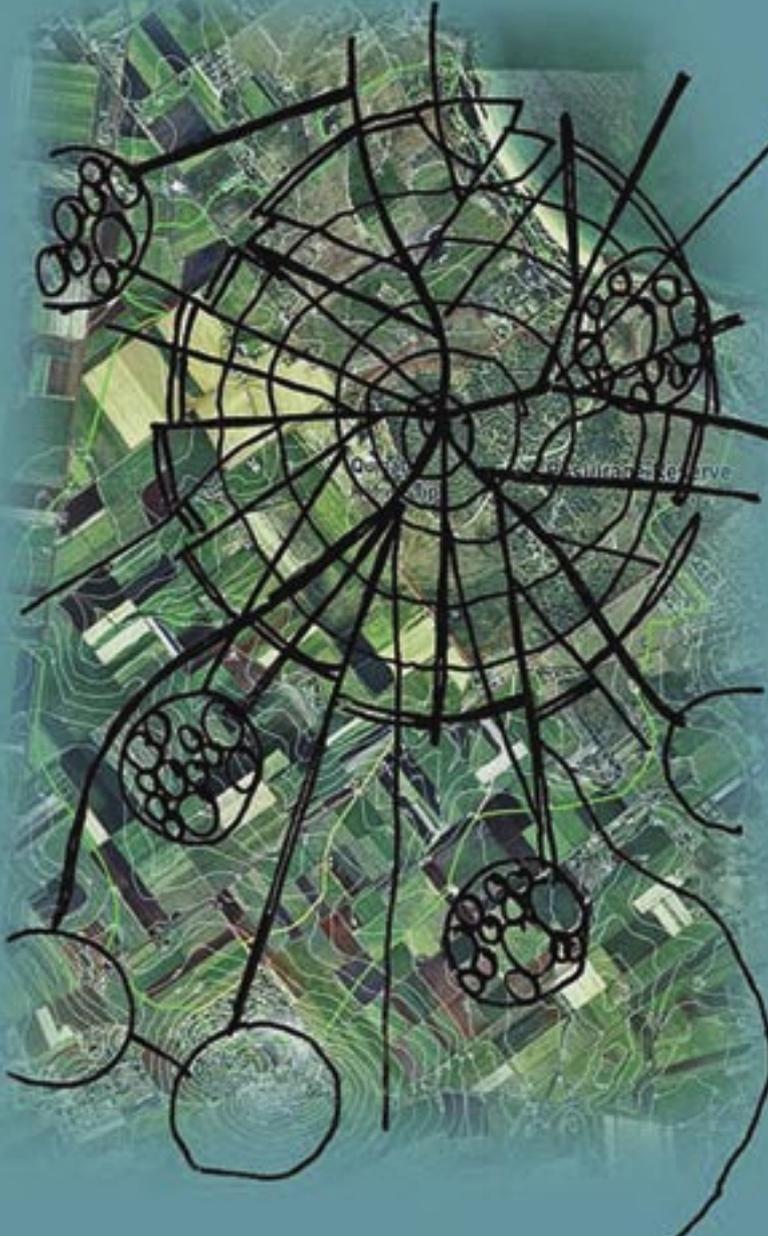


Waves

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THIS ISSUE:

Collaboration

Innovation

Partnerships

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Contributions to *Waves* vol 14(1) 2008

The next edition of *Waves* will highlight *Blue/Green Energies, Ocean Technologies and more*. The deadline to submit articles for consideration is Monday 4 February 2008. Please supply 400-word (half-page) or 800-word (full-page) articles and high-resolution digital images to the National Office.

The Marine and Coastal Community Network facilitates involvement in marine and coastal biodiversity conservation and sustainable use. It is supported by the Australian Government's Natural Heritage Trust through the Department of the Environment and Water Resources. This national Network is administered by the Australian Marine Conservation Society.

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Welcome

Welcome to MCCN's 3rd and final *Waves* magazine for 2007. For this edition we sought articles on innovation, collaboration and partnerships from across MCCN's broad range of participants – reflecting the Australian community's diversity and ongoing interest in our marine and coastal environments. We hope you find it useful and stimulating.

Following the last *Waves* edition, *Indigenous Perspectives*, it was my good fortune to represent MCCN at the 2nd National Indigenous Land and Sea Management Conference in Cardwell, organised by the Girringun Aboriginal Corporation. More than 600 delegates had the opportunity to learn about a vast range of advocacy, policy development, management planning and business initiatives being undertaken by Traditional Owners and other representatives of Aboriginal communities.

Over this last 12 months you may have noticed some changes in MCCN's communications. The team has been working hard to improve our communications services, including:

- Our weekly **Wetstuff** and monthly **E News** services – delivering current and relevant news from overseas and Australia;
- Our **Website** – improving access to key information and increasing our capacity to assist you connect with each other;
- **Waves** – continuing to provide an opportunity to hear from leaders across all sectors about important developments in marine and coastal matters;
- **New National Office** – established with the assistance of the University of NSW and Sydney Institute of Marine Science at Chowder Bay, Sydney.

MCCN recognises there is a lot to do in assisting Australians keep up-to-date with: government policies and programs; scientific research outcomes; and industry and community initiatives in our coastal and marine environments. MCCN is committed to the task of sharing information and will continue to seek creative opportunities to keep you informed, engaged and connected!

Fiona Mandelc
National Coordinator, MCCN



The SIMS site at Chowder Bay, new home for the MCCN's National Office and where NSW-IMOS is based (see article page 7). Photograph by Claire Stammers.

We've Moved!

MCCN's new head office is based at the University of NSW's (UNSW) Building 2 at Chowder Bay. UNSW is a member of the Sydney Institute of Marine Science (SIMS), which is also located at Chowder Bay on Sydney Harbour.

Chowder Bay, part of the Sydney Harbour Federation Trust, was set up by the Australian Government to plan the future of former defence and other special Commonwealth lands in Sydney Harbour. The lands contain historic buildings, natural vegetation, magnificent harbour views and a record of our city's Aboriginal, maritime and defence heritage.

MCCN's new postal address is:
MCCN National Office, PO Box 709, Spit Junction NSW 2088
Free call: 1800 815 332
E: nat-off@mccn.org.au
W: www.mccn.org.au

WHAT IS SIMS?

SIMS is a joint venture (see article by Iain Suthers), bringing together key researchers to form cross-disciplinary teams of leading scientists working on issues that are critical for the sustainable management of our coastal and oceanic environments. The Sydney Harbour urban marine environment will be a major research focus of the Institute. Research at the Institute will deliver significant benefits to related industries and the Australian community.

Chowder Bay will provide high quality seawater from a deep harbour location to service the state-of-the-art running seawater research facility. It will be a beacon to international researchers and students for visits, sabbaticals and fellowships.

Further information: <http://sims.org.au/>

Noticed Anything New?

MCCN has a new cyber face – with a refresh of our website: www.mccn.org.au

A quick look at the site and you will notice it retains all that was good with our old site – focusing on the provision of news/resources, links to other organisations, communities' awareness raising, and improving conservation and sustainable use outcomes for our marine and coastal environments.

However, you will also notice we have added new sections for some of our participant groups e.g. media, industry, community groups and students. Visitors can click on relevant sections – making it easier to find information, activities and connections relating to you.

This is just the beginning of improvements to our website; it will evolve over time and we welcome your feedback on the changes.

The MCCN team also recently agreed to revitalise our logo – to clearly illustrate our vision for our network and marine/coastal conservation into the future.

Finally, a big thank you to our partners who helped launch our new website and logo: web designer Bianca Shapiro from Blast Web Consulting and graphic designer Dianna Wells Design; and Aengus Moran, Oceanwide Images, Dianna Wells and Australocetus Research, for supplying inspirational images for our new website.

The Multiplier Effect

Diane Tarte, Project Director, SEQ Healthy Waterways Partnership

THE ORGANISATION

The current South East Queensland (SEQ) Healthy Waterways Partnership has evolved from its precursor, the Moreton Bay Waterways and Catchments Partnership (established 2001). Known widely as 'The Partnership', its composition and the scope of its activities render it unique.

The Partnership members include: 5 state agencies, 3 state corporations, all 19 local SEQ governments, 29 industry groups, 6 university and research institutions and 38 catchment groups. There are no less than 79 organisations represented on the Partnership's five sub-regional Implementation Groups.

All Partners work together to improve catchment management and waterway health in the eastward-draining rivers and estuaries of SEQ (between Noosa in the north, west to Toowoomba, south to the Old-NSW border) and Moreton Bay.

The Partnership is guided by a Chief Executive Officers' Standing Committee, a Scientific Expert Panel and the five sub-regional groups, and is overseen by the SEQ Regional Coordination Committee. The collective efforts of the Partnership are facilitated by a small Partnership Office staff, and complemented by the activities of individual Partners.

The Partners and supporting organisations were responsible for developing and implementing the SEQ Regional Water Quality Management Strategy (SEQRWQMS 2001) and the SEQ Healthy Waterways Strategy (SEQHWS 2007-2012).

THE HEALTHY WATERWAYS APPROACH

The philosophy underlying the Partnership's approach rests on two foundations:

- 1 commitment to working within a structure which allows all partners to be heard, contribute to decision-making and implement agreed actions within their own spheres of responsibility;
- 2 formulation of management strategies based on sound science, rigorous monitoring, and adaptive learning.

The Partners' Vision for the waterways and catchments of SEQ is that: *By 2026,*



Estuarine lake with submerged trees. Photograph courtesy of SEQHWP.

our waterways and catchments will be healthy ecosystems supporting the livelihoods and lifestyles of people in South East Queensland, and will be managed through collaboration between community, government and industry.

KEY REGIONAL ACTIVITIES

The Partnership's office coordinates comprehensive science, research and planning projects, and is responsible for the Ecosystem Health Monitoring Program (EHMP) – one of the most comprehensive marine, estuarine and freshwater monitoring programs in Australia. The EHMP delivers a regional and catchment-based assessment of the aquatic ecosystem health of SEQ's waterways, culminating in a well-publicised annual 'Report Card'.

The office is also responsible for the Healthy Waterways Campaign, aimed at all stakeholders throughout SEQ. The Campaign:

- produces communications collateral and education/behavioural change programs;
- manages annual high-profile events (the Healthy Waterways Awards and the Report Card release);
- supervises the Healthy Waterways Clean-Up program.

The SEQ Healthy Waterways Strategy

The SEQ Healthy Waterways Strategy is an integrated set of activities which the Partners have committed to initiating during the period 2007 to 2012, as part of a longer-term program for achieving the 2026 Vision. The Strategy aims to ensure that the health of SEQ's waterways are maintained or improved in the face of one of the highest rates of population growth in Australia. It recognises the significance of long-term water security and highlights the importance of maintaining water quality – a key aspect of waterway health, and a key benefit of healthy aquatic ecosystems.

The Strategy contains over 500 management actions within management outcome targets, which are contained in a series of 12 Issue-focussed, Area-focussed and Enabling action plans. The Strategy has a nominal five-year timeline and supports/initiates key elements of many other State and regional policy/planning documents.

Important outcomes from the SEQ Healthy Waterways Strategy include:

- major reductions in loads from point source pollution (by investments in reuse and improved technologies);
- reductions in urban diffuse source

pollutants (through the adoption of Water Sensitive Urban Design);

- significant reductions in non-urban diffuse pollutants (with a target of a 50% reduction in sediment load to Moreton Bay by 2026);
- protection and conservation of High Ecological Value waterways;
- reduced intensity and frequency of existing types of coastal algal blooms.

In the broader sense, the goals of the Strategy will be achieved as a result of a combination of various factors, including:

- an ongoing commitment of the SEQ Healthy Waterways Partners to carry out the agreed actions;
- significant investment in the creation of the relevant capacity – human, institutional and physical infrastructure – to address the necessary issues;
- a willingness to embrace an integrated approach to waterway health, including total water cycle management;
- the capacity to develop and adopt new approaches, including innovative market-based instruments, that support major non-urban diffuse source pollution management initiatives.

The Partnership's collaborative approach, underpinned by its science-based adaptive management methodology, continues to generate interest throughout Australia and overseas. The Partnership is a complex organism; however, its significant gains have arisen from the successful, collaborative efforts of disparate groups with a common goal: to protect, conserve and improve the health of aquatic ecosystems in SEQ.

Further information: [Diane Tarte](mailto:di.tarte@healthywaterways.org), (07) 3403 4206, di.tarte@healthywaterways.org or www.healthywaterways.org.



Tim Ealey – Dr Mangrove.
Photograph by Laura Ealey.

Improving Seagrass and Mangroves in Western Port, Victoria

Dr E.H.M.(Tim) Ealey*, Project Manager, Western Port Seagrass Partnership Ltd

BACKGROUND

Roger James, Chairman of the Western Port Seagrass Partnership Ltd, explains that the 'Partnership is driven by a vision in which the environment of the Western Port catchment and bay are restored and provide the foundation of a sustainable, healthy, vibrant, natural, productive ecosystem'.

The Partnership was formally established in 2001, with considerable support from the Victorian Environment Protection Authority (EPA). Its members include distinguished academics, business people and community leaders with a passion to protect Western Port. It aims to foster broad community involvement, especially of schools, in Western Port rehabilitation work.

SEAGRASS

Seagrass forms an important part of the Western Port ecosystem. Many species of fish depend on the seagrass beds, especially the King George whiting larvae.

There are many theories as to why 70% of the seagrass has disappeared. Clearing of the Koo Wee Rup Swamp produced enormous amounts of sediment which smothered seagrass and mangroves many years ago. It also caused turbidity which inhibited the deep water seagrass. Low tides, coinciding with successive hot days, caused considerable damage to the shallow water species by sunburn. Extensive harvesting of seagrass for insulation also assisted the decline.

The vast meadows of seagrass and fringing mangroves protected the shoreline from erosion in the past. When these disappeared erosion was, and remains, dramatic. CSIRO tests showed that

32% of the sediments currently entering the bay come from erosion of the low Lang Lang cliffs in the north-east. It was alleged that discharges from sand mining were poisoning the Lang Lang mud flats, preventing seagrass growth. Bioassays by the Partnership of discharges and process water on the mine site showed no toxicity to seagrass. However, although seagrass would not grow on the Lang Lang mud flats, it flourished in containers of mud from Lang Lang elsewhere.

The Partnership discovered that a component of the sediment eroding from the Lang Lang cliffs, when mixed with sea water, creates a fine, slimy silt that smothered and killed all seagrass transplants attempted in this area. Until this erosion is halted, seagrass is unlikely to return to the Lang Lang mud flats.

MANGROVES

Mangroves are solar collectors, transforming carbon dioxide into starches and sugars via their leaves, which eventually fall, rot and transfer nutrients and energy into the bay. They also provide habitat for many species of birds and marine life, including the fish that penguins eat. They not only protect the shoreline from erosion, they usually cause the shoreline to expand by collecting sediments.

Mangroves were killed when their aerial roots were smothered by sediments. They were also cut down and burnt on a large scale for: charcoal; ash for soap-making; stock food in drought; and simply for a good view. Where they flourish, such as at Pioneer Bay, they increase the shore; where they have disappeared, extensive erosion is occurring. Consequently it was decided to grow mangroves along the 7kms of eroding cliffs, which measurements had shown were eroding at about 1m per year in some places – with subsequent damage to the valuable salt marsh.

It was decided that a mangrove planting would be more feasible than any physical barriers, and would increase the energy and nutrient flows to the bay. An extensive planting program was funded by the Department of Sustainability and Environment, the Port Phillip and Westernport Catchment Management Authority and, more recently, by the EPA alternative penalty provisions.

Thousands of seedlings are being dug up by volunteers from under mature mangroves at Blind Bight to supply the

replanting efforts. As it is a very high energy coast with 2m waves, there have been many losses as the Partnership experiments with various staking and protection measures. Nevertheless over one thousand seedlings have survived, and some have grown to over half a metre.

WHEN A SCIENTIST MEETS A TEACHER

The Partnership had germinated over 2,000 mangrove seeds and was facing the task of planting them out into containers to grow on. Tina Mayling, a senior teacher at the Bass Valley Primary School, came to the rescue with her students and a flourishing nursery evolved. The Partnership obtained a Commonwealth Community Water Grant to build a hot house, take students on planting trips to the mudflats, and other activities.

The students also assisted in the Partnership's experiments with seagrass. They planted hundreds of seagrass plugs, fertilised with Osmocote, and later took measurements to compare their growth with other control plugs. Seagrass growth using Osmocote is spectacular but transient. It is hoped that continued fertilisation with high potassium Osmocote will eventually produce seed-producing seagrass beds.

