

Intertidal oyster size frequency data from Pamlico Sound oyster reefs and hardened shoreline structures, North Carolina from 2014-2015 (EstuarineMetaDyn project)

Website: <https://www.bco-dmo.org/dataset/710314>

Data Type: Other Field Results

Version: 2

Version Date: 2017-07-31

Project

» [Interacting Effects of Local Demography and Larval Connectivity on Estuarine Metapopulation Dynamics](#)
(EstuarineMetaDyn)

Contributors	Affiliation	Role
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Abstract

Oyster size-frequency 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.

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Coverage

Spatial Extent: N:35.9004 E:-75.49803 S:35.071 W:-76.07262

Temporal Extent: 2014-06 - 2015-10

Acquisition Description

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.

The size-frequency data reflect the percentage of oysters present at a site within a specified size bin (e.g., 12% of oysters within the 10-15 mm size bin) at a given sampling date. These size-frequency measures can be scaled by the densities in the associated dataset.

Processing Description

BCO-DMO Processing Notes:

- data submitted in Excel files "PS_SizeFreq_2014.xlsx" and "PS_SizeFreq_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
- added year and month columns
- added Latitude and Longitude columns, obtained from the [oyster density](#) dataset

Versioning: Replaced v1 (2017-07-31) with v2 (2021-02-01) as submitted by Seth Theuerkauf, 2021-01-29. Lat/lons from the density data file were again added to this dataset.

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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](https://doi.org/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](https://doi.org/10.2983/035.036.0111)
Results

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Related Datasets

IsRelatedTo

Eggleston, D. B. (2021) **Oyster density in intertidal quadrats in Pamlico Sound, 2014-2015 (Estuarine Metapop Dynamics project)**. Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2) Version Date 2021-02-01 <http://lod.bco-dmo.org/id/dataset/710274> [[view at BCO-DMO](#)]

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Parameters

Parameter	Description	Units
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
Bin_Range	The values here reflect the smallest value in the bin (e.g.: 0 represents 0 - 4.9 mm; 5 represents 5 - 9.9 mm)	unitless
June_2014_Relative_Frequency	The relative frequency of oysters within the various size bins (scaled to 100%) at each site in June 2014	unitless
Aug_2014_Relative_Frequency	The relative frequency of oysters within the various size bins (scaled to 100%) at each site in August 2014	unitless
Oct_2014_Relative_Frequency	The relative frequency of oysters within the various size bins (scaled to 100%) at each site in October 2014	unitless
June_2015_Relative_Frequency	The relative frequency of oysters within the various size bins (scaled to 100%) at each site in June 2015	unitless
Aug_2015_Relative_Frequency	The relative frequency of oysters within the various size bins (scaled to 100%) at each site in August 2015	unitless
Oct_2015_Relative_Frequency	The relative frequency of oysters within the various size bins (scaled to 100%) at each site in October 2015	unitless

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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.

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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

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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.

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Funding

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

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