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## PROCEEDINGS OF THE



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## Editors Preface

The 12<sup>th</sup> International Coral Reef Symposium (ICRS 2012), held in Cairns, Queensland, Australia from July 9-13<sup>th</sup>, 2012, was attended by nearly 2000 delegates. The program included over 1500 talks and posters. We are pleased to present the Proceedings, which contains almost 200 contributions from scientists around the world arising from the Symposium.

The Proceedings encompass a broad spectrum of coral reef science, and demonstrate a growing expansion from the biological and earth sciences to non-traditional disciplines, including the social sciences and economics. The trend in earlier ICRS Symposia, towards a larger contribution from the fields of conservation planning and management, continued in Cairns in 2012. The Symposium also included an increased focus on climate change and ocean acidification, as well as reef management and governance issues including the Coral Triangle Initiative.

For the first time in the history of ICRS Symposia, the organizers of the meeting invited submission of manuscripts for peer review prior to the Symposium so that delegates could receive the Proceedings when they arrive at the Symposium. We hope the benefits of rapid publication will allow prompt dissemination of the latest breakthroughs in coral reef science, and stimulate further advances in the knowledge necessary for sustaining the world's coral reefs. An additional advantage of rapid publication is the benefit of immediately placing the Proceedings online on the ICRS 2012 website (<http://www.icrs2012.com/>), where it is freely accessible to a global audience. The Symposium website will also archive many other outcomes of ICRS 2012, including video recordings of the Plenary Talks. We thank the WorldFish Center in Penang, Malaysia, for agreeing to upload the ICRS 2012 Proceedings to ReefBase (<http://www.reefbase.org>) along with earlier ICRS Symposia.

We are very grateful to authors who submitted their manuscripts for publication in the ICRS 2012 Proceedings, and to our many colleagues around the world who have generously contributed to the peer-review editorial process. We especially thank the Chairs and Co-Chairs of the individual Mini-Symposia, listed on p4, who led and coordinated the peer-review of all manuscripts accepted and published in the Proceedings. Eliza Glasson, the Conference Coordinator, was instrumental throughout the organizational process, and Penny Sandercock at ICMS Australasia maintained the submission website and was key to producing the digital proceedings.

Finally we thank all committee members who contributed to the organisation of ICRS 2012.

David Yellowlees  
Terry Hughes

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<i>Torres Strait Seagrass Productivity, Climate Change Resilience and Recovery Capacity</i>	ICRS2012_15B_5
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<i>Taxonomic inventory of Scleractinia in French overseas territories</i>	ICRS2012_15A_4
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## **Theme 16: Microbes & viruses**

<i>A Slowly Progressing Disease Outbreak Among Massive Coral on Majuro Atoll</i> Jacobson, Dean M.	ICRS2012_16B_1
<i>Developments in understanding relationships between environmental conditions and coral disease (Abstract in Tyler Christensen's name)</i> Heron, Scott F., Jeffrey Maynard, Bette Willis, Tyler Christensen, Drew Harvell, Bernardo Vargas-Angel, Roger Beeden, Jamie Sziklay, Greta Aeby, Erik C. Franklin William Skirving, C. Mark Eakin, Tim Burgess, Jianke Li, Gang Liu, Ethan Lucas, Jacqueline Rauenzahn, Al Strong	ICRS2012_16B_4
<i>Microbial Activity and Dissolved Organic Matter in Sesoko reef, Okinawa</i> Mohamed Fairoz, Mohamed Farook, Beatriz Casareto, Yoshimi Suzuki	ICRS2012_16B_2
<i>Outbreak of the coral disease, Montipora White Syndrome in Maui, Hawaii</i> Ross, Megan, Yuko Stender, Darla White, Greta Aeby	ICRS2012_16B_3

## **Theme 17: The Coral Triangle Initiative**

<i>Applying habitat maps and biodiversity assessments to coral reef management</i> Bruckner, Andrew W., Philip Renaud	ICRS2012_17A_3
<i>Linking research to Indonesia's CTI Action Plan: the SPICE Program</i> Ferse, Sebastian C.A., Marion Glaser, Claudia Schultz, Jamaluddin Jompa	ICRS2012_17A_1
<i>Identifying Oceanic Thermal Anomalies in the Coral Triangle Region</i> Heron, Scott F., Robert L. Pressey, William J. Skirving, Jacqueline L. Rauenzahn, Britt-Anne A. Parker, C. Mark Eakin	ICRS2012_17D_1
<i>Impact of Coral Bleaching at Mu Koh Similan National Park</i> Klinthong, Wanlaya, Thamasak Yeemin	ICRS2012_17D_2
<i>Bridging the gap between regional plans and local action: The case of the Malaysian Coral Triangle Initiative and Semporna, Sabah.</i> Choo, Poh Leem, Kenneth Kassem, Monique Sumampouw	ICRS2012_17C_1
<i>An Ecological and Social Approach to Banggai Cardinalfish Conservation Management</i> Ndobe, Samliok, Daduk Setyohadi, Endang Yuli Herawati, Soemarno, Abigail Moore	ICRS2012_17A_2
<i>Tourist perception of coral bleaching in the Andaman Sea</i> Samsuvan, Watchara, Thamasak Yeemin	ICRS2012_17D_3
<i>Marine park with whale shark and adjacent to sardine fishery</i> Soliman, Victor, Raul B. Burce	ICRS2012_17B_1
<i>Managing bleached coral reefs in the Gulf of Thailand</i> Sutthacheep, Makamas, Sittiporn Pengsakun, Pongvithid Chueliang, Pitakphong Suantha, Kazuhiko Sakai, Thamasak Yeemin	ICRS2012_17D_4
<i>Coral farming as means of sustaining livelihoods and promoting resource management</i> Wia, Jane, Fraser A. Januchowski-Hartley, Rachael U. Lahari, Tau Morove, Helen M. Perks, Katherine E. Holmes	ICRS2012_17C_2

