

**Climate Change Adaptation  
Good Practice - Case Study**

# **The Great Barrier Reef Climate Change Action Plan 2007-2012**



# About Adaptation Good Practice

Adapting to climate change is a relatively new concept to many. It is important to learn from practitioners who are undertaking adaptation activities that are beginning to have tangible outcomes. Documenting examples of good practice and identifying the criteria that makes them work, enables those interested in adaptation to learn about how to take action.

There are expectations that Adaptation Good Practice (AGP) includes a definite start and finish to a project. However climate change practitioners' experiences show that adaptation projects are often steps in longer learning journeys. There are no golden rules on how to adapt and often practitioners across Australia are inventing the wheel that drives future AGP.

This case study of The Great Barrier Reef Climate Change Action Plan 2007 -2012 is part of a series of 16 case studies

that recognise exemplars for AGP in Australia. Through the development of these stories of successful adaptation it was refreshing to see an emergence of similar experiences and challenges regardless of the project or location. A synthesis of these stories can be seen in the Synthesis Report 'Climate Change Adaptation Good Practice: Key lessons from practitioners experiences', which will help practitioners to understand that they are not alone in their challenges and to see some of the clear lessons learned about what drives good practice in adaptation.

Following the Snapshot is a more in depth narrative of the experiences, learnings and network links from this project to stimulate further engagements and knowledge sharing among the growing community of adaptation practitioners.

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# Case study snapshot

## The Great Barrier Reef Climate Change Action Plan 2007-2012

The GBR is internationally renowned for its beauty and ecological significance. The Reef is located off the east coast of Queensland, Australia, and, at 348,000 km<sup>2</sup>, is the world's largest continuous reef system. A listed World Heritage Area it is home to more than 1600 species of fish, 600 corals, innumerable invertebrates, as well as iconic animals such as dugongs, sea turtles, dolphins and whales.

The Great Barrier Reef Marine Park was established in 1975 and it became the world's largest protected marine area. Management of the Park is the responsibility of the GBRMPA. GBRMPA works in partnership with the Australian and Queensland Governments, private sector organisations, research institutions, and a range of stakeholders across local communities. The goal is to ensure the ongoing protection of this unique natural asset, that is of significant ecological, social, economic and cultural value to Australia.

In addition to its environmental significance, the GBR supports a range of industries, especially tourism and commercial fishing. This provides the equivalent of over 68,900 full-time jobs, and has an economic contribution of \$5.7 billion annually to the national economy.

Furthermore, the GBR region is also central to the culture of Traditional Owners; is a major recreational area; provides an internationally important scientific resource; and is an important area for defence training.

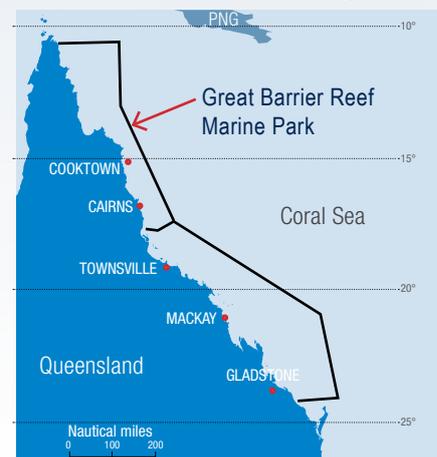
So, in managing the ecosystem, a range of environmental, economic and social benefits and impacts are all considered in pursuing the best outcomes for both the GBR and the wider community.

### The project journey

The Great Barrier Reef Climate Change Action Plan 2007-2012 is based on preceding work done to produce the 2007 foundation publication 'Climate Change and the Great Barrier Reef: A Vulnerability Assessment'. The Great Barrier Reef Marine Park Authority (GBRMPA) worked with key partners from across the public, private, community and research sectors to collectively learn about and assess the vulnerability of the Reef to climate change impacts and risks, and to consider appropriate responses.

