Uniform point contact (UPC) transect data from Isla Natividad from 2006 to 2021

Website: https://www.bco-dmo.org/dataset/907373
Data Type: Other Field Results
Version: 1
Version Date: 2023-08-30

Project
» Collaborative Research: Evaluating how abalone populations in the California Current are structured by the interplay of large-scale oceanographic forcing and nearshore variability (Abalone Safe Places)

Contributors	Affiliation	Role
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Abstract
This dataset encompasses information about Uniform point contact (UPC) transects between 2006 to 2021 in Isla Natividad. UPC refers to the information about the substrate where the transect is laid. Every meter (along the 30m transect) you identify what type of substrate there is (e.g., sand, cobble, boulder, reef, other such as anthropogenic), what type of cover there is (e.g., none, brown algae, green algae, red algae, crustose coralline algae, mobile invertebrates, sessile invertebrates or seagrass) and the height of the relief (e.g., less than 10cm, between 10cm and 1m, between 1m and 2m or more than 2m). With this information you can assess the kelp forest ecosystem. This dataset also has information about the dates when the transects were done, site, the name of the diver, the depth the transect was laid, if the site was a marine reserve or not, if the site is inside a marine protected area or not, the latitude and longitude of the sites, the temperature of the water, the number of transect from where the information was counted and the total of substrate, cover and relief points. Ecological monitoring is important to collect data of species that inhabit an specific ecosystem. For this data set, we present all the data form 2006 to 2021 on algae, marine invertebrates, fish and uniform point contact at six different sites in Isla Natividad off the coast of Baja California Sur, Mexico. Data was collected once a year by trained divers as a collaborative effort from Stanford University, non-governmental organizations, and fishing cooperative federations. These data provides the abundaces of algae, invertebrates, fish and substrate of Isla Natividad over the spam of 15 years and may be use to assess changes in the ecosystems after shocks such as hypoxic events or marine heatwaves.

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Coverage

Spatial Extent: **N**:27.8952 **E**:-115.084 **S**:27.505 **W**:-115.205
Temporal Extent: 2006-08-17 - 2021-09-24

Methods & Sampling

Ecological monitoring was conducted once a year from 2006-2021 at six different sites in Isla Natividad, Baja California Sur, Mexico. Using SCUBA, trained divers laid 30 x 2 meters belt transects to collect in situ algae, marine invertebrates, fish and uniform point contact (UPC) found along the transect. For algae, divers counted each algae and counted the number of stipes in the organism.

For data access and methodology details for marine invertebrates, fish, and uniform point contact (UPC) data, see the "Related Datasets" section. These four datasets related to each other in the way that the information from algae, invertebrates, fish and UPC was taken from the same site, on the same date, done by the same person.

These four related datasets were collected following the same methodology. Each year from 2006 to 2021, certified divers will lay several 30m transects along kelp forest in different sites in Isla Natividad, Baja California Sur, Mexico. Along the transects, the divers will collect information of algae, invertebrates, fish and UPC (Uniform Point Contact). Each transect was done in one single dive, collecting all the information already mentioned. At the end of the collecting season, the data was checked and transferred to the main dataset.

Instruments:
SCUBA equipment
30m transects
Diving slates

Data Processing Description

All the data collected during the ecological monitoring was then transferred to excel files, where it was double checked for typos and errors. Every year since 2006, the data has been collected in one excel file.

BCO-DMO Processing Description

* File "COBI_Mexico_UPC_IslaNatividad_2006-2021_EnglishVersion.csv" imported into the BCO-DMO data system with missing data identifiers "NA" and "ND."
** Missing data values are displayed differently based on the file format you download. They are blank in csv files, "NaN" in MatLab files, etc.
* Column names adjusted to conform to BCO-DMO naming conventions designed to support broad re-use by a variety of research tools and scripting languages. [Only numbers, letters, and underscores. Can not start with a number
* ISO_DateTime_UTC_Start column added in ISO 8601 format for UTC time zone using the supplied year, month, day, START_TIME (using "Mexico/BajaSur" UTC-7:00/-6:00). Time zone confirmed by submitter.

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Data Files

File
Ecological monitoring of UPC on Isla Natividad from 2006 to 2021 filename: 907373_v1_isla_natividad_upc.csv (Comma Separated Values (.csv), 397.11 KB) MD5:001c173e9683d3ab77e7085695f67943 Primary data file for dataset ID 907373, version 1

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Related Datasets

IsRelatedTo

Micheli, F., Woodson, C. B., Hernández-Velasco, A., Jacobson, C. O., Torre, J. (2023) **Ecological monitoring of algae on Isla Natividad from 2006 to 2021.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2023-08-29 doi:10.26008/1912/bco-dmo.907321.1 [view at BCO-DMO]
Relationship Description: Datasets collected as part of the same ecological monitoring study performed Isla Natividad off the coast of Baja California Sur, Mexico between 2006-2021.

