Data dictionary

Preface

This data dictionary is provided to facilitate understanding and transparency for the open datasets used in the statistical analyses and figure generation of biotic and abiotic parameters presented in the main paper and supplementary figures and tables. In the following pages, we describe the nature of each dataset, specify which analyses and/or figures each dataset pertains to, and provide written descriptions for each column header within the dataset. The dataset information below is organized by order of appearance in the R-script.

Contents

Biotic data

Datafile: richness_biomass.csv

Description: Measurements of taxonomic richness and total biomass of individual bricks from artificial reefs within each of the three reef year classes (0, 1, and 2-year reefs; n = 3 bricks per reef; n = 3 reefs per year class).

Pertains to: Figure 3, Table S2

Column name	Description
year	The year in which the reef was deployed.
year.class	The year class of the reef, defined as the number of years since the reef was deployed relative to the sampling year (2023).
pile.all	The overall replicate reef that the brick was collected from.
pile.year	The replicate reef that the brick was collected from within each reef year class.
brick.all	The overall replicate brick that was collected.
brick.year	The replicate brick that was collected within each reef and year class.
richness	The count of unique taxa observed on the brick.
biomass	The total biomass (g) of biotic material collected from the brick

Datafile: community biomass_RDA.csv

Description: Biomass of individual taxa for each brick including all weighed taxa on individual bricks from artificial reefs within each of the three reef year classes (0, 1, and 2-year reefs; n = 3 bricks per reef; n = 3 reefs per year class).

Pertains to: Figure 4A, Tables S3, S4

Column name	Description
obs	The overall replicate brick that was collected.
pile	The replicate reef that the brick was collected from within each reef year class.
brick	The replicate brick that was collected within each reef and year class.
years.deployed	The year class of the reef, defined as the number of years since the reef was deployed relative to the sampling year (2023).
year	The year in which the reef was deployed.
Daphnia sp. … Dyspanopeus sayi	Total biomass (g) for each individual taxa. Pertains to all columns in the dataset from "Daphnia sp." (Column F) to "Dyspanopeus sayi" (Column AQ).

Datafile: sessile biomass_RDA.csv

Description: Biomass of individual taxa for each brick including only sessile species on individual bricks from artificial reefs within each of the three reef year classes (0, 1, and 2-year reefs; n = 3 bricks per reef; n = 3 reefs per year class).

Pertains to: Figure 4B, Tables S3, S4

Column name	Description
obs	The overall replicate brick that was collected.
pile	The replicate reef that the brick was collected from within each reef year class.
brick	The replicate brick that was collected within each reef and year class.
years.deployed	The year class of the reef, defined as the number of years since the reef was deployed relative to the sampling year (2023).
year	The year in which the reef was deployed.
Ciona intestinalis … Balanomorpha	Total biomass (g) for each individual taxa. Pertains to all columns in the dataset from "Ciona intestinalis" (Column F) to "Balanomorpha" (Column S).

Datafile: community abundance_RDA.csv

Description: Abundance (counts) of individual taxa for each brick including all weighed taxa on individual bricks from artificial reefs within each of the three reef year classes (0, 1, and 2-year reefs; *n* = 3 bricks per reef; *n* = 3 reefs per year class).

Pertains to: Figure 4C, Tables S3, S4

Column name	Description
obs	The overall replicate brick that was collected.
pile	The replicate reef that the brick was collected from within each reef year class.
brick	The replicate brick that was collected within each reef and year class.
years.deployed	The year class of the reef, defined as the number of years since the reef was deployed relative to the sampling year (2023).
year	The year in which the reef was deployed.
Daphnia sp. … Homarus americanus	Abundance (counts) for each individual taxa. Pertains to all columns in the dataset from "Daphnia sp." (Column F) to "Homarus americanus" (Column AI).

Datafile: sessile_abundance_RDA.csv

Description: Abundance (counts) of individual taxa for each brick including only sessile species on individual bricks from artificial reefs within each of the three reef year classes (0, 1, and 2-year reefs; n = 3 bricks per reef; n = 3 reefs per year class).

Pertains to: Figure 4D, Tables S3, S4

Column name	Description
obs	The overall replicate brick that was collected.
pile	The replicate reef that the brick was collected from within each reef year class.
brick	The replicate brick that was collected within each reef and year class.
years.deployed	The year class of the reef, defined as the number of years since the reef was deployed relative to the sampling year (2023).
year	The year in which the reef was deployed.
Ciona intestinalis … Balanomorpha	Abundance (counts) for each individual taxa. Pertains to all columns in the dataset from "Ciona intestinalis" (Column F) to "Balanomorpha" (Column S).

Datafile: oyster_abundance_biomass.csv

Description: Abundance (counts) and biomass of oyster adults and spat for individual bricks from artificial reefs within each of the three reef year classes (0, 1, and 2-year reefs; $n = 3$ bricks per reef; $n = 3$ reefs per year class).