The Partnership now has funds for a three-year program. As well as the primary school, Newhaven College and hopefully other schools will produce seedlings for the program. A Landcare work crew is employed for much of the huge planting scheme.

Further information: Tim Ealey, ealey@bigpond.com or Doug Newton, Secretary,newtons@netspace.net.au

* Tim was given the Australian Coastal Custodian's Award for 2007.

Introducing the Integrated Marine Observing (IMOS) System

Dr Marian McGowen, IMOS, University of Tasmania

The Integrated Marine Observing System (IMOS) is a nationwide collaborative program designed to observe the oceans around Australia, including the coastal oceans and the 'bluewater' open oceans. IMOS will provide quality free data to support research on many of the critical marine issues facing Australia, including climate change and sustainability of ecosystems. Twenty-seven separate institutions will be involved in the new facility, which is funded under the National Collaborative Research Infrastructure Strategy. IMOS partners comprise most of the universities and agencies with capability in ocean and marine research. The program has strong links with similar international programs and agencies.

IMOS is a distributed set of equipment and data information services which collectively contribute to meeting the needs of marine climate and ecosystems research in Australia. The observing

system provides data in the open oceans around Australia out to a few thousand kilometres, as well as the coastal oceans. IMOS is driven by the needs of the marine community, to deliver key data-streams to support marine research, industry and management activities. The infrastructure also contributes to Australia's role in international programs of ocean observing.

The IMOS office coordinates the deployment of a wide range of equipment and assembles the data through 11 facilities distributed around the country. The data are made available to researchers through the electronic Marine Information Infrastructure (eMII) located at the University of Tasmania.

AN NCRIS FUNDED ACTIVITY

The \$92 million nationally integrated marine observing program was announced on 27 November 2006, by the Minister for Education, Science and Training. The investment is made up of \$50 million of direct funding provided under the National Collaborative Research Infrastructure Strategy (NCRIS) over five years, which has also attracted nearly equal in-kind and partner contributions from agencies and universities.

Distribution of the five Science Nodes. Artwork by Louise Bell.



IMOS ORGANISATION

IMOS represents a major shift in the way ocean observations are carried out and managed in Australia, and requires a new style of coordination within Australia's marine community. IMOS was designed by the marine community through a process that required a strong consensus on what observations are needed to support research at a national scale. IMOS is essentially a service to the community providing free, open and timely access to data.

The five Science Nodes are responsible for identifying the scientific objectives that need to be addressed by 'marine observing', the development of science plans and providing the strategic framework necessary for the initial deployment of infrastructure.

- 1 Bluewater and Climate Node – support research into climate change and its impacts on all timescales, by focussing on the physical and dynamical state of the ocean. Biogeochemical observations will play a role.
- 2 GBROOS (Great Barrier Reef Ocean Observing System) – understanding the physical environment which governs the GBR region and how it is changing.
- 3 NSW IMOS (New South Wales IMOS) – focuses on the East Australian Current, and its impact on shelf ecosystems.
- 4 SAIMOS (South Australia IMOS) – explores the nature and dynamics of

ecosystems in the region of Kangaroo Island-Eyre Peninsula and the Bonney Coast.

- 5 WAIMOS (Western Australia IMOS) – focuses on the Leeuwin current and its impact on shelf ecosystems.

IMOS infrastructure is implemented largely through 11 Facilities, centred around the generation of time series data for oceanographic and climate research and monitoring of productivity and biological populations. The facilities are run by existing scientific agencies or departments. Facilities will have the responsibility for operating and maintaining equipment, and making high quality time series data available in real time and quality controlled mode to the marine community.

- 1 Argo Australia – a fleet of around 200 profiling floats observing ocean physics to 2,000m, part of a larger global program.
- 2 Enhancement of Measurements on Ships of Opportunity – a set of underway observing systems for physical chemical and biological oceanography on volunteer observing ships.
- 3 Southern Ocean Automated Time Series Observations – a set of moored biogeochemical and ocean weather instruments in the Sub Antarctic Zone.
- 4 Australian National Facility for Ocean Gliders – a multisensor system similar

to an Argo float, which can traverse as well as profile, and is operated from a land base.

- 5 Australian National Autonomous Underwater Vehicle Facility – used for high resolution surveys of benthic habitats.
- 6 Australian National Mooring Network – a network of national reference stations, plus regional moorings on shelves and slopes.
- 7 Australian Coastal Ocean Radar Network – for high resolution mapping of coastal currents.
- 8 Australian Acoustic Tagging and Monitoring System – curtains of receivers to monitor movements of tagged marine animals.
- 9 Facility for Automated Intelligent Monitoring of Marine Systems – a communications system on the barrier reef, facilitating the delivery of data from sensors to the scientists in real time.
- 10 eMarine Information Infrastructure – responsible for hosting, managing, distributing and archiving IMOS data.
- 11 Enhancing Access to Australian Ocean Remote Sensing Data – to make satellite products to support research in Australia's regional waters.

Further information: [Marian McGowen, \(03\) 6226 7505, Marian.McGowen@utas.edu.au](mailto:Marian.McGowen@utas.edu.au) or www.imos.org.au

Activities from NSW-IMOS

Associate Professor Iain Suthers, University of New South Wales

The Sydney Institute of Marine Science (SIMS) is the NSW node leader for IMOS. SIMS is an equal partnership of the University of NSW, University of Technology, Macquarie University and University of Sydney; with associate partners the University of Wollongong, University of Newcastle, Australian Museum, Defence Science and Technology, and others.

Beside the partner universities, NSW-IMOS includes the NSW Department of Primary Industries (DPI), the NSW Department of Environment & Climate Change, the Manly Hydraulics Laboratory (NSW Department of Commerce), and the Sydney Water Corporation.

NSW-IMOS is responsible for:

- Australian Acoustic Telemetry and Monitoring System (AATAMS) – which has also attracted \$1.25M from the Ocean Tracking Network. AATAMS will deploy 'listening curtains' across the NSW shelf from the beach to 100–200m deep, which records when an acoustically tagged shark swims by. The NSW DPI already has ~70 listening posts for tagged grey nurse sharks between Byron Bay and Eden.
- Autonomous Underwater Vehicle – for surveying deep water habitats (to 700m) and high resolution water quality.
- NSW component of Ocean Mooring network – including passive acoustics (whale song, ice-cracking, mulloway spawning).

Another \$5M will support the National Research Vessel, *Southern Surveyor*. She is nearly 40 years old and has achieved outstanding work, but Canberra must now consider her replacement.

Other NSW-IMOS activities:

- High Frequency Coastal Ocean Radar (HFCOR) provides surface current and wave information from over 300km along shore, and 100km out from land. The antennae broadcast radio waves, and the reflected sound is Doppler shifted by ocean currents or waves. HFCOR can be used for waves, beach erosion, yachting, tsunami watch, search and rescue (Heron, pers. comm.).
- The Slocum Ocean Glider is a 50kg package that can navigate by dead-reckoning and some GPS tweaking. It moves forwards (and vertically) by altering its density, just like the famous Argo floats. Over 22 days off Perth, it traveled nearly 500km and did 110 vertical profiles of temperature, salinity, per day. It records position and water colour for three weeks before retrieval (Pattiaratchi, pers. comm.).

Further information: [Iain Suthers, \(02\) 9385 2065](mailto:Iain.Suthers@unsw.edu.au) or I.Suthers@unsw.edu.au

BlueNet – Helping Universities Connect to the Australian Ocean Data Network

Andrew Myers and Dr Regina Magierowski, BlueNet Project

WHAT IS BLUENET?

We all know that the oceans makes up more than 70% of the earth's surface, but few would have a good appreciation of the amount and diversity of marine research occurring within Australian universities. The amount of marine research data collected will increase exponentially over the next few years for a variety of reasons, including concerns about global climate change, and the development of new real-time monitoring systems.

The increase in data collection poses two main problems for Australian marine researchers. Firstly, how do we properly manage this data to ensure that it is preserved for the long term? Secondly, how do we share this data so that we can prevent duplication and foster collaborative approaches to science? BlueNet is a Department of Education Science and Training funded project, established to address these problems within the university sector. BlueNet is developing infrastructure that enables the archival, discovery, access and online integration of marine science data on a large scale. BlueNet allows researchers to store their data in perpetuity, and to more readily share their data with others.

BlueNet links Australian universities to the Australian Ocean Data Network (AODN), of which the Australian Ocean Data Centre Joint Facility is a leader. The AODN provides a central data management system for marine resources, including data generated by Australian Government agencies (e.g. Bureau of Meteorology, CSIRO, Geoscience Australia, Australian Antarctic Division, Royal Australian Navy and Australian Institute of Marine Science). Our vision is to integrate university and government agency data to form the AODN.

The AODN will allow users to search for and access Australian marine data through a single web portal. No longer will marine researchers face the long and tedious process of searching through confusingly different systems in the quest for data.

BENEFITS

- University researchers, many for the first time, will have access to state-of-the-art systems for long-term data curation and delivery; and a standardised way of describing the data, so that users can better discover and determine data quality, coverage and usefulness.
- BlueNet aids the wider dissemination of research results, creating cohesive profiles of researcher output and allowing identification of potential collaborators.
- Submission of metadata and data via BlueNet into the AODN involves no change in the intellectual property status of the data, and allows the researcher to define data sharing conditions covering both access and use.
- If datasets are considered sensitive or the research is yet to be published, BlueNet can embargo such information so that it is archived but not accessible to the wider marine community.
- The BlueNet/AODN infrastructure provides access to online tools that have been developed specifically for research in the marine environment. This currently includes an online interactive mapping tool that allows users to display datasets from a web-map service.
- Funding bodies such as the Australian Research Council and the Fisheries Research and Development Corporation recommend that data obtained through use of research grants be made publicly available. Submitting data to BlueNet will satisfy these recommendations.

CURRENT STATUS OF BLUENET

The first core piece of AODN technology developed by BlueNet – the MEST v1 (Metadata Entry and Search Tool) – is now live and can be viewed at <http://bluenet.its.utas.edu.au/geonetwork/>. The MEST allows users to search for data and assess its quality through a metadata description. Data collected under BlueNet, where appropriate, will be immediately available via the MEST. Data available on request from government agencies is also discoverable using the MEST's 'Remote Search' option.

Currently, only a few BlueNet records are publicly available, but this will change rapidly over the next few months as IP agreements are signed, and records are checked and released. Staff are always on the look out for new data, and are keen to hear from anyone interested in submitting data to BlueNet.

BlueNet's funded university positions are currently filled at University of Tasmania, University of Melbourne, Australian National University, University of Sydney and University of Western Australia. We are currently developing agreements with Flinders University, Deakin University and the University of New South Wales and are keen to hear from other universities interested in joining BlueNet.

Whether you are a student, researcher, or retired professor, if you hold any marine data, you are encouraged to contact your local BlueNet representative or the BlueNet Project Office for more information. BlueNet has some resources to convert old data formats and paper records into contemporary digital formats, to minimise data loss within the community. Data that you no longer consider important could be the missing link in someone else's research!

Further information: BlueNet Project Office, (03) 6226 1817 or www.bluenet.org.au

BLUElink – A Partnership Approach to Ocean Forecasting

Amanda Amjadali and Dr Peter Dexter, Oceanographic Services, Australian Bureau of Meteorology

BLUElink is the Australian Government's most recent investment in ocean forecasting and research to benefit maritime and commercial operations, defence, maritime safety, management/sustainability of the marine environment and regional and global climate research/prediction. Three of Australia's leading oceanography agencies – CSIRO (through the Wealth from Oceans Flagship), the Bureau of Meteorology (BoM) and the Royal Australian Navy (RAN) – formed a unique partnership to initiate Project BLUElink (2002). The first phase of the project was completed in mid-2007, with the official launch of BLUElink operational forecasts on 2 August 2007, delivering an ocean forecasting system that provides seven-day forecasts of the oceans around Australia. This system will be validated and enhanced in the next phase of the project, BLUElinkII, which began in mid-2007 and ends in 2010.

THE BLUELINK PARTNERSHIP

CSIRO Marine and Atmospheric Research and the BoM Research Centre have collaborated to provide the scientific intelligence for the BLUElink project. Together, the two agencies operate the High-Performance Computing and Communications Centre (HPCCC), providing the essential computational power needed to run the ocean forecasting system. The RAN provided an important national security perspective and is a significant end-user of the ocean forecast products generated by BLUElink.

BENEFITS FOR AUSTRALIA

Australia's need for a regional ocean forecasting system is compelling. The Australian continent is bounded by three ocean basins and influenced by key oceanic features (the Indonesian through-flow system of currents as well as El Niño and La Niña) that affect rainfall across the continent. Nearer to the coast there is a continually evolving system of ocean eddies generated in the Tasman Sea from the East Australian Current, and in Western Australian waters from the world's longest continuous ocean current, the Leeuwin Current. Australia's ocean territory is nearly twice the size of its land area, with 90% of the Australian population living within 50km of the coast. There has been a significant financial investment in coastal structures associated with economically critical mining, shipping, and oil and gas extraction. Physical ocean conditions also directly influence wild fisheries and most aquaculture.

OPERATIONAL OCEAN FORECAST SYSTEM

Technical developments and intensive research have rapidly improved the marine community's understanding and ability to measure the influences on ocean behaviour, contributing significantly to the development of the BLUElink ocean forecasting system. A range of oceanic observations in real time or near real time is required to be assimilated by the BLUElink system, to develop accurate analyses and enable predictions of the physical state of the ocean. Ocean satellites provide measurements of sea level, sea-surface temperature and wind, in addition to other variables. Free drifting Argo robotic ocean profilers observe the upper two kilometres of the ocean. All this information is captured in real time and fed into the BLUElink system. Computers in the HPCCC synthesise and

process these data to ensure the best performance of the forecasting system.

The major forecasting component of BLUElink is a global ocean modelling and assimilation system, OceanMAPS, with a resolution telescoping from 2° in the North Atlantic to 0.1° (about 10km) in the Asian-Australian region (90°E to 180°E, 16°N to 75°S). This allows resolution of ocean eddies and other key dynamic features. The model forms the backbone of the operational ocean forecasting system developed by CSIRO and the BoM. OceanMAPS results are communicated to user communities under the BoM's Oceanographic Services program.

REGIONAL COASTAL MODELLING

In addition to OceanMAPS, CSIRO has developed the Relocatable Ocean-Atmosphere Model (ROAM) for the RAN. ROAM is a rapidly deployable, high-resolution, coupled atmosphere-ocean forecasting system – capable of providing a forecast out to seven days for the coastal and continental shelf regions around Australia. A simple graphical interface has been developed to allow the ROAM user to specify the geographical extent to be used for the forecast. This region can cover approximately 100–500km in extent with a horizontal resolution between 2–10km, e.g. Bass Strait region or the Timor Sea.

BLUELINK PRODUCTS

The BoM already provides operational weather services for marine users, focused on the sea surface and forecasts of wind and wave conditions, storm surge heights, visibility, and sea-surface temperatures. BLUElink provides the core of an extended oceanographic service in which the ocean model and data assimilation maintain up-to-date analyses and predictions of the state of the ocean.

The BoM has made a number of basic BLUElink products available for the public, while more specialised BLUElink products will be available via commercial meteocean service providers. The initial suite of BLUElink products available to the general public includes seven-day forecasts, sea level anomaly, temperature, salinity and currents. Subsurface and other products generated by the BLUElink system may be made available on request: www.bom.gov.au/oceanography/forecasts/.

Further information: Amanda Amjadali, (03) 9669 4448, a.amjadali@bom.gov.au or <http://www.bom.gov.au/bluelink>

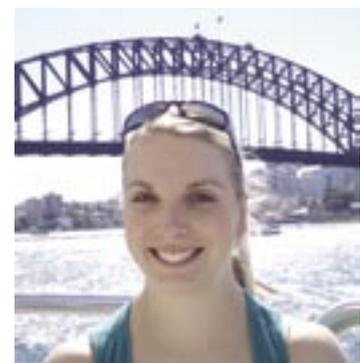
Fish Friendly

MCCN is excited to announce two fantastic, fabulous, fish friendly new staff!

Along with her depth of knowledge and diverse experience, Kate Rogulskyj brings much enthusiasm to the position of WA Regional Coordinator for MCCN. Kate was previously employed as Marine Mammal Observer for Western Whale Research, participating in a number of seismic surveys off the coasts of WA and Mauritania. In this capacity, Kate was responsible for coordinating and enforcing marine mammal avoidance procedures, and undertaking research on the migration and behaviour of cetaceans and other marine fauna. Kate has obtained a Bachelor of Science in Marine Biology and a Postgraduate Diploma in Ecologically Sustainable Development, and is currently acquiring a Masters by Research in marine and coastal conservation.



