

Octocoral colony heights measured during transect surveys at four sites on the south shore of St. John, US Virgin Islands during June-October 2019

Website: <https://www.bco-dmo.org/dataset/793259>

Data Type: Other Field Results

Version: 1

Version Date: 2020-02-12

Project

» [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 contains octocoral colony heights measured during transect surveys at four sites on the south shore of St. John, US Virgin Islands in June-October 2019. These data are a continuation of BCO-DMO project 562086 (<http://www.bco-dmo.org/project/562086>) and BCO-DMO project 749653 (<https://www.bco-dmo.org/project/749653>).

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Coverage

Spatial Extent: N:18.3167 E:-64.7104 S:18.3029 W:-64.7299

Temporal Extent: 2019-07-10 - 2019-10-03

Dataset Description

This dataset contains octocoral colony heights measured during transect surveys at four sites on the south shore of St. John, US Virgin Islands in June-October 2019.

These data are a continuation of BCO-DMO project 562086 (<http://www.bco-dmo.org/project/562086>) and BCO-DMO project 749653 (<https://www.bco-dmo.org/project/749653>).

Acquisition Description

Survey design:

All sites were located at 6 to 9 meters depth.

Censuses at East Cabritte, Europa, and Tektite were based on 50x10m areas that were arbitrarily selected and permanently marked with stainless steel eyebolts at the corners of the sites. A total of six transect lines, also marked with eyebolts, were laid out at 10 m intervals. All octocorals present in 1 x 1 m quadrats along the 10-meter long transects were scored. The transect identifier "transect_pos" has values 0, 10, 20, 30, 40 or 50 which represent position in meters within the 50x10 survey area corresponding to each of the 6 transects (e.g. 20 = 20m).

The census at Booby Rock was conducted in a single day in which transects were randomly placed along a 50 m line that was arbitrarily placed on a constant depth contour. The transect identifier (transect_pos) for transects at Booby Rock refers to position along the 50 m line.

Yawzi and Deep Tektite surveys: 20 quadrats at each transect (3 transects). Yawzi transects were censused over two field trips, July/August and September.

Sampling methods:

Identifications were based on traits visible in the field, and samples of representative colonies were collected for further analysis in cases in which field identification was uncertain. Sclerites from those samples were examined for species identification.

Two height measures are present, height of living tissue, which only includes that part of the axis with living tissue and total height which is the distance from the base to the tip of the farthest branch from the base (i.e. not necessarily perpendicular to the substrate), regardless of

whether the tips or base had living tissue. (Only colonies with some living tissue were measured). All measures rounded to the nearest cm with the exception of 5 cm which only includes colonies ≥ 5 cm. Starting in 2016, measures less than 5 cm reflect colonies with thick branches which could only have <5 cm heights due to partial mortality.

Processing Description

BCO-DMO Processing:

- joined the Genus_Species from the species code list to the survey data;
- added site Latitude and Longitude columns using coordinates provided in metadata;
- replaced spaces with underscores in column names and in the Site names.

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Parameters

| Parameter | Description | Units |
|-------------------|--|-----------------|
| Site | Site name | unitless |
| Latitude | Site latitude; converted from degrees decimal minutes to decimal degrees; positive values = N | decimal degrees |
| Longitude | Site longitude; converted from degrees decimal minutes to decimal degrees; positive values = E | decimal degrees |
| Census_Year | Four-digit year when the census took place; format: yyyy | unitless |
| Date | Date when the census took place; format: yyyy-mm-dd | unitless |
| Transect_Position | Transects positioned in a marked 50x10m area, with stainless steel eye bolts marking each corner, and each of the 6 transect. Transects were 10m long across the 50x10m area at 0m; 10m; 20m; 30m; 40m; 50m. | unitless |

| | | |
|-------------------------|---|------------------|
| Side_of_transect | Side of the transect tape (Left or Right), orientation looking towards open ocean, with the nearest shore to the back. | unitless |
| Meter_on_transect | From 0m to 9m. 1x1m quadrats were positioned randomly along the 10 m transect. The values refer to the position of the "shoreward" corner of the quadrat. Thus "0" refers to the quadrat placed between the 0 and 1 meter marks | unitless |
| Genus | Genus | unitless |
| Species_code | Octocoral species code. Field identifications of <i>Pseudoplexaura flagellosa</i> and <i>P. wadenaari</i> are difficult and for analysis purposes the two species should be lumped as a single group. Field identifications of <i>Eunicea mammosa</i> , <i>E. laxispica</i> , and <i>E. succinea</i> are sometimes difficult, thus, for analysis purposes the three species should be lumped as a single group. Colonies identified as <i>Plexaurella dichotoma</i> include colonies with sclerites that match Bayer's <i>Plexaurella fusifera</i> and whose branches best match a thin branch version <i>P. nutans</i> . aa2 is an undescribed <i>Antillogorgia</i> sp. similar in appearance to <i>A. americana</i> . | unitless |
| Genus_Species | Genus and species | unitless |
| Height_of_living_tissue | Maximum distance from the base of the octocoral colony until the farthest tips of the longest branch with living tissue (i.e. not necessarily perpendicular to the substrate). All measures rounded to the nearest cm with the exception of 5 cm which only includes colonies ≥ 5 cm. Measures less than 5 cm reflect colonies with thick branches which could only have | centimeters (cm) |
| Total_height | Total height (dead and alive tissue) | centimeters (cm) |

| | | |
|------------------------------|--|------------------|
| Basal_damage | Height (cm) from the base of the colony to living tissue. This value is 0.0 for colonies that have no damage to their base. | centimeters (cm) |
| Damage | Field estimate of the proportion of tissue on the colony that has been damaged: 1, | unitless |
| Cyphoma_present | Number of individuals per colony | unitless |
| Comments_1 | Notes and comments. C. gibbosum denotes the presence of Cyphoma gibbosum, a grazing snail that strips living tissue from octocoral colonies. Millepora present: Indicates millepora overgrowing naked axis. Cyanobacteria present: Indicates Cyanobacteria growing on the colony. aa2 is new Antillogorgia sp. | unitless |
| Comments_2_sample_tag_number | Notes and comments | unitless |

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Deployments

Lasker_St_John

| | |
|--------------------|---|
| Website | https://www.bco-dmo.org/deployment/682967 |
| Platform | Virgin Islands |
| Start Date | 2014-07-17 |
| End Date | 2019-10-03 |
| Description | Octocoral transects at St. John, USVI. Sites surveyed for corals: Booby Rock Tektite East Cabritte Europa Yawzi |

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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 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 reefs. 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 scleractinian 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-1756381 |

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