



Australian Government
Great Barrier Reef
Marine Park Authority

SEA READ

FROM CATCHMENT TO CORAL

No. 37
Jan/Feb 2011

Special Climate Change Supplement



Flood impacts on Reef

Tourism taking action

Reef Guardian Schools awarded

Fishers are doing their bit



Cover: Bleached staghorn corals on Keppel Island Reefs with fluorescent purple tipped corals in foreground.

Chairman's message



with those communities affected. When Prime Minister Julia Gillard visited Rockhampton, she took the time to discuss the flood's impact on the Great Barrier Reef. With such a significant flood plume bringing sediments, nutrients, pesticides and other contaminants into the southern part of the Great Barrier Reef, the GBRMPA will continue to monitor and assess its impact.

While the GBRMPA, its partners, schools and communities achieved so much in 2010, we have a long road ahead to continue to reduce the impacts of climate change, the greatest long-term threat to the Reef. I look forward to working with everyone this year in our shared goal to protect the Reef for future generations.

Russell Reichelt
Great Barrier Reef
Marine Park Authority

Welcome to our new-look *SeaRead* newsletter, which we've redesigned to better present the news of the Great Barrier Reef. It includes the first in a series of in-depth supplements focussing on key issues. Climate change seemed an obvious choice for this first special newsletter feature, as future predictions of climate change dominate most aspects of the Reef's outlook over the next few decades. The ability of the Reef to withstand the impacts will depend on its resilience in the immediate future. It's important for us to understand what we can do to build the Reef's strength so it can cope with the stresses on its ecosystem.

Schools, organisations and businesses have implemented a range of environmental initiatives that are invaluable in supporting the health of the Reef. This includes the work undertaken on Lady Elliot and Low Isles islands to reduce energy consumption. Initiatives include installing a new solar-powered energy system.

The 2010 Reef Guardian Awards were announced late last year, recognising 10 Queensland schools along the Great Barrier Reef that have adopted best practice environmental initiatives. The winning

schools were awarded for reducing their carbon footprint, sustainability, encouraging behavioural change in their community and restoring local wetlands. We congratulate the 10 award winners and also acknowledge the good work of all the 230 Reef Guardian Schools.

Fishers are also taking action to future proof their industry in the face of threats from climate change. Many people rely on fishing for their livelihoods and a healthy Reef is vital to the seafood industry. The Great Barrier Reef Marine Park Authority (GBRMPA) has introduced an online emissions calculator to help fishers measure and reduce their carbon footprint.

The Queensland Seafood Industry Association is also actively supporting the GBRMPA by encouraging fishers to report sightings of species of conservation concern, such as marine turtles. With commercial fishers spending a large part of their lives on the water, their observations of species and habitats is critical in the protection of some marine animals.

In early January, flood waters devastated Queensland towns and the GBRMPA's thoughts are

...future predictions of climate change dominate most aspects of the Reef's outlook over the next few decades.

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Aboriginal and Torres Strait Islander readers are advised that this publication may contain names and images of deceased persons.

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ISSN 1834-6774

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Flood impacts on Reef discussed with the Prime Minister

The mouth of the Fitzroy leading into the Great Barrier Reef Marine Park.
Photo courtesy CQ Environmental/GKI Resorts Pty Ltd

During Queensland's recent floods, Prime Minister Julia Gillard met with the Great Barrier Reef Marine Park Authority's Southern Regional Liaison Officer Kalair Conaghan to talk

about the impact on the Reef.

Kalair said the briefing, held in Rockhampton, was a great opportunity to discuss the effects of a freshwater flood plume that

extends out from the Fitzroy and Burnett catchments into the Marine Park.

"The Prime Minister was particularly concerned about the community," Kalair said.

"We spoke with her about local people's concerns regarding the impact of the floods on the Reef and any flow-on effects this might have on industries such as tourism and commercial fishing that rely on the Reef."

