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MS19-001013

25 NOV 2019

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Dear Dr Rössler

I am pleased to submit Australia's State Party Report on the state of conservation of the Great Barrier Reef World Heritage Area in response to World Heritage Committee decision **41 COM 7B.24**.

In submitting this report, I wish to emphasise Australia's unwavering commitment to the protection and best practice management of what we proudly acclaim as one of the jewels in the World Heritage crown. The Great Barrier Reef is beautiful, vast and diverse.

The *Reef 2050 Long-Term Sustainability Plan* – updated in 2018 – provides a strong framework for investment, management and action by the Australian and Queensland state governments and our partners across industry and the community. The State Party Report details the significant progress we have made in implementing the Reef 2050 Plan.

The State Party Report also provide a clear-headed appraisal of the current state of the Great Barrier Reef, and the threats and pressures it faces. Mass coral bleaching in 2016 and 2017 (part of a global event), six tropical cyclones, flooding, and a crown-of-thorns starfish outbreak have impacted the Outstanding Universal Value of the property.

Climate change is foremost among the pressures facing the Reef. Concerted global action to limit global warming is needed for the Great Barrier Reef – and all other coral reefs. This is the context in which Australia manages the Reef. Drawing on the best available science, we are actively managing the pressures over which we have direct control. We are also committed to effective global action under the Paris Agreement to reduce greenhouse gas emissions.

Australia will continue to comprehensively address the threats facing the Great Barrier Reef World Heritage Area in order to sustain the Outstanding Universal Value.

Yours sincerely

SUSSAN LEY

Enc

Australian Government
Department of the Environment and Energy

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
41COM 7B.24

FOR SUBMISSION BY
1 DECEMBER 2019

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1. Executive summary

The Great Barrier Reef World Heritage Area is beautiful, vast and diverse. It is the world's largest coral reef ecosystem and a living natural wonder of the world. The Great Barrier Reef was inscribed on the World Heritage List in 1981. Australia is strongly committed to the responsible stewardship of the Great Barrier Reef World Heritage Area and continues to act and invest to protect its Outstanding Universal Value (OUV) and strengthen its resilience. Total investment to benefit the Reef over the decade ending in 2023-24 will exceed $2.7 billion.

Mass coral bleaching events in 2016 and 2017, six tropical cyclones, flooding, and a coral-eating crown-of-thorns starfish outbreak have impacted the OUV of the property since the last State Party Report in 2015. The Great Barrier Reef Marine Park Authority's *Great Barrier Reef Outlook Report 2019* (2019 Outlook Report) found that the long-term outlook for the Reef's ecosystem has deteriorated from *poor* to *very poor*. It states that climate change (especially sea temperature rise) remains the most serious and pervasive threat to the Great Barrier Reef – a threat in common with all coral reefs globally. The other key threats identified in the 2019 Outlook Report are land-based run off, coastal development and some aspects of direct human use such as illegal fishing.

Concerted global action to limit global warming is needed to turn around the deteriorating outlook for the Great Barrier Reef – and all other coral reefs. This is the context in which Australia manages the Great Barrier Reef. We are actively managing the pressures over which we have direct control through investment and regulation based on the best available science. In the face of these pressures we are scaling up investment in reef restoration and adaptation science.

Australia is taking strong action as part of global efforts to address the global threat of climate change under the United Nations Framework Convention on Climate Change and the Paris Agreement. The Paris Agreement aims to keep global temperature rise well below 2°C – and to pursue efforts to limit the temperature increase to 1.5°C. Australia's commitment under the Paris Agreement is to reduce emissions by 26 to 28 per cent below 2005 levels by 2030.

In 2015, the Australian and Queensland governments put in place the *Reef 2050 Long-Term Sustainability Plan* (Reef 2050 Plan). This Plan was welcomed by the World Heritage Committee at its meeting in Bonn (decision 39 COM 7B.7), as was our early progress in implementing the Plan (41 COM 7B.24). Since then we have matured, diversified and accelerated our response to Reef health challenges. A mid-term review of the Reef 2050 Plan was brought forward to 2017 in light of the mass coral bleaching that occurred in 2016 and 2017 and additional funding provided, demonstrating our ongoing commitment to responsive and adaptive management of the Reef. The *Reef 2050 Plan Insights Report* (an independent report commissioned to inform the 2019 Outlook Report) found the Reef 2050 Plan provides a "very sound framework for improving the management of the Reef's values through improved governance, planning and resourcing".

To accelerate efforts to address water quality, the Australian and Queensland governments are implementing a $600 million *Reef 2050 Water Quality Improvement Plan for 2017-2022* (Reef 2050 WQIP). The Reef 2050 WQIP uses an adaptive management approach, informed by the best available science. The approach to improving water quality includes working with landholders to reduce pollution run off into waterways, land restoration to prevent erosion, and strengthening regulation of vegetation management, water quality and dredge disposal. Water quality management for the Reef is expected to improve following the approval of new legislation by the Queensland Government on 19 September 2019 which strengthens Queensland's regulatory framework for reducing nutrient and sediment releases from agricultural activities and new industrial development. Amongst

other measures, these Reef Protection Regulations regulate agricultural activities to avoid excessive fertiliser application, and to actively manage erosion risks in all Reef catchments.

Australia is also committed to transparent monitoring and reporting through publication of the Great Barrier Reef Outlook Report (required every five years under the *Great Barrier Reef Marine Park Act 1975*), Scientific Consensus Statement for water quality (updated every five years), annual Reef Water Quality Report Cards and the establishment of the Reef 2050 Integrated Monitoring and Reporting Program.

While there has been significant progress in addressing the threats and pressures facing the Reef, Australia does not underestimate the scale of the challenges that lie ahead. The Australian and Queensland governments will continue to comprehensively address these threats and pressures in order to sustain the OUV of the Great Barrier Reef World Heritage Area.

2. Résumé analytique (français)

La Grande Barrière est une zone de patrimoine mondial vaste, diverse et d'une grande beauté. Il s'agit du plus grand écosystème de récifs coralliens du monde et de l'une des merveilles naturelles vivantes de notre planète. La Grande Barrière a été inscrite sur la Liste du patrimoine mondial en 1981. L'Australie s'engage fortement en faveur d'une gestion responsable de la zone de patrimoine mondial de la Grande Barrière et continue d'agir et d'investir pour protéger sa valeur universelle exceptionnelle (VUE) et renforcer sa résilience. Le montant total des investissements au profit de la Grande Barrière dépasseront les 2,7 milliards de dollars sur la décennie terminant en 2023-24.Depuis le dernier Rapport de l'Etat partie sur l'état de conservation en 2015, la VUE de ce site a été mise à l'épreuve par plusieurs événements de grande ampleur de blanchiment des coraux en 2016 et 2017, par les inondations causées par six cyclones tropicaux, ainsi que par une invasion d'étoiles de mer « couronne d'épines » se nourrissant de corail. Le Rapport de 2019 sur les perspectives de la Grande Barrière (Great Barrier Reef Outlook Report 2019, ou Rapport de perspectives 2019) de l'Autorité du parc marin de la Grande Barrière a révélé une détérioration des perspectives à long terme de l'écosystème du récif, passant de « mauvaises » à « très mauvaises ». Ce rapport identifie le changement climatique (notamment l'augmentation de la température des mers) comme la menace la plus sérieuse et la plus généralisée affectant la Grande Barrière, une menace affectant par ailleurs tous les récifs coralliens du monde. Les autres menaces principales identifiées dans le Rapport de perspectives de 2019 sont les ruissellements terriens, le développement côtier et certains aspects d'exploitation humaine directe, comme la pêche illégale.

Une action concertée à l'échelle mondiale pour limiter le réchauffement planétaire est nécessaire pour inverser les sombres perspectives pour la Grande Barrière et tous les autres récifs coralliens. Voici le contexte dans lequel l'Australie gère la Grande Barrière. Nous gérons activement les pressions sur lesquelles nous avons un contrôle direct par le biais d'investissements et de réglementations reposant sur les meilleures données scientifiques disponibles. Face à ces pressions, nous intensifions nos investissements pour une restauration du récif corallien et dans le domaine de la science de l'adaptation.

L'Australie prend des mesures fortes dans le cadre des efforts internationaux pour faire face à la menace mondiale du changement climatique selon la Convention-cadre des Nations Unies sur les changements climatiques et l'Accord de Paris. Ce dernier a pour objectif de maintenir le réchauffement planétaire bien en dessous de 2 °C – tout en essayant de le limiter à 1,5 °C. Dans le cadre de cet accord, l'Australie s'est engagée à réduire ses émissions d'ici 2030 de 26 à 28 % par rapport aux niveaux de 2005.

En 2015, les gouvernements de l'Australie et de l'État du Queensland ont mis en place le Plan de durabilité à long terme Reef 2050 (Reef 2050 Long-Term Sustainability Plan, ou Reef 2050 Plan). Le Comité du patrimoine mondial a favorablement accueilli ce plan lors de sa réunion à Bonn (décision 39 COM 7B.7), de même que nos premières avancées pour sa mise en application (41 COM 7B.24). Depuis, notre réponse aux défis affectant le récif corallien a gagné en réflexion, en diversité et en rapidité. L'examen à mi-parcours du plan Reef 2050 a été avancé à 2017 en réponse au phénomène de blanchiment des coraux de grande ampleur de 2016 et 2017, et des subventions supplémentaires ont été accordées, démontrant ainsi notre engagement continu envers une gestion réactive et adaptative du récif. Selon le Rapport d'observation du plan Reef 2050 (Reef 2050 Plan Insights Report, un rapport indépendant visant à renseigner le Rapport de perspectives 2019), le plan Reef 2050 est jugé comme une « structure très solide pour améliorer la gestion des valeurs du récif en améliorant la gouvernance, la planification et les ressources ».

Pour accélérer les efforts visant à améliorer la qualité de l'eau, les gouvernements de l'Australie et de l'État du Queensland mettent actuellement en application un Plan Reef 2050 d'amélioration de la qualité de l'eau pour

2017-2022 (Reef 2050 Water Quality Improvement Plan for 2017-2022, ou WQIP Reef 2050) de 600 millions de dollars. Le plan WQIP Reef 2050 fait appel à une gestion adaptative fondée sur les meilleures données scientifiques disponibles. L'approche visant à améliorer la qualité de l'eau repose notamment sur une collaboration avec les exploitants agricoles pour réduire les ruissellements d'eaux polluées vers les cours d'eau, sur une restauration des terres pour lutter contre leur érosion, et sur un renforcement des réglementations sur la gestion de la végétation, de la qualité de l'eau et des activités de dragage. La gestion de la qualité de l'eau du récif devrait s'améliorer à la suite de l'approbation d'une nouvelle législation par le gouvernement de l'État du Queensland du 19 septembre 2019 qui renforce le cadre réglementaire de cet État pour réduire les rejets de nutriments et de sédiments des activités agricoles et de nouveaux développements industriels. Ces règlements pour la protection du récif, accompagnés d'autres mesures, contrôlent les activités agricoles pour éviter l'utilisation excessive d'engrais et activement gérer les risques d'érosion dans tous les bassins du récif.

L'Australie s'engage également envers une surveillance et un suivi transparents grâce à la publication du Rapport sur les perspectives de la Grande Barrière (exigé tous les cinq ans selon la Loi de 1975 sur le parc marin de la Grande Barrière (Great Barrier Reef Marine Park Act 1975)) et la Déclaration de consensus scientifique pour la qualité de l'eau (mise à jour tous les cinq ans), les Fiches de résultat annuelles sur la qualité de l'eau dans le récif, ainsi que par la mise en place du Programme intégré de surveillance et de suivi Reef 2050.

Bien qu'il y ait eu des progrès significatifs dans la lutte contre les menaces et les pressions qui pèsent sur le récif, l'Australie ne sous-estime pas l'ampleur des défis à relever. Les gouvernements de l'Australie et du Queensland continueront de faire face à l'ensemble de ces défis et pressions afin de préserver la Valeur universelle exceptionnelle de la zone de patrimoine mondial de la Grande Barrière.

3. Introduction and context

This State Party Report demonstrates the continued commitment of Australia to manage and protect the Outstanding Universal Value (OUV) of the Great Barrier Reef World Heritage Area (the Reef). It focuses on progress made since the most recent State Party Report was considered in 2015 and builds on the *Reef 2050 Plan Update on Progress*, which reported on early implementation of the *Reef 2050 Long-Term Sustainability Plan* (Reef 2050 Plan) and was received positively by the World Heritage Committee (the Committee) at its meeting in Krakow, Poland, in July 2017.

Australia has a strong history of working closely with the Committee to protect the Reef World Heritage Area. Continuous engagement with the Committee and its technical advisers over the past decade has yielded significant improvement in the management of the Reef, backed by legislation and increased investment and founded on scientific evidence. This will continue.

As the custodian of this World Heritage icon, Australia understands and willingly accepts its responsibility to protect and sustain the Reef. Australia has accelerated efforts for the effective and sustained protection of the Reef's OUV and is diligently addressing all decisions of the Committee through implementation of the Reef 2050 Plan.

We understand that the Reef is an icon under pressure with a deteriorating long-term outlook. We know that concerted action is needed on multiple fronts to address the key threats it faces – and we are acting. Climate change, poor water quality caused primarily by land-based run off, coastal development and some aspects of direct human use such as illegal fishing are the primary threats. Among them, climate change is the most significant and can only be addressed by effective global action under the Paris Agreement. Australia has committed to reduce greenhouse gas emissions by 26-28 per cent below 2005 levels by 2030. We are joined with other signatories to the Paris Agreement in striving to keep global average surface temperature increases to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C. The target of limiting the temperature increase to 1.5°C is widely cited as a critical threshold for the Reef.

The Reef is greatly valued by people across Australia and around the world. The Reef is an important economic asset, providing jobs for the people who live in its catchment and supporting diverse and sustainable communities. The Reef is estimated to generate 64,000 jobs and annual income of $6.4 billion[1] to the Australian economy, most of this from tourism.

Aboriginal and Torres Strait Islander peoples are the Traditional Owners of the Reef area and have a continuing connection to their land and sea country. The Reef is of great significance to its Traditional Owners and is fundamental to their cultural, economic and social wellbeing.

1 All references to dollar values within this report are for Australian dollars

3.1 The Great Barrier Reef World Heritage Area

The Reef is an iconic World Heritage property that contains about 10 per cent of the world's coral reefs, making it the world's largest coral reef ecosystem. It is one of the best known and most complex natural systems on earth, containing a unique range of ecological communities, habitats and species. The World Heritage Area covers 34,870,000 hectares, or more than 348,000 km^2, which is approximately the same area as Japan, Germany or Malaysia (see map in Appendix A).

As a whole, the property is a diverse patchwork of habitats supporting thousands of species. It is home to abundant animal life including bony fishes, sharks and rays, marine mammals, marine reptiles, seabirds and a wide variety of invertebrates. When describing the property, it is important to understand it is more than just coral reefs, which comprise only about seven per cent of the World Heritage Area. The property contains a diverse array of spectacular non-reef habitats. These range from shallow estuarine areas with seagrass beds, mangroves and sponge gardens, to deep oceanic areas more than 250 km offshore. The lagoon floor habitat that surrounds and connects reefs and islands covers approximately 61 per cent of the property's footprint. Beaches, cays and vegetated islands provide habitat and nesting areas for many species.

All properties inscribed on the World Heritage List have OUV. The United Nations Educational, Scientific and Cultural Organization (UNESCO) explains OUV as having three pillars. To have OUV a property must:

- meet one or more of the 10 world heritage criteria (Pillar 1). The Reef is inscribed under four natural world heritage criteria:
  - natural beauty and natural phenomena (criterion vii),
  - major stages of the Earth's evolutionary history (criterion viii),
  - ecological and biological processes (criterion ix), and
  - habitats for conservation of biodiversity (criterion x).
- meet the condition of integrity (wholeness and intactness) (Pillar 2).
- have an adequate system of protection and management to safeguard its future (Pillar 3).

3.2 Management of the Great Barrier Reef World Heritage Area

Protection and management of the Reef is achieved through multiple partnerships between government agencies, industry, community and non-government organisations, scientists, and Traditional Owners. The Commonwealth *Great Barrier Reef Marine Park Act 1975*, which established the Great Barrier Reef Marine Park Authority (the Marine Park Authority), is the primary national legislation dedicated to the long-term protection of the environment, biodiversity and heritage values of the Great Barrier Reef Region. The Commonwealth marine protected area is complemented by the Queensland Great Barrier Reef Coast Marine Park in adjacent Queensland waters and Queensland island national parks, and the Commonwealth Coral Sea Marine Park, which extends from the outer boundary of the Great Barrier Reef Marine Park eastwards to the edge of Australia's Exclusive Economic Zone. Many of the islands within the property are national parks and there are also extensive areas of national park and other protected land along the adjacent coast.

The Australian and Queensland governments work in partnership through the *Great Barrier Reef Intergovernmental Agreement 2015* to protect and manage the Region. This agreement provides a transparent framework for cooperative management of the environment, biodiversity and heritage values of the World Heritage Area by the Marine Park Authority and the Queensland Parks and Wildlife Service.

In response to concerns raised by the World Heritage Committee in 2011, the Australian and Queensland governments took decisive action to improve the management and protection of the Reef. This included a strategic assessment between 2012 and 2014 of the World Heritage Area and adjacent coastal zone to evaluate and improve the effectiveness of the management of existing and emerging risks to the Reef. The assessment resulted in development of the Reef 2050 Plan, which was strongly affirmed by the Committee in 2015 (39 COM 7B.7). In 2017, the Committee welcomed progress with the initial implementation of the Reef 2050 Plan and the establishment of the associated Investment Framework (41 COM 7B.24).

3.2.1 Governance arrangements

The Reef 2050 Plan sets out what Australians, as custodians of the Reef for the international community, want the future of the Great Barrier Reef World Heritage Area to be and how this will be achieved. The Reef 2050 Plan is overseen by the Great Barrier Reef Ministerial Forum and is supported by strong governance arrangements that draw on the expertise of a number of advisory bodies.

The Reef 2050 Independent Expert Panel (IEP) chaired by former Chief Scientist of Australia, Emeritus Professor Ian Chubb AC[2] FAA FTSE[3], provides expert scientific advice related to the Reef. Panel members have expertise in climate change, water quality, agriculture, reef ecology, fisheries and economics.

The Reef 2050 Advisory Committee (RAC), chaired by The Hon Penelope Wensley AC, former Governor of Queensland and former Australian Ambassador for the Environment, provides strategic advice on the implementation of Reef 2050 Plan actions, stakeholder priorities, and any emerging cross-sectoral issues that need to be addressed. Membership includes Traditional Owners, a range of industry sectors (agriculture, tourism, fishing and ports) as well as local government, natural resource management, community, science and environmental non-government organisations.

3.2.2 Traditional Owner engagement

Aboriginal and Torres Strait Islander people are the Traditional Owners of the Great Barrier Reef region. Evidence of their sea country connection goes back over 60,000 years. Improving involvement of Indigenous Traditional Owners in the protection and management of the Reef is a priority for the Australian and Queensland governments. Traditional Owner involvement in implementing the Reef 2050 Plan has been boosted. Twenty-three Reef 2050 Plan actions specifically relate to Traditional Owners. In 2017, the Australian Government engaged a consortium of Indigenous and research organisations to work with Great Barrier Reef Traditional Owners to better understand and support their aspirations and commitments under the Reef 2050 Plan.

The final report of the consortium was published in June 2019, and includes advice from Traditional Owners about their aspirations for involvement in the management and protection of the Reef. It offers a strategic blueprint to support the fulfilment of Traditional Owners' custodial responsibilities and obligations. The report's findings and recommendations are helping inform the comprehensive review of the Reef 2050 Plan currently underway and to be completed in 2020. Further detail on Traditional Owner engagement is reported in section 4.3.2c.

2 Officer of the Order of Australia. The Order of Australia recognises Australians who have demonstrated outstanding service or exceptional achievement.

3 Fellow of the Australian Academy of Science and Fellow of the Academy of Technological Services and Engineering.

3.3 Investing for impact

The Australian and Queensland governments have made significant progress in implementing the Reef 2050 Plan. In December 2016, the *Reef 2050 Plan Investment Framework* was released to help guide Reef investment decisions. The framework established the baseline for investments, identified investment priorities for securing the future health of the Reef, and set out a strategy for boosting investment and diversifying its sources. Since it was released, the Australian and Queensland governments have made a range of additional funding commitments, which are outlined in the Reef 2050 Plan (as updated in 2018).

The Australian and Queensland governments, along with their many partners, are making substantial investments to achieve the successful implementation of the Reef 2050 Plan. When the Reef 2050 Plan was considered by the World Heritage Committee in 2015, the Reef 2050 Plan Investment Baseline projected that the Australian and Queensland governments would invest around $2 billion over the decade from 2014-15 to 2023-24 on its implementation. Investments have increased substantially since that time and the investment over this period is now more than $2.7 billion (Table 1).

The investment includes funding for marine park management, improving water quality, controlling coral-eating crown-of-thorns starfish, reducing marine debris, research and innovative science, increasing engagement with Traditional Owners, monitoring and reporting, and the restoration and repair of coastal ecosystems. This investment continues to grow and has increased since the 2017 decision of the Committee which encouraged the acceleration of efforts to meet the targets of the Reef 2050 Plan. Further detail about Reef investments is included at Appendix B.

The Reef is a highly complex socio-ecological system. Effecting enduring positive outcomes demands not only an understanding of the Reefs' physical processes and ecological systems, but also the importance of people in creating change. Engaging with a range of communities and utilising modern behavioural science to achieve practice change is essential to improving the long-term outlook of the Reef. Australia is driving change by empowering communities to have a positive influence on the Reef, whether it be through agricultural practice change on farms or a reduction of plastic use within households. Ensuring these changes are sustainable over the long-term will continue to be an important area of investment under the Reef 2050 Plan.

Table 1: Reef funding 2014-15 to 2023-24

Australian and Queensland Government Reef funding (2014-15 to 2023-24)	
Source	**All figures in AUD $m**
Australian Government Reef Programs	875.199
Reef Science	388.606
Great Barrier Reef Marine Park Authority	400.941
Australian Maritime Safety Authority	270.901
Queensland Government Reef Programs	498.759
Queensland Sustainable Fisheries Programs	41.852
Maritime Safety Queensland	280.000
Total	**2756.258**

A full breakdown of Reef funding from 2014-15 to 2023-24 is provided at Appendix B.

Australian Government Investment

The Australian Government is investing more than $1.9 billion in the Reef over 10 years. Over $875 million has been allocated to deliver Reef programs consistent with the Reef 2050 Plan. On-ground Reef protection through the Reef Trust has grown from an initial multi-year investment of $40 million commencing in 2015 to a commitment of $704 million until 2022-23.

The Reef 2050 Plan is underpinned by the best available science. The Australian Government invests in the science underpinning the health and resilience of the Reef through the Australian Institute of Marine Science (AIMS). AIMS invests more than $313 million in Reef activities, including reef monitoring through programs such as the AIMS Long Term Monitoring Program; field work and experimentation in AIMS's world-class research aquarium facility and research and development to protect and restore the Reef from the cumulative effects of environmental stresses. The Australian Government also invests in the scientific evidence base through the National Environmental Science Program (NESP). Reef water quality research is a key focus for research under NESP, with total investment of more than $31 million.

Australia continues to focus on reducing the impacts of shipping with $270 million invested through the Australian Maritime Safety Authority for the protection of the marine environment, preventing and combating ship-sourced pollution, and providing infrastructure for safe navigation in Australian waters.

Queensland Government Investment

The Queensland Government is investing $820 million over 10 years to deliver a broad range of programs that benefit the Reef. Through Queensland's Reef Water Quality Program, a record five year investment of $261 million from 2017, the Queensland government is investing in a range of actions to reduce land-based run off. Maritime Safety Queensland is investing $280 million over 10 years to improve maritime safety in Queensland waters including the Reef, to minimise vessel-sourced waste and respond to marine pollution incidents. Queensland is investing more than $41 million to improve the sustainability of commercial and recreational fisheries.

Local Government and the Private and Philanthropic Sectors

In addition to the $2.7 billion being invested by the Australian and Queensland governments, the Reef continues to benefit from additional investment from local governments and the private and philanthropic sectors. Local government authorities invest more than $200 million a year in urban stormwater treatment, waterways and coastal foreshore rehabilitation, vegetation and pest management and coastal hazard adaptation strategies amongst many other actions. The private and philanthropic sectors continue to invest in Reef outcomes through awareness raising, community education, on-ground works, monitoring, planning and research.

4. Response to the decision of the World Heritage Committee

This Report responds to the World Heritage Committee decision 41 COM 7B.24 (Appendix C) in three parts:

1. how Australia is protecting the OUV of the Reef though an analysis of outcomes from the 2019 Outlook Report against the three pillars of OUV.
2. how the management of the Reef has been enhanced in an effort to meet the targets of the Reef 2050 Plan; and
3. how effective Australia's performance has been in meeting targets established under the Reef 2050 Plan through an analysis of progress against a representative selection of these targets.

4.1 Demonstrating the effective and sustained protection of the property's Outstanding Universal Value

41 COM 7B.24 Paragraph 6: Reiterates its request to the State Party to submit to the World Heritage Centre, by 1 December 2019, an **overall report on the state of conservation of the property demonstrating the effective and sustained protection of the property's Outstanding Universal Value** and effective performance in meeting the targets established under the Reef 2050 LTSP, linked to the findings of the 2014 and 2019 Great Barrier Reef Outlook Reports, for examination by the World Heritage Committee at its 44th session in 2020.

State Party's Response

Every five years, the Great Barrier Reef Marine Park Authority publishes a Great Barrier Reef Outlook Report that examines the Reef's health, pressures, and likely future. The report is required under the *Great Barrier Reef Marine Park Act 1975* and provides a regular, reliable and transparent assessment of the condition of natural and heritage values, as well as an independent assessment of management effectiveness.

The *Great Barrier Reef Outlook Report 2019* (2019 Outlook Report) found that key pressures on the Reef remain largely the same as the previous 2014 assessment. Climate change (especially sea temperature rise and temperature extremes) remains the most serious and pervasive threat to the Reef – a threat in common with all coral reefs globally. This is consistent with the recently released *IPCC Special Report on the Ocean and Cryosphere in a Changing Environment* which stated "Almost all warm-water coral reefs are projected to suffer significant losses of area and local extinctions, even if global warming is limited to 1.5°C."[4] The other key threats were associated with land-based run-off, coastal development and some aspects of direct human use such as illegal fishing. It concluded that the long-term outlook for the Reef's ecosystem has deteriorated from *poor* to *very poor* and indicated that accelerated action to mitigate climate change and improve water quality is essential to turn around this outlook.

Concerted global action to limit global warming is needed to turn around the deteriorating outlook for the Great Barrier Reef – and all other coral reefs. This is the context in which Australia manages the Reef and is the context in which this State Party Report has been prepared. We are actively managing the pressures over which we have direct control through investment and regulation based on the best available science.

The 2019 Outlook Report included nine assessments covering biodiversity, ecosystem health, heritage values, commercial and non-commercial use, factors influencing the Reef's values, existing protection and management, resilience, risks and a long-term outlook for both the ecosystem and heritage values. To do this, the report assessed

4 IPCC Special Report on the Ocean and Cryosphere in a Changing Environment, 25 September 2019. Pg 34.

87 components of which 38 were then mapped to the OUV of the property, enabling an assessment of current state and future trends.

The 2019 Outlook Report concluded that the OUV of the Reef remains whole and intact and maintains many of the elements that make up its OUV, however, components that underpin all four natural criteria have deteriorated since the Reef's inscription on the World Heritage List. The size of the property is becoming a less effective buffer to broadscale and cumulative threats, primarily due to climate change.

An overall summary of the World Heritage attributes from the 2019 Outlook Report and an assessment of the linkages between the Outlook Report and the Reef's OUV are provided at Appendix D.

4.1.1 Pillar 1: The World Heritage criteria

The Reef is inscribed on the World Heritage List under four natural world heritage criteria. The 2019 Outlook Report (chapter 4) provides assessments under each of these criteria, summarised below.

1. **Natural beauty and natural phenomena** (criterion vii) – the natural beauty and natural phenomena of the Reef endure. However, it is clear that coral mortality (resulting from sea temperature extremes in combination with predation from crown-of-thorns starfish) and impacts from severe cyclones has affected aspects of the Reef's natural beauty and natural phenomena.

2. **Major stages of the Earth's evolutionary history** (criterion viii) – the Reef continues to provide outstanding examples of the earth's evolutional history and geomorphological diversity, though Reef disturbances will have some long-lasting effects.

3. **Ecological and biological processes** (criterion ix) – ecosystem processes continue to operate, with ecological and biological processes, such as primary production, microbial process and herbivory, remaining in very good to good condition. However, climate change is having a detrimental impact on some critical regulating processes such as sea temperature, reef building and recruitment (the addition of new young to the population) which means the ability of the system to 'bounce back' is weakening.

4. **Habitats for conservation of biodiversity** (criterion x) – the Reef continues to be one of the richest and most complex natural ecosystems on earth, and one of the most significant for biodiversity conservation. Large habitats, such as the lagoon floor, are considered to be in good condition, whereas coral reef habitat has deteriorated and is considered to be in very poor condition. Threats from a changing climate and other human impacts have led to habitat loss and degradation in a number of areas, which is having a detrimental impact on habitats for conservation of biodiversity.

Additional detail on the condition of a wide range of the elements that make up the Reef ecosystem is provided in the assessment of progress against Reef 2050 Plan targets in section 4.3.

4.1.2 Pillar 2: Meeting the condition of integrity (wholeness and intactness)

Since the last State Party Report was submitted in 2015, the Reef – like many coral reefs globally – has been impacted by unprecedented temperature-driven mass coral bleaching events in 2016 and 2017. Additionally six tropical cyclones have made landfall. While these events were large scale and significant, particularly in terms of coral loss, integrity is intact, but borderline in two of the six integrity criteria (see Appendix E for the 2019 Outlook Report Integrity Test). While the Reef exists in a dynamic state, the spatial extent of the World Heritage Area has remained generally unchanged since the time of inscription and the property remains whole and intact (2019 Outlook Report, page 90).

The 2019 Outlook Report notes that the property's size, at least for some of its habitats, is becoming a less effective buffer against ongoing and increasing reef wide disturbances. The widespread loss of coral habitat, warming seas and intensifying external pressures such as ocean acidification, altered weather patterns, and modification of coastal habitats are affecting the property's intactness.

4.1.3 Pillar 3: Adequate systems of protection and management

Australia established the *Great Barrier Reef Marine Park Act* and the Great Barrier Reef Marine Park Authority in 1975. Over the succeeding 40 years, the Marine Park Authority has developed world-class expertise in tropical marine ecosystem management. Under Queensland's *Marine Parks Act 2004*, protection extends into coastal and inland tidal waters. Many of the islands within the property are national parks and there are also extensive areas of national park and other protected land along the adjacent coast. The Great Barrier Reef Marine Park and the Great Barrier Reef Coastal Marine Park together comprise about 99 per cent of the World Heritage Area. The Great Barrier Reef Marine Park is protected as a matter of national environmental significance under the national *Environment Protection and Biodiversity Conservation Act 1999*.

In assessing the effectiveness of current protection and management of the Reef, the 2019 Outlook Report drew on two independent assessment reports: the *Reef 2050 Insights Report* and the *Independent assessment of management effectiveness for the Great Barrier Reef Outlook Report 2019*. The *Reef 2050 Plan Insights Report*, which drew from the main independent assessment, used a management effectiveness evaluation approach (based on the framework developed by the IUCN World Commission on Protected Areas). The report considered whether the Reef 2050 Plan was *appropriate* and *effective* in achieving its vision, based on its goals, objectives and targets, and looked at evidence of improvements achieved to date. The independent management effectiveness assessment considered the activities of all Australian and Queensland government agencies and other partners that contribute to protection and management of the Region. This framework has been consistently applied across all Outlook reports.

Management actions inside and outside the Region were examined to the extent they are relevant to, and influence protection and management of, the Region's ecosystem and heritage values. In relation to the global issue of climate change, the assessment primarily considered measures undertaken by managing agencies specifically to protect and manage the Region. Given the unprecedented back-to-back coral bleaching events and other climate change driven pressures, this assessment also broadly considered state, national and global climate change initiatives that are relevant to the values of the Region.

The *Reef 2050 Plan Insights Report* concluded that the Reef 2050 Plan has provided a "very sound framework for improving the effective management of the Reef's values through improved governance, planning and resourcing" (page 5). The independent management effectiveness assessment found improvements in management were most notable for ports, heritage values and fishing activities and that many of the improvements in management effectiveness are the result of the Reef 2050 Plan, which has improved consistency of priority-setting between

the Australian and Queensland governments and enabled better coordination of a range of actions, targets and objectives to address the key threats to the Region.

It also noted that the *Reef 2050 Water Quality Improvement Plan* consolidates water quality planning, and reduces duplication by providing a single framework for addressing water quality issues. However, it concluded that achieving outcomes on the ground continues to be difficult for complex and spatially broad topics, such as land-based run off. The 2019 Outlook Report observed that there are significant time lags between actions on the ground and observable improvements in water quality.

The 2019 Outlook Report includes a chapter on Existing Protection and Management (Chapter 7) which summarises the findings from the independent management effectiveness assessments referred to above. Table 2 below is taken from the 2019 Outlook Report (page 222) and summarises these findings. It demonstrates that across almost all management topics (those addressed directly by the Reef 2050 Plan and existing well established management frameworks), the effectiveness of existing measures is rated as good or very good, and stable or improving. Nonetheless, the extensive investment, management action, and policy and regulatory changes delivered under the Reef 2050 Plan are yet to translate into measurable improvement in outcomes against some management topics that are more complex and where outcomes take long periods to achieve. The independent management effectiveness review observed that "achieving outcomes on the ground continues to be difficult for complex and spatially broad topics such as climate change, land based run-off and biodiversity" (2019 Outlook Report, page 221).

Improvements to Reef governance

In March 2017, the Australian Government commissioned an independent review into the governance of the Marine Park Authority, specifically the role and composition of the Marine Park Authority Board and the Authority's executive management arrangements. The Government accepted all 24 recommendations of the independent report released on 5 October 2017, and the Authority is well advanced in their implementation. Recognising the significant challenges facing the Reef, part of the response created a separate Chairperson and Chief Executive Officer for the Authority. The board was also expanded to include one more additional part-time member and a broader range of skills and expertise.

Further information is available at: https://www.environment.gov.au/marine/gbr/authority-governance-review.

Table 2: Overall assessment of the effectiveness of existing measures to protect and manage the Region's values (2019 Outlook Report)

Effectiveness of existing measures						Management topic	Summary
Context	Planning	Inputs	Processes	Outputs	Outcomes		
↔	↘	↓	↘	↓	↘	**Climate change**	Management focus has significantly declined for climate change, particularly for outputs and outcomes.
↔	↑	↑	↑	↑	↗	**Coastal development**	Planning systems to effectively address coastal development have continued to evolve and improve.
↔	↔	↑	↔	↗	↔	**Land-based run-off**	Knowledge of water quality continues to be well understood, although outcomes continue to be poor due to significant time lags.
↑	↑	↔	↗	↑	↑	**Ports**	Ports within the Region are well managed. Coordinated and holistic planning for future port developments are undertaken through legislation and policy processes.
↔	↑	↑	↔	↔	↔	**Fishing**	The Sustainable Fisheries Strategy has improved planning and inputs of fishing.
↔	↔	↔	↔	↔	↗	**Heritage values**	Outcomes for the Region's heritage values have improved over the last five years.
↔	↔	↗	↔	↔	↔	**Commercial marine tourism**	A comprehensive suite of management tools contributes to the sustainable management of tourism activities.
↔	↘	↔	↔	↓	↔	**Recreation (not including fishing)**	Recreation is generally managed effectively. Outputs have declined as emphasis has shifted to emerging risks.
↓	↔	↔	↔	↑	↔	**Traditional use of marine resources**	Sound agreements and cooperative management are in place to address traditional use of marine resources.
↓	↔	↔	↔	↔	↓	**Biodiversity values**	Back-to-back bleaching events in 2016 and 2017 have dramatically changed the situation in relation to outcomes for biodiversity in the Region.
↗	↗	↑	↑	↔	↔	**Community benefits of the environment**	Community benefits are better defined and there has been a significant management focus in this area since 2014.
↑	↑	↑	↑	↗	↔	**Shipping**	Shipping is well regulated and managed.
↔	↑	↑	↑	↔	↔	**Research activities**	Planning, inputs and processes have all improved, largely as a result of enhanced systems and processes relating to management of research permits.
↔	↔	↑	↔	↔	↔	**Defence activities**	Defence activities continue to be managed effectively with close cooperation between agencies.

Increasing complexity

Grading statements			
Very good The grading statements for each of the assessment criteria are provided in Section 7.5.1 to 7.5.6.	**Good** The grading statements for each of the assessment criteria are provided in Section 7.5.1 to 7.5.6.	**Poor** The grading statements for each of the assessment criteria are provided in Section 7.5.1 to 7.5.6.	**Very poor** The grading statements for each of the assessment criteria are provided in Section 7.5.1 to 7.5.6.

