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BOOST TO MARINE CONSERVATION IN TORRES STRAIT

CRC Reef Research Centre has received \$3 million cash funding to support a three-year research program in the Torres Strait. The cash funding is part of a \$478 million funding package for the Federal Government's 2002 Cooperative Research Centres (CRC) Program.

This cash funding complements a further \$3 million in cash and over \$10 million in-kind funding from the partners in the project who represent community and industry interests (the Torres Strait Regional Authority); managers (Australian Fisheries Management Authority, the National Oceans Office, Queensland Department of Primary Industries); researchers (Australian Institute of Marine Science, CSIRO, Geoscience Australia, James Cook University, Queensland Department of Primary Industries) and non-government organisations (Great Barrier Reef Research Foundation).

The Torres Strait Program will focus on research that will ensure the conservation and sustainable management of marine resources in the Torres Strait including fisheries, seagrasses, dugongs and turtles.

"As part of the Torres Strait Research Program, we will also research opportunities for low-tech, high value mariculture ventures to provide important bases from which to develop industries appropriate to the economic development of the Torres Strait," said CRC Reef researcher Dr Bruce Mapstone, who led the proposal.



The new research program will build the capacity of Torres Strait people to benefit from their marine resources in a sustainable way. Photo by GBRMPA.

"The program will build capacity of the people of Torres Strait to benefit from their marine resources in a sustainable way."

The program will also help to fulfill Australia's obligations under the Torres Strait Treaty and other agreements with Papua New Guinea. The work addresses several key objectives of the Marine Science and Technology Plan and will be an important part of the Regional Marine Planning processes led by the National Oceans Office.

The Torres Strait research program will be based at CRC Reef in Townsville with a full-time presence in the Torres Strait. It will start in July 2003.

SPEED CAN CHANGE REEF FISH DESTINY

By Louise Goggin and Bridget Green

Ian Thorpe might be able to swim at speeds that win gold, but he'd be left behind in a race against some tiny reef fish.

Scientists thought that baby reef fish couldn't swim fast enough to escape the tug of ocean currents but Dr Rebecca Fisher, who recently completed a PhD at James Cook University supported by CRC Reef, has found that some baby fish swim so fast they would rival Thorpedo for gold.

While Ian Thorpe swims at a modest two body lengths per second, Dr Fisher has found that the clown fish *Amphiprion melanopus*, just a day after hatching, can swim at an amazing 9 body

lengths per second. And at a tiny 7mm long at 8 days old, and is changing from a transparent larvae into a brightly coloured juvenile ready to settle down to life on a coral reef, it can swim at an astonishing 49 body lengths per second. This puts the clown fish in a class of its own – swimming faster than any other water-dwelling vertebrate.

Until 10 years ago, little was known about tropical reef fish larvae because they are so difficult to collect. It was assumed they were totally at the mercy of ocean currents and had very little swimming ability.

But Dr Fisher's research is causing marine scientists to reassess fundamental assumptions about fish larvae and their ability to influence their destiny. Other studies with Dr David Bellwood of James Cook University, have also led



A young clown fish swims at astonishing speeds. Photo by Bridget Green.

to a re-evaluation of how long these tiny fish can swim. Previous experiments were done without feeding the young fish and they were only able to swim for 12 km before they were exhausted. When the young dynamos were fed, Drs Fisher and Bellwood found they could swim at least three times this far – 29 km.

Since these tiny reef fish can swim at high speeds for long periods, they can escape ocean currents and stay close to where they were born. Many of them also show sophisticated use of the vertical

FROM THE CEO'S DESK



*Russell Reichelt.
Photo by Rob Parsons*

CRC Reef is about half way through the period of the grant from the CRC Program which finishes in the 2005-2006 financial year. Since its incorporation in 1999, the Centre has grown by attracting a new member, the Great Barrier Reef Research Foundation, and also by attracting occupants such as the International Ocean Institute into the International Marine Project Activities Centre (IMPAC) in Townsville.

