

**Newsletter n° 41
March 2012**



**Australian
Coral Reef Society**

**A society promoting the scientific
study of Australian coral Reefs**

Editorial

Dear Members,

Welcome to the 41st edition of the Australian Coral Reef Society's annual newsletter! It has been a busy year with changes in council members, an exciting conference in the Sunshine Coast, and a range of stimulating research projects occurring at the Research Stations throughout the reef.

2011 was a big year for the ACRS in engaging with both federal and state politicians on a number of issues related to the reef. Most importantly, the ACRS have been instrumental in developing submissions on MPA development within NSW and nationally, and remains an important voice in the conservation of coral reefs in Australia.

The potential role of suspended sediment in structuring coral reef fish populations, and the importance of bacterial disease impacts on the reef are several of the findings presented by student award winners at the end of the present newsletter.

Understanding and confronting climate change is the single most important issue for coral reef management and conservation. As such, the ACRS newsletter is offered primarily as an electronic resource to help reduce consumption of resources and resulting greenhouse gas emissions. Make sure you power your computer using Greenpower when enjoying this edition.

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 F. Joseph Pollock, Maria Gomez, and David Feary.

Cover Art: **Maria Gomez-Cabrera**

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President's Message

It's been another full-on year for the Australian Coral Reef Society and Australian coral reefs! Your society continues to play an active role in preserving Australia's coral reefs, raising awareness, providing advice and helping to train and educate the next generation of Australian research scientists and stakeholders.

A number of very critical issues have occurred this year. Some have been very political, such as the introduction by the Gillard government of a Carbon Tax. While there remains considerable debate on this issue among the broader community, the ACRS is pleased to see that large issues dealing with our personal responsibility for anthropogenic climate change are being debated and acted upon by our government. What are you doing to lower your carbon footprint? Whatever you can do, you can be sure that you are doing your part to reduce or delay the damaging effects of climate change on coral reefs. In the meantime, have a go at trying to reduce local stressors so reefs are in as good as shape as possible to deal with ongoing environmental change.

The ACRS continues to engage with both federal and state politicians on a number of reef related issues and we are grateful to Dr Frances Michaelis (AIMS) for keeping us up to speed through our membership with FASTS (Federation of Australian Scientific and Technological Societies). Frances has been our trusted conduit to and from the Australian government. Joe Pollock and Selina Ward represented the ACRS at the 2011 Science Meets Parliament, a FASTS-run event. This event is a wonderful opportunity for the Society to express our views directly to politicians about the

conservation and management of Australia's coral reefs.

And don't forget that in 2012 The ARC Centre of Excellence for Coral Reef Studies will coordinate the International Coral Reef Symposium (ICRS) in Cairns (9-13th July) and ACRS will as ever have a strong presence. We have already provided a number of students with registration awards for the event. Although still a ways away, this is a huge undertaking and is an event that ACRS strongly supports. Look out for our booth in the Exhibition Hall.

Coral reefs and coastal systems continue to come under increasing stress, both local and climate change. ACRS continues to take a very active role in making our voice heard at the state and federal levels, urging greater care and more effective management. Several recent submissions are featured on the ACRS website, including the [ACRS submission on the independent scientific audit of marine parks in New South Wales](#), the [ACRS endorsement of developing Australia's national system of marine reserves](#), and the [ACRS submission to Safe Work Australia regarding the model Work Health & Safety Bill in relation to scientific diving](#). We are now preparing 2 submissions for the government's Marine Bioregional Planning, one for the Temperate East Marine region, and the other for the Coral Sea region. The ACRS Council is committed to continue to provide the basis for coral reef conservation and advocacy in Australia. As such we continue to recommend all ACRS members to write to federal and state as well as local government on a more regular basis. All ACRS councillors are happy to provide guidance with such approaches.

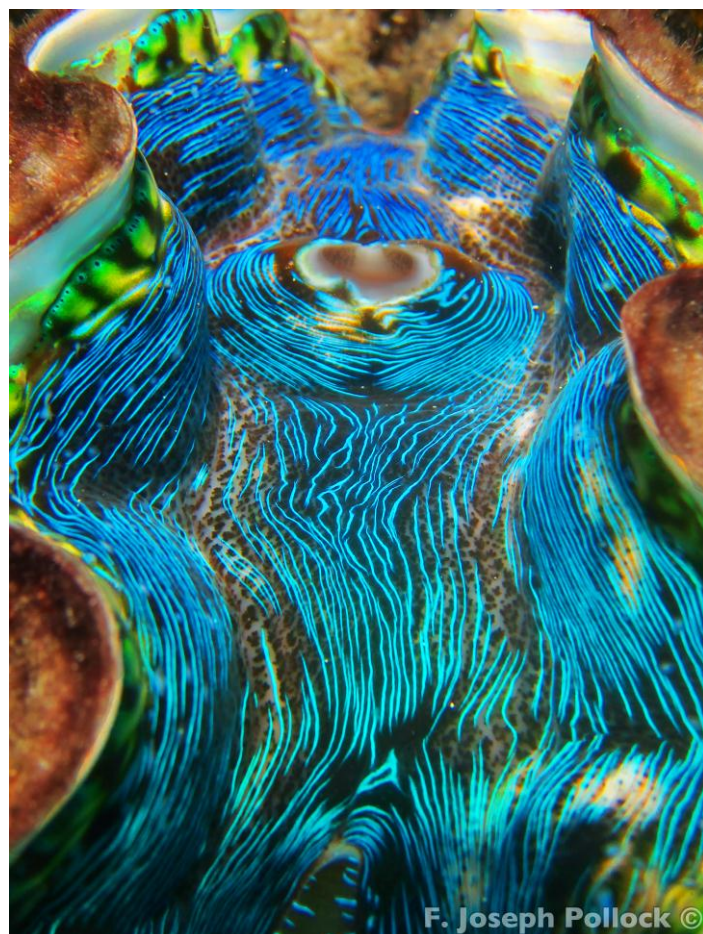
Communication continues to be a clear goal of ACRS. One of the critical lines of communication available to all members is the ACRS listserver. For some reason, members have the impression that this listserver functions as a conduit from Council to members. That it does; however, the

listserver belongs to you, our membership, and I encourage you to use it as much as you like to spread the word and communicate with each other on issues relevant to ACRS and our membership. To kick-start the listserver in 2012, look out for provocative e-mails, which we will be issuing to get the conversation rolling. But please don't wait – hear and be heard on the ACRS listserver!

Also along these lines is a new feature on our website, 'Scientist Commentary' which is a short contribution from a selected coral reef scientist on a topical issue. The Commentary will appear for 3 or 4 months, after which a new Commentary will be posted. Speaking of our website, our ACRS website has now had a complete makeover. I want to once again thank our website designer, Diana Kleine with input from Ross Hill. Remember, we are now able to process memberships and handle financial and logistical arrangements for participants in the annual ACRS conference. We also have a very noticeable place on the site to attract potential donors, since we are now eligible to accept tax-free donations. If members have any further suggestions to improve our web site please send us a note along those lines.

And speaking of the ACRS conference, we had another wonderfully organized event on the Sunshine Coast this year, thanks to the hard efforts of a number of people, in particular ACRS Councillor (and past president) Selina Ward, who continues to ensure the success of ACRS conferences on a yearly basis. Selina and the organizing committee provided an incredible display of organizational skill at the Novatel Resort in Maryochoodore – it was a wonderful forum for exchange of the latest research from the best and the brightest of the up and coming generation of Australian coral reef scientists. One of the highlights of the meeting was a public forum with panellists addressing the question 'If we had a \$100 M, how would we best spend it to

increase reef resilience?" Panellists from academia, industry, and management all had their say - many thanks for their wonderful participation. I would also like to thank all 120 of you who came to share new results and research. Many thanks to all of the insiders who also played pivotal roles in making sure the meeting was a success including Ulrike Siebeck, Ross Hill, Zena Dinesen, Naomi Gardiner, Andy Hoey, Ross Hill, Rebecca Lawton, K-le Gomez, Chico Burrell, and Brigitte Sommer. 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: Katharina Fabricius, Terry Hughes, Morgan Pratchett, and Hugh Possingham. The event was sponsored by The ARC Centre of Excellence for Coral Reef Studies, GBRMPA, AIMS, the Great Barrier Reef Foundation, UQ Science, and JCU. Thanks for their generous prize donations are also due to Fantasea, Coral Identification Capacity Building Program, the marine stations (Lizard Island,



Orpheus Island, Heron Island and One Tree Island), Quicksilver, CSIRO Publishing and the Queensland Museum, and as always, Woolworths for their environmentally friendly tote bags. We also thank the Hon Peter Slipper, Federal Speaker and Member for Fisher for opening the conference and Lyndon Davis for his warm 'Welcome to Country' and didgeridoo presentation.

Congratulations to the 18 student recipients of awards to travel to the annual ACRS conference in Twin Waters at the Sunshine Coast. Several councillors (Zena Dinesen, Pat Hutchings and Ulrike Siebeck) assessed student submissions for the travel awards and another group of councillors (Zena Dinesen, Andrew Hoey, Naomi Gardiner, K-le Gomez, Ross Hill, and myself) helped judge student talks so many thanks to all for these time consuming tasks. I also take this opportunity to congratulate the 3 students who received research awards from ACRS this year through our Danielle Simmons (Melanie Trapon, JCU), Terry Walker (Amelia Wenger, JCU), and ACRS (Yui Sato, JCU) awards.