Trend since last report	
↑	Improved, grade changed
↗	Improved within same grade
↔	Stable
↘	Deteriorated within same grade
↓	Deteriorated, grade changed

4.2 Acceleration of efforts to meet targets of the Reef 2050 Long-Term Sustainability Plan

41 COM 7B.24 Paragraph 4: Strongly encourages the State Party to **accelerate efforts to ensure meeting the intermediate and long-term targets of the plan**, which are essential to the overall resilience of the property, in particular regarding water quality.

State Party's response

Our strategy for improving the long-term outlook for the Reef is founded on three key action areas: first, Australia's contribution to global emissions reductions (under the Paris Agreement and outside the scope of the Reef 2050 Plan); second, direct action to reduce pressures like poor water quality and direct human use; and third, supporting adaptation to a changing climate. The focus of the Reef 2050 Plan is on improving the Reef's health and resilience to climate change by reducing local and regional pressures. A more resilient Reef will recover faster in the absence of further disturbances. This focus on resilience management is consistent with the recent World Heritage Committee decision (43 COM 7) that all State Parties put in place adaptation strategies that strengthen the resilience of properties and ensure the conservation of their OUV. Australia is leading the way in reef adaptation science, as outlined in the Reef Restoration and Adaptation Program case study in section 4.3.2.

Australia is accelerating efforts to strengthen the health and resilience of the Reef. The mid-term review of the Reef 2050 Plan was brought forward in response to the mass coral bleaching events of 2016 and 2017. The Plan was updated and investment has been increased with priorities carefully planned. Australia is addressing key threats to the Reef by taking action on climate change, improving water quality and coastal habitats, tackling outbreaks of crown-of-thorns starfish, addressing pollution and protecting threatened and migratory species.

Our investments are informed by the best available science and knowledge, with water quality interventions maturing to the point where we can prioritise our interventions by type and catchment to ensure that we get the greatest benefit possible from our funding. *The Reef 2050 Water Quality Improvement Plan 2017-2022* – the fourth iteration of this plan – builds on more than 15 years of effort by governments at all levels working in partnership with landholders, natural resource managers and conservation groups to address all land-based sources of water pollution. Results from this program show steady progress is being made.

4.2.1 Action on climate change

Australia is taking strong action to address the global threat of climate change under the United Nations Framework Convention on Climate Change and the Paris Agreement.

Australia has a track record of meeting its international commitments and is on track to exceed its 2020 target to reduce greenhouse gas emissions by five per cent below 2000 levels by 2020. Australia's Paris target to reduce emissions by 26 to 28 per cent below 2005 levels by 2030 is a significant contribution to global climate action. The headline target represents a halving of emissions per person in Australia, or a two-thirds reduction in emissions per unit of GDP.

To meet the goals of the Paris Agreement Australia, like all other Parties to the Agreement, will put forward new commitments every five years. As part of the recommendations in the Australian Government's *2017 Review of Climate Change Policies* (2017 Review), the Government agreed to introduce a process of 'review and refine' cycles of its climate change policies to ensure integrated consideration of domestic policy and international targets.

Australia is also developing a long-term whole-of-economy emissions reduction strategy, as recommended in the 2017 Review, which is expected to be delivered by the end of 2020.

The Australian Government has a comprehensive set of policies to reduce greenhouse gas emissions, increase energy efficiency and fast track the development and uptake of clean energy. This is backed by strong investments, such as our $3.5 billion Climate Solutions Package to help deliver on Australia's 2030 Paris climate commitments, including a $2 billion Climate Solutions Fund to build on the success of the Emissions Reduction Fund. These measures will contribute more than 200 million tonnes of abatement toward our emissions reduction targets while giving farmers, small businesses and Indigenous communities the chance to improve the environment and benefit from new revenue opportunities.

The Australian Government is funding clean energy projects in the Reef catchment area through the Clean Energy Finance Corporation's (CEFC) $1 billion Reef Funding Program, launched in June 2016. To 30 June 2019, the CEFC has committed more than $370 million towards over 400 projects under the Reef Funding Program with a total project value of more than $1.22 billion. Under the Reef Funding Program, finance is directed to eligible projects in the Reef catchment area, across renewable energy, energy efficiency and low emissions technologies. The CEFC's primary role and statutory objective is to facilitate financial flows into the clean energy technology sector. As such, CEFC's investments within the Reef catchment area can benefit the Reef in that they address its greatest threat, that of climate change. They also contribute to the region's economic development by providing a local source of clean renewable energy supply and efficient local use of energy; and they demonstrate to the Reef communities that action on climate change makes good business sense; all outcomes that support the Government's Reef 2050 Plan. Also in line with the Reef 2050 Plan, the CEFC seeks projects that deliver water quality outcomes.

The Queensland Government similarly recognises the threat that climate change is posing to the Reef and is committed to playing its part in the global effort to address climate change impacts, having committed to achieving a net reduction of its greenhouse gas emissions of 30 per cent by 2030. In addition to its comprehensive climate mitigation and adaptation strategies, the Queensland Government has introduced a $500 million Land Restoration Fund to facilitate Queensland-based land sector carbon offset projects which also generate co-benefits such as improved vegetation management to reduce sediment entering the Reef.

The Queensland Government is also investing $8.9 million for improved infrastructure on Reef islands along with $1.7 million to help Great Barrier Reef islands develop business cases for renewable energy use to cut their carbon emissions.

4.2.2 Reef Blueprint for Resilience

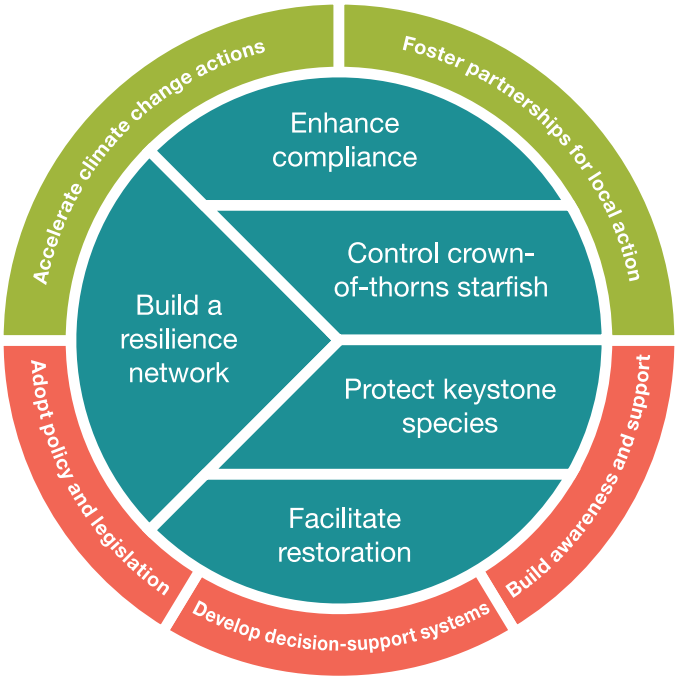
In 2017, prompted by the significant loss of coral cover during the 2016 and 2017 mass coral bleaching events, the Marine Park Authority brought together over 70 regional, national and international delegates representing Traditional Owners, marine park rangers, managers, scientists, industry representatives, and government and non-government organisations for a dedicated summit to address the situation.

The Marine Park Authority's *Reef Blueprint for Resilience* was the primary output of the 2017 Reef Summit. The Blueprint signals the actions that will be taken to strengthen the Reef's resilience, its capacity to recover after disturbances and return to a healthy state, and the challenges it faces now and in the future.

The Blueprint is designed around 10 key initiatives focused on delivering maximum benefits for Reef resilience. In considering the initiatives, summit participants looked at what scale solutions needed to be applied, how quickly they could be implemented and how soon they would deliver benefits for the Reef.

The Blueprint informed the 2018 update of the Reef 2050 Plan and has contributed to securing additional funding to develop and implement innovative and timely strategies. It has also helped galvanise collaboration and resilience-building efforts across the Reef community.

From Blueprint to Action examines the first year of progress by the Authority towards achieving the Blueprint initiatives, describing the critical work undertaken to help sustain the Reef as a functioning ecosystem while the key threats of climate change and water quality are tackled in the longer term.



Building Resilience – helping the Reef help itself

In recent years it has become clear that conventional management methods will no longer be enough to protect coral reefs under any projected climate change scenario. A new set of on-reef management options is needed if we are to give coral reefs the best chance to survive and persist in a warmer future, and to build resilience while the causes of climate change are being addressed.

Since the mass coral bleaching events of 2016 and 2017, the Australian Government has put the nation's best minds to work on building the Reef's resilience to future pressures, not only through existing actions such as improving water quality and controlling crown-of-thorns starfish outbreaks, but also by actively investigating options for helping the Reef to recover and adapt to changing pressures.

With initial funding of $6 million, the Reef Restoration and Adaptation Program has embarked on finding new, creative and targeted measures for large-scale protection of the Reef's ecology, social and economic values. The program has three phases – scoping and feasibility, research and development and implementation (production and deployment).

The scoping phase drew on world leading expertise from the Australian Institute of Marine Science, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), James Cook University, the University of Queensland, Queensland University of Technology, the Marine Park Authority, and the Great Barrier Reef Foundation, as well as many other leading research universities and institutes.

During this 18-month scoping and feasibility process, which concluded in mid-2019, experts conducted a preliminary evaluation of the widest possible range of new intervention techniques that could, alone and in combination, complement existing management approaches to help protect the Reef's ecological functions

and economic and social values. The program aims to provide decision-makers with scientifically-proven, ecologically-effective, socially-acceptable, technically-feasible and economically-viable options to successfully intervene at scale on the Reef. It is strengthening our understanding of how coral reefs are likely to be affected by global temperature increases and the interventions required to ensure they can continue to function.

The program is considering how the Reef could repair and recover after disturbances like coral bleaching and cyclones through modifying reef surfaces to promote growth, or producing and distributing coral larvae on a large scale. Experts are examining prevention measures such as reducing corals' exposure to extreme temperatures by increasing shade or cooling water, or building up coral populations through selective breeding.

The scoping phase modelled the potential benefits, costs and risks of ecological and physical interventions, looking at all the relevant factors and drivers, from regulatory and institutional factors to social factors and planning for long-term research and development.

Results of the scoping phase are now informing how best to fund smart, cost effective and scalable reef solutions through the $100 million available for reef resilience and adaptation science under the Reef Trust Partnership with the Great Barrier Reef Foundation.

1. CONCEPT FEASIBILITY

- Identify potential techniques
- Cost-benefit analysis
- Stakeholder engagement
- Program design
- Independent review
- Investment case

2. RESEARCH & DEVELOPMENT

- Progress prospective techniques
- Refine focus
- Progressively scale concept testing
- Stakeholder engagement and decision-making

3. IMPLEMENTATION (PRODUCTION & DEPLOYMENT)

- Commercial transfer
- Construction of full-scale systems
- Production and deployment operations
- Assess and refine

4.2.3 Reef 2050 Plan reviews

Bringing forward the Reef 2050 Plan mid-term review

The Reef 2050 Plan was scheduled for a mid-term review in 2018. In light of the mass coral bleaching events in 2016 and 2017, the Great Barrier Reef Ministerial Forum, consisting of relevant Australian and Queensland government ministers, brought forward the mid-term review in 2017. This was to ensure that the Plan effectively considered and addressed current pressures impacting the health and resilience of the Reef to identify any further action that needed to be taken. The updated Reef 2050 Plan was published in July 2018. The revised 2018 Plan clearly recognised climate change impacts on the Reef and the importance of coordinated global action to reduce carbon emissions.

As part of the 2018 review process, all the actions from the original Plan were reviewed and either confirmed as finalised, updated, re-categorised or incorporated into new actions. These actions underpin the targets in the revised Reef 2050 Plan. A comprehensive list of how all the actions in the original Plan have been treated is available on the Department of the Environment and Energy website at:

http://www.environment.gov.au/system/files/resources/35e55187-b76e-4aaf-a2fa-376a65c89810/files/reef-2050-long-term-sustainability-plan-action-tracker-2018.pdf

The Reef 2050 Plan includes new actions for immediate attention. For example, the revised Reef 2050 Plan includes an action to "undertake further research to gain a deeper understanding of climate change trajectories for the Reef and communities that depend on it". The outcomes from this work are currently being used to help to identify the effect that regional and local management efforts have under different climate scenarios, which will help inform Reef management planning.

Full review of the Reef 2050 Plan in 2020

The Reef 2050 Plan identifies that there will be a full review of the plan every five years to ensure it remains current, consistent with scientific advice, and relevant in addressing pressures on the Reef. The next comprehensive review is due for completion in 2020. It is being informed by the outcomes of the mid-term review and the 2019 Outlook Report, and is engaging the advisory committees established under the plan. It will take into account new information about the condition of the Reef, the results of implemented actions and the effectiveness of management interventions.

The outcome of the 2020 review will be a revised Reef 2050 Plan that reflects the current state and future management needs of the Reef. This best-practice adaptive management approach to planning will again be informed by the best available science and knowledge.

Case study: The Reef Trust Partnership

During the International Year of the Reef in 2018, following back-to-back coral bleaching events in 2016 and 2017, the Australian Government announced investment of $443 million in a Reef Trust Partnership with the Great Barrier Reef Foundation.

It is the Government's largest ever single investment in reef protection, aiming to spark new and innovative responses from private investors and philanthropists.

The Great Barrier Reef Foundation is the leading charity for the Reef. The Partnership is boosting the engagement of Australian and international businesses, science, communities, individuals and Traditional Owners in a united effort to keep the Reef healthy.

The Partnership's comprehensive and innovative approach will be complemented by an investment portfolio substantial enough to effect real change. It aims to:

- improve water quality by further improving farming practices, including more efficient fertiliser use, and increasing the uptake of new technology and land management practices ($201 million)
- enable reef restoration and adaptation, by harnessing the best available science and knowledge to fund innovative projects that support Reef resilience ($100 million)
- expand efforts in the fight against the coral-eating crown-of-thorns starfish, including investigating new ways to detect and tackle primary outbreaks ($57.8 million)
- create opportunities for greater engagement of Traditional Owners in the Great Barrier Reef World Heritage Area (up to $42 million, which equates to 10 per cent of the value of the grant agreement. This includes $12 million under the original grant, plus earmarked funds from across all other components)
- improve engagement by local communities in the protection of the Reef ($10 million)
- improve Reef health monitoring and reporting that tracks progress and informs better management ($40 million).

The Foundation has set a target of leveraging a further $300 million to $400 million in investment over five years from domestic and international partner organisations and philanthropic donors to complement the Australian Government's investment. To date, more than $21 million has been indicated as in-kind contribution for the Foundation's 2018-19 committed on-ground projects.

With strong governance arrangements in place, funding is rolling out with an annual work plan for 2019-20 that commits $58 million to projects ranging from large-scale water quality projects across priority Reef catchments to targeted regional community activities.

Early investment projects worth $25 million include more than 50 on-ground projects - 11 water quality projects with farmers to remediate gully erosion and reduce run-off of sediments, nutrients and pesticides; 18 projects with Traditional Owner groups to support land and sea country action planning and junior ranger programs; and 25 projects for community groups to take action through citizen science and projects coordinated through Local Marine Advisory Committees.

Case study: Queensland fisheries reforms

The Queensland Sustainable Fisheries Strategy was released in June 2017 and sets out the Queensland Government's reform agenda for the next 10 years. It is the biggest fisheries reform in Queensland's history and will help ensure healthy fish stocks that will support thousands of Queensland jobs. This strategy delivers the fisheries-related commitments under the Reef 2050 Plan.

The strategy is the outcome of a significant consultation exercise in 2016. A total of 11,800 submissions were received and the overwhelming message was that all stakeholders wanted reform in the way fisheries are managed.

The strategy outlines 33 actions to be delivered across 10 reform areas with specific targets to achieve by 2020 and 2027. Actions include harvest strategies for each fishery, satellite tracking on all commercial fishing boats, regionally specific fishing rules and using new technologies more effectively.

An additional $30 million over four years is being invested by the Queensland Government to support the reforms. Key investments in the Reef region include 14 new Queensland Boating and Fisheries Patrol officers (one each in Cairns, Mackay and Yeppoon; two each in Port Douglas and Airlie Beach; three in Townsville and four in Gladstone). The Gladstone Queensland Boating and Fisheries Patrol office reopened in October 2017. The new funding also provides for additional biological monitoring in the Great Barrier Reef on species like coral reef fish species, shark and scallops, as well as a new economic and social monitoring program for fisheries, which will contribute to the Reef 2050 Integrated Monitoring and Reporting Program.

Vessel tracking has been rolled out to all net, crab and line boats, with more than 1100 boats brought online in 2019, with the remaining commercial fisheries to commence 1 January 2020. The Marine Park Authority and the Queensland Government have pooled funding, with around $3 million available to subsidise the costs for industry.

Major reforms to fisheries laws were completed in 2019, including stronger compliance powers, heavier penalties, a more responsive decision making framework and rules to recover depleted stocks and address bycatch and protected species interaction issues.

A year two progress report on implementation of the Strategy is available online at: https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/sustainable-fisheries-strategy/sustainable-fisheries-strategy-overview

4.2.4 Joint Field Management Program

The Marine Park Authority and the Queensland Department of Environment and Science deliver the Joint Field Management Program. The Program delivers practical on-ground actions to protect, maintain and restore the marine and island ecosystems of the Reef. Ensuring compliance with Marine Protected Area zones, particularly the no-take zones, has been shown to include a range of benefits including faster recovery of coral and fish communities following cyclones, coral bleaching, and crown of thorns starfish and coral disease outbreaks.

Following the coral bleaching events of 2016 and 2017 and severe Tropical Cyclone Debbie, which impacted the health and resilience of the Reef, the Australian and Queensland governments recognised the need for further action. A range of additional funding commitments, outlined in the revised Reef 2050 Plan, included increased funding for the Joint Field Management Program. This was one of the initiatives identified in the Reef Blueprint.

In 2017-18 the Australian and Queensland governments provided an additional $73.7 million over six years, with a commitment of a further $20.6 million per year ongoing for the Joint Field Management Program. This is the largest expansion of the program since its inception in 1979. It is enabling an increased focus on compliance, island and Reef restoration activities, incident response, collaboration with Aboriginal and Torres Strait Islander people to deliver field activities, and engagement with Reef and island users.

Joint Field Management Program - Prime Minister's Gold Award

On 13 November 2019, the Marine Park Authority and the Queensland Department of Environment and Science collectively won the Prime Minister's Gold Award for Excellence in Public Sector Management. The award recognised 'A Transformed Great Barrier Reef Joint Field Management Program – Meeting 21st Century Challenges'. The accolade comes following a transformative period in Reef and island management, where the focus has been on striving for excellence and modernising the approach to tackling unprecedented threats to the Great Barrier Reef World Heritage Area. The award recognised the program's cross-jurisdictional collaboration, integrated stakeholder engagement and planning in a complex and sensitive multi-stakeholder context.

Gold Award Winners: Damian Head, Jackie Chappell and Simon Banks from the QLD Department of Environment and Science and the Great Barrier Reef Marine Park Authority © 2019 Institute of Public Administration Australia (ACT) Limited.

4.2.5 Water quality

The Reef's biodiversity, its networks of habitats and range of species are an important part of its OUV and are dependent on the quality of the water within and around them. Poor water quality, influenced by land-based run-off, is recognised as one of the most significant threats to the long-term health and resilience of the Reef,

which is why the majority of Australian and Queensland government investment in Reef 2050 Plan actions is focused on water quality.

This investment is guided by the *Reef 2050 Water Quality Improvement Plan 2017-2022* (see below). The Australian and Queensland governments have committed more than $600 million to projects to reduce pollutants and sediment flowing into the Reef, remediate eroded gullies and streambanks, and work with landowners to improve their land management practices.

Queensland has committed $261 million to the 2017 Queensland Reef Water Quality Program. Over the five years of the program, Queensland is investing in on-ground water quality improvement projects with a strong focus on innovation and working with landholders to reduce the run-off of nutrients, sediment and pesticides into local waterways. Investments are also underway in land restoration, science and research projects and setting industry minimum standards through regulation to limit the risk of polluted run-off.

Including $201 million for delivery through the Reef Trust – Great Barrier Reef Foundation Partnership, the Australian Government has committed more than $362 million over this five year period to improving the quality of water entering the Great Barrier Reef World Heritage Area. This investment is helping support land managers change practices to reduce pollutant loads, address sediment loss from legacy issues of land development and past practices and increase the uptake of new technology. It helps governments to monitor and report on progress towards the 2025 water quality targets.

Reef 2050 Water Quality Improvement Plan 2017-2022

Better management of water quality flowing to the Reef commenced with the release of the *Reef Water Quality Protection Plan in 2003*, with subsequent iterations in 2009 and 2013. When the Reef 2050 Plan was released in 2015, water quality was one of seven themes for managing the Reef. The *Reef 2050 Water Quality Improvement Plan 2017-2022* (Reef 2050 WQIP) is nested under the water quality theme of the Reef 2050 Plan. The desired outcome of the Reef 2050 WQIP is to ensure that 'good water quality sustains the OUV of the Reef, builds resilience, improves ecosystem health and benefits communities'.

This revised Reef 2050 WQIP builds on water quality achievements to date, while recognising the need to accelerate adoption of improved land and catchment management. It takes an adaptive management approach, informed by best available science, with regular monitoring of actions to ensure continuous improvement. The revised plan builds on the work many landholders are doing already to reduce pollution run-off into local waterways, making a clear, long-term and tangible difference to Reef water quality and the World Heritage Area's overall health. The Reef 2050 WQIP:

- includes all sources of land-based water pollution (agriculture, industry, urban and public lands) while recognising that most water pollution still arises from agriculture
- incorporates human dimensions of change: our social, cultural and economic values and why we take action to improve water quality, and
- sets individual catchment targets for reducing water pollution, enabling action to be targeted to where it is most needed in all 35 catchments flowing to the Reef.

Measures to address declining water quality are underpinned by an extensive body of science brought together in the *2017 Scientific Consensus Statement: Land use impacts on Great Barrier Reef water quality and ecosystem condition*. The 2017 Scientific Consensus Statement is an authoritative synthesis of Reef water quality science and draws on independent, peer reviewed research from more than 1600 reports. It was prepared by a panel of 48 scientists and government officials from a range of disciplines with expertise in Reef water quality science and management.

The most recent progress towards the Reef 2050 WQIP targets is detailed in the Reef Water Quality Report Card 2017 and 2018, which assessed the results of the Reef 2050 WQIP actions reported up to June 2018. Progress against targets is outlined in section 4.3 below.

The report card outlines results captured through the Paddock to Reef Integrated Monitoring, Modelling and Reporting Program, and details a range of results including levels of sediment reduction and improvements in best practice nutrient management. It shows the progress being made in improving water quality across regions and river catchments, sets out progress towards achieving the finer-scale water quality targets for the 35 major river basins that flow into the Reef and provides a clearer view of where actions have been successful.

Further information on the outcomes of the Reef 2050 WQIP and the Reef Water Quality Report Cards is available at: https://www.reefplan.qld.gov.au/tracking-progress/outcomes.

Work is also underway on an independent review of Regional Water Quality Improvement Plans to ensure that they reflect the latest available information including alignment with the Reef 2050 WQIP. This review will identify any major gaps and areas for improvement, along with opportunities to strengthen and simplify the plans so that they are a useful resource for multiple stakeholders. This work will be complete in early 2020.

Case study: Regulation to improve water quality from land-based run-off

Water quality management for the Reef is expected to improve following the approval of new legislation by the Queensland Parliament on 19 September 2019. The legislation strengthens Queensland's regulatory framework for reducing nutrient and sediment releases from existing and new agricultural activities and new industrial development.

These Reef Protection laws regulate agricultural activities to cut excessive fertiliser use and to actively manage erosion risks in all Reef catchments. Sugar cane, grazing, banana, grains and horticulture operations will be required to meet minimum practice standards that are designed to minimise pollution run off while maintaining profitable and productive farms. Additionally, new cropping activities will need to meet farm design standards under a permit to allow for ecologically sustainable development. The Regulations complement the investments of the Australian and Queensland governments and the voluntary action being taken by many farmers, ensuring that the uptake of good practice is widespread, driving more rapid improvements in water quality.

The Regulations also require new industrial development, such as sewage treatment plants, mining and aquaculture to avoid, mitigate or offset any sediment and nutrient emissions to Reef waters.

Implementation of the new regulations is being supported through a $10.1 million support package for farmers and a $3.7 million expanded compliance program.

Compliance data from Queensland's work with the existing Reef protection regulations shows that regulation is effective in encouraging growers to improve their practices. While more than half of farmers visited for the first time are found to be non-compliant with at least one requirement, compliance improves with repeat visits. The statistics are available at: https://www.qld.gov.au/environment/agriculture/sustainable-farming/reef/reef-regulations/reef-initiatives/cane-farmers.

Vegetation management legislation to improve water quality

One of the Queensland Government's commitments in the Reef 2050 Plan was to strengthen vegetation management legislation to protect remnant and high value regrowth native vegetation, including in riparian

zones. Changes to Queensland's vegetation management laws were passed in 2018, delivering on this commitment, with the laws boosting protection for important habitats, including waterways leading to the Great Barrier Reef World Heritage Area.

The changes protect high-value regrowth vegetation in Reef catchments and prevent broadscale clearing of remnant vegetation for new agricultural development. Vegetation clearing within 50 metres of a watercourse is also regulated to provide consistent protection of riparian vegetation in all Reef catchments. Queensland has also improved monitoring and other measures to ensure compliance with the law, and reporting based on latest science.

The changes are expected to deliver reduced carbon emissions and sediment run-off, as well as provide increased protection for endangered, vulnerable and near-threatened species. This is helping to protect the habitats for conservation of biodiversity of the Reef, one of the world heritage criteria for which the Reef was inscribed on the World Heritage List.

Other Reef regulations and water quality improvement policies

In June 2015 the Australian Government established a new regulation under the *Great Barrier Reef Marine Park Regulations 1983* that restricted the disposal of dredge material in the Great Barrier Reef Marine Park from capital dredging projects such as port developments. Under the regulation the Marine Park Authority must not grant a permission for conduct that includes dumping of capital dredge material (greater than 15,000 cubic metres) in the Marine Park. The ban applies to existing permits for conduct that includes uncontained disposal of capital dredge material in the Marine Park where the permits have yet to expire.

The Queensland Government is also implementing key port-related actions of the Reef 2050 Plan, including through the *Sustainable Ports Development Act 2015* (Ports Act), which came into effect in November 2015. The Ports Act established a legislative framework to balance the protection of the Reef with the development of major bulk commodity ports in that region, responding to World Heritage Committee decisions by ensuring the OUV of the Reef is an intrinsic consideration in future port development, as well as prohibiting the disposal of capital dredge spoil in areas of the World Heritage Area that are not part of the Marine Park.

The Queensland Government has made a range of other improvements to regulations and policies which are providing tangible benefits to the Reef.

- Three net-free fishing zones were introduced in November 2015, providing a 1400 square kilometre boost in protection for snub fin dolphins, dugong and turtles which are all listed as either vulnerable or endangered.
- The Queensland Government's revised Planning Act 2016 and associated legislation, which came into effect in July 2017, established ecological sustainability as a core principle. The legislative changes included reinstatement of coastal land surrender provisions under the *Coastal Protection and Management Act 1995* to ensure areas at high risk of coastal erosion are maintained development free.
- The Queensland Government developed the *Wetlands in the Great Barrier Reef Catchments Management Strategy 2016–2021* to outline an integrated approach to catchment and coastal environment management that considers the multiple values of wetlands and the role they play in ecosystem health of the World Heritage Area. The strategy provides a whole-of-system framework for catchment management and the protection, maintenance and restoration of wetland systems.

4.2.6 Crown-of-thorns starfish control program

Outbreaks of crown-of-thorns starfish are one of the major sources of coral mortality across the Reef, driving coral decline on a scale comparable to cyclones and severe bleaching events. However, unlike cyclones and bleaching events, crown-of-thorns starfish outbreaks can be controlled at manageable spatial scales. More than $100 million has been allocated to this essential work.

Efforts to reduce the impact of crown-of-thorns predation on coral have become increasingly critical given the cumulative impacts to coral cover from other threats, such as climate change, coral bleaching, tropical cyclones and poor water quality. The Reef Blueprint (see section 4.2.2) identified crown-of-thorns starfish control as one of the most feasible actions to reduce coral mortality and improve resilience on the Reef.

The largest broad-scale, government-funded crown-of-thorns starfish control program began in 2012. To date the control program has been successful in holding starfish densities below thresholds to allow for coral growth on 75 per cent of the 57 priority reefs between Port Douglas and Townsville.

Based on this success, in 2017 and 2018 the Marine Park Authority received additional funding to expand the crown-of-thorns starfish control program. Control of starfish is achieved by a team of divers manually injecting starfish with either vinegar or approved chemicals. Repeat visits to high value reefs by control teams has been key to knocking down starfish numbers and protecting live corals. Total funding directed towards crown-of-thorns starfish control from 2012-13 until 2019-20 is $46.9 million. As part of the Australian Government's Reef Trust Partnership, a further $57.8 million has been committed towards crown-of-thorns starfish control work and research from 2019-20 until 2023-24 under the Reef Trust Partnership.

The goals of the expanded program are to:

- protect coral cover at reefs that are critical sources of coral larvae to facilitate Reef recovery and resilience
- protect coral cover at reefs of high value for the tourism industry
- reduce the spread of the outbreak by culling at reefs that have greatest risk of spreading crown-of-thorns starfish larvae.

The Marine Park Authority works cooperatively with and relies on the National Environmental Science Program (NESP) Integrated Pest Management Program to provide research and advice to continually improve crown-of-thorns starfish control.

4.2.7 Collaboration and key partnerships

Working with a wide range of partners on Reef management, protection and restoration has enabled the Australian and Queensland governments to accelerate activities and achieve far more than would otherwise have been possible. Formal and informal partnerships, whether they be international or local, non-government, industry, community or cultural organisations, provide crucial resources, financial co-contributions, volunteer hours and valuable on-the-ground support and knowledge. Partnerships with Traditional Owners, essential to the stewardship of the Reef, are discussed in sections 3.2.2 and 4.3.2c.

Internationally, Australia is a founding member of the International Coral Reef Initiative (ICRI- established in 1994), an informal partnership between nations and organisations that strive to preserve coral reefs and related ecosystems. From mid–2018 to mid–2020 the Marine Park Authority on behalf of Australia, partnering with Monaco and Indonesia, is the Secretariat for ICRI. Australia has made many contributions to international marine science, including a leading role coordinating ICRI's Global Coral Reef Monitoring Network. Australia's

emphasis is on sharing and collaborating with international partners to build scientific capacity and innovation in reef management in the face of increasing impacts of climate change.

Domestically, the Australian and Queensland governments work in partnership with experts, industry, community and the non-government sectors. The Reef 2050 Independent Expert Panel (IEP) and the Reef 2050 Advisory Committee (RAC) – the advisory bodies under the Reef 2050 Plan are important forums for collaboration on strategies and actions for Reef conservation, under the Reef 2050 Plan.

Partnerships provide additional resources and expertise. The 2018 Reef Trust Partnership with the Great Barrier Reef Foundation, outlined earlier, is an example of a successful partnership between government, private investors and philanthropists that is already delivering and building on the Reef 2050 Plan. Further information is available at https://www.barrierreef.org/science-with-impact/reef-partnership.

Case Study: Reef Alliance – Sugarcane farmers tackling inorganic nitrogen and pesticides

The sugar industry is rising to the challenge of changing land management practices to help improve the quality of water flowing into the Reef.

As of June 2019, 580 sugarcane farmers across more than 76,000 hectares in Reef catchments had taken action under the $45.6 million Reef Alliance Project: Growing a Great Barrier Reef. The Reef Alliance is a partnership 14 organisations – industry, regional natural resource management bodies and the conservation sector – all working since March 2016 towards the common goal of a healthy Great Barrier Reef.

The project aims to help farmers update and improve their practices beyond industry best management practice and fast track the implementation of innovative practices.

By its December 2019 end date it aims to support up to 1,196 farmers and graziers to improve their practices over more than 1.8 million hectares spanning 33 of 35 of the Great Barrier Reef catchments. The project aligns with Reef 2050 Plan and Reef 2050 targets using the Water Quality Risk Frameworks developed by the Paddock to Reef Program to prioritise activities.

The project addresses all priority water quality target pollutants by working with the main agriculture groups in the Reef catchments including sugarcane, grazing, grains, horticulture and dairy.

Sugarcane farmers in the Burnett Mary, Burdekin and Wet Tropics regions are making strides in tackling such pollutants as dissolved inorganic nitrogen and pesticides. For more about the work under way, see: https://wtsip.org.au/uncategorized/nutrient-management-plans-over-300-sugarcane-growers-benefit-from-reef-program/.

A range of other partnerships established with local governments and communities are contributing to positive outcomes for the Reef.

- The 2018 Marine Park Authority Reef Guardians stewardship grants program provided funding to communities to undertake locally relevant Reef protection projects. This includes the Reef Guardian School Program's annual Future Leaders Eco Challenge. Operating in partnership with local communities, the challenge includes more than 270 schools, 120,000 students and 7,400 teachers and is designed to give students new skills and knowledge to help protect the Reef.

- Originally established in 1999, the new term of the Marine Park Authority's Local Marine Advisory Committees started in July 2018 with about 180 community members volunteering their advice and input on the management of the Marine Park, as well as encouraging and participating in actions to protect the Reef.
- The Queensland Local Government Coastal Hazard Adaptation Program was launched in June 2016. This partnership, delivered by the Local Government Association of Queensland, provides funding, tools and technical support to enable coastal local governments, including Reef councils, to develop adaptation strategies to address climate change related coastal hazard risks over the long-term.

Further information on the range of partnerships that have been established to provide positive and enduring outcomes for the Reef is available at: http://www.environment.gov.au/marine/gbr/our-partners.

4.3 Effective performance in meeting the targets established under the Reef 2050 Plan

41 COM 7B.24 Paragraph 6: Reiterates its request to the State Party to submit to the World Heritage Centre, by 1 December 2019, an overall report on the state of conservation of the property demonstrating the effective and sustained protection of the property's Outstanding Universal Value and **effective performance in meeting the targets established under the 2050 LTSP,** linked to the findings of the 2014 and 2019 Great Barrier Reef outlook reports, for examination by the World Heritage Committee at its 44th session in 2020.

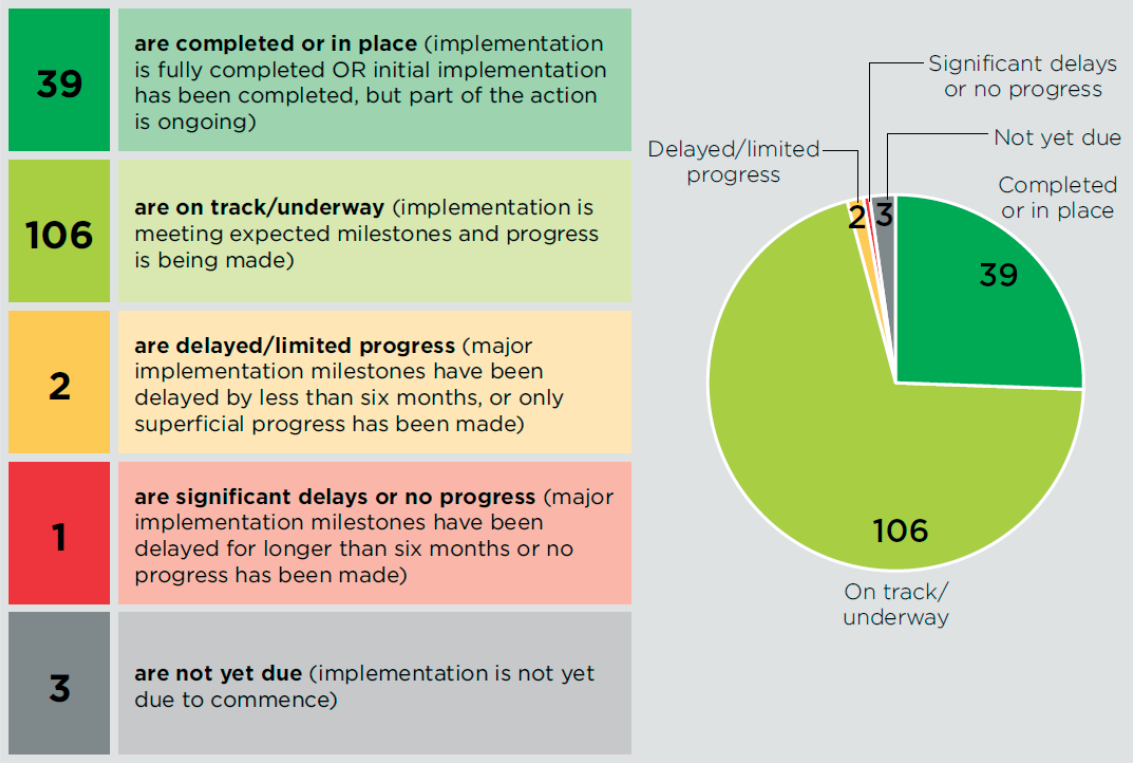
State Party's Response

4.3.1 Progress implementing the Reef 2050 Plan

The Reef was seriously affected by extreme weather events after the development of the Reef 2050 Plan in 2015 and this has impacted the ability to meet targets despite the actions of the Australian and Queensland governments, their partners and stakeholders. The mass coral bleaching events of 2016 and 2017, together with the impacts of six tropical cyclones since 2014, significantly impacted ecosystem health and biodiversity and this is reflected in the performance measures set out below.

