

Seagrass-Watch news



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Spring monitoring has begun in earnest and many groups are keen to see how their seagrasses are faring.

In this issue you'll find articles on recent efforts in south east Queensland (Australia), Papua (Indonesia), Kuwait and the Maldives to map seagrass and establish monitoring. Seagrass in all these regions face pressures from human impacts - everything from sewage effluent and coastal development to industrial waste and heavy metals. In Moreton Bay (SE Qld) monitoring is showing impacts from bait worm digging. But all is not lost. Read about the Restore-a-scar program in Florida, which is attempting to repair the damage to seagrass meadows caused by boat propellers, anchors and vessel groundings.

Many groups are working tirelessly to raise the profile of seagrass. Team Seagrass continues its excellent outreach programs and you can also read about an exciting new find for Singapore. Lāje Rotuma continue their EcoCamps and Seagrass-Watch HQ is developing educational tools and activity books. In this issue you can even learn about sea cucumbers and a project in the south Pacific aiming to restore wild populations.

Globally seagrass face many impacts, however this important resource unfortunately doesn't attract as much media or public attention as coral reefs because they are not considered "charismatic". Through programs such as Seagrass-Watch, we have the power to change the imbalance through our actions.

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Raising the charisma

During the first week of September 2008, seagrass scientists from around the globe attended the 8th International Seagrass Biology Workshop (ISBW8) at the Bamfield Marine Science Centre (BMSC), Vancouver Island, Canada. The meeting was an opportunity for scientists and enthusiasts to share their experiences and the results of their latest research and monitoring.

Workshop sessions included seagrass epiphytes, restoration, reproduction and genetics, physiology, monitoring, nutrients, ecological modelling and plant-animal interactions. Delegates also participated in discussions on seagrass management and assessing risk, recruitment/dispersal models and global integration.

An important outcome of the meeting was the support of outreach programs. It has been recognised that of the four coastal ecosystems (coral reefs, mangroves, salt marsh and seagrass), seagrass ecosystems receive the least attention in the media, accounting for 1.3% of the media reports directed toward threatened coastal ecosystems. Salt marshes received greater attention, with 6.5%. Mangroves received 20%, but the dominant focus was on coral reefs, which are the subject of almost three in every four media reports on coastal ecosystems (72.5%) (see Duarte *et al.* (2008). The charisma of coastal ecosystems: Addressing the imbalance. *Estuaries and Coasts* 31: 233-238).

It has been argued that research efforts on seagrass meadows "have been particularly ineffective in raising public awareness compared to research on other coastal ecosystems." Seagrass ecosystems are simply not seen as "charismatic" by the media and public, particularly when contrasted with the "dense array of dazzling and colourful fish and invertebrates that populate coral reefs." However, as all Seagrass-Watch participants would argue, seagrasses also contain a number of charismatic species that attract the public, such as seahorses, tiger sharks, turtles, dugongs and manatees.

Many consider that the conservation of threatened coastal ecosystems "ultimately depends on the level of success in raising the charisma of these habitats by building public awareness on their values and the pressures responsible for their losses, a task that requires more dynamic and effective communication between scientists, science educators, the media, and coastal resource managers."

To address the imbalance, support for outreach programs has been encouraged. One such program is seagrassonline.org - a collaborative, resource-sharing environment developed by the World Seagrass Association. This website is aimed at general audiences, with links to significant resources. The website also includes nodes on the



Bamfield Marine Sciences Centre



Continued over.....

Seagrass-Watch acknowledges the Traditional Owners on whose sea country we monitor



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For information about the Reef and Rainforest Research Centre visit <http://www.rrrc.org.au>

Seagrass News



global initiative to barcode seagrasses and a number of pages intended to address the recognised lack of charisma that seagrass attracts.

Seagrass-Watch is also playing a key role in addressing the imbalance. Community education, awareness and participation are central to Seagrass-Watch as they are the building blocks for a bottom-up monitoring and management process that is capable of sustaining itself through grassroots. Only educated coastal residents and stakeholders can contribute in a constructive way to the management process. Educational messages and heightened awareness provide a vehicle for inducing behavioural shifts and other types of community action that are often required to resolve major seagrass ecosystem health issues identified through monitoring.

Seagrass-Watch uses a number of mechanisms to communicate the messages, including newsletters, E-bulletins, public presentations, media reports, information pamphlets and a comprehensive website. Seagrass-Watch HQ is also preparing educational aids to contribute to seagrass and marine conservation education in schools and recently introduced educational activity books (<http://www.seagrasswatch.org/education.html>). Although the documents are currently in draft form, teachers are encouraged to use these documents as part of lessons or extra-curricula activities. Seagrass-Watch HQ plans to expand it's educational information so that it may be incorporated into school curricula, designed to assist students to become lifelong learners. For example, in the Torres Strait (Australia), Seagrass-Watch has been incorporated into the high school marine studies curricula and used as a successful program for capacity building beyond the school gate (see Mellors *et al.* (2008). Seagrass-Watch: Engaging Torres Strait Islanders in marine habitat monitoring. *Continental Shelf Research* 28: 2339-2349).

Through more effective communication of scientific knowledge, it is hoped that seagrasses can shake their "uncharismatic" label. By continuing to develop effective

partnerships between scientists and media communicators, public awareness of issues, concerns, and solutions within seagrass ecosystems can be raised. Only through increased public understanding can we inform and motivate effective management of these ecologically important coastal ecosystems. 🌱



Great Sandy Strait Roundup

Gordon Cottle reports



[The Great Sandy Strait Flora and Fauna Watch continued monitoring in their region of southeast Queensland (Australia) over the last four months]

Boonooroo

In June, Hanne and Helen visited BN1 to find even more foreshore erosion (exposed coffee rock) than they reported in March. The seagrass cover however was slightly higher, mostly due to an increase in *Halophila ovalis*.

Tinnanbar

Robyn, Mike, Hanne and newcomer Amy monitored all three sites in June/July and found little change in seagrass abundance since the March sampling. Some sections of TN1 increased in seagrass cover, however other sections had declined, possibly a result of freshwater runoff across the site. TN2 had slightly decreased in cover (although not significantly), which may be a result of the recent inclement weather.

