CRC Reef news
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CRC Reef Research Centre

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CHECKING TROPICAL PORTS FOR INTRODUCED PESTS

CRC Reef researchers based at James Cook University, in conjunction with Queensland Department of Primary Industries were commissioned by Cairns Port Authority in August to undertake a survey of the marine life of Cairns Port.

According to CRC Reef researcher, Dr Kerry Neil, a thorough survey of marine life in Cairns Port is the best protection against invasion by introduced marine pests.

"Foreign marine species can be accidentally brought into Australian ports on ships' hulls or in ballast water", she said. "Our survey will determine whether any introduced species are present in Cairns Port. It will also be a much-needed inventory of native marine life in the port."

"We have already surveyed other tropical ports, including Weipa, Karumba, Lucinda and Townsville, for introduced species", said Dr Neil.

"The recent discovery of the black-striped mussel in Darwin and its successful eradication is evidence that such surveys are a vital tool for port managers."

Researchers taking samples during a port survey. Photo by Kerry Neil

The survey will take about 10 days in November. Eight researchers will use 12 different sampling techniques to take samples from the water and sea floor as well as from port piles, breakwaters and rocky reefs.

Sorting and analysing samples will take a further twelve months before the researchers give a written report of their findings to the Cairns Port Authority.

"The survey will provide us with a good understanding of the marine biodiversity of the port and help us better manage the Port of Cairns", said Cairns Port Authority's, Ms Kim Kelleher. "It will also form part of Australia's Decision Support System, administered by the Australian Quarantine and Inspection Service which incorporates results from port surveys around the country."

"The DSS helps estimate the risk that a particular vessel – either commercial or recreational – could be a carrier of foreign marine species. The more information that is incorporated from ports around Australia, the better the DSS will become as a risk assessment tool. "

CRC Reef Research Centre is established and supported under the Australian Government's Cooperative Research Centres Program.
It is a joint venture between: Association of Marine Park Tourism Operators, Australian Institute of Marine Science, Great Barrier Reef Research Foundation, Great Barrier Reef Marine Park Authority, James Cook University, Queensland Department of Primary Industries, Queensland Seafood Industry Association, Sunfish Queensland Inc.

UNDERSTANDING THE IMPACT OF CHANGE ON FISHING COMMUNITIES

CRC Reef researchers based at James Cook University have collected social and financial information about fishers in Queensland that will help managers to understand the impact of changes in fisheries policy and management on fishing communities.

Dr Mark Fenton and Ms Nadine Marshall have collected information from Queensland's commercial fishing industry, the harvest fishery and the charter fishing industry.

The information will help to assess the social and financial impacts on fishing communities that would be associated with proposed changes in fisheries policy and management.

The researchers asked more than 2,000 fishers in Queensland about their social and financial status. They asked how long the fishers had lived in their home towns, their age, whether they were married, how many children they had, their level of education, how long they had worked in the industry, whether they employed crew or worked for someone else, how much they earned, where they spent their money, and their debts.

Dr Fenton and Ms Marshall spoke to fishers from Karumba in the north, to Southport in the south. They divided the Queensland coast into 22 Town Resource Clusters (TRCs).

The researchers found that most commercial fishing businesses in Queensland were in the Brisbane, Bundaberg, Mooloolaba and Cairns TRCs. Some of the oldest fishing businesses owned by the current owners were found in the Southport and Thursday Island TRCs, whereas some of the newest owned fishing businesses in Queensland were in the Weipa and Cooktown TRCs. Families of commercial fishers were larger in the Airlie Beach, Karumba and Hervey Bay TRCs. The youngest commercial fishers were found in Weipa TRC and the oldest in Southport and Yeppoon TRC.

The results are published in three CRC Reef technical reports by Mark Fenton and Nadine Marshall (see new CRC Reef technical reports below) and are also available on the CRC Reef website.

Dive into a seagrass adventure on the CRC Reef website created by Bentley Park College students in collaboration with DPI scientists.

AUSTRALIAN SEAGRASS EDUCATION GOES GLOBAL

Some bright, fun and educational information about seagrass for school students can now be found on the CRC Reef website.

