



## Member's report on activities related to ICRI

AUSTRALIA (GREAT BARRIER REEF MARINE PARK AUTHORITY)

Reporting period November 2016 – November 2017

1. **Contribution to the ICRI Plan of Action 2016-2018.** *Your responses to the following questions will assist the Secretariat in assessing contributions towards the major themes of the current ICRI Plan of Action (<http://www.icriforum.org/icri-secretariat/current>)*

### Theme 1 – “Help raise awareness of how coral reefs and related ecosystems help to fight climate change”

- *Goal 1-1: highlight the contribution of coral reefs, mangroves and seagrasses to mitigate and adapt to climate change and its impacts*

**Question:** Do you have examples of solutions provided by coral reefs and coastal systems to mitigate and adapt to climate change?

Since 2007, the Great Barrier Reef Marine Park Authority has been working with reef managers, researchers, industries, communities and Traditional Owners to build the health of the Great Barrier Reef so it can withstand the impacts of climate change. We are working to understand the risks of climate change and other threats to the Reef, and helping reef communities and industries adapt to the changing environment. A resilient Reef is better able to withstand stress and cope with impacts of disturbances.

Our [strategic assessment](#), the [Reef 2050 Long-Term Sustainability Plan](#) and [Great Barrier Reef Climate Change Adaptation Strategy and Action Plan 2012-2017](#) outline actions to improve the health and resilience of the Great Barrier Reef.

The Authority works with our management partners to build the Reef's resilience by:

- continuing to make no-take areas effective as refuges for key species
- identifying and protecting critical habitats
- working with communities and industries to improve stewardship for local reefs
- understanding the interactions between threats to improve targeting of management efforts
- monitoring and evaluating patterns of damage and recovery after disturbances to inform the need for additional management measures.

The Authority recently provided input to the Australian Department of Environment and Energy on the climate change policies and review discussion paper. The Authority's [submission](#) reinforces the importance of Australia leading global efforts to meet the goals of the Paris Climate Change Agreement.

In May 2017, over 70 regional, national and international delegates representing marine park managers, Traditional Owners, government agencies, research institutions, industry groups, Reef users and other stakeholders participated in the Authority's [Great Barrier Reef Summit: Managing for Resilience](#). The key objective of the Summit was to develop a blueprint for the Authority and its partners in response to mass bleaching and cumulative impacts on the Great Barrier Reef. An important part of this was to develop resilience initiatives focusing on coral reef habitats.

It reaffirmed a shared commitment to protecting the Reef and building resilience — the strong take away message being that ‘together we can secure the future of the Reef’ — but we have to try harder, do more and act now.

The blueprint has been drafted and will be released in December 2017. Building on foundational management arrangements for the Reef, it outlines ten key initiatives the Authority will pursue with our partners, to enhance resilience. They fall into four broad areas:

- Building a resilience network
- Delivering on-ground actions to enhance resilience
- Empowering people to be part of the solution
- Fostering change.

The Authority has already committed to several actions which has enabled implementation of the blueprint to begin.

Initiatives are future-focused, collaborative and adaptive. A set of principles has been developed to inform the development and prioritisation of resilience actions. Considerations include effectiveness, feasibility, cost and risk. A decision framework for prioritising selection of coral reefs for the reef-wide resilience network– based on exposure, ecosystem state and connectivity - is also outlined within the blueprint.

Australia’s Commonwealth Scientific and Industrial Research Organisation (CSIRO) has also been working with the Department of Foreign Affairs and Trade (DFAT) and other partners to build capacity and raise awareness of the climate mitigation and adaptation potential of coral reefs, but also mangrove and seagrass ecosystems in particular. The Australian Government has hosted the Australia Awards fellowships, with fellows working in government, research, academia, NGOs and private industry from Madagascar (6), Seychelles (4) and Mauritius (1). Fellows received training in a wide variety of aspects from governance to finance to ecology, and will be passing on their learnings in their home countries. The Authority contributed its expertise and facilitated some of the training provided to the Fellows.

CSIRO hosted a Blue Carbon Finance workshop in June 2017, attended by representatives from government, research, academia, industry, NGOs and afforestation practitioners. The workshop outcomes were summarised and will be in a publically-available report that is currently being prepared for publication.

The CSIRO Carbon cluster paper Atwood et al 2017 (DOI: 10.1038/NCLIMATE3326) addressed Global patterns in mangrove soil carbon stocks and losses and is currently the most comprehensive assessment of mangrove carbon sequestration.

The CSIRO ‘Carbon Cluster’ has provided a strong evidence basis for the mitigation and adaptation potential of coastal mangrove, seagrass and tidal ecosystems. The research conducted in the cluster included a compilation of existing Australian coastal carbon data as well as new data to estimate carbon storage potential of these coastal vegetated ecosystems, providing a strong basis to estimate carbon sources, sinks and their rates of change. Outputs included a digital carbon inventory on the sources, stocks and flows of carbon in Australian coastal vegetation, estimated sequestration rates, improved methods to estimate carbon stocks in coastal areas and process understanding of changes in carbon cycling resulting from natural and anthropogenic change. The cluster research produced numerous reports and scientific papers that together combine to form a robust evidence base from which to develop policy.