Brown's Gutter

In late August, Paul was able to get his boat with Robyn, Matthew and Hanne to Brown's Gutter sites. On BG3 the usual *Zostera capricorni* with sparse *Halodule uninervis* gave an excellent average grass cover of 30 to 40% with canopy lengths to 10cm. At BG2 the cover was 25 to 30% with canopy lengths up to 12cm. But at BG1 Robyn was ecstatic at finding seagrass (*Zostera capricorni*) over the shoreward parts of the site - a first for some transects since 2003. A freshwater creek, clearly visible on our Spot 5 satellite chart, runs over this site which probably accounts for the lack of grass on the seaward edge. Robyn reported that the whole area was covered in brown algae, the last time we recorded this was in May 2004.

Poona

On the last day of Winter, Hanne and Helen visited the sites that they have adopted. PN1 continued to remain low, the highest cover being 2% and most quadrats only showing 0.5% cover, with 2cm canopy height. At PN2 a similar situation with seagrass down from a maximum 20% in May to an average of about 2% overall, brown algae was present at both sites. 🌱



Hanne and Amy wrap up monitoring at Tinnanbar



Singapore

Team
SeaGrass

Cyrene Reef : Nature's proverbial box of chocolates

Siti Maryam Yaakub reports



Singapore sleeps while Team SeaGrass lands on Cyrene



6am and the Team is back on Cyrene Reef to monitor the fabulous seagrass on this submerged reef right in the middle of our port!

have transferred a host of ungainly implements onto a smaller boat and are making their way to a lone patch of exposed reef, glowing amber in the early morning light. This is the holy grail of TeamSeaGrass.

Moments later, several splashes and shouts of "The water is COLD!" can be heard as TeamSeaGrass members make their way from the boat to the sandy patch on the reef where they begin preparations for monitoring the vast seagrass meadow found on Cyrene Reef. Making their way to the monitoring site, progress is halted several times by a variety of charismatic (and some not-so-charismatic) fauna, such as the Knobbly sea star (*Protoreaster nodosus*), seahorses (*Hippocampus kuda*), sand dollars and common sea stars as far as the eye can see.



The seagrasses of Cyrene are home to Knobbly sea stars (*Protoreaster nodosus*).

You're almost guaranteed to see new things every time at Cyrene Reef.

Cyrene Reef is part of a group of patch reefs that sit in the shipping lanes of one of the busiest ports in the world. Ship groundings at high tide used to be common until a ring of beacons was installed to demarcate the outline of the reef. In addition to constant shipping activity, Cyrene Reef is also surrounded by Jurong and Bukom Islands, which house Singapore's petrochemical industry.

Yet if you ask any TeamSeaGrass member who has been to Cyrene, you tend to forget that you're smack in the middle of petrochemical activity and high shipping traffic - that is, until one of the large container ships that frequent the shipping lane blasts its horn, forcing you to look up from whatever you were scrutinizing or



taking photographs of on the ground.

And boy, there's a lot to look at. Cyrene reef is made up of several different habitats. It's lush seagrass meadows houses eight of the twelve species of seagrasses found in Singapore. It's bordered on the rim by corals of almost every shape and hue and there is more to its sandy patches than meets the eye.

The seagrass meadow at Cyrene reef is probably the only place in Singapore where juvenile Knobbly sea stars (*Protoreaster nodosus*) are frequently seen and in large numbers, and thus is likely to be an important habitat for the species. Cyrene reef is also a an echinoderm heaven, with an array of sea stars, sea cucumbers, sea urchins, sand dollars and feather stars dotting its landscape. You can also find all kinds of fish darting about in the lagoon area - from pipefish to batfish and the ever-present sand gobies. It is also one of the two places in Singapore where you can find *Cymodocea rotundata* commonly known around these parts as Ribbon grass (the other site being Chek Jawa in the North).

To visit Cyrene Reef, one must be equipped with a sense of adventure. There is no jetty to land on, and very often, one can only hope that there's nothing sinister underfoot. There's also the fact that this nature wonderland is only accessible at very low tides. With so many things to look at, it's no surprise that almost every member of TeamSeaGrass as well as other nature enthusiasts want to make the trip to Cyrene Reef. It's nature's proverbial box of chocolates - you never know what you're gonna get. ♡

Images courtesy of Ria Tan. www.wildsingapore.com



Although it lies just opposite one of the world's busiest container terminals, Cyrene Reef has living seagrass meadows. The white spots are the *Enhalus* male flowers.



It's time to go home as the tide rushes in! It's then really obvious that Cyrene is a SUBMERGED reef. We are taken back to the main boat in two batches. Here's the rest of the Team on the fast disappearing reef, waiting to be taken back.

New record of Seagrass found in Singapore!

Singapore has added another species to its ranks! A patch of *Halophila decipiens* was found in the waters off Pulau Semakau at a depth of about 8m, by Eugene Goh, who was diving off the island late last year. A specimen was collected and passed on to the National Biodiversity Centre.

It has since been verified and lodged with the Singapore Herbarium. This species, which has a pan-tropical distribution, is commonly found in deeper waters. It has since been sighted at other locations in the waters of Southern Singapore. It may actually have been in Singapore waters prior to its discovery but remained unknown because it could have been mixed up with the more ubiquitous *H. ovalis*.



Halophila decipiens photos courtesy of Karenne Tun and Siti Maryam Yaakub



Kuwait



Seagrass in Kuwait

Mr. Dawood Ajeel Shuail reports



Kuwait's marine environment covers a very important zone of transition at the extreme NW corners of the Arabian Gulf. From north to south, Kuwait's coast covers a linear distance of 170 km of white sand beaches, rocky

outcrops, extensive intertidal mudflats, and *Salicornia* marshes.

The discharge of the Shatt Al-Arab River, the Gulf's major source of fresh water, reduces the salinity and increases turbidity in Kuwait's northern waters. The effects of the Shatt Al-Arab diminish rapidly, so that, in Kuwait's southern territorial waters, both salinity and water clarity are high. The maritime environment of Kuwait includes the Gulf's second largest island, Bubiyan Island, and three offshore islands with some of the world's most northern coral reefs. The outstanding feature of the local marine environment is Kuwait Bay.



