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BOOST TO IRUKANDJI RESEARCH

The Federal Minister for Science Peter McGauran announced \$100,000 funding to be allocated to the Great Barrier Reef Research Foundation to assist efforts to increase understanding of irukandji jellyfish and minimise further injuries or death.

Mr McGauran announced the funding at a meeting which he hosted on May 20 in Townsville. The meeting was called by the Great Barrier Reef Research Foundation and CRC Reef to review priorities for research on irukandji jellyfish and to further a coordinated and collaborative research program.

At an earlier meeting on 8 May, representatives from a number of Queensland Government Departments, CRC Reef and GBRMPA met in Brisbane to discuss a strategic response to the tragic loss of life from 'irukandji syndrome'. The meeting resolved to establish two working groups: Education and Response (lead agency - Qld Health) and Research (lead agency - CRC Reef).

Little is known about the jellyfish that cause 'irukandji syndrome'. Only one jellyfish *Carukia barnesi* (usually found close to Cairns) is proven to cause 'irukandji syndrome' but it is now believed that at least six species of jellyfish can produce the same symptoms.

The initial sting of an irukandji jellyfish is usually not very painful but about 5–45 (usually 30) minutes after being stung, the person starts to have a severe backache or headache and shooting pains in their muscles, chest and abdomen. They may also feel nauseous, anxious, restless and vomit. In rare cases, the victim suffers pulmonary oedema (fluid on the lungs) which could be fatal if not treated. There is no antivenom for the syndrome.

In Australia, most cases of 'irukandji syndrome' seem to be restricted to waters between the Tropic of Capricorn and the northern tip of Torres Strait. They occur between November and May but cases have been recorded from the east coast of Australia in most months except July and August.

Each year, varying numbers of people are stung - from only a few, to more than 200 people. In the summer of 2001–2002, approximately 160 people were stung by mid February (approximately 100 people in Cairns, 10–15 in Townsville, 20 in the Whitsundays, 10–12 in Great Keppel, 15 in Agnes Waters).

Work is ongoing to find and identify the various types of jellyfish causing 'irukandji syndrome', especially those in the offshore islands and the Great Barrier Reef that cause the life-threatening symptoms of severely high blood pressure and heart failure. The announcement of additional funding for research was welcomed by the research community.

For more information about irukandji

CRC Reef website at <http://www.reef.crc.org.au>

Dr Peter Fenner's fact sheet about jellyfish at <http://www.marine-medic.com/pages/biology.html>

Dr Jamie Seymour's fact sheet about jellyfish that cause 'irukandji syndrome' as well as information about the box jellyfish *Chironex fleckeri* at <http://cnsfse01.jcu.edu.au/schools/tropbio/cubozoan.html>



*An Irukandji Jellyfish.
Photo by Lisa Ann Gershwin*

ASIAN GREEN MUSSELS IN TROPICAL AUSTRALIA

In July 2001, Asian green mussels *Perna viridis* were found on the hull of a vessel in Cairns harbour in north Queensland. These mussels are not native to Australia. The discovery caused concern because in other parts of the world, Asian green mussels have become a pest. They can grow quickly and cover underwater walls, pylons, boat hulls and intake pipes. In some places, Asian green mussels form carpets 60cm thick and reach densities of more than 35,000 mussels per square metre. If the mussels were to establish in Cairns harbour, the commercial and recreational value of the Port may be detrimentally affected and the mussels may compete with native mussels and oysters affecting the biodiversity of the area.

In December 2001, a baseline survey in Cairns Port commissioned by the Environmental Protection Agency (EPA) was conducted by scientists from the CRC Reef and the Northern Fisheries Centre at the Queensland Department of Primary Industries (DPI) to determine the prevalence of Asian green mussels in the harbour.

