Species key for data collected along the shore of Monterey and Carmel from 1999-2015 (Kelp Forest Resilience project)

Website: https://www.bco-dmo.org/dataset/661165
Data Type: Other Field Results
Version: Final
Version Date: 2016-10-07

Project
» Kelp forest community resilience in action: adaptive responses of predators to a disease-driven food web perturbation (Kelp_Forest_Resilience)

Contributors	Affiliation	Role
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Table of Contents

Dataset Description

Species code key for the kelp forest community percent cover and density datasets collected from 1999 to 2015 along the coast of Monterey and Carmel, California.

Data Processing Description

BCO-DMO Data Processing Notes:
-All column names reformatted to comply with BCO-DMO standards
-nd was entered into all blank cells

[table of contents | back to top]

Data Files

File
species_codes.csv (Comma Separated Values (.csv), 12.24 KB) MD5:1dd5b68045cc52e7702daafc333e0a5a Primary data file for dataset ID 661165

[table of contents | back to top]

Parameters

Parameter	Description	Units
dataset	The dataset (percent cover or density) that the species key pertains to.	unitless
sample_subtype	This parameter only pertains to the percent cover dataset. It describes the type of percent cover observation. Values include: SUBSTRATE (size of rock or sand over which the observation is taken); RELIEF (vertical relief within a 1m x 0.5m box around the sampled point); COVER (type of biotic subtrate associated cover present the uppermost layer at the observation point); SUPERLAYER (organisms which are super-numerous but not attached to the bottom and would not therefore otherwise be captured by the density or percent cover samping methods.)	unitless
classcode	The unique taxonomic or functional classification code that is being counted as defined in the PISCO classification table. This refers to a code that defines the Genus and Species.	unitless
genus	Genus of organism identified.	unitless
species	Species name of organism identified.	unitless
common_name	Common name of organism identified.	unitless

[table of contents | back to top]

Deployments

Carr_1999

Website	https://www.bco-dmo.org/deployment/661099
Platform	Long Marine Lab UCSC
Start Date	1999-09-22
End Date	2015-07-24
Description	Sites of Kelp Forest Resilience project. Nearshore waters of southern Monterey Bay and Carmel Bay, California. 36 N, 121 W.

[table of contents | back to top]

Project Information

Kelp forest community resilience in action: adaptive responses of predators to a disease-driven food web perturbation (Kelp_Forest_Resilience)

Coverage: Monterey Bay and Carmel Bay, California; 36 N, 121 W

A key goal of ecology is to understand how species interactions -- competition, predation, mutualism -- influence the structure (e.g., biodiversity) and functions (e.g., productivity) of ecological communities and contribute to the stability and resilience of ecosystems. Kelp forests along the West Coast of North America

have been a model ecosystem in which marine ecologists have explored these questions. That work has provided evidence that predators, including sea otters, sea stars, and fishes, can be important in controlling sea urchins that otherwise overgraze forests and create alternative "barrens" states, devoid of kelp. However, other examples suggest that disease and disturbance, not predators, suppress urchin overgrazing. Here we employ experiments and surveys to determine whether and how sea otters and sea stars act separately and in combination to control the rapid growth of sea urchin populations that is occurring in concert with a sea star "wasting" epidemic along the West Coast of North America. The results of this work will (i) advance our understanding of how multiple predators interact to influence community structure, stability and resilience, and (ii) shed light on how species interactions contribute to the stability of these forests that are the foundation of productive commercial and recreational fisheries. The project will involve citizen scientists contributing to surveys of sea otter abundance, foraging behavior and diet, and underrepresented (largely Latino) undergraduates and results will be disseminated in several public outreach facilities and K-12 educational programs.

This project will advance our understanding of the combined roles of species diversity and predators in contributing to the stability and resilience of community structure. Though both predators and diversity have been the focus of numerous studies, fewer have explored how predator diversity does or does not enhance the resilience of marine ecosystems. The investigators will determine the relative contributions of southern sea otters (Enyhda lutris lutris) and two species of sea stars (Pycnopodia helianthoides and Pisaster giganteus) in controlling the density and size structure of two prey species, the purple sea urchin (Strongylocentrotus purpuratus) and a snail (Promartynia pulligo), and the cascading effects on survival and density of giant kelp (Macrocystis pyrifera). Orthogonal manipulations of predator access in large field enclosures/exclosures will be used to assess the relative roles of redundancy, complementarity and "sampling effect" (i.e. particular importance of either species) among the two predators on both direct mortality and indirect (trait-mediated) foraging behavior of their prey. The PIs will evaluate whether results from the experiments "scale up" to explain geographic variation in the relative densities of predators (otters and stars), prey (urchins) and the major primary producer (giant kelp) and the ability of sea otters to compensate for declines in sea stars to control the rapid growth in purple sea urchin populations that can otherwise cause phase shifts (forests to barrens) of these ecosystems.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1538582

[table of contents | back to top]