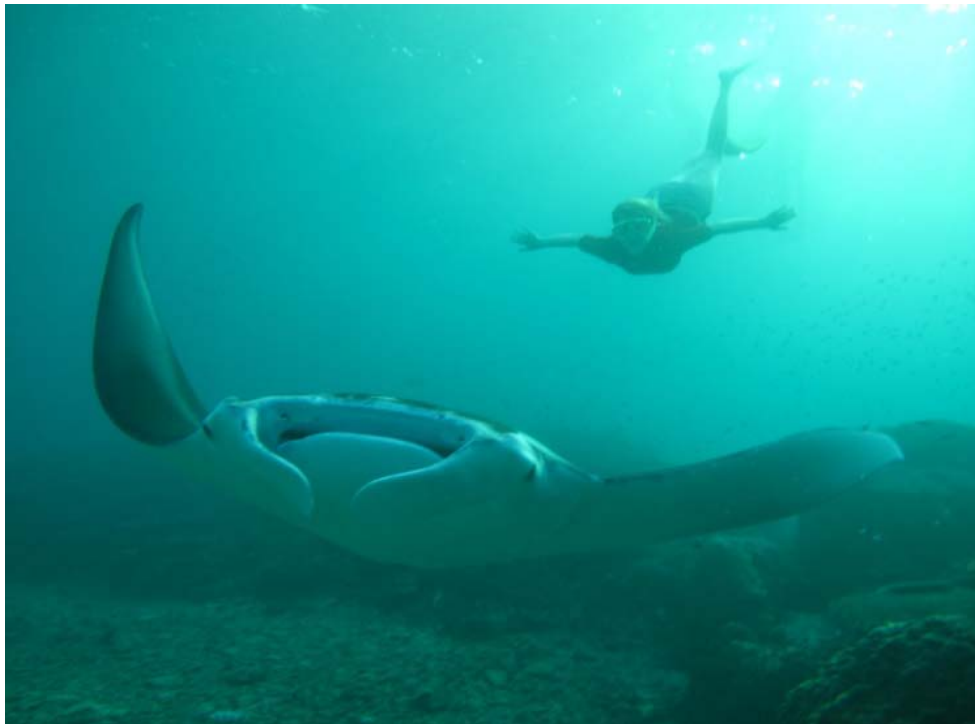
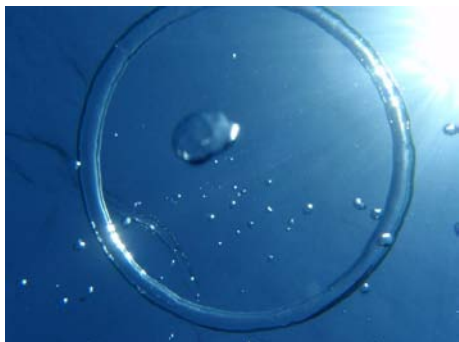


Australian Coral Reef Society



Newsletter

Number 39, December 2009

A society promoting the scientific study of Australian coral reefs.



Editorial

Dear Members,

Welcome to the 39th edition of the Australian Coral Reef Society’s annual newsletter! Another year has passed with a lot happening around research on our reefs and efforts to protect them from local and global threats.

In September the 84th ACRS conference held in Darwin saw delegates come together to discuss the latest science and management of reefs and the Coral Triangle. Participants shared some bleak truths on the fate of reefs in a changing climate mixed with inspiring stories on scientific progress being made and tips on how to best pass on findings to politicians and the wider community.

The Society has undertaken a number of projects this year. Two new books supported by ACRS are now available. The waterproof book “Coral Finder” is a great visual tool making coral ID easy. The new education resource, “Coral Reefs and Climate Change: The guide for education and awareness”, comes with an activities CD and coral health chart to allow people to better understand the current situation and get involved in coral reef conservation. The ACRS book “The Great Barrier Reef: Biology, environment, and management” has done well in its first year, with profits flowing from sales back to the Society.

Remember that we are keen to hear your ideas, opinions and stories so don’t hesitate to contact the Society if you would like to contribute to future ACRS newsletters or submissions. We hope you enjoy this newsletter prepared by your editorial team Fergus Molloy and Dave Logan.

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President's Message

This year has been an important and active one for coral reefs in Australia and worldwide. The Australian Coral Reef Society (ACRS) has played an active role in a number of areas and I would like to thank all of you who have given valuable time and energy towards the central aims of the society. These are to preserve Australian reef systems into the future, to raise awareness regarding conservation issues and to help train and educate the next generation of reef guardians.

Towards these aims, in 2008 the society published a book "The Great Barrier Reef Biology, Environment and Management" edited by Pat Hutchings, Mike Kingsford and Ove Hoegh-Guldberg (CSIRO Publishing 2008). The book has continued to sell well through 2009 with well over 1,000 copies sold and this year won the Royal Zoological Society of NSW's Whitley Certificate of Commendation for the best zoological text of 2008-9. Many congratulations to Pat Hutchings, Ove Hough-Guldberg and Mike Kingsford, along with the many contributing authors for this achievement. Profits from the sales of this book continue to flow back to the society.

The value of communication about reef biology and possible reef futures is something the ACRS has concentrated on this year and is an activity that is crucial to keep going. Most reef biologists have by now realised that it is no longer sufficient to just discover the wonderful biology within reefs. Each of us at every level needs to drive home the message that our current global carbon

emissions are likely to give Australia a future with greatly diminished reefs. The United Nations Climate Change Conference in Copenhagen ended days ago and has taken a small step in the right direction. Significantly, world leaders accepted a target of 450 parts per million (ppm) carbon dioxide (CO₂) and the likely temperature and ocean acidity rise that this will bring is, according to predictions, a future without coral reefs. We must press for emissions much closer to 350ppm, lower than our current levels, and I take this opportunity to make an urgent and strong call for ALL ACRS members to help convert the momentum started in Copenhagen to achieve this goal.

"A future without coral reefs" is often cited as an exaggeration and indeed, literally it is. As we all know there will likely be something there with some animals on it, however I am greatly concerned that we are already setting our sights too low in terms of the biodiversity loss we appear willing to accept. I hope you agree and will help to raise the bar? Australia and the ACRS have traditionally been world leaders in reef conservation and we are fortunate to be guardians of The Great Barrier Reef and other reef areas that remain in relatively good condition today. We need now to re-double our efforts while world attention is focussed on such issues and we cannot accept what Copenhagen has delivered.

My own personal response to these issues has been to co-author and guide the publication of a book "Coral Reefs and Climate Change: the guide for education and awareness", published through Coral Watch and The University of Queensland, with the help of our Vice Chancellor, Paul Greenfield. My co-authors, Craig Reid, Dave Logan and Diana Kleine are also ACRS members and we are aiming this publication and workbook at the public (particularly schools and young adults), not other scientists. A copy has been sent

to every federal and state minister in Australia and we are working hard to get this to as many schools as possible, both in Australia and worldwide. Details are available on the ACRS website and we urge you to also find ways of talking to non-scientists.

The ACRS has engaged with both federal and state politicians this year on a number of reef related issues and we are grateful once again to Pat Hutchings for keeping us up to speed through our membership with FASTS (Federation of Australian Scientific and Technological Societies). Pat hands this duty on to Frances Michaelis and AMSA this year and we look forward to working with Frances as our conduit to and from Australian government. The ACRS was represented at Science Meets Parliament, a FASTS-run event, by Charlie Veron. Charlie continues to campaign for reef systems worldwide and took the lead internationally on this with a special Coral Reef Crisis Working Group meeting at The Royal Society of London. Co-chaired by by Sir David Attenborough, the meeting was convened by The Zoological Society of London and The International Programme on the state of the Oceans and presented data and findings from hundreds of scientists. Key findings in the statement raised by this meeting were that a future with 450 ppm CO₂ would "...not prevent catastrophic loss of coral reefs..", that "...atmospheric CO₂ must be reduced significantly below 350 ppm." and effective management of other human-induced stresses on coral reefs was essential for their future.

Significantly, The Great Barrier Reef Marine Park Authority (GBRMPA) also released its "Outlook Report" this year with similar predictions and findings. This detailed document is a must-read for all ACRS members and as I suggested at the Darwin conference, try and send this report to at least one non-scientist that you know. It is particularly important to recognise that this is a

federal government organisation providing good evidence that the outlook for the GBR is in general "poor".

One of the stresses coral reefs and coastal systems need not be placed under are large scale oil spills and unfortunately Australia has produced two of these this year, one on the East coast and one in the West. ACRS wrote letters to many federal and state ministers on both occasions, urging greater care and more effective management. One such letter is featured on the ACRS website and while responses to these letters are always muted and in many ways disappointing, I would recommend all ACRS members to write to federal and state as well as local government on a more regular basis. The voice of the voter is very powerful, even if it does not result in an instant and desired reaction. Why not take the results of Copenhagen as an opportunity to contact Mr Rudd and his government and give your opinions? All ACRS councillors are happy to provide guidance with such approaches and our Vice-President, John Pandolfi has convened a special sub-committee to help in this regard.

The ACRS website, expertly mastered by Ross Hill, has continued to expand and we have taken the decision to give it a 'face lift' in 2010. As part of this, I have been asking senior reef experts such as Peter Sale and Charlie Veron to provide ideas and information for the website and we are grateful to them for this input that will be displayed and available for all to use in early 2010.

Ideas and information from ACRS was a great feature of the 2009 Darwin conference and I would like to thank all of you who came to share new results and research. There was a stunning array of great work so well done and keep it up! The conference was once again organised chiefly by Selina Ward and a great team including Anna Scott, Uli Siebeck, Ross Hill, Naomi Gardener,

Emily Howells and Barry Russell as our local representative. Many thanks for another job, well done Selina et al! As well as the next generation of reef scientists, represented by our students, I would like to thank our keynote speakers in particular for coming to share their experience and knowledge. The event was generously sponsored by The ARC Centre of Excellence for Coral Reef Studies, The University of Queensland's Centre for Marine Studies and The Faculty of Science, James Cook University, Great Barrier Reef Marine Park Authority, Woodside and the Department of the Environment, Water, Heritage and the Arts.

Congratulations to the 26 student recipients of awards to travel to the conference and also to the 3 students who received research awards this year through our Danielle Simmons, Terry Walker and ACRS funded awards, and to those who won prizes for their presentations at the annual conference including the Vicki Harriott prize. We will add another fund in 2010 from the Max Fabre Foundation and Pat Hutchings and husband Peter have been tireless in their efforts to guide the society through the necessary legal doorways to enable this to happen. This also will allow us to accept further donations in the future. Pat organised the prizes for student presentations at the conference, while councillors Zena Dinesen, Fergus Molloy, Ross Hill, Uli Siebeck, and Phil Munday judged student entries, so many thanks to them for this time consuming task.

Continuing the tradition of moving our conference around and diversifying its format, we will discuss desirable locations for the 2010 ACRS conference at the next council meeting. In 2012 The ARC Centre of Excellence in Coral Reef Studies will coordinate the International Coral Reef Symposium in Cairns and ACRS will as ever have a strong presence at this and has pledged support for Terry Hughes and team who are to be heartily congratulated on attracting this

important reef event to Australia. Although more than two years away, this is a huge undertaking and is an event that ACRS has a strong responsibility to help facilitate. Get ready to be helpful for this and for our 2011 conference which will also be a joint event, this time with sister society AMSA (Australian Marine Sciences Association). The joint AMSA/ACRS conference will be held in Perth, the site of our very successful 2007 conference and again this will require time and hard work from the ACRS membership. What an exciting mix of conferences we have ahead in the next 3 years!

The ACRS would not run without the efforts of its office bearers and the considerable time that they give to ensuring that this society, the oldest coral reef society in the world, continues. I would like to give a personal note of thanks to the treasurer Anna Scott, secretary Uli Siebeck, vice president John Pandolfi, immediate past president Selina Ward, website master Ross Hill and to Publications manager Dave Logan. Thanks also to The ARC Centre of Excellence in Coral Reef Studies and The Centre for Marine Studies at UQ for continuing to help us reduce our carbon footprint in providing video conferencing for council meetings.

Best wishes for an exciting and challenging year ahead, do all you can to reduce your carbon emissions on a personal level and encourage others to do so as well. As is evident from the current federal opposition in Australia, it is astonishing how many people still deny there is a problem that may seriously diminish reefs and all the life that they support. It is up to us to persuade them otherwise as well as showing them the stunningly beautiful life that lives there.

Justin Marshall 2009

Society News

Your ACRS council

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Minutes of the Annual General Meeting, 2009

VENUE: Surf Club, Arcadia, Townsville

DATE: Thursday, 26 May 2009

The Meeting opened 17:30

Present: Justin Marshall (chair), Selina Ward, Fergus Molloy, Naomi Gardiner, Emily Howells, Terry Done, Mike Kingsford, Betty Willis, Ashley Frisch, Annika Noreen, Laurence McCook, Johnston Davidson, Anna Scott, Barry Russell, Pat Hutchings, Justin Marshall, Zena Dinesen, Carden Wallace, Russell Kelley, David Wachenfeld, John Pandolfi, Emma Gyuris, Erin Graham, Vivian Combo, Terry Hughes.

1. Apologies

Ulrike Siebeck, Ove Hoegh-Guldberg, Len Zell, Don Kinsey

2. Minutes from previous meeting

The minutes from last meeting were accepted by David Wachenfeld, seconded by Laurence McCook.



3. Business arising from minutes

Nil

4. Correspondence

Nil

5. President's report

Please see page 3

6. Treasurer's Report

Anna Scott presented the annual treasury report and the report from the auditor. There was less income than last year as we did not run a conference last year but paid out international travel awards instead. The auditors were pleased with the audit and had no major problems. The motion to approve the report was put by Mike Kingsford and seconded by Pat Hutchings.

Justin Marshall nominated Wybenga & Co as auditors for next year. Motion was seconded by Emma Gyuris. The members present at the meeting would like to thank Ross Hill and Anna for preparing these statements for the annual audit report.

7. Election of new council

The presidential period is for two years so Justin Marshall was elected unopposed for the second year of his presidency. John Pandolfi was elected Vice president following the resignation of Malcolm McCulloch. Uli Siebeck was re-elected secretary and Anna Scott re-elected treasurer. Selina Ward is immediate Past President.

All nominations for council and office bearers were accepted by the membership.

8. Other business

[Registration of ACRS as an Environmental Organisation](#)

Pat Hutchings explained that Max Faber and other potential donors need to be able to have their gifts to ACRS tax deductible. The ATO has ruled that in order for such gifts to be tax deductible, ACRS needs to be reclassified as an Environmental Organisation. ACRS will need to set up a new bank account for receiving gifts and a Public Fund management Committee. The constitution has to be changed to accommodate these changes a law firm has been employed over the last few months to draft these changes. See attached file with changes to the constitution. The motion to change ACRS status to Environmental Organisation which then allows us to apply to the ATO for the Commonwealth Tax Deductibility Scheme for Environmental Organisations was put by Pat Hutchings and seconded by Laurence McCook. There was a vote and the motion was carried unanimously.