This survey found Asian green mussels were in low numbers and concentrated in a few areas in the Port of Cairns. The EPA, with the assistance of CRC Reef, the Queensland DPI, Queensland Transport, the Department of Defence, and the Cairns Port Authority commenced an emergency operation in Trinity Inlet on 19 March 2002. The operation involves inspection and decontamination of potentially infected vessels, slipping the vessels to inspect their hulls and dive surveys of Trinity Inlet to establish the extent of the Asian green mussel infestation. In addition, the entire port is being closely monitored for the settlement of

young mussels. For more information about the Asian green mussel operation, visit the EPA website (http://www.epa.gov.au/environment/science/water/marine_pests.html).

The key to preventing Asian green mussels hitching a ride on vessels is good maintenance and effective antifouling. The Environmental Protection Agency (EPA) has released a brochure that lists key steps to prevent the spread of the mussels. The brochure (The Tussle with the Asian Green Mussel) can be found at the EPA website (see above).

For more information about Asian green mussels: CRC Reef website at: <http://www.reef.crc.org.au/aboutreef/people/introduced.shtml>
CSIRO Centre for Research on Introduced Marine Pests (CRIMP): http://crimp.marine.csiro.au/Marine_pest_infosheets.html

FROM THE CEO'S DESK

CRC REEF RESEARCH - DELIVERING RESULTS THROUGH COLLABORATION



Russell Reichelt.
Photo by Rob Parsons

CRC Reef aims to build collaborative partnerships that tackle significant research problems related to the conservation and sustainable use of the Great Barrier Reef. The cooperation on coral bleaching research and monitoring is a good example. Scientists from AIMS, GBRMPA and the US agency, NOAA, have helped provide the best available overview of the extent of coral bleaching on the GBR. CRC Reef researchers based at AIMS are aiming to make better predictions on where and how the bleaching phenomenon might affect individual operators in the region.

Irukandji (or more generally, marine stingers) have moved to centre stage in the past few months. It appears likely that a number of species are involved, and that their biology and distribution is not well known at present. James Cook University and AIMS have strong capabilities to respond to the research and engineering challenges presented by the stingers and CRC Reef is committed to helping them build effective collaborations and raise the funds needed to sponsor this effort.

A virtual centre of excellence in marine science in north Queensland is fast becoming recognised internationally. The expertise is not located under one roof, but all the experts can readily collaborate and have a good track record in cooperative research.

James Cook University attracts many international students. The research providers in north Queensland (AIMS, CSIRO, JCU, Qld DPI, Museum of Tropical Queensland) have extensive international collaborations. AIMS collaborates with Penang-based ICLARM and the US Government to support the Global Coral Reef Monitoring Network spanning more than 80 countries.

The Great Barrier Reef attracts researchers from around the world, but equally important are the people based here with world-class scientific and engineering expertise. CRC Reef aims to promote this virtual centre by making it easier for international agencies to come to Townsville and work with the Australian experts. We have incorporated a subsidiary company, International Marine Project Activities Centre Ltd (IMPAC), with this as its central goal.

IMPAC opened in May with its first two partners: the International Ocean Institute and the International Marinelifelife Alliance. IOI is establishing both research and training projects in tropical marine and coastal resource management. IMA is studying the fisheries resources that support the live fish trade in the Western Pacific. Both groups intend attracting new research projects to the region and are committed to a collaborative approach. I look forward to reporting on their progress in partnership with CRC Reef members and others collaborating on Great Barrier Reef research.

Russell Reichelt
Chief Executive Officer

TOO MUCH STRESS FOR THE REEF?

The world's most comprehensive survey of coral bleaching has found that bleaching in the Great Barrier Reef Marine Park may be the worst on record.

The survey by scientists from the Australian Institute of Marine Science, CRC Reef and the Great Barrier Reef Marine Park Authority covered more than 640 reefs from the northern tip to the southern end of the Great Barrier Reef Marine Park using light aircraft. The team also used SCUBA to confirm results and determine whether corals were likely to recover from bleaching or would die.

