MONITORING SEAGRASS CONDITION & RESILIENCE

SEAGRASS-WATCH
GLOBAL SEAGRASS OBSERVING NETWORK

Disclaimer

Information contained in this manual is provided as general advice only. For application to specific circumstances, please contact Seagrass-Watch HQ.

Seagrass-Watch HQ, has taken all reasonable steps to ensure the information contained in this publication is accurate at the time of publication. Readers should ensure that they make appropriate enquires to determine whether new information is available on the particular subject matter.

This manual is designed to offer information on how to monitor seagrass resources to stakeholders and participants of the Global Seagrass Observing Network, for seagrass conservation.

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ABOUT SEAGRASS-WATCH

Seagrass-Watch is a not for profit, which established the Global Seagrass Observing Network in 1998. The network is currently working across 26 countries, monitoring the status and trends in seagrass condition.

Seagrass-Watch is one of the largest long-term seagrass observing programs globally and is highly recognised for its scientific rigour.

Participants are from a wide variety of backgrounds. All share a common interest in marine conservation and

Participants are associated with universities & research institutions, government (local & state) or non-government organisations.

Research

Seagrass-Watch has a strong scientific underpinning with an emphasis on consistent data collection, recording and reporting. Scientific, statistical, data management, data interpretation and logistic support underpins all monitoring efforts.

Aims

Seagrass-Watch raises awareness on seagrass ecosystems globally. The Program involves collaboration/partnerships between scientists, community and data users (environment management agencies).

Participants

Seagrass-Watch partners scientists with citizens, as people involved in the program develop a deep sense of custodianship and understanding of their local marine environments that reaches throughout the wider community.








GLOBAL SEAGRASS OBSERVING NETWORK GOALS

- To educate the wider community on the importance of seagrass resources
- To raise awareness of coastal management issues
- To build the capacity of local stakeholders in the use of standardised scientific methodologies
- To conduct long-term monitoring of seagrass & coastal habitat condition
- To provide an early warning system of coastal environment changes for management
- To support conservation measures which ensure the long-term resilience of seagrass ecosystem

OUR MISSION

Raise awareness on the condition and trend of nearshore seagrass ecosystems, provide an early warning of major coastal environment changes and to protect the valuable seagrass meadows along our coasts

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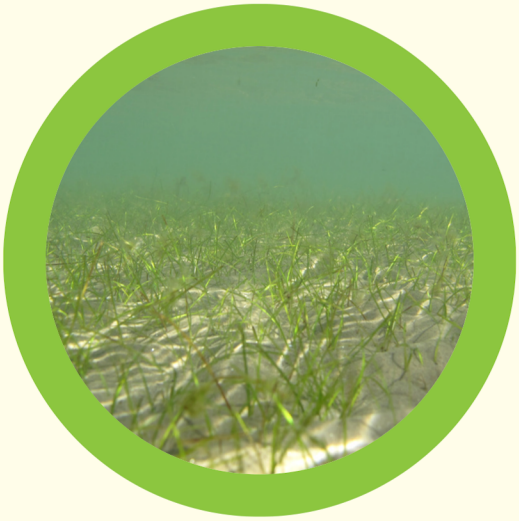
SEED BANKS



Condition and resilience of seagrass resources are other factors that can be measured and monitored.

Most methods can only be done by scientific laboratories, however there are some methods and techniques that can either be done by trained participants or with collection of specimens for analysis.

One factor that trained participants can measure and monitor is seagrass resilience.

Resilience is the capacity for seagrasses to recover and this can be done by determining the size of seed reserves in a seagrass meadow and to document changes in abundance through time.

Seagrass meadows are periodically subject to catastrophic mortalities as a result of cyclones and floods.

Recovery from these events can take several years and is presumed to result principally from germination of local seed reserves. This is only possible if existing seed reserves remain intact following death of the mature plants or if the seeds are dispersed to denuded locations from sites nearby.

The greater the seed reserve, the more capable the meadow is of regaining it original status after an acute impact.

Only *Halodule* seeds are examined in this exercise as *Zostera* and *Halophila* seeds are <1mm diameter (making them difficult to sieve) and require a microscope to see.

Fruit appearing predominately between January and April.

Halodule uninervis is common throughout the Indo Pacific. Members of the genus *Halodule* produce simple, single seeded, spherical fruits (approximately 2mm diameter) that are released below the surface of the marine sediments.

The fruit is essentially the seed in *Halodule*.

The fruits have a stony pericarp, are negatively buoyant and are capable of prolonged dormancy (>3 years).

Flowering is seasonal (October - February) with new fruits appearing predominately between January and April.

The following method for collecting quantitative measures of seed densities has been designed for an intertidal *Halodule uninervis* meadow where sampling can occur when the site is exposed.