For the last few months, Bentley Park College students have teamed up with the Marine Plant Ecology Group from the Department of Primary Industries and CRC Reef Research Centre to learn about seagrass and build fun web pages that other students can use to find out about these important marine plants.

The project was designed so that the students would learn about the biology, ecology and protective measures of seagrass. The Bentley Park College students explored the science of seagrass and the scientific techniques used in marine plant and fisheries research. Their 'classrooms' included a trawler and tropical Green Island where they discovered first-hand the growth of seagrass and its place in the marine ecosystem.

The students then came up with the best way to communicate the information to other students using the world wide web. The web pages will be a fantastic educational tool – and they look fabulous. Well done team!

SEAGRASS ART COLLECTION

Seagrass provides shelter for young prawns and fish and are food for dugong and turtles. Queensland boasts 15 species of seagrass - nearly a third of the world's species.

To celebrate the vital role that seagrass plays in marine ecosystems, the Marine Plant Ecology Group with the Department of Primary Industries (DPI) commissioned a unique set of watercolours of seagrass from high-profile north Queensland artist Ruth Berry.

Ruth has captured the mystical qualities and beauty of seagrass - from the tiny, delicate *Halophila* species to the robust *Enhalus acoroides*. The watercolours are also scientifically accurate and show different forms and leaf tips used for identification.

The scientifically accurate and beautiful print of the seagrass, Halophila spinulosa.

Queensland is a world leader in seagrass science and resource mapping. DPI studies, started in the early 1980s, have emphasised the importance of the state's marine plant heritage. Sale of the limited edition 10-print collection will be used to fund ongoing DPI research into seagrass.

The limited edition sets, signed by the artist, show 16 species of seagrass in eight genera. They are available for $400 (including GST, plus postage) from the Marine Plant Ecology Group at DPI by phoning 07 4035 0100 or by email on seagrass@dpi.qld.gov.au.

WAVE ATLAS ONLINE

A CRC Reef project has produced an online atlas of waves that hit the Great Barrier Reef World Heritage Area during cyclones.

As part of a CRC Reef project, Associate Professor Tom Hardy and his team from the School of Engineering at James Cook University modelled 6,000 virtual cyclones and calculated the wave energy, frequency and direction of waves at 150,000 points throughout the Great Barrier Reef.

"Wave measuring instruments are very expensive and can only measure waves at one point in the vastness of the Great Barrier Reef", said Associate Professor Hardy. "To find out about waves during tropical cyclones, we might have to wait years for that exact spot to be hit by a cyclone."

"So, we created a wave model especially adapted for the Great Barrier Reef and then used it to simulate the waves produced during thousands of cyclones."

The results from these simulations have been used to create the online wave atlas. The atlas will ensure reef users are better prepared for cyclonic conditions in the Great Barrier Reef World Heritage Area.

"Tourism operators can use the atlas to search for suitable sites for pontoons", said Associate Professor Hardy. "It will also help engineers to design mooring systems that are appropriate for extreme conditions."

"The atlas will also help biologists and reef managers to better understand the reef ecosystem", he said. "For example, it could help biologists understand why certain corals and fish may thrive in some areas and not in others."

Cyclone waves are just the first component of the atlas. Non-cyclonic winds and waves, as well as tidal and wind-driven currents and water levels will be future additions.

The web-based atlas is ideal for graphical display of this information. It is on CRC Reef's website at www.reef.crc.org.au/research/engineer/waveatlas.shtml or the James Cook University website at http://mmu.jcu.edu.au.

CYCLONE WAVE ATLAS WINS AWARD

The National Committee on Coastal and Ocean Engineering awarded the Kevin Stark Memorial Award for Excellence in Coastal and Ocean Engineering to Associate Professor Tom Hardy, Mr Lou Mason and Mr Jason McConochie for their work on the cyclone wave atlas. The award was presented at the Coasts and Ports Conference in the Gold Coast in October.

A beaming Lou Mason, Tom Hardy and Jason McConochie with their Kevin Stark Memorial Awards.

FROM THE CEO'S DESK

CRC REEF RESEARCH - DELIVERING RESULTS

Russell Reichelt.
Photo by Rob Parsons

Cooperative Research Centres were established by the Australian Government to promote collaboration between industry, science and government. CRC Reef is in its second year of funding from the Australian Government, so we are being independently reviewed to make sure our strategic direction is on track.