Bleaching is a sign of stress. Corals appear bleached when they expel the tiny plants that usually live in their flesh. High water temperatures and other environmental conditions stress corals and can cause them to bleach. Many corals can recover from bleaching but if temperatures stay too high for too long, the corals will die.



*Bleaching is a sign of stress in corals.
Photo by Ray Berkelmans, GBRMPA*

"Our aerial surveys found that nearly 60% of the reef area in the marine park was heat-stressed to some extent as indicated by bleaching," said Dr Ray Berkelmans from CRC Reef who led the aerial survey team.

Not all reefs were bleached equally, and the bleaching was not evenly distributed throughout the Marine Park.

"Until now, the coral bleaching episode in 1998 was the worst on record, but the 2002 event was probably worse because more reef area was affected. The most severe bleaching occurred on reefs close to shore in both bleaching events, but the 2002 event has affected a greater area of reefs further offshore", said Dr Berkelmans.

The aerial surveys found that bleaching was worst in the Princess Charlotte Bay region, near the Turtle Island Group, on inshore reefs from Cape Upstart to the Whitsundays in some reefs in the Sir James Smith Group and in the Keppel Island area. Moderate to very high bleaching was seen inshore and offshore from around Cape Flattery to Mackay. Little or no bleaching was seen in the Far Northern Section from the tip of Cape York to the northern Princess Charlotte Bay area, in the Swains area and in the Capricorn Bunker Group.

"Our underwater surveys found that few reefs escaped bleaching, but it appears likely that most reefs will recover with only minor death of corals. However, we did find that some of the most severely bleached reefs were devastated with 50% and 90% of coral dead at some sites", said Dr Paul Marshall of GBRMPA who led the underwater surveys.

"Australia has been lucky to see another major bleaching event without widespread death of corals but the devastation we have seen at some sites provides a vivid warning of what could happen if hot water events become more frequent and severe. Although we can't control the weather, the GBRMPA is working to reduce other stresses to coral reefs", said Dr Marshall.

"We may be witnessing the beginning of a slow-motion degradation of the reef system that will only get worse in coming decades", said Dr Terry Done, from AIMS and CRC Reef. "AIMS, CRC Reef and the GBRMPA will continue to keep a careful watch on the health of the reef and improve our understanding of the implications of global warming for reef management."

AUSTRALIA HELPING TO PROTECT THE WORLD'S DUGONGS

A report by CRC Reef researchers based at James Cook University that will help countries develop plans to protect dugongs was launched internationally in February.



*Dugong conservation world-wide is largely dependent on Australian initiatives.
Photo by GBRMPA*

"The report is an overview of the status and management of dugongs in 37 countries and territories around the world", said Professor Helene Marsh, CRC Reef researcher and lead author of the report. "Most importantly, the report provides an action plan so that countries can develop their own conservation plans to protect the dugong."

"Although dugongs occur in the waters of 37 countries, nearly all of these countries except Australia are developing nations with limited capacity to contain impacts on dugongs within sustainable limits. Therefore, dugong conservation world-wide is largely dependent on Australian initiatives."

"Within their range, dugongs are threatened by rising pollution from the land, coastal development, boat traffic, entanglement in fishing nets, and hunting for their meat and trophies."

"Dugongs appear to have disappeared in some places such as the waters off Mauritius, western Sri Lanka, the Maldives, Japan's Sakishima Shoto Islands, Hong Kong's Pearl River estuary, several islands in the Philippines and parts of Cambodia and Vietnam."

"In Australia, dugongs are not considered to be under serious threat throughout much of their range which extends from Moreton Bay near Brisbane through the tropics to Shark Bay in Western Australia. However, dugong numbers have declined along the urban coast of Queensland. Along the east coast of Queensland, especially in the Great Barrier Reef region, Dugong Protection Areas and Marine National Parks have been established to protect dugong."

