Daily temperature measurements on restored oyster reefs in Quonochontaug Pond, RI from July-August 2018 and September-October 2018

Website: https://www.bco-dmo.org/dataset/881834
Data Type: Other Field Results
Version: 1
Version Date: 2022-11-01

Project
» CAREER: Linking genetic diversity, population density, and disease prevalence in seagrass and oyster ecosystems (Seagrass and Oyster Ecosystems)

Contributors	Affiliation	Role
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Abstract
Daily temperature measurements were collected on restored oyster reefs in Quonochontaug Pond, Rhode Island, USA in the summer (July-August) 2018 and the fall (September-October) of 2018. Bottom water temperatures were collected hourly during tray deployment using one Onset Tidbit v2 HOBO temperature logger per block in summer 2018 and one logger at both the edge and interior of 3 reefs (one per block) in fall 2018.

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Coverage

Spatial Extent: **Lat**:41.3 **Lon**:-71.7
Temporal Extent: 2018-07-10 - 2018-10-04

Methods & Sampling

These data were published in Davenport et al., 2022 (Restoration Ecology). All figure numbers mentioned refer to Davenport et al., 2022 (Restoration Ecology).

Bottom water temperatures were collected during experimental tray deployment at Quonochontaug Pond, Rhode Island, USA, (41.3 N, 71.7 W). One Onset Tidbit v2 HOBO temperature logger was used per block in the summer of 2018 (July 10-August 6) and one logger at both the edge and interior of 3 reefs (one per block) in the fall of 2018 (September 7-October 4) (Fig. S2). Water temperatures were collected hourly during tray deployment.

Data Processing Description

Data Processing:
Hourly temperatures were processed to average daily temperature (averaged by Julian day), maximum daily temperature (the maximum temperature recorded each day was selected), or minimum daily temperature (the minimum temperature recorded each day was selected).

BCO-DMO Processing:
- Adjusted field/parameter names to comply with BCO-DMO naming conventions
- Added a conventional header with dataset name, PI names, version date
- Reorganized data, creating one row for each block-reef-treat-Julian day combination and separate columns for mean, maximum, and minimum temperature
- Values in the columns "temp_min", "temp_max", and "temp_mean" were rounded to 3 decimal places

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Data Files

File
all_temp_data_reformatted.csv (Comma Separated Values (.csv), 9.26 KB) MD5:a99311dc23205f6da8006f0c795c1dd0 Primary data file for dataset ID 881834

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Related Publications

Davenport, T. M. (2022). Reef and landscape characteristics influence nekton recruitment enhancement by restored oyster reefs. https://doi.org/10.17760/D20439250
General

Davenport, T. M., Grabowski, J. H., & Hughes, A. R. (2022). Edge effects influence the composition and density of reef residents on subtidal restored oyster reefs. Restoration Ecology. Portico. https://doi.org/10.1111/rec.13693
Results

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Related Datasets

IsRelatedTo

Hughes, A. R., Davenport, T., Grabowski, J. (2022) **Faunal ID, size and biomass on oyster reefs in Quonochontaug Pond, RI from July-August 2018 and September-October 2018.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2022-11-02 doi:10.26008/1912/bco-dmo.881801.1 [view at BCO-DMO]

Hughes, A. R., Davenport, T., Grabowski, J. (2022) **Oyster density of restored reef edge/interior in Quonochontaug Pond, RI in May 2019.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2022-11-02 doi:10.26008/1912/bco-dmo.881536.1 [view at BCO-DMO]