Combining her passion for the marine and coastal environment with her extensive experience in office administration, Rachel Maitland has joined the MCCN as their National Assistant. She has a BSc (Hons) in Marine Science. Her honours research assessed the risk of boat strike on a dugong population in the Hervey Bay region, and proposed management recommendations to alleviate this risk.



On behalf of our coasts, oceans and their inhabitants – welcome!

Nyambaga Green Team

Terrence Hudson, Project Manager,
Nyambaga Green Team

The Nyambaga Green Team (NGT) is an enthusiastic group of local Indigenous people – comprising a mixture of youth and vitality, with some senior more experienced, highly qualified supervisors. All members of the NGT are undergoing training in Conservation and Land Management, and are well versed in the rehabilitation of degraded areas and restoration of environmental sites. The NGT provides positive role models for the youth in our community and receives support from the Elders, teaching young people how to improve our environment and develop a great work ethic.

In 2003 a partnership between Uncle Larry Kelly and Terrence Hudson, both employed by the Northern Rivers Catchment Management Authority, gave birth to an idea: to seek contractual work that could employ local Aboriginals in natural resource management projects. A further partnership was forged with Nurralla Aboriginal Corporation to assist by providing Community Development Employment Program (CDEP) participants; and the Nambucca Heads Local Aboriginal Land Council to indenture the group in a traineeship.



The Nyambaga Green Team. Photograph by Natasha English

‘An honest day’s pay for an honest day’s work is all they required. It just took a bit of innovation and to build a few partnerships to make it happen.’

Funding to commence the program came from an Envirofund grant, which paid for coordination, transport to the worksites and transport to a TAFE Conservation and Land Management Certificate II program. Funding for the TAFE program was supplied by FarmBIS, and tools and clothing for the program was provided by Wesley Uniting Employment, as most of the group had been long-term unemployed.

The first of our contracts was from Nambucca Shire Council to build a wetland park at Macksville. Funding for the program was from NSW Sport and Recreation. The Green Team turned a disused, neglected block by the river into a peaceful tourist stop complete with boardwalk and cultural signage.

The Team forged a working partnership that became the glue that holds them together and makes them strong. Working together on country as a team:

- helps get each other over life’s hurdles;
- makes their families proud to see their own people looking after our shared environment;
- does our bit to make the river clean and the riverbanks green;
- provides somewhere for the animals to live alongside of the people through our habitat nesting box program.

- Muurrbay Cultural and Language Centre and Aboriginal Elders provided guidance;
- North Coast Institute of TAFE;
- Nambucca Shire Council;
- North Coast Weeds Advisory Committee;
- Nambucca Valley Landcare;
- Macleay Valley Landcare Network;
- Enterprise and Training Company;
- MAS National Australian Apprenticeship Centre.

Nowadays the Green Team is the preferred contractor for National Parks and Wildlife and is busy with Landcare/Coastcare work throughout the catchment – always advised by the Elders of where they can work and always learning the stories about their country.

They are about to embark upon a mentoring program, to help the kids and teach them more about the environment, showing them how having a job doing meaningful and culturally appropriate work can help themselves and the community.

The new year 2008 will bring new challenges. Those completing Certificate IV Conservation and Land Management will move on to Frontline Business management in preparation to expand the business. Certificate II students will tackle Certificate III and some new chums will be offered the chance to get ‘on the greenteam bros, ay’ – ‘deadly’.

An honest day’s pay for an honest day’s work is all they required. It just took a bit of innovation and to build a few partnerships to make it happen.

Further information: [Terrence Hudson, terrencehudson@nurralla.com](mailto:terrencehudson@nurralla.com)

To make their livelihood out of caring for the country that gives them life – being able to give back – helps to ensure that the land survives.

Since those days, many people have seen our dream and assisted the program:

- the Aboriginal and Torres Strait Islander Commission and the Department of Employment and Workplace Relations with continued support for the CDEP program;
- Nurralla Aboriginal Corporation continues to help with program administration, office and shed space, and keeping the traineeship going through all the its ups and downs;
- Northern Rivers Catchment Management’s continued support and commitment to the program;

The Emergency that Threatens Global Biodiversity

Joe Morrison, Executive Officer, North Australian Indigenous Land and Sea Management Alliance (NAILSMA)

The *Aboriginal Land Rights (Northern Territory) Act 1976* remains a positive political step for Traditional Owners (TO) in the Northern Territory (NT) from a biological and resource management perspective. Indigenous people comprise 30% of the NT population and own just under 50% of the terrestrial landmass and 87% of the coastline. This places Indigenous people firmly in control of globally significant land and sea assets, which, along with an increasing global awareness of the environment, culture and people, means that the opportunities Indigenous people face in the NT are now becoming apparent.

NAILSMA has long argued that it is essential to understand the contributions Indigenous people and their lands make towards national and international goals of: managing the dwindling biodiversity; reducing greenhouse emissions; reducing the risk of entry of exotic pests and diseases into Australia from the north; and managing valuable water resources and fish stocks. It is also important to understand the contribution of Indigenous knowledge – refined and developed over millennia – to the management of these resources.

‘... removal of the permit system ... opens the possibility that more cars, people and livestock could bring weeds, feral animals and the ignition of fires at the wrong time of year.’

In the NT, the Ranger Program allows Aboriginal Territorians to maintain their cultural obligations and rights to traditional lands by managing their country for the future. What began as an experiment by a few – Dhimurru Aboriginal Corporation, Bawinanga's Djelk Rangers and others – has now manifested into the most positive grassroots development Indigenous Australia has seen for some time. This was reinforced recently at the 2nd National Indigenous Land and Sea Conference held in Cardwell, where more than 500

Indigenous people participating in ‘Caring for Country’ gathered to further their aims, networks and to learn from others.

However, almost 90% of the Rangers exist on the Community Development Employment Projects (CDEP) scheme, and the NT Emergency Intervention threatens to remove CDEP from remote localities without considering the impact of Ranger Programs. The impact on our biodiversity, atmospheric pollution and ability to protect the northern coastline from diseases and illegal incursions are enormous with the removal of CDEP and the environmental services that these Rangers provide.

Furthermore, the removal of the permit system for communities and major roads may lead to greater access of lands owned by TOs and managed by Rangers. This opens the possibility that more cars, people and livestock could bring weeds, feral animals and the ignition of fires at the wrong time of year.

Unfortunately the overriding need to reform welfare, the exact matter that Ranger programs are addressing, is potentially destroying the means by which Indigenous aspirations are created in rural and remote parts of the NT. CDEP needs to be built upon – a new employment program created to allow Senior Rangers to move off CDEP and into full-time jobs; a structure that fosters and supports social capital development through leadership programs. The ‘Working on Country’ program, recently announced by the Howard government, partially addresses this; however, the demand for this program would clearly outweigh its resources. This program is also at odds with the general policy position delivered by the Indigenous Affairs portfolio. Sure there is a need to reform entrenched welfare dependency, but not at the expense of positive community developments.

Finally, an important outcome of the Cardwell conference was the proposal from the Indigenous Advisory Committee, which suggested the development of a national framework in which Caring for Country can be properly spelt out so that future policy makers, politicians and potential investors can support what has become a lonely positive story preceding a decade of negativity. It is hoped that Caring for Country can align with national priorities and goals of managing biodiversity and intact savanna ecosystems in the future, and accord equal support for Rangers' obligations to their country, kin and broader community.

Further information: Joe Morrison, joe.morrison@cdu.edu.au

Institutional Partnerships and Trophic Linkages

Ron Szymczak and Debashish Mazumder
ANSTO Institute for Environmental Research

Scientists from the Australian Nuclear Science and Technology Organisation (ANSTO) have established strategic alliances with the NSW Department of Primary Industries – Fisheries, NSW Department of Environment and Climate Change and the University of New South Wales to study food webs in the Sydney region estuaries. They are utilising stable isotope analysis techniques, available at ANSTO, to identify specific linkages between high trophic order species (commercially and recreationally important) and different habitat resources (e.g. saltmarsh, mangroves and seagrass), in order to manage the risks imposed by human activity. To model these food webs, carbon and nitrogen stable isotope ratios are being measured in a variety of plant, crustaceans, benthic macro-invertebrate and fish species collected from Botany Bay and Port Jackson, NSW. So far over 300 samples from 32 species have been analysed.

Understanding the pathways of nutrient (energy) flow and trophic linkages in estuarine food webs is essential for developing ecological models to assist in the effective management of ecosystems. However, food web inter-connections are very complex and often influenced by the dynamics of physico-chemical processes, biodiversity, habitat type, spatial extent and degree of disturbance. Integrating new with existing technologies, and developing strategic research teams strongly focused on policy development issues, makes an effective environmental management partnership.

ISOTOPIC SIGNATURES

Stable isotopes are different naturally occurring forms of elements. There are two stable atomic forms of carbon (^{13}C and ^{12}C) and nitrogen (^{15}N and ^{14}N). Biota assimilates both forms of C and N, and the $^{13}\text{C}/^{12}\text{C}$ ($\delta^{13}\text{C}$) and $^{15}\text{N}/^{14}\text{N}$ ($\delta^{15}\text{N}$) ratios can be determined by an analysis of tissue using an isotope ratio mass spectrometer. This technique provides valuable information on the sources of nutrients and the trophic level (position in the food web) of any animal in an ecosystem.

Scientists concerned with ecosystem energy flows and food web structures are realising the potential of stable isotope ratios as natural tracers. Conventionally, trophic linkages (who's eating who) have been determined by gut content analyses involving collection, dissection and careful examination of a broad range of organisms to identify prey-predator associations. Although these analyses provide valuable taxonomic information on dietary items, the method has difficulties, as it relies on visual observations. For example, not all ingested items are fully assimilated while some ingested items are assimilated very quickly and rarely found in a predator's stomach. Stable isotope ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) analyses are an alternative, and, in some cases, a better tool for food web analysis – providing chemically validated data from which mathematical models can be derived.

BOTANY BAY FOOD CHAINS

Studies conducted so far have separated several food chains from within the complex food web in Botany Bay. Results clearly identify mullet/jewfish (*Argrosomus japonicus*), as a top-order predator fish species, for which bream (*Acanthopagrus australis*) comprise a significant proportion of their prey. Mullet also consume a wide range

of other species. Bream at Towra Point are, in turn, primarily reliant on crabs (e.g. *Paragrapsus laevis*) and glassfish (*Ambassis jacksoniensis*) for their nutrition. Except for *P. laevis*, the diet of three other mangrove crabs were identical and seemingly reliant on the same source of food. These crabs appear to depend on particulate organic matter delivered by the tides for their nutrition, rather than the traditionally inferred reliance on mangrove leaves. Isotopic signatures in several species were also found to vary with season and location. Studies are ongoing with much of the work supported by the ANSTO Isotopes for Water Project.

These and other nuclear-based technologies developed from studies undertaken in the Sydney environs have been transferred to developing countries via ANSTO's partnership with the United Nations *International Atomic Energy Agency Regional Cooperative Agreement for Asia* and the Pacific Project *Improving Regional Capacity for Assessment, Planning and Responding to Aquatic Environmental Emergencies*. Expert missions supported regional training workshops and national projects in individual Member States, developing and transferring skills and technologies.

Ecological applications of stable isotope analyses rely on prey species' specific isotope ratio signatures which are transferred to the predators' tissues. There is an increase in the relative proportion of carbon-13 content ($^{13}\text{C}/^{12}\text{C}$ ratio) and nitrogen-15 content ($^{15}\text{N}/^{14}\text{N}$ ratio) of the organism due to selective metabolic loss of the lighter isotopes during assimilation, excretion and growth. An organism is typically enriched in heavier ^{13}C and ^{15}N relative to its diet by approximately 1 and 3 to 4 parts-per-mil (‰), respectively. This process is called trophic fractionation or enrichment. Carbon isotope signatures are used to trace the sources of organic nutrition, while nitrogen isotope ratios reflect the relative trophic position of organisms in the ecosystem. Correlating both carbon and nitrogen isotopic signatures of a broad range of ecosystem occupants can be used to construct specific food chains from within the complexity of an estuarine food web.

Further information: Ron Szymczak, (02) 9717 9221 or rsx@ansto.gov.au

Moreton Bay Marine Park – Nature's Nursery, Brisbane's Aquatic Playground

Craig Bohm, Australian Marine Conservation Society

Moreton Bay Marine Park is a beautiful tapestry of islands, beaches, corals, rocky reefs, mangrove forests and seagrass beds – stretching 125km from Caloundra to the Gold Coast.

The Park is home to over 740 recorded fish species, all six species of threatened marine turtles recorded in Australian waters, whales, three species of dolphin, dugongs and the critically endangered grey nurse shark. It is a Ramsar wetland of international significance for migratory wader birds from places as far away as China and Russia.

The Queensland Government is currently undertaking its mandatory ten-year review of the zoning plan for Moreton Bay Marine Park. As it stands, less



Green turtle in crab pot. Photograph courtesy of Sea World.

than 1% of Moreton Bay Marine Park is fully protected from extractive activities in protection zones or no-take areas. This review is an opportunity to greatly increase the protection the Park offers to its wildlife and habitats.

Pressure on the wildlife and habitats of Moreton Bay is on the rise. South-east Queensland has Australia's highest level of boat ownership and is the fastest-growing region in the country. Its 2006 population of 2.73 million is expected to increase to around 4 million people by 2026.

There are growing concerns about the lack of recovery of threatened species and the threat of overfishing in Moreton Bay.

Every year, 200 turtles are found dead, sick or injured in the Park and an average of 15 dugongs die as a result of human impacts.

Tim Winton, Australian Marine Conservation Society (AMCS) Patron and well-known author, recently spoke out for the conservation of Moreton Bay, commenting: 'No other Australian city has anything like Moreton Bay – But one per cent protection? Are you serious? The survival of turtles, dugongs, dolphins and seabirds will require something a bloody sight better than this. Let's do something about it.'

The AMCS is supporting growing scientific consensus that on average, one-third of each type of habitat (e.g. seagrass bed, coral garden, sandy plain, etc.) found in Moreton Bay Marine Park – and indeed across all our oceans – must be secured for the future in highly protected non-extractive areas. More on the review of Moreton Bay Marine Park, including Time Winton's impassioned speech, can be accessed at www.savemoretonbay.org.au

Further information: Craig Bohm, (07) 3393 5811 or craigbohm@amcs.org.au

Why Aren't Fishers Supporting MPAs?

Paul Winn, Hunter Community Environment Centre

Australia's marine environment has low productivity, low resilience, high diversity and is increasingly stressed by pollution, habitat destruction and overfishing. Now climate change is also set to severely affect tropical and cold water coral reefs, rocky reefs, kelps, plankton and species that live on or near the sea floor. But are we failing the groups significantly at risk from these dangers – fishers?

A quick browse through fishing websites would suggest to any fair-minded person that fishers are feeling under siege from well-intentioned and, according to some, poorly informed conservationists and conservation biologists who are promoting the idea that large areas of oceans and estuaries be 'locked up' from the old salts who, not surprisingly, just want to be left alone to peruse their sport, pastime or business interests. If this is an indicator of successfully built partnerships in the conservation of marine biodiversity, we've all scored an 'F'.

Leon Panetta, Pew Commission President, former US congressman and Chief of Staff in the Clinton administration, had it right when he said:

You have to convince fishermen that the marine reserves are going to improve the fisheries, improve their livelihoods. You can't take the position, 'To hell with the fishermen.' If we do that, the reserves will go nowhere.

Fishermen agree. Zeke Grader, Executive Director, US Pacific Coast Federation of Fishermen's Associations, said:

Fishermen will go along with conservation, but they have to be convinced. They're sceptics. Once they're convinced, they're the biggest champions.

It has been conservatively projected that the expected increases in Australian ocean temperatures from climate change will have a 35% overall economic impact on Australian fisheries by 2070. Further, national and international scientists have suggested that easing pressures from fishing and habitat destruction by establishing marine protected areas (MPAs) is probably the best way to adapt to the impacts of climate changes on marine ecosystems as MPAs build in ecosystem resilience and provide a buffer to stock collapse.

Why then is most of the literature on MPAs from Australian marine conservation groups and government agencies based solely on their benefits to biodiversity? What about the benefits to fishing? Aren't fished species biodiversity too?

As most fisheries depend on harvesting wild populations whose productivity derives from biodiversity, it is unwise to ignore the benefits to one of the main activities regulated by the establishment of MPAs. Without substantially increasing funding for compliance, I suggest that without broad acceptance and compliance by fishers, we will increasingly find that MPAs cannot provide expected benefits to biodiversity, let alone to fisheries.