The report was launched at a meeting of Environment Ministers from around the world in Columbia in February. It was funded by the United Nations Environment Programme (UNEP), the International Union for the Conservation of Nature (IUCN) and CRC Reef.

The report called 'The Dugong (*Dugong dugon*): status report and action plans for countries and territories in its range' by Marsh H, Eros C, Penrose H and Hughes J, can be found on the UNEP website at <http://www.unep.org/dewa/reports/dugongreport.asp>.

DIFFERENT WAYS OF KNOWING

People from 'western' and Indigenous cultures learn about their environment and pass information to others in different ways.

CRC Reef and the Indigenous Policy and Liaison Unit (IPLU) from GBRMPA organised a half-day workshop called 'Different Ways of Knowing' in Townsville on 11 April to share information about Indigenous and 'western' knowledge systems, research methods and principles.

At the workshop, Traditional Owners from Magnetic Island, Cardwell, Tully and Cairns joined CRC Reef researchers, and managers from GBRMPA, CSIRO, the Environmental Protection Agency (EPA) and Main Roads in a cultural exchange based on brief presentations and discussion, facilitated by Chicka Turner (IPLU, GBRMPA).

Wulgurukaba Traditional Owner, Chris George from Magnetic Island, welcomed the 46 attendees and talked about the need for greater involvement of Indigenous people in research and management of her country.

Researcher and linguist, Dr Bruce Sommer (Ethnografix Australia) shared his understanding of Indigenous ways of 'hands-on' learning through experience, and the transmission of knowledge by Elders through storytelling and example.



Randall Owens and Chicka Turner from GBRMPA at the workshop.
Photo by Bryony Barnett, CRC Reef

"The profile of Aboriginal cognitive activity is somewhat different from ours – we tend to partition sciences, where our Indigenous friends are more holistic", said Dr Sommer.

While Western society places great emphasis on developing and demonstrating cognitive skills, such as observation, comparison, analysis and classification, from childhood, Aboriginal society depends on these skills later in life. Girramay Traditional Owner Chris Kennedy confirmed the significance of the respect gained by elders through life experiences, and their role in transferring knowledge within the community.

CRC Reef scientist Dr Bruce Mapstone used a drawing of concentric circles to demonstrate the 'western way' of scientific knowledge. At the core, scientists (the 'experts') use structured processes to acquire knowledge. There is an emphasis on peer-reviewed papers to pass information to the next circle. Here the users of science, such as managers, select and apply the knowledge for their needs (e.g. information to help manage a fishery). The outer circle, no less important than the inner, includes all other community members with a general interest in science, some with extensive knowledge gained through experience. Generally, there is a transfer of information outwards, based on trust of the experts. The scientists tend not to value 'grey' literature (papers which have not been reviewed) or anecdotal evidence from the community.

The subsequent discussion, guided by Chicka Turner, brought a range of comments and experiences. Though the talk was of differences, the workshop brought new understanding from both sides, and a feeling that scientists, managers and Indigenous people can – and will – do better at working together.

NEW STUDIES TO PROTECT THE REEF

Four postgraduate students have received CRC Reef scholarships worth \$15,000 over three years for studies that will help protect and conserve the natural resources of the Great Barrier Reef World Heritage Area. The students are enrolled in doctoral degrees and are all based at James Cook University.

Shelley Anthony will study key factors that are needed for the successful growth of corals in aquaria. Her work will improve understanding of coral physiology and reef dynamics. Ultimately, her work will ensure corals survive better in aquaria such as Reef HQ in Townsville and other aquaria around the world. This will help to protect wild corals because aquarists will not need to constantly restock their aquaria.

Stephen Lewis will look at centuries of climate record that is contained inside large *Porites* coral colonies that were recovered from Nelly Bay on Magnetic Island. The colonies probably died about 4,000 years ago. Corals usually have annual growth rings which can be measured and analysed to give a record of past climate. Stephen will drill cores through the colonies to find out the frequency of weather events such as cyclones and El Niño. Stephen will compare this past record with modern day climate patterns. The information will be a powerful tool to predict future environmental changes to the Great Barrier Reef and inshore continental islands.