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Parameters

Parameter	Description	Units
season	season of tray deployment (summer or fall). HOBO loggers were attached to trays throughout tray deployment, collecting hourly temperatures.	unitless
block	numberical label for experimental block, 1-3; corresponds to Figure 1 in Davenport et al. 2022, Restoration Ecology.	unitless
reef	alphabetical label for the reef on which trays with hobo loggers were attached; corresponds to Figure 1 in Davenport et al. 2022. alphabetical label for the reef on which trays with hobo loggers were attached; corresponds to Figure 1 in Davenport et al. 2022, Restoration Ecology	unitless
treat	experimental treatment, including I (reef interior), E (reef edge), SHELL (shell control tray). Corresponds to Figure 1 in Davenport et al. 2022, Restoration Ecology.	unitless
julian	julian day of the year	unitless
temp_min	minimum temperature observed per day (measured once hourly)	degrees Celsius
temp_max	maximum temperature observed per day (measured once hourly)	degrees Celsius
temp_mean	mean temperature observed per day (measured once hourly)	degrees Celsius

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Instruments

Dataset-specific Instrument Name	HOBO TidbiT v2 water temperature data logger
Generic Instrument Name	Onset HOBO TidbiT v2 (UTBI-001) temperature logger
Generic Instrument Description	A temperature logger that measures temperatures over a wide temperature range. It is designed for outdoor and underwater environments and is waterproof to 300 m. A solar radiation shield is required to obtain accurate air temperature measurements in sunlight (RS1 or M-RSA Solar Radiation Shield). With an operational temperature range between -20 degrees Celsius and +70 degrees Celsius, the TidbiT v2 has an accuracy of +/-0.21 and a resolution of 0.02 degrees Celsius.

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Project Information

CAREER: Linking genetic diversity, population density, and disease prevalence in seagrass and oyster ecosystems (Seagrass and Oyster Ecosystems)

Coverage: Coastal New England

NSF Award Abstract:
Disease outbreaks in the ocean are increasing, causing losses of ecologically important marine species, but the factors contributing to these outbreaks are not well understood. This 5-year CAREER project will study disease prevalence and intensity in two marine foundation species - the seagrass Zostera marina and the Eastern oyster Crassostrea virginica. More specifically, host-disease relationships will be explored to understand how genetic diversity and population density of the host species impacts disease transmission and risk. This work will pair large-scale experimental restorations and smaller-scale field experiments to examine disease-host relationships across multiple spatial scales. Comparisons of patterns and mechanisms across the two coastal systems will provide an important first step towards identifying generalities in the diversity-density-disease relationship. To enhance the broader impacts and utility of this work, the experiments will be conducted in collaboration with restoration practitioners and guided by knowledge ascertained from key stakeholder groups. The project will support the development of an early career female researcher and multiple graduate and undergraduate students. Students will be trained in state-of-the-art molecular techniques to quantify oyster and seagrass parasites. Key findings from the surveys and experimental work will be incorporated into undergraduate courses focused on Conservation Biology, Marine Biology, and Disease Ecology. Finally, students in these courses will help develop social-ecological surveys and mutual learning games to stimulate knowledge transfer with stakeholders through a series of workshops.

The relationship between host genetic diversity and disease dynamics is complex. In some cases, known as a dilution effect, diversity reduces disease transmission and risk. However, the opposite relationship, known as the amplification effect, can also occur when diversity increases the risk of infection. Even if diversity directly reduces disease risk, simultaneous positive effects of diversity on host density could lead to amplification by increasing disease transmission between infected and uninfected individuals. Large-scale field restorations of seagrasses (Zostera marina) and oysters (Crassostrea virginica) will be utilized to test the effects of host genetic diversity on host population density and disease prevalence/intensity. Additional field experiments independently manipulating host genetic diversity and density will examine the mechanisms leading to dilution or amplification. Conducting similar manipulations in two marine foundation species - one a clonal plant and the other a non-clonal animal - will help identify commonalities in the diversity-density-disease relationship. Further, collaborations among project scientists, students, and stakeholders will enhance interdisciplinary training and help facilitate the exchange of information to improve management and restoration efforts. As part of these efforts, targeted surveys will be used to document the perceptions and attitudes of managers and restoration practitioners regarding genetic diversity and its role in ecological resilience and restoration.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1652320

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