Continuing on, GBRMPA undertook a collaborative project to develop an adaptive management plan to protect the Reef and enhance its resilience. Many partners and stakeholder organisations are affiliated with GBRMPA and contributed greatly to the research, development and implementation of the Great Barrier Reef Climate Change Action Plan 2007 - 2012. These organisations include the Great Barrier Reef Foundation, the Reef tourism industry, Traditional Owners and other Indigenous groups who have interests in the Reef sea country.

Prior to the Action Plan, there was little in-depth engagement with these key stakeholders with regards to climate change. It provided a platform to leverage their shared interests, deliver outputs and outcomes that they value, and build ongoing support across communities and industries. The project was underpinned by good scientific research across multiple disciplines, and local knowledge. This provided an evidence base to consider complex issues and design strategic responses



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Figure 1: Location and extent of the Great Barrier Reef, Queensland, Australia

that reflect a holistic approach to understanding climate change risks and impacts across economic, social, and environmental domains.

The initial five year Action Plan laid the scientific foundations and action oriented partnerships that have resulted in mainstreaming climate change mitigation and adaptation. Building on these earlier stages, a review of key outcomes informed the development and launch of a second stage Adaptation Strategy and Action Plan 2012 – 2017. And so the learning journey continues...

# The Great Barrier Reef Marine Park Authority worked together with stakeholders to create and implement a Plan to protect the reef from the threat of climate change.

## Risks and impacts addressed

Climate change impacts on the environment, society and economy of the Great Barrier Reef (GBR) such as increases in water temperature resulting in coral bleaching, ocean acidification and more frequent and intense extreme weather events.

## Drivers of adaptation action

A pre-cursor to the Action Plan was the 2007 foundation publication 'Climate Change and the Great Barrier Reef: A Vulnerability Assessment'

## → Adaptation action

The Action Plan outlined a five year program of initiatives designed to achieve objectives in four focus areas:

- Targeted science
- A resilient GBR ecosystem
- Adaptation of industries and communities
- Reducing climate footprints.

## Outcomes achieved

The Great Barrier Reef Climate Change Action Plan 2007 - 2012 has supported deeper understanding of climate change and its impacts in the Great Barrier Reef region; and this knowledge is now informing climate change adaptation policy and practice for reef ecosystems in Australia and beyond.

The action plan has driven broad engagement on climate change with specific stakeholder groups such as traditional owners, tourism operators and sea food industry; and built stronger ongoing relationships across the public, private, community and research sectors.

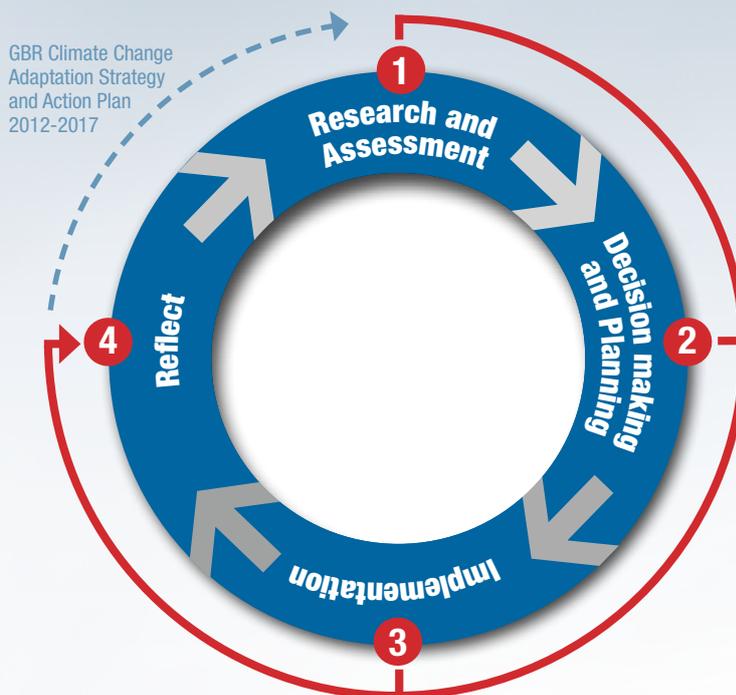


Figure 2: The Great Barrier Reef Climate Change Action Plan Adaptation Good Practice phase

