

South Slough Reserve REU project ideas

The **5-spine crab** (*Carcinus maenus*, aka green crab) is an invasive species in the South Slough estuary. We are interested their change in abundance over time (seasonal and annual) and their effects on other species. The South Slough Reserve could use research help this summer to study the questions: 1) Are green crabs increasing in abundance in the Coos estuary? 2) Can green crabs outcompete other crab species for resources (food and shelter)? and 3) How do we manage their impacts? The student researchers will continue an ongoing project monitoring crab populations, analyzing abundance data from present and past monitoring efforts, and conducting experiments. Crab monitoring data collection will include setting and retrieving crab traps at various locations around the Coos Bay estuary and recording the species and size data for crabs caught. Experiments will take place in sea water tables on the OIMB campus. This monitoring and experimentation will help us understand the effect of green crabs on PNW estuarine ecosystems.



Eelgrass (*Zostera marina*), a native species of seagrass - underwater flowering plants with special roots called rhizomes - occurs in the intertidal and subtidal zones of the South Slough estuary. Eelgrass beds provide many ecosystem benefits, including nursery grounds, shelter, foraging and spawning areas for fish and invertebrates along with improving water quality and storing carbon in sediments. Eelgrass habitat is sensitive to a variety of abiotic and biotic stressors, and has been diminishing globally due to multiple threats i.e. coastal development, warming ocean waters, sea-level rise and nutrient/sediment pollution. Intertidal eelgrass abundance has been declining at long-term monitoring sites in South Slough since 2015-2017, with variable recovery dependent on estuary location. Eelgrass declines were correlated to increased temperatures from marine heat waves and changes in turbidity, watershed disturbance, and elevation. Past REU projects have determined eelgrass habitat loss has been localized within the South Slough estuary compared to the lower Coos estuary and linked to long-term changes in water quality, and explored characteristics of eelgrass sediments, flowering dynamics, and seed energetics.

In order to understand how changes in environmental conditions may continue to impact eelgrass, the Reserve is interested in monitoring eelgrass distribution and abundance, investigating interacting environmental stressors, implementing pilot (seed-based) experiments and expanding restoration projects, characterizing eelgrass sediment, elevation/depth, and flowering dynamics, and applying new methods for tracking intertidal and subtidal habitat changes (i.e. uav sensors), which are all important for informing eelgrass resilience, habitat suitability and restoration implementation. Projects may utilize datasets from the NERR System-Wide Monitoring Program (SWMP) that measures a variety of water quality variables including water temperature, salinity, dissolved oxygen, pH, turbidity, nitrogen, phosphate, chlorophyll, and suspended sediment at sites in the South Slough and Coos estuary that are paired with eelgrass sites. Data collection may include plant community monitoring at South Slough and Coos Bay sites, water quality and sediment sampling, elevation/depth surveys, and eelgrass flowering shoot and seed dynamics. Data analyses may include examining correlations among environmental data and eelgrass attributes. Students will learn numerous data collection and analysis methods over the course of their project.

