

Annex 8: Seagrass Monitoring at Ban Lion, June 2009

What is monitoring?

The monitoring of an environment is the repeated measurement of some aspect of that environment in order to detect change over time.

Why monitor seagrass meadows?

Monitoring provides information that can be used to make confident decisions about managing the meadow environment. It provides a measure of the impacts of change, and may identify and quantify the causes of that change. It will give information on natural changes in the seagrass meadow, including changes that occur between seasons and years, which can be distinguished from man-made causes of change. For example, monitoring of meadows before and after the construction of a nearby port will give insights into the impacts of its construction, especially if it can also take into account naturally occurring changes in the area.

There are many different aspects of the seagrass environment that can be measured, and so there are many different ways that one could monitor a meadow. The system that we will follow is the transect method used in intertidal areas by Seagrass-Watch. That organization developed a monitoring program in Australia, which is now used in 17 countries, mostly in the Asia-Pacific region. That program combines the efforts of local volunteers and communities with the knowledge of scientists to better evaluate changes in the environment and to improve management of local resources. By participating in the Seagrass-Watch program, we become part of a global network, with accepted international standards.

The monitoring procedure



The seagrass monitoring site will be a 50m x 50m intertidal plot with 3 parallel transects, 25m apart, and perpendicular to the shore. The plot will be in an area typical of the seagrass meadow near Ban Lion. We will choose the site in advance, and mark the beginning of transect

#2 (the middle transect) with a stake. The location of that point will be recorded using GPS (Global Positioning System). This will allow us to return to the same point and monitor the same area in the future. We hope to repeat the following procedures every 3 months at the same site over many years.

Step 1 – set up the transects.

Attach the end of the measuring tape securely to the stake at the start of transect #2. Walk the tape out for 50m, following a bearing perpendicular to the shoreline. Secure the end of the measuring tape. Walk along the left side of the tape, as we will use the right side for our observations. Set up transect #1 parallel to #2, and 25 m to the left as measured using a measuring tape. Set up transect #3, 25m to the right.

There will be a data sheet for each transect. Complete the information at the top of the sheet, including the GPS reading taken at the 0m mark.

Equipment and materials for monitoring

- 3 X 50m measuring tapes
- Stakes for securing the ends of the tapes
- GPS
- 50m X 50m quadrats
- Data sheets
- Clipboards, pencils, plastic rulers
- Sheets showing seagrass percent cover standards
- Sheets showing algal percent cover standards
- Seagrass identification sheets
- Magnifying glass
- Camera and quadrat labels

Step 2 – Place the quadrat

The 25cm x 25cm quadrat is the basic unit of measurement and observation in this monitoring procedure. The quadrats will be placed against the right side of the measuring tape. The first quadrat will be placed with the lower right corner on the 0m mark.

Sediment type, reported as:

- Mud – has a smooth and sticky texture, with no roughness detectable when rubbed between the fingers
- Fine sand – smooth texture with some roughness just detectable, not sticky, grain size less than 0.25mm
- Sand – rough grainy texture, with particles distinguishable and between 0.25 and 0.5mm
- Coarse sand – loose particles between 0.5 and 1 mm
- Gravel – very coarse texture with some small stones, and grain size greater than 1mm.

It is possible to record more than one sediment type in the quadrat. In that case, record the dominant type first, e.g. sand/mud. Also record the presence of small shells mixed in the substrate.

Seagrass percent cover

Determine the percent cover of the seagrass within the plot by comparison to the photographic standards of percent cover. Make the estimates as accurately as possible. If the observed cover falls between the levels represented in the photographic standards, then make an estimate between those two values. Most of our quadrats will probably contain the species *Halophila ovalis* and *Halophila beccarii*, which lay fairly flat on the sediment surface. Occasionally, we may have specimens of the large species *Enhalus acoroides*. Its appearance in the quadrat will depend on the amount of water over the quadrat, and so we will simply record the number of shoots.

Seagrass species composition

Identify the species in the quadrat, and estimate what part each species contributes to the total seagrass cover. Enter the values under the codes for the appropriate species. The total of all species should add up to the total seagrass cover.

Canopy height

For long slender species, such as *Enhalus acoroides* or *Halodule uninervis*, the canopy height is measure as the average length of 3 leaves taken at random in the quadrat. Measure the leaf lengths against a ruler, and record the three measurements in centimeters.

Algal percent cover

Estimate the percent of the quadrat area covered by algae, using the photographic standards of algal percent cover. Note that when there is *Enhalus acoroides* in the quadrat, there may be algae on the floating leaves, and this should be recorded separately in the comments section, along with notes on animals which may be on the leaves, e.g. sponges.

Comments

In the space for comments, record the numbers of any animals found in the quadrat, and identify them to the best of your ability. Record the presence of any dugong trails. Note if there are any flowers or fruit on the seagrass. Record any other interesting observations you may have.

Step 4 – repeat

Place the quadrat at the 5m mark and repeat the observations and recording of the data, as above. The process will be repeated at every 5 metres on the transect, for a total of 11 quadrat per transect. Complete the process on the other two transects.

Step 5 – take photographs

Photographs of the quadrats are to be taken at quadrats #2 (5m), #6 (25m), and #10 (45m), in each transect. Include a label in the photo identifying the site, transect and quadrat. Those photos will be evaluated later to verify and assess the coverage estimates that have been made. Take photos of any other interesting quadrats, or other features of the plot. Take photos of any dugong trails you find. Take plenty of photos of animals. We are interested in developing a photo inventory of animals found in the local seagrass bed, along with their local names.

Step 6 – come back again

We hope to monitor every 3 months, so that we can see changes in the meadow that occur with the seasons, as well as changes between years.