The first stage of the second-year review checks the scientific and technical direction of the Centre. CRC Reef was reviewed by Dr Don Kinsey (Chair), Dr Chris Fandry (CSIRO Marine Research), Dr Burke Hill (CSIRO Marine Research) and Dr Peter Andrews (CRC Reef visitor) in Townsville on 25-26 September. The panel were given presentations by Program Leaders and met with the Board, researchers, Task Associates and students. Their review was very positive about work to date and included some good suggestions for further development of our research programs.

It was exciting to see the Program Leaders highlight the integration of CRC Reef tasks in their presentations to the panel. For example, CRC Reef researchers have a wealth of expertise in ports including hydrodynamic modelling, biological surveys (see the story about Cairns Port survey), assessment of critical habitats (see the stories about seagrass) and socio-economic information about fishers (now published as three technical reports). I am keen to see further integration between tasks that will strengthen our ability to bid for future funding as well as value-adds to our research.

The enthusiasm of the students particularly impressed the panel –for a taste of their innovative work see the stories about Rachel Pears and Amanda Hodgson in this newsletter.

A huge thank you to all the Program, Project and Task Leaders, Task Associates, students and Board members who took part in the review. The second stage of the review will be held in Townsville on 15-16 November. It will review the strategic direction, cooperation, application of research, education, training, management, budget and performance of CRC Reef.

Russell Reichelt
Chief Executive Officer

DUGONGS AND BLIMPS

James Cook University PhD student Ms Amanda Hodgson is using an innovative method to study the behaviour of dugong. She is using a video camera attached to an aerostat or tethered helium-filled blimp.

Her project, supported by CRC Reef, will provide some fundamental information about dugong behaviour and find out whether noise from boats or from acoustic alarms affects their behaviour. Acoustic alarms, or pingers, are deployed on gill nets to reduce the number of marine mammals that are accidentally caught in the nets. Amanda will investigate whether these noises disturb dugong and prevent them from using the shallow, inshore habitats they need to survive.

Amanda Hodgson with a video attached to a balloon that she is using to track dugong movements. Photo by Helene Marsh

The aerostat gives a much better view of dugongs than from a boat. So, it is providing information about dugong behaviour that was previously unknown. The method was first used to study manatees and bottlenose dolphins by researchers at the Mote Marine Laboratory in Florida. This is the first time that the aerostat has been used to study marine mammals in Australia.

The camera gives an aerial view of the dugong which is transmitted to a monitor onboard a boat. The camera is remote controlled so it can be manoeuvred to follow the dugongs. The method enables Amanda to see large numbers of dugongs and record their behaviour as a herd, as well as zoom in on individuals and see specifics such as diving, feeding, social interactions and even mother and calf relationships, such as suckling behaviour.

With this new bird's eye view of dugong behaviour, Amanda will be able to develop an 'ethogram' - a list of behaviours commonly performed by dugongs. She will determine daily behavioural patterns or the length of time spent conducting specific behaviours during the day. Amanda will also be able to assess what function herds perform for dugongs, that is, whether they are a defence against predators or used for feeding.

Amanda is studying the population of dugongs in Moreton Bay because they occur in relatively shallow, clear water that is excellent for filming using the aerostat. She will also be doing fieldwork in Cleveland Bay, Townsville, so that she can compare the responses of dugongs to boats in the two areas.

Since filming began in August, Amanda has collected many hours of footage that she will analyse when this year's field season ends in November.

SCIENCE MEETS ART IN THE WHITSUNDAYS

In August, the sculptors, Foot Young from Hamilton Island, and Silvio Aponyi from Adelaide, carved two life-sized dugongs from local limestone in Airlie Beach as part of the Centenary of Federation celebrations.

The project called 'Coast to Coal' involved several professional sculptors who carved threatened animals that live from the Whitsunday coast to the coal mining towns of Clermont and Moranbah. CRC Reef sponsored an assistant for the artists during August, the month of public sculpting at Airlie Beach.