Dean Miller will study the impact of live-aboard tourism on natural resources in the Cairns section of the Great Barrier Reef Marine Park. He will determine whether the current Great Barrier Reef Marine Park Authority management strategies ensure the ecological sustainability of the dive tourism operations in this area. He will also check what can be done to improve the levels of

protection for the GBRWHA. The study will help improve educational and interpretive tools based on visitor experiences and satisfaction to provide recommendations for the sustainable use of the natural resources. It will also improve understanding of the vulnerability of key taxa and life forms to disturbance by divers.

James Sheppard will study the foraging behaviour of dugongs. He will attach tags to dugongs that use GPS technology so that he can pinpoint the location of the animals to within 100 metres. James will track the dugongs as they feed on seagrass beds. His work will provide valuable information about the food resources of dugongs and how they use them. It will improve the management of dugong and particularly, their seagrass food.

GBRMPA SEEKS LOCAL INPUT TO PROTECT THE REEF

The Great Barrier Reef Marine Park is under pressure from the increasing impacts of coastal development, agriculture/ pastoralism, shipping, tourism and fishing. In some areas, those effects are of particular concern. The Great Barrier Reef Marine Park Authority (GBRMPA) has a comprehensive suite of management arrangements in place, including zoning. However, more needs to be done.

"There is no doubt the reef is under pressure from various sources on the land and water. Without an increase in the number and scale of Green Zones (or no-take areas) this unique Australian icon could face severe damage and its long-term ability to support sustainable tourism and fishing will be undermined. This is the lesson from many other parts of the world", said Mrs Chadwick, Chair of the GBRMPA.

The proposed new Green Zones are exactly the same as existing Green Zones; they are no-take areas where people can boat, swim and snorkel but where fishing and collecting are not allowed.

Currently, no-take areas or Green Zones comprise less than 5% of the Marine Park. The GBRMPA considers the current level of protection of the

Marine Park in Green Zones to be insufficient and incomplete, because the initial focus was limited to threatened species, high-profile habitats like coral reefs, and unspoiled areas in remote localities.

According to Virginia Chadwick, coral reefs are relatively well protected. However, this is not so for other areas which are just as important such as seagrass, mangroves and lagoonal shoals. Without an increase in the number and scale of Green Zones in the Marine Park, this unique Australian environment could be irreparably damaged.



*The Representative Areas Program will protect examples of the entire range of the Marine Park's biodiversity.
Photo by CRC Reef*

The GBRMPA now intend to take a different and more complete approach by protecting examples of the entire range of the Marine Park's biodiversity (that is, examples of the immense variety of all the plants and animals, the places they live and the natural processes that keep them alive). This approach is called the Representative Areas Program. To implement the Representative Areas Program, the GBRMPA needs to rezone the entire Marine Park.

A program of informal consultation and research has seen GBRMPA gain information from more than 150 community and industry groups during the past 18 months.

The GBRMPA will be consulting further with interested stakeholders and the public and will take into consideration all comments provided during two formal Community Participation phases.

The GBRMPA began the first formal Community Participation phase of the Representative Areas Program on 7 May which will last for three months.

Staff from the GBRMPA will be visiting communities along the coast of the Marine Park to gain local input on how and where to best place new Green Zones as well as seeking input on other aspects of zoning. For example, 28 new coastal areas have recently become part of the Marine Park and must be zoned for the first time.

GBRMPA representatives will be joined along the coast by representatives from Local Marine Advisory Committees (LMACs), Queensland's Environmental Protection Agency and Marine Parks Rangers. Notices will appear in local papers in the coming weeks informing each community of the date, time and location of these information sessions.