**Question:** Are you planning to add in your NDC the importance of coral reefs / mangroves?

CSIRO completed a report for the Australian government on opportunities of including blue carbon in the Australia’s governments Emission Reduction Fund  
<https://publications.csiro.au/rpr/download?pid=csiro:EP166570&dsid=DS2>

**Theme 3: “Help to reduce human threats to coral reefs and associated mangroves and seagrasses, by making greater use of regulatory tools”**

- *Goal 3-1: promote legal frameworks for the protection of coral reefs and associated mangroves and seagrasses, with quantified targets and effective enforcement to protect these ecosystems*

**Question:** What are the legal frameworks for the protection of coral reefs and associated mangroves and seagrasses in place in your countries? If you already replied to the previous request, you don't need reply

The Australian and Queensland governments have been working together for the long-term protection and conservation of the Great Barrier Reef Marine Park since its inception in 1975. This cooperative approach was formalised by the *Emerald Agreement* in 1979, which was updated in 2009 and again in 2015 to provide a contemporary framework for cooperation between the governments, recognising challenges such as climate change and catchment water quality not foreseen at the time of the 1979 agreement, and to reflect the shared vision for the future outlined in the Reef 2050 Long Term Sustainability Plan.

The Agreement recognises key pressures on the Reef — such as climate change impacts, catchment water quality and coastal development — cannot be effectively addressed by either government on their own. It aims to ensure an integrated and collaborative approach is taken by the Australian and Queensland governments to manage marine and land environments within the World Heritage Area.

The work to protect the Great Barrier Reef Marine Park in Australia is guided by a range of plans, regulations and legislation. The [Great Barrier Reef Marine Park Act 1975](#) is the primary Act relating to the Great Barrier Reef Marine Park. Other Commonwealth and Queensland Government legislation also applies.

The Great Barrier Reef Marine Park Authority is responsible for ensuring the Great Barrier Reef Marine Park is protected for the future. For more than 40 years the Authority has managed this biologically diverse icon and multiple-use area, using the best available scientific information and input from marine managers, researchers, experts and Traditional Owners.

Protection and management of the Great Barrier Reef Region is a partnership between many government agencies, stakeholders and the public. For example, the Authority and the [Queensland Parks and Wildlife Service](#) operate a Joint Field Management Program of education, compliance and enforcement to support rules aimed at protecting the ecosystem, and [Fisheries Queensland](#) undertakes much of the fisheries management within the Marine Park.

In addition, the [Federal Environment Department](#) is responsible for implementing the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Environment Protection (Sea Dumping) Act 1981*. The EPBC Act enables assessment and regulation of new proposals that have the potential to impact the Great Barrier Reef. [Maritime Border Command](#) provides aerial surveillance of the region; and the [Australian Institute of Marine Science](#) undertakes research.

Aboriginal and Torres Strait Islander peoples are the Traditional Owners of the Great Barrier Reef Region and evidence of their sea country connections goes back over 60,000 years. Today there are approximately 70 Traditional Owner clan groups whose sea country includes the Great Barrier Reef Marine Park. The Authority works with Aboriginal and Torres Strait Islander Traditional Owners and acknowledges their continuing social, cultural, economic and spiritual connections to the Great Barrier Reef Region.

The Authority collaborates with Traditional Owner groups on a suite of sea country management arrangements including Traditional Use of Marine Resources Agreements (TUMRAs) and Marine Park Indigenous Land Use Agreements (ILUAs). These formal agreements are developed by Traditional Owner groups and accredited by the Authority and the Queensland Department of National Parks, Recreation, Sport and Racing. Each agreement operates for a set time after which it is renegotiated.

An agreement may describe how Traditional Owner groups wish to manage their take of natural resources (including protected species), their role in compliance and their role in monitoring the condition of plants and animals, and human activities in the Great Barrier Reef Marine Park.

The TUMRA implementation plan may describe ways to educate the public about traditional connections to sea country areas, and ways to educate other members of a Traditional Owner group about the conditions of the agreement.

The Blue Carbon Finance workshop held by CSIRO and the Department of Foreign Affairs and Trade in June 2017 (see response to Goal 1.1 question) progressed understanding of the legal frameworks for coastal restoration, and highlighted the challenges faced by uncertainty of tenure. These challenges are present in many (perhaps most) nations, and need some attention to resolve. Typically, they are located within sovereign territorial seas, but can be complicated by local government, lease, and other arrangements. Promotion of legal frameworks needs to start from a basis of firm understanding of tenure and property rights, as well as nations' obligations under UNCLoS, and this remains unresolved for many jurisdictions.

**Question:** Did you set quantified targets to protect their coral reefs, mangroves and seagrasses? And are you able to provide a % of what is currently protected in your country? Please define what you mean by protection?

The Australian Government, together with state and territory governments, have established marine parks around the country, covering 3.3 million km<sup>2</sup> - some 36 per cent of our oceans.

The Great Barrier Reef Marine Park is a multiple-use area. The [Great Barrier Reef Marine Park Zoning Plan 2003](#) provides for a range of ecologically sustainable recreational, commercial and research opportunities and for the continuation of traditional activities.

