Microbial sample metadata, sequencing and treatment details, temperature and salinity at Pickles Reef, Florida Keys National Marine Sanctuary from 2009-2012

Website: https://www.bco-dmo.org/dataset/674321
Data Type: Other Field Results
Version: 2
Version Date: 2021-08-06

Project
» Cascading interactions of herbivore loss and nutrient enrichment on coral reef macroalgae, corals, and microbial dynamics (HERBVRE)

Contributors	Affiliation	Role
Burkepile, Deron	Florida International University (FIU)	Principal Investigator
Vega Thurber, Rebecca	Florida International University (FIU)	Co-Principal Investigator
Copley, Nancy	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager
Rauch, Shannon	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
This dataset contains microbial sample metadata for the study plots including sequencing and treatment details, HCOM temperature and salinity data. The experimental site was in the Florida Keys National Marine Sanctuary from 2009 to 2012. Published in Nature Communications (2016) doi:10.1038/ncomms11833, Supplementary Data 2c.

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Coverage

Spatial Extent: **Lat**:24.9943 **Lon**:-80.4065
Temporal Extent: 2009-06-22 - 2012-08-17

Dataset Description

This dataset contains microbial sample metadata for the study plots including sequencing and treatment details, HCOM temperature and salinity data. The experimental site was in the Florida Keys National Marine Sanctuary from 2009 to 2012. Published in Nature Communications (2016) doi:10.1038/ncomms11833, Supplementary Data 2c.

Temperature and salinity at the surface and 5 meters are from the Hybrid Coordinates Ocean Model HCOM 31.0.

Natural history of the study site:
This experiment was conducted in the area of Pickles Reef (24.99430, -80.40650), located east of Key Largo, Florida in the United States. The Florida Keys reef tract consists of a large bank reef system located

approximately 8 km offshore of the Florida Keys, USA, and paralleling the island chain. Our study reef is a 5-6 m deep spur and groove reef system within this reef tract. The reefs of the Florida Keys have robust herbivorous fish populations and are relatively oligotrophic. Coral cover on most reefs in the Florida Keys, including our site, is 5-10%, while macroalgal cover averages ~15%, but ranges from 0-70% depending on location and season. Parrotfishes (*Scaridae*) and surgeonfishes (*Acanthuridae*) are the dominant herbivores on these reefs as fishing for them was banned in 1981. The other important herbivore on Caribbean reefs, the urchin *Diadema antillarum*, remains at low densities across the Florida Keys following the mass mortality event in 1982-3.

Related Reference:
Zaneveld, J.R., D.E. Burkepile, A.A. Shantz, C. Pritchard, R. McMinds, J. Payet, R. Welsh, A.M.S. Correa, N.P. Lemoine, S. Rosales, C.E. Fuchs, and R. Vega Thurber (2016) Overfishing, nutrient pollution, and temperature interact to disrupt coral reefs down to microbial scales. Nature Communications 7:11833 doi:10.1038/ncomms11833 Supplementary Information

Data Processing Description

BCO-DMO Processing:
- extracted the collection, sequencing, temperature, salinity, and treatment details columns from the full table;
- added conventional header with dataset name, PI name, version date, reference information;
- renamed parameters to BCO-DMO standard;
- replaced 'unknown' with 'nd' ('no data').

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Data Files

File	
S2c_microbe_metadata.csv	(Comma Separated Values (.csv), 170.79 KB) MD5:4309333ed6a09077b86fa90e72a62028
Primary data file for dataset ID 674321	

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Related Publications

Zaneveld, J. R., Burkepile, D. E., Shantz, A. A., Pritchard, C. E., McMinds, R., Payet, J. P., ... Thurber, R. V. (2016). Overfishing and nutrient pollution interact with temperature to disrupt coral reefs down to microbial scales. Nature Communications, 7(1). doi:10.1038/ncomms11833
Results

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Related Datasets

IsRelatedTo

Burkepile, D., Vega Thurber, R. (2021) **Benthic community composition at Pickles Reef, Florida Keys National Marine Sanctuary from 2009-2013.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2) Version Date 2021-08-06 doi:10.26008/1912/bco-dmo.674368.2 [view at BCO-DMO]

Burkepile, D., Vega Thurber, R. (2021) **Parrotfish bite annotations from Florida Keys National Marine Sanctuary, 2009-2013.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2) Version Date 2021-08-06 doi:10.26008/1912/bco-dmo.674439.2 [view at BCO-DMO]

Burkepile, D., Vega Thurber, R. (2021) **Relative abundance of phyla from Florida Keys National Marine Sanctuary, 2009-2013.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2) Version Date 2021-08-06 doi:10.26008/1912/bco-dmo.674449.2 [view at BCO-DMO]