H. ovalis and *H. uninervis*, Kuwait



Above and Below: *Halodule uninervis*, Dbaiyyah



Seagrasses in Kuwait occur in scattered patches along the shoreline. Only two species have been reported in Kuwait, *Halodule uninervis* which is found on sheltered sand beaches of Doha, Dbaiyyah, Al-Khiran, and Al-Nuwaiseeb, and *Halophila ovalis* on sand beaches of Doha, Dbaiyyah, Al-Khiran, and Al-Nuwaiseeb. Both species can be seen in all seasons. In general, the Kuwait coastline can be separated into two primary regions: intertidal mudflats in the North of Kuwait Bay up to the Iraqi border and medium to coarse sand beaches dominant to the South of Kuwait Bay. However, within these two broad categories there are several other shoreline types.

The distribution and abundance of seagrasses differ between different sites and is controlled by a range of environmental factors. These factors are divided into physical, chemical and biological factors. *Halodule uninervis* meadows in the southern coastal areas, Dbaiyyah and Nuwaiseeb, had the best growth with respect to shoot density and shoot length. *Halophila ovalis*

are recently only found in the southern coastal areas. The poorest plant growth was observed in Doha where plants appeared to be exposed to longer exposure time, higher temperatures and high salinity. Sediment phosphorus levels were also relatively high at the Doha site, (70.0 and 74.0 mg l⁻¹, respectively).

Several factors may contribute to the high levels of phosphorus in Doha such as treated sewage effluent, inputs from Iraqi and Iranian rivers in the North, human activities such as fisheries and boat workshops. Elevated heavy metals concentration (Cu, Pb, Fe and Ni) were also observed at Kuwait Bay, Doha site. These may be attributed to chemical effluent discharge from the nearby desalination plants at the Doha power station, wastewater treatment plants from the Shuwaikh area, dumped materials and human waste from boat factories along the Doha shore, and shipwrecks in the intertidal area at the site. However Nuwaiseeb and Dbaiyyah are recreational urban areas and iron/copper inputs are lower than from industrial areas. In Kuwait it is of paramount importance that attention be paid to seagrass meadows in view of the significant ecological role they play.



Above: Seagrass meadow, Nuwaiseeb

Left: *H. Ovalis*, Nuwaiseeb

Below: *H. Uninervis*, Nuwaiseeb



Above and below: Ship wreck and dumped material at Doha



Halodule uninervis meadow, Doha



Kuwait

The State of Kuwait (population 3.1 million) is a sovereign Arab emirate on the coast of the Persian Gulf, enclosed by Saudi Arabia to the south and Iraq to the north and west. The name is a diminutive of an Arabic word meaning "fortress built near water". Kuwait is a constitutional monarchy with a parliamentary system of government and Kuwait City serves as its political and economic capital.

Located in the north-east corner of the Arabian Peninsula, Kuwait is one of the smallest countries in the world in terms of land area (17,818 km²). The flat, sandy Arabian Desert covers most of Kuwait. Kuwait is the only

country in the world which has no natural lake or water reservoir.

Kuwait has the world's fifth largest proven oil reserves and is the ninth richest country in the world per capita.

Photo courtesy of RajatKansal <http://www.flickr.com/photos/snapi/540280595/sizes/l/> (<http://creativecommons.org/licenses/by/2.0/>)



The Republic of the Maldives

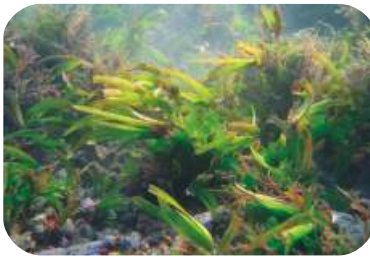


Maldives

Lucy Gwen Gills reports



The Republic of the Maldives is a nation of coral atolls off the south-west coast of the Indian subcontinent. Seagrasses here, have historically surrounded small areas adjacent to fishing villages. Since the creation of resort islands more seagrass meadows have started to flourish. Seagrasses in this area are considered non native species which have grown due to eutrophication of the water column. This occurs with increased nutrient loading from sewage, which has been caused more by resorts and population increases. Eutrophication can change the biological environment, consequently seagrasses start to grow near the effluent discharge site. Therefore seagrass meadows can be an indication of an altered nutrient flow. Seagrass species can change the morphology of the islands as they keep some of the sand which would have stayed on the beach therefore negatively affecting the erosion of the coastal areas.



Thalassodendron ciliatum



Syringodium isoetifolium meadow

There are several reasons why we decided to start monitoring the seagrass meadows in the Maldives. Firstly it was very interesting to record the colonization, cover and productivity of new seagrass meadows. We also wanted to document the positive affects that they have had on the areas with regard to marine organisms and reef ecosystems. Finally, sea level rise and the consequential weather systems are a real threat here and we felt that we could quantify the changes that the seagrasses brought to the morphology of the islands. During the next month we are hoping to have completed the first stage of monitoring seagrass here at the Four Seasons, Kuda Huraa. 🌱

The Maldives are located south of India's Lakshadweep islands, and about seven hundred km south-west of Sri Lanka. The twenty-six atolls of Maldives' encompass a territory featuring 1,192 islets, two hundred and fifty of which are inhabited, with a population of approx 300,000 (2007).

The Maldives holds the record for being the lowest country in the world, with a maximum natural ground level of only 2.3 m, though in areas where construction exists this has been increased to several metres. Over the last century, sea levels have risen about 20 centimetres; further rises of the ocean could threaten the existence of the Maldives.

The Maldivian economy was entirely dependent on fishing and other marine products for many centuries. Fishing remains the main occupation of the people and the government gives special priority to the development of the fisheries sector. In 1979, a Fisheries Advisory Board was set up with the mandate of advising the government on policy guidelines for the overall development of the fisheries sector. Today, fisheries contribute over fifteen percent of the GDP and engage about thirty percent of the country's work force. It is also the second largest foreign exchange earner after tourism.