Zoning helps to manage and protect the values of the Marine Park that people enjoy. Each zone has different rules for the activities that are allowed, the activities that are prohibited, and the activities that require a permit. Zones may also place restrictions on how some activities are conducted.

In July 2004, the Great Barrier Reef Marine Park rezoning came into effect to better protect the Great Barrier Reef's biodiversity. This increased the area of Marine National Park Green (no-take) Zones from less than five per cent to over 33 per cent of the Marine Park. Extractive activities such as collecting and fishing are not allowed in Green Zones.

Scientists from the Australian Institute of Marine Science (AIMS) recently published research based on 20 years of monitoring data collected by the Long-Term Monitoring Program that shows no-take marine reserves in the Marine Park have increased the resilience of coral reef communities to various natural disturbances including coral bleaching, coral diseases, outbreaks of crown-of-thorns starfish and storms. For example, full recovery of the coral community following a crown-of-thorns starfish outbreak required on average nine years on unprotected reefs, but just over six years inside protected no-take zones. At a time when the world's largest coral reef ecosystem is facing multiple and growing pressures from natural and anthropogenic disturbances, this proof of increased resilience from protective spatial management offers some encouragement to reef managers.

Using the [eReefs](#) platform CSIRO and partners have completed scenario modelling of the per cent reductions in catchment derived nutrient and sediment loads that would be required to achieve specified water quality targets in the Great Barrier Reef Region (Baird et al 2017)

- *Goal 3-2: encourage a ban on plastic microbeads in cosmetic products*

**Question:** How did you implement the [recommendation to reduce plastic microbeads pollution in marine environment?](#)

The Australian Government supports industry-led action to phase out the use of microbeads in personal care, cosmetic and some cleaning products. The voluntary phase out of microbeads is on track to be delivered by mid-2018. If the current industry-led approach does not effectively phase out microbeads by mid-2018, governments will move to implement a ban.

- *Goal 3-3: improve regulation and enforcement to reduce direct anthropogenic damage due to dredging and physical alteration of reef structures*

**Question:** are you working on this topic? If yes, could you please share with us your work. Please note that the information provided will help us to develop a recommendation for the next ICRI General Meeting. Please send us information as soon as possible,

In June 2015 the Australian Government regulation under the *Great Barrier Reef Marine Park Regulations 1983* came into effect to end the disposal of dredge material in the Great Barrier Reef Marine Park from capital dredging projects such as port developments. The effect of the regulation is:

- The Authority must not grant a permission for conduct that includes dumping of capital dredge material in the Marine Park.
- The ban applies to existing permits for conduct that includes uncontained disposal of capital dredge material in the Marine Park where the permits have yet to expire.

The desired outcome of this regulation change was to:

- improve water quality in the Marine Park
- increase protection and conservation of the plants and animals of the Marine Park, including protected species; and therefore,
- improve the Great Barrier Reef's overall World Heritage values,
- as well as to give certainty to future project proponents about capital dredge spoil disposal in the Marine Park.

The Australian Government also regulates the loading and dumping of waste at sea under the *Environment Protection (Sea Dumping) Act 1981*. This Act fulfils Australia's international obligations under the London Protocol to prevent marine pollution by controlling dumping of wastes and other matter. The Sea Dumping Act enables the Australian Government to minimise pollution threats by prohibiting ocean disposal of waste considered too harmful to be released in the marine environment and regulating permitted waste disposal to ensure environmental impacts of permitted actions are minimised.

The [National Sea Simulator](#) (SeaSim) at the AIMS facility near Townsville, Queensland continues to attract researchers from around the world. The SeaSim is the most advanced research aquarium facility of its kind in the world, giving AIMS' scientists and national and international collaborators unprecedented capability to conduct complex multi-factorial experiments examining the individual and cumulative impacts of pressures such as sediments, pCO<sub>2</sub> (pH), turbidity, nutrients, light, salinity and temperature on key reef species. For example, the capabilities of SeaSim were essential in evaluating the impacts of dredging on corals and other reef species in order to provide evidence-based advice on thresholds for light and siltation to mitigate environmental impact. This research, which was funded by offsets provided by the oil and gas industry, is informing government regulators and guiding industry best practice. Findings from this work is having real-world impact by being incorporated into multi-million-dollar port expansion plans in Darwin and Port Hedland.

CSIRO has led a substantial body of research directed at quantifying and predicting the effects of dredging. In Western Australia research has focussed on developing accurate and robust models of dredge plumes, developing best practice approaches for such modelling, understanding the light-mediated impacts of dredging on seagrasses and corals, and quantifying the lethal and sub lethal effects of sediment on corals. This advice is being incorporated into state guidelines for dredging management. In Queensland research has focussed on water quality, seagrass habitat distribution, turtle habitat use and numerical modelling of seagrass growth. The research is used to develop tools that can be used to determine management options that reduce impacts on corals and seagrasses. This work has been applied in developing an operating system of monitoring and models for the working port of Gladstone harbour.

