Kelp Forest Community Structure Methods

Last Modified: 5/9/2023

Density of algae and 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 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 34^0 24.007' N 119^0 44.663' W; Arroyo Hondo 34^0 28.312' N, 120^0 08.663' W; Arroyo Quemado 34^0 28.127' N, 120^0 07.285' W; Bulito 34^0 27.533' N, 120^0 20.006' W; Carpinteria 34^0 23.545' N, 119^0 32.628' W; Goleta Bay 34^0 24.827' N, 119^0 49.344' W; Isla Vista 34^0 24.170' N 119^0 51.472' W; Naples 34^0 25.340' N 119^0 57.176' W; Mohawk 34^0 23.660' N, 119^0 43.800' W) and two occur on the northern coast of Santa Cruz Island (Diablo 34^0 03.518' N, 119^0 45.458' W; Twin Harbors West 34^0 02.664' N, 119^0 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 abundance and mean size of a specified number of common species of invertebrates, algae were sampled by divers in 1 m^2 quadrats positioned at 6 m intervals (0m, 8m, 16m, 24m, 32m and 40m) along each transect (Figure 1). The list of species sampled in the quadrats is in the master species list data package https://sbclter.msi.ucsb.edu/data/catalog/package/?package=knb-lter-sbc.120. Sampling entailed thoroughly searching the area within each quadrat for the targeted species without disrupting the bottom substrate or displacing organisms.

The abundance and average size of a select group of larger common algae and mobile invertebrates that are not easily counted in a 1 m^2 quadrats were counted in four contiguous 20 m x 1m swaths that run parallel and adjacent to the 40 m transect (Figure 2). The average size of each targeted species encountered was estimated for each 20 m x 1 m swath. The list of species sampled in the quadrats is in the master species list data package https://sbclter.msi.ucsb.edu/data/catalog/package/?package=knb-lter-sbc.120. Sampling entailed thoroughly searching the area within each swath for the targeted species without disrupting the bottom substrate or displacing organisms.

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Figure 1. Schematic diagram showing the positioning of the 1 m^2 quadrats along the 40 m transect. Quadrats at 0 m, 16 m, and 32 m are positioned on the offshore side of the transect and quadrats at 8 m, 24 m and 40 m are positioned on the onshore side of the transect

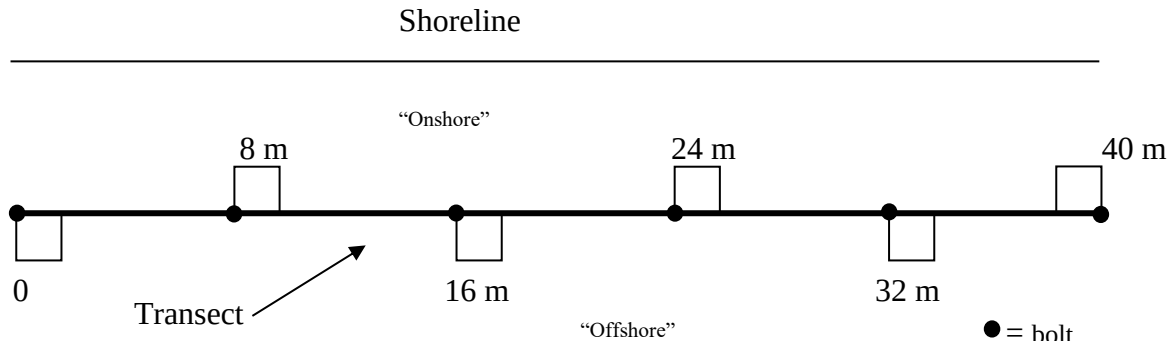
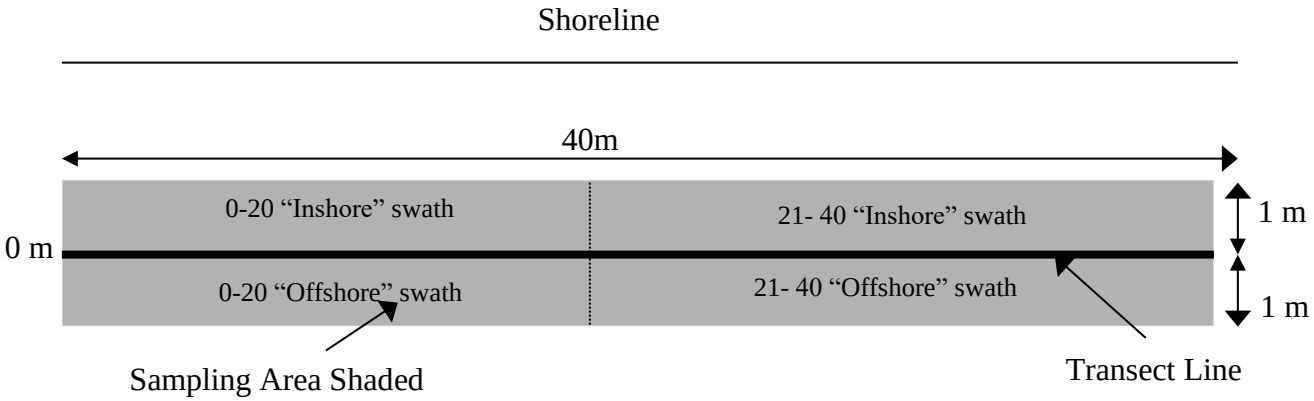


Figure 2. Schematic diagram showing the position of the four 20 m x 1 m swaths relative to the 40 m transect.



A list of species of macroalgae and invertebrates surveyed in the quadrats and swaths can be found it:
https://portal.edirepository.org/nis/mapbrowse?scope=knb-lter-sbc&identifier=120.