Micheli, F., Woodson, C. B., Hernández-Velasco, A., Jacobson, C. O., Torre, J. (2023) **Ecological monitoring of fish on Isla Natividad from 2006 to 2021.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2023-08-30 doi:10.26008/1912/bco-dmo.907363.1 [view at BCO-DMO]
Relationship Description: Datasets collected as part of the same ecological monitoring study performed Isla Natividad off the coast of Baja California Sur, Mexico between 2006-2021.

Micheli, F., Woodson, C. B., Hernández-Velasco, A., Jacobson, C. O., Torre, J. (2023) **Ecological monitoring of marine invertebrates on Isla Natividad from 2006 to 2021.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2023-08-30 doi:10.26008/1912/bco-dmo.907353.1 [view at BCO-DMO]
Relationship Description: Datasets collected as part of the same ecological monitoring study performed Isla Natividad off the coast of Baja California Sur, Mexico between 2006-2021.

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Parameters

Parameter	Description	Units
ID	identification number	unitless
DAY	day when monitoring was conducted	unitless
MONTH	month when monitoring was conducted	unitless
YEAR	year when monitoring was conducted	unitless
STATE	State in Mexico: Baja California Sur	unitless
COMMUNITY	The community were the monitoring was done	unitless
SITE	The specific sites were monitoring was done	unitless
LAT	latitute	decimal degrees
LONG	longitude	decimal degrees

HABITAT	type of ecosystem where monitoring was conducted	unitless
ZONE	If it was a marine reserve or not: Control (not reserve), Reserve (marine reserve)	unitless
PROTECTION	If the site had any type of protection: none, community reserve, fishing refuge zone	unitless
MPA	If there is any type of marine protected area on a national level	unitless
DIVER	The person that did the monitoring	unitless
START_TIME	initial time of monitoring (HH:MM or HH) in Pacific Time Zone (UTC-8/-7)	unitless
FINAL_TIME	final time of monitoring (HH:MM or HH) in Pacific Time Zone (UTC-8/-7)	unitless
ISO_DateTime_UTC_Start	initial timestamp of monitoring in UTC time zone (ISO 8601 format)	unitless
START_DEPTH	initial depth	meters (m)
FINAL_DEPTH	final depth	meters (m)
TEMPERATURE	water temperature	degrees Celcius
VISIBILITY	visibility description	meters (m)
CURRENT	current descritpion	unitless
TRANSECT	the number of transect of the monitoring	meters (m)
SubstrateSand	Count of points along transect with substrate "sand" = anything less than 0.5 cm (except anthropogenic substrate). See TotalSubstrate for total number of substrate points measured in this transect.	unitless
SubstrateGravel	Count of points along transect with substrate "gravel" = anything from 0.5cm to 15 cm (except anthropogenic substrate). See TotalSubstrate for total number of substrate points measured in this transect.	unitless
SubstrateBoulder	Count of points along transect with substrate "boulder" = anything from 15cm to 1 m (except anthropogenic substrate). See TotalSubstrate for total number of substrate points measured in this transect.	unitless

SubstrateReef	Count of points along transect with substrate "reef" = anything bigger than 1 m (except anthropogenic substrate). See TotalSubstrate for total number of substrate points measured in this transect.	unitless
SubstrateOther	Count of points along transect with substrate "other" = anything anthropogenic regardless of the size. See TotalSubstrate for total number of substrate points measured in this transect.	unitless
Rugosity_0	Count of points along transect with rugosity between 0 to 10cm. This is a metric of vertical variation. See TotalRugosity for total number of rugosity points measured in this transect.	unitless
Rugosity_1	Count of points along transect with rugosity between 10 to 1m. This is a metric of vertical variation. See TotalRugosity for total number of rugosity points measured in this transect.	unitless
Rugosity_2	Count of points along transect with rugosity between 1 to 2m. This is a metric of vertical variation. See TotalRugosity for total number of rugosity points measured in this transect.	unitless
Rugosity_3	Count of points along transect with rugosity greater than 2m. This is a metric of vertical variation. See TotalRugosity for total number of rugosity points measured in this transect.	unitless
CoverNone	Count of points along transect with "none" = nothing. Describes the absense of organisms living at that point. See TotalCover for total number of cover points measured in this transect.	unitless
CoverBrownAlgae	Count of points along transect with "brown algae" = brown algae but not kelps, boa feather for example.	unitless
CoverOtherBrownAlgae	Count of points along transect with "other brown algae" = invasive species such as sargasum. Describes the type of organism living at that point. See TotalCover for total number of cover points measured in this transect.	unitless
CoverKelp	Count of points along transect with "kelp" = brown algae such as giant kelp, bull kelp. Describes the type of organism living at that point. See TotalCover for total number of cover points measured in this transect.	unitless
CoverRedAlgae	Count of points along transect with "red algae." Describes the type of organism living at that point. See TotalCover for total number of cover points measured in this transect.	unitless
CoverCorallineArticulate	Count of points along transect with "coralline articulate." Describes the type of organism living at that point. See TotalCover for total number of cover points measured in this transect.	unitless