Source : <http://en.wikipedia.org/wiki/Maldives>
Male, capital of maldives photo courtesy of Shahee Ilyas



Malé, pop. 104,403 (2006), is the capital and largest city of the Republic of Maldives.



- TC** *Thalassodendron ciliatum*
- TH** *Thalassia hemprichii*
- SI** *Syringodium isoetifolium*





Seagrasses Survey in Cendrawasih Bay, Papua, Indonesia

Ichwan M. Nasution (Agency of Marine and Fisheries Research of Indonesia) reports



Papua is an island in Indonesia where knowledge about seagrass condition is very limited. Papua includes the most eastern province of Indonesia (formerly known as Irian Jaya) and extends west from the northeast border of Papua New Guinea to Halmahera (north Maluku Province). Overall this is a region separated from the main Indonesian archipelago by relatively complex bathymetry, where waters are very deep, and even islands only a few tens of kilometres apart might be separated by depths of over 1000 metres. The only areas of relatively extensive shallow water and true continental shelf are a platform west of the Birdhead (Doberai) Peninsula and to the south where Papua shares a common continental shelf with northern Australia.



Above: Sampling in Cendrawasih Bay
Below: Mansinam island seagrass



Cendrawasih Bay National Park (established in 1994) is the largest (1,453,000 ha) marine park in Southeast Asia and the only marine park in the region.

Surveys of Cendrawasih Bay seagrass extent and condition were carried out in August 2005 and August 2006. A total of 18 stations at four major islands in the bay were surveyed (Biak, Yapen, Numfoor, and Papua mainland). Using Seagrass-Watch methods, we collected data on seagrass distribution, total cover, species composition, shoot density and total biomass.

Extensive lagoonal seagrass meadows are present along the mainland coast of south-western

Cendrawasih Bay, particularly in Wondama Bay, and on the fringing reefs surrounding the many small islands.

A total of 10 species of seagrasses were found in the bay, including: *Enhalus acoroides*, *Thalassia hemprichii*, *Cymodocea rotundata*, *Cymodocea serrulata*, *Syringodium isoetifolium*, *Halodule uninervis*, *Halophila ovalis*, *Halodule pinifolia*, *Halophila minor*, and *Thalassodendron ciliatum*.

Most of the seagrass meadows in the bay were multi-specific, with the exception of one station which consisted of a mono-

specific *E. acoroides* meadow.

T. hemprichii was the species with the widest distribution in Cendrawasih bay, as it was found at 16 stations during this survey. Density of each species varied between stations. *H. pinifolia* has the highest density in the bay (4996 shoots m^{-2} , at Ansum) and *E. acoroides* has the lowest density (1 shoot m^{-2} , at Miosindi). Total percentage seagrass cover in the bay varied from 14% to 84%. Total seagrass biomass varied from 116.8 $gDWm^{-2}$ to 10513 $gDWm^{-2}$.



The vast seagrass meadows in this bay are reported to harbor a large dugong population.

All identified seagrass habitats have high ecological and/or economic value, whether supporting fisheries or biodiversity. Estuary/lagoonal and coastal habitats are considered to be the most threatened, due to coastal development.

The major changes in Papuan seagrass meadows would have occurred post World War Two and are related to coastal development, agricultural land use, or population growth. In general though, there is insufficient information and no long-term studies from which to draw direct conclusions on historic trends.

Localised impacts are likely to occur from sedimentation, that increases turbidity of marine waters, related to coastal agriculture, land clearing (upland logging and mining), fires and from the discharge of mine tailings.

Other impacts include sewage discharge, industrial pollution and overfishing. For example, there have been suggestions that dugong are disappearing from Cendrawasih Bay National Park because the shallow water seagrass meadows are being destroyed by trawl fishing as well as deforestation-produced sedimentation. Most of these impacts remain localised and relatively small and can be managed with appropriate environmental guidelines. However, in the future, climate change and associated increases in storm activity, water temperature and/or sea level rise have the potential to damage seagrasses in the region or to influence their distribution. 🌱

Papua Conservation

Indonesia is one of the most biodiversity-rich countries in the world. Its placement across two biogeographic realms and its island nature are two of the factors contributing to its high diversity in the marine ecosystem. Papua Province contains more than half of Indonesia's biodiversity.

The marine reef environments found in Cendrawasih Bay and the Raja Ampat Islands are among the very richest on earth in terms of species diversity. These environments are also very productive, and form an important sustainable resource for local communities.

Papua is becoming recognised as an important area for global conservation because of its extraordinary biodiversity, unique ecosystems and the fact that some marine areas remain in prime condition. Without a doubt, Papua has recently attracted much conservation interest and investment from conservation organisations, international donors, and the private sector. Biodiversity field surveys such as the Rapid Ecological Assessment in Raja Ampat may be the reason for this renewed attention.

What has been recommended is that future conservation efforts should aim to increase more meaningful and long-lasting field-based conservation, built upon a strong knowledge basis, which also must be generated from on-the-ground field studies.

Source: Marshall, AJ & Beehler, BM. (2007) The Ecology of Papua. The Ecology of Indonesia Series, Vol VI.



Seagrass Restoration

Restoring seagrass meadows vital to our environment

Mark Spalding (The Ocean Foundation) reports

This summer, the Ocean Foundation and Seagrass Recovery announced the launch of the Restore-A-Scar program, www.restoreascar.com, aimed at restoring scars in seagrass meadows found off the coasts of Florida, New York, California and Washington. These meadows sustain the most damage from boat propellers, anchors and vessel groundings that rip seagrass from the substrate and leave a scar that is vulnerable to further

erosion and, left unchecked, can eventually destroy the whole seagrass meadow.

The Restore-A-Scar program uses individual and corporate donations to place biodegradable sediment tubes inside the seagrass scar that will halt expansion of the scar and allow seagrass to re-colonize over the injury. Donations made purchase a section of the damaged seagrass, and costs range in increments from \$100 to \$5,000, providing restoration at \$10 per square foot. Following a donation, it is estimated the portion of a seagrass scar that was purchased could be repaired in 18-24 months.



