



Australian Government

STATE PARTY REPORT

ON THE STATE OF CONSERVATION OF THE GREAT BARRIER REEF WORLD HERITAGE AREA (AUSTRALIA)

PROPERTY ID N154



IN RESPONSE TO
THE WORLD HERITAGE COMMITTEE DECISION
WHC 37 COM 7B.10

FOR SUBMISSION BY
31 JANUARY 2014

© Commonwealth of Australia, 2014.



State Party Report on the state of conservation of the Great Barrier Reef World Heritage Area (Australia) is licensed by the Commonwealth of Australia for use under a Creative Commons By Attribution 3.0 Australia licence with the exception of the Coat of Arms of the Commonwealth of Australia, the logo of the agency responsible for publishing the report, content supplied by third parties, and any images depicting people. For licence conditions see:

<http://creativecommons.org/licenses/by/3.0/au/>

This report should be attributed as *State Party Report on the state of conservation of the Great Barrier Reef World Heritage Area (Australia)*, Commonwealth of Australia, 2014.

Disclaimer

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the Australian Government or the Minister for the Environment.

While reasonable efforts have been made to ensure that the contents of this publication are factually correct, the Commonwealth does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this publication.

STATE PARTY REPORT

**ON THE STATE OF CONSERVATION
OF THE GREAT BARRIER REEF
WORLD HERITAGE AREA (AUSTRALIA)**

PROPERTY ID N154

**IN RESPONSE TO
THE WORLD HERITAGE COMMITTEE DECISION
WHC 37 COM 7B.10**

**FOR SUBMISSION BY
31 JANUARY 2014**

Acknowledgements

The Australian Government Department of the Environment prepared this report with assistance from Australian and Queensland government agencies.

Abbreviations and acronyms

AIMS	Australian Institute of Marine Science
BMP programmes	Best management practice programmes for cane and grazing industries in Queensland
CDEP	Community Development Employment Projects
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cwth	The Commonwealth of Australia, the Australian Government
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GBRMPA	Great Barrier Reef Marine Park Authority
GBRWHA	Great Barrier Reef World Heritage Area
ISO	International Organisation for Standardization
IUCN	International Union for Conservation of Nature
LNG	Liquefied natural gas
MNES	Matters of national environmental significance under the EPBC Act
NERP	National Environmental Research Program
State Party	Australia
Queensland, Qld	The state of Queensland
WHC	World Heritage Committee

Table of contents

Executive summary	1
Report card: Australia's progress in responding to the 2013 World Heritage Committee decision	6
Sommaire	9
Rapport d'évaluation : progrès enregistrés par l'Australie dans sa réponse à la décision du Comité du patrimoine mondial de 2013	14
1. Introduction	18
2. Current conservation issues	21
3. Australia's progress in responding to the requests of the World Heritage Committee and mission recommendations	27
3.1 Comprehensive strategic assessment	28
3.2 Reef 2050—Long-Term Sustainability Plan	30
3.3 Water quality	32
3.4 The Port of Gladstone	39
3.5 Shipping and ports	43
4. Overall protection and management of the property	44
4.1 Legislative protection	44
4.2 Outstanding Universal Value as a clearly defined and central element within the protection and management system	46
4.3 Notification of proposed developments	47
Appendix 1—Decision of the 37th session of the World Heritage Committee (June 2013) on the state of conservation of the Great Barrier Reef (37 COM 7B.10)	50
Appendix 2—Overview of Australia's progress against the 2011 and 2012 World Heritage Committee decisions and 2012 mission recommendations	51
Progress on the 2012 World Heritage Committee Decision (36 COM 7B.8)	51
Progress on the recommendations of the 2012 World Heritage Centre and International Union for Conservation of Nature reactive monitoring mission	53
Progress on the 2011 World Heritage Committee Decision (35 COM 7B.10)	55
Appendix 3—Benchmarking the Outstanding Universal Value of the Great Barrier Reef World Heritage Area	56
Appendix 4—Benchmarking the integrity of the Great Barrier Reef World Heritage Area	64

Appendix 5—Research reports prepared as a contribution to the strategic assessments and the Reef 2050—Long-Term Sustainability Plan.....	65
Appendix 6—Information sheet on the Long-Term Sustainability Plan	76
Appendix 7—EPBC Act status of proposed developments within the Great Barrier Reef World Heritage Area.....	81
Appendix 8—EPBC Act status of proposed developments outside the Great Barrier Reef World Heritage Area.....	84
Appendix 9—Abbot Point and Curtis Island projects approved in December 2013	88

Table of figures

Figure 1: Map of Great Barrier Reef World Heritage Area, region and marine park boundaries	vi
Figure 1 : Carte de la Zone de patrimoine mondial de la Grande Barrière de Corail, de la Région et des limites du Parc marin.....	10
Figure 2: Facts and figures for the Great Barrier Reef.....	4
Figure 2: Faits et chiffres sur la Grande Barrière de Corail	12
Figure 3: Overview of the substantial number of initiatives and reports prepared, or being prepared, as contributions to the strategic assessments, Reef 2050—Long-Term Sustainability Plan and improved long-term management of the Great Barrier Reef World Heritage Area	20
Figure 4: Cyclone winds (2005–2011) and flood plume exposure (1991–2011) in the Great Barrier Reef Region.....	22
Figure 5: Timeline—impacts on the Great Barrier Reef and Australia’s management responses.....	33
Figure 6: Trajectory of management practice and water quality improvement	37
Figure 7: Best practice principles identified by the Independent Review of the Port of Gladstone.....	41

Table of boxes

Box 1: Crown-of-thorns starfish outbreaks	23
Box 2: Dugong and green turtle mortality recovers from impacts of floods	24
Box 3: Coral regeneration after Cyclone Yasi	25
Box 4: Ecosystem resilience in the northern Great Barrier Reef	26
Box 5: 2013 Scientific Consensus Statement: Land Use Impacts on Great Barrier Reef Water Quality and Ecosystem Condition	35

Figure 1: Map of Great Barrier Reef World Heritage Area, region and marine park boundaries



Executive summary

Introduction

The Great Barrier Reef is an Australian icon and is one of the most precious ecosystems on Earth. It was inscribed on the World Heritage List in 1981 and is one of the best known and most comprehensively managed marine areas in the world.

The Great Barrier Reef World Heritage Area (GBRWHA) contains a maze of reefs and islands covering an area of 348 000 square kilometres (about the size of Italy or Japan) and stretching about 2000 kilometres (in a straight line distance) along Australia's north-east coast (Figure 1 and Figure 2).

The GBRWHA is critical to the cultural, economic and social wellbeing of the more than one million people who live in its catchment and depend on the Reef for recreation or their livelihoods. The wide range of activities in the area—including tourism, fishing, recreation, traditional use, research, defence, shipping and ports—are carefully managed to minimise environmental impact and to conserve the environment. Activities such as mining, oil drilling and gas extraction are banned by law in the Great Barrier Reef Region.

In the 12 months since the 2013 State Party Report, significant progress has been made to comprehensively deliver on the requests of the World Heritage Committee in decisions **37 COM 7B.10**, **36 COM 7B.8** and **35 COM 7B.10** and the recommendations of the March 2012 joint World Heritage Centre / International Union for Conservation of Nature (IUCN) reactive monitoring mission.

Current conservation issues

The management system in place to protect the Outstanding Universal Value and integrity of the Great Barrier Reef is one of the most rigorous and modern in the world. The property's Outstanding Universal Value and integrity remain largely intact. In the northern third of the property, attributes generally remain in better condition. Habitats further offshore and in deeper water have also been subject to fewer impacts. Some of the region's biodiversity has improved. Almost all geomorphological evolutionary processes throughout the property remain intact. The large majority of ecosystem processes remain in good condition, although some—such as coral recruitment (the process by which drifting coral larvae attach and establish themselves as members of the reef community) and reef building—are declining in the southern region. The natural beauty of large areas remains intact, especially for offshore coral reefs in the far north and aerial vistas, as well as for neighbouring islands (most of which are national parks).

The major threats to the Reef—extreme weather events and the potential effects of climate change—cannot be managed directly but much can be done to maximise the ecosystem's resilience to their effects. Efforts to control the threat of crown-of-thorns starfish continue. Recent research has emphasised the importance of controlling nutrient and sediment run-off from land clearing and broad-scale agriculture, and this has been a major focus of effort which is starting to show results. In comparison, pollution from other sources (urban, port development, dredging) is minor but may be highly significant locally and over short time periods.

Progress in implementing the World Heritage Committee's decisions and mission recommendations

Australia is further strengthening its management arrangements for the GBRWHA to protect the property's Outstanding Universal Value and integrity.

In accordance with Australia's Constitution, jurisdictional responsibilities for management of the Great Barrier Reef are shared between the Australian Government and the State of Queensland. The two governments continue to collaborate closely on all aspects of the management of the GBRWHA, with relevant ministers meeting at least twice each year to facilitate coordinated delivery.

Since the 2013 State Party Report, Australia has:

- released draft strategic assessments of the management of the GBRWHA and adjacent coastal zone for public comment. These strategic assessments are the largest and most comprehensive ever undertaken for a natural system in Australia and possibly the world. They identify the values of the Reef, the threats to those values and what we need to do to protect it. Companion 'programme reports' identify a range of measures to better integrate and strengthen coastal and marine planning and management through the institutional arrangements to protect the Outstanding Universal Value of the property
- commenced work to develop the Reef 2050—Long-Term Sustainability Plan, which will draw together the findings of the two strategic assessments to set out the protection and management requirements for this iconic area to 2050.

Water quality

Since the 2013 State Party Report, Australia has:

- released a new Reef Water Quality Protection Plan that sets the direction for the next five years, maintaining a focus on addressing agricultural run-off, which is the major cause of the decline in coral cover and marine health
- released a Scientific Consensus Statement on land use impacts on Great Barrier Reef water quality and ecosystem condition which confirms that the greatest cause of decline in Great Barrier Reef marine water quality has been associated with terrestrial run-off from broadscale agriculture, thus strengthening the case for sustained efforts in this area
- released a Reef Water Quality Report Card for the year to June 2011, which shows that run-off water quality is continuing to improve.

Ports and shipping

Since the 2013 State Party Report, Australia has:

- released a draft Queensland Ports Strategy that commits to concentrating port development within existing major port areas to improve their efficiency and environmental management
- completed an Independent Review of the Port of Gladstone that proposes principles for improved port operation, including the incorporation of World Heritage protection and cumulative impact assessment in planning (these findings have also informed the development of the Queensland Ports Strategy)
- launched the Gladstone Healthy Harbour Partnership, which will integrate monitoring programmes, better engage the community and directly inform management
- released a draft North-East Shipping Management Plan that proposes measures to help manage any risks of increased shipping traffic, including some measures to be implemented through an Anchorage Management Working Group.

Figure 2: Facts and figures for the Great Barrier Reef



Overall protection and management

Following the adoption of the Retrospective Statement of Outstanding Universal Value for the Great Barrier Reef by the World Heritage Committee in 2012, Australia has adopted a much more explicit and considered approach to Outstanding Universal Value in planning and decision-making for the Reef.

Since the 2013 State Party Report, Australia has:

- released draft guidelines to ensure that Outstanding Universal Value is central to Australia's environmental impact assessment process for the GBRWHA
- released the Queensland State Planning Policy, which requires explicit consideration of matters of national environmental significance (including the Outstanding Universal Value of World Heritage properties), providing a direct line of sight in planning from the international level right down to the local level.

Coastal development

Consistent with the World Heritage Committee's decisions, no port developments or associated port infrastructure projects have been approved outside the existing and long-established major port areas within or adjoining the property (**37 COM 7B.10**, paragraph 6(b)). In addition, no developments that would have an unacceptable impact on the Outstanding Universal Value of the property have been approved (**37 COM 7B.10**, paragraph 6(a)).

All decisions made since the release of the draft strategic assessments have been consistent with those assessments.

Conclusions


This report demonstrates that Australia has made substantial progress in responding to the World Heritage Committee decisions and mission recommendations.








This work will continue. Major achievements expected prior to the next World Heritage Committee meeting in June 2014 include finalisation of the strategic assessments, release of a Reef Water Quality Report Card for the period 2011 to 2013, finalisation of the next five-yearly Great Barrier Reef Outlook Report by the Great Barrier Reef Marine Park Authority, release of a draft of the Reef 2050—Long-Term Sustainability Plan, finalisation of referral guidelines on Outstanding Universal Value, and introduction of Queensland legislation related to port planning and development.

Australia does not consider that the GBRWHA warrants inclusion on the List of World Heritage in Danger, as the property's Outstanding Universal Value and integrity remain largely intact and Australia is taking corrective action and has demonstrated substantial progress and commitment in responding to the requests of the World Heritage Committee and to mission recommendations.

Australia will continue to keep the World Heritage Committee informed of progress and will provide a further State Party Report by 1 February 2015.

Report card: Australia's progress in responding to the 2013 World Heritage Committee decision

2013 WHC decision (37 COM 7B.10)	Progress since June 2013	Status
3. Strategic assessments and Reef 2050—Long-Term Sustainability Plan	<p>Strategic assessments</p> <ul style="list-style-type: none"> • Draft strategic assessments of the management of the entire property and the adjacent coastal zone were released on 1 November 2013 for public comment until 31 January 2014 and active consultation with key stakeholders and the broader community. • The draft strategic assessments: <ul style="list-style-type: none"> – are the largest and most comprehensive of their kind ever undertaken in Australia – conclude that the Outstanding Universal Value and integrity of the Great Barrier Reef remain largely intact, while some aspects of the overall health of the Reef have declined – propose key areas of strengthened management to reduce the risks to the Reef, halt and reverse decline and restore health and resilience, including but not limited to: <ul style="list-style-type: none"> ▪ adopting a management framework focused on clear outcomes for the future of the Reef's values and driven by specific measurable targets ▪ developing a cumulative impact assessment policy to provide a transparent, consistent and systematic approach to assessing cumulative impacts across jurisdictions from activities within and adjacent to the region ▪ introducing a net benefit policy to guide actions required to restore ecosystem health ▪ introducing a reef recovery programme to address local issues at a local scale ▪ establishing a reef-wide integrated monitoring programme. <p>Reef 2050—Long-Term Sustainability Plan</p> <ul style="list-style-type: none"> • Work has commenced on the development of the Reef 2050—Long-Term Sustainability Plan for the GBRWHA, and opportunities have been provided for initial public input. • Broad elements proposed for the Reef 2050—Long-Term Sustainability Plan include: <ul style="list-style-type: none"> – a vision for the Great Barrier Reef World Heritage Area that reflects the diversity of use and interest in the property, protects the Outstanding Universal Value, sustains its integrity and integrates the three pillars of sustainability (environmental, social and economic) – an outcomes framework that includes desired outcomes and targets for protection of Outstanding Universal Value – adaptive management actions to deliver outcomes and targets, primarily drawn from the strategic assessments and focusing on critical areas of new work; these include but are not limited to: <ul style="list-style-type: none"> ▪ a standard approach on cumulative impact assessment ▪ implementing a policy of net benefit in the assessment of projects or actions ▪ building on successful programmes to deliver a plan for reef recovery – an integrated monitoring and reporting programme to measure the success of the plan – a Reef Trust to improve water quality and coastal habitat, a Dugong and Turtle Protection Plan and crown-of-thorns starfish control – submission of the plan to the 39th session of the World Heritage Committee in 2015. 	On track 

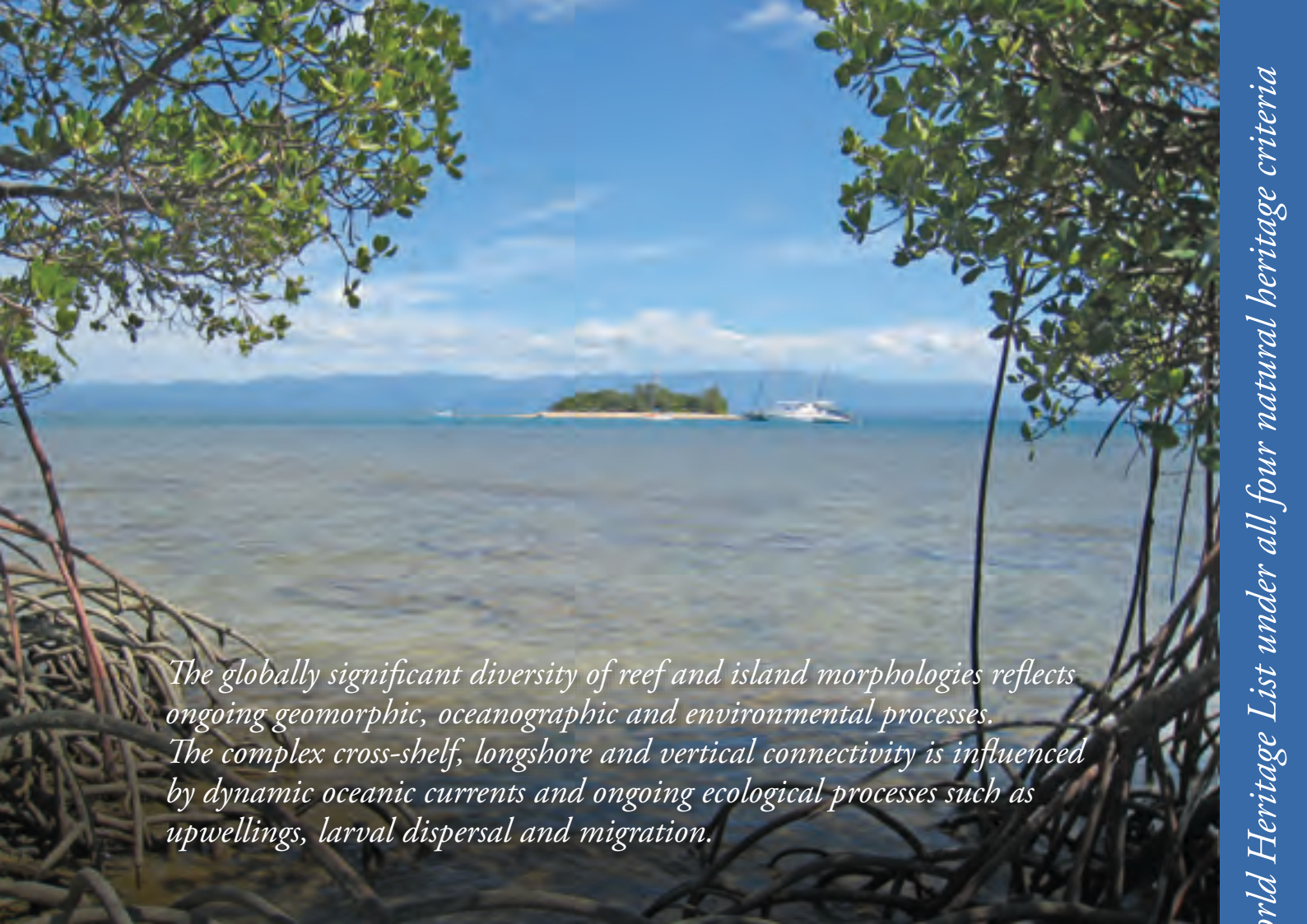
2013 WHC decision (37 COM 7B.10)	Progress since June 2013	Status
4. Managing development in Gladstone Harbour and on Curtis Island	<ul style="list-style-type: none"> The Independent Review of the Port of Gladstone was completed and its reports were released in two stages (July and November 2013). Both the Australian and Queensland governments have agreed to consider the review's proposed principles for port optimisation in planning for future port development and operations in the Great Barrier Reef World Heritage Area. The Gladstone Healthy Harbour Partnership was launched and implemented. Its intention is to bring community, industry, science, government, statutory bodies and management together to maintain and improve the health of Gladstone Harbour. The draft North-East Shipping Management Plan was released for public comment. The plan sets out Australia's intentions to enhance ship safety and environmental protection and specifically considers further measures to reduce and manage shipping-related risks to the Outstanding Universal Value of the GBRWHA. 	On track 
5. Water quality	<ul style="list-style-type: none"> The Reef Water Quality Protection Plan 2013 (Reef Plan) was released, guided by a revised Scientific Consensus Statement. The 2011 Reef Plan Report Card was released, showing continued progress towards water quality targets. The Australian and Queensland governments reaffirmed their commitment to the Reef Plan in December 2013. 	On track 
6a. No development to impact individually or cumulatively on the Outstanding Universal Value of the property	<ul style="list-style-type: none"> No developments that would have an unacceptable impact on the Outstanding Universal Value of the property have been approved and all decisions made since the release of the draft strategic assessments have been consistent with those assessments. Projects referred and assessed under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) explicitly incorporate Outstanding Universal Value into their decision-making framework. Any development proposal that could impact on the Great Barrier Reef will only be approved with the most robust conditions that ensure high environmental standards and a net benefit to the property, including protection of Outstanding Universal Value and integrity. 	On track 
6b. No port development outside existing and long-established port areas	<ul style="list-style-type: none"> No new port developments or associated port infrastructure projects have been approved outside existing or long-established major port areas in the Great Barrier Reef Region. The Draft Queensland Ports Strategy, released in October 2013, proposes to concentrate port development within existing major ports and introduce a statutory requirement for port master planning. Outside the long-established major ports, the Queensland Government will also prohibit capital dredging for the development of additional deepwater port facilities for the next 10 years within the GBRWHA. 	On track 
6c. Ensure legislation remains strong and adequate to maintain and enhance Outstanding Universal Value	<ul style="list-style-type: none"> Development proposals considered under national and state laws are assessed with enhanced consideration and understanding of the Outstanding Universal Value of the GBRWHA. A suite of products has been produced, including draft EPBC Act Referral Guidelines for the Outstanding Universal Value of the Great Barrier Reef World Heritage Area. Australia is working to deliver a single streamlined process for environmental approvals, maintaining high environmental standards. 	On track 
7. Overall protection and management of the property	<ul style="list-style-type: none"> Australia continues to make substantial progress in implementing the World Heritage Committee decisions and mission recommendations and is committed to corrective action to maintain the Outstanding Universal Value and integrity of the Great Barrier Reef World Heritage Area. A strong foundation of existing protection and management of the property remains firmly in place and continues to be built upon. The Great Barrier Reef Marine Park Authority is preparing the Great Barrier Reef Outlook Report 2014 for release mid to late 2014. 	On track 
8. Submit 2014 State Party Report by 1 February 2014	<ul style="list-style-type: none"> The 2014 State Party Report has been completed. The World Heritage Committee has been notified of all proposed developments through regular reports to the World Heritage Centre. A further State Party Report will be submitted in 2015. 	Complete 

The Great Barrier Reef is of superlative natural beauty above and below the water, and provides some of the most spectacular scenery on earth. It is one of a few living structures visible from space, appearing as a complex string of reefal structures along Australia's northeast coast.