Over the period 2007 - 2012 the Great Barrier Reef Climate Change Action Plan:

- The Great Barrier Reef Climate Change Action Plan 2007 - 2012 was recognised at a national level and a specific action item was recommended in the Council of Australian Governments (COAG) 2007 National Climate Change Adaptation Framework
- Delivered over 250 individual projects or activities aligned to the Action Plan's four focus areas
- Produced a diverse range of knowledge resources, including more than 150 reports and papers

- Created scientific knowledge underpinning new decision making tools and processes (e.g.: developing and refining remote sensing tools that forecast coral bleaching and coral disease outbreak risks).

## Emerging outcomes

- Informed the next Action Plan for the period 2012 - 2017.

# The project

In 2007, the Great Barrier Reef Marine Park Authority (GBRMPA) launched the Great Barrier Reef Climate Change Action Plan 2007 - 2012. The Action Plan acknowledged that three factors dictate the future health of the Reef - the **rate and extent** of global climate change, and, **the resilience** of the Reef ecosystem and associated communities to the effects of climate change. In response, the Action Plan outlined a coordinated approach to the threat of climate change, identifying specific measures to enhance the resilience of the Great Barrier Reef (GBR) ecosystem, and to support climate change adaptation by regional communities and industries. The Action Plan leveraged and extended knowledge and relationships built on previous work undertaken as part of the Great Barrier Reef Climate Change Response program.

## Risks and impacts addressed

Coral reef systems around the world are under threat from the impacts of climate change. Increases in water temperatures result in coral bleaching, increasing ocean acidification reduces coral growth, and more frequent and intense extreme weather events place further stress on coral ecosystems. In addition, non-climate related factors such as declining water quality, increasing coastal development, and incidents of over-fishing are also placing coral reefs across the globe at risk.

The threat posed by climate change to the GBR was evaluated through a comprehensive vulnerability assessment in 2007. The assessment, *Climate Change and the Great Barrier Reef: A Vulnerability Assessment*, conducted by 85 scientific and management experts, highlighted issues that could have far-reaching



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**The Vulnerability Assessment stated “The combination of sensitivity and exposure to climate change render the Great Barrier Reef ecosystem highly vulnerable to climate change...the implications are far reaching and, in many cases, severe...even under the most optimistic climate change scenarios, the Great Barrier Reef is destined for significant change over this century; under pessimistic scenarios, catastrophic impacts are possible.”.**

consequences for the GBR ecosystem and the industries and communities that rely on the Reef. The report also identified knowledge gaps and outlined management options to assist the GBR to cope with future climate change. The Vulnerability Assessment was used to inform the GBRMPA's Great Barrier Reef Climate Change Action Plan, as well as drive its climate change research interests.

The Vulnerability Assessment stated “*The combination of sensitivity and exposure to climate change render the Great Barrier Reef ecosystem highly vulnerable to climate change...the implications are far*

*reaching and, in many cases, severe... even under the most optimistic climate change scenarios, the Great Barrier Reef is destined for significant change over this century; under pessimistic scenarios, catastrophic impacts are possible.”.*

The changes associated with climate change that were identified in the Assessment as having implications for the Reef included: increasing air and sea temperatures; ocean acidification; nutrient enrichment (via changes in rainfall regimes); altered light levels; more extreme weather events; changes to ocean circulation; and sea level rise. The

impact of these changes will be felt across the species, habitats, industries and communities resident in the GBR region.

The Climate Change and the Great Barrier Reef: A Vulnerability Assessment 2007 identified 22 research gaps with regards to the plant and animal species, habitats, communities and industries resident in the GBR region. The Assessment acknowledged that filling these gaps would require significant effort and investment to provide the necessary scientific basis for informed, targeted and effective actions to mitigate and adapt to the effects of climate change.

