Relative abundance of phyla from Florida Keys National Marine Sanctuary, 2009-2013

Website: https://www.bco-dmo.org/dataset/674449
Data Type: experimental
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
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Abstract
This dataset contains relative abundance data of phyla for the study plots at Pickles Reef, Florida Keys National Marine Sanctuary from 2009-2013. 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 - 2013-08-17

Dataset Description

This dataset contains relative abundance data of phyla for the study plots at Pickles Reef, Florida Keys National Marine Sanctuary from 2009-2013. Published in Nature Communications (2016) doi:10.1038/ncomms11833, Supplementary Data 2c.

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:
- added conventional header with dataset name, PI name, version date;
- modified parameter names to conform with BCO-DMO naming conventions;
- reduced decimal places of lat/lon from 6 to 5 and abundances from 9 to 4 digits in consideration of sampling precision methods;
- reformatted date from m/d/yyyy to ISO_Date: yyyy-mm-dd;
- replaced 'unknown' with 'nd' ('no data').

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Data Files

File
S2c_abundance.csv (Comma Separated Values (.csv), 118.44 KB) MD5:43d4bd824b492cee1f46f8b6947ba8e3 Primary data file for dataset ID 674449

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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) **Microbial sample metadata, sequencing and treatment details, temperature and salinity at Pickles Reef, Florida Keys National Marine Sanctuary from 2009-2012.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2) Version Date 2021-08-06 doi:10.26008/1912/bco-dmo.674321.2 [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]

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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
SampleID	sample identifier	unitless
date_collected	date of collection formatted at yyyy-mm-dd	unitless
Unassigned__Other	taxon not assigned or not one of the listed taxa	unitless
k_Archaea__p_Crenarchaeota	relative abundance of kingdom: Archaea; phylum: Crenarchaeota	proportion
k_Archaea__p_Euryarchaeota	relative abundance of kingdom: Archaea; phylum: Euryarchaeota	proportion
k_Archaea__p_Parvarchaeota	relative abundance of kingdom: Archaea; phylum: Parvarchaeota	proportion
k_Bacteria__Other	relative abundance of kingdom: Bacteria; Other	proportion
k_Bacteria__p	relative abundance of kingdom: Bacteria;	proportion
k_Bacteria__p_Acidobacteria	relative abundance of kingdom: Bacteria; phylum: Acidobacteria	proportion
k_Bacteria__p_Actinobacteria	relative abundance of kingdom: Bacteria; phylum: Actinobacteria	proportion
k_Bacteria__p_AncK6	relative abundance of kingdom: Bacteria; phylum: AncK6	proportion
k_Bacteria__p_Aquificae	relative abundance of kingdom: Bacteria; phylum: Aquificae	proportion
k_Bacteria__p_Armatimonadetes	relative abundance of kingdom: Bacteria; phylum: Armatimonadetes	proportion
k_Bacteria__p_BHI80_139	relative abundance of kingdom: Bacteria; phylum: BHI80_139	proportion
k_Bacteria__p_BRC1	relative abundance of kingdom: Bacteria; phylum: BRC1	proportion
k_Bacteria__p_Bacteroidetes	relative abundance of kingdom: Bacteria; phylum: Bacteroidetes	proportion
k_Bacteria__p_Caldithrix	relative abundance of kingdom: Bacteria; phylum: Caldithrix	proportion
k_Bacteria__p_Chlamydiae	relative abundance of kingdom: Bacteria; phylum: Chlamydiae	proportion
k_Bacteria__p_Chlorobi	relative abundance of kingdom: Bacteria; phylum: Chlorobi	proportion
k_Bacteria__p_Chloroflexi	relative abundance of kingdom: Bacteria; phylum: Chloroflexi	proportion
k_Bacteria__p_Cyanobacteria	relative abundance of kingdom: Bacteria; phylum: Cyanobacteria	proportion
k_Bacteria__p_Deferribacteres	relative abundance of kingdom: Bacteria; phylum: Deferribacteres	proportion

