Sediment Size

The physical structure of the beach may change depending on such actions as winter storms, restoration activities, and shoreline armoring. Sediment size can affect the type of invertebrates that live within and on top of the substrate. Beach spawning forage fish (surf smelt, sand lance) also target specific sediment sizes.

Materials

- 50 m transect tape
- 32 x 32 cm pvc quadrat, subdivided with string into 25 6 x 6 cm small squares
- Hand trowel marked with 5 cm depth

Sampling Summary

- 50 m transect parallel to shore
- 0.1 m^2 quadrat (32 x 32 cm)
- N=5 random quadrats per transect
- Transects at MHHW, MSL, and MLLW, others as appropriate
- Measure % cover of surface and subsurface (5 cm depth) sediment in 5 size classes

Scale of Effort

$ Cost – low, simple materials and data are all field-based

$ People – low, 2-3 people can establish transects and record quadrat data

$ Fieldwork time – low, 1 day, once or twice a year (summer daytime low tides allow sampling at MLLW)

$ Processing time – low, entering field data into computer format

$$ Technical expertise – medium, knowledge on sediment size classes and analytical techniques is useful

Additional Resources

Reports that have used this method:
Heerhartz et al. 2014

Other methods that require a larger scale of effort and more technical expertise:
Digital photographs/cobble cam
Ro-Tap shaker/sieve analysis

Suggested citation: Shoreline Monitoring Toolbox. Washington Sea Grant.
Website: shoremonitoring.org

Methods

At five random points along a 50 m transect parallel to shore at MHHW, MSL, and MLLW, a 0.1 m^2 quadrat is placed on the surface sediment and a visual estimate made of the percent that is in five size classes: cobble (>6 cm), pebble (4 mm to 6 cm), granule (2-4 mm), sand ("gritty" up to 2 mm), and silt/clay (smooth between your fingers). Add other transect elevations based on the topography of the site, such as top of the most seaward berm. The quadrat is divided with string into 25 6 x 6 cm small squares (maximum pebble-size) to facilitate these estimates, and the frame has size-indicators for the other categories drawn on it. Once the surface has been categorized, the top 5 cm is scraped away and a visual estimate made for the subsurface sediment categories – these are often different than the surface because of the sorting action of waves. Summer daytime low tides allow sampling at MLLW.

Data to record in the field

Date, time, site name, transect elevation, sample number, sediment size data. It is advisable to take a digital photo looking straight down on top of the quadrat for documentation.

Processing

Enter the field data into computer spreadsheets. For each quadrat, the surface and subsurface percentages for each size category can be analyzed separately or averaged for characterization of the top 5 cm sediment layer. The median grain size (D_{50}) can be estimated from the grain-size distribution, and sorting estimated from the width of the grain-size distribution (span of size classes). Sorting indicates the distribution of grain size of sediments. Poorly sorted indicates that the sediment sizes are mixed (large variance), well sorted indicates that the sediment sizes are similar (low variance).