The Prime Minister was advised that the full effects of the flood plume wouldn't be known for some time. There has been an increased flow of sediments, and elevated levels of nutrients, pesticides and other contaminants into the southern part of the Great Barrier Reef.

However as part of the

Reef Rescue Monitoring Program, the GBRMPA in conjunction with its partners and the community will continue to monitor the impact of the flood plumes.

"We also talked about our other programs that build the Reef's resilience, which will help corals and associated ecosystems to be better able to deal with stresses such as this plume," Kalair said.

"It was a great opportunity to talk to the Prime Minister about this significant event and voice the community's concerns."

Presently, the area affected by the flood plume is localised to a part of the Central Coast off Queensland, which only covers a small percentage of the Great Barrier Reef. Most Great Barrier Reef tourism operators remain open for business.





Mother of Good Counsel School received the Reef Guardian 'r-Amp It Down' award

Reef Guardian Schools recognised

Ten Reef Guardian Schools throughout the Great Barrier Reef catchment have been rewarded for their environmental work.

Minister for Sustainability, Environment, Water, Population and Communities Tony Burke said the schools received prestigious Reef Guardian Awards and \$1000 to continue their environmental initiatives that protect the Great Barrier Reef for the future.

"The Reef Guardian Schools Program provides students, teachers and their communities with the opportunity to instigate positive change for the environment in the face of threats like climate change," Mr Burke said.

"It is fantastic to see the contribution our young people are making to protect the World Heritage listed Great Barrier Reef

and reduce the pressures on its ecosystem.

"These awards and funding grants will assist the schools to further their onground projects and implement their Reef Guardian Action Plans."

Among the winners were three Reef Guardian Schools in Cairns, including Mother of Good Counsel School, Trinity Anglican School and Gordonvale State School.

Great Barrier Reef Marine Park Authority Reef Guardian Schools Program

Manager Megan Sperring said Gordonvale State School won the Reef Guardian Champions award for a raft of sustainability initiatives.

"The school's initiative aimed to create a culture of environmental sustainability within the school and local community with a particular emphasis on long-term behaviour change," she said.

"Mother of Good Counsel School won the Reef Guardian 'r-Amp It Down' award for their commitment to reducing their carbon

footprint and looking after the environment.

"Trinity Anglican School won the 'Habitat Heroes' award for their tireless work in restoring Sawpit Gully, which is an ongoing project that saw students stabilise the site that feeds to Trinity Inlet and the Great Barrier Reef."

Entering its eighth year, the Reef Guardian program currently sees more than 60 000 students from over 230 schools committed to the protection and conservation of the Great Barrier Reef.

Our champions

Thuringowa State High School *Sea 'Stars' Award* for youth-directed and owned activities

Yeppoon State School *Waste Watchers Award* for reducing, reusing and recycling

Feluga State School *Water Warriors Award* for water conservation or water quality improvement

Mercy College *Learning Legends Award* for outstanding education in the classroom arena

Miriam Vale State School *Action in Adventures Award* for action in the field

Burdekin Christian College *Community Connection Award* for reaching out to the local community

Trinity Anglican School *Habitat Heroes Award* for outstanding improvement in the local environment

Ayr East State School *Bright Sparks Award* for creativeness, inventiveness and innovations

Gordonvale State School *Reef Guardian Champions Award* for mentoring or facilitating higher learning

Mother of Good Counsel School *'r-Amp It Down' Award* for reducing their ecological footprint



CLIMATE Change

S U P P L E M E N T

Climate change is real and it's affecting the Great Barrier Reef

The Great Barrier Reef Outlook Report 2009 identified climate change as the greatest threat to the long-term health of the Great Barrier Reef.

Rising temperatures, increased ocean acidification, rising sea levels and increased storms and cyclones have already had an effect on the Reef.

Some climate change impacts on marine life include the gender balance of marine turtles tipping to more females, a lower success rate of turtle nests as well as disruption to seabirds' feeding patterns.

