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Research Facility
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MARINE BIODIVERSITY AND RESOURCES

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IN THIS ISSUE

Convenor's Spot

Welcome to the autumn 2013 issue of the Marine Adaptation Bulletin (MAB). This quarter we explore *tourism and marine climate change*.

Highly responsive and flexible, the tourism industry adapts to demand for new destinations, activities and markets. On the other hand, the tourism industry can be volatile and tends to be sensitive to economic, social, ecological and technological changes. Marine tourism in Australia is dominated by small and medium sized businesses and is vulnerable to the effects of climate change with marine assets under threat from warming temperatures, e.g., the amazing coral habitats of the Great Barrier Reef and magnificent giant kelp forests off Tasmania.

In 2010 the Network held a series of focused strategy meetings around Australia to scope marine stakeholder needs to respond to, prepare for and manage the risks associated with climate change impacts on marine biodiversity and resource sectors. The highest priorities identified by key industry representatives from the marine tourism sector were: *risk and impact assessments* (government); and *communication/education and consultation/collaboration* (industry/peak body). These priorities identified by the tourism sector are largely consistent with those identified by representatives from other marine sectors – further emphasising the importance of marine stakeholder concerns around climate change threats to key marine assets, and the importance of facilitating clear dialogue and educational awareness regarding climate change effects and possible responses.

We trust that you have found articles presented in the MAB interesting and stimulating over the past four and a half years since the Network's establishment in January 2009. For now, however, this will be the last issue of the MAB, with the Network unfortunately ceasing on 30 June 2013. If you have any thoughts or comments about the Network and/or its activities, we would be delighted to hear from you.

I want to sincerely thank all 800+ Network members and organisers for your support and interest in the success of the Marine Adaptation Network over its four and a half year lifetime. I also want to sincerely thank NCCARF and the Department of Climate Change and Energy Efficiency for providing tremendous support and advice over the years. It's been an inspirational experience to convene the Network – and an honour to have had the opportunity to make some difference.

Neil Holbrook

At a glance

The Adaptation Research Network for Marine Biodiversity and Resources will foster an inclusive, collaborative and interdisciplinary research environment that generates outputs relevant for policy-makers and managers to develop appropriate climate change adaptation responses.

INVESTMENT
Australian Government Department of Climate Change & Energy Efficiency (DCCEE) through the National Climate Change Adaptation Research Facility (NCCARF) hosted by Griffith University

FRAMEWORK
Five interconnecting themes (integration, biodiversity & resources, communities, markets, policy)

HOST INSTITUTION
University of Tasmania

CONVENOR
Associate Professor Neil Holbrook

TIMEFRAME
2009 - June 2013

Adapting or Transforming: marine tourism at the Great Barrier Reef

Dr Susanne Becken, Tourism, Sport and Service Research Centre, Griffith University, Queensland; Dr Alexandra Coghlan, Department of Tourism, Sport and Hotel Management, Griffith University, Queensland

L-R: Millaa Millaa Falls, Atherton Tablelands, Queensland; Snorkelling at Low Isles, Queensland. Photos: Dr Tazim Jamal

Marine tourism, including beach and water-based activities, dominates global tourism. The Great Barrier Reef (GBR) alone is estimated to have generated A$6.9 billion towards Australia's gross product in 2005/06[1]. At the same time, the GBR is under threat from multiple stressors, including water pollution, increased sedimentation due to the loss of coastal wetlands and surrounding land practices, outbreaks of the crown of thorns starfish *(Acanthaster planci)*, and climate change. Scenario analysis undertaken for the tourism sector has shown that the GBR is expected to degrade under all scenarios, reducing its attractiveness to visitors. In the Cairns region, for example, severe bleaching (>60% of coral cover bleached) of some inshore coral reefs was observed in both 1998 and 2002, although the patchiness of bleaching suggests that, as long as the interval between bleaching is such that recovery can occur, there will be reefs attractive enough for tourism[2].

