U3A gets involved

Don Kinsey (U3A) reports

U3A (University of the Third Age) is a worldwide voluntary education movement primarily targeting retired people. Its members tend to be enthusiastic about nearly everything, which is a great start to any new activity.

The new U3A on Magnetic Island sampled Seagrass-Watch in October 2005. As a result of that afternoon of fun and incompetence it was decided that the U3A's Oceans and Coastal Zones course participants would like to undertake a formal, ongoing commitment to monitor the Island's Cockle Bay seagrass site. 16 class members have formed the Cockle Bay team, which gives us quite a bit of flexibility. Most of the team have now done a Seagrass-Watch training Workshop and the team has set up three separate transect working groups to facilitate the monitoring.

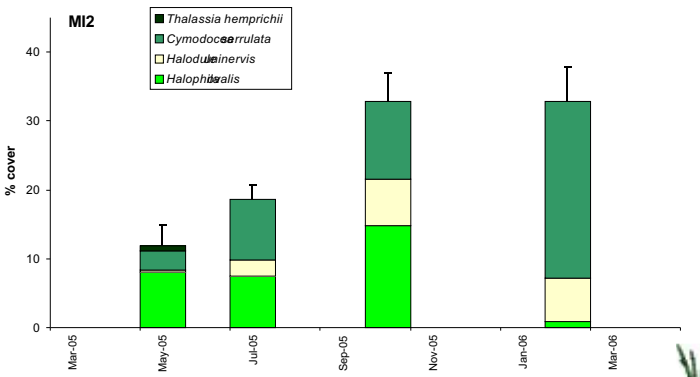
Unfortunately, our January monitoring had to be cancelled as the Island had just received the magnificent and much needed rainfall of nearly 800 mm. Our team, champing at the bit, finally got to carry out its first essentially independent (Jane was there to watch but not manage!!) monitoring session on 28/2/06. The tide was a bit marginal but the afternoon's activity went really smoothly and all tasks were completed in little more than an hour because of the large team and the well-organised groups. Everybody had a great time and our continuing enthusiastic involvement in Seagrass Watch seems assured.

Top left: Barbara Kinsey prepares to take quadrat photos

Top right: The team estimates species composition.

Left: Don Kinsey (centre) leads the team on transect 2.

Centre: The new inventors - a seed corer for standing up



Sarina Inlet

On the 26th March, Len, Jane and Naomi from Seagrass-Watch HQ (DPI&F) conducted a workshop in Sarina, near Mackay in central Queensland. With the assistance of Matt Bloor and the Sarina Beach Progress Association

The training was funded by GBRMPA as part of the Reef Water Quality Protection Program. Twenty people attended the training day, with participants ranging from University students and retirees to representatives from conservation groups across the region.

Len McKenzie, Seagrass-Watch program leader, and scientist Jane Mellors gave presentations on seagrass identification, biology, ecology, threats and the Seagrass-Watch program, including it's background, methods and some of the results. Naomi Smith assisted with a lab session on taxonomy. Participants were interested to learn not only about seagrasses, but how local participation makes them part of a global community.

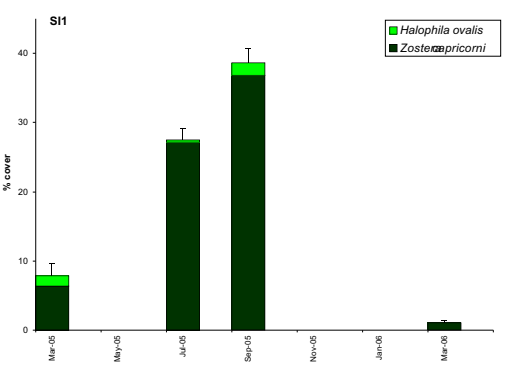
After a morning of presentations, participants made their way down to the Sarina Inlet sites (SI1 & SI2), where the monitoring techniques were put to use.