The Great Barrier Reef, extending 2000 kilometres along Queensland's coast, is a globally outstanding example of an ecosystem that has evolved over millennia. The area has been exposed and flooded by at least four glacial and interglacial cycles, and over the past 15 000 years reefs have grown on the continental shelf.





The globally significant diversity of reef and island morphologies reflects ongoing geomorphic, oceanographic and environmental processes. The complex cross-shelf, longshore and vertical connectivity is influenced by dynamic oceanic currents and ongoing ecological processes such as upwellings, larval dispersal and migration.



The enormous size and diversity of the Great Barrier Reef means it is one of the richest and most complex natural ecosystems on earth, and one of the most significant for biodiversity conservation. The amazing diversity supports tens of thousands of marine and terrestrial species, many of which are of global conservation significance.

1. Introduction

Australia's commitment

Australia welcomes this opportunity to provide a progress report to the World Heritage Committee.

Australia is committed to fulfilling its responsibilities under the World Heritage Convention and to maintaining the Outstanding Universal Value and integrity of the Great Barrier Reef World Heritage Area (GBRWHA).

In accordance with Australia's Constitution, jurisdictional responsibilities for management of the Great Barrier Reef are shared between the Australian Government and the state of Queensland. The two governments have made substantial progress in responding to the Committee's requests made in 2011, 2012 and 2013 and the recommendations of the 2012 reactive monitoring mission.

2014 State Party Report

This 2014 State Party Report is a progress report outlining Australia's substantial progress in implementing key requests made by the World Heritage Committee (Decisions **35 COM 7B.10**, **36 COM 7B.8** and **37 COM 7B.10**) and recommendations of the 2012 reactive monitoring mission on the state of conservation of the Great Barrier Reef World Heritage Area (GBRWHA).

This 2014 report builds on the extensive information already provided in the 2012 and 2013 State Party reports, available at www.environment.gov.au/heritage/places/world/great-barrier-reef/information.html.

Figure 3 gives an overview of the substantial number of initiatives and reports prepared, or being prepared, by Australia in response to the 2011, 2012 and 2013 committee decisions and 2012 mission recommendations as contributions to the strategic assessments and Reef 2050—Long-Term Sustainability Plan (see Chapter 3).

Australia places a strong emphasis on adaptive, evidence-based management. This means that management often evolves quickly in response to emerging issues. This State Party Report provides a snapshot up to 9 January 2014. Further progress in implementing key requests from the World Heritage Committee is expected to be made between January and June 2014. This is anticipated to include:

- finalisation of the comprehensive strategic assessments of management of the property and adjacent coastal zone
- finalisation of the EPBC Act Referral Guidelines for the Outstanding Universal Value of the Great Barrier Reef World Heritage Area
- finalisation of the North-East Shipping Management Plan

- release of the combined 2012 and 2013 Reef Plan Report Card
- release of the draft Reef 2050—Long-Term Sustainability Plan for comment
- introduction of new Queensland legislation related to port management
- finalisation of the Queensland Ports Strategy
- finalisation of the next five-yearly Outlook Report.

Australia will be providing a further State Party Report by 1 February 2015, at which time the comprehensive strategic assessment and Reef 2050—Long-Term Sustainability Plan will have been completed as requested by the World Heritage Committee (**36 COM 7B.8**, paragraph 6).

Structure of this report

The executive summary includes a report card demonstrating Australia's progress against the 2013 World Heritage Committee decision. Appendix 2 provides an overview of progress against all the mission recommendations and the 2011 and 2012 committee decisions concerning the state of conservation of the GBRWHA.

Chapter 1 is the introduction to the report.

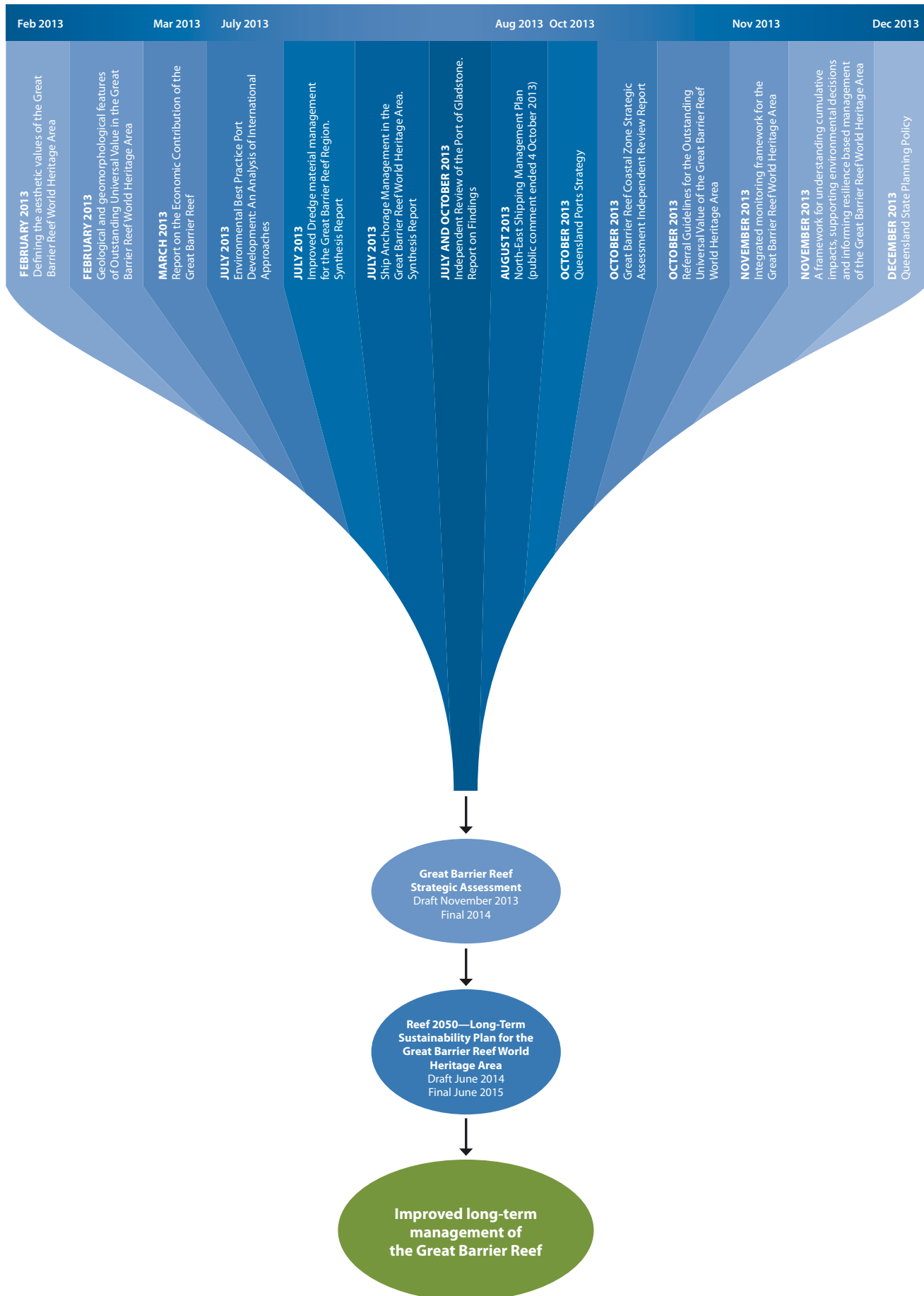
Chapter 2 identifies current conservation issues, including key findings of the draft strategic assessments on the condition and trend of the Outstanding Universal Value and integrity of the GBRWHA.

Chapter 3 summarises Australia's progress in responding to the 2013 World Heritage Committee decision (**37 COM 7B.10**, provided at Appendix 1), making reference also to recommendations in the 2012 World Heritage Committee decision and reactive monitoring mission report. Chapter 3 also outlines corrective actions being developed by the Australian and Queensland governments.

Chapter 4 provides an overview of legislative protection and a summary of proposed, withdrawn and approved developments within and outside the GBRWHA.

If further detail is required Australia would be pleased to provide it.

Figure 3: Overview of the substantial number of initiatives and reports prepared, or being prepared, as contributions to the strategic assessments, Reef 2050—Long-Term Sustainability Plan and improved long-term management of the Great Barrier Reef World Heritage Area



2. Current conservation issues

Overall condition of the Great Barrier Reef World Heritage Area

The Great Barrier Reef is one of the best managed coral reef ecosystems in the world and is internationally and nationally recognised for its significant environmental, social, cultural and heritage values.

The draft strategic assessments referred to in Chapter 3 have examined in detail the status and trends of the property's environmental values—including its Outstanding Universal Value, how these values are being protected and how this protection can be strengthened—while considering sustainable development and multiple use of this large property.

The drivers of change for the property are well understood. There is a 150-year history of land use change that continues to contribute sediment, nutrients and pesticides to the property. Over recent years a confluence of severe weather events, including floods and cyclones, has damaged the Reef. Poor water quality contributes to crown-of-thorns starfish outbreaks (see Figure 5 below). The emergent threat of climate change, while beyond the control of property managers, requires a focus on resilience.

Figure 4 (below) shows the extent of the Great Barrier Reef World Heritage Area (GBRWHA) and the Queensland coastline affected by cyclones of category 4 or 5 (the highest categories, with very destructive wind gusts ranging from 225 km/h to over 280 km/h) during the period 2005–2011.

Appendix 3 and Appendix 4, extracted from the draft Great Barrier Reef Region Strategic Assessment, benchmark the Outstanding Universal Value and integrity of the GBRWHA against the four criteria for which the property was inscribed on the World Heritage List.

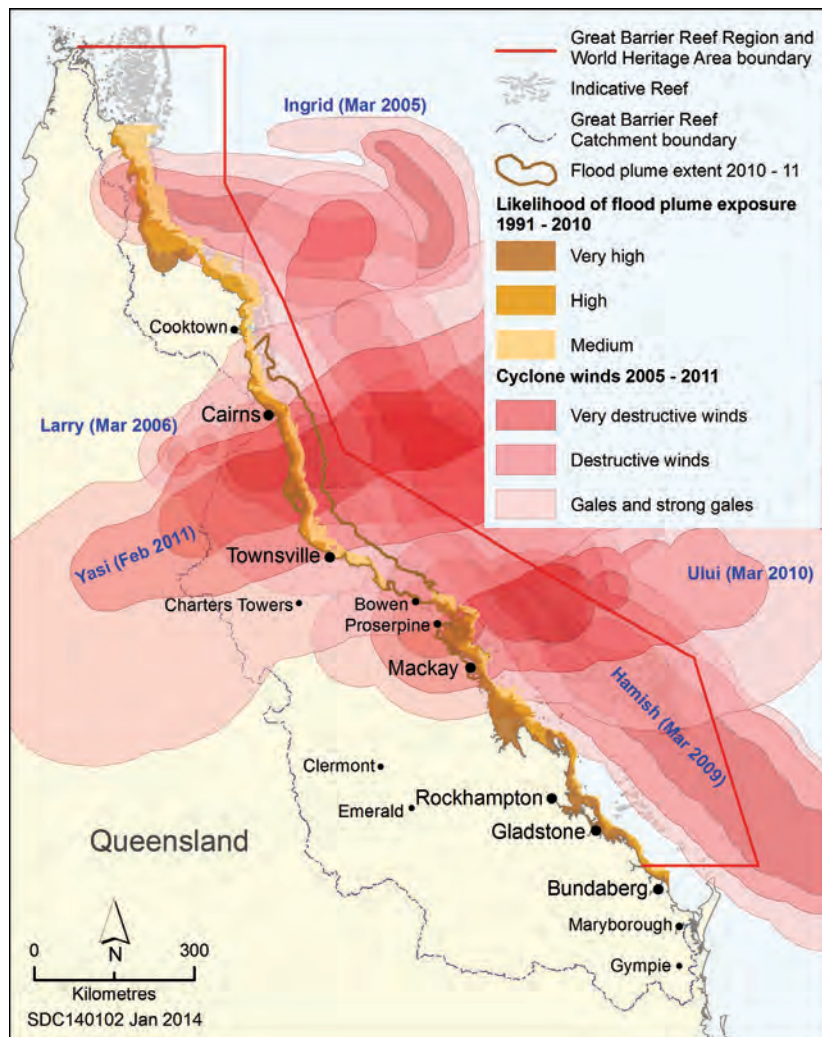
Overall the strategic assessments have found that the property continues to retain its Outstanding Universal Value and integrity. A number of attributes are in decline, particularly in inshore areas south of Cooktown. The assessments set out proposed management measures necessary to address these issues.

In the northern third of the property, attributes generally remain in better condition. Habitats further offshore and in deeper water have also been subject to fewer impacts. Some of the region's biodiversity has improved.

Almost all geomorphological evolutionary processes throughout the property remain intact. The large majority of ecosystem processes remain in good condition, although some—such as coral recruitment (the process by which drifting coral larvae attach and establish themselves as members of the reef community) and reef building—are declining in the southern region.

The natural beauty of large areas remains intact, especially for offshore coral reefs in the far north and aerial vistas, as well as for neighbouring islands (most of which are national parks). The loss of coral cover, especially in areas south of about Cooktown, has reduced underwater aesthetic value, as has increasing turbidity in some inshore areas. The loss of coral cover may have impacted some coral spawning and some other natural phenomena may have deteriorated—for example, some turtle nesting locations. There are concerns about some key habitats, particularly seagrass meadows and coral reefs, and about some species such as dugongs, marine turtles and some dolphins in the southern section of the property.

Figure 4: Cyclone winds (2005–2011) and flood plume exposure (1991–2011) in the Great Barrier Reef Region



The cluster of cyclones and flood events in recent years has seriously affected the condition of many Great Barrier Reef habitats and species. The likelihood of flood plume exposure (brown areas) is a cumulative assessment of multiple flood plumes based on remotely sensed conditions at the sea surface. The flood plume extent for 2010–11 (brown line) indicates the distribution of the flood plume as a result of the extreme weather events experienced over that summer. Map courtesy of the Spatial Data Centre, Great Barrier Reef Marine Park Authority 2014

The summer of 2010–2011 was the second wettest on record in Australia. This extreme weather caused flooding in several catchments and much higher than normal discharge from most rivers. A large expanse of the inshore reef south of Mackay was exposed to persistent flood plumes from the Fitzroy, Burnett and Mary rivers.

Tropical Cyclone Yasi, one of the largest and most powerful cyclones to affect Australia since records began, crossed the Queensland coast near Mission Beach in February 2011, causing damage to seagrass meadows and the reef from Cooktown south to Mackay. This led to the poor marine condition in many regions since 2011. Underwater surveys indicate that 15 per cent of the total reef area sustained some coral damage and full recovery may take decades.

Box 1 summarises current efforts to control crown-of-thorns starfish outbreaks, Box 2 highlights the recovery of turtle mortality following recent floods, Box 3 looks at coral regeneration following Cyclone Yasi in 2011 and Box 4 looks at ecosystem resilience in the northern Great Barrier Reef.

Box 1: Crown-of-thorns starfish outbreaks

The crown-of-thorns starfish (*Acanthaster planci*) is a coral-eating starfish or sea star native to coral reefs in the Indo-Pacific region.

While population booms of these animals are probably a naturally occurring event, their frequency has increased from once in 80 years or so to approximately once every 15 years. Elevated nutrient levels are linked to more frequent outbreaks of crown-of-thorns starfish. When a dramatic increase in nutrient levels in the water coincides with the spawning season (November to January), the larval crown-of-thorns starfish are able to develop, grow and survive at much higher than normal rates.



(Left) Crown-of-thorns starfish eating coral. Photo: GBRMPA

(Right) Diver injecting a starfish as part of the GBRWHA control programme. Photo: Daniel Schultz

There is emerging evidence that poor water quality resulting from floods and extreme weather events in the summers of 2009 to 2011 have created conditions for crown-of-thorns starfish numbers to increase at some locations on the Great Barrier Reef.

In the short term, the Australian Government has provided additional funding of \$5.1 million to further protect the Great Barrier Reef from the destructive crown-of-thorns starfish. The Australian and Queensland governments are working closely with tourism operators to implement a crown-of-thorns starfish control strategy to help the tourism industry protect coral at sites of high tourism value. In addition Australia is investing significantly in Reef Water Quality Protection Plan initiatives aimed at improving water quality and expected to reduce the long-term risk to the reef ecosystem from crown-of-thorns starfish. There are early indications that these programmes are successfully improving water quality. See also Chapter 3.2.

Box 2: Dugong and green turtle mortality recovers from impacts of floods

Over the last five years, predominant La Niña weather patterns led to extreme floods and storms that affected coastal water quality and seagrasses along some 1500 kilometres of the southern two-thirds of the Great Barrier Reef Region.



(Left) Dugong (*Dugong dugon*) feeding on seagrass. Photo: GBRMPA



(Right) Green turtle (*Chelonia mydas*). Photo: GBRMPA

There was an immediate measurable impact on turtles and dugongs that rely on seagrass for food; a large spike in the number of deaths was recorded—many of which were clearly caused by emaciation.

At the time there were implications that coastal development was the cause of these deaths. After a number of technical reviews, however, it has become clear that the primary cause was related to the floods. Several years later, the rate of mortality has returned to pre-flood levels.

Australia is maintaining strong management measures to further reduce human-caused mortality of these long-lived, slow-growing species, because they remain at very low population levels, especially in the southern part of the region.

A range of measures have resulted in increased numbers of female green turtles (*Chelonia mydas*) and loggerhead turtles (*Caretta caretta*) in the southern Great Barrier Reef.

Box 3: Coral regeneration after Cyclone Yasi

Baby corals are blooming on the Great Barrier Reef amid the damage left behind by Cyclone Yasi.



Coral recovering after Cyclone Yasi. Photos: GBRMPA

The Great Barrier Reef Marine Park Authority and the Queensland Parks and Wildlife Service have carried out their second inspection of a series of reefs between Townsville and Tully near the centre of category 5 Cyclone Yasi, which swept through in February 2011.

More than two years on, individual reefs are showing signs of recovery from the strong waves and currents that were generated by wind gusts of up to 285 kilometres per hour. The legacy of Cyclone Yasi is still plain to see but there are plenty of baby corals in the 11 reefs studied by GBRMPA, particularly in shallow waters, and much of the algae that smothered the rubble after the cyclone has disappeared.

Coral reef recovery following major disturbances such as cyclones typically takes decades, as long as other stresses are low. While severe weather events are beyond the control of managers, Australia is continuing to take actions to improve the quality of water that enters the Great Barrier Reef from the catchment and to control crown-of-thorns starfish (see Box 1) where possible.

Box 4: Ecosystem resilience in the northern Great Barrier Reef

The northern Great Barrier Reef provides a clear illustration of the potential resilience of the ecosystem. Recent evidence shows an upswing in coral abundance that returns the system to its long-term average coral cover and reflects the region's capacity to bounce back from the normal cycles of disturbance and recovery. In particular, over the last decade reefs have shown quite strong recovery from damage due to coral bleaching and other causes.