- *Goal 3-4: promote the deployment of mooring devices limiting the mechanical destruction of coral reefs and seagrasses*

**Question:** are you working on this topic? If yes, could you please share with us your work. Please note that the information provided will help us to develop a recommendation for the next ICRI General Meeting. Please send us information as soon as possible,

The Great Barrier Reef Marine Park Authority has a policy on moorings in the Great Barrier Reef that provides a framework for the management and use of public, private tourism and recreational vessel

moorings, to support ecologically sustainable access in the Great Barrier Reef while preventing environmental harm to sensitive environments.

The policy articulates the benefits of moorings, and promotes equity of public access, for example through public moorings, in multiple-use areas. The policy provides that any private mooring installed and operated in the Great Barrier Reef requires a written permission, which is usually a joint permission issued by the Authority and the Queensland Government. Private moorings must be maintained annually and a compliance certificate obtained by an appropriately qualified person as part of the permission conditions.

While users of the Great Barrier Reef Marine Park may generally anchor in most places, they must not damage or remove coral. They cannot anchor in designated Reef Protection Areas, which are generally marked with white pyramid-shaped buoys.

A series of public moorings are also installed in some sensitive locations, for example the Whitsundays area, with time access limits on day use. These moorings are colour-coded to provide for a range of vessel sizes, and are maintained by the Joint Field Management Program.

- *Goal 3-5: review issues related to the impact of sunscreens and other endocrine disruptors on coral reefs, and encourage the production of sunscreens that are proven not to damage coral reefs*

**Question:** are you working on this topic? If yes, could you please share with us your work. Please note that the information provided will help us to develop a recommendation for the next ICRI General Meeting. Please send us information as soon as possible.

#### **Theme 4: “Monitor the state of reefs in order to better manage them”**

Starting in 1985, AIMS’ Long-term Monitoring Program has surveyed more than 100 coral reefs every year to determine the status of reefs throughout the Great Barrier Reef Marine Park. In a landmark publication in 2012, AIMS’ scientists reported a loss of 50 per cent of living hard coral cover in the Great Barrier Reef over the 27 years that the Long Term Monitoring Program had been running, and attributed the declines to tropical storms, outbreaks of crown-of-thorns starfish, and coral bleaching.

Unlike storms and bleaching which are difficult, if not impossible, to control, crown-of-thorns starfish are an obvious target for population control. AIMS is investigating solutions to the crown-of-thorns starfish problem by studying the reproductive biology of the giant triton, a natural predator of the starfish, and examining the feasibility of using them to control crown-of-thorns starfish populations. AIMS’ scientists are also working on isolating and purifying chemicals with attractant and repellent properties, which has been greatly assisted by describing the complete genomes of crown-of-thorns starfish collected in Australia and Japan.

The Australian and Queensland governments’ Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan) provides an overarching strategy for managing the Great Barrier Reef. It contains targets, actions, objectives and outcomes along with defined areas of responsibility to protect and improve the Reef ’s health and resilience, while allowing ecologically sustainable use. The Reef 2050 Plan has been developed in consultation with partners, including Traditional Owners and the resource, ports, fishing, agriculture, local government, research and conservation sectors.

A key component of the Reef 2050 Plan is the establishment of the [Reef 2050 Integrated Monitoring and Reporting Program](#) (the Program). The Program will provide a comprehensive and up-to-date understanding of the Great Barrier Reef — the values and processes that support it and the threats that affect it. This knowledge is fundamental to informing actions required to protect and improve the Reef ’s condition and to drive adaptive management.

There are currently over 90 monitoring programs operating in the Great Barrier Reef World Heritage Area and adjacent catchment. These programs have largely been designed to address and report on specific issues, location or management initiatives. The need to ensure these programs align with

each other and management objectives was identified through the comprehensive strategic assessments of the Great Barrier Reef World Heritage Area and adjacent coastal zone.

The Program will report across the seven themes which make up the Reef 2050 Plan Outcomes Framework. The themes are ecosystem health; biodiversity; water quality; heritage; community benefits; economic benefits and governance. The intent of the Program is not to duplicate existing arrangements but to coordinate and integrate existing monitoring, modelling and reporting programs across disciplines.

Through the Great Barrier Reef Marine Park Authority's [Eye on the Reef](#) monitoring program anyone out on the water can collect information on Reef health, animals and incidents.

There are four levels of the program, allowing anyone to get involved:

- Eye on the Reef smartphone app — any Reef user submitting photos of marine animals, coral and incidents
- Tourism weekly surveys — tourism staff tracking changes over time at frequently-visited tourist hot-spots
- Rapid monitoring surveys — advanced surveyors using underwater slates to record common marine animals and plants and reef observations
- Reef health and impact surveys — mostly Marine Park rangers and researchers, comprehensively assessing ecosystem health in five-metre radius circles.

The Authority uses the information supplied by participants to gather a Reef-wide picture of ecosystem health and species distribution. Information may also be used to assess the impacts of incidents in the Marine Park, such as cyclones, flood plumes, coral bleaching, coral disease and crown-of-thorns starfish outbreaks.

The Eye on the Reef data also contributes to our [current conditions on the Great Barrier Reef](#) reports.

- *Goal 4-2: better monitor the phenomena of coral bleaching*

**Question:** How did you implement the [recommendation on addressing the decline in coral reef health due to global bleaching events?](#)

Also refer to input at Goal 1-1 on the Great Barrier Reef Summit and blueprint.