## Response strategy

In response to the increasing understanding of the GBR's vulnerability to climate change, the Great Barrier Reef Climate Change Action Plan 2007-2012 was developed and implemented.



**Targeted science:**  
Understanding risks and responses

© Courtesy of GBRMPA

### Targeted science

Key research related activities to understand climate change implications for the GBR were around:

- Addressing critical knowledge gaps about climate change impacts on the GBR including research that: targets specific species; maps areas of high and low resilience to prioritise



© Peter Lik, for Tourism Queensland

Figure 5: Snorkelling in The Waters of The Coral Cay, Mackay

investments; and, assess synergies between climate and non-climate stressors on critical processes

- Identifying thresholds, improve monitoring and predictions, and evaluate strategies to: identify thresholds beyond which climate change causes irreversible damage to vulnerable species; develop/improve tools for predicting, measuring and monitoring climate change effects; and, evaluate resilience strategies to optimise their effectiveness
- Translating information into action management responses in order to: coordinate and synthesise scientific knowledge; apply cost-benefit analysis to select responses that appropriately manage social, economic and environmental issues; and work with industry groups and stakeholders to support their adaptation responses.



**Improving the outlook for the Great Barrier Reef: Building ecosystem resilience**

© Courtesy of GBRMPA

### A resilient Great Barrier Reef ecosystem

Actions to reduce stresses on the ecosystem, facilitate natural adaptation and minimise ecological impacts were around:

- Maximising the resilience of the GBR ecosystem to climate change by: identifying water quality threats to resilience; identify and support habitats to facilitate species migration; assess sustainability of fishing practices; and protect species and

habitats that are highly vulnerable to climate change

- Incorporating climate change considerations into management regimes for water quality, ecosystem health, endangered species, and fisheries management such as Work with state fisheries management agencies to evaluate risks of climate change for sustainability of GBR fish populations and fisheries, which can be built into management plans.
- Minimising climate change impacts through local management actions including: regional case studies of good practice; testing strategies to better manage important turtle and seabird nesting sites; and, adapting island management plans to address impacts that exacerbate climate change vulnerability.



© Courtesy of GBRMPA

## Adaptation of industries and communities

The impacts of unavoidable climate change will affect the communities and industries that rely on the GBR. To support effective adaptation the Action Plan suggested initiatives around:

- Identify the factors that build resilience in industries and communities for example by developing an atlas of social resilience for GBR communities that can be used to inform regional

and local planning and coastal management

- Assisting industries and communities to adapt to climate change through providing climate risk information, adaptation case studies, and supporting industry and community leadership.



© Courtesy of GBRMPA

## Reducing climate footprints

Management responses that build resilience to climate change are important. However, they need to be pursued in concert with actions to reduce human influences on the climate system, such as lowering greenhouse gas emissions. Specific activities outlined in the Action Plan were:

- Increase the knowledge and involvement of stakeholders in climate change responses such as: community members, local industries, and Indigenous People in climate change monitoring; developing information packages for stakeholders; and raising awareness of stakeholder groups with regards to implications of climate change for the GBR.
- Work with organisations and individuals to reduce their climate footprint through a range of climate change mitigation programs.

## Implementation phases

Within GBRMPA, the Climate Change Group was responsible for the overall delivery of the Action Plan. This group coordinated the actions of relevant GBRMPA staff/sections, researchers, consultants and other project delivery partners.

Each year the Climate Change Group would produce a formal operational plan detailing projects and activities, budgets and performance metrics. Projects and activities would be identified and planned across the four focus areas of the Action Plan. Each year a review against the annual operating plan was conducted. At the midway point of the Action Plan, a formal mid-term review was undertaken, evaluating performance to date, considering lessons learnt, and informing future action. Similarly, at the conclusion of the Action Plan in 2012, a final review was conducted, with lessons learnt being incorporated into the follow on Great Barrier Reef Climate Change Adaptation Strategy and Action Plan 2012 - 2017.