During the sculpting, CRC Reef collaborated with GBRMPA and local QPWS staff on a display to raise public awareness about dugong and seagrass research as well as the role of each organisation.

Silvio Apponyi uses hammer and chisel to peel away the limestone from his emerging dugong. Photo by Bryony Barnett

The two dugong sculptures grew from the limestone blocks in a cloud of dust as children sculpted dugongs, turtles and mermaids on the beach. The dugong sculptures, now owned by the Whitsunday Shire, will be officially endorsed at a ceremony in November. They will stay in the communities for both locals and visitors to enjoy.

BUSINESS HIGHER EDUCATION ROUND TABLE (BHERT) COURSE

The Business and Higher Education Round Table (BHERT) Leadership and Career Development Course is designed to help senior postgraduate students and postdoctoral fellows understand the nature of leadership; how to work effectively in teams; and how to plan their professional careers. The course covers knowledge and skills in leadership, motivation, communication and influence, and team processes.

The course was developed jointly by the Melbourne Business School, CSIRO, several Cooperative Research Centres (CRCs) and the CRC secretariat. It was run by Professor Leon Mann (Melbourne Business School, the University of Melbourne) and Associate Professor Robert Marshall (CSIRO and Melbourne Business School).

Mr Geoffrey Muldoon, a PhD student with CRC Reef, attended the course in Melbourne from 20-24 August (when outside temperatures didn't reach 13 degrees Celsius!). Almost 30 other PhD students and postdoctoral fellows from CRCs around Australia participated in the course, including CRC for Diagnostic Technologies, CRC for Polymers, CRC for Water Quality and Treatment, and CRC for Coastal Zone Estuary and Water Management.

"The individual modules of the course were really useful", said Geoffrey. "But, the team exercise was the part of the course that stood out for me."

"Teams were formed on the first day and we worked in these teams throughout the course to decide Australia's five research priorities for the next five years. Our team decided that biodiversity; environmental quality; medical research and biotechnology; energy production (including renewable and alternative sources); and agriculture, fisheries and forestry, should be priorities for Australia in the next five years."

"The hands-on, applied aspect of this exercise was the most enjoyable and valuable aspect of the course, and the most useful activity in terms of future careers", said Geoffrey.

Looks like the course participants are well on their way to future careers as leaders because the research priorities they recommended were very similar to those listed by over 200 senior Australian scientists after a roundtable exercise. The top five research priorities of the senior scientists were: environment (salinity, biodiversity, global issues); new/specific technologies (including photonics and materials science); biotechnology (health drugs, agriculture, genomics, biodiversity); social issues (community development; health/drugs); and education (research, training, learning, teaching).

"I've no doubt that by attending the BHERT course, I'll be better equipped to function quickly as either a member of research teams or as a valuable member of commercial organisations", said Geoffrey.

Geoffrey thanked CRC Reef for the opportunity to attend the course.

FAMILY BUSINESS

Cod, groper and coral trout belong to the grouper* family and are one of the most recognisable family of fishes. Many species of these predatory fishes are common on coral reefs and are in growing demand to satisfy for market in the Indo-Pacific for live reef fish. As a result, some cod species that were once of little interest to fishers are becoming more marketable.

For most species of the grouper family (other than coral trout), there is very little information about their biology, such as how old they get; how quickly they grow; and at what age and size they reach maturity. This fundamental information is crucial for informed management of any fishery based on these fish and has been identified as a priority by the Reef Line Fishery Management Advisory Committee (ReefMAC).

These gaps in knowledge are the focus of a research project by Rachel Pears, a PhD student at James Cook University who is supported by CRC Reef. Rachel is studying the abundance, age and growth, and reproductive biology of eight species of cod on the Great Barrier Reef (GBR). These include the flowery cod *Epinephelus fuscoguttatus*, wire netting cod *Epinephelus quoyanus* and peacock rockcod *Cephalopholis argus*. As a first step, Rachel has undertaken diver-surveys on the northern GBR to estimate the abundance of these fishes. She will soon extend her surveys to other regions in the central and southern section of the GBR.

Rachel Pears.