Dell Williams (second from left) from Seagrass-Watch Whitsunday's provides valuable assistance

Coastal & Marine Coordinator Matt Bloor (left) assists with training

Unfortunately, Sarina Inlet seagrass meadows are not looking particularly healthy, with abundances below 5%, significantly lower that the 40% covers reported in October 2005. Local residents suspect the cause of the decline was greater rainfall over the last few months and possibly higher temperature. Temperature loggers have now been installed at the sites, and Noel and John have offered to be responsible for their collection and deployment - thanks guys!!

Fortunately, the sites are also part of the RWQPP monitoring, so while visiting, Len, Jane and Naomi collected sediment samples from the site to check for herbicide residues.



Bushland Beach

Lux Foot (Northern Beaches Rotary) reports

The Bushland Beach group turned out in good numbers, 7 from the Rotary Club and 5 from the Townsville Group for the first sampling of 2006.

Unfortunately the monsoon trough and offshore winds increased the height of the tide, which made monitoring difficult. The recent rains also made the water muddy.

Nevertheless, seagrass and seeds were plentiful, also three *Lingula* were found while seed sampling.

Above: Naomi (DPI&F) (right) helps out

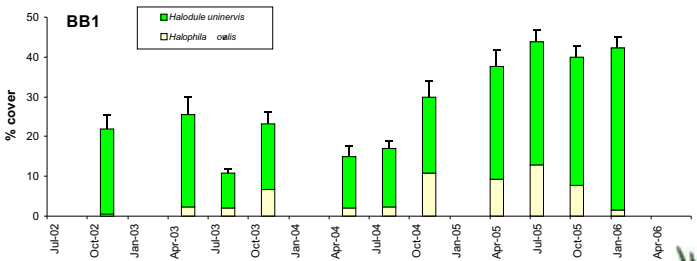
Above left: Jason, Rosie & Michelle

Right: Lux & Sharon sample seeds

Below left: Belinda ("Bubbles") & son

Below: Jason & Rosie

A productive fish habitat & Seagrass-Watch site - Picking up the crab pots

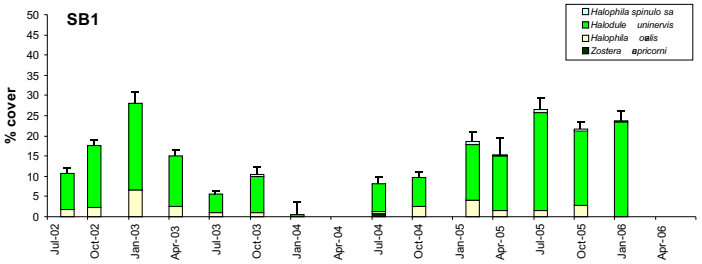


Shelley Beach

Naomi Smith (DPI&F) reports

Monitoring SB1 in January was cause for concern as Townsville had been hit by some rain and high winds. Luckily this ceased and Seagrass-Watch went full steam (yes that is right humid, hot and muggy) ahead. This meant sampling at midnight (due to suitable low tides) in the pitch black. This band of dedicated Seagrass-Watchers armed with torches and insect repellent trudged over the hill and across the rock strewn beach before arriving on site. Once at the site, I don't think any of us really realized just how much we needed the insect repellent as we had to fight off thousands of giant mozzies and other flying insects. What was worse is that the insects were attracted to our headlights, providing us as the midnight snack. So if you are looking for a new exciting challenge try a midnight Seagrass-Watch at your site!

Prepared for our midnight sortie.



Regional roundup

Other sites within the Townsville-Thuringowa Seagrass-Watch portfolio include MI1 (Picnic Bay), SB2 (Shelly Beach), SC1 and SC2 (Sandfly Creek).and RB1(Rowes Bay). Of these sites, Picnic Bay was monitored during a midnight sortie in late January between rain squalls and SB2 was monitored in early February. The SB2 monitoring event enabled a couple of watchers to complete their Seagrass-Watch training, as they were unable to take to the field during the Magnetic Island Workshop. Unfortunately the Sandfly Creek sites have not been monitored since July 2004, due to the difficulty of access to these sites. The site at Rowes Bay is yet to be monitored this year, but once the Rowes Bay rangers get back on board there will be no stopping them.

