



# Snapshot

## The Great Barrier Reef's climate change journey

### Summary

Climate change is already affecting the Great Barrier Reef, and the impacts are expected to intensify in the future. In the Southern Hemisphere summer of 2016, the Reef was affected by the third, and most severe, global coral bleaching event ever recorded. In response to this and other on-going environmental threats, the Great Barrier Reef Marine Park Authority (GBRMPA), the Queensland Government and the Great Barrier Reef Foundation developed and implemented a series of strategies, programs and plans with the aim of protecting the Reef and increasing its resilience to climate change. These efforts have generated a significant body of research, enhanced the understanding of reef processes, and demonstrated the importance of a partnership approach to Reef management. Nevertheless, there are limits to what can be done to physically protect the Reef from the impacts of a changing climate, other than a global effort to reduce emissions, and there are physical limits to adaptation for the Reef.

The Great Barrier Reef — the world's largest and most complex reef system — is home to more than 1600 species of fish, 600 types of coral, innumerable invertebrates, and iconic animals such as dugongs, sea turtles, dolphins and whales. Other than being an ecosystem of great ecological significance, it supports a range of industries (especially tourism and commercial fishing) and is central to the culture of Traditional Owners. In 1975 the Great Barrier Reef Marine Park was established under the management of the Great Barrier Reef Marine Park Authority (GBRMPA).

The Reef is already being affected by climate-related events, and during the 2016 summer it was impacted by the most significant global bleaching event ever recorded (Figure 1). In addition, the Reef is vulnerable to the negative impacts of declining water quality from catchment run-off, increasing population pressure, increased shipping traffic and port expansions (including dredging and spoil dumping), loss of coastal habitat and the impacts of fishing and poaching. These have all contributed to the deterioration of the Outstanding Universal Value of the Reef<sup>1</sup>, and reduced its resilience to climate change. Expected future changes associated with climate change include on-going warming of the oceans (leading to coral bleaching events), [ocean acidification](#) and [rising sea levels](#). In addition, [tropical cyclones](#) (Figure 2) may become more intense.

### Keywords

Great Barrier Reef, adaptation, stakeholders, engagement

<sup>1</sup> Criteria used by UNESCO to list World Heritage Sites. The Great Barrier Reef was first inscribed in 1981.

Several lead organisations — GBRMPA, other elements of the Commonwealth Government, the Queensland State Government and the Great Barrier Reef Foundation — have acknowledged the risks posed by climate change. Since 2007, these organisations have developed and implemented a series of strategies and programs aimed at determining the Reef’s vulnerability and identifying appropriate adaptation options (see documents listed in Table 1).

Important outcomes have been achieved through this multifaceted program. These include the development of a significant body of knowledge and an improved understanding of the critical need to share the responsibility of adaptation to climate change among a range of stakeholders and users. GBRMPA’s approach recognises the vital role of partnerships that build both capacity to manage the Reef as well as fostering a sense of stewardship within the Reef catchment and among its users.

Activities undertaken thus far have focused on building and maintaining the health of the Reef. However, the Reef catchment is a complex system that continues to support a diversity of industries that place pressures on the Reef. While the overall goal may be on Reef health, these pressures without careful management may act to decrease resilience. The partnership approach seeks to build consensus around reef management for its overall health.

The extent of the 2016 coral bleaching event has shown the potential of climate change to cause harm that cannot be ameliorated through management or adaptation. In the longer term, and without significant global efforts to reduce emissions, there are physical limits to adaptation for the Reef and there is little that can be done to protect it from a changing climate.

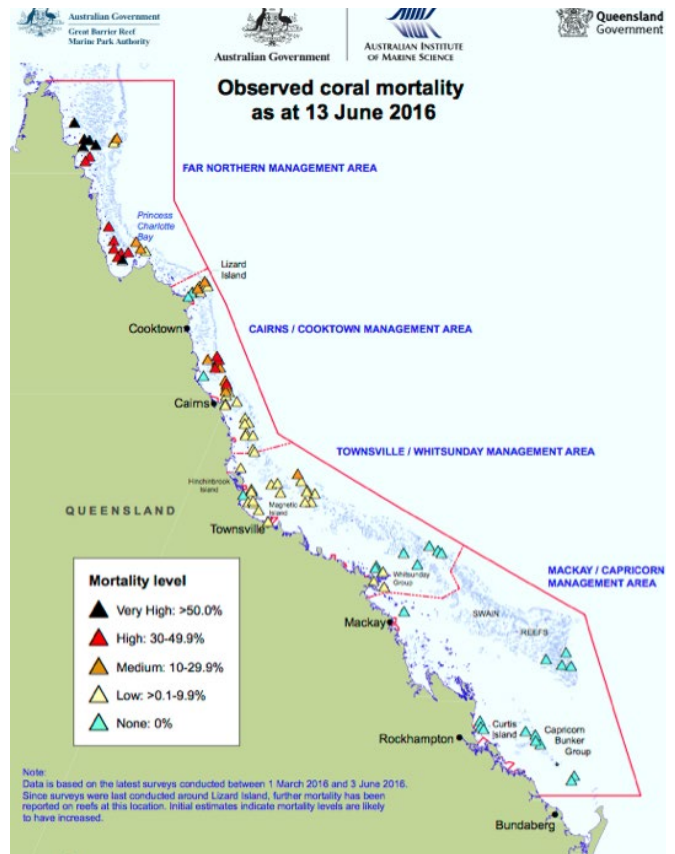


Figure 1: Map of observed coral mortality from bleaching as at 13 June 2016. Source: Website of the Great Barrier Reef Marine Park Authority (accessed 22 June 2016).



