

Blue mussel (*Mytilus edulis*) settlement data from settlement plates in coastal eastern Maine from 2014 to 2016 (MuLTI-2 project)

Website: <https://www.bco-dmo.org/dataset/720217>

Data Type: Other Field Results

Version: 1

Version Date: 2017-11-30

Project

» [An integrated theoretical and empirical approach to across-shelf mixing and connectivity of mussel populations](#) (MuLTI-2)

Contributors	Affiliation	Role
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Abstract

Blue mussel (*Mytilus edulis*) settlement data from settlement plates in coastal eastern Maine from 2014 to 2016.

Table of Contents

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

Coverage

Spatial Extent: N:44.825311 E:-66.986325 S:44.4644175 W:-68.3045225

Temporal Extent: 2014-07-16 - 2016-09-11

Dataset Description

Data quantifying temporal patterns in blue mussel (*Mytilus edulis*) larval settlement in large mussel beds in coastal eastern Maine.

Methods & Sampling

Location: Coastal waters of eastern Maine, from Frenchman Bay to the Canadian border. Locations and descriptions for station codes used in this dataset can be found in the dataset: [MuLTI-2 Mussel Station List](#)

Sampling and Analytical Methodology:

Three settlement plates were deployed randomly along a 6 m transect in a blue mussel (*Mytilus edulis*) bed at each station. Settlement plates were constructed by gluing 3M Scotch-Brite™ pad to a 1/8 inch thick and 9.7

cm diameter piece of PVC (with a 0.95 cm diameter mounting hole) with PVC heavy cement. Total area of each settlement plate was 73.2 cm². Settlement plates were oriented North in the mussel bed to reduce sun exposure. Following deployment, settlement plates were collected and replaced, and all newly settled mussels on each collected plate were counted. Settlement rate was calculated for each settlement plate at each station for each deployment.

The settlement rate was calculated for each deployment period at each station.

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
- * changed column name "Cruise" to "Sampling Event" for clarity and consistency with other datasets in this project.

[[table of contents](#) | [back to top](#)]

Data Files

File
Settlement.csv (Comma Separated Values (.csv), 28.73 KB) MD5:7444603523e3382a27a4d9afec8af6f4 Primary data file for dataset ID 720217

[[table of contents](#) | [back to top](#)]

Parameters

Parameter	Description	Units
Station_Code	Station identifier	unitless
Year	Year of sampling event	unitless
Sampling_Event	Identifier of sampling deployment	unitless
Plate_Number	Settlement plate identifier	unitless
Date_Deployment_Midpoint	Midpoint date of the deployment in format mm/dd/yy	unitless
Deployment_Length	Number of days in the deployment	unitless
Total_Settlers	Total number of settled blue mussels (<i>Mytilus edulis</i>)	unitless
Settler_Density	Density of settled blue mussels (<i>Mytilus edulis</i>) during a deployment period	settled mussels per cm ²
Daily_Settler_Density	Average density of settled blue mussels (<i>Mytilus edulis</i>) per day	settled mussels per cm ²

[[table of contents](#) | [back to top](#)]

Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	3M Scotch-Brite pad PVC settlement plate
Generic Instrument Description	An artificial colonization substrate made of a sheet of PVC covered with 3M Scotch-Brite pads of unknown material. It is used to determine the extent of colonization and/or the diversity of settled organisms in a marine or artificial environment.

[[table of contents](#) | [back to top](#)]

Deployments

MuLTI-2_Mussel_Sampling

Website	https://www.bco-dmo.org/deployment/658775
Platform	Maine_Coast
Start Date	2014-04-24
Description	These locations were sampled using The Ugment, an automobile. Mussel Gonad Index (GI), size frequency, settlement, and density were surveyed.

[[table of contents](#) | [back to top](#)]

Project Information

An integrated theoretical and empirical approach to across-shelf mixing and connectivity of mussel populations (MuLTI-2)

Coverage: Gulf of Maine: Frenchmen Bay (44 28.239 N -68 15.927 W) to Machais Bay (44 39.350 N -67 21.320 W)

Acronym "MuLTI-2" (Mussel Larval Transport Initiative-2)

Extracted from the NSF award abstract:

Existing larval transport models focus mainly on along-shelf transport and have done little to explicitly incorporate the effects of cross-shelf mixing and transport processes. Yet cross-shelf transits (both outgoing and incoming legs) are critical components of the dispersal paths of coastal invertebrates. This project will explore the role of cross-shelf mixing in the connectivity of blue mussel populations in eastern Maine. Previous work has shown that the Eastern Maine Coastal Current (EMCC) begins to diverge from shore southwest of the Grand Manan Channel and creates a gradient in cross-shelf mixing and larval transport, with cross-shelf mixing being more common on the northeastern end, episodic in the transitional middle area, and then becoming rare in the southwestern half of the region of the Gulf of Maine. As a result, the investigators predict that northeastern populations of mussels are seeded mostly from up-stream sources, while a significant component of self-seeding (local retention) exists in southwestern populations. Larvae settling in the intervening bays are expected to be derived from a mixture of local and up-stream sources. Using a combined empirical and theoretical approach hydrographic, current profile, and larval vertical migration data will be collected and used to develop and validate a high-resolution coastal circulation model coupled to a model of larval behavior. The investigators will model simulations in different years using the empirical data from mussel reproductive output and spawning times. Connectivity predicted from this model will be then tested against independent empirical estimates of connectivity based on trace element fingerprinting for larvae which can be connected to specific natal habitats. Regions of agreement and discrepancy in the model will be identified to guide additional data collection and model refinement. This iterative process will ensure an understanding of

both larval transport patterns and processes, and provide estimates of inter-annual variability in connectivity for blue mussel populations in the Gulf of Maine.

[[table of contents](#) | [back to top](#)]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1333755

[[table of contents](#) | [back to top](#)]