Pertains to: Figure 4, Table S5

Column name	Description
pile.year	The replicate reef that the brick was collected from within each reef year class.
pile.all	The overall replicate reef that the brick was collected from.
brick	The replicate brick that was collected within each reef and year class.
year	The year in which the reef was deployed.
year.class	The year class of the reef, defined as the number of years since the reef was deployed relative to the sampling year (2023).
adult.spat	The life stage (adult *vs.* spat) of the oysters.
biomass	The total biomass (g) of each oyster life stage from each individual brick.
count	The total abundance of each oyster life stage from each individual brick.

Datafile: fish_counts_behaviour.csv

Description: Data used to generate Figure 6 depicting daytime fish diversity and use of the reefs.

Pertains to: Figure 6

Column name	Description
reef.id	Identification code for each individual camera deployed on an individual reef (or the control bare patch)
year	The year in which the reef was deployed.
year.class	The year class of the reef, defined as the number of years since the reef was deployed relative to the sampling year (2023).
species	Scientific name of the observed species or taxa.
count	Total number of individual fish observed across the observed video frames for each species and camera.
passive	Total number of individual fish observed passively swimming across the observed video frames for each species and camera.
feeding	Total number of individual fish observed actively feeding on the reef in the observed video frames for each species and camera.
sheltering	Total number of individual fish observed actively sheltering on the reef in the observed video frames for each species and camera.
total.active	Total number of individual fish observed showing active use of the reef in the observed video frames for each species and camera. Calculated as: *total.active = feeding + shetering*

Abiotic data

Datafile: abiotic_hourly.csv

Description: Hourly measurements of abiotic parameters (temperature, salinity, pH, dissolved oxygen, and turbidity) including all locations across the entire observation period (July 26-August 24, 2023).

Pertains to: Figures 7, 8, Tables S7–S10

Column name	Description
stand	Location of the stand containing data loggers. The "Outside" stand was located outside the area of the reefs in a reference bare patch; the "Inside" stand was located within the area of the reefs but not directly beside a reef; the "Reef" stand was located directly beside a 2-year reef.
stand.number	The identification number of each of the three stands.
date	Date that the measurement was taken.
time	Time (hour) that the measurement was taken within a given date.
julian date	Consecutive Julian date that the measurement was taken.
hour	Consecutive hour that the measurement was taken within a given date (0-23, with 0 representing midnight).
time.of.day	Categorical time of day that the measurement was taken within a given date (Day = 05:00–19:00; Night = 20:00–04:00; based on approximate sunrise and sunset times during the abiotic monitoring period.)
tide.level.m	Measurement of the tide level (meters above mean sea level) at each hourly time point.
sw.ph	Measurement of seawater pH (NBS scale) at each hourly time point.
do	Measurement of dissolved oxygen (mg/L) at each hourly time point.
temp	Measurement of temperature (°C) at each hourly time point.
salinity	Measurement of salinity at each hourly time point.
turbidity	Measurement of turbidity (Nephelometric Turbidity Units; NTU) at each hourly time point.

Datafile: do_hourly.csv

Description: Hourly measurements of dissolved oxygen across the entire observation period (July 26-August 24, 2023), excluding data at the "Reef" location (probe malfunction).

Pertains to: Figures 7, 8, Tables S7–S10 (dissolved oxygen)

Column name	Description
stand	Location of the stand containing data loggers. The "Outside" stand was located outside the area of the reefs in a reference bare patch; the "Inside" stand was located within the area of the reefs but not directly beside a reef; the "Reef" stand was located directly beside a 2-year reef.
stand.number	The identification number of each of the three stands.
date	Date that the measurement was taken.
time	Time (hour) that the measurement was taken within a given date.
julian date	Consecutive Julian date that the measurement was taken.
hour	Consecutive hour that the measurement was taken within a given date (0-23, with 0 representing midnight).
time.of.day	Categorical time of day that the measurement was taken within a given date (Day = 05:00–19:00; Night = 20:00–04:00; based on approximate sunrise and sunset times during the abiotic monitoring period.)
tide.level.m	Measurement of the tide level (meters above mean sea level) at each hourly time point.
do	Measurement of dissolved oxygen (mg/L) at each hourly time point.

Datafile: turbidity_partial.csv

Description: Hourly measurements of turbidity across all three locations, excluding data after August 13, 2023 (probe malfunction at the "Reef" location).

Pertains to: Figures 7, 8, Tables S7–S10 (turbidity)

Column name	Description
stand	Location of the stand containing data loggers. The "Outside" stand was located outside the area of the reefs in a reference bare patch; the "Inside" stand was located within the area of the reefs but not directly beside a reef; the "Reef" stand was located directly beside a 2-year reef.
stand.number	The identification number of each of the three stands.
date	Date that the measurement was taken.
time	Time (hour) that the measurement was taken within a given date.
julian date	Consecutive Julian date that the measurement was taken.
hour	Consecutive hour that the measurement was taken within a given date (0-23, with 0 representing midnight).
time.of.day	Categorical time of day that the measurement was taken within a given date (Day = 05:00–19:00; Night = 20:00–04:00; based on approximate sunrise and sunset times during the abiotic monitoring period.)
tide.level.m	Measurement of the tide level (meters above mean sea level) at each hourly time point.
turbidity	Measurement of turbidity (Nephelometric Turbidity Units; NTU) at each hourly time point.