

Temperature data collected in the bottoms of intertidal rock tide pools at Bodega Marine Reserve intertidal zone, between October 2017 and August 2019

Website: <https://www.bco-dmo.org/dataset/851437>

Data Type: Other Field Results

Version: 1

Version Date: 2021-05-28

Project

» [Collaborative Research: Context-dependency of top-down vs. bottom-up effects of herbivores on marine primary producers](#) (CalCoast Grazer TDBU)

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Abstract

Temperature data collected in the bottoms of intertidal rock tide pools at Bodega Marine Reserve intertidal zone, between October 2017 and August 2019.

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Coverage

Spatial Extent: Lat:38.316333263392 Lon:-123.0722714

Temporal Extent: 2017-10-08 - 2019-08-19

Dataset Description

The parameters TidBitID, Block, TrtGroup, HerbivoreTreat, TempTreat, NutrientTreat are only available for the period 2019-06 to 2019-08.

Methods & Sampling

Temperature data collected by automated temperature dataloggers deployed in the bottoms of intertidal rock tide pools, set to sample at 15 minute intervals. Sensors were secured with screws in rock anchors, and remained submerged in pools at all times.

Latitude and longitude values for each of the tide pools used in the field experiment carried out at Bodega Marine Reserve, Bodega Bay in northern California, USA (38.31633326339228, -123.07227140000002). The locations were collected with a Garmin eTrex handheld GPS, using the WGS84 coordinate system.

TrtGroup - Coding variable for treatment type. A numeric value indicating each of 8 unique combinations of HerbivoreTreat, TempTreat, and NutrientTreat.

HerbivoreTreat - Coding variable for herbivore density treatment (Low or High). The High treatment level contains approximately twice the normal number of mobile grazers (limpets and littorine snails) as unmanipulated pools based on preliminary surveys. The Low treatment pools contained a near-zero number of mobile grazers maintained by repeated visits to the pool to manually pick out mobile grazers.

TempTreat - Coding variable for temperature treatment (Ambient or Warmed). Warmed treatment pools had a 60W heating element that heated the pool during daytime low tides, with a targeted 1-2 degree Celsius increase above ambient temperature conditions. Ambient treatment pools did not have temperature manipulated.

NutrientTreat - Coding variable for nutrient treatment (Control or Increased). The Increased treatment received slow-release nitrogen fertilizer to mimic increased coastal ocean nutrient supply. Control treatments were unmanipulated.

Data Processing Description

HOBOWare 3.7.13 was used to download data from the sensors, and data were collated into CSV files using scripts written in R version 3.5.

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Data Files

File
851437_v1_temperature.csv (Comma Separated Values (.csv), 41.30 MB) MD5:3dfb5b8faabd351b0ebe218ca88be1f6 Primary data file for dataset ID 851437, version 1

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Parameters

Parameter	Description	Units
DateTimeUTC	Date and time, in UTC time zone	unitless
Site	Descriptor of sampling site, BML = Bodega Marine Laboratory	unitless
Pool	Identifier for experimental tide pool, denoted by number and letter (A or B). There are 36 total pools, with identifiers ranging from 1A to 18A and 1B to 18B.	unitless
Latitude	Latitude of pool location south is negative	decimal degrees
Longitude	Longitude of pool location, west is negative	decimal degrees
TempC	Water temperature, reported to 0.001 C precision, practical limit of accuracy 0.21 degrees C	degrees Celsius (°C)
TidBitID	Unique TidBit sensor ID	unitless
Block	Identifier for experiment block within site at Bodega Marine Lab site (A or B)	unitless
TrtGroup	Coding variable for treatment type	unitless
HerbivoreTreat	Coding variable for herbivore density treatment (Low or High)	unitless
TempTreat	Coding variable for temperature treatment (Ambient or Warmed)	unitless
NutrientTreat	Coding variable for nutrient treatment (Control or Increased)	unitless

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Instruments

Dataset-specific Instrument Name	HOBO Tidbit V2 temperature data loggers
Generic Instrument Name	Onset HOBO Tidbit v2 (UTBI-001) temperature logger
Dataset-specific Description	HOBO Tidbit V2 temperature data loggers, Onset Computer Corporation, Bourne, Massachusetts, USA.
Generic Instrument Description	A temperature logger that measures temperatures over a wide temperature range. It is designed for outdoor and underwater environments and is waterproof to 300 m. A solar radiation shield is required to obtain accurate air temperature measurements in sunlight (RS1 or M-RSA Solar Radiation Shield). With an operational temperature range between -20 degrees Celsius and +70 degrees Celsius, the Tidbit v2 has an accuracy of +/-0.21 and a resolution of 0.02 degrees Celsius.

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Project Information

Collaborative Research: Context-dependency of top-down vs. bottom-up effects of herbivores on marine primary producers (CalCoast Grazer TDBU)

Coverage: Coast of California, USA

Humans are modifying marine food webs both from the top-down, by reducing consumer abundances, and from the bottom-up, by adding nutrients to coastal habitats. Predicting these impacts is complicated because herbivores affect primary producers both from the top-down, by eating them, and from the bottom-up, by recycling nutrients and facilitating the recruitment of algae into local marine ecosystems. This project uses experimental manipulations along a natural gradient in nutrient availability on the California coast to evaluate the complex interactions between top-down and bottom-up processes in marine communities. This project includes experiments and outreach in a location with substantial exposure to the public, and the investigators will work with community and university outreach personnel to communicate this research to broader audiences. Specifically, the project includes mechanisms for curriculum development and outreach and will train undergraduate and graduate students in marine science.

The investigators are implementing a suite of innovative approaches to understand the multiple roles that herbivores play in marine systems. Traditional experimental methods for herbivore removal result in the loss of both the consumptive and facilitative effects of herbivores. In contrast, the investigators' experimental design allows them to partition the different effects of herbivores on marine primary producers. These methods, including observations, experiments, and modeling approaches, allow researchers to (i) calculate the relative importance of herbivores' consumptive and facilitative effects on algal diversity and abundance; (ii) determine the effects of temperature, nutrients, and herbivores on the microbial community; and (iii) evaluate the relative importance of internal processes and spatial subsidies.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1736891
NSF Division of Ocean Sciences (NSF OCE)	OCE-1904184

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