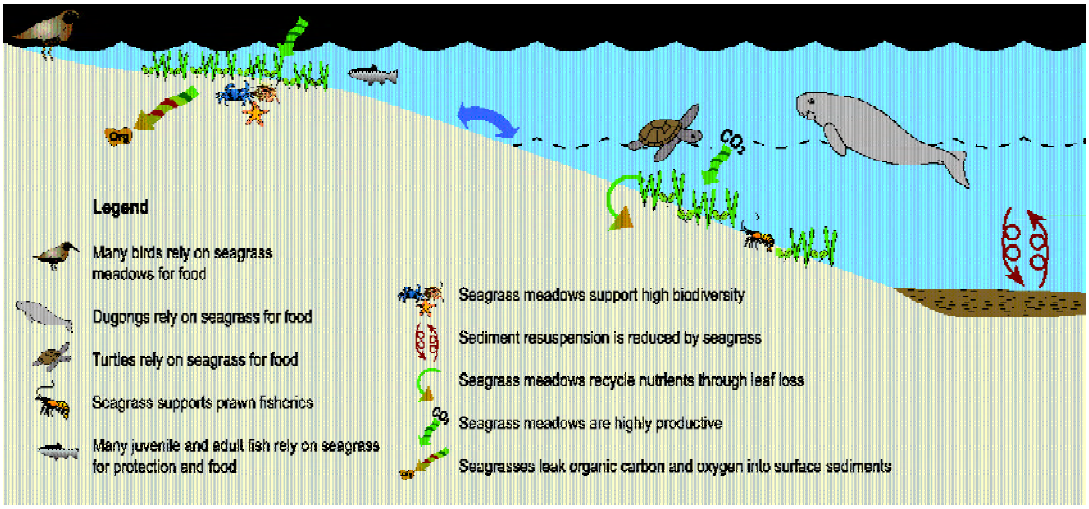

ecking sediment type

Seagrass-Watch

Seagrass meadows are ecologically and economically important. Seagrass can also provide an early warning sign of changes in the health of coastal systems. Linking frequent observations to research and management provides the best potential to detect changes as early as possible and therefore protect our coastal ecosystems.

Seagrass-Watch is a novel, community based monitoring program, involving over 300 volunteers watching seagrass meadows throughout Queensland. Between 1998 and 2001, funding from The Natural Heritage Trust Coast Clean Seas Program led to intertidal or subtidal monitoring sites being established in Hervey Bay, Great Sandy Strait, Whitsundays, Townsville, Cairns and Moreton Bay.

Seagrasses are important



Seagrass is ecologically and economically important. Tropical seagrass meadows have many important ecological functions, however these vary between the different species.

Monitoring seagrass has value

Monitoring, research and management, working together can help protect seagrass.

Healthy habitats for continued seagrass growth require collaboration between community, government and researchers. Frequent monitoring of seagrass meadows allows researchers to ask better questions and therefore increase our understanding of seagrasses. Managers can only implement protection of habitats when they are well informed of the issues and have data to support their claims.

