# Beach profile

Characterizing the beach profile provides valuable information on the physical structure of the beach. This may change depending on winter storms, restoration activities, and shoreline armoring. The variability in beach topography and slope is indicative of physical forces acting on the beach and can affect associated algae and invertebrates.

## Materials

- 100 m transect tape and wired flags
- Laser level
- 14’ Stadia rod

## Sampling Summary

- 100 m transect perpendicular to shore, from top of the berm or toe of bluff/armoring down to MLLW
- Take an elevation measurement every 2 meters and at key features
- Record elevation at the water line and note the time, adjust profile elevations based on the nearest NOAA station measurements, or alternatively adjust elevations to that of a benchmark

## Scale of Effort

$$ Cost – medium, supply costs are moderate, data are all field-based

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

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

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

$$ Technical expertise – medium, knowledge of laser level techniques

## Additional Resources

Reports that have used this method: Heerhartz et al. 2014, Toft et al. 2013, Toft et al. 2021

Report that uses both laser level and RTK-DGPS: Dethier et al. 2016

See the Sound Water Stewards procedures for methods that are less costly and technical (poles and line)

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

## Methods

Establish a transect perpendicular to shore, starting from above MHHW at the top of the berm or toe of the bluff at natural beaches, or at the base of armoring if there is bulkhead or riprap. Extend the transect down to MLLW. Mark any key elevation or transition areas with wired flags such as at the wrack line, an obvious change in beach profile or sediment grain size, or where you may be collecting other data. Take elevation measurements using the laser level and stadia rod at all flagged areas and every 2 meters along the transect, more frequently if the topography greatly varies, and less frequently if there is an extensive low tide terrace with not much change in gradient. A 100 m transect should be long enough; some beaches may require moving the transect tape if they extend far from shore. The ‘head’ of the laser level must be higher than the highest point to be surveyed (e.g., the base of the bluff). For most sites you will need a 14 foot stadia rod, or will need to survey high and low sections separately. Record the elevation at the water line and note the time so that data can be corrected to actual elevations measured at NOAA stations (Note: uncertainty increases with distance from the tide station). It may also be possible to measure the vertical distance from the start of the transect to a benchmark with a known elevation. Laser levels are commonly used in surveying work – search for detailed instructions online if you are unfamiliar with their use. Summer daytime low tides allow sampling down to MLLW.

## Data to record in the field

Date, time, site name, transect measurement, elevation data. It is advisable to take a digital photo of the transect for documentation.

## Processing

Enter field data into computer spreadsheets. Correct the data based on the actual elevation at the water line or a benchmark. Calculate the beach width (distance from MHHW to MLLW) and the beach slope. Plot the elevations along the transect length to note any key features in the topography, which will allow visualization of changes over time.