It should be noted that, given the emergent nature of the climate change agenda in the GBR and the collaborative approach adopted for delivering the Action Plan, was very much an iterative learning experience. The Action Plan provided a large-scale pilot study for GBRMPA and other key stakeholders to learn and experience how to work together in response to climate change in the region. This resulted in a collegiate and evolutionary 'learning by doing' approach to delivery.

### Links to other initiatives

The GBRMPA has close ties to a number of other organisations and initiatives aimed at increasing the resilience of the GBR to climate change impacts or contributing to a better understanding of the GBR system and approaches to underpin climate change adaptation. These include the GBR Foundation who funds many scientific projects and engages strongly with business and industry sectors.

The Reef Water Quality Protection Plan is a collaborative plan which aims to improve the health and resilience of the GBR by reducing the loads of pesticide, herbicides, nutrients and sediments being discharged from the catchment into the GBR lagoon.

### Outcomes achieved

The Great Barrier Reef Climate Change Action Plan 2007 - 2012 has been a catalyst for:

- Recognition and a deeper understanding of climate change in the GBR region
- Broad stakeholder engagement and dialogue regarding change and interpretation of climate change issues with specific stakeholder groups
- Strong ongoing relationships with key partners from across the public, private, community and research sectors
- New knowledge informing climate change adaptation policy and practice for reef ecosystems in Australia and beyond.

Over the period 2007 - 2012 the Great Barrier Reef Climate Change Action Plan:

- Delivered over 250 individual projects or activities aligned to the Action Plan's four focus areas
- Produced a diverse range of knowledge resources, including more than 150 reports and papers
- Created scientific knowledge underpinning new decision-making tools and processes (e.g. developing and refining remote sensing tools that forecast coral bleaching and coral disease outbreak risks).

### Emerging outcomes

- This Plan and information generated through it were useful to develop the next Action Plan for the period 2012 - 2017.

# Critical success factors

## AGP analysis of the project

Success of this approach has been driven by strong leadership and excellent connectivity between all stakeholders and by lasting and sustainable vision.

**This project is strong in:**

- Leadership
- Connectivity
- Sustainability

## Leadership

Leadership within GBRMPA was central to the success of the Action Plan. Internal champions working together across operating units in GBRMPA drove the design and delivery of the Action Plan. Importantly, executive level sponsorship within GBRMPA's leadership team provided legitimacy and resourcing to translate intent into action and outcomes. Beyond GBRMPA, relevant public sector agencies in the Queensland Government and Australian Government were also key enablers for the Action Plan.

At the project scale there were numerous industry, research and community partners all demonstrating leadership in addressing climate change. The nature of the work conducted, demonstrated that effective responses to climate change required organisations to work together. In doing so, they were able to pool their specific knowledge and resources to address issues of mutual interest and create shared value.

### → Leadership lesson learnt:

Pooling knowledge and resources to create shared value.

## Executive level sponsorship within GBRMPA's leadership team provided legitimacy and resourcing to translate intent into action and outcomes.

## Engagement

The GBRMPA asserts that *"adaptation is a participatory enterprise and partnerships have been instrumental to the success of the Action Plan"*. In executing the Action Plan, GBRMPA has worked in partnership with:

- Industry groups such as the Association of Marine Park Tourism Operators; the Seafood Industry Association; and Pro-Vision Reef, all who have been engaged in understanding and responding to climate change impacts resulting in industry-specific adaptation initiatives
- Traditional Owners have been involved in developing strategies for the management and traditional use of marine resources
- Reef communities actively contribute to the Action Plan objectives through the Reef Guardians Program - a hands-on, community-based approach which can make a real difference to the health and resilience of the Reef. The Program works with local councils, businesses and schools to enable understanding and adaptation to climate change
- Over 35 national and international research and management agencies to develop and share climate related Reef science. Major research partners include the Australian Institute for Marine Science (AIMS), the Australian Bureau of Meteorology (BOM), the University of Queensland, James

Cook University, the Australian Research Council (ARC) Centre of Excellence for Coral Reef Studies, Commonwealth Scientific and Industrial Research Organisation (CSIRO) and NCCARF

- International partners include: the US National Oceanic and Atmospheric Administration, The Nature Conservancy, The International Union for the Conservation of Nature, and the United Nations Environment Program
- The management of the GBRMP is a formal partnership between the Australian and Queensland Governments. Operationally this sees the GBRMPA work in close partnership with the Queensland Parks and Wildlife Service.