From here the application forms need to be submitted with the accompanying paperwork to the Department of Environment, Water, Heritage and the Arts. This can take many months to be processed.

Underwater Coral ID book

Russel Kelley (author) reported on progress of this book to which ACRS donated money last year. The publication was ready last year but needed an implementation strategy. The Packard Foundation notionally approved this strategy last August and signed off last week. There will be workshops held in Fiji in January 2010. Audio visual resources will be developed then so that expert help will not be required. There will also be a 'groove finder' prepared which will be a training tool to determine that people are looking at hard corals. This will look at major benthic groups. The book has a home and a purpose and will

be launched in September during the ACRS conference in Darwin.

Press releases

Justin Marshall said that ACRS should be more vocal about coral reef threats and issues. Can council reliably represent the views of the membership? Ask that the meeting approve this representation. Johnston Davidson suggested that we have a set of (borrowed) position statements that express our views on various issues – science based rather than political.

It was suggested that all statements and press releases get signed off by 50% of councillors to have approval. The hope is that we can make this a quick process so that we don't lose the opportunity on particular issues.

Non council members are always welcome to suggest ideas and press release topics. Russell Kelley expressed concern over poor quality press releases being generated. The plan is to use UQ and JCU press offices to assist in press release production. It was suggested that for approval, the majority of councillors must vote and at least 5 must say yes (or at least a majority if there are more than 10 councillors responding). Proposed Pat Hutchings, seconded Naomi Gardiner.

The meeting was closed at 7.00pm



ACRS Student Awards

Student Research Awards for 2010 & 2011

The ACRS supports the research of up to four students each year by the provision of Student Grants. The best proposals received are awarded the Terry Walker Prize of \$2500 or the Danielle Simmons Prize of \$2500. Research Grants for 2010 have already closed. The **closing date** for research grants applications **for 2011** will be **Friday, 10th Dec 2010**.

Given Terry Walker's commitment to field studies on Australian coral reefs and cays, this award is to be spent primarily on field studies on Australian coral reefs. Given Danielle Simmons commitment to field work at Heron Island, successful applicants for this award will need to spend some time at Heron Island working in the field.

The other research grants (up to two) of \$2000 are to be used for laboratory and/or field studies relevant to Australian coral reefs. Any student who is currently enrolled at an Australian university and working towards a PhD or MSc on a topic involving research on Australian coral reefs is eligible to apply. Awards may not be used to fund conference attendance, or travel not related to field studies.

Applicants must be a financial member of the society for the year in which the grant is to be awarded before applying for these awards.

Applications must be sent electronically and consist of one single document. The application itself must not exceed four pages in total including budget and short summary CV.

In addition, letters of support from the supervisor and institution and evidence of membership status must be provided and included within the single electronic document. Therefore applicants must arrange access to a scanner if required in advance of the closing date for applications.

Applications must include the following information:

1. Name, address, date of birth and tertiary qualifications.
2. Name of institution, department and supervisor with email contact details.
3. Project title and degree for which enrolled.
4. Brief description of the project, stating: aims and justification, methods, including project design, progress made to date, and expected year of completion and year in which enrolled.
5. An indication of how the award would be spent including a short but explicit budget.
6. Details of all other sources of funding for the project.
7. A signed statement by the supervisor and a representative of the university, verifying that the project has been represented accurately and that the Institution is prepared to administer the award.
8. Students should indicate whether they wish to be considered for the Terry Walker and/or the Danielle Simmons award, bearing in mind the requirements for these awards, extensive field work and working at Heron Island at least for part of the project respectively.
9. A copy of your ACRS membership receipt (or application for membership/renewal) for the membership year in which the grant is to be awarded.

Proposals will be judged on:

- Scientific merit of proposed research
- Relevance of topic to current Australian coral reef research
- Design of project and progress to date
- Project scope, given the degree to be awarded and applicable resources
- Proposal presentation
- Track and research record of the student (e.g. publications, talks, prizes).

Successful applicants are required to prepare a one-page report for publication in the Society's newsletter at the end of the one-year grant period, and provide a summary of how the research grant was spent.

To apply, please email your completed application to:

Dr Pat Hutchings

pat.hutchings@austmus.gov.au

Research Grants for 2010 have already closed.

The **closing date** for research grants applications for 2011 will be **Friday, 10th Dec 2010**. The successful applicant will be notified by late January/early February 2011.

Applications received after the closing will not be considered, and they must be complete (i.e. CV, letter of support of supervisor and willingness of University to administer the grant and evidence of current membership status attached) and be provided with a single electronic document.

ACRS Student Award Recipients for 2009

The following students were awarded research grants for the year 2009. Stay tuned for next year's newsletter to find out the outcomes of this research.

Terry Walker Award \$2500

Rebecca Fox - Marine Biology , James Cook University

For her research into "Ecosystem function of rabbitfishes (*Perciformes: Siganidae*) on the Great Barrier Reef (GBR)"

Danielle Simmons Award \$2500

Rebecca Lawton - Marine Biology, James Cook University

For her investigation "Does ecological specialization in coral-dependent butterfly fishes affect susceptibility to climate change?"

Australian Coral Reef Society Fellowship \$2000

Jennifer Donelson - Marine Biology , James Cook University

For her work on "Climate change and the future for coral reef fishes: impacts and adaptation"



Reports from ACRS Student Award Recipients for 2008

As a condition of the ACRS student Awards, recipients submit a report of their work. Reports received for the awards granted in 2008 have been included in full at the end of this Newsletter. These reports reflect the high quality of work to be found within the student membership of ACRS. They are an encouraging reminder of the importance of supporting student development through research and travel awards.

Conference Reports

Darwin '09

The 84th annual ACRS conference was held in Darwin for the first time in September this year. Over 90 papers were presented around the theme “Reefs of the Indopacific: Hopes for the future and lessons from the past”. A shared plenary day also provided an opportunity for participants to join in the Darwin 200 Symposium, a cluster of conferences celebrating the 200th anniversary of the birth of Charles Darwin.



The first day of the ACRS conference saw an array of excellent presentations, with keynote speakers Russell Reichelt, (GBRMPA) and Ray Berkelmans, (AIMS) providing sobering accounts of the outlook for the Great Barrier Reef and Phillip Munday, (James Cook University) revealing some of the dangers of ocean acidification for reef inhabitants. Nick Heath (WWF) provided some tips on how to best communicate our concerns to politicians, which is increasingly important to achieve to influence the global negotiations on climate change.



Poster presentations in the afternoon were complimented by drinks and canapés on Saturday evening.



The second day included a host of excellent talks including two inspiring sessions about science & capacity-building in the Coral Triangle. The primary aim of these sessions was to share experiences on coral reef science projects that have delivered effective science and local capacity-building within the Coral Triangle region and northern Australia, with a view to identifying ‘best practice’ approaches.



The conference finished with a dinner and awards night held at the Darwin Sailing Club on Sunday night. Delegates took advantage of the buses

provided and shared a drink or two to celebrate another successful event. Prizes were given to students for best oral and poster presentations, including the Vicki Harriott award of \$500, bench fees at four marine research stations, and a number of other generous awards.



The conference was followed by the ARC Centre of Excellence for Coral Reef Studies mentoring day, providing workshops and seminars in general interest areas such as finishing the thesis, publishing, writing literature reviews, writing research proposals and career structuring.

Every effort was made to reduce the carbon footprint of the ACRS conference, hosted in a Green Globe certified hotel with programs printed on recycled stock provided in a reusable 'shopping bag' and our remaining emissions offset. It is important for us as a society to 'walk the walk', with all we know about the impact we are having on reefs and the planet, in the hope that others will follow the examples we set.

Thanks to conference goers and organisers

Many thanks to all of you who participated in the ACRS 2009 conference in Darwin. It was fantastic to see the work and research areas and the clear passion and feeling for the reef.

Selina Ward again deserves a medal for for all her hard work and her excellent organization of this event – many many thanks Selina.



She was very ably supported and helped by Uli, Anna, Ross, Naomi, Emily, Fergus and Chico at various stages and Barry who organized the local coordination in Darwin. Many thanks guys – great job!

Zena also did a great job of coordination of the student awards and thanks to all the judges and assessors.

Justin Marshall

Student Awards at the 2009 Annual Scientific Conference

The annual ACRS scientific conference always provides a great opportunity for postgraduate students to showcase their research and hone their presentation skills. This year's conference in Darwin was no exception. There were numerous high quality student presentations, and students whose first language is not English are specially commended for the high standard of their presentations.

A panel of judges assessed presentations according to an agreed set of criteria, with at least two judges allocated per student paper. The panel consisted of Zena Dinesen, Fergus Molloy, Ross Hill, Uli Siebeck, and Phil Munday. This year there were no posters entered by student members, so no awards were given in this category.

The most prestigious student award is the Vicki Harriott Memorial Student Prize. This prize was established by the ACRS Council in 2005 in memory of the late Vicki Harriott, in recognition of Vicki's great contributions towards coral reef research and marine science education. Further information about Vicki Harriott and how to make a donation to the memorial prize fund (all contributions welcome!) is available on the ACRS website at

www.australiancoralreefsociety.org/vicki_harriot.htm

The Vicki Harriott Memorial Student Prize for 2009 (a cheque for \$500.00) for the best student presentation was awarded to Emily Howells, of James Cook University (JCU). This was for the research presented in the paper by Howells *et al.* entitled 'Population dynamics of *Symbiodinium* and the resilience of coral symbioses on the Great Barrier Reef'. Well done Emily!



The second prize was a trip for two people on a Quicksilver outer barrier reef cruise (valued at \$394.00). This was awarded to Rebecca Fox, also of James Cook University, for her presentation of Fox *et al.* 'Assessing functional roles on coral reefs: surprise variation in the ecosystem function of con-generic coral reef herbivores (*Siganidae*, *Siganus*)'.



There were also four prizes involving 4-7 days' bench fees at the various Great Barrier Reef research stations. These were awarded to Conor Champ, University of Queensland (Lizard Island RS); Yui Sato, JCU (One Tree Island RS); Andrew Hoey, JCU (Heron Island RS); and Laura Wicks, Victoria University of Wellington (Orpheus Island RS).

A copy of the book 'The Great Barrier Reef – Biology, Environment and Management' edited by Pat Hutchings, Mike Kingsford and Ove Hoegh-Guldberg and published by the CSIRO, was awarded to Colin Wen of JCU for his presentation on recruitment hot spots of large predatory reef fish.

Congratulations to these prize winners, and thanks to all the students for their high quality and interesting presentations. The ACRS Council is very grateful to Quicksilver, the Research Stations and CSIRO for generously donating these prizes. Thanks also to Pat Hutchings for liaising with these institutions and arranging for the donations of prizes.

Zena Dinesen

Student Travel Awards

The ACRS continues its strong commitment to student members. The society awarded travel grants between \$350 and \$940 to 26 students (as listed below), assisting with travel to the Darwin conference.

Dorothea Bender - UQ

Thomas Bridge - JCU

Vivian Cumbo - JCU

Jennifer Donelson - JCU

Christopher Doropoulos - UQ

Rebecca Fox - JCU

Naomi Gardiner - JCU

Christopher Goatley - JCU

Andrew Hoey - JCU

Emily Howells - JCU

Isobel Jimenez-Dennis - UTS

Narinratana Kongjandtre - UQ

Carine Lefèvre - JCU

Kimberley Lema - JCU

Raechel Littman - JCU

Adrian Lutz - AIMS

Caroline Palmer - JCU

Frederic Joseph Pollock - USA

Jean-Baptiste RAINA - JCU

Yui Sato - JCU

Francoise Seneca - JCU /AIMS

Claire Smallwood - Murdoch

Jessica Stella - JCU

Joost van Dam - UQ

Annamieke Van Den Heuvel - UQ

Patricia Warner - JCU

Upcoming Conferences

There is an exciting mix of ACRS conferences coming up over the next 3 years across Australia.

2010 **ACRS conference**

The location for the 2010 ACRS conference will be decided early in the New Year, continuing the tradition of moving the conference around and diversifying its format.

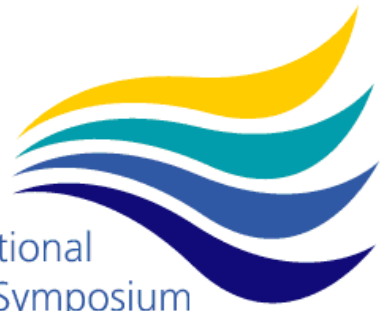
2011 **AMSA / ACRS in Perth**

Our 2011 conference will be a joint event with sister society AMSA (Australian Marine Sciences Association). The joint AMSA/ACRS conference will be held in Perth, the site of the very successful 2007 conference.

2012 **ICRS in Cairns**

In 2012 The ARC Centre of Excellence in Coral Reef Studies will coordinate the International Coral Reef Symposium in Cairns. ACRS has pledged support for Terry Hughes and team who are to be congratulated on attracting this important reef event to Australia. Although more than two years away, this is a huge undertaking and is an event that ACRS has a strong responsibility to help facilitate.

Please consider contributing your time and enthusiasm to the upcoming conferences.



12th International Coral Reef Symposium

9-13 July 2012 • Cairns • Queensland • Australia

www.icrs2012.com

First Announcement

James Cook University and the Australian Research Council (ARC) Centre of Excellence for Coral Reef Studies warmly welcome you to Cairns, Australia for the 12th International Coral Reef Symposium (ICRS) from 9 - 13 July 2012.

Held every four years, the ICRS is the world's largest and most important coral reef meeting bringing together coral reef scientists, graduate students, resource managers, and policy makers. ICRS 2012 is expected to attract more than 2,000 delegates from 80 countries.

Over 2,000 talks and posters will be presented on major themes including Climate Change, Reef Ecology, Conservation Planning, Fish and Fisheries, Genomics, Management Tools, The Coral Triangle Initiative, and the Human Dimension of Coral Reefs. Proposals for mini-symposia will be solicited in early 2010 and abstract submission will be from mid-2010.

Activities at ICRS 2012 will include a comprehensive program to showcase the latest coral reef science, a trade exhibition, and field trips to the World Heritage listed Great Barrier Reef. Exciting and culturally significant Australian social events are planned.



Venue

[Cairns](#) is a cosmopolitan city and a premier destination for visiting the spectacular Great Barrier Reef and Australia's tropical rainforests.

The award winning [Cairns Convention Centre](#), renowned for its unique environmental design, is only ten minutes from the Cairns International Airport and within easy walking distance of an extensive choice of suitable accommodation, cafes, bars and restaurants.

Field Trips

The Symposium's tradition of conducting scientific field trips before and after the event will continue in 2012 with trips to the Great Barrier Reef:

- [Heron Island Research Station](#),
- [Lizard Island Research Station](#), and
- [Orpheus Island Research Station](#).

For further information about attending or sponsorship opportunities, visit us at www.icrs2012.com or e-mail sponsorship@icrs2012.com.