photo: QPWS

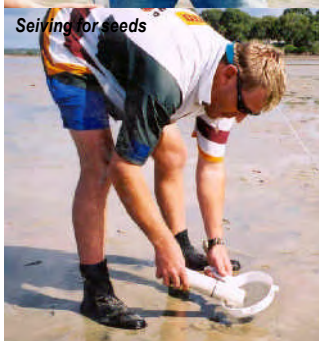
Management

Community involvement

Research


Monitoring seagrass transect


Checking data sheet


Seiving for seeds


Collecting reference specimen

Seagrass-Watch volunteers pass quality control


Measuring shoot height


Reference: 5% cover

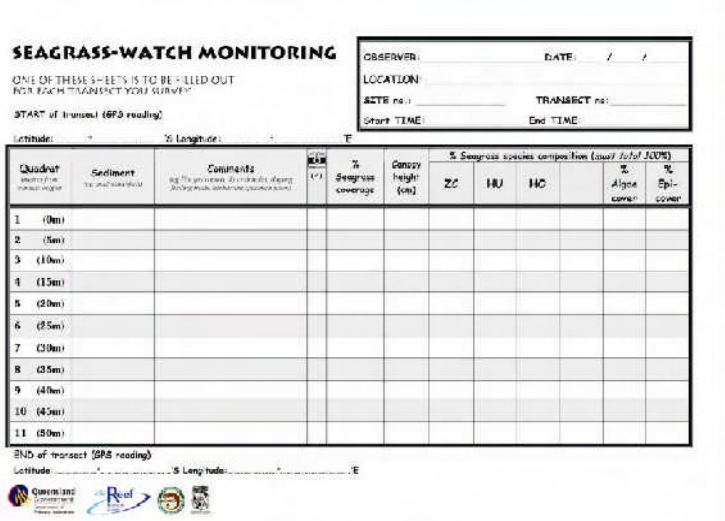

Reference: 22% cover


Reference: 70% cover


Subtidal monitoring

Methods: standard protocol is important

With the aid of volunteers, the Marine Plant Ecology Group at DPI Fisheries developed a set of methods which were then standardised for all monitoring locations. Two types of monitoring occur, intertidal and subtidal. Standard data sheets, photographic records, voucher specimens and regular training are all essential components of obtaining reliable and consistent data.


SEAGRASS-WATCH MONITORING

ONE OF THESE SHEETS IS TO BE FILLED OUT FOR EACH TRANSECT YOU SURVEY

START of transect (GPS reading)

Latitude: ° 'S Longitude: ° 'E

OBSERVER: DATE: / /

LOCATION:

SITE no.: TRANSECT no:

Start TIME: End TIME:

Quadrat	Sediment	Comments	% Seagrass coverage	Canopy height (cm)	% Seagrass species composition (sum total 100%) ZC	HU	HC	% Algae cover	% Epi-cover
1 (0m)									
2 (5m)									
3 (10m)									
4 (15m)									
5 (20m)									
6 (25m)									
7 (30m)									
8 (35m)									
9 (40m)									
10 (45m)									
11 (50m)									

END of transect (GPS reading)

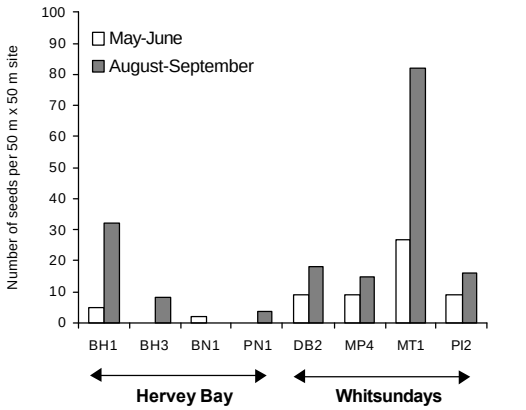
Latitude: ° 'S Longitude: ° 'E

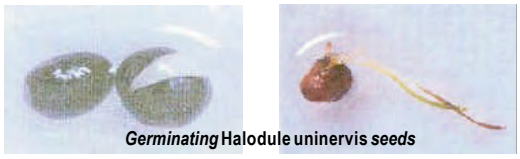
Results: More seeds in Whitsundays than Hervey Bay

Many tropical seagrasses are adapted to live in habitats with high disturbance (eg. cyclone, grazing and floods), they do this by producing seeds so that they can regrow after the disturbance. Counting seed banks therefore provides information on how well a certain meadow is likely to regrow after a disturbance.

Preliminary community data on *Halodule uninervis* seed abundance in the Hervey Bay/ Sandy Strait and Whitsundays regions shows that seed numbers increased from May/June to August/September and there is high variation between sampling locations. Seed numbers at Seagrass-Watch sites were generally higher in the Whitsundays region than Hervey Bay.