Rising temperatures are also detrimental to the health of the Reef as they increase the risk of coral bleaching.

The last decade alone has seen two of the warmest five-year average

sea surface temperatures recorded and the average temperature over the past 30 years also increased by about 0.4°C.

At least 50 per cent of coral reefs in the Great Barrier Reef faced unprecedented bleaching in 1998 and 2002. On each occasion, it is estimated that up to five per cent of the Reef was severely damaged.

In addition to impacts from rising temperatures, acidification is also reducing the coral's growth rate and structure through increased acidity in the water.

An increase in the severity and frequency of extreme weather conditions has also been recorded in the past five years.

Prior to 2005, there was only one category five

cyclone in 35 years. Since 2005 two category five cyclones have hit the Reef, one of which was cyclone Hamish in 2009.

Cyclone Hamish travelled down the Queensland coast and caused extensive damage to the Reef, which led to social and economic impacts for industries and communities that depend on the Reef.

However because of efforts from the broader community to build the resilience of the Reef it has been able to recover from

these incidents.

In light of this evidence, the Great Barrier Reef Marine Park Authority (GBRMPA) is working to build the health of the Great Barrier Reef against impacts from climate change.

Just as a healthy person is better able to cope with an illness, a healthy Reef is better able to cope with stresses on its system.

Communities, schools, organisations and councils are working with the GBRMPA to build the health of the Reef by working to improve water quality and protecting habitat biodiversity.

Summer's here

Over summer, marine managers and scientists have been keeping a close eye on the Great Barrier Reef.

High sea surface temperatures, cyclones and flood run-off are all linked to Queensland's summer and

can pose a threat to the health of the Reef.

Field officers from the Department of Environment and Resource Management and several tourism operators have undertaken surveys to provide an early warning of coral bleaching and storm damage.

Low Isles and Lady Elliot Island get a 'green' makeover



Lady Elliot Island

With a helping hand from the GBRMPA, Lady Elliot Island Resort and Low Isles have had a green makeover to reduce energy consumption and carbon emissions.

The eco-friendly islands are popular tourism, recreation and research spots, and are now operating in a more climate friendly way.

Low Isles, offshore from Port Douglas, has a new

solar-powered energy system and it also now uses environmentally friendly biodiesel in other systems.

A change to their sewage treatment system has halved their energy usage to 7.5 kWh/day.

Since Lady Elliot Island Resort's initial energy audit in 2007, electricity use has decreased by 32 per cent and a hybrid solar power station is now providing

power to the resort.

Together with the GBRMPA, the Lady Elliot Island Resort added a trail of interpretive signs to educate visitors on how climate change could affect the island.

The signs display how various ecosystems on the island could be affected by increased sea temperatures and storms, rising sea levels and ocean acidification.

It showcases responsible island management and suggests how visitors can help mitigate climate change to protect the Great Barrier Reef.

The sustainable energy use initiatives on Low Isles and Lady Elliot Island are being showcased as examples of best practice management for other islands and resorts.

Tourism industry takes action

Great Barrier Reef tourism operators are taking action to climate-proof their industry in the face of a changing climate.

In partnership with the GBRMPA and the Queensland Government, tourism industry leaders have developed the Tourism Climate Change Action Strategy to provide a blueprint for industry and management action.

Since its launch in 2009, tourism operators have adopted business practices that are both good for the environment and good for their bottom line.

Initiatives include tourism operators becoming carbon neutral, using low-emission outboard engines on boats and purchasing 'green' products such as reef-friendly cleaning products or recyclable materials.

Detailed climate change actions included in Ecotourism Australia's Eco Certification Program mean that all of the Marine Park's high standard tourism operators are now seriously addressing climate change.

Operators have received guidance on how to assess the climate change threat to their businesses and have kick-started their Eco and

Climate Action Certification applications through workshops run by the GBRMPA and tourism industry partners.