(Left) Healthy coral gardens. Photo: GBRMPA

(Right) Dugong feeding on seagrass. Photo: GBRMPA

Seagrass meadows are assessed to be in very good condition and stable and dugong populations remain healthy, with a stable population trend.

Maintaining the condition and resilience of ecosystems and species in the north is a key focus of the draft Great Barrier Reef Region Strategic Assessment. It also gives a strong indication that the efforts to restore water quality in the southern region are key actions to help restore resilience in the south.

3. Australia's progress in responding to the requests of the World Heritage Committee and mission recommendations

Australia takes its obligations under the World Heritage Convention seriously and is working hard to address the key requests made by the World Heritage Committee (**35 COM 7B.10**, **36 COM 7B.8** and **37 COM 7B.10**) and recommendations of the 2012 reactive monitoring mission on the state of conservation of the Great Barrier Reef World Heritage Area (GBRWHA).

Significant progress made since the 2013 State Party Report includes:

- release of the draft strategic assessments for public comment
- release of the Great Barrier Reef Biodiversity Conservation Strategy 2013 and publication of 12 of the 20 vulnerability assessments for at-risk habitats, species and groups of species that were identified through the strategy
- release of an ecological risk assessment of the East Coast Otter Trawl Fishery, which found that the fishery's impacts on marine plants and animals have reduced substantially over the last decade as a result of marine park zoning, the introduction of a fishery management plan and improved fishing practices
- release of the draft EPBC Act Referral Guidelines for the Outstanding Universal Value of the Great Barrier Reef World Heritage Area for public comment
- preliminary scoping of the Reef 2050—Long-Term Sustainability Plan
- release of a new Reef Water Quality Protection Plan, a supporting Scientific Consensus Statement and the 2011 Reef Plan Report Card
- release of the Independent Review of the Port of Gladstone and launch of the Gladstone Healthy Harbour Partnership
- release of the revised North-East Shipping Management Plan for public comment
- release of a draft Queensland Ports Strategy for public comment
- implementing outcomes from the report *Informing the Outlook for Great Barrier Reef Coastal Ecosystems*, which details coastal land use changes over many decades and their impact on water quality, habitats and inshore biodiversity
- launch of the Great Barrier Reef Climate Change Adaptation Strategy and Action Plan 2012–2017, which outlines how the Great Barrier Reef Marine Park Authority (GBRMPA) will build the Reef's health to make it better able to cope with stress and to reduce the potential impacts of climate change.

During this time, consistent with the World Heritage Committee's decisions, no port developments or associated port infrastructure projects have been approved outside the existing and long-established major port areas within or adjoining the property (**37 COM 7B.10**, paragraph 6(b)). In addition, no developments that would have an unacceptable impact on the Outstanding Universal Value of the property have been approved (**37 COM 7B.10**, paragraph 6(a)). All decisions made since the release of the draft strategic assessments have been consistent with the strategic assessments and have been reported to the UNESCO World Heritage Centre (see Chapter 4).

3.1 Comprehensive strategic assessment

In response to the World Heritage Committee's requests, Australia has been undertaking a comprehensive strategic assessment of the Great Barrier Reef World Heritage Area and the adjacent coastal zone.

It is by far the largest and most comprehensive, detailed and complex strategic assessment carried out in Australia and one of the most significant undertaken worldwide. It consists of two complementary assessments: one of the marine area and one of the adjacent coastal zone. The outcomes of these strategic assessments will be drawn together under the Reef 2050—Long-Term Sustainability Plan (see Appendix 6).

On 1 November 2013 both the strategic assessments and programme reports were released for a 13-week public review period, which ended on 31 January 2014. The extended timeframe allowed adequate time for the public and other stakeholders to participate. Copies of the draft reports are available upon request and can also be found at: www.reefhaveyoursay.com.au/draft-reports.

The draft programme reports outline Australia's further proposed actions for protecting the GBRWHA while providing for long-term development. The reports are currently being finalised, taking public comments into consideration.

Australia is working on proposed commitments that address potential direct, indirect and cumulative impacts on the property and recommend improvements to how the GBRWHA's values, including its Outstanding Universal Value, are protected and managed into the future.

The existing strong foundational management arrangements, combined with strengthened measures and commitments by both the Australian and Queensland governments, are expected to help achieve the goal of halting and reversing the deteriorating trend in some aspects of the Reef's health.

Managing the multiple pressures that are affecting the Reef will require a multi-pronged approach. North of Cooktown there is a need to focus on safeguarding the Reef's health. In the southern two-thirds of the region, restoring condition and halting and reversing damage will be the key themes for restoring health.

Where the strategic assessments found existing management to be only partially effective, both the Australian and Queensland governments have committed to strengthen existing arrangements, including:

1. Improved coordination across jurisdictions, in particular through reinvigoration of the Great Barrier Reef Ministerial Forum.
 - The forum, made up of relevant Australian and Queensland government ministers, provides a mechanism to prioritise protection, facilitate adaptive management and guide decision-making both in the World Heritage Area and in the adjacent coastal zone.
2. Ongoing investments and actions in regional reef recovery programmes.
 - These programmes involve cooperation between government agencies, traditional owners, industries and communities to implement on-ground actions to address local issues such as protecting and restoring biodiversity hotspots and re-establishing connectivity and the functioning of coastal ecosystems critical to the health of the Reef.
 - The Reef Recovery initiative recognises the inherent variability in the values and uses of the Reef across the region. GBRMPA intends to work with its partners to establish desired outcomes for individual regions. The outcomes will be based on national and international obligations to protect values and the levels of community acceptance of modifications to the system at local and regional levels to allow for ecologically sustainable use.

3. Improved assessment and management of cumulative impacts through the development of a cumulative impact policy and guideline that sets out values and impacts to be assessed, tools to be used and principles and standards to be applied.
4. Adoption of a 'net benefit' policy to offset any residual significant impacts of approved developments and contribute to reversing the trend of the property's declining health, particularly in the southern inshore areas that have been identified as a priority for restoration.
 - This policy will be guided by a more strategic and coordinated approach to actions and offsets to deliver a net gain that will complement existing policies and programmes.
5. More explicit consideration of Outstanding Universal Value so that there is a clear line of sight from the international level right down to the local level in planning and decision-making.
6. Better up-front planning so that potential environmental impacts can be avoided early.
 - Specific measurable targets will guide management actions and decision-making. These targets will be established for some key habitats, species, heritage values and community benefits, as well as some of the key risks.
7. More efficient and concentrated use of the major long-established ports, consistent with leading practice master planning.
8. A Reef-wide integrated monitoring and reporting programme.
 - This programme will bring together all the work that is currently being undertaken to monitor and report on the health of the Reef. It will ensure that this work (being undertaken across a number of different agencies and industries) is integrated and coordinated and that it addresses the priority issues. This programme will be fundamental in helping to assess how effective existing actions are to boost the health of the GBRWHA.

The draft strategic assessments and programme reports were subject to independent review to provide for a transparent process and community confidence. The reviews will be made available on the Department of the Environment website in early February 2014.

A considerable investment in additional research has provided valuable input to the strategic assessments and will inform the preparation of the Reef 2050—Long-Term Sustainability Plan. This new, innovative research will make a major contribution to the future management of the GBRWHA (see Figure 3 above and Appendix 5).

Australia will be providing a detailed State Party Report by 1 February 2015, at which time the comprehensive strategic assessment will have been completed as requested by the World Heritage Committee (**36 COM 7B.8**, paragraph 6).

3.2 Reef 2050—Long-Term Sustainability Plan

As requested by the World Heritage Committee (35 COM 7B.10, 36 COM 7B.8 and 37 COM 7B.10) and the 2012 mission (Recommendation 5), the comprehensive strategic assessment is being used to frame the preparation of a sustainable development plan, the Reef 2050—Long-Term Sustainability Plan (Reef 2050). Reef 2050 will guide the protection and management of the GBRWHA to 2050, to plan for and manage existing and emerging risks to ensure that its integrity and Outstanding Universal Value are protected for future generations (see Appendix 6). The details of Reef 2050 are currently being developed for release in 2014–15. It will outline a strategic long-term approach to addressing key threats to the GBRWHA, including nutrient and sediment run-off into the Great Barrier Reef, and crown-of-thorns starfish. The opportunities for protection of species, particularly turtles and dugongs, will be enhanced through reducing impacts of run-off on key habitat including coastal seagrass beds.

Reef 2050 will draw together a number of existing and new initiatives for protection and management of the GBRWHA to improve the integration of management and planning. These initiatives include the Reef Water Quality Protection Plan 2013 (see Chapter 3.3) and the newly announced Reef Trust, additional measures for run-off reduction and control of crown-of thorns starfish, and the Dugong and Turtle Protection Plan.

Reef Trust

A Reef Trust is being developed with an initial \$40 million commitment from the Australian Government. The trust will combine both government and private funds to focus on improving coastal habitat and water quality throughout the GBRWHA and adjacent catchments.

Run-off reduction and control of crown-of-thorns starfish

Additional action is planned to control crown-of-thorns starfish outbreaks and reduce the incidence of new outbreaks, through partnerships between managing agencies and marine tourism operators. The funding provided under this component will build on existing direct control activities and the \$1 million provided by the Queensland Government for training of divers for crown-of-thorns control programmes.

Through the Reef Trust, funding will be provided to assist farmers and land managers to implement techniques to reduce run-off to Great Barrier Reef catchments that contributes to crown-of-thorns starfish outbreaks.

The GBRMPA, working with the Association of Marine Park Tourism Operators, is using specially trained scuba divers to control crown-of-thorns starfish on high-value reefs between Cairns and Lizard Island. In the past, divers have had to inject starfish multiple times with sodium bisulphate, a swimming pool chemical. A new more efficient single-injection method using bovine bile salts, developed by researchers at James Cook University, is currently being utilised.

Dugong and Turtle Protection Plan

A new National Dugong and Turtle Protection Plan is being established, and \$5 million has been committed to contribute to its delivery. The plan will provide greater protection for dugong and turtle populations off Far North Queensland and the Torres Strait from the threats of poaching, illegal hunting and marine debris. The Australian and Queensland governments have also strengthened laws to address illegal hunting and poaching.

Reef 2050—Long-Term Sustainability Plan

At the Great Barrier Reef Ministerial Forum on 6 December 2013, the ministers agreed to the draft scope for the Reef 2050—Long-Term Sustainability Plan, which is to include the following elements:

- A vision for the Great Barrier Reef World Heritage Area that reflects the diversity of use and interest in the property, protects the property's Outstanding Universal Value, sustains its integrity and integrates the three pillars of sustainability (environmental, social and economic)
- An outcomes framework that includes desired outcomes and targets for protection of the property's Outstanding Universal Value
- Adaptive management actions to deliver outcomes and targets, primarily drawn from the two strategic assessments and with a focus on critical areas of new work. These may include:
 - a standard approach on cumulative impact assessment
 - implementing a policy of net benefit in the assessment of projects or actions
 - building on successful programmes to deliver a regional plan for reef recovery
- An integrated monitoring and reporting programme to measure the success of Reef 2050.

The development of Reef 2050 is integral to the finalisation of the comprehensive strategic assessment expected to be completed in mid-late 2014.

A collaborative approach between governments, industry and non-government and community sectors is being taken in the drafting of Reef 2050. Broad community consultation is being undertaken through a process of public comment on the draft Plan and through targeted consultation with key stakeholders.

Reef 2050 will be provided to the 39th session of the World Heritage Committee in 2015. Appendix 6 provides further information on the preparation of Reef 2050.

3.3 Water quality

Compromised marine water quality associated with terrestrial run-off from adjacent catchments continues to be one of the most significant issues for the Great Barrier Reef.

Figure 5 (below) shows a timeline history of land clearing and agricultural development and Australia's management interventions to protect the Reef.

The greatest water quality risks to the Reef are from nitrogen discharge, associated with crown-of-thorns starfish outbreaks and their destructive effects on coral reefs; and fine sediment discharge, which reduces the light available to seagrass ecosystems and inshore coral reefs. Pesticides pose a risk to freshwater and some inshore and coastal habitats.

Capital and maintenance dredging associated with the operation of ports and further port development has the potential to impact upon the water quality of inshore areas. The 2013 Scientific Consensus Statement concluded that, relative to diffuse sources of pollutants (broadscale agriculture), the contribution from point sources (urban, port development and dredging) is relatively minor but may be locally and over short time periods highly significant.

In July 2013, the 37th session of the World Heritage Committee welcomed Australia's renewed commitment to the Reef Water Quality Protection Plan, Reef Rescue measures and the positive results indicated in the 2011 Reef Plan Report Card. Since that time a significant amount of further progress has been made, setting the foundation for future water quality management and protection.

The Great Barrier Reef Water Quality Protection Plan (Reef Plan) has been in existence since 2003.

The Reef Plan is:

- a collaborative programme of coordinated projects and partnerships aimed at improving the quality of water entering the Great Barrier Reef
- part of the intergovernmental agreement between the Australian and Queensland governments to protect the Great Barrier Reef.

The long-term objective of the Reef Plan is to ensure that by 2020 the quality of water entering the Reef from broadscale land use has no detrimental impact on the health and resilience of the Great Barrier Reef.

The Reef Plan is renewed every five years; the latest version was signed by the Australian and Queensland ministers in July 2013. Building on successes to date, it sets the direction and ambitious but achievable targets for the next five years. It was developed in close consultation with stakeholders and was guided by the 2013 Scientific Consensus Statement on the land use impacts on Great Barrier Reef water quality and ecosystem condition, prepared by more than 40 leading water quality scientists (<http://reefplan.qld.gov.au/about/scientific-consensus-statement.aspx>) (see Box 5).

Reef Plan 2013 identifies actions with clear accountability to improve the quality of water entering the Reef. It includes the continuation of the Paddock to Reef monitoring programme, which provides ongoing evaluation of management effectiveness.



Great Barrier Reef impacts and responses timeline

Responses

- ### Legislation
1. Great Barrier Reef Marine Park Act 1975
 2. Queensland Coastal Protection and Management Act 1995
 3. EPBC Act proclaimed, protecting Matters of National Environmental Significance including five of relevance to reef
 4. Queensland Vegetation Management Act 1999. Stops vegetation clearance by 2006
 5. Queensland legislation related to port management

- ### Crown-of-thorns starfish control
1. 2011–12: First crown-of-thorns starfish control program (\$1.3 million)
 2. 2012–13: Second crown-of-thorns starfish control program
 3. 2013: Single injection research starts
 4. 2013: \$4 million announced for crown-of-thorns starfish control
 5. 2013: \$1 million announced for crown-of-thorns starfish research and development
 6. 2013: \$1.1 million for additional boat and crew for crown-of-thorns starfish culling
 7. 2014: Additional \$2 million for crown-of-thorns starfish control

Impacts

- Major cyclones
- Crown-of-thorns starfish outbreak
- Major coral bleaching event

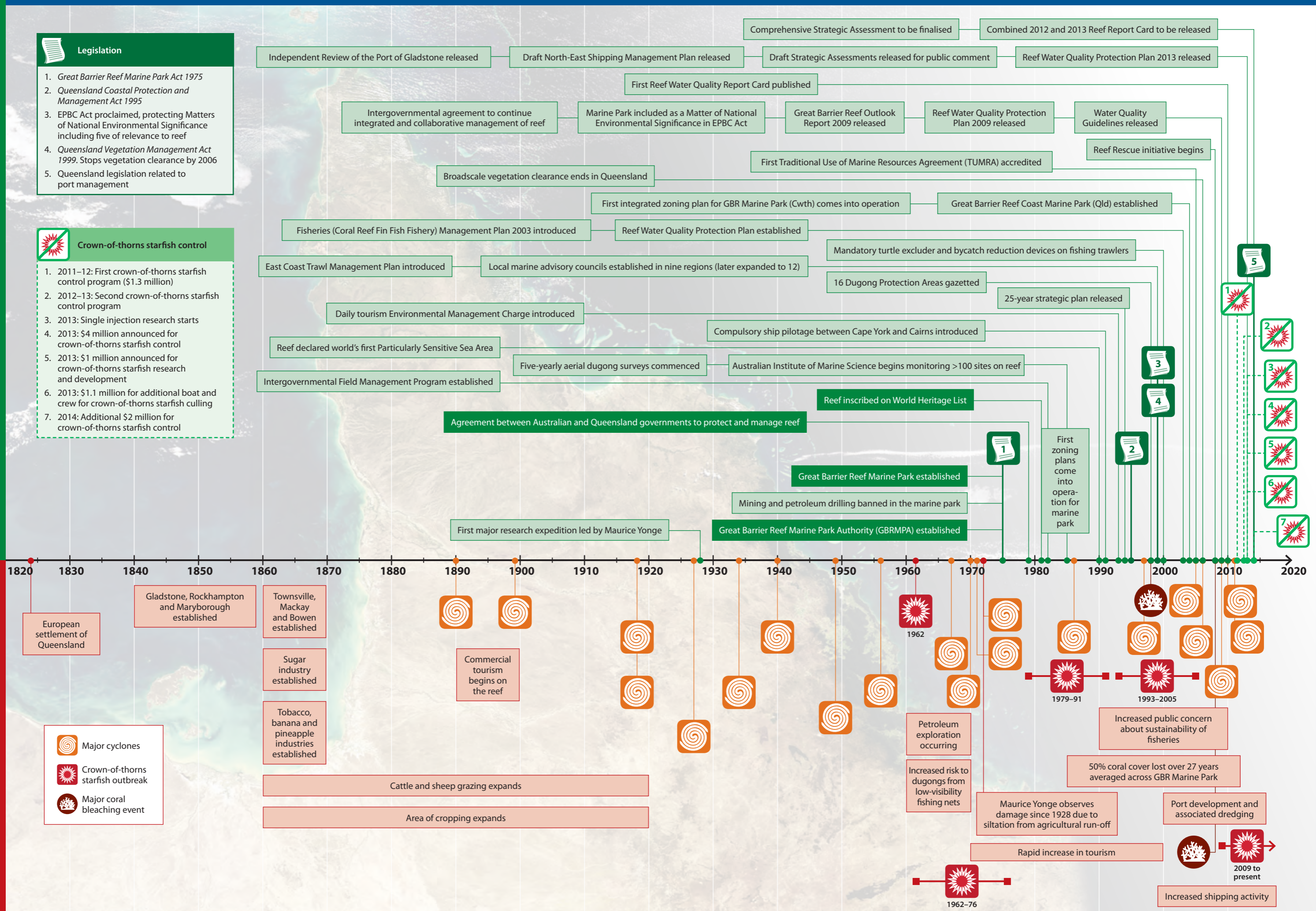


Figure 5: Timeline—impacts on the Great Barrier Reef and Australia's management responses

As part of the coastal component of the strategic assessment (see Chapter 3.1), Australia has committed to considering expanding the scope of the Reef Plan at its next review point in 2018 to incorporate sources of pollution other than broadscale agriculture (for example, urban, point sources, dredging). This is consistent with recommendations from the reactive monitoring mission and with Australian Government investment under the Reef Plan 2013 from 2013–14 to 2017–18 for strategic systems repair activities in agricultural, urban and industrial lands.

Box 5: 2013 Scientific Consensus Statement: Land Use Impacts on Great Barrier Reef Water Quality and Ecosystem Condition

The overarching consensus is that key Great Barrier Reef ecosystems are showing declining trends in condition due to continuing poor water quality, cumulative impacts of climate change and increasing intensity of extreme events.

The evidence base was synthesised in a series of five supporting chapters, and the following conclusions are based on those detailed reviews:

1. The decline of marine water quality associated with terrestrial run-off from the adjacent catchments is a major cause of the current poor state of many of the key marine ecosystems of the Great Barrier Reef.
2. The greatest water quality risks to the Great Barrier Reef are from nitrogen discharge, associated with crown-of-thorns starfish outbreaks and their destructive effects on coral reefs; and fine sediment discharge, which reduces the light available to seagrass ecosystems and inshore coral reefs. Pesticides pose a risk to freshwater and some inshore and coastal habitats.
3. Recent extreme weather events—heavy rainfall, floods and tropical cyclones—have severely impacted marine water quality and Great Barrier Reef ecosystems. Climate change is predicted to increase the intensity of extreme weather events.
4. The main source of excess nutrients, fine sediments and pesticides from Great Barrier Reef catchments is diffuse source pollution from agriculture.
5. Improved land and agricultural management practices are proven to reduce the run-off of suspended sediment, nutrients and pesticides at the paddock scale.

Independent Science Panel remarks

The Independent Science Panel was established in 2009 to provide multidisciplinary scientific advice to the Australian and Queensland governments on implementing the Reef Plan. The panel also oversaw and reviewed the 2013 Scientific Consensus Statement.