Rachel is collecting otoliths (ear bones) and gonads (sex organs) from these species of cod so that she can find out how long the fish live, growth patterns, and their age and size at sexual maturity. She is also using these samples to check if, like most other members of the grouper family, these cod change sex from female to male as they get older.

Commercial and recreational fishers are helping to provide samples for Rachel's study and she wants to thank everyone who has provided samples so far. Rachel will still be seeking samples throughout next year. If anyone is interested to find out more about the project

Peacock rock cod. Photo by AIMS

and how you can help, contact Ms Rachel Pears by phone on 07 4781 4143 or by email on rachel.pears@jcu.edu.au. Stay tuned in the next newsletter for Rachel's results.

(* The scientific name for this family of fishes is the Serranidae. In Australia and New Zealand, these fishes are called gropers, while elsewhere, the same fish are called groupers.)

FAST FISH STORY WINS RACE TO $1000 PRIZE

A story about fish that swim faster than Ian Thorpe by Ms Bridget Green, a PhD student at James Cook University, has won the $1000 Marine Science Journalism Prize for 2001.

According to Bridget's story, Ian Thorpe swims at a modest two body lengths per second while the clown fish, just 24 hours after hatching, can swim at an astonishing 9.5 body lengths per second.

The clown fish are also fast developers and are the only marine fish that are known to feed when they first hatch.

"In comparison, coral trout and barramundi do not open their mouths until they are a couple of days old and the cold water halibut doesn't feed until is it 30 days old", says Bridget in her story.

Bridget's story won the $1000 Marine Science Journalism Prize which is awarded each year to James Cook University students. The competition encourages professional communication of marine science issues in the Great Barrier Reef World Heritage Area.

Ms Brenda McDonald, a PhD student at James Cook University, was awarded the $250 Dorothy Paramore Highly Commended Award for her story about dugongs.

Her story is about using molecular techniques to learn about dugong populations in Australia. There are two separate populations of dugong in Australia that overlap in the Torres Strait region – one stretches from Shark Bay in Western Australia to Townsville, and the other group stretches from Moreton bay in Queensland to Torres Strait.

Genetic techniques are being used to check whether dugong are interbreeding in the Torres Strait. The techniques may also show dugong social structures and behaviours that have not been recognised in the past. The information is invaluable for managers.

The 2001 Marine Science Journalism Prize is sponsored by CRC Reef Research Centre, Great Barrier Reef Marine Park Authority, Australian Institute of Marine Science, James Cook University and Queensland Department of Primary Industries.

The prizes were awarded on 21 September at Reef HQ by Professor Janet Greeley, the Executive Dean of the Faculty of Arts, Education and Social Sciences from James Cook University.

FISHERS ASKED TO HELP WITH SPANISH MACKEREL RESEARCH

Fishers who target Spanish mackerel along the east coast of Queensland are being asked to help CRC Reef researchers with an important new research project, funded by the Fisheries Research and Development Corporation (FRDC).

There is a lack of information about the Spanish mackerel fishery, especially south of Townsville. To allow stakeholders and managers to debate and make informed management decisions about the Spanish mackerel fishery in the future, the characteristics of all fishing sectors from all coastal regions need to be understood.

This project will assess what gears and methods are used to harvest Spanish mackerel. It will also identify any differences in the length, age and sex of fish taken by different gears. Importantly, the project will assess these characteristics for the commercial, recreational and charter sectors, and from numerous regional centres along the east coast.

The project will complement the on-going work of Mr Geoff McPherson, a biologist with Queensland Fisheries Service (QFS). In the late 1970s and early 1980s, Mr McPherson studied the feeding, growth, reproduction and migration of Spanish mackerel. More recently, he and his staff started a long-term monitoring program so they can annually assess the age composition and spawning potential of Spanish mackerel from reefs in the Cardwell-Townsville region - the major east coast spawning area for these fish.

Fishers who catch Spanish mackerel are being asked to help with the study. Researchers would like to collect fish frames (if product is filleted) or heads, guts and lengths of fish (if product is trunked) for later processing in the laboratory. Where possible, researchers would also like to accompany fishers on trips to maximise the flow of information between the research staff and fishers.