A range of online tools, including an emissions calculator that identifies ways to reduce emissions, can help operators push through the climate change clutter and take practical action.



Fishers team up on climate change

The seafood industry depends on a healthy Reef for its livelihood and fishers have teamed up with Marine Park managers to

future proof their industry against climate change.

An online emissions calculator, developed by the GBRMPA and the

Queensland Seafood Industry Association (QSIA), allows fishers to measure and understand their carbon emissions,

providing the opportunity to be more energy and cost efficient.

In addition to this, the GBRMPA conducted a series of workshops to show fishers how to use the tool and encourage them to look at ways to minimise their energy use and improve waste management.

In 2009 a Climate Change Liaison Officer was appointed to the QSIA to facilitate fisheries and climate change related projects established under the partnership.

The liaison officer provides a contact for commercial fishers on all matters relating to climate change.

The partnership between the QSIA, marine managers and the GBRMPA is giving the Great Barrier Reef a better opportunity for a sustainable future.

Pro-vision Stewardship Action Plan

In a world first, fishers, managers and scientists are working together to ensure the wild capture aquarium harvest industry of the Great Barrier Reef remains sustainable under impacts from climate change.

The innovative *Pro-vision Stewardship Action Plan* sets standards across the industry to plan low impact strategies for collecting and to provide information on the health of habitats.

The Action Plan will also help to assess the vulnerability of the marine aquarium supply industry to climate change.



Reef Guardians do their bit

More than 230 schools and 13 councils in Queensland have pledged their support for the Great Barrier Reef through their involvement in the Reef Guardian Program.

The action-based program empowers students, teachers, schools, communities and councils to be leaders in sustainable living and to help build the Reef's resilience against the impacts of a changing climate.

Councils are working to build and maintain the resilience of coastal and marine areas to climate change impacts.

These actions are leading to a more coordinated environmental planning and management approach to address the impacts on the Great Barrier Reef.



The Reef Guardian Schools program provides the future custodians of the Great Barrier Reef with the opportunity to take the lead in the Reef's protection.

Students are involved in everything from recycling, composting and reducing

energy to improving water quality and water conservation.

The GBRMPA has also sponsored the Energy Wise Schools program for schools to reduce energy consumption and raise awareness and encourage

the wider community to adopt energy efficient practices.

In 2011 the Reef Guardian program will expand to include fishers, farmers and graziers, to further protect the Reef for its future.

Reef HQ goes energy efficient

Reef HQ Aquarium is actively reducing its carbon footprint and energy use.

The move follows a recent audit of water and energy systems that showed how better environmental initiatives could also result in economic benefits.

The first steps in a five year plan to significantly decrease energy consumption saw Reef HQ

replace all incandescent globes with compact fluorescents and all tubular fluorescent lamps with LED lighting.

In addition, pumps were replaced to be more energy efficient and variable speed drives were installed on large tank pumps.

The GBRMPA is also improving business and environmental practices to decrease its carbon emissions and improve its environmental performances.

This includes waste management processes, increased use of videoconferencing as

The Reef is in our hands

We all have a role to play in keeping the Great Barrier Reef healthy against impacts from climate change. Here are a few handy hints that will go a long way in the Reef's protection:

- Choose environmentally-friendly products, such as biodegradable detergents
- Install energy-efficient lights
- Leave your car at home
- Check your fridge temperature
- Keep cool with fans and use air conditioning efficiently
- Lower your hot water temperature
- Let your clothes dry naturally
- Turn off appliances at the wall when you are not using them
- Recycle, reduce and reuse

opposed to travel and incorporating good environmental practices into daily staff activities.

The process is being implemented by the agency's Green Office Committee.



Crabbing along Queensland's coast

Summer and crabbing go hand-in-hand along Queensland's vast coastline and all crabbers have a part to play in reducing impacts on the environment.