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Parameters

Parameter	Description	Units
sample_location_name	name of sample collection reef	unitless
latitude	latitude; north is positive	decimal degrees
longitude	longitude; east is positive	decimal degrees
depth	sample collection depth	meters
elevation	sample collection elevation	meters
host_common_name	common name of coral host	unitless
SequencingCenter	name of sequencing center	unitless
treatment_interruption_dates	dates of treatment interuption (none)	unitless
SampleID	sample identifier	unitless
BarcodeSequence	genetic barcode sequence	unitless
LinkerPrimerSequence	linker primer sequence	unitless
Replicate	replicate number	unitless
SampleID_no_replicate	sample identifier without the replicate number appended	unitless
Individual	specimen identifier	unitless
concatenated_date	date in format yyyymmdd	unitless
primer_name	name of the primer	unitless

barcode_number	barcode identifier	unitless
run_prefix	(sequence) run prefix identifier	unitless
sequencing_run	sequenceing run identifier	unitless
sample_site_id	sample site identifier	unitless
metadata_annotation_comments	metadata annotation comments	unitless
year	year	unitless
month	month	unitless
day	day	unitless
date_collected	date of collection formatted at yyyy-mm-dd	unitless
HCOM_temp_0m	temperature at surface from Hybrid Coordinates Ocean Model HCOM_31_0	degrees Celsius
HCOM_temp_5m	temperature at 5 meters depth from Hybrid Coordinates Ocean Model HCOM_31_0	degrees Celsius
HCOM_avg_temp_0m	average temperature at surface from Hybrid Coordinates Ocean Model HCOM_31_0	degrees Celsius
HCOM_avg_temp_5m	average temperature at 5 meters depth from Hybrid Coordinates Ocean Model HCOM_31_0	degrees Celsius
HCOM_salt_0m	salinity at surface from Hybrid Coordinates Ocean Model HCOM_31_0	PSU
HCOM_salt_5m	salinity at 5 meters depth from Hybrid Coordinates Ocean Model HCOM_31_0	PSU
HCOM_salt_avg_0m	average salinity at surface from Hybrid Coordinates Ocean Model HCOM_31_0	PSU
HCOM_salt_avg_5m	average salinity at 5 meters depth from Hybrid Coordinates Ocean Model HCOM_31_0	PSU

plot_code	plot code	unitless
host_taxon_abbreviation	2-letter abbreviation for coral host taxon name	unitless
host_taxon_name	coral host taxon name	unitless
host_taxid	coral host taxon name code	unitless
host_genus	genus of coral host	unitless
fertilizer	yes/no flag for whether fertilizer (nutrients) was added to plot	unitless
caged	yes/no flag for whether plot was surrounded by a cage as herbivore exclosure	unitless
plot_number	plot number	unitless
replicate_subplot	subplot replicate number	unitless
treatment	treatment desctiption: caged fertilizer both or control	unitless
treatment_start_date	start date of treatment	unitless
treatment_end_date	end date of treatment	unitless
plot_code_month_year	identifier with plot code month and year concatenated	unitless

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Deployments

Burkepile_FL_Keys

Website	https://www.bco-dmo.org/deployment/639486
Platform	Florida Keys National Marine Sanctuary
Start Date	2009-06-01
End Date	2012-08-31
Description	Herbivore effects on reef algae

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Project Information

Cascading interactions of herbivore loss and nutrient enrichment on coral reef macroalgae, corals, and microbial dynamics (HERBVRE)

Coverage: Key Largo, Florida Keys, USA; N 24.99430, W 080.40650

Description from NSF award abstract:
Coral reefs in the Caribbean Sea are undergoing unprecedented declines in coral cover due in large part to climate change, pollution, and reductions in fish biodiversity and abundance. Macroalgae have become abundant on reefs, probably due to decreases in herbivory (e.g., through overfishing) and increases in anthropogenic inputs of nutrients. The spread of macroalgae has negative feedbacks on reef recovery because algae are often superior competitors and suppress growth of both adult and juvenile corals. A majority of reef studies to date have focused on how stressors affect macroorganisms, while relatively few have investigated how these stressors and the resultant algal-dominated states affect microorganisms. Yet, coral reef-associated microbes play significant roles in coral reef ecosystems through biogeochemical cycling and disease. Since microbes are important mutualists of corals as well as potential pathogens, it is important to understand the mechanisms that control their taxonomic and functional diversity.

The goal of this proposal is to quantify how alterations of top-down (removal of herbivorous fish) and bottom-up (inorganic nutrient addition) forces alter macrobial as well as microbial dynamics on coral reefs in order to understand the mechanisms that reinforce coral-depauperate reef systems. This work asks two main questions:

Q1. How do nutrient enrichment and herbivore removal interact to affect benthic algal abundance, coral-algal interactions, and coral survivorship and growth?

Q2. How do nutrient enrichment and herbivore removal affect bacterial abundance, taxonomic diversity, and functional diversity on and within corals?

The proposed research will directly and empirically address many of the current hypotheses about how bottom-up and top-down forces alter reef dynamics. The PIs will investigate: (1) the impact of multiple stressors over several years; (2) impacts on multiple levels of biological organization (from fishes to algae to microbes); and (3) the mechanisms underlying changes in algal-coral microbe interactions. Significantly, the approach will provide the statistical power necessary to distinguish between seasonal- and stress-induced changes in macro- and microbial diversity.

Resulting Publication:
Zaneveld, J.R., D.E. Burkepile, A.A. Shantz, C. Pritchard, R. McMinds, J. Payet, R. Welsh, A.M.S. Correa, N.P. Lemoine, S. Rosales, C.E. Fuchs, and R. Vega Thurber (2016) Overfishing, nutrient pollution, and temperature interact to disrupt coral reefs down to microbial scales. Nature Communications 7:11833 doi:10.1038/ncomms11833.
Access to data via Supplementary Information.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1130786

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