k_Bacteria__p_Elusimicrobia	relative abundance of kingdom: Bacteria; phylum: Elusimicrobia	proportion
k_Bacteria__p_Fibrobacteres	relative abundance of kingdom: Bacteria; phylum: Fibrobacteres	proportion
k_Bacteria__p_Firmicutes	relative abundance of kingdom: Bacteria; phylum: Firmicutes	proportion
k_Bacteria__p_Fusobacteria	relative abundance of kingdom: Bacteria; phylum: Fusobacteria	proportion
k_Bacteria__p_GN02	relative abundance of kingdom: Bacteria; phylum: GN02	proportion
k_Bacteria__p_GN04	relative abundance of kingdom: Bacteria; phylum: GN04	proportion
k_Bacteria__p_Gemmatimonadetes	relative abundance of kingdom: Bacteria; phylum: Gemmatimonadetes	proportion
k_Bacteria__p_KSB3	relative abundance of kingdom: Bacteria; phylum: KSB3	proportion
k_Bacteria__p_LCP_89	relative abundance of kingdom: Bacteria; phylum: LCphylum: 89	proportion
k_Bacteria__p_Lentisphaerae	relative abundance of kingdom: Bacteria; phylum: Lentisphaerae	proportion
k_Bacteria__p_NKB19	relative abundance of kingdom: Bacteria; phylum: NKB19	proportion
k_Bacteria__p_Nitrospirae	relative abundance of kingdom: Bacteria; phylum: Nitrospirae	proportion
k_Bacteria__p_OD1	relative abundance of kingdom: Bacteria; phylum: OD1	proportion
k_Bacteria__p_OP1	relative abundance of kingdom: Bacteria; phylum: OP1	proportion
k_Bacteria__p_OP3	relative abundance of kingdom: Bacteria; phylum: OP3	proportion
k_Bacteria__p_OP8	relative abundance of kingdom: Bacteria; phylum: OP8	proportion
k_Bacteria__p_PAUC34f	relative abundance of kingdom: Bacteria; phylum: PAUC34f	proportion
k_Bacteria__p_Planctomycetes	relative abundance of kingdom: Bacteria; phylum: Planctomycetes	proportion
k_Bacteria__p_Proteobacteria	relative abundance of kingdom: Bacteria; phylum: Proteobacteria	proportion
k_Bacteria__p_SAR406	relative abundance of kingdom: Bacteria; phylum: SAR406	proportion
k_Bacteria__p_SBR1093	relative abundance of kingdom: Bacteria; phylum: SBR1093	proportion
k_Bacteria__p_SR1	relative abundance of kingdom: Bacteria; phylum: SR1	proportion
k_Bacteria__p_Spirochaetes	relative abundance of kingdom: Bacteria; phylum: Spirochaetes	proportion
k_Bacteria__p_TM6	relative abundance of kingdom: Bacteria; phylum: TM6	proportion
k_Bacteria__p_TM7	relative abundance of kingdom: Bacteria; phylum: TM7	proportion
k_Bacteria__p_Tenericutes	relative abundance of kingdom: Bacteria; phylum: Tenericutes	proportion
k_Bacteria__p_Verrucomicrobia	relative abundance of kingdom: Bacteria; phylum: Verrucomicrobia	proportion
k_Bacteria__p_WPS_2	relative abundance of kingdom: Bacteria; phylum: WPS_2	proportion
k_Bacteria__p_WS2	relative abundance of kingdom: Bacteria; phylum: WS2	proportion
k_Bacteria__p_WS3	relative abundance of kingdom: Bacteria; phylum: WS3	proportion
k_Bacteria__p_WS5	relative abundance of kingdom: Bacteria; phylum: WS5	proportion
k_Bacteria__p_WWE1	relative abundance of kingdom: Bacteria; phylum: WWE1	proportion

k_Bacteria__p_ZB3	relative abundance of kingdom: Bacteria; phylum: ZB3	proportion
k_Bacteria__p_Caldithrix_maybe	relative abundance of kingdom: Bacteria; phylum: Caldithrix_maybe	proportion
k_Bacteria__p_Thermi_maybe	relative abundance of kingdom: Bacteria; phylum: Thermi_maybe	proportion

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Camera
Generic Instrument Description	All types of photographic equipment including stills, video, film and digital systems.

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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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