A recreational fisher with a Spanish mackerel. Photo by Andrew Tobin

For more information, or if you are interested in helping researchers collect fish samples, please contact Andrew Tobin (07 4781 5114) or Amos Mapleston (07 4781 5247).

INDIGENOUS VOICES

Building bridges between Western and Indigenous knowledge systems was the focus of the 'Indigenous Voices' conference held on the Atherton Tablelands from 23 – 25 October, organised by Rainforest CRC. The conference aimed to encourage interactive exchange between Indigenous and non-Indigenous peoples, to promote better understanding of the two knowledge systems, and to build bridges between them. The conference brought together researchers, staff and Indigenous associates from nine CRCs, including CRC Reef who jointly sponsored the gathering.

Dr Penny Wurm (Tropical Savannas CRC), Dr Helen Ross (UQ), Professor Lowitja O'Donoghue and Dr Russell Reichelt (CEO of CRC Reef).

Following a welcome by Traditional Owner Syb Bresolin from the local Dulguburra Yidinji Clan, the 80+ delegates shared stories, which illustrated the different way we learn, conduct research and pass on knowledge. There was talk of ethics and protocols, collaboration and capacity sharing. Keynote speaker, Professor Lowitja O'Donoghue, Chair of the Aboriginal and Tropical Health CRC, moved the audience with her personal experiences as a member of the stolen generation in her talk about the relationship of the well-being of the country and the well-being of people.

One of a series of CRC presentations, a panel of CRC Reef researchers and Aboriginal associates presented different perspectives gained in research on co-management. CEO of CRC Reef, Russell Reichelt, also sought guidance on how we can better engage with Indigenous people in our research.

NEW TECHNICAL REPORTS

Hoedt FE, Choat JH, Cruz J, Collins JE. 2001. *Sample collection methods and practical considerations for introduced species' surveys at tropical ports*. CRC Reef Research Centre. Technical Report No. 35.

Fenton DM, Marshall NA. 2001. *A guide to the fishers of Queensland. Part A: TRC-analysis and social profiles of Queensland's commercial fishing industry*. CRC Reef Research Centre. Technical Report No. 36.

Fenton DM, Marshall NA. 2001. *A guide to the fishers of Queensland. Part B: TRC-analysis and social profiles of Queensland's harvest industry*. CRC Reef Research Centre. Technical Report No. 37.

Fenton DM, Marshall NA. 2001. *A guide to the fishers of Queensland. Part C: TRC-analysis and social profiles of Queensland's charter fishing industry*. CRC Reef Research Centre. Technical Report No. 38.

For copies, contact CRC Reef by phone on 07 4729 8400 or by email on info@crcreef.com.

MOVING STAFF

We wish administrative assistant, Amanda Norman, all the best in her move south to Brisvegas in search of better waves and more live music.

Mary Nash and Kylie Smith.

The new friendly voice you hear when you call CRC Reef is Mary Nash who has joined us from sales and administration in Mackay. Kylie Smith has also started at the CRC Reef city office as a trainee in office administration.

WE HAVE MOVED!

CRC Reef has opened an office in the Townsville CBD.

Postal address:	PO Box 772, Townsville, Queensland, 4810, Australia
Delivery address:	Level 6, Northtown Tower, 280 Flinders St, Townsville.
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SEAFOOD DIRECTIONS 2001

If your future is in commercial fishing or seafood, you can't afford to miss the Seafood Directions 2001 conference, being held in Brisbane on 27-29 November 2001.

The program for Seafood Directions will cover the critical challenges and opportunities confronting all sectors of the seafood industry. The conference themes are: Sustainability (key to the future); Resource Security (the vital ingredient); Industry Profile (removing the myths); Industry Development (focusing on the "D" in R&D);

(continued next page)

CRC REEF T-SHIRTS

Education officer Tim Harvey models the new-look CRC Reef sun shirt.

CRC Reef now has polo shirts and sun shirts for sale. The T-shirts come in a range of attractive colours with the CRC Reef logo embroidered or screen-printed on the left-hand chest corner.

To order your shirt, contact CRC Reef, quoting type, colour, size and number of shirts you need. We cannot take credit card payments. Please pay by cheque or money order.

