Data describing interactions between colonies on St. John, Virgin Islands in 2014.

Website: https://www.bco-dmo.org/dataset/662664
Data Type: Other Field Results
Version: 1
Version Date: 2016-10-25

Project
» LTREB Long-term coral reef community dynamics in St. John, USVI: 1987-2019 (St. John LTREB)
» Collaborative research: Ecology and functional biology of octocoral communities (VI Octocorals)

Contributors	Affiliation	Role
Lasker, Howard	State University of New York at Buffalo (SUNY Buffalo)	Principal Investigator
Ake, Hannah	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
Data describing interactions between colonies on St. John, Virgin Islands in 2014.

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Coverage

Spatial Extent: **N**:18.31685 **E**:-64.72415 **S**:18.3166 **W**:-64.72988
Temporal Extent: 2014 - 2014

Dataset Description

Data supporting Gambrel, B. and Lasker, H.R., 2016

Methods & Sampling

Methodology from Gambrel, B. and Lasker, H.R., 2016

Octocoral colonies at East Cabritte and Europa Bay were surveyed to assess the spatial distribution and,in particular, the incidence of colonies in close proximity to each other. At each site, five 10 m × 1 m parallel belt transects were set up perpendicular to shore at10 m intervals starting at an arbitrarily selected point. *Erythropodium caribaeorum* and the encrusting form of *Briareum asbestinum* were not included in the surveys because they are not branching and, therefore,do not compete for space in the canopy. Each octocoral ≥5 cm in height was identified to species level in the field when possible; otherwise a small, 3 cm long sample was collected from colonies ≥15 cm tall for sclerite examination under a microscope. Images of the colony and a close-up image of the collected branch were also obtained. Identifications were based on Bayer (1961) and Sánchez (2009).

Colonies were divided into 2 classes, those in close proximity to a neighbor, cases in which a colony's

branches or base were within 5 cm of another octocoral colony, and those more distantly spaced. When the branches of 2 colonies are <5 cm apart, branch movement driven by currents and wave action often leads to contacts between the branches. Large colonies whose bases are within 5 cm of each other almost always have branches within 5 cm of each other, and small colonies with bases <5 cm apart at the time of settlement will almost inevitably come into contact with each other as they grow in the canopy. We recorded all instances of interactions. We did not distinguish between interspecific and intraspecific interactions since our goal was to first determine the overall incidence of competition among branching octocorals at the 2 sites.

At East Cabritte, which had a greater density of octocorals than Europa Bay, 4 randomly selected 1×1 m2 quadrats on each transect were surveyed while all 10 quadrats on each transect were surveyed atEuropa Bay. The height of each colony was measured to the nearest centimeter. Each colony was assessed for proximity to adjacent colonies and for effects of proximity, tissue damage to branches in close proximity to an adjacent colony and/or an asymmetric colony form. Only the octocorals with an asymmetric colony form attributable to the presence of another octocoral were scored as asymmetric in this study.Colonies that were asymmetric as a result of growing adjacent to a physical obstruction were not included as our focus was on the incidence of competition among octocorals. Examples of the different effects are shown in Fig. 1.

Data Processing Description

Methodology from Gambrel, B. and Lasker, H.R., 2016

The data from the surveys were analyzed using hierarchical log-linear tests in SPSS (Version 22) to investigate the relationship of colony proximity with colony height (height classes of 5−19 cm, 20−29 cm,30−39 cm and ≥40 cm), octocoral genus and site. The proximity data were analyzed with respect to octocoral genus instead of species due to the low numbers of colonies in any one species. The 4-way analysis could not be undertaken due to a large number of expected values below 5, and the data were analyzed using three 3-way log-linear analyses. (The 4-wayanalysis yielded similar results, Table S1 in the Supplement at www.int-res.com/articles/suppl/m546p085_supp.pdf)

BCO-DMO Data Processing Notes:

- filled blank cells with "nd"
- replaced spaces with underscores
- replaced species codes with full names
- added latitudes and longitudes to data

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Data Files

File
interaction_survey.csv (Comma Separated Values (.csv), 57.89 KB) MD5:8588398142a043a99c505ebd3434a1d8 Primary data file for dataset ID 662664

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Related Publications

Gambrel, B., & Lasker, H. (2016). Interactions in the canopy among Caribbean reef octocorals. Marine Ecology Progress Series, 546, 85–95. doi:10.3354/meps11670
Methods

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Parameters

Parameter	Description	Units
year	Year sampling occurred; YYYY	unitless
season	Season sampling occurred	unitless
site	Site where sampling occurred	unitless
lat	Latitude; N is positive	decimal degrees
lon	Longitude; W is positve	decimal degrees
transect	Transect where sampling occurred	unitless
meter	Meter on transect where sampling occurred	meters
species	Species of coral that was sampled	unitless
damage	Abrasion from the interaction (1); no damage from the interaction (2)	unitless
growth_asym	Only the octocorals with an asymmetric colony form attributable to the presence of another octocoral were scored as asymmetric (1) in this study. All other colonies including those that were asymmetric as a result of growing adjacent to a physical obstruction were scored (0)	unitless
height	Height of each colony was measured to the nearest centimeter.	centimeters
interaction_type	Colonies were divided into interaction types. Those in close proximity to a neighbor (=cases in which a colon's branches were within 5 cm of another octocoral colony (1) or had based within 5 cm of another colony (2) and those more distantly spaced (0).	unitless

