Data from minnow traps placed across landscape fragmentation per se treatments in June, July, and August 2019 in Back Sound, NC to accompany scallop density surveys

Website: https://www.bco-dmo.org/dataset/939592
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
Fodrie, F. Joel	University of North Carolina at Chapel Hill (UNC-Chapel Hill)	Co-Principal Investigator, Contact
Yarnall, Amy	University of North Carolina at Chapel Hill (UNC-Chapel Hill)	Scientist, Contact
York, Amber D.	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Abstract
This dataset contains data from minnow traps placed across landscape fragmentation per se treatments in June, July, and August 2019 to accompany scallop density surveys. These data were collected as part of the following study published in Yarnall et al. (2024): To explore the independent influence of fragmentation per se (patchiness) on mobile juvenile bay scallop (Argopecten irradians) density, we constructed 16 artificial seagrass unit (ASU) landscapes, consisting of four replicates each of four treatments. Fragmentation per se treatments consisted of three levels of patchiness while maintaining consistent total ASU area. We also examined the effect of patch-scale position on scallop densities. To examine the relationship of potential scallop predator community density on scallop density, we deployed four baited minnow traps to accompany each density survey. 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.

Table of Contents

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: 2019-06 - 2019-08

Dataset Description

CPUE = Catch Per Unit Effort
ASU = artificial seagrass unit

Methods & Sampling

To explore the independent influence of fragmentation *per se* (patchiness) on mobile juvenile bay scallop (*Argopecten irradians*) density, we constructed 16 artificial seagrass unit (ASU) landscapes (12-m x 10-m), consisting of four replicates each of four treatments. Fragmentation *per se* treatments consisted of three levels of patchiness (i.e., 1 patch, 12 patches, 24 patches) while maintaining consistent total ASU area (48 ASUs, 50 m^2 artificial seagrass). Between treatments of 12 and 24 patches, differences in configuration could be achieved by either varying interpatch distances or total footprint area. Therefore, we used two 12-patch treatments to consider these covariates separately, as indicated by footprint sizes (i.e., 12 patches-small versus 12 patches-large). We also examined the effect of patch-scale position on scallop densities. Relative 'inner' and 'outer' positions were operationally defined for 1-patch and multi-patch landscapes, separately. Within 1-patch landscapes, ASUs that bordered sandflat were considered 'outer' positions, while 'inner' positions were defined by ASUs that only bordered other ASUs. Within multi-patch landscapes, 'outer' positions were patches that had no additional patches between them and the landscape footprint border. 'Inner' position patches were centrally located patches in the landscape.

To examine the influence of potential scallop predator community structure on scallop responses, 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 density survey. Four traps were deployed in each landscape 24 h prior to scallop placement, to not disturb mobile scallops. Two traps were haphazardly placed in inner and outer patch-scale positions and collected after 24 h. 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_2019.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 a 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 "939592_v1_scallop-density-assay-trap-cpue_revised.csv" which corrects species names. BCO-DMO data manager made one additional correction Lagadon rhomboides -> Lagodon rhomboides and Sarsema spp. -> Sesarma spp. revised file was imported into the BCO-DMO data system and provided as the primary data table for version 1 of this dataset (939592_v1_scallop-density-assay-trap-cpue.csv).

* Submitter revised and resubmitted table with file "939592_v1_scallop-density-assay-trap-cpue_revised2.csv" which corrects species names and resolves a conflict between revised file was imported into the BCO-DMO data system and provided as the primary data table for version 1 of this dataset (939592_v1_scallop-density-assay-trap-cpue.csv).

* Submitter revised and resubmitted table with file "939592_v1_scallop-density-assay-trap-cpue_revised3.csv" which corrects species names and resolves a conflict between revised file was imported into the BCO-DMO data system and provided as the primary data table for version 1 of this dataset (939592_v1_scallop-density-assay-trap-cpue.csv). This revision resolved conflicting common and species names (Blue crab,Lagodon rhomboides) issue.

* 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.

[table of contents | back to top]

Data Files

File
939592_v1_scallop-density-assay-trap-cpue.csv (Comma Separated Values (.csv), 219.95 KB) MD5:5157df938fd4331d4ebc08e1a06f284c Primary data file for dataset ID 939592, version 1

[table of contents | back to top]

Supplemental Files

File
Species List filename: 939592_species_list.csv (Comma Separated Values (.csv), 4.89 KB) MD5:b8c7913e1ed9f1b73db297d85408f8cb 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 (taxonomic identifier) 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 2024-10-11)

[table of contents | back to top]

Related Publications

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

[table of contents | back to top]

Related Datasets

IsRelatedTo

Yarnall, A., Fodrie, F. J. (2024) **Canopy height and epiphyte biomass of artificial seagrass landscapes in June, July, and August 2019 in Back Sound, NC.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2024-10-10 doi:10.26008/1912/bco-dmo.939609.1 [view at BCO-DMO]
Relationship Description: Datasets collected concurrently as part of the same study.

Yarnall, A., Fodrie, F. J. (2024) **Scallop density survey data across landscape fragmentation per se treatments in June, July, and August 2019 in Back Sound, NC.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2024-10-04 doi:10.26008/1912/bco-dmo.939617.1 [view at BCO-DMO]
Relationship Description: Datasets collected concurrently as part of the same study.

[table of contents | back to top]

Parameters

Parameter	Description	Units
Site_ID	Artificial seagrass unit (ASU) landscape name (Number of patches, footprint size, replicate letter)	unitless
Landscape	Landscape configuration type (Number of patches, footprint size)	unitless
Num_patches	Number of patches in landscape configuration (1, 12, 24)	integer
Footprint	Landscape footprint size (contiguous, small, large)	unitless
Rep_letter	Landscape configuration letter (a-e)	unitless
lat	Landscape latitude north	decimal degrees
lon	Landscape longitude west	decimal degrees
Month	Month of minnow trap deployment	unitless
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)	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	unitless
Time_Out	Time of minnow trap retrieval	unitless
H_tide	Time of high tide proximate to minnow trap Time_Out (local time zone EST/EDT)	unitless
L_tide	Time of low tide proximate to minnow trap Time_Out (local time zone EST/EDT)	unitless
WaterTemp_C	Surface water temperature at time of minnow trap deployment	degrees C
Sal_PSU	Surface salinity at time of minnow trap deployment	PSU
Trap_num	Trap number (1-4) deployed with landscape on Date_In	integer
Position	Patch-scale position (Inner, Outer)	unitless
Sp_name	Common name of fauna species	unitless
Sci_name	Scientific name of fauna species	unitless
Length_mm	Total length of fauna	millimeters (mm)
Notes	Notes about fauna or trap	unitless

[table of contents | back to top]

Instruments

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

[table of contents | back to top]

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.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1635950

[table of contents | back to top]