You can do this exercise at the same time as monitoring intertidal (Permanent Transects) seagrass status (*see Seagrass-Watch: Quick Guide to monitoring Seagrass Resources*).

The sampling involves collecting 30 cores within a 50 metre by 50 metre site.

Cores have a diameter of 50mm and are taken to a depth of 10 cm.

This technique can be applied sub-tidally with slight modifications (e.g., emptying sediment cores into a mesh bag or plugging the corer and returning to the surface for sieving).

Flowering is seasonal (October - February) with new fruits appearing predominately between January and April.

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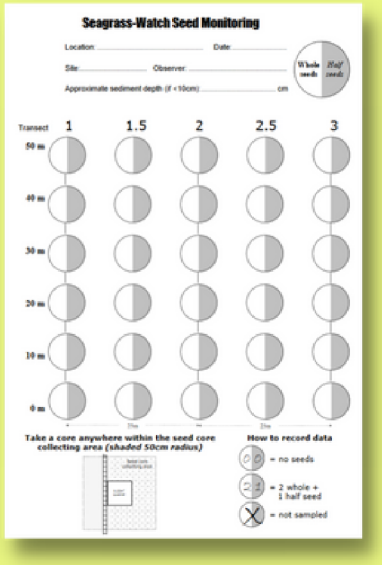
MONITORING SEAGRASS CONDITION & RESILIENCE

EQUIPMENT NEEDED

- 1x standard PVC seed corer & cap (50mm diameter x25cm long)
- Mesh kitchen sieve (1-2mm mesh)
- Seed monitoring datasheets
- Clipboard and pencils



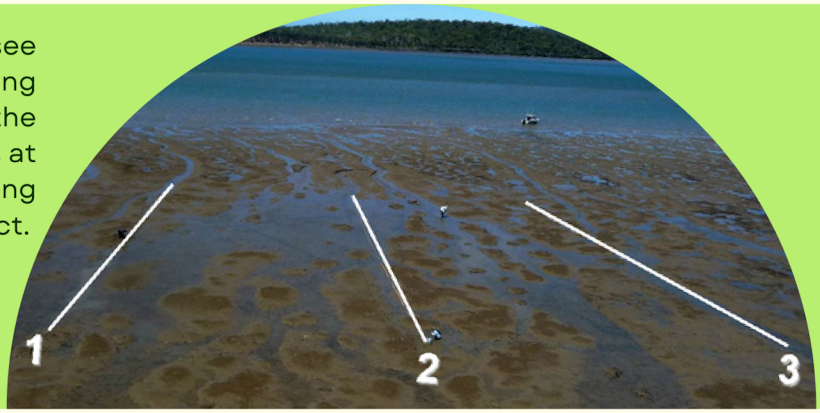
This seed datasheet has been designed to give the observer an idea of the spatial distribution of seeds within the site.

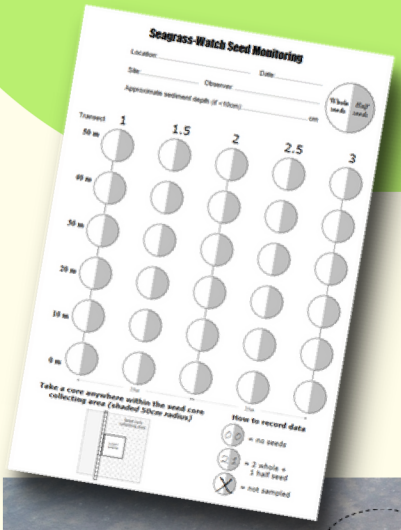
Keep an eye out for patterns that may develop as you continue sampling throughout the site. Often this pattern can provide information on the "dispersal shadow", ie., the distribution of seeds at increasing distances away from the parent plant.

This can be difficult in clonal populations, since it is difficult to identify the maternal source with any great certainty. However, you may note a pattern arising due to the clumping of seeds.