CRC Reef has also grown in terms of the amount and scope of its contracted research, so that the Centre acts as a coordinator and facilitator of new research projects that make use of the skills base developed over the life of this CRC and its predecessor.

With a number of its research projects now in their third year, CRC Reef is reviewing progress and priorities in advance of the fifth year review, which is due next year (2004). In the coming months, our focus will be on publicising the excellent results achieved by research groups in member institutions such as James Cook University, Australian Institute of Marine Science and Queensland Department of Primary Industries. We will be making every effort to ensure the results are transmitted to the users of the research, especially through our Task Associates.

The Task Associates are the experts and research users who have agreed to be a point of contact for industry or government as well as help to guide each researcher. The Task Associates are there to give feedback to the

researchers, to help them communicate the results of their work, and to ensure the original goals for each project are not lost with the passage of time. Thank you very much to those who agree to become Task Associates for CRC Reef research tasks.

So who are the 'users' of research results? In addition to industry and management (government) experts, we also regard the general public as a major 'user'. CRC Reef's goal is to ensure results are publicised where there is a strong 'public good' component – such as reporting on the health of the Great Barrier Reef. The focus on water quality over the past 12 months is a good example of this type of research.

In addition to serving the public interest, the CRC program calls on us to commercialise research results wherever possible. Capturing commercial benefits causes the research results to be steered into private ventures that create jobs and economic growth for Australia. For example, our work on ballast water treatment should lead to development of commercial products in the year ahead. In parallel with this applied engineering work, the marine ecology team at QDPI in Cairns are now working more closely with JCU engineering colleagues to provide an excellent research service related to ports and shipping interests.

Until the end of this year, CRC Reef will be examining its successes and failures to prepare for the five-year review. We will also be giving serious thought to the future directions of the Centre after that review. Please let us know your ideas on this, your advice would be welcomed.

Professor Russell Reichelt, CEO

structure of the water column just before they settle. Dr Fisher has found that the behaviour of tiny fish varies between groups. This means that oceanography as well as behaviour and taxonomy play a role in shaping the dispersal patterns of reef fish larvae so some young fish cannot be considered passive particles in mathematical models and may be able to self-seed reefs. It also means that just like Ian Thorpe, they can use their speed to change their destiny.

*Dr Fisher is now employed by the University of California Santa Cruz and the National Marine Fisher Service to conduct research on early life history processes in rockfish, *Sebastes* spp. Rockfish populations along the west coast of the US have recently undergone severe declines, prompting emergency management measures that include prohibiting fishing along extensive areas of the continental shelf. This decline has been accompanied by a shift in the size structure of these fishes, with few large females remaining in the population. Her primary hypothesis is that larval quality is a function of female age, with older females producing young with a greater likelihood of survival than larvae from younger females. There are important implications of these results for fisheries management, since current regulatory options typically provide little protection for older age classes. Future studies will expand to evaluate growth rates of larvae and early juveniles in the field, examine selective processes that influence which individuals survive the early stages, and determine the role of environmental variability in shaping survival patterns.*

TRAVELLING REEF FISH

CRC Reef researchers have developed a computer model that predicts the dispersal patterns of millions of tiny fish larvae on the Great Barrier Reef.

The model could help identify key areas of the Great Barrier Reef that need to be considered by managers and users, to ensure the long-term sustainability of reef fish populations.

CRC Reef scientist, Dr Lance Bode based at James Cook University and his team used their model to create a virtual ocean with fish larvae that mimic actual larval fish movements around the Great Barrier Reef.



Lance Bode is modelling the movements of millions of tiny reef fish.
Photo courtesy of Townsville Bulletin.

"In our model, fish larvae are represented by particles that move with the water currents but they are programmed to have behaviour that mimics actual fish larvae," said Dr Bode.

"The simulated fish larvae have the ability to detect a reef and swim toward it, provided they are close enough and at the appropriate stage of their development," he said.

