

SBC LTER Protocols for measuring macrophyte wrack cover and volume and biomass

Approach: The export of macrophytes to beaches located near SBC LTER reefs is estimated by measuring the composition, condition, cover and depth of macrophyte wrack on shore-normal transects monthly over time. Biomass of wrack is estimated from volume for each species/type. Beach habitat available for deposition is estimated by measuring upper beach zone widths on each sampling date. Surveys are conducted on 0.75 m (2.5 ft) or lower tides and could span the period preceding and following the low tide.

Sampling unit and replication: A total of 3 shore-normal transects is sampled per site. To estimate the standing crop of macrophyte wrack, the cover and composition of wrack was measured using a line intercept method along each of three shore-normal transects. All macrophyte wrack, debris, driftwood, carrion, or tar of 0.01 m or more in width that intersects the transect line was measured, categorized, and recorded. The maximum depth of each deposit of wrack is measured to the nearest cm and recorded. Giant kelp, *Macrocystis pyrifera* is categorized as fresh or old blades, stipes and holdfasts.

The total width of each type of wrack encountered is then totaled for each transect. Wrack cover can be expressed as square meters of wrack m⁻¹ of beach shoreline. Wrack volumes are calculated from depth and length of wrack deposits and used to estimate the wrack volume along each transect. Wrack volume is converted to estimates of biomass for selected species, including *Macrocystis pyrifera** and *Phyllospadix torreyi*** , using linear regressions developed by SBC LTER from the 2005-2006 study of Isla Vista Beach. This calculation yields an estimate of kilograms of wrack per meter of shoreline for each transect.

**Macrocystis pyrifera*: Biomass as kg m⁻¹ = 197.77*(volume as m³ m⁻¹), r² =0.872, p <0.001

***Phyllospadix torreyi*: Biomass as kg m⁻¹ = 152.99 *(volume as m³ m⁻¹), r² = 0.732, p <0.001