Seagrass Density

v 0.1.3

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Introduction

This protocol provides standardized data on seagrass percent cover, species composition, and shoot density using a common non-destructive method: the quadrat. The information from these variables helps characterize the quality and quantity of habitat that seagrasses provide, and is therefore closely linked with other seagrass sampling methods employed by MarineGEO.

Additional copies of this protocol, field datasheets, data entry templates, instructional videos, literature, and more can be found on the Seagrass section of the MarineGEO protocol website: https://marinegeo.github.io/seagrass-habitat.

Measured Parameters

This assay quantifies seagrass community structure, measured as:

- Percent cover of each seagrass and macroalgae species (in bins: 0-10%, 10-40%, 40-70%, 70-100% cover)
- Macroinvertebrate abundance (number 0.25 m^{-2}) and approximate size (cm)
- Grazing scars (present/absent)
- Shoot density (number 0.0625 m^{-2})

Requirements*

*Estimated times will vary by site and conditions

Personnel: 2 people

Estimated Total Time Per Site (i.e., all three locations at the site):

Preparation: 1 person x 1 day
Fieldwork: 2 people x 1 day
Data processing: 1 person x 1 day

Replication: Twelve (12) quadrats taken along three (3) transects (total n = 36 per location)

Materials:

Survey Design:

☐ 1 50-m metric transect tape
☐ Hand-held GPS unit
☐ 2 PVC marker poles (diameter and length as needed)

Fieldwork:

- ☐ 1 50 cm-x-50 cm (0.25 m^2) quadrat (PVC or other material) divided in 4 equal 25 cm-x-25 cm (0.0625 m^2) quadrants (Fig. 1)
- ☐ Pencil
- ☐ Waterproof paper
- ☐ Clipboard
- ☐ *RECOMMENDED:* Waterproof camera

Methods

Fully review this and any additional protocols necessary for the sampling excursion. Address any questions or concerns to maringeo@si.edu before beginning this protocol.

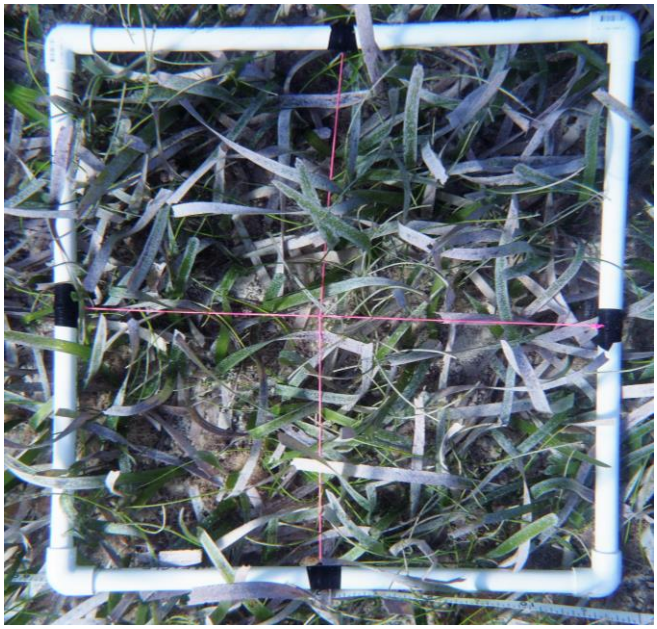

Figure 1. An example 1 m-x-1 m PVC quadrat divided into four equal quadrants using string.

Preparation:

1. Review the MarineGEO Seagrass Habitats Survey Design for site selection and setup. This protocol assumes n = 12 quadrats for percent cover taken every 4 m and n = 6 shoot density counts taken every 8 m along a 50-m transect, replicated along 3 separate transects.
2. Print field data sheets on waterproof paper. You will need at least 3 sheets, but having more available is useful.

Fieldwork:

1. At each replicate along the transect, lay down the 50 cm-x-50 cm quadrat immediately adjacent to the transect line. If visibility is too poor to perform a visual survey of percent cover, skip to step 5.
2. Estimate and record cover of each of the following in bins according to the Braun-Blanquet method[1] (Table 1, Fig. 2):
    a. Each seagrass species;
    b. Other sessile organisms (e.g., macroalgae, sponges, etc.). Be as specific as you can in identifying these organisms but do not guess if you are unsure (e.g., record 'red sponge' not '*Acarnus erithacus?*'); and,
    c. Bare substratum. Note the type (e.g., sand, mud, mixed).

[1] Fourqurean, J. W., Willsie, A., Rose, C. D., & Rutten, L. M. (2001). Spatial and temporal pattern in seagrass community composition and productivity in south Florida. Marine Biology, 138(2), 341-354.

Table 1. Values of the Braun-Blanquet scale representing discrete percent cover bins.

Bin	Interpretation	Cover
0	Absent	0%
0.1	A single shoot	< 5%
0.5	A few shoots	< 5%
1	Some cover	5-25%
2	Moderate cover	25-50%
3	Majority cover	50-75%
4	Total or near total cover	75-100%

3. Record the presence and approximate size of any larger (>1 cm) mobile benthic macroinvertebrates that fall within the quadrat (e.g., gastropods, urchins, sea cucumbers).
4. Record the presence of any conspicuous grazing scars (e.g., turtle, manatee, parrotfish) within the quadrat.
5. In every *other* replicate, obtain a measurement of shoot density by counting and recording the number of seagrass shoots within the lower right quadrant (25 cm-x-25 cm). If visibility is poor, shoot density can be obtained by touch. If shoot densities cannot be assessed visually OR by touch, a biomass core can be used to destructively sample the bed and count shoot densities in the lab (see: Seagrass Biomass protocol).
6. Count and record the number of reproductive (i.e., flowering/fruiting) shoots in the lower right quadrant (25 cm-x-25 cm).
7. *RECOMMENDED:* If visibility is sufficient, take a photograph of the quadrat from above using an underwater digital camera.
8. Repeat steps 1-7 for each replicate on the first transect.
9. Repeat steps 1-8 for the remaining two transects.

Data Submission

1. Enter data into provided data entry templates.
2. Scan the completed field data sheets and save both paper and electronic versions.
3. E-mail data entry file, any photos, and scanned field data sheets to: marinegeo-data@si.edu.