Dr Bode and his team have simulated the transport of reef fish larvae among 321 reefs in and around the Cairns Section of the Great Barrier Reef Marine Park, and are in the process of extending their model to the entire Great Barrier Reef.

"Understanding whether adult reef fish populations depend on larvae that remain in the area where they were spawned, or on recruits from elsewhere, is an important step towards reef fish conservation and successful fisheries management."

"So far we have found that reefs that rely on larvae from the same reef, rather than larvae from other reefs, appear to play an important role in maintaining the reef system as a whole," he said.

For more information, contact Lance Bode on lance.bode@jcu.edu.au.

STOPPING THE GLOBAL TRADE IN MARINE SPECIES

CRC Reef Research Centre has attracted funding and support from government, industry and research partners for a 3-year, \$675,000 project to develop a pilot plant that will sterilise ballast water and help prevent ships transporting exotic pests across the world's oceans. The technology used in the plant has the potential to improve shipping safety by providing an alternative to the need for ballast water exchange at sea. Preventing future introduction of exotic marine pests will save governments and industries around the world billions of dollars in costs to remove invasive species and prevent their spread.

The project has been underway for nearly a year. The pilot plant was constructed in Brisbane and is now in Townsville. Initial commissioning and testing was done at the Mt St John Sewage Plant in Townsville to demonstrate the pilot plant's efficacy at treating human pathogens. The plant will shortly be moved to the Marine Aquaculture Research Facilities Unit at James Cook University to commence testing for the treatment of other organisms likely to be found in ballast water.

For more information, contact Steve Hillman on steve.hillman@jcu.edu.au.



CRC Reef is developing a pilot plant to sterilise ships' ballast water.
Photo by John Barnett.

CRC REEF HOSTS INTERNATIONAL CONFERENCE

The world-class research of the Fishing and Fisheries (F&F) team at CRC Reef has been recognised in the decision to appoint them host of the Third International Symposium on Fish Otolith Research and Application.

Otoliths (or 'ear bones') are found in the heads of fish and are used for balance and orientation. These tiny structures also act as natural data loggers. Consequently, they are valuable to scientists because they retain information about the life history of the fish including information about their age and growth, movement patterns and interaction with their habitat. This information can be interpreted in terms of the ecology, demography and life history of the species, and has become fundamental to the management of fisheries and protected species around the world, and the ecosystems of which they are a part.

The challenge for scientists is to develop techniques to extract the information from otoliths and to interpret it accurately in terms of the biology of the fishes.

The Symposium will bring together leading scientists from around the world to establish current understanding, discuss state-of-the-art approaches, and determine future directions in this rapidly evolving field of research that underpins natural resource management.

Topics to be covered will include theoretical aspects of otolith research, as well as applications to fisheries management, stock assessment, climate change and other ecological studies. The Symposium will be an ideal opportunity to showcase the CRC Reef F&F research to a broad international audience, and to demonstrate the commitment of CRC Reef to marine science.

The Symposium will be held in Townsville from 11-16 July 2004 and will be organised by F&F project leader Dr Gavin Begg and his team. The Symposium is held every five years. For more information visit the Symposium website at www.Otolith2004.com or contact Dr Gavin Begg by phone on 07 4781 5287 or by email on gavin.begg@jcu.edu.au.

BLEACHING UPDATE

As a result of the relatively benign weather conditions in northern Queensland this summer, there were no significant coral bleaching events recorded on the Great Barrier Reef (GBR). Average sea temperatures are now declining, and the threat of widespread coral bleaching for the GBR region had abated by early April. With the usual cooling that is accompanying the onset of autumn and winter, no further risk of coral bleaching is anticipated.

The unusually hot, still and cloudless conditions that characterised the 2002 summer gave rise to the most severe coral bleaching event recorded on the GBR. By comparison, the summer of 2003 was characterised by relatively frequent cloud cover, fewer hot days and persistent winds, resulting in relatively benign conditions for corals of the GBR.

The Great Barrier Reef Marine Park Authority (GBRMPA) monitored conditions on the GBR during summer through a collaborative program with the Australian Institute of Marine Science (AIMS) and the US National Oceanic and Atmospheric Administration (NOAA).