Experienced seagrass-watchers Dick, Catherine and James show Andrew, Ron and Posa what's what at SB2

Mapping Seagrass in Moreton Bay.

By Chris Roelfsema and Stuart Phinn (UQ)

Last year Seagrass-Watch volunteers in Moreton Bay participated in ground-truthing satellite imagery in conjunction with the University of Queensland (UQ) as part of ongoing research projects to improve techniques for coastal management.

Stuart Phinn and Chris Roelfsema (Centre for Remote Sensing and Spatial Information Science) are applying remote sensing approaches in combination with field survey data similar to that collected by Seagrass-Watch, to map properties of seagrass meadows in the Moreton Bay region. The research is supported through the Coastal Zone CRC, an Australian Research Council Linkage project with the Healthy Waterways Program, and Chris's doctoral research.

A major part of this project was a field and image data collection campaign in July-September of 2004. During that period field data were collected in a combined effort by staff from the Ecosystem Health Monitoring Program (EHMP), CSIRO Land & Water, Queensland Parks and Wildlife Service (QPWS), UQ, Port of Brisbane and Seagrass- Watch volunteers.

The field data were collected at times to coincide with the collection of images of Moreton Bay from airborne and satellite sensors. These sensors are similar to your standard digital cameras, but have significantly higher pixel resolution and more spectral bands (colours per pixel). This enables us to look at the colour signatures in individual pixel images, which range in size from 2.4 m x 2.4 m to 30 m x 30 m, to work out the type of seagrass present and its level of cover.

Combining information from all the pixels allows us to map seagrass density or percentage cover, species composition and biomass in areas of shallow (< 4 m) clear water.

To develop and check the accuracy of our image based maps we need field data on seagrass density and composition at known locations in the study area. As our research focus is on the Eastern Banks area, the UQ team established 56 transects in this area in July 2004. Each transect was 100 m long and contained photos taken at 2 m intervals. The photos were analysed visually to determine species composition and % cover.

At each transect, two seagrass cores were collected to determine above and below ground biomass. All photos and cores had a known position in the field measured from a Global Positioning System. The seagrass cores were analysed by Seagrass-Watch staff (Louise Coles, Keira Price and Paul Finn).

In the deeper and more turbid waters of Moreton Bay the other teams collected field data (seagrass density and composition) using spot checks, through snorkeling or using a remote video camera dropped over the side of a boat. As all the field data were georeferenced to set coordinates, they were able to be mapped on top of the remote sensing images to create and validate maps of seagrass properties.

Maps covering all of Moreton Bay showing seagrass density (Figure 1, image and field survey) and species composition (field data only) were created with the help of Nicola Udy (QPWS). This map integrates outputs of image based mapping from the Landsat 5 Thematic Mapper sensor (12/8/04) for the Eastern Banks and some of the shallow, exposed areas in Western part of the bay (UQ), with field survey data collected by EPA, EHMP and Port of Brisbane Corporation in the exposed inter-tidal and deeper turbid western, northern and southern parts of the Bay.

Figure 1. Seagrass density map for Moreton Bay overlaid on a Landsat 5 Thematic Mapper Image collected on 12th August 2004. The map is an integration of data from Eastern Banks (UQ) and Western, Northern and Southern Bay (EHMP, QPWS).

Currently, the UQ team together with Dr's Arnold Dekker and Vittori Brando from CSIRO Land & Water are conducting further research to determine which type of sensor and processing technique is most suitable for seagrass mapping. We have also just commenced a project with the Reef CRC to determine how well sparse seagrass can be mapped. Chris is conducting more research on the techniques used and their applicability in developing countries. The results of this work and ongoing research will be presented at international conferences and in international journals, The contribution of Seagrass-Watch volunteers to this work is greatly appreciated.

