coast Maine. We used the following mapping methods: In summer 2013, we launched an interactive website at www.eelgrassinmaine.org to find out where eelgrass had been lost. We received reports from throughout Maine, telling us where eelgrass had been historically and is still present or is now missing. In addition, we traveled by boat to Hadley Point, the Jordan River, Berry Cove and the Lamoine Shore, Halls Cove, and between Bar Harbor and Bar Island and confirmed eelgrass presence or absence using underwater videography. In addition, we walked along the Bar and kayaked at Stave Island and mapped eelgrass using hand held GPS units.

Eelgrass continued to expand in the Hadley Point Restoration area between 2007 and 2012, as determined by underwater videography. In 2013 no eelgrass came up, although rhizomes were apparent in the sediment. NOAA temperature data (Bar Harbor town pier) revealed warmer water temperatures in 2012 and 2013 as compared to the years 2002-2008. [Temperature data from 2009-2011 were unusable.] Increased temperature might be having an effect (direct or indirect) on eelgrass viability in Frenchman Bay.

Crab Enclosure Study 2013



We tied 160 plants onto 18, 2 x 2 ft. wooden grids (20 plants per grid). We set up two 8 ft by 8 ft fenced areas and transplanted 8 grids into each area. Two grids were set outside the fenced areas. Crabs were regularly trapped from enclosure 2 and from the open area outside the fences, but not from enclosure 1. There was no difference in crabs trapped inside enclosure 2 and outside. After 6 weeks, 3 of the 8 grids from each enclosure and the 2 grids outside of the fenced areas were removed and plants were assessed for damage.

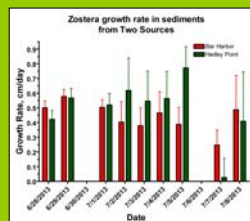


There was no difference in the number of crabs inside and outside of fenced areas. While there was evidence of crab damage in all areas, it is not clear that crabs were responsible for the poor survival outside the enclosures.

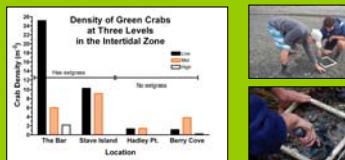
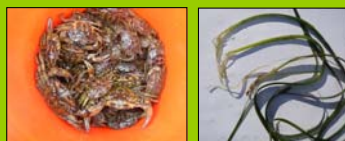
What Happened?

Sediment Nutrient Deficiency or Toxicity?

We looked at the growth rate of eelgrass in sediment from the Bar where eelgrass had not been lost and eelgrass from Hadley Point where eelgrass had been lost. We set up 6 five gallon tanks with each type of sediment; there were 6 plants per tank. The growth rate of plants was measured over 10 days; there was no difference in growth rate of plants under these two different conditions.



Green Crab Population Explosion?



We noticed an abundance of crabs in the bay and some damaged plants washed up on shore. We conducted a census by randomly tossing quadrats along transects in the low, mid and high intertidal areas of four sites in Frenchman Bay. Two of these sites had lost eelgrass in 2013; two of these areas did not. There were more crabs in areas where eelgrass was growing than areas where eelgrass had been lost.

Acknowledgements

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