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

Sea temperatures over the GBR did not exceed average temperatures throughout most of the GBR. These temperatures contrast with the anomalously warm conditions that occurred over the GBR in 1998 and 2002, when major bleaching events were recorded.

The only warm water recorded over the GBR this year occurred in the far northern areas around mid February. These anomalous conditions did not persist for long, and although the remoteness of this area makes surveillance of reef conditions difficult, anecdotal reports from Raine Island in the far north confirmed that no bleaching occurred. More information about GBR weather can be found on the AIMS website at <http://www.aims.gov.au/pages/facilities/weather-stations/aws-ytd.html>.

Warm water episodes were recorded over the central Pacific and some parts of southern Asia. Information about bleaching of reefs worldwide can be found on ReefBase at http://www.reefbase.org/threats/thr_bleaching.asp/.

The GBRMPA have completed surveys to assess coral mortality following the 2002 coral bleaching event on the GBR. Data are being analysed so that the ecological implications of the 2002 bleaching event can be determined. The results will be posted on the GBRMPA website soon. (<http://www.gbrmpa.gov.au>).

For the GBRMPA report from the 2002 bleaching event, visit http://www.gbrmpa.gov.au/corp_site/info_services/science/bleaching/01-02/final_report/index.html.

For more information on GBRMPA's bleaching monitoring program contact the Research and Monitoring Unit at GBRMPA by email on research_and_monitoring@gbmpa.gov.au or by phone on 07 4750 0700.

ENSURING LONG-TERM SURVIVAL OF DOLPHIN

CRC Reef is supporting the first comprehensive study into the ecology and conservation biology of two species of dolphin found in the inshore regions of northern Australia.



Guido Parra is studying inshore dolphins. Photo courtesy of Townsville Bulletin.

CRC Reef PhD student, Mr Guido Parra of James Cook University, is investigating the distribution, abundance, population dynamics, behaviour and threats to the survival of populations of Irrawaddy and humpback dolphins in the hope of ensuring their long-term survival. This information will assist reef and coastal area managers in Australia to develop conservation and management practices to ensure their future survival.

The Irrawaddy and humpback dolphins are two of only three species of coastal dolphin found in northern Australia. They differ from other dolphin species because of their preference for inshore areas and estuaries. In 2002, the United Nations Environmental Programme reported that prospects for the survival of both species of inshore dolphins in the South East Asian region were 'poor'.

"Inshore dolphins play an important role in the structure and function of marine ecosystems because of their large body size, wide distribution and position as a top predator. Their absence could upset the balance of the coastal ecosystem," according to Mr Parra. "These two species of dolphin are not well known because they are very inconspicuous and shy in comparison with other

dolphin species. Locals who have fished in the Cleveland Bay area for more than 20 years say they have never seen any Irrawaddy and humpback dolphins."

Mr Parra is working with the American Museum of Natural History on a worldwide study into the genetics of humpback dolphins. The results of this joint work will provide a better understanding of the population status of humpback dolphins in Australian and South East Asian waters.

Mr Parra said the public can assist his research by reporting any sightings or strandings of inshore dolphins to him by email on guido.parravergara@jcu.edu.au or by phone on 07 4781 5824.

IRUKANDJI UPDATE

The Great Barrier Reef Research Foundation has allocated \$267,000 in funding to support further research into Irukandji Syndrome. Irukandji Syndrome is an extremely painful jellyfish sting and can be fatal.

The rising number of reported stinging incidents in north Queensland over the past few years has prompted authorities to act to protect swimmers and to mitigate the impacts on the tourism industry.

The three projects that will receive funding were chosen by the Foundation's International Scientific Advisory Council which is made up of the worlds' foremost marine scientists, including Professor Russell Reichelt of CRC Reef.

Jellyfish expert and Mackay doctor Dr Peter Fenner has been allocated funds to collect irukandji jellyfish from offshore and onshore areas for taxonomy and toxinology research.