Figure 2: Damage to foreshores and coastal infrastructure affects people’s use of the Region. Source: The Great Barrier Reef Outlook Report 2014. © Commonwealth of Australia, Great Barrier Reef Marine Park Authority 2016.

Table 1: Documentation related to Great Barrier Reef's climate change journey.

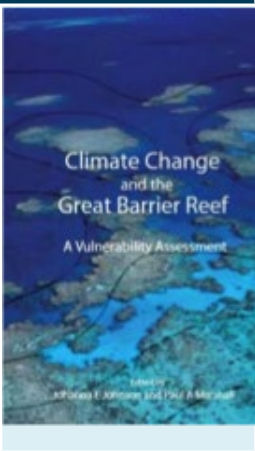
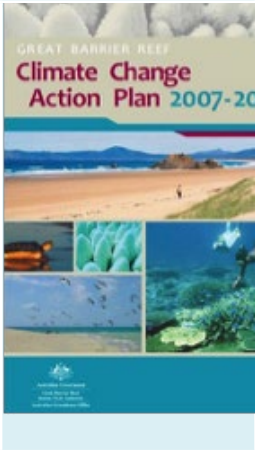


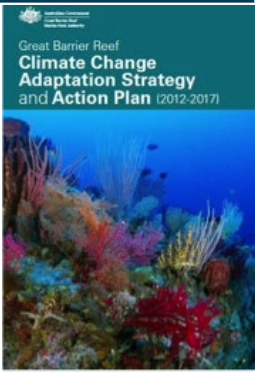

Year	Document	Description
2007	<a href="#">Climate Change and the Great Barrier Reef: A Vulnerability Assessment</a> 	<p>A first assessment of the potential far-reaching consequences of climate change for the GBR ecosystem and the industries and communities that rely on the Reef. This also identified knowledge gaps and outlined management options to assist the GBR and other tropical marine ecosystems to cope with future climate change. It served as the basis for the following Action Plan.</p>
2007	<a href="#">Great Barrier Reef Climate Change Action Plan 2007-2012</a> 	<p>This identified strategies for direct actions and partnerships to increase the health and therefore resilience of the GBR. It builds on four main objectives that aimed to maximise the resilience of the Reef system to a changing climate: (1) targeted science, (2) a resilient GBR ecosystem, (3) adaptation of industries and regional communities, and (4) reduced climate footprints.</p>
2010-2015	<a href="#">Resilient Coral Reefs Successfully adapting to climate change: A research portfolio</a> 	<p>This presented a portfolio of research projects in three priority research streams; Attributes, Solutions and Adaptation. There was also a crucial Integration stream. The portfolio was used to attract private investment into research projects. The portfolio is consistent with the Reef 2050 Plan.</p>
2012	<a href="#">Climate Change Adaptation: Outcomes from the Great Barrier Reef</a> 	<p>This provided detailed coverage of the major outcomes of the Action Plan. Outcomes include the delivery of over 250 individual projects and the production of a diverse range of knowledge resources (more than 150 reports and papers), actions to improve the Reef's health (including monitoring programs), work with industry partners to build stewardship principles and efforts to reduce the carbon footprint.</p>

Table 1: Documentation related to Great Barrier Reef management - continued.

Year	Document	Description	
2012	<a href="#">Great Barrier Reef Climate Change Adaptation Strategy and Action Plan (2012-2017)</a>		<p>This is the current adaptation strategy for the GBR. It identifies direct actions and partnerships to increase the health and therefore resilience of the GBR. The strategy adopts the key principles of ecosystem-based adaptation and includes a program of activities to be implemented in the period 2012-2017.</p>
2015	<a href="#">Reef 2050 Plan</a>		<p>This provides an overarching strategy for management of the GBR and coordinates actions to 2050. It integrates many activities being implemented by the Commonwealth and Queensland Governments, and establishes strategies, actions and investment required to achieve long-term outcomes. These include a focus on boosting the resilience of the GBR, which will support its ability to cope with the effects of climate change.</p>

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## Further reading

### All links accessed 29 May 2017:

The GBRMPA website: <http://www.gbrmpa.gov.au/managing-the-reef/threats-to-the-reef/climate-change/marine-park-management/climate-change-action-plan>.

Climate Change Adaptation: Outcomes from the Great Barrier Reef Climate Change Action Plan 2007–2012: <http://elibrary.gbrmpa.gov.au/jspui/bitstream/11017/1139/1/Climate%20Change%20Adaptation.pdf>.

The Great Barrier Reef Climate Change Adaptation Strategy and Action Plan 2012–2017: <http://elibrary.gbrmpa.gov.au/jspui/bitstream/11017/1140/1/GBR%20Climate%20Change%20Adaptation%20Strategy%20and%20Action%20Plan%202012-2017.pdf>.

The Great Barrier Reef Outlook Report 2014: <http://www.gbrmpa.gov.au/managing-the-reef/great-barrier-reef-outlook-report>.

A Good Practice – Case Study of the Great Barrier Reef adaptation journey: [https://www.nccarf.edu.au/localgov/sites/nccarf.edu.au.localgov/files/casestudies/pdf/Case%20Study\\_The%20Great%20Barrier%20Reef%20Climate%20Change%20Action%20Plan%202007\\_2012.pdf](https://www.nccarf.edu.au/localgov/sites/nccarf.edu.au.localgov/files/casestudies/pdf/Case%20Study_The%20Great%20Barrier%20Reef%20Climate%20Change%20Action%20Plan%202007_2012.pdf).

**This Snapshot was prepared by the NCCARF CoastAdapt Development Team. Please cite as:**  
NCCARF, 2016: The Great Barrier Reef's climate change journey. Snapshot for CoastAdapt, National Climate Change Adaptation Research Facility, Gold Coast.



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Department of the Environment and Energy