Counts of zootaxa collected in artificial seagrass in San Diego Bay, CA from 2012-2013 (Eelgrass Hab Fragmentation project)

Website: https://www.bco-dmo.org/dataset/542922
Data Type: experimental
Version: 1
Version Date: 2014-12-12

Project
» Habitat fragmentation as a process: how habitat context influences the effects of eelgrass loss on epifaunal community structure (Eelgrass Hab Fragmentation)

Contributors	Affiliation	Role
Hovel, Kevin Alexander	San Diego State University (SDSU)	Principal Investigator
Copley, Nancy	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
Counts of zootaxa collected in artificial seagrass in San Diego Bay, CA from 2012-2013

Table of Contents

Coverage

Spatial Extent: **N**:32.71 **E**:-117.14 **S**:32.65 **W**:-117.14
Temporal Extent: 2012-05-01 - 2013-07-24

Dataset Description

Access to this dataset is restricted until June 2015. Please contact the PI for further information.

The data are counts of taxa from samples of artificial seagrass (used to simulate eelgrass, *Zostera marina* L.) in San Diego Bay. Each line of data represents the total number of individuals from each taxon collected in a 0.25 x 0.25 m artificial seagrass unit (ASU) deployed in San Diego Bay. The density of individuals per square meter can be calculated by multiplying counts by 16. Taxa are identified to species where possible, but for some (primarily amphipods), identifications are to the family or genus level.

Methods & Sampling

Experiment #1: Deployments 1 and 2 were part of this experiment, which took place in central San Diego Bay, California, USA. The objective of this experiment on seagrass habitat fragmentation was to determine the interactive effects of habitat loss and structural complexity on epifaunal diversity, abundance, and biomass. Structural complexity was represented by shoot density, which varied across three levels (low SC (160 shoots m-2 = 10 shoots per ASU), intermediate SC (512 shoots m-2 = 32 shoots per ASU), and high SC (1024 shoots

m-2 = 64 shoots per ASU). Habitat loss varied over 10 levels, from 0 to 90% loss (specifically, 0, 10, 20, 40, 60, 70, 75, 80, 85, or 90% habitat loss). These variables were fully crossed to allow a determination of how structural complexity influences the relationship between habitat loss and epifaunal community structure. For this experiment, epifauna are crustaceans, molluscs, and other taxa that are residents in seagrass habitat (size range ca. 0.5 mm - 2 cm in body length). The experiment was conducted by creating 30 plots of artificial seagrass (each 2 m x 2 m), each of which was modular such that small sections (known as ASUs, for “Artificial Seagrass Unit”) of each could be removed to simulate habitat loss. Each ASU consisted of a 25 x 25 cm square of black plastic mesh to which were tied 64 artificial eelgrass shoots. Each artificial seagrass shoot was a 1 m long piece of green polypropylene ribbon folded in half and tied to the mesh to form two 50 cm tall simulated eelgrass blades. Plots were laid out in the shallow subtidal zone of San Diego Bay, were allowed to be colonized by organisms for 45 d, and then were experimentally fragmented by removing the appropriate number of modules from each. One month later, samples were collected from each plot. Four ASUs were collected from each plot, rinsed into sieves, and animals preserved in 10% formalin.

Epifauna were sorted in the laboratory using dissecting microscopes. To make sorting more efficient, animals first were sorted into two sizes, those that were retained on a 2.8 mm sieve, and those that were retained on a 0.5 mm sieve. Animals were sorted to species, genus, or family (lowest category possible) using field guides such as the Light and Smith Guide to Intertidal Invertebrates. Training for taxon identification was aided by digital photographs taken for most taxa. Specimens of small, similar looking taxa (e.g. amphipods) were sent to other benthic ecology laboratories for confirmation of identification.

Experiment #2: Deployments 3 and 4 were part of this experiment, which took place near the mouth of San Diego Bay, California, USA, adjacent to Shelter Island. The objective of this experiment on seagrass habitat fragmentation was to determine the interactive effects of predator access and habitat patchiness on epifaunal diversity, abundance, and biomass. The general design of the experiment matched that of Experiment #1, except that all plots consisted of the same structural complexity, and that plots were not fragmented after being colonized (instead, plots were deployed pre-fragmented [10 levels] and were colonized in that state). Instead of varying structural complexity, predator access to plots was varied by creating three treatments: caged ASUs (full wire mesh cage of selected ASUs to restrict predators, but allow colonization by epifauna), open ASUs (no cage), and cage-control ASUs (wire mesh cages with two sides removed to allow access by predators, but otherwise identical to full cages). Cages and cage-controls were placed over three separate AUSs in each plot for the duration of the soak. To sample plots, three ASUs were retrieved from each plot and handled identically to Experiment 1. For deployment 3, a shoot density of 1024 shoots m-2 was used in all plots. For deployment 4, a shoot density of 106 shoots m-2 was used in all plots.

