Octocoral colony density by pooled taxa, life stage, and year from surveys conducted in St. John, US Virgin Islands from 2014 to 2017

Website: https://www.bco-dmo.org/dataset/789128
Data Type: Other Field Results
Version: 1
Version Date: 2020-02-04

Project
» Collaborative Research: Pattern and process in the abundance and recruitment of Caribbean octocorals (Octocoral Community Dynamics)

Contributors	Affiliation	Role
Edmunds, Peter J.	California State University Northridge (CSUN)	Principal Investigator
Lasker, Howard	State University of New York at Buffalo (SUNY Buffalo)	Co-Principal Investigator
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Abstract
Octocoral colony density pooled by taxon and year from surveys conducted in St. John, US Virgin Islands from 2014 to 2017. These data were used in Edmunds and Lasker (2019) Figure 1.

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Coverage

Spatial Extent: **Lat**:18.32 **Lon**:-64.723
Temporal Extent: 2014 - 2017

Dataset Description

Octocoral colony density pooled by taxon and year from surveys conducted in St. John, US Virgin Islands from 2014 to 2017. These data were used in Edmunds and Lasker (2019) Figure 1. Related Datasets: all were used in Edmunds and Lasker (2019): * Edmunds and Lasker MEPS 2019 Fig 1a: Density pooled taxa and one year https://www.bco-dmo.org/dataset/789128 * Edmunds and Lasker MEPS 2019 Fig 1b: Height pooled taxa and one year https://www.bco-dmo.org/dataset/789140 * Edmunds and Lasker MEPS 2019 Fig 2a: Density by taxon and year https://www.bco-dmo.org/dataset/789145 * Edmunds and Lasker MEPS 2019 Fig 2b: Height by taxon and year https://www.bco-dmo.org/dataset/789149 * Edmunds and Lasker MEPS 2019 Fig 3: Community NMDS https://www.bco-dmo.org/dataset/789181 * Edmunds and Lasker MEPS 2019 Fig S1: Sampling effort https://www.bco-dmo.org/dataset/789188 * Edmunds and Lasker MEPS 2019 Fig S3: Sampling effort, juveniles https://www.bco-dmo.org/dataset/789195 * Edmunds and Lasker MEPS 2019 Fig S4: Colony sizes https://www.bco-dmo.org/dataset/789202 * Edmunds and Lasker MEPS 2019 Fig S5a: Density https://www.bco-dmo.org/dataset/789210 * Edmunds and Lasker MEPS 2019 Fig S5b: Height https://www.bco-dmo.org/dataset/789217

Methods & Sampling

The following methodology applies to this dataset in addition to other datasets published in Edmunds and Lasker (2019).

Sampling and analytical procedures:

Surveys were completed at six sites on shallow (7–9-m depth) fringing reefs on the south shore of St. John, between Cabritte Horn and White Point. In 1992, these sites were randomly selected on hard substrata along 4.5 km of shore between these headlands, and they have been censused annually to present. Each site consists of a permanently marked transect that has been 40-m long since 2000. The present project began in 2014 with the objective of augmenting a long-standing analysis of benthic community structure (which emphasized scleractinians with new analyses focused on octocorals. As part of this effort, arborescent octocorals were surveyed in situ with genus resolution, using 40 quadrats (0.5 × 0.5 m) placed at random, non-overlapping positions along the same transect (and re-randomized annually) located at each of the six sites. Surveys were completed over four weeks beginning on ~ 20th July of each of 2014–2017, and were conducted by counting and measuring the height of octocorals attached by holdfasts within each quadrat.

Height was determined (± 1 cm) using a flexible tape measure stretched from the holdfast to the colony apex. Abundances were analyzed separately for adults (> 5-cm tall), and recruits (≤ 5-cm tall), with this size cut-off based on the maximal height to which the recruits of most octocoral species are likely to grow in one year. While the benthos was inspected for all small octocorals, sampling efficiency probably was low for recruits consisting of only a few polyps (i.e., < 1-cm tall). Analyses testing for the effects of density dependence (DD) and self-thinning (ST) were first, completed for octocorals pooled among taxa, and second, for the three most common genera of octocorals. Evidence of DD recruitment also was sought from analyses of per capita recruitment by site, with these values obtained by dividing the density of recruits by mean density of adults.

For more information about statistical analyses performed using these data see Edmunds and Lasker (2019).

Data Processing Description

BCO-DMO Data Manager Processing Notes:
* Originally submitted data as an Excel File with multiple tables in multiple sheets imported into the BCO-DMO data system so it could be adequately described and provided to the public in various open data formats. The original Excel file was attached to each dataset landing page as a supplemental document.

