



Australian Government

Great Barrier Reef
Marine Park Authority

Great Barrier Reef **Climate Change Adaptation Strategy and Action Plan** (2012-2017)



Great Barrier Reef

Climate Change Adaptation Strategy and Action Plan (2012-2017)



Australian Government
Great Barrier Reef
Marine Park Authority

Published by Great Barrier Reef Marine Park Authority, Townsville, Australia



Australian Government

**Great Barrier Reef
Marine Park Authority**

Copyright © Commonwealth of Australia 2012

Reproduction of this publication for educational or other non-commercial purposes is authorised without prior written permission from the copyright holder provided the source is fully acknowledged. Reproduction of this publication for resale or other commercial purposes is prohibited without prior written permission of the copyright holder.

Great Barrier Reef Climate Change Adaptation Strategy
and Action Plan (2012-2017)/Great Barrier Reef Marine Park Authority.

ISBN: 9781921682889 (ebook : pdf)

1. Climatic changes–Queensland–Great Barrier Reef.
2. Coral reef conservation–Queensland–Great Barrier Reef.
3. Marine parks and reserves–Queensland–Great Barrier Reef–Planning.
4. Marine parks and reserves–Queensland–Great Barrier Reef–Management.
5. Great Barrier Reef (Qld.)–Climate.
6. Great Barrier Reef Marine Park (Qld.)–Management.

551.699436

Please cite this publication as:
Great Barrier Reef Marine Park Authority 2012,
Great Barrier Reef Climate Change Adaptation Strategy and Action Plan 2012-2017,
Great Barrier Reef Marine Park Authority, Townsville.

Available from:
Great Barrier Reef Marine Park Authority,
2-68 Flinders St,
PO Box 1379,
Townsville Qld 4810 Australia
Tel +61 7 4750 0700
Fax: +61 7 4772 6093
Email: climatechange@gbbrmpa.gov.au

Also available from the web <http://www.gbbrmpa.gov.au/>

This is a climate neutral publication. All greenhouse gases generated in the production have been offset by funding clean energy projects.
Visit www.climatefriendly.com for further information.

Design: Coretext
www.coretext.com.au



Contents

Foreword	6
Great Barrier Reef Climate Change Adaptation Strategy	7
The context of our Adaptation Strategy	10
Our approach: Ecosystem-based adaptation	11
Our objectives	13
Combining strategy and action: Delivery of the Adaptation Strategy	14
Great Barrier Reef Climate Change Action Plan (2012–2017)	
A A resilient Great Barrier Reef ecosystem	16
B Adaptation of industries and communities	18
C Action on climate change	19
D Strategic science	20
E Effective communication	22
F Strong stewardship	23



Foreword

The Great Barrier Reef is a jewel in the crown of Australia's marine estate. As an iconic feature of the Australian landscape with World Heritage values, and one of the most vulnerable ecosystems on the planet, the future of the Great Barrier Reef is a priority concern for the Australian Government. Tackling the global effects of climate change while investing in efforts to build the Reef's resilience through reducing local stresses is key to improving the outlook for the Great Barrier Reef. Working together, the Great Barrier Reef Marine Park Authority and its partners in government, industry and the community, have crucial roles in helping the Great Barrier Reef cope with the challenges ahead.

By its global nature, climate change will affect most aspects of the Great Barrier Reef ecosystem. Already we have seen direct evidence of the vulnerability of the Reef in three major coral bleaching events and in widespread reef damage from an unprecedented spate of extreme weather events. Through these events, the nationally important and regionally vital industries that depend on the Reef, particularly tourism and commercial fishing, have become acutely aware that they are also vulnerable to the effects of a changing climate.

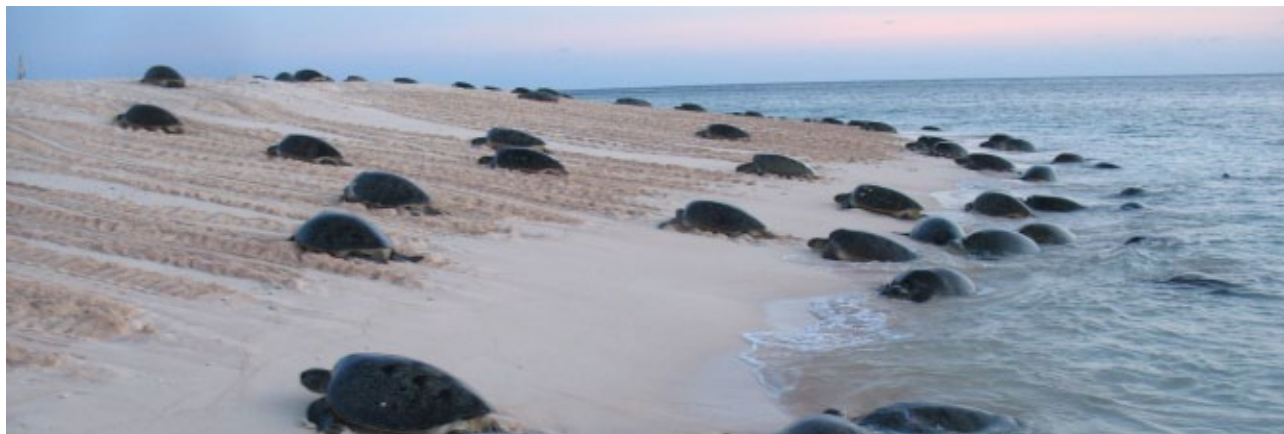
The Australian Government implemented the first Great Barrier Reef Climate Change Action Plan in 2007. A comprehensive vulnerability assessment for the Great Barrier Reef systematically assessed the implications of climate change for the Reef and provided the foundational knowledge for developing specific management

responses to climate change impacts. Important progress has been made in priority areas, including successful trials of adaptation strategies for threatened species and increased stewardship by Traditional Owners, commercial fishers, tourism operators and the community in building resilience of local reefs and monitoring reef health. Under the Action Plan, the management agencies responsible for the Great Barrier Reef have contributed significantly to the development of international best practice for managing climate change issues as they relate to coral reefs.