Current fisheries management in Australia and the world is failing. At a time when diversity of marine species is threatened, prevailing fisheries science cannot rely on assumptions that are seeing a continued decline in fished populations. It can no longer strive to maximise yield while ignoring biological interactions.

Density dependence models – relied upon by most traditional fishery managers – assume that juvenile survival increases as intraspecific competition (competition between individuals of the same species) is reduced by fishing down the larger individuals of a population. However, this model ignores ecosystem disruptions, such as diminished trophic interactions (due to a depletion of predatory fish species) and potentially maladaptive genetic selection for smaller, slower maturing, less aggressive fish. It also underestimates important population drivers, such as the exponentially increased egg production capacity and increased survival of larvae from larger fish compared with smaller fish of the same species. As one of the main documented benefits of MPAs is the increase in mean size of predominantly predatory fish (relative to fished areas), fishers should generally support MPAs. Sadly, this is still not the case.

So where's the answer? Academics and marine scientists must guide the debate and debunk the bunk, and publicly support emerging evidence of the value of MPAs to fisheries.

Despite broad acknowledgement of the pressing need for greater conservation effort in our estuaries and oceans, there is staunch resistance to promoting the fisheries benefits of MPAs. Recently I was castigated for proposing such benefits by some well-respected marine scientists. 'These are controversial issues', they cried. 'They are not fully accepted', they warned.

'You cannot promise benefits that can't be substantiated', they crowed. 'But', I countered, 'what about the overwhelming international experience?'

It's not good enough to publicly criticise new science that challenges established assumptions, without accepting the need for new approaches. Losing diversity while waiting for certainty has been shown to be a poor approach to conservation. Scientists should also encourage ordinary people to keep abreast of scientific issues.

We all need to be convinced and be convincing about the benefits of MPAs without becoming zealots. Clouding the issues with pedantry is not a viable way to move forward on what most of us, fisherfolk included, would agree is an essential path – the recovery, persistence and resilience of marine ecosystems.

Further information: Paul Winn, (02) 4926 1641/0407 074 370

Full article and references available: www.mccn.org.au

Blue Pages

A comprehensive marine and coastal contacts directory – *Blue Pages* – is currently being compiled by the MCCN. *Blue Pages* will focus on Australia's southern states, comprising marine and coastal contacts for South Australia, Tasmania and Victoria. The directory will contain information about government, industry, conservation and community groups working on, or with an interest in, the conservation/management/sustainable use of coastal and marine environments. Details of national organisations and Australian Government agencies will also be listed.

Although *Blue Pages* will primarily be an online resource accessible via MCCN's website, a limited number of hard copies will be published. Members of the directory will be provided with an online login to update their individual listing and keep the directory up-to-date. Listings for the directory are being finalised so if you would like to see your organisation, group or body listed then we would be happy to hear from you. Listings are FREE for non-commercial listings; business listings are also welcomed but are subject to a nominal fee, which will be used to publish additional hard copies of the directory.

Further information: Nicola Waldron, (03) 5973 4602 or vic@mccn.org.au

Linking Catchments to the Sea

Jan Barton, Deakin University

ESTUARY IMPACTS

Estuaries are special places for many reasons – both ecological and socio-economic – and their healthy functioning is extremely important. Flora and fauna living in or beside estuaries include many rare or endangered species. Estuaries contain habitats that many organisms, such as birds and fish, require to complete their life cycles.

As a consequence of their location, estuaries are also subject to many threats from human activities. The majority of Australians live in coastal catchments and many of our largest towns and cities surround estuaries. Apart from urbanisation, the catchments of the vast majority of estuaries are used for activities like forestry and farming. Water in these catchments is stored and extracted for our needs before it reaches the estuary.

We alter the way the estuary connects with the sea, through our removal of freshwater, construction of walls to keep mouths permanently open and by digging open the mouths when they close. Estuaries are very popular for fishing and boating and we often build structures in and beside estuaries for access. What we don't understand very well is how our activities impact on estuaries and what are the most important activities to manage. This is particularly so for the numerous small, often intermittently open estuaries of southern Australia that this project is focused on.

THE PROJECT

As part of a team of researchers at Deakin University, we are trying to untangle the causes of change and the impact of human activities on small temperate estuaries. In partnership with the Victorian Department of Sustainability and Environment (funded by NHT) we are working to assess threats to estuaries. Five categories of threat provide some structure for the assessment. These are:

- 1 alteration to freshwater flow;
- 2 land use;
- 3 coastal development;
- 4 recreational and commercial use;
- 5 mouth modification.



Spring Creek, Torquay. Urban development in an estuarine catchment. Photograph by Jan Barton.

Catchment managers will use this assessment of threats to estuarine assets to prioritise their management actions under the assets-threats-risk model that is currently used in management of freshwater environments in Victoria. The project interacts with and builds on other current projects in Victoria and elsewhere in Australia that address artificial mouth opening, environmental flows and the identification of estuarine assets.

INVENTORY

Victoria has over 500 mainly small coastal rivers and streams. Until now, the number of these which had estuaries was unknown. The first, recently finished, part of this project was to identify these systems, define their extents and map their catchments. In total, we have identified 85 estuaries in Victoria that are longer than one kilometre. This is an increase of at least 20 over previous inventories. We can now fully appreciate the diversity of Victoria's estuaries and the locations and sizes of the systems that need to be managed as estuaries.

Delineation of estuaries and their catchments is also an important step in allowing us to group estuaries of similar types. These groupings improve our ability to critically apply existing knowledge to a range of estuaries. To define the location of each estuary it was essential to identify its inland extent or 'head'. Unlike their mouths, the locations of the heads of many estuaries are unknown or unrecognised. With the help of local catchment managers, existing information on natural or artificial barriers, salinity measurements or changes in the shape and vegetation were used to define these upstream limits. This also allowed us to assess where this essential knowledge did not exist, helping to target future sampling and investigations.

CLASSIFICATION

Delineation of estuaries and their catchments allowed us to determine the physical characteristics of Victoria's estuaries and their catchments from existing spatial data layers. Analysis of these characteristics supported the broad classification of estuary type based on coastal energy and orientation. This classification captures variation in catchment geomorphology, coastal energy and climate along the Victorian coast. For example, small estuaries occur where the coastal plain is short and steep; and major bays have lower coastal energy than open beaches, so estuaries that flow into them are usually permanently open. Defining the catchments has also allowed us to determine and compare land use and population density. Sea change and increasing coastal populations are recognised as a substantial threat to our estuaries. Previous research (Barton, 2006) found urbanisation of the catchments surrounding estuaries (as opposed to catchments of their rivers) strongly linked to deterioration of their sediments. What we might not realise is that the catchments surrounding some small estuaries in regional areas (such as those along the Great Ocean Road) have as much relative urbanisation as those in Melbourne.

FUTURE

The next step for this project is to quantify the types and relative importance of threats across all Victorian estuaries, specifically those associated with catchment use, freshwater flow modification, coastal development estuary recreational and commercial use and artificial mouth opening.

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Full article and references available on MCCN's website: www.mccn.org.au

Integrated Coastal Zone Management and Victoria's Marine National Park System

Mark Rodrigue, Marine, Coasts and Catchments Officer, Parks Victoria

Integrated Coastal Zone Management (ICZM) is recognised worldwide as being the most effective means of protecting environmental, social and economic values of coasts and their adjacent marine waters. For reserves that lie at the bottom of altered catchments, it is imperative that the parks are seen in the context of the landscape in which they sit and that management efforts are applied to addressing the impacts of these catchments in receiving waters. This is not to suggest that efforts to manage within park issues such as illegal fishing should be ignored, but puts the argument that when considering the significant potential impacts of catchments on Marine Protected Areas (MPAs), it is equally important to develop management approaches that actively seek to improve water quality entering the reserves.

Because of the highly connected nature of the sea, which efficiently transmits substances and forcing factors, an MPA will rarely succeed unless it is embedded in, or is so large, that it constitutes an integrated ecosystem management regime. (Kelleher, 1999)

Around Australia the marine and coastal environment is challenged by human activities that have markedly altered natural systems since European settlement. The Australian Government's *State of the Environment Report* (2001) notes that 'Pressures on coastal resources are increasing at a rate that exceeds the time necessary for damaged environments to stabilise and be repaired'.

VICTORIA'S MPAS

Victoria's system of Marine National Parks (MNP) and Marine Sanctuaries (MS) was established in November 2002 and are managed by Parks Victoria. It is within a context of increasingly altered catchments and poor water quality that Parks Victoria has recognised the challenges posed by a broad range of threats to all marine and coastal areas. Catchment issues are complex and are 'owned' by a range of stakeholders including communities,



Posidonia sp. Photograph by Mark Rodrigue.

industry, agencies, and governments at three levels. In its role as steward of Victoria's MPA system, Parks Victoria must seek to build effective partnerships and work cooperatively with others in achieving protection of park values.

In developing overall management responses to the challenges of managing MPAs for conservation outcomes, Parks Victoria first sought to clearly identify the values and threats to the park system through a series of stakeholder workshops, conducted between 2003 and 2006. Not surprisingly, poor water quality, and in particular elevated nutrient and sediment levels, was consistently identified as a key threat to the integrity of the parks along the coastline.

For MPA managers, water quality threats arise from activities usually beyond the organisation's direct control. As park management deals largely with issues inside park boundaries, impacts from external sources require a different approach, which seeks to facilitate cooperation of all terrestrial and waterway managers, including private landholders, to improve water quality and reduce flow-on effects of land-based activities.

LANDSCAPE SCALE CONSERVATION

Landscape Scale Conservation recognises that reserves are located within the context of the landscape in which they sit, and Parks Victoria's *Catchment Connections* projects demonstrate opportunities for linking terrestrial and MPA management. This approach markets the values of wet parks as a goal for water quality improvement and is critical to improving the cooperation between catchment stakeholders – providing a clear focus for improved integration of catchment effort.

Victorian examples of *Catchment Connections* approaches include the Watson Creek to Yaringa project in Western Port established in 2006. This is focused on one of the poorest water quality creeks in the region, flowing directly into Yaringa MNP. The park manager is working in partnership with all catchment stakeholder groups to develop a shared understanding of values impacted by poor water quality, and identify and implement integrated opportunities to address threats – bringing together groups as distinct as farmers, teachers, local government, and agencies.

On the Bellarine Peninsula, a sustained and successful ICZM project is the Swan Bay (Port Phillip Heads MNP) Integrated Catchment Management Committee, which is currently celebrating its tenth year of agency-community partnerships in coastal and catchment protection. In West Gippsland an opportunity to improve cooperation between agencies and the community, by focussing on protecting the values of Corner Inlet Marine and Coastal Parks and MNP, is being realised. In western Victoria, the Merri MS in Warrnambool – at the receiving end of the Merri River – is gaining focus.

In Victoria the MNP system provides a unique opportunity to promote awareness of marine values, and to seek integration of agency, landholder, and community effort to achieve the goal of protecting our unique and diverse marine and coastal ecosystems.

Further information: Mark Rodrigue, 0429 350 971, mrodrigue@parks.vic.gov.au or www.parkweb.vic.gov.au

Full article and references available on MCCN's website: www.mccn.org.au

Partnerships in Coastal Lake Management

Naomi Brydon, Coastal Lake Assessment and Management (CLAM) Coordinator

When the researchers at the Australian National University (ANU) developed the Coastal Lake Assessment and Management (CLAM) tool, they recognised the worth of strong partnerships across coastal and estuary management. A recent project with the Northern Rivers Catchment Management Authority (CMA), leading to 16 CLAM applications along the NSW north coast, has succeeded through close collaboration across stakeholders in local government, state government agencies, industry and community.

WHAT IS CLAM?

CLAM is a modelling approach and decision-support system designed to enable decision-makers and stakeholders to assess the environmental, economic and social trade-offs of the development, remediation and use options for their coastal lakes and estuaries.

Coastal lakes are often classed as Intermittently Closed and Open Lakes and Lagoons (ICOLLs). As they are often closed to the sea, ICOLL water quality tends to be highly sensitive to catchment inputs and as a result the living systems of ICOLLs are often highly vulnerable. In the catchments of these highly sensitive ICOLLs, there are conflicting management pressures for local decision-makers, such as to expand the area of urban development; intensify agriculture, aquaculture and tourism; and conserve the area's biodiversity.

The conflicting management options and pressures often make partnerships in these situations difficult, yet there is a need for close collaboration to discuss management options, understand the wide range of values within a coastal catchment and identify common goals.

For example, CLAM enables local government decision-makers and stakeholders in state agencies, community and industry to view the ecological impacts on coastal lakes and estuaries of their catchment management decisions. This promotes consideration of the sustainability of the living systems of coastal lakes – that is, the hydrological

and estuarine processes that underpin ecosystem health, and often the aquaculture and tourism industries. In an interactive page of the CLAM tool, users can select each node of the coastal lake system to examine further the relationships and impacts of management actions.

NORTHERN RIVERS CMA PROJECT

The Northern Rivers CMA project saw partnerships between: the CMA; ANU; eight Local Government Areas; the NSW Departments of Planning, Environment and Climate Change, and Primary Industries – Fisheries; industry stakeholders; and community

applications that captured perspectives across various stakeholder and community groups. This was because of the established working relationships these consultants had with the stakeholders in local government, state government agencies, industry and community, as well as their familiarity with the regional issues, values and physical systems of the estuaries. Clear guidelines are provided through a training and accreditation scheme to CLAM developers, in terms of how to approach stakeholder and targeted community consultation – including how to deal with conflict through individual meetings with community groups and investigation into the issues.



Local environmental CLAM consultants with sugarcane farmer. Photograph courtesy of CLAM.

representatives. The shared aim was to produce 16 CLAMs over an 18-month period in 2006–07. To facilitate this, the researchers at the ANU trained ten local environmental consultants to undertake the consultation process and develop the CLAM applications.

By training and sub-contracting local environmental consultants to develop the CLAM applications on the NSW North Coast, ANU and the Northern Rivers CMA sought to build local capacity for the local government to draw from in the continued maintenance of the CLAMs as management options change, or as new information becomes available. Accreditation of local consultants also produced more thorough CLAM

The Northern Rivers CMA project has been recognised by Environs – the Local Government Environment Network – with a Silver Environs Award in Outstanding Sustainability Partnerships and the Golden Environs Award for Outstanding Sustainability Leadership. The awards were presented to Naomi Brydon (representing ANU) and Rod McKelvey (a board member of the Northern Rivers CMA) at the Local Government Sustainable Development conference dinner in Melbourne on 11 September 2007.

Further information: Naomi Brydon, (02) 6125 9595, clam@anuenterprise.com.au or www.clam.net.au

Atlantis Ecosystem Model Rated Best in the World

Bryony Bennett, CSIRO

A CSIRO ecosystem model has provided the first sound basis for partners in Australia's South Eastern Scalefish and Shark Fishery to evaluate integrated approaches to fishery management.

Marine ecosystem modelling supports management that seeks to balance sensible development and resource use with the conservation of biodiversity and functioning ecosystems.

The world's best ecosystem model is Atlantis, according to a 2007 Food and Agriculture Organisation (FAO) report that reviewed the world's leading 20 ecosystem-modelling platforms.

Atlantis was developed by Dr Beth Fulton of the Wealth from Oceans National Research Flagship, leader of an ecosystem-modelling team based at CSIRO Marine and Atmospheric Research in Hobart.

In September 2007, Dr Fulton received the Science Minister's Prize for Life Scientist of the Year for marine ecosystem modelling, and her impact on regional marine planning, fisheries management, and understanding climate change.

SUPPORT FOR ECOSYSTEM MANAGEMENT

The Atlantis model has been applied to more than 15 ecosystems, primarily in temperate regions of Australia and the United States to investigate:

- strategic management options for regional fisheries;
- the effects of complexity on model performance;
- robust indicators of the ecological impacts of fisheries;
- regional marine planning;
- spatial management to meet conservation goals.

The success of Atlantis lies in its capacity to strike a balance between realism and tractability. Dr Fulton was the first to systematically explore the optimum level of complexity for an ecosystem model. She identified which aspects of spatial resolution, temporal resolution, functional group aggregation, and representation of ecological process are vital to model performance.

Ecosystems are created in Atlantis three-dimensionally, using linked polygons that represent major geographical features. Information is added on oceanography, chemistry and biology such as currents, nutrients, plankton, invertebrates and fish. The model is then set in motion, simulating ecological processes such as primary production, consumption, waste production, migration, predation, habitat dependency and mortality.

