

Community composition (relative abundance) separated by native and cryptogenic, and introduced species of each community from coastal sites across a geographic gradient spanning the sub-arctic to the tropics from 2015-2017

Website: <https://www.bco-dmo.org/dataset/850190>

Data Type: Other Field Results

Version: 1

Version Date: 2021-04-23

Project

» [Community Effects of Competition and Predation across Latitude and Implications for Species Invasions](#)
(Competition and Predation across Latitude)

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Abstract

Community composition of sessile marine invertebrates from coastal sites across a geographic gradient spanning the sub-arctic to the tropics. Community composition is divided into two data sets. One corresponds to the community composition of the introduced species found in each community, and the other data set corresponds to the community composition of native and cryptogenic species found in each community.

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Coverage

Spatial Extent: N:55.47257 E:-79.52183 S:8.91758 W:-131.79698

Temporal Extent: 2015-12 - 2017-06

Dataset Description

The main data table served from this Dataset Metadata Page includes data columns "Species" and "Abundance" (See "Parameters" section for more details about columns in the main data table). An alternate format of this dataset is available in the "Data Files" section which has an abundance column per species with a form of the species name as the column name.

The alternate data format has two separate tables divided by whether it is for introduced species or native and cryptogenic species. That information is included in the main data table for this dataset in column "Species_status_type."

Methods & Sampling

These data were used for the publication Lopez and Freestone (2020) and only include composition for taxa identified to genus or species and represent a subset of the data collected for OCE-1434528.

Location: Ketchikan, AK, San Francisco, CA, La Paz, Mexico, and Panama City, Panama

Methodology: Marine invertebrate communities grew on artificial settlement panels hung on floating docks one-meter below the water surface at local marinas in three coastal sites at each region (locations above).

Sampling and analytical procedures: Marine invertebrates from each community were identified on a 50-point grid to generate a measure of percent cover by taxa. The National Exotic Marine and Estuarine Species Information System (NEMESIS) was used to assign status to confirmed species and complemented status information with published literature.

Data Processing Description

BCO-DMO Data Manager Processing Notes:

* Imported files Rel_Abun_3mo_int_all_latlong.csv and Rel_Abun_3mo_nat_all_latlong.csv into the BCO-DMO data system.

* Combined the two data tables adding a new column to capture the species type (int or nat).

* unpivoted dataset. This transforms from all columns per species containing relative abundance into one column "Species" containing the taxonomic name and one column "Abundance" containing the relative abundance.

* removed underscores in taxonomic names. Added the two data tables before combining and unpivoting to the "Data Files" section of this Dataset Metadata Page.

* changed column names to match BCO-DMO naming conventions (only underscores and a-Z0-9)

* Taxonomic names matched to accepted taxonomic names using the World Register of Marine Species taxa match tool on 2021-04-26. Names were not changed in this dataset. Misspelled and unaccepted synonyms are present in the data. A species list including the matches accepted names, aphiaIDs, and LSIDs attached to this dataset as a supplemental file. For more information see <https://www.marinespecies.org/aphia.php?p=match>

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Data Files

File	
comm_comp.csv	(Comma Separated Values (.csv), 469.80 KB) MD5:4ce7ac16dc9776120d4112c8e9c3e4c3
Primary data file for dataset ID 850190	
Relative abundance of introduced species (alternate data format, species by column)	(Comma Separated Values (.csv), 12.93 KB) MD5:7d382a41e27835d7321cdb095b933ca8
filename: Rel_Abun_3mo_int_all_latlong.csv	
This file contains only data for introduced species of the region. In this data format there is a column for each species' relative abundance (percent cover) . See "Parameters" section of the metadata for information about each column in this data table .	
Relative abundance of native and cryptogenic species (alternate data format, species by column)	(Comma Separated Values (.csv), 12.23 KB) MD5:84021db815321fa40f5ff0193b5e0f1a
filename: Rel_Abun_3mo_nat_all_latlong.csv	
This file contains only data for native and cryptogenic species. In this data format there is a column for each species' relative abundance (percent cover).	
See "Parameters" section of the metadata for information about each column in this data table.	

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Supplemental Files

File	
Species list	(Comma Separated Values (.csv), 6.24 KB) MD5:d1fa4f271c48a5e6eeb588f965a72230
filename: species_list.csv	
Species list for BCO-DMO datasets:	
Community composition separated by native and cryptogenic, and introduced species of each community	
https://www.bco-dmo.org/dataset/850190	
Trait data: native, cryptogenic, introduced species	
https://www.bco-dmo.org/dataset/850202	
This file contains the exact taxonomic names used in these datasets along with the results of the Taxa Match tool at the World Register of marine species (match performed 2021-04-26). For more information about match, results see http://www.marinespecies.org/tutorial_taxonmatch.php .	
Parameter (Column names and descriptions):	
ScientificName_in_Dataset, The taxonomic name exactly as it appears is in the datasets.	
AphiaID, The AphiaID matched with the ScientificName_in_Dataset.	
Match type, The ScientificName_in_Dataset's match type to the AphiaID (exact or phonetic).	
Taxon status, Whether ScientificName_in_Dataset is the accepted taxonomic name or an unaccepted synonym.	
LSID, Life Science Identifier for the ScientificName_in_Dataset.	
AphiaID_accepted, The AphiaID for the accepted taxonomic name matched to the ScientificName_in_Dataset.	
ScientificName_accepted, The accepted taxonomic name matched to the ScientificName_in_Dataset.	