We are proud of our efforts in tackling the climate change challenge for the Great Barrier Reef, but there is still much work to be done to secure the future for the Reef. The *Great Barrier Reef Climate Change Adaptation Strategy* outlines our vision for ongoing efforts to help the Reef, its industries and its communities adjust to a changing climate. Through the *Great Barrier Reef Climate Change Action Plan (2012–2017)* the Australian Government is committing to a program of activity that will improve the outlook for the Reef.

Russell Reichelt
Chairman
Great Barrier Reef Marine Park Authority

Great Barrier Reef Climate Change Adaptation Strategy



COPYRIGHT: DUNCAN LIMPUS, DEPARTMENT
ENVIRONMENT AND HERITAGE PROTECTION

Helping a vulnerable species cope with climate change

Sea turtles are highly vulnerable to climate change. As the most important breeding site in the world for the green turtle (*Chelonia mydas*), Raine Island provided a valuable case study for climate change adaptation in the Great Barrier Reef. Under the *Great Barrier Reef Climate Change Action Plan (2007-2012)* we partnered with Queensland Government agencies, Traditional Owners and scientific experts to develop and apply a climate change adaptation framework. This enabled us to identify key sources of vulnerability, develop strategies for building resilience, prioritise potential adaptation strategies and implement a trial management action in 2012. A fencing trial greatly reduced the mortality of nesting turtles associated with falls from a rock ledge on the island. While the rock hazard was not caused by climate change, the management strategy highlighted the potential to reduce total vulnerability by offsetting climate risk. This project is one of the first to trial an adaptation strategy to help a vulnerable species build resilience to climate change.



Since the development of the first Great Barrier Reef Climate Change Action Plan (Action Plan) in 2007 by the Great Barrier Reef Marine Park Authority (GBRMPA), the prominence of climate change in public discourse and environmental policy has increased dramatically. Today, climate change is a mainstream issue with widely recognised significance for the future of society and the environment.

A key issue for Australia is the vulnerability of coral reefs — and the communities and industries that they support — to projected changes in climate. Although the Great Barrier Reef is expected to cope with climate change better than most coral reef systems around the world, it is not immune to the effects of warmer seas, changed rainfall patterns, increased storm intensity and ocean acidification predicted for this century.

Already, the Reef is showing signs of high sensitivity to these changes. Mass coral bleaching events in the summers of 1997-98, 2001-02 and 2005-06 demonstrated the consequences of warming seas, and the severe damage caused by Tropical Cyclones Hamish in 2009 and Yasi in 2011 highlighted the risks from increased frequency of severe storms.

The evidence of coral reef vulnerability and the predictions of climate change underpin the *Great Barrier Reef Outlook Report 2009* conclusion that climate change is the dominant threat to the future of the Reef.

This document outlines our strategy to address these challenges, and sets out our plan for action over the next five years. It builds on the strong foundations laid by our pioneering work under the *Great Barrier Reef Climate Change Action Plan (2007-2012)*.

Climate change and the Great Barrier Reef: Taking action

Climate Change and the Great Barrier Reef: A Vulnerability Assessment 2007 (Vulnerability Assessment) was the world's first comprehensive assessment of climate risks for a coral reef system. It highlighted key areas of

vulnerability, such as corals, seabirds, seagrasses and reef-dependent industries, and provided the basis for identifying options to reduce climate-related risks. The Vulnerability Assessment provided the knowledge base for the first Great Barrier Reef Climate Change Action Plan, implemented over the period 2007–2012.

The Action Plan has been instrumental in guiding the efforts of the GBRMPA and its partners to address climate change issues over the past five years. It was built on four main objectives that aimed to maximise the resilience of the Reef system to a changing climate: Targeting science, Building ecosystem resilience, Supporting adaptation of industries and communities, and Reducing climate footprints. Work under each of these objectives has produced significant outcomes for our understanding of climate change risks and our ability to help build the resilience of the Reef in a changing climate. Detailed coverage of major outcomes is available in the final report – *Climate Change Adaptation: Outcomes from the Great Barrier Reef Climate Change Action Plan 2007-2012*.

The Targeting science program has supported a range of science initiatives that have helped address critical knowledge gaps identified in the Vulnerability Assessment. These efforts have helped to more clearly define the source of risks and potential adaptation strategies for vulnerable species such as green turtles, and explored novel interventions for priority habitats and processes, such as using seaweeds to reduce the impacts of stream discharges on water quality. They have helped us understand community attitudes and motivations relating to climate change adaptation, and provided the foundations for tracking the long-term trends in social and economic dimensions to climate change impacts on the Reef.

Under the Building ecosystem resilience program, we have built on the targeted knowledge of climate-related risks to identify and test resilience-building strategies. Work in priority locations such as Raine Island and Keppel Bay have helped to engage communities and Traditional Owners in efforts to build ecosystem resilience. These projects have also enabled reef managers and policy-makers to test the feasibility and efficacy of management interventions to reduce mortality of nesting female turtles. Driven by the imperative to also adapt our own policies and approaches, we have built new management systems, and developed frameworks for assessing and responding to acute and chronic risks from climate change. Through collaborations with key partners such as the Reef tourism industry, we have developed an integrated citizen-science program that will increase opportunities for stewardship to help build resilience to climate change.

