Seagrass Macroalgae

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Introduction

This protocol provides estimates of macroalgal biomass per unit area. Additional copies of this protocol, field datasheets, data entry templates, instructional videos, literature, and more can be found at: https://marinegeo.github.io/modules/seagrass-macroalgae.

Measured Parameters

This assay quantifies the biomass of macroalgae, measured as:

- Macroalgal wet weight (mg)
- Macroalgal dry weight (mg)

Requirements

Personnel: 2 people

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

Preparation: 1 person x 1 day
Field work: 2 people x 1 day
Post processing: 1 person x 3-5 days
Data processing: 1 person x 1 day

*Estimated times will vary by site and conditions

Replication: Six (6) macroalgae samples taken along three (3) transects (total $n = 18$).

Materials:

Survey Design:

- ☐ 1 50-m metric transect tape
- ☐ Hand-held GPS unit
- ☐ 2 PVC marker poles (diameter and length as needed)
- ☐ 0.5m x 0.5m ($0.25m^2$) quadrat

Fieldwork:

- ☐ 18 draw-string mesh bags (1 mm mesh size, approximately 25x35 cm or sized as needed) (example)
- ☐ 1 cooler with ice (optional)

Post-Processing:

- ☐ 20+ pre-weighed foil tins (example)
- ☐ Sorting tray
- ☐ Pencil/pen
- ☐ Permanent marker
- ☐ Ruler (mm)
- ☐ Drying oven

Methods

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

Preparation:

1. Review the MarineGEO Seagrass Habitats Survey Design for site selection and setup. Samples are collected concurrently with the MarineGEO Seagrass Density protocol. This protocol assumes $n = 6$ macroalgae samples taken every 8 m along a 50-m transect, replicated along 3 separate transects.
2. Label 18 disposable plastic bags with the sampling location, transect, and replicate number using a permanent marker.
3. Place 18 internal labels with the same metadata written on waterproof paper inside the corresponding plastic bag.
4. Fill a cooler with ice immediately before departing for the field.

Fieldwork:

1. Set up transects and position the first quadrat. Refer to the MarineGEO Seagrass Density protocol for further instructions.
2. With the 0.5x0.5 m quadrat in place, hand collect all macroalgae within the quadrat and place in the corresponding labeled mesh bag. Limit collections to large intact macroalgae that can be picked from the bottom by hand (filamentous attached/epiphytic algae are evaluated in a separate protocol). Macroalgae with holdfasts can be broken from the substrate at the sediment surface.
3. If the macroalgal unit overlaps the bounds of the quadrat, collect the entire frond (unless it has a holdfast that is outside of the quadrat).
4. Place the mesh bag and contents on ice in the cooler.
5. Repeat steps 1-4 at the at the remaining 5 sampling locations along the transect.
6. Repeat steps 1-5 for the remaining two transects.
7. Transport cooler with samples back to the lab for immediate processing.

Post-Processing:

Samples are best processed immediately (within 24 hours) upon returning from the field. Samples can be stored for longer in the freezer but risk decay.

1. Print lab data sheets.
2. Weigh foil tins and record the weight of the tin directly on the foil using a pen. Tins can be either pre-made, or constructed by folding an aluminum foil square over on itself and sealing the sides.
3. Select a labeled bag and record the metadata on the lab data sheet.
4. Transfer the macroalgae from the bag into a sorting tray or bowl and rinse with freshwater. Add enough freshwater to cover the macroalgae.
5. Allow algae to soak in freshwater for approximately one minute to release any epifauna. Remove algae from the freshwater soak and check fronds for any remaining animals. Remove animals if present and discard.
6. Select a pre-weighed tin and label with the sample metadata (replicate number, date, location) and contents (macroalgae). Record tin weight (mg) on lab data sheet.
7. Place macroalgae in tin.
8. Repeat steps 3-7 for each remaining replicate.
9. Place all the tins in a drying oven at 60°C. Dry samples until they register a constant weight (usually 1-3 days, depending on the volume of material).
10. Remove tins from the oven and weigh each to the nearest mg. Record this dry mass (including foil) on the lab data sheet.

Data Submission

1. Scan the completed field data sheets and save both paper and electronic versions locally.
2. Enter data into provided data entry template.
3. Use our online submission portal to upload the Excel Spreadsheet (coming Fall 2019).
4. Contact us if you have any questions: marinegeo@si.edu.