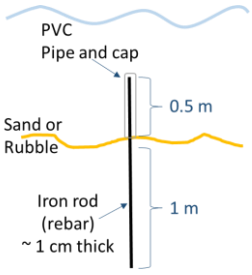
SAM Programme
Seagrass Monitoring Protocol

Site Selection

- Initially, at each MPA (park or reserve), set up a minimum of three sites in the closed zone (or reserve) and three sites either outside the reserve (in a fished area) OR in the general or specified use zone.
- Overtime, we will want to have a total of 9 sites in the parks with 3 in each zone; and 6 site total for reserves with 3 inside and 3 outside.
- If possible, situate your seagrass sites right next to the reef where your coral transect is. That way, you can use your coral transect marker to locate the position of your first quadrat for seagrass. If this is not possible, you may choose other sites for seagrass, but you MUST mark them underwater or use a GPS to locate them each time. It is NOT ok to guess or use landmarks to find the seagrass sites.
- Try to have the 3 sites within a zone distributed across different parts of the zone (not close together).
- Select shallow areas (1-3 m deep at low tide) that are not in areas of shifting sands (e.g. are stable seagrass beds).

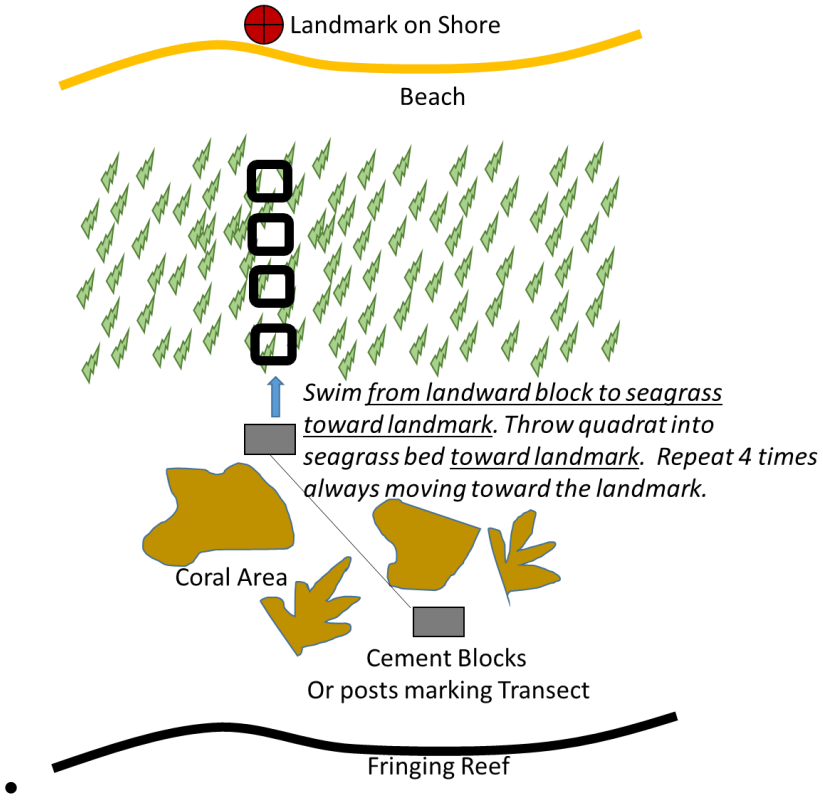
Marking Sites

- It is VERY important to always go back to the same location to start your first quadrat. You can use a GPS coordinate to get to this location or you can mark the location using the rebar method (see below).
- Do not guess where the site is or use landmarks, because you will not be at the same place each time. This is VERY important for seagrass because it is patchy, and sometimes moving over by only a few meters puts you in a different species of seagrass with different densities. As we have few replicates per site (quadrats per site), we must be in the same location.
- If you are marking your seagrass site, place your mark near the outside edge of the seagrass bed, and always throw your quadrat INTO the bed (so that it is not landing near the bed edges).