ACRS Membership

This Newsletter has a membership application/renewal form attached. Please note that the society now offers both Individual and Corporate memberships. An important incentive is a \$10 reduction for all applications/renewals made before February 26 – think of it as a gift from the ACRS to thank you for your support, and to complement your New Year resolution to get active about contributing to Society issues. So, if you haven't already renewed your membership, tear out the attached form, fill it in and send it to:

ACRS Memberships
c/- Centre for Marine Studies
Seddon Building,
University Of Queensland
St Lucia QLD 4072

Don't forget to make a copy and give it to your friends and colleagues.



ACRS comments on environmental management plans

The Society makes submissions from time to time on government plans relating to coral reef management. This is an important role for ACRS,

which has some very knowledgeable and experienced members.

Take a look at the [ACRS comment on recent oil spills in the vicinity of Australian coral reefs and coastline](#)

All ACRS members are encouraged to write to federal and state as well as local government on a more regular basis. The voice of the voter is very powerful, even if it does not result in an instant and desired reaction.

All ACRS councillors are happy to provide guidance with such approaches and our Vice-President, John Pandolfi has convened a special sub-committee to help in this regard.

Email: j.pandolfi@uq.edu.au

How to get involved and add your expertise to the Society's pool of knowledge:

1. Keep a watch for submissions and opportunities to comment.
2. Send comments to coordinator by email and indicate clearly whether comments are for publication or to raise a query.

The more input we receive the more effective and scientifically sound will be our contribution.

The ACRS website and email list

www.australiancoralreefsociety.org

The ACRS website is the global doorway to your Society. The website contains the latest information on student grants, workshops and conferences, plus Councillor contact details. As submissions are lodged, they too are posted on the website.

The website also contains details on how to subscribe to the ACRS List (in case you are not

already on it) and more importantly, a membership form so you can renew your membership and encourage your colleagues to join.

The website will also act as a repository for documents and conference material. There are also links to other reef-related sites.

The Email List provides a discussion forum for current issues in coral reef science, and is also the main method by which the ACRS distributes information to its membership. The email list is open to all members and new members will automatically be added to the list once their membership has been approved. Alternatively, the ACRS website contains a link that allows members to subscribe to the email list themselves.

Announcement of advertising

The Australian Coral Reef Society is currently updating its website (www.australiancoralreefsociety.org) and aims to include advertising banners on some of its pages. The money raised by these advertisements will be used for supporting student travel costs to attend conferences, student awards, to subsidise ACRS conference costs and to help cover newsletter production costs. We hope to attract advertisements from universities, government agencies, private businesses and other organisations that have an interest in coral reef ecosystems.

The website is currently receiving approximately 600 visits per month. The advertisements will be a long rectangle displayed along the bottom of one of the pages on the ACRS website. A banner will cost \$200 and will appear on the website for 1 year.

The advertisement will need to be appropriate for posting on the website and will need to be approved by the ACRS Council before it appears on the website.

For further information regarding advertisements on the ACRS website please contact

Ross Hill (Ross.Hill@uts.edu.au).

The ACRS annual newsletter will also be available for posting advertisements. Again, we wish to attract universities, government agencies, private businesses and other organisations that have an interest in coral reef ecosystems. All money raised will be used for supporting student travel costs to attend conferences, student awards, to subsidise ACRS conference costs and to help cover newsletter production costs.

Advertisements can be of several sizes, each with their respective cost:

- One page advertisement: \$250
- Half page advertisement: \$150
- Quarter page advertisement: \$100





Australian Coral Reef Society Inc.

A society promoting scientific study of Australian Coral Reefs

Address: ACRS Memberships
c/- Centre for Marine Studies
The University of Queensland
St Lucia QLD 4072

Tel: (07) 3365 3307
Fax: (07) 3365 4755
Email: acrs@cms.uq.edu.au

APPLICATION FOR MEMBERSHIP

I,.....(Title, first name and surname)

hereby apply for membership of the Australian Coral Reef Society Inc.

Mailing address:.....

.....Postcode:.....

Email:.....Phone:.....

Research/professional/other interests in coral reefs:.....

.....

Institution/Organisation and Branch/Department (if any):.....

.....

Signature of Applicant:.....Date:.....

For New Members Only

*Proposed by:..... *Seconded by:.....

Signature:.....

* both being members of ACRS Inc. who, to the best of their knowledge, verify that the applicant is eligible for membership under the ACRS Constitution. In the case of those applying for student membership, this would include their full-time status. NB: Applications are considered by the ACRS Council (minimum of three meetings/annum) and applicants are notified of its decision in writing.

I would like to pay \$..... to The Australian Coral Reef Society Inc for the following membership fees (please tick as appropriate): Full (\$50.00) Student (Full-time) (\$30.00)

Note: There is a \$10.⁰⁰ discount on the above prices for applications received between 1st January and 28th February each year. Memberships are valid until the end of the calendar year.

New Option: 5 year full membership Full (\$200)

I would like to receive the annual newsletter in PDF format Hard copy

Payment Options

Internet payment: *Preferred Option*

Account name: Australian Coral Reef Society Inc. BSB: 034-212. Account number: 16-1127.

Please enclose transaction receipt with application and send to treasurer for processing

Cheque or money order option: Please enclose a cheque/money order with application and send to treasurer for processing

Credit card authority: Please charge \$..... to the following card: MasterCard Visa

Card Number: _____ Valid to: ___/___/___

Name on the card:.....

Signature:.....

President: Prof Justin Marshall; T: (07) 3365 1397; F: (07) 3365 4522; E: justin.marshall@uq.edu.au
Hon Secretary: Dr Ulrike Siebeck; T: (07) 3365 4070; F: (07) 3365 4522; E: u.siebeck@uq.edu.au
Hon Treasurer: Dr Anna Scott; T: 0421 181 484; F: (02) 6651 6580; E: ascott@nmsc.edu.au



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Address: ACRS Memberships
c/- Centre for Marine Studies
The University of Queensland
St Lucia QLD 4072

Tel: (07) 3365 3307
Fax: (07) 3365 4755
Email: acrs@cms.uq.edu.au

CORPORATE MEMBERSHIP APPLICATION

The Organisation,.....

ABN:.....wishes to apply for corporate membership of the Australian Coral Reef Society Inc.

Postal address:.....

.....Postcode:.....

Email:.....Phone:.....

Web address:.....Fax:.....

Describe the major activity of your organisation:.....

.....Total number of employees (incl. Executives):.....

Authorisation: *On behalf of the above organisation, I authorise this corporate membership application for the Australian Coral Reef Society Inc.*

Name:.....Position:.....

Date:.....Signature:.....

Please note: Applications are considered by the ACRS Council (minimum of three meetings/annum) and applicants are notified of its decision in writing.

Members Names: Please identify three people to whom correspondence from the ACRS should be sent:

Name:.....Email:.....

Name:.....Email:.....

Name:.....Email:.....

Yearly Membership Options: Non-Profit Organisations (\$250) Other Organisations (\$500)

I would like to pay \$..... to The Australian Coral Reef Society Inc. for a 1 year calendar membership.

I would like to receive the annual newsletter in PDF format Hard copy

Payment Options

Electronic Funds Transfer: *Preferred Option*

Account name: Australian Coral Reef Society Inc. BSB: 034-212. Account number: 16-1127.

Please enclose transaction receipt with application and send to Treasurer for processing

Cheque or money order option: Please enclose a cheque/money order with application and send to Treasurer for processing

Credit card authority: Please charge \$..... to the following card: MasterCard Visa

Card Number: _____ Valid to: ___/___/___

Name on the card:.....

Signature:.....

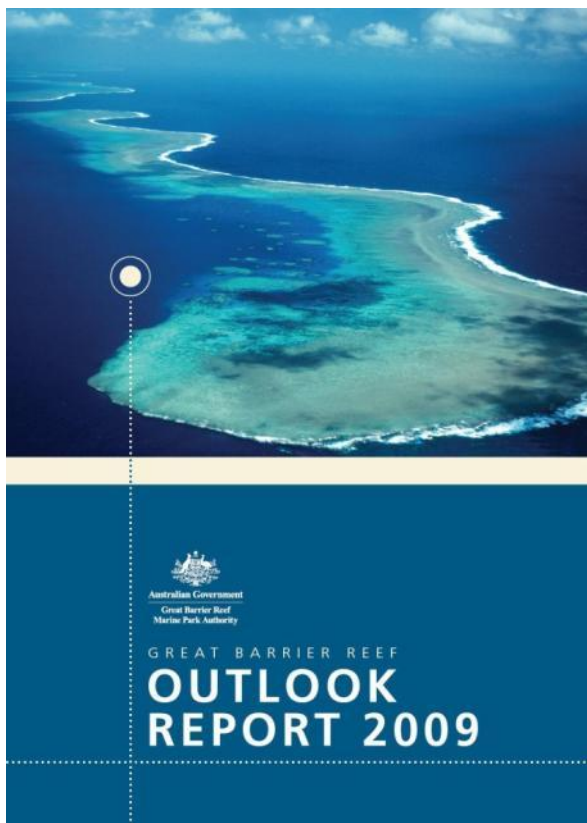
President: Prof Justin Marshall; T: (07) 3365 1397; F: (07) 3365 4522; E: justin.marshall@uq.edu.au

Hon Secretary: Dr Ulrike Siebeck; T: (07) 3365 4070; F: (07) 3365 4522; E: u.siebeck@uq.edu.au

Hon Treasurer: Dr Anna Scott; T: 0421 181 484; F: (02) 6651 6580; E: ascott@nmsc.edu.au

Science, Conservation and Management News

The Great Barrier Reef Outlook Report 2009



The much anticipated Great Barrier Reef Outlook Report 2009 was recently released by Federal Environment Minister Peter Garrett providing the first comprehensive assessment of the health of

the Great Barrier Reef and its outlook for the future.

"The Outlook Report identifies that overall the reef remains one of the world's healthiest coral reef ecosystems, but that significant challenges need to be met to ensure this remains the case," Minister Garrett said.

"Comprehensive, effective and immediate action on climate change is critical. So too is action to help the reef withstand the impacts of the already changing climate."

The Outlook Report was prepared by the Great Barrier Reef Marine Park Authority (GBRMPA) based on the best available information. The Report identifies climate change, catchment runoff, loss of coastal habitats and a small number of fisheries impacts as key challenges facing the Reef.

President of the Australian Coral Reef Society Justin Marshall called the report a "must read" for coral reef scientists.

"This is a sobering document based on the latest data and represents a very important moment for the Great Barrier Reef," Justin said.

"As it states, we are at a crossroads and it is up to us to decide the direction to go in."

The Outlook Report was welcomed by industry groups such as Queensland Tourism Industry Council (QTIC) as a valuable assessment of the state of the Reef. QTIC CEO Daniel Gschwind described the Outlook Report as a comprehensive document which outlines the ecological health of the Reef, its uses and future opportunities and threats.

"Clearly there are climate change and land use challenges facing the Great Barrier Reef however I would like to assure all Australians that Queensland's tourism industry is committed to

doing its part to ensuring a sustainable future for the Reef," Daniel said.

Canegrowers CEO Ian Ballantyne said the Great Barrier Reef Outlook Report 2009 appeared balanced and based on science.

"The report recognises that continuing changes occurring in agricultural practices have a long lag time before water quality impact can be assessed. It also recognises that the Great Barrier Reef continues to be one of the healthiest coral reef ecosystems but will need to be well managed and protected."

Ian said that Canegrowers had long supported the need for a healthy Reef and that it was agriculture's aim to operate sustainably by adopting improved technology and systems.

GRBMPA Chairman, Russell Reichelt, said it would require a coordinated approach from government, industry and communities to improve the health and resilience of the Reef.

"We've developed some great partnerships with key stakeholders in the Reef's future."

"These collaborations will improve our ability to effectively manage the Great Barrier Reef, an icon for which protection is ultimately the responsibility of every Australian."

Minister Garrett and Queensland Climate Change and Sustainability Minister Kate Jones released a joint response to the Outlook Report, outlining a cooperative, re-energised, and whole-of-ecosystem approach to protecting the Reef.

The Outlook Report is available online at www.gbrmpa.gov.au



The Coral Reef Crisis

In July 2009 there was a special Coral Reef Crisis Working Group meeting at The Royal Society, one of the world's most respected and long established scientific societies, and co-chaired by Sir David Attenborough, the face and voice of the natural world for many of us.

The meeting was convened by the Zoological Society of London and The International Programme on the State of the Oceans. The many participating specialists included Professor Charlie Veron – the world's leading authority on coral reefs. The working group reviewed data and research from hundreds of scientists to produce the resultant statement.

The take home message is that the current world leader's target of 450ppm CO₂ will present a future with no reefs. We must aim below 350ppm. This is achievable. Restoring our planet to health will be a major undertaking, but we have no option. Children alive today will look back in wonderment at our success, or curse us for lack of it.

The Coral Reef Crisis: scientific justification for critical CO₂ threshold levels of < 350ppm

Output of the technical working group meeting. The Royal Society, London, 6th July 2009

On the 6th July, 2009, the Royal Society, the Zoological Society of London and the International Programme on the State of the Ocean facilitated a Coral Reef Crisis meeting to identify key thresholds of atmospheric carbon dioxide needed for coral reefs to remain viable. The following statement summarises the conclusions of the meeting's technical working group:

- 1. Coral reefs are the most biologically diverse habitats of the oceans and provide essential ecosystem goods and services to hundreds of millions of people.*
- 2. Temperature-induced mass coral bleaching causing widespread mortality on the Great Barrier Reef and many other reefs of the world started when atmospheric CO₂ exceeded 320ppm.*
- 3. At today's level of 387ppm CO₂, reefs are seriously declining and time-lagged effects will result in their continued demise with parallel impacts on other marine and coastal ecosystems.*
- 4. Proposals to limit CO₂ levels to 450ppm will not prevent the catastrophic loss of coral reefs from the combined effects of climate change and ocean acidification.*
- 5. To ensure the long-term viability of coral reefs the atmospheric CO₂ level must be reduced significantly below 350ppm.*

6. In addition to major reductions in CO₂ emissions, achieving this safe level will require the active removal of CO₂ from the atmosphere.

7. Given the above, ecosystem-based management of other direct human-induced stresses on coral reefs, such as over-fishing, destructive fishing, coastal pollution and sedimentation, will be essential for the survival of coral reefs on which we are all dependent.

New Underwater Coral Finder

A new exciting tool is available in January 2010 (at a 5% discount for ACRS members) to help anyone identify corals.

The Coral Finder is the missing link in the coral identification learning process. It puts reliable genus level coral identification within the reach of students, divers, scientists and resource managers. It can be used above or below the water anywhere in the Indo Pacific.

This visual summary of Corals of the World, backed by a website, captures the 65 most common coral genera regardless of shape and form expressed by over 500 species.

This robust plastic book can be used underwater and will give you the Genus name within one minute based on visual clues.

Russel Kelley (author) is being supported by the Packard Foundation to run workshops using the Coral Finder in Fiji in January 2010.