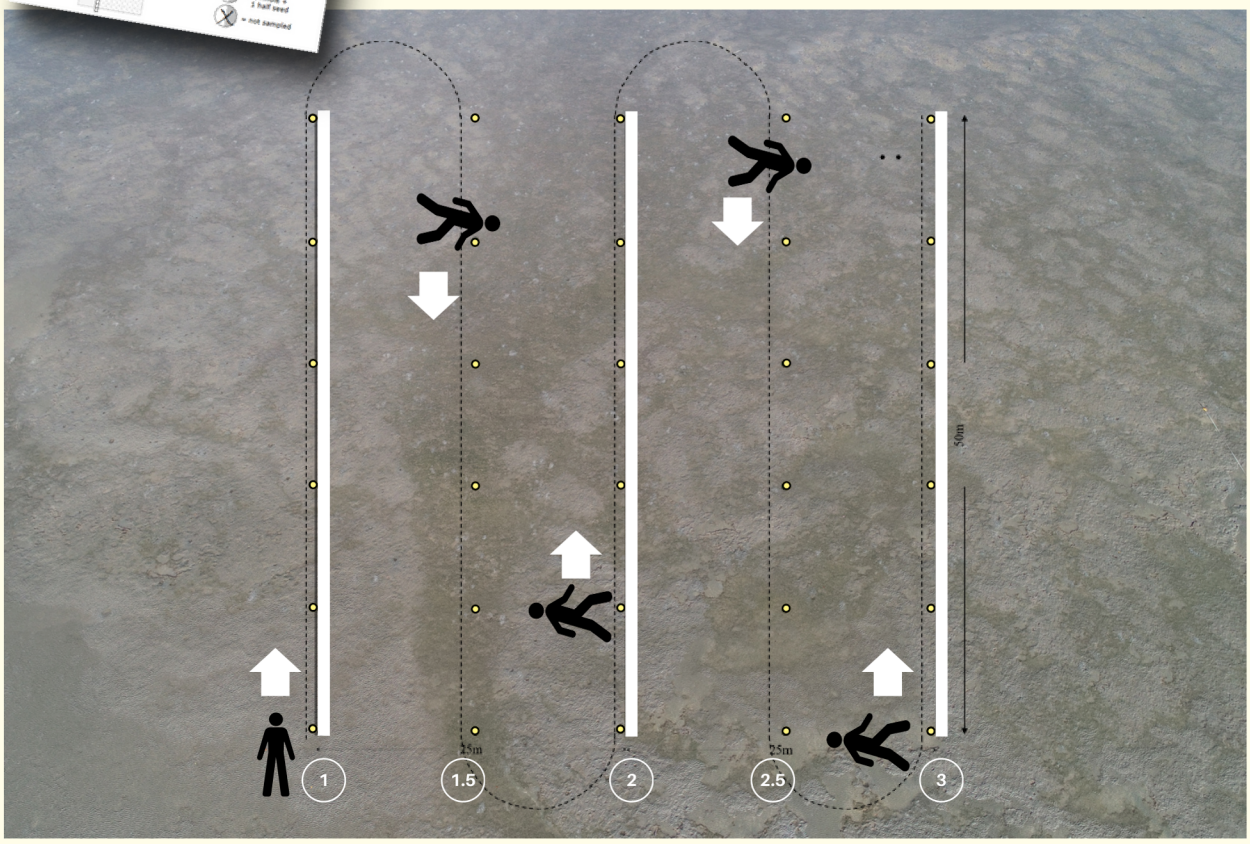
STEPS IN MONITORING SEAGRASS CONDITION & RESILIENCE

Once all 3 transects have been laid out (see Seagrass-Watch: Quick Guide to monitoring Seagrass Resources), determine the abundance of Halodule uninervis seeds at every 10 metre mark for the 50 metres, along each transect.





To determine the abundance of *Halodule uninervis* seeds at your Permanent Transect site you will need to sample every 10 meters along each transect and mid way between each of the transects (*please see layout below*).



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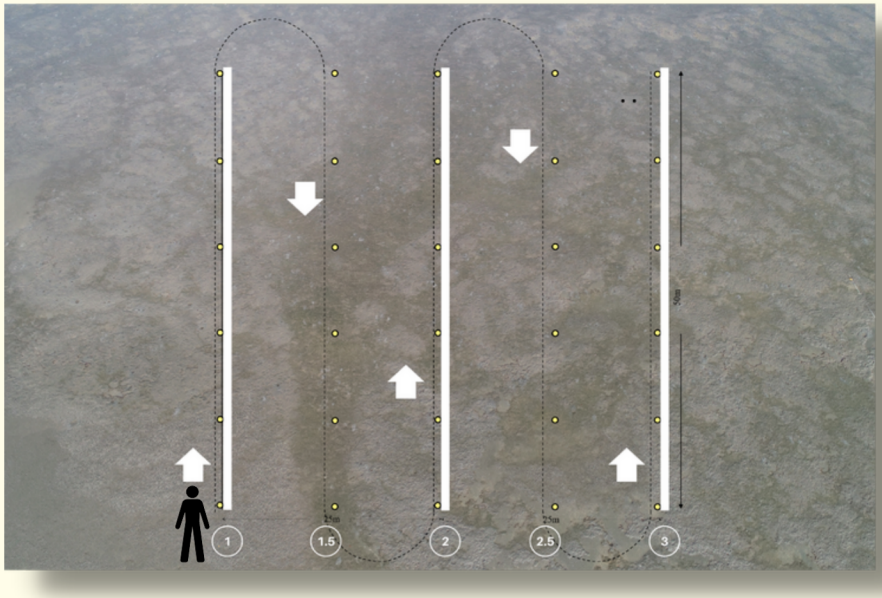
SEED CORING STEPS



1

At the start of transect 1, take a core on the 0 metre mark. The cores are always taken on the left hand side of the tape measure and adjacent to the 0.25 metre squared quadrat.

