

Blue mussel (*Mytilus edulis*) density data from surveys conducted in coastal eastern Maine from 2014 to 2017 (MuLTI-2 project)

Website: <https://www.bco-dmo.org/dataset/717620>

Data Type: Other Field Results

Version: 1

Version Date: 2017-10-24

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*) density data from surveys conducted in coastal eastern Maine from 2014 to 2017.

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Coverage

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

Temporal Extent: 2014-06-14 - 2017-07-24

Dataset Description

This dataset includes data from blue mussels (*Mytilus edulis*) density surveys. Large mussel beds in coastal eastern Maine were sampled from 2014 to 2017.

Acquisition Description

Sampling and Analytical Methodology:

Density of blue mussels (*Mytilus edulis*) was randomly sampled at each of the major mussel beds (stations) along the eastern Maine coast from Frenchman Bay to the Canadian border. Sampling followed a nested design of 4 plots (30 cm x 30 cm) randomly distributed along a 6 meter transect, and three transects randomly spaced in a random subarea within the greater mussel bed. This process was repeated for at least three subareas per year per mussel bed. Where densities of mussels were too great, plots were subset into a 5 x 5 grid, and the average density of 3 randomly chosen grid sections measured, and the mean extrapolated to the entire area of the plot.

Processing Description

Data Manager Processing Notes:

* spaces in data parameter names replaced with underscores due to system requirements.

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Parameters

Parameter	Description	Units
Year	Year of sampling	unitless
Sample_Date	Date of sampling in format mm/dd/yy	unitless
Sampling_Event	Identifier of sampling event	unitless
Station_Code	Station identifier	unitless
Bed_Designation	Identifier of mussel bed	unitless
Substrate_Type	Substrate type description. Habitat of the bed section.	unitless
SubArea	Subarea number within mussel bed	unitless
Transect	Transect number within subarea	unitless
Count	The number of blue mussels (<i>Mytilus edulis</i>) within a plot (summed across size classes).	unitless

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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.

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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.

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Funding

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

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