As documented recently[3], a range of policies and initiatives (mostly in relation to the GBR Marine Park) are in place to address climate change risks affecting the reef. These, however, focus largely on monitoring and education, and appear less efficient for actually reducing risks. The tourism sector was found to show little signs of preparing for future climate change through adaptation measures, with 'climate change actions' typically targeted at company's carbon footprints and environmental image[2]. The failure to fully consider the implications of climate change could be significant, as the marine tourism industry is particularly vulnerable to climate change[1]. A large number of businesses and communities depend directly (e.g. operators of scenic flights, glass bottom boats, boat charters, and diving companies) and indirectly (e.g. support services such as transport and hospitality providers) on a healthy reef and intact coastal ecosystems. Loss of coral due to bleaching, changes to marine biodiversity, poor visibility, and an increased occurrence and intensity of storms, will impact not only on tourist experiences but also on their safety[4] and business viability.

There are several options for tourism operators to adapt to climate change[3]. Implementing measures that help reduce stress on the coastal and marine ecosystems are more important than ever. These include strict control of pollution, no anchoring, speed control over the reef, and adherence to code of practices when diving and snorkelling. Operators could also get more actively involved in marine research that might help counteract climate change impacts on the reef (e.g. experimenting with shading, or new ways of reducing pollution around fixed pontoons). Moving from a product-based to an experience delivery of tourism services (including more emphasis on a learning component) might allow for increasing profit margins that compensate for a squeeze on the number of operating days due to increased climate variability and extreme events. Product diversification that capitalises on non-marine opportunities, such as the rainforest or sporting events, is another avenue. From a destination perspective, strategic planning should include aspects of how the destination wants to position or brand itself, what types of tourists it wants to attract, and what role tourism should play in the broader mix of economic activities. For some places, the environmental changes induced by climate change might mean that tourism, in its current form, cannot be sustained/is no longer competitive, with alternative small-scale forms of emerging tourism. These could, for example, be combined with a growth in the food sector that offers synergies of food trails, farmer markets and 'slow tourism'[5].

For further information regarding this article, please contact Susanne Becken: s.becken@griffith.edu.au

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Great Barrier Reef marine tourism operators take action for the future of their industry and the Reef

Fiona Merida, Manager – Eye on the Reef, Climate Change and Science, Great Barrier Reef Marine Park Authority;
Vicki Bonanno, Manager – Policy, Tourism and Recreation, Great Barrier Reef Marine Park Authority

Harnessing solar power on island resorts and establishing tree farms to offset carbon emissions are some of the ways Great Barrier Reef marine tourism operators are responding to climate change and looking after the Reef.

Climate change is recognised as the greatest threat to the long-term health of the Great Barrier Reef[1]. It also poses a significant risk to the Great Barrier Reef marine tourism industry, which generates $5.2 billion to the Australian economy each year and supports 64,000 full-time positions[2]. With about 1.8 million visitors a year[3], the marine tourism industry is also the primary vehicle for presenting the Great Barrier Reef World Heritage Area to the world.

Many tourism operators recognise that the health of their industry is linked directly to the health of the Reef and that their industry must respond to the threat of climate change. The Great Barrier Reef Marine Park Authority (GBRMPA) developed the *Great Barrier Reef Climate Change Action Plan 2007-2012*[4] to guide its own, as well as its partners', activities to respond to climate change.

Clockwise: Steve & Katrina Edmondson, Eco Shamba Tree Farm; Peter & Jan Claxton, Ocean Rafting; Peter Gash, Lady Elliot Island Eco Resort.

The Great Barrier Reef Tourism Climate Change Action Group — which includes GBRMPA, tourism industry bodies, and innovators within the marine tourism industry — was formed in 2006 to facilitate industry action on climate change.

The Group's *Great Barrier Reef Tourism Climate Change Action Strategy 2009 –2012*[5] has delivered a range of products including case studies, operator workshops, the Tourism Operators' Emissions Calculator, the Climate Incident Response Plan, Climate Action Certification program and enhancement of the High Standard Tourism program, and the integrated Eye on the Reef monitoring program.