In reviewing the evidence and conclusions of the consensus statement, the panel noted:

1. There has been excellent progress over the past four years with greater scientific understanding and measurement of ‘catchment to reef’ processes and progress by the farming community towards land management practices that reduce pollutant loads to the Great Barrier Reef.



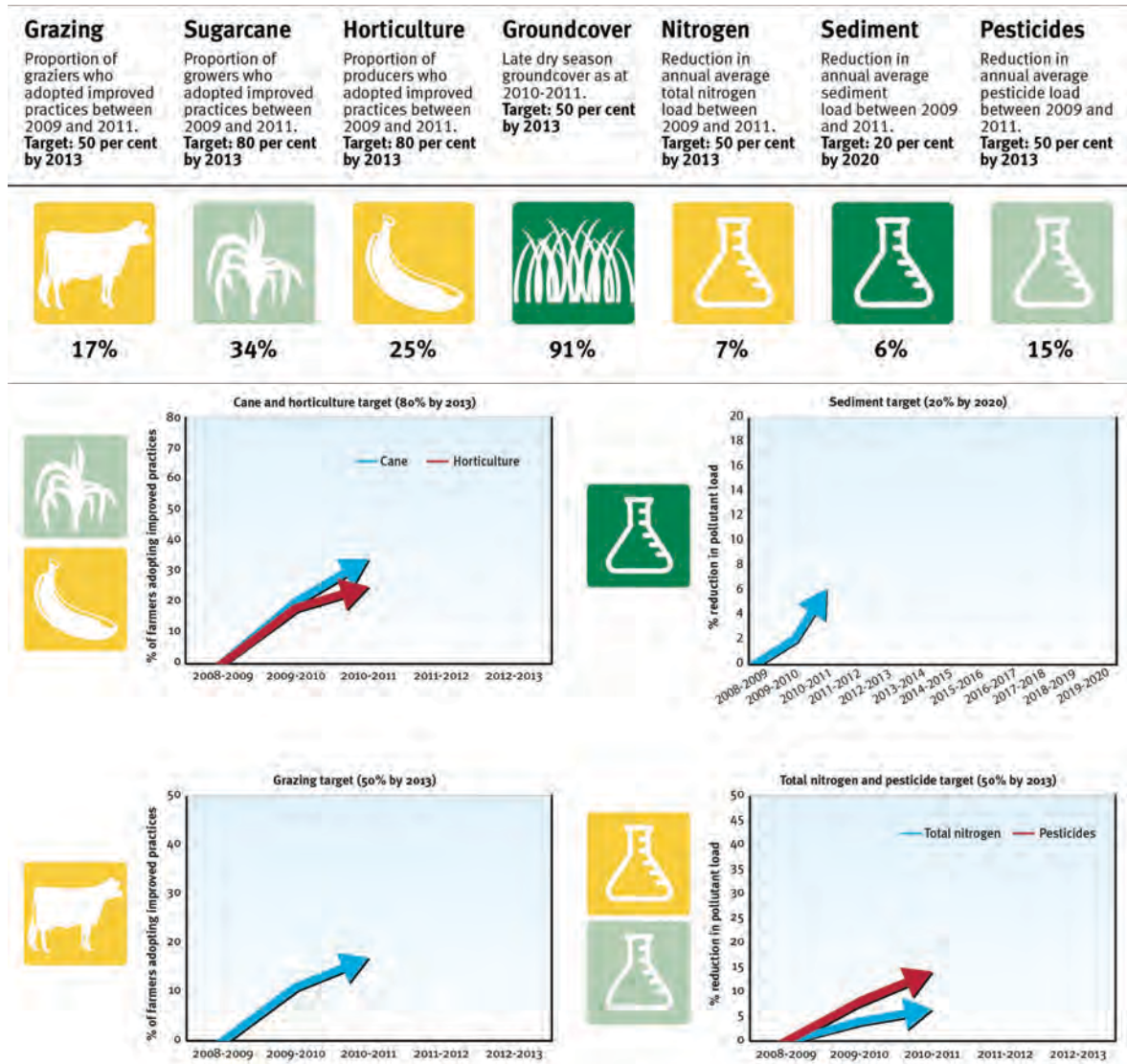
2. Water quality modelling, supported by appropriate validation, indicates that early adopters of best practice land management have reduced total pollutant loads—a significant step towards the goal of halting and reversing the decline in the quality of water going to the Reef.
3. The recent relative risk assessment is a major achievement allowing the development of cost-effective, regionally specific management actions to improve water quality. The leading example is the recommendation to reduce nitrogen loads from northern rivers. This will reduce the frequency and severity of primary outbreaks of crown-of-thorns starfish arising from floods in this area, which propagate to many other areas of reef in the central Great Barrier Reef over 15-year cycles.
4. While current management interventions are starting to address water quality in the Great Barrier Reef, sustained and greater effort will be needed to achieve the ultimate goal of no detrimental impact on the health and resilience of the Reef. In addition to continuous improvement, transformational changes in some farming technologies may be necessary to reach some targets.
5. Conditions in terrestrial catchments are most strongly connected with marine receiving waters during floods, but the extreme rainfall causing major floods is often episodic and may be separated by decadal droughts. Consequently there are inherent and complex lags in this system which must be recognised in performance evaluations of the Reef Plan. This challenge is best met by investing in continued development of coupled catchment-reef models and the essential collection of adequate data to calibrate and validate the models.
6. The consensus statement has identified new knowledge needed to help achieve the ultimate goal of the Reef Plan. These are outlined in the supporting chapters of the statement and will assist with identifying future research priorities. Future efforts should focus on synthesising the knowledge gained and communicating the results to landholders and decision makers. The consensus statement provides an excellent platform for this work.

2011 Reef Plan Report Card

Also released in July 2013, the 2011 Reef Plan Report Card measures and assesses the combined results of all Reef Plan actions up to June 2011 against the baseline set in 2009. The key findings of the 2011 Reef Plan Report Card include:

- Confirmation that the management changes and water quality improvements being implemented are having a positive impact on water quality across the Great Barrier Reef catchments (see Figure 6):
 - 15 per cent reduction in pesticide load
 - 13 per cent reduction in dissolved nitrogen load
 - seven per cent reduction in total nitrogen load
 - six per cent reduction in annual average sediment load.
- Encouraging progress towards the Reef Plan targets set in 2009, particularly the on-ground management practice changes, which are starting to reduce pollutant loads entering the Great Barrier Reef. This is a result of significant uptake of improved land management in the Great Barrier Reef catchments by:
 - 34 per cent of sugarcane growers
 - 17 per cent of graziers
 - 25 per cent of horticulture producers.

Figure 6: Trajectory of management practice and water quality improvement



Source: 2011 Reef Plan Report Card released July 2013

The 2011 Reef Plan Report Card also showed a decline in marine condition from moderate to poor as a result of much higher than normal river discharge and the effects of Cyclone Yasi in February 2011 (as discussed earlier). The impact of severe weather events such as Yasi on the health of the Reef reinforces the need to strengthen its resilience by controlling the impacts from land-based activities.

The next report card, covering 2012 and 2013, is on track to be released before June 2014. It is expected to show a slight improvement in marine water quality condition due to the abatement of extreme weather in the last two years (2011–2013).

Further information is available on the Reef Plan website: www.reefplan.qld.gov.au.

Water quality grant funding

As part of the Great Barrier Reef Water Quality Protection Plan, \$200 million of funding was invested through the first phase (2008–09 to 2012–13), to improve the quality of water entering the Great Barrier Reef lagoon.

Funding provided through the Water Quality Grants and Partnerships component of the programme assisted more than 2000 farmers from the sugarcane, horticulture and grain agriculture sectors to adopt land management practices that are improving the quality of water reaching the Reef lagoon. Additionally, over 1000 pastoralists managing over 2.7 million hectares have implemented improved grazing management practices that have increased groundcover and reduced the amount of sediment reaching the Great Barrier Reef.

Since the release of the 2013 State Party Report, Australia has committed more than \$140 million through the second phase (2013–14 to 2017–18). In addition to continuing to support the implementation of improved agricultural land management practices to further reduce the discharge of nutrients, sediments and pesticides into the reef lagoon, the second phase of the programme has been expanded to include complementary and strategic systems to repair activities in agricultural, urban and industrial lands. These activities include measures to reduce run-off from urban areas, and riparian plantings aimed at reducing stream sediment loads by stabilising and protecting stream banks. These measures will help to further improve water quality, and thereby increase the resilience of the property, by improving the condition and extent of biodiverse native habitats in the adjacent catchments.

The 2013–18 Indigenous element of the programme (\$10 million over five years) will be delivered through the Land and Sea Country Indigenous Partnerships Programme, which maintains a strong focus on the development and implementation of traditional use of marine resources agreements to deliver positive conservation outcomes in partnership with traditional owners. These agreements have particular regard to critical species, cultural values and key habitats located across the GBRWHA.

Best management practice programmes

Australia has confirmed its ongoing commitment to support the cane and grazing industries as they develop and implement best management practice (BMP) programmes. An allocation of \$5.4 million (\$3.5 million for cane and \$1.9 million for grazing) has been made available for BMP adoption through to 30 June 2014.

The BMP programmes will encourage producers to adopt improved practices that enhance productivity and profitability, and deliver improved Reef water quality outcomes.

Modules for the grazing and cane BMPs cover a wide range of topics including grazing land management; soil health; animal production; plant nutrition; pest, disease and weed management; and irrigation and drainage. These modules have been independently reviewed to ensure that they incorporate the latest agronomic and scientific understanding of management practices.

Uptake of grazing BMP modules to date has been promising, with more than 330 grazing enterprises completing BMP modules across the Burdekin and Fitzroy catchments. Delivery of the cane BMP module has recently commenced; it will initially focus on the priority areas of the Wet Tropics, Burdekin and Mackay Whitsunday catchments.

Accreditation, data collection and reporting systems for the cane and grazing BMP programmes have also been finalised. These ISO-rated systems will give producers, industry, government and the wider community confidence that BMP programmes reflect actual on-ground practice adoption and continuous improvement in both industries.

3.4 The Port of Gladstone

Independent Review of the Port of Gladstone

In 2012, the World Heritage Committee requested that Australia:

... undertake an independent review of the management arrangements for Gladstone Harbour that will result in the optimization of port development and operation in Gladstone Harbour and on Curtis Island, consistent with the highest internationally recognised standards for best practice commensurate with iconic World Heritage status (36 COM 7B.8 Paragraph 9).

This request was reaffirmed by the Committee in 2013, with the additional request to ensure that:

... these efforts result in the optimization of port development and operation in Gladstone Harbour and on Curtis Island, as well as other existing port developments ... (37 COM 7B.10 Paragraph 4).

In June 2013 the 37th session of the World Heritage Committee welcomed the establishment of an independent review of the management arrangements for Gladstone Harbour. Since then the Independent Review of the Port of Gladstone has been completed and its reports released. Both the initial and supplementary reports of the Independent Review are available at www.environment.gov.au/gladstonereview.

Overall, the review found that environmental management and governance within the Port of Gladstone is generally comprehensive and that it is possible to operate, manage and enhance the Port of Gladstone while also adequately protecting the environmental attributes of the area.

The independent review reported in two stages. The initial report, finalised in July 2013, presented findings and recommendations. It described three key areas for improvement:

- the need to incorporate World Heritage and other environmental protection considerations in a single, comprehensive and consultative port planning process
- the assessment and consideration of cumulative impacts
- the need for meaningful and ongoing stakeholder engagement to improve information and community confidence in environmental management and governance.

A supplementary report focused on port optimisation issues was released on 7 November 2013.

The supplementary report included a set of 21 proposed principles for the optimisation of development and operation of ports in the GBRWHA (see Figure 7). These principles may also have broader applicability to ports in other World Heritage properties.

Principle 1 recognises that the Outstanding Universal Value of the GBRWHA should be an intrinsic consideration in all aspects of environmental management and governance of ports in the Great Barrier Reef Region. The principle responds to the duty of care to manage the Great Barrier Reef so that the property's Outstanding Universal Value can be maintained. The principle also recognises that World Heritage status, and the obligations to protect, conserve, present and transmit that heritage to future generations, should be a consideration in all elements of port environmental management and governance and not just a consideration in environmental assessments and decision-making.

Australia is considering the review's proposed principles for port optimisation in the planning for future port development and operations in the GBRWHA.

The findings and recommendations of the review are comprehensive. It is expected that the Reef 2050—Long-Term Sustainability Plan will be informed by the review's findings.

Gladstone Healthy Harbour Partnership

The Gladstone Healthy Harbour Partnership is a forum to bring together parties to maintain and, where necessary, improve the health of Gladstone Harbour. The guiding principles of the partnership are open, honest and accountable management; annual reporting of the health of Gladstone Harbour; and management recommendations and actions based on rigorous science and strong stakeholder engagement.

The Gladstone Healthy Harbour Partnership was launched on 6 November 2013 by 23 partners across community, government, industry and research organisations signing a memorandum of understanding to be members of the partnership. The Gladstone Healthy Harbour Partnership independent science panel has provided recommendations on the report card framework which will help show progress towards the community-developed vision of a healthy harbour. The first pilot report card will be developed in 2014 and the first full report card in 2015.

The Queensland Government's investment of \$3 million over two years has been matched by industry, community, research and local government.

The Australian Government has also committed \$1 million to the programme over the next two years.

Figure 7: Best practice principles identified by the Independent Review of the Port of Gladstone

Overarching principles	
Principle 1	The Outstanding Universal Value of the GBRWHA should be an intrinsic consideration in all aspects of environmental management and governance of ports in the Great Barrier Reef Region.
Principle 2	Meaningful engagement strategies should be implemented throughout planning and operational processes so that all stakeholders can be aware of environmental condition and progress in achieving a shared vision.
Principle 3	Relevant information used in decision-making should be freely accessible in a timely manner.
Principle 4	Environmental management and governance should be objective, transparent and informed by best available knowledge.
Principle 5	Port planning and operations should be reviewed and improved regularly, informed by advances in technology and knowledge.
Planning	
Principle 6	Existing developed footprints within port areas should be optimised to the greatest extent possible prior to expansion into greenfield sites, including through the consolidation and sharing of infrastructure.
Principle 7	Port plans should specifically identify and address environmental objectives, including the maintenance of the outstanding universal value of the GBRWHA, and the plans should be subject to risk-based environmental assessments.
Principle 8	Planning and management solutions should be site specific and fit for purpose within the local and regional environmental and social context, including having regard to cumulative pressures.
Principle 9	Individual port plans should be consistent with regional, state and national port and freight logistics plans within a long-term shared vision.
Principle 10	Port master plans should encompass the entire extent of port limits and adjoining land likely to be associated with port development and operation.
Principle 11	Planning criteria and option analysis should be risk-based, documented and publicly available, including economic, social and environmental considerations.
Principle 12	Ports should implement incentive schemes to encourage use of the best available environmental technology and operational practice.

Environmental assessment and decision-making	
Principle 13	A consistent, robust and transparent integrated modelling and decision support framework should be available to stakeholders and regulators.
Principle 14	Environmental assessment and decision-making should be based on a whole-of-system understanding of the receiving environment and impacts of cumulative pressures.
Principle 15	Environmental offsets should be strategic, measurable and in place prior to impacts occurring, while aiming for a net environmental gain.
Principle 16	Decision-making and development approvals should be consistent with port planning and a shared vision for the region.
Monitoring and reporting	
Principle 17	Appropriate indicators, thresholds and methods for monitoring ecological health should be identified through a risk-based whole-of-system approach and consistent with a regional integrated monitoring framework.
Principle 18	Adequate capacity should be maintained in port areas to prevent, detect and rapidly respond to significant environmental incidents such as marine pest species incursions and oil spills.
Compliance and enforcement	
Principle 19	Compliance with regulatory controls should be monitored and the results published regularly, including in the event of an infringement.
Principle 20	Performance against port planning and environmental objectives should be regularly assessed and publicly reported.
Principle 21	Penalties for non-compliance should be sufficient to deter infringements.

Source: Independent Review of the Port of Gladstone Supplementary Report (October 2013)

3.5 Shipping and ports

In addition to the comprehensive strategic assessment and the review of the Port of Gladstone, a number of initiatives focused on shipping management and port optimisation have been progressed.

North-East Shipping Management Plan

The 2013 State Party Report provided information on the development of the North-East Shipping Management Plan, which is a plan to further manage risks associated with shipping in the Great Barrier Reef, Coral Sea and Torres Strait regions, given the projected growth of shipping over the next 10 years. It is an important component of Australia's response to the mission's recommendation to develop a fully integrated approach to shipping activity affecting the GBRWHA.

Since the 2013 State Party Report, substantial progress has been made in the development of the plan, which was released for public comment by the Australian Maritime Safety Authority on 2 August 2013.

The North-East Shipping Management Plan sets out Australia's intentions to enhance ship safety and environmental protection in the north-east region of Australia. The plan specifically considers shipping-related risks to the Outstanding Universal Value of the Great Barrier Reef World Heritage Area and identifies measures, implemented through a work programme, for preventing or mitigating ship-sourced pollution and other environmental impacts.

Public comments are currently being considered and a revised version of the plan is expected to be released in early 2014. The plan is a long-term living document and will be subject to continual review, continued community and industry consultation and regular adaptive management processes.

The draft North-East Shipping Management Plan is available at www.amsa.gov.au/community/consultation/nesm-consultation.asp.

Draft Queensland Ports Strategy

Australia has reaffirmed its commitment to protect the Great Barrier Reef through a strategic approach to port development which includes a commitment to 'restrict any significant port development, within and adjoining the GBRWHA, to within existing port limits to 2022'.

The draft Queensland Ports Strategy, released in October 2013, strengthens and builds on this commitment, focusing development around long-established major port areas.

Within the GBRWHA four Priority Port Development Areas will be identified around the long-established ports of Gladstone, Mackay / Hay Point, Abbot Point and Townsville. Development at these ports will continue to be subject to rigorous environmental assessment. The Queensland Government will mandate that these ports undertake comprehensive master planning, including rigorous assessment of marine and cumulative impacts, and an environmental management framework.

Outside of these long-established major ports, the Queensland Government will also prohibit capital dredging for the development of additional deepwater port facilities for the next 10 years within the GBRWHA.

4. Overall protection and management of the property

4.1 Legislative protection

'Ensure that the legislation protecting the property remains strong and adequate to maintain and enhance its Outstanding Universal Value' (37 COM 7B.10)

National legislation

Australia is committed to protecting the Great Barrier Reef World Heritage Area (GBRWHA) through the national environmental laws: the *Great Barrier Reef Marine Park Act 1975*, the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Environment Protection (Sea Dumping) Act 1981*. Under these laws, the GBRWHA, the Great Barrier Reef Marine Park and the Great Barrier Reef National Heritage Place are matters of national environmental significance, as are a number of threatened and migratory species that use these waters.

For proposals that are considered under the EPBC Act, all relevant direct, indirect and cumulative impacts on the Outstanding Universal Value of the GBRWHA are formally and rigorously assessed. All projects must meet the highest environmental standards and all potential significant impacts are to be avoided, mitigated or offset in such a way as to deliver a net benefit. Strict conditions are imposed on any approval to ensure that the project contributes to improving the health of the Reef. If a project is considered likely to have unacceptable impacts on matters protected under national environment law, approval will not be granted.

Great Barrier Reef Marine Park Authority

The Australian and Queensland governments have been working together for the long-term protection and conservation of the Great Barrier Reef Marine Park since its inception in 1975.

The *Great Barrier Reef Marine Park Act 1975* enabled the establishment of the Great Barrier Reef Marine Park Authority (GBRMPA) as the Australian Government statutory authority specifically charged with managing the marine park.

The objects of the Act are set out in section 2A, and the specific functions of the GBRMPA are defined in sections 7 and 7A. The GBRMPA also administers other Acts, regulations and plans of management.

The GBRMPA works towards the long-term protection, ecologically sustainable use, understanding and enjoyment of the Great Barrier Reef for all Australians and the international community, through the care and development of the marine park.

This outcome is delivered through three objectives:

- Addressing the key risks affecting the outlook for the Great Barrier Reef
- Ensuring that management supports ecologically sustainable use
- Fostering stewardship by engaging, educating and inspiring people through the care and management of the marine park.

Development of a single streamlined process for environmental approvals under the EPBC Act

To reduce regulatory duplication, Australia is working towards a 'one stop shop' policy for environmental approvals, whereby approval decisions made under state and territory processes are accredited for EPBC Act purposes. The one stop shop policy aims to maintain the high environmental standards required under the EPBC Act while avoiding the need for businesses to seek approvals across multiple levels of government. Key elements of its delivery will include standards and an assurance framework.