The ACRS would not run without the efforts of its office bearers and Councillors 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 Naomi Gardiner, secretary Chico Burrell, vice president Pete Mumby, immediate past president Justin Marshall, and the tireless efforts of Selina Ward, Pat Hutchings, Zena Dinesen, Anna Scott, and website master Ross Hill. Without these dedicated workers, and indeed our entire Council, our Society would not be able to accomplish so much. Thanks also to The ARC Centre of Excellence in Coral Reef Studies and

The School of Biological Sciences at UQ for continuing to help us reduce our carbon footprint by providing video conferencing for council meetings.

I wish you all a successful and productive 2012 and I invite you to make your views on coral reefs known within and outside of the ACRS. We will continue to provide you with channels for your voices on a number of key issues in 2012 (check out our new website for a complete summary of our government submissions), but also encourage you to speak out and be heard within your community and by your government at all levels. As I said last year, it is up to all of us to advocate for a reef that is still stunning for our children's children. And to co-opt the words of a late great person 'Ask not what your ACRS can do for you, ask what you can do for your ACRS'!

John Pandolfi, President ACRS
2011



Society News

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Minutes of the Council Meeting

Date: Tuesday, 22 November, 2011

Venue: RM 172 Gerhmann Building Level 7 Boardroom, Brisbane, Queensland

Meeting started at 10:00 am

Present: Prof John Pandolfi, Prof Peter Mumby, Prof Justin Marshal, Mr Chico Birrell, **(Phone links):** Dr Zena Dinesen, Dr Rebecca Lawton, Dr Anna Scott, Ms Brigitte Sommer, Dr Pat Hutchings, Dr. David Leary

Apologies: Dr Maria Gomez, Dr Laurence McCook, Dr David Wachenfeld, Dr Andrew Hoey, Dr Ross Hill, Dr Ulrike Siebeck, Mr F. Joseph Pollock

1. Correspondence

- Minutes of last meeting: Two changes made.
 1. Fraud issue with accounts resolved.
 2. Motioned by John Pandolfi and seconded by Peter Mumby.
- Submissions must go through president.
- Last submission: "Enquiring into Australian biodiversity in a changing climate" needs to go on the website. Selina Ward to provide the document submitted.
- Parliamentary enquiry on marine parks 1st December. B. Sommers to attend because took a leading role preparing the East Coast submission. Patrina Allcock (02 92302293) is the facilitator.

2. Business arising from last meeting

- There is a need to discuss the amount of surplus money available for spending. This should be put in context of conference and non-conference years. In particular because we will have high costs from grants for ICRS 2012
- Ross has Peter Mumby's www submission: Issue of protecting herbivores on the GBR. Laurence's done.
- Next one from: Pat Hutchings in 3 months issue piece roughly one page see previous for examples.

3. Archiving of ACRS records

- Pat Hutchings sent past records (previous prizes etc) to Justin Marshall during his term as President of the Society. This was 3 boxes of documents. Scanning these is considerable and it was originally hoped this could be archived by UQ library. This is unlikely under the current context of library reduction of printed collections. It is decided to keep the records at close hand to an ACRS member and John Pandolfi will talk to the archival department at UQ. P. Mumby suggested putting a note on the ACRS webpage to alert people that there is this information available. Justin Marshal will identify where they are currently stored.
- Archiving council meetings: Digital copies of minutes and presidential communications have been kept and J.Pandolfi received these from J. Marshall, who received from S. Ward each at the turn of Presidential roles.

4. ICRS Conference 2012- position regarding awards

- Confusion from during decision of last awards regarding what council had agreed to award was noted for the future and eligibility and purpose of awards (e.g. travel or registration) will be made clear before advertising the awards on the ACRS webpage.
- Student awards for ICRS 2012 will be given once notification has circulated as to whether ICRS abstracts have been accepted or not. This is expected to occur soon after the decisions made by symposium organisers on the 28th of November.

5. ACRS Exhibition at ODEX and attending personnel: report

- Odex report from Justin: worthwhile Zena, Ida, Alyssa Marshal, Chico, Justin. Minor sales. Good exercise and we prepared a package of publicity materials, with corrected information (website and foundation date). These can be used for stand at ICRS.
- Remaining stock of GBR Books will be used as a float of books that can be sold at other events, such as ICRS 2012. Rebecca Lawton has clarified with CoE that we can sell merchandise at the ICRS 2012.

- We need a receipt book (from a newsagent) for future stands. Naomi probably has a half used one somewhere.
- Zena: ACRS will benefit from a one page flyer about the society for people to take away. This encourages memory of ACRS and membership.

6. ACRS list server - enhancing member input

- John Pandolfi agrees to follow up for list server

7. Russell Kelley Business plan for Reef Finder?

- Need a strategic plan for products that ACRS supports
- Need a defined proposal format

Pat Hutchings:

- No decision can be made today because only part of the council present.
- ACRS money used to support student grants
- ACRS brand: logo not included satisfactorily on Coral Finder.
- 20K is not a trivial amount.
- need a break down of what level of detail will be put in the finder.

Zena Dineson:

- Make this a competitive process in line with our student awards.
- where would ACRS like to go with a greater plan with regards to supporting initiatives related to our mission statement.

Anna Scott:

- make clear and transparent with definable delivery times.

Peter Mumby:

- This is an opportunity that will benefit ACRS more than a funding consideration. Do we feel this is an opportunity to make a significant contribution to our mission statements? Need to circulate a questionnaire for everyones views on this topic. Rather than devise a policy. How much do we think we can afford if we give this the go ahead. Who feels this is a worthy cause?
- How much expendable budget do we have?
- We do not have a budget that can be advertised.

Justin Marshall:

- Will we support in principal?

- How much is council willing to consider awarding to Reef Finder?
- What would we like in return i.e logo image on finder....
- Coral Watch is a similar venture but follows other funding avenues. Requesting a formal business proposal is a little too demanding.
- ACRS should consider having a caveat regarding funds granted so they are not lost if the Reef Finder project does not get off the ground.
- Justin will coordinate an email enquiry to council and will collate suggestions and votes.

Brigitte Sommer:

- What is target audience and how will they be reached. Dive shops? Price point?

Rebecca Lawton:

- Don't need full business plan. But do need a greater breakdown of the costs. List risks and where the project may fail.

8. Position on development of ports on the Queensland coast and adjacent to reefs around Australia:

Justin Marshall:

- Encourages councilors to watch the Four Corners documentary recently aired. Was this Sensationalized? How well was the program researched?
-
- Councillors to send comments to Justin Marshall and John Pandolfi who will draft a letter for council to comment on. The goal is to draft one letter, and comments should be given as to who this will be sent to.
- UNESCO are making noise regarding world heritage breaches to GBRMPA which is a major concern.
- GBRMPA council members may not be able to participate but we should seek their advice.
- What can we achieve beyond expressing a concern? E.g. Dredge spoil being spilt 400m from reef.... Bad

Peter Mumby:

- Beware we are not liable for a comment.

Further comments:

- What is the review process that has been made. Do we need 6 ports or more smaller ports. Could say we simply question the

design of these projects. Do we need 6 or can we limit the damage to 1 port.

- Should the letter criticize the continued selling of coal to China > climate change > kills the reef from bleaching events.
- Society expressing extreme concern in a broad general manner and we are willing to present expertise at meetings and would like info when possible from state and fed govt as well as port. Ask for a specific response.
- Who defines the guidelines?

9. Temperate East bioregional submission to the Australia Marine Bioregional Planning Program: Commonwealth waters.

- Northern submissions due 28 Nov. John Pandolfi felt it is too late for ACRS to comment.
- Temperate Eastern Waters (include reef areas) and we can prepare a submission in time for February 2012. Is there overlap from the NSW marine park submission and can we use our earlier submission as a start point?

Brigitte Sommer:

- It is a start but does not include Norfolk and other offshore waters. If happy to have a generic submission may be a good start.

John Pandolfi:

- Happy to draft people from his lab working in these areas.

Pat Hutchings:

- Happy to help and will attend the meeting at Ulabela.

David Feary:

- Also happy to help as this is his area of work too.

Anna:

- A meeting will be held at NMSC next week and Anna will provide feedback soon. Will attend a meeting in Coffs Harbour on the 5th of December.

Action items:

- Brigitte Sommer: please get committee going by email and circulate a draft/base document.
- Anna Scott: send a request to the list asking for submission.

10. ACRS Newsletter Progress

- David Feary has at the start of November contacted: research stations, media centers of CoE, AIMS, GBRMPA, Reef Check requesting all to add sections regarding what has happened in their areas this year.
- Joe Pollock emailed all ACRS student fellows.
- John Pandolfi has been emailed regarding the president's address.
- Don't have a well formatted document but will call on support for pictures and editing.
- Dave Logan supplied last years template.
- Fergus also happy to provide reduced assistance i.e comment.
- The newsletter is no longer printed. Members are referred to a link on the ACRS website for a pdf document.
- Some people request printed copies and these will be printed at the UQ printers.

