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# Vulnerability of eelgrass (Zostera marina) to green crab (Carcinus maenas) invasion

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**Vulnerability of eelgrass (*Zostera marina*) to green crab (*Carcinus maenas*) invasion**
**Sabine Berzins, Class of 2016**

Eelgrass (*Zostera marina*) is a perennial seagrass that is widely distributed among the shallow subtidal and intertidal Atlantic coastline of the United States and Canada. A highly productive keystone species, eelgrass helps maintain healthy estuarine and ecosystem functions by stabilizing sediments, regulating water flow, absorbing nutrients, and providing critical habitat for animals including commercially important species like soft-shell clams, blue mussels, and migrating waterfowl. Loss of eelgrass beds can therefore result in degraded water quality, shoreline erosion, and reduced fish and wildlife populations. Historically, the Maine coast supported extensive eelgrass beds. However, between 2010 and 2013, eelgrass distribution in Casco Bay declined in area by over 55%. This decline in eelgrass distribution coincides with a regional population explosion of green crabs (*Carcinus maenas*), an invasive species that physically disturbs eelgrass while foraging for prey.

This summer, I collaborated with several Casco Bay Eelgrass Partners including individuals from the Fish and Wildlife Service, Maine Department of Environmental Protection, and the Friends of Casco Bay. Led by U.S. Geological Survey biologist Dr. Hilary Neckles, this project identifies factors that make eelgrass more or less resilient to invasion by green crabs. In June, we established permanent eelgrass survey transects at five locations spanning eastern Casco Bay. Where possible, two transects were established in different types of sediment (fine or coarse/sandy). Most of the eelgrass loss observed over the past decade has been in fine sediments. The question remains; is eelgrass in coarse sediments prone to similar levels of damage? In addition to differences in substrate type, each site also exhibited varying degrees of eelgrass density, shoot height, green crab density and population structure, and other environmental stressors including light availability, temperature, nutrient availability, and natural physical disturbance. I made biweekly measurements of green crab densities at one site, Widgeon Cove in Harpswell. Crap trapping indicated few green crabs occurred near the Widgeon Cove transect, but traps at the other four Casco Bay sites collected as many as 300 crabs within a 24-hour period.

Final measurements in the eelgrass transects will be taken in September and data collection will be completed in October. Data gathered this summer will provide information to help move forward with a plan to protect and potentially restore eelgrass in Casco Bay. Additionally, I identified patches of eelgrass in the Kennebec Estuary that might be viable sites for replanting next summer. I hope to continue working on this project next year, thinking about ways to restore eelgrass to the system while identifying ways to increase trapping pressure on green crabs such that their numbers might be reduced.

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