A revised assessment bilateral agreement between the Australian and Queensland governments was signed on 13 December 2013 (available at: www.environment.gov.au/topics/environment-protection/environment-assessments/bilateral-agreements). This agreement accredits selected Queensland Government environmental assessment processes for the purposes of the EPBC Act, including for any proposed actions on state land or in state waters that may impact on the Commonwealth marine area or the Great Barrier Marine Park. In accordance with the Memorandum of Understanding signed between the Australian and Queensland Governments (available at: www.environment.gov.au/system/files/pages/71679b88-a037-420d-966f-1f5b7047ea83/files/onestopshop-mou-qld.pdf), both parties are currently working towards a comprehensive approval bilateral agreement.

4.2 Outstanding Universal Value as a clearly defined and central element within the protection and management system

As reported in the 2013 State Party Report, Australia will continue to work collaboratively to establish the Outstanding Universal Value of the GBRWHA as a clearly defined and central element within the protection and management system for the property, including as part of project-by-project environmental assessment processes (see www.environment.gov.au/heritage/places/world/great-barrier-reef/information.html).

Since 2013, the decision-making framework for projects referred and assessed under the EPBC Act has explicitly incorporated Outstanding Universal Value. Examples include a number of approval conditions specific to reducing impacts on the Outstanding Universal Value of the GBRWHA as well as offsets to ensure a 'net benefit', tailored guidelines to develop environmental impact statements that include explicit requirements to address impacts on the Outstanding Universal Value of the GBRWHA and explicit consideration of Outstanding Universal Value in referral decision documentation.

Guidelines for the Outstanding Universal Value of the Great Barrier Reef World Heritage Area

Australia has developed a suite of products to enhance consideration and understanding of the Outstanding Universal Value of the GBRWHA. An integral part of this work includes the EPBC Act Referral Guidelines for the Outstanding Universal Value of the Great Barrier Reef World Heritage Area. These guidelines, which are being finalised, are intended to assist development proponents determine whether an action needs to be referred to the Minister for consideration in relation to the GBRWHA. Guidance is provided on:

- the concept of Outstanding Universal Value
- the types of actions that may require a referral
- how to avoid, reduce or manage impacts on the Outstanding Universal Value of the GBRWHA.

The draft EPBC Act Referral Guidelines for the Outstanding Universal Value of the Great Barrier Reef World Heritage Area are available at www.environment.gov.au/resource/draft-epbc-act-referral-guidelines-outstanding-universal-value-great-barrier-reef-world.

During the development of the EPBC Act referral guidelines, the Australian Government released the Interim Guidelines on the Outstanding Universal Value of the Great Barrier Reef World Heritage Area to assist proponents of actions that may impact on the Outstanding Universal Value of the Great Barrier Reef with the referral and assessment process of the EPBC Act. These guidelines were published in August 2013.

4.3 Notification of proposed developments

Consistent with the World Heritage Committee's decisions, no port developments or associated port infrastructure projects have been approved outside the existing and long-established major port areas within or adjoining the property (37 COM 7B.10, paragraph 6(b)). In addition, no developments that would have an unacceptable impact on the Outstanding Universal Value of the property have been approved (37 COM 7B.10, paragraph 6(a)).

Furthermore, all decisions made since the release of the draft strategic assessments have been consistent with those assessments.

Proposed developments

Since the 2013 State Party Report, Australia has continued to provide quarterly notification reports of proposed developments within or outside the GBRWHA to the UNESCO World Heritage Centre.

At the time of preparation of this report there are 31 development proposals being assessed for potential significant impacts on the GBRWHA. This includes 30 proposed developments previously reported in the 2012 and 2013 State Party reports which are still being assessed.

Appendix 7 and Appendix 8 list proposed, withdrawn and approved developments and their status as of 9 January 2014.

Subsequent changes to the status of proposed developments after this date will be reported to the UNESCO World Heritage Centre as part of Australia's regular quarterly notification process, with the next quarterly notification reports to be provided in March and June 2014.

Abbot Point and Curtis Island projects approved in December 2013

As reported to the UNESCO World Heritage Centre on 10 December 2013, after rigorous assessment in accordance with the EPBC Act the Australian Government Minister for the Environment, the Hon Greg Hunt MP, approved four projects at Abbot Point and the Port of Gladstone.

The projects and links to the approval conditions are as follows:

- Capital dredging programme for the proposed terminals 0, 2 and 3, Port of Abbot Point (EPBC reference 2011/6213)—www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6213
- Adani Abbot Point Coal Terminal 0, Port of Abbot Point, (EPBC reference 2011/6194)—www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6194
- Arrow Liquefied Natural Gas Facility, Curtis Island, Gladstone (EPBC reference 2009/5007)—www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=5007
- Arrow Gas Transmission Pipeline, Gladstone to Curtis Island (EPBC reference 2009/5008)—www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=5008

All four projects:

- are for existing developed port and industrial sites
- have been approved subject to the highest environmental standards and conditions
- had been previously reported to the World Heritage Committee in the 2012 and 2013 State Party reports (2013 State Party Report pages 74–75, all four projects; 2012 State Party Report page 72, the two Arrow projects only).

In assessing these projects and reaching these decisions, the Minister took into account all relevant information in accordance with his statutory obligations. The Minister was mindful of the World Heritage Committee decisions on the GBRWHA since 2011 (**35 COM 7B.10**, **36 COM 7B.8** and **37 COM 7B.10**) and the March 2012 joint World Heritage Centre / International Union for Conservation of Nature reactive mission recommendations. Australia is of the firm view that the strict conditions that have been applied to these project approvals ensure that the approvals are in keeping with the requirements of the World Heritage Committee decisions.

In addition, the Minister's decisions to approve the four projects took into consideration:

- the latest and best science and management practices
- the draft strategic assessments of the Great Barrier Reef Region and coastal zone
- the Independent Review of the Port of Gladstone
- the Queensland Government's draft Ports Strategy.

At the same time, the Minister announced that the first priority for disposal of dredging spoil for all future capital dredging projects within the Central and North Queensland coastal zone will be shoreline, near to shore or land reclamation disposal. He also stated that he will only approve the proposed 12 million cubic metres of capital dredging for the Port of Gladstone as land-based disposal rather than disposal in the marine park.

Approval conditions

The decisions were subject to some of the strictest and most rigorous conditions in Australian history to ensure that any potential impacts to the Outstanding Universal Value of the GBRWHA and other matters of national environmental significance are avoided, mitigated or offset.

The approval conditions require project proponents to implement substantial net benefit offsets to any potential impacts on water quality and other components of the GBRWHA.

For example:

- With the Abbot Point dredging and spoil disposal project, in order to address any potential cumulative impacts of dredging on water quality the company must offset the amount of fine sediments released into the marine environment from the project, and available for resuspension, by 150 per cent. This will be done by funding onshore activities to reduce the amount of fine sediment entering the Great Barrier Reef lagoon from catchment areas. The result will be a long-term net reduction of fine sediments entering the GBRWHA from land-based sources, well beyond the life of this project
- A similar 150 per cent offset condition has been imposed on the dredging component of the Curtis Island liquefied natural gas development
- Approximately \$89 million of offset contributions will be made over the life of these projects to support the health of the Great Barrier Reef through programmes such as the Reef Trust
- Ninety-five environmental conditions have been put in place for Abbot Point and 53 for Curtis Island
- Additional measures for the protection of marine species and their habitat, ecological communities, flora and fauna are included in the conditions of approval for these projects.

Further summary information on the four project approvals and the sets of conditions that have been applied by the Minister is included in Appendix 9.

Defence activities

The Great Barrier Reef Marine Park is a multiple-use area. The environmental impacts of defence training activities in the marine park are managed by the Department of Defence in collaboration with the GBRMPA.

Activities undertaken by the Department of Defence within the Great Barrier Reef Marine Park are conducted in line with Part 5.2(d) of the Great Barrier Reef Marine Park Zoning Plan 2003.

Exercise Talisman Saber—incident involving four unarmed pieces of ordnance, July 2013

As reported to the World Heritage Centre on 23 July 2013, on Wednesday 17 July 2013 the GBRMPA was notified of an incident involving two inert and two unarmed pieces of ordnance jettisoned by US military aircraft in the Great Barrier Reef Marine Park on Tuesday 16 July 2013 during a training activity prior to Exercise Talisman Saber—a combined US and Australian defence training exercise. As the aircraft were running low on fuel, they were forced for safety reasons to jettison the four pieces of ordnance in an area where the least impact would occur to the marine environment.

The incident occurred north-east of Townshend Island, off the Queensland coast north-east of Rockhampton. The location where the ordnance was dropped is a channel about 60 to 70 metres deep and about 30 kilometres from the nearest reef and 50 kilometres from the coastline. A comprehensive environmental plan that identifies sensitive areas and vulnerable species was prepared prior to the exercise occurring in Shoalwater Bay. The exercise was conducted under mechanisms outlined in the *Strategic Environmental Assessment of Defence Activities Within the Great Barrier Reef World Heritage Area 2006*.

Recovery of ordnance

The two inert and two unarmed live rounds were located by Royal Australian Navy mine hunter HMAS *Gascoyne* on 16 August 2013. The US Navy Seventh Fleet, with specialist advice from a GBRMPA representative, recovered the two unarmed live rounds on 29 and 30 August 2013 using a combination of divers and lift balloons to bring the ordnance safely to the water surface, after which they were transported to the approved Triangular Island ordnance demolition area and destroyed.

Due to challenging weather conditions and diver safety issues, the two inert pieces of ordnance, which are made of steel and filled with concrete, were left on the sea floor after full consultation and agreement with the GBRMPA. These devices pose no risk to people or the environment.

In conducting the ordnance retrieval, the US Navy Seventh Fleet coordinated closely with the Australian Defence Force and the GBRMPA to ensure that the greatest care was taken to protect the environment. No immediate environmental damage was seen during either the search or recovery of the ordnance. GBRMPA officers will continue to monitor the area.

Appendix 1—Decision of the 37th session of the World Heritage Committee (June 2013) on the state of conservation of the Great Barrier Reef (37 COM 7B.10)

The World Heritage Committee,






1. *Having examined* Document WHC-13/37.COM/7B,
2. *Recalling* Decision **36 COM 7B.8**, adopted at its 36th session (Saint-Petersburg, 2012),
3. *Welcomes* the progress made by the State Party with the Strategic Assessment and reiterates its request to the State Party to ensure that the assessment and the resulting long-term plan for the sustainable development of the property are completed against defined criteria for success, fully address direct, indirect and cumulative impacts on the reef and lead to concrete measures to ensure the conservation of the Outstanding Universal Value (Outstanding Universal Value) of the property;
4. *Also welcomes* the establishment of an independent review of the management arrangements for Gladstone Harbour, and requests that these efforts result in the optimization of port development and operation in Gladstone Harbour and on Curtis Island, as well as other existing port developments, consistent with the highest internationally recognized standards for best practice commensurate with iconic World Heritage status;
5. *Also welcomes* the renewed commitment for the Reef Water Quality Protection Plan and associated Reef Rescue measures and the positive results indicated in the Second Reef Plan Record Card;
6. *Notes with concern* the limited progress made by the State Party in implementing key requests made by the Committee (Decision **36 COM 7B.8**) and the recommendations of the March 2012 joint World Heritage Centre/IUCN reactive monitoring mission as well as on-going coastal development on the Reef, and urges the State Party to strengthen its efforts in order to fully implement the Committee requests and mission recommendations that have not yet or only partially been implemented, including by making commitments to:
 - a) *Ensure rigorously that development is not permitted if it would impact individually or cumulatively on the Outstanding Universal Value of the property, or compromise the Strategic Assessment and resulting long-term plan for the sustainable development of the property,*
 - b) *Ensure that no port developments or associated port infrastructure are permitted outside the existing and long-established major port areas within or adjoining the property,*
 - c) *Ensure that the legislation protecting the property remains strong and adequate to maintain and enhance its Outstanding Universal Value;*
7. *Considers* that the above-mentioned issues represent a potential danger to the Outstanding Universal Value of the property in line with paragraph 180 of the Operational Guidelines;
8. *Further requests* the State Party to submit to the World Heritage Centre, by **1 February 2014**, an updated report on the state of conservation of the property, including on the implementation of actions outlined above as well as on the other points raised in the 2012 mission report, for examination by the World Heritage Committee at its 38th session in 2014, **with a view to considering, in the absence of substantial progress, the inscription of the property on the List of World Heritage in Danger.**




Appendix 2—Overview of Australia’s progress against the 2011 and 2012 World Heritage Committee decisions and 2012 mission recommendations

This appendix provides an update on the extensive information already provided in the 2012 and 2013 State Party Reports, which are available at www.environment.gov.au/heritage/places/world/great-barrier-reef/information.html.










If further detail is required Australia would be pleased to provide it.







Progress on the 2012 World Heritage Committee Decision (36 COM 7B.8)

2012 World Heritage Committee Decision (36 COM 7B.8)	Australia’s progress (as of December 2013)	Status
3. Water quality	<ul style="list-style-type: none"> In 2012 the World Heritage Committee welcomed the initial positive results of the Reef Plan and Australia’s associated measures to address major long-term impacts on the property from poor water quality. See also response to 2013 decision paragraph 5 in the Report Card, and Chapter 3.3. 	On track 
4. Address the 2012 reactive mission recommendations in future protection and management of the property	<ul style="list-style-type: none"> Australia has welcomed the advice of the reactive monitoring mission and continues to address the mission recommendations in the protection and management of the Great Barrier Reef. Responses to the mission recommendations can be found below and in the Report Card. 	On track 
5. No port development outside existing and long-established port areas	<ul style="list-style-type: none"> See response to 2013 decision paragraph 6b in the Report Card, and Chapter 4.3. 	On track 
6. Strategic assessments and long-term sustainability plan Ensure no development permitted if it would impact individually or cumulatively on Outstanding Universal Value	<ul style="list-style-type: none"> See responses to 2013 decision paragraphs 3, 6a and 6c in the Report Card, and Chapter 3 and Chapter 4.3. 	On track 
7. Establish the Outstanding Universal Value of the property as a clearly defined and central element within the protection and management system for the property, and include an explicit assessment of Outstanding Universal Value within future Great Barrier Reef Outlook Reports	<ul style="list-style-type: none"> See responses to 2013 decision paragraphs 3, 6a and 6c in the Report Card, and Chapter 4.1. The condition and trend of attributes under each of the World Heritage criteria for which the property is listed were included in the Great Barrier Reef Region Strategic Assessment (see Appendix 3) and will be included in the 2014 Outlook Report. Reports on aesthetic and geological aspects of Outstanding Universal Value have been sent to the UNESCO World Heritage Centre (see summaries in Appendix 5). Work on the aesthetic Outstanding Universal Value is a major contribution internationally. 	On track 







2012 World Heritage Committee Decision (36 COM 7B.8)	Australia's progress (as of December 2013)	Status
<p>8. Sustain and increase efforts and available resources to conserve the property</p> <p>Develop and adopt clearly defined and scientifically justified targets for improving the state of conservation of the Outstanding Universal Value of the Great Barrier Reef World Heritage Area</p> <p>Ensure that plans, policies and development proposals affecting the property demonstrate a positive contribution to achieving those targets and an overall net benefit to the protection of Outstanding Universal Value</p>	<ul style="list-style-type: none"> The Australian and Queensland governments have reinvigorated the Great Barrier Reef Ministerial Forum. The forum provides joint oversight by both governments of the management of the Reef. The ministers meet several times a year and oversee the investments, the strategic assessments, the Australian response to the World Heritage Committee and, in the future, the development and implementation of the Reef 2050—Long-Term Sustainability Plan. See also response to 2013 decision in the Report Card, particularly paragraph 3, and Chapter 3.3. 	<p>On track</p> 
<p>9. Manage development in Gladstone Harbour and on Curtis Island</p>	<ul style="list-style-type: none"> See response to 2013 decision paragraph 4 in the Report Card, and Chapter 3.4. 	<p>On track</p> 
<p>10. Submit 2013 State Party Report by 1 February 2013</p>	<ul style="list-style-type: none"> The 2013 State Party Report was submitted to the World Heritage Centre by 1 February 2013. 	<p>Complete</p> 
<p>11. Submit to the 39th session of the World Heritage Committee in 2015 a 2015 State Party Report, a 2014 Outlook Report and a completed strategic assessment and related long-term sustainability plan</p>	<ul style="list-style-type: none"> Australia is committed to meeting its international obligations and will provide further information to the committee in 2015, including a 2015 State Party Report, a 2014 Outlook Report and a completed comprehensive strategic assessment and related Reef 2050—Long-Term Sustainability Plan. 	

Progress on the recommendations of the 2012 World Heritage Centre and International Union for Conservation of Nature reactive monitoring mission

2012 World Heritage Centre and IUCN mission recommendations	Australia's progress (as of December 2013)	Status
R1: Water quality	<ul style="list-style-type: none"> See response to 2012 decision paragraph 3 above. 	On track 
R2: No port development outside existing and long-established port areas	<ul style="list-style-type: none"> See response to 2012 decision paragraph 5 above. 	On track 
R3: Manage development in Gladstone Harbour and on Curtis Island	<ul style="list-style-type: none"> See response to 2012 decision paragraph 9 above. 	On track 
R4: Ensure that any development, including ports and associated infrastructure, is carried out consistently with the highest international standards of best practice	<ul style="list-style-type: none"> See response to 2013 decision paragraph 4 in the Report Card, and Chapters 3.4 (Independent Review of the Port of Gladstone and Gladstone Healthy Harbour Partnership); Chapter 3.5 (North-East Shipping Management Plan and draft Queensland Ports Strategy); and Appendix 5 (research reports <i>Ship Anchorage Management in the Great Barrier Reef World Heritage Area and Environmental Best Practice for Port Development: An Analysis of International Approaches</i>). 	On track 
R5: Strategic assessments and long-term sustainability plan	<ul style="list-style-type: none"> See response to 2012 decision paragraph 6 above. 	On track 
R6: Include in the future editions of the Outlook Report, commencing with the version to be published in 2014, a specific assessment of the condition, trends, threats and prospects for the Outstanding Universal Value of the Great Barrier Reef World Heritage Area	<ul style="list-style-type: none"> See response to 2012 decision paragraph 7 above. 	On track 
R7: No development to impact individually or cumulatively on the Outstanding Universal Value of the property	<ul style="list-style-type: none"> See response to 2012 decision paragraph 6 above. 	On track 
R8: Prevent any approval of major projects that may compromise the outcomes of the strategic assessment, until it is completed No development to impact individually or cumulatively on the Outstanding Universal Value of the property	<ul style="list-style-type: none"> See response to 2012 decision paragraph 7 above, and Chapter 4. 	On track 
R9: Ensure all components of the Outstanding Universal Value of the Great Barrier Reef are clearly defined and form a central element within the protection and management system for the property	<ul style="list-style-type: none"> See response to 2012 decision paragraph 7 above. 	On track 

2012 World Heritage Centre and IUCN mission recommendations	Australia's progress (as of December 2013)	Status
R10: Develop and adopt clearly defined and scientifically justified targets for improving the state of conservation of the Outstanding Universal Value of the Great Barrier Reef World Heritage Area	<ul style="list-style-type: none"> See response to 2012 decision paragraph 8 above. 	On track 
R11: Commission an independent review of the overall institutional and legal mechanisms that provide coordinated planning, protection and management of the Great Barrier Reef World Heritage Area as a whole	<ul style="list-style-type: none"> Institutional and management arrangements are being reviewed as part of the comprehensive strategic assessment and the development of the Reef 2050—Long-Term Sustainability Plan for the property. The Great Barrier Reef Ministerial Forum will oversee the implementation of the comprehensive strategic assessment and the Reef 2050—Long-Term Sustainability Plan for the property. In 2014 a substantive assessment of the implementation of the Great Barrier Reef Intergovernmental Agreement 2009 will be undertaken, in line with Schedule B of the agreement. The outcomes of this assessment will contribute to responding to mission recommendation 11. 	Work in progress 
R12: Ensure increased resources for the protection and management of the property	<ul style="list-style-type: none"> See response to 2012 decision paragraph 8 above. 	On track 
R13: Take an integrated approach to planning, regulation and management of ports and shipping activity	<ul style="list-style-type: none"> See response to R4 above. 	On track 
R14: Share best practices and success stories with other World Heritage sites facing similar management challenges	<ul style="list-style-type: none"> Australia is pleased to share its experience and success stories through international symposiums and workshops. All research and reports developed as part of the strategic assessment are available on websites (see Appendix 5) so they can be accessed by other World Heritage management authorities. 	On track 
R15: Inform the committee of developments that may affect Outstanding Universal Value	<ul style="list-style-type: none"> Australia provides regular quarterly reports to the World Heritage Centre on proposed developments being assessed for any potential impact on World Heritage properties and the outcomes of each assessment. See also Chapter 4.3 and appendices 7, 8 and 9. 	Complete 

Progress on the 2011 World Heritage Committee Decision (35 COM 7B.10)

2011 World Heritage Committee Decision (35 COM 7B.10)	Australia's Progress (as of December 2013)	Status
2. Manage development in Gladstone Harbour and on Curtis Island	See response to 2012 decision paragraph 9 above.	On track 
3. Strategic assessment	See response to 2012 decision paragraph 6 above.	On track 
4. Inform the committee of developments that may affect Outstanding Universal Value	See response to R15 above.	Complete 
5. Invite a World Heritage Centre / IUCN reactive monitoring mission	A joint World Heritage Centre / IUCN reactive monitoring mission to the property was undertaken in March 2012. See also response to 2012 decision paragraph 4 above.	Complete 
6. Address climate change and other forms of environmental degradation following the extreme weather events	In 2012 the World Heritage Committee welcomed Australia's commitment to improve the property's resilience and its ability to adapt to climate change and other forms of environmental degradation following the extreme weather events.	On track 
7. Submit 2012 State Party Report by 1 February 2012	The 2012 State Party Report was submitted to the World Heritage Centre by 1 February 2012.	Complete 

Appendix 3—Benchmarking the Outstanding Universal Value of the Great Barrier Reef World Heritage Area

Source: GBRMPA (2013) draft Great Barrier Reef Region Strategic Assessment Table 7.11

Understanding the table			
<p>Very good: All elements necessary to maintain the outstanding universal value are essentially intact, and their overall condition is stable or improving. Available evidence indicates only minor, if any, disturbance to this element of outstanding universal value.</p>	<p>Good: Some loss or alteration of the elements necessary to maintain the outstanding universal value has occurred, but their overall condition is not causing persistent or substantial effects on this element of outstanding universal value.</p>	<p>Poor: Loss or alteration of many elements necessary to maintain outstanding universal value has occurred, which is leading to a significant reduction in this element of the outstanding universal value.</p>	<p>Very poor: Loss or alteration of most elements necessary to maintain the outstanding universal value has occurred, causing a major loss of the outstanding universal value.</p>
<p>Area</p> <p>GBR Great Barrier Reef Region</p>	<p>Trends</p> <p>↑ Improving</p> <p>↔ Stable</p> <p>↓ Deteriorating</p> <p>— No clear trend</p>	<p>Confidence in condition and trend</p> <p>● Adequate high-quality evidence and high level of consensus</p> <p>◐ Limited evidence or limited consensus</p> <p>○ Very limited evidence, assessment based on anecdotal information</p>	

a) **Natural beauty and phenomena (previously criterion (iii) now criterion (vii))**: contains unique, rare or superlative natural phenomena, formations or features or areas of exceptional natural beauty, such as superlative examples of the most important ecosystems to man.