Please contact Stuart (s.phinn@uq.edu.au) or Chris (c.roelfsema@uq.edu.au) if you want further information.

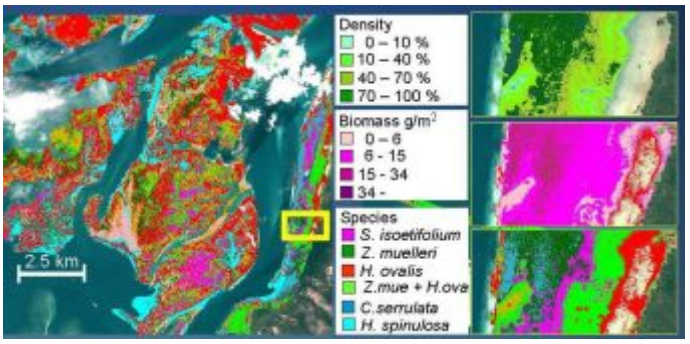


Figure 2. Seagrass species map for the Eastern Banks, 29 July 2004, produced from high spatial resolution Quickbird satellite image data. Inset maps show a zoomed in area and output maps of species, biomass and density.

The Gladstone Oil Spill

Just before midnight on 24th January 2006, the tug "Tom Tough" suffered an engine failure and punctured the hull of a 263 metre Korean vessel, 'Global Peace', causing approximately 25-30,000 litres of heavy fuel oil to spill out into Gladstone Harbour. This was arguably the largest oil spill in the Great Barrier Reef World Heritage Area for 30 years.

Although there were some concerns that strong winds and strong currents could push the oil spill into the Great Barrier Reef, the spill was contained to the waters off Fisherman's Island and the estuaries of Calliope River and Auckland Creek. The multi-agency response included booms and boats; foreshore assessments; a QPWS wildlife response; clean-up of mangroves, marinas and other foreshore areas; liaison with an affected community; and interesting legal ramifications. Although clean-up crews initially suffered a setback with the high winds and the collapse of a protective boom (which allowed oil to enter the marina, damaging boats and affecting seven birds), the majority of the slick was removed within a few days.

Above left: the main sick on the second morning
Above right: Floating booms being used to help contain the oil spill in Gladstone

The Marine Ecology Group at DPI&F was recently in Gladstone (27th Feb-1st March) to reassess the status of intertidal seagrasses that may have been affected by the oil spill. These meadows had last been looked at in October 2005 as part of the regular monitoring program and initial results of the February survey indicate that they had been largely unaffected by the oil spill. Tidal conditions at the time of the spill may have spared the intertidal banks from prolonged exposure to the oil. The team is planning to resurvey the area later in the year.

Samples of water, fish, prawns and crabs have also been laboratory tested, and the DPI&F recently advised fishermen that local product to date is suitable for sale. DPI&F officers will continue their sampling program for some time, particularly mud crab and fin fish from the area directly affected by the oil spill.

A dark oil stain marks the height of the tide on the effected mangoves in Gladstone

A plan for an ongoing Port Curtis integrated habitats monitoring program, including seagrass, is currently under consideration. If implemented, the long-term monitoring program will assess the slick's impact on the ocean's bottom.

Website update

The Seagrass-Watch website has continued to prove popular with web users, as the number of visitors accessing the site has continued to increase to near 1000 per month.

The website has also had a major overhaul in the past few months. With the assistance of Sen Chung (Momidea), the website now features an interactive map which allows users to quickly access information on currently participating locations, regions and countries. The streamlining of the website will also allow faster downloading and quicker updates. New features include a gallery page.

In late January 2006, the Seagrass-Watch website was selected for preservation by the State Library of Queensland. A copy of the Seagrass-Watch website was archived for historical and preservation purposes in PANDORA (Preserving and Accessing Networked Documentary Resources of Australia) Australia's web archive by the National Library of Australia and Partners.