Scars through a seagrass meadow at 7-mile bridge, Knight's Key Bay, Florida, Sept 2008.
Photo courtesy of Kenny Wright (Seagrass Recovery)



Top side scar, Knight's Key Bay, Florida, Sept 2008.
Photo courtesy of Kenny Wright (Seagrass Recovery)

The Ocean Foundation is a community foundation that works to support, strengthen and promote those organizations dedicated to reversing the trend of destruction of ocean environments around the world. Their partner, Seagrass Recovery, based out of Indian Rocks Beach, Florida, is dedicated to preserving all types of seagrass. They have a wide variety of patented inventions and services that provide a rapid cost-efficient means for replanting and restoring damaged areas. Recently Seagrass Recovery began licensing their Sediment Tube technology to vendors that are interested in providing propeller scar restoration using this scientifically proven methodology.

Seagrass-Watch HQ is currently discussing future collaborations with the Restore-A-Scar program.

For more information on how to donate to the Restore-A-Scar program, please visit www.restoreascar.com. Visit www.seagrassrecovery.com and www.oceanfdn.org for more information about the organizations described above. ♻️

Go slow- for those below!



Prop scars in Green Island seagrass meadow, QLD. April 2008



Example of what a propeller scar looks like prior to restoration.



Prop scar restoration in *Thalassia* meadow using sediment tubes (Seagrass Recovery technology that is being used in Restore a Scar).



Sediment tube and *Thalassia*: Almost decomposed sediment tubes where *Thalassia* is recovering the injury site faster than expected.



Recovering Scar : Successful restoration after sediment tubes have decomposed. You can see a runner of seagrass emerging inside the scar

South East Queensland

Moreton Bay Roundup

Paul Finn reports



We have about seven years worth of data now and have recently been delving into it for quality and assurance purposes, and also to look at any interesting stories that might be emerging. It is still early days but we have found that one of the uses of our data is comparing seagrass meadow condition within a location. Even sites within a location are sometimes impacted in different ways and to different degrees. Figure 1 depicts one such location by presenting the percent seagrass cover and species composition for two sites at Wynnum (WN1 and WN3). WN1 is a site which is heavily impacted by recreational bait worming and WN3 is rarely or never subjected to this activity. It is not surprising that this appears to be manifested in the condition of the seagrass meadows at these two sites. Although the seagrass cover at WN3 is more variable, the site typically supports a more dense seagrass meadow and a greater proportion of *Halophila ovalis* than does WN1 (Figure 1). The greater intensity of recreational bait worming at WN1 is likely to explain a majority of the reduced seagrass cover at this site, because both Wynnum sites are very similar in terms of other environmental attributes (e.g. water clarity, position on the intertidal flats). We look forward to finding out what else our data can tell us about seagrass conditions in Moreton Bay. 🌱



Gold Coast Roundup

Lou Coles reports



In August our Currumbin Creek crew monitored our CC1 site up against a gusty wind. The same north-westerly managed to quash plans for a South Stradbroke Island site training day but we have some keen boating volunteers around the Broadwater that might adopt those sites. We plan to establish monitoring sites in Tallebudgera Creek in the near future that will be more accessible for volunteers and less exposed to the weather (hopefully a good training site too).

At the moment we are putting our energy into mapping all of the seagrass meadows of the Gold Coast. We are doing this as part of turtle ecology research being conducted by Andrew Cuttriss at the Gold Coast City Council and with the help of Gecko volunteers Linda Ray, Daniella Wilken-Jones, Hugh Scarlett and South Stradbroke Island resident, Leighton Upton. This information will assist Seagrass-Watch on the Gold Coast in identifying areas to establish monitoring sites in the region, but will also be a useful tool (and scientifically rigorous data) for authorities to access when considering permits and applications.

The amount of time we've spent out there in the seagrass meadows at low tide has given us the luxury of observing numerous animals feeding amongst the exposed seagrass. My favourite was the Agile Wallaby (*Macropus agilis*) that was feeding on the seagrass that had been washed up onto the beach. Linda Ray was excited at seeing seven Royal Spoonbills (*Platalea regia*) all feeding amongst the *Zostera* opposite Tippler's camping grounds. We have also been lucky enough to see birds such as a family of Beach-stone Curlews (*Esacus neglectus*), migratory Eastern Curlews (*Numenius madagascariensis*) and many more that feed on the animals that live amongst the seagrass meadows. Upon completion of the mapping we hope to identify areas to establish monitoring sites that we will then call for volunteers to adopt. 🌱

[Taking over from Sheila Davis as the Seagrass-Watch local coordinator on the Gold Coast is Lou Coles. Having worked on Seagrass-Watch in Moreton Bay in the past she is excited to be back working in the marine environment and getting out there in the field - mud and all!!!]

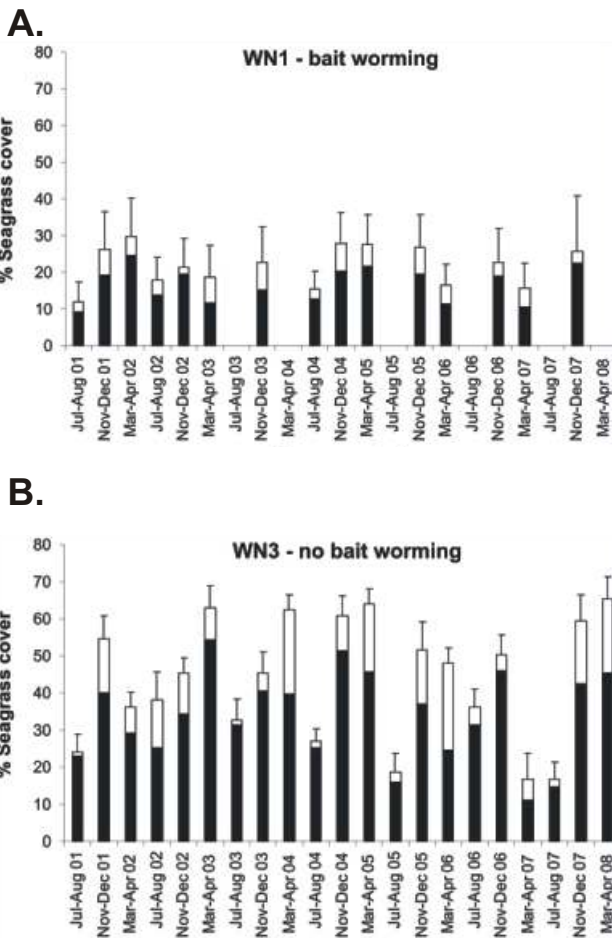


Figure 1. The percent seagrass cover (means and standard errors shown) and species composition (*Zostera muelleri* subsp. *capricorni* – black and *Halophila ovalis* – white) for two sites at Wynnum (A–WN1 and B–WN3) during each survey period since the Seagrass-Watch program began in Moreton Bay. Missing bars for WN1 (A) indicate the survey was not completed and so no data was available.