11. Discussion forum that might make trails of conversation easier to follow? Some form of chat software or section of the ACRS website?

- Use Email. Web forum not desirable

12. Coral Sea Initiatives

- Coral sea situation to be announced soon and ACRS will respond. John Pandolfi to lead response.

13. UQ marine research station issues

- Developing as we speak. Unfriendly face of UQ put forward which is out of character for research station worldwide and UQ runs the risk of losing interest from researchers. A Letter from ACRS to UQ will be considered in the near future.

14. Amazon commissions from books recommended.

- Can be set up quite easily through Amazon Approved by all present. Chico Birrell will liaise with Ross Hill to set this up.

15. T-Shirts and merchandise for 2012 ICRS

- Can ACRS sell merchandise at the ICRS2012?
Rebecca will check up in Townsville with Elisa

16. Membership report

- Technical issue reported prior to meeting by Anna Scott:

17. Treasurers report

- Forwarded to council by Naomi Gardiner prior to meeting.

18. Other business

- Finance from ODEX Chico Birrell to finalise with Naomi Gardiner

Meeting Ended at 12.09pm.



ACRS Student Awards

Student Research Awards for 2013

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 2012 have already closed. The **closing date** for research grants applications **for 2013** will be in **December of 2012**.

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 2012 have already closed.

The **closing date** for research grants applications for 2013 will be in **December of 2012**. The successful applicant will be notified by late January/early February 2013. 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 2012

Congratulations to the following students who were awarded research grants for the year 2012. Stay tuned for next year's newsletter to find out the outcomes of this research:

- **Terry Walker Prize: Jessica Tout** (UTS)
"The role of bacterial behaviour in structuring coral-bacteria interactions"
- **Danielle Simmons Prize: Sarah Van-Eyk** (UQ)
"The sensory system of elasmobranchs"
- **ACRS Award: Gabrielle Miller** (JCU)
"The interactive effects of ocean acidification and increasing temperature on key life history stages of a coral reef fish, *Amphiprion melanopus*"
- **ACRS Award: Heather Veilleux** (JCU)
"Epigenetic acclimation to increasing sea surface temperature in a coral reef fish"

Conference Reports

86th Annual Conference



The 86th Annual ACRS Conference, held August 26-29, 2011 at the Novotel Twin Waters Resort on Queensland's beautiful Sunshine Coast, was a smashing hit. The student-centric conference combined cutting edge student research talks with plenary presentations by leaders in the field of coral reef research, including Katherina Fabricius, Terry Hughes, Hugh Possingham, and Morgan Pratchett. This year's program covered a diversity of the most pressing topics in coral reef studies including: climate change, ocean acidification, coral disease, fish ecology, reef resilience, water quality, connectivity, genomics, and reef management.

Another highlight of the 2011 ACRS conference was the public forum held on Saturday night, which invited a mix of scientists, managers, and industry leaders to answer the question, "How would you spend \$100 million to best improve resilience of the reef?" Answers ranged widely; from don't spend any of the money, to spending the funds on public education and outreach, to industry support to community engagement, and

more. While the panelists were unable to settle on just one use for the fictitious millions, there was some very heated, yet friendly, debate among the panelists and a volley of insightful questions from the public audience.



On Sunday night, the conference participants' efforts were rewarded with a beautiful banquet featuring fresh local cuisine and a live band. The evening also featured the inaugural auction of a perpetual ACRS lifetime membership, which went to Lawrence McCook, and the announcement of the conference presentation awards. As the evening carried on, the volume of conversation, laughter, and music floating into the cool, Sunshine Coast air provided a testament to the success of the 2011 ACRS conference.

Through our annual conference, ACRS continues to expand its influence on the science and management of coral reefs and its support for the next generation of coral reef scientists.

2011 ACRS Conference Student Prizes

The annual ACRS scientific conference always provides a great opportunity for postgraduate students to showcase their research. At the 2011 conference at the Novotel Twin waters, Sunshine Coast there were, once again, many high quality and very interesting student presentations.

A panel of judges assessed the presentations according to an agreed set of criteria, with at least two judges allocated per student paper.

The panel included Zena Dinesen, Ross Hill, Naomi Gardiner, Andrew Hoey, K-le Gomez-Cabrera and John Pandolfi.

The Vicki Harriott Memorial Student Prize was established by the ACRS Council in 2005 in memory of the late Vicki Harriott, in recognition of her contributions to coral reef research and marine science education. This prestigious prize (a cheque for \$500.00) for the best student presentation was awarded to Rebecca Lawton of the ARC Centre of Excellence for Coral Reef Studies at James Cook University. Her paper (Lawton et al.) was entitled 'Geographic variation in resource use by specialist vs generalist coral-feeding butterflyfishes'. Another major prize this year was the Fantasea Foundation Prize of seven days' access to Reefworld at Hardy Reef for a team of four researchers, including two overnight stays. This Fantasea Foundation prize was awarded to Melanie Trapon, also of the ARC CoE at James Cook University, for her (joint) paper 'Recent disturbances augment community shifts in coral assemblages in Moorea, French Polynesia'. Congratulations to Rebecca and Melanie!



Student Travel Awards

For the 2011 Conference, ACRS continued its strong commitment to assisting students with their fares to the national conference. While many of these students were from James Cook University, travel awards were also given to students from the University of Queensland and Victoria University of Wellington in New Zealand. ACRS is really pleased to be able to support so many students to travel to the annual conference and present their research. The society awarded travel grants between \$280 and \$560 to the 18 students listed below:

Tom Bridge- JCU
Nicola Browne - JCU
Andrew Chin- JCU
Karen Chong-Seng - JCU
Miin Chua - JCU
Darren Coker- JCU
Andrew Cole- JCU
Tom Hawkins – VUW (NZ)
Rebecca Lawton - JCU
Joe Pollock- JCU
Stefanie Pontasch– VUW (NZ)
Yui Sato – JCU
Brigitte Sommer - UQ
Mareike Sudek– VUW (NZ)
Melanie Trapon - JCU
Jeroen Van de Water - JCU
Amelia Wenger - JCU
Anne Wiethegar– VUW (NZ)

Another major prize, a trip for two people on a Quicksilver outer barrier reef cruise, was awarded to Yui Sato, also of the ARC CoE and School of Marine and Tropical Biology at JCU, for his presentation of 'Drivers of microbial dynamics in the development of black band disease'. There were also four prizes involving 4 - 7 days' bench fees at the various Great Barrier Reef research



stations, awarded in order of merit to: Andrew Chin (for Heron Island RS); Tom Hawkins (Lizard Island RS); Stefanie Pontasch (Orpheus Island RS); and Joanne Bayes (One Tree Island RS). The prize for the best student poster was awarded to Ai Nguyen, and various other book prizes were awarded to Nicola Browne, Alyssa Marshall, Andrew Olds and Tom Bridge.

Our congratulations to these prize winners, and thanks to all the students for their very interesting and high calibre presentations. The ACRS Council is very grateful to the Fantasia Foundation, Quicksilver Connections Ltd, the Research Stations, CSIRO, the Queensland Museum and Russell Kelley (BYO Guides) for generously donating these prizes. Thanks also to Selina Ward for helping to arrange for the donations of prizes.

Zena Dinesen
January 2012

Upcoming Conferences



12th International Coral Reef Symposium
9-13 July 2012, Cairns Convention Centre,
Queensland, Australia
(<http://www.icrs2012.com/>)



36th Annual Larval Fish Conference
2-6 July, Bergen, Norway
(http://www.larvalfishcon.org/Conf_home.asp?ConferenceCode=36th)



8th Asia-Pacific Conference on Algal
Biotechnology
9-12 July 2012, Adelaide Convention Centre,
South Australia
(<http://sapmea.asn.au/conventions/apcab2012/index.html>)

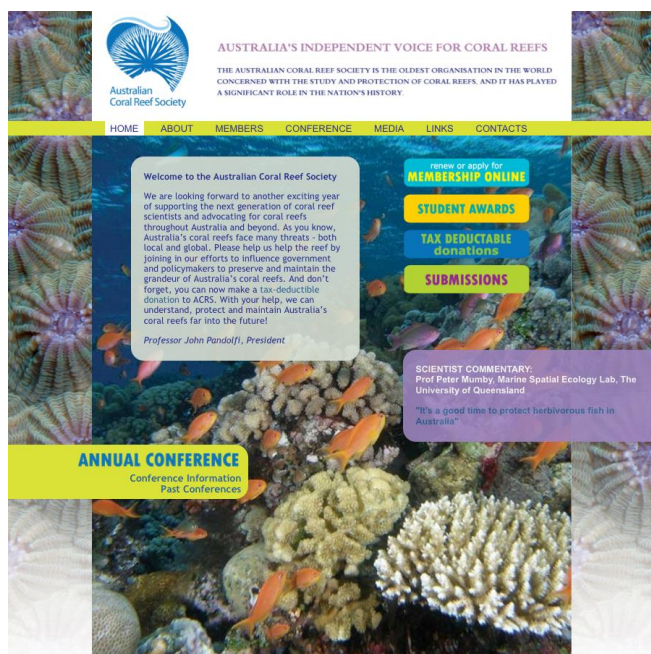


2012 ASFB Conference (Joint Meeting with the
Oceania Chondrichthyan Society).
15-18 July 2012, The Sebel Playford Hotel,
Adelaide, South Australia
(<http://www.asfb.org.au/>)



AMSA-NZMSS 2012
1-5 July 2012, Wrest Point Hotel, Hobart ,
Tasmania
(<http://www.amsa-nzmss2012.com.au/>)

The ACRS website and email list



www.australiancoralreefsociety.org

If you haven't wondered over to the ACRS website lately, you are in for a treat!