Push the PVC corer into the sediment to a depth of 10 cm.

- Keep your finger off the hole in corer's cap.
- Extract corer from sediment, with your finger over the hole in cap.

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With the mouth of the corer over the sieve, release the sediment core, into the sieve.

SEED CORING STEPS

Sieve the sediment core in a little water and check the retained material for seeds

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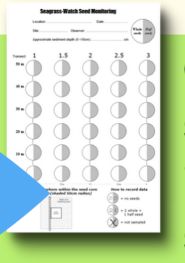

5

Count the number of whole and half seeds retained by the sieve and enter into the corresponding position on the seed monitoring data-sheet. Also note any seedlings (newly sprouted seeds) in the comments section.

Once the seeds have been counted, they can be returned to the sediment as there is no need to keep them.

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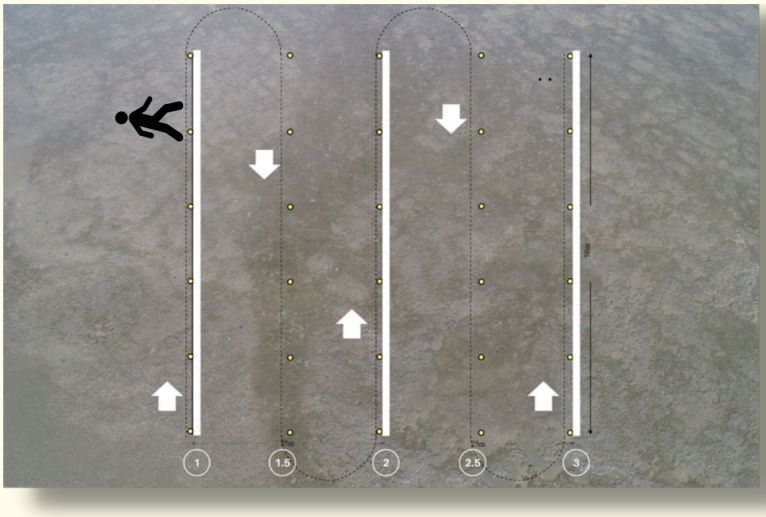
SEED CORING STEPS



7

Continue to the next 10 metre mark and repeat the procedure. Continue along the transect sampling every 10 metres until the transect is completed.

Repeat the process mid way between & along the remaining transects. When sampling between transects, you may estimate the distance and position, it does not have to be precise.

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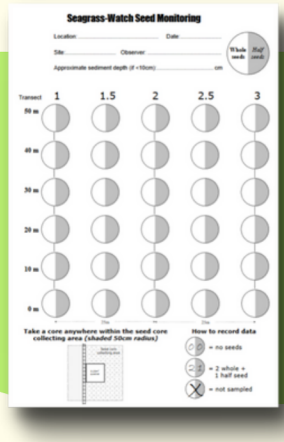

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At completion of monitoring

Check data sheets are filled in fully. Remove equipment from site (e.g. non-permanent pegs)

SEED CORING STEPS

Wash & pack gear

Rinse all tapes, pegs and quadrats with freshwater and let them dry.

Review supplies for next sampling and request new materials

Store gear for next sampling

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FAQ

SAMPLING FREQUENCY

We recommend that seed sampling be conducted every 3 months and/or in conjunction with monitoring the seagrass status.

UNDERSTANDING THE SEED DATASHEET

This datasheet has been designed to give the observer an idea of the spatial distribution of seeds within the site. Keep an eye out for patterns that may develop as you continue sampling throughout the site. Often this pattern can provide information on the "dispersal shadow", ie., the distribution of seeds at increasing distances away from the parent plant.
This can be difficult in clonal populations, since it is difficult to identify the maternal source with any great certainty. However, you may note a pattern arising due to the clumping of seeds.

WHAT SEED DENSITIES CAN I EXPECT?

In dense *Halodule uninervis* meadows in north Queensland, overall mean densities ranged from between 14 ±1.6 and 19 ±1.9 seeds/fruits per core (approximately 7,000 - 10,000 seeds/fruits per m2) (*from G Inglis, JCU, Pers. Comm.*). Temporal effects may not be significant unless the site has been heavily disturbed due to wave action.

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