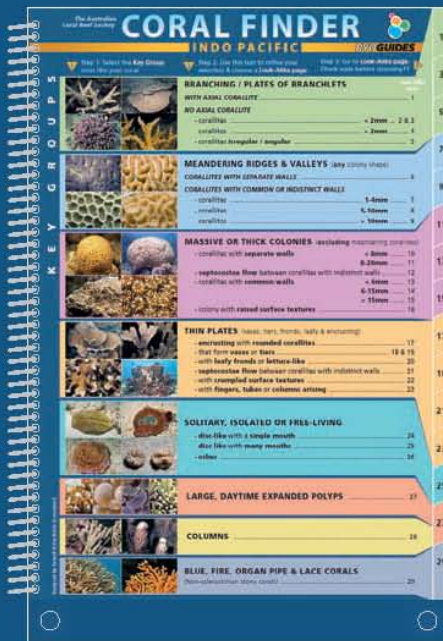
You can order your copy at coralfinder@gmail.com.

Normal retail cost is \$79.95 plus postage (5% discount for ACRS members)

The CORAL FINDER is the missing link in the coral identification learning process. It puts reliable genus level coral identification within the reach of students, divers, scientists and resource managers. It can be used above or below the water anywhere in the Indo Pacific.

The CORAL FINDER

- is a robust plastic book that can be used underwater
- is easy-to-use and requires no specialized knowledge
- allows you to find the answer visually using shape and texture - and requires little reference to text
- gives you the name of the coral genus in about a minute - regardless of growth form
- is backed by a website with in-depth learning resources



The CORAL FINDER

- is a visual summary of Corals of the World - it captures the 65 most common coral genera regardless of shape and form expressed by over 500 species
- has concise supporting text with tips and arrows - similar to a bird guide
- cross-references back into the formal taxonomy for post dive learning
- improves reliability of coral surveys and opens the door to species identification



What you see
is what you look for



MEANDERING RIDGES & VALLEYS (any colony shape)

CORALLITES WITH SEPARATE WALLS	6
CORALLITES WITH COMMON OR INDISTINCT WALLS	
- corallites	1-4mm 7
- corallites	5-10mm 8
- corallites	> 10mm 9



- 1 Choose a key group
... meandering ✓
- 2 Choose a look-a-like page
... fused walls, corallites >10 mm ✓
- 3 Choose a genus
... *Symphyllia* ✓

What coral is this?



34 pages of practical underwater goodness!

Order from coralfinder@gmail.com

Available January 11, 2010
AU \$ 79.95 plus Postage
5% discount
to ACRS members

New book aims to help public protect reefs for future generations

A new book which demystifies the science surrounding coral reefs and climate change, is now available.

The lavishly illustrated soft cover **“Coral Reefs and Climate Change: the guide for education and awareness”** has been published by CoralWatch at UQ and supported by The University of Queensland.

Co-authors are educator Craig Reid, Professor Justin Marshall and designer Diana Kleine of UQ, and environmental education officer Dave Logan.

The book is designed as a resource for those many people currently confused by conflicting statements about climate change and how this might impact on areas such as the Great Barrier Reef.

“There's been a big swing back towards climate change sceptics, and we wondered why that was,” Prof Justin Marshall said.

“One of the main reasons appears to be that a lot of people don't understand the complex scientific arguments put forward. They do not know who to believe.

“In effect, this book helps convey the messages from the Great Barrier Reef Outlook report, data from the Australian Institute of Marine Science and the International Panel on Climate Change for anyone to read.

“It uses language and a set of conceptual diagrams that are understandable from the upper end of primary school on. It provides grim predictions about the future, but also shows what actions people can take now to effect change.”

The book is aimed at anyone wishing to explore the natural wonder and beauty of coral reefs and understand the forces that help to create and destroy them.

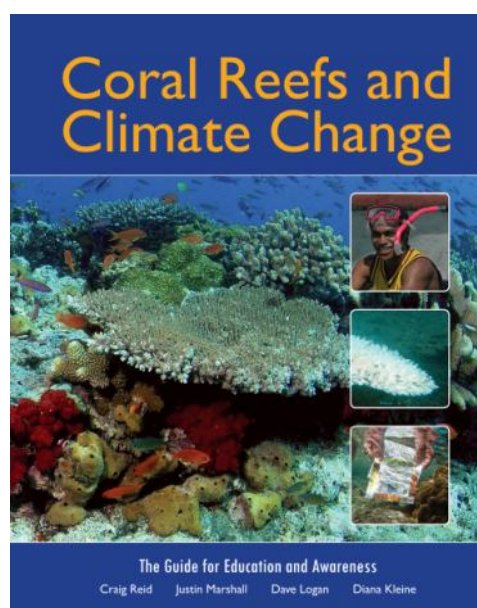
“Reefs are already beyond 40 percent lost or unrecognisable and are disappearing five times faster than rainforests,”.

“Our current aim for carbon emission reduction, with 450 parts per million CO₂ in the atmosphere, is a future with no reefs. The best science published in late 2009 tells us that 350ppm CO₂ must be our upper limit.”

Professor Marshall said the Native American proverb saying that “We do not inherit our environment from our ancestors but borrow it from our children's” was nowhere more pertinent than our coral reefs.

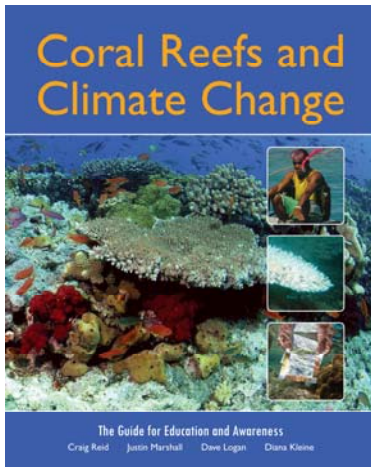
The 256-page book is aimed at providing solutions and practical exercises that people can approach, and includes a CD with a workbook for teachers, classrooms and anyone interested in learning more through activities.

The book is available for \$45 plus GST and will be for sale through CoralWatch www.coralwatch.org or CSIRO or email: info@coralwatch.org.



Coral Reefs and Climate Change

THE GUIDE FOR EDUCATION AND AWARENESS



This comprehensive guide is a unique collaboration between educators and researchers. It explains the science, the issues and the remedies to a global problem and provides tools for understanding the complex dynamics that shape our living reefs.

INCLUDES ACTIVITY CD

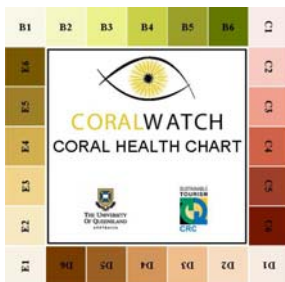
A broad set of both field activities and guided research projects that are targeted to anyone interested in taking a closer look at coral reefs.



AND CORAL HEALTH CHART

The Coral Health Chart is a flexible tool that allows you to contribute to a global reef database by monitoring coral health in the field or classroom through simply comparing the colour of a coral with the colours on the chart and recording the matching codes.

Act Now for our future



BOOK INFORMATION

Craig Reid, Justin Marshall,
Dave Logan and Diana Kleine
Published by CoralWatch,
The University of Queensland,
Australia
256 pages, PB
Colourfully illustrated
ISBN: 978-0-646-52360-6
\$45.00 (plus \$4.50 GST)



Please note: This page acts as a **TAX INVOICE** upon receipt of payment. ABN: 639 429 126 84
Multiple copies will vary the postage cost.

Please send me _____ copies of:
Coral Reefs and Climate Change AU\$45.00 (plus \$4.50 GST)

Subtotal \$ _____
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TOTAL \$ _____

Name _____
Organisation _____
Address _____
Postcode _____
Tel _____
Fax _____
Email _____

Prices are in Australian dollars and are subject to change without notice.

My cheque/money order for \$ _____

Payable to CoralWatch is enclosed,

or charge my Mastercard Visa

Name on card _____

Card no. _____

Expiry date _____ / _____ Ver. Code _____

Signature _____

Phone # _____

When complete, please return to:
CoralWatch, School of Biomedical Sciences
University of Queensland
St Lucia, QLD 4072, Australia
Phone +61 (07) 3365 3127 Fax +61 (07) 3365 4522
Email: info@coralwatch.org Web: www.coralwatch.org

New coral health database sheds light on key sites.

Reef Check Australia

With the click of a button, people from around the world can now get up-to-date information on the health of parts of the Great Barrier Reef and South East Queensland coral habitats thanks to a new database by community monitoring organisation, Reef Check Australia.

The new database, accessible via www.reefcheckaustralia.org provides free access to the charity's coral health data to everyone with an internet connection.

The data relate to over 81 sites across Queensland coasts, from Osprey Reef up in the Coral Sea to Palm Beach Reef down on the Gold Coast. The vital information on coral health has been collected by highly-trained teams of volunteer divers. Trained to carry out monitoring according to a stringent Australia-specific version of a globally-recognised Reef Check protocol, these divers scour the reefs in small teams and record their findings on underwater datasheets.

Speaking ahead of the Australian Coral Reef Society Symposium in Darwin this year, as the database made its debut, Science Operations Manager at Reef Check Australia, Dr Marie-Lise Schläppy said the database collated up to eight years of data, which is input from the volunteers' datasheets by RCA's project scientists.

"The so-called 'stratified haphazard' sampling technique is well recognised and is a good way to trace changes in reef health over time. This can provide a valuable early-warning system in the case of serious impacts to the reef, such as coral bleaching," she said.

Russell Reichelt, Chairman at the Great Barrier Reef Marine Park Authority – a major sponsor of the project, said the information provided a

useful snapshot of coral health on the Great Barrier Reef. "Reef Check volunteers have done a good job in collecting data and it is great to see them sharing this information with people from around the world through the new database," he said.



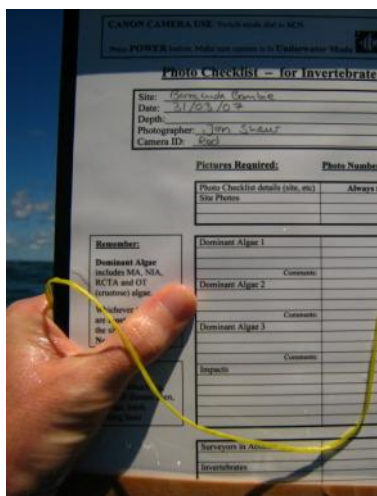
"This information is a useful supplement to the other reef health monitoring efforts supported by the Authority such as the Australian Institute of Marine Science Long-term monitoring program, Eye on the Reef, BleachWatch and Reef Health Impacts Summary."

The data provided by the new Reef Check Australia database include records of substrate cover (e.g. coral, sponge, rock); incidences of coral damage, bleaching and disease; plus counts of significant fish species and key invertebrates. Also featured in the reports are live photographs taken at the site during surveys. These include the research site landscape, any damaging impacts, and important creatures discovered.

Dr Marie-Lise Schläppy is delighted with the new database: "It takes the form of an interactive map-search display, using a Google Earth interface, allowing visitors to click on particular sites of interest and view summary reports of the data collected. They can also search for specific impacts, such as Crown of Thorns Starfish. It's a far more user-friendly experience than the traditional spreadsheet data."

The new database means that Reef Check Australia's volunteers can now look at the data they've helped to collect and understand more about the valuable commitment they're making to science. Likewise, members of the Australian

Marine Park Tourism Operators group and participating dive operators in South East Queensland can also access the data gathered on the surveys they make possible by providing in-kind berth space for the research teams.



Researchers, students and other interested parties will also be able to request permission to access the full series of raw data for use in their own projects. The Google Earth data points are also available for download as a KML file through the website and can be saved as a layer within Google Earth for repeat visits.

Australian Marine Park Tourism Operators Executive Director, Col McKenzie says: "This new tool allows our members to see the real results of the research they make possible by providing in-kind berth space for the survey teams".

Likewise, Wally Lancaster, proprietor of Beuchat Dive Centre in the Manly area of Brisbane, welcomes the new database: "We enjoy helping RCA by having them on our dive trips," he said. "It will be interesting to see the results of their surveys on the important Moreton Bay Marine Park sites we visit regularly with our customers."

RCA's database is the most instantaneous public information source on Australia's coral health – each survey's results are online within a week of collection. The reports should make interesting reading. See them at reefcheckaustralia.org/data.html.

Reef Check Australia

Reef Check Australia is an award-winning, not-for-profit organisation combining education and research to result in the protection and rehabilitation of the world's coral reefs.

Established in 2001 by one passionate individual with a strong vision, the charity has inspired over 150 volunteers to train using a scientifically standardised protocol in established monitoring techniques and now collects and distributes valuable data on reef health to marine resource managers and the wider scientific community. This data can provide vital early-warnings of a decline in reef health.



With a professional approach and recognised integrity, Reef Check Australia works in collaboration with community and industry partners to raise awareness, both locally and further afield through education and participation programs, about the effects of climate change and human impacts on the resilience of the reef.

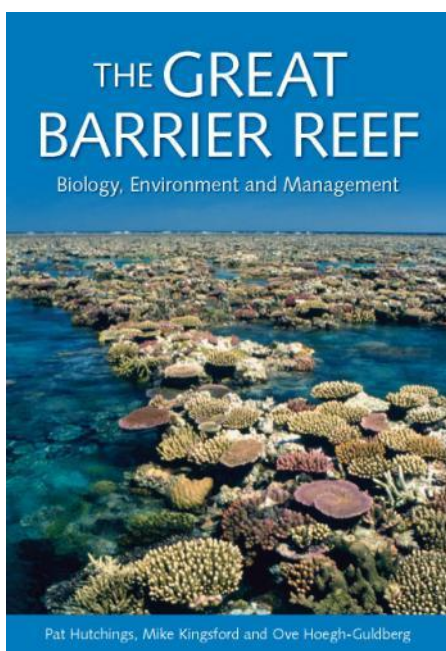
Support from a number of industry professionals, along with some valued sponsors and several hard-working volunteers all make our current projects possible but, in order to succeed in our mission, we need to do more. As a charitable organisation, donors can make fully tax-deductible gifts to help Reef Check Australia take positive action towards reaching environmentally sound and economically sustainable solutions to the real challenges of coral reef conservation.

ACRS book profiting our society

As we're sure you are aware; the new book from the Australian Coral Reef Society, *The Great Barrier Reef: Biology, environment, and management*, is available. The book has continued to sell well through 2009 with well over 1,000 copies sold and this year won the Royal Zoological Society of NSW's Whitley Certificate of Commendation for the best zoological text of 2008-9.

The various chapters of the book have been written by leading Australian experts, edited by Pat Hutchings, Mike Kingsford and Ove Hoegh-Guldberg and published in November 2008 by CSIRO Publishing.

The book is intended to be a comprehensive introduction to the Great Barrier Reef, for students and interested public. While the book concentrates on the GBR, much will be relevant to other coral reefs in Australia and indeed throughout the world. For your copy, just fill out the form included in this Newsletter to place an order and send it to CSIRO Publishing (full details available on the form).