The *Tourism Operators Responding to Climate Change* case studies demonstrate how Great Barrier Reef marine tourism operators have been taking action for the future of their industry and the Great Barrier Reef[6].

As an active member of GBRMPA's Tourism Climate Change Action Group, Peter Gash was inspired to make operational changes at Lady Elliot Island Eco Resort, which is located on the southernmost island in the Great Barrier Reef. After undertaking an energy audit, Mr Gash replaced his diesel generators with a large hybrid solar power system in 2008. A follow-up audit in 2009 showed he had reduced the resort's energy use by 32 per cent. By mid-2012, he had reduced his resort's diesel consumption by almost 70 per cent and is well on the way to creating a sustainable island resort.

Steve and Katrina Edmondson of Low Isles Sailaway, Port Douglas, have set up their operation to be 100 per cent carbon neutral. They are using wind power, recycled bio-diesel, four-stroke outboards, and onboard wastewater treatment and recycling on 'Sailaway IV', a 33-passenger luxury catamaran that takes tourists to Low Isles. The Edmondsons used the Tourism Operators' Emissions Calculator[7] to determine their carbon footprint and decided to carbon offset by delivering revegetation projects. Since 2010, they have planted more than 15,000 trees on a former sugar cane paddock. These plantings include *Pongamia pinnata* 'diesel' trees for their own biofuel use and as a trial for larger projects.

Jan and Peter Claxton, who own Ocean Rafting in the Whitsundays and Ocean Safari at Cape Tribulation, have slashed their carbon emissions by replacing the two-stroke engines on their semi rigid inflatable boats with ultra-low emission four-stroke engines. The move has enabled them to cut their fuel and oil use by 30 per cent — making them industry leaders in responding to climate change and looking after the Great Barrier Reef. More efficient outboard motors have also been good for business: their fuel costs are lower and the quieter engines offer greater passenger comfort.

Building on the first Action Plan, the *Great Barrier Reef Climate Change Adaptation Strategy and Action Plan 2012–2017* provides a platform for GBRMPA to continue to work in partnership with the marine tourism industry to deliver the shared objectives of protecting the Great Barrier Reef and adapting to climate change.

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Managing Marine Australia – the climate adaptation component

Colin Creighton, Chair, Climate Change Adaptation – Marine Biodiversity and Fisheries

L-R: Fish and scuba diver, Tasmania. Image: Lorne Kriwoken; Oyster farm at Duck River mouth. Image: TSIC; Squid. Image: Alistair Hobday.

The *Climate Change Adaptation - Marine Biodiversity and Fisheries* initiative seeks to explore opportunities and prepare Marine Australia for a changing climate. Our oceans are warming. The recent marine heat wave event off Western Australia and the southward extension of the Eastern Australian Current eddies are evidence for change. Our marine biodiversity has responded accordingly, with massive mortality of Roes Abalone (*Halliotis roei*) along the mid WA coast, whale sharks sighted around Albany, Mahi Mahi (*Coryphaena hippurus*) caught off Victoria and sea urchins (*Centrostephanus rodgersii*) moving south, causing declines in kelp beds along the east Tasmanian coast – to list just a few of the observed changes.

The Fisheries Research and Development Corporation (FRDC) recognises the importance of climate change adaptation for the benefit of those who spend their time working, living and enjoying the marine environment. The knowledge that timely intelligence equips us for improved management responses prompted the negotiation of a partnership initiative to research the implications of climate change on Australia's marine resources, and most importantly, to research smart adaptation responses. Principal investors include FRDC, the Department of Climate Change and Energy Efficiency, and all of the research agencies undertaking projects. From 2010-2013, the total investment over the four years of research and development stands close to $10M.

