Data from minnow traps deployed to accompany scallop survival assays conducted as part of a larger concurrent study with Artificial Seagrass Units (ASU) in NC from July to September 2018

Website: https://www.bco-dmo.org/dataset/939600
Data Type: Other Field Results, experimental
Version: 1
Version Date: 2024-10-11

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
This dataset contains minnow trap data from deployments performed to accompany scallop survival assays conducted in 2018 (assays across landscape area x fragmentation per se treatments). These data were collected as part of the following study published in Yarnall et al. (2024): To parse the influences of fragmentation components on scallop survival, we generated nine unique landscapes composed of artificial seagrass units (ASUs), were constructed to mimic Zostera marina. These landscapes were part of a larger-scale concurrent experiment, during which we examined seagrass fragmentation effects on estuarine faunal communities (Yarnall et al. In Press). Landscapes were designed to be treatments along orthogonal axes of seagrass percent cover of the landscape footprint (10%, 35%, 60%) and fragmentation per se, indexed by percolation probability (0.1, 0.35, 0.59). To examine the influence of potential scallop predator community density on scallop survival, we deployed two baited minnow traps to accompany each survival assay. All caught fauna were identified to the species level, enumerated, and released. Data were collected by Drs. F. Joel Fodrie and Amy H. Yarnall for the Estuarine Ecology Laboratory of the University of North Carolina at Chapel Hill's Institute of Marine Sciences.

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Coverage

Location: Oscar Shoal in Back Sound, NC, USA
Spatial Extent: **N**:34.706 **E**:-76.588 **S**:34.7 **W**:-76.604
Temporal Extent: 2018-07 - 2018-09

Dataset Description

CPUE = Catch Per Unit Effort
ASU = artificial seagrass unit

Methods & Sampling

To parse the influences of fragmentation components on scallop survival, we generated nine unique landscape grids of 15 × 15 cells. Each cell was the size of an ASU, making the landscape area = 234 m^2 (18-m × 13-m). These landscapes were part of a larger-scale concurrent experiment, during which we examined seagrass fragmentation effects on estuarine faunal communities (Yarnall et al. In Press). Landscapes were designed to be treatments along orthogonal axes of seagrass percent cover of the landscape footprint (10%, 35%, 60%) and fragmentation *per se*, indexed by percolation probability (0.1, 0.35, 0.59).

To examine the influence of potential scallop predator community density on scallop survival, we deployed Gee-style minnow traps (41-cm x 22-cm cylinders, 0.3-cm galvanized wire-mesh, with 4-cm dia. funneled openings) baited with ~8 pieces of dry dog food within landscapes to accompany each survival assay. During each survival assay, two traps were haphazardly deployed on ASUs in each landscape >1 m from any scallop tether. During the first assay, traps were only checked after 24 h. For subsequent assays, to better match tether check frequency, traps were checked at 6 h and rechecked at 24 h (i.e., an 18-h deployment). Once it was determined that 24-h cumulative scallop survival would be analyzed, we pooled all fauna caught in 6-h and 24-h traps to obtain total catch per unit effort (a common faunal density metric) after a 24-h deployment. All caught fauna were identified to the species level, enumerated, and released.

Depth note: Depth ranges were similar across all sites as they were located on a single shoal (Oscar Shoal in Back Sound, NC, USA). Depths typically ranged from <0.5 m (at low tide) to 1.5-2 m (at high tide).

Organism identifiers (common name, scientific name, LSID):
bay scallop, Argopecten irradians, urn:lsid:marinespecies.org:taxname:156817
eelgrass, Zostera marina, urn:lsid:marinespecies.org:taxname:495077
* see Supplemental File "Species List" for additional taxonomic information to accompany the trap data.

Data Processing Description

All data were entered electronically into an Excel spreadsheet.

BCO-DMO Processing Description

* Sheet "Data" of submitted file "Scallop_Predators_Minnow_Traps_2018.xlsx" was imported into the BCO-DMO data system for this dataset. Values "NA" imported as missing data values.
** In the BCO-DMO data system missing data identifiers are displayed according to the format of data you access. For example, in csv files it will be blank (null) values. In Matlab .mat files it will be NaN values. When viewing data online at BCO-DMO, the missing value will be shown as blank (null) values.

* Column names adjusted to conform to BCO-DMO naming conventions designed to support broad re-use by a variety of research tools and scripting languages. [Only numbers, letters, and underscores. Can not start with a number]

* DateTime with time zone column added "ISO_DateTime_UTC_In." Converted from Date_In and Time_In (from local EST/EDT to UTC) converted to ISO 8601 format.

* Species List added as supplemental file. Contains match information for taxonomic names used in the dataset

to names at the World Register of Marine Species (WoRMS) using the WoRMS taxa match tool (https://www.marinespecies.org/aphia.php?p=match). Match performed on 2024-10-08.

* Submitter revised and resubmitted table with file "939600_v1_scallop-survival-assay-trap-cpue_revised.csv" which corrects species names. BCO-DMO data manager made one additional correction Lagadon rhomboides -> Lagodon rhomboides. The revised file was imported into the BCO-DMO data system and provided as the primary data table for version 1 of this dataset (939600_v1_scallop-survival-assay-trap-cpue.csv).

* Submitter revised and resubmitted table with file "939600_v1_scallop-survival-assay-trap-cpue_revised2.csv" which corrects species names. The revised file was imported into the BCO-DMO data system and provided as the primary data table for version 1 of this dataset (939600_v1_scallop-survival-assay-trap-cpue.csv).