Similarly, poor water quality is a big, system-wide challenge. The changes in land management needed to improve water quality require substantial investment and take time to implement – this means it can be years before we see the results on the ground, and this reality is reflected in the performance reported below.

Progress on the implementation of the Reef 2050 Plan is reported annually. Annual reports, provided to the Great Barrier Reef Ministerial Forum, highlight key achievements during the year and include case studies demonstrating the range of work undertaken by Reef 2050 delivery partners. Substantial progress has been made in implementing the 151 actions under the original Reef 2050 Plan. The Reef 2050 Plan 2017 Annual Report showed that more than 25 per cent of the actions were completed or in place and over 70 per cent were on track or underway, as shown in the figure below.



The revised Reef 2050 Plan, released in July 2018, included a set of actions comprised of updated targets from the original Reef 2050 Plan, along with new actions developed to reflect the current state of the Reef. In total, there are 70 actions in the current Reef 2050 Plan. A summary of progress against them is provided in the figure below:

Comprehensive progress updates for all Reef 2050 Plan actions are published on the Atlas of Living Australia every six months. All Reef 2050 Action Reports are available at: https://fieldcapture.ala.org.au/home/projectExplorer#reportView-heading.

4.3.2 Assessment of progress against current targets

To demonstrate the extent of progress against the Reef 2050 Plan, at least one target from each of the Reef 2050 Plan themes was selected for in-depth assessment. The targets were selected after consideration of whether the intent of the target was clear, what spatial and temporal scales applied to the target, and whether accurate information was available to support the assessment. These targets cover ecosystem health; biodiversity; cultural heritage; water quality; social, community and economic benefits; and governance. The primary source of information that informed this assessment is the 2019 Outlook Report.

4.3.2a Ecosystem health

Ecosystem health encompasses habitats and processes that operate to keep an ecosystem functioning and resilient. Resilience cannot be measured directly – assessing the resilience of a system depends on how well it responds to and recovers from disturbance, and is a function of its health. Changes in habitats and species listed below can only be used as an approximate indicator of ecosystem status – the 2019 Outlook Report also includes an assessment of key ecosystem processes (refer Chapter 3 of the Outlook Report).

The ecosystem health targets within the Reef 2050 Plan focus on key ecological and biological processes important to Reef function. Two selected targets against which progress has been measured are detailed below, and relate to key habitats and coastal ecosystems.

Target: Condition and resilience indicators for coral reefs, seagrass meadows, islands, estuaries, shoals and inter-reefal shelf habitats are on a trajectory towards at least good condition at local, regional and Reef-wide scales (EHT5).

In this target 'condition and resilience indicators' included consideration of the abundance, diversity, and recruitment success or reproductive potential of the listed habitats (where data was available).

Key lines of evidence used to measure progress:

- Current condition and trend for listed habitats in 2019 Great Barrier Reef Outlook Report (Region-wide scale)
- Marine Monitoring Program (for inshore coral reefs and seagrass) (local and regional scale)
- Long-term coral monitoring program (local and regional scale)

Progress Summary

The assessment has shown a stable to deteriorating trend in the listed habitats and species for this indicator; particularly for coral reefs and corals. This is only a subset of habitats, species and ecosystem health processes assessed in the 2019 Outlook Report, which shows some habitats in good to very good condition. Events such as floods and cyclones, along with changes in physical processes such as increasing sea temperature caused by global warming, have resulted in limited progress against some ecosystem health targets under the Reef 2050 Plan.

Habitat	Condition and trend[5]		Progress	Reason for current state	Key progress enablers
	2014	2019			
Halimeda banks	Stable	No consistent trend	Target met	Improved spatial analysis has increased understanding of the spatial coverage of Halimeda banks. Exposure to potentially damaging cyclonic waves and thermal stress in some areas has occurred since 2014, but impacts are inferred to be limited given their isolation and depth	Isolation from populated areas Great Barrier Reef Marine Park Zoning Plan 2003 (and complementarry State zoning) protection and enforcement Depth and proximity to high water movement

5 2019 Outlook grading key:

Very Good	Good	Poor	VeryPoor

Further detail is available in the 2019 Outlook Report available at: www.gbrmpa.gov.au

Habitat	Condition and trend[6]		Progress	Reason for current state	Key progress enablers
	2014	2019			
Islands	Deteriorated	Stable	Target met – trend improved	Localised damage to some islands has occurred from severe weather, temperature extremes and pests. Recovery from past impacts is occurring due to management intervention in the form of pest management and restoration and monitoring of island condition is increasing	Comprehensive pest management program Great Barrier Reef Marine Park Zoning Plan 2003 (and complementarry State zoning) protection and enforcement Australian and Qld government funding – post cyclone clean up and repair
Lagoon floor	Stable	Deteriorated	Improvement required	Some areas of the lagoon floor have been exposed to prolonged thermal stress, impacts associated with dredging and disposal, bottom trawling, vessel anchorage, shipping and potentially damaging cyclonic waves.	Some isolation from populated areas Great Barrier Reef Marine Park Zoning Plan 2003 (and complementarry State zoning) protection and enforcement Expansion of Reef protection markers and moorings to prevent anchor damage

6 2019 Outlook grading key:

Very Good	Good	Poor	VeryPoor

Further detail is available in the 2019 Outlook Report available at: www.gbrmpa.gov.au

Habitat	Condition and trend[7]		Progress	Reason for current state	Key progress enablers
	2014	2019			
Shoals	Stable	Deteriorated	Improvement required		Some isolation from populated areas Great Barrier Reef Marine Park Zoning Plan 2003 (and complementarry State zoning) protection and enforcement Expansion of Reef protection markers and moorings to prevent anchor damage
Seagrass meadows	Stable	Deteriorated	Significant improvement required to meet target	Degradation of inshore seagrass meadows has occurred in a number of areas and recovery has been slowed by a number of disturbances (Cyclone Debbie near the Whitsundays, poor water quality and marine heatwaves). The absence of seed banks and low reproductive effort have resulted in many seagrass meadows being vulnerable A more regional analysis of inshore seagrass meadows shows inshore seagrass remained in poor condition in all regions except the Burdekin, where it remained	Australian Government climate commitments (see section 4.2.4) Great Barrier Reef Marine Park Zoning Plan 2003 (and complementarry State zoning) protection and enforcement Reef 2050 Water Quality Improvement Plan – although it takes significant period of time for improved land practices to influence the condtion of inshore

7 2019 Outlook grading key:

Very Good	Good	Poor	VeryPoor

Further detail is available in the 2019 Outlook Report available at: www.gbrmpa.gov.au

Habitat	Condition and trend[8]		Progress	Reason for current state	Key progress enablers
	2014	2019			
Coral reefs	Deteriorated	Deteriorated	Significant improvement required to meet target Australian Institute of Marine Science – regional surveys disturbances have caused widespread damage and loss of coral reef habitat in a number of areas. Coral	Multiple severe disturbances have caused widespread damage and loss of coral reef habitat in a number of areas. Coral recruitment has declined significantly. More regionally, across the three sectors surveyed that make up the Reef, coral cover in the northern Reef (north of Cooktown) has stabilised, but remains close to the lowest levels recorded since 1985. Coral cover in the central and southern survey locations (the remaining two thirds of the Reef) followed a declining trend.	Australian Government climate commitments (see section 4.2.4) Great Barrier Reef Marine Park Zoning Plan 2003 (and complementarry State zoning) protection and enforcement Expansion of Reef protection markers and moorings to prevent anchor damage Reef 2050 Water Quality Improvement Plan – although it takes significant period of time for improved land practices to influence the condtion of inshore ecosystems

Target: There is no net loss of the extent, and a net improvement in the condition, of natural wetlands and riparian vegetation that contribute to Reef resilience and ecosystem health (EHT 3).

Progress Summary

The current condition and trend in the 2019 Outlook Report (Region-wide scale) shows that coastal ecosystems that support the Reef remain in poor condition overall, mainly due to historical modification of coastal ecosystems for different land uses. However, the trends of most components have stabilised.

Currently the remaining extent of each coastal ecosystem is the primary indicator of condition within the 2019 Outlook Report until such time as more broadscale condition and function data are available. The Statewide

8 2019 Outlook grading key:

Very Good	Good	Poor	VeryPoor

Further detail is available in the 2019 Outlook Report available at: www.gbrmpa.gov.au

Landcover and Tree Study is a Queensland Government vegetation monitoring program that reports annually on the woody vegetation loss in Queensland. Since the 2014 Outlook Report, the clearing rate of regrowth woody vegetation (mainly for agriculture land use) in the Reef catchment has increased. Vegetation management laws were reinstated in mid-2018 to provide consistent protection to regrowth vegetation in all Reef catchments.

There has been limited clearing of freshwater wetlands, with about 81 per cent of the habitat remaining in the Catchment. Freshwater wetlands help the Reef by absorbing and transforming pollutants, regulating sediment, slowing freshwater flows and providing nurseries for freshwater and marine species, including barramundi and other finfish (2019 Outlook Report). Heath and shrublands remain in very good condition and two coastal ecosystems (saltmarshes and rainforests) remain in good condition.

Changes in the extent of coastal ecosystems in the Catchment before European settlement, 2009 and 2015

The 2014 Outlook Report outlined the remaining extent of terrestrial habitats (renamed to coastal ecosystems) since European settlement. The current extent and trend since 2009 of coastal ecosystems is presented (being remnant vegetation only; or more broadly, vegetation that has not previously been cleared). Source: Adapted from Neldner et al. 2017 and Kelley and Ryan 2018.that has not previously been cleared). Source: Adapted from Neldner et al. 2017 and Kelley and Ryan 2018.

Coastal ecosystem (remnant)	Total area before European settlement (km^2)	Total area remaining (km^2)		Proportion remaining in Catchment (per cent)
		2009	2015	2015
Saltmarshes	2187	1870	1867	85
Freshwater wetlands	1668	1357	1357	81
Forested floodplains	50,060	29,116	29,037	58
Heath and shrublands	3178	2972	2970	93
Grass and sedgelands	11,897	5730	5721	48
Woodlands and forests	323,809	196,532	195,938	60
Woodlands	228,642	157,088	156,609	68
Forests	95,167	39,444	39,329	41
Rainforests	27,413	17,878	17,869	65

4.3.2b Biodiversity

Target: Populations of Australian humpback and snubfin dolphins, dugong, and loggerhead, green, hawksbill and flatback turtles are stable or increasing at Reef-wide and regionally relevant scales (target BT4)

Dolphins, dugongs and marine turtles are protected under national and state legislation. The Marine Park Authority and the Queensland Department of Environment and Science work with Traditional Owners, stakeholders and other Australian and Queensland government agencies to ensure Marine Park populations are able to recover from disturbances, and that their habitat is improved.

In 2017, the Australian Government released a 10-year recovery plan for marine turtles in Australia (available at http://www.environment.gov.au/system/files/resources/46eedcfc-204b-43de-99c5-4d6f6e72704f/files/recovery-plan-marine-turtles-2017.pdf). The recovery plan summarises actions to be implemented and responsible agencies.

While data is limited for some species, such as dolphins, more comprehensive data for other species indicate signs of population recovery. For example, the dugong breeding rate has increased along the urban coast after a decline following effects of a severe cyclone and flooding in 2011, and the southern green turtle population continues to recover. Green turtle strandings within the Region have also declined markedly since 2011 (following impacts on seagrasses from cyclone Yasi). While whale populations are not specifically included in this target, populations of whale species within the region are stable, while humpback whale populations have recovered strongly.

Progress Summary

Species	Condition and trend[9]		Progress	Reason for current state	Key progress enablers
	2014	2019			
Dolphin	Deteriorated	Deteriorated	Improvement required	Data on the Region's dolphins are very limited. Offshore dolphin species are considered more stable as they are less likely to be exposed to human-related threats than inshore dolphin species. Concerns continue for the condition of Australian humpback and snubfin dolphins (both inshore species), which may be in decline due to human-related mortality.	Inshore – 3 net free areas established in 2015 – reduce interactions with species of conservation concern. Protection of coastal habitats. 'Go slow' areas in the marine park to reduce boat strike. Inshore – Port Master Planning, Sustainable Ports Act, and permit assessments to reduce impacts on these populations where they exist.

9 2019 Outlook grading key:

Very Good	Good	Poor	VeryPoor

Further detail is available in the 2019 Outlook Report available at: www.gbrmpa.gov.au

Species	Condition and trend[10]		Progress	Reason for current state	Key progress enablers
	2014	2019			
Dugong	Deteriorated	Improved	While grade is poor, progress improved and is tracking to meet target – but this will take time.	The Region is home to globally significant populations of dugongs. Over the entire Region there is a high probability that the dugong population declined between 2005 and 2016 – due to multiple impacts, particularly loss of seagrass following extreme weather. However, along the urban coast, from Hinchinbrook south (approximately half of the property area), the breeding rate has improved since the impacts of cyclone Yasi and widespread flooding in 2011. The poor condition reflects both ongoing effects of past significant population declines (for example commerical harvest at least 60 years ago) and current impacts.	Inshore – 3 net free areas established in 2015 – interactions with species of conservation concern. Reef 2050 Water Quality Improvement Plan (regarding link to improving water quality which is important to dugong foodsource – seagrass). 'Go slow' areas in the marine park to reduce boat strike. Sustainable traditional use through accredited Traditional Use of Marine Resources Agreements.

10 2019 Outlook grading key:

Very Good	Good	Poor	VeryPoor

Further detail is available in the 2019 Outlook Report available at: www.gbrmpa.gov.au

Species	Condition and trend[11]		Progress	Reason for current state	Key progress enablers
	2014	2019			
Marine Turtles	No consistent trend	No consistent trend	Significant improvement required	Heightened concerns exist for the future of loggerhead, hawksbill and northern green turtle populations. The southern green turtle population continues to recover. The trend for flatback turtles is not clear. Increasing sea and air temperatures are a very high risk for marine turtles – warmer temperatures lead to more female and fewer male turtle hatchlings.	As above for dugongs. Australian Government climate commitments (see section 4.2.4) Reduced mortality of large female green turtle breeders under the Raine Island Recovery Project.

4.3.2c Cultural heritage

Target: Partnerships between Traditional Owners and all stakeholders are increased to ensure key Reef heritage values are identified, documented and monitored (target HT3).

The 2019 Outlook Report indicated that for Aboriginal and Torres Strait Islander people many cultural practices remain strong and the resilience of this value is increasing in some areas (Chapters 4 and 8). Partnerships are being maintained and new partnerships formed to protect multiple Indigenous values within the property.

Some heritage components have been documented on and around islands, but there is limited monitoring of their condition by Reef managers who do not always have a sufficient understanding of the condition of Indigenous structures, technology, tools and archaeology. While some structures and sites are located within the Region,

11 2019 Outlook grading key:

Very Good	Good	Poor	VeryPoor

Further detail is available in the 2019 Outlook Report available at: www.gbrmpa.gov.au

many are located on the adjacent coast and islands and are important to the Region's heritage. Some heritage components have been documented (for example, on the Keppel Island group, Lizard Island and the Whitsunday islands). Strengthening 'ask first' principles and protocols for consultation with Indigenous people will improve progress against this target.

Traditional Owners also validated indicators for the Reef 2050 Integrated Monitoring and Reporting Program (RIMReP) targets and objectives under the Strong Peoples – Strong Country framework.

Progress Summary

As discussed in section 3.2.2, the Department of the Environment and Energy in 2017 commissioned a consortium of Indigenous and research organisations to engage with Reef Traditional Owners to better understand and reflect their aspirations for the Reef. The Consortium prepared a report, titled *Traditional Owners of the Great Barrier Reef: The next Generation of Reef 2050 Plan Actions*, which provides advice from Reef Traditional Owners about their aspirations for involvement in the management, governance and protection of the Reef. The report is an important contribution to the comprehensive review of the Reef 2050 Plan in 2020.

In 2019 the Marine Park Authority released its Aboriginal and Torres Strait Islander Heritage Strategy for the Marine Park, which contains aspirations and actions for sea country management. The strategy addresses many actions under the Reef 2050 Plan and commits to increasing co-management of the Reef. The strategy will lead to better understanding, protection and promotion of Indigenous heritage values of the Reef. Indigenous community engagement is fostered through membership on the Marine Park Authority board and the Indigenous Reef Advisory Committee, science and management workshops for Traditional Owners, compliance training, monitoring and traditional ecological knowledge projects.

Through the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation, the Foundation has committed to making the largest single investment in Traditional Owner Reef protection, amounting to $42 million over six years, equalling 10 per cent of the total partnership funding. In April 2019 an investment of $1.8 million was announced for 18 Reef protection projects designed to empower Traditional Owners to expand their Reef protection activities in three priority areas: Indigenous junior ranger programs; country-based planning; and implementation of existing land and sea country plans.

The Australian Institute of Marine Science (AIMS) is implementing an Indigenous Partnership Plan to work with Reef's Traditional Owners in areas of mutual interest, to develop genuine research and monitoring partnerships, to combine excellent science with Indigenous knowledge, insights, capability and capacity, and to generate the best possible knowledge-base to inform land and sea management based practice.

Partnerships with Traditional Owners are delivering benefits for Aboriginal and Torres Strait Islander communities and the Reef. This includes the implementation of Traditional Use of Marine Resources Agreements which cover around 25 per cent of the property's coastline and support Traditional Owners involvement in Reef compliance management, research, education and youth-focussed activities.

Partnerships with Indigenous organisations are also delivering on-ground water quality outcomes for the Reef such as innovative denitrification bioreactor trials to remediate water quality and prevent nutrients from leaving the farm. In the Cape York region, the Yalanji Joint Venture is delivering on-ground gully remediation to reduce sediment loss, preserve cultural heritage significance and empower the local community while building local capacity to deliver major investments.

In 2017, the Queensland Government boosted funding for the Indigenous Land and Sea Ranger Program, bringing the number of funded rangers to over 100 across 23 regional and remote communities. The $12 million per annum program, administered by the Department of Environment and Science, assists Indigenous Land

and Sea Ranger groups to conserve Queensland's important ecosystems and Aboriginal and Torres Strait Islander cultural heritage in locations stretching from Cape York to the Bunya Mountains.

The Queensland Government has committed to systemic improvements in the relationship between Aboriginal and Torres Strait Islander peoples and the Queensland Government. The Queensland Government has specifically recognised the rights of Indigenous Queenslanders through the Human Rights Act 2019, including that Indigenous peoples have the right:

- not to be subjected to forced assimilation or destruction of their culture (article 8)
- to maintain and strengthen their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used lands, territories, waters and coastal seas (article 25)
- to conserve and protect the environment and the productive capacity of their lands, territories and waters (article 29)
- to maintain, control, protect and develop their cultural heritage, traditional knowledge and traditional cultural expressions (article 31).

In July 2019, the Queensland Government announced Tracks to Treaty – A Path to Treaty which will develop a process for state-wide agreement making. Such processes build on successful programs engaging the First Nations peoples of the Reef region, such as the Queensland Indigenous Land and Sea Ranger Program.

4.3.2d Water quality

At its 2017 meeting in Krakow, Poland, the World Heritage Committee welcomed the progress made since the inception of the Reef 2050 Plan in 2015, but noted progress towards the water quality targets was slow. Poor water quality is a large, system-wide challenge, with action needed to reduce nutrient, pesticide and sediment loads that are impacting the ecosystems of the Great Barrier Reef.

The changes in land management needed require substantial investment and take time to implement. Significant time is needed to engage individual land managers and support them in planning for and then making the changes that will improve the quality of water flowing into the Reef lagoon. This means it can be years before we see the results on the ground and for the Reef. For example, a key source of sediments is the extensive gullies in Reef catchments that have eroded over many years. Gully erosion remediation is a high cost and often technically complex undertaking. We are investing more resources and trialling new approaches to more effectively address the required landscape scale changes in the future.

The Reef Water Quality Report Card 2017 and 2018 assesses the results of *Reef 2050 Water Quality Improvement Plan 2017-2022* actions reported up to June 2018. The report card results reflect the large scale of change still required to meet water quality targets. The report card shows that we are seeing some encouraging progress towards improving the quality of the water flowing to the Great Barrier Reef. Many landholders have improved their land management practices.

With many water quality improvement projects in different stages of implementation, not all water quality improvement outcomes have been captured in the report card. Over coming years, we will see more results being reported from existing and additional programs, including through the regulatory measures, Reef Trust - Great Barrier Reef Foundation Partnership, and further investments under the Australian Government Reef Trust, Queensland Reef Water Quality Program and Queensland Natural Resource Management Investment Program. Future reporting will better reflect progress towards the Reef 2050 WQIP targets, as the benefits to Reef water quality from investments are realised.

The Queensland Government has introduced additional regulatory measures to improve the quality of water entering the Reef from the catchment (see section 4.2.5 for additional detail). This will build on the voluntary efforts of landholders to change their farming practices and reduce run-off, setting agricultural minimum practice standards across a number of industries in Reef catchments. This will help to further improve Reef water quality when the new laws come into effect on 1 December 2019.

Modelling suggests the Reef Regulations could deliver an estimated 80 per cent of the 2025 nutrient target in the Reef 2050 Water Quality Improvement Plan 2017-2022 and just over 16 per cent of the 2025 sediment target.

Target: By 2025 (compared to a 2013 baseline): MTR WQT1

1. 60 per cent reduction in anthropogenic end-of catchment dissolved inorganic nitrogen loads.
2. 25 per cent reduction in anthropogenic end-of catchment fine sediment loads
3. 20 per cent reduction in particulate nutrient loads
4. pesticide target—to protect at least 99% of aquatic species at the end-of-catchments.

These are the targets in the *Reef 2050 Water Quality Improvement Plan 2017-2022*, which seeks to improve the quality of water flowing from the catchments adjacent to the Reef. The Plan was updated from high level Reef-wide targets to evidence-based targets for each of the 35 major catchments adjacent to the Reef. This helps prioritise both the sources of and the types of pollution that pose the highest risks to the Reef, and to each catchment, and identifies the types of actions that will assist in achieving the water quality targets.

Water quality targets define the required reductions in sediment, nutrient and dissolved inorganic nitrogen loads by 2025 for the catchments discharging to the Reef. The pesticide target defines the required protection level for aquatic ecosystems.

Progress Summary

Progress across regions and river catchments against these targets is demonstrated in the interactive online *Reef Water Quality Report Card 2017 and 2018*.

The report card shows that while progress is being made towards the 2025 water quality targets, the trajectory of improvement needs to be lifted. The Australian and Queensland governments are confident that investments already made or still in the pipeline will further improve results. The introduction of the enhanced Queensland Reef regulations is also expected to lift performance in future years.

Results in the report card show overall progress to date of:

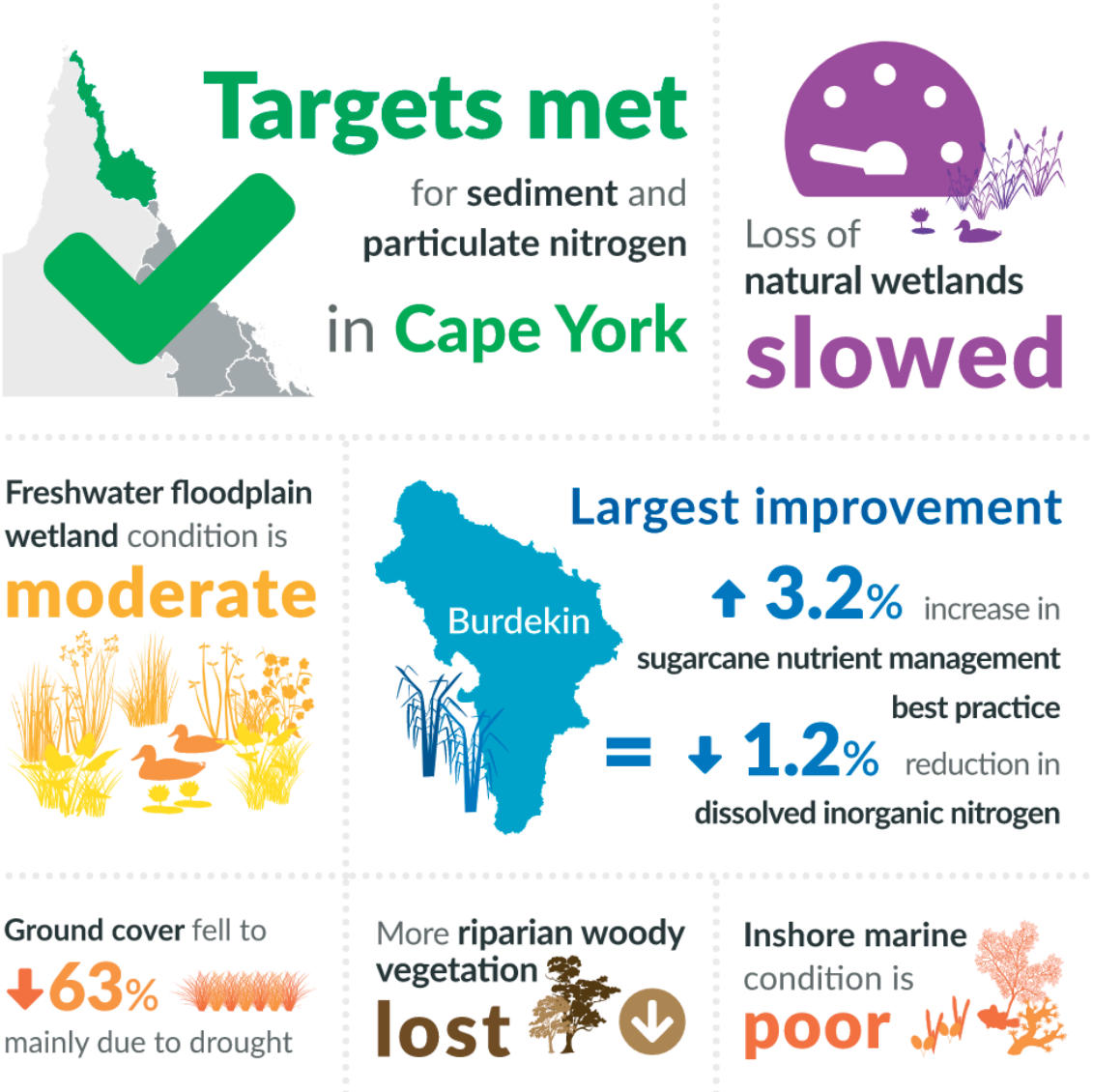
- 21.2 per cent reduction in anthropogenic end-of-catchment dissolved inorganic nitrogen loads
- 14.4 per cent reduction in anthropogenic end-of-catchment fine sediment loads
- 13 per cent reduction in anthropogenic end-of-catchment particulate nutrient loads
- Pesticide target not included in this report card – scoring will occur for the next report card.

The 2017 and 2018 report card has some promising results:

- The Cape York sediment and particulate nutrient targets were met. Modelling shows the average annual loads of sediment reduced by 1.8 per cent to 9.8 per cent, almost double the 5 per cent target. Reductions were due to improved pasture management from destocking cattle and controlling feral animals on the

Queensland Government owned Springvale Station, and improved pasture and gully management through Australian Government Reef Trust projects.

- The Burdekin region recorded the largest improvement (up 3.2 per cent to 19.6 per cent) in best practice nutrient management for sugarcane. Improved nutrient management was delivered through the Queensland Government Burdekin Nitrogen Project and the Australian Government Reef Trust: Reef Alliance Growing a Great Barrier Reef project.
- Modelling shows the annual average load of dissolved inorganic nitrogen flowing from the Burdekin reduced by 1.2 per cent to 26.7 per cent as a result of these projects.
- The loss of natural wetlands across the Reef catchments slowed with less than 0.1 per cent loss (556 hectares) between 2013 and 2017.
- Throughout the catchments, freshwater floodplain wetlands remained in moderate condition.



Continuous improvements in water quality management

Working with the Queensland Government and NCEconomics, Alluvium Consulting developed an online interface to evaluate the cost effectiveness of investment options for meeting specific regional water quality targets across the Reef, determining least cost pathways to meet these targets. By modelling reductions in pollutant loads achieved through the various investments made under the governments water quality improvement initiatives, the tool can be used to estimate marginal and total abatement cost curves. A cost range was established enabling the total costs of achieving regional targets to be determined.

Case study: Gully and Stream Bank Erosion Control Program

This program addresses one of the key threats to the Reef, sediment run-off from gully and stream bank erosion, including in minor streams and drainage lines, large river channels, and high-energy streams in wet coastal catchments. Following a $7.5 million pilot program, the Australian Government has expanded the program providing over $29 million in grants for nine projects through the Reef Trust.

This includes a $2.9 million project, Improving Reef Water Quality through Herbert River Catchment and Gully Remediation. Targeting priority erosion hot spots and high-risk areas in the Herbert River Basin, the project will reduce the export of fine sediments from eroding stream banks and gullies into the Reef lagoon. New grazing management practices and erosion repair work is taking place on century-old Woodleigh Cattle Station, stopping thousands of tonnes of fine sediment from flowing to the Reef each year. Read more about this work at: https://terrain.org.au/wp-content/uploads/2019/09/Case-Study-Woodleigh-Cattle-Station-Herbert-Gully-and-Grazing-Program.pdf.

4.3.2e Community benefit

Target: Community benefit values for Great Barrier Reef coastal ecosystems are being monitored and show a positive trend (target CBT4)

The community benefits of a healthy Reef (understanding, appreciation, enjoyment, personal connections, health benefits and aesthetics) are recognised in the Marine Parks, Commonwealth marine area, National heritage place and World Heritage Area as values. Income, employment and access to reef resources are also considered community benefits, and are discussed under economic benefit below.

The property provides constantly evolving opportunities for people to engage with it. This allows people to develop a sense of identity based on living within the Region, pride in the World Heritage Area and an appreciation of its outstanding natural beauty and biodiversity. Survey results suggest that the cultural value of the Reef has significantly increased for residents since 2013 despite the loss of corals from climate change.[12]

12 Marshall and Curnock (2019) Changes among coastal residents in the Great Barrier Reef Region 2013-2017: a Report from the Social and Economic Long-term Monitoring Program – prepared for the Great Barrier Reef Marine Park Authority, CSIRO, Townsville.

Progress Summary

Significant work has been undertaken over the past five years to understand the range of community benefits and to incorporate community benefits into policy, assessment processes and decision-making guidelines. This includes projects under the National Environmental Science Program that are developing indicators and metrics for human dimension outcomes, objectives and targets in the Reef 2050 Plan. This reflects a high-level understanding by managers that the property provides substantial and diverse community benefits.

Case Study: National Environmental Science Program

Climate change, poor water quality from land-based run-off, impacts from coastal development and some fishing impacts such as illegal fishing are the major challenges being tackled as part of the National Environmental Science Program. With funding of $31 million, a new Tropical Water Quality hub was established in 2015 to research coastal water quality and coastal management focused on the Reef. In January 2018, 50 new research projects were announced under the program with more than a dozen projects looking at solutions to the challenges faced by the Reef. Projects being funded range from crown-of-thorns starfish management approaches and seagrass condition assessment, through to reducing Reef governance risks and testing the effectiveness of managing gully erosion to reduce sediment sources to the Reef.

Further information on the National Environmental Science Program Tropical Water Quality hub is available at https://www.environment.gov.au/science/nesp/current-projects/tropical-water.

Economic and social use of the Region continues to provide benefit to communities and the Region is valued by residents, the nation and the world. This aspect of use continues to be in very good to good condition (refer table below from 2019 Outlook Report). For example, commercial and non-commercial use continue to contribute to the Region's economy while the social benefits of traditional use, fishing and recreation continue to contribute to connection, health and wellbeing.

However, many factors both inside and outside the Reef are impacting upon the social, economic and heritage values of the Region (Chapter 6). The economic value of Reef-dependent uses relies on a healthy reef ecosystem. The impact on economic values from factors such as climate change, coastal development, land-based run off and other direct uses is considered to be high and likely to increase into the future. The relatively low impact on social values so far is predicted to increase if ecosystem health declines with resulting consequences for community health, wellbeing and enjoyment (pg 188, 2019 Outlook Report).

Value	Condition and trend[13]		Progress	Reason for current state	Key progress enablers
	2014	2019			
Economic and social benefits of use (of the Marine Parks)	Stable	Stable	Target met	The property continues to be managed as a multiple use marine park, enabling different types of use and community benefit to be derived from the Region in a sustainable manner. Economic and social benefits to the Region continue to be in very good or good condition overall. Commercial and non-commercial use continue to contribute to the Region's economy. The social benefits of fishing and recreation contribute significantly to health and wellbeing. The Reef is of major importance to Traditional Owners. health and wellbeing. The Reef is of major importance to Traditional Owners.	Social and Economic Long-term Monitoring program continues to inform management on community benefit. Great Barrier Reef Marine Park Zoning Plan 2003 (and complementarry State zoning) protection and enforcement. Expansion of Reef protection markers and moorings to prevent anchor damage.

13 2019 Outlook grading key

Very Good	Good	Poor	VeryPoor

Further detail is available in the 2019 Outlook Report available at: www.gbrmpa.gov.au

4.3.2f Economic benefit

Target: The relationship between Reef health and the viability of Reef-dependent industries (e.g. tourism and fishing) is understood and considered in planning and development decisions (target EBT5)

Reef-dependent industries and activities directly support approximately 64,000 jobs and brought $6.4 billion into the Australian economy in 2015-16. Direct human use of the Reef continues to be a significant contributor to regional and national economies, which demonstrates that the Reef continues to be valued by national and international communities.

Progress Summary

The economic contributions to the Australian economy from Reef-dependent activities, 2006-07 to 2015-16 is provided in the table below (2019 Outlook Report, page 111). Data such as this are essential to measuring progress against this target. However up to date, ongoing analysis of the direct and indirect economic benefit from the Reef was identified as a knowledge gap in the 2019 Outlook Report and will need to be considered in the 2020 review of the Reef 2050 Plan.

Activity	**Australian total value-added ($ million)**			
	2006-07	**2011-12**	**2015-16**	**Change since 2011-12 (%)**
Tourism	$5117	$5176	$5700	+10
Commercial fishing and aquaculture	$139	$160	$162	+1
Recreation use (including fishing)	$153	$244	$346	+42
Scientific research and Reef management	-	$98	$182	+86
Total contribution	$5409	$5678	$6390	+13

4.3.2g Governance and performance

Target: A comprehensive Integrated Monitoring and Reporting Program is established and operational and the reporting informs the review and updating of this Plan (target GT5)

A key element of the Reef 2050 Plan is the establishment of the Reef 2050 Integrated Monitoring and Reporting Program. The program will provide a comprehensive and up-to-date understanding of the Reef and its adjacent catchment – the values and processes that support it and the threats that affect it. This knowledge is fundamental to informing actions required to protect and improve the Reef's condition and to drive adaptive management.

The program's vision is to become a knowledge system that will enable resilience-based management of the Reef and its catchment, and provide managers with a comprehensive understanding of how the Reef 2050 Plan is progressing. Its goals are to be:

- effective in enabling the early detection of trends and changes in the Reef's environment, inform the assessment of threats and risks, and drive resilience-based management

- efficient in enabling management priorities and ensuring that all decisions are well informed, cost-effective and transparent.
- evolving based on the findings of the Great Barrier Reef Outlook reports, new technology and priority management and stakeholder feedback.

This ambitious program, now moving from design to implementation, is unprecedented in its scale and scope, drawing together more than 90 existing environmental, social and economic monitoring and modelling programs across the Reef and adjacent catchment.

Progress Summary

The Marine Park Authority has finalised version one of the recommended monitoring program design and developed a prototype knowledge system that is currently being tested by program partners. The next steps are to establish governance, funding and data systems to support the delivery.

4.3.3 Development of targets for the revised Reef 2050 Plan

Reporting against Reef 2050 targets has presented a number of reporting challenges, including:

- limited capability to provide quantitative data against targets
- high complexity within single targets, including varying spatial scales and habitat types, and
- reference to terminology not defined in legislation or policy.

To ensure that the Reef 2050 Plan remains fit for purpose, its 2020 review will include the development of a comprehensive and measurable set of targets and objectives to guide the delivery of the revised outcomes and vision. This reflects the continuous improvement approach adopted by the Australian and Queensland governments to ensure that the property is managed adaptively in a changing environment. This, combined with the implementation of the Reef 2050 Integrated Monitoring and Reporting Program, will facilitate improved tracking and evaluation or progress and reporting against targets in future.