Along the Great Barrier Reef some crab pots can trap other marine animals, such as turtles, and the pots can also become lost and continue to 'ghost fish' – meaning it could continually trap marine animals.

In light of this, Fisheries

Queensland in partnership with the Department of Environment and Resource Management recently released an information package on how to crab responsibly.

Minister for Primary Industries, Fisheries and Rural and Regional Queensland Tim Mulherin said that when crabbing, it is important people follow the fishing rules.

"The information package aims to educate people about crab pot construction

to help reduce the catch of non-target species such as turtles," he said.

"Often badly constructed crab pots can trap other marine animals.

"The practices outlined in this package will help us to ensure the sustainability of our fisheries for future generations."

For a copy of the responsible crabbing guidelines contact Fisheries Queensland on **13 25 23** or visit www.deedi.qld.gov.au

Crabbing responsibly

- Adjust the pot opening size – a maximum pot opening size of approximately 60cm in circumference or smaller is recommended
- Adjust the pot weight – pots should weigh about 3kg or more to ensure they sit firmly on the sea floor
- Use the right rope – pots should be secured by an approximately 6mm UV stabilised rope, which is either not buoyant or is weighted so it hangs below the surface of the water
- Consider pot construction – if a pot is constructed of trawl mesh (or a similar material) then it should be of reasonable quality so that it will not easily entangle marine species
- Maintain pots – crabbing gear should be maintained regularly. This means regular cleaning and repairing or replacing any damaged pots, ropes or floats.

BRIEFS

Reef HQ Aquarium makes a splash

After winning three awards at the North Queensland Tourism Awards in November, Reef HQ Aquarium was named as a finalist in two categories at the Queensland Tourism Awards.

Reef HQ Aquarium Director Fred Nucifora said it was an honour to make the finals in both the Significant Tourism Attraction and New Tourism Development categories.

The LMAC is put to the test

The Capricorn Coast Local Marine Advisory Committee (LMAC) recently hosted a Reef-themed trivia night for more than 80 people.

The trivia night was a success in increasing local knowledge of the Reef and was supported by the Great Barrier Reef Marine Park Authority and Fitzroy Basin Association Incorporated.

Compliance boost

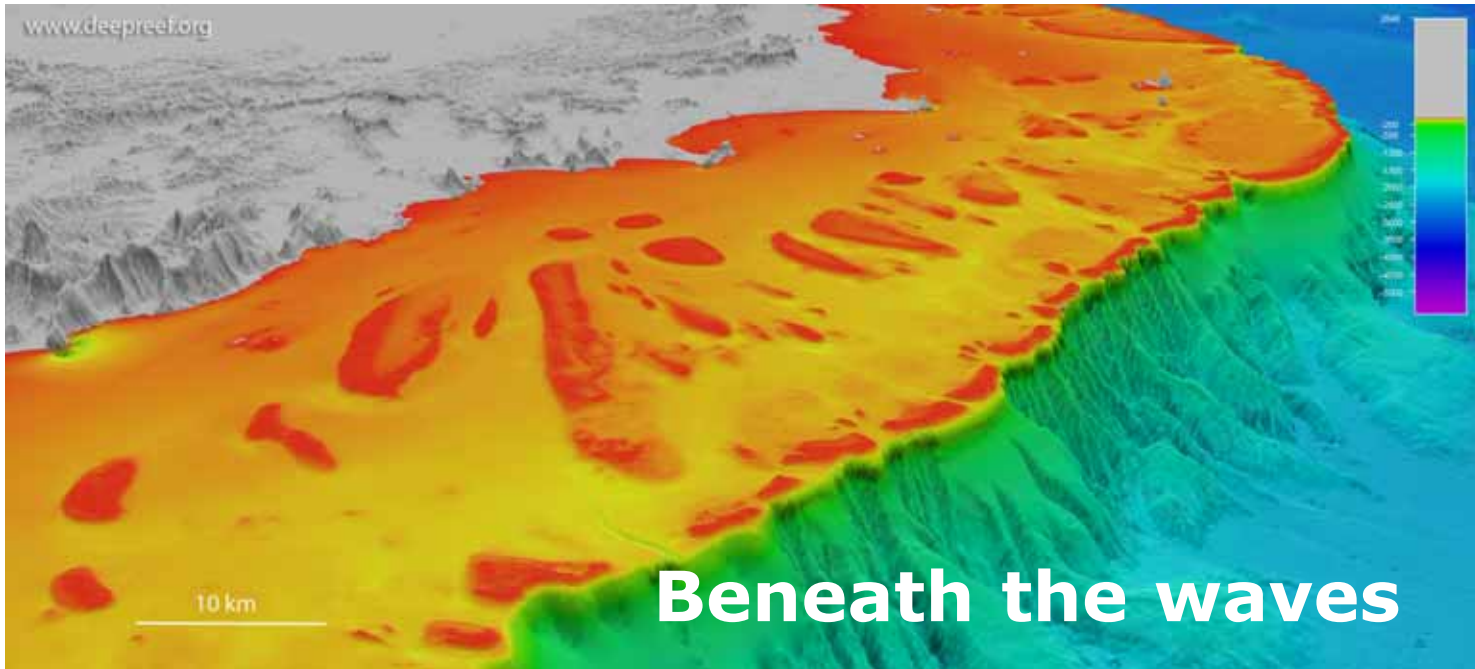
The Great Barrier Reef Marine Park Authority works in partnership with Traditional Owners to improve the management of the Marine Park.

