Merrymeeting Bay is a freshwater tidal ecosystem in midcoast Maine that experienced ecosystem collapse in the mid-20th century. The focus of our study this summer was on two vital components of the ecosystem that were negatively impacted by poor water quality, overfishing, and other human activities. Submerged aquatic vegetation provides key habitat for a variety of organisms present in the bay. Anadromous fish are economically and ecologically important fish that pass through the bay before and after spawning. Studying vegetation and fish species can provide details on the status of recovery of biological components of the bay.

Submerged aquatic vegetation (SAV) are rooted aquatic plants and both freshwater and marine species are present in our study area. Our work this summer focused on freshwater species of *Vallisneria* and *Potomogeton* present in Merrymeeting Bay. For the past two summers, a Trimble GeoXM GPS unit has been used to map vegetation beds on the ground (Figure 1). This distribution data can be added to a graph of area of MMB that is covered by SAV (Figure 2). This can tell us whether SAV is continuing to recover from its low densities in the early 1970s.

Anadromous fish spend most of their life time in marine systems but spawn in freshwater. Three species of the genus *Alosa* play pivotal roles in Maine waters. Alewives, shad, and Blueback herring serve as nutrient transporters between freshwater and marine ecosystems. They are food sources for important groundfish such as cod and are preferred lobster bait. Passage upstream to spawning grounds is vital for anadromous fish in spring and early summer, but dams pose barriers to migrating alosids. Fish ladders are effective for some species such as alewives and Atlantic Salmon, but ladders are ineffective for shad passage. A study in coordination with the Maine DMR and Florida Power and Light initiated this summer to investigate the effectiveness of a fish elevator at the Brunswick-Topsham dam. A structure was engineered to simulate the flow generated by a fish lift with the goal of monitoring how fish react to the flow. Two underwater cameras were placed in the river and a computer program called SalmonSoft FishTick was used to capture and review video of when fish passed the cameras. The results can help make a decision about installation of a fish lift.

To answer questions about alosid activity in Merrymeeting Bay, weekly beach seine collections were conducted at Abby Point. Species and length were recorded for each fish caught and alosids that did not survive were brought back to lab and their stomachs were preserved in alcohol. Examining stomach contents of juvenile alosids can provide information on diet, which has been previously unexplored for fish in the ecosystem. Diet analyses will answer questions such as how diets differ by species and size class and whether diets are composed primarily of planktonic or benthic invertebrates.

**Figure 1.** Map of MMB vegetation 2010-2011  
**Figure 2.** Area of MMB covered by SAV

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**Funded by the University of Maine, Sustainability Solutions Initiative**