

## Percent Cover of Bottom Substrate and Thickness of the Sand Layer

**Overview:** These data are part of a larger collection of ongoing data sets that describe the temporal and spatial dynamics of kelp forest communities in the Santa Barbara Channel. Data on the abundance (density or percent cover) and size of ~250 species of reef associated macroalgae, invertebrates and fishes, substrate type and bottom topography are collected annually by divers in the summer within fixed plots (i.e. 40 m x 2 m transects) at 11 sites (n = 2 to 8 transects per site) that have historically supported giant kelp (*Macrocystis pyrifera*). Species-specific relationships between size (or percent cover) and mass developed for the region are used to covert abundance data to common metrics of mass (e.g., wet, dry, de-calcified dry) to facilitate analyses of community dynamics involving all species. Data collection began in 2000 and is ongoing.

**Study Sites:** Nine of the 11 study sites occur along the mainland coast of the Channel (Arroyo Burro 34° 24.007' N 119° 44.663' W; Arroyo Hondo 34° 28.312' N, 120° 08.663' W; Arroyo Quemado 34° 28.127' N, 120° 07.285' W; Bulito 34° 27.533' N, 120° 20.006' W; Carpinteria 34° 23.545' N, 119° 32.628' W; Goleta Bay 34° 24.827' N, 119° 49.344' W; Isla Vista 34° 24.170' N 119° 51.472' W; Naples 34° 25.340' N 119° 57.176' W; Mohawk 34° 23.660' N, 119° 43.800' W) and two occur on the northern coast of Santa Cruz Island (Diablo 34° 03.518' N, 119° 45.458' W; Twin Harbors West 34° 02.664' N, 119° 42.908' W).

The time period of data collection varied among the 11 kelp forest sites. Sampling at Bulito, Carpinteria, and Naples began in summer 2000, sampling at the other six mainland sites (Arroyo Burro, Arroyo Hondo, Arroyo Quemado, Goleta Bay, Isla Vista, Mohawk) began in summer 2001 (transects 3, 5, 6, 7, 8 at Isla Vista were added in fall 2011). Data collection at the two Santa Cruz Island sites began in summer 2004.

**Methods:** The percent cover of eight different bottom substrate types was estimated from data collected using a Uniform Point Contact (UPC) sampling method. UPC data were collected at 80 points uniformly positioned within a 1 m wide area centered along a permanent 40 m transect (Figure 1). A diver records the type of substrate underlying each of the 80 points along the transect and the percent cover of each substrate type is determined as a proportion of the 80 points x 100. If the substrate type is sand, then the diver measures the thickness of the sand layer by inserting a 3 mm diameter stainless steel rod into the sand until it reaches bedrock. Only one substrate type is measured at each point and the percent cover of any given substrate type on a transect cannot exceed 100%. The eight substrate types sampled are: Bedrock, Large boulder (largest diameter >100 cm), Medium boulder (50 cm to ≤ 100 cm), Small boulder (25 cm to < 50 cm), Cobble (< 25 cm), Sand (≥ 1 cm thick), Shallow Sand (< 1 cm thick), and Shell Debris.

**Figure 1.** Diagram of Uniform Point Contact sampling showing location of 80 points sampled.