Beyond formal partnering arrangements, wider stakeholder engagement was an important component of the both research and awareness raising activities within the Action Plan. Regular stakeholder engagement events were conducted to share knowledge, explore issues and discuss adaptation options. Furthermore, individual community members and groups actively supported and contributed to a number of research and monitoring activities.

### → Engagement lesson learnt:

Adaptation is a participatory enterprise and partnerships have been instrumental to the success of the Action Plan.

## Beyond formal partnering arrangements, wider stakeholder engagement was an important component of both the research and awareness raising activities within the Action Plan.

### Connectivity

By design, the Action Plan provided a coordinated approach for management agencies and stakeholders to respond to climate change. Specifically the Action Plan:

- Formed a significant part of GBRMPA's overall strategy and corporate plan
- Complemented Queensland Government agencies' and the tourism industry's climate change response strategies
- Worked in conjunction with relevant research initiatives including the National Climate Change Adaptation Research Facility, and science programs funded by the Marine and Tropical Sciences Research Facility and ARC
- Other research relationships have enabled the sharing of knowledge and access to world leading research and management initiatives relating to climate change risks for coral reefs and adaptation strategies
- Connected to local councils in the region and contributed to their climate change adaptation initiatives
- Linked to the Great Barrier Reef Intergovernmental Agreement 2009
- Was informed by GBRMPA specific actions outlined in the Council of Australian Governments' National Climate Change Adaptation Framework 2007.

An important goal of the Action Plan was to raise the profile of climate change adaptation and 'mainstream' this work into everyday practice. A specialist climate change group within GBRMPA coordinated the Action Plan and they

worked with a broad range of internal and external partners to implement adaptation action through providing administrative support, strategic guidance and technical advice.

Finally, the Action Plan is also connected other similar initiatives providing valuable lessons for other Australian and international climate change programs.

#### → Connectivity lesson learnt:

Relationships have enabled the sharing of knowledge and access to world leading research and management initiatives.

### Sustainability

The Action Plan is a working example of collective action to address climate change. The sum of the individual projects and activities contained within the Action Plan add up to a strategic, holistic and long-term approach to building the resilience of the GBR to climate change.

By addressing sustainability - social, economic, and environmental development which meets the needs of the present yet allows for intergenerational needs, the Action Plan provides an adaptation pathway to climate change that is useful for many other organisations.

#### → Sustainability lesson learnt:

The Action Plan took a deliberately iterative, learning-based approach to its delivery and this provided appropriate levels of flexibility for partners and stakeholders. Significantly, this approach provides a working example of how to effectively approach climate change, in an evidence-based way, that adequately deals

with inherent uncertainties, and provides mechanisms for adaptation pathways to be designed and tested with industries and communities. A testament to the effectiveness of this approach is the commitment to the new and expanded Great Barrier Reef Climate Change Adaptation Strategy and Action Plan 2012 - 2017.

### Cost

The Australian Government committed over \$9 million to the 2007 - 2012 Action Plan. This initial investment was supported by additional cash and in-kind contributions from key partners in the execution of the Action Plan.

The funds allocated for the delivery of the new Adaptation Strategy and Action Plan 2012-2017 are commensurate with the funding provided for the original Action Plan.

#### → Cost lesson learnt:

Having a cash commitment from Australian Government, enabled additional funding and in-kind support to be leveraged.

# Conclusion

The Great Barrier Reef Climate Change Action Plan 2007 - 2012 is a recognised example of climate change adaptation thought and practice leadership.