James Cook University biologist, Dr Jamie Seymour, received funding to develop a bedside monitor to measure the definition, physiological process and optimal treatment of Irukandji Syndrome.

Australian Institute of Marine Science marine biologist and geneticist, Dr Madeleine van Oppen, was funded to identify which species are responsible for Irukandji Syndrome. Little is known about the species that cause Irukandji

Syndrome and an assay will be more quickly developed if it's established they are closely related.

"The impact of the irukandji has major implications for public health and the tourism industry that underpins many local economies along the Queensland coast. It needs to be addressed as a matter of urgency," said Mr David Windsor, Executive Director of the Foundation. "The funding is aimed at developing a practical response to managing the presence of irukandji."

OBITUARY

Sir Sydney Williams OBE. 1920-2003.

Sir Sydney Williams was a driving force behind the development of tourism and business in north Queensland. He was the founding Chairman of the CRC for the Ecologically Sustainable Development of the Great Barrier Reef which was established in 1993 and later became CRC Reef Research Centre. He played a major role in fostering collaboration between industry, government and research for the benefit of the sustainable development of the Great Barrier Reef. He was awarded the Order of the British Empire in 1977 and was knighted in 1983 for community service. In 2001, he won the World Tourism Conference Award for an outstanding contribution by an Australian individual and, in 2003, was awarded the Centenary Medal. He will be sadly missed by everyone involved with CRC Reef.



Sir Sydney Williams OBE. Photo courtesy of Cairns Post.

SUPPORTING REEF STUDIES

CRC Reef is supporting students with augmentative research grants totalling \$10,000. This year there were 15 successful applicants from James Cook University: four Honours students, two MSc students and nine PhD students. There is one round of augmentative grants each year. The next round will be in April 2004. The grants are available to tertiary students who do not receive a CRC Reef Scholarship.

NAME	PROJECT TITLE	AMOUNT
HONOURS STUDENTS		
Glenn Dunshea	Molecular age estimation in the sirenian <i>Dugong dugon</i> : applicable tool or genetic curiosity?	\$ 800
Jana Guenther	The effect of surface microtopography of <i>Pinctada</i> and <i>Pteria</i> species on the settlement of fouling organisms.	\$ 400
Ed Slaughter	Federal and State Government exploitation of Great Barrier Reef Islands between 1830 and 1950.	\$ 600
Nigel Tonkin	Ghost Ports and Harbours.	\$ 600
POSTGRADUATE STUDENTS (PhD unless otherwise noted)		
Michelle Boyle	The ecology and migrations of post-hatchling sea turtles in Australia.	\$1300
Cathryn Clarke (MSc)	The ecology of feeding in sea hares. Are sea hares an appropriate agent for the control of algal resources?	\$ 700
Martial Depczynski	The functional role of cryptobenthic reef fishes in coral reef ecosystems.	\$ 500
Piers Ettinger-Epstein	Examination of the chemical ecology and commercial viability (biopharmaceutical) of selected Great Barrier Reef sponge species.	\$ 500
Guitarina Ghtarina	Rapid determination of environmental stress in aquatic ecosystems.	\$ 500
Jean-Paul Hobbs	Regional scale analysis of processes regulating the abundance and diversity of fishes on the Great Barrier reef.	\$ 600
Elizabeth Laman-Trip (MSc)	An age-based analysis of sexual size dimorphism in surgeonfishes (Acanthuridae, Perciformes) from the Indo-Pacific region.	\$ 900
Zoe Richards	An investigation of the relative vulnerability of rare versus common corals to factors threatening the Great Barrier Reef.	\$ 300
William Robbins	Growth, demography and genetic stock structure of Queensland reef sharks.	\$1300
Andrew Scardino	Surface technologies modelled from nature.	\$ 500
Paul Tudman	Modelling the ecosystem effects of fishing on coral reefs of the central Great Barrier Reef.	\$ 500

MEDIA TRAINING

During a recent workshop in Townsville, CRC Reef students were given practical tips to help them deal with the media. The workshop was run in April by Mr Chip Henriss-Anderssen, Media Manager at the Great Barrier Reef Marine Park Authority, and radio journalist, Ms Michelle Nicholls.