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Deployments

Edmunds_StThomas

Website	https://www.bco-dmo.org/deployment/630432
Platform	Virgin Islands
Start Date	2011-01-01
End Date	2015-03-17
Description	coral studies

Edmunds_VINP

Website	https://www.bco-dmo.org/deployment/523357
Platform	Virgin Islands National Park
Start Date	1987-01-01
End Date	2016-09-01
Description	Studies of corals and hermit crabs

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Project Information

LTREB Long-term coral reef community dynamics in St. John, USVI: 1987-2019 (St. John LTREB)

Website: http://coralreefs.csun.edu/

Coverage: St. John, U.S. Virgin Islands; California State University Northridge

Long Term Research in Environmental Biology (LTREB) in US Virgin Islands:

From the NSF award abstract:
In an era of growing human pressures on natural resources, there is a critical need to understand how major ecosystems will respond, the extent to which resource management can lessen the implications of these responses, and the likely state of these ecosystems in the future. Time-series analyses of community structure provide a vital tool in meeting these needs and promise a profound understanding of community change. This study focuses on coral reef ecosystems; an existing time-series analysis of the coral community structure on the reefs of St. John, US Virgin Islands, will be expanded to 27 years of continuous data in annual increments. Expansion of the core time-series data will be used to address five questions: (1) To what extent is the ecology at a small spatial scale (1-2 km) representative of regional scale events (10's of km)? (2) What are the effects of declining coral cover in modifying the genetic population structure of the coral host and its algal symbionts? (3) What are the roles of pre- versus post-settlement events in determining the population dynamics of small corals? (4) What role do physical forcing agents (other than temperature) play in driving the population dynamics of juvenile corals? and (5) How are populations of other, non-coral invertebrates responding to decadal-scale declines in coral cover? Ecological methods identical to those used over the last two decades will be supplemented by molecular genetic tools to understand the extent to which declining coral cover is affecting the genetic diversity of the corals remaining. An information management program will be implemented to create broad access by the scientific community to the entire data set.

The importance of this study lies in the extreme longevity of the data describing coral reefs in a unique ecological context, and the immense potential that these data possess for understanding both the patterns of comprehensive community change (i.e., involving corals, other invertebrates, and genetic diversity), and the processes driving them. Importantly, as this project is closely integrated with resource management within the VI National Park, as well as larger efforts to study coral reefs in the US through the NSF Moorea Coral Reef LTER, it has a strong potential to have scientific and management implications that extend further than the location of the study.

Collaborative research: Ecology and functional biology of octocoral communities (VI Octocorals)

Website: http://coralreefs.csun.edu/

Coverage: St. John, US Virgin Islands: 18.3185, 64.7242

The recent past has not been good for coral reefs, and journals have been filled with examples of declining

coral cover, crashing fish populations, rising cover of macroalgae, and a future potentially filled with slime. However, reefs are more than the corals and fishes for which they are known best, and their biodiversity is affected strongly by other groups of organisms. The non-coral fauna of reefs is being neglected in the rush to evaluate the loss of corals and fishes, and this project will add on to an on-going long term ecological study by studying soft corals. This project will be focused on the ecology of soft corals on reefs in St. John, USVI to understand the Past, Present and the Future community structure of soft corals in a changing world. For the Past, the principal investigators will complete a retrospective analysis of octocoral abundance in St. John between 1992 and the present, as well as Caribbean-wide since the 1960's. For the Present, they will: (i) evaluate spatio-temporal changes between soft corals and corals, (ii) test for the role of competition with macroalgae and between soft corals and corals as processes driving the rising abundance of soft corals, and (iii) explore the role of soft corals as "animal forests" in modifying physical conditions beneath their canopy, thereby modulating recruitment dynamics. For the Future the project will conduct demographic analyses on key soft corals to evaluate annual variation in population processes and project populations into a future impacted by global climate change.

This project was funded to provide and independent "overlay" to the ongoing LTREB award (DEB-1350146, co-funded by OCE, PI Edmunds) focused on the long-term dynamics of coral reefs in St. John.

Note: This project is closely associated with the project "RAPID: Resilience of Caribbean octocorals following Hurricanes Irma and Maria". See: https://www.bco-dmo.org/project/749653.

The following publications and data resulted from this project:
2017 Tsounis, G., and P. J. Edmunds. Three decades of coral reef community dynamics in St. John, USVI: a contrast of scleractinians and octocorals. Ecosphere 8(1):e01646. DOI: 10.1002/ecs2.1646
Rainfall and temperature data
Coral and macroalgae abundance and distribution
Descriptions of hurricanes affecting St. John

2016 Gambrel, B. and Lasker, H.R. Marine Ecology Progress Series 546: 85–95, DOI: 10.3354/meps11670
Colony to colony interactions
Eunicea flexuosa interactions
Gorgonia ventalina asymmetry
Nearest neighbor surveys

2015 Lenz EA, Bramanti L, Lasker HR, Edmunds PJ. Long-term variation of octocoral populations in St. John, US Virgin Islands. Coral Reefs DOI 10.1007/s00338-015-1315-x
octocoral survey - densities
octocoral counts - photoquadrats vs. insitu survey
octocoral literature review
Download complete data for this publication (Excel file)

2015 Privitera-Johnson, K., et al., Density-associated recruitment in octocoral communities in St. John, US Virgin Islands, J.Exp. Mar. Biol. Ecol. DOI: 10.1016/j.jembe.2015.08.006
octocoral density dependence
Download complete data for this publication (Excel file)

Other datasets related to this project:
octocoral transects - adult colony height

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1334052

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