A TRIBUTE TO GORDON ANDERSON

In July 2009, highly respected marine scientist and marine resource manager Gordon Anderson passed away from cancer. Gordon's early work and postgraduate research were conducted on reef fish communities on the Great Barrier Reef, and much of his subsequent work in marine policy, conservation and fisheries management was relevant to Australian coral reefs and tropical marine environments. Those of us who are more 'mature' members of ACRS remember him from the early days of Lizard Island research Station and are greatly saddened by his loss. Gordon was an active member of the Australian Marine Science Association and served for some years on the AMSA National Council, and I recently wrote a tribute to Gordon which was published in the AMSA Bulletin. With kind permission of AMSA and Gordon's wife Sue, this article is reproduced here.

Gordon Anderson passed away in July this year after a short but very courageous battle with cancer. This article tries to capture the scope and significance of Gordon's many contributions to marine science, marine conservation, national oceans policy, and most recently to fisheries management in the Pacific.

Gordon was born in Kenya and was educated at the Prince of Wales school in Nairobi, the Royal High School of Edinburgh, Scotland and Auckland University, moving to Australia in 1973 to work at the Australian Museum. In the late 1970s, Gordon did a PhD in reef fish ecology on the

Great Barrier Reef, based at Macquarie University under the supervision of Frank Talbot. This research and his subsequent work at the Australian National Parks and Wildlife Service helped to identify key factors controlling the structure of fish communities on coral reefs.

Gordon went on to work on a wide range of marine management, conservation and policy projects at a national and international level with the Australian Government. During the 1980s Gordon was involved with International Whaling Commission issues, working closely with Professor Derek Ovington and Professor Peter Bridgewater on some very challenging issues and assisting with difficult international negotiations. His significant efforts and ongoing commitment helped to achieve the moratorium on commercial whaling, and the establishment of the Southern Ocean whale sanctuary.

Gordon's many significant achievements during this period included the national plan for cetacean strandings (a world first), and working to resolve the controversial debate on whether cetaceans should be kept in captivity. He was also instrumental in setting up agreements to protect migratory birds, and worked tirelessly to reveal the extent of the dolphin kill in the Taiwanese driftnet fishery in the Arafura Sea.

In the 1990s, Gordon worked at Environment Australia on the development of Australia's oceans policy, also a world first. Gordon made a very valuable contribution to the National Oceans Policy - this was another very complex and challenging program of work involving multiple stakeholder sectors and inter-governmental negotiations, in the context of a whole-of-government approach to management of Australia's oceans. The Oceans Policy was released in 1998 and continues to guide the direction of the Australian Government's programs in the marine environment. Gordon's outstanding contribution to this policy was

recognised by others, and he was rewarded with his first of two major awards, the Department of the Environment Australia Day awards. Gordon went on to receive a second award, the National Australia Day Achievement Medallion in 2003, this time for his work on sustainable fisheries.

In 2006 Gordon commenced work as the Senior Fisheries Adviser for AusAid. AusAid had been struggling with developing a strategy for fisheries in the Pacific. Gordon brought to his role in AusAid extensive fisheries, environmental and economic knowledge, and formulated AusAid's key fisheries policy *Valuing Pacific Fish*, a policy underpinned by high quality research, knowledge and evidence.

Through this work and his desire to protect Pacific fisheries from over-exploitation, Gordon helped to forge partnerships with Pacific countries and regional bodies, particularly with the Secretariat of the Pacific Community (SPC) and the Forum Fisheries Agency (FFA). Gordon was deeply concerned with the plight of small Pacific island nations, and the need to provide for food security in the future. In 2008, Gordon moved to the Solomon Islands accompanying his wife Sue, who was also on an AusAID posting in Honiara. Some of Gordon's most recent work, so sadly cut short by his illness, involved looking at the impacts of climate change on Pacific fisheries.

Gordon will be deeply missed by his wife Sue, his children and grandchildren. In the words of one colleague, Gordon was pretty much a legend in his own lifetime. He will also be greatly missed by his many friends and colleagues working in marine science and resource management, as well as by those involved in community development and aid programs in the Pacific.

While Gordon was committed to the conservation of whales, another of his passions was the conservation of smaller cetaceans such as dolphins and porpoises, as he considered their

plight had often been overlooked alongside that of larger species. Gordon was also very passionate about the necessity to build capacity in developing countries and work with indigenous people to conserve and manage their marine resources. His family felt that a fitting memorial to his life and passions would be to collect funds (in lieu of flowers), to be made available for an appropriate research project that furthers these aims.

Any donations in Gordon's memory to support research on small cetacean conservation would be much appreciated. Donations can be made through www.gordon.underoaks.net

Zena Dinesen



Vicki Harriott Reef named

A reef in the Great Barrier Reef Marine Park was recently named after renowned coral reef researcher and marine science educator, the late Dr Vicki Harriott. In October 2009, the Great Barrier Reef Marine Park Authority (GBRMPA) Chairman Russell Reichelt announced that a reef had been named in her honour. The reef naming recognises Vicki Harriott's immense contribution to coral reef research. Vicki's career spanned over 25 years and she was highly regarded among her peers for her many and varied contributions to coral reef science, education and management.

Vicki Harriott Reef is located in the Cairns/Cooktown Management Area of the Great Barrier Reef Marine Park – it is Reef No 15-070

located at Lat 15.503°S Long 145.618°E. The previously unnamed reef was officially named following a formal assessment process and principles for reef naming. The submission was assessed by GBRPMA, the Royal Australian Navy – Australian Hydrographic Office, and the Queensland Department of Environment and Resource Management.

Vicki Harriott is remembered as a strong advocate whose work in coral reef research, education and management was internationally recognised and widely respected. Highlights of Vicki's career include establishing Townsville's Reef HQ coral reef exhibit, the largest coral reef tank in the world at its time. Vicki was a pioneer in the field of coral reef research and published one of the first papers on bleaching of Great Barrier Reef corals. She also carried out cutting edge research on temperate coral reefs which represents some of her most important contributions to coral reef science.

Vicki was also an active member of the Australian Coral Reef Society Council over many years. She passed away in March 2005 and in recognition of her special contribution to coral reef research the ACRS established the Vicki Harriott Memorial Student Prize. The prize is presented each year at the ACRS Annual Scientific conference for the best student presentation. The ACRS Council established a dedicated fund to support this prize and welcomes donations to the memorial fund so that Vicki's great contribution towards marine science and education can continue to be acknowledged and remembered. Further information about Vicki Harriott and how to make a donation to the memorial prize fund can be found on the ACRS website at

www.australiancoralreefsociety.org/vicki_harriot.html

Zena Dinesen

Research Station News

Lizard Island Research Station

A facility of the Australian Museum

Heavy usage by researchers

During 2008/09, about 90 research projects were conducted at LIRS and usage exceeded 7000 person nights. Impacts of climate change on coral reefs are a major theme for many current research projects. More than 1,250 publications have now resulted from work conducted at LIRS.

Major upgrade nearing completion

The Lizard Island Reef Research Foundation has been extremely successful in raising funds for the Station's 30th Anniversary Project. About \$4.75 million has been raised for capital improvements at LIRS since the project was launched in 2003, with donations from the Ian Potter Foundation, the Thyne Reid Foundation, private donors, and a loan from the Queensland Government's Smart State Research Facilities Fund.



The new Loomis House

During 2009, Loomis House was rebuilt and extended from one to three bedrooms. The view of the blue lagoon from the main verandah is stunning! A significant expansion of the aquarium was completed thanks to generous sponsorship from the Vincent Fairfax Family Foundation.

Funding from the Macquarie Group Foundation enabled us to acquire two 6 metre centre-console boats powered by 90 hp four stroke motors. They can each carry up to 12 people within 1 nautical mile of Lizard Island, making them very useful for transporting student groups. They also provide additional options for researchers to access other mid-shelf reefs. The LIRS fleet is now fourteen vessels, enabling excellent access to reefs.

An upgrade of laboratory equipment will be completed in 2010. New items of equipment already acquired include a freeze drier, refrigerated incubator, microscopes, balances, centrifuges, fume cupboard and an assortment of small laboratory gear. Funding for these acquisitions has been provided by the Thyne Reid Foundation and the Raymond E. Purves Foundation.

Major developments to be completed in 2010 and 2011 include refurbishment of the oldest section of the workshop and installation of a hybrid solar/diesel power generating system. Installation of the solar system will result in at least a 60% reduction in CO₂ emissions from power generation at LIRS.

Lizard Island Fellowships

In 2009, the Australian Museum awarded five fellowships to enable field-intensive coral reef research at LIRS: two to PhD students (funding for up to three years) and three to early career postdoctoral scientists (funding for one year). The same number of fellowships are offered for 2010 and applications are currently being assessed.

The fellowships are made possible through the generosity of sponsors as shown below.

Information about the fellowships is at

www.australianmuseum.net.au/Lizard-Island-Fellowships

2009 Lizard Island Doctoral Fellowship

Funded by the Lizard Island Reef Research Foundation

Alicia Crawley

Centre for Marine Studies, University of Queensland

Assessing the risk of ocean acidification for the Great Barrier Reef

2009 Ian Potter Doctoral Fellowship at Lizard Island

Funded by The Ian Potter Foundation

Rebecca Fox

ARC Centre of Excellence for Coral Reef Studies & School of Marine and Tropical Biology, James Cook University

The functional ecology of rabbitfishes (Perciformes: Siganidae) on the Great Barrier Reef

2009 Isobel Bennett Marine Biology Fellowship

Funded by the Hermon Slade Raiatea Foundation

Dr Megan Porter

University of Maryland Baltimore County

Barcoding larval stomatopod crustaceans for physiological, ecological, and biodiversity studies

2009 John and Laurine Proud Fellowship

Funded by the John and Laurine Proud Family Estate Trust

Dr Michael Berumen

Woods Hole Oceanographic Institution

Self-recruitment and the contribution of resource quality to fitness in coral reef fish

2009 Yulgilbar Fellowship

Funded by the Yulgilbar Foundation

Dr Guillermo Diaz-Pulido

Centre for Marine Studies, University of Queensland

Understanding the sensitivity of crustose coralline algae to ocean acidification



Dr Guillermo Diaz-Pulido working in the new aquarium

Dr Anne Hoggett & Dr Lyle Vail, Directors
Lizard Island Research Station

PMB 37, Cairns QLD 4870, Australia

Ph and Fax: (0)7 4060 3977

Email: lizard@austrmus.gov.au

Web: www.australianmuseum.net.au/Lizard-Island-Research-Station

One Tree Island Research Station

One Tree Island (OTI) is situated 80kms from the mainland at Gladstone, QLD and is a close neighbour to Heron Island.

One Tree was discovered on the 10th Jan 1843. HMS "FLY" was commissioned to survey the Islands and reefs of the GBR and Torres Straits. It was named by J.Beete Jukes who must have seen just one tree, perhaps one remaining following a cyclone. In the 1920's the first naturalist expeditions went to One Tree Island. Research began in 1965 when Dr Frank Talbot led an expedition to One Tree Island. This started a legacy of research on the ecology of tropical reef fish at OTI, which continues today. When Frank Talbot was Director of the Australian Museum he acquired a lease which the Museum administered from 1969 to 1971. In 1975 The University of Sydney took over the lease and since that time has continued the lease and operation of the research station.



White-bellied sea eagle at OTI

The infrastructure on the island has changed significantly from year to year, however still has all of its charm from the pioneer days. Power was originally generated from windmill and we now use solar energy as the main source. The station is undergoing a major solar upgrade at the moment, partly funded by government grants. One of the unique features of One Tree Island's infrastructure is that the whole station is completely self sustained, from solar power to

composting toilets, and relying completely on rain water.



Offloading gear on the beach

Weather plays a very significant influence on One Tree Island and the reef. There was a very close threat with Cyclone Hamish at the beginning of this year. The station along with Heron Island was evacuated. The station itself did not suffer any damage, however the strong winds from Hamish and the subsequent strong winds which continued for the first half of this year, have had a significant impact on the eastern side of the reef where the spur and groove formations are. Once where there was good coverage of plate corals is now bare.

The effects of the weather on the reef, is what attracts most the research currently being undertaken at One Tree, climate change being foremost in all of our minds.

This year the station has had an increase in its user days, and with that has come a great diversity of researchers not seen at OTI before. This is encouraging as word is spreading of the unique natural resources and experiences that OTI offers. Researchers appreciate the ability to be able to access and work in the lagoon under just about all weather conditions.

Dr KeFu Yu with his team from UQ came to OTI for this specific reason to obtain core samples from the lagoon. Results from the core samples will be used to document infilling rates of OTI

lagoon and the influence of storms and sea level history in the Capricorn Bunker group.



Healthy corals on One Tree reef

Another newcomer to OTI was a group of researcher's lead by Dr Jacob Silverman, who is replicating the Don Kingsley's work on the 1960's. The Kingsley Report (1964) "Carbon Turnover and Accumulation by Coral Reefs," is a key resource for a present-past comparison. The Silverman team have also been working at Lizard Island, visiting both stations twice in the year. The group includes researchers from America, Israel and Australia. They will compare their results to the original Report.

Our regular users continue to support OTI with enthusiasm.

Prof Mike Kingsford from JCU brought a team, which included researchers from Woods Hole, and The University of Miami. Prof Kingsford's continuing work involves genetics, olfaction, habitat, and fish counts.

David Booth from UTS continues his research and brought with him on this trip the journalist, James Woodford. James writes about environment issues and has a web site: www.realdirt.com.au

David Abrego from JCU continues to research the ecology and biology of coral disease.

Cameron Veal, from UQ came to research the Latitudinal and Longitudinal comparison of

ultraviolet and visible light field in waters surrounding the GBR

Dr Anya Salih from UWS, came with researchers from The University of California. Dr Salih continues her work on the Biology, optical properties and bioimaging application of fluorescent proteins.

Dr Ashley Ward from USYD, along with Lyndon Jordan and James Herbert-Read, continue their project of looking at the social behaviour of humbug damselfish.

We had two undergrad groups this year, one from USYD, and one from UTS. There was a Master's group from USYD, and the Tropical Marine Network.

Our scholarship students, Lana Roediger (Flinders University) and Maely Gauthier (UQ) completed their field work this year. We wish them all the success in the future. Kate Thoronborough (USYD) continues her field work at OTI.

The Director of One Tree Island Research Station, Dr Maria Byrne from USYD, continues to research the life history, phylogenetic relationships and population biology of tropical echinoderms. On a field trip this year, Dr Byrne also had with her Andy Gale from the University of Portsmouth, Kazuya Nemoto from Kanagaga University and Ana Christensen from Lamar University.

Jennifer Reiffel



The photo of the dolphin was taken on the 12th Nov 09. It was found at "The Gutter" One Tree Island. It has very unusual injuries.

Orpheus Island Research Station

Orpheus Island Research Station was established in 1979 as a research facility by James Cook University. Since 1999, it has operated on behalf of James Cook University through the Faculty of Science and Engineering.

Orpheus Island is an inshore island in the Great Barrier Reef Marine Park in the Palm group of islands. Orpheus Island Research Station is set within a 2-hectare site surrounded by the Orpheus Island National Park. The research station attracts national and international experts with a diversity of interests ranging from coral reef ecology to geology.