The Great Barrier Reef Marine Park Authority maintains a Reef Health Incident Response System designed to provide for a consistent and coordinated approach to Reef health incidents. The plans include related routine and responsive tasks.

Each summer season, the Authority prepares for the potential impacts of a bleaching event through its Coral Bleaching Risk and Impact Assessment Plan. The plan provides a transparent and consistent decision-making framework during bleaching events to ensure a rapid, robust and coordinated response.

The Authority and key partners recognised and alerted the fact that there would be a high risk of bleaching in 2016, and monitored for early warning signs. As the mass bleaching unfolded, the Authority triggered its Coral Bleaching Risk and Impact Assessment Plan and subsequently it's largest-ever in-water monitoring effort. The Authority formed an incident management team to coordinate and undertake the surveys, as well as logistics, mapping, data analysis, and stakeholder and broader communications. The incident response was supported by many collaborations and partnerships, and the Authority was also a member of Australia's National Coral Bleaching Taskforce.

In 2016, the Authority activated the highest response level (3) of the Reef Health Incident Response System due to mass coral bleaching. The criteria for response level 3 was again met in 2017 due to a second wave of mass coral bleaching, elevated levels of coral disease, crown-of-thorns starfish outbreaks, and a severe cyclone. The Authority's Eye on the Reef program played a critical role in both these responses.

Early in 2017 staff from the Authority participated in aerial surveys of bleaching with Professor Terry Hughes' team (Australian Research Council Centre of Excellence for Coral Reef Studies) and

conducted ‘spot checks’ at a number of reefs to confirm severe bleaching and high incidence of coral disease. Authority and Australian Institute of Marine Science staff also conducted an aerial survey of the central Reef, and staff have been trained in aerial survey methods.

During the 2016 bleaching event, the three core components of the plan were put into action.

- Early warning system—an assessment of the probability of the event was made using an early warning system comprised of climate forecasts, tools that enable near real-time monitoring and site inspections.
- Incident response—an incident response system coordinating the governance, planning, operations, logistics, financial and inter-agency liaison arrangements was activated, redirecting resources to where they were most needed. Additional resources were deployed to monitor the extent and impact of the event.
- Communications strategy—arrangements for internal and external communications was enacted, enabling accurate, clear and timely communications of the status of bleaching. Regular updates were posted on the Authority’s website enabling anyone to access an up-to-date assessment of the extent of coral bleaching and subsequent coral mortality.

The Authority co-funded a project at reefs off Mission Beach led by Professor Bette Willis (coral disease expert from the Australian Research Council Centre of Excellence for Coral Reef Studies), ‘Unravelling the links between thermal stress, bleaching and disease: Monitoring the fate of tabular corals following a combined white syndromes outbreak and bleaching event’. Three field trips were completed, and repeated re-surveys of coral colonies at the reefs have enabled tracking of disease progression and provided valuable information for managers during the event. The project is advancing knowledge of the impacts of thermal stress on coral assemblages, and will inform future management tools (e.g. disease outbreak risk tools used for pre-summer workshops).

Scientists from the Australian Institute of Marine Science (AIMS) have been working closely with others, particularly the Authority and James Cook University, to determine the impact of the back-to-back coral bleaching event on the Great Barrier Reef in 2016 and 2017. The extent and severity of these bleaching events is unprecedented in the 32-year record of AIMS’ Long-term Monitoring Program. In the 2015–16 event the northern third of the Reef was severely bleached and lost at least 30 per cent of the cover of living coral. In the 2016–17 event, bleaching extended further south to include nearly two-thirds of the Great Barrier Reef and bleaching severity increased resulting in severe bleaching being recorded on 76 per cent of the reefs in the central section. At the peak of the bleaching event, 15–60 per cent of the living corals as far south as Townsville were at risk of dying. These events are particularly unfortunate as Long-Term Monitoring Program surveys showed that the average coral cover across the Reef had been recovering after declines caused by several severe tropical cyclones, including Tropical Cyclone Hamish (2009) and Tropical Cyclone Yasi (2011).

Throughout the bleaching events, in excess of 2600 surveys across 190 reefs were completed to develop a robust understanding of the bleaching. This included 873 surveys comprising a set of seven transects forming a representative sample of reefs along the length and breadth of the Great Barrier Reef to assess the severity of bleaching and allow comparison to previous mass bleaching events. Throughout October and November 2016, the surveys were repeated to determine how much coral died from the event (mortality) and assess early signs of recovery. It is expected the assessment from these latter surveys will be finalised in early 2018.

The gradient for mortality was even more pronounced with most mortality occurring in the 600 kilometre stretch between the tip of Cape York and just north of Lizard Island.

Based on this analysis:

- The Authority implemented a new policy, ‘Dredging coral reef habitat: operating a facility or carrying out works for the development of marine infrastructure’, to strengthen protection of coral reef habitat from dredging of coral, related to development of infrastructure.
- A Coral Stress Response Taskforce was activated with the coral and aquarium fisheries and resource managers to minimise impacts on reef ecosystems under stress from significant bleaching. The sole aquarium supply business operating north of Cooktown voluntarily agreed not to collect in the region pending the results of further reef health surveys. The sea cucumber and tropical rock lobster industries also participated.
- Research institutions permitted to collect coral were encouraged to voluntarily suspend coral collection activities for research purposes in the Far Northern Management Area.

