# Oyster density in intertidal quadrats in Pamlico Sound, 2014-2015 (Estuarine Metapop Dynamics project)

**Website**: https://www.bco-dmo.org/dataset/710274
**Data Type**: Other Field Results
**Version**: 2
**Version Date**: 2021-02-01

**Project**
» Interacting Effects of Local Demography and Larval Connectivity on Estuarine Metapopulation Dynamics (EstuarineMetaDyn)

| Contributors | Affiliation | Role |
|---|---|---|
| Eggleston, David B. | North Carolina State University - Center for Marine Science and Technology (NCSU CMAST) | Principal Investigator |
| Copley, Nancy | Woods Hole Oceanographic Institution (WHOI BCO-DMO) | BCO-DMO Data Manager |

**Abstract**
Oyster density data on natural intertidal oyster reefs and hardened shorelines in Pamlico Sound, North Carolina. Reef sites from the ground-truthing survey that met a minimum density criterion (10 live oysters per m2) were revisited and continuously sampled in June, August, and October in 2014 and 2015.

## Table of Contents

## Coverage

**Spatial Extent**: **N**:35.9004 **E**:-75.49803 **S**:35.071 **W**:-76.07262
**Temporal Extent**: 2014-06 - 2015-10

**Methods & Sampling**

To quantify oyster density and demographic rates on natural intertidal oyster reefs and hardened shorelines, the reef sites from the ground-truthing survey that met a minimum density criterion (10 live oysters per m2) were revisited and continuously sampled. The present study's sampling protocol was adapted from Drexler et al. (2014) and ensured that the reported measurements represented all living oysters existing on all available substrate material within a fixed 1-m2 footprint. For natural intertidal reefs, oysters were sampled using a 1-m2 quadrat randomly placed on a reef with the number of quadrat samples determined as a function of reef area, and a maximum number of quadrat samples set at 10. When densities appeared likely to exceed 500/m2, a 0.25-m2 quadrat was substituted and subsequent oyster density estimates were standardized to 1 m2. All samples were hand-excavated to a depth of 10 cm. Natural intertidal oyster reefs were sampled during June, August, and October of 2014 and 2015. These sampling intervals followed several annual peak oyster recruitment pulses in North Carolina estuarine waters in May and a secondary peak in August, with the intention of tracking various oyster cohorts to quantify post-settlement growth and survivorship. The left valve

length (LVL; distance from the umbo to the anterior margin of the shell) of all live oysters was measured to the nearest 1 mm with calipers.

Each site has an associated lat/lon coordinate -- this was updated in version 2 (2021-02-01) to be the same for all data points. The accuracy of the GPS was not adequate to provide more resolution with the data.

**Data Processing Description**

**BCO-DMO Processing Notes:**
- data submitted in Excel files "PS_Mean_Std_2014.xlsx" and "PS_Mean_Std_2015.xlsx" extracted to csv
- added conventional header with dataset name, PI name, version date
- modified parameter names to conform with BCO-DMO naming conventions
- changed '< 10' to 'lt_10'
- added columns year and month

Versioning: Replaced v1 (2017-07-31) with v2 (2021-02-01) as submitted by Seth Theuerkauf, 2021-01-29.

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## Data Files

| File |
|------|
| **oyster_density.csv**(Comma Separated Values (.csv), 2.18 KB) MD5:214b87d64e1545582a9daa90f4a966d0 Primary data file for dataset ID 710274 |

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## Related Publications

Drexler, M., Parker, M. L., Geiger, S. P., Arnold, W. S., & Hallock, P. (2013). Biological Assessment of Eastern Oysters (Crassostrea virginica) Inhabiting Reef, Mangrove, Seawall, and Restoration Substrates. Estuaries and Coasts, 37(4), 962–972. doi:10.1007/s12237-013-9727-8
*Methods*

Theuerkauf, S. J., Eggleston, D. B., Theuerkauf, K. W., & Puckett, B. J. (2017). Oyster Density and Demographic Rates on Natural Intertidal Reefs and Hardened Shoreline Structures. Journal of Shellfish Research, 36(1), 87–100. doi:10.2983/035.036.0111
*Results*

