

South Florida/Caribbean Network

National Park Service
Inventory and Monitoring Division



Standard Operating Procedure SEA06

Training—Version 1.1

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Purpose

This standard operating procedure (SOP) describes the training required for participants to collect seagrass community monitoring data.

Revision Log

Revision Date	Author	Changes Made	Reason for Change	New Version #
02/23/2021	Rob Waara	Added list of contacts	Removed from the narrative	1.1

Introduction

Accurate seagrass community surveys require participants to be proficient in the following skill sets:

1. Site selection and quadrat layout.
2. Species identification (seagrasses as well as other species and taxa described below).
3. Braun-Blanquet ordinal classification scores to estimate percent cover.
4. Measurement of canopy height and sediment depth.
5. Substrate identification.
6. Seagrass distribution estimation.
7. Identification of juvenile and adult Queen Conch (from other conch species).

In-water training is the best way to demonstrate and learn these skill sets, though the participants should familiarize themselves with species identification, methods, and data to be recorded prior to entering the water. The in-water training is split into two sections. First, emphasis is put on species identification, Braun-Blanquet estimates, and visual estimation of canopy height and sediment type and depth. The second section focuses on site selection, quadrat layout, distribution of seagrass and the identification and enumeration of Queen Conch. Once both individual sections of trainings are satisfactorily completed, a full site survey should be conducted by the trainee and the trainer. This step will task load the trainee similar to an actual survey and should be completed in less than 15 minutes bottom time. New divers should be paired with an experienced surveyor when actual surveys are conducted.

Species Identification

Participants making observations should be competent in the identification of seagrass species and macroalgae to genera. This includes familiarization with eight species of seagrass and 14 genera of calcareous green, green, red and brown macroalgae and their four-letter codes. *Marine Plants of the Caribbean, A Field Guide from Florida to Brazil* written by Littler et al. (1989) and *Caribbean Reef Plants, An Identification Guide to the Reef Plants of the Caribbean, Bahamas and Florida and Gulf of Mexico* by Littler and Littler (2000) are both excellent sources for field identification. Table 2 in SOP SEA05 *Field Methods*—Version 1.1 (SFCN 2022a) has a list of scientific names and corresponding codes used for data entry. Participants also need to be able to differentiate the Queen Conch from other similar *Strombus* species including the Milk Conch *Strombus costatus*, Hawkwing Conch *Strombus raninus*, and *Strombus alatus* Florida Fighting Conch. Adult Queen Conch are distinct from juveniles due to a thick (5–12 millimeters [0.2–0.5 inches [in]]) flared lip that develops as they become reproductively mature (Appeldoorn 1987). The most recent edition of *Reef Creature Identification: Florida Caribbean Bahamas* by Humann et al. (2013) is a good resource for conch species identification for participants.

In-Water Training: Species Identification, Braun-Blanquet, Canopy Height and Sediment

In-water training should be separated into two parts. First, emphasis is placed on species identification, Braun-Blanquet estimates, and visual estimation of canopy height and sediment type and depth. This is most effective if the in-water training occurs in an area where there is a high diversity of seagrass and macroalgae. Navigation to a site or random placement of quadrats is not emphasized in this exercise.

1. An experienced observer (trainer) brings the new diver(s) to a location where a diverse community of seagrass is expected to be encountered. A suitable test area should also be relatively shallow, with visibility exceeding 10 meters (32.8 ft), and with minimal current.
2. The trainer places two 0.25 square meter (m^2 ; 2.7 square feet [ft^2]) quadrats on the bottom. Both the trainer and the new surveyor score the species present in the quadrat and estimate the canopy height, substrate type and substrate depth for each taxon. The Braun-Blanquet score and codes are recorded as described in the “Performing a Braun-Blanquet survey at a predetermined sampling site” section in SOP SEA05 *Field Methods*—Version 1.1 (SFCN 2022a).
3. Once completed the trainer may pick up the quadrats and repeat the exercise if a suitably diverse habitat is located nearby.
4. For the rest of the dive, the trainee is given the opportunity to locate and identify additional seagrass and macroalgae taxa.
5. Following the dive, the trainer and trainees compare the seagrass community data that were collected.
6. These steps are conducted on at least two sites with a combined total of at least eight quadrats. Sites may be adjacent to each other but preferably contain a variety of seagrass communities and densities. Data recorded by the trainee must be 95% accurate (when compared to the trainer’s data) for all seagrass and macroalgae taxa identified, including both the quadrat data and the site data. Identification of substrate type recorded must be 95% accurate. The Braun-Blanquet score for all seagrass and macroalgae taxa must be within 1 ordinal category for BB scores 0–1 and equal for BB scores 2–5 for each taxon. Seagrass canopy height must be $\pm 10\%$ for each seagrass species recorded. Sediment depth values must be ± 5 centimeters (2 in) up to a maximum measured depth of 1 meter (3.28 ft). A trainee that exhibits consistent and considerable error greater than these standards will need additional training.