Data Processing Description

BCO-DMO Processing:

- added conventional header with dataset name, PI name, version date
- renamed parameters to BCO-DMO standard
- added lab, lat, lon, experiment and deployment columns
- replaced blanks with 'nd' (no data); replaced spaces with under-scores.
- lined up data for all taxa for all expts. by adding columns where needed

[table of contents | back to top]

Data Files

File
eelgrass_taxa.csv (Comma Separated Values (.csv), 5.79 MB) MD5:8f311563ad96d74a4999d757ace1eed0 Primary data file for dataset ID 542922

[table of contents | back to top]

Related Publications

Light, S. F. (2007). The Light and Smith manual: intertidal invertebrates from central California to Oregon. Univ of California Press. https://isbnsearch.org/isbn/978-0520239395
General

[table of contents | back to top]

Parameters

Parameter	Description	Units
expt	experiment id number	unitless
deployment	deployment id number	unitless
date	date the sample was collected in the field	yyyy-mm-dd
site	name of the site for the experiment	unitless
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
sorter_id	initials of the person who sorted the sample	unitless
plot	the plot number (1 - 30)	unitless
square	the replicate asu taken from each plot (either 1; 2; 3; or 4)	unitless
density_shoots	the shoot density for each plot. One of three levels; low; medium; or high.	unitless
predator_tmt	the predator treatment for each plot. One of three levels; cage; cage control (cc); or open.	unitless
pcnt_removed	the percent of the plot that was removed when the plot was fragmented. One of 10 values: 0; 10; 20; 40; 60; 70; 75; 80; 85; or 90%.	percent
notes	comments on samples	unitless
group	higher taxonomic group	unitless
taxon	generally species name	unitless
count	number of individuals found in each artificial seagrass unit	animals

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	dissecting microscope
Generic Instrument Name	Microscope - Optical
Generic Instrument Description	Instruments that generate enlarged images of samples using the phenomena of reflection and absorption of visible light. Includes conventional and inverted instruments. Also called a "light microscope".

[table of contents | back to top]

Deployments

Hovel_SanDiegoBay_2013

Website	https://www.bco-dmo.org/deployment/543013
Platform	Unknown Platform
Start Date	2012-05-01
End Date	2013-07-24
Description	Sampling locations for project "Habitat fragmentation as a process: how habitat context influences the effects of eelgrass loss on epifaunal community structure"

[table of contents | back to top]

Project Information

Habitat fragmentation as a process: how habitat context influences the effects of eelgrass loss on epifaunal community structure (Eelgrass Hab Fragmentation)

Coverage: San Diego Bay, San Diego, CA

Description from NSF award abstract:
In this research project, the investigator will carry out a set of field experiments to determine whether the effects of experimentally fragmenting seagrass habitat on epifaunal community structure are mediated by environmental factors that typically co-vary in marine habitats: structural complexity and predation risk.

Studies in terrestrial and marine systems collectively show that the effects of patchiness depend largely on landscape context, i.e., the characteristics and settings of individual landscapes. Progress in exploring what aspects of landscape context modify effects of habitat fragmentation on ecological processes has been slow. The experiments developed for this research directly address primary questions about the role of habitat structure in moderating ecological processes in a critical nursery habitat, and take initial steps forward to explore three important concepts: (i) how communities respond to the process of habitat fragmentation, rather than simply how communities differ between continuous and patchy areas; (ii) the relative influences of the two major components of habitat fragmentation (habitat loss and increasing patchiness) on biodiversity; and (iii) how co-varying factors in naturally occurring habitats alter faunal responses to large-scale alteration of habitat.

Seagrasses provide critical ecosystem services including the formation of critical refuge and foraging areas for the postlarvae, juveniles, and adults of many species of fishes and invertebrates that feed on diverse assemblages of invertebrate epifauna and infauna. However, disturbances that fragment seagrass habitat are increasingly common and approximately 30% of the world's seagrass habitat has been lost. Disturbances to seagrass habitat may alter feedbacks between plants and invertebrate grazers that influence ecosystem function and may increase susceptibility to species invasions.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1131616

[table of contents | back to top]