[ ]

## Related Datasets

**IsRelatedTo**

Eggleston, D. B. (2021) **Intertidal oyster size frequency data from Pamlico Sound oyster reefs and hardened shoreline structures, North Carolina from 2014-2015 (EstuarineMetaDyn project).** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2) Version Date 2017-07-31 doi:10.26008/1912/bco-dmo.710314.2 [view at BCO-DMO]

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## Parameters

| Parameter | Description | Units |
|---|---|---|
| Year | sampling year | unitless |
| Month | sampling month | unitless |
| Site | Reef location sampled | unitless |
| Latitude | Latitude for each quadrat; north is positive | decimal degrees |
| Longitude | Longitude for each quadrat; east is positive | decimal degrees |
| Number_of_Quadrats | number of quadrats where oysters were examined | quadrats |
| Mean_Density | the mean oyster density per m2 at a given site at a given sampling date | oysters/meter2 |
| Std_Dev | the standard deviation of the oyster density per m2 at a given site at a given sampling date | oysters/meter2 |
| Std_Error | the standard error of the oyster density per m2 at a given site at a given sampling date | oysters/meter2 |
| Average_Perc_Shell | the average percentage of shell material apparent within a quadrat when sampled (e.g.: 75% reflects 75% of a quadrat was composed of shell material and 25% bare substrate). | dimensionless |
| Salinity | Salinity | practical salinity units (psu) |
| DO | Dissolved oxygen concentration | milligrams/liter (mg/l) |
| Temp | Water temperature | degrees Celsius |

[ table of contents | back to top ]

## Instruments

| Dataset-specific Instrument Name | YSI-85 |
|---|---|
| Generic Instrument Name | Multi Parameter Portable Meter |
| Dataset-specific Description | YSI Model 85 Handheld Oxygen, Conductivity, Salinity, mg/L C and Temperature System |
| Generic Instrument Description | An analytical instrument that can measure multiple parameters, such as pH, EC, TDS, DO and temperature with one device and is portable or hand-held. |

[ table of contents | back to top ]

## Deployments

**Eggleston_oyster_reef_2014**

| Website | https://www.bco-dmo.org/deployment/710310 |
|---|---|
| **Platform** | shoreside Pamlico-Oysters |
| **Start Date** | 2014-06-01 |
| **End Date** | 2015-08-31 |
| **Description** | oyster population studies in Pamlico Sound, North Carolina |

## Project Information

**Interacting Effects of Local Demography and Larval Connectivity on Estuarine Metapopulation Dynamics (EstuarineMetaDyn)**

**Coverage**: North Carolina Estuaries

Description from NSF award abstract:
The PIs will use the eastern oyster (*Crassostrea virginica*) in Pamlico Sound, North Carolina, as a model system and will attempt to optimize the design of networks of no-take reserves as a strategy for maintaining metapopulations of this commercially harvested species. The project specifically recognizes that network persistence depends on (1) the potential for growth, survival, and reproduction within reserves, and (2) the potential to distribute offspring among reserves. Thus, demographic processes within reserves and settling areas play important roles, along with variability of physical transport. The PIs plan to:
(1) test and refine 3D bio-physical models of connectivity due to oyster larval transport in a shallow, wind-dominated system;
(2) test, refine, and apply technology to detect natal origins of larvae using geochemical tags in larval shell; and
(3) integrate regional connectivity and demographic rates to model metapopulation dynamics.

This study will produce new tools and test and refine others used for studying larval connectivity, a fundamentally important process in the maintenance of natural populations, and thus in biological conservation and resource management. The tools include a hydrodynamic modeling tool coupled with an open-source particle tracking model that will be available on-line with computer code and user guide. The project will use integrated modeling approaches to evaluate the design of reserve networks: results will be directly useful to improving oyster and ecosystem-based management in Pamlico Sound, and the methods will inform approaches to network design in other locations.

## Funding

| Funding Source | Award |
|---|---|
| NSF Division of Ocean Sciences (NSF OCE) | OCE-1155609 |