

Linked Demographic Connectivity Matrices for *Mytilus californianus* and *Mytilus galloprovincialis* from the Southern California Coast and Northwest Coast of Mexico from 2003-2009

Website: <https://www.bco-dmo.org/dataset/3811>

Version: 2012-12-01

Project

» [Temporal and spatial scales of variability in bivalve connectivity](#) (Bivalve Connectivity)

Contributors	Affiliation	Role
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Dataset Description

Linked Demographic Connectivity Matrices for *Mytilus californianus* and *Mytilus galloprovincialis* in Southern California

Based on life history data collection and Inshore larval connectivity studies May 03- Nov. 2009

Larval connectivity data are based on trace elemental fingerprinting. Reference algorithms are based on shell chemistry of larvae outplanted at study sites.

Methods & Sampling

Larval connectivity data are based on trace elemental fingerprinting. Reference algorithms are based on shell chemistry of larvae outplanted at study sites.

The data also appear as online appendices in:

Carson, H.S., G. Cook, M. Paola López-Duarte and Lisa A. Levin.

Evaluating the importance of demographic connectivity in a marine metapopulation

Ecology 92: 1972-84.

This paper provides the demographic methods.

Elemental Fingerprinting methods are described in:

Becker, B.J., Levin, L.A., Fodrie, F.J. and McMillan, P.A. Complex larval retention patterns in marine invertebrates. Proc. Nat. Acad. Sci. 104: 3267-3272.

Carson, H.S., Lopez-Duarte, M.P., Wang, D., Levin, L.A., Time series reveals how reproductive timing alters coastal connectivity. Current Biology **20**: 1926-1931 (2010).

Fodrie, F.J., Becker, B.J., Levin, L.A., Gruenthal, K., McMillan, P., Connectivity clues from short-term variability in settlement and geochemical tags of mytilid mussels. *Journal of Sea Research* **65**: 141-50 (2011).

Data Processing Description

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Data Files

File
linked_matrices.csv (Comma Separated Values (.csv), 244 bytes) MD5:919d0f0f1d8f8b98aff607d629896fbd Primary data file for dataset ID 3811

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Parameters

Parameter	Description	Units
file_type	Type of file to download, such as Microsoft Word or Adobe PDF	n/a
file_link	Clickable link to the file to display or download	n/a

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Deployments

BC_May2003-Nov2009

Website	https://www.bco-dmo.org/deployment/58788
Platform	Bivalve Connectivity
Start Date	2003-05-01
End Date	2009-11-30
Description	<p>Life history data collection and Inshore larval connectivity studies May/2003 - Nov/2009 A series of sites re-visited on separate occasions from May/2003 - Nov/2009 General Location of the Sites: Southern California Coast around 32N, 117W Northwest Coast of Mexico - Bajamar, MX and Punta Morro, MX</p> <p>Methods & Sampling</p> <p>Processing Description</p>

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Project Information

Temporal and spatial scales of variability in bivalve connectivity (Bivalve Connectivity)

Website: <http://levin.ucsd.edu/>

Coverage: Southern California Coast around 32N, 117W, NW Mexico

Temporal and spatial scales of variability in bivalve connectivity

Larval connectivity, the extent to which sub-populations exchange larvae, has emerged as a fundamental concept within the diverse arenas of population ecology, biotic resource management, biodiversity conservation, invasive species control, and habitat restoration. However, determining dispersal trajectories of larvae and their scales of variability remain a major challenge. Project investigators Levin, Muccino and Rasmussen will use an integration of prospective modeling and retrospective (elemental fingerprinting) approaches to assess variability in larval connectivity and its demographic consequences for mytilid mussel populations in southern California. This project builds on initial studies of mytilid connectivity to address in greater depth and with a more strongly coupled physical/biological approach, questions of variability and its causes.

These collaborating scientists will address hypotheses concerning the spatial and temporal scales of connectivity for mussels, *Mytilus californianus* and *Mytilus galloprovincialis*, examining their consistency among sites and species. This will be accomplished through (a) larval out-planting at 18 locations in San Diego County several times a year to generate reference signatures for trace elemental fingerprinting, (b) collection of recruits and elemental analyses of their larval shells to determine sites and regions of origins, and (c) high frequency data collection at 2 bay locations for *M. galloprovincialis* and 2 open coast locations for *M. californianus* to carry out weekly analysis of recruitment variability, its link to chemical signals and recruit origins, and for collection of demographic data (size-specific survivorship, growth and fecundity).

Through numerical dispersal simulations of the coastal ocean and bays, and subsequent comparisons to fingerprinting based assessment of recruit origins, they will examine the roles of circulation, local vs. remote forcing, bay-ocean interaction, episodic events, and larval attributes (vertical behavior, release times, planktonic duration) in defining the variability of connectivity. Demographic data will be combined with connectivity data to model the population and meta-population level fitness consequences of observed mytilid connectivity patterns.

The results of connectivity studies have direct applicability to conservation and management of commercial and natural bivalve populations, and given the key structural role of mussels, to the conservation of rocky shore habitats.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0648656

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