Sampling in Currumbin Creek, Gold Coast



Queensland

Noosa Roundup

Lee King reports



Seagrass-Watch in the Noosa River is supported by Noosa Integrated Catchment Association (NICA), Sunshine Coast Regional Council, Moreton Bay Community Seagrass-Watch and Queensland Parks and

Wildlife Service - Elanda Point. The majority of our funding is provided by SEQ Catchments and the Sunshine Coast Regional Council.

With over 52 members, ranging from school age to senior citizens, we have a large knowledge base of Noosa history from which to source information and share experience.

We are currently in our third year of sampling, so are starting to notice some interesting trends throughout the river system. The discovery of the existence of *Cassiopea andromeda* (the upside-down jelly-fish) within the network was one of our highlights from the Spring 2007 sampling round, though by Summer the population was mostly consumed by large stingrays, as well as



being affected by large influxes of fresh water from recent heavy rainfall (disrupts life-cycle).

All seagrass meadows are looking healthy except for those in Lake Doonella and Lake Weyba which are

showing some signs of stress from increased epiphyte cover and siltation. Results from the recent Winter surveys will be available soon, as some new volunteers were eager to get out on the river.



The applied coastal meadow sampling method has proven to be quite difficult to maintain due to the local conditions of the catchment, that of high silt and permanent water coverage. Method refinement

incorporating video recording may be the preferred sampling technique for this region, with trials hopefully starting soon in coordination with the team at Moreton Bay.

Local distribution of seagrass meadows was investigated earlier in the year via integration of remote sensing and GIS techniques. Local distributions and relative densities are presented in the following maps. 🌱

Noosa River-Lake Doonella and Goat Is. Seagrass Distribution



Noosa River-Keyser Is. Seagrass Distribution



Noosa River- Seagrass Distribution 2007



HAVE YOU REGISTERED WITH HQ??

To receive regular updates on the program and be a recognised member of the Seagrass-Watch community go to

www.seagrasswatch.org/register.html



Townsville



Regional Roundup

Posa Skelton reports



As we shrug off the winter woollies and

spring into the summer-months ahead, our thoughts are with our seagrass meadows and how they fared. We have been truly land-based in our activities and the withdrawal symptoms of the salt-spray were slightly abated by a fantastic global seagrass presentation by one of our seagrass members and a leading expert in seagrass Associate Professor Michelle Waycott in mid August.

In early July, Don and his troupe led our survey activities with Cockle Bay on July 4th. The next day Jacky and her team ventured down Bushland Beach to see their patch of grass. Just across the Bohle River were Sue and her army of volunteers on Shelley Beach. I was fortunate to be one of Sue's cadets



Monitoring Cockle Bay

where most of our quadrats were still under-water. I guess with anticipation of the winter blues - the seagrass hibernated, as the seagrass cover was noticeably lower than previous surveys.

A week after getting our feet muddy and sandy, Maureen, Julia, Sue and I attended a Community-based Social Marketing course organised by our partner, the Townsville City Council, on how to mobilise behavioural change in communities. We are hoping to use this psychology to get more people to join us at our seagrass surveys.

On August 14, we joined the Institute of Marine Engineering, Science and Technology to hear from Michelle Waycott on the latest status of seagrasses of the world. According to Michelle things don't look too good due to coastal developments in many parts of the world. This brings home the value of being part of a large community (Seagrass-Watch) keeping an eye on our environment.

Finally, as the seagrass is said to be greener on the other side, I will be moving to take up a new job in Fiji starting in mid-September. I would like to thank our Townsville Seagrass Volunteers for participating in all of our activities. Thanks also to our many local partners for supporting this worthwhile initiative. I will continue to be doing seagrass surveys from Fiji and I will keep in touch via our Seagrass-Watch Newsletters. With best wishes on your next seagrass survey. 🌱

several years working on her PhD on turtle biology. Once again, it is always great to have watchers with plenty of knowledge and experience in the marine field to enrich the seagrass watch experience. Thanks also to the rest of the gang, Rebecca, Samantha, and Posa.

It is with sadness that we farewell Posa Skelton to the fairer seagrass fields of Fiji, for a one year appointment with the University. We wish him well, and thank him for such an unstinting voluntary contribution in his role in Seagrass-Watch co-ordination in Townsville, and for sharing his marine expertise with us. We hope he will be back. 🌱



The Shelly Beach Team with Posa for the last time. Hope we see you back in familiar fields again!!

Magnetic Island, Cockle Bay

Dr Don Kinsey reports



Some dramatic changes were observed over the last six months, including a seagrass decline in July after the highest abundances (since monitoring began) were recorded in May.

Abundances were very high in both April and May, however significant changes over that one month were observed. The dominant *Cymodocea serrulata* was looking much older in May with considerable dead or sunburnt leaves and very few new leaves. By contrast, the cover of *Halodule uninervis* was much more obvious with well-developed, new, vigorous, clean leaves. The substantial mounds of *Halimeda* sp noted in April were still quite obvious but the alga was mostly dead or dying. The same can be said for the numerous green sponges also noted in April. The numerous small gastropods evident everywhere in April were quite scarce in May.

The dramatic reduction in cover by July gave lower values than in either July 2007 or July 2006 (the earliest available). Perhaps this can be attributed to the peculiar weather pattern with distinctly warm weather initially followed by unusually cold weather with a very sudden onset in June. The dominant *C. serrulata* was short and old. The flush of new growth of *H. uninervis* noted in May was not persisting. While diatomaceous mud continued to dominate the epicover, the usual winter occurrence of filamentous algae on the seagrass leaves was becoming noticeable. The summer mounds of *Halimeda* sp and the numerous green sponges of the summer period were largely absent by July and any remaining were essentially dead.