The Atlantis framework used to evaluate management strategies incorporates a range of sub-models for each major step in the management cycle. These simulate the marine environment, the behaviour of industry, fishery monitoring and assessment processes, and management actions and implementation.

GUIDING MANAGEMENT IN THE SOUTH-EAST

A version of the model, Atlantis SE, has been developed to provide strategic advice to the Australian Fisheries Management Authority on management of the Southern and Eastern Scalefish and Shark Fishery (SESSF), which harvests some 150 species in a region covering a third of Australia's Exclusive Economic Zone.

A major project completed in 2007 used Atlantis to assess ecological and socio-economic outcomes of alternative management strategies for the SESSF. The modelling exercise tested management approaches for their effects on:

- fishing practices and fleet size and behaviour (such as changes in targeting practices);
- harvest volumes and catch rates for commercial stocks;
- habitats and food webs;
- profitability and trading of quotas;
- public perceptions of the fishery;
- recovery of ecological systems.

This was one of the few studies ever undertaken to explore alternative management strategies at a whole-of-fishery and whole-of-ecosystem level. It provided managers, industry and other stakeholders with the first sound basis to evaluate integrated rather than piecemeal solutions to complex fishery management problems.



Pilchard fishing boat, Lakes Entrance. Photograph by Bryony Bennett.

REMOVING PREDATORS COULD OFFSET SEABIRD 'BYCATCH' LOSSES

Removing invasive predators from island breeding colonies could save more seabirds for less cost than reductions in fishing.

Dr Chris Wilcox of the Wealth from Oceans Flagship and his colleague C. Josh Donlan of Cornell University explored the offset approach in a study of flesh-footed shearwater bycatch in the Australia's Eastern Tuna and Billfish Fishery (ETBF), which targets yellowfin and bigeye tuna, albacore and billfish.

Dr Wilcox and Mr Donlan compared the potential impact of fishing with that of rat predation on Lord Howe Island flesh-footed shearwater populations, and the costs and benefits of rat control and fishery closures.

They found that banning fishing in a 750-kilometre radius of the island would result in a 6% increase in growth rate of the shearwater population, at a cost of about A\$3.5 million. The eradication of rats would result in a 32% increase in the population growth rate, at a cost of about A\$580,000.

Rat eradication therefore could yield a conservation return on investment 23 times greater than a fishery closure, and could have broader ecosystem benefits.

Dr Wilcox and Mr Donlan say that while the priority should always be for fishers to avoid bycatch, they could also 'offset' the bycatch that does occur by funding conservation measures that tackle other, often greater, threats to bycatch-affected species.

Further information: Bryony Bennett, (03) 6232 5261 or Bryony.Bennett@csiro.au

Team Works to Protect Coastal Wetland

Angela Read, Communications Manager, Queensland Wetlands Programme

The Australian Government and land managers are working together in northern Queensland to control invasive weeds and feral pigs in one of Australia's most important wetlands.

The Australian Government provided funding to Whitsunday Catchment Landcare to trial an integrated approach to weed and pig control at the Proserpine Goorganga Plain wetlands in 2004.

The funding was allocated through the Great Barrier Reef (GBR) Coastal Wetland Protection Programme pilot programme, which is coordinated by the Queensland Wetlands Programme and implemented through a consortium that includes Wetlandcare Australia and Conservation Volunteers Australia.

The Queensland Wetlands Programme was established to develop and apply measures for the long-term conservation and management of wetlands in the GBR catchment and throughout Queensland.

BACKGROUND

The Proserpine Goorganga Plain wetlands stretch almost 17,000ha to the south of Proserpine, a sugarcane town in the GBR catchment.

It is listed in the Directory of Important Wetlands in Australia and provides habitat for a variety of wildlife, including rare and threatened species. The wetland complex also supports grazing, cane production, forestry and some residential activities. It also retains nutrients and sediments that would otherwise flow into the GBR lagoon.

The wetlands are under threat from woody weed invasion, invasive grasses, landuse changes, regrowth thickening and feral pigs.

THE COLLABORATORS

The Whitsunday Catchment Landcare teamed up with Wetland Care Australia and Conservation Volunteers Australia to investigate how to control the weeds and pigs. The project also involved collaboration from landholders, canegrowers, the Whitsunday Shire Council, the Department of Primary Industry and Fisheries and the Environmental Protection Agency (EPA).



Proserpine Goorganga Plain wetlands. Photograph by Cassie Burns.

WEED TRIALS

The project used an integrated approach to try to achieve long-term control measures for devil's fig (*Solanum hispidum*), urena burr (*Urena lobata*), sicklepod (*Senna obtusifolia*) and *Melaleuca* sp. regrowth.

Methodology for terrestrial weeds

Strip trials were undertaken in a 1ha plot that had been fenced off from grazing. The area had been fertilised in previous years to encourage pasture growth. Broadscale treatments were applied to both small (less than 10 plants) and large (more than 10 plants). Fire was used as in the initial weed control phase.

Results

- Fire proved an effective initial knock-down when fuel loads of blady grass (*Imperata cylindrica*) were high. It killed mature devil's fig and promoted germination of the sicklepod seed bank in the soil. This allowed efficient follow-up with herbicide on young plants.
- Controlling grazing pressures to promote fuel load, timing controlled burns and following herbicide application was proven to be effective.
- Control costs were reduced and more effective if herbicides containing Triclopyr + Picloram were applied while weeds are young.

Result for aquatic weeds

- *Hymenachne* (*Hymenachne amplexicaulis*) growth was best controlled with continued grazing throughout the dry season; enabling wet

season inundation to cover the weed and reduce growth rates.

- Herbicide follow-up should be carried out in sections to avoid adversely impacting water quality with rotting vegetation.
- Saline influence was found to be very effective management of *Hymenachne* with waterholes of 500 μ S electrical conductivity were free of the weed.

FERAL PIG CONTROL

The feral pig control project, which received additional funding to continue to 2009, focuses on trapping and baiting the animals. To date, there are 30 pig traps on private land, each maintained by the land manager. These were set up with the help of Whitsunday Shire Council, which also provides continued technical advice. Whitsunday Catchment Landcare supplies the materials and bait.

Broadscale aerial baiting of pigs has been hampered by bad weather but is planned for late 2007. This baiting will be carried out in conjunction with the EPA and private land managers.

Results

- Traps that were pre-fed properly are providing good results, with pigs being trapped within two weeks of installation. These traps were baited with fermented grains.

Further information: Whitsunday Catchment Landcare, (07) 4945 0267, wcl@whitsunday.qld.gov.au or the Queensland Wetlands Programme, wetlands@epa.qld.gov.au

Community Environmental Monitoring – Partnerships Forged @ Lake Wollumboola

Karyn Knowles, Project Co-ordinator, Community Environmental Monitoring

Lake Wollumboola is a unique shallow ICOL (Intermittently Closing and Opening Lake). You will find it adjacent to the small township of Culburra Beach, in the Shoalhaven, 180kms south of Sydney. Listed on the *Directory of Important Wetlands in Australia*, Lake Wollumboola, along with Beecroft Peninsula, is on the *Register of the National Estate*. In 2002 the bed of the lake and its sand berm entrance were gazetted as additions to Jervis Bay National Park.

Recent Lake management history has presented challenges for both Shoalhaven City Council and later the NSW National Parks and Wildlife Service (NPWS). These have related to pockets of community angst regarding certain issues about the Lake: the emission of naturally occurring hydrogen sulfide; artificial openings; and recreational uses.

In November 2006, with funding support from the Southern Rivers Catchment Management Authority, the NPWS commenced a community-based project, inviting local residents to participate in monitoring changes within and around the Lake.

The monitoring methodology is simple. A local resident has been employed to coordinate the small group of volunteers in:

- Beach Berm height monitoring – recording changes in berm heights and their relationship with lake levels and weather;
- Monitoring of hydrogen sulphide – maintenance of an 'odour log', including the use of industrial gas badges to introduce a more scientific data set and keep the level of interest up;
- Vegetation monitoring – in particular the *Wilsonia rotundifolia*, a rare, endemic saltmarsh;
- Photo monitoring – adding to the historical record of the lakescape.

Sand Spit walk.
Photograph by Narelle Wright.



Volunteer enthusiasm is high, with the local primary school joining in. It is hoped that the opportunity to engage in the consistent and systematic collection of basic data will strengthen a shared understanding between the managers and residents of the Lake's natural cycle. It is anticipated that future monitoring, reflecting volunteer interests and capacities, will add to the growing bank of knowledge that documents this remarkable Lake.

Treat yourself to a visit if you are down this way!!

Further information: Karyn Knowles, (02) 4447 2227, kazzaknowles@gmail.com or NPWS Ranger, alexdeura@environment.nsw.gov.au

Sustainable Coastal Futures – Innovative Ideas from University Partnerships

Shannon Satherley, Associate Lecturer, Queensland University of Technology (QUT), Les Dawes, Senior Lecturer, QUT

From March to June 2007, senior Landscape Architecture and Environmental Engineering students and staff from Queensland University of Technology (QUT) engaged in a project partnership with Burnett Shire Council (BSC), Wetland Care Australia, Burnett-Mary Regional Group (BMRG), Bargara Landcare and others from the Bargara community, east of Bundaberg. The project concerned planning and design for the sustainable future of a coastal wetland known as the Bargara Pasturage Reserve;

an exemplar of many issues facing sensitive coastal places in Queensland today.

The project was one in an ongoing series by QUT with a recent coastal focus (Poona and Hervey Bay). At the forefront of generating new knowledge, universities are uniquely placed to engage in partnerships to enhance ecological, cultural, economic and social opportunities, and in turn benefit by expanding our learning and knowledge generation in response to 'real world' projects. Our students have the capacity at professional accreditation level to offer project partners a wider and more affordable diversity of possible futures than conventional consultancies.

The 312ha Pasturage Reserve at Bargara is the only biofilter between the pressures of Bargara's urban and tourism expansion, surrounding sugarcane farming, and the Great Sandy Marine Park – including the largest concentration of nesting marine turtles on the eastern mainland. This

ephemeral wetland is also in high demand for passive recreation, and our project partners' priorities were to meet all of these challenges.

To understand the challenges, the QUT students: met with partners; analysed the Pasturage Reserve; spent time in and around Bargara talking to locals and inviting dialogue with Indigenous representatives and the South Sea Islander community; and undertook theoretical and technical research. They then produced:

- 11 Strategic Plans;
- 2 Environmental Management Plans;
- 33 Detailed Designs.

This work was presented to our partners midway through the project and, upon completion, to the wider Bargara community via public exhibition.

The students were required to plan and design for the best balance possible between: wetland and coastal ecological

health; enhancement of cultural heritage and values; sustainable urban development; and local economic health.

Foley, Petrillo and Edmunds analysed the Bargara landscape as an historical and ongoing series of conversations between coastal ecological systems, cultural heritage, community and stakeholders. Warwick, Tanner and Learmonth identified it metaphorically as a series of layered thematic 'fields' such as water, conservation, reconciliation, and educational fields. These landscape analyses became the organising mechanisms for strategic planning.

An outstanding Strategic Plan by Zhang, Lemberg and Jensen is entitled *Metanoia*, meaning to 'make a change as the result of reflection on values'. Three implementation phases of 'flow', 'flux', and 'flex' span 25 years, presenting a vision for a coastal and marine research and conservation hub focused on coastal wetland function, turtle habitat and coral reef conservation.

An Environmental Management Plan by Brand and Stickland aimed to protect and improve wetland biodiversity and habitat quality, and increase hydrological and water quality function – vital in a coastal

area of such high conservation value.

After the planning stage of the project, students individually developed detailed design proposals responsive to their plans. From *Metanoia*, Zhang concentrated on wetland access and interpretation, proposing four focal places to form the nucleus of a wider pattern of connectivity – encouraging community engagement with coastal environmental management and education.

Jensen tackled the thorny issue of coastal urban development, proposing a sensitive staged eco-village model which maintains both ecological and recreational connectivity between the wetland and the marine environment.

This project offered QUT's partners many innovative options to inform their future planning. BSC, BMRG and Oceanwatch Australia are currently engaged in the



QUT students at pasturage reserve. Photograph by Les Dawes.

investigation of on-ground opportunities drawing on these options. It is clear that such partnerships between tertiary, government and community sectors can generate innovative new ideas for managing sustainable coastal futures.

Further information: Shannon Satherley, s.satherley@qut.edu.au or (07) 3138 2467; Les Dawes, l.dawes@qut.edu.au or (07) 3138 2776.

A Partnership Forging a Way Forward for Whales

Humane Society International (HSI) and the Environmental Defenders Office have been involved in a legal challenge since 2004 – requesting an injunction to stop the Japanese whaling company Kyodo Senpaku Kaisha Ltd from killing whales within the Australian Whale Sanctuary.

At a recent hearing in the Federal Court of Australia, where the whaling company decided not to be present, HSI presented evidence that they have been responsible for the killing of an estimated 1,253 minke whales and 9 fin whales within the Australian Whale Sanctuary since the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* came into force in 2000.

Presiding over the case, Justice James Allsop reserved his judgement, and ordered HSI's solicitors to write to the Attorney General, Philip Ruddock, to

ask whether the Government's view in opposition to the case has changed since January 2005 when they last intervened in the case. The Attorney General has replied confirming that the Government's view has not changed. Meanwhile, the Federal Opposition has given public support for the case and said they will enforce any injunction the court issues.

HSI is hopeful that, despite the current Government's view, Justice Allsop will deliver a final judgement to issue an

injunction before the hunt resumes in December. This is vital as the Government of Japan has given Kyodo Senpaku Kaisha Ltd a permit to hunt 935 minke whales, 50 fin whales and 50 humpback whales in Antarctica this year. If they proceed with the hunt this year the vast majority of the 1,035 whales will be killed within the Australian Whale Sanctuary.

Abridged from a media release on and background information on the case from: www.hsi.org.au/

Figure 1: Total number of whales killed in the Japanese Research Program in Antarctica (JARPA) Phase 1 and II and the number HSI estimates were killed within the Australian Whale Sanctuary (AWS) since commencement of the EPBC Act in July 2000.

Year	Total number of Antarctic minke whales killed in JARPA and JARPA II	Approximate number of Antarctic minke whales killed within the AWS	Total number of fin whales killed in JARPA and JARPA II	Approximate number of fin whales killed within the AWS
2000–01	440	65	0	0
2001–02	440	215	0	0
2002–03	440	21	0	0
2003–04	440	164	0	0
2004–05	440	20	0	0
2005–06	853	768	10	9
2006–07	505	0*	3	0*
Total	3558	1253	13	9

*Fire on board a ship prevented the company completing the hunt last year.

A Winning Formula!

Tony Johnson, Government and Community Relations Manager, Woodside's Australia Business Unit

Every now and then a community partnership comes along that works on so many levels – education, conservation, scientific research, ecotourism and Indigenous culture. 'Teach Live' is one of them, bringing together the combined strengths of scientific researchers, the global conservation volunteer network of the Earthwatch Institute, and the financial support of Woodside Energy.

The Woodside Teach Live program has its origins in 2005, when financial support from Woodside to Earthwatch allowed seven primary and secondary teachers from north-western Australia to participate in an echidna and goanna research program conducted by Dr Peggy Rismiller on Kangaroo Island, South Australia. Not only did the teachers provide a valuable resource to Dr Rismiller, they also passed on their new-found knowledge to their students via web technology, allowing real-time teaching from the field to the classroom.

WHALE SHARKS OF NINGALOO REEF

Subsequent discussions between Earthwatch and Woodside saw the launch of a new volunteer research campaign – Whale Sharks of Ningaloo Reef. It was a worthy research project and in a region where Woodside had business interests. For this campaign Earthwatch sought volunteers from around the globe to assist award-winning researcher Dr Brad Norman of ECOCEAN, a not-for-profit organisation which has a focus on protection of the threatened whale shark (*Rhincondon typus*) and the biodiversity of Ningaloo Marine Park in Western Australia.

Despite their size – whale sharks can grow up to 18 metres – little is known about this fish species or where they go each year between their April to July visits to the Ningaloo Reef area, off North West Cape. Dr Norman's global research effort is centred on a unique photographic identification technique, using Java-based technology to map the spots on the skin of each whale shark. More than 150 matches have been made of these 'digital fingerprints'.

The significant biodiversity of Ningaloo Reef (a coastal fringing reef stretching about 280km), the northern and southern

migrations of humpback whales and the annual visitation of the whale sharks are major tourist drawcards. Turtle nesting and manta rays completes the picture.

