Seagrass (Zostera marina and Halodule wrightii) shoot count, biomass and shoot height from seagrass bed core samples collected in Back Sound, North Carolina in June and July of 2013

Website: https://www.bco-dmo.org/dataset/748842
Data Type: Other Field Results
Version: 2
Version Date: 2019-06-18

Project
» Collaborative Research: Habitat fragmentation effects on fish diversity at landscape scales: experimental tests of multiple mechanisms (Habitat Fragmentation)

Contributors	Affiliation	Role
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Abstract
Seagrass (Zostera marina and Halodule wrightii) shoot count, biomass and shoot height from seagrass bed core samples collected in Back Sound, North Carolina in June and July of 2013.

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Coverage

Spatial Extent: **N**:34.70648 **E**:-76.37371 **S**:34.06503 **W**:-76.62355
Temporal Extent: 2013-06-13 - 2013-07-26

Dataset Description

These data were published in Yeager et al. (2019). See "Related Datasets" section for other datasets from the same core samples.

Methods & Sampling

We sampled 86 sites within seagrass habitats throughout Back Sound, North Carolina, USA (3442’ N to 3439’ N, 7637’ W to 7631’ W during July 2013. Sampling sites were located across 21 seagrass landscapes which were defined by 200m x 80m rectangles (matching common isolated bed size and shape within our system). These landscapes were previously selected to represent independent gradients in both total seagrass cover (260-11,764 m2) and landscape patchiness (1-75 individual patches; Yeager et al. 2016). Sampling sites in the current study were haphazardly placed across all 21 landscapes, but always located within seagrass itself, and not the unvegetated matrix.

Seagrass core sampling and laboratory processing:
One core sample was taken from each sampling site. Each core measured 30 cm in diameter and captured the above ground seagrass habitat as well as the top 10 cm of the sediment surface. All cores were taken within 2 h of low tide and the GPS location of each core was marked with a Garmin 72H handheld unit (Garmin International, Olathe, Kansas, USA). Low-tide depth was measured in situ at each site at the time of sampling to the nearest 10 cm.

Seagrass tissue from the cores was separated and rinsed with clean freshwater. Seagrass was sorted by species (Zostera marina and Halodule wrightii). All shoots were enumerated to assess species-specific density and the first 20 shoots from each species were measured to assess maximum canopy height (rounded to the nearest mm). Seagrass was then sorted according to above and below-ground biomass; the above-ground biomass of each species was dried at 60 C for 48 h and weighed to the nearest 0.01 g.

The core (30-cm diameter, PVC) was gently placed by hand at each site and pushed down to a constant depth of 10 cm into the sediment. The core was gently rotated to break seagrass rhizomes, then dug out by hand, lifted, and placed into a resealable 1.5-gallon plastic bag. The sample was transported back to the laboratory on ice.

Shoot heights we averaged across (up to) 20 shoots measured within each core. Mean shoot height per core was calculated using a pivot table in Excel.

Data Processing Description

BCO-DMO Data Manager Processing Notes:
* added a conventional header with dataset name, PI name, version date
* lat and lon rounded to five decimal places
* gram and mm measurement columns rounded to two decimal places.
* date format converted to ISO 8601 standard format yyyy-mm-dd
* data values that were a period, indicating no value, changed to the default missing data identifier in BCO-DMO, "nd" meaning "no data."

data version 2 (2019-06-14) replaces data version 1:
* cells with just a period as a value replaced will no-data values. No-data values in this dataset are displayed as the missing data identifier "nd" for "no data" in the BCO-DMO system.
* Date for CP6 5 changed from 2015-07-16 to 2013-07-16

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Data Files

File
seagrass.csv (Comma Separated Values (.csv), 5.97 KB) MD5:79d5adb39708bc6e6a109ba09cef2ff5 Primary data file for dataset ID 748842

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Related Publications

Yeager, L. A., Geyer, J. K., & Fodrie, F. J. (2019). Trait sensitivities to seagrass fragmentation across spatial scales shape benthic community structure. Journal of Animal Ecology, 88(11), 1743–1754. Portico. https://doi.org/10.1111/1365-2656.13067
Results

Yeager, L. A., Keller, D. A., Burns, T. R., Pool, A. S., & Fodrie, F. J. (2016). Threshold effects of habitat fragmentation on fish diversity at landscapes scales. Ecology, 97(8), 2157–2166. doi:10.1002/ecy.1449
Methods

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Related Datasets

IsRelatedTo

Yeager, L. (2018) **Infauna abundance from seagrass bed core samples collected in Back Sound, North Carolina in June and July of 2013.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2) Version Date 2018-06-18 doi:10.1575/1912/bco-dmo.748860.2 [view at BCO-DMO]
Relationship Description: Data from the same core samples.

