MarineGEO

Seagrass Density

v 0.1.1

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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 5% bins of 0.25 m^2)
- Macroinvertebrate abundance (number 0.25 m^{-2}) and approximate size (cm)
- Grazing scars (present/absent)
- Shoot density (number 0.0625 m^{-2})

Requirements

Personnel: 2 persons

Time: Preparation: None
Fieldwork: 2 persons x 0.5 days
Data processing: 1 person x 0.5 days

Replication: Twelve (12) quadrats are taken along three (3) transects (total *N* = 36)

Materials:

- ☐ Hand-held GPS unit
- ☐ 1 (large) 50 cm-x-50 cm (0.25 m^2) quadrat (PVC or other material)
- ☐ 1 (small) 25 cm-x-25 cm (0.0625 m^2) quadrat
- ☐ 1 50-m transect tape with 1-m markers
- ☐ 3 sets of twelve randomly generated numbers for each transect survey
- ☐ 2 PVC marker poles (diameter and length as needed)
- ☐ 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

Preparation:

1. Identify sampling scheme. If following the MarineGEO survey design, review the materials here (12 replicates *x* 3 transects = 36 replicates total). Alternately, replicate samples can be taken haphazardly within the bed (if done, record GPS coordinates of each sample)
2. Print field data sheets on waterproof paper. You will need at least 3 sheets, potentially more
3. Assemble field gear (see Materials checklist)

Fieldwork:

1. Identify transect locations determined during Preparation (#1), and record the GPS coordinates (decimal format) of the beginning and end of each of the 3 transects
2. Lay out the first transect line and anchor it using the PCV marker poles
3. At the first sampling point (e.g., 4 m), lay down the 50 cm-x-50 cm quadrat grid immediately adjacent to the transect line.
4. Estimate and record percentage (in 5% bins) of:
    a. Each seagrass species (see Appendix A – Seagrass Percentage Cover Photo Guide).
    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?*').
    c. Bare substratum. Note the type (e.g., sand, mud, mixed)
    d. If multiple species are present in layers, percent cover can exceed 100%
5. 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)
6. Record the presence of any conspicuous grazing scars (e.g., turtle, manatee, parrotfish) within or immediately adjacent to the quadrat
7. Place the smaller 25 cm-x-25 cm quadrat in the lower quadrant of the larger quadrat.
    a. Count and record the number of seagrass shoots within the smaller quadrat
    b. Count and record the number of reproductive (i.e., flowering/fruiting) shoots (see Appendix B – Seagrass Flowers and Fruit)
8. *RECOMMENDED* – if visibility is sufficient, take a photograph of the larger 0.25-m^2 transect from above using an underwater digital camera
9. Repeat for the remaining points along the first transect (e.g., 8, 12, 16 m, etc.) until all 12 replicate samples are taken
10. Move PVC markers and repeat #2-9 for the second and third 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

