Octocoral recruitment surveys on transects at 5 sites on the south shore of St. John, US Virgin Islands, 2014-2019.

Website: https://www.bco-dmo.org/dataset/851382
Data Type: Other Field Results
Version: 1
Version Date: 2021-08-31

Project
» Collaborative research: Ecology and functional biology of octocoral communities (VI Octocorals)
» Collaborative Research: Pattern and process in the abundance and recruitment of Caribbean octocorals (Octocoral Community Dynamics)

Contributors	Affiliation	Role
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Abstract
This dataset includes species identifications and sizes from octocoral recruitment surveys conducted on transects at five sites on the south shore of St. John, US Virgin Islands from 2014-2019.

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Coverage

Spatial Extent: **N**:18.31672 **E**:-64.71882 **S**:18.30293 **W**:-64.72993
Temporal Extent: 2014-08-06 - 2019-10-03

Methods & Sampling

Censuses of octocoral recruits were conducted at 5 sites on the south shore of St. John, US Virgin Islands from 2014-2019. Recruits (1 polyp – 5 centimeter tall colonies) were enumerated, and when possible were identified to genus in separate 0.25 square meter quadrats (n = 8) randomly placed along 6 transects at each of 3 sites (48 quadrats per site). Transects were positioned in a marked 50 meter x 10 meter area, with stainless steel eye bolts marking each of the 6 transects. Transects were 10m long.

Two sites were added in November 2017. At these sites 0.25 square meter quadrats (n = 16) were randomly placed along 3 fixed transects at each site (48 quadrats per site).

NOTES:
- 8 quadrats were surveyed by transect but be aware that a few transects present differences in the number of quadrats surveyed. That cases were noted below.
- 0.1 cm recruits are those with 1, 2 or 3 polyps, therefore, not measurables

2014 - Four transects surveyed at E Cabritte.

2014 - 7 quadrats surveyed at Europa on transect 10.
2014 - All quadrats at E Cabritte positioned on the left (L) side of line.
2014 - All quadrats at Europa were positioned alternating left (L) or right (R) side of the transect line but on the quadrats L8 and L6 on transect 10.

2015 - Quadrats surveyed from Feb -15 to Mar-15 were positioned alternating left (L) or right (R) side of the transect line.
2015 - March at Europa -7 quadrats were surveyed (instead of 8) on transect 40.
2015 - August at E Cabritte - 10 quadrats (instead of 8) were surveyed on transect 10.
2015 - August at Europa - 6 quadrats (instead of 8) were surveyed on transect 40.
2015 - August at Tektite - 7 quadrats (instead of 8) were surveyed on transect 10.

2016 - Quadrats surveyed were randomly positioned on the right or left side of the transect line.
2016 - March at Tektite - 7 quadrats (instead of 8) were surveyed on transect 30.
2016 - 29th July at Europa - 2 quadrats (instead of 8) were surveyed on transect 10.
2016 - August at E Cabritte - The quadrat 6R on the transect 40 was surveyed twice (indicated in the Comments column as "Repeated Quadrat")
2016 - August at E Cabritte - 7 quadrats (instead of 8) were surveyed on transect 40.

2017 - March at Tektite - The transect 40 was not surveyed.
2017- July at E Cabritte- 9 quadrats were surveyed on transect 50.
2017 - July at E Cabritte- 9 quadrats were surveyed on transect 20.
2017 - November at E Cabritte - Seven quadrats (instead of 8) surveyed on transect 0.
2017 - November at E Cabritte - Transect 10 was not surveyed.
2017 - November at Europa - Nine quadrats (instead of 8) surveyed at transect 10.
2017 - November Deep Tektite was included in the study but just 8 quadrats (instead of 16) on transect 1 were surveyed. Surveys are performed on the left side of the transect line.
2017 - November Yawzi was included in the study, but just 8 quadrats on transect 1, and 3 quadrats (instead of 16) were surveyed. Surveys are performed on the left side of the transect line.

2018 - July and August we included scleractinian recruits surveys (genus level) at E Cabritte, Europa and Tektite (But NOT on Deep Tektite and Yawzi)
2018 - July and August at Deep Tektite we surveyed 16 quadrats at each of the 3 transects.
2018 - July and August at Yawzi we surveyed 17 quadrats on transect 2 (instead of 16).

Data Processing Description

BCO-DMO processing description:
- Converted dates to ISO8601 format (yyyy-mm-dd)
- Adjusted field/parameter names to comply with BCO-DMO naming conventions
- Added a conventional header with dataset name, PI name, and version date
- Added the Species_name column from the "Species Code" sheet of the original Excel data file
- Added columns containing latitude and longitude

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Data Files

File
octocoral_recruitment.csv (Comma Separated Values (.csv), 637.53 KB) MD5:9ee43190a362435194be428441649431 Primary data file for dataset ID 851382

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Related Publications

Lasker, H. R., Martínez-Quintana, Á., Bramanti, L., & Edmunds, P. J. (2020). Resilience of Octocoral Forests to Catastrophic Storms. Scientific Reports, 10(1). doi:10.1038/s41598-020-61238-1
Results

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Parameters

Parameter	Description	Units
Census	Census year and month that a majority of data were collected in: 2015, 2016, 2017, 2019 have multiple censuses in one year	year and month
Census_Year	Year census was taken, from 2014 to 2019	year
Date	Date on which data were collected; format: YYYY-MM-DD	date
Latitude	latitude of sample site	decimal degrees North
Longitude	longitude of sample site	decimal degrees East
Site	Census locations	unitless
Transect_Position	Transects positioned in a marked 50 m x 10 meter area, with stainless steel eye bolts marking each corner, and each of the 6 transects. Transects were 10m long across the area. So positions are 0m; 10m; 20m; 30m; 40m; 50m. Transects at Deep Tektite and Yawzi, established by Pete Edmunds, are approximately 10m from each other. Positions are 1, 2, 3	unitless
Side_transect	Side of the transect tape (Left or Right), orientation looking towards open ocean, with the shore in the back.	unitless
Meter_transect	From 0 m to 9.5 meters. Quadrat of 50 x 50 centimeters positioned randomly along a 10 meter transect. Each number indicates the meter at which the inferior side of the quadrat was positioned.	meters
Taxon	Octocoral or Scleractinian coral	unitless
Genus	Genus of each individual colony	unitless
Species_code	Octocorals or scleractininan species acronym	unitless
Species_name	Octocorals or scleractininan species names	unitless
Height	Maximum distance from the base of the octocoral recruit until the farthest tips of the branches (i.e. not necessarily perpendicular to the substrate)	centimeters
Minor_axis	Applies to scleractinian corals. Minor diameter of colony	centimeters
Major_axis	Applies to scleractinian corals. Major diameter of colony	centimeters
Area	Applies to scleractinian corals. Elipsoid area calculated from the major and minor axes	centimeters squared
Comments	"No recruits present" indicates quadrats surveyed that contained no recruits;"aa2" refers to individuals that appeared to be A. americana but had somewhat broader branchlets and were not as slimy as classic A. americana. All aa2 colonies that were examined under stereoscope had A. americana;"No measurement" indicates that recruits' heights were not recorded; "X polyps" refers to the number of polyps of the recruit 1, 2, 3, 4, 5, or 6 polyps	unitless

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Instruments

Dataset-specific Instrument Name	Transect tape
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: 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

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-1334052
NSF Division of Ocean Sciences (NSF OCE)	OCE-1756381

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