The Supporting adaptation of industries and communities program led to stronger relations between the GBRMPA and the industries and communities that depend on the Reef. Reef-based industries now have a much greater awareness of the implications of climate change and an increased capacity for adaptation to changing conditions. As a result, the Reef tourism

industry and sectors of the commercial fishing industry have developed climate change action plans of their own, and are actively working on strategies to build resilience to future change at the business and industry scale. Our Action Plan (2007–2012) also supported Reef-based industries to become aware of their roles as stewards of the Reef, as exemplified by the ProVision Reef Stewardship Action Plan of the coral and aquarium collection fishery.

The Reducing climate footprints program has ensured we maintain a focus on promoting action to reduce greenhouse gas emissions as a crucial goal in addressing risks to the Great Barrier Reef. We have built tools and provided resources to help people take action, worked with iconic Reef destinations to demonstrate climate-friendly makeovers that also make business sense, and influenced policy-makers at national and international levels.

Great Barrier Reef industries leading climate adaptation

The Great Barrier Reef tourism industry depends strongly on a healthy Reef. Under the first Action Plan (2007-2012) we helped the industry develop the *Great Barrier Reef Tourism Climate Change Action Strategy (2009-2012)*. The first of its kind in the world, the strategy has provided the framework for the Reef tourism industry to lead international best practice in climate adaptation. Tourism businesses have reduced greenhouse emissions, promoted sustainable practices, educated visitors about climate change issues and assisted managers in monitoring the health of the Reef.

Commercial fishing industries operating in the Great Barrier Reef are also leading the world in climate change adaptation. Key sectors such as the trawl industry are using an emission calculator developed under the first Action Plan to reduce its climate footprints, while the aquarium supply industry has shown active stewardship in the face of climate-driven extreme events, such as coral bleaching. The Queensland Seafood Industry Association became a key partner in educating fishers all around Australia about climate change issues through the Australian Seafood and Climate Change Symposium held in 2012.





Building climate change into sea country management

GBRMPA has partnered with Traditional Owners of the Great Barrier Reef to build climate change into their use and management of sea country. Under the first Action Plan, Wuthathi Traditional Owners incorporated climate change into their Traditional Use of Marine Resources Agreement (TUMRA) and Elders from the Woppaburra attended an international forum on Indigenous people and climate change. Giringin families assisted in the turtle satellite tracking program implemented in the wake of severe weather events, and the Traditional Owners played an important role in the adaptation planning process for Raine Island.

Partners in adaptation

Adaptation is a participatory enterprise and partnerships have been instrumental to the success of the Action Plan (2007–2012). The Reef tourism industry was an early leader in recognising the risks from climate change and developing a strategic approach to adaptation. Its active engagement, notably through the Association of Marine Park Tourism Operators (AMPTO) and GBRMPA's Tourism and Recreation Reef Advisory Committee, has helped define a path for collaborative efforts in climate change adaptation. Building on this momentum, the various commercial fishing sectors operating in the region are rapidly becoming leaders in adaptation at national and international scales. Peak bodies Queensland Seafood Industry Association and ProVision Reef are embracing the climate change challenge as a central platform in strategies to 'future-proof' their industries.

Traditional Owners and other Indigenous groups with interests in Reef sea country are no strangers to change. Key groups are working closely with the GBRMPA to understand the implications of changing conditions, such as extreme weather events and a shifting climate, for their management strategies and traditional use of marine resources.

The communities living throughout the Reef catchment are key players in efforts to protect and sustain wise use of the Marine Park. Through the Reef

Guardians program, councils and schools are leading local communities in understanding and adapting to the implications of climate change for the Reef.

Management of the Reef is achieved through a formal partnership between the Australian and Queensland governments. Under this arrangement, the Queensland Parks and Wildlife Service (QPWS) has been especially crucial to the effective implementation of the Action Plan. As the day-to-day managers of the Reef, QPWS is at the front line in dealing with implications of climate-related events. Our partnership with QPWS has enabled valuable advances in adaptation, especially in the development and testing of strategies for building Reef resilience.

The Great Barrier Reef Climate Change Adaptation Strategy

While we made important and innovative progress under our first Action Plan (2007–2012), the pace of climate change and our understanding of the implications continue to accelerate. The past five years have seen important progress in the evolution of climate policy and adaptation knowledge, yet the analysis in 2011 by Professor Ross Garnaut for the Australian Government concluded that the next decade is particularly critical for Australia's future.¹ This is likely to be especially true for the Great Barrier Reef, which is facing increasingly frequent climate impacts such as extreme weather and coral bleaching, along with unprecedented coastal development and intensifying pressures in inshore areas. It is against this background that we have developed this *Great Barrier Reef Climate Change Adaptation Strategy* (the Adaptation Strategy).

The Adaptation Strategy outlines the approach and objectives that will guide the GBRMPA and its partners in addressing key climate change challenges over the coming decades. This document includes a program of activities that will be implemented over the next five years (the *Great Barrier Reef Climate Change Action Plan 2012-2017*). These activities build upon the outcomes and lessons from our first Action Plan (2007–2012).

The Adaptation Strategy provides an overview of the policy context in which it is embedded, followed by a summary of the principles of ecosystem-based adaptation guiding its implementation. Building on the foundations established in our first Action Plan (2007–2012), the Adaptation Strategy adopts the key principles of ecosystem-based adaptation in describing its six core objectives. These objectives were developed in collaboration with internal and external partners and provide a high-level vision and structure for an integrated program of climate change adaptation activities in the Great Barrier Reef region. The six core objectives and their component activities inform our Action Plan for 2012-2017.

¹ <http://climatecommission.gov.au/topics/the-critical-decade/>



The context of our Adaptation Strategy

The Great Barrier Reef Marine Park Authority is the Australian Government agency responsible for management of the Great Barrier Reef to ensure long-term protection and ecological sustainability of the region.