Two Indigenous Community Liaison Officers have been employed to support this work.

The best job just got better

The Best Job in the World's Ben Southall will be travelling along the Great Barrier Reef this year in the Best Expedition in the World campaign to promote the Reef.

The three month journey will commence in May from the Town of 1770.



Undersea canyons off the coast of Cooktown

A scientist has developed 3D images that plunge viewers kilometres deep into the Great Barrier Reef's waters – exposing submarine canyons, underwater seabeds and soaring undersea mountains.

It took James Cook University's Dr Robin Beaman three years to create the 3D model of the Great Barrier Reef but he

has revealed the seafloor in extraordinary detail.

"Users can see vast underwater dune fields, the extensive algal reefs on the northern Great Barrier Reef shelf and ancient river channels preserved in seabeds," Robin said.

"We're able to show the true shapes of the coral reefs, including the older and deeper Pleistocene bases upon which modern

reefs have grown."

An unbroken 900km-long line of fossil barrier reefs and ancient river beds can also be seen for the first time in the 3D depth model, creating unprecedented imagery of what lies beneath the sea surface.

To create the model, data was collected from nearly 1000 million individual points in the Reef through a number of sources

including underwater robots and satellite imagery.

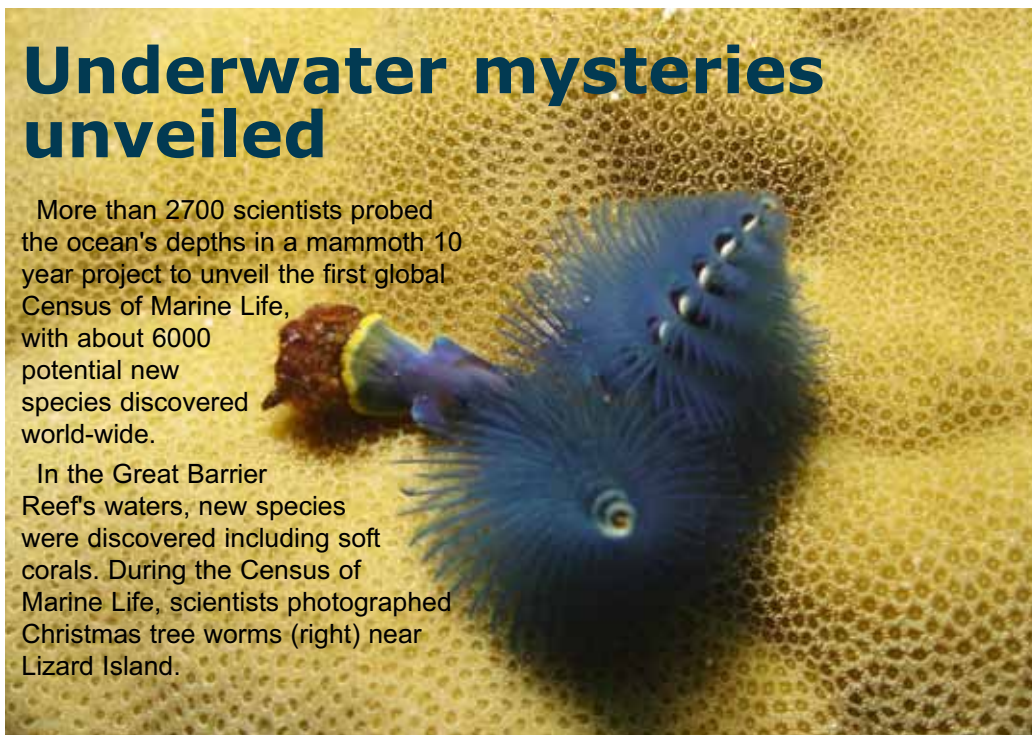
"Previously we've had little understanding of what exists below 20m, so it's very exciting to be able to map from the coastline all the way down to the abyss, over five kilometres deep," Robin said.

"Coral reefs comprise only five to seven per cent of the geographical area of the Great Barrier Reef World Heritage Area, and even the most experienced of divers will usually only dive down around 40m.

"It certainly gives you a sense of how dramatic the undersea landscape is and how little we really know about it."

The model may be used as a solid foundation for other research aimed at improving the understanding of the Great Barrier Reef.

It could also allow oceanographers to accurately map currents and biologists to target important sites on the seafloor for studying deep sea marine life.