	Area	Condition and trend			
		Very good	Good	Poor	Very poor
Overview: The significant loss of coral cover, especially in areas south of about Cooktown, has reduced underwater aesthetic value, as has increasing turbidity in inshore areas. The natural beauty of large areas remains intact, especially for offshore coral reefs in the far north and aerial vistas, as well as for neighbouring islands (many of which are national parks). While many of the natural phenomena remain intact, others are likely to have deteriorated, for example some turtle nesting locations and coral spawning.	GBR				

Excerpt from statement	Comment	Area	Condition and trend				Confidence
			Very good	Good	Poor	Very poor	
Superlative natural beauty above and below the water	The natural beauty of most of the Region remains intact, especially for offshore coral reefs and aerial vistas, as well as for neighbouring islands. The significant loss of coral cover has reduced underwater aesthetic value.	GBR					
Some of the most spectacular scenery on Earth	Both above and below the water, the area's scenery remains spectacular. There have been some declines in the aesthetics of inshore reefs in the southern two-thirds.	GBR					
One of a few living structures visible from space	The Reef remains visible from space and technological advances make these images more accessible.	GBR					
A complex string of reefal structures along Australia's north-east coast	Reefal structures remain intact. Recent estimates vastly increase the extent of coral with the identification of more deepwater reefs.	GBR					
Unparalleled aerial panorama of seascapes comprising diverse shapes and sizes	Aerial vistas remain spectacular, with scenic flights a popular tourism activity.	GBR					
Whitsunday Islands provide a magnificent vista of green vegetated islands and white sandy beaches spread over azure waters	The majority of the Whitsunday Islands are protected and managed as national parks. There have been some changes to island scenery, such as on resort islands.	GBR					

Excerpt from statement	Comment	Area	Condition and trend				Confidence
			Very good	Good	Poor	Very poor	
Vast mangrove forests in Hinchinbrook Channel, or the rugged vegetated mountains and lush rainforest gullies	All of Hinchinbrook Island is protected and managed as a national park. Patches of mangrove forests and rainforest were affected by cyclone Yasi.	GBR					
On many of the cays there are spectacular and globally important breeding colonies of seabirds and marine turtles	There have been serious declines in some populations of seabirds and some marine turtle species.	GBR					
Raine Island is the world's largest green turtle breeding area	Long-term data indicates that, since the mid-1970s, green turtle nesting on Raine Island has increased and then plateaued over the past two decades. It is thought to have declined recently.	GBR					
Beneath the ocean surface, there is an abundance and diversity of shapes, sizes and colours... Spectacular coral assemblages of hard and soft corals	Since 1986, average hard coral cover is estimated to have declined from 28 to 13.8 per cent, principally in the southern two-thirds of the Region. This is mainly due to storm damage (48 per cent), crown-of-thorns starfish (42 per cent), and bleaching (10 per cent).	GBR					
Thousands of species of reef fish provide a myriad of brilliant colours, shapes and sizes	There are about 1500 species of bony fish. Long-term monitoring of about 200 species of coral reef fish has not detected declines in the species monitored. A small number of targeted species are under significant pressure.	GBR					
The internationally renowned Cod Hole is one of many significant tourist attractions	There is anecdotal evidence of severe declines in the number and condition of potato cod at Cod Hole.	GBR					
Superlative natural phenomena include the annual coral spawning, migrating whales, nesting turtles, and significant spawning aggregations of many fish species	The number of migrating humpback whales is increasing. Nesting numbers have declined for at least two of the six species of marine turtle. Protection for fish spawning aggregations has improved, but most sites are unknown.	GBR					

b) **Major stages of the Earth’s evolutionary history (previously criterion (i) now criterion (viii)):** outstanding examples representing the major stages of the Earth’s evolutionary history

	Condition and trend				
	Very good	Good	Poor	Very poor	
Overview: The Region remains a globally outstanding example of an ecosystem that has evolved over millennia, and almost all geomorphological evolutionary processes remain intact. Examples of all stages of reef development remain, although the overall health of reefs, especially in the southern two-thirds, has declined significantly.	GBR				

Excerpt from statement	Comment	Condition and trend				Confidence	
		Very good	Good	Poor	Very poor		
Globally outstanding example of an ecosystem that has evolved over millennia	The Reef remains an outstanding example of evolutionary history. Recent research has identified deepwater reefs that extend for hundreds of kilometres along the outer shelf at between 40 and 70 metres depth.	GBR					
Area has been exposed and flooded by at least four glacial and interglacial cycles, and over the past 18,000 years reefs have grown on the continental shelf	The deepwater reefs are providing valuable records of past coral reef responses to climate and sea level change.	GBR					
Today, the Great Barrier Reef forms the world’s largest coral reef ecosystem... Including examples of all stages of reef development	The Great Barrier Reef remains the world’s largest coral reef ecosystem and, while its condition has deteriorated, it remains one of the most world’s most healthy reef systems, including examples of all stages of reef development.	GBR					
Processes of geological and geomorphological evolution are well represented, linking continental islands, coral cays and reefs	Geomorphological features and processes are well represented. Most remain in most good condition but some processes are declining, especially in the inshore southern two-thirds.	GBR					
The varied seascapes and landscapes that occur today have been moulded by changing climates and sea levels, and the erosive power of wind and water, over long time periods	The impacts of modern climate change are beginning to have effects on seascapes, for example through reduced reef building.	GBR					
One-third of the Great Barrier Reef lies beyond the seaward edge of the shallower reefs (and) comprises continental slope and deep oceanic waters and abyssal plains	Evidence of cold water coral communities have been found on deepwater knolls along the edge of the Great Barrier Reef at depths of more than 1000 metres, but these deep areas are hardly known.	GBR					

c) **Ecological and biological processes (previously criterion (ii) now criterion (ix)):** outstanding examples representing significant ongoing geological processes, biological evolution and man's interaction with his natural environment

	Area	Condition and trend			
		Very good	Good	Poor	Very poor
Overview: Many ecosystem processes remain in good condition, however some, such as recruitment and reef building, are declining. Any processes associated with species groups that are in decline (for example, corals and seagrasses) have likely also declined. In the inshore southern two-thirds, there are particular concerns about some processes such as connectivity, nutrient cycling and sedimentation, principally associated with land-based activities in the catchment. Traditional Owners maintain their cultural practices and customs, however Indigenous heritage values are under pressure especially in the southern two-thirds of the Region.	GBR				

Excerpt from statement	Comment	Area	Condition and trend				Confidence
			Very good	Good	Poor	Very poor	
Significant diversity of reef and island morphologies reflects ongoing geomorphic, oceanographic and environmental processes	There remains a diverse range of reef and island morphologies. Most geomorphic, oceanographic and environmental processes remain in good condition but some are declining, especially in the inshore southern two-thirds.	GBR					
Complex cross-shelf, longshore and vertical connectivity is influenced by dynamic oceanic currents	Most marine species and habitats are thought to remain well connected. There is increasing evidence of intensified flow and accelerated warming in the East Australian Current.	GBR					
Ongoing ecological processes such as upwellings, larval dispersal and migration	Ecological processes remain in good condition in northern areas. Some processes are in poor condition inshore in the southern two-thirds of the Region and are deteriorating.	GBR					
Ongoing erosion and accretion of coral reefs, sand banks and coral cays combine with similar processes along the coast and around continental islands	Reef building is likely to be in good condition for much of the Region, especially in the north, but has been affected by cyclones and reduced coral cover, especially in the southern two-thirds of the Region.	GBR					
Extensive beds of Halimeda algae represent active calcification and accretion over thousands of years	Halimeda beds are poorly studied, but are likely to be in very good condition given their isolation from land-based impacts and level of protection from trawling.	GBR					

Excerpt from statement	Comment	Area	Condition and trend				Confidence
			Very good	Good	Poor	Very poor	
Biologically the unique diversity of the Great Barrier Reef reflects the maturity of an ecosystem that has evolved over millennia; evidence exists for the evolution of hard corals and other fauna	The diversity of species remains high, but some species are in poor condition, especially inshore in the southern two-thirds of the Region.	GBR					
Vegetation on the cays and continental islands exemplifies the important role of birds... in seed dispersal and plant colonisation	Many islands are national parks or protected within the Marine Park. There are introduced plants on most islands.	GBR					
Human interaction with the natural environment is illustrated by strong ongoing links between Aboriginal and Torres Strait Islanders and their sea country, and includes numerous shell deposits (middens) and fish traps, plus the application of story places and marine totems	Traditional Owners with connections to the Great Barrier Reef maintain their cultural practices and customs. Indigenous heritage is under pressure especially in the southern two-thirds of the Region.	GBR					

d) **Habitats for conservation of biodiversity (previously criterion (iv) now criterion (x)):** habitats where populations of rare or endangered species of plants and animals still survive

	Area	Condition and trend			
		Very good	Good	Poor	Very poor
<p>Overview: There are significant concerns about some key habitats, particularly seagrass meadows and coral reefs, and some species such as dugongs, some marine turtles and some dolphins. These concerns are not as great in far northern areas, which remain relatively intact. Populations of humpback whales, estuarine crocodiles, loggerhead turtles and green turtles (southern stock) are recovering from historical declines. There have been no records of species extinction, though there is concern that speartooth shark has not been recorded in or near the Region since 1982.</p>	GBR				

Excerpt from statement	Comment	Area	Condition and trend				Confidence
			Very good	Good	Poor	Very poor	
One of the richest and most complex natural ecosystems on Earth, and one of the most significant for biodiversity conservation	The Great Barrier Reef remains a complex ecosystem, rich in biodiversity. Some key habitats are under pressure, especially in southern inshore areas.	GBR					
Tens of thousands of marine and terrestrial species, many of which are of global conservation significance	Some populations (dugong, sharks, seabirds and marine turtles) are known to have declined. Others such as humpback whales, loggerhead turtles and estuarine crocodiles are increasing.	GBR					
The world's most complex expanse of coral reefs... Contain some 400 species of corals in 60 genera	There remain more than 400 species of hard coral and at least 150 species of soft corals, sea fans and sea pens, living in a complex reef system. There has been a serious decline in hard coral cover in the southern two-thirds of the Region.	GBR					
Large ecologically important interreefal areas. The shallower marine areas support half the world's diversity of mangroves	The Region's mangrove forests remain very diverse with at least 39 mangrove species and hybrids recorded.	GBR					
Large ecologically important interreefal areas. The shallower marine areas support ... many seagrass species	Seagrass diversity remains; however, there have been recent severe declines in abundance and community composition in the inshore southern two-thirds of the Region.	GBR					

Excerpt from statement	Comment	Area	Condition and trend				Confidence
			Very good	Good	Poor	Very poor	
Waters also provide major feeding grounds for one of the world's largest populations of the threatened dugong	The dugong population in northern areas remains robust. The population in the southern two-thirds of the Region was very low at the time of listing and remains so. Declines in the condition of seagrass meadows have had profound effects on dugongs in recent years.	GBR					
At least 30 species of whales and dolphins occur here	Little is known about the populations of most whale species. Two inshore dolphin species are known to be at risk.	GBR					
A significant area for humpback whale calving	The humpback whale population is recovering strongly after being decimated by whaling. The calving habitats are well protected.	GBR					
Six of the world's seven species of marine turtle occur in the Great Barrier Reef. As well as the world's largest green turtle breeding site at Raine Island, the Great Barrier Reef also includes many regionally important marine turtle rookeries	Of the habitats that support marine turtles, the condition of seagrass meadows and coral reefs have declined significantly. While nesting habitats are generally in good condition, sea level rise, increasing air temperature and extreme weather events are affecting their condition.	GBR					
Some 242 species of birds have been recorded in the Great Barrier Reef. Twenty-two seabird species breed on cays and some continental islands, and some of these breeding sites are globally significant	While the nesting habitats for seabirds remain in generally good condition, declines of up to 70 per cent in some nesting populations have been recorded. There is evidence this may relate to reduced availability of pelagic prey.	GBR					
The continental islands support thousands of plant species, while the coral cays also have their own distinct flora and fauna	Plant diversity is generally well protected, with about one-third of the islands contained within national parks.	GBR					

Appendix 4—Benchmarking the integrity of the Great Barrier Reef World Heritage Area

Source: GBRMPA (2013) draft Great Barrier Reef Region Strategic Assessment Table 7.12

	Area	Condition and trend			
		Very good	Good	Poor	Very poor
<p>Overview: The Great Barrier Reef is the world’s third largest World Heritage Area and encompasses all but the most northerly part of the Great Barrier Reef ecosystem. Except for small exclusions, it is all within a marine protected area, and is therefore afforded a high level of direct protection and management. External pressures such as climate change, catchment run-off and coastal development are affecting its overall integrity.</p>	GBR				

	Area	Condition and trend				Confidence	
		Very good	Good	Poor	Very poor	Condition	Trend
<p>Includes all elements necessary to express its outstanding universal value: The Great Barrier Reef meets all four natural criteria. While some ecosystems, habitats and populations are under pressure, the elements remain largely intact, particularly in the northern third of the Region.</p>	GBR						
<p>Is of adequate size to ensure the complete representation of the features and processes which convey the property’s significance: The Great Barrier Reef Region is vast, covering 14 degrees of latitude and extending 80 to 250 kilometres from the coast. Except for some small exclusions and about 600 of the 1050 islands, almost all of the World Heritage Area is within marine or national parks, and is therefore afforded a high level of protection and management. While it is of adequate size to ensure complete representation of features and processes, increasing pressures from outside the Region are affecting them.</p>	GBR						
<p>Is protected from the adverse effects of development and/or neglect: While activities within the property are comprehensively managed and use is generally sustainable, the remoteness of some of the property poses challenges for managing agencies. This, and previous assessments, have demonstrated that the most significant impacts on the property’s values arise from external pressures such as climate change, catchment run-off and coastal development.</p> <p>In the southern two-thirds of the Region, where there are greater levels of development, the condition and trend of some values are in decline.</p>	GBR						

Appendix 5—Research reports prepared as a contribution to the strategic assessments and the Reef 2050—Long-Term Sustainability Plan

1. Defining the Aesthetic Values of the Great Barrier Reef World Heritage Area
2. Geological and Geomorphological Features of Outstanding Universal Value in the Great Barrier Reef World Heritage Area
3. Improved Dredge Material Management for the Great Barrier Reef Region
4. Ship Anchorage Management in the Great Barrier Reef World Heritage Area
5. Great Barrier Reef Coastal Ecosystems Assessment
6. Environmental Best Practice Port Development: An Analysis of International Approaches
7. Economic Contribution of the Great Barrier Reef
8. A Framework for Understanding Cumulative Impacts and Supporting Environmental Decisions: To Inform Resilience-Based Management of the Great Barrier Reef World Heritage Area
9. Integrated Monitoring Framework for the Great Barrier Reef World Heritage Area

1. Defining the Aesthetic Values of the Great Barrier Reef World Heritage Area

Author: Context Pty Ltd

Scope: This report forms one part of Australia's programme of work to better understand and articulate the Outstanding Universal Value of the GBRWHA to be a central element of future decision-making.

The report identified, defined and assessed the aesthetic values (criterion vii of the Operational Guidelines for the Implementation of the World Heritage Convention) of the GBRWHA. It included mapping of the attributes that embody these values where possible and also considered the sensitivity of those values to a range of impacts.

Key findings:

- At present, there is no clear methodology recommended by the IUCN to identify aesthetic values under criterion vii. The consultants developed a methodology drawing on existing heritage practice within Australia and internationally. The consultants defined aesthetics as including environmental, sensory, experiential and emotional responses to place.
- The attributes of aesthetic Outstanding Universal Value identified in the report were also attributes identified under the other World Heritage criteria for which the property was listed. However, the consultants identified qualities that enhance the aesthetic value of those attributes and provided a distinctive lens for considering impacts of development or other actions on aesthetic values.
- A case study on the aesthetic values of Princess Charlotte Bay was provided as part of the report. The case study provided an illustration of how the methodology can be applied, including an analysis of the sensitivity of aesthetic values to a range of threats.
- This work provides an initial discussion on the distinctive lens for considering impacts of development or other actions on aesthetics.

Current status: Publicly available at www.environment.gov.au/resource/defining-aesthetic-values-great-barrier-reef-world-heritage-area-february-2013

2. Geological and Geomorphological Features of Outstanding Universal Value in the Great Barrier Reef World Heritage Area

Author: Geoscience Australia and James Cook University

Scope: This report forms part of the Australia's work to better understand and articulate the Outstanding Universal Value of the GBRWHA to be a central element of future decision-making.

The scope of the project was to further define, map and describe geological and geomorphological features of Outstanding Universal Value listed under criterion viii of the Operational Guidelines for the Implementation of the World Heritage Convention. The scope did not include analysis of the condition of the features. Not all feature types were able to be mapped.

Key findings:

- The report identified 18 broad feature types and provided further detail on representative examples and best examples of each feature type. Many of these feature types were also identified attributes for the other criteria for which the property was listed.
- The report was a preliminary examination of these features. Additional work was recommended to further refine the analysis.
- Geoscience Australia provided an initial sensitivity analysis that outlined how pressures identified in GBRMPA's 2009 Outlook Report could affect the identified features. Climate change was found to be the most concerning pressure. Ribbon reefs, deltaic reefs and northern detached reefs were identified as being the most sensitive and at risk to climate change, with their location on the continental shelf exposing them to high energy impacts from extreme weather.
- The identification of geological features will assist in assessing the impact of developments and other actions on the Outstanding Universal Value of the property.

Current status: Publicly available at www.environment.gov.au/resource/geological-and-geomorphological-features-outstanding-universal-value-great-barrier-reef

3. Improved Dredge Material Management for the Great Barrier Reef Region

Author: Sinclair Knight Merz and Asia-Pacific Applied Science Associates (contract managed by GBRMPA)

Scope: The project provides modelling and gross scale analysis and information.

The project comprised three main tasks: a literature review, cost analysis and review of options for beneficial reuse and land disposal of dredge material in six study areas; development of a generic framework for reactive water quality monitoring and management programmes during dredging and dredge material placement operations; and identification of potential alternative dredge material placement areas in the six study areas, and comparative assessment of environmental risks from sediment plumes and long-term migration of sediment from these hypothetical alternative disposal sites, as well as currently used placement sites.

