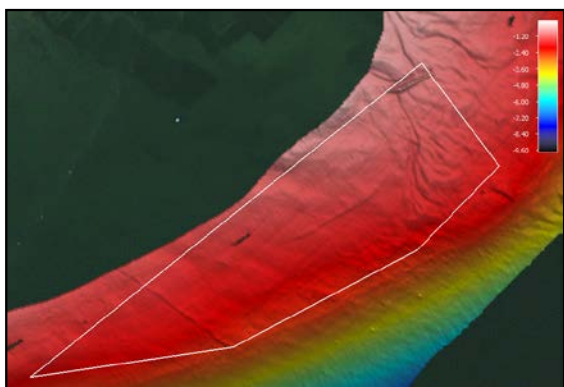




Are there changes in beach elevation and sediment characteristics during intertidal geoduck culture and harvest?



Areas around the study site are also surveyed to evaluate natural variability in sediment characteristics and beach elevation.



High resolution elevations show small changes in sediment distributions. Notice the small channels in the upper right side of the picture where a small stream empties off the delta at low tide. DNR is currently in the second year of a multiyear study. Initial analysis shows some beach elevation change up current of the farm where a small channel runs through the intertidal.

Pacific Geoduck, (*Panopea generosa*), is a large, edible shellfish that is an important economic fishery in Washington State. Most farmed geoduck is grown in intertidal areas (between high and low tides) by aquaculture specialists on private lands. DNR, as the manager of Washington State's public lands, is working to make more public areas available to lease for intertidal geoduck aquaculture. In order to ensure that these new activities do not have long-lasting effects on public lands, DNR has developed a monitoring strategy focused on potential geoduck aquaculture impacts.

Changes in beach elevation and sediment size are being evaluated during the planting, growing, and harvesting phases of new geoduck aquaculture farms. Because beaches experience natural seasonal changes in sediment transport and shape, monitoring is occurring throughout the year, over several years. Surveying over a longer time period and in areas beyond the farm borders allows scientists to evaluate whether activities associated with planting, protecting, and harvesting have enhanced effects. Planting involves inserting PVC tubes (generally 8-10 cm diameter) into the sediment to about a 10 cm depth, with 8 cm of the tube remaining above the bed. Tubes are planted in arrays, with each tube spaced approximately a meter away from the next. Juvenile geoduck are placed into the sediment within the tubes and the tubes are covered with nets for protection. As the geoduck mature and become less vulnerable to predation, the tubes and nets are removed. After 5-7 years the adult geoduck are harvested. Each of these steps may affect sediment characteristics and transport and ultimately alter intertidal habitat for other organisms.

In order to evaluate changes, sediment samples are collected and analyzed for size and total organic content. Beach changes are measured on a very fine scale using a multibeam sonar system. This technology collects hundreds of thousands of sound measurements traveling from the instrument to the seafloor then reflected back. The travel time of the sound is recorded and beach elevation is calculated. This allows scientists to map and detect very small features in large areas. Having a larger picture provides the context to evaluate what other factors may or may not be contributing to changes at the site. For instance, if a nearby stream shifts its channel and changes the way sediment is deposited to the beach and modifies the beach.