Cockle Bay continues to exhibit extremely low occurrences of seed which is interesting in a site with rather high seagrass cover throughout most of the year. 🌱

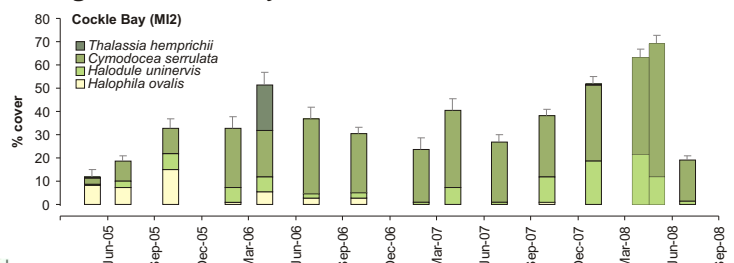
Shelly Beach

Sue Mulvany reports



A small but intrepid band of Seagrass-Watchers carried out the July survey. The seagrass in the SB1 sampling area was looking even sadder than previously, with only four of the 30 quadrats with more than 3% cover. The seed count was also not very reassuring, however, the seagrass has come and gone several times since monitoring began apparently, so fingers crossed the grass will return!

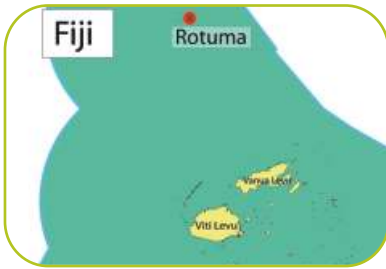
As always it was a pleasant afternoon, and great to welcome newcomer Vera Polikarpowski, and also Julia Hazel - returning after



From the schools

LäjeRotuma and Seagrass monitoring

Alfred Ralifo reports



It's the 21st of August, a bright, sunny afternoon on the second day of the LäjeRotuma 2008 eco-camp. A group of campers comprising of ten energetic youngsters, two adult campers and Sholto Fanifau of the UNDP- GEF Small Grants Programme together

with Alfred Ralifo of LäjeRotuma Initiative headed for Maka Bay on the island of Rotuma to conduct the annual seagrass monitoring, as part of the eco-camp programme.



The Rotuma Schools' annual eco-camp is an environmental awareness event aimed at creating a culture of biodiversity conservation targeted at young campers aged at 9 to 18 years olds. The 3-day camp schedule involves young eco-campers in fun-filled learning

interactions with their natural environment, from bird watching, forest walks, beach profiling, snorkelling and seagrass monitoring. Creative art and craft sessions utilizing local materials also had eco-campers gain a different perspective on the recycle, reuse and reduce principles for common household containers (normally thrown away as rubbish).



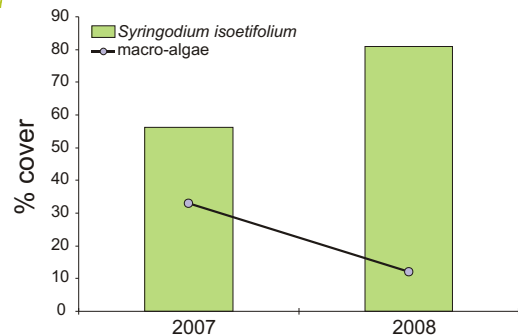
Maka Bay.
Image courtesy of Google maps

The seagrass field trip to Maka Bay was especially a memorable experience for many of the teenage eco-campers, as it was their first time to conduct surveys. Maka Bay is the only area where seagrass is found and its significant role as a nursery and breeding area for small fish and marine life as well as a source of food for many important species like the turtles. Prior to the actual survey work, Alfred the seagrass leader, provided a short orientation of what each group of eco-campers would do. There were two groups with at least 5 eco-campers each and two adult supervising eco-campers, who then conducted the survey of the seagrass cover and habitat. During their observations, the young eco-

campers were curious about a lot of things such as the scientific names of the types of seagrass found at Maka Bay; the difference of seagrass and seaweed; the many types of snails and other invertebrates and why they were important in the seagrass area! Tipu Avaiki of Rotuma High School was particularly enthusiastic about the whole Maka Bay experience and quoted: "I'm so excited and glad to be part of the seagrass monitoring team because I feel like a real scientist when I am collecting data. Before, I used to take the seagrass meadow at Maka Bay for granted but now I really appreciate the significance of this meadow to my island community and its ecosystem!"



This was only a two hour field trip and each group surveyed two 100m long transect belts (from shore towards the outer reef) and parallel to each other. The groups were able to survey 400m along the Maka Bay shoreline, whereby, a 100m interval was allowed between each transect belt. The main invertebrates observed were sea cucumbers (mean = 2.2 individuals per quadrat), gastropods (3.9 per quadrat) and sponges (12 per quadrat). The graph below summarizes the results of the seagrass survey.



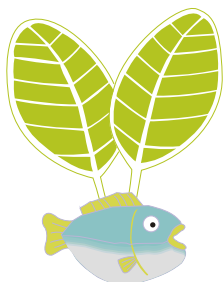
Rotuma is a Fijian Dependency, consisting of the island of Rotuma and the nearby islets of Hatana, Haf Liua, Solkope, Solnohu and Uea. The island group is home to a small but unique indigenous ethnic group which constitutes a recognizable minority within the population of Fiji, known as

"Rotumans". Its population at the 1996 census was 2,810, although a large exodus of Rotumans from the island sees the population on mainland Fijian islands totalling 10,000.

Located 465 kilometres north of Fiji. Rotuma Island itself is 13 kms long and 4 kms wide, with a land area of approximately 43 sq km. It is a shield volcano made of alkali-olivine basalt and hawaiiite, with many small cones, and reaches 256 metres (840 ft) above sea level. While very secluded from much of Fiji proper, the large reef and untouched beaches are renowned as some of the most beautiful in all of Fiji.