Key findings:

- The study found that beneficial reuse and land disposal at the six locations are unlikely to be viable strategies for overall management of dredge material in the long term. This is largely because much of the expected material, particularly that from maintenance dredging, is dominated by silts and clays.
- The study developed a general framework for developing water quality monitoring programmes for dredging and material placement projects. The framework is aimed at reactive management—that is, detecting potentially stressful water quality conditions in time to take management actions to prevent or minimise ecological impacts.
- The modelling indicates that dredge material placed at sea has the potential to migrate on much greater spatial and temporal scales than previously thought (tens to hundreds of kilometres away from the initial disposal site).
- The information generated by this study is high level and is not intended to replace the detail required as part of an environmental impact assessment process for any future dredge material placement operations.
- This project will help support the comprehensive strategic assessment and have been used to inform individual project decisions under Part 9 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Current status: Publicly available at www.environment.gov.au/resource/improved-dredge-material-management-great-barrier-reef-region

GBRMPA has also developed an interpretative statement, 'Improved dredge material management for the Great Barrier Reef Region: Interpretive statement of findings and management implications of the technical reports for the Great Barrier Reef Strategic Assessment'.

Current status: Publicly available at www.gbrmpa.gov.au/__data/assets/pdf_file/0004/97159/Interpretive-Statement-draft-20131028web.pdf

4. Ship Anchorage Management in the Great Barrier Reef World Heritage Area

Author: GBRMPA

Scope: This study supports the Great Barrier Reef comprehensive strategic assessment by identifying potential impacts and proposed management strategies associated with ship anchorage management in the GBRWHA.

Key findings:

- The final report incorporates the findings from the environmental impact assessment undertaken for five major ports (Cairns, Townsville, Abbot Point, Hay Point, and Gladstone) and the identification of environmental management strategies, including recommendations for ship anchorages in the Great Barrier Reef Region.
- The study identified six primary impacts that may be realised on a frequent basis from ship anchorage, including disturbance to seabed and supported biodiversity from anchor drop and chain drag, minor releases of emissions or pollutants/wastes from ships, reduction or alteration of the aesthetic value of the coastal vista, interference with other users' access to resources within the GBRWHA, potential for marine pest introduction and interference with species behaviour. Of these, a reduction in aesthetic values and the potential for marine pest introduction had high risk ratings.
- The study found that anchorage areas (assessed by this project) in use across the five major ports are able to support current demand requirements and, with the exception of Hay Point, are predicted to be able to support future demand requirements. Hay Point anchorage may require a 30 per cent expansion with no change in management.
- It was also identified that opportunities exist across all port anchorages to improve management of anchorages, reduce impact potential and achieve environmental benefits (e.g. adoption of a vessel arrival system, reduction in size of designated anchorage areas).
- The environmental ship anchorage management strategy identified three objectives to minimise environmental and social impacts associated with anchorage use while maintaining efficient port operation. These objectives include managing existing anchorages with the aim of protecting environmental values, optimising the use of existing anchorages in the marine park and minimising environmental impacts from future anchorages and anchorage relocations.

Current status: Publicly available at www.environment.gov.au/sustainability/regional-development/gbr/publications/gbr-anchorage-management.html

5. Great Barrier Reef Coastal Ecosystems Assessment

Author: GBRMPA

Scope: The project applied the Coastal Ecosystems Assessment Framework (developed in collaboration with the Queensland Government) to seven basins: Baffle, Fitzroy, Plane, O'Connell, Don, Haughton and Mulgrave-Russell. Each assessment indicates how changes to coastal ecosystems have impacted on the inshore Great Barrier Reef ecosystem and will provide an understanding of both present and future development pressures and areas important for protection or restoration.

There were also other reports commissioned to support the basin assessments, including case studies examining the management of land use activities and practices, a study on the presence and potential impacts of non-Reef Plan pollutants, and a study on the impacts of hydrological change in the upper catchment on processes in the lower Burdekin floodplain.

Key findings:

- The project delivered a series of reports, including seven catchment assessments and four case studies, and mapped areas with high functional connections to the GBRWHA.
- The basin assessments:
 - identify and review important ecological values in the basins, modifications to coastal ecosystems, land/water use and impacts on ecosystem processes/services
 - identify current and future drivers of change, likely impacts on the World Heritage Area and priorities for conservation and restoration (including how particular land use activities may be altered to better protect coastal ecosystems).
- The results of the basin assessments vary but show that there has been significant modification to coastal ecosystems which has affected connectivity with, and ecosystem services to, the GBRWHA. The coastal zone, floodplains and wetlands are identified as areas of particular concern that require greater protection and restoration.
- The case studies outline the impacts of irrigation, hydrological barriers (e.g. dams and bund walls), grazing and urban/industrial development on coastal ecosystems and identify potential high-level management approaches to address the impacts of these activities.
- It is anticipated that these reports may inform future planning, natural resource management activities, reef recovery, development assessments and offset opportunities.

Current status: Report being finalised by GBRMPA

6. Environmental Best Practice Port Development: An Analysis of International Approaches

Author: GHD Pty Ltd

Scope: The purpose of this report was to further understanding on international benchmarks in the environmental management of ports, and the potential application of those practices in Australia. The project involved a literature review and case study analysis of practices undertaken at international ports during key stages of port development, including site selection and master planning, design and construction, operation, and monitoring and continuous improvement.

The report was particularly focused on impacts and practices relevant to the protection of matters of national environmental significance under the EPBC Act. Key environmental management issues and responses considered included those related to water and sediment quality, coastal processes and hydrology, noise and vibration, lighting, aesthetics, direct ecosystem impacts, air quality and invasive species.

Key findings:

- The key deliverable from this research was a report on international environmental best practice port development.
- Overall the study found that environmental performance of ports internationally is largely driven by regulation, policy and governance.
- The ability to avoid environmental impacts is greatest at the site selection, master planning and design stages of a port, and hence it is critical that these processes consider environmental and social values along with operational requirements. Internationally, this has included undertaking a strategic environmental assessment as part of the port master planning process.
- For port construction and operation activities there are many different technologies and environmental management solutions used internationally, each with its benefits and constraints. So, while there is evidence that environmental management practices and approaches employed by Australian ports are comparable to those internationally, there are opportunities for Australian ports to learn from international practice.
- The report identified that further consideration may also need to be given to the difference and potential gap between meeting best practice and achieving best environmental outcomes.

Current status: Publicly available at www.environment.gov.au/sustainability/regional-development/gbr/publications/gbr-ports-environmental-standards.html

7. Economic Contribution of the Great Barrier Reef

Author: Deloitte Access Economics

Scope: This project was an update to a previous study undertaken by Access Economics in 2006–07. The study examined the economic contribution of the GBRWHA for specified Reef-dependent industries and activities, including tourism, recreation, commercial fishing and scientific research. It also provided a breakdown of the economic contribution by each of the seven natural resource management areas in the catchment.

Key findings:

- The study estimated that the value-added economic contribution of the GBRWHA to the Australian economy in 2011–12 was \$5.68 billion and that it generated almost 69 000 full-time equivalent jobs (see Table 1 below).
- The value-added economic contribution was down slightly on the 2006–07 figure, which was estimated at \$5.4 billion—the equivalent of \$5.76 billion in 2012 dollars. Employment had increased from almost 53 800 in 2006–07.
- The study found that over 90 per cent of the economic contribution was generated by tourism, which contributed approximately \$5.2 billion to the Australian economy and was responsible for approximately 64 000 jobs. Cruise-ship tourism made up a small proportion of the overall tourism sector (approximately \$28 million in total value added).
- On a regional scale, the study found that the Wet Tropics Natural Resource Management Area (which includes Cairns) had the most economic activity generated from the Great Barrier Reef, principally due to its significant tourism activity.
- The report provides information on the economic benefits of Reef-dependent industries that may be used to inform decision-making on the strategic assessment and on individual development applications.

Table 1: Economic contribution of Reef-dependent industries to Australia (2011–12)

	Direct expenditure (\$m)	Value-added (\$m)	Employment (FTE)
Tourism	6 410.6	5 175.6	64 338
Recreation	332.4	243.9	2 785
Commercial fishing	192.5	160.3	975
Scientific research & management	106.1	98.0	881
Total	7 041.5	5 677.8	68 978

Current status: Publicly available at www.environment.gov.au/sustainability/regional-development/gbr/publications/gbr-economic-contribution.html

8. A Framework for Understanding Cumulative Impacts and Supporting Environmental Decisions: To Inform Resilience-Based Management of the Great Barrier Reef World Heritage Area

Author: AIMS, CSIRO, GBRMPA and the University of Melbourne

Scope: This project was commissioned to develop a framework to support decision-making that would enhance the resilience of Great Barrier Reef ecosystems to ensure they have the capacity to deal with future impacts, including climate change. The framework was intended to be regionally scalable, facilitate analysis of cumulative impacts, allow scenario testing, and help identify management actions that can best maintain or improve the Reef's resilience.

The project involved the development of qualitative and probabilistic models for seagrass and coral reef ecosystems, which allow managers to identify the likely impacts of cumulative impact scenarios. The models were integrated with the process of structured decision-making to produce an overall decision framework.

Key findings:

- The project has delivered a six-step framework that enables managers to use models to evaluate different cumulative impact scenarios, highlight environmental risks and identify effective management options.
- The framework can use quantitative data (for example on flood plumes) to identify spatial 'zones of influence' where impacts are expected to have a significant and observable pressure on Great Barrier Reef ecosystems, and where these impacts overlap. This enables a manager to assess and map estimates of cumulative risk at different scales across the GBRWHA.
- The report used hypothetical development scenarios involving agricultural and port development to illustrate how the framework can be used. It showed that climate change and storms are likely to be the key stressors affecting reef and seagrass ecosystems in the future. However, risks to these ecosystems (particularly in the inshore area) can be greatly exacerbated by sediment and nutrient input from agricultural run-off and, to a lesser extent, from port development. Strategic management of these stressors can assist in maintaining or improving the resilience of the ecosystems to future climate change.

Current status: Publicly available at www.environment.gov.au/resource/framework-understanding-cumulative-impacts-supporting-environmental-decisions-and-informing

9. Integrated Monitoring Framework for the Great Barrier Reef World Heritage Area

Author: Marine Biodiversity NERP Hub, Tropical Ecosystems NERP Hub, Environmental Decisions NERP Hub, AIMS and GBRMPA

Scope: This project was commissioned to establish a framework for a standardised and integrated ecological, social and economic monitoring programme. The team developed practical guidance to help partners involved in a strategic assessment under the *Environment Protection and Biodiversity Conservation Act 1999* establish an integrated monitoring framework. The guidance was applied to the GBRWHA, with the intention that the approach could be used to inform the development of integrated monitoring programmes in other coastal and marine regions of Australia.

Key findings:

- Part 2 of the report (the guidance) articulates a set of overarching principles and processes that when applied set the direction, prerequisites and essential functions for integrated monitoring. It is used to instigate a depth of thought—covering ‘why’, ‘what’ and ‘how’—about the use of integrated monitoring to support adaptive management of MNES values.
- Part 3 of the report applies the guidance to produce an integrated monitoring framework for the GBRWHA.
- Through this project, and for the first time, the monitoring needs for management, the legacy of past monitoring programmes and the capacity of existing monitoring programmes have been brought together to provide a blueprint for an integrated approach to monitoring the Great Barrier Reef.
- The framework explicitly links management objectives, monitoring objectives and monitoring programmes in a driver, pressure, state, impact and response framework to provide a solid foundation for an integrated monitoring programme for the GBRWHA.
- The report found that there are gaps in existing monitoring both spatially and in regard to some of the identified monitoring priorities. There are also very few instances where both the pressure and the value are adequately monitored to inform cause–effect relationships.
- Some values, such as coral reefs, are the focus of multiple monitoring programmes with differing objectives. There is an opportunity to better draw together, evaluate, interpret and report the relevant results for these groups of programmes.
- Further work will be required to operationalise the framework. The report identifies a potential governance model building on that established for the Reef Plan.

Current status: Publicly available at www.environment.gov.au/resource/integrated-monitoring-framework-great-barrier-reef-world-heritage-area

Appendix 6—Information sheet on the Long-Term Sustainability Plan

Information sheet released for public comment on 1 November 2013, until 31 January 2014



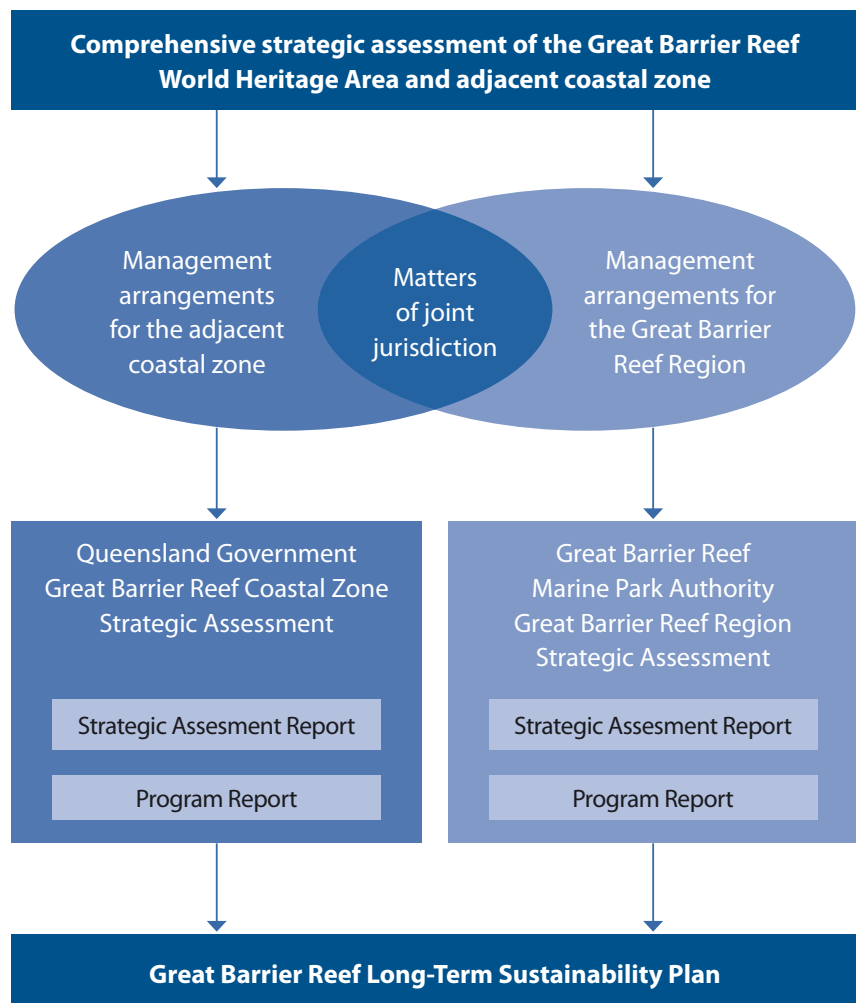
Great Barrier Reef Long-Term Sustainability Plan

The Australian and Queensland governments are working together to develop a Long-Term Sustainability Plan for the Great Barrier Reef World Heritage Area to guide the protection and management of this iconic World Heritage Area to 2050.

The Great Barrier Reef is one of Australia's most significant environmental assets, and has been recognised as one of the best managed marine areas in the world. It is a multiple-use area, supporting a wide range of activities including tourism, fishing, recreation, traditional uses, research, defence, shipping and ports. It is recognised internationally for its outstanding universal value as a world heritage property.

The World Heritage Committee has requested that Australia:

“...undertake a comprehensive strategic assessment of the entire property, identifying planned and potential future development that could impact the Outstanding Universal Value to enable a long-term plan for sustainable development that will protect the Outstanding Universal Value of the property.” (WHC **Decision 35 COM 7B.10** 2011).



The Plan will inform future development by drawing together the marine and coastal components of the comprehensive strategic assessment, providing an over-arching framework to guide the protection and management of the Great Barrier Reef World Heritage Area from 2015 to 2050. It will target the identified areas of action from the strategic assessments and seek to address gaps important for future management of the Area.



Building upon a strong foundation

The Long-Term Sustainability Plan will build on the successful Reef Water Quality Protection Plan 2013 (Reef Plan), which is an agreement between the two governments and a schedule to the Great Barrier Reef Intergovernmental Agreement 2009 (GBR IGA 2009).

It will also build upon a strong foundation of management already in place, with a large majority of the World Heritage Area and adjacent coastal zone in protected areas. Both governments have also agreed to work cooperatively to remove duplication in assessment and approvals processes, while maintaining environmental outcomes. The Plan will identify ways in which both governments and other non government partners can continue to work collaboratively to further strengthen management of the World Heritage Area.



Scope

The draft strategic assessment reports identify the need for better integrated and strategic management of the Great Barrier Reef with clear and measurable outcomes and targets.

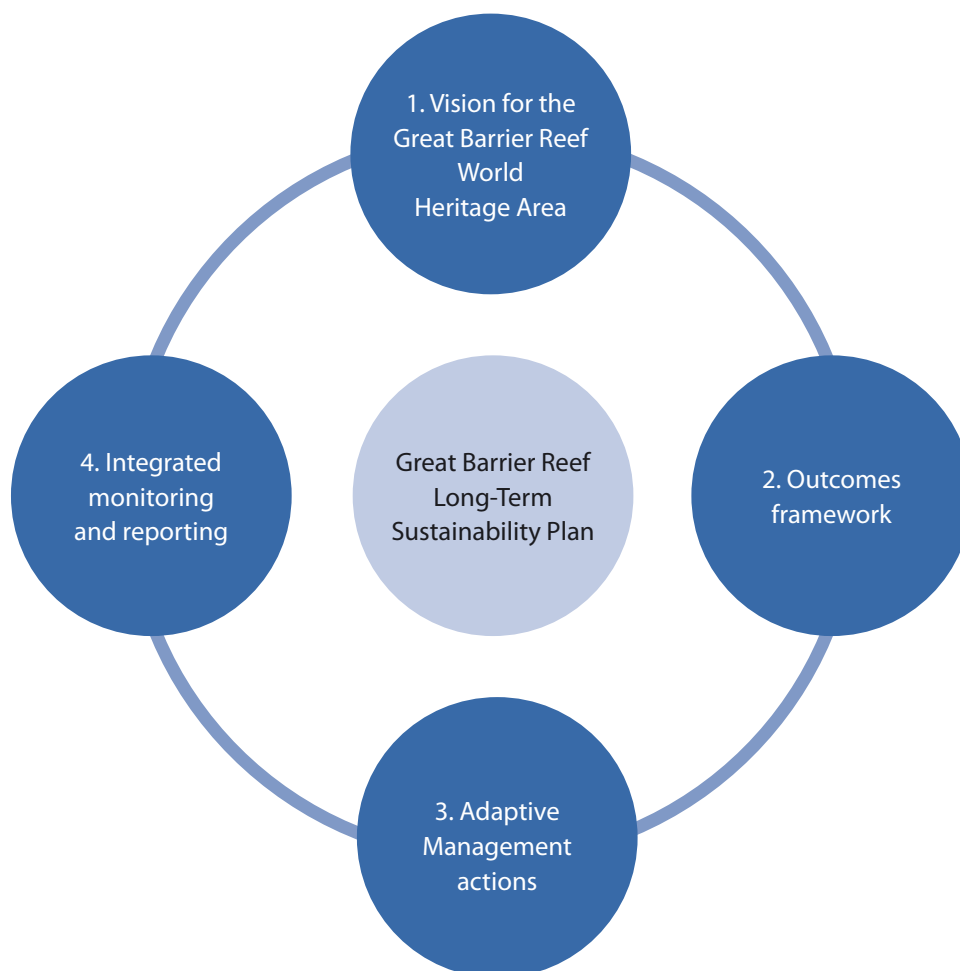
The Plan will build on a strong foundation by incorporating the following four elements:

1. A **Vision** for the Great Barrier Reef World Heritage Area that reflects the diversity of use and interest in the property, protects the outstanding universal value, sustains its integrity and integrates the three pillars of sustainability (environmental, social and economic).
2. An **Outcomes framework** that includes desired outcomes and targets for protection of the property's outstanding universal value.
3. **Adaptive management actions** to deliver outcomes and targets (primarily drawn from the two strategic assessments and with a focus on critical areas of new work).
4. **Integrated monitoring and reporting programmes** to measure the success of the Plan.

The Plan will draw together a number of existing and proposed initiatives for protection and management of the Great Barrier Reef World Heritage Area. This includes the Reef Water Quality Protection Plan and Reef 2050 Plan, the Australian Government's strategic long-term approach to addressing key threats to the Reef. Reef 2050 Plan will include the establishment of a Reef Trust, managing nutrient run-off and crown-of-thorns starfish, and implementing a Dugong and Turtle Protection Plan.

