Acoustic summary data from hydrophone deployments at coral reefs in St. John, U.S. Virgin Islands in 2016 and 2017

Website: https://www.bco-dmo.org/dataset/748552
Data Type: Other Field Results
Version: 2
Version Date: 2020-12-11

Project
» Coral Chorus: The Role of Soundscapes in Coral Reef Larval Recruitment and Biodiversity (Coral Chorus)

Contributors	Affiliation	Role
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Abstract
A passive acoustic recorder was deployed at various coral reefs in St. John, U.S. Virgin Islands between 2016-03-28 and 2017-07-11. This dataset contains average sound pressure level, low frequency sound pressure level (50 - 1500 Hz), high frequency sound pressure level (2 kHz - 20 kHz) and peak frequency of files at each site, sorted by files with and without boat noise.

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Coverage

Spatial Extent: **N**:18.31789 **E**:-64.70429 **S**:18.30106 **W**:-64.76439
Temporal Extent: 2016-03-28 - 2017-07-11

Dataset Description

Related dataset:

Hydrophone deployment information: https://www.bco-dmo.org/node/748536/edit

Methods & Sampling

Methodology:

One SoundTrap ST300 passive acoustic recorder (Ocean Instruments NZ, Inc.) was deployed at each coral reef over the course of one year. Hydrophones were attached to rebar stakes 0.75 meters from the seafloor

with the omnidirectional hydrophone facing the sea surface. One-minute files were recorded every ten minutes. See Dinh et al. 2018 for more details.
RMS sound pressure level in two separate bands, overall sound pressure level, and peak frequency were calculated for each recording. Files were sorted by site and presence of boat noise. For each group of recordings, the median sound pressure level, high frequency sound pressure level, low frequency sound pressure level, and peak frequency were calculated.

Problem report:
Hydrophones were offloaded and recharged between deployments. Gaps exist due to hydrophone malfunction. See Dinh et al. for more details.

Data Processing Description

BCO-DMO Data Manager Processing Notes:
* added a conventional header with dataset name, PI name, version date
* modified parameter names to conform with BCO-DMO naming conventions

Data version 2: site lat and lon added to datasets.

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Data Files

File
Acoustic_Summary.csv (Comma Separated Values (.csv), 1.12 KB) MD5:da69deafd0cfb3af58b6495b487c47f2
Primary data file for dataset ID 748552

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Related Publications

Dinh, J. P., Suca, J. J., Lillis, A., Apprill, A., Llopiz, J. K., & Mooney, T. A. (2018). Multiscale spatio-temporal patterns of boat noise on U.S. Virgin Island coral reefs. Marine Pollution Bulletin, 136, 282–290. doi:10.1016/j.marpolbul.2018.09.009
Results
,
Methods

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Parameters

Parameter	Description	Units
Site_Code	Site number (corresponds to Dinh et al., 2018)	unitless
Site_Name	Full Name of deployment site	unitless
Boat_Presence	Boat presence. Yes indicates boat noise present, no indicates boat noise absent	unitless
Median_SPL	Median RMS sound pressure level	dB re 1 uPa
Median_Low_SPL	Median RMS sound pressure level in 50 - 1500 Hz band	dB re 1 uPa
Median_High_SPL	Median RMS sound pressure level in 2 - 20 kHz band	db re 1 uPa
Median_Peak_Frequency	Median frequency with highest acoustic power	Hz
lat	Site latitude	decimal degrees
lon	Site longitude	decimal degrees

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Instruments

Dataset-specific Instrument Name	SoundTrap ST300 passive acoustic recorder (Ocean Instruments NZ, Inc.)
Generic Instrument Name	Acoustic Recorder
Generic Instrument Description	An acoustic recorder senses and records acoustic signals from the environment.

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Deployments

Coral_Chorus_St_John

Website	https://www.bco-dmo.org/deployment/748532
Platform	Virgin Islands

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Project Information

Coral Chorus: The Role of Soundscapes in Coral Reef Larval Recruitment and Biodiversity (Coral

Chorus)

NSF Award Abstract:
Coral reef ecosystems host some of the highest biodiversity of life per unit area on Earth and harbor about one-quarter to one-third of all marine animals. Reef-associated animals are a major source of protein for millions of people, and reefs offer shoreline protection and provide a significant source of tourism revenue, especially in developing countries. Factors that influence supply and settlement of young (larval) fish, coral, and associated animals can have large impacts on reef ecosystem and population structure, and learning more about these can help improve understanding of how to maintain the benefits provided by coral reefs. This study will lead to a detailed, mechanistic understanding of how young larvae use natural sounds to orient toward, locate, and select preferred settlement habitat. The approach will combine detailed field measurements and experiments to isolate key soundscape variables that impact coral reef larvae.

For marine communities, such as those on coral reefs, factors influencing larval supply and settlement can have major impacts on community structure and population replenishment. There are now some indications that sound plays an important role in attracting larvae to suitable settlement habitat. There is little understanding of what soundscape habitat information is available to larvae and how differences and variability in sound can influence settlement. This project will include comprehensive experiments, environmental measurements, and modeling with the goal of understanding the role of sound in influencing larval recruitment and local biodiversity. The investigators will measure in situ settlement of larval fish and coral in relation to different soundscapes and habitat conditions in a marine protected area using traditional larval sampling methods, moored acoustic recorders, and a suite of environmental observations. Controlled and calibrated environmental playback experiments will isolate soundscape components and determine specific and fundamental acoustic cues larvae use to orient and settle. The spatial and temporal variability of soundscape cues and components across reef habitats will be established. Finally, the project will determine the relevant ranges of sound plumes that larvae may encounter through direct measurements of the sound fields of multiple reefs.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1536782

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