Our website has been completely revamped with a stylish new look and an entirely new level of functionality. As the global doorway to your Society, the website contains the latest information on student grants, workshops and conferences, and exciting commentaries by leading coral reefs scientists

Membership Applications

Keeping with our mission of environmental stewardship, all ACRS membership applications (individual and corporate) are now handled completely online (and paper-free).

To renew your ACRS membership, simply point your browser to the ACRS website and click on the "MEMBERS" tab. Alternatively, you can direct your browser directly to the following URL:

<http://www.australiancoralreefsociety.org/apply-individual>

Tax-deductible donations to ACRS

The majority of funds raised by the ACRS go toward supporting the next generation of Australia's coral reef scientists. We support Australian student participation to the annual ACRS meetings and we provide several research grants to PhD students working on the biology and geology of coral reefs. You can donate to the ACRS in several ways. Tax deductible donations will be used to support student travel to annual ACRS meetings and student research grants. Presently, 4 student research awards are competed for annually and the two best are represented as the Terry Walker Prize (\$2500) and the Danielle Simmons Prize (\$2500). If you would like for your donation to be use in some other manner consistent with the goals of the Society, we would welcome your input.

Donate to the Vicky Harriott Memorial Student Prize

You can also make contributions to another individual ACRS award, such as the annual Vicki Harriott Memorial Student Prize given to the student with the best presentation at each annual ACRS meeting. Contributors should note, however, donations to this fund are NOT tax deductible.



Student Awards

Terry Walker Award: Amelia Wenger

The effects of suspended sediment on early life history stages of coral reef fish

Amelia Wenger (amelia.wenger@jcu.edu.au)

School of Marine and Tropical Biology and

ARC CoE for Coral Reef Studies

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Townsville, Qld, 4811

Habitat degradation attributable to multiple anthropogenic sources is a major threat to coastal marine environments, leading to declining populations and loss of biodiversity (Hughes et al. 2003). Among these sources, increased deforestation and coastal development have substantially increased sediment input into several marine environments worldwide (Rogers 1990; Ryan et al. 2008). Coral reef habitats and dependent species appear to be particularly sensitive to sediment deposition and turbidity (Fabricius 2005; Wenger et al. 2011). In the Great Barrier Reef (GBR) region, over 200 reefs have now been classified as high risk to sedimentation (Devlin et al. 2003) associated with a five-fold increase in suspended sediment loads from rivers since European settlement (Kroon et al., in press, Furnas 2003). The effects of sediment on coral distribution and dynamics can have substantial indirect effects on other organisms associated with coral reefs, such as coral reef fishes (Rogers 1990). Direct linkages between suspended sediment and reef fishes are also important, but there have been few studies investigating these links. Elevated suspended sediment levels are known to reduce the ability of some coral reef fish species to locate suitable habitat during

settlement (Wenger et al. 2011). However, for most coral reef fishes, the influence of suspended sediment on key individual traits and subsequent population consequences are unknown. My overall PhD examines how increasing concentrations of catchment-derived suspended sediment affect early life history stages of coral reef fish. The aims of this part of my project were to determine threshold concentrations of suspended sediment that begin to affect coral reef fish. Specifically, I examined habitat choice and migration of settlement stage *P. moluccensis*, a primarily live coral dwelling damselfish, under different concentrations of suspended sediment. I also investigated how predator and prey interactions change as suspended sediment increases.

The studies were carried out in January and February 2011 at Lizard Island. For the first aim of the project, newly settled *P. moluccensis* were collected from live coral around Lizard Island. Habitat choice experiments run under different sediment treatments showed that at the threshold concentration of suspended sediment, the fish experience a 40% reduction in their ability to find live coral. They were also 20% less likely to move to a new habitat. These results suggest that not only will fish have a harder time at settlement finding suitable habitat as suspended sediment increases, they will also be less likely to move to a better habitat. Coral reef fish that are not on their appropriate habitat experience slower growth rates and increased risk of predation (Coker et al. 2009; Feary et al. 2009).

The second experiment measured how predation levels changed as suspended sediment increased. Juvenile *Chromis* sp. and *Pseudochromis fuscus* were collected as the prey species and predator species, respectively.

Predation over a twelve hour period was recorded in four different concentrations of suspended sediment. Predation rates increased as suspended sediment increased, but at the highest concentration of sediment, predation rates were similar to the predation rates in clear water. As suspended sediment increases, prey will likely be more at risk to predation but at a certain point the predators will also be disadvantaged.

These studies add to an increasing awareness that suspended sediment has direct effects on coral reef fish and provides a direct link between catchment-derived sediment and ecological response that is relevant to managers (Wenger et al. 2011). Previous work focused solely on the direct effects of enhanced suspended sediment concentrations on corals and extrapolated that fish would be affected through their interaction with corals (Rogers 1990). While this is in part true, understanding the direct relationship between reef fish and suspended sediment allows us to more fully assess the vulnerability of coral reef ecosystems to increased sediment loading. Importantly, information on threshold concentrations of suspended sediment provides an additional line of evidence to set ecologically relevant targets for reef water quality, river sediment loads, and catchment management.

Acknowledgements

I would like to thank the ACRS for fund in the form of the Terry Walker Prize for 2011. Funding for the project was also provided by the ARC through a grant to Professor Geoffrey Jones. I would like to thank the staff at Lizard Island Research Station for provision of essential support and facilities and Geoff Endo and Ian McLeod for assistance in the field.

Thank you to the Selection Committee for the award of the Terry walker Prize 2011. This award funded my travel and bench fees at Lizard Island Research Station. The work completed as a result of the award forms two chapters of my PhD as well as two publications (in prep). I am very grateful to the Committee for providing me the opportunity to complete such a significant portion of my dissertation.



Experimental tanks for habitat choice experiment



Chromis sp. and P. moluccensis

ACRS Award: Yui Sato

Unravelling microbial mechanisms of black band disease in corals

Yui Sato (Yui.Sato1@my.jcu.edu.au)

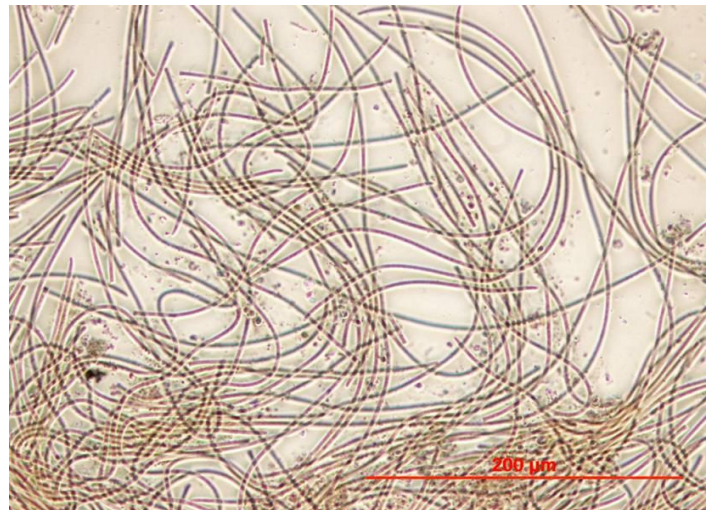
ARC CoE for Coral Reef Studies,
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Infectious diseases of corals are contributing to the ongoing decline of coral reef ecosystems¹. On the Great Barrier Reef (GBR), long-term monitoring of coral populations has also identified patterns of increasing disease abundance², which indicates an urgent need to understand potential disease impacts on this reef system. An outbreak of 'black band disease' (BBD), a virulent infectious disease that causes rapid tissue loss³, was reported on an inshore reef in Palm Island Group at the central GBR in 2006. We conducted a long-term monitoring program and recorded recurring summer outbreaks of BBD that have caused significant mortality in susceptible coral populations⁴.

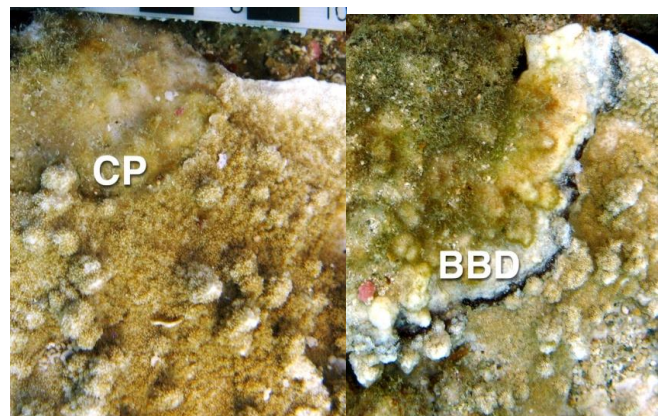
Past microbiological studies demonstrated that BBD lesions comprise a very complex microbial mat made of a suite of different microbes³. These microbial members act together within the BBD mat to maintain high concentrations of sulfide and anoxic micro-environmental conditions that kills underlying coral tissues⁵. However to date, we know little about the contributions of each microbial member to overall pathogenesis of this complex microbial consortium. Also, little is known about how the complex microbial communities of BBD form in the field at the onset of infection. This gap in our knowledge is a major stumbling block for developing potential management strategies against BBD. Recently, using intensive field monitoring and bacterial profiling techniques, we reported the microbial dynamics of a precursor



'Black band disease' affecting Montipora coral sp.



