Blue mussel (Mytilus edulis) size frequency sampling information for surveys conducted in coastal eastern Maine from 2014 to 2017 (MuLTI-2 project)

Website: https://www.bco-dmo.org/dataset/722031
Data Type: Other Field Results
Version:
Version Date: 2017-12-28

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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Coverage

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

Dataset Description

This dataset contains sampling information indicating when sites were sampled. The surveys were conducted to quantify temporal patterns in blue mussel (*Mytilus edulis*) size frequency in large mussel beds in coastal eastern Maine.

For results of the survey, see the dataset Size Frequency.

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:

Size frequencies of blue mussels (*Mytilus edulis*) were measured at three random sample locations at each of the major mussel beds (stations) along the eastern Maine coast from Frenchman Bay to the Canadian border. At each sample location, a 30 cm x 30 cm quadrat was laid down haphazardly in a relatively dense patch of mussels, and the entirety of the quadrat contents harvested (byssal thread matrix and soft-sediment included). If <30 individual mussels were in the quadrat, further samples were taken immediately adjacent to

the original quadrat until 30+ mussels had been harvested. The contents of each sample was returned to the lab for careful sorting into 5 mm size class bins. The number of mussels within each size class bin were enumerated and the frequency of each size class in each sample was calculated yielding three frequencies per size class per year per mussel population.

Size Class Frequency was calculated as the Count of Individual Mussels within a particular size class divided by the Total Individual Mussels Sampled within a plot.

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

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Data Files

File
SizeFreq_Sampling.csv (Comma Separated Values (.csv), 477 bytes) MD5:c235fb96e091a7a4f5478d7d9a19964e Primary data file for dataset ID 722031

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Parameters

Parameter	Description	Units
Sampling_Event	Identifier of sampling event	unitless
Year	Year sample was taken	unitless
CBC_LBC	Mussel size frequency sampling status (YES or NO) at Cabscook Bay - Lubec Channel site	unitless
DYB_FSH	Mussel size frequency sampling status (YES or NO) at Dyer Bay - Fish Island site	unitless
FRB_EST	Mussel size frequency sampling status (YES or NO) at Frenchman Bay - East site	unitless
FRB_JRD	Mussel size frequency sampling status (YES or NO) at Frenchman Bay - Jordan River site	unitless
FRB_RAC	Mussel size frequency sampling status (YES or NO) at Frenchman Bay - Raccoon Cove site	unitless

FRB_TFP	Mussel size frequency sampling status (YES or NO) at Frenchman Bay - Tidal Falls Preserve site	unitless
FRB_WST	Mussel size frequency sampling status (YES or NO) at Frenchman Bay - West site	unitless
GLB_STL	Mussel size frequency sampling status (YES or NO) at Gouldsboro Bay - Steuben Town Landing site	unitless
HAB_HBR	Mussel size frequency sampling status (YES or NO) at Harrington Bay - Harrington Boat Ramp site	unitless
LKB_CHR	Mussel size frequency sampling status (YES or NO) at Little Kennebec Bay - Chandler River site	unitless
MCH_FBB	Mussel size frequency sampling status (YES or NO) at Machias Bay - Finn Beach site	unitless
PHB_BAR	Mussel size frequency sampling status (YES or NO) at Pigeon Hill Bay - Bar Island site	unitless
PLS_PLR	Mussel size frequency sampling status (YES or NO) at Pleasant Bay - Pleasant River site	unitless
WAH_WRL	Mussel size frequency sampling status (YES or NO) at Wahoa Bay - West River Landing site	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 Uglement, 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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