As far as possible, the GBRMPA will reflect the views of the local and wider communities when producing a Draft Zoning Plan. There will be further opportunities to provide more comments during the development of the Representative Areas Program, including on the Draft Zoning Plan. The existing zoning plans will not change until the new zoning plans are approved by the Minister and accepted by both Houses of the Commonwealth Parliament. For more information call 1 800 990 177.

DEVELOPING BEST-PRACTICE FOR TRADE IN LIVE REEF FOOD FISH

In January 2002, Mr Geoffrey Muldoon, a CRC Reef PhD student, attended an international workshop in Hong Kong at which he presented an overview of the Australian live reef food fishery.

The workshop was coordinated by the International Marinelifelife Alliance (IMA), the Marine Aquarium Council (MAC) and The Nature Conservancy (TNC). It followed a workshop in Honolulu last year that highlighted the need to develop a set of 'best-practice standards' for the live reef food fish trade (LRFFT) to cover the chain of custody from reef to restaurant as one strategy to address concerns about the trade.



*Fish outside
a restaurant
in Hong Kong
Photo by Fraser
McGilvray*

"While I did not endorse the 'Australian model' as ecologically sustainable or the best-practice possible for the LRFFT, it was agreed that the fishery in Australia represented the highest standard of LRFFT management in the world today", said Mr Muldoon. "So, the Australian case was an important point of departure for a discussion of LRFFT standards."

During the workshop, a two-year workplan was developed that aims to establish and implement best-practice standards for the capture, handling, husbandry and transportation of live reef fish as well as protocols for resource assessment and monitoring of new and existing fisheries. The industry standards will be developed in an open, multi-stakeholder consultative process to ensure credibility and stakeholder involvement.

The IMA, MAC and TNC are responsible for the project's delivery and will work closely with governments, development agencies, marine-focused NGOs and other institutions and networks to facilitate the application of these standards and protocols.

As part of the workshop, participants toured wholesale and retail outlets of live reef fish as well as mariculture and grow-out facilities near Hong Kong.

"It was an eye-opening experience", said Mr Muldoon. "Many of the fish being sold in wholesale markets were undersized by Australian standards and were almost certainly sourced from countries other than Australia. The small size of some fish species made me realise the threats posed by reef fishing in unregulated or less

regulated environments, such as in south-east Asia and Indo-west Pacific. Although I'm aware that there is a trade in large fish, I was moved by the large Maori wrasse and cods in tanks in retail restaurants, but the origin of these fish was not clear."

Mr Muldoon pointed out that stopping the trade in live reef fish was not practical and is not the intention of this project.

"This project is about bringing together stakeholders and building consensus on what 'best-practices' are needed to move the industry toward sustainability, in terms of fish stocks and fishing communities."

The report about the live reef food fishery on Australia's Great Barrier Reef by Geoffrey Muldoon is available on the International Marinelife Alliance website at www.marine.org.

2002 CRC REEF MARINE SCIENCE JOURNALISM PRIZE

The 2002 CRC Reef Marine Science Journalism Prize is open to all students studying at an Australian university. The \$1000 prize is awarded for the best factual, feature story about marine science in the Great Barrier Reef World Heritage Area. The Dorothy Paramore prize of \$250 will be awarded for the runner-up.

The prizes aim to encourage professional communication by tertiary students about marine science. They also aim to promote awareness and understanding of Great Barrier Reef science, management and conservation.

The prizes are sponsored by the CRC Reef, the Australian Institute of Marine Science (AIMS) and *Australasian Science* magazine. Stories must be received by 5 July. For more information visit the CRC Reef website at www.reef.crc.org.au or contact Louise Goggin, Communication Coordinator, CRC Reef Research Centre, PO Box 772, Townsville 4810 Phone: 07 4729 8404 Email: louise.goggin@crcreef.com

TOURISTS HAPPIER WITH REEF TRIPS

CRC Reef researchers based at James Cook University surveyed reef visitors and found that they are more satisfied with their trip to the reef than they were only a few years ago.

