Investigating the impact of *Littorina littorea* on algal communities across a latitudinal gradient
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The common periwinkle snail, *Littorina littorea*, was introduced to New England from Europe in the 1800s. By grazing on algae, these snails reduce overall cover, change species composition, and alter habitat structure, which in turn affects other organisms that are dependent on algae for shelter and food. Because macroalgae serve as the base of the intertidal food web and provide critical habitat, understanding how snail grazing interacts with environmental conditions is important for predicting ecosystem responses to climate change. This project specifically examined how snail density and temperature interact to influence macroalgal abundance, with the goal of anticipating how global warming may shift intertidal communities and the broader ecosystems they support.

We manipulated snail densities using copper-topped fences. Copper is a highly effective material for this application as it is toxic to snails. So, it could safely but properly keep snails maintained. We built these fences using two different meshes: PVC coated stainless steel lobster mesh for structure and a stainless steel mesh in order to have the holes small enough to keep out *L. littorea*. We were able to build all of the fences and deploy them at six sites. Three of the sites were in Harpswell and three were in the southern Maine and New Hampshire region. At each of the sites, we deployed six different treatments: a control plot without a fence, a control plot with fences that allow for snail movement, and four fenced plots with natural or manipulated snail abundances (0, natural levels, double natural levels, and 200 snails per meters^2). All plots are 90 × 90 cm^2 (0.81 meters^2). Within each area, we used a quadrat divided into 100 points to record which macroalgal species occurs under each point. This provided an estimate of species composition. In addition to field identification, I took a photograph of each plot in order to identify percent coverage from the surface view. Each photograph was taken before manipulation of the algae to get a true surface level count of 250 total points. Both types of identification will continue to be recorded and compared throughout the duration of the project.

Throughout the summer we handmade 75 cages, starting by cutting the raw material. After weeks of work and ensuring they were successfully eliminating snail movement, we began the deployment process. We recorded the initial set of data per location we visited, including the algal and animal identification per plot. To determine natural abundance at each site, we counted all snail types in 12 meter squared plots along a transect. This project will continue for the next two years with seasonal data collection, building on these initial recordings. The long-term dataset will provide a clearer picture of how *L. littorea* influences macroalgal communities and intertidal ecosystems over time.

Images: 

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