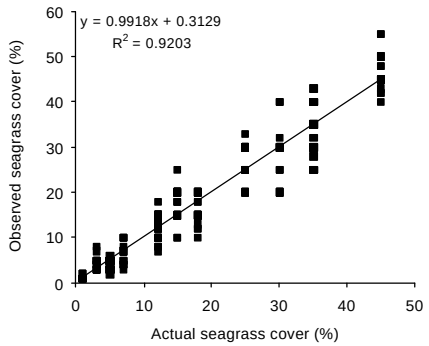
This study forms part of an ongoing assessment by community volunteers, DPI scientists and researchers from James Cook University.




Germinating Halodule uninervis *seeds*

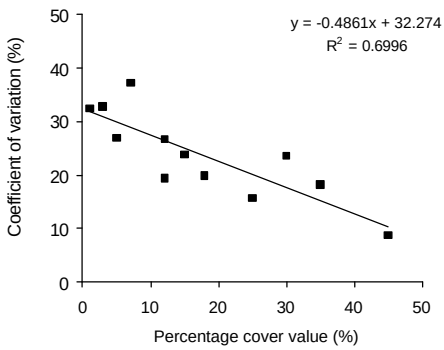
Estimates are accurate

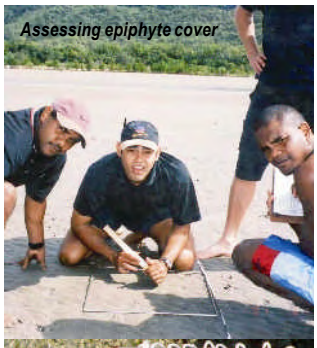
There is consistently high correlation between actual seagrass cover and the cover estimated by Seagrass-Watch volunteers. This is an essential component of a successful monitoring program.

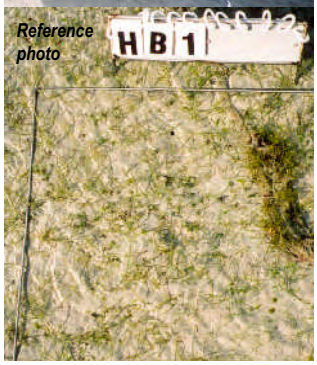


Easier to estimate high % cover

Estimates of cover have been found to be more accurate when more seagrass is present. Estimating cover when there is very little seagrass present has been found to be more difficult, with up to 30% variation in estimates between different observers.




Assessing epiphyte cover



Monitoring provides information on many seagrass processes

Management applications

- **Seagrass-Watch data is being used in local management decisions.**
- **Seagrass-Watch data provides important baseline data to monitor any future changes.**
- **The 'Local Eyes' of seagrass watch volunteers ensure that when changes occur, they are observed and responded to as quickly as possible.**

Whitsundays: intertidal

Seagrass mapping (1999) has been used to minimise dredge and spoil dumping impacts (Shute Harbour) and assess boat ramp construction sites (Pioneer Bay and Muddy Bay). Seagrass Watch data has been used by Whitsunday Shire Council to aid in sewage treatment plant management.

Whitsundays: subtidal

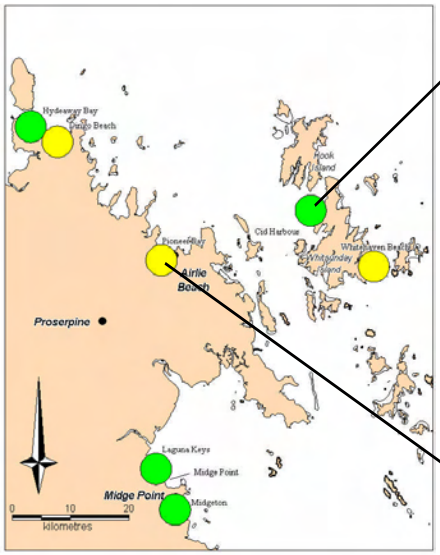
Seagrass survey data is being used by Queensland Parks and Wildlife Services (QPWS) to assess anchor damage. Seagrass Watch detected blooms of the toxic cyanobacteria *Lygbya majuscula*, which is leading to further investigations in the region.