In 2009, with the assistance of a Smart State Grant and other various funds, OIRS completed a further upgrade of the facilities to include an expansion of the wet laboratory and raceway area with laserlight roofing; a new saltwater pump and additional salt water tanks now capable of delivering up to 30,000L saltwater per hour for experimental usage; upgrade of the saltwater system and temperature control units (and associated monitoring programs) within the



Temperature Control Rooms and Larval Culture Room; new laboratory equipment including a Fluorescent Microscope with dedicated Olympus DP70 Camera Head and an Ultra-Low Temperature (-80o) freezer for ease of sample storage; significant upgrade of OIRS communications including the enhancement of the Ethernet link from a current capacity of 512Kbps to a capacity of 11MBps; and various other upgrades to general infrastructure and station equipment.

In 2009 domestic and international post-graduate/researcher projects undertaken at OIRS included;

- Effects on Reproductive Output on Coral Trout
- Reproduction and Population Genetic Structure of *S.hystrix*
- Culture of Winged Pearl oyster, *Pteria*
- Ecological & Behavioural Determinants of Colour Transition in Juvenile Coral Reef Fishes
- Sponge Ecology
- Introgressive Hybridization among coral species
- Coral Disease & Bleaching

- Seasonality in Herbivory



- Coral Spawning
- Effect of zoning on coral reefs
- Fish earstones to monitor environmental change
- Energetics of coral larvae
- Drivers of change in seagrasses
- Evolution of Life History traits in coral larvae
- Larval biology & chemical ecology of tropical shipworms
- Green seaweed aquaculture
- Bidirectional sex change of coral gobies
- Behaviour and ecology of anemone fish
- Energetics of habitat choice in planktivorous coral reef fishes
- Relationships between habitat structure and performance of gobies
- Endocrine mechanics of bidirectional sex change in gobies
- Seasonal changes in sargassum populations

- Genetic diversity, bleaching sensitivity and colour polymorphism in *A. millepora* colonies
- Butterfly fish Ecology
- Dating historical changes in coral communities since European settlement in the GBR
- Mechanisms of scleratinian immunity
- Developing hatchery techniques of the winged pearl oyster, *Pteria*
- Algal fish interactions on coral reefs
- Structure of coral communities and the ecological performance of coral associated fishes
- Sponge disease
- Abundance & behaviour of cleaning fishes on fished and non-fished reefs
- Coral expression and coral associated microbiota
- Herbivorous fishes functional role



Visitors include postgraduate students and researchers, government agencies, industry groups, student groups from universities and schools and community groups. Find out more about Orpheus Island Research Station at: www.jcu.edu.au/oirs

Research at the Inter-University Institute for Marine Sciences, Eilat, Israel

By Chris Talbot

PhD candidate at the University of Queensland

The Inter-University Institute (IUI) for Marine Sciences in Eilat is located at the bottom tip of Israel, on the coast of the beautiful Red Sea (upper Gulf of Aqaba). The IUI allows students and scientists from institutions all around Israel to conduct their marine-related research directly on site, in protected waters, and with all the facilities needed for acquiring, maintaining and analysing their subjects. The local marine environment varies from nearly 100% coral cover, to virtually nothing but sand and degraded, fragmented reefs across a narrow shelf, which drops off to over 800m into the gulf. Thus, there are a variety of habitats in which to explore and conduct research. The fully-equipped dive centre on campus, as well as the research boats and aquarium facilities, allow researchers access to all areas of the gulf within Israeli jurisdiction, to install 3D underwater projects and infrastructure, and the opportunity to maintain marine life for experimentation on site.



The jetty and one of the research vessels at the IUI, looking out into the Gulf of Aqaba. The mountains in the background are in Jordan.

Some of the most significant work being conducted at the IUI is assessing the deteriorating coral reef communities around the gulf, monitoring the changes that have been occurring over the past few decades, and investigating ways to manage and maintain what still remains. The causes of this deterioration are of particular concern, and management of such factors (including fisheries, tourism, mining, sewage treatment and shipping) are being investigated now. To help the reef recover, several innovative projects are currently, and quite successfully, looking into installing artificial reef structures which are populated with cultured coral communities.



Beautiful, healthy coral outside the IUI.

I was lucky enough to be awarded a post-graduate fellowship from the Australian-Israeli Scientific Exchange Foundation in 2009, to conduct research at the IUI to contribute directly to my PhD. I am investigating the visual ecology of cephalopods (octopus, cuttlefish and squid) and at the IUI, I worked specifically on polarization sensitivity on the local species of cuttlefish – *Sepia gibba*. I was provided with a multitude of equipment, laboratory supplies and advice, and access to many dive sites from which to acquire animals. In addition to this, I was fortunate to be involved in the projects of other students within my host lab, and was greatly

impressed with the work being undertaken, particularly in relation to the restoration and conservation of the coral reefs.



Part of one of the artificial reef structures with small, cultured corals anchored to the surface.

This fantastic facility was a perfect place to conduct my research thanks to the location and helpful staff and students. I highly recommend pursuing opportunities to work at the IUI, and form collaborations within their research community, especially where coral reef restoration is concerned.



The local species of cuttlefish I worked on – *Sepia gibba*.

Advances in Coral Reef Science

In 2009, the major marine science institutions in Australia continue to produce numerous press releases that highlight significant research advancements. Check out the following websites to keep up with the latest coral reef research!

ARC Centre of Excellence for Coral Reef Studies
www.coralcoe.org.au

[Corals Raise Hopes for Survival](#) July 7

[Scientists call for humanity to 'set safe boundaries to the damage'](#) September 24

[Corals 'could starve in high CO₂'](#) October 5

Australia Institute of Marine Science
www.aims.gov.au

[Coral disease found to have similar MO to cholera](#)
February 25

[Hard working mangroves the equal of rainforests in productivity and carbon cycling](#) April 22

[Massive corals help unlock climate change secrets in Western Australia](#) December 3

Great Barrier Reef Marine Park Authority
www.gbrmpa.gov.au

[New research on coral growth decline has serious implications for the Great Barrier Reef](#) January 7

[Marine managers and Queensland seafood industry team up on climate change](#) Aug 17

Observed Impacts From Climate Extremes on the Great Barrier Reef - Summer 2008/09

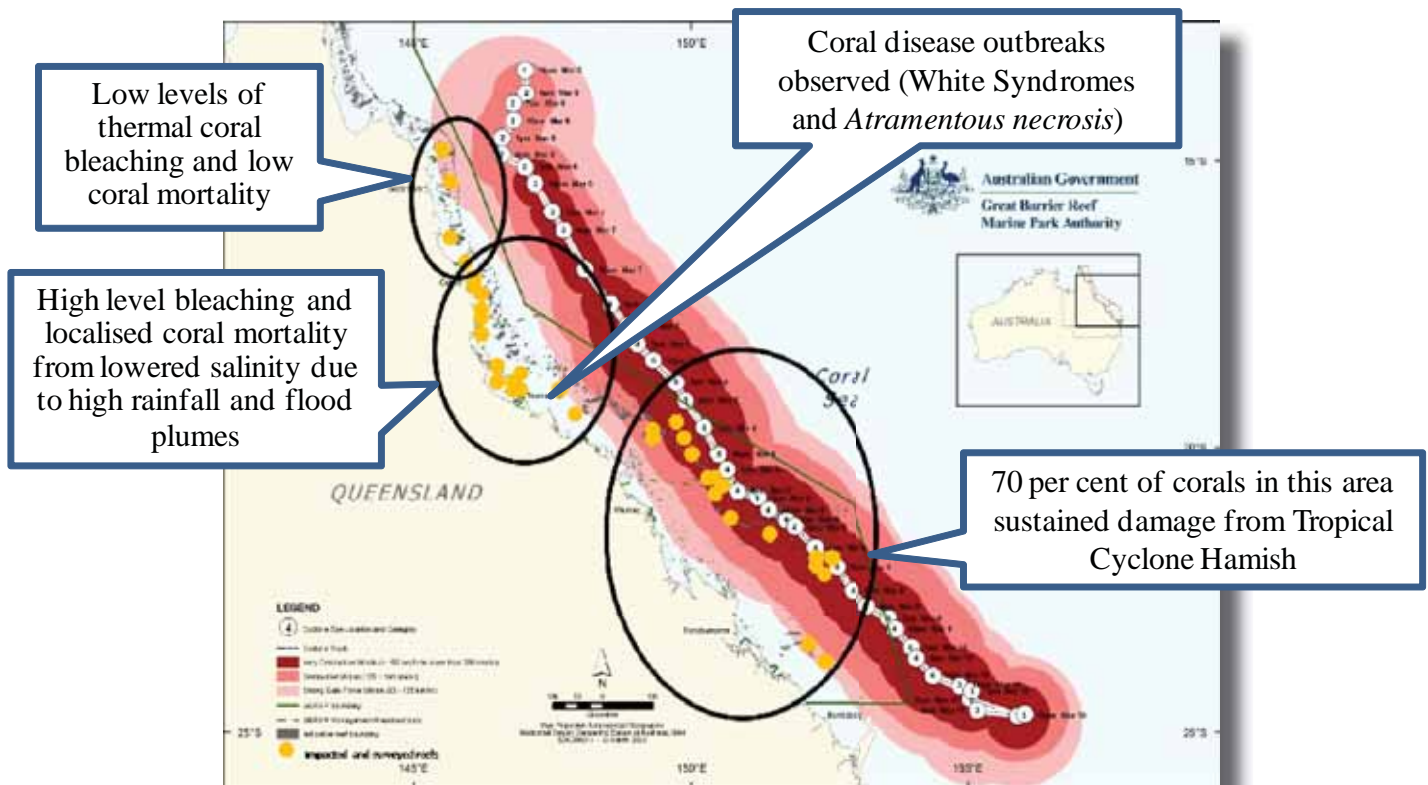


Figure 1: Track of Tropical Cyclone Hamish, with summary of 2008/2009 impacts on the Great Barrier Reef

Background

Each summer season, the Great Barrier Reef (the Reef) is at risk from the impacts of climatic events such as thermal stress, heavy rainfall, flood plumes and cyclonic activity. These events may directly damage coral reefs, or cause stress leading to coral bleaching and disease.

During the 2008/2009 summer, three extreme weather events affected the Reef:

1) Extreme temperatures

The Great Barrier Reef Marine Park Authority's (GBRMPA) 2008 pre-summer forecasts predicted a high likelihood

of elevated sea surface temperatures affecting much of the Reef. Extreme sea surface temperatures were recorded in many areas (Figure 2). The heat stress recorded in December 2008 was equivalent to the patterns that preceded the mass coral bleaching of the Reef in 1998 and 2002.

2) Record Rainfall

Very high rainfall (record breaking in some areas) was experienced all along the Queensland coast. The region between Cairns and Townsville experienced 600 mm of rain above the three month average. This excessive rainfall caused extensive flooding in

the region, and flood plumes extended beyond the outer Reef in some areas.

3) Tropical Cyclone Hamish

Tropical Cyclone (TC) Hamish was a Category five system that tracked down the Reef between 5-11 March 2009 (Figure 1). TC Hamish affected coral reefs and islands in the central and southern regions of the Reef. More than 50 per cent of the coral reefs in the Great Barrier Reef Marine Park (the Marine Park) were affected by "strong gale force winds", "destructive winds" or "very destructive winds". TC Hamish also affected

many of the cays that form the Swains Reefs National Park (a significant area for seabird nesting). Significant sand movement and vegetation scouring was identified through aerial surveys on many cays. TC Hamish travelled through the area late in the breeding season, and this may have resulted in fewer casualties of seabird eggs, chicks and young birds than if the cyclone had occurred between December and February. Winter bird numbers and breeding efforts observed post TC Hamish were consistent with previous winter surveys.

Impact Summary

Each of these events caused stress and/or damage to the Reef ecosystem. While the high sea surface temperatures and still conditions could have led to mass coral bleaching, the prolonged monsoonal conditions from January 2009 reduced temperature stress across most of the Reef, keeping water temperatures at or below coral bleaching thresholds. Mass coral bleaching did not occur, and only localised, minor thermal bleaching was observed on reefs in the northern half of the Marine Park.

Excessive rainfall and the subsequent flood plumes (Figure 3) lowered the salinity of inshore

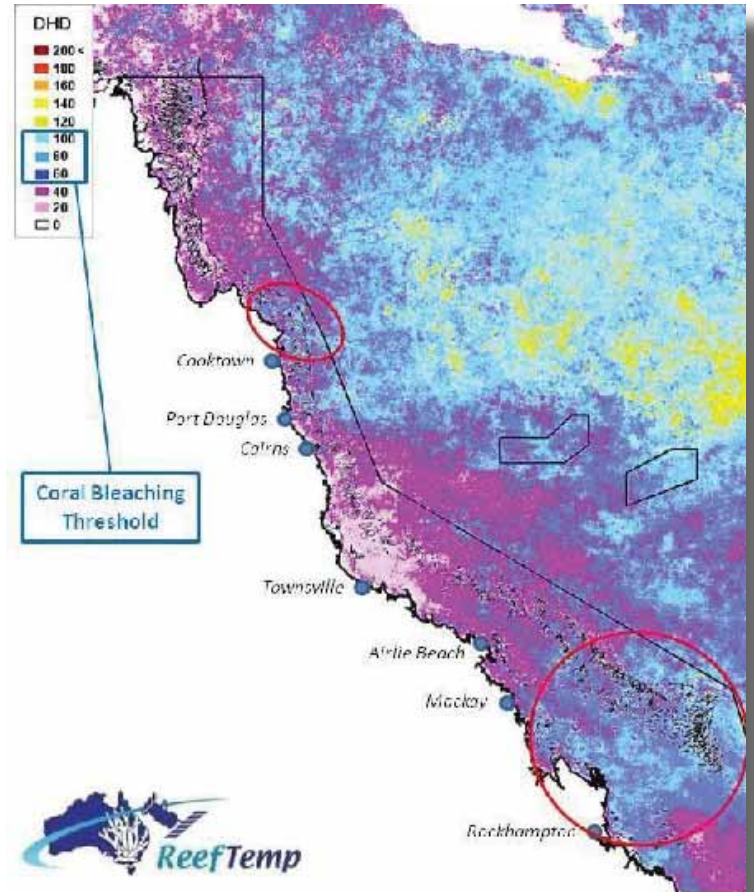


Figure 2: Accumulated heat stress (Degree Heating Days) on the Great Barrier Reef (28 January 2009)

areas, which caused coral bleaching and localised coral death on shallow, inshore reefs between Cairns and Townsville. Coral disease outbreaks were observed on some of the reefs subjected to the flood plume and rainfall impacts. While these impacts are serious for individual affected reefs, damage from floodwaters was relatively minor on a Reef-wide scale.

Damage to the Reef from Tropical Cyclone Hamish is estimated to extend for 500 kilometres with up to 70 per cent of corals in this area sustaining damage. Reefs sustained the most damage on exposed windward faces, with leeward sides and sheltered reefs sustaining much less damage.

Although neither the flooding nor the cyclone events were unprecedented, both were at the extreme end of the scale for such events.