Mr Henriss-Anderssen talked about the media being a tool in science communication and shared techniques that scientists can use to control the messages they send to the public via the media.

Students also heard from Townsville's local environment reporter, Ms Karen Ingram, who talked about the pressures that journalists face. Students were surprised to learn that a rural print journalist was often required to write up to seven news stories per day.



Guido Parra at the media training workshop.
Photo by CRC Reef.

Ms Nicholls interviewed students in front of a camera to give participants the opportunity to use their newly acquired media skills. Ms Nicholls then used the footage to demonstrate which responses a journalist was most likely to use in a television news story.

We look forward to seeing CRC Reef students in the news.

SUCCESSFUL COMMUNICATION

Thank you to everyone who responded to our 'Are we reaching you?' questionnaire that was sent out with our last newsletter. Congratulations to Mr Ben Logai of Papua New Guinea who won a new CRC Reef T-shirt for returning his questionnaire.

The questionnaire was sent out with our newsletter to 1070 people and organisations in Australia and overseas. Only 46 people responded to the questionnaire. Overall, their feedback about our communication products was positive.

Newsletter: Most people said the newsletter looked great (65%) and that they read all of it (54%). They considered that the length of the articles was just right (89%) and that the content was good (83%). Most respondents considered the use of recycled paper essential (80%). More than half of all respondents (54%) said they shared their newsletter with 2-5 people. Over half of respondents said they would prefer to receive the newsletter in electronic format (54%), although 41% of respondents said they would not read the newsletter if it were sent electronically. So, we will continue to publish the newsletter in hard copy on recycled paper, and make it available on our website in pdf format.

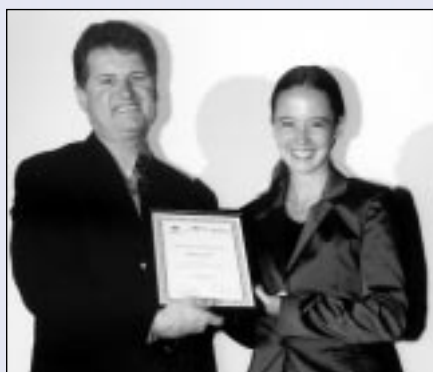
Brochures: Most respondents said that the brochures were very informative (91%) and covered topics which were very useful (76%). Most respondents thought that the brochures were written in an easy to read style (74%) and that the amount of information in the brochures was 'just right' (93%). The brochures were used for general knowledge (53%), tourism interpretation (15%) and school projects (14%).

Website: The CRC Reef website did not appear to be used as widely as other communication products because less than half of the respondents (41%) answered questions relating to the website. Of those who did respond to questions about the website, most said it looked good (60%), that the navigation of the website was easy (60%) and that the content was good (60%).

People who responded to the questionnaire were from the tourism industry (23%), teaching and education (20%), planning and management (17%), and academic studies (15%).

CRC REEF MARINE SCIENCE JOURNALISM PRIZE

The CRC Reef Marine Science Journalism Prize valued at \$1000 and Dorothy Paramore Highly Commended Award valued at \$250 are awarded annually by CRC Reef Research Centre for factual stories about marine science in the Great Barrier Reef World Heritage Area.



Vanessa Woods won the 2002 CRC Reef Marine Prize which was presented by the Hon Peter McGauran. Photo by Australian Science Festival.

The CRC Reef Marine Science Journalism competition is open to full-time students from tertiary institutions in Australia. Deadline for entries is 5 July. For more information see www.reef.crc.org.au.