Microscopic image of microbial communities from the BBD lesion.



L to R; the precursor lesion 'cyanobacterial patch (CP)' and subsequently developed 'black band disease (BBD)' lesion.

lesion stage, termed 'cyanobacterial patches' (CP), that subsequently develops into characteristic BBD infections⁶. Using this CP-BBD field system, my PhD research addresses fundamental microbial mechanisms that are responsible for the onset of BBD

During October and November 2009, our dive team visited the BBD monitoring site at Orpheus Island reefs weekly to monitor disease development on tagged colonies of *Montipora hispida* corals and collect microbial samples of developing microbial mats during the transitions from CP to BBD. Collected microbial mats were fixed in preservatives and transported to the Australian Institute of Marine Science (AIMS), where I processed these samples and sequenced key genes (DNA and RNA) allowing identification of the microbial members of the BBD lesion, their abundance, and functional roles. This work was able to document microbial changes during the development of BBD.

Bacterial communities changed throughout the transition and development of BBD from CP⁶. Cyanobacteria, which dominate microbial mats of both CP and BBD, indicated a shift from one species to another, and 'sulphate reducing bacteria' (SRB) increased in relative abundance, indicating their important role in BBD pathogenesis by the production of toxic sulphide. Quantitative methods that specifically target SRB also confirmed the increase of these sulphate reducers⁷. Therefore this transition of CP into BBD results from a complex succession in the associated microbial community within the disease lesions.

Live coral samples infected with CP and BBD lesions were also brought back to study the biochemistry during the development of BBD. Our visiting collaborator, Martin Glas from Max Plank Institute in Germany, profiled chemical concentrations throughout the <1 mm-thin microbial mats of CP and BBD using needle-like sensors (microsensors). Chemical profiles

illustrated that when CP lesions develop into BBD and increased the virulence, microbial mats forms a stratified micro-environmental structure. The bottom of the mat becomes high in sulphide and very low in oxygen in the developed disease mat (Glas et al. submitted). Concentrated sulphide near the disease progression front suggests the importance of dying coral tissue as an organic source for microbial communities. CP and BBD were also compared for the compositions of the third domain of life form; 'archaea' for the first time, using a next-generation sequencing platform. Novel archaea associated with strictly-anaerobic species were identified in BBD, confirming the formation of extremely anoxic conditions in the BBD mats

The next-generation sequencing is a powerful tool in molecular biology, generating millions of nucleotide reads from one sample. The output of these sequencing approaches produces large bioinformatic datasets that characterize the entire microbial community of a sample (in our case CP and BBD lesions). Using next generation platforms, my study is currently applying a RNA-based meta-transcriptomic approach to elucidate microbial drivers that result in a shift in microbial communities during the development of BBD, and determine the functional responses of BBD microbial communities when BBD becomes more virulent under enhanced temperature and light levels. Sequencing has been partially completed with the first very large dataset obtained, and analyses of this data are underway.

Knowledge derived from this study to date has enabled us to draft up the first model of the BBD pathogenesis. It can be outlined as (1) changes in microbial communities from an oxygenic state to anoxic state through increase of organic input (dead coral tissue), facilitating proliferation of key microbial species in the diseased lesion, (2) Increase in anaerobic sulphate reducers that produce toxic sulphide,

and (3) further development of anoxia and high-sulphide conditions as a result of a positive feedback mechanism between these two virulent factors through increased organic input from dying coral tissue. Results from ongoing sequencing projects will provide further insights into the etiology of BBD and contribute to better mechanistic understanding of BBD pathogenesis. Finally, I would like to acknowledge ARCS for the Student Award research fund, which has contributed to the cost of the sequencing projects. Thank you!

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Danielle Simmons Prize: Melanie Trapon

Fine scale patterns of juvenile corals distributions and abundance

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Introduction

A plethora of studies have examined spatial and temporal variations in settlement patterns of scleractinian corals (e.g. 1, 2, 3) and the abundance and composition of adult coral populations (e.g. 2 and 3) across multiple scales. However, relatively few studies have studied the transitional stage between newly settled and adult corals, commonly referred to as juvenile corals (4, 5, 6, 7, 8). This paucity of information is largely due to difficulties associated with identifying and quantifying the abundance of juvenile corals ≤ 50 mm on natural substrates (9). Consequently, our understanding of the relationship between settlement rates, recruitment rates and adult coral abundance is limited (10).

Mortality of corals is generally extremely high immediately following settlement, and consequently may contribute to the disjunct between settlement and adult densities (8). Juvenile corals are typically months to years post-settlement (8), and consequently reflect variation in both settlement and early post-settlement mortality. Juvenile corals' density may, therefore, reflect the capacity of corals to recolonise available substrata and thereby the capacity of reefs to recover following disturbances (9). Quantifying juvenile coral assemblages over a range of spatial scales and determining the factors that influence their density will advance our understanding into the processes that structure coral assemblages.

Thus, the objective of this study was to quantify variation in juvenile scleractinian coral assemblages (≤ 50 mm) on natural substrates and adult coral assemblages across three spatial scales on the Great Barrier Reef (GBR): among sites, among reefs, and among latitudes.

Methods

Juvenile coral abundance, size and microhabitat occupancy at small and large scales along the GBR latitudinal gradient were assessed using a hierarchical sampling design. Three sectors of the GBR were chosen for their different latitude, 14°S, 18°S and 23°S. Then, at each sector, three mid-shelf reefs were chosen for their proximity to a research station: Lizard Island, Orpheus Island and Heron Island research station. Then at each mid-shelf reef, three sites on the reef crest were chosen randomly to install three continuous permanent 10 m transects parallel to the reef crest. Finally, I placed randomly on these transect, five replicates 1m² quadrat (total n=405) to record juvenile corals abundance, size and microhabitat occupancy (horizontal, vertical, under a coral or immersed in the substrate), as well as adult coral cover.



Photo: Melanie Trappon

Results and conclusion

Overall, 2801 juvenile corals ≤ 50 mm were measured in this study, with their density tending to be greatest on reefs in the central GBR (mean = 8.2 colonies.m⁻²) and then

decreasing to both the south (6.5 colonies.m⁻²) and north (6.1 colonies.m⁻²). However the high variation among sites and reefs masked the detection of any large-scale latitudinal patterns. Encompassing the same reefs used in this study, Hughes et al 1999 reported significant latitudinal variations in coral settlement rates on artificial substrata. We found no such gradient in the density of juvenile corals, suggesting that early post-settlement processes may alter these settlement patterns markedly. Similarly to juvenile density, we found no significant differences in adult coral abundance across the three sectors, suggesting that coral cover along the GBR is relatively constant. However, we found no relationship between the abundance of juvenile corals and the percent cover of adult corals. This disparity is most likely arising from processes occurring during the juvenile phase, such as differences in juvenile growth and mortality, and/or disturbance history and susceptibility.

Indeed, size-class distributions of juvenile corals ≤ 50 mm revealed significant difference between our three sectors. These differences suggest that post-settlement processes might differ across the latitudinal gradient of the GBR probably due to differences in oceanographic traits (11) and disturbance regime of the regions (12). Juveniles were distributed almost evenly between the size-classes at the northern and central sectors with even higher abundance of large juveniles, revealing low post-settlement mortality. However at the southern sector, large juveniles were far less abundant, suggesting that post-settlement mortality rates are most likely higher in this region of the GBR.

Another striking result in this study was that juveniles were occurring mostly on exposed horizontal microhabitats, especially at the southern sector. Then, juvenile corals were found to occur on vertical surfaces and the least on immersed or under a coral colony. This suggests that despite a preference for cryptic

habitat in shallow water found in previous studies, horizontal surfaces might maximised the fitness and enhance survival and growth of juveniles (13). Rates of growth and mortality should be measured to test the effect of substrate occupancy on juveniles' survivorship, and this will constitute the second chapter of my thesis.

While regional coral assemblages may dictate larval supply (14) and thereby place an upper limit on the potential settlement of coral larvae, post-settlement processes such as shown by the significant variations in the size-class frequency distributions and the microhabitat occupancy, may largely determine the number of corals entering adult populations. This study provides important ecological information on juvenile corals on natural substrate along the Great Barrier Reef latitudinal gradient and show new insights on their distribution and abundance patterns.



Photo: Melanie Trappon

Acknowledgements

Thank you to the Australian Coral Reef Society for granting me the Danielle Simmons Prize 2011. This funding helped to expand my study to the southern GBR by covering bench fees at Heron Island Research Station in February 2011. Thank you to the ARC for providing support and to Darren Coker, Andrew Hoey and my supervisor Dr Morgan Pratchett for assisting me in the field.

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F. Joseph Pollock ©

Science, Conservation and Management News

Reef Check Australia

Happy Birthday to Us!

