Blade Tissue Strength of the Sugar Kelp, *Saccharina latissima*, as a Factor of Hydrodynamic Flow

Sessile organisms living in a media such as the ocean need to be able to adapt to the variability of their environment in order to survive. Kelps and other large macrophytes rooted to a hard substrate have developed a plastic morphology, which allows individuals to reconfigure their shape in response to events of high hydrodynamic force, such as waves or strong currents. This plasticity has led to many morphological differences among individuals of the same species in varying hydrodynamic environments, including differences in tissue strength and biomass. The objectives of this study were to determine how the strength of the blade tissue and diameter of the stipe of the sugar kelp, *Saccharina latissima*, varied amongst populations in differing hydrodynamic environments. Samples were collected from two locations: Castine Harbor, which served as a proxy for a sheltered environment of low hydrodynamic activity, and Blue Hill Reversing Falls, which served as a proxy for an exposed environment with high levels of hydrodynamic activity. Overall, no significant difference was observed in the strength of the blade tissue, but there was a difference seen in the diameter of the stipe across the two environments. Given the plastic nature of sugar kelp morphology and the importance of the stipe as a load-bearing structure, these results are consistent with what would be expected in a biomechanical context.

Advisors: Jessica Muhlin and David Walker