Sample logs from the Fixed Station cruises of the TRANSPORT program on R/V Hugh R. Sharp (HRS110714EN, HRS120711EN) in the Choptank River, Chesapeake Bay during 2011-2012 (TRANSPORT project)

Website: https://www.bco-dmo.org/dataset/566982
Version: 3
Version Date: 2015-09-22

Project
» Integrating field methods and numerical models to quantify the links between larval transport, connectivity, and population dynamics (TRANSPORT)

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Dataset Description

Cruises were in the Choptank River to four fixed locations in July 2011 and 2012.

Data Processing Description

BCO-DMO Processing:

- added conventional header with dataset name, PI name, version date
- renamed parameters to BCO-DMO standard
- created toplevel file to serve individual files as a single object
- added cruise_name, cruise_id

Versions:
- v3: 2015-09-22: corrected FSBT12 dates - v2: 2015-09-21: added ISO_DateTime_UTC and yrday_UTC columns
- v1: 2015-09-15: served data

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Data Files

File
logs_FSBT.csv(Comma Separated Values (.csv), 18.12 KB) MD5:35cfaab7111fc4ebab7b1fbf9391a6e1 Primary data file for dataset ID 566982

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Parameters

Parameter	Description	Units
cruise_id	official cruise identification	unitless
cruise_name	alternate name assigned to cruise	unitless
station	station number	unitless
date	date	yyyymmdd
time_UTC	UTC time	HH:MM
time_local	local time	HH:MM
ISO_DateTime_UTC	UTC time; ISO formatted	yyyy-mm-ddTHH:MM:SS[.xx]
yrday_UTC	local day and decimal time; eg. 326.5 for the 326th day of the year or November 22 at 1200 hours (noon)	unitless
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
depth_w	depth of the water	meters
sal	surface salinty	PSU
temp	surface temperature	degrees Celsius
cast_ctd	CTD cast number	unitless
depth_TSS	depth of total suspended solids samples	meters

depth_secchi	Secchi depth	meters
pump_samples	pump samples (2011 only): B=botton; M=middle; MS=mid-surface; S=surface	unitless
pycno_type	pycnocline type	unitless
comments	notes	unitless

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	CTD Sea-Bird 9
Generic Instrument Description	The Sea-Bird SBE 9 is a type of CTD instrument package. The SBE 9 is the Underwater Unit and is most often combined with the SBE 11 Deck Unit (for real-time readout using conductive wire) when deployed from a research vessel. The combination of the SBE 9 and SBE 11 is called a SBE 911. The SBE 9 uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 and SBE 4). The SBE 9 CTD can be configured with auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorometer, altimeter, etc.). Note that in most cases, it is more accurate to specify SBE 911 than SBE 9 since it is likely a SBE 11 deck unit was used. more information from Sea-Bird Electronics

Dataset-specific Instrument Name	
Generic Instrument Name	Niskin bottle
Generic Instrument Description	A Niskin bottle (a next generation water sampler based on the Nansen bottle) is a cylindrical, non-metallic water collection device with stoppers at both ends. The bottles can be attached individually on a hydrowire or deployed in 12, 24, or 36 bottle Rosette systems mounted on a frame and combined with a CTD. Niskin bottles are used to collect discrete water samples for a range of measurements including pigments, nutrients, plankton, etc.

Dataset-specific Instrument Name	gel-net
Generic Instrument Name	Plankton Net
Dataset-specific Description	1) Gel-net, towed vertically, for gelatinous zooplankton collection 2) Zooplankton net, 64 micron mesh
Generic Instrument Description	A Plankton Net is a generic term for a sampling net that is used to collect plankton. It is used only when detailed instrument documentation is not available.

Dataset-specific Instrument Name	
Generic Instrument Name	Pump
Dataset-specific Description	Bellows pump attached to CTD with hose for collecting bivalve larvae caught on a 64 micron mesh.
Generic Instrument Description	A pump is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action. Pumps can be classified into three major groups according to the method they use to move the fluid: direct lift, displacement, and gravity pumps

Dataset-specific Instrument Name	
Generic Instrument Name	Sea-Bird SBE 43 Dissolved Oxygen Sensor
Generic Instrument Description	The Sea-Bird SBE 43 dissolved oxygen sensor is a redesign of the Clark polarographic membrane type of dissolved oxygen sensors. more information from Sea-Bird Electronics