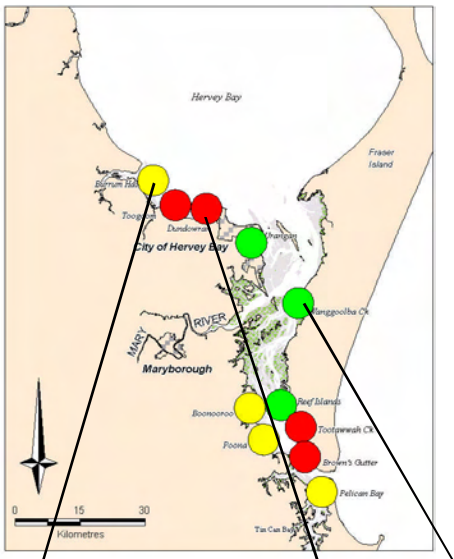
Hervey Bay: intertidal

Seagrass mapping (1998) and preliminary Seagrass-Watch data has been used in the assessment of dredging and development proposals in Burrum River. Seagrass-Watch data is providing insight into post-flood status of intertidal seagrass meadows in Hervey Bay.

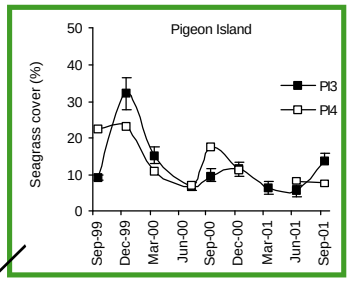
Great Sandy Strait: intertidal

Seagrass mapping (1989/99) and Seagrass-Watch data was used in assessment and design of Poona boat ramp and Urangan Marina. Seagrass-Watch data is being used in the development of the Wide Bay coastal management plan.



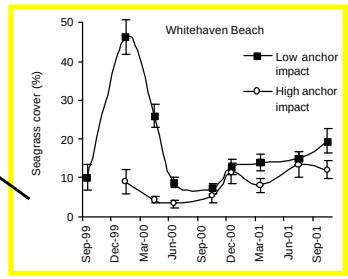


Overall site rating
- *Poor*
- *Fair*
- *Good*



Seasonality

Pigeon Island as well as the southern and northern regions of the Whitsundays region showed clear seasonality in cover of seagrass, with highest cover (>20%) during summer/autumn (December-April).



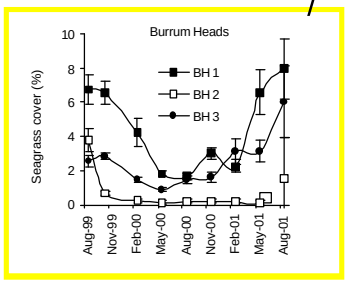
Anchor damage

Subtidal meadows at Whitehaven Beach, in the Whitsundays, clearly showed lower seagrass cover in areas of high anchor use.

Site rating

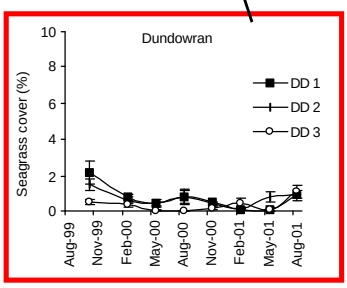
Overall site ratings assess the condition of each seagrass habitat. They are based upon:

- Seagrass abundance
- Epiphyte cover and algae
- Evidence of Dugong feeding
- Invertebrate fauna
- Physical disturbance
- Potential threats to habitat



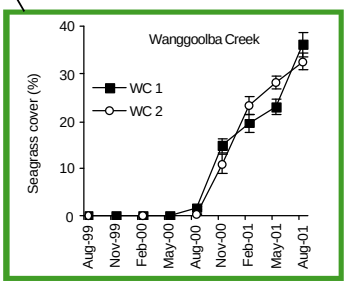
Sediment burial

Burrum heads and most inter-tidal sites in Hervey Bay recorded seagrass decline between August 1999 and May 2000, as a result of sediment burial. At many sites leaf length increased, which is a well documented seagrass response to being limited by low light.