Progress on the implementation of the Reef 2050 Plan is reported annually. Annual reports, provided to the Great Barrier Reef Ministerial Forum, highlight key achievements during the year and include case studies demonstrating the range of work undertaken by Reef 2050 delivery partners.

5. Other conservation issues identified by the State Party which may have an impact on the property's outstanding universal value

5.1 Great Barrier Reef Outlook Report 2019 – risk assessment

The 2019 Outlook Report includes a chapter assessing the risks to the Reef's ecosystem and heritage values (Chapter 9). It demonstrates that, as well as the significant risk from threats associated with climate change and water quality, a range of other threats also pose risks and contribute to cumulative impacts. Recognising the need to manage cumulative impacts, the Reef 2050 Cumulative Impact Management Policy was developed alongside a complimentary Reef 2050 Net Benefit Policy. These policies were released in July 2018 and are being implemented. Continued awareness and management of all threats is critical to ongoing protection and management of the Reef.

5.2 Great Barrier Reef Outlook Report 2019 – long-term outlook

The final chapter of the report (Chapter 10) considers the risk findings as part of the overarching assessment of the Reef's future long-term outlook and mentions some of the existing and future initiatives to support the Reef's resilience. This includes work in the Marine Park such as enhanced compliance and effective Reef restoration and intervention, as well as accelerated action to improve agricultural land management practices across the catchments.

6. Potential major restorations, alterations and/or new constructions intended within the property, the buffer zones and/or corridors or other areas, where such developments may affect the outstanding universal value of the property, including authenticity and integrity

6.1 Quarterly reporting

In 2011 Australia formalised a procedure for providing quarterly notification reports to the World Heritage Centre of proposed developments within or outside a property that may impact upon a property's Outstanding Universal Value. Notification reports and a full list of proposed, approved and withdrawn actions relating to the property that require consideration under the national Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act) are available at: www.environment.gov.au/heritage/about/world/notification-development-proposals.

Sixteen proposals have been approved under the EPBC Act for the Great Barrier Reef World Heritage Area since the 2015 State Party Report on the state of conservation of the property was submitted on 30 January 2015.

Appendices

Appendix A: Map of the Great Barrier Reef World Heritage Area

Appendix B: Reef Funding 2014-15 to 2023-24

Appendix C: World Heritage Committee Decisions

Appendix D: Summary of heritage attributes from the 2019 Outlook Report and Complementary assessments- linking the Outlook Report and the Great Barrier Reef's outstanding universal value

Appendix E: Integrity test – Great Barrier Reef World Heritage Area (from the 2019 Outlook Report)

Appendix A: Map of the Great Barrier Reef World Heritage Area

Appendix B: Reef funding 2014-15 to 2023-24

All figures in AUD $m	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Australian Government Reef Programs											
Reef 2050			2.090	9.438	8.891	8.891	7.736	7.736	9.700	TBD	**54.482**
Reef Trust*^	7.702	15.865	35.554	486.422	34.161	42.175	34.650	25.853	21.670	TBD	**704.052**
Reef Program	29.650	32.850	10.100	10.150							**82.750**
Other Reef Funding	15.507	10.426	5.986	1.996							**33.915**
Sub-total	**52.859**	**59.141**	**53.730**	**508.006**	**43.052**	**51.066**	**42.386**	**33.589**	**31.370**	**0.000**	**875.199**
Australian Government Reef Science											
National Environment Science Program (Tropical Water Quality Hub)	2.200	5.630	5.400	5.400	5.400	5.400	2.550	NP	NP	NP	**31.980**
Australian Institute of Marine Science	15.100	15.100	15.100	29.100	39.200	34.800	37.400	40.100	42.800	45.200	**313.900**
Australian Research Council (Centre of Excellence for Coral Reef Studies)	6.437	6.409	6.304	6.778	6.956	5.994	3.403	0.385	0.06	TBD	**42.726**
Sub-total	**23.737**	**27.139**	**26.804**	**41.278**	**51.556**	**46.194**	**43.353**	**40.485**	**42.860**	**45.200**	**388.606**
Great Barrier Reef Marine Park Authority**											
Joint Field Management Program (Australian Government funding)	8.372	8.372	9.767	14.859	11.965	12.740	16.576	19.428	18.99	18.99	**140.059**
Great Barrier Reef Marine Park Authority	18.773	19.845	22.411	24.830	41.256	33.086	33.369	33.550	33.762	TBD	**260.882**
Sub-total	**27.145**	**28.217**	**32.178**	**39.689**	**53.221**	**45.826**	**49.945**	**52.978**	**52.752**	**18.990**	**400.941**
Australian Maritime Safety Authority											
Sub-total	**23.459**	**24.185**	**21.088**	**24.888**	**27.533**	**28.927**	**29.703**	**29.838**	**30.340**	**30.940**	**270.901**
Australian Government Total	**127.200**	**138.682**	**133.800**	**613.861**	**175.362**	**172.013**	**165.387**	**156.890**	**157.322**	**95.130**	**1935.647**
Queensland Government Reef Programs											
Queensland Government Reef Water Quality Program*	35.000	33.425	47.145	43.308	61.493	69.962	39.000	35.000	TBD	TBD	**364.333**
Joint Field Management Program (Queensland Government funding)	8.372	8.372	8.766	8.779	13.279	12.709	16.468	19.227	19.227	19.227	**134.426**
Sub-total	**43.372**	**41.797**	**55.911**	**52.087**	**74.772**	**82.671**	**55.468**	**54.227**	**19.227**	**19.227**	**498.759**
Queensland Sustainable Fisheries Programs											
		7.001	**2.674**	**6.439**	**7.697**	**9.541**	**8.500**	TBD	TBD	TBD	**41.852**
Maritime Safety Queensland											
	28.000	**28.000**	**28.000**	**28.000**	**28.000**	**28.000**	**28.000**	**28.000**	**28.000**	**28.000**	**280.000**
Queensland Total	**71.372**	**76.798**	**86.585**	**86.526**	**110.469**	**120.212**	**91.968**	**82.227**	**47.227**	**47.227**	**820.611**
TOTAL	**198.572**	**215.480**	**220.385**	**700.387**	**285.831**	**292.225**	**257.355**	**239.117**	**204.549**	**142.357**	**2756.258**
Cumulative total	**198.572**	**414.052**	**634.437**	**1334.824**	**1620.655**	**1912.880**	**2170.235**	**2409.352**	**2613.901**	**2756.258**	

	Shows years prior to the commitment of funds and after allocated funding has finished.
NP	New program in development. The National Environmental Science Program is scheduled for completion in 2021. The Australian Government has budgeted for a future environmental research program.
TBD	To be determined-funding allocations to be considered in future budgets.

Notes

Australian Government Reef Programs	
Reef 2050	**TBD**- 2023-24 funding will be determined as part of future Australian Government budget processes.
Reef Trust*^	*$2.1 million provided by Queensland Government in 2016-17 for the Reef Trust Phase IV Enhanced Efficiency Fertiliser Project with expenditure to occur from 2016-17 to 2019-20 is reported under Queensland Government investment (and not in Reef Trust). ^2017-18, funding includes $443.3 million for the Reef Trust Partnership. Funding will be expended over six-years until 30 June 2024. **TBD**- 2023-24 funding will be determined as part of future Australian Government budget processes.
Reef Program	Reef Program ended in 2017-18. Future Reef funding was allocated to the Reef Trust.
Other Reef Funding	Includes a range of Reef projects undertaken between 2014-15 and 2017-18: • Natural Heritage Trust Reef projects. • Systems Repair and Urban Water Quality Grants (Biodiversity Fund). • $9.375 million for e-Reefs coastal information system (Total project value is $12.5 million and commenced in 2013-14).
Australian Government Reef Science	
National Environment Science Program (Tropical Water Quality Hub)	**TBD**- 2021-22 funding will be determined as part of future Australian Government budget processes. The National Environmental Science Program (NESP) is a long-term environment and climate research program with funding of $145 million. The Tropical Water Quality Hub is one of the six thematic NESP research hubs, with Australian Government funding of $31.98 million.
Australian Institute of Marine Science	The Australian Institute of Marine Science invests a considerable proportion of its scientific effort in research that supports the health and resilience of the Great Barrier Reef. This covers a wide range of activities which can be summarised as: detailed reef monitoring; field work and experimentation; research and development; and partnerships and international engagement.
Australian Research Council (Centre of Excellence for Coral Reef Studies)	The Australian Research Council Centre of Excellence for Coral Reef Studies undertakes world-best integrated research for sustainable use and management of coral reefs. Includes ARC Centre for Excellence for Coral Reef Studies and other ARC funded projects relating the Reef. **TBD**- 2023-24 funding will be determined as part of future Australian Government budget processes.
Great Barrier Reef Marine Park Authority	
Joint Field Management Program (Australian Government funding)	The Great Barrier Reef Marine Park Authority and the Queensland Government co-fund the Reef Joint Field Management Program. Through the 2018 Budget, the Australian Government boosted funding of the Joint Field Management Program by $42.685 million from 2018-19 until 2023-24.

Great Barrier Reef Marine Park Authority**	** Funding for this item includes Departmental Appropriation and Environmental Management Charge (EMC). The EMC is a charge associated with most commercial activities, including tourism operations, non-tourist charter operations, and facilities, operating under a permit issued by the Marine Park Authority. Funding for this item does not include Reef HQ sales or permits. **TBD**- 2023-24 funding will be determined as part of future Australian Government budget processes.
Australian Maritime Safety Authority	
	The Australian Maritime Safety Authority, together with the Marine Park Authority and Maritime Safety Queensland, administer a suite of measures that regulate all ship activities within the region.

Additional Australian Government funding for the Reef is provided through:

- The Commonwealth Scientific and Industrial Research Organisation (CSIRO), including significant investments in understanding water quality and how agricultural practices affect sediment and nutrient loss, as well as developing practical solutions for land managers to reduce these losses.
- The Bureau of Meteorology (BOM) is Australia's national weather, marine, climate and water information agency. BOM's operational services, including weather and ocean forecasts, climate outlooks including ocean temperature outlooks for the Reef lagoon, flood and streamflow forecasts and tropical cyclone warnings, and they provide critical support to communities and agencies in the Great Barrier Reef region. BOM is part of the eReefs+ project.

Queensland Government Reef Programs	
Queensland Government Reef Water Quality Program	*$2.1 million provided by Queensland Government in 2016-17 for the Reef Trust Phase IV Enhanced Efficiency Fertiliser Project with expenditure to occur from 2016-17 to 2019-20 is reported under Queensland Government investment (and not captured in the Reef Trust). **TBD**- 2023-24 funding will be determined as part of future Queensland Government budget processes. Since 2015, the Queensland Government has invested approximately $570 million into initiatives targeted solely at the protection of the Reef. In addition, the Queensland Government delivers a range of other programs that apply to the whole state of Queensland, with the Great Barrier Reef and its catchment making up a significant proportion of the state. The Queensland Reef Water Quality Program is invested through three Queensland Government agencies, the Department of Environment and Science, the Department of Agriculture and Fisheries and the Department of Natural Resources, Mines and Energy.
Joint Field Management Program (Queensland Government funding)	The Queensland Government and the Great Barrier Reef Marine Park Authority (GBRMPA). co-fund the Reef Joint Field Management Program. The Queensland Government contributed over $8 million per year to the program until additional funding was announced in 2018 which will see the Queensland Government's contribution grow to over $19 million by 2021.

Queensland Sustainable Fisheries Programs	
	TBD- 2023-24 funding will be determined as part of future Queensland Government budget processes. The Queensland Government Department of Agriculture and Fisheries developed and commenced implementation of the Queensland Sustainable Fisheries Strategy.
Maritime Safety Queensland	
	Maritime Safety Queensland is responsible for improving maritime safety in Queensland waters, minimising vessel-sourced waste, responding to marine pollution incidents, and providing essential maritime services such as aids to navigation and vessel traffic services. Maritime Safety Queensland operates the Great Barrier Reef and Torres Strait vessel traffic service, which aims to improve navigational safety, reduce the risk of maritime incidents and respond quickly to incidents that do occur within those regions. The Great Barrier Reef and Torres Strait vessel traffic service is supported by a User Guide which was published in 2017.

Appendix C: World Heritage Committee Decisions

41 COM 7B.24 Great Barrier Reef (Australia) (N 154)

The World Heritage Committee,

1. Having examined Document WHC/17/41.COM/7B.Add,
2. Recalling Decision 39 COM 7B.7, adopted at its 39th session (Bonn, 2015),
3. Welcomes the progress made with the inception and initial implementation of the Reef 2050 Long-Term Sustainability Plan (2050 LTSP) and the establishment of the Investment Framework, and expresses its appreciation for the significant efforts by all those involved in the implementation of the 2050 LTSP;
4. Strongly encourages the State Party to accelerate efforts to ensure meeting the intermediate and long-term targets of the plan, which are essential to the overall resilience of the property, in particular regarding water quality;
5. Notes with serious concern the coral bleaching and mortality that affected the property in 2016 and 2017;
6. Reiterates its request to the State Party to submit to the World Heritage Centre, by 1 December 2019, an overall report on the state of conservation of the property demonstrating the effective and sustained protection of the property's Outstanding Universal Value and effective performance in meeting the targets established under the 2050 LTSP, linked to the findings of 2014 and 2019 Great Barrier Reef Outlook Reports, for examination by the World Heritage Committee at its 44th session in 2020.

39 COM 7B.7 Great Barrier Reef (Australia) (N 154)

The World Heritage Committee,

1. Having examined Document WHC-15/39.COM/7B.Add,
2. Recalling Decisions 36 COM 7B.8, 37 COM 7B.10, and 38 COM 7B.63, adopted at its 36th (Saint-Petersburg, 2012), 37th (Phnom Penh, 2013) and 38th (Doha, 2014) sessions respectively,
3. Notes with concern the conclusion of the 2014 Great Barrier Reef Outlook Report that the overall Outlook for the property is poor, and that climate change, poor water quality and impacts from coastal development are major threats to the property's health and regrets that key habitats, species and ecosystem processes in the central and southern inshore areas have continued to deteriorate from the cumulative effects of these impacts;
4. Welcomes the State Party's efforts, in consultation and partnership with stakeholders, to establish the Reef 2050 Long-Term Sustainability Plan (2050 LTSP) that outlines an overarching vision for the future conservation of the property over the next 35 years and, in particular:

    a) The establishment of an 80% reduction in pollution run-off in the property by 2025 and the commitment of an initial additional investment of AUS 200 million dollars to accelerate progress in water quality improvements,

    b) The confirmation of protection of greenfield areas by restricting major new port development in and adjoining the property, thereby limiting capital dredging for the development of new or expansion of existing port facilities within the regulated port limits of the major ports of Gladstone, Hay Point/Mackay, Abbott Point and Townsville, excluding Fitzroy Delta, North Curtis Island and Keppel Bay from future port development and ensuring consistency with the 2003 Great Barrier Reef Zoning Plan,

    c) The commitment toward a 5-yearly evaluation of the plan performance and adaptation of its actions and targets on the basis of the results of future Great Barrier Reef Outlook reports;
5. Also welcomes the State Party's decision to reconsider the approval to dispose capital dredge material inside the property from the proposed Abbot Point development and the commitment to establish a permanent ban on dumping of dredged material from all capital dredging projects within the property;
6. Considers that the effective implementation of the 2050 LTSP, supported by clear oversight and accountability, research, monitoring and adequate and sustained financing, is essential to respond to the current and potential threats to the property's Outstanding Universal Value, and requests the State Party to rigorously implement all of its commitments of the 2050 LTSP, including where necessary through their inclusion in legislation, in order to halt the current documented declines in the property, create the conditions for sustained recovery and to enhance the property's resilience;
7. Takes note of the State Party commitment to establish an investment framework in 2015 and also considers that

this is an essential requirement for the effective implementation of the 2050 LTSP, that should be established as a matter of priority;

8. Also requests the State Party to submit to the World Heritage Centre, by 1 December 2016, an update on progress with implementation of the 2050 LTSP to confirm that the inception of the plan has been effective, and the Investment Strategy has been established, for examination by the World Heritage Centre and IUCN, and if in their assessment the anticipated progress is not being made, for consideration at the subsequent session of the World Heritage Committee in 2017;

9. Further requests the State Party to submit to the World Heritage Centre, by 1 December 2019, an overall state of conservation report, including a 1-page summary, on the state of conservation of the property demonstrating effective and sustained protection of the property's Outstanding Universal Value and effective performance in meeting the targets established under the 2050 LTSP, linked to the findings of the 2014 and anticipated 2019 Great Barrier Reef Outlook Reports, for examination by the World Heritage Committee at its 44th session in 2020.

Appendix D: Summary of heritage attributes from the 2019 Outlook Report and Complementary assessments- linking the Outlook Report and the Great Barrier Reef's outstanding universal value

4.7 Overall summary of heritage values

The Great Barrier Reef's heritage values are assessed against natural (world heritage and national heritage), Indigenous, historic (Commonwealth and other) and other heritage (social, aesthetic and scientific) values.

Overall, human-induced climate change is challenging the integrity of the World Heritage Area; its size is becoming a less effective buffer against broadscale impacts

The Great Barrier Reef remains whole and intact and maintains many of the elements that make up its outstanding universal value, as recognised in its world heritage listing. However, significant components that underpin all four natural world heritage criteria for which the World Heritage Area was inscribed in 1981 have deteriorated since its inscription. One criterion — habitats for the conservation of biodiversity — is assessed as poor, which aligns with the assessment findings in Chapter 2. Given that the impacts from climate change are accelerating, the overall assessment of the Reef's world heritage and national heritage values is good, borderline poor.

Indigenous heritage includes tangible and intangible heritage and is interlinked with the condition of the Reef's natural components

Indigenous heritage includes tangible and intangible heritage and is interlinked with the condition of the Reef's natural components. The effects of acute and chronic disturbances in the past five years have affected the condition of the Region's Indigenous heritage value, some of which is irreplaceable (for example, songlines). For this reason, material and non-material Indigenous heritage is graded as being in poor condition overall with a stable trend. However, the limited evidence available in both 2014 and 2019 means the confidence in both grade and trend is rated as inferred. A noteworthy achievement in this space was the release of the Marine Park Authority's 2019 *Aboriginal and Torres Strait Islander Heritage Strategy*.

The historic heritage values of the five properties in the Region listed on the Commonwealth Heritage List are graded as good, having been identified and included in a relevant inventory. Yet, the condition and trend of most places are based on limited published evidence. The inference by managers is, however, that the properties retain their integrity and are in good condition.

The significance of the World Heritage Area still transcends national boundaries and remains a source of pride for the Australian public broadly

Other historic heritage components (other lightstations, shipwrecks, aircraft wrecks and other places of historic significance) are graded overall as poor. Published condition and trend data are lacking for most sites, so confidence in the grade and trend is limited or inferred. Positive progress has been made towards gathering evidence on shipwrecks and aircraft wrecks. The significant discovery in late 2018 of the precise location of the wreck of the *Martha Ridgway* increased the baseline data for this component.

Other heritage values, including social, aesthetic and scientific, are graded overall as good. The significance of the World Heritage Area still transcends national boundaries and remains a source of pride for the Australian public broadly. Significant progress has been made since 2014 in understanding the human dimensions of the Reef, focusing on societal attitudes and how people value the Reef. The social heritage value of the Region is considered to be in good condition.

A 2017 survey of approximately 3900 people living close to, or deriving benefit from, the Reef (local and national residents, tourists, tourism operators and commercial fishers) highlighted the wider community's concern about the declining condition of the Reef, as their connection to its environment and natural beauty continues to strengthen.[847,857]

As people's concerns about the declining health of the Reef increase, the Region's scientific heritage value continues to grow. The connection between emerging science and the natural heritage value of the Region provides adequate evidence to assess scientific heritage value.

Complementary assessments - linking the Outlook Report to the great Barrier reef's outstanding universal value

The Outlook Report assesses around 87 components within a broad analysis of the Great Barrier Reef's natural, Indigenous and historic heritage value. This table maps these components against the Reef's outstanding universal value[28], and outlines where the assessment within the Outlook Report is broader than an assessment of outstanding universal value.

The *Statement of the Outstanding Universal Value of the Great Barrier Reef World Heritage Area*[28] is the official statement adopted by the World Heritage Committee outlining how the property meets the criteria for outstanding universal value (OUV). The following excerpts from the statement indicate the attributes considered to contribute to the property's outstanding universal value. The Great Barrier Reef Region Strategic Assessment[1446] Section 7.6.1, introduced an assessment of the Reef's outstanding universal value based on 38 attributes (in parentheses). The table below includes the current criteria (italic text in parentheses) as well as the original criteria (italic text in square brackets) applied at the time of inscription. Many Outlook Report components address several attributes and may be listed more than once in the left column.

Outlook Report 2019 Components	**World Heritage Area** Great Barrier Reef World Heritage Area
	Statement of outstanding universal value: 38 attributes *(vii)* *contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance* *[iii]* *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*
2.3.5 Coral reefs 2.4.4 Corals 2.4.7 Bony fishes 4.5.1 Social heritage values 4.5.2 Aesthetic heritage values 8.3.1 Coral reef case study	(1) Superlative natural **beauty** above and below the water (2) Some of the most spectacular **scenery** on Earth (3) One of a few living structures **visible** from space (4) A complex string of reefal structures along Australia's north-east coast (5) Unparalleled aerial panorama of **seascapes** comprising diverse shapes and sizes (10) Beneath the ocean surface, there is an abundance and diversity of shapes, sizes and **colours ...** Spectacular coral assemblages of hard and soft corals (11) Thousands of species of reef fish provide a myriad of **brilliant colours**, shapes and sizes (12) The internationally renowned **Cod Hole** is one of many significant **tourist** attractions
2.3.1 Islands 2.3.2 Beaches and coastlines 2.4.10 Marine turtles 2.4.12 Seabirds 4.2.2 Natural beauty and phenomena 8.3.5 Loggerhead turtles case study	(6) Whitsunday islands provide a magnificent vista of green vegetated **islands** and white sandy beaches spread over azure waters (8) On many of the cays there are spectacular and globally important breeding colonies of **seabirds** and marine **turtles** (9) Raine Island is the world's largest green **turtle** breeding area
2.3.3 Mangrove forests 2.3.2 Beaches and coastlines 2.4.1 Mangroves 3.5.1 Saltmarshes 3.5.2 Freshwater wetlands 3.5.3 Forested floodplain 3.5.4 Heath and shrublands 3.5.5 Grass and sedgelands 3.5.6 Woodlands and forests 3.5.7 Rainforests	(7) Vast **mangrove** forests in Hinchinbrook Channel, or the rugged vegetated mountains and lush **rainforest** gullies
2.3.5 Coral reefs 2.4.3 Corals 2.4.10 Marine turtles 2.4.14 Whales 8.3.1 Coral reef case study 8.3.5 Loggerhead turtles case study 8.3.7 Humpback whales case study	(13) Superlative natural phenomena include the annual **coral** spawning, migrating **whales**, nesting **turtles**, and significant **spawning aggregations** of many fish species

Outlook Report 2019 Components	World Heritage Area Great Barrier Reef World Heritage Area
	Major stages of the Earth's evolutionary history (viii) *(viii) be outstanding examples representing major stages of Earth's history, including the record of life, significant ongoing geological processes in the development of landforms, or significant geomorphic or physiographic features* *[i] outstanding examples representing the major stages of the Earth's evolutionary history*
3.4.8 Reef building 4.2.3 Major stages of the Earth's evolutionary history	(14) Globally outstanding example of an ecosystem that has evolved over millennia (15) 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 (16) Today, the Great Barrier Reef forms the world's largest coral reef ecosystem **...** Including examples of all stages of reef development (17) Processes of **geological** and **geomorphological evolution** are well represented, linking continental islands, coral cays and reefs
3.2.1 Currents 3.2.2 Cyclones and wind 3.2.3 Freshwater inflow 3.2.4 Sediment exposure 3.2.5 Sea level 3.2.6 Sea temperature 3.2.7 Light 3.3.2 Ocean pH (acidity) 3.3.3 Salinity 3.4.8 Reef building	(18) 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
2.3.9 Continental slope 2.3.10 Water column	(19) 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
	Ecological and biological processes (ix) *(ix) be outstanding examples representing significant ongoing ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals* *[ii] outstanding examples representing significant ongoing geological processes, biological evolution and man's interaction with his natural environment*
2.3.1 Islands 2.3.5 Coral reefs 2.3.8 *Halimeda* banks 2.4.4 Corals 3.4.8 Reef building 3.3.2 Ocean pH (acidity) 8.3.1 Coral reef case study	(20) Significant diversity of reef and island **morphologies** reflects ongoing geomorphic, oceanographic and environmental processes (25) 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
3.2.1 Currents 3.2.2 Cyclones and wind 3.4.10 Connectivity	(21) Complex cross-shelf, longshore and vertical connectivity is influenced by dynamic **oceanic currents**
3.3.1 Nutrient cycling 3.4.1 Microbial processes 3.4.2 Particle feeding 3.4.3 Primary production 3.4.5 Predation 3.4.6 Symbiosis 3.4.7 Recruitment	(22) Ongoing ecological processes, such as **upwellings, larval dispersal and migration**
3.2.2 Cyclones and wind 3.2.4 Sediment exposure 3.4.4 Herbivory 3.4.8 Reef building 3.4.9 Competition	(23) Ongoing **erosion and accretion** of coral reefs, sand banks and coral cays combine with similar processes along the coast and around continental islands
2.3.8 *Halimeda* banks	(24) Extensive beds of ***Halimeda* algae** represent active calcification and accretion over thousands of years
2.4.12 Seabirds 2.4.13 Shorebirds 2.3.1 Islands 3.4.7 Recruitment	(26) Vegetation on the cays and continental islands exemplifies the important role of **birds ...** in seed dispersal and plant colonisation

Outlook Report 2019 Components		World Heritage Area Great Barrier Reef World Heritage Area
		Habitats for conservation of biodiversity (x) *(x) contain the most important and significant natural habitats for in situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation* *[iv] habitats where populations of rare or endangered species of plants and animals still survive*
2 Biodiversity **3 Ecosystem Health** 2.4.3 2.4.5 2.4.6 2.4.7 2.4.8 2.4.9 2.4.11 2.4.12 2.4.13 8.3.3 8.3.4	Benthic algae (includes macroalgae and microalgae) Other invertebrates Plankton and microbes Bony fish Sharks and rays Sea snakes Estuarine crocodiles Seabirds Shorebirds Black teatfish case study Coral trout case study	(28) One of the richest and most complex natural ecosystems on Earth, and one of the most significant for **biodiversity** conservation (29) Tens of thousands of **marine** and **terrestrial species**, many of which are of global conservation significance
2.3.5 2.4.3 8.3.1	Coral reefs Corals Coral reef case study	(30) The world's most complex expanse of **coral reefs ...** Contain some 400 species of corals in 60 genera
2.3.3 2.4.1	Mangrove forests Mangroves	(31) Large ecologically important inter-reefal areas**.** The shallower marine areas support half the world's diversity of **mangroves**
2.3.4 2.4.2	Seagrass meadows Seagrasses	(32) Large ecologically important inter-reefal areas**.** The shallower marine areas support … many **seagrass** species
2.4.16 8.3.6	Dugongs Urban coast dugongs case study	(33) Waters also provide major feeding grounds for one of the world's largest populations of the threatened **dugong**
2.4.14 2.4.15 8.3.7	Whales Dolphins Humpback whales case study	(34) At least 30 species of **whales** and **dolphins** occur here (35) A significant area for humpback **whale** calving
2.3.1 2.4.10 2.4.12 2.4.13 8.3.5	Islands Marine turtles Seabirds Shorebirds Loggerhead turtles case study	(36) 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 (37) 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 (38) The continental **islands** support thousands of plant species, while the coral cays also have their own distinct flora and fauna
4.3.6 **7**	Integrity **Existing protection and management**	Related to assessment of integrity of the property's outstanding universal value
	Broader than outstanding universal value	
4.3 5.9	Indigenous heritage values Traditional use of marine resources	(27) Human interaction with the natural environment is illustrated by strong ongoing links between Indigenous people and their sea country, and includes numerous shell deposits (middens) and fish traps, plus the application of story places and marine totems
2.2 3.6 4.4 **5** **6** **7** 8.5 **9** **10**	Legacies and shifted baselines Outbreaks of disease, introduced species and pest species Historic heritage values **Commercial and non-commercial use** **Factors influencing the Region's values** **Existing protection and management** Heritage resilience (Indigenous and historic heritage value) **Risks to the Region's values** **Long-term outlook**	

Appendix E: Integrity test – Great Barrier Reef World Heritage Area (from the 2019 Outlook Report)

Integrity score

Very good | Good | Poor | Very poor | Borderline

World heritage criteria and integrity test criteria	Assessment	Integrity score
(vii) Natural beauty and natural phenomena		
The Great Barrier Reef depends on scenic beauty as a value and areas that are integrally linked to the maintenance of the aesthetic qualities of the property	The aesthetic value and naturalness of the world heritage property are heavily reliant on the condition of the Region's biodiversity (Chapter 2) and ecosystem health (Chapter 3). The wholeness and intactness of the Reef's aesthetic attributes, above and below the water, are in good condition overall. But many elements which contribute to this criterion (such as clear water and bright colourful reef fish) are deteriorating. Some critical elements of natural phenomena, such as coral spawning, have deteriorated on a broad scale due to significant loss of coral broodstock following back-to-back bleaching events in 2016 and 2017. The criterion overall is considered good borderline poor. Quantifying the condition of this attribute on a Region-wide scale is difficult as it relies upon the state of the system, its appearance and perceptions of beauty.	
(viii) Major stages of the Earth's evolutionary history		
The Great Barrier Reef contains all or most of the key interrelated and interdependent elements in their natural relationships	At a Region-wide scale the Reef continues to provide outstanding examples of the Earth's evolutionary history and geomorphological diversity. However, unprecedented recent disturbances will have long-lasting effects. Processes that influence reef formation and maintain sediment accumulation on reef islands (for example, ocean acidification, sea temperature and sea-level rise) have deteriorated since 2014. The processes are intensifying in a negative way due to climate change, and pose the greatest threat to the Reef's contemporary geomorphology. Further deterioration of this element may occur if supporting physical and chemical processes continue to alter the geomorphology of the Region.	
(ix) Ecological and biological processes		
The Great Barrier Reef is a sufficient size and contains the necessary elements to demonstrate the key aspects of processes that are essential for the long-term conservation of the ecosystems and the biological diversity they contain	The condition of key processes that interlink and operate to keep the ecosystem functioning are assessed in Chapter 3. Ecological processes have not ceased to operate, although processes that are fundamental to a functioning ecosystem (such as symbiosis, recruitment and reef building) are considered to be in poor condition and are causing the good grade to be borderline with poor. Multiple disturbances have transformed the ecosystem on a broad scale and cumulatively hindered recovery. Historically, the Region's size has provided a buffer to periodic and dispersed damage due to its broad latitudinal extent. However, given the global scale of human-induced climate change, the size of the Region is becoming a less effective buffer to some broadscale impacts. Deterioration has been more rapid and widespread than was evident in the period 2009 to 2014.	
(x) Habitats for conservation of biodiversity		
The Great Barrier Reef is one of the most important properties for the conservation of biological diversity and those that contain habitats for maintaining the most diverse fauna and flora characteristic of the bio-geographic province and ecosystems under consideration	As a value distributed throughout the whole of the property, habitats to support species continue to deteriorate and are assessed as poor overall. Habitats for conservation of biodiversity face growing direct threats and external pressures. Safeguard measures to mitigate climate change are essential for the long-term conservation of the ecosystem. Declines in key habitats have been more rapid and widespread than was evident in the period 2009 to 2014. An emerging field of science around intervention and restoration measures has established since 2014, but many measures are yet to be fully tested or implemented.	

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Australian Government
Great Barrier Reef Marine Park Authority

Great Barrier Reef health and condition

January 2021

The Great Barrier Reef is a vast, diverse and spectacular ecosystem, but like all coral reefs globally, it is under pressure from climate change and other stressors. There are parts of the Reef that still are essentially pristine and vibrant, and which offer an incredible visitor experience. Others have been impacted by disturbances such as coral bleaching.

While reducing greenhouse gas emissions is a global challenge – and Australia is playing its part under the Paris Agreement – the Australian Government is also investing significantly in Reef resilience and adaption measures. This includes an investment of $150 million for the research and development phase of the world-leading Reef Restoration and Adaptation Program.

2021 conditions and forecast

The latest information on the health of the Reef can be found via the Reef Health updates published on the Great Barrier Reef Marine Park Authority's (the Authority) website. Monthly updates are released throughout the year, with increased frequency over the Australian summer, as this is the period when the most significant impacts on Reef health from climate-induced extreme weather conditions are likely.

Prior to each summer, the Authority convenes a pre-summer workshop with leading Reef science experts and management partners to review events from the previous summer and consider forecasts for the coming summer. The findings from the 2020-21 pre-summer workshop can be found on the Authority's website.

The Authority takes a comprehensive approach to summer Reef health:

- Monitoring the forecast conditions and actual observations.
- Understanding the science of Reef health and impacts by working with science institutions, particularly the Australian Institute of Marine Science.
- Collecting in-water observations and reports using the "Eye on the Reef" database and app, surveys from the Authority's Reef Joint Field Management Program, tourism operators and the public.
- Regularly communicating Reef health observations and Reef management actions.

Coral bleaching and the cumulative impacts of the 2016, 2017 and 2020 events

Coral bleaching is a stress response when a coral colony is exposed to warmer, or cooler, than usual sea temperatures for an extended period, usually at least a few weeks in duration. Large-scale marine heatwaves create mass coral bleaching events in which very large numbers of corals bleach severely, on many different reefs over a wide area. These events are usually associated with significant levels of coral mortality and sub-lethal effects, such as reduced reproduction.

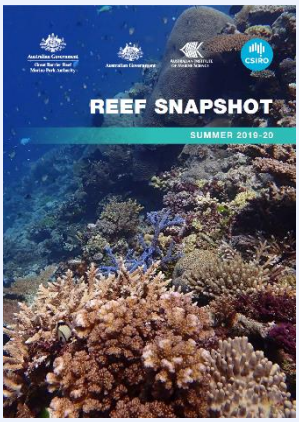
The Great Barrier Reef has experienced three mass bleaching events in the past five years (2016, 2017 and 2020).The cumulative area of shallow coral reef that has severely bleached at least once since 2016 now makes up a very substantial proportion of coral reefs of the Great Barrier Reef. It is important to note that bleached corals are not dead corals – on mildly or moderately bleached reefs, there is a good chance most bleached corals will recover and survive. Coral mortality depends on a number of factors, including past exposure to stress events, the extent of the current stress event and the tolerance of the coral species to heat stress.

Coral recruitment, which is essential for reef recovery, is also impacted by the frequency and intensity of coral bleaching. There is now, from this and past events, a reduced number of mature corals to spawn; and those mature corals which bleached and survived have a reduced fitness to spawn. Nonetheless, the annual mass coral spawning event remains a key regenerative process for the Great Barrier Reef World Heritage Area.

The Reef has shown the ability to recover from impacts in the past; however, a number of things play into recovery capacity of the Reef and effective recovery can only occur if disturbance-free periods are long-enough.

Information on the bleaching event that occurred in the latter part of the 2019-20 summer and the cumulative impacts to the Reef over the past decade are detailed in the inaugural Reef Snapshot: Summer 2019-20.

Annual Reef Snapshots



In 2020, the first Annual Reef Snapshot was released, providing a concise, easy to understand summary of how the Reef fared over the past summer, what this meant for coral and the actions being taken to help coral health.

The snapshot is a joint initiative of the Australian Government's lead management and science agencies for the Great Barrier Reef, the Great Barrier Reef Marine Park Authority, the Australian Institute of Marine Science and CSIRO and is based on the latest available science and information at the time of writing.

A Reef Snapshot: Summer 2020-21 will be released post the summer period.

Long-term monitoring of Reef health

The Australian Institute of Marine Science reports annually on the condition of reefs in the Great Barrier Reef World Heritage Area, through its comprehensive Long-Term Monitoring Program. The 2019-20 report presents the results of field surveys of coral reefs across the Great Barrier Reef conducted over September 2019 to June 2020.The report from this survey season found that while the reefs surveyed were beginning to recover from the recent disturbance history; the third mass coral bleaching event in five years would likely set-back this recovery.

The 2020-21 Long-Term Monitoring Program survey commenced in late August 2020 and will give a clearer picture of the impacts of the 2020 bleaching event in the next annual update due in mid 2021.

Crown-of-thorns starfish outbreaks

Crown-of-thorns starfish are native coral predators on the Reef. When densities of starfish reach a point where the consumption of coral tissue exceeds coral growth, an outbreak is established. Outbreaks of crown-of-thorns starfish continue to impact reef health across all management areas, with the most severe impacts occurring on reefs in the Townsville–Whitsunday (offshore) and Mackay–Capricorn (inshore and offshore) management areas.

