

Raw files from passive hydrophone from Middle Marsh, Rachel Carson Estuarine Research Reserve, NC from 2014 (Larval settlement soundscapes project)

Website: <https://www.bco-dmo.org/dataset/659506>

Data Type: Other Field Results

Version: 1

Version Date: 2016-09-21

Project

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

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Abstract

This dataset contains passive acoustic recordings within the Middle Marsh portion of the Rachel Carson Estuarine Research Reserve, NC. Each file contains raw acoustic records collected using a low-power SoundTrap recorder and hydrophone (Ocean Instruments New Zealand). The hydrophone was configured to record for 130 seconds every 20 minutes at a 96 kHz sample rate.

Table of Contents

- [Coverage](#)
- [Dataset Description](#)
 - [Methods & Sampling](#)
 - [Data Processing Description](#)
- [Data Files](#)
- [Related Publications](#)
- [Parameters](#)
- [Instruments](#)
- [Deployments](#)
- [Project Information](#)
- [Funding](#)

Coverage

Spatial Extent: N:34.69761 E:-76.28797 S:34.68915 W:-76.31173

Temporal Extent: 2014-06-12 - 2014-08-31

Methods & Sampling

Beginning in June of 2014, a short-term effort was initiated to record ambient underwater sound at high temporal resolution, within the Middle Marsh portion of the Rachel Carson Estuarine Research Reserve. 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 in water of sufficient depth so that it remained submerged during spring low tides. At low tide, the SoundTraps were

submerged at least 0.15 m, and at high tide, the SoundTraps were submerged in approximately 1 m of water, depending on the magnitude of the tide.

Three individual deployments were carried out using eight SoundTraps between 12 June 2014 and 31 August 2014. Deployment start and end dates for each site are listed in Table 1. The instrument was programmed to record for 130 seconds every 20 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, 36,870 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
```

Additional information about this dataset can be found in Ricci et al (2016 and 2017).

Data Processing Description

No processing. These are the raw data files in .wav format.

BCO-DMO Processing:

- added conventional header with dataset name, PI name, version date
- created 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
MM_acoustics_links.csv (Comma Separated Values (.csv), 5.39 KB) MD5:0e52bf5424a9b0b9594bd36dcafd552d
Primary data file for dataset ID 659506

[[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>
Results

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](https://doi.org/10.3354/meps11724)
Results

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

Dataset-specific Instrument Name	
Generic Instrument Name	Hydrophone
Dataset-specific Description	Ocean Instruments New Zealand
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_2014

Website	https://www.bco-dmo.org/deployment/659528
Platform	Rachel_Carson_Estuarine_Research_Reserve
Start Date	2014-06-12
End Date	2014-08-31
Description	Passive acoustics studies of ambient underwater sound.

[[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](#)]