

Percent Cover of Algae, Invertebrates

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 convert 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: Uniform Point Contact (UPC) sampling is done to determine the percentage cover of algae and sessile invertebrates. UPC data are collected at 80 points uniformly positioned within a 1 m wide area centered along each 40 m transect (Figure 1). A diver records all organisms intersecting an imaginary vertical line passing through each point and the percent cover of a species is calculated as the proportion of points that it intercepts x 100. A species is only recorded once at a given point even if it intersects the imaginary line multiple times. Using this technique, the percent cover of all species combined on a transect can exceed 100%, but the percent cover of any individual species cannot. Species are recorded from top-down as they are encountered and are entered from left to right on the datasheet in such a way that primary space holders occupy the left side of the "SP_CODE" column. Mobile organisms occurring at a sampling point are not counted and are moved so that any species beneath them (e.g., encrusting coralline algae) can be recorded. Only the holdfast is recorded to estimate the percent cover of the kelps *Macrocystis pyrifera*, *Pterygophora californica*, *Eisenia arborea* and *Laminaria farlowii*; the blades and stipes of these species, which extend into the water column, are ignored if they intersected a sampling point. Unlike the sampling of algal and invertebrate density done in fixed quadrats and swaths, the number of taxa sampled by UPC is not fixed; instead all sessile species encountered are recorded. Species that are difficult to identify underwater are lumped into broader taxonomic categories (e.g., crustose coralline algae) to facilitate sampling.

Figure 1. Diagram of Uniform Point Contact Sampling showing 80 points sampled