The 2006 Earthwatch campaign allowed 25 people from around the world to help Brad and his team swim with these giants of the deep to take their photographs. The volunteers also spent time in the field conducting water sampling and other tests, as well as some hours onshore in the lab. Among them were three volunteers nominated by Woodside – Peter Versteeg, a teacher from the nearby Exmouth District High School; Aaron Huebert, an Injabundi Aboriginal man with connections to North West Cape; and Cara Price, Woodside's environmental officer for its Enfield oil operations, located about 40km off the Cape. The success of the inaugural Ningaloo program and the Kangaroo Island experience led Earthwatch to revive Teach Live – this time for the Whale Sharks of Ningaloo Reef campaign.

TEACH LIVE 2007

In early 2007, Earthwatch sought eight teachers from regional and metropolitan Western Australia to participate in the program. Exmouth District High School is the only school in a remote and isolated community of about 2,500 people. The population swells to about 6,000 during the winter months on the back of a growing tourism industry, which is significantly reliant on nature-based activities. Exmouth District High School was included in the final eight schools. Other schools were Karratha Senior High School, Dongara District High School, Tom Price Senior High School, Rockingham Senior High School and Safety Bay Senior High School.

The participation by Exmouth school students was exceptional, taking a very keen interest in their own 'back yard'. Not only did the students and the broader school community learn more about the whale sharks and the need to conserve these amazing creatures, the seeds may have been sown for potential career opportunities, be it in marine biology, tourism or conservation.

Members of the local Indigenous community were also active participants in the Teach Live program, with representatives from the North West Cape Exmouth Aboriginal Corporation speaking to each of the Earthwatch volunteers and the Teach Live participants about the historical and cultural significance of the region.

Whale Sharks of Ningaloo Reef and Teach Live are examples of Woodside's community program in the region, which aims to create long-lasting and meaningful benefits for the local community. These programs also allow Woodside staff participation, thus building a strong sense of ownership in the region where Woodside operate.

Teach Live: adds to the scientific knowledge of the region; allows teachers to experience unique professional development; helps students to learn in an exciting and engaging way; adds a few dollars to Exmouth's financial wellbeing through ecotourism; and reinforces the Indigenous history of the Cape.

Further information: Tony Johnson, (08) 9348-5034, tonyjohnson@woodside.com.au or www.teachlive.org.au

Exmouth District High School teacher Mark Sherwin with some of the students who participated in the Whale Sharks of Ningaloo Reef program. Photograph courtesy of Woodside.



Climate Change and the GBR: A Vulnerability Assessment

Johanna Johnston, Great Barrier Reef Marine Park Authority (GBRMPA)

Climate change is now recognised as the greatest long-term threat to the Great Barrier Reef (GBR). Climate-related events have already caused significant impacts through coral bleaching in 1998 and 2002, and seabird nesting failures associated with unusually warm summer conditions. This has prompted experts to assess the vulnerability of all species groups and habitats of the GBR to climate change, and highlight the social and cultural implications. *Climate Change and the Great Barrier Reef: A Vulnerability Assessment* is a collaboration between the Great Barrier Reef Marine Park Authority and over 80 leading climate and tropical marine scientists. This publication presents climate projections for the GBR region to 2100, and assesses how these changes will affect the flora and fauna of the Reef and ecosystem functioning. The publication also identifies strategies that can minimise climate change impacts.

Climate projections for the GBR region show that sea and air temperatures will continue to increase, sea level is rising, the ocean is becoming more acidic, intense storms and rainfall will become more frequent and ocean currents will change. These changes will have consequences for many Reef species and habitats, as well as ecosystem processes and the industries and communities that depend on the Reef.

Habitat vulnerability is related to the vulnerability of individual components:

- coral reef vulnerability is high, as hard corals are the main structural components and are highly vulnerable to changes in sea temperature and ocean acidification;
- pelagic environments have moderate to high vulnerability, particularly because of the sensitivity of plankton to environmental changes;
- coastal habitats – estuaries, mangroves, salt marshes, beaches, wetlands, seagrass meadows and nearshore waters – have moderate to high vulnerability;
- the vulnerability of islands and cays is high, as they provide critical habitat

and food for other organisms, stabilise sediments and influence biochemical and hydrodynamic conditions.

The vulnerability of GBR species and habitats to climate change has consequences for ecosystem processes and function. Productivity of coral reef ecosystems will be affected through changes to microbial, planktonic, algal and seagrass communities. For example, the productivity of phytoplankton is strongly influenced by periodic events that alter nutrient availability, such as freshwater inputs, sediment re-suspension from storms, and upwelling of nutrient-rich water along the continental slope. All of these events will be affected, with an expected corresponding change in the dynamics of plankton communities and flow-on effects to fish and seabirds. If productivity on the Reef becomes highly variable so will recruitment dynamics, ultimately favouring shorter-lived, rapid turnover species at higher trophic levels and affecting population replenishment.

Ocean currents and upwelling on the Reef are likely to be affected by climate change, with changes to circulation patterns likely to affect reproductive success of many species, through changes in larval dispersal and supply, and the degree of connectivity between reefs and across the shelf. Changes to circulation will also interact with changes to temperature and productivity to affect larval survival and condition at settlement, particularly of corals and fish.

MANAGEMENT STRATEGIES

Recent management initiatives for the GBR have resulted in an increase in biodiversity protection, a multi-stakeholder agreement to address water quality and a multi-use marine protected area. Despite these landmark initiatives, there is an urgent need to identify ways of reducing climate-induced impacts. Strategies that enhance the resilience of the ecosystem, by reducing stresses from other human activities (e.g. from poor water quality or overfishing), are the most promising. Stressed ecosystems are less likely to recover from disturbances and more likely to collapse or flip to alternative states from which they might not recover.

While climate change is certain to cause further degradation to tropical marine ecosystems, not all sites will be equally affected. Sites naturally resistant to climate-related stresses and sites that could serve as climate change refugia, warrant consideration for special protection from other threats.

OUTLOOK FOR THE GBR AND POSITIVE ACTION

There is uncertainty in projecting how global and regional climate will change because of the difficulties in predicting human behaviour. Global models depend on knowing how societies will respond to the challenge of reducing greenhouse gas emissions, and therefore how greenhouse gas concentrations will change in the future. Therefore, there is no single future but a range of possible futures. How the Reef will look in the future depends not only on mitigation strategies, but also

Nesting failures of seabirds such as noddies have been associated with unusually warm summer conditions. Photograph by Johanna Johnston.



on the resilience of the system and the effectiveness of management strategies.

Adaptive, resilience-based management offers the best hope of limiting the impacts of climate change on tropical marine ecosystems. Management and governance systems need to be flexible, so that managers can respond rapidly to opportunities to reduce local stresses, to protect sites with favourable characteristics, or modify management practices as ecosystems change. The impacts of climate change will extend beyond the widely publicised effects of coral bleaching and reduced calcification – it will affect a broad suite of tropical marine organisms and has the potential to affect key ecological processes.

Understanding the social and economic implications of climate change for communities and industries that depend on the Reef, such as fisheries and tourism, is important to assist with adaptation and to ensure sustainable industries into the future. The focus must be on facilitating adaptation to bring about positive changes in the interactions between people and the ecosystem.

Climate change is a global issue but there are many things individuals, businesses and industry can do to help minimise the impact on the GBR. Reducing greenhouse gas emissions is vital, as increases in atmospheric greenhouse gas concentrations are directly responsible for climate change.

Further information (or a copy of the book): GBRMPA, (07) 4750 0700, info@gbmpa.gov.au or www.gbmpa.gov.au

Full article and references available: www.mccn.org.au

Coral Consensus on Climate Change

The world has a narrow window of opportunity to save coral reefs from the destruction caused by extreme climate change, according to a unanimous statement issued on Monday 22 October 2007 by over 50 scientists of the Australian Research Council Centre of Excellence for Coral Reef Studies. The call for action is the outcome of a National Forum on Coral Reef Futures, held at the Australian Academy of Sciences, in Canberra.

Further information: www.coralcoe.org.au/

Lateral Thinking to Address Coral Bleaching

Phillip Laycock, Marine Biologist, Quicksilver Connections

Quicksilver Connections, in conjunction with the Centre for Marine Studies at the University of Queensland, is investigating whether shading corals can stop corals from bleaching. The Shade Project aims to exploit the contribution of light intensity to the bleaching of corals.

When corals are exposed to temperatures beyond their comfort zone, the symbiotic relationship between the coral and the algae that live within the coral's body tissues is compromised. It's the symbiotic algae that give the coral its colour and supplies the coral with its major source of nutrition, in the form of sugars. Should such temperatures continue for more than a few days, especially in conjunction with calm waters and clear skies, the coral begin to lose their algae which initially causes the coral to go pale and then white – hence the term bleaching. If the stressful conditions persist, the coral may die. A bleached coral can, however, recover to its former glory if the environmental conditions return to normal within a few weeks.

It is widely accepted among bleaching and climate change experts that global warming and the associated warming of our oceans is the greatest threat to the health of coral reefs around the world. It is predicted that within 20 years bleaching on coral reefs will become a regular event, and within 30–50 years, bleaching will be an annual event in most reef regions of the world – significantly changing the abundance of corals and impacting on their biodiversity.

At high temperatures, strong light intensity significantly contributes to the processes that cause coral bleaching. This project is investigating whether shading corals will prevent the corals from bleaching, or at least delay the onset of bleaching, thus providing a better chance of survival for the coral.

RESEARCH

The research involves both lab studies, using controlled artificial environments, and field studies, where a small number of 5x5m floating squares of shade cloth have been located over shallow water coral communities. In both these experiments,

the physical and physiological response of the corals and their symbiotic algae are being compared with corals not exposed to shade. The research so far has been very encouraging.

The results have shown the corals below the shades have higher densities of algal symbionts and are healthier when compared to those corals outside the shades. The project is currently looking to expand the study to help validate these findings and develop practical devices that reef tourism operators could easily deploy at times in the future when the reef was at risk of bleaching.

In an exciting new development, this project will collaborate with Dr. Maoz Fine from the University of Haifa in Israel who has been developing solar powered sprinkler devices that could replace the shade cloth structures currently being used in the experiment.

Corals are most at threat from bleaching when sea conditions are very calm and therefore the light intensity they are exposed to is very high. These sea and light conditions are quite.

The theory behind the sprinkler devices is that during very calm and high light intensity conditions – common during the summer months, and particularly in El Niño years – the spray from the sprinkler would cause a ripple on the water's surface that would reflect and scatter sunlight, thus reducing the light intensity received by the corals. Smart technology could allow the sprinklers to turn on and off depending on the light intensity, temperature and motion sensors. Sprinklers also have the potential to cover a much larger area of reef than is practicable with shade cloth.

This research is of great interest to the Great Barrier Reef tourism industry. Although this research alone will never protect the entire reef, if the facts match the theory reef tour operators in the future will be able to protect key areas of reef associated with their snorkeling areas, dive trails and semi-submersible/glass-bottom boat viewing routes.

It is somewhat ironic that the future of a \$5 billion industry, based on one of Australia's biggest tourism drawcards, may be dependent on the outcome of such research when the undeniable evidence is that greenhouse gas driven climate change is the real issue.

Further information: Russell Hore, 07 4087 2150

Offshore Challenge Supports Responsible Boating

Roger Dickeson, Director, Australian Offshore Challenge

Recreational boating in Australia is perceived by many as an almost perfect pastime. With Australia's 20,000 km of coastline, its hot sunny weather and much of its population living within a short drive of the coast, boating has always been extremely popular with large numbers of people – and the trend continues. There are over 650,000 registered boats in Australia, which increases annually.

With this growth comes the inevitable pressures that are placed on all coastal regions. Fishing, waterskiing, sailing, cruising or just messing about on a hot Sunday afternoon with the family and friends, all adds to the congestion and pressure on these popular and often fragile marine environments.

Although most recreational boat owners are responsible, the reality remains that they can impact on the places they boat. To obtain a power boat licence, you need only know the 'rules of the road' and pay a fee. No information is provided about the environment of the waterways or the impact boaters can have.

THE AOC – TURNING THE TIDE

However, the tide is starting to turn. The Australian Offshore Challenge (AOC) is a major long-distance power boat navigational rally. This event takes power boats on a 700 nautical mile adventure from Hobart to Melbourne across Bass Strait. Along the way, crews have to navigate a course around hundreds of bays, inlets, islands, passages and other marine coastal features.

In 2008, the AOC will be partnering with the Marine and Coastal Community Network (MCCN) to use this event as a major forum to educate and inform recreational boaters about a range of environmental issues directly relevant to their own boating activities. Through a variety of media channels used by the AOC, the MCCN will have the chance to raise awareness of four key issues. They are:

- 1 Translocation of marine pest species – boats will begin from many locations within Australia, move to Hobart and then travel to multiple sites in Tasmania and Victoria during the event;
- 2 Marine mammal collisions and interference – including with seals, dolphins and whales;
- 3 Marine pollution – in particular disposal of sewage, litter and the need for daily refueling at wharves and jetties;
- 4 Use of marine protected areas and restrictions on anchoring and fishing in areas with critical habitat values.

The AOC will be used by MCCN to promote to participants in the event, and the wider boating community who follow the event, the use of best practice techniques to reduce marine pollution and the spread of marine pest species. It will also raise awareness of marine mammal collisions and interference, marine protected areas and historic sites in Victoria and Tasmania.

It is hoped that the national media attention which the AOC will generate will be the start of a community and media dialogue about these important issues and will start the boating public thinking, talking and being more environmentally responsible.

Further information: Roger Dickeson, (03) 9867 6666, info@offshorechallenge.com.au or www.offshorechallenge.com.au
Full article and references available: www.mccn.org.au

Sunken History – The SS Alert

Mark Ryan, Southern Ocean Exploration

The one thing that all shipwreck hunters have in common is the fascination for the story behind the ship. The *SS Alert* is one such story – a story of the two passengers and thirteen crew lost at sea that wild and stormy night, five miles west of Cape Schank, Victoria.

Built in 1877, the *Alert* sailed for Melbourne from Scotland in 1878. Within one week of leaving, the crew refused to sail any further due to seaworthiness issues. The ship was forced to put in to Wales, and the crew jailed for six weeks. It was not until a surveyor assessed the ship as un-seaworthy, that the men were released. It took another five months to sail out to Australia. She arrived in Melbourne under sail, rigged as a three-mast schooner.

The *Alert* sank while trying to enter Port Phillip Bay on 28 December 1893. The one survivor was the ship's cook, Robert Ponting: he grasped a portion of a cabin door and clung to it for 16 hours. That morning he was found on the back beach of Sorrento, unconscious and half hidden in the sand.

When Southern Ocean Exploration (SOE) team members – Peter Taylor and Mick Whitmore – found a possible *Alert* image from the side scan sonar, nobody could have imagined the wider community interest in this wreck. The Maritime Heritage Unit of Heritage Victoria allowed SOE to control the searching and reporting of this shipwreck. Although SOE has not yet completed the survey work, it is our belief that the ship might have sunk not due to the ship's design – but due simply to metal fatigue!

Further information: Mark Ryan, mark@southernoceanexploration.com

Full article and references available: www.mccn.org.au

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Christie Creek Report to Southern NRM Group

The Christie Creek Taskforce has prepared a report to the Southern Natural Resources Management Group of the Adelaide and Mount Lofty Ranges Natural Resource Management (AMLRNRM) Board, as the culmination of the activities to develop integrated natural resource management (NRM) strategies for Christie Creek. It is intended that its recommendations guide NRM implementation in the catchment and, where applicable, are considered by the Board across its region.

The report includes proposed strategies, actions and priorities/costings for addressing key NRM issues in the catchment. It also identifies the contribution each Strategy makes to the Draft Resource Condition Targets and the key stakeholders for each Action.

In developing the Strategies and Actions, the Taskforce was guided by the major NRM issues in the catchment, including:

- the export of high sediment loads entering the Gulf St Vincent;
- watercourse erosion impacting sediment loads entering the Gulf, and degradation of habitat/amenity and protection of property/infrastructure;
- degradation of the near-shore marine environment, in particular Horseshoe Reef – part of the Port Noarlunga Aquatic Reserve – which is on the verge of collapse;
- exotic plant species infestations in the urban and rural parts of the catchment, impacting on natural resource assets, e.g. loss of habitat and biodiversity;
- existing urban design which is not sympathetic to best NRM practice;
- lack of community ownership of problems, impeding effective management.

These are not issues unique to the Christie Creek catchment, and the Taskforce considers that the findings of the report – particularly the Strategies and Actions – could be applied to other areas of the AMLRNRM Region.

