Scleractinian coral counts within and outside of canopies at Lameshur Bay, St John, USVI, Feb- Mar 2016

Website: https://www.bco-dmo.org/dataset/826227
Data Type: Other Field Results
Version: 1
Version Date: 2020-10-07

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
Edmunds, Peter J.	California State University Northridge (CSUN)	Principal Investigator
Tsounis, Georgios	California State University Northridge (CSUN)	Co-Principal Investigator
Copley, Nancy	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
Scleractinian coral counts within and outside of canopies at Lameshur Bay, St John, USVIin February and March 2016.

Table of Contents

- Coverage
- Dataset Description
  - Methods & Sampling
  - Data Processing Description
- Data Files
- Related Publications
- Related Datasets
- Parameters
- Project Information
- Funding

Coverage

Spatial Extent: **N**:18.3167 **E**:-64.7188 **S**:18.3092 **W**:-64.7299
Temporal Extent: 2016-02 - 2016-03

Dataset Description

Scleractinian coral counts within and outside of canopies at Lameshur Bay, St John, USVIin February and March 2016.

These data were used to test hypothesis 2 in Tsounis et al. Coral Reefs (2020): Appendix 1, Appendix 2: the role of the recruitment niche in mediating post-settlement success.

These data are a continuation of BCO-DMO project 562086 (http://www.bco-dmo.org/project/562086) and BCO-DMO project 752508 (https://www.bco-dmo.org/project/752508).

Methods & Sampling

The data presented in this file have been published in: Tsounis, G., Steele, M. A., & Edmunds, P. J. Elevated feeding rates of fishes within octocoral canopies on Caribbean reefs.Coral Reefs (2020) 39:1299-1311, doi:

10.1007/s00338-020-01963-1.

Surveys were conducted at octocoral communities in St John, US Virgin Islands, in February and March 2016. Building on our previous studies on the environmental impact of octocoral community structure (Tsounis and Edmunds 2017; Tsounis et al. 2018), the present study was conducted at East Cabritte, Europa Bay, and East Tektite, within the Virgin Islands National Park, along the south shore of St. John.

Hypothesis (2) was tested: The role of individual fish feed more intensely near octocoral colonies than away from them, because they are safer due to visual cover.

Methods: In order to provide a broader characterization the habitat, other features of the benthos were measured using quadrats (1 × 2 m) that were surveyed for fish foraging behavior. Each of these quadrats was censused for the number of scleractinian corals, octocorals, and demospongia (pooled among species within each broad taxon). Scleractinians were counted regardless of colony size, and a colony was defined by an autonomous area of tissue. Colonies of octocorals > 5 cm tall were counted if their holdfasts were in the quadrat, and demospongia were counted based on the presence of discrete areas of biomass that were unconnected to other sponges.

Locations within each of the three sites were defined as within canopy ("in") if at least two large octocoral colonies were present in the quadrat. Where this criterion was not met, the area was categorized as outside of canopy ("out"). "Large colonies" were defined by the estimated mean height of arborescent octocorals at each site, and thus differed among sites. Large colonies were > 20 cm tall at Europa Bay and East Tektite, and > 30 cm tall at East Cabritte.

Data Processing Description

BCO-DMO Processing Notes:
- data submitted in Excel file "Tsounis 2020 data archive.xls" sheet "Canopy effect benthic community" extracted to csv
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- joined lat/lon coordinates from dataset 765328: (formerly http://dmoserv3.bco-dmo.org/jg/serv/BCO-DMO/Octocoral_Community_Dynamics/adult_surveys.html0)

[table of contents | back to top]

Data Files

File
canopy_benthos.csv (Comma Separated Values (.csv), 3.73 KB) MD5:04246e3ba5f406dac6c13105c72487fb Primary data file for dataset ID 826227

[table of contents | back to top]

Related Publications

Tsounis, G., Steele, M. A., & Edmunds, P. J. (2020). Elevated feeding rates of fishes within octocoral canopies on Caribbean reefs. Coral Reefs, 39(5), 1299–1311. doi:10.1007/s00338-020-01963-1
Results

[table of contents | back to top]

Related Datasets

References

Edmunds, P. J., Tsounis, G. (2020) **Demersal fish feeding rates within and at edges of octocoral communities at Lameshur Bay, St John, USVI, Feb- Mar 2016.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2020-10-08 doi:10.26008/1912/bco-dmo.826263.1 [view at BCO-DMO]

Edmunds, P. J., Tsounis, G. (2020) **Fish bite rates of individual 'focal' herbivorous fishes within and outside of canopies at Lameshur Bay, St John, USVI, Feb- Mar 2016.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2020-10-08 doi:10.26008/1912/bco-dmo.826253.1 [view at BCO-DMO]

IsReferencedBy

Edmunds, P. J., Tsounis, G. (2020) **Fish abundance and foraging rates by family from point surveys within and outside of canopies at Lameshur Bay, St John, USVI, Feb- Mar 2016.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2020-10-07 doi:10.26008/1912/bco-dmo.826193.1 [view at BCO-DMO]

[table of contents | back to top]

Parameters

Parameter	Description	Units
Site	site identifier	unitless
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
Canopy	Locations within each of the three sites were defined as within canopy ("in") if at least two large octocoral colonies were present in the quadrat. Where this criterion was not met the area was categorized as outside of canopy ("out").	unitless
Nr_Scler	Number of stony coral colony holdfasts present in the 1m x 2m quadrat.	stony corals
Nr_Octo	Number of octocoral colony holdfasts present in the 1m x 2m quadrat.	octocorals
Nr_Spong	Number of sponge colonies present in the 1m x 2m quadrat.	sponges

[table of contents | back to top]

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.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1332915
NSF Division of Ocean Sciences (NSF OCE)	OCE-1756381

[table of contents | back to top]