Seagrass Quadrats

- If you are using one of your coral transect markers (block or bar) to find your location, start at the same block each time you do the survey. Swim from the transect marker toward a known point on land (or use a compass to find a direction) until you reach the edge of the seagrass bed. Throw your first quadrat from here (See below)



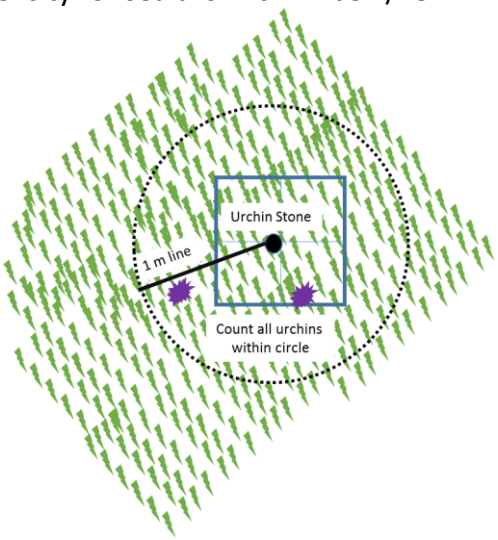
- If you are not near your coral transect, go to the mark you have placed in the seagrass bed (see above) and throw your first quadrat from here toward your fixed landmark.
- ALWAYS throw your blocks in the SAME DIRECTION (toward a fixed point you can see on land (e.g. a house or a tree) or use a compass to find the same direction each time. Start n. Use the same landmark each time.
- Make sure you put quadrats in the middle, not the edge of the beds. If you throw a quadrat and it lands on the edge of the bed, re-throw it toward the center of the bed. If the quadrat is in the center of the bed, but lands on a patch with sand, this is ok, as long as there is SOME seagrass in the quadrat. You should never have a quadrat with no seagrass of any species in it. If this happens, re-throw the quadrat.
- Complete 4 seagrass quadrats per site. The quadrats should be **0.25 x 0.25 m^2** as measured from the inside. Make sure there are strings tied down the center of each side that divide the quadrat into 4 sections. Make sure the quadrat is weighted (using stones inside the PVC pipes is fine) and that the pipes have holes punched in them to release trapped air.

- For each of the quadrats, count the number of seagrass stipes in each of the 4 sections, then total them. Do your counts one species at a time and record counts by species (TH = *Thalassia Hemprichii* TC = *Thalasodendron ciliatum*, *Halodule*, *Halophila* and *Syringodium*). I have attached a separate ID guide for seagrass species commonly found in Kenya.
- Note that the stipe is like the trunk of a tree – we count the stipes, not the blades (which are like the leaves of a tree). Be aware that two species: *Halophila* and *Syringodium* have two blades per stipe. Thus, be very careful you are counting stipes not blades.
- Typically, 2 people will work together to finish a single quadrat, with each person counting 2 of the 4 sections (alternating so that the partner can catch their breath).
- USE A SHORT METAL BAR that fits inside one of the sections of the quadrat to keep track of your place in the quadrat if you need to come up and take a breath. Count stipes in a row, and push them a side, and leave the rebar in place to mark where you left off, so you can surface and breath. DO NOT GUESS where you were in the quadrat. You must mark your position with the metal bar.

NOTE: All seagrass quadrats should be 25 cm x 25 cm (or 0.25 m x 0.25 m).

<u>Urchin Counts (NEW METHOD)</u>

- After you have counted all 4 sections of your quadrat, you will count sea urchins using a stone tied to a 1 m line.
- Place the stone in the middle of your quadrat. Swim the line in a circle, counting all urchins within that circle.
- The area you have searched for urchins will be 3.14 m^2 (the area of a circle with a 1 m radius). Thus, your density for sea urchins will be #/~3 m^2.



NOTE: This is a new method. So, on your database, you will need to create a new column and enter new data in this as it is a different search area. *Do not enter in the old sea urchin column for seagrass urchins.*