NEW PUBLICATIONS

CRC Reef has published two new technical reports:

- Harriott VJ. 2002. Marine tourism impacts and their management on the Great Barrier Reef. CRC Reef Tech Rept 46 (published online only. Visit <http://www.reef.crc.org.au/publications/techreport/index.html>)
- Williams AJ, Welch DJ, Muldoon G, Marriott R, Kritzer JP, Adams S. 2003. Bridging the gap: a workshop linking student research with fisheries stakeholders. CRC Reef Tech Rept 48. (published in hard copy and online at the above address).

IMPAC NEWS

The International Marine Project Activities Centre Ltd (IMPAC) provides a host facility for marine project managers from around the world. It was established as a non profit subsidiary company by CRC Reef Research Centre.

IMPAC welcomed two new associates into their offices in February 2003 – Dr Alison Green, Marine Protected Areas Science and Strategies Coordinator from The Nature Conservancy (TNC) and Ms Sarah Lowe, Coordinator of the World Wide Fund for Nature (WWF), Great Barrier Reef Campaign.

Other associates of IMPAC are the International Ocean Institute - regional office for Asia and the western Pacific (IOI-Australia); The Great Barrier Reef Research Foundation and; the Global Coral Reef Monitoring Network (co-hosted by the Australian Institute of Marine Science). Mr Geoffrey Muldoon, who is based at IMPAC, is working with the Marine Aquarium Council and The Nature Conservancy to develop best-practice standards for the live reef fish food trade as well as undertaking socio-economic research into the trade.



Sarah Lowe, WWF, and Alison Green, TNC. Photo by CRC Reef.

DIARY ←**9-11 July 2003. Australian Marine Science Association Annual Conference, Brisbane.**

Visit: www.amsa.asn.au/conference

14-17 July 2003. MODSIM International Congress on Modelling and Simulation, Townsville.

Integrated modelling of biophysical, social and economic systems for resource management solutions. Contact David Post email: David.Post@csiro.au or visit: mssanz.cres.anu.edu.au/modsim2003.html

22-25 July 2003. National Conference on Tourism Futures, Novotel Twin Waters Resort, Sunshine Coast.

Australia's second national tourism conference which will focus on the future of the tourism industry. At the 'Protecting the Great Barrier Reef Workshop', topics to be discussed include the Great Barrier Reef Protection Plan, Crown-of-thorns Starfish and Best Practice Tourism on the Reef. The workshop aims to inform and update tourism industry stakeholders on key issues relating to the tourism future of the Great Barrier Reef. It also aims to develop a coordinated tourism industry view on key priorities for action regarding the Great Barrier Reef, and to determine, with advice from relevant authorities, the most effective means for progressing the industry's key priorities. The full conference program including keynote speakers and workshop details can be obtained from Melissa Webster at Tourism Queensland on 07 3535 5275, email: melissa.webster@tq.com.au or visit: <http://www.tq.com.au/tfconf/program22.asp>

9-12 September 2003. 16th Australasian Coastal and Ocean Engineering Conference; 9th Australasian Port and Harbour Conference, Auckland, New Zealand.

Visit: www.coastsandports.co.nz

21-27 September 2003. Marine Biotechnology Conference 2003, Chiba, Japan.

Visit www.tuat.ac.jp/~marine/ or email: MBC2003@knt-tokyo.gr.jp

26-29 September 2003. Australian Coral Reef Society Annual Conference, Townsville.

Visit: www.australiancoralreefsociety.org

1-4 October 2003. 37th International Conference on Nearshore and Estuarine Cohesive Sediment Transport Processes, Virginia Institute of Marine Science, Gloucester Point, VA, USA.

Visit: www.vims.edu/intercoh/

3-6 February 2004. Pacific 2004 International Maritime Conference, Sydney.

Visit: www.pacific2004.com.au or www.tourhosts.com.au/pacificimc2004

28 June – 2 July 2004. Tenth International Coral Reef Symposium, Okinawa, Japan.

Stability and Degradation of Coral Reef Ecosystems. Visit: www.plando.co.jp/icrs2004

11-16 July 2004. Third International Symposium on Fish Otolith Research and Application, Townsville.

Visit: www.Otolith2004.com