- The Authority implemented education initiatives with fishers to reinforce the importance of protecting herbivorous reef fishes to support recovery processes on coral reefs.

### Theme 5: “Progress via education”

- *Goal 5-1: prepare for the 2018 International Year of the Reef (IYOR)*

**Question:** How did you implement the Recommendation designating 2018 as the third International Year of the Reef? Please let us also know what you are planning to celebrate IYOR2018.

The Great Barrier Reef Marine Park Authority is developing a plan for communications and events around the 2018 International Year of the Reef. This will be delivered in partnership with the Department of the Environment and Energy and the Department of Foreign Affairs and Trade. It will include a range of messages and action using social media, public engagement, and delivering messages through our national education centre Reef HQ Great Barrier Reef Aquarium.

**Please also list the educational material that you’ve developed in the past, so we can share it on the IYOR website.**

There is a range of education material available on the GBRMPA website:  
<http://www.gbrmpa.gov.au/learn-about-the-reef/resources-by-theme>

**Question:** Would you like to report on one of your activities during the ICRI GM meeting?

Yes. The Great Barrier Reef Marine Park Authority would like to present on its Reef Summit, and the resulting *Reef Blueprint for Resilience*.

**2. Publications.** Please list relevant publications/reports (related to the ICRI plan of action) you have released during this reporting period.

### **GBRMPA Policy and Reports**

Great Barrier Reef Marine Park Authority 2017, *Cumulative impact management policy: Draft for public consultation*, Great Barrier Reef Marine Park Authority, Townsville  
<<http://hdl.handle.net/11017/3213>>.

Great Barrier Reef Marine Park Authority 2017, *Environmental Impact Management: Permission System (Document No. 100430)*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3224>>.

Great Barrier Reef Marine Park Authority 2017, *Net benefit policy: Draft for public consultation*, Great Barrier Reef Marine Park Authority, Townsville  
<<http://hdl.handle.net/11017/3214>>.

Great Barrier Reef Marine Park Authority 2017, *Draft Policy: Cruise ship operations within the Great Barrier Reef*, Great Barrier Reef Marine Park Authority, Townsville  
<<http://hdl.handle.net/11017/3184>>.

Great Barrier Reef Marine Park Authority 2017, *A vulnerability assessment for the Great Barrier Reef: Estuaries*, Great Barrier Reef Marine Park Authority, Townsville  
<<http://hdl.handle.net/11017/3169>>.

Great Barrier Reef Marine Park Authority 2017, *Crown-of-thorns starfish control guidelines: second edition*, Great Barrier Reef Marine Park Authority, Townsville  
<<http://hdl.handle.net/11017/3162>>.

Great Barrier Reef Marine Park Authority 2017, *Summary of the second round of public consultation on proposed changes to the permission system (conducted September to November 2016)*, Great Barrier Reef Marine Park Authority, Townsville  
<<http://hdl.handle.net/11017/3124>>.

Great Barrier Reef Marine Park Authority 2017, *Reef Guardian Councils: highlight reports 2015-2016*, Great Barrier Reef Marine Park Authority, Townsville  
<<http://hdl.handle.net/11017/3161>>.

Thompson, A. *et al.* 2017, *Marine Monitoring Program: Annual report for inshore coral reef monitoring 2015 to 2016*, Great Barrier Reef Marine Park Authority, Townsville  
<<http://hdl.handle.net/11017/3258>>.

Tracey, D., Waterhouse, J. and da Silva, E. (TropWater) 2017, *Preliminary investigation of alternative approaches for the Reef Plan Report Card Water Quality Metric report*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3222>>.

Great Barrier Reef Marine Park Authority 2017, *Corporate Plan: 2017-2018*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3246>>.

Great Barrier Reef Marine Park Authority 2017, *Great Barrier Reef Marine Park Authority service charter 2017-2020*, Great Barrier Reef Marine Park Authority, Townsville  
<<http://hdl.handle.net/11017/3250>>.

Great Barrier Reef Marine Park Authority 2017, *Final report: 2016 coral bleaching event on the Great Barrier Reef*, Great Barrier Reef Marine Park Authority, Townsville  
<<http://hdl.handle.net/11017/3206>>.

Great Barrier Reef Marine Park Authority and Reef Guardians Council 2017, *Reef Guardian Councils: highlight reports 2016-2017*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3259>>.

Cardno Ltd. 2017, *Douglas Shoal preliminary site assessment report*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3282>>.

Great Barrier Reef Marine Park Authority 2017, *Cost Recovery Implementation Statement: cost recovery for managing the permission system under the Great Barrier Reef Marine Park Act 1975*, Great Barrier Reef Marine Park Authority, <<http://hdl.handle.net/11017/3167>>.

Great Barrier Reef Marine Park Authority 2017, *A method for identifying and prioritising coastal ecosystem functional connections to the Great Barrier Reef World Heritage Area and Great Barrier Reef Marine Park*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3170>>.

Great Barrier Reef Marine Park Authority 2017, *Regulator performance framework self-assessment 2015-16*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3114>>.

