

Symposium report: Great Barrier Reef restoration symposium, 2018

Introduction

The Great Barrier Reef (GBR), located off the coast of Queensland, Australia, is a UNESCO¹ World Heritage site, one of the seven natural wonders of the world and the world's largest living structure. Spanning 2300 km, it has more than 450 species of corals, 1600 types of fish, and is one of the world's unique and most biodiverse environments (AIMS 2018). It is estimated that the GBR supports more than 64,000 jobs and contributes more than AU \$6.4B/yr to the Australian economy (Deloitte 2017). However, the unprecedented back-to-back bleaching events of 2016 and 2017 led to widespread mortality of shallow water corals (Hughes *et al.* 2018). While the Great Barrier Reef is still resilient, the projected increase in sea temperatures, forecasts for more frequent coral bleaching, continued outbreaks of crown-of-thorns starfish (COTS) and increasing intensity and frequency of cyclones puts the Great Barrier Reef's future recovery at high risk.

With the relatively recent recognition of a need for urgent activity around GBR coral restoration, the low information base from which we were operating, and the recognised need to learn from the international community on best practice restoration, the first Great Barrier Reef Restoration Symposium (the symposium) was initiated. The symposium brought together restoration practitioners, scientists, engineers, environmental managers, NGOs and industry partners to share experiences, insights and ideas about what worked, what did not, and the knowledge gaps that needed filling in order to help the GBR. The symposium was a collaborative effort between the Tropical Water Quality Hub of the Australian Government's National Environmental Science Program, the Reef and Rainforest Research Centre, the Reef Restoration and Adaptation Program and the Association of Marine Park Tourism Operators. Additional partners included James Cook University, Reef Ecologic and the Reef Restoration Foundation.

Symposium Themes, Presentations and Workshops

The symposium focused on sharing coral reef restoration knowledge from around the world, as well as developments in specific restoration research and methodologies. The format included three days of presentations and a field trip on the fourth and final day to Fitzroy Island to view examples of local coral restoration and conservation programmes. A number of workshops were also held during the symposium.

The symposium opened with a Welcome to Country delivered by Gavin Singleton of the Yirrganydji and Gudju Gudju of the Gimuy Walibara Yidinji. Then followed introductions and welcome by symposium convenor, Professor Damien Burrows. Plenary and keynote speakers included Australia's Ambassador for the Environment, Mr Patrick Suckling. Three opening keynote talks, by Great Barrier Reef Marine Park Authority Chief Scientist, Dr David Wachenfeld, The Nature Conservancy's Boze Hancock, and NOAA's Tali Vardi, summarised the status of the GBR and presented summaries of international restoration programmes. The Honourable Penelope Wensley AC facilitated a listening session in which representatives of major stakeholder groups presented their views.

Each day of the symposium concluded with a wrap-up session, allowing symposium participants to publicly reflect on what they had heard during the day, before moving on to evening social functions. Additional attendees at the social functions included local political and reef-related dignitaries. Plenary presentations were delivered by experts and leaders from across the world and the GBR, outlining strategic approaches to coral reef restoration, adaptation and management. These included COTS control, international examples of coral reef restoration, the role of social licence, the challenges of scaling-up restoration, and navigating the regulatory and legislative pathways for implementing non-traditional restoration techniques in Australia.

Fifteen-minute presentations delivered across the first three days were organised into the following broad themes:

- Reef restoration, methods, and restoration of other marine and coastal ecosystems
- COTS control
- Achieving scale for restoration
- Hydrodynamics and mixing to reduce bleaching risk and enhance recovery
- Enhancing the temperature tolerance of corals
- Economic levers and investment
- Social licence, policy and regulation
- Decision-making approaches and tools

In addition, on the second day, five-minute speed talks provided snapshots of projects as conversation starters for networking sessions. There were also poster displays and three workshops provided the opportunity to discuss topics and issues in more detail.

¹United Nations Educational, Scientific and Cultural Organization

Workshop 1 – Young Adults Workshop

The Young Adults Workshop brought together 30 primary and secondary school students to identify problems and solutions relating to reef restoration and stewardship from their perspective. The goal was to enable young people to discuss and understand their important role as the next generation of Great Barrier Reef stewards (Cook 2018). During the workshop, students watched two short videos, one highlighting healthy reefs and the other degraded coral reefs. Before discussion, the students were asked to write down a single word to describe their thoughts, emotions or feelings following each video, which were then collated into word clouds (Fig. 1).