The *Great Barrier Reef Outlook Report 2009* provides a comprehensive assessment of what is known about the Reef ecosystem, its use, its management and the pressures it is facing. The Outlook Report concludes that, despite the Reef being one of the healthiest coral reef ecosystems in the world, it is at a crossroads and the decisions made in the next few years are likely to determine its long-term future. It identifies climate change as one of the priority issues influencing the Reef's resilience and affecting almost all aspects of its biodiversity.

This *Great Barrier Reef Climate Change Adaptation Strategy* (the Adaptation Strategy) is central to our ongoing work to improve the outlook for the Reef and to delivering on the key strategic priorities of the *Great Barrier Reef Marine Park Authority Strategic Plan 2012–2016*. The Adaptation Strategy will provide important base knowledge for the Great Barrier Reef Strategic Assessment and the *Great Barrier Reef Outlook Report 2014*.

The outcomes of this Adaptation Strategy will inform broader climate adaptation initiatives such as

the Australian Government's National Climate Change Adaptation Framework. It will also contribute to Australia's international obligations to understand and mitigate the risks from climate change to the Outstanding Universal Values of the Great Barrier Reef World Heritage Area, and contributes to the Specific Work Plan on Coral Bleaching¹ contained in the Convention on Biological Diversity.

¹ <http://www.cbd.int/decision/cop/?id=7742>



Our approach: Ecosystem-based adaptation

The GBRMPA recognises the importance of biodiversity and ecosystem services to Reef-based industries, local communities, Traditional Owners and the broader public. The connections between people and the Reef ecosystem are especially important in the context of climate change. A healthy Great Barrier Reef enhances the resilience of the ecosystem to adverse impacts of climate change; a resilient ecosystem reduces the vulnerability of industries and communities that depend on the Reef.

National and international climate change adaptation strategies have evolved significantly over the past five years. Under our first Action Plan (2007–2012), the GBRMPA collaborated with a wide range of local, regional and global organisations that are working to mitigate climate change impacts and adapt coral reef management to a changing climate.

Internationally, the GBRMPA has established strong working relationships with coral reef managers around the world. A partnership with the National Oceanic and Atmospheric Administration (NOAA) in the United States has established tools for predicting coral bleaching, built capacity among managers to tackle climate change issues and developed approaches to adaptation planning. In conjunction with The Nature

Conservancy, we have developed new strategies for managing coral reefs in the face of climate change and provided training for marine park managers from more than 30 countries. Close ties have been established with our near neighbours in the 'Coral Triangle' and are being built with coral reef managers in the Caribbean through support of the Australian Agency for International Development (AusAID). We also work closely with the United Nations Environment Program (UNEP), the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and the International Union for Conservation of Nature (IUCN). These collaborations have enabled the GBRMPA to assess strategies from around the world for their potential to improve climate adaptation on the Reef.

An emerging approach to climate change challenges by all these agencies is ecosystem-based adaptation. This approach, promoted internationally by organisations such as UNEP, IUCN and the United Nations Development Program (UNDP), is closely aligned with the principles of our first Action Plan (2007–2012) and this Adaptation Strategy. Ecosystem-based adaptation integrates the protection and use of biodiversity and ecosystem services into an overall strategy to help people adapt to the adverse impacts of climate change. It encompasses ecosystem-



based management, conservation and restoration of ecosystems to maintain services that help people adapt to climate variability and change.¹ Ecosystem-based adaptation helps to reduce vulnerability and increases resilience to climate and non-climate risks. It provides multiple benefits to society and the environment. Appropriately designed ecosystem management initiatives can contribute to climate change mitigation by reducing greenhouse gas emissions from ecosystem loss and degradation, and enhancing carbon sequestration through ecosystem restoration.

Implementation of this *Great Barrier Reef Climate Change Adaptation Strategy* will be guided by the following key principles of ecosystem-based adaptation:²

1 UNEP: <http://hqweb.unep.org/climatechange/adaptation/EcosystemBasedAdaptation/tabid/29583/Default.aspx>
IUCN: http://www.iucn.org/what/tpas/climate/key_topics/eba/
UNDP: <http://www.undp.org/biodiversity/mitigation.shtml>

2 A. Colls, N. Ash, and N. Ikkala (2009). *Ecosystem-based Adaptation: a natural response to climate change*. Gland, Switzerland: IUCN. 16pp.

Focusing on reducing non-climate stresses

Reducing ecosystem degradation is a 'no regrets', 'win-win' approach to adaptation. Ecosystem-based adaptation strategies should minimise other anthropogenic stresses that have degraded critical ecosystems and thereby undermined their resilience to climate change. Such stresses include unsustainable harvests, habitat fragmentation, non-native species and pollution.

Involving local communities

Ecosystem-based adaptation measures are more successful when the local population participates in both planning and implementation.

Multi-partner strategy development

Ecosystem-based adaptation presents a tangible opportunity to solve climate change problems by aligning conservation, development and poverty alleviation interests. Benefits are shared through the collaboration between Indigenous and local communities, conservationists, natural resource managers, private sector stakeholders, and the various levels of government and non-government institutions involved in social development and conservation issues.

Building on existing good practices in natural resource management

The most effective ecosystem-based adaptation strategies apply established best practices in land, water and natural resource management to some of the new challenges posed by climate change. Using the ecosystem approach for the integrated management of resources is particularly appropriate to ecosystem-based adaptation.