CoverCrustoseCoralline	Count of points along transect with "crustose coralline" = crustose coralline algae . Describes the type of organism living at that point. See TotalCover for total number of cover points measured in this transect.	unitless
CoverSessilInvertebrate	Count of points along transect with "sessil invertebrate" = anemone, bryozoan, coral, gorgonians. Describes the type of organism living at that point. See TotalCover for total number of cover points measured in this transect.	unitless
CoverMobileInvertebrate	Count of points along transect with "mobile invertebrates" = sea urchins, sea stars, sea cucumber, snails. Describes the type of organism living at that point. See TotalCover for total number of cover points measured in this transect.	unitless
CoverGreenAlgae	Count of points along transect with "green algae ." Describes the type of organism living at that point. See TotalCover for total number of cover points measured in this transect.	unitless
CoverCrustoseRed	Count of points along transect with "crustose red algae. " Describes the type of organism living at that point. See TotalCover for total number of cover points measured in this transect.	unitless
CoverSeagrass	Count of points along transect with "seagrass or eelgrass ." Describes the type of organism living at that point. See TotalCover for total number of cover points measured in this transect.	unitless
TotalSubstrate	total sum of all the points of substrate along the transect (maximum of 30 but may be less depending how many points were taken during transect)	unitless
TotalRugosity	total sum of all the points of rugosity along the transect (maximum of 30 but may be less depending how many points were taken during transect)	unitless
TotalCover	total sum of all the points of cover along the transect (maximum of 30 but may be less depending how many points were taken during transect)	unitless

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Project Information

Collaborative Research: Evaluating how abalone populations in the California Current are structured by the interplay of large-scale oceanographic forcing and nearshore variability (Abalone Safe Places)

Coverage: Pacific Coast of Baja California (26 N to 32 N)

NSF Award Abstract:
Oceanographic variability is increasingly recognized as a driver of change in marine ecosystems.

Understanding the effects of this oceanographic variability and its extremes on organisms, populations, ecosystems and the critical services they deliver is of great scientific interest and pivotal for resource management and policy. The overarching goal of this project is to determine how small-scale heterogeneity in habitat quality and site-specific vulnerability to extreme oceanographic conditions might help identify safe spaces and protect coastal populations and fisheries from the detrimental effects of increasing frequency, intensity and durations of extreme oceanographic conditions. This project will combine detailed nearshore oceanographic studies with ecological experiments and coupled biophysical modeling to advance understanding of the drivers of local oceanographic variability and consequent effects on coastal marine animals. The research will determine how multiple, potentially stressful, environmental drivers co-vary in the field and how such variation affects the population dynamics of coastal species. Specifically, this project will provide key insights regarding how changes in ocean acidification, dissolved oxygen and temperature will affect green and pink abalone, an ecologically and economically important resource in the southern California Current. Team members will work with partner non-governmental organizations, resource agencies, and fishing cooperative federations to disseminate results and incorporate data and insights into fisheries management and adaptation initiatives in Baja California, Mexico and in California, USA. This project will also support the training and professional development of underrepresented groups at the high school, undergraduate, graduate and postdoctoral levels through direct involvement in research, intensive courses and international workshops.

Despite large-scale drivers and regional perturbations, local variability in ocean conditions may be a major driver of the overall performance and vulnerability of coastal marine species. Research performed as part of this project will test two specific hypotheses: (1) The relative influences of upwelling versus tides, as mediated by coastal geometry and structural complexity associated with rocky reefs and kelp forests act to create high local variability in physical conditions, at scales of 10s-1000s meters; and (2) Local variability in oceanographic conditions results in high local patchiness in the performance of sedentary marine organisms, providing for safe spaces in the face of escalating heat waves, hypoxia, and acidification, that have caused recent mass mortalities in multiple species across the California Current region. Integrated oceanographic-ecological field studies will be conducted along the coast of Baja California, Mexico, using green and pink abalone (Haliotis fulgens, H. corrugata) as model species. Complementary laboratory experiments will evaluate how different exposure regimes (frequency, intensity and duration of high temperature, and/or low dissolved oxygen and acidity events) may affect the demography and persistence of abalone populations under current and future environments. Coupled biophysical and population models will integrate results from the field and laboratory experiments to understand how local variability in ocean conditions affects population dynamics over longer periods. The research will advance the understanding of factors affecting the resilience coastal species by (1) ascertaining how large-scale oceanographic phenomena manifest in ocean conditions (dissolved oxygen, acidity, temperature) at local scales that are most relevant to coastal marine ecosystems and (2) determining the effects of current, and expected future, ocean conditions and variability on important marine species.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1736830

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