Reef Check Australia (RCA) is celebrating a decade of community-based reef health monitoring and education in Australia! Started in 2001 by passionate marine scientist, Jos Hill, the program was designed to harness the power of trained volunteers to implement a broad-scale and globally-relevant reef health monitoring program on the vitally-important Great Barrier Reef, with plans to expand to wider Australia. Over the past decade we have established more than 100 monitoring sites stretching from the pristine northern end of the Great Barrier Reef to the subtropical rocky reefs in SE Queensland.

The RCA program contributes reef health data to one of the most extensive global databases of comparable reef monitoring information. The past 10 years have been supported by more than 50,000 volunteer hours and a vast network of more than partners, including industry, government, scientists, managers and other community organisations. Our more than 200 trained volunteers have completed 1,124 surveys along the Queensland coast, helping to document benthic composition, indicator invertebrates, reef health impacts and fish abundance. You can learn more about the data collected by our trained volunteers online through our [Reef Health Database](#). If you're interested in taking a closer look at RCA data, Data Users can easily access raw data and detailed site information, helping to facilitate data applications for relevant projects.

Brisbane Bound

In April 2011, we moved our headquarters to Brisbane, cementing our program in the SEQ region. Thanks very much to SEQ Catchments and the South East Queensland community for such a warm welcome! Have no fear, we're still actively working in North Queensland and GBR surveys will continue... and grow!

Surveys, Training and Data

This year past, we trained 41 volunteers in Reef Check methods and despite cyclones and floods, completed 27 reef survey trips. We've also established new survey sites on Lady Elliot Island and Heron Island to add to our annual surveys. Over the past several months our survey teams have been getting out to our Sunshine Coast, Moreton Bay and Gold Coast sites to see how sites fared after the January 2011 floods. We also had our first Adopt a Reef corporate sponsor, Air Asia, join us to support monitoring on the Gold Coast's Palm Beach Reef. Early next year we'll be kicking-off our Great Barrier Reef survey season.



In May 2011, Reef Check was a finalist for the Healthy Waterways Brisbane Airport Community Award for Community-based monitoring and protection of South East Queensland's rocky reefs. Many thanks to Healthy Waterways for highlighting the important work of our dedicated volunteers!

In September 2011 we presented *A comparison of the marine biodiversity of Queensland's*

tropical and subtropical reef habitats by the Reef Check Australia community monitoring program at the World Conference on Marine Biodiversity in Aberdeen, Scotland. Results from pooled regional surveys show differences in substrate composition as well as distribution and abundance of fish & invertebrate communities between the two regions.

Community Outreach

In May 2011, we launched REEFSearch, our new community engagement program, on Lady Elliot Island with a group of students from University of the Sunshine Coast. REEFSearch is a reef identification and observation program that makes it easier for more people to get involved in reef check activities. For four months, the REEFSearch pilot program was part of Tourism Queensland's Best Expedition in the World, with numerous trials of the new program to collect community feedback. Find out more about pilot results on our [website](#).

In June 2011, we helped to host, launch and promote [Grey Nurse Shark Watch](#), a community grey nurse shark photographic identification monitoring program encompassing QLD and NSW waters. The photographic identification monitoring program is designed to monitor the recovery of the Australian east coast population of grey nurse sharks and to assist in the identification of critical areas for sharks in different stages of their life cycle.



We've also been helping more people take the time to ponder on their personal daily choices through our [Helping Reefs from Home](#) page and multiple screenings of the movie [Bag It: Is Your Life too Plastic?](#), reaching hundreds of community members. Our volunteer teams have completed plenty of on-ground actions including community events and multiple underwater clean ups with partners such as Gold Coast City Council, University of Queensland's UniDive, Healthy Waterways and local dive operators in Townsville and Brisbane.

Upcoming developments in 2011/2012

We've recently been awarded Australian Government 'Caring for Our Country' funds to establish new Reef Check sites in Great Sandy Marine Park and on the Ningaloo Coast. We're thrilled to continue growing our reef coverage in Australia and helping to fill gaps in reef monitoring and community engagement.

With additional funding granted from Sunshine Coast Regional Council, Redland City Council, Townsville City Council and OceanWatch, we'll also continue working to:

- Find new and meaningful ways to share data collected by our trained volunteers with the public;
- Engage the community in direct actions to protect reef ecosystems through clean-ups and participation in daily conservation activities;
- Survey reef locations using the globally-compatible Reef Check protocols;
- Train new and current volunteers in reef monitoring methods that support reef & ocean management efforts;
- Develop and implement our new REEFSearch & Adopt a Reef programs.



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Research Station News

Lizard Island Research Station (Australian Museum)



Solar power

A 30 kW solar power system has been working brilliantly since it was commissioned in late February 2011. It saves about 65% of the diesel burned for generating electricity and hence 65% of greenhouse gas emissions. The generators need to run for only 4-6 hours per day in winter and 8-9 hours per day in summer.

Numbers

Usage remains close to capacity throughout the year except for a month of planned low usage in winter to allow for maintenance and staff holidays. Of the 7800 visitor nights occupied in 2010/11, 5600 (72%) were for research. The remainder were student groups, volunteers, commercial users, contractors and others.

In 2010/11, LIRS facilitated 101 research projects involving scientists from 45 institutions in 13 countries: 74 senior researchers, 38 PhD students, 15 Masters students and 4 Honours students. Nine high school or undergraduate student groups also used the Station's facilities during the year. Eighty publications based on work conducted at LIRS were added to the collection.

Harmonisation of Occupational Health and Safety regulations

National harmonisation of state-based workplace health and safety regulations is underway with implications for both boating and diving that could adversely affect operations for marine research. LIRS has been active in both processes to press the case for reef science.



ICRS conference

LIRS is running four 4-night field trips for participants of the International Coral Reef Symposium in July 2012. This is a wonderful opportunity to showcase the Great Barrier Reef to the wider coral reef science community. Two trips will be run as coral identification workshops led by Russell Kelley of the Coral Identification Capacity building Program and two will focus on exploration of the area, including the outer reef, led by the Station's directors. The Lizard Island Reef Research Foundation is providing funds to allow some subsidised places on these trips. These will enable access by people who have not visited the GBR before and whose attendance may have flow-on benefits to coral reef conservation.

Lizard Island Fellowships

The Lizard Island Reef Research Foundation and its donors fund a burgeoning program of research fellowships and grants that are awarded by the Australian Museum. Thirteen were current in 2010/11, comprising six awarded in previous years and seven new awards in 2011. Information about the fellowships is at www.australianmuseum.net.au/Lizard-Island-Fellowships.

The **2011 Lizard Island Doctoral Fellowship** was awarded to F. Joseph Pollock of James Cook University and the Australian Institute of Marine Science. Joe will receive \$8,800 in each of 2011 and 2012 for his project: *White syndromes, a virulent group of coral diseases impacting Indo-Pacific coral reefs*.

The **2011 Ian Potter Doctoral Fellowship at Lizard Island** was awarded to Sandra Binning of Australian National University. Sandra will receive \$8,800 in each of 2011 and 2012 for her project: *Shape up or ship out: can coral reef fish change their shape to suit their environment?*

Two **2011 Yulgilbar Fellowships** were awarded in 2011. One was to PhD student Jessica Stella of James Cook University. Jess' one year award of \$8,800 is for her project: *Threats to coral-associated invertebrate diversity from climate change*. Dr Chris Fulton of the Australian National University was awarded \$12,100 for his project: *How does climate influence seaweed patch dynamics on the Great Barrier Reef?*

The **2011 John and Laurine Proud Fellowship** was awarded to Dr Tracy Ainsworth of James Cook University. Tracy's \$12,100 award will enable her project: *The contribution of host-microbe interactions to coral physiology within the microbial environment*.

The **2011 Isobel Bennet Marine Biology Fellowship** (\$12,100) was awarded to Dr Stefan Walker of James Cook University for his project: *The evolution of dominance signalling and signal-receiver behaviour*.

A **special grant** of \$7,480 was awarded in 2011 to Dr Sarah Hamylton of the University of Wollongong for her project: *Modelling coral reef response to environmental change: a geospatial approach*.

All fellowships will be awarded again for 2012 – the winners will be announced in January. There will also be a new grant of \$33,000 in 2012: the Peter Teakle Sustainable Fishing Research Grant. Applications for the 2013 fellowships will close in August or September 2012.

Dr Anne Hoggett & Dr Lyle Vail, Directors
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Web:

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

One Tree Island Research Station (University of Sydney)

One Tree Island has had another great year for ongoing research projects and new work being conducted with development of interesting collaborations.

A major highlight this year was the delivery of two new vessels which will provide greater flexibility for clients with regard to access to field sites near and at a distance from One Tree Reef. ORCINUS II is a 6 m Orca design aluminium pontoon vessel, surveyed to hold 8 persons on board. She has two 60HP outboard engines. This boat will be particularly useful for dive teams working near the reef. For smaller teams working within 500 m of the reef our new 4.10 m boat SEABREEZE will be particularly useful. This vessel is also an Orca design pontoon boat and is surveyed for 5 persons on board. She has a 30 HP outboard engine and a canopy.



We have renovated the dark room at the back of the aquarium and wet lab building to provide a controlled temperature room. With installation of an air conditioner there is now a facility to control light and air temperature.