Seagrass-Watch HQ welcomes Dr Hugh Kirkman

Dr Hugh Kirkman is a marine ecologist with more than 27 years of marine research experience in Australia and internationally. His experience includes seagrass ecology and biology, macroalgal ecology, marine resource management, policy and strategy development for marine systems and mapping underwater features. He has worked in east Asia for 5 years and has knowledge and experience of marine resources in eight east Asian countries.

Hugh has also published extensively and has more than 5,000 hours underwater SCUBA experience. Hugh's interests lie in management of marine resources and building long-term databases suitable for assisting management with sustaining those resources. The establishment of marine protected areas is a priority in his work with mapping underwater habitats. He is also a professional editor working part-time to edit journal papers for authors with English as a second language.

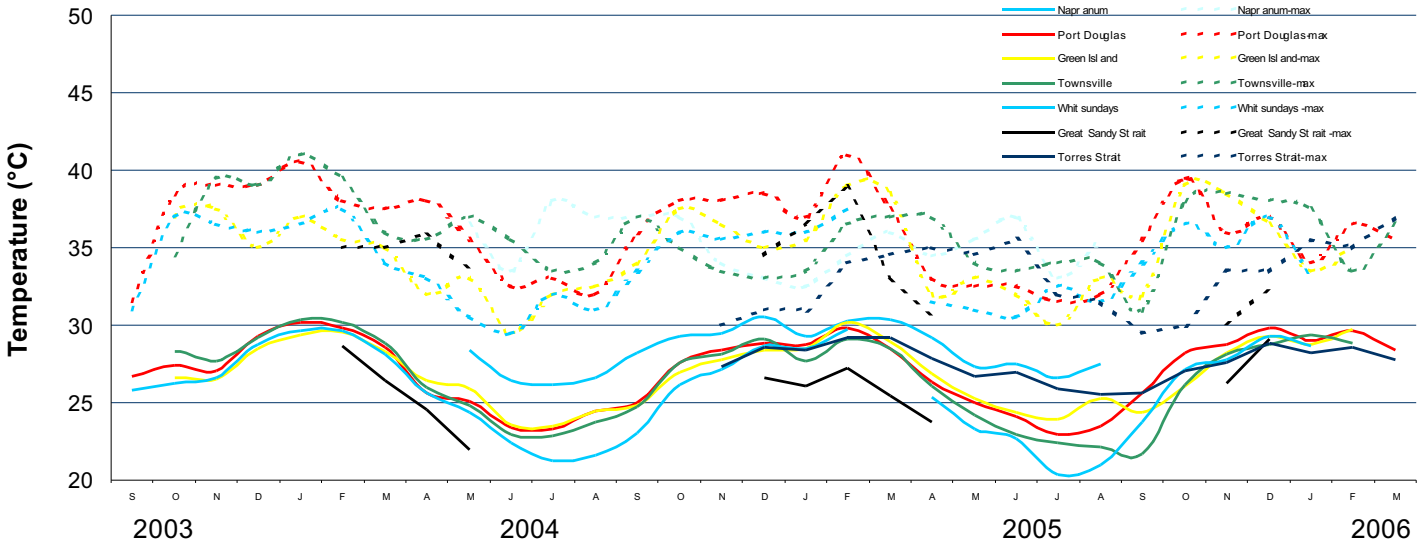
Hugh's extensive experience in southern Australia will play a key role in providing scientific expertise to Seagrass-Watch participants assessing temperate seagrass ecosystems.

Hugh Kirkman (right) and a park ranger collect seagrass at Haad Chao Mai National Park, Thailand.

Temperature monitoring

In late January 2006, coral bleaching was observed by marine researchers and tourist operators on reefs in the Capricorn section of the Great Barrier Reef (Keppels) and sea surface temperatures (SSTs) in the region were well above critical levels for normal coral function. SSTs in the Keppels had been hovering 2 degrees C above the average since early December, and this sustained warm period caused temperature-sensitive corals to reach bleaching thresholds.