No Change

Some meadows maintained low cover. Dundowran consistently had 1-2% cover, which is similar to seagrass cover recorded at this site in 1988 (0.1-10% cover).



Recovery

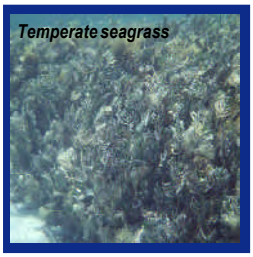
The Mary River flood in February 1999 resulted in seagrass loss at all sites in the northern Sandy Strait. By August 2001, seagrass cover at all these sites (eg. Wanggoolba Creek) had recovered to pre-flood levels.

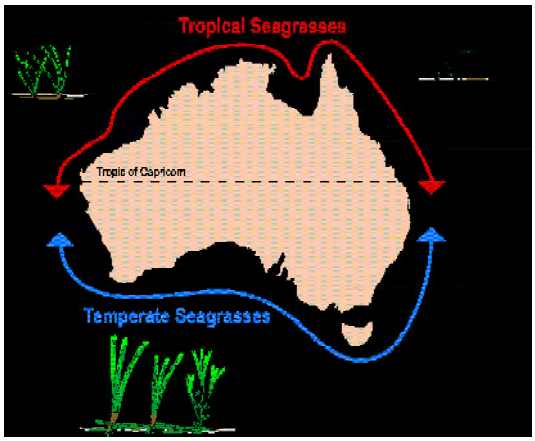
Dugong grazing trail

t anchored at Whitehaven Beach

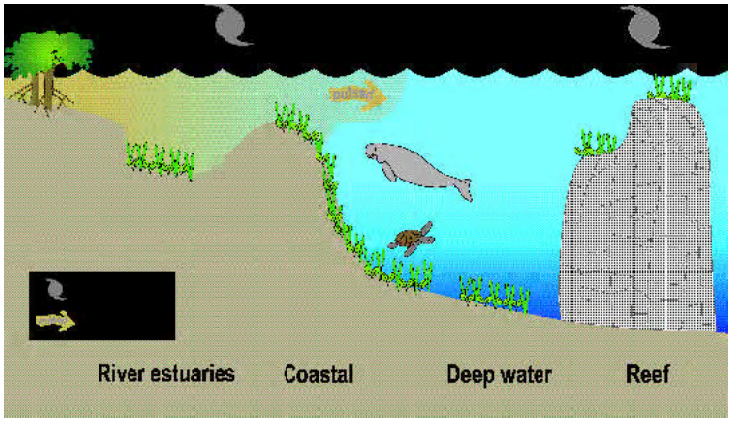
Tropical and temperate seagrass communities

Australia has two broad seagrass communities which can conveniently be divided into tropical and temperate communities. Tropical communities are frequently disturbed and consist of seagrass species that are usually low biomass, grow fast and recolonise well. In contrast, the temperate meadows of Australia are usually high in biomass, grow more slowly and rely mainly on vegetative growth to colonise new areas or regrow after disturbance.





Northeast Australia has diverse seagrass habitats



Seagrass habitats of north-east Australia are extensive, diverse and important for primary and secondary production. Due to cyclones, high tidal ranges, grazing and nutrient concentrations, these habitats are dynamic, as well as spatially and temporally variable. Four broad categories can be defined as 'river estuary', 'coastal', 'deep water' and 'reef' habitats.

For more information . . .