The Great Barrier Reef Ministerial Forum will oversee implementation of the Plan. The Forum, made up of relevant Australian and Queensland government ministers, provides a mechanism for governments to prioritise protection, facilitate adaptive management and guide decision-making both in the world heritage area and in the adjacent coastal zone.

If you would like to provide comment to inform development of the Plan please follow the directions for providing input via the strategic assessment public comment process and refer to the draft Queensland Government and Great Barrier Reef Marine Park Authority strategic assessment reports. Further consultation on the Plan will occur in 2014.





Further information

- The strategic assessment public comment process:
<http://www.environment.gov.au/epbc/notices/assessments/great-barrier-reef.html>
- The outstanding universal value of the Great Barrier Reef World Heritage Area:
<http://www.environment.gov.au/heritage/places/world/great-barrier-reef/understanding-values-factsheet.html>
- The World Heritage Committee decisions:
<http://www.environment.gov.au/heritage/places/world/great-barrier-reef/information.html>
- The Great Barrier Reef Intergovernmental Agreement:
<http://www.environment.gov.au/coasts/gbr/agreement.html>

© Commonwealth of Australia 2013

This work is copyright. You may download, display, print and reproduce this material in unaltered form only (retaining this notice) for your personal, non-commercial use or use within your organisation. Apart from any use as permitted under the *Copyright Act 1968*, all other rights are reserved. Requests and enquiries concerning reproduction and rights should be addressed to Department of the Environment, Public Affairs, GPO Box 787 Canberra ACT 2601 or email public.affairs@environment.gov.au

Photos:

Front Slashers Reef, Great Barrier Reef (GBRMPA)

Page 2 Pair of Clown Anemonefish (adult and juvenile) in an anemone off Cairns (David Harasti)

Page 4 Heron Island on the Great Barrier Reef (Allan Fox and Department of Environment)

Appendix 7—EPBC Act status of proposed developments *within* the Great Barrier Reef World Heritage Area

Including proposed developments previously reported in the 2012 and 2013 State Party Reports (current as at 9 January 2014)

Blue shading indicates projects that have been approved since 1 February 2013.

Grey shading indicates projects that have been withdrawn since 1 February 2013.

Project	World Heritage Centre notified of latest status change	Links to further information	Status
LNG processing facilities and associated infrastructure			
2009/5007 Arrow CSG (Australia) Pty Ltd, Development of a Liquefied Natural Gas Facility	Notified of project approval in letter of 10 December 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referrals&limit=999999&text_search=2009%2F5007	Approved on 10 December 2013
2009/5008 Arrow CSG (Australia) Pty Ltd, Development of High-Pressure Gas Pipeline	Notified of project approval in letter of 10 December 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referrals&limit=999999&text_search=2009%2F5008	Approved on 10 December 2013
Port facilities and dredging			
2011/5979 Port of Townsville Limited, Port Expansion Project	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?limit=999999&name=current_referrals&text_search=2011%2F5979	Under assessment
2011/6185 BHP Billiton Abbot Point Coal Terminal 2	Notified of project withdrawal in quarterly notification report 1 December 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6185	Withdrawn
2008/4647 Hancock Prospecting Pty Ltd, Alpha Coal Project— Port Options Development	Notified of new project in 2013 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=4647	Under assessment

Project	World Heritage Centre notified of latest status change	Links to further information	Status
2008/4406 Queensland Curtis LNG Project— Swing Basin and Channel Dredging	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=4406	Under assessment
2009/5158 Xstrata Coal Queensland Pty Ltd, Balaclava Island Coal Export Terminal	Notified of project withdrawal in quarterly notification report 1 June 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?limit=999999&name=current_referrals&text_search=2009%2F5158	Withdrawn
2011/6069 Fitzroy Terminal Project Pty Ltd, Fitzroy Terminal Project	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referrals&limit=999999&text_search=2011%2F6069	Under assessment
2011/6213 Abbot Point Terminal 0, 2 & 3 Capital Dredging	Notified of project approval in letter of 10 December 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6213	Approved on 10 December 2013
2012/6240 Dudgeon Point Port of Hay Point Expansion	Notified of new project in quarterly notification report 1 March 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6240	Under assessment
2012/6250 Waratah Coal Terminal	Notified of new project in quarterly notification report 1 March 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6250	Under assessment
2012/6348 Tenement to Terminal Limited (3TL) Development of the Yarwun Coal Terminal, Port Gladstone	Notified of new project in quarterly notification report 1 June 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6348	Under assessment
2011/6194 Adani Abbot Point Coal Terminal 0	Notified of project approval in letter of 10 December 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6194	Approved on 10 December 2013
2012/6558 Gladstone Ports Corporation, Port of Gladstone Gatcombe and Golding Cutting Channel Duplication Project	Notified of new project in quarterly notification report 1 December 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6558	Under assessment

Project	World Heritage Centre notified of latest status change	Links to further information	Status
2012/6538 Far North Queensland Ports Corporation Limited, Cairns Shipping Development (Trinity Inlet) Project	Notified of new project in quarterly notification report 1 December 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6538	Under assessment
Tourism developments			
2010/5521 GKI Resort Pty Ltd, Tourism & Marina Development	Notified of project approval in quarterly notification report 1 June 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referrals&limit=999999&text_search=2010%2F5521	Approved on 5 March 2013
2008/3971 Pathold No 84 Pty Ltd, Ecotourism Resort on Wild Duck Island	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referrals&limit=999999&text_search=2008%2F3971	Under assessment
2007/3580 Laguna Pty Ltd Resort Expansion	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=3580	Under assessment
2006/2939 Shute Harbour Marina Development Pty Ltd, Construction of Marina Facility	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=2939	Approved on 9 January 2014
2012/6643 Eaton Place Pty Ltd, Pacificus Tourism Project, Hummock Hill Island	Notified of new project in quarterly notification report 1 March 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6643	Under assessment
Aquaculture developments			
2007/3613 Coolgaree Aboriginal Corporation for CDEP, Palm Island Sponge Aquaculture Project	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=3613	Under assessment

Appendix 8—EPBC Act status of proposed developments *outside* the Great Barrier Reef World Heritage Area

Including proposed developments previously reported in the 2012 and 2013 State Party Reports (current as at 9 January 2014)

Blue shading indicates projects that have been approved since 1 February 2013.

Grey shading indicates projects that have been withdrawn since 1 February 2013.

Project	World Heritage Centre notified of latest status change	Links to further information	Status
Mining and extractive industries			
2011/5965 Xstrata Coal Queensland Pty Ltd, Rolleston Coal Expansion Project	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=5965	Under assessment
2010/5736 Adani Mining Pty Ltd, Carmichael Coal and Rail Project	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=5736	Under assessment
2009/4737 Waratah Coal, Incorporated Establishment of Galilee Coal Mine and Associated Infrastructure	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referrals&limit=999999&text_search=2009%2F4737	Approved on 19 December 2013
2010/5642 RTA Weipa Pty Ltd, South of Embley Bauxite Mine and Port Development, Cape York Qld	Notified of project approval in quarterly notification report 1 June 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=5642	Approved on 15 May 2013

Project	World Heritage Centre notified of latest status change	Links to further information	Status
2011/6062 Sarsfield Expansion	Notified of new project in quarterly notification report 1 March 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6062	Under assessment
2012/6281 Grosvenor West Coal Project	Notified of new project in quarterly notification report 1 September 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6281	Under assessment
2012/6483 Harrybrandt Open Cut Coal Mine and Associated Infrastructure, Bowen Basin	Notified of new project in quarterly notification report 1 September 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6483	Under assessment
2011/6092 Aust-Pac Capital, Wongai Underground Coal Mine Project, Queensland	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6092	Under assessment
Transport infrastructure (excluding port developments)			
2011/6082 BHP Billiton Goonyella to Abbot Point Rail	Notified of project withdrawal in quarterly notification report 1 December 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6082	Withdrawn
2012/6321 Aurizon, Central Queensland Integrated Rail Project, Goonyella to Abbot Point	Notified of new project in quarterly notification report 1 June 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6321	Under assessment
2012/6322 Aurizon, Central Queensland Integrated Rail Project, South and Central Galilee to Newlands Junction, Qld	Notified of new project in quarterly notification report 1 June 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6322	Under assessment

Project	World Heritage Centre notified of latest status change	Links to further information	Status
2012/6489 Galilee Infrastructure Corridor Project, Abbot Point to Galilee Basin, Queensland	Notified of new project in quarterly notification report 1 September 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6489	Under assessment
2013/6885 Adani Mining Pty Ltd North Galilee Basin Rail Project, Abbot Point to Galilee Basin	Notified of new project 1 September 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6885	Under assessment
Water treatment facilities and water supply infrastructure			
2010/5448 Cassowary Coast Regional Council, Sewerage Treatment Plant & Outfall	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referrals&limit=999999&text_search=2010%2F5448	Under assessment
2009/5173 Gladstone Area Water Board & SunWater Limited, The Lower Fitzroy River Infrastructure Project	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?limit=999999&name=current_referrals&text_search=2009%2F5173	Under assessment
2008/4313 SunWater, Construction and Operation of Nathan Dam	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referrals&limit=999999&text_search=2008%2F4313	Under assessment
2006/2527 SunWater, Water for Bowen Project	Notified of project withdrawal in quarterly notification report 1 December 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referrals&limit=999999&text_search=2006%2F2527	Withdrawn
2005/2390 Cairns Regional Council, Groundwater extracted from Mulgrave River Aquifer, Bore Field and Associated Infrastructure	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=2390	Under assessment

Project	World Heritage Centre notified of latest status change	Links to further information	Status
Tourism developments			
2009/5211 Tropical Resort Developments Pty Ltd, Cairns Queensland	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=5211	Under assessment
2009/4785 Taylor Family Trust, Taylor Family Health Retreat	Notified of new project in 2012 State Party Report	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=4785	Under assessment
2012/6482 Coquette Point Recreational Vehicle (RV) park, Coquette Point, Queensland	Notified of new project in quarterly notification report 1 September 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6482	Under assessment
Agricultural developments			
2010/5514 CassTech, The Burdekin Cassava Project	Notified of project approval in quarterly notification report 1 September 2013	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referrals&limit=999999&text_search=2010%2F5514	Approved on 11 July 2013
Proposals for residential developments outside the GBRWHA			
2012/6351 Bushland Grove Pty Ltd, Mt Low Developments Master Planned Community, Townsville, Qld	Notified of new project in quarterly notification report 1 June 2012	www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6351	Under assessment

Appendix 9—Abbot Point and Curtis Island projects approved in December 2013

This appendix provides summary information on the four projects approved by the Australian Government Minister for the Environment on 10 December 2013.

Abbot Point terminals 0, 2 & 3 Capital Dredging (EPBC reference 2011/6213)

Project summary

The dredging is for six new berth pockets and the associated ship apron areas for three coal export terminals (terminals 0, 2 and 3) at the existing Port of Abbot Point. The sediment will be removed from a 185 hectare dredge area within port limits, to a maximum depth of five metres. The spoil disposal site is located 24 kilometres north-east of Abbot Point.

Conditions to protect the environment and benefit water quality

No more than 1.3 million cubic metres of sediment can be dredged or disposed of in a year, unless the proponent can demonstrate that increased dredging will not compromise water quality. Dredging and disposal activities can only be undertaken between 1 March and 30 June each year to protect water quality during critical times for seagrass growth and coral spawning.

The proponent must prepare and submit a number of plans for approval by the Minister prior to the commencement of dredging and disposal activities.

A dredging and spoil disposal management plan will include measures to monitor water quality and ecosystem health and to minimise the risk to flora and fauna from the dredging and spoil disposal. The plan requires early warning trigger levels for water quality and ecosystem health to address possible risks from turbidity, sediment deposition and impacts on seagrass. The plan will be reviewed by an independent dredging technical advice panel (see below).

The Abbot Point Ecosystem Research and Monitoring Programme will validate hydrodynamic modelling and develop measures to monitor water quality (including where sediment travels from the dredging and disposal site), seagrass health and recovery. The plan will be reviewed annually by an independent technical advice panel.

A disposal site analysis plan will identify alternative disposal sites for analysis and identify a process for public consultation on alternative sites. Disposal will only be allowed at an alternative site if the impacts would be equivalent to or less than those at the site identified in the environmental impact statement. Any alternative dredge disposal site must be approved by the Minister.

An offsets plan will address the loss and potential loss of seagrass; outline the net benefit outcome to the GBRWHA; and offset the fine sediments resulting from the dredging and dredge spoil disposal activities and available for re-suspension by an equivalent 150 per cent reduction in the load of fine sediments entering the marine environment from the Burdekin and Don catchments.

An independent dredging technical advice panel will be formed to provide advice to the proponent on the development, endorsement, implementation and review for adaptive management purposes of the dredging and spoil disposal management plan, the Abbot Point Ecosystem Research and Monitoring Programme and the offsets plan.

The proponent is required to implement procedures to observe for marine mammals and turtles before and during dredging and disposal activities and to use a turtle exclusion device on the dredger head at all times during dredging.

For further information: www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6213

Abbot Point Coal Terminal 0—Adani Abbot Point Terminal Pty Ltd (EPBC reference 2011/6194)

Project summary

The project is a coal export facility involving the construction and operation of onshore and offshore coal loading and export infrastructure. The onshore component includes rail loading facilities, coal-handling facilities, coal stockpiles and the upgrade of an existing service jetty. The offshore component includes a 2.75 kilometre out-loading jetty and conveyor (called a 'trestle'), new wharves, shiploaders and berths for two Cape Size vessels. The berths and trestle/jetty will be adjacent to the existing Terminal 1 berths and trestle/jetty.

Conditions to protect the environment and benefit water quality

Specific conditions apply to the pile-driving operations (associated with the jetty construction) to ensure protection of marine species.

A marine offset strategy must be implemented to achieve a net benefit to the Outstanding Universal Value of the GBRWHA. It is to be funded through an annual contribution of \$450 000 (adjusted for the Consumer Price Index) for the life of the project (40 years) and will include:

- a turtle plan—an annual programme to reduce the level of feral pig, dog and fox predation on green turtle and flatback turtle species nests and to enhance the marine habitat
- a marine plan to reflect the most appropriate natural resource management priorities relating to the potential impacts on the outstanding universal value of the GBRWHA.

The proponent must prepare and submit to the Minister a number of plans prior to the commencement of construction of the coal terminal and offshore jetty/trestles:

- A terrestrial management plan for the construction and operational phases of the project, which must include actions to protect listed ecological communities (the semi-evergreen vine thicket of the Brigalow Belt and Nandewar bioregions) and listed bird and migratory bird species. It must address potential water quality impacts, including potential downstream impacts on the Caley Valley Wetland, in recognition of its use by migratory bird species, and to the project site more generally, including from run-off from coal stockpiles and stormwater.
- A marine and shipping management plan to cover both the construction and the operation of the project. The scope of this plan covers all aspects of shipping, including loading and ballast water management to control marine pest risks. Adani is required to reflect best practice mitigation and management measures to ensure protection of marine species and their habitat, with particular regard to humpback whales, dugong, listed dolphins and listed turtles.

For further information: www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=6194

Arrow Curtis Island Liquefied Natural Gas (LNG) Facility, Gladstone (EPBC reference 2009/5007)

Project summary

The project involves the construction and operation of an LNG facility on Curtis Island within the GBRWHA, with four LNG processing facilities (also known as LNG 'trains'), a jetty, workers accommodation and materials offloading facilities. It also includes 1.4 million cubic metres of capital dredging in Port Curtis and the mouth of the Calliope River, to allow ship access to the facility. Dredge spoil will be disposed of at existing and approved onshore and offshore spoil grounds in Gladstone Harbour. The LNG facility will cool and liquefy gas supplied from Arrow's proposed coal seam gas fields in the Surat and Bowen basins, which are currently being assessed under national environment law. The project has a 534 hectare project footprint.

Conditions to protect the environment and benefit water quality

The approval holder must develop a dredge management plan and a shipping activity management plan to address water quality impacts from dredging and shipping. To ensure a net environmental benefit outcome, the proponent must offset by 150 per cent any potential dredging impacts above water quality triggers identified in the dredge management plan. This requires the proponent to invest in activities in the Great Barrier Reef catchment that will achieve a reduction in the load of fine sediments entering the marine environment. This will ensure that the project's contribution to cumulative impacts is addressed. Trigger levels for early warning of water quality impacts and for ceasing dredging must also be provided in the dredge management plan.

To offset potential impacts to the GBRWHA a 1400 hectare offset property on Curtis Island must be secured for national park status; and a contribution of \$200 000 per annum plus an additional \$100 000 per annum (adjusted for the Consumer Price Index) must be made for each of the operating LNG processing facilities, to improve management of the Great Barrier Reef.

The approval holder must also develop an EPBC species impact management plan, a long-term marine turtle management plan and a water mouse management plan and must offset 80 hectares of water mouse habitat. The proponent must contribute an initial up-front payment of \$150 000 to implement the long-term marine turtle management plan, with further funds to be contributed if needed to meet turtle management outcomes identified in the plan.

For listed threatened species and ecological communities, maximum disturbance limits apply to the clearance of habitat. Importantly, the critically endangered littoral rainforest must not be cleared, and the conditions give effect to the proponent's commitment to fence off the area, control weeds and provide a 20 metre buffer.

For further information: www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=5007

Arrow Gas Transmission Pipeline, Gladstone to Curtis Island (EPBC reference 2009/5008)

Project summary

The Arrow Gas Transmission Pipeline consists of a 9.45 kilometre long gas pipeline starting from the mainland at Gladstone, then traversing beneath the sea floor in a tunnel to a reception shaft on Curtis Island. The reception shaft surfaces within the already disturbed footprint of the Arrow LNG Facility. The disturbance footprint for the project is approximately 35 hectares.

Conditions to protect the environment and benefit water quality

All project activities will take place above the low tide mark, and only minor land-based disturbance is expected from the project. The pipeline will be tunnelled under Port Curtis to reduce potential impacts to the marine environment as far as possible. Potential water quality impacts (e.g. sedimentation and erosion) are expected to be minor and will be managed through controls and conditions managed by the Queensland Government.

For further information: www.environment.gov.au/cgi-bin/epbc/epbc_ap.pl?name=current_referral_detail&proposal_id=5008

Image credits

Page no.	Image credits
Front cover	Heron Island on the Great Barrier Reef. Photograph by Allan Fox
iii	These crinoids, soft corals and hard corals are an example of the rich biodiversity of the Great Barrier Reef. Photograph courtesy of the Great Barrier Reef Marine Park Authority
vi	The Great Barrier Reef is home to six of the world's seven species of marine turtles, including the green sea turtle. Photograph courtesy of the Great Barrier Reef Marine Park Authority
4	<p>(From left to right and top to bottom)</p> <p>View of Dent Island from Hamilton Island in the Whitsundays. Photograph courtesy of the Great Barrier Reef Marine Park Authority</p> <p>Aerial photograph of Heart Reef in the Whitsundays. Photograph courtesy of the Great Barrier Reef Marine Park Authority</p> <p>The rainforest meets the Reef in parts of North Queensland, including Cape Tribulation. Photograph courtesy of the Great Barrier Reef Marine Park Authority</p> <p>Tourists can snorkel and dive off the beach at Green Island, near Cairns. Photograph courtesy of the Great Barrier Reef Marine Park Authority</p> <p>A tourism crew member monitors a reef as part of the Great Barrier Reef Marine Park Authority's Eye on the Reef—Tourism Weekly programme. Information gathered by tourism crew helps the agency create an up to date picture of reef health. Photograph courtesy of the Great Barrier Reef Marine Park Authority</p> <p>A fishing trawler in the Great Barrier Reef Marine Park. Photograph courtesy of the Great Barrier Reef Marine Park Authority</p> <p>Aerial photograph of Cape Tribulation in North Queensland. Photograph courtesy of the Great Barrier Reef Marine Park Authority</p> <p>View of Townsville Harbour with Castle Hill behind. Photograph courtesy of the Department of the Environment</p> <p>Aerial photograph of the Port of Hay Point near Mackay. It comprises two coal export terminals—Dalrymple Bay coal terminal and Hay Point coal terminal—both managed by North Queensland Bulk Ports. Photograph courtesy of the Great Barrier Reef Marine Park Authority</p>
8	<p>(Top) Coral cod, fish, Stevens Reef, Great Barrier Reef. Photograph courtesy of the Great Barrier Reef Marine Park Authority</p> <p>(Bottom) Aerial view of Hardy Reef in the Great Barrier Reef. Photograph courtesy of the Department of the Environment</p>
9	<p>(Top) The edge of a mangrove forest on Woody Island at low tide. Low Island can be seen in the distance. Photograph courtesy of the Great Barrier Reef Marine Park Authority</p> <p>(Bottom) Fish of the Great Barrier Reef. Photograph courtesy of the Department of the Environment</p>
Back cover	Slashers Reef, Great Barrier Reef. Photograph courtesy of the Great Barrier Reef Marine Park Authority