Appendix A – Seagrass Percentage Cover Photo Guide

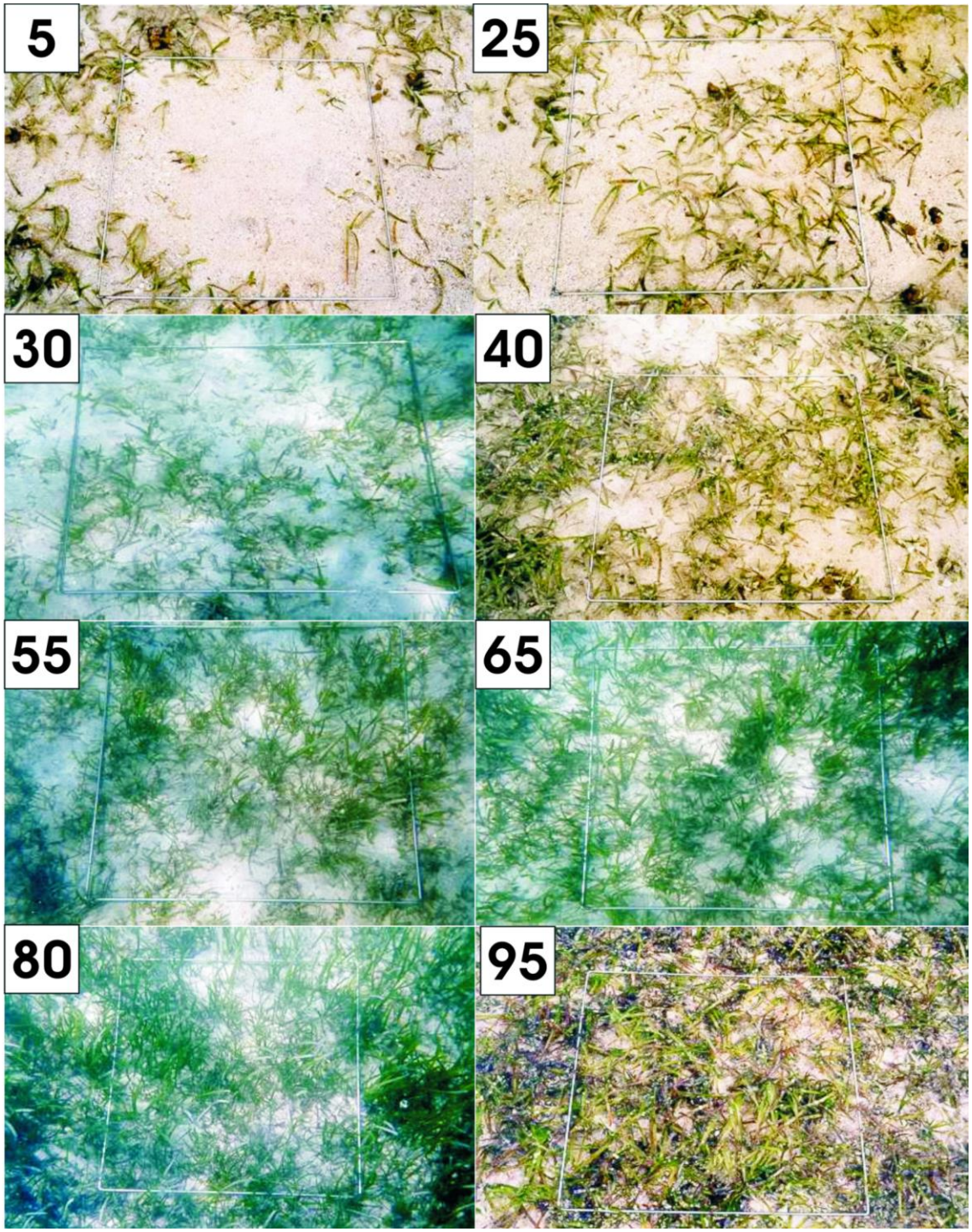

Figure 1. Seagrass density classes and example photographs. Courtesy: SeagrassNet.

Appendix B – Seagrass Flowers and Fruit

Figure 1. Flower of *Thalassia testudinum*.

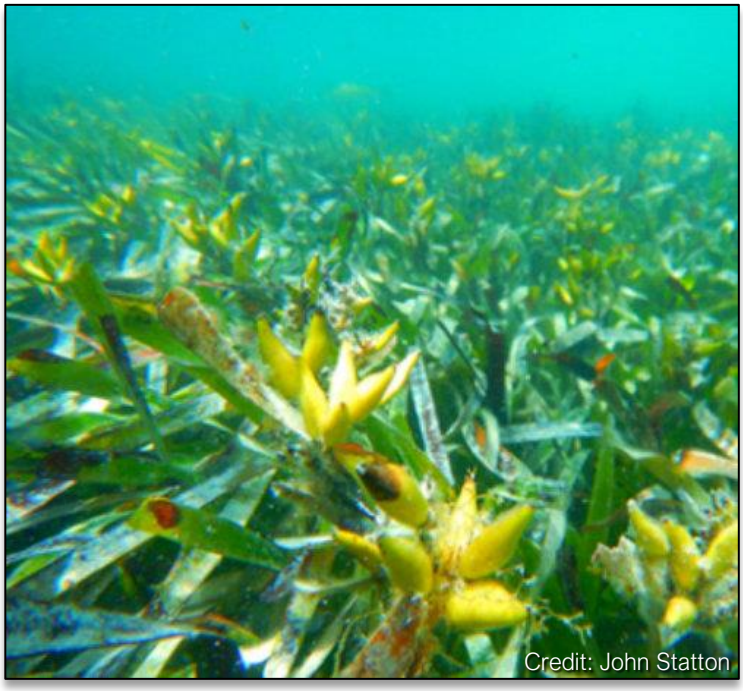

Figure 2. Fruit of *Posidonia australis*.