Dataset-specific Instrument Name	
Generic Instrument Name	Sea-Bird SBE-3 Temperature Sensor
Generic Instrument Description	The SBE-3 is a slow response, frequency output temperature sensor manufactured by Sea-Bird Electronics, Inc. (Bellevue, Washington, USA). It has an initial accuracy of +/- 0.001 degrees Celsius with a stability of +/- 0.002 degrees Celsius per year and measures seawater temperature in the range of -5.0 to +35 degrees Celsius. more information from Sea-Bird Electronics

Dataset-specific Instrument Name	
Generic Instrument Name	Sea-Bird SBE-4 Conductivity Sensor
Generic Instrument Description	The Sea-Bird SBE-4 conductivity sensor is a modular, self-contained instrument that measures conductivity from 0 to 7 Siemens/meter. The sensors (Version 2; S/N 2000 and higher) have electrically isolated power circuits and optically coupled outputs to eliminate any possibility of noise and corrosion caused by ground loops. The sensing element is a cylindrical, flow-through, borosilicate glass cell with three internal platinum electrodes. Because the outer electrodes are connected together, electric fields are confined inside the cell, making the measured resistance (and instrument calibration) independent of calibration bath size or proximity to protective cages or other objects.

Dataset-specific Instrument Name	
Generic Instrument Name	Secchi Disc
Generic Instrument Description	Typically, a 16 inch diameter white/black quadrant disc used to measure water optical clarity

Dataset-specific Instrument Name	
Generic Instrument Name	WetLabs FLNTU
Generic Instrument Description	The WetLabs ECO FLNTU is a dual-wavelength, single-angle sensor for simultaneously determining both chlorophyll fluorescence and turbidity. It detects light scattered by particles suspended in water, generating an output voltage proportional to turbidity or suspended solids. Scaling factors are used to convert the voltage readings to values representing chlorophyll concentration and turbidity expressed in Nephelometric Turbidity Units (NTUs).

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Deployments

HRS110714EN

Website	https://www.bco-dmo.org/deployment/565814
Platform	R/V Hugh R. Sharp
Report	http://dmoserv3.bco-dmo.org/data_docs/TRANSPORT/2011cruise_reports/TRANSPORT_Cruise_Report_FSBT11.pdf
Start Date	2011-07-14
End Date	2011-07-18

HRS120711EN

Website	https://www.bco-dmo.org/deployment/565816
Platform	R/V Hugh R. Sharp
Report	http://dmoserv3.bco-dmo.org/data_docs/TRANSPORT/2012cruise_reports/TRANSPORT_Cruise_Report_FSBT12.pdf
Start Date	2012-07-10
End Date	2012-07-14

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Project Information

Integrating field methods and numerical models to quantify the links between larval transport, connectivity, and population dynamics (TRANSPORT)

Website: http://northweb.hpl.umces.edu/TRANSPORT/home.htm

Additional information can be found at the TRANSPORT website:
http://northweb.hpl.umces.edu/TRANSPORT/home.htm

Project description:
This coupled field-and-modeling research project is designed to address fundamental, cutting-edge questions that will significantly enhance our understanding of physical-biological interactions in planktonic organisms and quantify how pelagic life stages influence population dynamics. Technological advances in field methodology and numerical modeling will be integrated and applied to investigate and compare how circulation patterns, larval transport, sub-population connectivity, and population dynamics of the Eastern oyster, *Crassostrea virginica*, respond to environmental variability and habitat alteration. This project will provide information that will significantly enhance the restoration and management of oysters.

Physical-biological interactions are an integral part of understanding fish, bivalve, and crustacean early-life history and the processes that affect inter-annual variability in their recruitment to reproducing populations. The combined modeling and field approach builds on existing state-of-the-art models, it applies a new technology that will significantly advance our ability to investigate in-situ bivalve larvae dynamics, and it will generate critical information about the early life of oysters (timing of spawning, larval behavior) that is necessary for enhancing our understanding and prediction of recruitment processes.

This research will also advance our understanding of population dynamics of organisms with a pelagic life stages by making quantitative links between larval transport and a full life-cycle model. In doing so, it will provide improved understanding of the inter-relationships between, and relative importance of, larval transport, the connectivity of different reef systems, and adult growth, mortality, and gamete production, and how these relationships are influenced by changes in physical conditions and habitat.