Equally important, a program approach was implemented, recognising that the sum of the research endeavors would deliver much more insight into the opportunities for Australia's marine climate adaptation than just commissioning an individual mish-mash of projects. This program approach and the specialised skills being brought to the program are best illustrated by the spread of the research projects and the list of Principal Investigators including:

Species orientated e.g. Barramundi [Dean Jerry] and Coral Trout [Morgan Pratchett]

Biodiversity conservation e.g. seabirds [Alistair Hobday] and deep reefs [Ron Thresher]

Regional fisheries management e.g. tropical Australia [David Welch], south eastern Australia [Gretta Pecl] and western Australia [Nick Caputi]

Opportunities in a changing environment e.g. commercial fishing [Alistair Hobday] and recreational fishing [Bill Sawynok]

Inshore and onshore adaptation e.g. estuarine habitat [Marcus Sheaves] and coastal zone [Michael Raybould]

The Marine Adaptation Network has showcased some of these projects through previous bulletins which can be viewed and downloaded from the Network website: www.nccarf.edu.au/marine

Volume 4 Issue 3 Spring 2012
Fishing for Data: what can novel datasets tell us about climate impacts and rec-fisher adaptation?
Dan Gledhill & Matt Lansdell
Project # 2010-524 FRDC-DCCEE

Climate Change Adaptation: building industry and community knowledge
Jenny Shaw
Project # 2011-503 FRDC-DCCEE

Volume 4 Issue 1 Autumn 2012
Effects of Climate Change on Coral Trout (*Plectropomus leopardus*), the Most Important Marine Fisheries Species in Tropical Australia
Morgan Pratchett & Adam Reynolds
Project # 2010-554 FRDC-DCCEE

Volume 3 Issue 3 Spring 2011
Climate Change Adaptation – Biodiversity & Fisheries Adaptation Research Project's progress as of June 2011

Volume 3 Issue 2 Winter 2011
Seabird & Mammal Researchers Tackling Climate Change
Alistair Hobday
Project # 2011-533

Image: Alistair Hobday

Monitoring systems and management information, rocky reef systems [Neville Barrett], spearfishing [Daniel Gledhill], Redmap [Gretta Pecl] and oyster water quality information portal [Pia Winberg]

Governance and marine policy, e.g. marine conservation strategies [Michael Lockwood], blue carbon [Anissa Lawrence] and translocation [Nic Bax]

Community led adaptation e.g. regional responses [Stewart Frusher] and community information [Jenny Shaw]

FRDC recognises that climate change adaptation is about how we respond as individuals through to management and policy levels. Therefore all research projects were set the challenging tasks to communicate the science widely whilst respecting the needs of various stakeholders. Mandatory requirements for all the projects include:

- Science papers as part of science interaction sharing of science knowledge
- Engagement and interaction of key stakeholders through workshops, press releases, websites etc.
- Data collected as part of the legacy to be stored under the IMOS data management system.

Salmon eggs. Image: TSIC.

In implementing such a unique program, there were challenges to be met along the way. At the project level, the challenges for the science teams were to utilise various sets of experimental gear and perhaps even more challenging, to gain the support of the Australian community to interact with and share data, when the public perceptions of climate change vary, and the various policies appear to be somewhat contradictory. A good example of this contradiction is climate change mitigation, which is also seen as imperative for Australia. Yet "blue carbon", the carbon sequestered by mangrove, seagrasses and salt marsh ecosystems and comprising of approximately 39% of Australia's carbon store, is not counted in the Australian National Carbon Account. Therefore, the potential win-win for both adaptation and mitigation of estuarine habitat repair cannot yet be realised.

The initiative is now in its final year with most of the projects in final write-up phase, including further science papers and community interaction along with the multiple science papers and activities that have occurred along the way. As work is completed, Executive Summaries and full reports are uploaded to the FRDC website and paper copies deposited in key libraries.

The final stage will involve the synthesis across all science findings to prepare a Climate Adaptation Strategy for Marine Australia – detailing priorities for adaptation action and specifying key knowledge gaps that require further investment. This is due for release in September 2013.