Great Barrier Reef Marine Park Authority 2017, *Annual Report 2016-2017*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3261>>.

Centre for Tropical Water & Aquatic Ecosystem Research 2017, *Annual report for flood plumes and extreme weather 2013-2014*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3160>>.

Great Barrier Reef Marine Park Authority 2017, *Managing for a resilient Great Barrier Reef Marine Park: Supporting information paper and workbook*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3204>>.

Howley Environmental Consulting 2017, *Water quality in Princess Charlotte Bay flood plumes and eastern Cape York Peninsula flood plume exposure: 2012-2014*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3159>>.

Great Barrier Reef Marine Park Authority 2017, *Marine Monitoring Program summary report: results for 2015-16*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3262>>.

Great Barrier Reef Marine Park Authority 2017, *Reef Summit: Managing for resilience. Summary of proceedings and outputs, 24-25 May 2017, Townsville*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3203>>.

Great Barrier Reef Marine Park Authority 2017, *Managing cumulative impacts and achieving no net loss and net benefit outcomes for the Great Barrier Reef: A review of current understanding and application for management*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3207>>.

Great Barrier Reef Marine Park Authority 2017, *Whitsundays plan of management 1998: includes the 2017 amendment as in force 2 August 2017*, Great Barrier Reef Marine Park Authority, Townsville <<http://hdl.handle.net/11017/3242>>.

#### **GBRMPA staff papers**

Brodie, J.E., Lewis, S.E., Collier, C.J., Wooldridge, S., Bainbridge, Z.T., Waterhouse, J., Rasheed, M.A., Honchin, C., Holmes, G. and Fabricius, K. 2017, Setting ecologically relevant targets for river pollutant loads to meet marine water quality requirements for the Great

Barrier Reef, Australia: A preliminary methodology and analysis, *Ocean & Coastal Management* 143: 136-147 doi: 10.1016/j.ocecoaman.2016.09.028.

Pratchett, M.S., Cameron, D.S., Donelson, J., Evans, L., Frisch, A.J., Hobday, A.J., Hoey, A.s., Marshall, N.A., Messmer, V., Munday, P.L., Pears, R., Pecl, G., Reynolds, A., Scott, M., Tobin, A., Tobin, R., Welch, D.J. and Williamson, D.H. 2017, Effects of climate change on coral grouper (*Plectropomus spp.*) and possible adaptation options, *Reviews in Fish Biology and Fisheries* 27: 297-316 doi: 10.1007/s11160-016-9455-9.

Anthony, K., Bay, L.K., Costanza, R., Firn, J., Gunn, J., Harrison, P., Heyward, A., Lundgren, P., Mead, D., Moore, T., Mumby, P.J., van Oppen, M.J.H., Robertson, J., Runge, M.C., Suggett, D.J., Schaffelke, B., Wachenfeld, D. and Walshe, T. 2017, New interventions are needed to save coral reefs, *Nature Ecology and Evolution* 1: 1420-1422 doi: 10.1038/s41559-017-0313-5.

Hedge, P., Molloy, F., Sweatman, H., Hayes, K.R., Dambacher, J.M., Chandler, J., Bax, N., Gooch, M., Anthony, K. and Elliot, B. 2017, An integrated monitoring framework for the Great Barrier Reef World Heritage Area, *Marine Policy* 77: 90-96 doi: 10.1016/j.marpol.2016.12.014.

van Oppen, M.J.H., Gates, R.D., Blackall, L.L., Cantin, N., Chakravarti, L.J., Chan, W.Y., Cormick, C., Crean, A., Damjanovic, K., Epstein, H., Harrison, P.L., Jones, T.A., Miller, M., Pears, R.J., Peplow, L.M., Raftos, D.A., Schaffelke, B., Stewart, K., Torda, G. and Wachenfeld, D. 2017, Shifting paradigms in restoration of the world's coral reefs, *Global Change Biology* 23: 3437-3448 doi: 10.1111/gcb.13647.

Ramasamy, R.A., Allan, B.J.M., McCormick, M.I., Chivers, D.P., Mitchell, M.D. and Ferrari, M.C.O. 2017, Juvenile coral reef fish alter escape responses when exposed to changes in background and acute risk levels, *Animal Behaviour* 134: 15-22 doi: 10.1016/j.anbehav.2017.09.026.