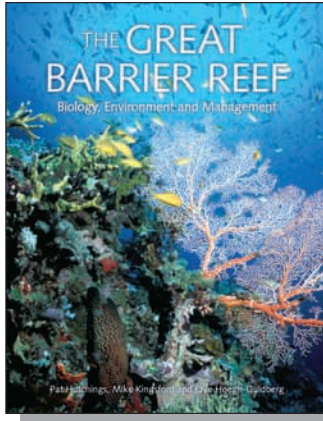


Figure 3: Flood plume from Burdekin River - February 2009

For further information, contact the:
Climate Change Group, Great Barrier Reef Marine Park Authority
PO Box 1379 Townsville, Qld 4810
07 4750 0759
www.gbrmpa.gov.au

The Great Barrier Reef

Biology, Environment and Management



Pat Hutchings, Mike Kingsford and Ove Hoegh-Guldberg

This book gives readers a broad overview of biological and physical attributes of the Great Barrier Reef and, where relevant, other reefs of the world. Contemporary pressing reef issues such as coral bleaching, coral disease and the challenges of coral reef fisheries are discussed by world research leaders.

The Great Barrier Reef also includes a 'field guide' that will help people to identify the common animals and plants on the reef, then to delve into the book to learn more about the roles the biota play on the reef. The introductory sections explain the numerous coral reef processes which are responsible for this ecosystem – one of the most diverse in the world. The major processes include primary productivity, calcification and energy flow through coral reef food webs, and these are explained using accessible language. The major threats that face coral reefs are also covered, as well as the management solutions that can be adopted to reduce these threats.

While its focus is on the Great Barrier Reef, this comprehensive volume can be used as a baseline text for most Indo-Pacific coral reefs.

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- Written by leading authorities on the biodiversity of the GBR as well as its position as an icon for monitoring global warming
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Sales in Australia and New Zealand:

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Professor Ove Hoegh-Guldberg is the Director of the Centre for Marine Studies at Queensland University.

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Publications

Publication list for 2009

Author institutions appear after each citation and are abbreviated as follows:

AIMS: Australian Institute of Marine Science

AM: Australian Museum

ANU: Australian National University

CoE: ARC Centre of Excellence for Coral Reef Studies

CSIRO: Commonwealth Scientific and Industrial Research Organisation

GBRMPA: Great Barrier Reef Marine Park Authority

JCU: James Cook University

SU: Sydney University

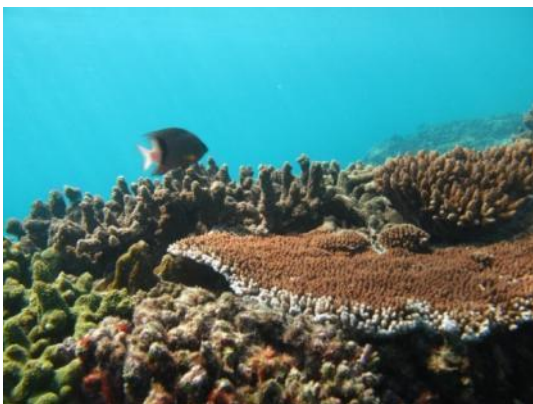
SCU: Southern Cross University

UQ: University of Queensland

UTS: University of Technology Sydney

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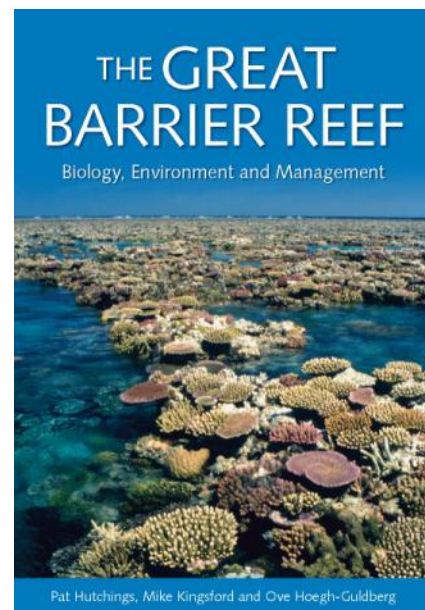
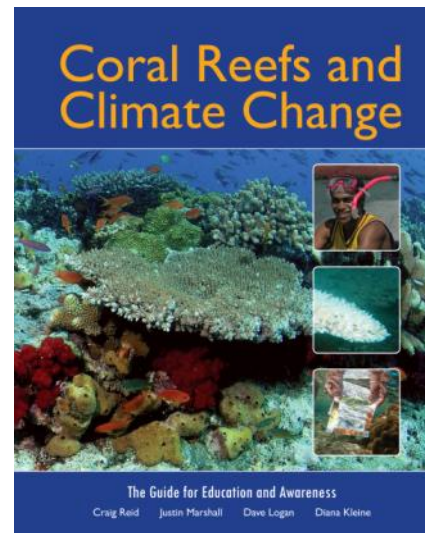
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Reports from ACRS Student Research Fellows

Assessing the risk of ocean acidification on the Great Barrier Reef

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Introduction

Oceanic pH has declined by 0.1 units since pre-industrial times and is predicted to decline by a further 0.3 - 0.4 pH units by the end of the

century under business-as-usual emission scenarios, which represents a real threat to coral calcification and reef growth [1-4]. In addition, rising ocean temperatures due to the greenhouse effect of CO₂ molecules and CO₂-equivalents (CO₂-eq), will likely lead to more regular coral mass bleaching events, some of which are associated with extensive declines in coral cover [5, 6]. Despite numerous studies dealing with the effect of temperature on the coral symbiosis and the effect of ocean acidification on calcification, the effect of ocean acidification on the coral symbiosis is not well understood.

A recent study has reported loss of productivity, measured as reduced net O₂ evolution per symbiont cell, and increased bleaching in corals exposed to high CO₂ [7]. Under high irradiance, ocean acidification can act synergistically with temperature to lower the thermal bleaching threshold of the coral symbiosis [7]. A low light experiment, investigating the underlying mechanism responsible for reduced productivity with increased CO₂, has shown that symbiotic dinoflagellates (genus *Symbiodinium*) in *Acropora formosa* had reduced expression of a key enzyme in the photorespiratory pathway [8]. As photorespiration can act as a photoprotective

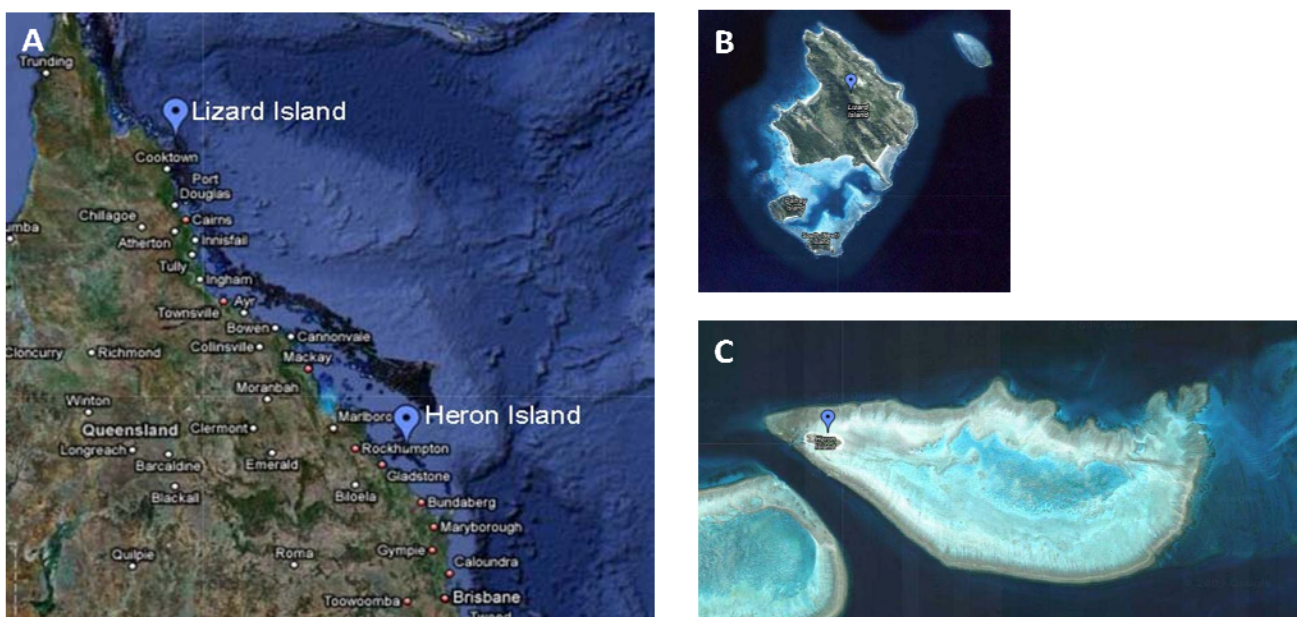


Figure 1: Study Sites A) Location of Lizard Island and Heron Island on the Great Barrier Reef. B) Lizard Island and surrounding reefs. C) Heron Island reef system. Photos courtesy of Google. maps.

mechanism, this decline may explain how CO₂ acted as a bleaching agent under high light scenarios. Furthermore, the observed increase in non-photochemical and non-assimilatory photochemical quenching could potentially explain productivity loss [8]. However, this response may be specific to clade C3 *Symbiodinium* hosted within *A. formosa*. Previous studies have shown significant physiological variation between dinoflagellate clades and even within the same clade hosted within a different coral [9-11]. An objective of this study was to investigate the potential mechanisms of CO₂-induced bleaching and productivity loss in a variety of coral – symbiont associations across the Great Barrier Reef.

Methods

The research was conducted in the Southern GBR (Heron Island; 23° 26' 60 S, 151° 55' 0 E) and Northern GBR (Lizard Island; 14° 40' 6 S, 145° 27' 2 E) (Figure 1). Coral sub-colonies were sampled from locations within these sites and were treated with CO₂ and temperature regimes representing IPCC projections for the end of the century. Physiological measurements including photosynthesis and respiration rates were linked with gene expression assays in order to determine the response of *Symbiodinium* hosted within the coral sub-colonies.

Preliminary Results and Conclusions

Initial findings and interpretation of results from Heron Island suggest that xanthophyll de-poxidation is higher under natural light conditions (in comparison to [8]). Potentially, an increase in non-photochemical quenching would not be available to the dinoflagellates should photorespiration decline. The genetic analysis is yet to be analysed for this data set. Future research at Lizard Island Research Station will also provide comparative research for the northern section of the Great Barrier Reef.

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Size does matter: macroalgal height influences the feeding response by reef herbivores.

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Herbivory is widely accepted as a key process determining the structure and resilience of coral reefs, with roving herbivorous fishes playing a predominate role. Indeed, the removal of herbivores through overfishing has underpinned shifts from coral to dominance by fleshy macroalgae on Caribbean, Hawaiian and east African reefs (Hughes 1994; Hunter and Evans 1995; Graham *et al.* 2006). Once established these shifts appear difficult to reverse as the macroalgae reach a size refuge from herbivores. Macroalgal propagules are easily eliminated by grazing herbivores, however as they grow they become less susceptible to the same suite of herbivores. The removal of fleshy macroalgae appears to be restricted to a small suite of species (i.e., macroalgal browsers) and represents a separate but critical process on coral reefs (Bellwood *et al.* 2006). Given the potential importance of fleshy macroalgae in coral reef phase-shifts, our ability to successfully manage coral reefs into the future requires a clearer, quantitative understanding of the roles of individual herbivorous fish species.

Several studies on inshore GBR reefs have reported the removal of the fleshy macroalga *Sargassum* to be dominated by a single species, however the species have differed markedly, even among studies conducted at the same site (e.g., *Platax pinnatus*: Bellwood *et al.* 2006;

Siganus canaliculatus: Fox and Bellwood 2008; *Kyphosus vaigiensis*: Cvitanovic and Bellwood 2009). To date none of these studies have considered the role of the size or density of the *Sargassum* in influencing the feeding response of herbivorous fishes.

This study, therefore, examined the influence of the height of *Sargassum* on the feeding responses of the herbivorous fish communities at Orpheus Island. *Sargassum* thalli of four different heights (i.e. 10, 20, 40 and 80cm) were transplanted from the reef flat to the reef crest and monitored continuously for 5 hours using a stationary underwater video camera. This procedure was replicated over several days at each of two sites on the leeward side of the island. All video footage was viewed and the number of bites taken from the *Sargassum* by each species and size (total length, TL) of fish was recorded. To account for body size related variation in the impact of individual bites, a mass standardized bite impact was calculated as the product of body mass (kg) and number of bites.

The removal rates of *Sargassum* were high and displayed little variation among the four heights (10cm: 90.5%; 20cm: 87.0%; 40cm: 91.5%; 80cm: 94.9%). Given the almost complete removal of the *Sargassum* biomass from all treatments, it may have been reasonable to assume that there was little variation in the species responsible for consuming the *Sargassum*. Analysis of the video footage, however, revealed significant variation in the species responsible for consuming the *Sargassum* of different heights (MANOVA: $F_{2,34} = 2.43$, $p = 0.03$). This variation was primarily driven by two species, *Naso unicornis* and *Kyphosus vaigiensis*, that collectively accounted for 97% of all bites recorded. *N. unicornis* appeared to favour the shorter (10cm) and avoid the taller (80cm) *Sargassum*, accounting for 83.4% and 27.9% of the standardized bites, respectively (Fig 1). Conversely, *K. vaigiensis* tended to avoid the

shorter and favour the taller *Sargassum*, accounting for 9.3% and 68.0% of the bites, respectively.

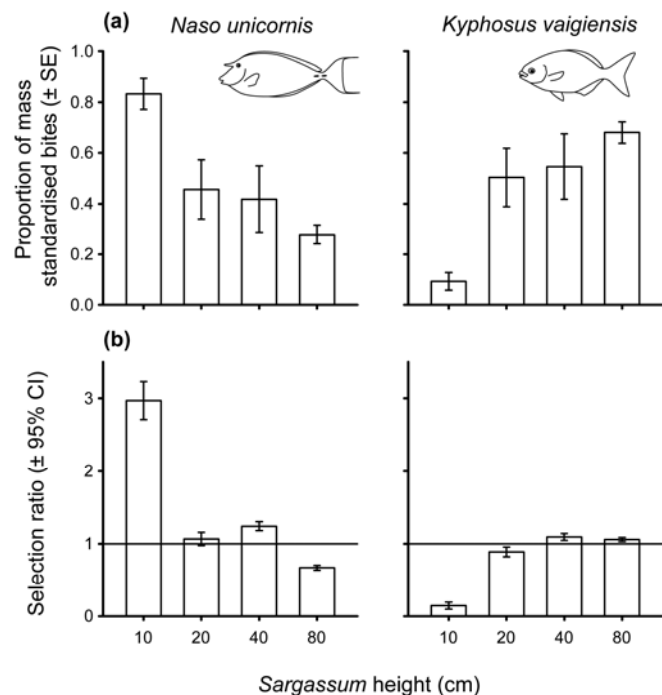


Fig. 1: a) Proportion of mass standardized bites taken by *Naso unicornis* and *Kyphosus vaigiensis* from the *Sargassum* of varying heights; b) Selectivity of feeding by *N. unicornis* and *K. vaigiensis* on *Sargassum* of varying heights. A selection index of one indicates the *Sargassum* was consumed in proportion to its availability; values greater than one indicate positive selection; values less than one indicate negative selection.

