Blue mussel (Mytilus edulis) gonad index data from mussel collections in coastal eastern Maine between 2014 and 2016 (MuLTI-2 project)

Website: https://www.bco-dmo.org/dataset/658752
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) gonad index data from mussel collections in coastal eastern Maine between 2014 and 2016.

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Coverage

Spatial Extent: **N**:44.825311 **E**:-66.986325 **S**:44.4644175 **W**:-68.3045225
Temporal Extent: 2014-04-24 - 2016-08-06

Dataset Description

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

Collections occurred in coastal waters of eastern Maine, from Frenchman Bay to the Canadian border between 24 Apr 2014 and 08 Aug 2016.

Related datasets:

- Gonad Index Station List
- Gonad Index Stations Sampled

Methods & Sampling

15-25 individual blue mussels (*Mytilus edulis*) were randomly sampled at each of the major mussel beds (stations) along the eastern Maine coast from Frenchman Bay to the Canadian border. Sampling reflected the existing size frequency distribution of mussels within each bed, but was truncated at a minimum shell length of 25 mm to ensure mussels were of reproductive size. For each individual mussel, sample processing consisted of measuring the shell length (0.1 mm resolution), and then dissecting out the gonad and somatic soft tissue separately. Gonad and somatic soft tissues were weighed separately to 0.01 g resolution. The gonad index of each individual mussel was calculated from the two measured weights (Gonad Soft Tissue Weight, Somatic Soft Tissue Weight).

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

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Data Files

File
GI.csv (Comma Separated Values (.csv), 387.84 KB) MD5:0f1fc4306508d2505830e42026bb1a1b Primary data file for dataset ID 658752

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Parameters

Parameter	Description	Units
Sampling_Event	Identifier of sampling event	unitless
Station_Code	Station code	unitless
Sample_Date	Date sample was taken	unitless
Year	Year of sample	unitless
Latitude	Latitude	decimal degrees
Longitude	Longitude; west is negative	decimal degrees
Shell_Length	Shell length measurement (0.1 mm resolution)	millimeters (mm)
Gonad_Weight	Gonad soft tissue weight	grams
Somatic_Weight	Somatic soft tissue weight	grams
GI	Gonad index; Proportion of soft tissue weight attributable to gonad soft tissue: GI = gonad_weight/(somatic_weight + gonad_weight)	dimensionless

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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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