Although the island has been politically part of Fiji since 1881, Rotuman culture more closely resembles that of the Polynesian islands to the east, most noticeably Tonga, Samoa, Futuna, and Uvea. Because of their Polynesian appearance and distinctive language, Rotumans now constitute a recognizable minority group within the Republic of Fiji. As recently as 1985, some 85 percent of Rotumans voted against opening the island up to tourism, wary of the influence of Western tourists.

<http://en.wikipedia.org/wiki/Rotuma>



Animal Facts

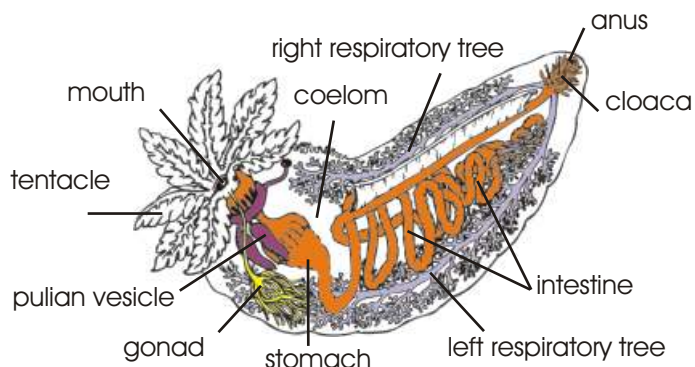


Sea Cucumbers

The sea cucumber may be named after a plant and look like a slug, but it's actually an animal closely related to a starfish.

Sea cucumbers are echinoderms (class Holothuroidea) that are found in a variety of sea floor habitats globally, from warm tropical waters to cold deep sea trenches. However they are most common in seagrass meadows of the Indian Ocean and the South West Pacific. There are about 900 species and they have a life span of 5 to 10 years.

The body of the sea cucumber is elongated, leathery and muscular. Within the skin are microscopic calcified structures (ossicles or sclerites) joined by connective tissue. Five double rows of tube feet (with tiny suction cups) run along the body; they are used for crawling along the sea bed or anchoring to a rock. Sea cucumbers lie on their sides with a mouth at one end and anus at the other. Surrounding the mouth are 8 to 30 tentacles.



Main internal anatomical features of a sea cucumber. Drawing by Ivy Livingstone. Copyright 1995 BIODIDAC.

Sea cucumbers breathe by taking in water through their anus. Running internally along the length of the body is a pair of respiratory trees. To breathe, water is pumped in through the anus and up through the respiratory trees. The water is then flushed out through the anus again.

There are two types (sub-classes) of sea cucumbers: Dendrochirotea have branched feather-like tentacles and feed on plankton in the water column; Aspidochirotea have shield-shaped tentacles and feed on organic debris (dead plant and animal material) in the sea floor. Some simply shovel sediments into their mouths with their tentacles and process the edible bits, leaving behind them a trail of sausage-like lumps of processed sediments. Some sea cucumbers have been estimated to process 130kg of sediments per year!

Most sea cucumbers are separate sexes. Their reproductive organs are near the front of their body and most species release sperm and eggs simultaneously for external fertilisation. Some spawning sea cucumbers raise their front end in a cobra-like posture when releasing their eggs and sperm. When an egg is fertilized and hatches, the tiny planktonic larva drifts with the ocean currents. It will eventually settle into seagrass meadows or onto the sea floor and develop into an adult.

Some species spend their whole life in seagrass meadows (e.g. *Holothuria atra*) whereas other species use the seagrass as a nursery. For example, juvenile sandfish (*Holothuria scabra*) are often observed in intertidal seagrass meadows. During low spring tides you can often see them emerging from the sediment late in the afternoon to start feeding. When the juveniles mature, they move into deeper waters.

Sea cucumbers protect themselves by hiding, containing toxins or by expelling their entire digestive system and other internal organs. Depending on the species, these can emerge from the front or back end of an animal. Some species eject sticky white threads (called Cuvierian tubules) from their anus. These immobilise the predator in a gummy mess. Replacement tubules grow back in one-and-a-half to five weeks.

Sea cucumbers play an important role in nutrient recycling by constantly processing the sediment. Scientists are also studying the toxins for possible medical and other applications. Some compounds exhibit antimicrobial activity or act as anti-inflammatory agents and anticoagulants. Fishers in the Pacific islands use the toxins, which act as respiratory inhibitors, to entice fish and octopus from crevices. Furthermore, the sticky Cuvierian tubules are placed over bleeding wounds as a bandage.

The sea cucumber is a prized food, particularly on Asian markets, where it fetches good prices in a smoked, dried form used in soups and, according to some reports, as an aphrodisiac. In its prepared form, sea cucumbers are known as trepang or béche-de-mer. However, some edible sea cucumbers are globally threatened by over-harvesting.

Across the Indo-Pacific, sea cucumber aquaculture has been investigated to reduce wild harvest. There is also increasing interest in the use of hatchery produced juveniles to restore depleted fisheries and create livelihoods for Pacific Islanders. However, the production and release techniques for restocking and sea ranching have not yet been shown to be economically viable.

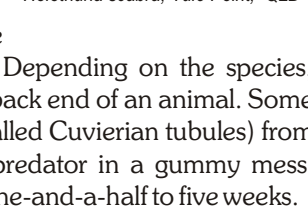
A study is currently underway on Vanua Levu in Fiji for the valuable sandfish, *Holothuria scabra* (dairo in Fiji). A component of the ACIAR funded project "Developing aquaculture based livelihoods in the Pacific Islands and tropical Australia", the study focuses on transfer of production technology and release strategies. Partners in the project include Fiji Department of Fisheries, Hunter Pearls, USP and FLMMA. Seagrass-Watch HQ is providing advice to assist the assessment of suitable seagrass habitat sites for juvenile release (assuming hatchery phase is successful) later this year. 🌱



Holothuria atra, Green Is, QLD



Holothuria scabra, Yule Point, QLD



Diaro, Fiji



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Front page banner: Len McKenzie surveying seagrass, Solomon Islands. Photo by David Wachenfeld, Triggerfish Images. ISBNW logo artwork by Margot Hensing-Lewis.



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

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