A Telstra technician came to visit the station to improve the phone system, long the bane of the station. So it looks set for early next year after



Photo by Prof Maria Byrne

the bird nesting season that the station will have installed a satellite phone connection. This will give us 2 phone lines and a fax line.



Station Manager Russell Graham graduated with his Master 5 Certification this year, congratulations Russ! A tour of the station led by Russ and footage of the station is on YouTube (<http://www.youtube.com/user/CarnegieGlobEcology#p/u/0/-oBbXl3Ss2o>).

In 2011 our clients came from a number of Australian and overseas institutions.

UNIVERSITY OF SYDNEY

We had several teams from the University of Sydney. The group led by Dr Will Figueira and Ronen Galaiduk investigated the Impacts of temperature and habitat fragmentation on reef fish.

Associate Professor Ashley Ward's team continued their research on the social behaviour of humbug damselfishes, sand gobies and a number of species of shoaling fishes in visits by PhD students James Herbert Read and Kelly Davis.

Work on the beche-de-mer sea cucumber species that are super abundant in One Tree Lagoon continued in surveys conducted by Professor Byrne's team. Masters students Ben Thorne and Amy Parry focussed on the curry fish species (*Stichopus herrmanni*). This team also started a project on the benthic foraminifera present in the carbonate sands on the reef flat and in sea

cucumber habitat. Steve Doo led this aspect of the research. In a continuation of collaboration with the Caldiera group, Sergio Barbosa investigated the impact of the feeding biology of sea cucumbers to reef mineralization.

The geosciences teams also continued and expanded their research in 2011. Dr Ana Vila Concejo, brought a team to study the sand sheet and reef lat sediment dynamics. Dr Concejo also placed an ADCP to monitor currents near the entrance of OTI, within the lagoon.



Dr. Jody Webster continued his study of coral and sediment distribution around the lagoon with additional studies on the distribution of coralline algae. Honours student Belinda Dechenik investigated, sedimentary facies, coral assemblages and an algal assemblage with a respect to palaeoenvironmental setting. Dr. Anja Rösler undertook research on calcareous algae at One Tree Reef collecting samples for molecular taxonomy.

Prof Tony Larkum paid a short visit to collect sediment samples for his continuing research on the symbiotic algae of coral reef animals.

JAMES COOK UNIVERSITY

Prof Mike Kingsford continued his long-term research program at OTI. The research of the Kingsford team involved fish genetics, olfaction, and habitat and fish counts. Mike also continued his surveys at long term monitoring sites including those impacted by Tropical Cyclone Hamish in 2009. Along with Mike and his

students this year was Dr. Jella Atema from Boston University Woods Hole, with Prof Henrik Mouritzen and Dr Gabi Gerlach from the University of Oldenburg, Germany. Prof Henrik Mouritzen became part of the Kingsford team this year for his work in magnetic orientation. He is also a very keen bird enthusiast, and during his stay at OTI, conducted a bird count, which has since been made into a bird book for OTI. The data are an important survey for Queensland Parks and Wildlife Service and have been added to the data base. In total 33 birds were identified by Prof Mouritzen.

Professor Bette Willis's team continued their research on the ecology and biology of coral disease in the work of Allison Paley and Greg Torda.

MACQUARIE UNIVERSITY

Dr Matthew Kosnik and team are investigating the historical palaeoecology of the GBR including sites at One Tree Reef. Their work involves investigation of living and dead mollusc assemblages in lagoonal sediment.

UNIVERSITY OF QUEENSLAND

Dr Linda Tonk with Dr Pim Bongaerts came to OTI, so that they could dive at Fitzroy Reef to look at soft corals. Dr Tonk is exploring the symbiotic relationships in soft corals. Linda was able to access Fitzroy Reef, in the station vessel "Linckia" as the station manager Russell Graham has just completed his Master Class 5 Skippers Certificate. This allows researchers to be able to access reefs further afield.

Dr Sebastien Dutertre and Ai-Hua Jin were at OTI to collect cone snails for their research on conotoxins. They are investigating the toxins from the Superfamily Conacea.

UNIVERSITY OF TASMANIA

Dr Karen Miller's team continued her long-term research on the population genetics of tropical corals. The team also included Dr Craig Mundy and Sebastian Schmidt-Roach. In their research they aim to link the life history to population structure to corals.



CARNEGIE INSTITUTION

Another large team led by Professor Ken Caldeira and Dr Kenny Schneider. Team members were Dr Jacob Silverman from The Israeli Limnology & Oceanography Institute, Tanya Rivlin from Hebrew University of Jerusalem, Dr Ben Kravitz, Dr Julia Pongratz, Dr Katherine Ricke all from Carnegie, Dr Aya Schneider-Mor from Stanford and PhD students Emily Shaw (UNSW) and Sergio Barbosa (USYD) and Lilian Caldeira. Dr Sarah Hamylton & Dr Valerie Harwood from the University of Wollongong were involved in the remote sensing aspect of the project.

The Caldeira Team investigated calcification cycles on the reef using many of the sites investigated by Prof. Don Kinsey, decades ago. The main experiment undertaken by the group at OTI is a "world first " to bring seawater chemistry back closer to what it was pre-industrially in the unconfined natural environment to see whether the reef grows faster. The team also investigated the response of sea cucumbers maintained at high CO₂ levels. This study focussed on sediment processing in the gut and whether these animals are able to control their internal chemistry. If so, then dissolution in such micro-environments may not increase with ocean acidification.

Dr Sarah Hamylton's work focussed on development of remotely sensed benthic cover maps of the One Tree Island reef system from WorldView-2 satellite imagery.

You can check out the work carried out by the Carnegie group on you tube:

<http://www.youtube.com/user/CarnegieGlobEcology>

CSIRO

Dr Frederieke Kroon and her team were here to assess the potential responses of wild population of marine fish to endocrine disruptors (EDCS) as part of a larger project across the whole GBR

region. At One Tree Reef they focussed on the collection of juvenile Coral Trout.

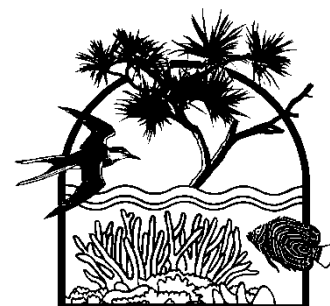
THE NATIONAL INTEGRATED MARINE OBSERVING SYSTEM (IMOS)

An extensive array of IMOS infrastructure is deployed in and around One Tree Reef. A team led by Andrew Boomer from AATAMS, part of IMOS came to service the acoustic array at OTI. The IMOS receiver array in the southern GBR is research infrastructure for all. This means that all receivers are to be serviced at regular intervals by AATAMS staff and that all tag receptions will be downloaded and posted on the web. This real time data is freely available via the [IMOS Ocean Portal](#) and can be overlaid with data from the other IMOS facilities.

Dr Michelle Heupel and a team from Australian Institute of Marine Science used the AATAMS to integrate fish movement with environmental data. The Facility for Automated Intelligent Monitoring of Marine Systems (FAIMMS), tracks the movements of reef predators. They have tagged 10 coral trout and 4 grey reef sharks in and around One Tree Reef with acoustic tags.

STUDENT GROUPS

Prof. Gavin Birch led his annual Geosciences student field trip and Professor Maria Byrne brought her Coral Reef Masters class to the station. David Booth from UTS along with Peter Ralph also brought students to OTI.



ONE TREE
ISLAND RESEARCH STATION
GREAT BARRIER REEF
 THE UNIVERSITY OF SYDNEY

Completed by Jennifer Reiffel and Maria Byrne.

National Marine Science Centre (Southern Cross University)

Infrastructure Upgrade

The National Marine Science Centre (NMSC) received over \$2M from the university as part of a federally funded grant to improve its research and teaching facilities. This funding is being used to upgrade and extend several areas within the NMSC.

One of the strengths of the NMSC is its sea-water system. Apart from supplying the aquaculture tank-farm and aquarium with flow-through sea-water, the system also feeds directly into the laboratories and temperature controlled rooms. Researchers are able to turn on a tap and access sea-water direct from Charlesworth Bay. Although substantial, the existing capacity does have limits to number of users, especially during low-tides. In addition, the current tank farm does not have room to accommodate the 20 ton tanks required for breeding large fish such as mulloway and mangrove jack. A substantial part of the funding will be used to double in size the tank farm, provide additional sea-water storage tanks, and expand the pumping system.

Included in the building works are upgrades to the existing laboratories, construction of four more temperature controlled rooms, and construction of three new offices overlooking the palm trees and Resort.

Additional funding is also being provided to install video-conferencing facilities in the Board-Room and Lecture Theatre.

The works will be completed by March 2012.

Research

Research output at the NMSC is continues to grow exponentially, despite the small number of staff that are currently based at the facility. In 2011 SCU staff and students published over 20

peer-reviewed papers and 5 reports for Catchment Management Authorities. Staff secured grants from a range of funding sources including ACR, ACIAR, RIRDC, NSW Environmental Trust, Recreational Fishing Trust and CMA's. The areas of research currently underway include impacts of ocean acidification and warming on marine life, marine biodiversity monitoring, aquaculture of mulloway, ecological studies on anemones and their resident fish, and coral bleaching.