Underwater mysteries unveiled

More than 2700 scientists probed the ocean's depths in a mammoth 10 year project to unveil the first global Census of Marine Life, with about 6000 potential new species discovered world-wide.

In the Great Barrier Reef's waters, new species were discovered including soft corals. During the Census of Marine Life, scientists photographed Christmas tree worms (right) near Lizard Island.

BRIEFS

Celebrating National Water Week

As part of National Water Week, the Mackay Local Marine Advisory Committee and Reef HQ offered a Reef video conference as first prize in a colouring-in competition.

All Reef Guardian Schools in Mackay and the Whitsundays region were invited to enter and Philippa Vella from St Anne's Catholic Primary School was announced the winner.

New wing for Turtle Hospital

In just over a year, about 50 marine turtles have been cared for at the Reef HQ Aquarium Turtle Hospital, and now it's time for expansion.

To meet the demands of the increasing number of patients, the hospital's capacity will be doubled with the addition of a second wing. It will house another eight tanks.

Reef HQ Aquarium will again be relying on generous donations from the community and corporate sector to make this dream a reality. To find out how you can make a donation please call (07) 4750 0800.

Snapper closure

A six week reef closure will take place early this year to help reduce fishing pressure on Queensland's over-fished snapper stock.

The closure will apply along the Queensland east coast from 15 February to 31 March 2011, making snapper, teraglin and pearl perch off limits until new management arrangements can be finalised.



Reef HQ traineeship program opens doors for local Indigenous youth

Reef HQ Aquarium has opened its doors to Indigenous youth with an opportunity to complete a Certificate in Tourism through the Sea Country Connections Traineeship Program.

The 12 month program aims to develop future Indigenous leaders, providing them with on-the-job training and the opportunity to share their cultural and spiritual connections to the Great Barrier Reef.

Khrishna Wyles, a Girramay Traditional Owner in the Cardwell region, said the program has made her more aware of her cultural heritage.