For further information regarding this article, please visit: http://frdc.com.au

The Principal Investigators of each project have provided a 'snapshot' of their work in a way that is informative and easily understood for coastal communities.

The following flyers were a collaboration between Project # FRDC 2011-503, Ocean watch and the Marine Adaptation Network. Access the flyers here: <http://arnmbr.org/content/index.php/site/resources_extended/category/adaptation_research_projects>

The vulnerability of an iconic Australian finfish to an altered climate: Barramundi (*Lates calcarifer*)

Project: FRDC 2010-521
Associate Professor Dean Jerry

Changing currents in marine biodiversity governance and management: responding to climate change

Project FRDC 2010-532
Dr Michael Lockwood

An Information Portal for the Oyster Industry

Project: FRDC 2010-534
Dr Ana Rubio

Management implications of climate change effects on fisheries in Western Australia

Project FRDC 2010-535
Dr Nick Caputi

An adaptation blueprint for coastal communities

Project: FRDC 2010-542
Dr Stewart Frusher

Effects of climate change on reproduction, larval development, and population growth of coral trout

Project: FRDC 2010-554
Prof. Morgan Pratchett

Climate change impacts on tropical fisheries species

David Welch, James Cook University, Adaptation Research Grant Project Principal Investigator.
Project title: Management implications of climate change impacts on fisheries resources of northern Australia.
Project number: 2010/565 FRDC-DCCEE

Many of Australia's tropical fish species are truly iconic in the eyes of anglers. Some of these hugely popular target species are barramundi *Lates calcarifer*, Spanish mackerel *Scomberomorus commerson*, coral trout *Plectropomus* spp. and mangrove jack *Lutjanus argentimaculatus*. However, increasingly there have been anecdotal reports of tropical species being caught in unusual locations, with one notable example being the reported catch of a coral trout off the east coast of Tasmania! This is likely attributable to the East Australian Current, which in the past 50 or so years has gradually increased its southward penetration, making east coast waters warmer than usual[1]. This is just one of the effects of a changing climate. However, we actually know very little about what the impacts of climate change will be on the key fishery species which so many people rely on for social benefits, business profitability and for eating pleasure.

The impacts of climate change on Australia's tropical fisheries are being investigated by a three-year collaborative research project involving scientists, fishers and managers from around Australia, including Queensland, the Northern Territory, Tasmania, New South Wales and Western Australia. Scientists on the project, entitled 'Management implications of climate change impacts on fisheries resources of northern Australia', are drawing on previous research , and looking at existing tropical fisheries data collections in new ways to assess how sensitive these species are to environmental change. Climate change is already influencing the Australian environment and these changes are predicted to continue and even accelerate. This project aims to understand how these changes affect important fish species, and make projections regarding the potential impacts on fisheries in the future. Ultimately, the results of the research will be used to assist stakeholders best prepare for the potential changes ahead.

The main aim of the project is to ensure fisheries stakeholders have the best available information so they can prepare for the potential climate-related changes to fisheries populations and their fishing activities. This is particularly important in tropical Australia where iconic species such as barramundi and coral trout attract thousands of visitors each year to try their hand at catching one of these tasty fish. Not only is this leisure activity popular with thousands of tourists but it also supports a multi-billion dollar industry including charter fishing operators, tackle shop owners and other associated businesses. Recent nationwide estimates of expenditure by recreational anglers arrived at a figure of $2.5 billion directly contributing to local economies annually, while another $200 million is brought in by international visitors[2].

1. & 3. Tourists flock to northern Australian estuaries annually to chase the revered barramundi. Photo: Andrew Doig; 2. A recreational spearfisher with a prized wahoo. Photo: Adele Bennett.

Climate variability has always had an effect on fisheries, but only recently has it been documented that productivity of some species is linked to environmental factors such as rainfall patterns, and for others the timing of spawning is linked to water temperature. This means that if these environmental variables change in the future as predicted, there may be some dramatic changes on species. Some of these changes may be positive, but others could be negative.