Adaptive management approaches

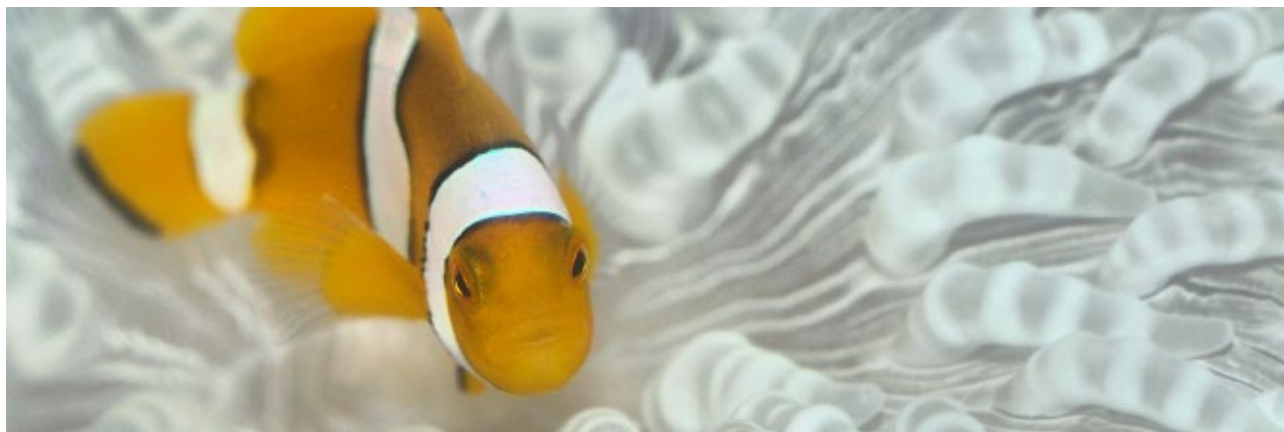
Ecosystem-based strategies should facilitate opportunities to identify and test adaptation options and accelerate their implementation. Climate impacts and ecosystem-based adaptation measures should be monitored carefully so that management actions can be adjusted in response to changing conditions.

Integrating ecosystem-based adaptation with wider adaptation strategies

Successful adaptation depends on integrating ecosystem-based adaptation initiatives with other risk management components, such as early warning systems and awareness-raising, and in some cases with physical infrastructure. It is important to encourage and enable technology transfer and dialogue between planners and practitioners with expertise in hard engineering and in ecosystem management.

Communicating and educating

Successful ecosystem-based adaptation depends on knowledge transfer, capacity building, integrating science and local knowledge and raising awareness about climate change impacts and the benefits of sound ecosystem management.



Our objectives

Our Adaptation Strategy is outcome-focused and will be achieved through six main objectives. These build on the original four objectives of the Action Plan (2007–2012) and include two additional objectives that recognise an increased focus on stewardship and communication activities. The objectives are divided into core and foundational objectives.

Core objectives

These objectives are central to delivering adaptation outcomes for the Great Barrier Reef. They specifically aim to reduce risks and build resilience of different components of the Reef system.

A resilient Great Barrier Reef ecosystem

The resilience of the Reef ecosystem is central to its ability to cope with future stress and avoid the worst impacts of climate change. *A core objective of our Adaptation Strategy is to improve the capacity of Reef managers to build the resilience of the Great Barrier Reef ecosystem.* This objective will be met by activities that focus on reducing or offsetting risks, and developing tools to support management decisions.

Adaptation of industries and communities

While industries and communities can be a source of stress to coral reef ecosystems, they can also play crucial roles as environmental stewards and partners in conservation. *A core objective of our Adaptation Strategy is to support adaptation of Great Barrier Reef industries and communities so that they can continue to make wise use of the Reef and be active partners in building ecosystem resilience.* This objective will be met through activities that provide support to adaptation initiatives by industries and communities.

Action on climate change

The outlook for the Great Barrier Reef ultimately depends on the concentration of greenhouse gas emissions in the Earth's atmosphere over the coming century. *A core objective of our Adaptation Strategy is to encourage action that reduces the rate and extent of climate change.* This objective will be met through activities that ensure policymakers have access to information about the implications of climate change for the Reef.

Foundational objectives

These objectives aim to provide the knowledge, systems and conditions to support the core objectives. They are broad-based, and often underpinned by activities and initiatives implemented under related programs by the GBRMPA or partner organisations.

Strategic science

Effective action to improve the outlook for the Great Barrier Reef in the face of climate change requires timely and pertinent information. *A foundational objective of our Adaptation Strategy is targeted science that supports management decisions and adaptation planning.* This objective will be met by activities that address key knowledge gaps for management of the Reef more broadly, and provide knowledge specifically to support management efforts in the critically important inshore areas of the Reef.

Effective communication

Communication plays a critical role in nearly every aspect of climate change adaptation. *A foundational objective is effective communication to support implementation of our Adaptation Strategy.* This objective will be met through activities that improve the accuracy, availability and delivery of communication materials to support climate change adaptation.

Strong stewardship

Reef users have the potential to contribute substantially to efforts to build the resilience of the Reef ecosystem. *A foundational objective of our Adaptation Strategy is to have strong stewardship among individuals and groups that interact with the Reef.* This objective will be met through activities that build opportunities for stewardship and support for measures designed to build the resilience of the Reef.

Combining strategy and action: Delivery of the Adaptation Strategy

 Incorporated within the *Great Barrier Reef Climate Change Adaptation Strategy* is the *Great Barrier Reef Climate Change Action Plan 2012-2017* (Action Plan).

While the strategy outlines our objectives, the Action Plan sets specific activities and performance targets for the GBRMPA and our partners during the next five years.

Stakeholder partnerships

Collaboration with industry groups, communities and other organisations that influence or are influenced by the Great Barrier Reef will be essential in successfully carrying out activities to support the strategy objectives. These collaborations create the opportunities for raising awareness, sharing experiences and building capacity that are the core ingredients to effective adaptation. Collaborations will be strengthened and expanded through existing forums such as our Reef Advisory Committees and Local Marine Advisory Committees. We will also continue to foster the constructive working relationships with local government and peak industry bodies that have been established over many years and advanced through the Reef Guardians program. Our relationships with Traditional Owner groups will provide a valuable mechanism for collaborating on climate change adaptation activities, especially within the frameworks of Traditional Use Marine Resource Agreements. The close working partnership between the GBRMPA and the Queensland Government will continue to be important in the success of our climate adaptation work. Collaboration on activities under our Adaptation Strategy will be in accord with the *Great Barrier Reef Intergovernmental Agreement (2010)*.