Data version 1: Changes made between original Excel sheet and what was imported into the BCO-DMO data system:
* Sheet "split" view removed.
* The first table in sheet 1 of the original excel sheet exported as csv
* Column names modified to fit BCO-DMO naming conventions designed for interoperability and data reuse (e.g. no spaces, special characters).

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Data Files

File
meps2019_fig1a.csv(Comma Separated Values (.csv), 68.79 KB) MD5:e32efb6701b44e6a08b5aa5c6842d452 Primary data file for dataset ID 789128

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Supplemental Files

File

Data published in Edmunds and Lasker, 2019 (Excel File)

filename: Data_in_Paper_Edmunds_Lasker_2019.xlsx

(Microsoft Excel, 528.98 KB)
MD5:5df0453c3cbec3b6ea6739a2102a9dd4

Data published as figures in MEPS as “Regulation of population size of arborescent octocorals on shallow Caribbean reefs”
doi.org/10.3354/meps12907

These sheets contain data published in Edmunds and Lasker 2019

FIGURE 1 (contains two tables)

Octocoral colony density and Height

Columns A-E

A = Site (Cabritte Horn, Europa Bay, West Tektite, East Tektite, White Point, West Little Lameshur)

B = quadrat (1-41)

C = Life stage (adult or Juvenile)

D = Taxon (All Taxa, Eunicea, Gorgonia, Antillogorgia)

E = colony density, number of colonies in 0.5 x 0.5 m quadrat

Columns G-J

A = Year (2014, 2015, 2016, 2017)

B = Taxon (All Taxa, Eunicea, Gorgonia, Antillogorgia)

C = Site (Cabritte Horn, Europa Bay, West Tektite, East Tektite, White Point, West Little Lameshur)

J = colony height (cm)

FIGURE 2 (contains two tables)

Octocoral density and height

Columnes A-E

A = Year (2014, 2015, 2016, 2017)

B = Taxon (All Taxa, Eunicea, Gorgonia, Antillogorgia)

C = Life stage (adult or Juvenile)

D = colony density, number of colonies in 0.5 x 0.5 m quadrat

Columns G-K

G = Year (2014, 2015, 2016, 2017)

H = Taxon (All Taxa, Eunicea, Gorgonia, Antillogorgia)

I = Site (Cabritte Horn, Europa Bay, West Tektite, East Tektite, White Point, West Little Lameshur)

J = Life stage (adult or Juvenile)

K = colony height (cm)

FIGURES 3

A = Year (2014, 2015, 2016, 2017)

B = Taxon (All Taxa, Eunicea, Gorgonia, Antillogorgia)

C = Site (Cabritte Horn, Europa Bay, West Tektite, East Tektite, White Point, West Little Lameshur)

D = Life stage - Adult or Juvenile

E = mean density (colonies per 0.5 x 0.5 m)

F = SE of density

File
FIGURE S1 A = Year (1-4) B = Taxon (All Taxa, Eunicea, Gorgonia, Antillogorgia) C = Site (Cabritte Horn, Europa Bay, West Tektite, East Tektite, White Point, West Little Lameshur) D = Quadrat number (1-40) E = density (colonies per 0.5 x 0.5 m quadrat)   FIGURES S2 A = Year (1-4) B = Taxon (All Taxa, Eunicea, Gorgonia, Antillogorgia) C = Site (Cabritte Horn, Europa Bay, West Tektite, East Tektite, White Point, West Little Lameshur) D = samples number of coloy E = Height (cm)   FIGURES S3 A = Year (1-4) B = Taxon (All Taxa, Eunicea, Gorgonia, Antillogorgia) C = Site (Cabritte Horn, Europa Bay, West Tektite, East Tektite, White Point, West Little Lameshur) D = Quadrat number (1-40) E = density (colonies per 0.5 x 0.5 m quadrat)   FIGURES S4 A = Year (1-4) B = Taxon (All Taxa, Eunicea, Gorgonia, Antillogorgia) C = Site (Cabritte Horn, Europa Bay, West Tektite, East Tektite, White Point, West Little Lameshur) D = Height (cm)   FIGURE S5 (contains two tables) Columns A - ELUMnS A-E A = Year (2014, 2015, 2016, 2017) B = Taxon (All Taxa, Eunicea, Gorgonia, Antillogorgia) C = Site (Cabritte Horn, Europa Bay, West Tektite, East Tektite, White Point, West Little Lameshur) D = Life stage - Adult or Juvenile E = density, colonies per 0.5 x 0.5 m quadrat Columns G-K G = Year (2014, 2015, 2016, 2017) H = Taxon (All Taxa, Eunicea, Gorgonia, Antillogorgia) I = Site (Cabritte Horn, Europa Bay, West Tektite, East Tektite, White Point, West Little Lameshur) J = Life stage - Adult K = Height (cm)