Two ways that species may be affected are by changes in their productivity or changes in their distribution. For example, a gradual shift in fish distribution may impact fishers in one region, but open up opportunities for fishers in another region. The movement south of Spanish mackerel, due to increases in water temperature beyond their preferred range, is a good potential example of distributional change. Another example is if fish productivity becomes more variable as expected, then reliability in catches will be affected from year to year. Barramundi recruitment has been shown to be positively correlated with high river flow patterns so reduced rainfall, as predicted in some regions, may mean fewer barramundi willing to jump on an anglers hook.

The project started in 2011 and has so far produced reviews of 23 tropical fisheries species, which in itself will be a useful resource for all stakeholders. The project team has also been conducting analyses of data sets to better understand species relationships with the environment. This information will underpin assessments of key fisheries in better understanding potential impacts. But the project is not just about scientists sitting in front of computers. In September and October this year the project will conduct a series of regional stakeholder workshops to (a) present findings of the project, and (b) for scientists, fisheries managers and fishers to work together to ensure that a range of practical and relevant adaptation options are considered for management and industry. These workshops will be held in several locations including Darwin, Townsville and Brisbane.

The project is led by James Cook University in collaboration with the Queensland Department of Agriculture, Fisheries & Forestry, the Northern Territory Department of Resources, the Institute for Marine & Antarctic Studies at the University of Tasmania, Infofish Australia, Maynard Marine, C2O (Coasts, Climate, Oceans), and the Queensland Seafood Industry Association.
The project is supported by funding from the Australian Government Fisheries Research and Development Corporation and the Department of Climate Change and Energy Efficiency. Results from the project are expected to be available in early 2014.

For more information regarding this article please contact David Welch: d.welch@c2o.net.au

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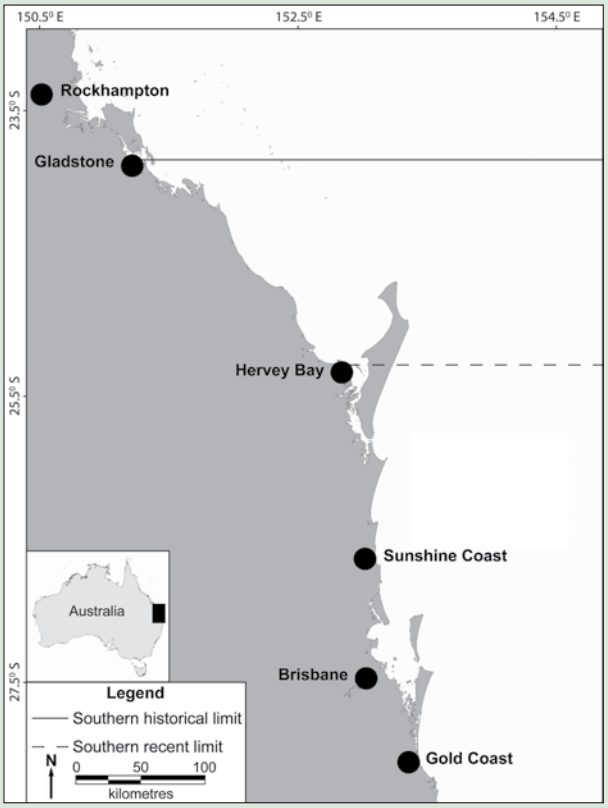
2012 Student Research Support Grant Recipient

Potential effects of climate change on the survival and reproduction of the cubozoan jellyfish, *Alatina nr mordens*: an experimental approach

Shannon Klein – Griffith University Queensland; honours project financially supported by the Marine Adaptation Network through the Research Support Grant Funding Scheme.

Increased ocean temperatures and the strengthening of surface currents have caused many marine species to shift their distribution polewards[1]. Ocean warming may facilitate survival of species at higher latitudes but warming is occurring concurrently with ocean acidification. Because acidification can be detrimental for some marine organisms, acidification could mediate range expansions that are facilitated by warming. To develop a realistic understanding of how species will respond to changing ocean conditions we first need to understand the interactive effects of multiple climate stressors.

