Sediment Dynamics and the Stability of Maine's Largest Salt Marsh

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The purpose of my research this summer was to determine the stability of Sbi1Sn Nonetheless

, marshes face numerous threats such as nutrient pollution and human disruption of food webs. The largest threat, however, may be accelerated sea level rise due to global warming.

As climate change causes sea levels to rise, marshes must constantly increase their elevation in order to stay above water. Many salt marshes are unable to keep pace, so it is of great importance to be able to quantify their stability. To determine if a marsh is stable or not, scientists study the movement of sediment during tidal cycles and construct a sediment budget. Marshes keep pace with sea level rise primarily by way of a process called vertical accretion, sediment accumulation on top of the marsh. Therefore, a marsh is considered stable if there is a net import of sediment and unstable if there is a net export.

For my project this summer, I took an instrument heavy approach to determine sediment flux. I chose a study site on the Nonesuch River (a main tributary of Scarborough Marsh) and installed a datalogger box on the high marsh connected to salinity, turbidity, water level, and water temperature probes reaching down into the bottom of the tidal channel. To measure water velocity, I installed two tilting current meters on the bottom of the channel. In addition, I installed two programmable pump samplers that collected water samples on either bank. Twice a week, my mentor Peter Lea and I boated out to our site to maintain the instrumentation and download the data. In the lab, I filtered, dried, and weighed the water samples to calculate suspended sediment concentration, which is