Research collaborations

Under this Adaptation Strategy, we will substantially build our collaborations with key knowledge providers to ensure we, and our stakeholders, have access to the information and insights required for effective adaptation. We will continue to support individual research projects that address our priority knowledge gaps, but we will also work with other relevant institutions. In particular, we will work through the National Environmental Research Program to support multi-year research programs designed to deliver direct benefits to management of the Great Barrier Reef. We will also maintain and strengthen our partnerships with the Australian Institute of Marine Science (AIMS), the University of Queensland, James Cook University, the National Climate Change Adaptation Research Facility and other research organisations to harness Australia's research capacity for an improved outlook for the Great Barrier Reef.

An important platform for delivery of strategic adaptation science is the collaboration between major national research providers. The CSIRO's National Climate

Change Adaptation Flagship was initiated under the Council of Australian Governments National Climate Change Adaptation Framework, which also established the GBRMPA's Climate Change program. This enhanced collaboration will capture synergies between the applied climate adaptation research done by CSIRO, the ecosystem science done by AIMS, and the adaptive management work by the GBRMPA and its industry partners. It will bring particular strengths in the areas of integrated assessments, complex systems modelling, decision support and social and economic research to the portfolio of activities under the Action Plan.

International linkages

The GBRMPA is sharing its experience in climate adaptation and coral reefs with the international coral reef community. Through collaborations with the NOAA, The Nature Conservancy, the IUCN and the UNEP, the GBRMPA will assist coral reef managers in other regions to better understand climate risks and develop adaptation strategies and programs. These tools, knowledge products and strategies are being used to help other coral reef systems cope with climate change. The Caribbean is an emerging focus of this work through expanding collaborations with AusAID and partners.

Implementation

Implementation of this Action Plan is financed through ongoing program funding to the GBRMPA, detailed in the Australian Government's Portfolio Budget Statement. A monitoring, evaluation, reporting and improvement (MERI) plan will be developed to support the Action Plan. This will outline the logic that links short-term activities with program objectives, and specify the schedules for reporting on and review of Action Plan implementation.

The activities that contribute to delivery of the Action Plan will be embedded in the work plans of a broad range of internal and external partners. A coordinated, decentralised approach to implementation of our Adaptation Strategy will ensure further progress toward effective 'mainstreaming' of climate adaptation work within the Great Barrier Reef, with associated benefits to the sustainability of adaptation outcomes. Annual implementation plans will guide the delivery of the Action Plan.



Australian Government

Great Barrier Reef
Marine Park Authority

Great Barrier Reef Climate Change Action Plan 2012-2017

As part of our *Great Barrier Reef Climate Change Adaptation Strategy*, this Action Plan sets specific activities and performance targets for the Great Barrier Reef Marine Park Authority and our partners over the next five years.



A

A resilient Great Barrier Reef ecosystem



A.1 Reduce or offset risks to Great Barrier Reef species and habitats from climate change

The *Climate Change and the Great Barrier Reef: A Vulnerability Assessment 2007* (Vulnerability Assessment) and subsequent work clearly shows that many Reef species and habitats face an uncertain future as climate change and ocean acidification exert increasing pressure. There is no doubt that concerted global action to reduce greenhouse gas emissions is essential for the survival of many vulnerable ecosystem components. There is increasing evidence that actions to reduce other stresses on the Reef can build resistance and substantively improve its prognosis. There is also a growing need to explore the potential benefits and feasibility of interventions, such as enhancing recovery processes, restoring damaged habitats or creating refuge areas. These concepts need to be carefully explored, tested and evaluated before they can be considered for implementation as ecosystem management responses. They are likely to involve long-term investments in research and development and therefore are important inclusions in a strategic approach to climate change adaptation. The experimental nature of many potential management responses requires an adaptive (implement,

monitor, evaluate, review, improve) approach to their development and implementation. Key activities to build resilience include:

- A.1.1** Identify and monitor Great Barrier Reef species and habitats vulnerable to crossing resilience thresholds
- A.1.2** Develop and apply systems for assessing and reducing risks from potential management interventions
- A.1.3** Test, evaluate and refine management interventions for building resilience of vulnerable species and habitats

Targets

- By 2015, an integrated monitoring program in place that enables reporting on status of species and habitats vulnerable to crossing resilience thresholds.
- By 2015, a framework and protocol for evaluating management strategies available for use by decision makers.
- By 2016, adaptation plans developed for at least five of the most vulnerable species groups or habitats, incorporating the results of practical management intervention trials aimed at building resilience.

A.2 Provide tools and systems to support management decisions

Over the past five years, there has been a dramatic increase in the amount of information about climate change risks and implications for coral reef systems. Climate vulnerability and resilience are now integral to management thinking, and climate-related risks for key species or specific locations are increasingly being incorporated into management plans. However, there remains a critical need to:

- develop more effective tools and systems that will support management responses to cumulative risks/ impacts
- assist with strategic prioritisation (in space and time) of management investments
- evaluate ecological social trade-offs between alternative response strategies.