Species range expansions that pose a threat to human enterprise are of particular interest as they have the potential to cause severe socioeconomic effects. Of those species predicted to expand their ranges polewards, venomous box jellyfish, such as Irukandji, will arguably have one of the greatest socio-economic impacts. Irukandji jellyfish have previously been confined to waters north of Gladstone (Fig. 1). However, *Carukia barnesi*, a species of Irukandji jellyfish, was recorded as far south as Hervey Bay (Fig. 1) in March 2007. There is major concern that these tropical jellyfish are expanding their range south towards densely populated areas of southeast Queensland (SEQ), a popular vacation destination that relies on its beaches to attract tourists. In order for Irukandji jellyfish to expand their distribution southward, the entire jellyfish lifecycle must be able to establish in more southern waters. The life history of Irukandji jellyfish includes an often-unnoticed benthic polyp stage, from which the jellyfish are produced. Irukandji (Cubozoa: Carybdeidae) polyps asexually reproduce and can bud secondary polyps. Individual polyps can then metamorphose into juvenile medusae to eventually form the adult jellyfish.



The combined effects of ocean warming and acidification were tested on the asexual reproduction of polyps of the Irukandji jellyfish *Alatina* nr *mordens* to determine whether Irukandji jellyfish polyps will be able to tolerate the future oceanic conditions predicted for SEQ. Although warmer waters enhanced asexual reproduction, acidification reduced the number of polyps produced. *A*. nr *mordens* polyps were able to tolerate both current summer and winter temperatures of SEQ suggesting that cooler winter temperatures may not inhibit the establishment of permanent populations of polyps within SEQ

Our results show that *A*.nr *mordens* polyps can survive a wide range of temperature and pH conditions. Observations that asexual budding was lower in more acidic treatments suggest that rates of asexual reproduction will likely be much slower in the future. *A*. nr *mordens* polyps are likely to tolerate future temperature and pH conditions but may not thrive in the long term. However, *A*. nr *mordens* may be able to expand southwards in the short term if acidification proceeds slowly.

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Conference

Species on the move: detection, impacts, prediction and adaptation.

Hobart, Tasmania, Australia in February 2015

Gretta Pecl – Senior Research Fellow.

The global redistribution of our planets' species is widely recognised as a fingerprint of climate change. However, the mechanisms that underpin such range shifts are poorly understood. Additionally, the pervasiveness of range shifts, from poles to the equator, and depths of oceans to tops of mountains, provides us with a unique opportunity to advance our theory of biogeography, evolutionary ecology and macroecology. Our move into the 'anthropocene' allows unprecedented opportunity to understand the mechanisms that drive species distributions across ecosystems and address the fundamental tenet of ecology: what lives where and why? However, such dramatic changes also pose significant challenges for sustainable management of our natural resources.

We see this conference targeting scientists and natural resource managers working in the disciplines of global change, biogeography and evolution. It will be relevant in the contexts of natural resource management, biodiversity management and conservation, and theoretical ecology. Species' responses to climate change is a rapidly evolving research field, however, much of our progress is being made in independent research areas: e.g. understanding the process vs responding to the implications, terrestrial vs marine ecosystems, global meta-analyses vs in depth species-specific approaches. This interdisciplinary conference is expected to develop connections between these parallel streams, and across temporal and spatial scales.

If you or your organisation/ society would like to help shape this exciting conference, please contact Dr Gretta Pecl (Gretta.Pecl@utas.edu.au) or Professor Stephen Williams (Stephen.Williams@jcu.edu.au) for more information. We would welcome suggestions for theme areas, Steering Committee members, Theme Organisers, Session Chairs and Plenary Speakers.

<www.speciesonthemove.com>

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MARINE BIODIVERSITY AND RESOURCES

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