Intertidal seagrasses in the region near Gladstone also declined between November 2005 and February 2006. A long term seagrass monitoring program conducted by DPI&F and Central Queensland Ports Authority indicated that there was a large decline in biomass of intertidal *Zostera capricorni* meadows throughout the port area and at nearby Rodds Bay. Although water temperature was not measured as part of the program, the widespread nature of the seagrass decline indicated that the cause of declines was likely to be associated with climate conditions such as temperature. Seagrass-Watch *in situ* temperature monitoring however, has indicated that temperatures were generally lower over the 05/06 summer than previous years (see graph).



Although the Keppel reefs experienced near 100% bleaching episodes in 1998 and 2002, they recovered within 3-6 months revealing a remarkable resilience not seen in many other places on the Great Barrier Reef. Research in the Keppel Islands by scientist's from the Australian Institute of Marine Science have found that corals in this region have the ability to change the type of algae they associate with and that this alters their thermal tolerance. Corals in the Keppels also seem to grow faster than their northern counterparts and store more fats. They believe this may be at least part of the reason why the Keppels are able to bounce back from a heat wave that had dire consequences for other regions. AIMS Scientists are hopeful of a similar recovery following this bout of bleaching and will audit the situation in the near future, as well as conduct more experiments.

BleachWatch

BleachWatch is a community-based coral reef monitoring initiative developed by the Great Barrier Reef Marine Park Authority (GBRMPA). BleachWatch was established in 2002 during a mass- bleaching event. In subsequent years, both the number of participants and its spatial coverage have expanded. BleachWatch is a key component of the GBRMPA's Coral Bleaching Response Plan, a comprehensive management response to mass coral bleaching.

When water temperatures increase above average, severe and widespread bleaching can occur. The initial onset of mass coral bleaching can range from gradual and patchy to rapid and uniform, and can occur with varying synchrony over hundreds or thousands of square kilometres. Detecting the early signs of a mass-bleaching event requires a wide network of observers providing regular reports of conditions throughout the region.

BleachWatch is built on a network of regular reef users (including tourism professionals, researchers and fishers) who voluntarily monitor and report on conditions at reefs that they visit regularly. BleachWatch is an opportunity for everyone to help the GBRMPA understand the effects of coral bleaching, and the implications of climate change on the Great Barrier Reef.

The goals of BleachWatch are:

- To inform the community about coral bleaching and to encourage individuals, tourism operators, organisations and fishers to participate in BleachWatch.
- To detect the early stages of coral bleaching events over a wide geographic range.
- To use coral bleaching as a means to communicate the broader impacts of climate change on the Great Barrier Reef.

For information on how to participate in BleachWatch, please email bleachwatch@gbrmpa.gov.au or contact the BleachWatch Coordinator on (07) 4750 0700.

Bleaching reported by Maren Mathew near her Seagrass-Watch monitoring site at Hydeaway Bay, early 2002.

Facts about Echinoderms

Echinoderms are radially symmetrical animals that are only found in the sea (*there are none on land or in fresh water*). Echinoderm means "spiny skin" in Greek. Many, but not all, echinoderms have spiny skin. There are over 6,000 species. Echinoderms usually have five appendages (*arms or rays*), but there are some exceptions

Radial symmetry means that the body is a hub, like a bicycle wheel, and tentacles are spokes coming out of it (*think of a starfish*). As larvae, echinoderms are bilaterally symmetrical. As they mature, they become radially symmetrical.

Most adult echinoderms live on the bottom of the ocean floor. Many echinoderms have suckers on the ends of their feet that are used to capture and hold prey, and to hold onto rocks in a swift current.

Sea stars

Sea stars (group name Stelleroidea) are sometimes called starfish, though they are not real fish (they lack both vertebrae and fins). There are two sub-types of sea stars:

- Asteroideas are the true sea stars and sun stars.
- Ophiuroideas are brittle stars and basket stars.

The differences between the two sub-types lies in how the arms connect to the central disk. Ophiuroids have arms that do not connect with each other. There is a distinct boundary between arm and central disk. Asteroids have arms that are connected to each other. Also, it is harder to tell with asteroids where the central disk ends and the arms begin.