## CSIRO

Babcock RC, Bancroft K, Barnes P, Bearham D, Bennett K, Berry O, Bessey C, Birt MJ, Boddington D, Bond T, Bornt KR, Boschetti F, Bryce M, Candland L, Clarke H, Colberg F, Collin SP, Collins DL, Cuttler M, Depczynski M, D'Olivo JP, Donovan A, Dorji P, Doropoulos C, Drost E, Du Y, Ellis N, Evans R, Evans SN, Evensen NR, Fearn R, Feng M, Field S, Fisher R, Falter J, Fromont J, Fry G, Gershwin L-A, Gomez O, Gómez-Lemos LA, Grol MG, Haberstroh J, Hansen J, Hara A, Hardman-Mountford N, Harvey ES, Haywood MDE, Hoell A, Holmes TH, Hosie A, Huisman J, Hurley T, Ingram B, Ivey GN, Jackson G, Jones NL, Keesing JK, Kendrick GA, Kirkendale L, Kuret AJ, Lan J, Langlois TJ, Liu D, Lough JM, Lowe RJ, Lozano-Montes HM, Marin M, Marsh L, Mattio L, McCulloch MT, McInnes A, McLean DL, McLeod I, Miller M, Mitchell JD, Moore G, Morello B, Morrison S, Mortimer N, Moustaka M, Naughton K, Newman SJ, Nguyen HM, O'Hara T, O'Loughlin M, Olsen YS, Partridge JC, Perez AZ, Piggott C, Pillans RD, Pitcher CR, Prunera K, Rankenburg K, Ricca V, Richards SA, Richards Z, Rochester WA, Rountrey AN, Rule M, Shedrawi G, Slawinski D, Speed C, Stoddart J, Strzelecki J, Taylor MD, Taylor S, Thompson A, Thomson DP, Trapon M, Travers MJ, van Hees DH, Vanderklift MA, Waite AM, Wakefield CB, Whisson C, Wijffels SE, Wilson S, Xu J, Zavala Perez A, Zhang N, Zhang Z, Zinke J. (2017) Pilbara Marine Conservation Partnership – Final Report.

Babcock, Russ; Dambacher, Jeffrey; Morello, Bee; Plaganyi-Lloyd, Eva; Hayes, Keith; Sweatman, Hugh; Pratchett, Morgan (2016) Assessing Different Causes of Crown-of-Thorns Starfish Outbreaks and Appropriate Responses for Management on the Great Barrier Reef. PLoS ONE, vol. 11, no. 12, : e0169048

Feng, Ming; Colberg, Frank; Slawinski, Dirk; Berry, Olly; Babcock, Russ (2016) Ocean circulation drives heterogeneous recruitments and connectivity among coral populations on the North West Shelf of Australia. Journal Title: Journal of Marine Systems, vol. 164, : 1-12.

Baird, Mark; Adams, Matthew; Babcock, Russ; Oubelkheir, Kadija; Mongin, Mathieu; Wild-Allen, Karen; Skerratt, Jenny; Robson, Barbara; Petrou, Katherina; Ralph, Peter; O'Brien, Katherine; Carter, Alexandra; Jarvis, Jessica; Rasheed, Micheal (2016) A biophysical representation of seagrass growth for application in a complex shallow-water biogeochemical model. Ecological Modelling, vol. 325, : 13-27.

Vanderklift MA, Marcos-Martinez R, Butler J, Coleman M, Lawrence A, Steven A, Thomas S (2017) Blue Carbon Finance Workshop Summary. Final report. CSIRO Oceans & Atmosphere.

Kendrick GA, Vanderklift M, Bearham D, Mclaughlin J, Greenwood J, Säwström C, Laverock B, Chovrelat L, Zavala-Perez A, De Wever L, Trapon M, Grol M, Guilbault E, Oades D, McCarthy P, George K, Sampi T, George D, Sampi C, Edgar Z, Dougal K, Howard A (2016) Benthic primary productivity: production and herbivory of seagrasses, macroalgae and microalgae. Report of Project 2.2.4 prepared for the Kimberley Marine Research Program, Western Australian Marine Science Institution, Perth, Western Australia, 61 pp.

Vanderklift M, Bearham D, Haywood M, Lozano-Montes H, McCallum R, McLaughlin J, McMahan K, Mortimer N, Lavery P (2016) Natural dynamics: understanding natural dynamics of seagrasses in north-western Australia. Report of Theme 5 – Project 5.3 prepared for the Dredging Science Node, Western Australian Marine Science Institution, Perth, Western Australia, 55 pp.

Vanderklift M, Bearham D, Haywood M, McCallum R, McLaughlin J, McMahan K, Mortimer N, Lavery P (2016) Recovery mechanisms: understanding mechanisms of seagrass recovery following disturbance. Report of Theme 5 – Project 5.4 prepared for the Dredging Science Node, Western Australian Marine Science Institution, Perth, Western Australia. 25 pp.

Lozano-Montes HM, Keesing JK, Grol MG, Haywood MDE, Vanderklift MA, Babcock RC, Bancroft K (2017) Limited effects of an extreme flood event on corals at Ningaloo Reef. Estuarine, Coastal and Shelf Science. 191: 224-238

Smale DA, Wernberg T, Vanderklift MA (2017) Regional-scale variability in the response of benthic macroinvertebrate assemblages to a marine heatwave. Marine Ecology Progress Series. 568: 17-30

3. **General Information.** (Note that this information will be posted on the ICRI website on your member page: <http://www.icriforum.org/about-icri/members-networks>.)

Member type (Country / Organization):	Country - Australia
<b>Focal Point 1:</b>	
Name:	Margaret Johnson
Title/Organization:	General Manager, Strategic Advice Branch, Great Barrier Reef Marine Park Authority
Email:	margaret.johnson@gbrmpa.gov.au
<b>Focal Point 2:</b>	
Name:	Ben Palmer
Title/Organization:	International Business Manager, Great Barrier Reef Marine Park Authority
Email:	ben.palmer@gbrmpa.gov.au

*Thank you very much for sharing your valuable experiences and information with ICRI.*