The Taskforce has identified the following significant emerging issues in NRM:

- 1 the need for the SA Stormwater Policy to expand its focus from purely flood mitigation to include stormwater quality re-use objectives;
- 2 inconsistencies between development and planning decisions and NRM aims;
- 3 the ongoing loss of biodiversity through continuing vegetation clearance and pest plant/animal invasion;
- 4 the resourcing implications for addressing these issues, including a budget commitment to the Christie Creek management strategies to expedite remedial works and minimise the further deterioration of the near-shore environment, particularly the reefs.

The Strategies and Actions for NRM in the catchment that are proposed by the Taskforce include:

Strategy 1 – Reduce and treat stormwater flow to Gulf St Vincent.

Strategy 2 – Watercourses managed to minimise sediment contribution from stream erosion.

Strategy 3 – Native vegetation protected and managed.

Strategy 4 – Key habitats and landscape features protected through legislative amendment and enforcement.

Strategy 5 – Ensure best practice rural land management.

Strategy 6 – Increased knowledge of marine, coast and near-shore environment as indicators of efficacy of land and water management.

Strategy 7 – Community engagement.

Further information: Councillor Rex Manson, 0410 642 916 or www.amlrnrm.sa.gov.au

Hooked on Marine Conservation

Josh Coates, Fishers For Conservation

A community group of recreational fishers will be taking the marine conservation message face-to-face to their peers this summer. Assisted by a Commonwealth Government grant, the project is developing a range of educational resources to be personally delivered by

fishers to fishers, at a range of popular fishing locations.

Fishers For Conservation Inc. (FFC) is an Australian based non-profit incorporated association – educating, supporting and representing environmentally minded recreational fishers. FFC members come from all walks of life, united by the goal of protecting the aquatic environment. FFC supports conservation and ecologically based management of the coastal, marine and freshwater environments.

In addition to delivering resources developed by the community, FFC has collaborated with government and other agencies to deliver information developed by others, such as the Keeping South Australia Beautiful Clean Marine program (educating recreational fishers regarding litter reduction) and the Department of Primary Industries and Resources official regulations (including size and bag limits).

FFC supports the use of tackle, techniques and practices that minimise the negative impacts of recreational fishing on the environment. FFC believes that the largest group of marine environment lovers in Australia (that's right – recreational fishers!) can make our positive input into the environment outweigh the negative.

Educational materials to be delivered via this project will focus on a range of issues including: interactions with marine mammals, sensible tackle choices and fish handling, marine parks and recreational fishing, protecting fish habitat by reducing both land and aquatic based pollution, destructive fishing practices, and practical ways to minimise the impacts.

FFC is looking for more volunteers, who will receive training and a resource pack. There are plenty of roles to fill behind the scenes and travelling as a group to jetties, boat ramps and beaches to share educational materials, conduct a friendly recreational fishing based survey and spread the word regarding conservation minded fishing. This project is fun, educational, family-friendly and rewarding. What a great opportunity to give something back to recreational fishing and the marine environment you love!

Further information: Josh Coates, 0438 805 284, fisherfc@internode.on.net or www.ffc.org.au/Sustainable_fishing_education.html

Cottesloe Coastcare Association

Robyn Benken, Vice Chair, CCA

Cottesloe Coastcare Association Inc. (CCA) was established in 1995 by some locals concerned about foreshore erosion in Cottesloe, a western suburb of Perth. Over the past ten years, CCA has managed a number of successful projects in partnership with State Government (Coastwest), the Commonwealth Government (Envirofund/NHT) and the Town of Cottesloe. CCA is also currently represented on the Coastal and Marine Reference group of the Swan Catchment Council (SCC) to assist local governments and Coastcare groups with Natural Resource Management (NRM) issues.

CCA has built up a wealth of knowledge, experience and skills in the management of the coastal area of Cottesloe. CCA volunteers collect seeds and weeds, plant local provenance seedlings, work with local school groups, and raise funds for local projects. CCA's many projects tally in at over \$200,000.

CCA has embarked on a new project in partnership with the Town of Cottesloe, to develop an overarching environmental management plan and natural areas plan for Cottesloe. This project will allow CCA to be involved in the NRM decision-making process, giving them the opportunity to contribute to the future planning and management of the Cottesloe coastal area.

CCA began the planning process by convening two community workshops early in 2007. Coastcare members were joined by other local residents to document the natural biodiversity values they hold for Cottesloe. This document helped inform the natural areas planning process which now follows. CCA has successfully raised \$20,000 through the Swan Catchment Council's Coastal planning incentive grant and the LGA has budgeted \$25,000 for the plan. CCA will be involved throughout the planning process, as a member of the steering committee and will contribute to vegetation mapping, data collection and a further community workshop.

Cottesloe coastcarers are eager to develop innovative ways to collect and

communicate important information so that CCA continues to learn, share what they have learnt and put this knowledge into practice. CCA will also continue to foster partnerships with local schools, community groups, sponsors and all levels of government.

Further information: Robyn Benken, (08) 9384 7668, robynbenken@iinet.net.au or www.cottesloecoastcare.org

Dirk Hartog Island Beach Cleanup

Carl Bevilacqua, SeaNet Extension Officer WA, OceanWatch Australia

The Dirk Hartog Island Beach Cleanup has been a highly successful project, accomplished through the joint efforts of OceanWatch Australia's SeaNet WA, the Western Rock Lobster Council, WA Fishing Industry Council, members of the fishing industry and community volunteers.

The project commenced in 2005, when SeaNet WA Extension Officer, Carl Bevilacqua, led a team of eight volunteers out to Dirk Hartog Island off the north-west coast of Western Australia. The volunteers spent a day removing decades of accumulated domestic and commercial fishing related rubbish from the two sandy beaches on the west coast of the island. The total weight of rubbish removed from the beaches was approximately 1,372kg.

The organiser and volunteers involved in the 2005 effort received the Western Australian Department of Fisheries Reward and Recognition Program 2005–06 in the category of Community and Industry Awards, Community Stewardship Award. The \$3500 award was used to fund the 2007 project.

The objective of the July 2007 visit to Dirk Hartog Island was to assess the recruitment of debris back to this site two years after the initial effort. Carl Bevilacqua and five volunteers again removed accumulated rubbish on the same beaches, collecting 840kg of debris. The amount of industry-related debris retrieved was significantly less; however, the amount of general debris collected was similar to 2005.

The 2007 project was an enormous effort undertaken by a small team of dedicated volunteers. Special thanks must go to lobster fisher Terry Ash of Kalbarri for providing the use of his vessel, Port Dennison lobster fisher Jason Horn, Kalbarri local David Graziadelli and Kalbarri policeman Harry Rice for graciously volunteering their time and effort. Further thanks must also go to OceanWatch Australia, the Western Rock Lobster Council, the WA Fishing Industry Council and Island managers Kieran and Tory Wardle for providing financial and in-kind support which made this initiative possible.

Further information: Carl Bevilacqua, (08) 9492 8811, seanet@wafic.org.au

Marine Planning in the South-west

The South-west Bioregional Profile has recently been released as part of the bioregional marine planning process carried out by the Australian Government under the Environment Protection and Biodiversity Conservation Act 1999. This document is the first of a three-stage process in the creation of the South-west Bioregional Plan: the Bioregional Profile, the Draft Marine Bioregional Plan and the final Marine Bioregional Plan.

The Profile provides the information-base upon which the South-west Bioregional Plan will be developed. In particular, it focuses on geomorphology, oceanography and biodiversity in the South-west Region, its conservation values, human activities within the region and the principles behind the development of a network of marine protected areas.

The draft South-west Marine Bioregional Plan will be publicly released in approximately 12 months. The South-west Bioregional Profile and associated data can be downloaded at: www.environment.gov.au/coasts/mbp/publications/south-west/sw-region-profile.html

Abridged from Department of the Environment and Water Resources, Australian Government website.

TRaCK: Research for Northern Rivers

As interest in the rivers and water resources of northern Australia grows, a new initiative called TRaCK (Tropical Rivers and Coastal Knowledge) research hub, has been formed to improve our understanding of these resources. TRaCK was launched in Darwin on 31 July 2007.

TRaCK is a consortium of research organisations and government agencies, formed to invest more than \$30 million to improve our understanding of northern Australia's rivers, estuaries and catchments over the next four years. The TRaCK consortium brings together more than 70 leading researchers from 15 organisations across Australia – including Charles Darwin University (CDU), CSIRO, Griffith University, Land and Water Australia, the North Australia Indigenous Land and Sea Management Alliance and the University of Western Australia – with support from the governments of the Northern Territory, Queensland and Western Australia.

The research effort will be led by TRaCK's Director, Associate Professor Michael Douglas (based at a new TRaCK office at CDU) who says TRaCK will increase the knowledge and capacity needed to underpin water planning for northern Australia's rivers and groundwater systems.

Abridged from a CDU media release: www.cdu.edu.au/newsroom/story.php?nID=2163

Centre for Traditional Knowledge

The Northern Territory (NT) Government has committed \$2.5 million to help establish a United Nations University Centre on Traditional Knowledge (UNUCTK) with Charles Darwin University (CDU) as host partner.

CDU Vice-Chancellor, Professor Helen Garnett, said the UNUCTK with CDU as host, provided opportunities to promote the recognition of the value of Traditional Knowledge systems in Australia.

CDU is looking to grow their Traditional Knowledge centre. By harnessing the unique knowledge of Indigenous Territorians for practical applications in areas such as science and environmental management, the Centre for Traditional Knowledge will help develop new economic opportunities – particularly in the remote, regional areas.

The Centre will focus on research and training in many aspects of Traditional Knowledge of Indigenous communities from a global perspective, developing the capacity of Indigenous communities.

The opening coincided with the opening of a new Centre for Sustainable Indigenous Communities in The Australian Tropical Forest Institute at James Cook University's Cairns campus, with substantial funding from the US philanthropic organisation The Christensen Fund. The Centre will focus on leading research to ensure the sustainable management of the natural and cultural resources of Indigenous communities, particularly Australia's Aboriginal and Torres Strait Islander peoples.

Abridged from a media release by NT Government: www.nt.gov.au/dcm/ocm/media/index.cfm?fuseaction=viewRelease&id=2842&d=5 and a media release by JCU: http://cms.jcu.edu.au/news/current/JCUPRD_014497

NT Marine Atlas

The Marine Biodiversity Group (MBG) and Charles Darwin University (CDU) are developing a single web-based information system for accessing marine and coastal information in the Northern Territory (NT).

The \$600,000 collaborative NT Marine Atlas aims to allow interested people and organisations to view, identify and access (when appropriate), geospatial data (maps) and information about marine and coastal resources in the NT.

It is hoped the project will compensate for the lack of data on the NT's marine and coastal resources by creating a 'one-stop shop', where shared data is available on a single web-enabled GIS.

Abridged from NT Government website: <http://nt.gov.au/nreta/wildlife/marine/atlas.html>

Coastal Jewel Saved

Prue Barnard, Australian Marine Conservation Society

Glyde Point is to be protected from industrial development.

Glyde Point lies 40km northeast of Darwin and is highly significant for its conservation and cultural values, including threatened and endangered species, populations of dugong and turtle, rare rainforests, diverse mangrove communities, coral reefs and many sites of cultural significance. The decision in 2000 to allow heavy industry in this sensitive area spurred conservation groups to lead a vigorous community campaign to protect Glyde Point.

The Environment Centre NT and the Australian Marine Conservation Society applaud the Government's decision to protect the precious and relatively pristine coastal environment of Glyde Point and look forward to seeing the details behind the announcement. We congratulate and thank the community for supporting the campaign to protect Glyde Point.

Further information: Prue Barnard, Pruebarnard@amcs.org.au

Tropical Birds Face Extinction

Scientists are warning that sea levels in northern Australia are already rising by around 8mm a year, so fast that salt water could flood thousands of kilometres of pristine wetland. That would destroy vast areas of tropical bird habitat, putting 66 species at risk of extinction.

Every evening across the tropical skies of the Top End, flocks of magpie geese pass overhead in their familiar 'V' formation. Their characteristic honk can be heard for miles.

A study by Professor Stephen Garnett has found magpie geese are among a wide range of birds at risk of serious decline, even extinction, as climate change sets in.

Abridged from ABC News Online: www.abc.net.au/news/stories/2007/09/18/2036963.htm

New Fisheries Research Centre

James Cook University in Queensland has formed a new Fishing and Fisheries Research Centre. The new centre emerged from the defunct Cooperative Research Centre for the Reef. Many of the 14 staff are veterans of marine research and the centre has already attracted substantial research funding.

It will focus on freshwater and ocean fishing for northern Australia. Centre Director, Colin Simpfendorfer, says it means they are not just considering the reef any more but have a wider scope – particularly focusing on fisheries on the east coast of Queensland.

Abridged from ABC News Online: www.abc.net.au/news/stories/2007/08/06/1997984.htm

Threadfin Salmon Under the Microscope

Scientists will use DNA, ear-bones and parasites to help unravel information about movement patterns of two important inshore fish species across northern Australia in a new three-year project. The information will help fisheries determine how best to sustainably manage threadfin salmon across northern Australia.

King and blue threadfin salmon are favoured table fish caught by commercial, recreational and Indigenous fishers across tropical and sub-tropical Australia. Scientists suspect that there may be several different populations of each species throughout Queensland, the Northern Territory and Western Australia.

So little research has been carried out on these important species that there are information gaps on their basic biology. Principal investigator Mr David Welch, a Queensland Department of Primary Industries & Fisheries (DPI&F) biologist based at James Cook University (JCU), says understanding the population structure and movements of these two species is critical to ensure they are managed sustainably.

Research will help determine the extent that fish of each species interact with those from other areas.

This new multi-agency research project is a collaboration between the DPI&F, the Northern Territory Department of Primary Industry, Fisheries & Mines, JCU, the University of Queensland, and the Department of Fisheries, Western Australia. It will be coordinated by the Fishing & Fisheries Research Centre at JCU, and supported by funding from the Australian Government's Fisheries Research and Development Corporation.

Abridged from a JCU media release: http://cms.jcu.edu.au/news/current/JCUPRD_015229

Raine Island – Protection for Green Turtle Rookery

The world's largest green turtle rookery, at Raine Island near Cape York Peninsula, will now be safeguarded as part of a National Park (Scientific), following an historic agreement between the Queensland Government and Traditional Owners.

This new status will offer Raine Island and its adjacent cays the highest level of protection possible under Queensland's Nature Conservation laws. Also, as a National Park (Scientific), the Environmental Protection Agency (EPA) will be able to continue its successful monitoring and conservation of Raine Island's green turtle breeding population where tens of thousands of green turtles come ashore each year to nest.

The Queensland Government signed an historic new Indigenous Land Use Agreement (ILUA) with Aboriginal and Torres Strait Islander Traditional Owners, the Wuthathi people from Shelbourne Bay – who identify as native title holders and the area's Traditional Owners – and the Erubam Le of Darnley Island, the Ugarem Le of Stephen Island and Meriam Le of Murray Island – who identify as the Torres Strait Native Title Holders of the area.

Environment Minister Lindy Nelson-Carr said the EPA negotiated the ILUA – which recognises the Traditional Owners

connection to the place and respects the need to jointly manage and conserve Raine Island and its surrounds – with the stakeholders in a process convened through the National Native Title Tribunal.

Abridged from: EPA website www.epa.qld.gov.au/about_the_epa/media_room/raine_island_national_park_scientific/ and a Queensland Government media release: <http://statements.cabinet.qld.gov.au/MMS/StatementDisplaySingle.aspx?id=53573>

Partnering to Ranch Saucer Scallops

Dr Liz O'Brien, Queensland Department of Primary Industries and Fisheries (DPI&F)

Queensland saucer scallop meat is highly valued, but a variable catch rate means the industry can be highly unstable. The Queensland DPI&F is investing in developing hatchery technology for saucer scallops as a recovery option for this industry in crisis.

DPI&F, in partnership with the University of Queensland, developed methods to breed juvenile saucer scallops in tanks. Growing scallops in an intensive land-based hatchery allows larvae to grow protected from most predators in a controlled environment with high quality seawater, stable temperature and an ample supply of algae, thus achieving higher survival rates than wild scallops.

Once juvenile scallops (spat) reach a suitable size, they are moved to sea and continue to grow in a seabed aquaculture lease in the natural environment.

DPI&F's preliminary research success was commercialised by Queensland Sea Scallop Ltd (QSS). Saucer scallop spat are being produced in their millions in Bundaberg for free-range growth in a seabed aquaculture lease in Hervey Bay.

DPI&F is continuing to partner with QSS, as well as the University of the Sunshine Coast and Western Australian researchers, in a range of research projects, including investigating a method to physically mark the scallop's shell to differentiate the wild from the hatchery-reared spat.