Management actions to reduce the impacts of threats such as crown-of-thorns starfish outbreaks are essential to giving the Reef the best chance of recovery. The Crown-of-thorns Starfish Control

Program continues throughout the Marine Park, with the latest control program data available on the Authority's crown-of-thorns starfish project dashboard.

As climate change driven impacts on the Reef grow, particularly to hard corals, tactical control of crown-of-thorns starfish is increasingly the most effective scalable management tool to protect corals and World Heritage values associated with coral reefs.

Reef 2050 Objectives and Management Goals: Public consultation draft, August 2020

The *Reef 2050 Objectives and Management Goals* is the key supporting document to the updated *Reef 2050 Long-term Sustainability Plan* (the Plan). This document should be read in context with the updated Plan, including its renewed vision and outcomes framework.

The updated Plan includes a comprehensive and measurable suite of 20 objectives for the Great Barrier Reef (the Reef) through to 2050, underpinned by associated indicators, to better guide delivery of the Plan's outcome and vision. The objectives and indicators (Table 1) were developed in partnership with over 100 technical and subject matter experts. The objectives are set across four categories: habitats, species, Indigenous heritage, and human dimensions. The objectives have been designed to apply from local to Reef-wide scales, and were selected to represent desired aspects of a functioning Reef between 2020 and 2050.

The updated Plan also includes a suite of 17 management goals for 2025, designed to focus effort and investment to achieve the Plan's vision. Management goals are set to reduce cumulative impacts, and protect and conserve the Reef (Table 2), and to enable delivery (Table 3).

Progress against objectives and management goals will be assessed against a set of indicators contained within this supporting document, which may be updated over time as new evidence arises. The objectives and management goals have been designed to be measurable, interpretable, sensitive to scale and reliable. Information based in both scientific and Traditional knowledge will be used to measure progress and delivery of outcomes.

Adding to the proposed list of indicators and goals may be considered, but only if it would fill a critical gap. Some indicators will continue to be refined, and where required, reference levels/years or benchmarks will be developed through further expert input.

Relevant objectives from the *Reef 2050 Water Quality Improvement Plan* (as updated periodically) have been incorporated into this Plan's objectives, management goals, and key factors to be monitored. Additionally, aspects of the *Reef 2050 Water Quality Improvement Plan* such as load reduction targets will inform reporting against relevant objectives, management goals and factors in the Reef 2050 Plan.

Definitions:

Objectives: the results the Plan aims to achieve for the Reef through to 2050, in order to deliver the Plan's outcome and vision. The objectives will apply from local to Reef-wide scales and were selected to represent desired aspects of a functioning Reef between 2020 and 2050.

Management goals: the results the Plan aims to achieve by 2025; a measure of progress in addressing key pressures on the Reef.

Factors that influence the state of objectives

Key pressures and large-scale processes which influence the state of the Reef will be monitored. Their condition and trend provide important context for how the Reef is managed, the achievement of objectives and the responsiveness of managers and partners.

- Anthropogenic noise levels
- Atmospheric carbon dioxide concentrations
- Changes in coastal erosion
- Changes in extreme weather event frequency, severity and extent of influence
- Changes in ocean currents
- Changes in ocean pH
- Changes in the benthic sediment type (e.g. particle size, organic content)
- Changes in wave energy
- Microbes and plankton abundance and distribution
- Sea level rise
- Sea surface temperature / degree heating days
- Water quality parameters, including but not limited to:
    - Anthropogenic dissolved inorganic nitrogen loads to the Great Barrier Reef
    - Anthropogenic fine sediment loads to the Great Barrier Reef
    - Anthropogenic sourced particulate nutrient loads to the Great Barrier Reef

Level of knowledge:

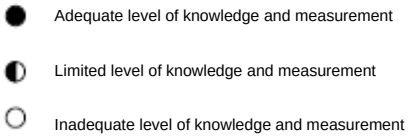
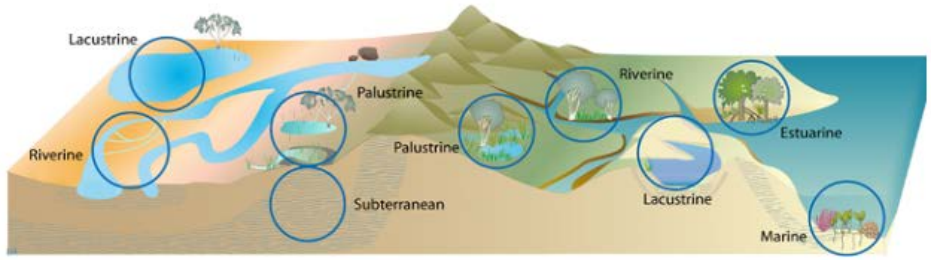


TABLE 1: Reef 2050 Plan objectives, and associated indicators to guide evaluation and progress reporting

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
Coral reef habitats maintain good condition and resilience	Coral reef habitats occur across a broad depth range and cover an area of around 26,000 square kilometres (~seven per cent of the Marine Park) (Strategic Assessment, 2014). Corals are susceptible to multiple pressures, for example, thermal stress from warmer than average seawater, poor water quality which can reduce light, crown-of-thorns starfish predation, changes in ocean pH (ocean acidification) effecting the net rate of calcium carbonate accretion, and physical damage caused by cyclones and anchor damage (GBRMPA 2019a). Coral reef habitat recovery requires conditions that provide for sustained positive carbonate budgets. This includes periods of time without disturbance, favourable environmental conditions, inter-reef connectivity, an adequate supply of coral larvae, and successful coral recruitment (GBRMPA 2019a).	Monitoring and reporting that measures the condition and trend in coral reef condition over time is needed to understand the extent and rate of any changes, inform management decisions, and assess the effectiveness of particular management actions (Schaffelke et al. 2020). Objective indicators: • Condition of 'individual' surveyed reefs as measured through state and trend of: o Percentage hard coral cover o Coral disease per unit of coral cover o Benthic algae: ▪ Proportion of macroalgal cover ▪ Algal turf height ▪ Percentage of crustose coralline algae (CCA) cover o Microbial community composition *(Note: While preliminary work is underway, any data on this indicator is unlikely to be available in the next few years. Therefore this is an aspirational indicator only at this time.)* o Herbivore biomass • Damage caused by crown-of-thorns starfish mitigated by maintenance of populations at below outbreak densities	ix vii x Integrity	●

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
		• Capacity of individual reefs to recover post disturbance as measured through state and trend of: o Hard coral community composition o Density of juvenile corals o Post disturbance coral size class distribution • Capacity for sustained functioning of the Reef ecosystem, as indicated by o measuring the current carbonate budget of individual reefs and o predicting the future carbonate budget		
Resilient seagrass meadows that maintain condition	Seagrasses vary spatially and temporally in their distribution and abundance across the Great Barrier Reef. They cover 35,000 square kilometres and have a potential habitat area of 228,300 square kilometres. Occurring in different water quality types (estuaries, coastal, reefal and offshore) and at different water depths (intertidal, shallow subtidal, deep water), they support the outstanding universal value of the Great Barrier Reef. Seagrasses are a critical food source for some protected species as well as habitat for many recreationally and commercially important fisheries species. The presence and abundance of seagrasses are often used as indicators for ecosystem health, as they require good water quality and relatively stable benthic habitats in order to thrive.	Monitoring of seagrass meadows needs to consider an assessment of the sites where seagrass has the potential to grow, an assessment of plant and reproductive health and monitoring of the processes that underpin resilience (Udy et al. 2019). Objective indicators: • The long-term trend of seagrass spatial distribution does not decline. • The long-term trend of seagrass biomass / cover does not decline. • Community composition and expected community types for an area are maintained or improved. • Short-term trend in asexual / sexual reproductive capability does not decline. Where known, baseline period will be specified.	x Integrity	●
No loss of the extent of natural wetlands	'Wetland' is a broad term used for different kinds of wet ecosystems or ecosystems that are wet for a period of time. There are many definitions of wetlands in Queensland and which have been grouped into different types or classes based on their diversity, values and uses (see Figure 1 below). Wetlands can be natural, artificial or a mixture of both. Chemical changes and the life cycles of wetland plants and	Although highly variable, the extent of wetlands is a key indicator of their status, captured through the following indicators to describe overall change in natural wetland extent. Objective indicators: • Volumetric extent of wetlands does not decline. • Existing spatial extent of wetlands does not decline.	vii x Integrity	●

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
	animals combine to create a system that supports a healthy Great Barrier Reef by removing sediments and stoping chemicals getting into healthy rivers, the sea and the Reef. This objective includes lacustrine, palustrine, riverine and estuarine (mangrove and salt flat) natural wetlands, which are key contributors to the outstanding universal value of the Great Barrier Reef. Figure 1: Wetlands are usually divided into broad systems based on their general characteristics which is useful for managing wetlands with different functional needs.	• Spatial extent does not decrease. Where known, baseline period will be specified. 		
Wetland condition is improved	Wetlands provide essential functions and services in, and to, coastal and marine ecosystems by connecting sections of the landscape to allow animal and plant species to move and spread from place to place to maintain their populations, and filtering catchment runoff (GBRMPA 2019a and the Wetlands in the Great Barrier Reef Catchments Management Strategy 2016–21). Threats to wetlands include weeds and invasive animals, land development, changes in salinity, drainage and water extraction, and excessive land-based runoff of nutrients, pesticides and sediments (Wetlands in the Great Barrier Reef Catchments Management Strategy 2016–21). Wetlands support numerous species, making them diversity hotspots and key contributors to the outstanding universal value of the Great Barrier Reef.	Monitoring the extent of wetlands only partially informs an understanding of condition and impacts on them. For example, while a wetland may exist over a large area, its condition may be so degraded that it does not provide the range of values that it would if it was in a better condition. Four wetland environmental values are assessed, comprising a number of indicators of condition. Objective indicators: • Biological health and diversity of the wetland's ecosystems is improved. • The wetland's natural physical state and integrity is improved. • The wetland's natural hydrological cycle is improved. • The natural interaction of the wetland with other ecosystems, including other wetlands, is improved.	vii ix x Integrity	◐

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
		Where known, baseline period will be specified. Cultural heritage is intrinsically linked to the natural environment, and indicators for this connectedness are to be developed with Traditional Owners through the implementation of the Strong Peoples – Strong Country framework.		
Key values associated with islands are in a desired condition	The Great Barrier Reef ecosystem includes approximately 1050 islands, comprising of coral cays, continental islands and mangrove islands (GBRMPA 2019a). They are important refugia for animals and plants, and provide a number of ecosystem services, such as buffering the coast from storms, supporting nutrient cycling to adjacent marine ecosystems, and contributing to soil and sand formation (GBRMPA 2019a). Many have historic heritage sites and are of Indigenous heritage significance. They are threatened by sea-level rise, coastal erosion, severe weather (including cyclones and wildfires), marine debris and invasive species (GBRMPA 2019a). Great Barrier Reef islands provide a diversity of natural, cultural, social and economic values and these contribute to its outstanding universal value (see https://parks.des.qld.gov.au/managing/framework). Healthy islands are also important to support healthy fringing reefs. Desired condition means a realistic goal for the future condition of the key value.	In managing the Reef's protected islands, Queensland's Parks and Wildlife Service's Values Based Management Framework (VBMF) is utlised to prioritise actions to address the most pressing risks to the most important values towards having positive, ongoing outcomes. Objective indicators and reporting progress will be drawn from the VBMF and contribute to determining whether Natural, Cultural and Social Values are in the desired condition. The values are determined by stakeholder groups whose make-up is determined by the relative significance of the protected area but that should always include Traditional Owners as partners in management. Condition of values is expressed as a four point scale from Good to Critical. Examples of indicators are specified in the Health Check Guides developed by QPWS. Indicator themes include indices on ecosystem health, cultural heritage and visitor presentation, such as: • the extent, prevalence and scope of pest invasion, • extent and condition of habitat and regional ecosystems, • Functionality and health of key breeding and nesting sites • Protection of culturally sensitive sites • Availability and quality of visitor experiences at key visitor destinations.	ix vii x Integrity	

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
Populations of seabirds and shorebirds are healthy	The Great Barrier Reef Region supports breeding populations of 20 seabird species and approximately 41 shorebird species (GBRMPA 2019a). Seabirds and shorebirds have profound influences on island ecosystems by bringing nutrients from sea to land (GBRMPA 2019a). Changes in sea surface temperature affect food supplies and can have implications at a population level (GBRMPA 2019a). Other threats to seabirds and shorebirds include, but are not limited to, commercial and recreational fishing impacts on prey species, direct disturbance by recreation and tourism visitors to islands, the introduction of exotic plants and animals (including predation and disturbance by domestic and feral animals), and ingestion and use in nesting of marine debris (GBRMPA 2019a). Seabirds and shorebirds are attributes of the Great Barrier Reef's outstanding universal value.	Monitoring of seabird and shorebird populations needs to effectively describe healthy populations, detect adverse changes in population size, short-term changes in reproductive success, and identify the potential ecological and threatening processes that drive these changes (see Woodworth et al. 2019 and RIMREP seabird report - in preparation). Objective indicators are: • Trends in overall population size, reproductive population size, and population size at key sites are not declining, as measured by: o Abundance o Density o Mortality versus population size • Trends in key demographic parameters are not declining: o Fecundity o Recruitment o Adult and chick survivorship rates • Nesting (including roosting areas) and feeding and foraging habitats are maintained and in good condition. Where known, baseline period will be specified.	vii x Integrity	◐
Populations of protected species[1] are healthy	Protected species are those that are protected at an international, national, state or local level: • International level: species that are listed as vulnerable, endangered or critically endangered under IUCN (World Conservation Union) Red Data Book. • National level: species that are a listed threatened species, a listed migratory species or a listed marine species under *the Environment Protection and Biodiversity Conservation Act 1999*	In order to effectively describe healthy populations, monitoring of population-level indicators over long time scales is necessary to establish trends in distribution, abundance and threat exposure for adults and juveniles. Objective indicators: • Trends in population size are not declining, as measured by: o Abundance o Density o Mortality versus populations size	vii x Integrity	◐

[1] Excluding seabirds and shorebirds

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
	• State level: species of marine mammal, bird or reptile that are prescribed as endangered, vulnerable, and near threatened under the *Nature Conservation Act 1992* of Queensland • Local level: species referred to or mentioned in Section 30 of the *Great Barrier Reef Marine Park Regulations 2019*. Many protected animal species are attributes of the Great Barrier Reef's outstanding universal value. Populations of protected animal species are impacted by indirect pressures that affect their growth, fecundity, movements and mortality by causing changes in the status of the communities on which they depend for food, and direct pressures that cause mortality (Marsh et al. 2019). For many protected species, loss of even small numbers of individuals may have a substantial effect on population status, resilience and rate of recovery from past impacts (GBRMPA 2019a).	• Trends in recruitment are not declining, as measured by: o Encounter rate o Gender ratio o Neonatal mortality o Calving pairs o Hatchling production • Nesting and feeding habitat are available and in good condition. A list of protected species to be monitored will be developed. Where known, baseline period will be specified.		
Populations of species of cultural significance to Traditional Owners are healthy	The Great Barrier Reef has many species that are of cultural significance to Traditional Owners, which may include protected species. Cultural significance refers to aesthetic, historic, scientific, social or spiritual value for past, present or future generations. For a place, cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. (AICOMOS 2013).	The Strong peoples – Strong country framework is an Indigenous heritage monitoring framework connecting the health of the Reef and its catchment to Traditional Owners' quality of life. It provides a Traditional Owner-led approach for systematic monitoring of the condition of the Reef and its catchment as an Indigenous heritage asset. It reflects the Traditional Owner worldview that their quality of life is connected inseparably to and underpinned by, their land and sea country (Jarvis et al. 2019a). Indicators to describe healthy populations of	vii x Integrity	

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
		species of cultural significance will be developed through the implementation of this framework.		
Populations of bioculturally important fish and invertebrate species are healthy	Many Great Barrier Reef fish and invertebrate species are of biocultural importance to Traditional Owners. Biocultural heritage is a complex system of interdependent parts centred on the relationship between Indigenous Peoples and their natural environment. Its components include biological resources, from the genetic to the landscape level; and long standing traditions, practices and knowledge for adaptation to environmental change and sustainable use of biodiversity (international Institute of Environment and Development (n.d), About biocultural heritage, International Institute of Environment and Development)	The Strong peoples – Strong country framework is an Indigenous heritage monitoring framework connecting the health of the Reef and its catchment to Traditional Owners' quality of life. It provides a Traditional Owner-led approach for systematic monitoring of the condition of the Reef and its catchment as an Indigenous heritage asset. It reflects the Traditional Owner worldview that their quality of life is connected inseparably to and underpinned by, their land and sea country (Jarvis et al. 2019a). Indicators to describe healthy populations of species of bioculturally important fish and invertebrate species will be developed through the implementation of this framework.	ix vii x Integrity	○
Populations of fish and invertebrate species that are important for recreational, commercial and culturally-based fisheries are healthy	There are approximately 1625 bony fish species, 136 cartilaginous fish species (sharks, rays, skates and chimaeras) and over 12,000 described invertebrate species found in the Great Barrier Reef (GBRMPA 2019a), that contribute to its outstanding universal value. They influence habitat structure, population dynamics and the flow of energy and nutrient cycling (GBRMPA 2019a). Many species are of high ecological value and some are also of high cultural and economic value (GBRMPA 2019a). Significant threats continue to compromise the health and resilience of many species, including climate change, unsustainable fishing of target species, impacts on non-target species (including mortality), illegal fishing, and damage to habitats.	Key fishery species – indicators to be included. Monitoring of population status and trends needs to consider spatial differences in assemblage composition, including the survival of larval fish (Schaffelke et al. 2020). Objective indicators: • No less than 60 % biomass. • Recruitment rates are maintained or improved.	ix vii x Integrity	◐

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
Traditional Owners caring for country	Aboriginal and Torres Strait Islander peoples are the Traditional Owners of the Great Barrier Reef area and have a continuing connection to their land and sea country. Aboriginal and Torres Strait Islander peoples have cared for their sea country and heritage for tens of thousands of years (GBRMPA 2019b). Since colonisation, their sea country and cultural practices have come under increasing pressure from other uses. Many cultural practices linked with the Reef remain strong, whilst other Indigenous heritage values linked with the Reef have deteriorated with changes in the environment and impacts on heritage. Partnerships between Aboriginal and Torres Strait Islander peoples and other land and sea managers are increasingly important to assist with managing these external pressures. Despite this recent history, many Reef Traditional Owners remain connected to their sea country and strong in their culture (GBRMPA 2019b). Many people work tirelessly through their communities and various Aboriginal and Torres Strait Islander organisations to maintain the remaining heritage values of the Reef. Aboriginal and Torres Strait Islander peoples are increasingly re-asserting their role in managing their country through active engagement in on-country management and policy and planning programs.	The Strong peoples – Strong country framework is an Indigenous heritage monitoring framework connecting the health of the Reef and its catchment to Traditional Owners' quality of life. It provides a Traditional Owner-led approach for systematic monitoring of the condition of the Reef and its catchment as an Indigenous heritage asset. It reflects the Traditional Owner worldview that their quality of life is connected inseparably to and underpinned by, their land and sea country (Jarvis et al. 2019a). Indicators to demonstrate the protection and retention of traditional knowledge will be developed through implementation of this framework.	ix	○
Traditional knowledge about the Great Barrier Reef is	Aboriginal and Torres Strait Islander peoples have been linked with the Reef since time immemorial (GBRMPA 2019b). Knowing, managing, protecting, and having access to country (land and sea) and heritage, as well as being able to continue the oral history, transfer of knowledge and interaction with	The Strong peoples – Strong country framework is an Indigenous heritage monitoring framework connecting the health of the Reef and its catchment to Traditional Owners' quality of life. It provides a Traditional Owner-led approach for systematic monitoring of the condition of the Reef and its catchment as an Indigenous heritage asset. It reflects the Traditional Owner worldview that	ix	○

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
protected and retained for future generations	western science is a key component of Indigenous heritage values.	their quality of life is connected inseparably to and underpinned by, their land and sea country (Jarvis et al. 2019a). Indicators to demonstrate the protection and retention of traditional knowledge will be developed through implementation of this framework.		
Traditional Owners' rights are genuinely recognised and prioritised and inform and drive how benefits are shared	Aboriginal and Torres Strait Islander peoples are the first peoples of the Great Barrier Reef and their connection to country continues to be a key element of the ecosystems (ref LTSP Indigenous Targets Report 2014). They seek full recognition as the 'first peoples' of the Great Barrier Reef and, as such, to have a strong voice in its governance, especially in relation to conservation, management and use (ref LTSP Indigenous Targets Report 2014).	The Strong peoples – Strong country framework is an Indigenous heritage monitoring framework connecting the health of the Reef and its catchment to Traditional Owners' quality of life. It provides a Traditional Owner-led approach for systematic monitoring of the condition of the Reef and its catchment as an Indigenous heritage asset. It reflects the Traditional Owner worldview that their quality of life is connected inseparably to and underpinned by, their land and sea country (Jarvis et al. 2019a). Indicators to measure the extent to which Traditional Owners rights are recognised and the sharing of benefits will be developed through implementation of this framework.		○
Local Traditional Owner land and sea management organisations are equipped to operate at the right scale	To continue to deliver cultural responsibilities for sea country and lore, Aboriginal and Torres Strait Islander peoples have formed organisations to manage land and sea programs through administration, project officers and rangers. Many are Traditional Owner organisations, following cultural protocols and exercising cultural authority on behalf of specific Traditional Owner groups. These organisations can have partnerships with other organisations that also contribute to heritage management. Partnerships between Aboriginal and Torres Strait Islander peoples and other land and sea managers are increasingly important to assist with managing external pressures to the Great Barrier Reef (GBRMPA 2019b).	The Strong peoples – Strong country framework is an Indigenous heritage monitoring framework connecting the health of the Reef and its catchment to Traditional Owners' quality of life. It provides a Traditional Owner-led approach for systematic monitoring of the condition of the Reef and its catchment as an Indigenous heritage asset. It reflects the Traditional Owner worldview that their quality of life is connected inseparably to and underpinned by, their land and sea country (Jarvis et al. 2019a). Indicators to measure the capacity of Traditional Owner groups to undertake and participate in land and sea management will be developed through implementation of this framework.		○

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
Country is healthy and culture is strong	Country (land and sea) needs to be healthy for Traditional Owners to feel that they have carried out their cultural obligations and responsibilities in looking after country (Jarvis et al. 2019b). There are many places, especially in coastal systems and on islands, where there is pressure on sacred sites and other sites of cultural significance. This is particularly around areas of high development and those exposed to severe weather events (GBRMPA 2019b). Many cultural practices remain strong, whilst other Indigenous heritage values have deteriorated with changes in the environment and direct impacts (GBRMPA 2019b). For example, story, language, songlines and totems are being affected by activities such as shipping, anchoring and dredging (GBRMPA 2019b). The specific wording in the retrospective Statement of Outstanding Universal Value for the Great Barrier Reef (2012) under criteria (ix) refers to "*Man's interaction with his natural environment*" is of particular significance to Aboriginal and Torres Strait Islander peoples who have lived in the area for 40,000 years and have strong connections to what we know today as the Great Barrier Reef (Day 2012).	The Strong peoples – Strong country framework is an Indigenous heritage monitoring framework connecting the health of the Reef and its catchment to Traditional Owners' quality of life. It provides a Traditional Owner-led approach for systematic monitoring of the condition of the Reef and its catchment as an Indigenous heritage asset. It reflects the Traditional Owner worldview that their quality of life is connected inseparably to and underpinned by, their land and sea country (Jarvis et al. 2019a). Indicators to describe healthy country and strong culture will be developed through the implementation of this framework.	ix	○
Uses of the Reef are ecologically sustainable as the system changes, in turn sustaining economic	Since European settlement, use of the Great Barrier Reef has increased through a combination of direct commercial and non-commercial uses (Reef-dependent uses) and Reef-associated uses that require access through (or to) the area (GBRMPA 2019a). The Great Barrier Reef has an economic, social and icon asset value of $56 billion. It supports 64,000 jobs and contributes $6.4 billion per year to the Australian economy. Millions of visitors each year come to enjoy its beauty above and below the water. For more than 40 years, implementation of government management plans and policies have had to balance the protection of the Great Barrier Reef	Monitoring of the economic benefits that people derive directly or indirectly from a healthy and well-managed Great Barrier Reef is an aspect of 'healthy people' and provides important context for management and an indication of how natural values interact with social and economic benefits. These benefits are derived from both Reef-dependent (e.g. commercial fishing, tourism, recreation, research) and Reef-associated (e.g. shipping, catchment industries such as agriculture, urban, industrial and ports) uses (Gooch et al. 2019). Objective indicators:		◐

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
benefits to people	against the needs of communities and industries that depend on the Reef for traditional use, social and cultural purposes, and livelihoods. Factors such as climate change and coastal development that influence the Great Barrier Reef have changed and intensified over the years, making this management balance more challenging. To be within ecologically sustainable limits of the Reef ecosystem as it changes, the co-existence and operation of Reef-dependent and Reef-associated activities must not compromise other objectives of the Plan or the health and resilience of the Great Barrier Reef. This applies at all scales from local to Reef-wide. With the Reef changing in complex ways, and uncertainty about futures under ongoing climate change, there is a need to build preparedness and adaptive capacity of people and industries. This will help them to navigate through potentially major and uncertain changes.	• Recreational and tourism visitor benefits are sustained and maintained within ecologically sustainable limits. • Recreational and commercial fishery benefits are sustained and maintained within the ecologically sustainable limits of the whole system as it changes. • The number of businesses transitioned to green energy and/or using other reef sustaining measures continues to rise. • The adoption of best practice by agricultural; reef recreational users; industry and urban sector; and marine industries is increased. • The number of reef-dependent industries with low climate risk/vulnerability ratings is increased. • Adaptive capacity of Reef users continues to improve. • Reef-dependent and reef-associated industries are undertaken in ways that protect the health of the Reef. • Improved economic confidence in the Great Barrier Reef Region. • Improved level of knowledge of ecological thresholds.		
People maintain or grow their attachment to the Great Barrier Reef	The Great Barrier Reef is considered Australia's most inspiring landmark by the general Australian population and, nationally, the most socially significant natural environment (GBRMPA 2019a). People across the world and in its catchment love the Great Barrier Reef and value it at $56 billion dollars (DAE, 2017).	Association with the Great Barrier Reef creates a strong sense of place attachment and identity within the community (Gooch et al. 2019). Objective indicators: • Community health, wellbeing, satisfaction associated with the Great Barrier Reef is maintained or improved. • For (i) Great Barrier Reef region residents, (ii) the Australian public, and (iii) International community, scores of the below are maintained or improved: o place attachment o identity associated with the Reef o pride in the Reef o personal connections to the Reef	vii	◐

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
		o non-use values for Reef protection		
People and communities take individual and collective action to maintain its resilience	Communities with a relationship with the Great Barrier Reef range from residents in catchment towns and cities, to people across the nation or globe, that may either have an interest in the Great Barrier Reef or influence (directly or indirectly) the condition of the Great Barrier Reef (re RIMReP HD Report). Cohesive vision and aspirations for the future of the Great Barrier Reef, together with awareness, skills, knowledge and capacities, is necessary to turn aspirations into action (re RIMReP HD Report). To ensure the resilience of the Great Barrier Reef, individual and collective stewardship efforts are required.	An informed community has a role to play in protecting the benefits of the Great Barrier Reef for current and future generations (re RIMReP HD Report). Objective indicators: • Levels of community awareness and education about the Great Barrier Reef is maintained or improved. • Opportunities for community leadership and stewardship are increased and supported. • Multiple dimensions of community capacity for stewardship are maintained or improved. • Adoption of stewardship practices by the community are maintained or improved. • Skill gaps are closed. *Note: needs to be refined to clarify what this is intended to refer to*. Where known, baseline period will be specified.		○
Intangible and tangible historic heritage and contemporary cultural values remain intact	Non-Indigenous cultural heritage includes buildings, monuments, gardens, industrial sites, landscapes, cultural landscapes, archaeological sites, groups of buildings and precincts, or places which embody a specific cultural or historic value (Gooch et al. 2019). Historic heritage relates to the occupation and use of an area since the arrival of European and other migrants, and describes the way in which the many cultures of Australian people have modified, shaped and created the cultural environment (Gooch et al. 2019, GBRMPA 2019a). By its nature, historic heritage will continue to evolve, representing the flow of history, changing community perceptions and contemporary attributes (GBRMPA 2019a). Maintaining connections to these heritage values promotes a sense of place associated with Great Barrier Reef communities. In turn, this may also	Contemporary cultural and heritage connections promote a sense of place associated with Great Barrier Reef coastal communities (Gooch et al. 2019). Objective indicators: • Protection of tangible historic maritime heritage assets (e.g. lighthouses and shipwrecks) is maintained or improved. • Aesthetic values scores are maintained or improved. Where known, baseline period will be specified.	vii Integrity	◐

Objective	Narrative	Indicators	OUV Criteria	Level of Knowledge
	encourage care and protection of the Great Barrier Reef.			
Governance systems to prioritise, adapt and engage communities in systems for Reef management are effective	Governance arrangements for the Great Barrier Reef have become more complex (GBRMPA 2019a). The multi-tiered governance and management regime is not designed to directly address the effects of a changing climate. As such, managers are increasingly intervening where critical habitats or species require assistance (GBRMPA 2019a). Reef-based decision-making systems (from local to international scales) need to include levels of connectivity between different parts of the governance system and the community to ensure effective use of diverse knowledge sets to deliver system capacity for effective action for Reef health outcomes.	A multi-tiered governance and management regime for the Great Barrier Reef and its catchment exists and aims to protect biodiversity, ecosystem and heritage values through a range of management tools. Objective indicators: • Availability of integrated knowledge sets is improved. • Extent to which integrated knowledge sets are used in decision making is improved. • Management of integrated knowledge sets is improved. • Integrated monitoring and reporting across social and ecological reef systems is improved. • Decision-making and planning processes improve over time to be more inclusive and recognise the rights and interests of stakeholders, Traditional owners and communities. • Organisational and collective capacity for adaptive management and decision-making increases. • Policy and program coherence (between tiers of government and between portfolio areas) is improved. • Risk rating of key governance domains is maintained or reduced. • Community satisfaction with governance and management in maintained or improved. Where known, baseline period will be specified.	adequate protection and management system	

Level of confidence[2]:

- ● Adequate high-quality evidence and high level of consensus
- ◐ Limited evidence or limited consensus
- ○ Inferred, very limited evidence

TABLE 2: Management goals to reduce cumulative impacts and protect and conserve the Reef, and associated indicators to guide evaluation and progress reporting

Management goal	Narrative / description	Indicators	Confidence
M1: Australia contributes to global emissions reduction, through the Paris Agreement, to limit warming to well below 2°C and as close to 1.5°C as possible	Concerted global action to limit global warming is critical to the future of the Reef – and all other coral reefs. The Paris Agreement aims to keep global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C above pre-industrial levels. Limiting global temperature rise to the maximum extent possible, and certainly within the objectives of the Paris Agreement, is critical to improve the outlook for the Reef. Within the Paris Agreement objectives, the 1.5°C ambition would deliver a far better outcome for the Reef than the 'well below 2°C' ambition.	National emission reductions *<u>Note:</u> There are two types of reporting included in the national greenhouse accounts. Past and present national emissions and the trajectory of past or present emissions are reported in the National Inventory Report (released quarterly). For forward estimates, the National Projections provide an emissions outlook.*	●
M2: Integrated planning across catchment and Reef reduces cumulative impacts	Management of cumulative impacts should consider how decisions about planning, programs, development assessment and on-ground actions within the Great Barrier Reef, along the coast, in coastal catchments and globally will impact Great Barrier Reef values. Cumulative impacts should be considered at all scales of decision-making and applied proportionately to the nature and scale and risk of likely impacts.	The rates of inclusion of cumulative impact assessment in decision making at various scales is improved. The number of joint policy, positions, strategies, programs where GBR values are considered in planning activities is increased. Where known, baseline period will be specified	◐

[2] Confidence - this has the same meaning as in the Great Barrier Reef Outlook Report assessments

Management goal	Narrative / description	Indicators	Confidence
M3: Indigenous Heritage Goals are considered, integrated and progressed in partnership	This is an overarching management goal (M3) regarding Indigenous heritage, and is supported by the following suite of Indigenous heritage goals. A group of Traditional Owners were consulted in the preparation of the updated Plan as Indigenous heritage experts and provided these goals for inclusion in the Plan. • **IH1**: Increase in Traditional Owner led co-designed and co-delivered water quality projects. • **IH2**: Traditional Owner Indigenous heritage, rights and responsibilities are incorporated into all facets of management. • **IH3**: Formal and informal partnerships between Traditional Owners and all stakeholders are increased to ensure key Reef heritage values are identified, documented, protected and monitored to be measured by the Strong Peoples - Strong Country Indigenous Heritage Monitoring Framework. • **IH4**: Traditional Owner-developed Indigenous Knowledge Management Systems enable the appropriate collection, handling and / or sharing of Indigenous heritage and knowledge information. • **IH5**: Traditional Owner protocols for managing information and agreements relating to Indigenous heritage and knowledge information are adopted by Reef 2050 partners and stakeholders. • **IH6**: The number of formal and informal agreements with Traditional Owners addressing management of ecosystems within their traditional estate is increased in line with the Strong Peoples - Strong Country Indigenous Heritage Monitoring Framework. • **IH7**: Increase in co-design and co-delivery in the management, conservation and ecologically sustainable use of cultural keystone species and biocultural resources. • **IH8**: Customary use of biological resources, in accordance with traditional cultural practices that are compatible with	To be developed by Traditional Owners through the implementation of the Strong Peoples - Strong Country Indigenous Heritage Monitoring Framework. The Strong Peoples – Strong Country Indigenous Heritage Monitoring Framework is designed to operate under the Reef 2050 Integrated Monitoring and Reporting Program, and connects the health of the Reef and its catchment to the quality of life enjoyed by Traditional Owners. The framework reflects the Traditional Owner worldview that their quality of life is connected inseparably to and underpinned by their land and sea country.	

