Raw files from passive hydrophone from Harris Creek, Chesapeake Bay, MD from 2015 (Larval settlement soundscapes project)

Website: https://www.bco-dmo.org/dataset/707721
Data Type: Other Field Results
Version: 1
Version Date: 2017-07-05

Project
» Can you hear me now? Estuarine soundscapes and their role in larval settlement (Larval settlement soundscapes)

Contributors	Affiliation	Role
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Abstract
This dataset contains passive acoustic recordings from sites within a mid-latitude Oyster Reef Restoration Site in Harris Creek, a tributary of the Chesapeake Bay, MD. Each file contains raw acoustic records collected using a SoundTrap hydrophone recorder (OceanInstruments New Zealand) deployed within the boundaries of a reef assessment site during May 2015. The hydrophone was configured to record 2 minutes of data every 30 minutes at Little Neck, Walnut, and Lodges, and 2 minutes every 15 minutes at Rabbit Island East, Seth's Point, Mill Point, Eagle Point, and Change. The sample rate for each deployment was 96,000 Hz.

Table of Contents

Coverage

Spatial Extent: **N**:38.7718 **E**:-76.28797 **S**:38.7208 **W**:-76.31173
Temporal Extent: 2015-05-06 - 2015-06-01

Methods & Sampling

Beginning in May 2015, a short-term effort was initiated to record ambient underwater sound at high temporal resolution, at restored and unrestored oyster reefs within a large-scale oyster restoration site in Harris Creek, MD. This was accomplished using a low-power SoundTrap recorder and hydrophone (Ocean Instruments New Zealand).

The instrument was strapped vertically to a metal post and positioned ~0.15m above the seafloor and approximately 1.0-3.5 m below mean lower low water (MLLW) at all sites.

Recordings began 5/6/2015 at 12:00 and ended 6/1/2015 at 10:00. The instrument was programmed to record for 130 seconds every 15 or 30 minutes at a 96 kHz sample rate. The SoundTrap analog signal is digitized at a fixed rate of 288 kHz. A digital anti-alias filter, with a cutoff frequency of 0.45 times the desired sample rate, is then applied before decimation. Consequently, at our sample rate of 96 kHz, the useable (-3 dB) bandwidth of these recordings is 0.020-43.0 kHz. In total, 16,185 separate 2-minute recordings were made as part of this monitoring initiative.

The data may be read into MATLAB using functions included in MATLAB.

Example:
% Set calibration
cal=10^(STcalibration/20);

[y,fs]=audioread('filename.wav'); %read in audiofile
y=y(fs*5:end) %remove first 5 seconds that have calibration sound
y=(y-mean(y))*cal; %demeaned and response correct to uPa

Data Processing Description

These are raw .wav acoustic files.

BCO-DMO Processing:
- added conventional header with dataset name, PI name, version date
- created a flat file with submitted metadata including lat and lon, date/time, recording parameters, and links to download the data files.
- converted datetimes to ISO_TimeDate_Local_start and _end

[table of contents | back to top]

Data Files

File
HC_acoustics_links.csv (Comma Separated Values (.csv), 2.16 KB) MD5:cca13f2cb95a539d22178147c2fdc5f9
Primary data file for dataset ID 707721

[table of contents | back to top]

Related Publications

Ricci, S. W., Eggleston, D. B., & Bohnenstiehl, D. R. (2017). Use of passive acoustic monitoring to characterize fish spawning behavior and habitat use within a complex mosaic of estuarine habitats. Bulletin of Marine Science, 93(2), 439-453. https://doi.org/10.5343/bms.2016.1037
Methods

Ricci, S., Eggleston, D., Bohnenstiehl, D., & Lillis, A. (2016). Temporal soundscape patterns and processes in an estuarine reserve. Marine Ecology Progress Series, 550, 25–38. doi:10.3354/meps11724
Methods

[table of contents | back to top]

Parameters

Parameter	Description	Units
site	recording site	unitless
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
deployment	deployment identification	unitless
ISO_DateTime_Local_start	start date and time; ISO 8601:2004(E) format: YYYY-MM-DDTHH:MM:SS	year-month-day-hour-minute-second
ISO_DateTime_Local_end	end date and time; ISO 8601:2004(E) format: YYYY-MM-DDTHH:MM:SS	year-month-day-hour-minute-second
SoundTrap_num	identification number of recorder	unitless
calibration	hydrophone calibration: sound pressure level in water	decibel microPascals per count (dB uPa/count)
first_file	first sound file in series at a particular site and deployment	unitless
last_file	last sound file in series at a particular site and deployment	unitless
file_size_GB	size of zipped sound file	Gigabytes
file_link	link to download .zip sound file	unitless

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	SoundTrap recorder and hydrophone (Ocean Instruments New Zealand)
Generic Instrument Name	Acoustic Recorder
Generic Instrument Description	An acoustic recorder senses and records acoustic signals from the environment.

Dataset-specific Instrument Name	Ocean Instruments New Zealand
Generic Instrument Name	Hydrophone
Generic Instrument Description	A hydrophone is a microphone designed to be used underwater for recording or listening to underwater sound. Most hydrophones are based on a piezoelectric transducer that generates electricity when subjected to a pressure change.

[table of contents | back to top]

Deployments

Bohnenstiehl_hydrophone_2015

Website	https://www.bco-dmo.org/deployment/707725
Platform	small boat - NCSU
Start Date	2015-05-06
End Date	2015-06-01
Description	Ambient underwater sound recordings

[table of contents | back to top]

Project Information

Can you hear me now? Estuarine soundscapes and their role in larval settlement (Larval settlement soundscapes)

Coverage: Pamlico Sound, North Carolina

The overall goal of this study is to advance our general understanding of the role of underwater sound in biological oceanography by characterizing spatiotemporal variation in an estuarine soundscape, and determine if this variation affects the settlement of larval invertebrates. The investigators will use larval bivalves and subtidal oyster reefs in Pamlico Sound, North Carolina as a study system. A combination of field and laboratory experiments will be used to test the effects of sound on larval behaviors and settlement. The underwater sonic environment has the potential to provide meaningful sensory information to all aquatic animals. Acoustic signals are transmitted relatively large distances, are present at all depths, and reflect biological and physical characteristics of the environment, while other cues (e.g. light, chemicals) are rapidly attenuated from the source. Sound is well established as an orientation and habitat selection cue for marine mammals and fishes, and has recently emerged as a potentially important contributor to larval settlement. Building capacity (knowledge, expertise, equipment) for integrating geophysical aspects of underwater sound propagation with ecological and oceanographic processes is central to bio-physical studies of larval connectivity and recruitment in marine systems. It also informs our understanding of the potential adverse effects of noise pollution in the ocean and may elucidate untested benefits of marine reserves - ultimately leading to healthier and better managed oceans and estuaries. The project supports graduate, postdoctoral and undergraduate student training, as well as educational outreach programs that span local, regional and national levels

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1234688

[table of contents | back to top]