"Currently tourism across the world and especially in Queensland is struggling to survive the downturn in international travel and major changes to air services", said Professor Philip Pearce, leading researcher on the project.

"Tourism operators need to find new ways to be competitive. One method is to better understand tourists, and how they decide what they will do and where they will travel."

Professor Pearce and his team surveyed more than 2,000 visitors during the high tourist season in 2001. The survey was conducted in multiple languages with different operators from the Whitsundays to Port Douglas.

"We found that visitors are very satisfied with their experiences on the reef", said Professor Pearce. "On average, visitors give their reef experiences a score of 8.6 out of 10 with even higher scores for the reef staff who are central to their experiences. The score is higher than in previous surveys conducted in 1996 and 1998."

Also good news for the tourism industry is the high level of intended repeat reef visitation by Australian domestic visitors.

"One of the consequences of the international tensions is that people are more likely to holiday in their own country", said Professor Pearce. "This could be an opportunity for reef operators to capture more of the Australian market that previously sought marine experiences overseas."

"Australian domestic visitors are very positive about their reef experiences but they are looking for variety in their experiences. One of the lessons for reef operators is the need to promote the variety of opportunities available and to update and change their services regularly."

The CRC Reef researchers have collected a large amount of detailed information about reef visitors that can help tourism operators understand visitor expectations, market characteristics and likely future demand for reef experiences.



Surveying reef tourists.
Photo by Rob Parsons

In April, the researchers shared their detailed information with tourism operators at workshops in Cairns and in the Whitsundays. The workshops were an opportunity for reef operators to get involved in the analysis so they can maintain their competitiveness in difficult times.

IOI OPENS FIRST REGIONAL OFFICE IN AUSTRALIA

The International Ocean Institute (IOI) has opened its first regional office at the International Marine Project Activities Centre Ltd (IMPAC).

"There are about 20 operational centres of the IOI around the world, most of which are in developing countries", said Professor Robin South, Director of IOI - Australia. "The new office in Townsville is the only regional office of the IOI anywhere in the world. It will oversee work in Asia and the Pacific Islands."

"The IOI was attracted to Townsville because of the concentration of marine agencies in the area", said Professor South. "We will be working closely with CRC Reef Research Centre Ltd, as well as other marine organisations in the area."

The IOI will be one of the first collaborators in the International Marine Project Activities Centre Ltd (IMPAC) which is a coordination centre for international marine organisations from the tropical Indo-Pacific region. IMPAC is a subsidiary company of CRC Reef Research Centre Ltd.

"Another attraction for the IOI was that IMPAC offers modern offices with high-speed communication links, extensive information databases and access to expansive libraries. Townsville is also a safe, inexpensive city for staff to live and work."

"The IOI is the only international NGO focused entirely on the oceans", said Professor South. "It trains upper-level government employees in ocean law issues; and coastal and fisheries managers in FAO code of conduct for sustainable fisheries. The IOI also runs seminars for leaders in the Law of the Sea and Oceans Policy. We are hoping to run some of these courses here in Australia."



Professor Robin South and Mr Posa Skelton.
Photo by Tim Donovan, CRC Reef

The IOI is also developing a virtual university which will offer a Masters in Marine Affairs via the internet. The degree will be offered through several universities including the University of the South Pacific (Fiji), University of Western Cape (South Africa), the Universidad Nacional de Costa Rica and Dalhousie University (Canada).

The IOI was founded in 1972 and has its registered office in Rotterdam and headquarters in Malta. It is funded by many government agencies and foundations.

Professor South and Mr Posa Skelton were welcomed to IMPAC by The Honourable Peter Lindsay MP and Dr Clive Wilkinson, Coordinator, IMPAC in May.