Although focused on the oyster, *Crassostrea virginica*, the ecological studies and comparisons will result in a significant enhancement in our understanding of the interactions between physical conditions and a suite of bivalve species. This program will benefit society by providing new insights and understanding that will enhance fisheries management capabilities. The numerical tools developed will have the resolution appropriate for helping to guide oyster restoration programs, locate optimal sanctuaries (i.e., marine protected areas), and inform spatial management of oyster harvest. Although the quantitative tools and information generated will directly support oyster management and restoration activities of state and federal partners in Chesapeake Bay, the findings and tools developed in this project will be applicable to many other systems where bivalves comprise an important component of commercial and recreational fisheries. A PhD graduate student will be trained in field and numerical modeling research in this coupled field-and-modeling program. In addition to gaining a solid foundation in a cutting-edge field, the student will have the opportunity to develop science communication skills and interact with management agency representatives.

Publications Produced as a Result of this Research:

Gallego, A., E.W. North and E.D. Houde. 2012. Understanding and quantifying mortality in pelagic, early life stages of marine organisms — Old challenges and new perspectives. Journal of Marine Systems 93: 1-3.

Goodwin, J. D., and E.W. North. In prep. Identifying factors that influence the swimming behavior of *Crassostrea virginica* larvae in Choptank River and calculating their mortality.

Goodwin, J. D., E. W. North, and C. M. Thompson. 2014. Evaluating and improving a semi-automated image analysis technique for identifying bivalve larvae. Limnology and Oceanography: Methods 12: 548-562. DOI: 10.4319/lom.2014.12.548

Goodwin, J. D., E. W. North, and V. S. Kennedy. 2016. Identification of eastern oyster *Crassostrea virginica* larvae using polarized light microscopy in a mesohaline region of Chesapeake Bay. Journal of Shellfish Research 35(1): 157-168.

Goodwin, J. D., E. W. North, C. M. Thompson, I. Mitchell and H.M McFadden. In press. Improving a semi-automated classification technique for bivalve larvae: automated image acquisition and measures of quality control. Limnology and Oceanography: Methods.

North, E. W., D. M. King, J. Xu, R. R. Hood, R. I. E. Newell, K. T. Paynter, M. L. Kellogg, M. K. Liddel, and D. F.

Boesch. 2010. Linking optimization and ecological models in a decision support tool for oyster restoration and management. Ecological Applications 20(3): 851–866.

Spires, J. E., E. W. North, and W. Long. In prep. The influence of salinity-induced mortality on larval transport between eastern oyster (*Crassostrea virginica*) reefs in an oligohaline estuary: model simulations and implications for restoration. Estuaries and Coasts.

Thompson, C. M., E. W. North, V. S. Kennedy, and S. N. White. 2015. Classifying bivalve larvae using shell pigments identified by Raman spectra. Analytical and Bioanalytical Chemistry 407:3591-3604, DOI 10.1007/s00216-015-8575-8

Thompson, C.M., E.W. North, S.N. White, and S.M. Gallager. 2014. An analysis of bivalve larval shell pigments using micro-Raman spectroscopy. Journal of Raman Spectroscopy 45(5):349-358

Dissertations and Theses:

Goodwin, J. D. 2015. Integrating automated imaging and a novel identification technique to estimate mortality and factors that determine the vertical distribution of *Crassostrea virginica* larvae. Ph.D. Dissertation. University of Maryland College Park and the University of Maryland Center for Environmental Science.

Spires, J. E. The exchange of eastern oyster (*Crassostrea virginica*) larvae between subpopulations in the Chotpank and Little Choptank Rivers: model simulations, the influence of salinity, and implications for restoration. Master of Science Thesis, University of Maryland College Park and Center for Environmental Science, 79 pp.

Books and One-Time Proceedings:

Anthony, Z. 2014. Optimal microscope and camera settings for counting and identifying copepods (*Acartia tonsa*) using a newly developed semi-automated image analysis technology. Undergraduate Research Report. 14 pp.

Hinson, K. I., E.W. North, and C.M. Thompson. 2011. New technologies to support shellfish restoration. Research Experience for Undergraduates (REU) final report.

Mitchell, I. 2013. Updates in LTRANS v.2b. University of Maryland Center for Environmental Science, Horn Point Laboratory. Cambridge, MD. 2 pp.

North, E. W. 2010. Q&A: Elizabeth North. 10/01/2009-09/30/2010, ICES Insight, September 2010, vol. 47, p. 43-44.

Schlag, Z. R., and E. W. North. 2012. Lagrangian TRANSport model (LTRANS v.2) User's Guide. University of Maryland Center for Environmental Science, Horn Point Laboratory. Cambridge, MD. 183 pp.

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Funding

Funding Source	Award
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