

South Slough Reserve REU project ideas

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. Eelgrass abundance has been declining at long-term monitoring sites in South Slough since 2015/2016, with recent research identifying environmental drivers contributing to declines, including 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 when compared to sites in the lower Coos estuary and linked to long-term changes in water quality while another explored characteristics of eelgrass sediments, which are important for understanding resilience, habitat suitability and restoration planning. In order to understand how long-term changes in environmental conditions may continue to impact eelgrass, the Reserve is interested in monitoring eelgrass distribution and abundance, investigating interacting environmental stressors, implementing and assessing pilot restoration projects, and understanding eelgrass sediment and seed/flowering dynamics. Projects may utilize datasets from the NERR System-Wide Monitoring Program (SWMP) that measures water quality variables including water temperature, salinity, dissolved oxygen, pH, turbidity, nitrogen, phosphate, chlorophyll-a, and total suspended solids (TSS) at sites in the South Slough estuary that are paired with eelgrass sampling sites. New data collection may include plant community monitoring at South Slough eelgrass sites, SWMP water quality sampling, and eelgrass sediment and flowering shoot/seed data collection and processing. Data analysis will include examining correlations among environmental data and eelgrass attributes. Students will learn numerous data collection and analysis methods over the course of their project.



The **European green crab** (*Carcinus maenus*) 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 answer two questions: 1) Are green crabs increasing in abundance in the Coos estuary? and 2) Can green crabs outcompete other crab species for scarce resources (food and shelter)? The student researcher will continue an ongoing project monitoring crab populations; analyzing abundance data from present and past monitoring efforts and conducting experiments to look at the interactions among different crab species (green crabs, shore crabs (*Hemigrapsus spp.*), red rock crabs (*Cancer productus*), and Dungeness crabs (*Cancer magister*)). 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. The student researcher will study the interactions among crabs by pairwise placing of crabs of differing relative sizes and species together in controlled microcosms and observe how they compete for a resource (food or shelter). This monitoring and experimentation will help us understand the effect of green crabs on PNW estuarine ecosystems.