In-Water Training: Site Selection/Characterization, Quadrat Layout, Queen Conch

The second portion of in-water training focuses on site selection/characterization, quadrat layout, and the identification and enumeration of Queen Conch. Here, the trainees are assessed as to whether they can select a site and layout quadrats in an unbiased manner following SOP SEA05 *Field Methods*—Version 1.1 (SFCN 2022a). These steps are described in the “Navigating to Each Sample Site” and “Placement of BB Quadrats” sections. Trainees also record all site characteristics listed in the “General Site Survey” section including the distribution of seagrass as described in 5.ii and the number of Queen Conch observed at the site.

1. Before entering the water, the trainer verbally discusses the decision rules and methods in order to select a site and place quadrats in an unbiased manner. The trainer also answers any questions the trainees may have prior to entering the water.
2. Under guidance of the trainer, the trainee deploys a buoy attached to a line and reel at the site and deploys quadrats as described in SOP SEA05. The trainer assesses whether the trainee deployed the buoy and quadrats in an unbiased manner. The trainee also records the diver name, site number and date and time on the datasheet.
3. Once the trainee has set up the site properly and divers are on the bottom, they characterize the site according to the steps in “General Site Survey” section in SOP SEA05. Information recorded includes: water depth, current, visibility, distribution of seagrass, Queen Conch present and notes on the site. Photographs of the site as described in step 4 are also taken by the trainee. The trainer records site data as well and compares data with the trainee after surfacing.
4. If possible, the trainer tries to locate and point out other *Strombus* species present to stress the different identifying features of each species.
5. Following the dive, the trainer and trainees compare the general site survey information that was collected.
6. These steps are conducted on at least two sites. Data recorded by the trainee must be 95% accurate (when compared to the trainer’s data) for all seagrass species and macroalgae taxa identified at the site. Water depth (ft) recorded must be ± 1 meter (3.28 ft). Estimation of current speed must be 100% accurate. The maximum horizontal visibility estimate must be ± 5 meters (16.4 ft). The total Queen Conch count must be $\pm 10\%$ accurate. Identification of queen conch and juvenile or adult classification must be 95% accurate and all identifications must be to the species level. A trainee that exhibits consistent and considerable error greater than these standards will need additional training.

It is unlikely all seagrass and macroalgae taxa will be seen during the training. The trainee should however be comfortable with the identification of most species and codes and know how to identify

less-frequently encountered types. Once training is completed, a new diver can use a camera to document species they are unsure of and confirm identification with an experienced surveyor after a dive.

Surveys Conducted by New Divers, Post-training

A new diver's first seagrass community surveys will occur with an experienced seagrass surveyor. The experienced surveyor will provide guidance and answer any questions. The new diver will also be calibrating their Braun-Blanquet estimates by comparing their taxon scores to those of the experienced surveyor. Queen Conch counts will also be checked and compared after the dive. In general, less experienced seagrass surveyors should continue to be paired with more experienced surveyors throughout the surveys. It is recommended that during actual surveys, the experienced diver should select the site and direct the placement of quadrats (SOP SEA05 *Field Methods*—Version 1.1 [SFCN 2022a]) until the new diver understands the decision rules for selecting a site and deploying quadrats. Regardless of experience, after a survey, both divers should discuss how the survey was laid out and compare and discuss observations and data collected during the survey.

Annual Surveys

Prior to the start of a new survey season, an in-water training session(s) will be held. Estimates of variability in metrics across observers will be made. Additionally, during park-wide surveys, 5% of sites will be selected for collection of quality control data. These sites will be completely resampled by a second diver. The position of quadrats will remain in place after the initial data are collected so a second diver can complete a duplicate QA/QC count. If possible, all participants in a survey will have their subsample data duplicated at least once by a second observer. Data quality standards must be met by all surveyors, regardless of level of experience.

Data Entry and Proofing Training

All participants will be instructed on data entry methods and must be familiar with SOP SEA07 *Entering, Verifying and Performing a 100% QA/QC Check of Seagrass Data in the NPStoret Seagrass Database*—Version 1.1 (SFCN 2022b). Once data entry is complete, participants will be briefed on how to perform basic QA/QC checks of the data. The data manager will assist in this process.

List of Contacts

Contacts

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