Yeager, L. (2018) **Infauna biomass from seagrass bed core samples collected in Back Sound, North Carolina in June and July of 2013.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 2) Version Date 2018-06-18 doi:10.1575/1912/bco-dmo.748852.2 [view at BCO-DMO]
Relationship Description: Data from the same core samples.

Yeager, L. (2019) **Trait data for epibenthic and infaunal seagrass macrofauna in North Carolina, USA from peer-reviewed literature and web-based identification guides.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2019-06-18 doi:10.1575/1912/bco-dmo.770626.1 [view at BCO-DMO]
Relationship Description: Data from the same core samples

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Parameters

Parameter	Description	Units
Site	Sampling location name	unitless
Date	Date (local) where core was taken. Local time zone is Eastern Daylight Time (EDT, UTC-4)	unitless
Replicate	Replicate core number at site	unitless
Latitude	Latitude of location of where core taken	decimal degrees (DD)
Longitude	Longitude of location where core taken	decimal degrees (DD)
Depth	Low tide depth where the core was taken	meters (m)
Zos_shoot_count	Number of shoots of Zostera marina in core	count (shoots)
Zos_biomass_g	Total dry weight of Zostera marina in core	grams (g)
Mean_zos_height_mm	Mean height of 20 haphazardly selected shoots of Zostera marina within the core	millimeters (mm)
Hal_shoot_count	Number of shoots of Halodule wrightii in core	count (shoots)
Hal_biomass_g	Total dry weight of Halodule wrightii in core	grams (g)
Mean_hal_height_mm	Mean height of 20 haphazardly selected shoots of Halodule wrightii within the core	millimeters (mm)

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Instruments

Dataset-specific Instrument Name	Garmin 72H handheld unit (Garmin International, Olathe, Kansas, USA)
Generic Instrument Name	GPS receiver
Generic Instrument Description	Acquires satellite signals and tracks your location. This term has been deprecated. Use instead: https://www.bco-dmo.org/instrument/560

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Project Information

Collaborative Research: Habitat fragmentation effects on fish diversity at landscape scales: experimental tests of multiple mechanisms (Habitat Fragmentation)

Coverage: North Carolina

Amount and quality of habitat is thought to be of fundamental importance to maintaining coastal marine ecosystems. This research will use large-scale field experiments to help understand how and why fish populations respond to fragmentation of seagrass habitats. The question is complex because increased fragmentation in seagrass beds decreases the amount and also the configuration of the habitat (one patch splits into many, patches become further apart, the amount of edge increases, etc). Previous work by the investigators in natural seagrass meadows provided evidence that fragmentation interacts with amount of habitat to influence the community dynamics of fishes in coastal marine landscapes. Specifically, fragmentation had no effect when the habitat was large, but had a negative effect when habitat was smaller. In this study, the investigators will build artificial seagrass habitat to use in a series of manipulative field experiments at an ambitious scale. The results will provide new, more specific information about how coastal fish community dynamics are affected by changes in overall amount and fragmentation of seagrass habitat, in concert with factors such as disturbance, larval dispersal, and wave energy. The project will support two early-career investigators, inform habitat conservation strategies for coastal management, and provide training opportunities for graduate and undergraduate students. The investigators plan to target students from underrepresented groups for the research opportunities.

Building on previous research in seagrass environments, this research will conduct a series of field experiments approach at novel, yet relevant scales, to test how habitat area and fragmentation affect fish diversity and productivity. Specifically, 15 by 15-m seagrass beds will be created using artificial seagrass units (ASUs) that control for within-patch-level (~1-10 m2) factors such as shoot density and length. The investigators will employ ASUs to manipulate total habitat area and the degree of fragmentation within seagrass beds in a temperate estuary in North Carolina. In year one, response of the fishes that colonize these landscapes will be measured as abundance, biomass, community structure, as well as taxonomic and functional diversity. Targeted ASU removals will then follow to determine species-specific responses to habitat disturbance. In year two, the landscape array and sampling regime will be doubled, and half of the landscapes will be seeded with post-larval fish of low dispersal ability to test whether pre- or post-recruitment processes drive landscape-scale patterns. In year three, the role of wave exposure (a natural driver of seagrass fragmentation) in mediating fish community response to landscape configuration will be tested by deploying ASU meadows across low and high energy environments.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1661683

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