Workshop 2 – Coral tipping, bommie rolling and fragments of opportunity

This workshop brought together 40 managers and researchers to discuss emergency response to coral damage resulting from ship strikes and extreme weather events. Two case studies of actions taken and lessons learned from Guam and Australia were presented. Discussions and advice were recorded to be included in good practice guidelines being developed by the Reef Resilience Network.

Workshop 3 – What you need to know about regulations in the GBR Marine Park

This workshop explored some of the limitations, challenges and difficulties in assessing and approving restoration projects in the GBR Marine Park from a regulatory and permitting perspective.

News and Media

Strategic pre-event media pitches and daily media alerts generated more than 250 news items reaching an estimated audience of about 2.5 million Australians. This

included full-page in-depth feature articles in both *The Australian* and *The Courier-Mail*, a news feature syndicated throughout Fairfax media – including *The Sydney Morning Herald*, *The Age* and *Brisbane Times*, daily television and radio coverage, as well as a video shared on *The Australian's* Facebook page. There was also international coverage, with live streams of presentations and keynote speeches from the symposium available through the Nature Conservancy's Reef Resilience Network website (www.reefresilience.org). A proactive article 'The science and art of reef restoration' was published in *The Conversation* (Smith & McLeod 2018). Some industry representatives, such as those from the agricultural industry, wrote about the symposium in their respective industry journals. Interviews with key symposium presenters were filmed and produced into short web vignettes for distribution via social media, and most presentations were filmed, shared on YouTube and made available via the symposium's legacy website (www.gbrrestorationsymposium.org). The Nature Conservancy recorded a series of podcasts and videos from the event.

#RestoretheReef2018 Twitter Data Analysis

The symposium initiated #RestoretheReef2018 for delegates and those unable to attend in person. Over three days, the total number of tweets was 2657 (measured using Twitter analytics and NVivo software). Of these, 30% were original tweets ($n = 818$), and the rest were retweets ($n = 1839$). On the first day of the symposium, #RestoretheReef2018 was the fifth most popular hashtag in Australia. Tweets from accounts registered outside of Australia came from Dhaka, Bangladesh, Mombasa, Kenya, California and North Carolina, USA. The top delegate Twitter user handles were @K_vella $n = 237$, and the top five tweeters were female. @ReefEcologic was the highest group (non-individual) with 207 tweets. Notably, tweets from non-symposium delegates came from international



Figure 1. Word clouds resulting from the reflections session of the Young Adults Workshop. These were presented to all attendees in the wrap-up session and were very powerful.

marine and science institutions, and individual scientists. The four most common twitter accounts were from @aims_ceo @aims_gov_au, @AusCoastRestore and @NOAA.

What was Special About the Symposium?

The symposium placed much emphasis on listening to the views of a broad range of stakeholders, including Traditional Owners and school-age speakers. Stakeholders were given prime billing on the first morning during the single session period. In addition, no fewer than 10 oral presentations were from representatives of tourism operators, on their work in reef restoration and resilience management. The young adults' workshop, attended by 30 high school students was a particular highlight. There were also numerous presentations by NGOs (including several started by dedicated and inspiring young entrepreneurs), commercial groups and reef managers, including a session on alternative financing approaches. Together, this variety of perspectives was appreciated by attendees, especially as it affirmed the wide variety of stakeholder groups that were very supportive of the reef restoration concept.

Reef restoration and adaptation management activities are new in the Australian context and potentially risky, especially at the scale required for the GBR. The challenges facing the GBR are enormous, the need for further knowledge and skills around scalable and affordable restoration and adaptations approaches is urgent, and our history of attempting such is limited. Yet despite this, by coming together and sharing a variety of potential approaches and collective thinking, the overwhelming result from the symposium, and one that brought delegates together, was a feeling of optimism, unity and the growing belief that we can indeed make a meaningful difference to present reef trajectories. We posit that this optimism was borne out of a realisation of the possibility of a wide community of people from diverse backgrounds working together on reef restoration and adaptation, while trialling ideas from around the world that have previously been untested in Australia. Many new ideas and approaches had their first public airing at the symposium and many delegates were inspired by what they saw and heard.