Management goal	Narrative / description	Indicators	Confidence
	conservation or cultural use requirements, are formally recognised and respected by Reef 2050 partners and stakeholders. • **IH9**: The rights of Traditional Owners to derive benefits from the conservation and cultural use of biological resources are recognised and the number of benefit-sharing initiatives and agreements with Traditional Owners is increased. • **IH10**: The number of employment opportunities for Traditional Owners in sea country management and Reef-based industries increases annually. • **IH11**: There is an annual increase in the number of Traditional Owner service providers and viable businesses. • **IH12**: The rights of Traditional Owners to derive economic benefits from the conservation and cultural use of biological resources are recognised and access, benefit sharing initiatives and agreements with Traditional Owners is increasing. • **IH13**: Traditional Owner Governance capacities in sea country is enhanced and measured against the Strong Peoples: Strong Country Framework. • **IH14**: A GBR Traditional Owner-led Sea Country Alliance is established in 2023 to ensure an equal voice in all decision-making. • **IH15**: A Tripartite Agreement is negotiated between the Australian and Queensland Governments and the GBR Traditional Owners with their free, prior and informed consent. • **IH16**: Accredited cultural competency of Reef 2050 partners and stakeholders is implemented as best practice and identified in relevant operational plans. **Indigenous heritage** means Physical (tangible) and non-physical (intangible) expressions of Traditional Owners' relationships with country, people, beliefs, knowledge, law, language, symbols, ways		

Management goal	Narrative / description	Indicators	Confidence
	of living, sea, land and objects; all of which arise from Indigenous spirituality, including heritage places (sites) and/or values. Indigenous heritage includes everything in sea country, including natural values, Indigenous values and historic values.		
M4: The flow of water to the Reef is further managed through targeted catchment restoration to mitigate water quality impacts.	The hydrological processes within catchments set the backbone of all ecological functions and water quality outcomes. These catchment ecosystems and water quality outcomes in turn are in direct connection with the health of the marine environment to which they drain, and are impacted by factors such as pollution from transport, connectivity, and fish passages. Therefore, these have been of increasing concern for the long-term health of the Great Barrier Reef World Heritage Area. Targeted catchment restoration can help slow the flow of water from the catchment to the Reef. This is particularly important under ongoing climate change since there are predicted to be more intense rainfall events in the future.	Sensitive Urban Design and Best Practice agricultural water management adoption be increased. Surface roughness within the catchment is maintained or improved. The vegetation coverage within the catchment is maintained or improved. Priority fish passage barriers within catchments are provided with fish passage where possible. Where known, baseline period will be specified.	●
M5: Reef 2050 Water Quality Improvement Plan targets and ambient water quality guidelines are met	Refer to *Reef 2050 Water Quality Implementation Plan 2017-2022* targets: • 25% reduction in anthropogenic end of catchment fine sediment loads • 60% reduction in anthropogenic end of catchment dissolved inorganic nitrogen loads • 20% reduction in anthropogenic end of catchment particulate nutrient loads Refer to water quality guidelines for each region: • Wet Tropics region including all waters of the Daintree, Mossman, Barron, Mulgrave-Russell and Trinity Inlet, Johnstone, Tully, Murray, Hinchinbrook Island and Herbert River basins. • Townsville region including all waters of the Black and Ross River basins, Cleveland Bay, Magnetic Island.	• Anthropogenic fine sediment loads to the Great Barrier Reef • Anthropogenic dissolved inorganic nitrogen loads to the Great Barrier Reef • Anthropogenic sourced particulate nutrient loads to the Great Barrier Reef • Dissolved oxygen • pH • Ammonia nitrogen • Oxidised nitrogen • Particulate nitrogen • Total nitrogen • Filterable reactive phosphorus • Particulate phosphorus • Total Phosphorus • Chlorophyll a • Dissolved organic carbon • Pesticides • Turbidity • Secchi disc depth	●

Management goal	Narrative / description	Indicators	Confidence
	• Mackay-Whitsundays region including all waters of the O'Connell, Pioneer and Proserpine River basins, Plane Creek and Whitsunday Island basins, Repulse Bay, the Whitsundays. • Capricorn and Curtis Coast region including all waters of the Styx, Shoalwater and Water Park Creek Basins, Keppel Bay, the Boyne, Calliope and Curtis Island Basins, including Gladstone Harbour, the Narrows, lower Fitzroy estuary. • Other basins include Cape York, Wet Tropics (coastal waters), Burdekin-Don-Haughton, Mackay-Whitsunday (coastal waters) and the Fitzroy region	• Total suspended solids	
M6: The threats associated with fishing are reduced	Fishing is the largest extractive use of the Great Barrier Reef Region and comprises a range of fishing activities targeting a variety of species, including fishes, crabs and prawns. This management goal refers to fishing associated with recreational, cultural, charter and commercial fisheries. A number of threats associated with fishing (illegal fishing, incidental catch of species of conservation concern, discarded catch, extraction of predators and particle feeders, and extraction from unidentified or unprotected spawning aggregations) are rated as high or very high risk.	Incidence of the below is declining: • Illegal fishing; • Unsustainable extraction of predators; • Unsustainable extraction of particle feeders; • Extraction from unidentified or unprotected spawning aggregations; • Incidental catch of protected species; • Incidental catch of protected and at-risk sharks and rays; Amount (tonnes) and species composition of discarded catch. Where known, baseline period will be specified.	
M7: Outbreaks of disease, introduced species and pests are reduced	Diseases are infections of plants and animals by pathogenic microorganisms, such as bacteria, viruses, fungi and parasites. Although many of these microorganisms are naturally present in the environment and usually do not cause widespread disease, outbreaks can occur when microorganism abundance increases rapidly or the immunity of a potential host is compromised. Environmentally induced disease outbreaks can occur, such as white syndromes disease of corals during marine heatwaves.	• Presence and abundance of indicator species of bacteria, viruses, fungi and parasites is reduced. (Indicator species of concern to be identified where possible). • Presence of scars etc. caused by disease, introduced species and pests is reduced. • Presence and abundance of COTS per manta tow is reduced. • Presence and abundance of weeds is reduced. • Presence and abundance of pest species is reduced.	

Management goal	Narrative / description	Indicators	Confidence
	Crown-of-thorns starfish are native coral predators on the Reef, and high densities of these starfish can lead to outbreaks. At natural densities (less than one starfish per hectare), the starfish do not pose a threat to coral reefs because coral growth rates exceed predation rates. However, when densities of starfish reach a point where the consumption of coral tissue exceeds coral growth (approximately 15 starfish per hectare), an outbreak is established. Introduced species or 'pests' include non-native plants or animals that establish beyond their natural range and threaten values within their new range. Introduced species are a threat to native plants and animals because they compete for food and space, and in some cases may directly prey on native species.	• Signs of grazing from non-native species are reduced. • Presence of feral animal tracks, trampling, digging, rooting is reduced. • Presence and amount of feral animal dung is declining. Where known, baseline period will be specified.	
M8: Anthropogenic noise impacts are reduced	Indirect environmental impacts associated with intermittent noise pollution. Note: This is still being discussed and developed.	Additional indicators to be established, current knowledge gap.	○
M9: Artificial light impacts are reduced	Artificial light impacts arise from a number of sources including from coastal and island infrastructure and shipping. Growth in shipping and urban and industrial development is likely to continue to increase the amount of artificial light. The main known issue is the effect of artificial light on turtle hatchlings' orientation, including where artificial light leads to misdirection, aggregation and increased predation. Current hotspots for elevated light near turtle nesting beaches include the Woongarra coast, Gladstone and Mackay. Other impacts include effects on fish behaviour, including on juvenile fish and the orientation of pelagic species around vessel lights, and potential effects on seabird behaviour.	An increase in use of light reduction technology. A reduction in artificial light impacts from sources within and adjacent to the Marine Park (e.g. time ships spent waiting at anchor reduced, marine park vessels operating in vicinity of turtle and seabird nesting areas implement light reduction strategies). A greater awareness of the impacts of artificial light pollution and an increase in light reduction behaviours of ports, shipping and coastal communities.	◐

Management goal	Narrative / description	Indicators	Confidence
M10: Marine debris and rubbish pollution is reduced	Marine debris, in particular plastic, causes environmental, economic, aesthetic and human health impacts. The most common marine debris found in the Great Barrier Reef Region are plastic remnants (including lids, wrap and containers), rope and net scraps, cigarette butts and rubber footwear.	Amount (tonnes) and composition of marine debris and rubbish collected declines over time. Amount (tonnes) and composition of marine debris and rubbish estimated to be present in the Reef. Where known, baseline period will be specified.	
M11: Targeted Marine Park management reduces local and regional risks and supports ecosystem resilience	Resilience refers to the capacity of the ecosystem to resist and recover from disturbance and undergo change while still retaining essentially the same function, structure and integrity. Targeted Marine Park management on a risk-basis and using a resilience-based approach is important for reducing local and regional risks and supporting ecosystem resilience.	Resilience-based management approach provides for the ecologically sustainable use of the Marine Park whilst ensuring ongoing protection of its values and ecological processes. Reef Joint Field Management Program 5-year strategy targets are met. Under development. Feedback to inform the selection of indicators is encouraged.	
M12: Potential Reef restoration and adaptation interventions are developed and deployed on a risk-basis.	Significant work is underway to develop restoration and adaptation interventions to try to help the Great Barrier Reef ecosystem while climate change is addressed. Small-scale interventions and trials are underway in the Marine Park and other potential intervention options are at earlier stages of development, where project outcomes are mainly about proving a concept, advancing techniques, or addressing critical information gaps in our knowledge and understanding. Over time, as options are developed, the focus is anticipated to shift to more to interventions at a range of scales. This will be done using risk-based processes (such as staged trials), and these will be managed in a way that is socially and culturally responsible and open to public scrutiny.	Under development. Feedback to inform the selection of indicators is encouraged.	

Level of confidence[3]:

- ● Adequate high-quality evidence and high level of consensus
- ◐ Limited evidence or limited consensus
- ○ Inferred, very limited evidence

TABLE 3: Management goals to enable delivery, and associated indicators to guide evaluation and progress reporting

Goal for enablers	Narrative / description	Indicators	Confidence
E1: The vulnerability of sectors and economies dependent on Reef health is reduced, and users of the Reef are preparing for changes to the Reef	Monetary and non-monetary benefits that people derive directly or indirectly from a healthy and well-managed Great Barrier Reef. Fundamental is the premise that economic activities within the Great Barrier Reef and its catchments are ecologically sustainable, and must not compromise objectives and other management goals of the Plan or the health and resilience of the Great Barrier Reef. Vulnerability is a function of exposure, sensitivity and adaptive capacity (in a linked social-ecological system; Marshall et al. 2013). Five domains of adaptive capacity are: (1) assets, (2) flexibility, (3) organisation, (4) learning, (5) agency (Cinner et al 2018). With the Reef changing in complex ways, and uncertainty about futures under ongoing climate change and other drivers, there is a need to build preparedness and adaptive capacity of people and industries. This will help them to navigate through potentially major and uncertain changes.	Cumulative impact on the Reef from community, industry and government is understood and reduced. The number of regional, sectoral and/or enterprise level response plans based on low climate risk / vulnerability assessments is increased. The number of new restoration service industries, value-adding to existing industries and novel financing mechanisms are increased. Opportunities to maximise benefits within sustainable limits for the changing Reef are increased. Opportunities to transition to different economic activities that are ecologically sustainable and aligned with the changing Reef are increased.	◐
E2: Science and knowledge are advanced and decisions are	Efforts to advance science and knowledge, and to facilitate its wide uptake, play an important role in enabling the protection and management of the Reef and its catchment.	The synthesis of science and knowledge for management purposes enables progress under the Plan towards management goals and the vision.	◐

[3] Confidence - this has the same meaning as in the Great Barrier Reef Outlook Report assessments

Goal for enablers	Narrative / description	Indicators	Confidence
informed by the best available evidence-base	A holisitic scientific perspective is important. Robust science, traditional and intergenerational knowledge are key to understanding the condition of the Reef and its catchment, how it is changing and whether actions to improve its health are working. An evidence-based approach is fundamental to delivery of the Reef 2050 Plan, and to decision-making about protection and management of the Reef and its catchment.	Co-ordinated and integrated modelling, monitoring and reporting of the Reef's values and processes delivers a system-understanding of the many components of the Reef, how they interact, how they affect each other and how they are reacting as a system to external pressures and mitigation efforts. The establishment of a Great Barrier Reef decision support framework that facilitates the development of specific tools to underpin operational, tactical and strategic decision-making. The integration of Traditional knowledge into adaptive management practices by managing agencies is increased. Additional indicators may be established. Feedback to inform the selection of indicators is encouraged.	
E3: Governance systems are effective and coherent	The health of Reef-based decision-making systems (from local to international scales), including levels of connectivity between different parts of the governance system, effective use of diverse knowledge sets and system capacity for effective and timely action. The viability of institutional arrangements; community participation in Reef management; and use of strong principles in planning and management is also an important consideration.	Policy and program coherence is increased (between tiers of government and between portfolio areas) to enhance desired management outcomes. Additional indicators will be established. Feedback to inform the selection of indicators is encouraged.	◐
E4: Communities, industries and governments adopt stewardship behaviours	To address the cumulative pressures, personal and collective (including industry) effort is necessary to: • minimise impacts on the Great Barrier Reef and its catchment; • restore degraded marine, coastal and catchment ecosystems; • apply ecologically sustainable development principles; and	The data capture (reporting?) and use of environmental stewardship behaviours for all enterprise types or sectors is improved.	◐

Goal for enablers	Narrative / description	Indicators	Confidence
	• be actively involved in Great Barrier Reef and catchment management.	Reported self and collective efficacy for protective or restorative actions improve or maintained at 2020 levels. Increased adherence (adoption) and participation in stewardship behaviours and practices	
E5: Comprehensive monitoring, evaluation and reporting supports informed and agile management responses	Comprehensive monitoring, evaluation and reporting is important to guide management, and is well-developed in the Reef context. To evaluate the effectiveness of management actions and respond to challenges faced by the Reef, managers and stakeholders need up-to-date, reliable information on the Reef's condition, and the driving forces and pressures impacting it. Conditions can change rapidly. To enable agile responses, information needs to be in an accessible, usable format to enable effective preparation and response. Monitoring and evaluation is essential to determine if management responses need to be adapted to achieve the desired objectives. Management responses need to be agile, and priorities may need to be revised to achieve these outcomes.	Under development. Feedback to inform the selection of indicators is encouraged.	◐

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Australian Government

Queensland Government

Reef 2050 Long-Term Sustainability Plan Public Consultation Draft

AUGUST 2020

This draft Plan for public consultation is the result of the first five-yearly review and update of the Plan.

Advice and feedback received through the public consultation process, and any additional relevant information, will be considered prior to finalising the updated Plan.

This report should be attributed as '*Reef 2050 Long-Term Sustainability Plan—Public Consultation Draft May 2020*, Commonwealth of Australia 2020.

Reef 2050 Long-Term Sustainability Plan
Public Consultation Draft

AUGUST 2020

Aboriginal and Torres Strait Islander peoples are the Traditional Owners of the Great Barrier Reef area and have a continuing connection to their land and sea country

MINISTERS' FOREWORD

We must first acknowledge that at the time of releasing this draft plan for public comment people around the world are being severely impacted by the COVID-19 pandemic. We don't know how long the pandemic will last or how severe it may become. The priority for the Australian and Queensland governments is the health of our people.

We are also acutely aware of the extreme impact that COVID-19 is having on communities, businesses, organisations and workers dependent on the Reef. In addition to health impacts, COVID-19 travel and social restrictions are creating difficult economic conditions that pose increasing challenges for protecting and managing the Great Barrier Reef. The full extent of the implications of the pandemic on the Reef is yet to be known.

Despite these extraordinary challenges, we know that Australians are passionate about the Reef and do not wish to lose momentum in the work that is underway for its protection.

This document is the result of the first five-yearly review of the Reef 2050 Long-Term Sustainability Plan. Since the Plan was launched in 2015 significant progress has been made. The legislation and programs that are now in place are delivering good results and provide a strong foundation for work going forward.

We are continuing to provide substantial investment and effort to implement the Plan. In 2015, the Reef 2050 Plan Investment Baseline projected that the Australian and Queensland governments would invest around $2 billion over the decade from 2014-15 to 2023-24 on implementation of the Plan. Efforts have been accelerated since that time, and together the Australian and Queensland governments' investment is now calculated to be more than $2.7 billion over these 10 years.

We are proud of the progress made under the Plan so far, including delivering improvements to water quality, tackling outbreaks of crown-of-thorns starfish, doubling the on-ground joint field management program and rehabilitating island and coastal habitats. However, the challenges are great and we know that regulation and government investment alone will not be enough; we all must act.

Mass coral bleaching has occurred on the Reef again in 2020, following consecutive years of bleaching in 2016 and 2017. The full extent of this event, and its effect on the ecosystem including coral-dependent fish, will be investigated in the coming months, with COVID-19 restrictions also likely to have some impact on the ability of scientists to do this work. The unprecedented nature of three mass coral bleaching events within five years cannot be overstated. It confirms the urgent need to do all we can to ensure that the Reef can be sustained as a living natural and cultural wonder of the world.

The update of the Plan is an opportunity to channel everyone's efforts around the task of supporting the health and resilience of the Reef. We need to reduce our greenhouse gas emissions as part of global efforts to address climate change, improve water quality, ensure our use of the Reef and its catchment are sustainable, and rehabilitate areas where we can.

The strength of the Plan is the partnerships between governments, industry, land managers, scientists, Traditional Owners and the community on which it is founded. The draft Plan has been prepared with significant input and advice from the Reef 2050 Advisory Bodies – the Reef 2050 Plan Independent Expert Panel and the Reef 2050 Advisory Committee. Further targeted consultation has occurred with Traditional Owners to better include their aspirations in the Plan. We would like to take this opportunity to thank all those who have contributed to the draft updated Plan for their time and effort.

We invite you to provide feedback on this draft updated Plan and identify the actions you can take within its framework. We appreciate your engagement and input into the review of the Plan in this challenging time and we value your ongoing contribution to protect and sustain the Reef.

The Hon Sussan Ley MP

Australian Minister for the Environment

The Hon Leeanne Enoch MP

Queensland Minister for Environment and the Great Barrier Reef, Minister for Science and Minister for the Arts

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EXECUTIVE SUMMARY

Overview

The overarching vision of the Reef 2050 Long-Term Sustainability Plan (the Plan) is that *the Great Barrier Reef is sustained as a living natural and cultural wonder of the world.*

The World Heritage listed Great Barrier Reef (the Reef), stretching 2300 kilometres along the east coast of Queensland, is a diverse and unique ecosystem that is recognised as a natural wonder of the world. It is one of the best known and most complex natural systems on Earth, has developed over millions of years, and contains a unique range of ecological communities, habitats and species. The Reef's biodiversity, sheer size and interconnected nature were some of the reasons it was listed as a World Heritage Area. The Reef is more than the sum of its multitude of species and habitats. Its wholeness, intactness and how it functions are also key to its integrity. It is a place of Outstanding Universal Value.

The Reef is, and will continue to be, a multiple use Marine Park. The Reef is critical to the tourism industry and the millions of coastal residents who use it. This immense ecosystem supports an estimated 64,000 jobs and generates an annual income of $6.4 billion to the Australian economy.[1] Most of this is from tourism, with the Reef attracting more than two million visitors each year from across the globe.

There is a united drive from governments, industry, land managers, scientists, Traditional Owners and the community to protect and sustain the Reef for future generations. The Plan is Australia's overarching long-term strategy for protecting and managing the Reef to support its health and resilience.

The Plan is underpinned by a strong legislative and governance framework built by the Australian and Queensland governments over more than 40 years of cooperation to protect, conserve and manage the Reef. Key pieces of legislation include the *Great Barrier Reef Marine Park Act 1975* and the *Marine Parks Act 2004* (Queensland). The Great Barrier Reef Marine Park is protected as a matter of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999*.

The condition of the Reef

The Reef is an ecosystem that is under pressure. The *Great Barrier Reef Outlook Report 2019* (the 2019 Outlook Report) concluded that the future outlook for the Reef's ecosystem has deteriorated from poor to very poor.

Global warming and the climate change it drives is the most serious and pervasive threat to the Reef. The future long-term outlook is critically dependent on limiting global temperature rise to the maximum extent possible. [2]

Climate change impacts are being amplified by other threats including land-based run-off from agricultural, urban and industrial sources. The Reef has been impacted by three mass coral bleaching events within five years. In 2020, severe bleaching was more widespread than in previous bleaching events in 2016 and 2017. While major tourism areas of the Reef mostly had negligible or moderate bleaching in 2020, areas in the southern part of the Reef that escaped much of the impact in 2016 and 2017 were severely affected by this third event.

Inshore areas of the Reef continue to be exposed to elevated concentrations of fine sediments and excess nutrients that adversely affect the water quality of the Reef ecosystem and consequently its health. Other threats from direct human use include illegal fishing, bycatch of species of conservation concern, marine debris and artificial light pollution.

About the updated Plan

The Plan sets out the vision for the Reef that Australians will strive to achieve, as custodians of this World Heritage icon for the international community. It provides a strategic framework for action (Figure 1). The Plan is formed as a rolling series of plans, updated every five years with a long-term vision to 2050. It has been developed through collaboration with the Reef 2050 Plan Independent Expert Panel, Reef 2050 Advisory Committee and a group of Reef Traditional Owners.

The Plan focuses on actions to address key threats and support the health and resilience of the Reef. The updated Plan builds on the substantial work of the previous Plan released in 2015 and updated in 2018. It reflects the fact that existing programs and policies are effective but need to be maintained, intensified or adapted to meet accelerating threats, emerging needs and changing patterns of direct human use.

The updated Plan includes a greater focus on climate change and its impact on the Reef, empowering communities to take stronger action to protect the Reef, and increasing reflection on and inclusion of Traditional Owner aspirations. It is also the primary vehicle for coordinating a response to the 2019 Outlook Report, released by the Great Barrier Reef Marine Park Authority.

The updated Plan includes a renewed vision and outcomes framework (Figure 1) and has been repositioned as a more strategic document. The outcomes framework specifies a new suite of objectives for the Reef through to 2050, with management goals for 2025, which will focus effort and investment to achieve the vision. The objectives are set across four categories: habitats, species, Indigenous heritage and human dimensions. Management goals are set to reduce cumulative impacts to the Reef, protect and conserve the Reef, and to enable delivery. An overarching management goal regarding Indigenous heritage (M3) is supported by a suite of Indigenous heritage goals.

Responding to the challenge

What will be done to achieve these objectives and management goals is described in the ‘Responding to the challenge’ chapter, which includes five priority work areas and four cross-cutting enablers (Figure 1). Each section describes the work that will be undertaken and includes a table detailing the response, major policies and programs, strategic actions and how progress will be measured.

The five priority work areas are:

1. **Limit the impacts of climate change** by reducing greenhouse gas emissions as part of global efforts to address climate change, fostering partnerships and stewardship to support climate mitigation, and supporting adaptation of Reef communities and industries to a changing climate.

2. **Reduce impacts from land-based activities** by improving water quality, improving coastal planning, and encouraging responsible use and conservation efforts within the communities living alongside the Reef.

3. **Reduce impacts from water-based activities** by enhancing biodiversity protection, reducing impacts from fishing, supporting Traditional Owner management, improving management practices to reduce cumulative impacts, and preventing disease and pest incursions.

4. **Influence the reduction of international sources of impact** through Australia's international engagement to reduce pollutants and debris and to protect habitat for populations of migratory species.

5. **Protect, rehabilitate and adapt** by controlling established pests and outbreaks, undertaking intervention and restoration activities to assist rehabilitation of habitats and heritage sites, and supporting the adaptation of species and habitats to a changing climate.

The priority work areas are supported by four cross-cutting enablers that are essential to effective delivery: **Coordination and Empowerment**; **Science and Knowledge**; **Monitoring, Evaluation and Adaptive Management**; and **Investment**.

Implementation and reporting

The Australian and Queensland governments together are investing more than $2.7 billion over the decade from 2014-15 to 2023-24 to deliver the Plan.

The Plan will be implemented using an adaptive management approach, underpinned by the best available science and knowledge to guide ongoing action and investment. The Plan does not specify exactly how much funding needs to be invested, and where, in order to meet the objectives and management goals in the Plan. Trying to do this for such a large and complex set of interconnected actions would be speculative at best. However, it does outline the priority areas for investment and confirms the substantial financial commitment by governments, industry and community to manage the Reef and its catchment.

Reporting on collective efforts through the priority work areas and cross-cutting enablers will be published annually. A more detailed mid-term report on progress towards the objectives and management goals will be prepared in 2023. The separate *Reef 2050 Objectives and Management Goals* document provides detail on specific indicators that form the basis for measuring progress against the objectives and management goals.

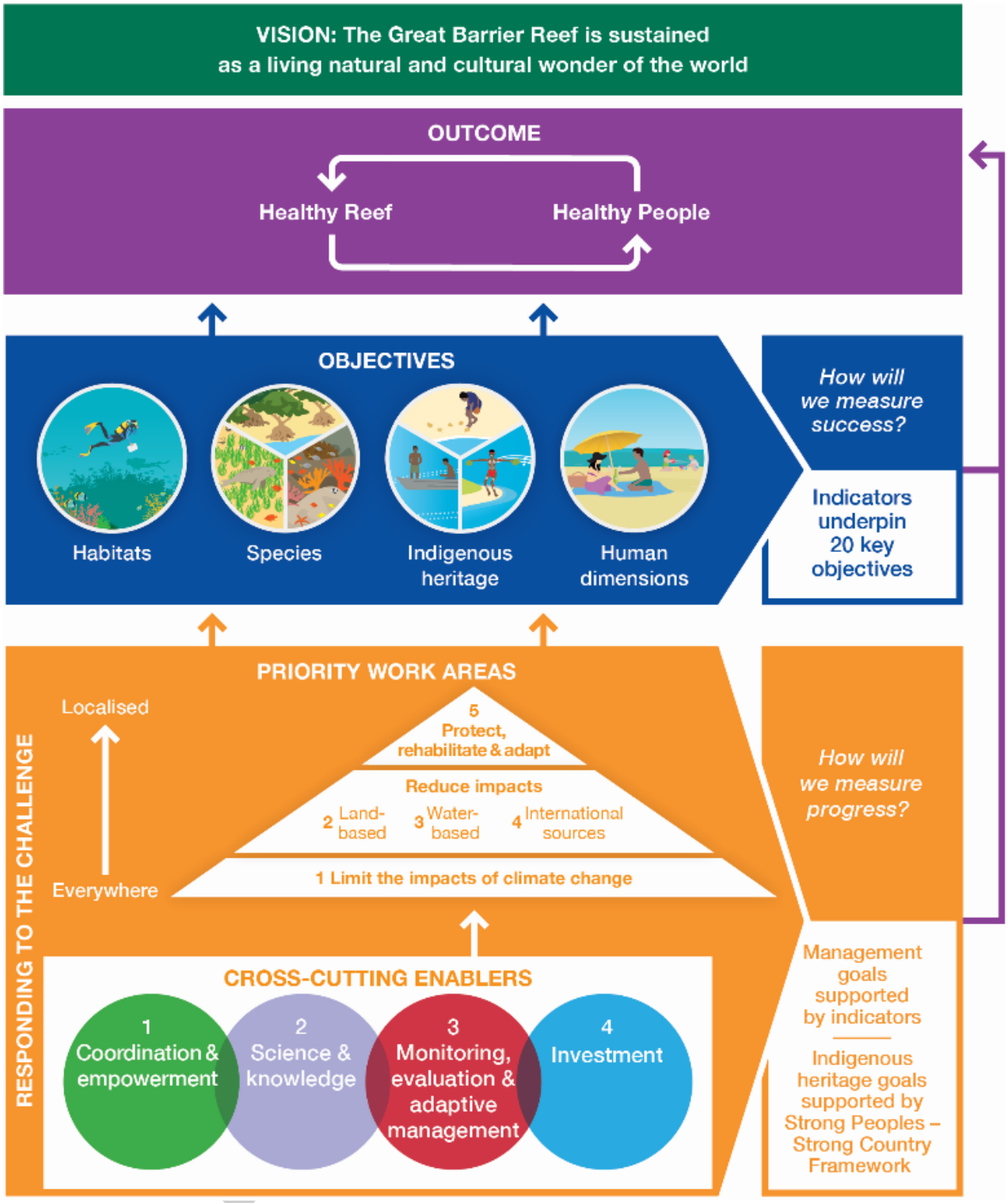


Figure 1: Reef 2050 Plan Outcomes and Implementation Framework

Figure 2: Map of the Great Barrier Reef World Heritage Area and catchment. The World Heritage Area includes all waters seaward of the low water mark, including those around 12 trading ports, and about 1050 islands. Appendix B describes the difference between the World Heritage Area, Region and Marine Park.

1: CONTEXT

What is the Great Barrier Reef?

The Great Barrier Reef (the Reef) is a network of almost 3000 coral reefs and a diverse array of non-reef habitats stretching 2300 kilometres along the east coast of Queensland. The Great Barrier Reef World Heritage Area covers an area of 348,000 square kilometres and has connections to the Torres Strait north of Cape York, the Coral Sea and the Great Sandy Strait, adjacent to Fraser Island in the south (Figure 2; Appendix B).

The Reef provides some of the most spectacular scenery on earth and is of exceptional natural beauty. It has developed over millions of years to cover a vast area producing an unparalleled natural wonder visible from space. The Reef as we know it today has been there for around 10,000 years, when the end of the last ice age caused a large coastal area to become part of the sea and the Reef established itself. This change is part of the dreamtime stories of the Reef's Traditional Owners who have lived through the Reef's evolution.

A healthy Reef is a productive reef. It is important to recognise that the Reef ecosystem is more than coral reefs. It contains vegetated islands and important coastal areas including wetlands, beaches and mangroves. The vast network of non-reef habitats range from shallow estuarine areas with seagrass beds, mangroves and sponge gardens, to deep oceanic areas more than 250 kilometres offshore.

KEY FACTS:

There are over 1200 species of hard and soft corals that grow throughout the Reef.

Approximately 1625 species of bony fish.

Beaches and coastlines provide important habitats for marine turtles, crustaceans, worms, molluscs and approximately 80% of Australia's shorebird species.

15 seagrass species occupy extensive meadows along the Reef and are the primary food source for dugongs and turtles.

The open ocean links all habitats within the Reef ecosystem.

Agricultural land makes up over 80% of the 424,000 km^2 Catchment.

157 rare or threatened animals depend on the Reef, including seabirds, shorebirds, turtles, dugong, dolphins and whales.

136 shark and ray species.

1050 islands (cays, continental, and mangrove islands) support over 200 bird species.

Over 880 species of algae provide food, habitat and reef stabilisation.

Lagoon floor ecosystems account for approximately 61% of the World Heritage Area and support over 5000 species.

The Reef is a focus for coastal resource use by Traditional Owners.

The Reef and many of its species, particularly fish, seabirds and marine reptiles, also depend on its connections to the coastal ecosystems of the adjacent catchments like adjoining mangrove forests, saltmarshes and freshwater wetlands. It is the interconnectedness of all these different habitats and how they work together that makes the Reef so special. The Reef is more than the sum of its parts; it is this integrity, or wholeness and intactness, that contributes to the Outstanding Universal Value ascribed to it by the World Heritage Committee in 1981.

The Reef and its catchment are rich in Indigenous heritage, which is fundamentally linked to the condition of land and sea. More than 70 Aboriginal and Torres Strait Islander Traditional Owner groups have long, continuing relationships with the Reef and its catchment stretching back over 60,000 years. Strong social and cultural connections with the Reef are also evident among the scientific community and people who rely on, or use, the Reef for their livelihoods, recreation and wellbeing.

What is the value of the Reef?

The Reef is an international icon and valued as Australia's most acclaimed natural asset for its unique biodiversity, cultural significance and immense ecological scale. The Reef meets all four of the UNESCO natural criteria for World Heritage listing. It is recognised for its natural beauty and natural phenomena, ecological and biological processes, habitats for conservation of biodiversity and for containing major stages of the Earth's evolutionary history (Appendix C).

The Reef is an intrinsic part of culture for Traditional Owners, who continue to conserve and benefit from places of cultural significance and use the Reef's resources. For them, its value is immeasurable.

The Reef is critical to the tourism industry and the millions of coastal residents who use it. Aesthetic importance is not simply measured by reference to scenic beauty, or 'naturalness'. It includes the range of values that the community places upon the World Heritage Area, whether it be for recreation, wellbeing or parents fishing with their children. For the more than one million people who live in its catchment, the Reef provides important social, cultural and economic benefits (Figure 3). The Reef supports approximately 64,000 jobs and contributes around $6.4 billion to the Australian economy each year, mostly through tourism.[3] As an asset, its value has been estimated at $56 billion.[4]

The Reef supports a range of Reef-dependent commercial (e.g. tourism and fishing) and non-commercial uses (e.g. recreation, research) that collectively form an important part of the social and economic fabric that supports adjacent communities in the catchment. Reef-associated industries, while not directly dependent on Reef health for their economic sustainability, operate within the Reef (e.g. ports, shipping) or adjacent to it (e.g. agriculture) and have an important relationship with the Reef. There are also sites of historic heritage value, including shipwrecks, lightstations and aircraft wrecks, which contribute to the Reefs broader heritage.

Figure 3: The World Heritage Area contains a diverse range of habitats and species that comprise the overarching ecosystems of the Reef and its catchment. Traditional Owners have a continuing connection to their land and sea country; Indigenous heritage is interwoven across this landscape as well as a diverse range of human uses.

What is threatening the Reef?

The *Great Barrier Reef Outlook Report 2019* (the 2019 Outlook Report) found the condition of many of the Reef's natural values (including species, habitats and ecosystem processes) had deteriorated since 2014. It found the size of the Reef is becoming a less effective buffer to broadscale and cumulative threats and concluded that the future long-term outlook for the Reef's ecosystem had deteriorated from poor to very poor.

Global warming and the climate change it drives is the most serious and pervasive threat to the Reef — a threat in common with all coral reefs globally. Oceans absorb and store most of the excess heat caused by greenhouse gas emissions and marine ecosystems become stressed as ocean temperatures rise.[7] Extreme temperature events driven by global warming are increasing in frequency and severity and have already caused significant mortality in corals and other species (including fish and invertebrates). These temperature extremes caused widespread coral bleaching in 2016, 2017 and now 2020. This, coupled with an ongoing crown-of-thorns starfish outbreak, has depleted live coral cover in many areas.

Global warming from greenhouse gases is also changing weather patterns and altering ocean currents. For example, cyclones are intensifying and the east Australian current, which flows southwards through the Reef, now extends approximately 350 kilometres south of where it reached historically. Increased carbon dioxide emissions are causing Reef waters to acidify slowly and this will reduce the ability of corals and other organisms to grow skeletons; for corals, this will lessen their ability to withstand cyclones. Changing weather patterns and altered ocean currents then affect the land, species and people through coastal erosion and inundation of habitats; for example, turtle nesting sites, causing mortality of hatchlings.

THREATS TO THE REEF[5]

Increasing temperatures are threatening most species and habitats in the Reef ecosystem.
Reef-dependent industries are affected when poor water quality degrades ecosystems.
The greatest water quality risks to the Reef and its coastal ecosystems are land-derived inputs from nutrients, fine sediments and pesticides.[6]
Overfishing of particular species and illegal fishing can impact food chains and ecosystem processes.
Marine debris can be eaten by wildlife or entangle them, impacting their health and potentially causing death.
Artificial light pollution from coastal infrastructure and ships can interrupt the navigation ability of marine species and disturb turtle hatchlings.

Regionally, land-based run-off threatens coastal and inshore habitats, particularly seagrass and coral reefs. Sediment and nutrient pollution from agricultural, urban and industrial activities is the main source of poor water quality entering the Reef. Excess sediment and nutrients can reduce light penetration into the water, which can affect the growth of important species that need light to photosynthesise, like seagrass. Sediment can smother animals and plants, and nutrients can increase growth of algae which compete for space with corals. Pesticides also adversely affect water quality and this impacts the Reef ecosystem.

The increasing pressures from expanding coastal communities, including associated coastal development, have a wide range of direct and cumulative impacts on ecosystems.[8] Direct human use impacts were recognised in the 2019 Outlook Report to also pose high risks to the Reef. These include illegal fishing, fishing impacts on species of conservation concern, marine debris, artificial light and underwater noise. When combined with other threats, these have a cumulative negative impact.

2: VISION

The Plan's vision for the Reef in 2050 is:

The Great Barrier Reef is sustained as a living natural and cultural wonder of the world

The Reef is under significant pressure, but with strong local, national and global action to address the greatest threats, it can be sustained as a living natural and cultural wonder of the world.

The Reef remains a diverse and vibrant ecosystem of great natural beauty and economic value, but events in recent years have hit it hard. Research, monitoring and adaptive management efforts are striving to keep pace with a rapidly changing Reef. This Plan is designed to be adaptable and forward-looking to respond to this changing landscape.

Complete restoration of the Reef to its condition at the time of World Heritage listing in 1981 is unlikely to be possible. But acting now on effective intervention and adaptation measures, as well as reducing pressures, can help the Reef and buy it critical recovery time while greenhouse gas emissions reductions occur globally.

The Reef has been impacted by three mass coral bleaching events since the Plan was released in 2015. In 2020, severe bleaching was more widespread than in the previous events in 2016 and 2017. While major tourism areas of the Reef mostly had negligible or moderate bleaching in 2020, areas in the southern part of the Reef that escaped much of the impact in 2016 and 2017 were severely affected by this third event. Six tropical cyclones, flooding and an ongoing coral-eating crown-of-thorns starfish outbreak have also caused significant impacts since 2014.

There is currently a critical window of opportunity to take the actions needed to sustain the Reef. The Paris Agreement aims to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C above pre-industrial levels. This is a significant challenge: global greenhouse gas emissions and temperatures continue to increase and in 2019 global temperatures were 1.1°C above the long term average.[9,10] The science shows that coral reefs are at risk of declining by a further 70 to 90 per cent at global temperatures of 1.5°C above pre-industrial levels, and are at risk of even larger losses (over 99 per cent) at global temperatures of 2°C above pre-industrial levels.[11] Limiting global temperature rise to the maximum extent possible, and certainly within the objectives of the Paris Agreement, is critical to improve the outlook for the Reef.

Concerted global action to address climate change needs to be combined with stronger management of other pressures. This includes land-based run-off, coastal development and some aspects of direct human use, for example illegal fishing, bycatch of species of conservation concern and increased volumes of marine debris. Fortunately, the Reef is a complex and dynamic system and there will continue to be regional variability and differences in how it responds to cumulative pressures; the response outlined in the Plan takes this into account.

The Plan aims to create a future in which the Reef is in a better condition and on a pathway of replenishment and recovery. A future Reef would have clearer and cooler ocean waters, functioning ecosystems and healthy populations of species. More sustainable use of the Reef would help maintain both the intrinsic value the global community places on the Reef and the lifestyles and livelihoods of coastal communities who depend on it.

The challenge to sustain the Reef is big, but achievable. It requires everyone to do more. Actions taken now by governments, industry, land managers, scientists, Traditional Owners and the community are essential to improving the Reef's future.

3: ABOUT THE PLAN

The Plan is Australia's overarching long-term strategy for protecting and managing the Reef to support its health and resilience. The Plan sets out the vision for the Reef that Australians will strive to achieve, as custodians of this World Heritage icon for the international community. It provides a strategic framework for action (Figure 1).

Protecting and managing the Reef is a collective effort, and strong collaboration and partnerships are essential. This is a central concept of the Plan. Governments, industry, land managers, scientists, Traditional Owners and the community all have a role to play in helping to protect and sustain the Reef. The Plan is intended to guide stakeholders on actions they can take to contribute to improving the Reef's future. Collaboration is a strong focus in delivery of the Plan, and the Reef 2050 Plan Independent Expert Panel and Reef 2050 Advisory Committee perform an important role in advising the Great Barrier Reef Ministerial Forum on its implementation.