Further information: Liz O'Brien, Liz.O'Brien@dpi.qld.gov.au

In Memorium: Lance Ferris

If you're not aware of Lance Ferris, founder of Australian Seabird Rescue (ASR), you should be. The Pelican Man's passion is appreciated not only by coastal communities but by the thousands of seabirds, turtles and other marine and coastal animals he has rescued and rehabilitated. Lance passed away Sunday 14 October 2007.

Lance's 'work' included diving from boats onto pelicans sporting fishing lures, ripped bills and hooked wings, as well as rescuing turtles washed ashore, suffering injuries and in dire need of his care. He was known to go without life's necessities to make sure the wildlife in his care had enough food and medicine to recover and be released back into their habitat.

His work is widely praised and honoured with numerous awards including the prestigious National Community Coastcare Award. He has been donated a vast array of items including a boat from NSW Fisheries, diagnostic tools, and laboratory and rehabilitation equipment to assist with the continuation and growth of this work. The recent donation by an anonymous benefactor of an endoscope, has provided an innovative advantage in the rehabilitation of seabirds and marine turtles.

To put in perspective the immense appreciation of his work, following an ABC *Australian Story* episode on Lance, the Tony and Lisette Lewis Foundation provided a sanctuary – the WildlifeLink Sanctuary – home of the Australian Seabird Rescue. The sanctuary includes ASR's rescue and rehabilitation facility, a sea turtle hospital as well as an education and discovery centre. The sanctuary is high-tech, well organised, clean and clinical. The patients are the luckiest in the world – they are cared for by a remarkable and devoted team.

Lance knew time was precious for his patients, so items too expensive or too far away were masterfully created, he was a man that 'made things work' – a willing, creative and passionate man who knew no boundaries when it came to caring for marine and coastal wildlife.

Lance's dream was to establish seabird rescue teams in every major estuary frequented by pelicans. With teams already established in WA (WASR), SA (SASR), Victoria (VSR) plus two NSW branches at the Central Coast and South Coast, he was getting there. To understand the work Lance devoted his life to, and appreciate one of the highest achievers the marine and coastal community has produced, view the ASR website and photos of his patients and team at work. Donations to ASR will allow his vital work to continue.

Further information: ASR, (02) 6686 2852, info@seabirdrescue.org or www.seabirdrescue.org

Grey Nurse Shark Tribunal Decision

Earlier this year, the Nature Conservation Council of NSW (NCC) lodged a legal challenge against the NSW Ocean Trap and Line Fishery, made up of commercial fishers along the NSW coast. The basis of this challenge is the NCC's contention that the fishery continues to have a significant impact on the critically endangered grey nurse shark (GNS) and should not have received approval to operate under Commonwealth environmental legislation.

With fewer than 500 GNS left off the east coast of Australia, the death of even one animal from human impact is considered significant and likely to lead to a decline in the population. The NSW Ocean Trap and Line Fishery is known to kill at least four sharks each year. The appeal in the Administrative Appeals Tribunal requested that:

- 1,500m closures be created around 18 key GNS habitat areas, including iconic areas like Julian Rocks and Montague Island;
- non-offset circle hooks be implemented;
- wire trace be banned across the fishery.

On 19 October 2007, the Tribunal decided that despite the stated risk posed to the GNS by commercial and recreational fishing, the court alone did not have the power to prevent the extinction of the GNS. The Tribunal recognised that the GNS is at dire risk of extinction, but stated

that the responsibility to act lies with the NSW Department of Primary Industries.

Further information: NCC, (02) 9279 2466 or www.nccnsw.org.au/greynurses shark

The John Holliday Student Conservation Award

A PhD student from the University of NSW was awarded the annual NSW Department of Primary Industries (DPI) John Holliday Student Conservation Award, for her innovative research into the ecology and behaviour of pelagic fish in NSW coastal waters.

Elizabeth Heagney used baited underwater video cameras suspended in waters around Lord Howe Island to gain new insights into the behaviour of large fish. The baited underwater video attracted fish to the camera, revealing a close association between Galapagos whalers and large pelagic fish. The research suggested these species may move around together as a group and that the waters around Lord Howe may be an important breeding ground for yellowtail kingfish, white trevally and a nursery for juvenile Galapagos whalers. The information from the study will assist NSW DPI to develop management strategies for fish stocks around offshore islands.

Each year the NSW DPI John Holliday Student Conservation Award encourages postgraduate students to share innovative research about NSW's aquatic environment. The award is presented in memory of the late Dr John Holliday who dedicated 26 years to working for fisheries conservation. The winning entry attracts a cash prize of \$2,000. Details on the Award program can be found at: www.dpi.nsw.gov.au/research/fishing-aquaculture/funding/john-holliday-student-conservation-award

Abridged from a DPI media release: www.dpi.nsw.gov.au/aboutus/news/recent-news/fishing-and-aquaculture/how-big-fish-behave

Review & Revision of the Victorian Coastal Strategy

Erin Nash, Project Officer, Victorian Coastal Council and Cathy Ronalds, Coastal Policy Officer, Department of Sustainability and Environment

The Victorian Coastal Council (VCC) is committed to a long-term vision for the coast through the development of the Victorian Coastal Strategy (VCS), to ensure the diverse values of the coast are not compromised by short-term decisions.

THE VCS TEN YEARS ON

The draft VCS (2007) will be the third VCS in ten years, building upon the strengths of the previous two Strategies published in 1997 and 2002. Over the last decade the VCS has gathered a strong base of community support and acceptance. Achievements for the coast since 1997 include the:

- expansion of protected areas on the coast, including the proclamation of 13 Marine National Parks and eleven Marine Sanctuaries, which protect about 5% of the state's waters;
- Coastal Spaces project, which provides guidance on protecting coastal landscapes between settlements and maintaining character within townships;
- development of 18 Coastal Action Plans by Regional Coastal Boards, which implement the VCS at regional and local levels across the state;
- continued increase of volunteer effort and community interest in the coast, supported by the Coast Action/Coastcare program;
- completion of Regional Catchment Strategies out to the State marine limit (5.5km);
- introduction of a network of coastal planners to oversee decisions made on coastal Crown land.

VCS (2002) REVIEW

The VCC reviewed the VCS (2002) during 2006–07, meeting with more than 30 stakeholders and advertising for public submissions during that process. Feedback

revealed that there is strong support for the Hierarchy of Principles within the Strategy. These principles follow the objectives of the *Coastal Management Act 1995* and are designed to guide decision making and planning on the coast. Stakeholders felt that the VCS has been a good foundation for local and regional planning on the coast.

NEW AND CONTINUING DIRECTIONS

Though many of the same coastal issues persist, there are also a number of new challenges emerging on the coast, the largest being climate change. In response, the revised VCS will include:

- stronger directions and a precautionary approach to climate change;
- greater emphasis on marine planning and management;
- stronger principles for planning, including the recommendations of Coastal Spaces (2006);
- initiatives to strengthen Victoria's coastal management capacity, including better recognition of and support for local government;
- guidance for resolving ongoing and historically difficult issues e.g. coastal-dependent uses and old, inappropriate subdivisions.

The draft VCS (2007) is expected to be released in late October and the VCC will be welcoming public submissions over an eight-week period.

Further information: Cathy Ronalds, cathy.ronalds@dse.vic.gov.au or www.vcc.vic.gov.au

The Sea Search Partnership

Rebecca Koss, The People and Parks Foundation

Citizen Science programs involve communities and public stakeholders in conserving the natural environment through scientific monitoring. Public stakeholders include corporate, government, non-government/not-for-profit organisations and educational institutions. In view of current global and local environmental topics – such as climate change, ocean acidification, large scale

erosion and salinity – the community and these stakeholders are coming together to understand what impacts these issues will have on their local natural environment.

Partnerships are an important component in the delivery of a Citizen Science program. It requires involvement from all to meet the expectations and aims of the program. The individuals involved can also expect benefits to come in many forms – learning new skills, creating networks with organisations or working alongside and connecting with like-minded volunteers.

Sea Search is a community-based Citizen Science monitoring program for Victoria's Marine National Parks and Marine Sanctuaries. There are five partners involved in the delivery of the program across the State. The Sea Search program is run by The People and Parks Foundation, a not-for-profit, non-government organisation whose vision is to connect people to parks for better health and wellbeing, both mentally and physically. Parks Victoria, the government management agency for Victoria's system of marine protected areas, assists in the delivery of the program by involvement of Parks Victoria Marine Rangers and the Manager for Marine National Parks Research. ExxonMobil is a corporate sponsor of the program, allowing volunteers access to monitoring equipment. Deakin University is the tertiary institution which created the monitoring protocols, and accessed the scientific capabilities of volunteer involvement and their motivations for being involved in a community monitoring program. The last partner, but the most important, is the volunteer community. Without their involvement the program would not occur.

The delivery of Sea Search over the past two years has created a greater understanding of how partnerships work in a Citizen Science program. Overall, expectations from all groups have to be met for the program to be viable in the long term. Citizen Science community monitoring programs create networks between and within organisations and the public, for the benefit of the community and the environment.

Further information: Rebecca Koss, (03) 8627 4615 or rkoss@peopleandparks.org.au

Tasmania Plans for Climate Change

Jess Tyler, The Antarctic Climate & Ecosystems Cooperative Research Centre

Tasmania's response to climate change took a major step forward recently, with the announcement of Climate Futures for Tasmania – a multi-million dollar research collaboration to provide probable future climate information at local scales around Tasmania.

The Climate Futures for Tasmania (CFT) project will equip Tasmania with the most detailed and practical climate change information yet produced.

Running from 2007 to 2010, it will detail likely conditions through to the year 2100 under a range of greenhouse gas emission scenarios. It will provide targeted information at scales that will feed into locally based planning for climate adaptation strategies. CFT will also identify the key climate information that has the most influence on a range of industries, services and communities in Tasmania.

The CFT project has been developed through extensive consultation with state and local government, emergency services, water authorities, power generating companies, power delivery and infrastructure providers, farmers, graziers, fruit growers, vigneron and the research community.

New national-scale projections confirm the trends of previous projections, with a general drying and warming across much of Australia and significant regional variation. Overall, Tasmania is likely to have warmer conditions, with a trend to drying in the eastern half of the State, especially in the warmer months. While these national-scale projections provide important information, they are at scales that limit their use in local decision-making.

The CFT project builds on recent research undertaken by Hydro Tasmania, the Tasmanian Partnership for Advanced Computing and the CSIRO, which established that climate projections for Tasmania could be provided at a finer scale than has been undertaken before and better represent Tasmania's

geography and its effect on the local climate. By extending the projections to more scenarios under the CFT project, The Antarctic Climate & Ecosystems Cooperative Research Centre (ACE CRC) is confident that it can better capture likely climate variation over time and across the state in projections of the future conditions under which we will have to live.

The research is co-funded by the Commonwealth Environment Research Facilities Programme, the Tasmanian Government and Hydro Tasmania. The project will receive significant in-kind support from the consortium partners, which include the State Emergency Services and the Department of Primary Industry and Water.

The ACE CRC will lead a consortium of state and national research partners to deliver Climate Futures for Tasmania, including CSIRO, the Tasmanian Partnership for Advanced Computing, the Tasmanian Institute of Agricultural Research, the University of Tasmania, the Bureau of Meteorology, Hydro Tasmania and Geoscience Australia.

Further information: [Jess Tyler, \(03\) 6226 2265 or media@acecrc.org.au](mailto:Jess.Tyler@acecrc.org.au)

Marine Science in the Classroom

Jane Alpine and Anne-Elise Nieblas, Centre for Marine Science University of Tasmania & CSIRO Marine & Atmospheric Research

'Are there cute boys at uni?' and 'Do you go to the pub lots?' are perhaps not questions one would immediately expect from a marine ecology lesson, but are equally important to Year 9 and 10 students as the fate of the world's oceans. Students at Flinders Island District High, Tasmania, are nearing the end of a new unit: 'How is the open ocean important to us?' As visiting scientists, we are here to wow them with our tales of shark wrestling, whale rescuing and a general lack of the clichéd white coat and grey beard deemed requisite for a scientist.

This ocean unit was developed through a collaborative project, headed by Jeannie-Marie LeRoi, between: the Tasmanian

rural and regional schools; the University of Tasmania's Faculty of Education and Faculty of Science, Engineering and Technology; and the Marine Discovery Centre at Woodbridge. Funded through the nationwide initiative Australian School Innovation in Science, Technology & Mathematics (ASISTM), the project sought to expand science literacy in schools by fostering working partnerships between science educators and early career scientists. This initiative aimed to develop cutting-edge science units for Years 7–10, with a particular emphasis on getting scientists involved in classroom activities.

Such partnerships offer exciting opportunities for both teachers and scientists. The teachers' benefits include exposure to recent scientific developments, cutting-edge ideas and extra hands in the classroom. For the scientist, this project provides an opportunity to let loose a scientific passion on a new and as yet untapped audience, as well as develop skills in teaching young students.

The project, which culminated in June of this year, showcased fantastic examples of what this type of partnership can achieve. Over 30 teachers and 15 researchers were involved in producing 6 units covering a broad range of topics from micro brewing beverages and distilling essential oils to aerodynamic lessons learnt from investigating insects.

It is not just teachers and scientists who benefited from the collaboration. Back on Flinders Island, when we had dragged their attention away from boys and beer, we gave students the chance to participate in hands-on science units, encouraged their interest in marine science, and challenged their preconceptions of who scientists are and what it takes to become one.

Although this project is now completed, a comprehensive report of the project's outcomes is underway and a funding proposal to rerun the project is being considered for the next ASISTM round in February 2008. Hopefully this will be successful and generate a new set of science units designed to enthrall the next generation of budding scientists.

Further information: [Jane Alpine, \(03\) 6232 5172 or Jane.Alpine@csiro.au](mailto:Jane.Alpine@csiro.au) or [Anne-Elise Nieblas, \(03\) 6232 5061 or Anne.Nieblas@csiro.au](mailto:Anne.Nieblas@csiro.au)

MARINE AND COASTAL COMMUNITY NETWORK IMPORTANT DATES

DATE	EVENT	CONTACT
3–9 December 2007	Coastcare Week	T: (02) 9412 1040 E: erlend@landcareaustralia.com.au W: www.landcareonline.com/page.asp?plD=78
3–7 December 2007 Brisbane, Qld	8th Invertebrate Biodiversity & Conservation / Society of Australian Systematic Biologists Conference	T: (07) 3201 2808 E: sally.brown@uq.net.au W: www.ibcc2007.org/
2008	International Year of the Reef 2008 – a year-long campaign of events and initiatives hosted by governments, individuals, corporations, schools around the world to promote awareness, conservation action and strengthen long-term constituencies for coral reef conservation. All welcome and actively encouraged to participate.	
2 February 2008	World Wetlands Day 2008 – Healthy Wetlands, Healthy People	E: ramsar@ramsar.org W: www.ramsar.org/wwd/8/wwd2008_intro.htm
24–28 February 2008 Auckland, New Zealand	Advances in Tagging and Marking Technology for Fisheries Management and Research – jointly hosted by the Australian Society for Fish Biology, the American Fisheries Society and the New Zealand Society for Marine Sciences	E: tag2008@newyork.com W: www.fisheries.org/units/tag2008
27–29 February 2008 Gold Coast, Qld	EcoForum Conference & Exhibition (Australia) – a three-day industry function comprising four workshops within four themes of environmental management	T: (02) 9410 1302 E: Quitz@ecoforum.net.au W: www.ecoforum.net.au/2008/pdfs/e8%20CALL%20FOR%20PAPERS.pdf
2–8 March Australia	Seaweek 2008: Extinction – A Saw Point	W: www.mesa.edu.au/seaweek2008/default.asp
11–13 March 2008 London, England	Oceanology International 2008 (OI) OI hosts an agenda setting conference, training program, visiting vessels and live demonstrations as well as the latest ocean science and marine technology.	W: www.oceanologyinternational.com/
24–26 June 2008 Texas, USA	Energy Ocean 2008 The 5th Annual Energy Ocean conference on renewable and sustainable energy from the oceans (wind, wave, tidal, current, thermal, solar, hybrids)	W: www.energyocean.com/pdf/EO08-Reg-Form.pdf
18 August 2008 Darwin, NT	National Coastal Estuarine and Marine NRM Workshop	E: kath.nash@nt.gov.au
18–22 August 2008 Darwin, NT	Coast to Coast, Darwin 2008 – Call for Abstracts Now Open!	E: admin@coast2coast.org.au W: www.coast2coast.org.au/expression-of-interest.html