Key activities to support management decisions that will help build Reef resilience include:

A.2.1 Design and implement management strategy evaluation tools and processes to prioritise adaptation actions that will reduce climate change risk to the Reef

A.2.2 Develop decision-support tools to evaluate interacting stresses and cumulative impacts including climate change pressures

A.2.3 Develop a framework to evaluate climate change risks and identify strategic responses to improve spatial planning for protection of coastal ecosystems

A.2.4 Develop a system for prioritising and evaluating offset strategies relating to development activities in the region that will result in net improvement in the resilience of the Reef

Targets

- By 2014, a program of collaboration with the CSIRO Climate Adaptation Flagship and other leading research organisations established to develop improved decision-support tools.
- By 2014, a conceptual model available to decision-makers to prioritise management issues and research investment in complex systems (such as the inshore region of the Reef) in the context of climate change.
- By 2015, a decision support framework available that incorporates climate change risks and helps managers identify and prioritise adaptation actions for islands of the Great Barrier Reef World Heritage Area.
- By 2016, a decision support framework available to help managers integrate social, economic and ecological considerations as a basis for resilience-based management.
- By 2017, a system to identify and evaluate offset strategies for development activities in the region designed and tested.

B



Adaptation of industries and communities



B.1 Provide adaptation resources for reef-dependent industries and communities

It is essential to minimise the vulnerability of coastal communities and reef-dependent industries while also increasing their capacity to collaborate in building ecosystem resilience to climate change. Under our first Action Plan (2007–2012) and other GBRMPA programs, we have substantially strengthened our partnerships with key sectors of the commercial fishing industry and the Reef tourism industry. We have also extended our engagement with local communities, councils, Traditional Owners and regional organisations. Our focus to date has been on raising awareness of the implications of climate change for the Great Barrier Reef and the ecosystem services the Reef provides, and building interest in adaptation planning as a way to reduce future risks from climate change and minimise its impact on the environment.

An important ingredient in our success so far has been the provision of information, tools and resources to enable community-oriented groups and industry organisations to engage their constituents in dialogue about climate change. We will continue our work with industries and communities to advance their understanding of climate change risks and further support

their efforts to build adaptive capacity and develop adaptation plans. Activities under this strategy will include:

B.1.1 Produce a climate adaptation guide and online resource centre to support reef stewardship and management in a changing climate

B.1.2 Develop and implement tools and approaches for identifying and prioritising adaptation options for Reef-dependent industries and communities

B.1.3 Facilitate and otherwise support adaptation initiatives by Reef-dependent industries and communities that contribute to ecosystem resilience

Targets

- By 2014, GBRMPA climate adaptation guidelines for Reef-dependent industries and communities developed and tested.
- By 2015, a climate change adaptation guide and online resources to support Reef managers operational.
- By 2017, at least four priority adaptation initiatives by Reef-dependent industries and communities that contribute to ecosystem resilience identified and supported.

C



Action on climate change



C.1 Inform national and international climate policy

Information about the Great Barrier Reef's vulnerability to climate change compiled under our first Action Plan (2007–2012) has been instrumental in informing policymakers of some of the key threats associated with greenhouse gas emissions. However, global action on climate change must accelerate if we are to avert catastrophic decline of the world's coral reefs. The outlook for the Reef is largely determined by the rate and extent of climate change. Predictions for the Reef's future under even moderate climate scenarios clearly illustrate the serious risks of unmitigated climate change. The GBRMPA will continue to play an important role in informing the public policy debate about climate change by partnering with other knowledge providers to communicate the implications of different climate change scenarios for coral reefs. Key activities include:

C.1.1 Provide strategic information that enables key decision-makers (individuals, corporate leaders, policymakers) to understand and incorporate the implications of climate change for the Great Barrier Reef into their decisions

C.1.2 Improve understanding of the carbon sequestration potential of Great Barrier Reef habitats, such as mangroves, seagrasses and salt marshes (blue carbon)

C.1.3 Facilitate and promote a program to recognise carbon offset projects that contribute to the resilience of the Great Barrier Reef

Targets

- The *Great Barrier Reef Outlook Report 2014* to provide a contemporary, scientifically robust assessment of the implications of climate change for the Reef.
- By 2014, an evaluation of the carbon sequestration potential of Reef habitats completed and published.
- By 2015, a framework to facilitate establishment of Reef-friendly carbon offset scheme developed.
- By 2017, at least five information briefs covering key climate change issues for senior decision-makers published.

D



Strategic science



D.1 Address knowledge gaps that are limiting management response to climate change

The strategies implemented under the first Action Plan (2007–2012) were guided by the Vulnerability Assessment. Although this document has been fundamental to our planning and is still the most comprehensive assessment of its kind for coral reefs, our knowledge about the nature and patterns of climate change exposure, climate sensitivity and adaptive capacity of system components has increased substantially since it was published in 2007. Additionally, our knowledge about adaptation approaches and options has improved considerably over the past five years. Many of these advances have been captured in the *Great Barrier Reef Biodiversity Conservation Strategy 2012*. However, we still require more detailed knowledge of climate vulnerability and adaptation options for key components of the system, both ecological and social. Under this activity area, we will work with the research community and research funders to identify and target research toward priority knowledge gaps, especially those that are limiting our ability to implement appropriate and effective management responses. We will also work with researchers to increase the utility of relevant knowledge and improve the uptake of research findings into management decisions and actions. Key activities include:

D.1.1 Update and maintain the Vulnerability Assessment for the Great Barrier Reef

D.1.2 Provide information on climate change implications to support major assessments and analyses such as the

Great Barrier Reef Region Strategic Assessment and the *Great Barrier Reef Outlook Report 2014*

D.1.3 Establish a formal collaboration with CSIRO, in partnership with AIMS and other leading research organisations, to develop and test new approaches to adaptation for complex systems like the Reef

D.1.4 Compile detailed knowledge of climate change implications and adaptation options for priority species, habitats and industry sectors as a basis for adaptation planning

Targets

- By 2013, collaborations with CSIRO, AIMS and other leading research organisations established to develop and test priority adaptation strategies for the Reef.
- By 2014, information on climate change implications relevant to the *Great Barrier Reef Region Strategic Assessment* and the second *Great Barrier Reef Outlook Report (2014)* generated.
- By 2014, an updated Vulnerability Assessment published online.
- By 2014, results from priority research projects supported under the National Environmental Research Program (NERP) incorporated into management activities.
- By 2015, priority research needs reviewed and used to inform decisions on future NERP investment.
- By 2015, resilience analyses for at least two priority species, habitats and industry sectors produced as a basis for adaptation planning.