Scope

The Plan addresses the protection and management of both natural and heritage values including species and habitats, ecological processes, Indigenous values and historic heritage of the World Heritage Area. This scope includes activities that affect the Reef but that are undertaken outside the World Heritage Area, including in the Reef catchment and adjacent marine areas of the Great Sandy Strait, Torres Strait and the Coral Sea.

The Plan addresses the local and regional pressures over which people in Australia and Queensland have direct control. It also addresses Australia's international engagement to influence the reduction of impacts on the Reef that come from international sources, including to protect populations of migratory species that spend part of their life outside the World Heritage Area. The Plan acknowledges the importance of local, state and national contributions to global greenhouse gas emissions reduction to limit global warming, while recognising that global efforts to reduce emissions are critical for the Reef's long-term health. Setting targets and policy mechanisms for Australia's contribution to global emissions reduction is outside the scope of the Plan and is addressed through Australia's international commitments, including under the Paris Agreement.

The Plan also deals with human dimensions; the social, cultural and economic benefits derived from the Reef, as well as people's attachment to the Reef. It includes steps to increase involvement of Traditional Owners in protecting and managing the Reef, alongside the rest of the community. External factors that influence economic opportunities for Reef communities – for example, global commodity prices for crops that are grown in the Reef catchment, outbreaks of crop pests and diseases, or tourism market fluctuations – are outside the scope of the Plan.

2020 review and update

This Plan builds on previous versions of the Plan and introduces a new outcomes framework to describe what the Plan seeks to achieve. It provides a clearer explanation of the links between actions and outcomes to guide effective action, evaluate progress and support adaptive management of the Reef.

The Plan has been revised to be a more strategic document, with detailed operational actions no longer included. This addresses expert and stakeholder feedback that previous versions of the Plan represented a hybrid between a strategy and an operational plan. It recognises the broad effort required across the Reef and its catchment, and the need for the Plan to be able to adapt to a rapidly changing Reef environment. Wherever possible, references have been made to the substantial supporting strategies and policies that already detail operational actions and support day-to-day protection and management of the Reef.

Other key changes to the Plan include:

- responding to the findings of the 2019 Outlook Report, so the Plan continues to address the highest risk threats facing the Reef
- greater consideration of climate change and its impact on the Reef
- increased reflection on and inclusion of Traditional Owner aspirations
- more focus on empowering communities to take stronger action to protect the Reef
- incorporation of investment information within the Plan.

The updated Plan has been developed through collaboration with the Reef 2050 Plan Independent Expert Panel, Reef 2050 Advisory Committee and a group of Reef Traditional Owners. Relevant government departments and agencies have also been consulted. The development process has involved or referred to the following items:

- Findings of the *Great Barrier Reef Outlook Report 2019*.
- The report *Reef 2050 Plan Review Options*, prepared by a consortium of experts, led by CSIRO, to advise on options for the 2018 mid-term review.
- A series of workshops to review the Plan's outcomes framework using a program logic approach, by a joint working group of members of the Reef 2050 Plan Independent Expert Panel and Reef 2050 Advisory Committee.
- Review and incorporation of continuing actions and priorities from the 2018 Plan into the revised outcomes framework.
- Recommendations from the report *Traditional Owners of the Great Barrier Reef: The Next Generation of Reef 2050 Actions* (published June 2019).
- Traditional Owner Theory of Change for the Great Barrier Reef – Workshop (December 2018, Cairns).
- Draft targets and indicators workshops – with science and management experts involved in the design of the Reef 2050 Integrated Monitoring and Reporting Program.

Timeframe and review

The Plan sets out the vision, outcome and objectives for the Reef through to 2050, with management goals for 2025. The objectives and management goals will guide activities under the Plan over the next five years until 2025.

The Plan will be reviewed and updated every five years. These reviews will draw on the best available knowledge and science information on the condition of the Reef's values, the risks affecting these values and the effectiveness of management. Future Outlook Reports, the Reef 2050 Integrated Monitoring and Reporting Program, and the Paddock to Reef program will be important sources to inform these reviews.

Reporting

Reporting on collective efforts through the priority work areas and cross-cutting enablers will be published annually. A more detailed mid-term report on progress towards the objectives and management goals will be prepared in 2023. The separate *Reef 2050 Objectives and Management Goals* document provides detail on specific indicators that form the basis for measuring progress against the objectives and management goals. Cross-cutting enabler 3 (Monitoring, Evaluation and Adaptive Management) provides further information on how progress will be measured and used to inform adaptive management of the Reef.

4: BUILDING ON STRONG FOUNDATIONS

Ongoing protection of the Reef's Outstanding Universal Value is a key priority for the Australian and Queensland governments. The Plan is underpinned by a strong legislative and governance framework built by the Australian and Queensland governments over more than 40 years of cooperation to protect, conserve and manage the Reef.

A comprehensive suite of legislation, policies and programs is in place to protect the Outstanding Universal Value and other natural, cultural and Indigenous values of the Reef, while allowing a range of activities to continue in an ecologically sustainable manner (Appendix A). Key pieces of legislation include the *Great Barrier Reef Marine Park Act 1975* and the *Marine Parks Act 2004* (Queensland). The Great Barrier Reef Marine Park is protected as a matter of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Great Barrier Reef Intergovernmental Agreement 2015 is the foundation for the long-standing governance arrangements that have facilitated collaboration between successive Australian and Queensland governments on Reef matters since 1979. This collaboration has grown over time from its initial focus on joint management of the Marine Park to also include management of catchment water quality. The first joint Reef Water Quality Protection Plan was launched in 2003 and now, in its fourth iteration, is known as the *Reef 2050 Water Quality Improvement Plan 2017-2022*. Water quality protection is characterised by strong partnerships between Commonwealth, state and local governments, the agriculture industry, community, natural resource management organisations, Traditional Owners and research institutions.

The first Reef 2050 Plan was released in 2015, expanding the joint arrangements further to address all impacts to the Reef. The Plan was informed by a comprehensive strategic assessment of the World Heritage Area, the largest assessment of its kind in the world. The Plan established a long-term vision to 2050 and built on the partnership approach between governments and with industry, scientists, Traditional Owners and the community.

In 2018, a mid-term review of the Plan refined the Plan's actions and laid the foundations for the review that has been undertaken to produce this Plan. Significant policy reforms, investments and on-ground actions have been delivered under the Plan. The *Independent assessment of management effectiveness*, conducted as part of the 2019 Outlook Report, rated the effectiveness of existing measures as good or very good, and stable or improving. These achievements have been made possible by strong and productive partnerships between governments, industry, land managers, scientists, Traditional Owners and many other critical partners in the community.

Continuing this evolution, the updated Plan includes a greater focus on climate change and its impact on the Reef, consolidates priority work areas, emphasises support for innovations in program delivery, and seeks to empower communities to take stronger action to protect the Reef and increase reflection on and inclusion of Traditional Owner aspirations. The Plan continues to reflect a collaborative and adaptive approach to help support the Reef's resilience and ability to recover from past and future disturbances like marine heatwaves and cyclones.

Key achievements 2015-2020

Reduced pressures on the Reef

Improved water quality by reducing fertilisers, sediment and pesticides entering the Reef

Significant work has been undertaken to improve water quality in the Reef over the last five years, including strengthening legal frameworks and improving water quality planning. The *Reef 2050 Water Quality Improvement Plan 2017-2022* was released to guide how industry, government and community work together to improve the quality of water flowing to the Reef. Early results, in the 2017 and 2018 Reef Water Quality Report Card, show that progress is being made (e.g. the Cape York sediment and nitrogen targets), but there is more work to do.

On 1 December 2019, new Queensland regulations came into effect to enhance water quality outcomes by tackling all land-based sources of water pollution to the Reef. This includes all industrial and agricultural activities that release nutrients and sediment across all Reef catchments.

Improved agricultural land management practices by supporting farmers

The Australian and Queensland governments are investing more than $900 million (2013-2024) in actions to protect water quality. Much of this expenditure has focused on working with farmers on-ground to improve their agricultural practices. For example:

- Through a $19.7 million Reverse Tender project, the Reef Trust assisted cane growers in the Wet Tropics and Burdekin regions to reduce fertiliser use without impacting their productivity or profitability. For 2017-2018, 111 sugar cane farmers in the two regions reduced fertiliser application by approximately 2600 tonnes and prevented 643 tonnes of dissolved inorganic nitrogen entering waterways leading to the Reef.
- The Queensland Government has invested close to $33 million into two Major Integrated Projects (Wet Tropics and the Burdekin Landholders Driving Change). The Wet Tropics project is working with cane and banana farmers in the Johnstone and Tully catchments to reduce nutrient, sediment and pesticide losses. The Burdekin project is encouraging graziers to trial tailored solutions to control erosion.

Improved sustainability of ports and shipping industries operating in the World Heritage Area

Implemented major reforms to port development through restricting port expansions to priority ports through the Queensland Government's *Sustainable Ports Development Act 2015*. Enshrined in law the banning of a 100-year-old practice of sea-based disposal of capital dredge material inside the World Heritage Area through changes to the Great Barrier Reef Marine Park Regulations. Developed improved practices for maintenance dredging to reduce the risk to the Reef and implemented port master planning for priority ports.

Improved shipping management through the *North-East Shipping Management Plan*. This includes extending the Particularly Sensitive Sea Areas and instigating measures to route ships around these areas, and implementing other measures to reduce invasive pests and respond more quickly to pollution events.

Improved the sustainability of the commercial fishing industry

The Queensland Government released the *Queensland Sustainable Fisheries Strategy 2017–2027*, paving the way for a world-class fisheries management system for Queensland with healthy fish stocks over the long term.

Stepped up the fight against coral-eating crown-of thorns starfish

Upscaled the Crown-of-thorns Starfish Control Program delivered through the Marine Park Authority to include six vessels undertaking in-water control activities, holding starfish densities below thresholds to allow for coral growth on 87 per cent of the 113 priority reefs across the Marine Park. An additional $57.8 million Reef Trust Partnership investment will continue the program and investigate new ways to detect and tackle primary outbreaks.

Built Reef Resilience
Enhanced management of the World Heritage Area The Great Barrier Reef Marine Park Authority (the Marine Park Authority) developed the *Great Barrier Reef Blueprint for Resilience* to respond to emerging impacts on the Reef. The Reef Joint Field Management Program delivers on-ground actions to protect and maintain well-functioning marine and island ecosystems. This includes monitoring and maintaining internationally-important turtle and seabird breeding islands, eliminating island pests, and developing walking tracks, camping areas and lookouts. The Program has dramatically increased compliance, with support from partner agencies, to ensure the integrity of marine park zoning and island national parks. In 2018 the Australian and Queensland governments boosted investment in the Program to grow from an annual commitment of more than $17 million to more than $38 million by 2021. This includes a 60 per cent increase in staff and an enhanced vessel fleet.
Protected the largest breeding population of green turtles in Queensland A $7.95 million partnership between the Queensland Government, the Marine Park Authority, BHP Billiton, Traditional Owners and the Great Barrier Reef Foundation has ensured the future of important green turtles and seabirds. Critical habitat on Raine Island in the northern part of the Reef was restored, reducing turtle mortality and increasing nesting and hatchling production.
Protected important vegetation Changes to Queensland's vegetation management laws were passed in 2018. The changes protect high-value regrowth vegetation in Reef catchments, prevent broadscale clearing of remnant vegetation for new agricultural development and boost protection of important habitats including waterways leading to the Reef.
Strengthened partnerships and investment for the future
Increased community stewardship of the Reef Tangaroa Blue Foundation in partnership with Conservation Volunteers engaged citizen scientists, schools, Traditional Owners and local communities in marine debris clean ups (a $5 million Reef Trust project). In October 2019, 55 events involved 1291 volunteers and removed 9.3 tonnes of debris.
Strengthened partnerships with Traditional Owners and boosted support for work on-country The Australian Government commissioned a *Traditional Owners of the Great Barrier Reef: The Next Generation of Reef 2050 Actions* report to provide a strategic blueprint to better support the fulfilment of Traditional Owners' custodial responsibilities and obligations to the Reef. The Queensland Government boosted support for Indigenous Land and Sea Rangers, with an additional $8.1 million across Queensland, increasing Indigenous Land and Sea Rangers in the Reef from 28 to 42. Implemented the *Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park*. This strategy seeks to increase understanding, protection and promotion of Reef Indigenous heritage value and contribute towards Aboriginal and Torres Strait Islander aspirations for sea country and heritage management.
Exceeded investment targets In 2015, the *Reef 2050 Plan Investment Baseline* projected that the Australian and Queensland governments would invest around $2 billion over the decade from 2014-15 to 2023-24 on implementation of the Plan. Efforts have been accelerated since that time, and together the Australian and Queensland governments' investment is now calculated to be more than $2.7 billion over these 10 years.
Initiated a ground-breaking Reef Restoration and Adaptation Program Completed a $6 million study to assess the benefits and feasibility of developing and deploying additional "interventions" to preserve the natural resilience of the Reef. This study recommended developing interventions to: protect existing corals by shading the reef and reducing the bleaching pressure (cloud brightening and artificial sea misting); restore high value reefs (seeding new corals and speeding up natural recovery processes); and increase rates of adaptation (enhancing natural genetic adaptation processes). The Australian Government has endorsed investment of a further $100 million for the Reef Restoration and Adaptation Program through the Reef Trust Partnership, with a further $50 million in research and scientific contributions from consortium partners. This unprecedented research and development program will put Australia at the cutting edge of global efforts to help coral reefs adapt to climate change.

5: OUTCOMES FRAMEWORK

Outcome

The Plan seeks to achieve the following outcome by 2050:

Healthy Reef, Healthy People

This outcome recognises the fundamental interconnectivity of the Reef and the communities that depend on it. The health and well-being of people cannot be separated from the health and well-being of the Reef. People benefit economically, socially and culturally from a healthy Reef, and the Reef benefits from a local, national and global community that acknowledges its value and is committed to caring for it. As human activities are contributing to declines in the health of the Reef, future Reef management is also a people management challenge.

Objectives

The Plan sets 20 objectives across four categories: habitats, species, Indigenous heritage and human dimensions (Box 1). These objectives will apply from local to Reef-wide scales and were selected to represent desired aspects of a functioning Reef between 2020 and 2050. Each objective is supported by a series of indicators that form the basis for measuring success. These are detailed in the separate *Reef 2050 Objectives and Management Goals* document.

The objectives, and their associated indicators, were developed through an evidence-based process that was part of the Reef 2050 Integrated Monitoring and Reporting Program design. The process was informed by knowledge from scientists, stakeholders and managers with expertise in the Reef and/or its catchment, and Traditional Owners. They were chosen on the basis that they include:

- matters that can be directly managed and influenced and/or
- elements that can be measured or will be able to be measured in future.

Example: For the objective "Populations of seabirds and shorebirds are healthy" a series of indicators will enable progress towards this objective to be measured. These indicators include: trends in abundance, density and mortality of seabirds and shorebirds at key sites, measuring the fecundity (or reproductive output), and the survivorship of chicks, the condition of nesting habitats and feeding areas.

Many objectives refer to a value being 'healthy' and/or resilient. In this context healthy means the ability for the value to maintain its key characteristics and self-renewal capacity.[12] Resilience, in the broadest sense, is the capacity of a system to absorb disturbances and recover so as to retain essentially the same structure and function.[13] Maintaining resilience may be achievable for some species and habitats (e.g. island vegetation post disturbance) but not others, particularly if disturbances have caused too much change over time or recur too frequently to allow for system recovery. In these instances, the focus will be on maintaining or improving condition or ecological function over time. Where possible, adaptation and transformative change will also be facilitated (for example, investigating heat tolerance of corals and addressing unsustainable practices).

Some objectives will have regionally relevant thresholds for different spatial areas. For example, green turtles in the Reef are divided into two different populations: northern and southern. Indicators and the rate of recovery needed in each population differ, sometimes regionally, and therefore thresholds will need to be sensitive to this.

Factors that influence the state of objectives will also be monitored. These are detailed in the *Reef 2050 Objectives and Management Goals* document. For example, in order to understand what is driving the state of seagrass meadows, it is also important to measure factors like sea temperature, water clarity (a measure of light penetration through the water) and fine sediment loads.

Objectives

Habitat

- Coral reef habitats maintain good condition and resilience.
- Resilient seagrass meadows that maintain condition.
- No loss of the extent of natural wetlands.
- Wetland condition is improved.
- Key values associated with islands are in a desired condition.

Species

- Populations of seabirds and shorebirds are healthy.
- Populations of protected species are healthy.
- Populations of species of cultural significance to Traditional Owners are healthy.
- Populations of bioculturally important fish and invertebrate species are healthy.
- Populations of fish and invertebrate species that are important for recreational, commercial and culturally-based fisheries are healthy.

Indigenous heritage

- Traditional Owners caring for country.
- Traditional knowledge about the Great Barrier Reef is protected and retained for future generations.
- Traditional Owners' rights are genuinely recognised and prioritised and inform and drive how benefits are shared.
- Local Traditional Owner land and sea management organisations are equipped to operate at the right scale.
- Country is healthy and culture is strong.

Human dimensions

- Uses of the Reef are ecologically sustainable as the system changes, in turn sustaining economic benefits to people.
- People maintain or grow their attachment to the Great Barrier Reef.
- People and communities take individual and collective action to maintain its resilience.
- Intangible and tangible historic heritage and contemporary cultural values remain intact.
- Governance systems to prioritise, adapt and engage communities in systems for Reef management are effective.

Box 1: Objectives for Healthy Reef, Healthy People

Management goals

Overall impacts to Reef habitats and species, and consequent impacts to the cultural, social and economic values of the Reef, are due to the cumulative effect of a range of pressures.

The management goals in this Plan provide a framework for measuring progress in addressing key pressures on the Reef (Box 2). Management goals describe the results the Plan aims to achieve by 2025. Many of the goals support multiple objectives.

The *Independent assessment of management effectiveness*, conducted as part of the 2019 Outlook Report, rated the effectiveness of existing measures as good or very good, and stable or improving. However, achieving outcomes on the ground continues to be difficult for complex and spatially broad management areas including climate change, land-based run-off and biodiversity conservation. For these topics, the achievement of outcomes was graded as poor to very poor.

The Plan sets 17 management goals to guide action in areas that require strengthening. Information on the indicators associated with these goals is provided in the *Reef 2050 Objectives and Management Goals* document.

Management goals

Goals to reduce cumulative impacts and protect and conserve the Reef

- **M1**: Australia contributes to global emissions reduction, through the Paris Agreement, to limit warming to well below 2°C and as close to 1.5°C as possible.
- **M2**: Integrated planning across catchment and Reef reduces cumulative impacts.
- **M3**: Indigenous heritage goals are considered, integrated and progressed in partnership [see Box 3].
- **M4:** The flow of water to the Reef is further managed through targeted catchment restoration to mitigate water quality impacts**.**
- **M5**: Reef 2050 Water Quality Improvement Plan targets and ambient water quality guidelines are met.
- **M6**: The threats associated with fishing are reduced.
- **M7**: Outbreaks of disease, introduced species and pests are reduced.
- **M8**: Anthropogenic noise impacts are reduced.
- **M9**: Artificial light impacts are reduced.
- **M10**: Marine debris and rubbish pollution is reduced.
- **M11**: Targeted Marine Park management reduces local and regional risks and supports ecosystem resilience.
- **M12**: Potential Reef restoration and adaptation interventions are developed and deployed on a risk-basis.

Goals to enable delivery

- **E1**: The vulnerability of sectors and economies dependent on Reef health is reduced, and users of the Reef are preparing for changes to the Reef.
- **E2**: Science and knowledge are advanced and decisions are informed by the best available evidence-base.
- **E3**: Governance systems are effective and coherent.
- **E4**: Communities, industries and governments adopt stewardship behaviours.
- **E5**: Comprehensive monitoring, evaluation and reporting supports informed and agile management responses.

Box 2: Management goals

Indigenous heritage goals

[Further targeted consultation with Traditional Owners is planned simultaneous with public consultation to discuss the goals and Traditional Owner-related content.]

Increasing involvement of Traditional Owners in protecting and managing the Reef is a priority for the Australian and Queensland governments. All Reef 2050 partners and stakeholders have a role to play in considering and supporting the full breadth of Traditional Owner rights and aspirations.

Traditional Owners were involved in the preparation of the first Plan (2015) and a range of targets and actions were proposed and included in the Plan. Implementation of these is ongoing.

The Plan applies a broad definition of Indigenous heritage: physical (tangible) and non-physical (intangible) expressions of Traditional Owners' relationships with country, people, beliefs, knowledge, law, language, symbols, ways of living, sea, land and objects; all of which arise from Indigenous spirituality, including heritage places (sites) and/or values.[14]

A group of Traditional Owners were involved in the preparation of this Plan as Indigenous heritage experts and provided the following Indigenous heritage goals for inclusion in the Plan. The Indigenous heritage goals (Box 3) are linked to actions across all priority work areas and cross-cutting enablers and are to be considered, integrated and progressed in partnership under a broad management goal (M3).

Indigenous heritage goals

- **IH1**: Increase in Traditional Owner led co-designed and co-delivered water quality projects.
- **IH2**: Traditional Owner Indigenous heritage, rights and responsibilities are incorporated into all facets of management.
- **IH3**: Formal and informal partnerships between Traditional Owners and all stakeholders are increased to ensure key Reef heritage values are identified, documented, protected and monitored to be measured by the Strong Peoples - Strong Country Indigenous Heritage Monitoring Framework.
- **IH4**: Traditional Owner-developed Indigenous Knowledge Management Systems enable the appropriate collection, handling and / or sharing of Indigenous heritage and knowledge information.
- **IH5**: Traditional Owner protocols for managing information and agreements relating to Indigenous heritage and knowledge information are adopted by Reef 2050 partners and stakeholders.
- **IH6**: The number of formal and informal agreements with Traditional Owners addressing management of ecosystems within their traditional estate is increased in line with the Strong Peoples - Strong Country Indigenous Heritage Monitoring Framework.
- **IH7**: Increase in co-design and co-delivery in the management, conservation and ecologically sustainable use of cultural keystone species and biocultural resources.
- **IH8**: Customary use of biological resources, in accordance with traditional cultural practices that are compatible with conservation or cultural use requirements, are formally recognised and respected by Reef 2050 partners and stakeholders.

- **IH9**: The rights of Traditional Owners to derive benefits from the conservation and cultural use of biological resources are recognised and the number of benefit-sharing initiatives and agreements with Traditional Owners is increased.
- **IH10**: The number of employment opportunities for Traditional Owners in sea country management and Reef-based industries increases annually.
- **IH11**: There is an annual increase in the number of Traditional Owner service providers and viable businesses.
- **IH12**: The rights of Traditional Owners to derive economic benefits from the conservation and cultural use of biological resources are recognised and access, benefit sharing initiatives and agreements with Traditional Owners is increasing.
- **IH13**: Traditional Owner Governance capacities in sea country is enhanced and measured against the Strong Peoples - Strong Country Indigenous Heritage Monitoring Framework.
- **IH14**: A Great Barrier Reef Traditional Owner-led Sea Country Alliance is established in 2023 to ensure an equal voice in all decision-making.
- **IH15**: A Tripartite Agreement is negotiated between the Australian and Queensland governments and the Great Barrier Reef Traditional Owners with their free, prior and informed consent.
- **IH16**: Accredited cultural competency of Reef 2050 partners and stakeholders is implemented as best practice and identified in relevant operational plans.

Box 3: Indigenous heritage goals

Development of these goals was informed by previous products prepared by Traditional Owners containing recommendations and priorities for the management of sea country.[i] These include the Strong Peoples – Strong Country Indigenous Heritage Monitoring Framework and the Traditional Owner program logic (Figure 4).

The Strong Peoples – Strong Country Indigenous Heritage Monitoring Framework is designed to operate under the Reef 2050 Integrated Monitoring and Reporting Program, and connects the health of the Reef and its catchment to the quality of life enjoyed by Traditional Owners – see cross-cutting enabler 3 (Monitoring, Evaluation and Adaptive Management). The framework was developed by the Indigenous Heritage Expert Group, a group of experts brought together to advise on the design of the Indigenous heritage theme of the Reef 2050 Integrated Monitoring and Reporting Program. The framework reflects the Traditional Owner worldview that their quality of life is connected inseparably to and underpinned by their land and sea country. It will facilitate the measurement of progress against the Plan's Indigenous heritage objectives and Indigenous heritage goals, as well as parts of the *Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park*.

The Traditional Owner program logic builds on a foundation of Traditional Lore and Custom, and provides a structure through which Traditional Owners can achieve their aspirations and responsibilities for the management of their estates and cultural heritage.

[i] Includes but not limited to: *Strong Peoples: Strong Country Indigenous Heritage Monitoring Framework* (2019); Reef 2050 Traditional Owner Program Logic (2018); existing Reef 2050 targets (2015-2018); *Traditional Owners of the Great Barrier Reef: The Next Generation of Reef 2050 Actions*, Reef 2050 Traditional Owner Aspirations Project (2018); *Project 3.9: Indigenous Capacity Building and Increased Participation in Management of Queensland Sea Country*, National Environmental Science Program Tropical Water Quality Hub (2016); *Reef 2050 Long Term Sustainability Plan Indigenous Targets,* Indigenous Sea Country Policy Group and the Cape York Turtle and Dugong Taskforce Steering Committee (2014);

"We the Great Barrier Reef's First Nations and Traditional Owners stand strong and ready to take affirmative action to conserve, protect and manage our home, for the benefit of all."

- *Great Barrier Reef Traditional Owner working group, November 2019*

Figure 4: Traditional Owner program logic

6: RESPONDING TO THE CHALLENGE

This chapter details five priority work areas and four cross-cutting enablers that will drive progress towards the objectives and management goals over the next five years (Figure 6).

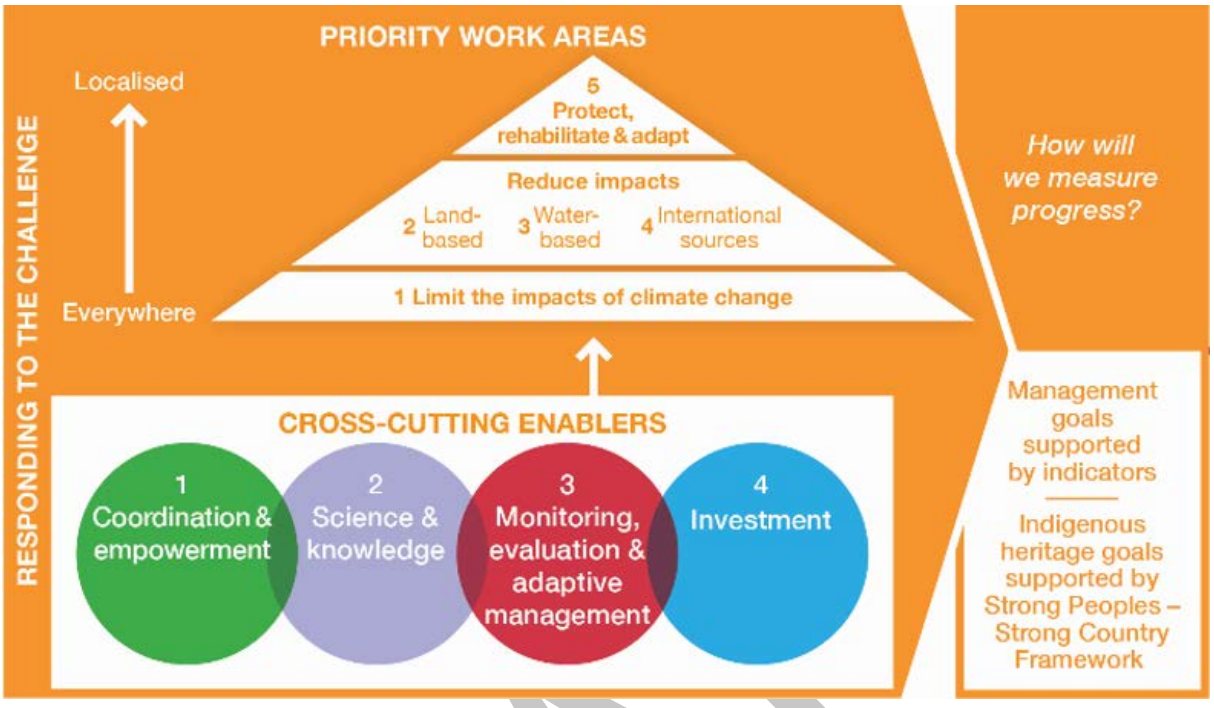


Figure 6: Priority work areas and cross-cutting enablers

Each section describes the work that will be undertaken and includes a table detailing the response, major policies and programs, strategic actions (which are new high-level actions or enhancements) and how progress will be measured (Box 4).

The priority work areas are structured around what will be done to help the Reef. The priority work areas are supported by the cross-cutting enablers, which cover activities that are essential to effective delivery of outcomes. These activities include coordinating and empowering effort by various stakeholders, strengthening the science and knowledge base, monitoring and adaptively managing the Reef, and providing funding to support delivery. Information on investment related to priority work areas and the first three cross-cutting enablers is included in cross-cutting enabler 4 (Investment).

Efforts to protect specific elements of the Reef ecosystem are spread across multiple priority work areas, supported by all cross-cutting enablers. For example, protection of dugong is covered through:

- reducing greenhouse gas emissions to mitigate climate change, which is the most significant threat to the Reef (priority work area 1)
- reducing land-based run-off to improve water quality, which supports healthy seagrass meadows, a primary food source for dugong (priority work area 2)
- reducing pressures including vessel strike, outbreaks of disease and illegal fishing and poaching (priority work area 3)
- fostering international cooperation to protect migratory species, so dugong habitat is protected and conserved throughout their range (priority work area 4)
- coordinating incident response programs to assist affected wildlife (priority work area 5).

Key to tables

Responding to the challenge: the high-level response to be taken under the priority work area or cross-cutting enabler. For priority work areas, this column also identifies the relevant threats from the 2019 Outlook Report (noting that threats from climate change intensify the effect of other threats).

Major policies / programs: established high-level policies/programs that underpin action in this area, and that will be maintained. These are the foundation upon which the Plan is built.

Strategic actions: high-level actions that enhance or complement delivery of established policies/programs, or new high-level actions that need effort and prioritisation.

Measuring progress: identifies the management goals that the response will contribute to. These goals will be monitored and reported on using the associated indicators.

Box 4: Key to tables

The contribution of each priority work area to each of the objectives is outlined in Figure 7.

		Priority work areas				
Objectives		**1**	**2**	**3**	**4**	**5**
Habitat	Coral reef habitats maintain good condition and resilience	●	●	●	●	●
	Resilient seagrass meadows that maintain condition	●	●	●	●	●
	No loss of the extent of natural wetlands	●	●			
	Wetland condition is improved	●	●			●
	Key values associated with islands are in a desired condition	●	●	●	●	●
Species	Populations of seabirds and shorebirds are healthy	●	●	●	●	●
	Populations of protected species are healthy	●	●	●	●	●
	Populations of species of cultural significance to Traditional Owners are healthy	●	●	●	●	●
	Populations of bioculturally important fish and invertebrate species are healthy	●	●	●	●	●
	Populations of fish and invertebrate species that are important for recreational, commercial and culturally-based fisheries are healthy	●	●	●	●	●
Indigenous heritage	Traditional Owners caring for country	●	●	●		●
	Traditional knowledge about the Great Barrier Reef is protected and retained for future generations	●	●	●		●
	Traditional Owners' rights are genuinely recognised and prioritised and inform and drive how benefits are shared	●	●	●		●
	Local Traditional Owner land and sea management organisations are equipped to operate at the right scale	●	●	●		●
	Country is healthy and culture is strong	●	●	●	●	●
Human dimensions	Uses of the Reef are ecologically sustainable as the system changes, in turn sustaining economic benefits to people	●	●	●		●
	People maintain or grow their attachment to the Great Barrier Reef	●	●	●	●	●
	People and communities take individual and collective action to maintain its resilience	●	●	●	●	●
	Intangible and tangible historic heritage and contemporary cultural values remain intact	●	●	●		●
	Governance systems to prioritise, adapt and engage communities in systems for Reef management are effective	●	●	●		●

Figure 7: Contribution of priority work areas to objectives

PRIORITY WORK AREA 1: Limit the impacts of climate change

Global warming and the climate change it drives is the most serious and pervasive threat to the Reef. The future long-term outlook is critically dependent on limiting global temperature rise to the maximum extent possible.[15]

This priority work area focuses on reducing greenhouse gas emissions as part of global efforts to address climate change, fostering partnerships and stewardship to support climate mitigation, and supporting adaptation of Reef communities and industries to a changing climate. Supporting adaptation of the Reef ecosystem is addressed in priority work area 5 (Protect, rehabilitate and adapt).

Mitigate climate change

Australian Government actions and commitments

Climate change is a global issue that requires a global solution. Australia's efforts alone will not address climate change and this is why Australia is participating in the Paris Agreement to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase even further to 1.5°C above pre-industrial levels.

Australia's commitment under the Paris Agreement is to reduce emissions by 26 to 28 per cent on 2005 levels by 2030. This represents a halving of emissions per person in Australia, or a two-thirds reduction in emissions per unit of gross domestic product (GDP). Australia is on track to meet its 2030 target.

Australia, like other Parties to the Paris Agreement, will communicate its Nationally Determined Contributions (NDC) under the Agreement every five years, including in 2020. Australia's next NDC, including a target to 2035 or 2040, is due to be communicated in 2025. Technological advancement will be key to reducing global emissions.

The Australian Government has an effective suite of policies in place to meet its emissions reduction commitments, encourage innovation and expand the clean energy sector. The Government's $3.5 billion Climate Solutions Package maps how Australia will achieve its 2030 emissions reduction target under the Paris Agreement. The Package will:

- Support farmers, landholders, businesses and Indigenous communities to reduce emissions by investing $2 billion in a Climate Solutions Fund to continue purchasing low cost abatement.
- Bring new clean energy projects on-line including, Snowy 2.0 and the Marinus Link (connecting Tasmania's Battery of the Nation pumped-hydro power generation to the mainland).
- Support households and businesses to improve energy efficiency and lower energy bills.
- Develop an Electric Vehicle Strategy to ensure the transition to electric vehicles is planned and managed.

The Climate Solutions Package builds on the success of the Emissions Reduction Fund which has contracted over 190 million tonnes of abatement since 2015.

In addition to this, the Safeguard Mechanism provides a framework for Australia's largest emitters to measure, report and manage their emissions, while programs like Climate Active Carbon Neutral Standard encourage voluntary action by businesses and other organisations to reduce their emissions.

Australia will develop a long-term emissions reduction strategy ahead of the United Nations' next climate summit COP26. This will be framed around technology pathways for key sectors. It will highlight that technology presents opportunities for Australian businesses to boost productivity, create jobs and remain globally competitive in a world where markets increasingly value low emissions, and that Australia's natural endowments means it can secure a share of emerging global export markets for zero emissions fuels and commodities.

The Australian Government is also developing a technology investment roadmap to support Australia's transition to lower emissions and ensure its investments in technology provide the right support at the right time along the innovation chain.

Queensland Government actions and commitments

The Queensland Government, under the Queensland Climate Transition Strategy, is committed to reducing Queensland's carbon emissions by 30 per cent on 2005 levels by 2030 and achieving zero net emissions by 2050. The Strategy is working to position Queensland industries and communities to prosper in a low carbon global economy. To complement the Strategy, the Queensland Government has also delivered a range of programs to help Reef-dependent business reduce their emissions and increase their resilience, including the $1.73 million commitment that includes the Decarbonising the Resorts of the Great Barrier Reef Islands Program.

The Queensland Government has committed to power Queensland with 50 per cent renewable energy by 2030. Large-scale renewable generation in Queensland has grown from zero megawatts in 2015 to 2370 megawatts in early 2020, and Queensland now has more solar systems than any other state.

The Queensland Government recently launched its flagship $500 million Land Restoration Fund to support carbon farming projects in Queensland that also deliver additional environmental, social and economic co-benefits for regional Queensland communities.

In 2018, the Queensland Government reformed how vegetation is managed in Queensland. This ceased broadscale clearing of remnant vegetation and protected over 800,000 additional hectares of high value regrowth vegetation, which will deliver carbon sequestration outcomes. As nearly half of this newly protected vegetation is in catchments that flow into the Reef, this will also deliver co-benefits for water quality.

Support adaptation of Reef communities and industries to a changing climate

Climate adaptation refers to actions taken to reduce the negative impacts of climate change. The National Climate Resilience and Adaptation Strategy sets out how Australia is managing the risks of a variable and changing climate and the different roles governments and community sectors have. The Marine Park Authority's Great Barrier Reef Blueprint for Resilience is the guiding framework for ensuring a future focussed and targeted approach to protect the Reef and build its resilience through collaboration across the Reef community.