STYLE	COST (AUS $ inc GST)	SIZE				
TASLON SUNSHIRT with screen-printed logo		S	M	L	XL	XXL
White with navy collar and cuffs	26.00	x				x
COTTON POLO with embroidered logo		S	M	L	XL	XXL
White with royal blue collar	22.00					
Sky blue with navy collar	22.00	x				
Paprika with navy collar	22.00					x
Purple with jade collar	22.00					x
Navy with navy collar	22.00	x	x			
LADIES POLO with embroidered logo (fitted look)		S	M	L	XL	XXL
Navy	16.00				x	x
Sky blue	16.00				x	x

x: not available

Seafood Quality and Safety; and Human Capital (the key investment).

For commercial fishers, Seafood Directions 2001 provides a unique opportunity to attend a major national seafood industry conference in Brisbane that will have a significant impact on the future of commercial fishing and the seafood industry. It is also an opportunity to be involved in discussions about key issues, challenges and opportunities facing the industry. At Seafood Directions 2001, the industry sets the agenda and determines the issues to be discussed.

Seafood Directions is organised by the seafood industry and is designed to attract a high level of industry participation. This will ensure the action plan and outcomes arising from the conference strongly focus on issues and opportunities that the industry need to develop a more secure and prosperous future for the industry.

The Women Industry Network Seafood Community conference and the Community Communication Workshop being held immediately before Seafood Directions 2001 (at the same venue) are also important events for the seafood industry as it strives to improve community understanding and acceptance of the seafood industry. Everyone is welcome to attend these events (which are not women's only affairs) and to benefit from the valuable information and opportunities available to participants.

For more information about the conference, visit the website on www.seafoodsite.com.au (click on the Seafood Directions logo) or contact the conference secretariat by telephone on 07 3854 1611 or fax 07 3854 1507.

DIARY

20-23 November, 2001. Townsville. National Conference on Aquatic Environments, 'Sustaining Aquatic Environments – Implementing Solutions.'
Contact: Symposium Secretariat, Australian Water Association, PO Box 388, Artarmon, NSW, 1570.
Telephone: 02 9413 1288
Email: events@awa.asn.au
Website: www.awa.asn.au/AquaticEnvironments

27-29 November, 2001. Brisbane. Seafood Directions 2001 – the Australian Seafood Industry National Conference.
See information on page 7.

29 November – 2 December, 2001. Swansea, Tasmania. Coastcare Tasmania 2001 Conference. The Cutting Edge.
Contact: Chris Rees
Telephone: 03 6233 3963
Email: chrisrees@dpiwe.tas.gov.au

29-30 January, 2002. Sydney. Pacific 2002: International Maritime Conference.
Contact: Tour Hosts
Telephone: 02 9262 2277
Website: www.tourhosts.com.au/pacificimc/

30-31 May, 2002. Brisbane. Fourth Queensland Environmental Conference. Practical and Sustainable Solutions for Government, Industry and Infrastructure.
Contact: Environmental Engineering Society,
PO Box 1124, Spring Hill Qld 4004.
Telephone: 07 3510 2114
Email: admin@eesq.com.au

2-5 July, 2002. University of Queensland, Brisbane. Environment, Culture and Community Conference.
Contact: emash.uq.edu.au/conferences/ecc/
The conference will explore the role of social and cultural processes in relation to environment awareness, such as artistic interpretation, valuing and protecting the environment, population and use of resources.

14-17 August, 2002. Cairns. World Congress on Aquatic Protected Areas 2002.
Contact: OzAccomm Conference Services,
PO Box 164, Fortitude Valley Qld 4006.
Telephone: 07 3854 1611
Facsimile: 07 3854 1507
Email: apa2002@ozacomm.com.au.
Website: www.ozacomm.com.au/apa2002
Conference themes include: Who and what are the beneficiaries of Aquatic Protected Areas? How to design and select Aquatic Protected Areas; Success factors in the implementation and management of Aquatic Protected Areas; How good are Aquatic Protected Areas? (measuring their performance); and the role of Aquatic Protected Areas in the aquatic ecosystem.

17-25 August, 2002. National Science Week 2002.
Contact: Willow McGregor, National Coordinator.
Telephone: 02 6205 0281
Website: www.scienceweek.info.au