The collaborative, action-learning approach that underpinned the Action Plan enabled the GBRMPA to work together with relevant stakeholders to:

- Design and deliver a participatory, evidence-based climate change adaptation strategy
- Create climate change understanding and willingness to act across key partners and stakeholders
- Embed climate change considerations in the strategic and operational plans of governments, businesses, researchers and communities in the GBR region
- Reduce their climate footprint through a range of climate change mitigation programs
- Build an ongoing commitment to climate change action.

GBRMPA values their partners and collaborators who have given of their time and resources to help develop this Action Plan and the Plan has benefited greatly by their input and ongoing collaboration for the next Action Plan.

The Action Plan has been a catalyst for ensuring the GBR is appropriately managed and protected in the face of threats from climate change. Rather than simply being a statement of intent, the execution of the Action Plan has: meaningfully raised awareness; diligently researched issues; initiated collaborative action; effectively implemented a portfolio of projects; and, meticulously reviewed performance.

## Climate change adaptation principles

Climate change adaptation principles arising from the reflections of adaptation researchers and practitioners in the GBR are as follows:

- **Clarity Within Context:** Clearly define the context of the issue (stakeholders, industries, adaptation type, scale, etc), along with expectations and constraints. Use this as the basis for planning further action.
  - **Positive Change:** Focus on influencing and building capacity in what is most needed. This will be different in different contexts, so ensuring the approach is tailored.
  - **Compelling Future Vision:** Create an imaginative and compelling vision to guide planning into the future
  - **Flexible and Adaptive:** Recognise that uncertainties are certain. Consider innovative approaches to ensure change can be quick and efficient. Be prepared to try something different, and throw out the rule book! Remember that adaptation is a process, and is never finished.
  - **Engage, Include and Excite:** Design and apply participatory and inclusive processes for stakeholder engagement, clearly outlining benefits to those involved. Allow the space
- and time for relationships and trust to develop and consider different ways to engage.
- **Diverse Incentives:** Focus on rewarding buy-in and the achievement of incremental goals.
  - **Built On Existing Foundations:** Freely share knowledge and lessons learned, building on current and past experiences.
  - **Action Oriented and Specific:** Create and deliver a detailed action plan that considers strengths, limitations, opportunities and threats. Start somewhere, without trying to get it perfect straight away.
  - **Open and Communicative:** Ensure a systematic, practical and shared understanding of key terminology, goals, approaches and outcomes.
  - **Achievable and Simple:** Focus on both the future vision and what is achievable at present. Keep things simple, easy to understand and implement, with small, incremental goals.
  - **Fair and Equitable:** Consider how adaptation action impacts gender, generations and cultures. Being effective means being equitable and above all 'doing no harm'.

## Gaps and future challenges

A sound understanding of environmental, social, economic, and governance factors in the GBR region, supported by a robust knowledge base, was seen as essential to the design, delivery and

evaluation of targeted actions to reduce the region's vulnerability to climate change.

## Links to more information and projects

- Climate Change Adaptation: Outcomes from the Great Barrier Reef Climate Change Action Plan 2007–2012  
<http://hdl.handle.net/11017/1139>
- Great Barrier Reef Climate Change Action Plan 2007-2012  
<http://hdl.handle.net/11017/198>
- Great Barrier Reef Climate Change Adaptation Strategy and Action Plan 2012-2017  
<http://hdl.handle.net/11017/1140>
- Climate change adaptation principles: bringing adaptation to life in the marine biodiversity and resources setting  
<http://hdl.handle.net/11017/201>
- Marine Climate Change: Impacts and Adaptation Report Card Australia 2012  
<http://www.oceanclimatechange.org.au/content/index.php/2012/home/>
- Great Barrier Reef Marine Park Authority YouTube channel  
[www.youtube.com/user/TheGBRMPA?feature=watch](http://www.youtube.com/user/TheGBRMPA?feature=watch)
- Reef Guardian  
[www.gbrmpa.gov.au/our-partners/reef-guardians](http://www.gbrmpa.gov.au/our-partners/reef-guardians)
- Great Barrier Reef Foundation  
[www.barrierreef.org](http://www.barrierreef.org)



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