<i>Genetic structure of Culcita sp. pincushion seastar in the Coral Triangle</i> Yasuda, Nina, Coralie Taquet, Satoshi Nagai, Miguel Fortes, Suharsono, Handoko Adi Susanto, Niphon Phongsuwan, Kazuo Nadaoka	ICRS2012_17A_4
<i>Impacts of coral bleaching, recovery and management in Thailand</i> Yeemin, Thamasak, Vipoosit Mantachitra, Sakanan Plathong, Paulwatt Nuclear, Wanlaya Klinthong, Makamas Sutthacheep	ICRS2012_17D_5
<i>First Quantitative Assessment of Coral Bleaching on Indonesian Reefs</i> Yusuf, Syafyuddin, Jamaluddin Jompa	ICRS2012_17D_6

### Theme 18: Management & monitoring

<i>Science and Public Input: Biscayne National Park's Proposed Marine Reserve</i> Alvear Rodriguez, Elsa Marcella	ICRS2012_18D_1
<i>MPA Evaluation and Habitat Characterization for Vulnerability Assessment in Davao, Philippines</i> Bacaltos, Della Grace, Hilly Ann Roa-Quioit, Fra-and Quimpo, Roy Molina, Joy Jimenez, Buzar Beu Bacaltos	ICRS2012_18D_2
<i>Quantifying coral substratum detectability from earth observation sensors</i> Botha, Elizabeth J., Vittorio E Brando, Janet M. Anstee, Arnold G. Dekker	ICRS2012_18C_1
<i>Measuring and communicating effects of MPAs on deep 'shoal' fisheries</i> Cappo, Mike, Marcus Stowar, Thomas Stieglitz, Eric Lawrey, Charlotte Johansson, Aaron MacNeil	ICRS2012_18A_1
<i>Australia's Coral Sea - how much do we know?</i> Ceccarelli, Daniela M.	ICRS2012_18E_1
<i>Reef Health Monitoring to Inform Climate Change Policy in Jamaica</i> Creary, Marcia Loureene Jones Smith, Sean Green	ICRS2012_18B_1
<i>The color of the Coral Sea</i> Dupouy, Cecile, Guillaume Wattelez, Rosalie Fuchs, Jérôme Lefèvre, Morgan Mangeas, Hiroshi Murakami, Robert Frouin	ICRS2012_18E_2
<i>Managed Access: Moving Towards Collaborative Fisheries Sustainability in Belize</i> Foley, James R.	ICRS2012_18A_2
<i>Effects of a network of NTZs after 15 years in Nabq, Sinai, Egypt</i> Galal, Nasser, Rupert Ormond, Jennifer Ashworth, Emad El-Aaydi	ICRS2012_18A_3
<i>Effectiveness of Different Levels of Management on Three Belizean MPAs</i> Hagan, Annelise B.	ICRS2012_18A_4
<i>A Decade of Community-based Socioeconomic Monitoring in Lakshadweep, India 2001-2011</i> Hoon, Vineeta, Christy Loper	ICRS2012_18F_1
<i>Teardrop - a rapid reef mosaicing tool for coastal communities</i> Judilla, Roel John, Jaylord Jauod, Eusebio Capili Jr., Maricor Soriano	ICRS2012_18D_3
<i>Monitoring supports establishment of Pacific Remote Islands Marine National Monument</i> Kenyon, Jean, James Maragos, Peter Vroom	ICRS2012_18F_2

<i>Coral reefs of Gulf of Mannar, India - signs of resilience</i>	ICRS2012_18F_3
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<i>Science-based design of coral protected areas in the Gulf of Mexico</i>	ICRS2012_18F_4
Schmahl, George P., Emma L. Hickerson, Marissa F. Nuttall	
<i>Towards marine spatial planning for Hervey Bay's coral reefs</i>	ICRS2012_18C_2
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#### **Theme 19: Human impacts on coral reefs**