"Through the traineeship program I'm learning to guide tours through the Aquarium, which includes school visits such as the Reef Sleeps educational sleep over program," she said.

"The traineeship has made me more aware of my cultural heritage, because it's not something I knew much about growing up."

Khrishna said she sees opportunities for her generation through the tourism traineeship.

"Aboriginal and Torres Strait Islander children need to have faith in their abilities," she said.

"I used to be very shy, and didn't believe in myself, but now I can look back and see how far I've come already.

"I want to use this opportunity to open doors in the travel industry. One day I'd like to work as a travel agent, and travel myself. My dream is to travel to Canada, and learn about that country's Indigenous people."

The Sea Country Connections Traineeship Program is part of the Great Barrier Reef Marine Park Authority's Caring for our Country Reef Rescue Indigenous Land and Sea Country Partnerships Program funded by the Australian Government.

Calendar of events 2011

4 January

GBRMPA offices reopen

1-23 February

LMAC meetings

- 1 Capricorn Coast
- 2 Gladstone
- 8 Port Douglas
- 9 Cairns
- 15 Hinchinbrook
- 16 Cape York, Cassowary
- 17 Burnett, Townsville
- 21 Mackay
- 23 Whitsunday

2 February

World Wetlands Day

What can I do?

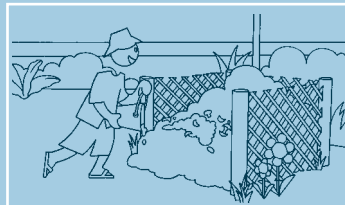
Composting

We are running out of space to dump our rubbish! Recycling is just one way to reduce the amount of litter that may go into the Great Barrier Reef. What about your apple cores and bread crusts?

You can also reuse and reduce the amount of food scraps by creating your own compost in the backyard, which in return will give you rich fertiliser for your gardens.

Here are some handy hints while creating your first compost:

- While you can buy special composting bins, you could also just use a large wooden box - it's cheaper
- A bigger bin makes it easier to turn the compost later
- Keep your layers loose - compost needs air
- Put the coarsest waste on the bottom
- Make sure your bin has a lid so your compost doesn't dry out or get soggy. It also helps to keep out flies, pests and pets
- Your bin should have no bottom so earthworms can get in and out
- For a better result, you can sprinkle manure, blood and bone or lime between the layers.



Creature feature

The echinoderms *starfish and their relatives*

Starfish, featherstars, brittlestars, sea urchins and sea cucumbers all belong to a group of animals called echinoderms.

Each of these animals has no head or brain, yet they have some amazing features and once you start to learn more you will never look at them the same again!

Starfish are probably one of the more easily recognised animals on the Great Barrier Reef with their five 'arms' and variety of colours.

Feeding

Echinoderms have a range of feeding techniques such as:

- Sea urchins use a tooth-bearing jaw structure known as 'Aristotle's lantern' to scrape algae from rocks.
- If it needs to, a starfish's stomach can come outside its mouth to begin digesting food and eventually the stomach and partially digested food is sucked back into the starfish's body.



Starfish provide another splash of colour to the Great Barrier Reef

- Sea cucumbers act like vacuum cleaners, they suck up sand, extract the food, then expel the clean sand.

Reproduction

- Some starfish and brittlestars are capable of asexual reproduction, where a new starfish can

be produced from body fragments.

- Sexual reproduction usually involves mass spawning. Many sea cucumbers rear up like snakes and sway in the water as eggs and sperm are released from a pore on their head.



Sea cucumber

Moving about

- Generally slow movers, echinoderms have tentacle-like structures called tube feet.
- Fluid passes in and out of the tube feet with the help of muscles surrounding each foot. This creates a suction effect and helps to move the animal along.

These animals can be easily damaged if handled by people diving and snorkelling. Avoid touching any plants or animals when you are out enjoying the Great Barrier Reef.