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

Website: https://www.bco-dmo.org/dataset/662791

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)

» 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
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Abstract

Data describing interactions between neighboring coral 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: 2014-01-01 - 2014-12-31

Dataset Description

Data supporting Gambrel, B. and Lasker, H.R. 2016: Marine Ecology Progress Series 546: 85–95, doi: 10.3354/meps11670

Acquisition Description

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

To further examine the spatial distribution of colonies and potential competition among them, nearest neighbor data were collected along the belt transects from each site. Each transect had 20 sampling points arranged at the corners of every 1 m2 quadrat along the first 9 m of each transect. The octocoral colony closest to each sampling point was selected, identified,and the distance between its base and the base of its nearest branching octocoral neighbor was measured to the nearest centimeter (Fig. S1 in the Supplement). The height, width, and length of each colony was measured to the nearest centimeter to calculate cross-sectional area (height × length) and volume (height × width × length), and the proximity of the colony's branches to nearby octocorals was also noted. Due to the water flow and the resulting oscillation of colony branches, measurements were made when the branches were vertical in the water column to optimize the precision of our measurements.To increase sample sizes, an additional 9 m transect parallel to the other 5 was sampled at each site.

The nature of the spatial distribution of octocorals at each site was determined from the nearest-neighbor data following Clark & Evans (1954). Observed and expected mean distances between the octocoral neighbors were calculated using the total distance between neighbors, sample size (120 pairs of octocorals per site) and the density of octocorals at each site(calculated from the belt transect data). The ratio (R)of the observed and expected (given a randomly distributed octocoral community) mean distances between octocoral neighbors describes the octocoral distribution at each site, where $R = 1$ denotes a random distribution, $R < 1$, an aggregated distribution,and $R > 1$, a uniform distribution (Clark & Evans1954). The significance of R was determined by analyzing the standard variate of the normal curve (c), since the measured distances between neighbors in a randomly dispersed community are expected to follow a normal distribution.

The effects of colony–colony proximity on colony size were assessed by correlating the distance between neighbors at the base with the sum of their sizes (Pielou 1962). If competition affects growth, then the closer the organisms are, the smaller their expected sizes will be (Pielou 1962). Implicit in these analyses is the notion that size is both an indicator of resource use and of success in acquiring resources.

The relationships among the distance between octocoral neighbors at the base (divided into 3 distance groups to make the data categorical: 5–14 cm, 15–24 cm and 25–34 cm), branch proximity and site were analyzed using a hierarchical log-linear test in SPSS. The relationship between the distance between neighbors and branch proximity was further analyzed in a separate log-linear test in SPSS.

Processing Description

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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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

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Parameters

Parameter	Description	Units
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
colony	PI issued colony ID	unitless
species	The octocoral colony closest to each sampling point was selected and identified.	unitless
height	Height of each colony was measured to the nearest centimeter.	centimeters
width	Width of each colony was measured to the nearest centimeter.	centimeters
thickness	Thickness of each colony was measured to the nearest centimeter.	centimeters
visibleInhibition	Visible inhibition (1) denotes colony asymmetry or damage due to abrasion between colonies; (0) indicates no visible inhibition.	unitless
distance	The distance between the measured colony's base and the base of its nearest branching octocoral neighbor was measured to the nearest centimeter.	centimeters

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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. The following publications and data resulted from this project: 2015 Edmunds PJ, Tsounis G, Lasker HR (2015) Differential distribution of octocorals and scleractinians around St. John and St. Thomas, US Virgin Islands. Hydrobiologia. doi: 10.1007/s10750-015-2555-zoctocoral - sp. abundance and distributionDownload complete data for this publication (Excel file) 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-xoctocoral survey - densitiesoctocoral counts - photoquadrats vs. insitu surveyoctocoral literature reviewDownload 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.2015.08.006octocoral recruitmentDownload complete data for this publication (Excel file) 2014 Edmunds PJ. Landscape-scale variation in coral reef community structure in the United States Virgin Islands. Marine Ecology Progress Series 509: 137–152. DOI 10.3354/meps10891. Data at MCR-VINP. Download complete data for this publication (Excel file) 2014 Edmunds PJ, Nozawa Y, Villanueva RD. Refuges modulate coral recruitment in the Caribbean and Pacific. Journal of Experimental Marine Biology and Ecology 454: 78-84. DOI: 10.1016/j.jembe.2014.02.00 Data at MCR-VINP.Download complete data for this publication

(Excel file) 2014 Edmunds PJ, Gray SC. The effects of storms, heavy rain, and sedimentation on the shallow coral reefs of St. John, US Virgin Islands. Hydrobiologia 734(1):143-148. Data at MCR-VINP.Download complete data for this publication (Excel file) 2014 Levitan, D, Edmunds PJ, Levitan K. What makes a species common? No evidence of density-dependent recruitment or mortality of the sea urchin Diadema antillarum after the 1983-1984 mass mortality. Oecologia. DOI 10.1007/s00442-013-2871-9. Data at MCR-VINP.Download complete data for this publication (Excel file) 2014 Lenz EA, Brown D, Didden C, Arnold A, Edmunds PJ. The distribution of hermit crabs and their gastropod shells on shallow reefs in St. John, US Virgin Islands. Bulletin of Marine Science 90(2):681-692. http://dx.doi.org/10.5343/bms.2013.1049 Data at MCR-VINP.Download complete data for this publication (Excel file) 2013 Edmunds PJ. Decadal-scale changes in the community structure of coral reefs in St. John, US Virgin Islands. Marine Ecology Progress Series 489: 107-123. Data at MCR-VINP.Download complete data for this publication (zipped Excel files) 2013 Brown D, Edmunds PJ. Long-term changes in the population dynamics of the Caribbean hydrocoral Millepora spp. J. Exp Mar Biol Ecol 441: 62-70. doi: 10.1016/j.jembe.2013.01.013Millepora colony sizeMillepora cover - temps - storms 1992-2008Millepora cover 1992-2008seawater temperature USVI 1992-2008storms USVI 1992-2008Download complete data for this publication (Excel file) 2012 Brown D, Edmunds PJ. The hermit crab Calcinus tibicen lives commensally on Millepora spp. in St. John, United States Virgin Islands. Coral Reefs 32: 127-135. doi: 10.1007/s00338-012-0948-2crab abundance and coral sizecrab displacement behaviorcrab nocturnal surveyscrab predator avoidanceDownload complete data for this publication (Excel file) 2011 Green DH, Edmunds PJ. Spatio-temporal variability of coral recruitment on shallow reefs in St. John, US Virgin Islands. Journal of Experimenal Marine Biology and Ecology 397: 220-229. Data at MCR-VINP.Download complete data for this publication (Excel file) 2011 Colvard NB, Edmunds PJ. (2011) Decadal-scale changes in invertebrate abundances on a Caribbean coral reef. Journal of Experimental Marine Biology and Ecology. 397(2): 153-160. doi: 10.1016/j.jembe.2010.11.015benthic invert codesinverts - Tektite and Yawzi Ptinverts - pooledDownload complete data for this publication (Excel file)

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/ecs2.1646Rainfall and temperature dataCoral and macroalgae abundance and distributionDescriptions of hurricanes affecting St. John 2016 Gambrel, B. and Lasker, H.R. Marine Ecology Progress Series 546: 85–95, DOI: 10.3354/meps11670Colony to colony interactionsEunicea flexuosa interactionsGorgonia ventalina asymmetryNearest 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-xoctocoral survey - densitiesoctocoral counts - photoquadrats vs. insitu surveyoctocoral literature reviewDownload 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.2015.08.006octocoral density dependenceDownload 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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