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<i>Interpretation to manage marine recreational resource use in Mombasa, Kenya</i>	ICRS2012_19A_1
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<i>Opportunities and challenges of managing spawning aggregations in Fiji</i>	ICRS2012_19D_2
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<i>Does collecting inhibit the recovery of anemone and anemonefish populations after bleaching?</i>	ICRS2012_19A_2
Jones, Alison M.	
<i>Fate of Suspended Dredge Material at Apra Harbor, Guam</i>	ICRS2012_19A_3
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<i>Building Ecological and Social Resilience into Southeast Florida Reef Management</i>	ICRS2012_19B_1
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<i>Catastrophic Loss of Acropora palmata in the Florida Keys</i>	ICRS2012_19B_2
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<i>Importance of heterotrophic adaptations of corals to maintain energy reserves</i>	ICRS2012_19A_4
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<i>Assessing community resilience to climate change</i>	ICRS2012_19A_5
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<i>International trade in hard corals: review of management, sustainability and trends</i>	ICRS2012_19C_1
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## **Theme 20: Restoration of coral reefs**

<i>Thermal tolerance as a factor in Caribbean Acropora restoration</i> Bowden-Kerby, Austin, Lisa Carne	ICRS2012_20A_1
<i>Scaling up Acropora nurseries in the Caribbean and improving techniques</i> Griffin, Sean, Hanae Spathias, Thomas D. Moore, Iliana Baums, Beth Ann Griffin	ICRS2012_20A_2
<i>Success of outplanted Acropora cervicornis colonies in reef restoration</i> Hollarsmith, Jordan A., Sean P. Griffin, Thomas D. Moore	ICRS2012_20A_3
<i>Coral Relocation: A mitigation tool for dredging works in Jamaica</i> Kenny, Ivana, Astrid Kramer, Peter Wilson Kelly, Timothy Burbury	ICRS2012_20A_4
<i>Experimental transplantation of corals using sexual reproduction in Manado, Indonesia</i> Okamoto, Mineo, Kakaskasen A. Roeroe, Minlee Yap, Laurentius Th.X. Lalamentic, Syuichi Fujiwara, Kumi Oyamada	ICRS2012_20A_5

## **Theme 21: Water quality: impacts & management**

<i>Macrobioerosion in Porites corals from the northern South China Sea</i> Chen, Tianran	ICRS2012_21B_1
<i>Extreme weather conditions in the Great Barrier Reef: Drivers of change?</i> Devlin, Michelle, Jon Brodie, Amelia Wenger, Eduardo da Silva, Jorge G. Alvarez-Romero, Jane Waterhouse, Len McKenzie	ICRS2012_21A_1
<i>Factors affecting land-based sedimentation in coastal bays, US Virgin Islands</i> Gray, Sarah C., Whitney Sears, Megan L. Kolupski, Zoe C. Hastings, Nicholas W. Przyuski, Michael D. Fox, Amalia DeGrood	ICRS2012_21A_2
<i>Tropical Foraminifera as indicators of water quality and temperature</i> Reymond, Claire E., Sven Uthicke, John M. Pandolfi	ICRS2012_21B_2
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<i>Assessment of Sediment Organic Matter Transportation Using Stable Isotope Analysis</i> Susanto, Handoko Adi, Masaaki Yoneda, Makoto Komoda, Hiroko Koike	ICRS2012_21A_4
<i>Anthropogenic factors and nutrient variability along the Coral Coast, Fiji.</i> Tamata, Ulukalesi, John Morrison	ICRS2012_21A_5
<i>Salinity as a structuring force for near shore coral communities</i> True, James D.	ICRS2012_21B_3

## **Theme 22: Social, economic & cultural perspectives**

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<i>Customary marine tenure and contemporary resource management in Solomon Islands</i> Bennett, Gregory	ICRS2012_22A_3
<i>Loss of economic value from coral bleaching in S.E. Asia</i> Doshi, Amar, Sean Pascoe, Olivier Thébaud, Colette R. Thomas, Naneng Setiasih, James Tan Chun Hong, James True, Heidi Z. Schuttenberg, Scott F. Heron	ICRS2012_22D_1
<i>Whose sustainability? Top-down participation in MPA management in Indonesia</i> Glaser, Marion, Wasistini Baitoningsih, Sebastian CA Ferse, M. Neil, Rio Deswandi	ICRS2012_22A_2
<i>Development of Indicators for Measuring Effects of Human Activities on U.S. Pacific Coral Reefs</i> Grace-McCaskey, Cynthia A.	ICRS2012_22A_4
<i>Decision making tools: How to best manage the coral reefs?</i> Hilmi, Nathalie, Alain Safa, Mine Cinar	ICRS2012_22D_2
<i>Conservation of our natural heritage The Singapore experience</i> Low, Jeffrey, Liang Jim Lim	ICRS2012_22A_5
<i>The Worth of Coastal Ecosystems in the Coral Triangle</i> Napitupulu, Lydia, Annabelle Cruz-Trinidad, Titaningtyas	ICRS2012_22D_3
<i>Coral Buildings at Raya and al-Tur in Sinai, Egypt</i> Nawata, Hiroshi, Mutsuo Kawatoko, Yoko Shindo, Shinichi Nishimoto	ICRS2012_22A_6
<i>What impacts to expect from economic valuation of coral reefs?</i> Pascal, Nicolas, Luke Brander, Eric Clua, Gilbert David, Yann Laurans, Andrew Seidl	ICRS2012_22D_4



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