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Related Publications

López, D. P., & Freestone, A. L. (2020). History of co-occurrence shapes predation effects on functional

diversity and structure at low latitudes. *Functional Ecology*, 35(2), 535–545. doi:[10.1111/1365-2435.13725](https://doi.org/10.1111/1365-2435.13725)
Results

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Related Datasets

IsRelatedTo

Lopez, D. P., Freestone, A. (2021) **Trait data captured from literature sources, field observations and measurements of sessile marine invertebrates from coastal sites across a geographic gradient spanning the sub-arctic to the tropics from 2015 to 2017**. Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2021-04-23 doi:10.26008/1912/bco-dmo.850202.1 [[view at BCO-DMO](#)]

Relationship Description: Trait data for species in this dataset.

Welcome to NEMESIS! National Estuarine and Marine Exotic Species Information System (NEMESIS). Marine Invasions Research, Smithsonian Environmental Research Center. (n.d.). <https://invasions.si.edu/nemesis/>.

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Parameters

Parameter	Description	Units
Region	Region where each taxon was collected (Alaska, Panama, Mexico, California)	unitless
Site	Unique site abbreviation (two letter code)	unitless
Site_name	Complete site name	unitless
Deploy_month	Month when experimental communities (panels) were deployed for a 3 month growth period. Numeric month.	unitless
Deploy_year	Year when experimental communities (panels) were deployed for a 3 month growth period. Year in format yyyy.	unitless
Latitude	Latitude of site were communities were grown	decimal degrees
Longitude	Longitude of site were communities were grown	decimal degrees
Treatment	Treatment description. full =full cage; open = no cage	unitless
Plate_ID	Unique panel (community) reference number	unitless
Species_status_type	Invasion status: nat = native or cryptogenic, int = introduced	unitless
Species	Lower taxonomic information (~genus/species, if available) based on best available information in the field	unitless
Abundance	Relative abundance of each taxon from a 14 x 14 cm panel and a 50 point grid	percent cover (%)

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Project Information

Community Effects of Competition and Predation across Latitude and Implications for Species Invasions (Competition and Predation across Latitude)

Coverage: Eastern Pacific in four coastal regions: Ketchikan, Alaska; San Francisco, California; La Paz, Mexico; and Panama City, Panama

Description from NSF award abstract:

Global patterns of biodiversity demonstrate that most of the species on earth occur in the tropics, with strikingly fewer species occurring in higher-latitude regions. Biologists predict that this global pattern of species diversity is likely shaped by three ecological interactions between species. Yet few detailed experimental data

exist that demonstrate how species interactions influence natural communities from the tropics to the arctic. Therefore, a significant opportunity exists to transform our understanding of how these fundamental species interactions shape patterns of biodiversity across the globe. Furthermore, these species interactions have the strong potential to limit potentially harmful biological invasions by non-native species, which are often transported by human activities that can breach historical dispersal barriers, such as ocean basins and continents. Biological invasions can cause undesired ecological and economic effects and are considered one of the primary drivers of global change. Through extensive field research on marine ecosystems along the Pacific Coast of North and Central America, from the tropics to the subarctic, this project will study ecological factors that shape global patterns of diversity and limit biological invasions.

Biologists have long theorized that the latitudinal diversity gradient may be shaped by stronger species interactions, such as competition and predation, occurring in the tropics than at higher latitudes. Prior research suggests that predation pressure is indeed stronger at lower latitudes, but it is unclear how interactive effects of predation and competition structure communities to maintain these diversity patterns in ecological time. This project represents an international research program to expand ecological understanding of species interactions across latitude. The objectives are to determine the relative influences of two primary species interactions, competition and predation, on patterns of species diversity, community assembly and sensitivity to species invasion. Field research will employ a large-scale experimental approach that focuses on sessile marine invertebrate communities across 47 degrees of latitude (over 7000 km). Experiments will manipulate levels of predation and competition for one year and will be conducted in four regions, ranging from the subarctic to the tropics: Alaska, California, Mexico, and Panama. Communities of sessile marine invertebrates, composed of both native and non-native species, will be examined iteratively under different predation and competition regimes to evaluate community dynamics. The relative importance of a suite of factors, including environmental conditions and recruitment rates, to interaction outcomes will be evaluated.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1434528

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