Symposium Outcomes and Lessons Learned

The symposium recognised the need to address climate change as a priority, to maintain existing management activities and to harness adaptation and restoration techniques to enhance the recovery and increase resilience of the GBR. There was shared recognition that coral reefs around the globe are facing similar threats to the GBR, and that experts, practitioners and concerned parties needed to work together to share knowledge and enable global action in protecting and restoring coral reefs. It was understood there was also a need to adapt, innovate and develop methods appropriate to the scale, nature and

legislative climate of the Great Barrier Reef. In an outcomes and position statement produced by leading symposium attendees, it was noted that restoration raised questions around the risk of intervening with coral reef ecosystems; placed additional roles and demands on regulators; and there was a need to consider the implications of new technologies, such as genetic modification. It was noted that these risks must be carefully managed and balanced against the implications of inaction. Active restoration and adaptation activities should not be seen as the sole solution to addressing the global coral reef crisis, but rather, part of an integrated and multi-pronged approach. The symposium placed significant emphasis on the important role of Traditional Owners and the wider community in active protection of the Great Barrier Reef. The ongoing involvement of these groups will be important in designing appropriate restoration methods, as well as their potential implementation. The Great Barrier Reef Restoration Symposium program and abstracts are available from <https://gbrrestorationsymposium.org/>.

This report was prepared by: Damien W. Burrows, National Environmental Science Program, Tropical Water Quality Hub (Cairns, QLD 4870, Australia); TropWATER, James Cook University (Townsville, QLD 4811, Australia). **Jemma Purandare**, TropWATER, James Cook University (Townsville, QLD 4811, Australia; Email: jemma.purandare@gmail.com). **Line Bay**, Australian Institute of Marine Science (PMB3, Townsville, QLD 4810, Australia). **Nathan Cook**, Reef Ecologic Pty Ltd (14 Cleveland Terrace, Townsville, QLD 4810, Australia). **Danielle Koopman**, Reef Restoration and Adaptation Program (RRAP) (Townsville, QLD 4811, Australia). **Suzanne Long**, National Environmental Science Program, Tropical Water Quality Hub (Cairns, QLD 4870, Australia); Reef and Rainforest Research Centre (PO Box 1762, Cairns, QLD 4870, Australia). **Petra Lundgren**, Great Barrier Reef Foundation (PO Box 2725, Brisbane, QLD 4006, Australia). **David Mead**, Australian Institute of Marine Science (PMB3, Townsville, QLD 4810, Australia). **Sheriden Morris**, National Environmental Science Program, Tropical Water Quality Hub (Cairns, QLD 4870, Australia); Reef and Rainforest Research Centre (PO Box 1762, Cairns, QLD 4870, Australia). **Maxine Newlands**, School of Social Science, James Cook University (Townsville, QLD 4811, Australia). **Christian Roth**, Commonwealth Scientific and Industrial Research Organisation (GPO Box 2583, Brisbane, QLD 4001, Australia). **David Wachenfeld**, Great Barrier Reef Marine Park Authority (Townsville, QLD 4810, Australia). **Adam K. Smith**, TropWATER, James Cook University (Townsville, QLD 4811, Australia); Reef Ecologic Pty Ltd (14 Cleveland Terrace, Townsville, QLD 4810, Australia). **Ian M. McLeod**, TropWATER, James Cook University (Townsville, QLD 4811, Australia).

References

Australian Institute of Marine Science (2018) Reef Restoration and Adaptation Program. [Accessed 28 October 2018.] Available from URL: <https://www.gbrrestoration.org/documents/2159048/2159891/RRAP+Brochure/ddf3124e-3809-4662-9bd2-ca68e9641bac>

Cook N. (2018) Summary of proceedings and outputs Young Adults Workshop, Great Barrier Reef Restoration Symposium, Cairns, Australia, 18 pp.

Deloitte Access Economics (2017) At what price? The economic, social and icon value of the Great Barrier Reef.

Hughes T. P., Kerry J. T., Baird A. H., et al. (2018) Global warming transforms coral reef assemblages. *Nature* **556**, 492–496.

Smith A. and McLeod I. (2018) The science and art of reef restoration. *The Conversation*. 16 July. [Accessed 28 October 2018.] Available from URL: <https://theconversation.com/the-science-and-art-of-reef-restoration-99933>