NEW CRC REEF PUBLICATIONS

CRC Reef has published new brochures and technical reports which are available from our office or can be downloaded from our website.



Brochures:

- Dugongs in the Great Barrier Reef. Current State of Knowledge. April 2002.
- Dwarf minke whales in the Great Barrier Reef. Current State of Knowledge. May 2002.

Technical reports:

- Harriott VJ. 2001. *The sustainability of Queensland's coral harvest fishery*. CRC Reef Tech Rept No. 40.
- Harriott VJ. (ed). 2002. *Making a difference. The achievements of the Cooperative Research Centre for the Ecologically Sustainable Development of the Great Barrier Reef*. CRC Reef Tech Rept No. 41.

In collaboration with the Port of Townsville, CRC Reef has published the final report from the baseline survey of the marine life in the Port of Townsville. It is available from the Townsville Port Authority website at <http://www.townsville-port.com.au/>


DIARY
Corrections to previous brochure

There are some corrections to:

Land Use and the Great Barrier Reef World Heritage Area. Current State of Knowledge. November 2001.

* Caption to graph on p.2 should read:

"Increase in the area harvested for sugarcane and the application of nitrogen and phosphorus fertilisers to the Great Barrier Reef catchment"

* At the end of the second page, the sentences "In sugar crops, about one third of the fertiliser nitrogen is taken up by the crop. The remainder is lost to the atmosphere, surface run-off and groundwater..." should read: "In sugarcane and other crops and pastures, about one third to half the fertiliser nitrogen is utilised for growth. A portion remains in the soil, building fertility. The remainder moves from the root zone either to deeper layers of the soil and/or is lost to the atmosphere, surface run-off and groundwater"

10–12 July, Australian Marine Sciences Association National Conference. Fremantle, WA. "Tropical temperate transitions." Contact: Charitha Pattiaratchi. Email: pattiara@cwr.uwa.edu.au

21–24 July, Innovation in Action. 2002 Queensland Landcare and Catchment Management Conference, Townsville. Seeking innovative solutions to landcare and catchment management issues and focusing on hands-on activities. Website: www.burdekindrytropics.org.au/conference.htm

31 July–3 August, Excellence in Environmental Practice, Environmental Institute of Australia Conference. Brisbane, Queensland. Email: eia@orgaus.com.au Website: www.eia.asn.au

14–17 August, World Congress on Aquatic Protected Areas 2002. In conjunction with the 31st Annual Conference of the Australian Society for Fish Biology, Cairns, Queensland. What works best and how do we know? Contact: OzAccom Conference Services. Ph: 07 3854 1611. Website: www.ozaccom.com.au/apa2002

17–25 August, Australian Science Festival, Canberra. Email: info@sciencefestival.com.au Website: www.sciencefestival.com.au

20–22 August, Fourth New Guinea Biology Conference, Jayapura, Indonesia. 'Working together for better biological resources management'. Contact: Dr Rosye Tanjung, FMIPA Uncen, Jayapura, Indonesia 99351. Ph/Fax: 62 967 572. Email: hefmyca@yahoo.com

2–6 September, Australasian Remote Sensing Conference: Images to Information, Brisbane. Website: www.geosp.uq.edu.au/11arspc

3–6 September, Fifth International River Management Symposium, Brisbane. 'The scarcity of water – the future of rivers, the future of water.' Contact: Selina Ward. Email: symposium@riverfestival.com.au Website: www.riverfestival.com.au

11–13 October, Queensland Conservation Council Conference, Tallebudgera, Queensland. 'Caring for Queensland: Catchments, Coasts, the Cape and Communities'. Ph: 07 5534 1412. Email: conference@gecko.org.au.

4–8 November, Coast to Coast 2002 National Coastal Conference, Tweed Heads, NSW. Contact: Sally Brown. Ph: 07 3201 2808. Email: sally.brown@uq.net.au Website: www.coastal.crc.org.au/coast2coast2002