* Names checked again and species list supplemental file updated (name match performed on 2024-10-11).

Problem Description

Note: Duplicate rows in this dataset are intentionally included and are from separate individuals of the same species and length caught in the same trap.

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Data Files

File	
939600_v1_scallop-survival-assay-trap-cpue.csv	(Comma Separated Values (.csv), 60.90 KB) MD5:154b98f1a594a7ce4bfedbda3c517766
Primary data file for dataset ID 939600, version 1	

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Supplemental Files

File	
Species List filename: 939600_species_list.csv	(Comma Separated Values (.csv), 2.19 KB) MD5:b8d49e6540aa2517906e1a0fe9c4a590
Unique list of organism taxonomic names used in this dataset matched to taxonomic identifiers. Includes quality information about the match. Columns: dataset_Sp_name, Common name as it appears in the dataset column "Sp_name" dataset_Sci_name, taxonomic name (verbatim) as it appears in the dataset column "Sci_name" ScientificName_WoRMS, name matched to at the World Register of Marine Species (WoRMs) LSID, Life Science Identifier (LSID) for the ScientificName_WoRMS AphiaID, AphiaID for the ScientificName_WoRMS Match_type, An indication of how closely the dataset Sp_name matches the WoRMS name Taxon_status, An indication of whether the matched names at WoRMS is the currently accepted name for the organism or is an unaccepted synonym (at the time of the match 2024-10-10)	

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Related Publications

Yarnall, A. H., Yeager, L. A., Lopazanski, C., Poray, A. K., Morley, J. M., Hurlbert, A., and Fodrie, F.J. Habitat area more consistently affects seagrass faunal communities than fragmentation per se.
Methods

Yarnall, A. H., Yeager, L. A., Lopazanski, C., Poray, A. K., Morley, J. W., Hurlbert, A. H., & Fodrie, F. J. (2024). Habitat area more consistently affects seagrass faunal communities than fragmentation per se. Ecological Monographs. Portico. https://doi.org/10.1002/ecm.1629

Results

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Related Datasets

IsRelatedTo

Yarnall, A., Fodrie, F. J. (2024) **Data from scallop survival assays conducted as part of a larger concurrent study of fragmentation effects on estuarine faunal communities with Artificial Seagrass Units (ASU) in Back Sound, NC from July to September 2018.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2024-10-04 doi:10.26008/1912/bco-dmo.939581.1 [view at BCO-DMO]
Relationship Description: Datasets collected concurrently as part of the same study in Back Sound, NC.

Yarnall, A., Fodrie, F. J., Lopazanski, C., Poray, A. K., Yeager, L. (2023) **Landscape fine-scale complexity of seagrass, fish and macroinvertebrate communities within Artificial Seagrass Units (ASU) in Back Sound, NC from July to September 2018.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2023-03-17 doi:10.26008/1912/bco-dmo.891652.1 [view at BCO-DMO]
Relationship Description: Datasets collected concurrently as part of the same study in Back Sound, NC.

Yarnall, A., Fodrie, F. J., Lopazanski, C., Poray, A. K., Yeager, L. (2023) **Landscape parameters of seagrass, fish and macroinvertebrate communities within Artificial Seagrass Units (ASU) in Back Sound, NC from July to September 2018.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2023-03-27 doi:10.26008/1912/bco-dmo.891670.1 [view at BCO-DMO]
Relationship Description: Datasets collected concurrently as part of the same study in Back Sound, NC.

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Parameters

Parameter	Description	Units
Site_ID	Artificial seagrass unit (ASU) landscape name (Percent cover value-Percolation probability value)	unitless
Per_cov	Percent cover of ASUs in 234 m^2 landscape footprint (10, 22.5, 35, 47.5, 60)	percent (%)
Frag	ASU landscape fragmentation per se indexed by percolation probability (0.1, 0.225, 0.35, 0.475, 0.59)	unitless
lat	Landscape latitude north	decimal degrees
lon	Landscape longitude west	decimal degrees
Date_In	Date of minnow trap deployment (local time zone EST/EDT)	unitless
Time_In	Time of minnow trap deployment (local time zone EST/EDT, 24hr)	unitless

ISO_DateTime_UTC_In	DateTime with timezone of minnow trap deployment (ISO 8601 format in timezone UTC)	unitless
Date_Out	Date of minnow trap retrieval (local time zone EST/EDT)	unitless
Time_Out	Time of minnow trap retrieval (local time zone EST/EDT, 24hr)	unitless
Check_num	Interval of minnow trap check 6 h, 24 h	unitless
H_tide	Time of high tide proximate to minnow trap deployment (local time zone EST/EDT, 24hr)	unitless
L_tide	Time of low tide proximate to minnow trap deployment (local time zone EST/EDT, 24hr)	unitless
WaterTemp_C	Surface water temperature at time of minnow trap deployment	degrees C
Sal_PSU	Surface salinity at time of minnow trap deployment	Practical Salinity Units (PSU)
Cell_coord	ASU landscape "cell coordinate" by C (column; out of 15) and R (row; out of 15) number	unitless
Cell_class	ASU type of cell within landscape (Edge = borders sandflat on >=1 side, Interior = does not border sandflat)	unitless
Sp_name	Common name of fauna species	unitless
Sci_name	Scientific name of fauna species (See supplemental file 'Species List' for more details of this name including the matched taxonomic identifier)	unitless
Length_mm	Total length of fauna	millimeters (mm)

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	minnow trap
Generic Instrument Description	shore fishing gear

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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-1635950

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