Apart from SCU staff, the NMSC also houses Wild Fisheries Research and Commercial Fisheries Policy staff from NSW DPI, as well as Wetland Care Australia. This provides a dynamic and multidisciplinary environment for researchers and students.

Teaching

The NMSC continued to support the final year of Southern Cross University's Bachelor of Marine Science and Management degree. After completing two years of the course at the Lismore campus, students attend intensive six-day teaching periods at the NMSC in subjects such as global climate change, marine pollution, coral reefs and marine ecosystem management. A Masters Degree in Marine Science and Management is also run at the NMSC.

Aquarium, Schools Programs and Community Outreach

The Solitary Islands Aquarium is part of the NMSC and operates as a public entity on weekends and school holidays. During weekdays the Aquarium caters to primary and secondary schools and community groups. The Aquarium showcases the biodiversity found within the Solitary Islands Marine Park in the Coffs Harbour Region. This is a particularly interesting region it as situated at the intersection between the subtropical and temperate currents.



In 2011 it is expected that there will have been approximately 10,000 Aquarium visitors and 58 school groups comprising 2,200 students. Using the Solitary Island Marine Park as a backdrop, the NMSC Primary and Secondary School Programs offer innovative field and laboratory-based activities in topics such as marine science, aquaculture and chemistry. In 2011, two new activities were introduced on ocean acidification and coastal management.

The Aquarium hosted National Science Week activities around the theme “Science under the Sea”. Funding for this was received from the Department of Innovation, Industry, Science and Research. The three day event attracted over 400 visitors and was a great success.

Heron Island Research Station (University of Queensland)

Heron Island Research Station has had a fantastic year with over 200 Australian and International researchers visiting the station. In addition, over 140 educational groups visited, taking advantage of the station’s dedicated teaching facilities. Throughout 2011 the station worked towards

streamlining processes and procedures to allow researchers to focus on the job at hand and make the most out of their visits. This has been reflected in the more than 50 published papers arising from research conducted at HIRS in the last 12 months. The station will continue to work towards these efficiencies in 2012.

2011 has also seen the completion of a number of upgrades around the station. One of particular interest to many of our clients has been the extension of the station’s molecular facilities. Visiting researchers now have the capacity to take PCRs right through to the gel visualization step. These facilities have been utilized to type *Symbiodinium* clades and confirm species identification to ensure experimental designs are correct. The refurbishment of the HIRS library was also completed in 2011 with the generous support of The University of Queensland Information Services. A wide range of new books have been acquired and 2012 will see the station’s coral skeleton collection placed back on display. Significant changes to the stations internet service also occurred with clients no longer having to pay per download, a vast improvement on the old system.

The coming year is set to be another year of improvements for HIRS clients. The website is currently being overhauled and will be launched later this year. The new website will be accompanied by a new online-booking system and a revised, more client-friendly, pricing structure for the station. The station’s capacity for sustainable power generation is set to increase this year and our energy production will be able to be monitored online when the website is launched later in the year.

We look forward to another productive year of research at the station and to seeing as many of you as possible here on the Island. HIRS will have a booth at ICRS so please stop by to say hello and quiz us for more information.

Orpheus Island Research Station (James Cook University)

Orpheus Island Research Station was established in 1979 as a research facility by James Cook University. Set within a 2-hectare site surrounded by the Orpheus Island National Park it offers access to inshore and mid-shelf reefs providing access to a wide variety of reef types, species and management zones.

Usage of station facilities during 2011

2011 saw a reduction of overall user days at OIRS primarily caused by the impacts of heavy flooding and Cyclone Yasi at the start of the year.

Educational Study Groups

OIRS hosted 22 educational field trips during 2011 including two international undergraduate visits, one from University of St Andrews, UK and the other organised by Australearn.

Research Projects

2011 saw the completion of several long term research projects, including three international projects conducted by:

- **Max Wisshak & Christine Schonberg** – University of Erlangen-Nuremberg, Germany
- **Mikhail Matz** – University of Texas, USA
- **Rebecca Vega Thurber** – Oregon State University, USA

An additional thirty seven research projects were undertaken at OIRS during 2011 by Australian based researchers, looking into a wide range of subjects including:

- Scleractinian corals
- Sponge ecology
- Impacts of climate change on coral development
- Connectivity in reef building corals
- Behavioural adaptation to climate change
- Coral reef fishes ecology
- No-take zoning effects on the Great Barrier Reef
- Sponge symbiotic function
- Invertebrate feeding
- Reef shark distribution
- Ecosystem functions
- Ecological connectivity
- Physiological and genetic adaptation by corals to climate change
- Mortality in adult colonies
- Coral spawning experiments
- Seaweed
- Intertidal sponges
- Coral energy allocation and life-history
- Acoustic tracking of *Siganus doliatus*
- Maternal stress and offspring success
- Sexual development in marine fish species
- Population dynamics of reef-building corals





Research subjects (cont'd):

- Use of otoliths to monitor environmental change
- Biodiversity of ecto-symbionts associated with branching coral
- Heterospecific associations
- Sponge sediment
- Sublethal bleaching
- Water Quality
- Coral immunity
- Effect of ocean acidification
- Coral disease
- Larval dispersal and reef connectivity
- Coastal geomorphology

2011 developments:

Great Barrier Reef Ocean Observing System (GBROOS): Whilst offline for most of the year due to Cyclone Yasi damage, the weather stations have now been replaced or repaired and due to upgrades now offer additional data including salinity and turbidity. Additionally OIRS users now have access to the live data via a kiosk donated by AIMS.

Acoustic Tracking and Monitoring System (AATAMS): An additional 5 acoustic receivers have been deployed in Hazard Bay and Southern Orpheus Bay.



Change of Pickup Location: In November the pickup location changed from Taylors Beach to Lucinda. As a result the station is no longer as restricted by tides and can now offer greater flexibility in transfer times, same day return trips and easier cargo loading.

Upcoming developments in 2012

ICRS 2012: During July OIRS will be hosting two field trips for ICRS conference delegates.

Great Barrier Reef TV Show: Screening in March the new BBC TV show will be featuring the GBR and OIRS.

Challenger IV: The new transfer vessel will be delivered in February. The new vessel will be capable of transferring 25 passengers between the mainland and the station and taking 12 passengers to the mid-shelf reefs.

ORCA Booking System: The new online booking and station management operating system is expected to be operational around September.

Low Isles Research Station (University of Queensland)

With the unfortunate departure of the Low Isles Research Station caretaker last year, the facilities have been closed for business from the 15th of October. The University of Queensland apologises for any inconvenience this has caused researchers and educational groups. The Faculty of Science is working with the Great Barrier Reef Marine Park Authority to resolve this issue as soon as possible. For any enquiries please contact the Faculty of Science Office at www.science.uq.edu.au/contact-us

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Advances in Coral Reef Science

In 2010, 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!

Centre of Excellence in Coral Reef Studies

[Australians urged to support world's largest marine park](#): 26 December 2011.

[The constant gardeners of the world's reefs](#): 8 December 2011

[When the heat's on, fish can cope](#): 5 December 2011

[Do Marine Parks need sharks](#): 5 December 2011

[Of turtles and men](#): 30 November 2011

[Leaders urged to curb climate vulnerability](#): 28 November 2011

[Scientific sleuths pinpoint the guilty coral killers](#): 23 November 2011

[Corals can sense what's coming](#): 18 November 2011

[Sea life "must swim faster to survive"](#): 4 November 2011

[Fair trade "can help save reefs"](#): 20 October 2011

[Give Fishers a Break, Says Researcher](#): 17 October 2011

[Deep-reef coral hates the light, prefers the shade](#): 17 October 2011

[Decline and recovery of coral reefs linked to 700 years of human and environmental activity](#): 3 October 2011

[Call for Australian lead in safeguarding oceans](#): 3 October 2011

[New analysis confirms sharks are in trouble](#): 28 September 2011

[World-first discovery 'can help save coral reefs'](#): 27 September 2011

[Award winner "can count fish from space"](#): 19 September 2011

[Seeking the keys to coral reef renewal](#): 5 September 2011

[Centre researcher wins L'Oreal Fellowship](#): 23 August 2011

[Coral genome decoded](#): 25 July 2011

[Climate change will damage reefs 'at different rates'](#): 22 July 2011

[Gene secrets of the reef revealed](#): 5 July 2011

[Big marine parks 'save money and oceans'](#): 19 April 2011

[2011 Rosenstiel award winner revealed](#): 6 April 2011

[Fish know to avoid the spear](#): 21 March 2011

[Weed eating fish 'key to reef survival'](#): 10 March 2011

[Coral 'Network' can protect Asia-Pac fish stocks](#): 22 February 2011

[Extinction predictor 'will help protect coral reefs'](#): 15 February 2011

[Acid oceans demand greater reef care:](#) 14 February 2011

[Kenya's fisheries management promotes species that grow larger and live longer:](#) 10 February 2011

[New research tracks dugong movements within Torres Strait:](#) 10 February 2011

[Finding new ways to protect both fish and fishers:](#) 27 January 2011

[Migration helps corals survive climate change:](#) 24 January 2011

[De coral has de rhythm to beat de night-time blues:](#) 14 January 2011



2011

Publication List

Author institutions include:

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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