The sea star's top surface (or skin) looks spiny if you examine it. If you look very closely you will notice that there are different types of growths on the surface. Some bumps are used to absorb oxygen, they are called dermal branchiae. Pedicellaria are pincher-like organs used to clean the surface of the skin. Barnacle larvae could land on a sea star and start growing if it were not for these organs.

Sea Urchins & Sand Dollars

Sea urchins, heart urchins, cake urchins, and sand dollars belong to a sub-group of echinoderms called Enchinoidea. These creatures have many sharp spines pointing out in all directions that offer protection from predators.

The spines are connected to the skeleton in a ball-joint manner called the "test." Spines are able to swivel towards a predator because they are connected to muscles.

These animals have five paired rows of tube feet with suckers.

The mouth is on the bottom, and the anus on top. The mouth contains five teeth that point towards the center. The tubed feet are used to move along the bottom of the sea, where these organisms use their teeth to eat algae.

Sea Cucumbers

Sea cucumbers belong to a sub-category of echinoderms called Holothuroidea. Some members of the group look like cucumbers you find in the supermarket. The similarity ends there.

Sea cucumbers are football shaped creatures that lay on their side at the bottom of the ocean. They have five rows of tube feet running lengthwise. Its mouth is surrounded by tentacles that are really tubed feet. Unlike sea stars, the vascular system is not filled with sea water. Instead, sea cucumbers use a special body fluid.

Sea cucumbers eat plankton and other organic matter. Some position themselves in a current that brings a steady supply of food, and spend hours there. The tentacles open up and collect food in the current. The sea cucumber brings each tentacle to its mouth to eat, while the other tentacles go on collecting food. Other sea cucumbers feed by sifting through sand using their tentacles.

How Do Sea Cucumbers Protect Themselves?

Many sea cucumbers are poisonous. If injured, sea cucumbers can kill fish in the same aquarium as them.

The sea cucumber has an interesting way of defending it self - a sea cucumber can expel (throw out) all of its internal organs! This either scares off or satisfies predators. The sea cucumber can then grow another set of internal organs.

Some sea cucumbers secrete a very sticky substance as a defence mechanism. If you get this glue on your body, you will not be able to remove it without shaving your skin!

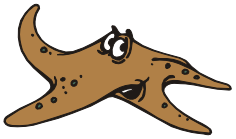
Envirofund

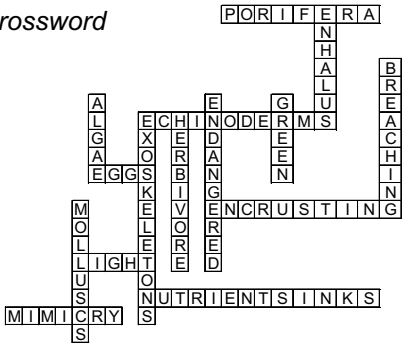
Round 8 of the Envirofund is at present open. Applications close at 5pm on Fri 28th April.

Funding is available for up to $50 000 for community groups in Australia. To download a copy of the form, guidelines and hints go to www.nht.gov.au/envirofund or alternatively FREECALL 1800 065 823 for a printed copy.

General enquiries FREECALL 1800 303 863

Solution to Issue 24 crossword





Do you want to get Involved?
Contact a local Seagrass-Watch representative in your location - visit www.seagrasswatch.org

Queensland Government
Department of Primary Industries and Fisheries

Text: Len McKenzie, Jane Mellors & Rudi Yoshida
Layout & graphic design: Len McKenzie & Rudi Yoshida

Any comments or suggestions about Seagrass-Watch or contributions to newsletters would be greatly appreciated.

NEXT ISSUE OUT JULY 2006

Contact: Seagrass-Watch HQ
Northern Fisheries Centre
PO Box 5396, Cairns. Qld. 4870 AUSTRALIA
Email: seagrass@dpi.qld.gov.au
Phone: +61 7 4035 0100