Protocol: Seagrass Quadrats

V 0.0.1

Authors: Jonathan Lefcheck

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1. Introduction

This protocol provides a standardized set of response variables based around a common non-destructive method, the **quadrat**. These variables include: *percent cover*, *species composition*, and *shoot density*. The information from these variables helps characterize the quality and quantity of foundational habitat that seagrasses provide, and is therefore closely linked with other seagrass sampling methods employed by MarineGEO. Five quadrats are deployed at random points along three 50-m transect lines (N = 15) that capture the properties of the meadow.

The latest version of this and other MarineGEO protocols, along with field data sheets, data templates, instructional videos, and standardized analysis scripts, are hosted and updated at the MarineGEO site: https://marinegeo.github.io/seagrass-habitat.

2. Requirements

Personnel: 2 persons

Time:
Preparation: None.
Fieldwork: 2 persons *x* 0.5 days.
Post-processing: None.
Data curation: 1 person *x* 0.5 days.

Replication: 5 quadrats *x* 3 transects = 15 replicates

3. Materials

- ☐ 1 larger 50 cm-*x*-50 cm (0.25-m^2) quadrat (PVC or other material)
- ☐ 1 smaller 25 cm-*x*-25 cm (0.0625 m^2) quadrat
- ☐ 1 50-m transect tape with 1-m markers
- ☐ 3 sets of five randomly generated numbers for each transect survey

☐ 2 PVC marker poles (diameter and length as needed)
☐ Waterproof paper
☐ Clipboard
☐ Pencil
☐ *OPTIONAL*: waterproof camera

4. Methods

4.1. Preparation

1. Review this and any additional protocols necessary for the sampling excursion. Address any questions or concerns to marinegeo@marinegeo.si.edu before heading into the field.
2. Use the "Random Point Generator" tab on the Data Sheet to generate a single random point for each 10-m bin along each 50-m transect (n = 5 random points per transect x 3 transects = 15 points in total).
3. Assemble field gear (see Materials checklist).
4. Print datasheets on waterproof paper.

4.2. Fieldwork

1. Identify the positions of the three 50-m transects. Transects should be placed parallel to shore near the shallow edge, middle, and deep edges of the bed. Transects should intersect the meadow to ensure the maximum amount of habitat is captured.
2. Lay out the first transect line and anchor using the PCV marker poles.
3. Move along each transect stopping at the random values generated prior to arriving in the field.
4. At the first stop, lay down the 0.25-m^2 quadrat grid immediately adjacent to the transect lines.
5. Record the approximate percent cover (in 5% bins) of the total area by each species, including other sessile organisms such as sponges (see *Appendix A – Seagrass Percentage Cover Photo Guide*). Percent cover can include drift (i.e., unrooted) macroalgae, in which case total cover may exceed 100%. Also record the type of any bare substrate (e.g., sand, mud, mixed).
6. Record the presence and approximate size of any mobile benthic macroinvertebrates that fall within the quadrat (e.g., gastropods, urchins, sea cucumbers).
7. Place the smaller 25 cm-x-25 cm quadrat in the lower quadrant of the larger transect and count all shoots within the smaller transect.
8. *OPTIONAL*: if sufficient visibility, take a photograph of the 0.25-m^2 transect using an underwater digital camera.
9. Repeat for the remaining four points along the first transect.
10. Move PVC markers and repeat steps 4-9 for the second and third transects.

Commented [LJ1]: Will need to add this

Commented [LJ2]: SeagrassNet vs 1 m^2 for current MarineGEO protocol

Commented [LJ3]: Dunno why this was omitted from the previous protocol but seems obvious (e.g., conchs, urchins, sea cucumbers)

Commented [LJ4]: This is seagrassnet protocol, will want to discuss This could be a burden in highly dense areas, in which case they suggest getting this from biomass cores, which we have elected not to require.

4.3. Post-processing

There is no post-processing necessary for quadrat samples. Digitize data using provided "Data Entry Sheet" in Section 6 and submit to data@marinegeo.si.edu.

5. Measured parameters

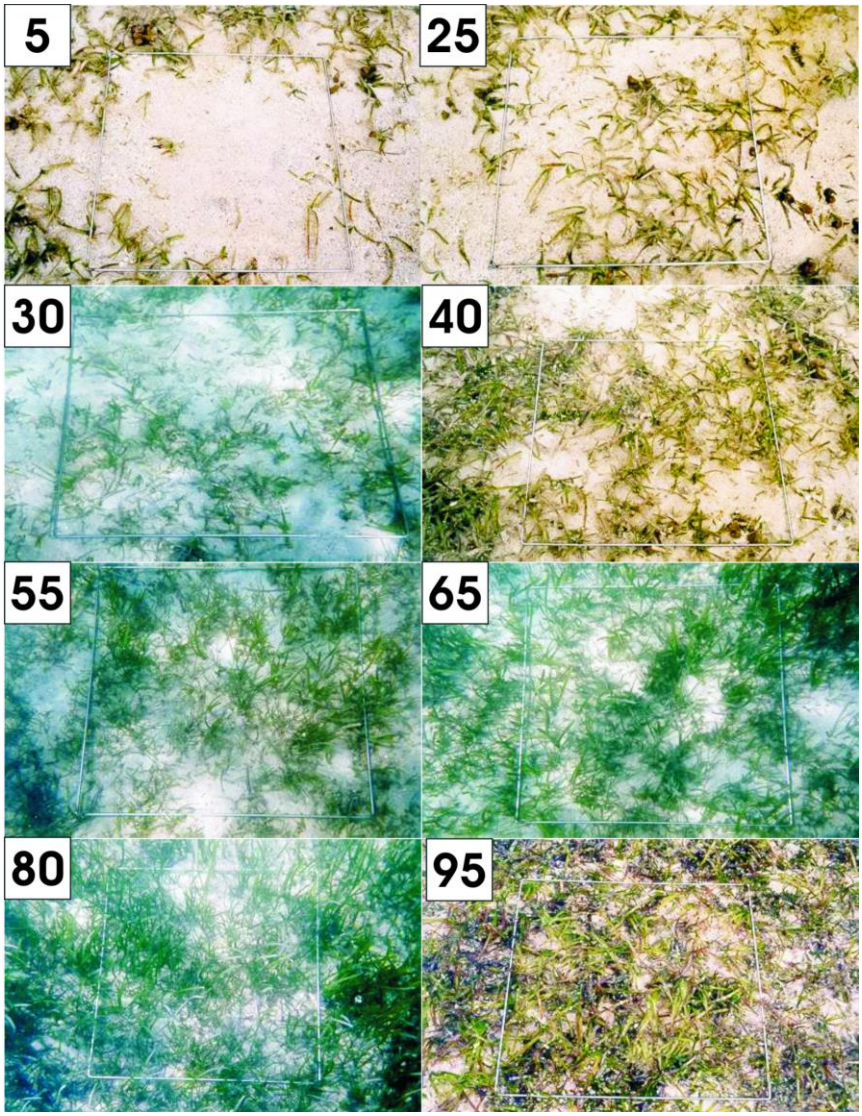
- Percent cover (in 5% bins of 0.25 m^2) of each species (see *Appendix A – Seagrass Percentage Cover Photo Guide*)
- Macroinvertebrate abundance (number 0.25 m^{-2}) and approximate size (cm)
- Shoot density (number 0.0625 m^{-2})

6. Data sheets

Field data sheet – *link*

Data entry sheet – *link*

Appendix A – Seagrass Percentage Cover Photo Guide



Courtesy: SeagrassNet