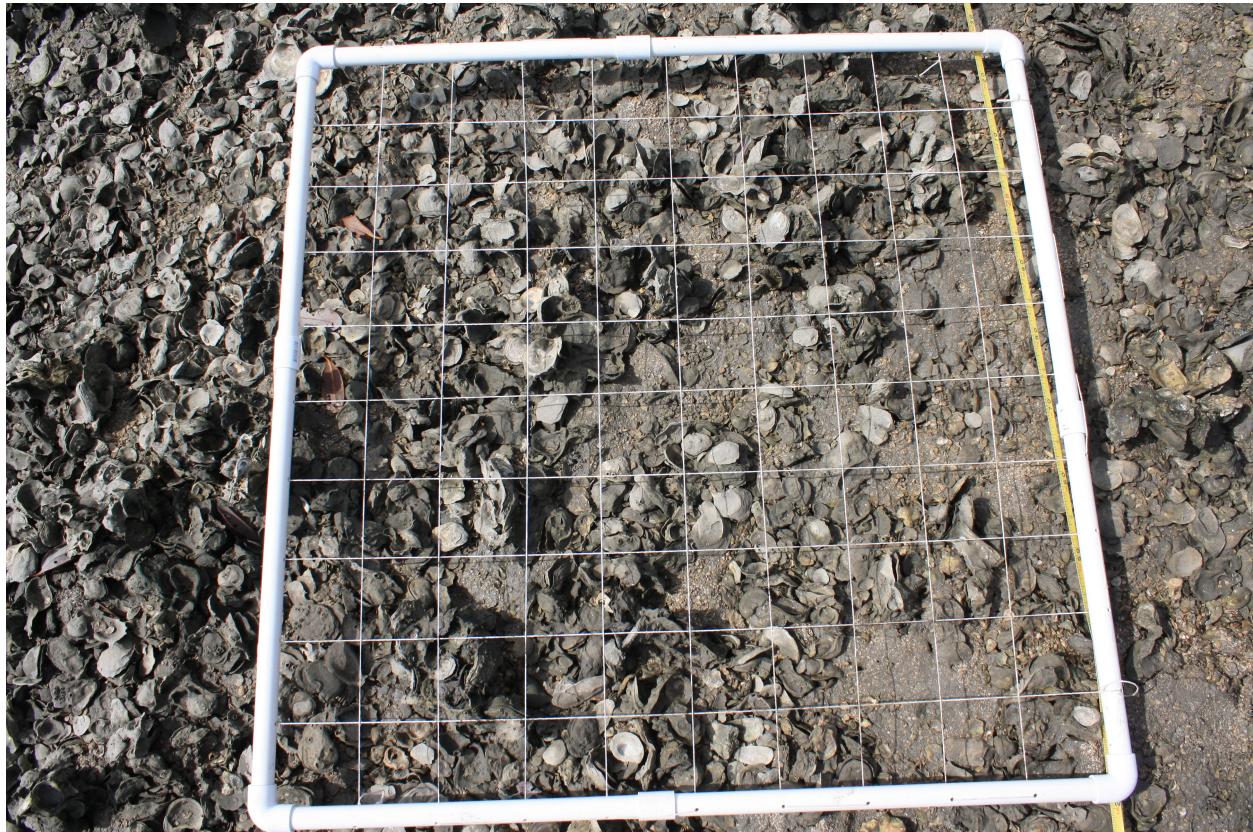


## Protocol: Oyster Density and Size Frequency

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## Introduction

This protocol provides standardized data collection on live oyster density and the size frequency of oysters on a reef. Because a reef is structurally complex, the accurate number of live oysters, including recruits, can't be adequately measured through percent cover alone. Along with the density of oysters, the size frequency of those oysters is taken to provide information on how the oysters are distributed across different size classes. Other encountered bivalves, barnacles, and gastropods are counted and measured as well. Data on these species are important and provide detail on oyster predators and space competitors. Decapods are enumerated in the Oyster Reef Associated Fauna protocol and are NOT sampled here because of the difficulties in field identification and collection. The methods here are semi-destructive, due to excavating a portion of the reef, however, once measured, all oysters are returned to the excavation site.

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## Measured Parameters

- Oyster density ( $\text{m}^{-2}$ )
- Non-oyster invertebrate (other bivalves, barnacles, gastropods, etc,) density (individuals  $\text{m}^{-2}$ )
- Oyster size frequency (mm individual $^{-2}$  for both live and box oysters)
- Non-oyster invertebrate size (mm individual $^{-2}$ )

## Requirements

Personnel: 2 – 4 people

Estimated Total Time Per Location ( $n = 3$ )

Preparation: 1 person x 1 day

Fieldwork: 2 - 4 people x 1 day per location

Post processing: None

Data processing: 1 person x 1 day

Replication: 3 0.25 x 0.25 m excavated quadrates per reef and 3 oyster reefs per region

Materials:

### Fieldwork:

- 0.25 x 0.25m PVC quadrat
  - Calipers
  - Buckets
  - Work gloves
  - Oyster reef density and size frequency data sheets
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## Methods

### Preparation:

1. Review the MarineGEO [Oyster Reef Habitat Survey Design](#) for selection of permanent sites.
2. Become familiar with the methodology prior to going out into the field to conduct sampling.
3. Print datasheets on waterproof paper.
4. This protocol assumes that  $n = 3$  replicate quadrats for oyster density and size are taken, 1 per each transect.
5. Sampling is typically done at a low tide when the oyster reef is exposed.

**Fieldwork:**

1. Along each transect, haphazardly choose one representative quadrat while conducting the Oyster Reef Composition protocol to do an excavation. Once the percent cover is scored from the previous protocol, place a 0.25 x 0.25 m quadrat inside the area of the larger quadrat used for percent cover. Within the smaller quadrat, excavate all oysters to the sediment level or where it is assumed no living oysters still remain. All shell is placed into buckets and can be rinsed if covered in sediment.
2. From the bucket, randomly remove all material. Measure with calipers at least both the first 50 live oysters and the first 25 box oysters encountered. Measurements are taken on the height of the oyster (umbo to distal edge of the shell). Count all the remaining live and box oysters to obtain an accurate density. Count all other sessile fauna including barnacles, serpulid worms, sponges, ascidians, etc. These do NOT require height measurements. For other bivalve and gastropod species, count all individuals and measure the height (at least 25 individuals) of each species.
3. As material gets processed, it can be placed into another bucket. Once all the material has been processed, the bucket can be carefully placed back into the excavation pit.
4. Repeat this once for each transect (n = 3 per reef)

**Alternative Methodology:**

1. Because oysters coalesce with one another, it could be difficult or too destructive to excavate a portion of the reef. It might be possible to at least count and measure oysters without removing them from the substrate to get some measurements of the number and size of oysters in a given area.
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**Data Submission**

1. Scan the completed field data sheets and save both paper and electronic versions locally. We do not require you to submit the scanned forms.
2. Enter data into the provided data entry template. Each template is an Excel spreadsheet. Please provide as much protocol and sample metadata as possible, such as the protocol version and contact information. Use the “notes” columns to provide additional information or context if a relevant column doesn’t already exist, rather than renaming or creating columns.
3. Use our online submission portal to upload the Excel Spreadsheet: <https://marinegeo.github.io/data-submission>
4. Contact us if you have any questions: [marinegeo@si.edu](mailto:marinegeo@si.edu)