Websites

Seagrass-Watch website: http://www.seagrasswatch.com/

http://www.reef.crc.org.au/
Learn about seagrasses and the Seagrass-Watch program in an innovate and interactive way, including children's games, on the CRC Reef website

http://www.bayconnect.com.au/seagrass/default.htm
home site of the Seagrass-Watch volunteers from the Hervey Bay Dugong and Seagrass Monitoring Program

http://www.ouchvolunteers.org/ home site of the Seagrass-Watch volunteers from O.U.C.H. Whitsundays

http://www.botany.uq.edu.au/research/marine/tropicalmarine/seagrasshabqld.htm Summary of four major seagrass habitats in NE Queensland, processes and controls

http://possum.murdoch.edu.au/~seagrass/subform.htm
Seagrass Forum: a global seagrass discussion list

http://www8.myflorida.com/environment/news/seagrass/
Florida: ecology, photos, prop damage

http://www.epa.gov/owow/oceans/lagoon/seagrass.html
Indian River Lagoon – why seagrass is important, species information

http://www.ncl.ac.uk/tcmweb/tcm/sglinks.htm
has links to Australian and global seagrass information

http://www.botany.hawaii.edu/seagrass/
Great site with taxonomic information and lots of photos

Books

Hemminga, M.A. and Duarte, C.M. (2000) **Seagrass Ecology,** Cambridge University Press 298pp.

Larkum, AWD., McComb, AJ and Shepherd, SA. 1989. **Biology of Seagrasses: A treatise on the biology of seagrasses with special reference to the Australian region**. Elsevier. 841pp

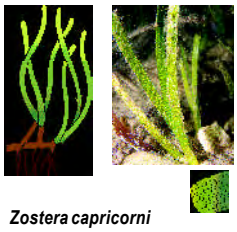
McKenzie, L.J., Campbell, S.J. & Roder, C.A. (2001) **Seagrass-Watch: Manual for Mapping & Monitoring Seagrass Resources by Community (citizen) volunteers.** (QFS, NFC, Cairns) 94pp

Short, F.T. and Coles, R.G. (eds.) (2001). **Global Seagrass Research Methods**. Elsevier Science B.V., Amsterdam. 473pp.

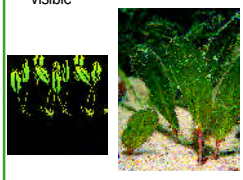
Do you want to get Involved?

Contact information
Seagrass-Watch Coordinator
Northern Fisheries Centre
38-40 Tingira Street
PO Box 5396,
Cairns. Qld. 4870
Email:seagrass@dpi.qld.gov.au
Phone(07) 4035 0100

'Seagrass Watch'
December 2001
Text: Stuart Campbell, Len Mc Kenzie, Tim Carruthers
photos: Stuart Campbell, Len Mc Kenzie, Chris Roelfsema
Illustrations & layout:
Diana Kleine, Marine Botany, University of Queensland

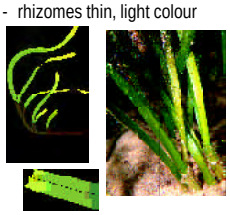


Zostera capricorni
- intertidal / subtidal to 6m
- monospecific / mixed meadows
- simple leaf
- leaves flat, leaf tip rounded
- leaves 2-5mm wide, 3-50cm long
- rhizomes light to dark brown
- cross veins in leaf clearly visible



Halophila ovalis
- intertidal / subtidal to 48m
- monospecific / mixed meadows
- simple leaf
- leaves flat
- leaves 0.5-2.0cm wide, 1-4cm long
- rhizomes thin, light colour

Halophila spinulosa
- subtidal to 44m (QLD)
- monospecific / mixed meadows
- compound leaf
- leaves flat, serrated
- 5-20 serrated leaf pairs
- rhizomes thin, light colour



Halodule uninervis
- intertidal / subtidal to 10m
- monospecific / mixed meadows
- simple leaf
- leaves flat, leaf tip 3 points in 'crown'
- leaves 0.25-5mm wide, <25cm long
- rhizomes thin, light colour
- no cross veins in leaf