D.2 Provide knowledge to support effective management of inshore areas of the Great Barrier Reef

Inshore areas of the Great Barrier Reef are shaped by a complex interplay between marine and coastal processes and are ecologically distinct from mid-shelf and offshore areas. The connections between land and sea makes inshore areas particularly vulnerable to both climate change and the cumulative impacts of coastal and catchment development. These areas are especially important to coastal communities and many Reef-based industries by virtue of their proximity and their productivity. Despite this area's importance, there is relatively little information to support management decisions that aim to integrate biodiversity protection with sustainable use in the inshore-coastal zone. Under this strategy, we aim to fill critical gaps in our knowledge about climate vulnerabilities, cumulative impacts and linkages in the inshore areas of the Reef. The outcomes will provide a basis for more informed, strategic decisions about planning arrangements and adaptation strategies in the coastal zone to support implementation of the *Great Barrier Reef Biodiversity Conservation Strategy 2012*. Key activities include:

D.2.1 Develop an integrated understanding of the inshore and coastal systems, addressing flows, linkages and barriers, to support integrated responses to priority threats

D.2.2 Improve knowledge of strategies for building resilience of priority species, habitats, processes and regions in the inshore-coastal zone of the Reef

D.2.3 Identify strategies for protecting coastal processes and habitats critical to the resilience of inshore areas of the Reef

D.2.4 Develop adaptation plans to address key vulnerabilities in the inshore-coastal zone and incorporate them into regional planning frameworks

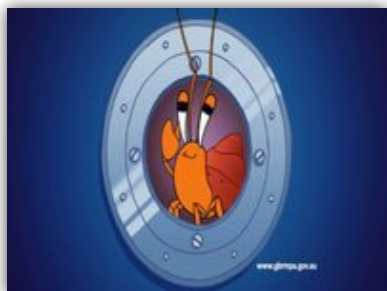
Targets

- By 2015, an integrated assessment of the Reef's inshore-coastal system completed to support integrated responses to priority threats.
- By 2016, strategies for building resilience of at least five priority species, habitats, processes or areas in the Reef's inshore-coastal zone identified and prioritised.
- By 2017, adaptation plans to address key vulnerabilities in the inshore-coastal zone developed and incorporated into regional planning frameworks.

E



Effective communication



E.1 Improved communications

Climate change is widely considered to be a critical intergenerational challenge, requiring urgent and decisive action to avoid severe damage to ecological and social systems on a global scale. Yet public debate continues about the nature of the problem and the justification and feasibility of response strategies. Improving the accuracy, availability and delivery of communication materials is a high priority under this Action Plan. Key communication activities include:

E.1.1 Understand and monitor climate change awareness, attitudes and relevant behaviours among Reef stakeholders

E.1.2 Develop targeted communication materials and tools to support delivery of the climate change communications plan

E.1.3 Design and implement a communications plan to build understanding among community and Reef-based industries about climate change implications for the Great Barrier Reef and management responses, including contributions of partners and stakeholders

E.1.4 Build and maintain knowledge and capacity among GBRMPA staff and partners to support delivery of the Adaptation Strategy

E.1.5 Build and maintain an online climate change adaptation resource centre to support the knowledge needs of all partners and stakeholders contributing to delivery of the Adaptation Strategy

Targets

- By 2013, a communications plan to support delivery of the *Great Barrier Reef Climate Change Adaptation Strategy and Action Plan (2012–2017)* developed and implemented.
- By 2014, a climate change adaptation capacity building program for staff and stakeholders developed and implemented.
- By 2015, a dedicated online climate change adaptation resource centre to support delivery of the Adaptation Strategy operational.
- By 2017, Great Barrier Reef stakeholder awareness, attitudes and behaviours relating to climate change assessed at least twice.

F



Strong stewardship



F.1 Build stewardship and increase compliance

The challenges presented by climate change require action from all sectors of the community. Everyone who values the Great Barrier Reef — Traditional Owners, researchers, commercial industries, recreational users and tourists — can play important roles in increasing its resilience in the face of global threats and local pressures. The Action Plan explicitly recognises the importance of partnerships and stewardship in securing a sustainable future for the Reef, and strategies to build stewardship are central to its effective implementation. This foundational strategy has strong links to the strategies under Objective A, which aims to build ecosystem resilience, and Objective B, which aims to support adaptation in Reef industries and communities. Key activities under this strategy include:

F.1.1 Build stewardship and increase involvement of Great Barrier Reef stakeholders in Reef management through participatory Reef health monitoring and reporting

F.1.2 Increase opportunities and capacity for stewardship among Reef communities and industries through the Reef Guardians program and other initiatives

F.1.3 Increase compliance with policies and regulations that build climate change resilience

Targets

- By 2015, information to support climate change adaptation included in all Reef Guardians programs.
- By 2015, education and information packages developed and available for delivery to Reef users by compliance and enforcement officers.
- By 2017, training to support participation in the Eye on the Reef monitoring program provided to at least 500 people
- By 2017, the Eye on the Reef program reports on the health of at least 1000 reefs.

Further information

The Great Barrier Reef Climate Change
Adaptation Strategy and Action Plan (2012-2017)
is available from the web:
www.gbrmpa.gov.au

For further information about the Great Barrier Reef
Climate Change Adaptation Strategy
and Action Plan (2012-2017) contact:

Great Barrier Reef Marine Park Authority,
PO Box 1379,
Townsville Qld 4810
Australia

Email: climatechange@gbrmpa.gov.au



Australian Government
Great Barrier Reef
Marine Park Authority

