It's Mud! Sediment Size and Total Organic Content Analysis of Bellingham Bay

Aaron Watkins, Ellen Pak, Victoria Sims; Faculty – Julie Masura

Sediment size and total organic content (TOC) are important vital signs for water bodies in Washington state. In past research, sediment size was inversely related to TOC and benthic community health. This study adds to temporal data on urban bays monitored by the Puget Sound Ecosystem Monitoring Program. In June 2024, 29 samples were collected from Bellingham Bay by the Washington State Department of Ecology Marine Sediment Monitoring Team. The distribution of grain-sizes were analyzed using a laser diffractometer particle size analyzer. TOC was calculated by the loss on ignition technique to determine carbon content. Results showed the grain-size distribution averaged 6% sand, 57% silt, and 37% clay, compared to previous studies that were 10-20% sand, 50-55% silt, and 20-30% clay. TOC averaged to 3.50% carbon (wet mass) and 9.21% carbon (dry mass) with previous studies noting carbon (wet mass) generally ranged from 0.5 – 3.5%. Our TOC values align with previous work in Bellingham Bay. No statistically significant correlation was present between the median grain size and the wet and dry TOC values (R^2 = 0.008 and 0.08 respectively). The change of decreased sand and increased clay percentages could indicate that conditions in Bellingham Bay are favoring a depositional environment where fine grained sediments settle out within the bay and large grained sediments prior to the bay. Without correlation between median grain size and TOC, further long term studies are needed to identify changes in TOC and benthic communities as a possible response to sediment size changes.