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Related Publications

Edmunds, P., & Lasker, H. (2019). Regulation of population size of arborescent octocorals on shallow Caribbean reefs. Marine Ecology Progress Series, 615, 1–14. doi:10.3354/meps12907
Results

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Parameters

Parameter	Description	Units
Site	Site (Cabritte Horn, Europa Bay, West Tektite, East Tektite, White Point, West Little Lameshur)	unitless
Quad	Quadrat (1-41)	unitless
Life_stage	Life stage (adult or Juvenile)	unitless
Taxon	Taxon (All Taxa, Eunicea, Gorgonia, Antillogorgia)	unitless
Density	colony density, number of colonies in 0.5 x 0.5 m quadrat	number per quadrat

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Measuring Tape
Generic Instrument Description	A tape measure or measuring tape is a flexible ruler. It consists of a ribbon of cloth, plastic, fibre glass, or metal strip with linear-measurement markings. It is a common tool for measuring distance or length.

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Project Information

Collaborative Research: Pattern and process in the abundance and recruitment of Caribbean octocorals (Octocoral Community Dynamics)

Coverage: St. John, US Virgin Islands

NSF Award Abstract:
Coral reefs are exposed to a diversity of natural and anthropogenic disturbances, and the consequences for ecosystem degradation have been widely publicized. However, the reported changes have been biased towards fishes and stony corals, and for Caribbean reefs, the most notable example of this bias are octocorals ("soft corals"). Although they are abundant and dominate many Caribbean reefs, they are rarely included in studies due to the difficulty of both identifying them and in quantifying their abundances. In some places there

is compelling evidence that soft corals have increased in abundance, even while stony corals have become less common. This suggests that soft corals are more resilient than stony corals to the wide diversity of disturbances that have been impacting coral corals. The best coral reefs on which to study these changes are those that have been studied for decades and can provide a decadal context to more recent events, and in this regard the reefs of St. John, US Virgin Islands are unique. Stony corals on the reefs have been studied since 1987, and the soft corals from 2014. This provides unrivalled platform to evaluate patterns of octocoral abundance and recruitment; identify the patterns of change that are occurring on these reefs, and identify the processes responsible for the resilience of octocoral populations. The project will extend soft coral monitoring from 4 years to 8 years, and within this framework will examine the roles of baby corals, and their response to seafloor roughness, seawater flow, and seaweed, in determining the success of soft corals. The work will also assess whether the destructive effects of Hurricanes Irma and Maria have modified the pattern of change. In concert with these efforts the project will be closely integrated with local high schools at which the investigators will host marine biology clubs and provide independent study opportunities for their students and teachers. Unique training opportunities will be provided to undergraduate and graduate students, as well as a postdoctoral researcher, all of whom will study and work in St. John, and the investigators will train coral reef researchers to identify the species of soft corals through a hands-on workshop to be conducted in the Florida Keys.

Understanding how changing environmental conditions will affect the community structure of major biomes is the ecological objective defining the 21st century. The holistic effects of these conditions on coral reefs will be studied on shallow reefs within the Virgin Islands National Park in St. John, US Virgin Islands, which is the site of one of the longest-running, long-term studies of coral reef community dynamics in the region. With NSF-LTREB support, the investigators have been studying long-term changes in stony coral communities in this location since 1987, and in 2014 NSF-OCE support was used to build an octocoral "overlay" to this decadal perspective. The present project extends from this unique history, which has been punctuated by the effects of Hurricanes Irma and Maria, to place octocoral synecology in a decadal context, and the investigators exploit a rich suite of legacy data to better understand the present and immediate future of Caribbean coral reefs. This four-year project will advance on two concurrent fronts: first, to extend time-series analyses of octocoral communities from four to eight years to characterize the pattern and pace of change in community structure, and second, to conduct a program of hypothesis-driven experiments focused on octocoral settlement that will uncover the mechanisms allowing octocorals to more effectively colonize substrata than scleractinian corals on present day reefs. Specifically, the investigators will conduct mensurative and manipulative experiments addressing four hypotheses focusing on the roles of: (1) habitat complexity in distinguishing between octocoral and scleractinian recruitment niches, (2) the recruitment niche in mediating post-settlement success, (3) competition in algal turf and macroalgae in determining the success of octocoral and scleractian recruits, and (4) role of octocoral canopies in modulating the flux of particles and larvae to the seafloor beneath. The results of this study will be integrated to evaluate the factors driving higher ecological resilience of octocorals versus scleractinians on present-day Caribbean reefs.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1756678

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