This variation in feeding response by these two species may be related to differences in their ability to detect the smaller *Sargassum*, or feeding preferences related to palatability, or nutritional content, of the various sizes. Irrespective of the mechanism this variation has important implications for the resilience and management of coral reefs. Shifts to macroalgal dominance may not be dependent on a single, or

unique, tipping point; rather there appears to be several transitional stages and the species of herbivore capable of arresting the transition appears to change at each of these stages.

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Historical ecology of coral communities from the central inshore Great Barrier Reef: a palaeoecological approach

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Introduction

“As it is not in human record, but in natural history, that we are to look for the means of ascertaining what has already been... in order to be informed of operations which have been transacted in times past... or to events which are in time to happen”

- James Hutton (1785)

Coral reefs are showing evidence of global decline across local and regional scales, resulting in long term losses of abundance, diversity and habitat structure^{1,2,3}. Since European settlement of the Queensland coastline, extensive land use change in the Great Barrier Reef (GBR) catchment region has occurred resulting from grazing, agriculture and land clearance^{4,5}. However, it has been difficult to ascertain the link between terrestrial discharge, water quality and coral decline at a regional scale, and the contribution of anthropogenic influence to the disturbance regimes of inshore reefs remains highly controversial^{6,7}. Direct evidence suggests that significant anthropogenic impacts of GBR catchments have historically affected water quality by a five to tenfold increase in sediment discharge from the Burdekin river⁴, and recent research suggests that inshore reefs are undergoing persistent phase shifts, with losses of previously dominant Acroporid communities and

local removal of coral species^{2,6,8}. Despite this, considerable difficulty exists in determining proximal causes of regional declines, and there remains no direct evidence of changes in coral community structure following European settlement, primarily due to a lack of historical data^{1,9}.

Through palaeoecological reconstructions of coral communities and innovative application of high precision TIMS U-Series aging techniques¹², the objective of this project was to determine the timing and extent of historical changes in coral communities from the central inshore Great Barrier Reef (Palm Islands region) following European settlement (>1850).

Methods

Sediment cores (>52 total) varying between 2m and 5m in length were extracted from the upper reef slope (5m) depth at Pandora, Havannah and Pelorus reefs (Palm Island region, central GBR). Additional surveys of modern coral community structure was conducted using belt transects at each site. Upon return to the lab, cores were sectioned and preliminary composition determined using a CT scans. Coral assemblages from the cores and transects were identified to the highest taxonomic resolution. To determine the age structure of coral communities, dead coral fragments were aged using the high precision Thermal Ionization Mass Spectrometry Uranium-Series (TIMS U-Series) at the Radio Isotope facility at the University of Queensland, allowing dating of coral fragments to within ± 4 yrs accuracy.

Preliminary results and significance

U-Series dating of coral fragments from the bases of sediment cores place the maximum age to less than 1000 years (5m depth). Preliminary results from the palaeoecological reconstructions indicate that whilst inshore coral communities are capable of rapid recovery following disturbance, a loss of resilience and subsequent shift towards low diversity coral communities coincided with the altered disturbance regimes following European settlement. Further analysis is currently being conducted to determine the exact timing and magnitude of these changes. Ultimately, this research aims to provide a baseline for the restoration of coral communities at local and regional scales, instead of merely maintaining the ecological 'status quo'.

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Coring through dead Acroporid reefs in the Palm Islands



Uncovering the ecosystem function of rabbitfishes (Perciformes: Siganidae) on the Great Barrier Reef

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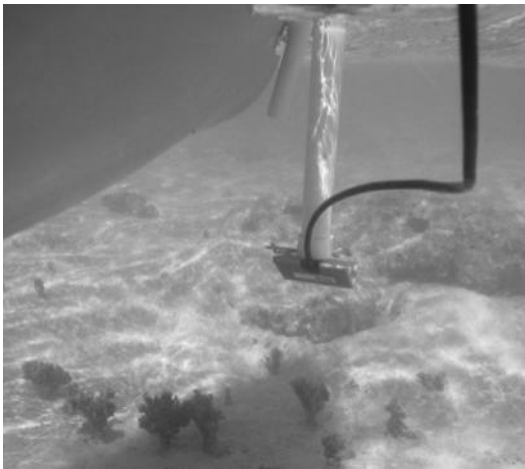
Rabbitfishes (F. Siganidae) are characteristic of coral reefs of the Great Barrier Reef, Indo-Pacific and Red Sea. Despite their widespread distribution and abundance, the specific ecosystem function of individual species of siganid and their roles in maintaining the balance between coral and algae on reefs is not well understood. In terms of their ecology, they are the least-studied of the four major families of herbivorous fishes (parrotfishes, surgeonfishes, damselfishes and rabbitfishes) on coral reefs. In many countries, however, siganids form a significant part of the commercial and artisanal fishing catch (Lam 1974, Bwathondi 1982, Grandcourt 2002). Building a greater understanding of the ecological role of the family before numbers of potential agents of coral reef resilience and rehabilitation are driven to levels below which their ecosystem impact becomes obsolete is therefore vital. By examining five specific facets of the biology and ecology of common species of siganid on the GBR (diet, feeding behaviour, habitat use, home range and movement patterns), the overall aim of my PhD is to determine the ecosystem function of individual species and the scale over which they exert their functional impact. In this part of the project, the specific aim was to determine the home range, habitat use and movement patterns of the species *Siganus lineatus* using acoustic telemetry (manual tracking).

The study was carried out at sites around Lizard Island from Aug-Nov 2009, where individuals from three separate populations of *Siganus lineatus* were collected, surgically implanted with acoustic transmitters (Vemco V9-1L) and released back at the point of capture. Individuals were then tracked on up to 5 separate occasions over the 21-day battery life of the transmitter for continuous periods of 12-24 hours. Tracking was conducted from a kayak with an acoustic hydrophone mounted to the bow (Fig.1), following the method of Meyer & Holland (2001, 2005). In the reef environment, the kayak provided numerous advantages over the traditional method of tracking from a motorised vessel, including less noise disturbance to the fish and avoidance of the release of fuel emissions over the reef. The shallow draft of the kayak also allowed ready access to all areas of the reef and shoreline without risk of damage to the corals below, and the manoeuvrability of the craft in shallow habitats turned out to be crucial in order to effectively map the movements of this particular species of siganid.





b



c



d

Fig.1: (a) Individuals of *Siganus lineatus* are tagged by inserting an acoustic transmitter (Vemco, V9-1L, 9mm x 24 mm) into the peritoneal cavity, released back onto the reef and then (b) tracked over continuous 24 hour periods from a kayak equipped with (c) an acoustic hydrophone (Vemco, VH110) and (d) receiver (Vemco, VR100). Photos: J Donelson

In total, over 600 hours of data were collected on the movement patterns of 3 individuals from a mangrove-based population and 4 individuals from two separate reef-based populations of *Siganus lineatus*. At the time of writing results have yet to be formally analysed, however, preliminary indications are that *S. lineatus* has a relatively small home range over the time-scale examined in this study. The reef and mangrove populations showed some interesting differences in their behaviour and movement patterns. In behaviour typical of a coral reef herbivore, the mangrove individuals displayed greatest movement during diurnal hours and remained stationary in resting holes at night, whereas the reef individuals remained stationary during the day, resting in overhangs at the edge of bommies, and actually exhibited greatest movement during nocturnal hours (particularly just after sunset and just before dawn), moving off the reef to adjacent sand aprons. This nocturnal movement and feeding by reef individuals corroborates observations on the passage of digesta through the guts of specimens collected from reefs around Lizard Island (Fox et al. 2009) and raises interesting issues in terms of the adaptation of lifestyle for the two different habitats (reef and mangrove) by this species. The differentiation between feeding and resting sites for the reef individuals also highlight the fact that a species' observed location may not necessarily be where it exerts its ecosystem impact.

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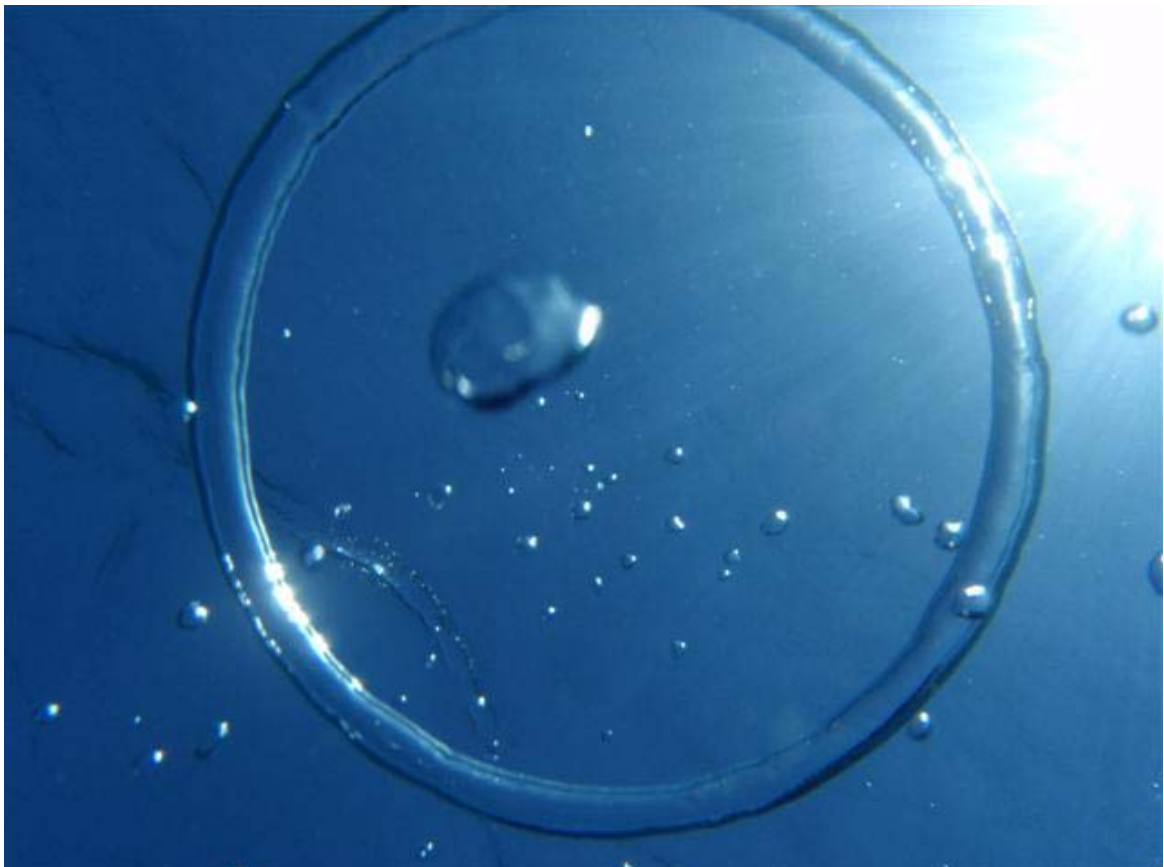
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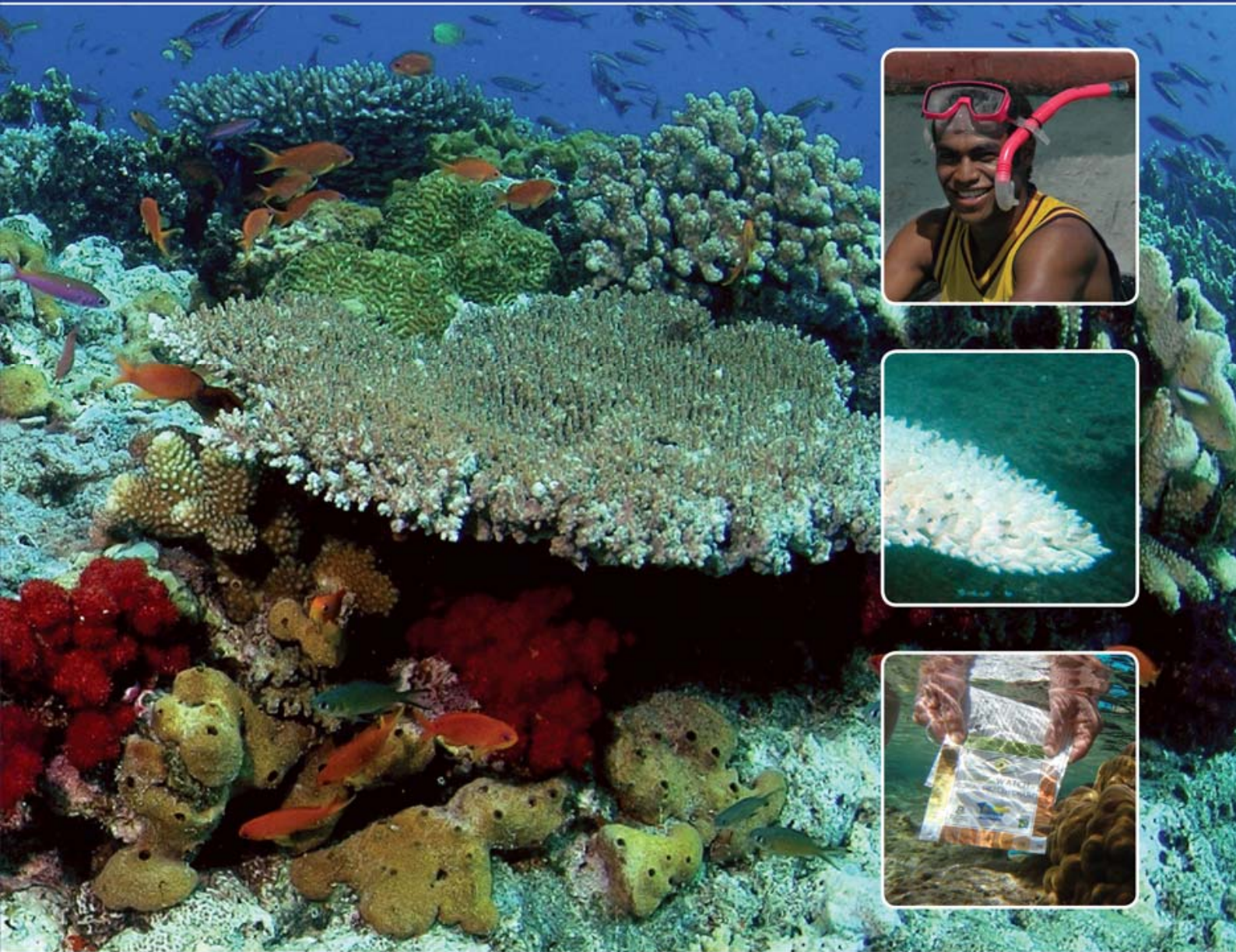
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