The Queensland Climate Adaptation Strategy embeds adaptation actions in policies and planning and supports sector adaptation planning by industry and community sectors, including tourism and agriculture. The Biodiversity and Ecosystems Climate Adaptation Plan provides guidance in facilitating the adaptation of Queensland's biodiversity and ecosystems under a changing climate. The Queensland Government's Queensland Future Climate portal allows users to explore a range of topics including 'Understanding Future Climate' and 'Adapting to Future Climate'.

Priority work area 1: Limit the impacts of climate change			
Responding to the challenge	**Major policy / program**	**Strategic actions**	**Measuring progress**
Mitigate climate change **Threats** Altered weather patterns Ocean acidification Sea-level rise Sea-temperature increase Altered ocean currents	Australian Government climate mitigation policies including the Climate Solutions Package Queensland Land Restoration Fund Queensland Climate Transition Strategy United Nations Framework Convention on Climate Change	**Contribute to global efforts to reduce greenhouse gas emissions** • Reduce emissions, encourage innovation and expand the clean energy sector through delivery of the Australian Government climate mitigation policies including the Technology Roadmap and Climate Solutions Package. • Reduce emissions through Queensland's Land Restoration Fund by investing in land sector carbon farming projects that deliver Australian Carbon Credit Units with water quality, biodiversity, and social co-benefits, including in Reef catchments. • Meet Australia's Nationally Determined Contributions (NDC) under the Paris Agreement, every five years. Australia's next NDC, including a target to 2035 or 2040 is due to be communicated in 2025. • Develop a whole-of-economy long-term emissions reduction strategy for Australia. **Foster partnerships and stewardship** • Communicate the implications of climate change for the Reef and the emission reduction outcomes required to secure the Reef's future, to encourage additional effort to reduce emissions. • Support Reef communities and industries to demonstrate leadership in the transition to a lower emissions economy, consistent with the Australian Government's long-term emissions reduction strategy and the Queensland Government's Climate Transition Strategy.	M1. Australia contributes to global emissions reduction, through the Paris Agreement, to limit warming to well below 2°C and as close to 1.5°C as possible. M3: Indigenous heritage goals are considered, integrated and progressed in partnership (all: IH1 through IH16). E4. Communities, industries and governments adopt stewardship behaviours.

Priority work area 1: Limit the impacts of climate change			
Responding to the challenge	**Major policy / program**	**Strategic actions**	**Measuring progress**
Support adaptation of Reef communities and industries to a changing climate **Threats** Altered weather patterns Ocean acidification Sea-level rise Sea-temperature increase Altered ocean currents	National Climate Resilience and Adaptation Strategy National Disaster Risk Reduction Framework Queensland Climate Adaptation Strategy Queensland Future Climate Portal *Great Barrier Reef Blueprint for Resilience*	**Improve information and planning** • Strengthen engagement with local and regional communities and work with industries and communities to improve climate resilience through sectoral adaptation plans and transitioning programs. • Review and enhance the Great Barrier Reef Blueprint for Resilience. • Improve access to the latest climate science information to support adaptation planning. **Build capacity and capability** • Support local councils to strengthen their climate adaptation planning capability. • Empower people to be part of the solution through accelerating actions to address climate change and fostering innovation. *Note: supporting adaptation of the Reef ecosystem is addressed in priority work area 5 (Protect, rehabilitate and adapt).*	E1. The vulnerability of sectors and economies dependent on Reef health is reduced, and users of the Reef are preparing for changes to the Reef. E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E4. Communities, industries and governments adopt stewardship behaviours.

PRIORITY WORK AREA 2: Reduce impacts from land-based activities

The increasing pressures from expanding coastal communities, including associated coastal development, have a wide range of cumulative and direct impacts on ecosystems. The greatest water quality risks to the Reef and its coastal ecosystems are land-derived inputs from nutrients, fine sediments and pesticides.[16]

This priority work area focuses on efforts to improve water quality, improve coastal planning, and encourage responsible use and conservation efforts within the communities living alongside the Reef. Industry (agriculture, tourism, ports), Traditional Owners and the community (including private land holders) all play significant roles in reducing impacts on the Reef from land-based activities.

Improve water quality

The 2019 Outlook Report identified that inshore water quality is improving, but too slowly.[17] This reflects the system-wide challenge and significant time lags between program implementation and cleaner water flowing to the Reef. The *Reef 2050 Water Quality Improvement Plan 2017-2022* is underpinned by the 2017 Scientific Consensus Statement, an independent review produced by 48 multidisciplinary scientists and technical experts to synthesise the current scientific knowledge of water quality issues impacting the Reef. The *Reef 2050 Water Quality Improvement Plan 2017-2022* is a comprehensive plan to improve water quality in partnership between all levels of government, farmers, industry, natural resource and land and water managers, Traditional Owners, research organisations and the wider community. It is supported by regional Water Quality Improvement Plans designed to prioritise pollution reduction efforts at the local level.

Agriculture is the major land use and the main source of water pollution[18] in the Reef catchment and is therefore a major focus for action and funding under the Plan. Agricultural industries have taken steps to reduce farm run-off by improving farm management practices. The Queensland Government has regulated minimum practice standards, to increase the uptake of improved farm management practices for Reef water quality outcomes. Best Management Practice programs are voluntary, industry owned and led programs designed to support farmers to improve the long-term profitability and sustainability of their business while contributing to improved water quality in the Reef. Farmers can choose to become accredited under a Best Management Practice program as an alternate pathway to meet the regulated minimum practice standards. Many farmers are already actively going above and beyond regulated standards to manage their land to reduce sediment and nutrient run-off into the Reef.

While urban areas are small compared to the scale of agricultural production within the Reef catchment, they are generally located closer to the Reef coast and urban land uses can be more intensive point sources of water pollution (e.g. stormwater, industrial discharge and sewage treatment plants). Local governments are increasingly active as Reef Guardian Councils and participate in coordinated efforts for cleaner wastewater, stormwater and road run-off. An Urban Water Stewardship Framework is being developed by the Queensland Government in close collaboration with councils, developers and other stakeholders to assess and measure urban water management practices and their risk to water quality for the Reef. A key aim of this framework is to increase the level of engagement among urban water managers, to encourage continuous improvement in management practice to protect the Reef.

Plastic pollution continues to be a major threat to oceans worldwide, and the 2019 Outlook Report found that plastic remnants continue to dominate marine debris loads. Around 80 per cent of marine litter is plastic. It is estimated that by 2050, the mass of plastic in the ocean will be greater than that of fish.[19] The Queensland Government has taken steps to reduce plastic pollution by releasing a plastic pollution reduction plan, banning single-use plastic bags, and establishing a container refund scheme that has involved wide-spread community participation.

Aboriginal and Torres Strait Islander peoples have had custodianship of the Reef catchment for over 60,000 years using holistic land management practices for sustainable use of its resources. Drawing on this knowledge and experience through co-design and co-delivery of programs with Traditional Owners presents an opportunity for improvements in integrated landscape management. This involves long-term collaboration among different groups of land managers and stakeholders to achieve the multiple objectives required from the landscape, including outcomes for the Reef.[20]

Improve coastal planning

Strong coastal planning and policy can help minimise impacts from the predicted growth in human population and subsequent development and intensive land use along the Reef coast. Legislation and tools to plan for, assess and approve development in the Reef catchment aim to reduce cumulative impacts on the environment. The Queensland water planning framework aims to account for multiple uses including agriculture and industry use, environmental flows and cultural values of Aboriginal and Torres Strait Islander communities.

Improving and integrating knowledge about the flow of water across the catchment, and connections between land and sea, is also important for minimising impacts. Initiatives in place to bridge knowledge and policy gaps include the Queensland Government's Walking the Landscape science synthesis framework. This helps to give a more complete understanding of how the catchment functions in a whole-of-system sense, to guide management. The framework is used to inform decision making, for example prioritisation of land for rehabilitation within the Reef catchment.

Artificial light from urban and industrial areas can disrupt critical behaviours in wildlife, including fish, seabirds and shorebirds, and can reduce turtle nesting success. The 2019 Outlook Report found that the risk of artificial light is more significant than was understood in 2014.[21] The Australian Government has developed National Light Pollution Guidelines for Wildlife including Marine Turtles, Seabirds and Migratory Shorebirds, which aim to provide a framework for assessing and managing these impacts. In addition, Queensland's Coastal Management Plan guides local planning and encourages ecologically sensitive use of the coastal area. For example, seasonal and night closures of beaches and reducing artificial light pollution can reduce impacts on turtles and migratory bird nesting beaches.

Increase adoption of responsible use and community conservation efforts

Coastal communities' behaviours have a direct impact on ecosystems that contribute to a healthy Reef. Education and compliance activities are important mechanisms to encourage communities to use and enjoy coastal ecosystems responsibly. Industry, tourism operators, farmers, recreational fishers, private landholders, Traditional Owners, and natural resource management and community groups play an important role in developing and implementing sustainable practices. Community actions can reduce the spread of weeds and pests, minimise impacts of recreational activities including fishing and four wheel driving, and protect

wildlife and habitat beyond national parks. Private land conservation in the Reef catchment is also contributing to improvements in water quality, with 682,772.5 hectares of land voluntarily protected under nature refuge agreements.

In addition to guiding development decisions, the Coastal Management Plan provides direction and guidance for how communities use Queensland's coastal resources, to account for coastal landforms, nature conservation, Indigenous cultural heritage, and public recreation. For example, it includes regulating beach driving by a permit system, speed limits, and restricting vehicle access to below the drift line, away from dune vegetation.

Regional waterway health partnerships help to coordinate government and local communities to produce annual report cards for waterways in their region to increase education and awareness, and further motivate action for improved water quality.

Priority work area 2: Reduce impacts from land-based activities			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Improve water quality **Threats** Nutrient run-off Outbreak of crown-of-thorns starfish Sediment run-off Marine debris Pesticide run-off Barriers to flow Terrestrial discharge Acid sulfate soils	*Reef 2050 Water Quality Improvement Plan 2017-2022* National Environmental Science Program Queensland Reef Water Quality Program Reef Trust and Reef Trust Partnership Reef Councils Rescue Plan Agricultural Best Management Practice Programs for Water Quality Regional Water Quality Improvement Plans National Waste Policy Action Plan 2019	**Improve coordination and delivery of water quality outcomes** • Deliver whole-of-system outcomes by refining prioritisation of water quality actions to include multiple values including coastal wetlands and cultural values of water. • Review and update regional water quality improvement plans for improved alignment and reflecting Reef 2050 water quality target. • Improve the assessment of water quality benefits from on-ground works to guide investment decision making. • Improve alignment and linkages between actions taken in the catchment and resulting effects in waterways connected to the inshore marine ecosystem. • Deliver cleaner wastewater, stormwater and road run-off through the Reef Councils Rescue Plan. • Invest in conservation activities in less disturbed catchments to prevent future water quality issues. • Co-design and co-deliver programs for water quality with Traditional Owners and Aboriginal organisations. • Improve agricultural land management practices by supporting farmers to achieve economic and environmental outcomes. **Reduce plastic pollution** • Reduce plastic pollution through implementation of regulation of single use plastics. • Develop a national plastics plan to increase recycling rates and reduce plastic pollution.	M2. Integrated planning across catchment and Reef reduces cumulative impacts. M3: Indigenous heritage goals are considered, integrated and progressed in partnership (IH1, IH6). M4. The flow of water to the Reef is further managed through targeted catchment restoration to mitigate water quality impacts. M5. Reef 2050 Water Quality Improvement Plan targets and ambient water quality guidelines are met. M10. Marine debris and rubbish pollution is reduced.

Priority work area 2: Reduce impacts from land-based activities			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Improve coastal planning **Threats** Modifying coastal habitats Artificial light Wildlife disturbance Noise pollution Acid sulfate soils Dredging Barriers to flow Fragmentation of cultural knowledge Sea-level rise	Coastal Management Plan Queensland Water Plans Wetlands in the Great Barrier Reef Catchments Strategy 2016-21 Reef 2050 Cumulative Impact Management Policy Queensland State Planning Policy Sustainable Ports Strategy National Light Pollution Guidelines for Wildlife including Marine Turtles Seabirds and Migratory Shorebirds	**Improve coastal development outcomes** • Improve policy alignment for coastal ecosystem planning for multiple outcomes to reduce cumulative impacts. • Undertake intertidal and subtidal habitat mapping to improve prioritisation of coastal management. • Improve understanding of catchment values and how water moves across the catchment to the Reef to inform management and decision making, through the Walking the Landscape framework and catchment stories communication products. • Improve understanding of estuarine and marine systems by adapting the Walking the Landscape framework for broader application to these environments to inform decision making and management. **Implement sensitive lighting practices** • Guide development decisions through planning instruments for turtle nesting areas to reduce light impacts. • Pilot and trial innovations in turtle sensitive lighting. • Deliver guidance for urban, port, tourism and industrial light management.	M2. Integrated planning across catchment and Reef reduces cumulative impacts. M3: Indigenous heritage goals are considered, integrated and progressed in partnership (IH3). M4. The flow of water to the Reef is further managed through targeted catchment restoration to mitigate water quality impacts. M9. Artificial light impacts are reduced.

Priority work area 2: Reduce impacts from land-based activities			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Increase adoption of responsible use and community conservation efforts **Threats** Artificial light Atmospheric pollution Barriers to flow Behaviour impacting heritage values Exotic species Foundational capacity gaps Fragmentation of cultural knowledge Illegal activities — other Incompatible uses Marine debris Modifying coastal habitats Nutrient run-off Pesticide run-off Sediment run-off Terrestrial discharge Wildlife disturbance	Regional Waterway health partnerships and report cards Coastal Management Plan Indigenous Land Use Agreements Reef Guardian Councils Reef Guardian Schools Queensland Junior Rangers Program Local Council Education and Awareness Programs Sustainable Ports Strategy Queensland Biosecurity Strategy 2018-2023	**Foster partnerships and stewardship** • Promote behaviour change in recreational users of coastal ecosystems to reduce impacts on species, habitats (particularly nesting areas), cultural and historic heritage. • Increase community and agricultural stewardship and landscape management on private lands • Integrate Indigenous land management practices through co-design and co-delivery of coastal management/programs with Traditional Owners and Aboriginal organisations. **Improve planning and compliance** • Greater focus under the Coastal Management Plan to identify ecologically sensitive habitats and species and manage access (including four wheel driving) • Enhance compliance in protected areas and historic and Indigenous cultural sites. **Weeds and pests prevention** • Improve community and industry monitoring for new and existing pests and diseases across catchments.	M3: Indigenous heritage goals are considered, integrated and progressed in partnership (IH2, IH6, IH7, IH8, IH9)). E4. Communities, industries and governments adopt stewardship behaviours. E5: Comprehensive monitoring, evaluation and reporting supports informed and agile management responses.

PRIORITY WORK AREA 3: Reduce impacts from water-based activities

Efforts under this priority work area focus on reducing direct impacts to the Reef from activities that occur within the Reef area (i.e. both the Commonwealth and Queensland marine parks and islands). This includes addressing unsustainable impacts from direct human use identified in the 2019 Outlook Report and preventing pest incursions from domestic sources (for example, spread of pests and weeds to Reef islands).

Management is focussed on ensuring continued protection and conservation of the Reef, so values are safeguarded for current and future generations to the greatest extent possible. A wide range of human uses like fishing and tourism occur in the Reef, and most are dependent on a healthy Reef. Reef-associated uses that occur in and adjacent to the Marine Park include ports, shipping and defence activities. The challenge in managing a multiple-use Marine Park, and the Reef more broadly, is to ensure use is ecologically sustainable while at the same time providing for the social, cultural and economic benefits derived from the Reef.

Over the next 20 years, the population living near the Reef is anticipated to continue increasing, which will intensify impacts from the associated use of the Reef if not managed appropriately. Enhanced regulatory systems and management efforts will need to be agile and adapt to changing pressures, for example, intensified use of reef and island areas that are not currently high use areas and changing ocean current patterns that may alter where commercial fish species aggregate.

Strong joint management arrangements for the Reef have been in place for over 40 years to manage water-based activities and these will continue. The Great Barrier Reef Marine Park Authority was established in 1975 dedicated to the long-term protection and conservation of the environment, biodiversity and heritage values of the Great Barrier Reef Region. The Great Barrier Reef Marine Park is complemented by the Queensland Great Barrier Reef Coast Marine Park that provides protection for Queensland tidal lands and waters. Full realisation of the expanded Reef Joint Field Management Program is a priority. This program is responsible for practical, on-ground delivery of marine and island national park management.

A comprehensive legislative framework (Appendix A), world-leading complementary Zoning Plans that manage multiple use and joint permits (managed across both Commonwealth and state jurisdictions) are key to managing the impacts of water-based activities. These are supported by education programs that promote the importance of following the rules to protect biodiversity and promote sustainable use. The Reef Guardians program creates awareness, understanding and appreciation for the Reef and its connected ecosystems, including its rules. This fosters stewardship and promotes a community culture of custodianship for Reef protection.

Enhance biodiversity protection

Management actions that focus on reducing risks identified in the 2019 Outlook Report will be implemented and strengthened to enhance the protection of biodiversity. A doubling of field management program capacity will result in increased presence of field officers and compliance effort. Implementation of the Marine Park Authority's 2019 Policy and Planning Strategic Roadmap and a greater understanding of how and where users interact with the Reef are key aspects of the enhanced management response.

Reduce impacts from fishing

Managing fisheries in a sustainable way is important for maintaining a healthy and resilient Reef. Reforms to fisheries management are important to ensure fisheries resources are managed in a sustainable and responsible manner that recognises the interests of all Queenslanders. Improved fisheries management and practices are important to help ensure the health and resilience of fish stocks, and to manage the impacts of fishing activities on non-target species and the broader ecosystem.

Implementation of the Queensland Sustainable Fisheries Strategy will deliver world-class fisheries reform and enhance biodiversity protection. There will be an increased focus on working with fishers to improve data and encourage responsible practices.

Support Traditional Owner management

The Plan supports Traditional Owners' role in managing their country through active engagement in on-country management, policy and planning programs. This includes supporting Traditional Owner organisations to manage land and sea programs to fulfil custodial obligations and strengthening relationships with managing partners. Governments will focus on coordinating and implementing management actions in partnership with Traditional Owners as well as working with industry and the community.

Improve management practices to reduce cumulative impacts of water-based activities

The 2019 Outlook Report found that planning systems for ports had been subject to profound reforms under the Plan and shipping was one of the strongest areas of management effectiveness.[22] In the next five years, remaining impacts from these Reef-associated industries will be further mitigated. New and revised actions under the North–East Shipping Management Plan, will assist in minimising multiple impacts from shipping (and associated ports), including noise and light pollution, resuspension of sediment from ship propellers and anchorage-associated risks.

Efforts under this priority work area will also encourage impact mitigation partnerships with Reef-dependent (marine tourism and fishing) and Reef-associated industries (including shipping and adjacent ports) and local councils to reduce impacts on species, habitats, ecosystem processes and heritage values.

Prevent pest and disease incursions (including biosecurity)

In a rapidly warming climate and with an increasing population, the risk of many pest and disease incursions and spread of pest species is likely to be heightened. There is likely to be more instances of marine pests, for example the Asian striped mussel arriving on the hulls of yachts and ships, and an increase in toxic algal blooms. Surveillance and prevention of pests and disease will be enhanced to increase protection of native flora and fauna, Indigenous heritage values and socio-economic wellbeing. This will be delivered through biosecurity initiatives and regulation, established programs (Reef Joint Field Management Program) as well as partnerships with rangers and Traditional Owner groups.

Priority work area 3: Reduce impacts from water-based activities			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Enhance biodiversity protection **Threats** Damage to reef structure Illegal activities — other Incompatible uses Grounding — small vessel Vessel strike Vessel waste discharge Wildlife disturbance Spill — small	Great Barrier Reef Blueprint for Resilience The Marine Park Authority's 2019 Policy and Planning Strategic Roadmap Reef Joint Field Management Program North-East Shipping Management Plan *Great Barrier Reef Marine Park Zoning Plan 2003 (Cth)* *Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004*	**Reduce the impact of direct-human use** • Review and enhance the Great Barrier Reef Blueprint for Resilience. • Transform the approach to Marine Park policy, planning and regulation that will protect key values and enable ecologically sustainable use for a changed and changing Reef. • Increase impact-mitigation partnerships with Reef-dependent industries (marine tourism and fishing), Reef-associated industries (including shipping and ports) and local councils to reduce impacts on species, habitats, and heritage values. • Evaluate the safety and environmental risks, benefits and viability of a vessel arrival system for major ports within the Reef, which could help reduce impacts on aesthetics and from anchoring and other associated impacts including noise and artificial light. • Strengthen interagency partnerships around incident response, particularly for non-pollution damage of the Reef. **Expand in-park presence and user compliance** • Deliver an expanded Reef Joint Field Management Program to check for changes in the World Heritage Area, respond to incidents, educate Reef users and uphold compliance and the integrity of marine protection. **Foster partnerships and stewardship** • Encourage and support stewardship actions and behaviours that reduce impacts of water-based activities by partnering with Traditional Owners, the tourism industry, research providers, government agencies, Reef users and interested stakeholders.	M2. Integrated planning across catchment and Reef reduces cumulative impacts. M11. Targeted Marine Park management reduces local and regional risks and supports ecosystem resilience. E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E3. Governance systems are effective and coherent. E4: Communities, industries and governments adopt stewardship behaviours.

Priority work area 3: Reduce impacts from water-based activities			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Reduce impacts from fishing **Threats** Incidental catch of species of conservation concern Illegal fishing and poaching Discarded catch Extraction of particle feeders (e.g. scallops) Extraction of predators (e.g. sharks) Extraction from spawning aggregations Damage to seafloor Extraction of herbivores	Queensland Sustainable Fisheries Strategy 2017-2027 Reef Joint Field Management Program *Great Barrier Reef Marine Park Zoning Plan 2003 (Cth)* *Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004* *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*	**Reform fisheries management** • Implementation of the *Queensland Sustainable Fisheries Strategy 2017-2027.* • Reduce recreational and commercial fishing pressure to sustainable levels through size and possession limits, closures, and no-take species to allow more fish to reach maturity and reproduce. • Improve data and understanding of recreational fishing numbers and catch to inform management decisions and protection of values. • Develop and encourage responsible recreational fishing practices in partnership with fishers. **Reduce illegal fishing and other impacts from fishing** • Deliver a strengthened compliance program that maximises the benefits of zoning plans and reduces the impacts from illegal fishing in fresh and salt water. • Implement effective fishery management measures to provide for timely recovery of depleted fishery species • Support development and encourage the adoption of new technologies to reduce the ecological impact of fishing activities.	M3: Indigenous heritage goals are considered, integrated and progressed in partnership (IH8). M6. The threats associated with fishing are reduced M11. Targeted Marine Park management reduces local and regional risks and supports ecosystem resilience. E1: The vulnerability of sectors and economies dependent on Reef health is reduced, and users of the Reef are preparing for changes to the Reef. E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E3: Governance systems are effective and coherent. E4: Communities, industries and governments adopt stewardship behaviours.
Support Traditional Owner management **Threats** Illegal fishing and poaching Fragmentation of cultural knowledge	*Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park* Traditional Use of Marine Resources Agreements	**Support sea country management** • Support ongoing Land and Sea Ranger Programs and expand to additional areas to deliver on-ground activities including compliance, marine monitoring and species protection. • Increase capacity of Australian and Queensland Indigenous Land and Sea Rangers through training and professional development and peer-to-peer learning. • Collaborate with Traditional Owners through full implementation the Marine Park Authority's *Aboriginal and*	M3. Indigenous heritage goals are considered, integrated and progressed in partnership (IH2, IH7, IH8, IH12, IH13). M7: Outbreaks of disease, introduced species and pests are reduced.

Priority work area 3: Reduce impacts from water-based activities			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Foundational capacity gaps Incompatible uses Behaviour impacting heritage values Damage to seafloor	Queensland Indigenous Land and Sea Rangers Program Australian Government Indigenous Rangers – Working on Country Australian Government Indigenous Protected Area Program	*Torres Strait Islander Heritage Strategy* to keep their Indigenous heritage strong, safe and healthy. • Implement and enhance the Traditional Use of Marine Resources Agreements program to strengthen the protection of biodiversity and Indigenous heritage values.	E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E3: Governance systems are effective and coherent. E4: Communities, industries and governments adopt stewardship behaviours.
Improve management practices to reduce cumulative impacts of water-based activities **Threats** Artificial light Illegal activities — other Marine debris Outbreak of disease Outbreak of other species Disposal of dredge material Dredging Noise pollution Exotic species Grounding — large vessel Spill — large chemical Spill — large oil	North-East Shipping Management Plan Maintenance Dredging Strategy Master Planning for priority ports International Maritime Organization (IMO) Action Plan to address marine plastic litter from ships National Waste Policy Action Plan 2019 Reef 2050 Cumulative Impact Management Policy Reef 2050 Integrated Monitoring and Reporting Program Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans	**Reduce cumulative impacts** • Strengthen cumulative impact assessment in decision making through development assessments and planning. • Maintain and enhance spatial planning in the marine parks, on islands and along the coast to protect natural and heritage values and ensure cumulative impacts in these areas are considered and appropriate management arrangements are in place. • Implement effective waste reception facilities at marinas and ports along the Reef coastline to reduce at sea disposal. • Implement measures to reduce ship-sourced waste in accordance with the International Maritime Organisation's Action Plan to address marine plastic litter. **Reduce noise and light impacts** • Investigate and reduce artificial light impacts from sources within and adjacent to the Marine Park. • Evaluate the safety and environmental risks, benefits and viability of a vessel arrival system for major ports within the Reef which could help reduce impacts from noise and artificial light emitted from ships. • Pursue at the international level the review and update of guidelines to reduce the impacts of underwater noise from shipping on marine life. • Improve understanding of the impacts of noise pollution and mitigate impacts based on severity of risk to Reef values.	M2. Integrated planning across catchment and Reef reduces cumulative impacts. M8: Anthropogenic noise impacts are reduced. M9: Artificial light impacts are reduced. M10: Marine debris and rubbish pollution is reduced. M11. Targeted Marine Park management reduces local and regional risks and supports ecosystem resilience. E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base.

Priority work area 3: Reduce impacts from water-based activities			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Atmospheric pollution Noise pollution Wildlife disturbance			
Prevent pest and disease incursions (including biosecurity) **Threats:** Exotic species Outbreak of disease Outbreak of other species	Reef Joint Field Management Program Crown-of-thorns Starfish Control Program Queensland Biosecurity Strategy 2018-2023 Biosecurity pilot projects with Queensland Ports	**Enhance pest surveillance and prevention** • Deliver innovative surveillance and control to prevent pest species establishing and spreading within estuarine, marine and island environments (for example, molecular techniques for environmental surveillance of marine pests). • Deliver community education on pest species identification. • Strengthen management of biosecurity risks from international and domestic vessels, particularly in relation to ships and biofouling from commercial and recreational vessels, through Australian and Queensland government coordination with industry including regular and consistent inspections of port facilities. • Expand marine pest biosecurity research and development in partnership with ports, the shipping industry and communities.	M3. Indigenous heritage goals are considered, integrated and progressed in partnership (IH6, IH7). M7. Outbreaks of disease, introduced species and pests are reduced. E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E4: Communities, industries and governments adopt stewardship behaviours. E5: Comprehensive monitoring, evaluation and reporting supports informed and agile management responses.

PRIORITY WORK AREA 4: Influence the reduction of international sources of impact

Impacts on the Reef come from international sources as well as domestic sources. This priority work area focuses on Australia's international engagement to influence the reduction of impacts on the Reef that come from international sources, excluding climate change which is covered in priority work area 1 (Limit the impacts of climate change).

Australia works through various international treaties, bodies and initiatives to influence reductions in plastic litter and other pollutants that end up in the ocean and ultimately as marine debris in the Reef. This international engagement complements domestic efforts to reduce the sources of rubbish that becomes marine debris within the catchment – priority work area 2 (Reduce impacts from land-based activities) – and from on-water activities – priority work area 3 (Reduce impacts from water-based activities).

Australia also works internationally to influence the protection of habitat for migratory species that spend part of their lives in the Reef. This complements domestic efforts to protect migratory species and their habitat through priority work area 5 (Protect, rehabilitate and adapt).

Reduce international sources of pollutants and debris

Plastic rubbish and other types of litter in the oceans are a major international concern. Most rubbish that ends up as marine debris originates from land-based sources. Uncollected waste, inadequately managed landfill sites and sewage discharge can flow into rivers and out into the ocean. Global ocean currents transport the debris and it has been found along the coastline, islands and ocean in some of the most remote areas of the Reef. The debris consists of macroplastics, microplastics, and abandoned, lost or otherwise discarded fishing and boating gear.[23] Marine debris can be eaten by wildlife or entangle them, impacting their health and potentially causing death.

The amount of debris entering the marine environment is expected to escalate, and community concern about the threats of pollution and marine debris have increased in the last five years.[24] Australia will continue active membership of international bodies and initiatives focussing on marine plastics and will contribute to efforts to improve knowledge, prevention and responses to marine debris. Maintaining a sustained, comprehensive approach to reducing debris in the marine environment that includes clean-up activities in partnership with community and industry, education, outreach and awareness raising, is essential. This will be supported by research to understand and quantify the source and volume of pollution in the Reef, to address a knowledge gap identified by the 2019 Outlook Report.

Protect international habitat for populations of migratory species

The Reef provides critical habitat for migratory species notably cetaceans and dugongs, turtles, sharks and birds that migrate to Australia and its external territories, or that pass through Reef waters during their annual migrations. Habitat loss in the ocean, coastal and estuarine environments is a major threat to migratory species, and the conservation of important sites in other countries along their migration routes is essential to their survival.

To protect migratory species and their habitats, Australia has fostered and will continue international cooperation through its participation in a range of international treaties and agreements, including bilateral migratory bird agreements and memoranda of understanding to promote cooperation among governments and other organisations.

Priority work area 4: Influence the reduction of international sources of impact			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Reduce international sources of pollutants and debris **Threats:** Marine debris Outbreak of disease (cumulative effect of many factors) Damage to reef structure Wildlife disturbance Behaviour impacting heritage values	Global Partnership on Marine Litter Pacific Regional Action Plan: Marine Litter 2018-2025 and Pacific Ocean Litter Project G20 Implementation Framework for Actions on Marine Plastic Litter CSIRO Global Plastic Pollution Survey	**Reduce marine debris internationally sourced entering the Marine Park** • Contribute to international efforts to reduce marine plastic pollution that could affect the Reef. • Support capacity building activities in communities in neighbouring countries, including targeted education and awareness raising about marine debris and pollution. • Conduct research to understand the source, quantity, and ecological effects from marine debris and microplastics in the Reef. • Work with governments, industries, other partners and the international community to reduce lost or discarded fishing gear through source reduction initiatives and clean-up activities.	M7. Outbreaks of disease, introduced species and pests are reduced. M10. Marine debris and rubbish pollution is reduced. E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E4. Communities, industries and governments adopt stewardship behaviours.
Protect international habitat for populations of migratory species **Threats:** Pollution Wildlife disturbance	Reef Joint Field Management Program Ramsar Convention on Wetlands Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) and memoranda of understanding for cetaceans, migratory sharks, dugongs, and marine turtles Bilateral Migratory Bird Agreements: Japan-Australia (JAMBA); China-Australia (CAMBA); Republic of Korea-Australia (ROKAMBA) East Asian Australasian Flyway Partnership	**Maintain or improve populations of migratory species** • Contribute to international agreements, conventions and programs to protect migratory species habitat. • Conduct research to identify species knowledge gaps (for example, seabird and shorebird condition and trend as identified in the 2019 Outlook Report).	M3: Indigenous heritage goals are considered, integrated and progressed in partnership (IH9, IH12). E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E4. Communities, industries and governments adopt stewardship behaviours.

Priority work area 4: Influence the reduction of international sources of impact			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
	Agreement on the Conservation of Albatrosses and Petrels International Convention for the Regulation of Whaling Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Strategic Plan for Biodiversity 2011-2020, including Aichi Biodiversity Targets: Target 11		

PRIORITY WORK AREA 5: Protect, rehabilitate and adapt

Priority work areas 1 through 4 are focused on reducing the pressures and mitigating impacts to the Reef and its catchment. Many parts of the Reef ecosystem are still recovering from past events including marine heatwaves, cyclones and pest incursions. This recovery is hindered by ongoing impacts, including those associated with climate change, and shorter periods of recovery between impacts.

This priority work area focuses on the control of established pests and outbreaks, intervention and restoration activities to assist rehabilitation of habitats and heritage sites, and enhancements to support the adaptation of species and habitats to a changing climate.

Control pests and introduced species

Crown-of-thorns starfish are native to the Reef, however, when their numbers peak past natural levels they can 'outbreak' and place unsustainable pressure on reefs. In their current plague proportions they eat live coral tissue faster than it can recover, and present a very high risk to the Reef.[25] The trigger for outbreaks is still undetermined, however, there is evidence that a combination of poor water quality and a reduction in natural predators are factors that can exacerbate an outbreak. The Crown-of-thorns Starfish Control Program has been boosted to protect a network of priority coral reefs. However, further enhancement is required through an integrated research program to identify root causes of outbreaks, reduce likelihood of future outbreaks and improve adaptive management.

Introduced species like feral pigs and goats have an impact on wetland and island habitats and prey on Reef species. Local partnerships between community, landholders, natural resource management organisations, councils, Traditional Owners and conservation groups help to identify and control pests. Established effective pest management programs will be strengthened, particularly where habitats and species are highly vulnerable, or of high ecological or cultural value.

Support rehabilitation and recovery of key habitats and species

Active restoration of island, wetland and coral habitats can maintain and support resilience of the Reef. This includes continued work by the Reef Joint Field Management Program, planned enhancement of the Authority's *Great Barrier Reef Blueprint for Resilience*, and development of a Reef-wide 'resilience network'. Collaborative efforts between scientists, industry, the community, Traditional Owners and governments are needed to explore and trial intervention and rehabilitation for coral reefs, wetlands, seagrass and islands. Recent small-scale trials involving coral relocation following cyclone disturbance, coral larvae re-seeding projects, and supporting reef structures to help coral replenishment processes have been successful. Efforts will focus on investigating and staged trialling of intervention options to minimise harm and vulnerabilities, restore and repair damage, and increase the ability to adapt to a changing climate.

The Reef's connection to coastal ecosystems including wetlands, rivers and estuaries is essential for many Reef species. The 2019 Outlook Report identifies that while losses have generally stabilised, many coastal ecosystems remain in poor condition. The Wetlands in the Great Barrier Reef Catchments Management Strategy 2016-21 and implementation of on-ground restoration will be expanded, focusing on shorebird habitat and fish passage and nursery habitats.

The success of community organisation partnerships with science and research institutions, landholders, natural resource management groups, Traditional Owners and government are vital to reconnecting and rehabilitating coastal ecosystems. Localised efforts are important, for example the restoration of Mungalla Wetlands by the Nywaigi Aboriginal people in collaboration with CSIRO. Another example is the wetland restoration stream of Greening Australia's Reef Aid program, which is working with Traditional Owners and landholders to improve grazing management practices to encourage healthy wetlands, reduce the spread of invasive aquatic weeds, and revegetate wildlife corridors.

A wide range of restoration and intervention activities are being delivered, including through the Queensland Indigenous Land and Sea Ranger Program, Traditional Use of Marine Resource Agreements, natural resource management groups, community conservation organisations, and councils. Co-designed and co-delivered projects are critical to support rehabilitation and recovery of key habitats of the Reef.

Support the adaptation of species and habitats to a changing climate

Supporting the adaptive capacity of species and habitats is an important part of adaptive management given the increasing frequency of acute and chronic stressors.

Work is underway to explore options to reduce the exposure of coral reefs to temperature stress, promote the ability of coral to recover after disturbance and increase the ability of corals to adapt to warming oceans. Australia's leading science institutions have launched an unprecedented research and development program that will put the Great Barrier Reef at the cutting edge of global efforts to help coral reefs adapt to climate change. The Reef Restoration and Adaptation Program will develop, test and risk-assess novel interventions to help keep the Reef resilient and sustain critical ecological functions as well as the Reef's social and economic values. The aim is to provide Reef managers and decision-makers with an innovative toolkit providing an integrated three-point approach to helping protect the Reef:

- cooling and shading to help protect the Reef from the impacts of climate change
- assisting Reef coral species to evolve and adapt to the changing environment, to minimise the need for ongoing intervention
- supporting natural restoration of damaged and degraded reefs.

On-reef experimental trials of selected techniques at a meaningful scale are expected to begin within the first two years of the program and scale up over time depending on need, findings of the research and testing, and underpinning infrastructure and investment. These interventions would need to be combined with best-practice conventional Reef management and reduced greenhouse gas emissions to maximise their effectiveness.Conserve historic and cultural heritage sites

The 2019 Outlook Report found that many historic and cultural heritage components have not been systematically identified, and there is a lack of evidence regarding the condition and trend across historically significant sites. This will be addressed through ongoing monitoring, knowledge sharing and conservation programs.

Priority work area 5: Protect, rehabilitate and adapt			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Control pests and introduced species **Threats:** Outbreak of crown-of-thorns starfish Exotic species	Reef Joint Field Management Program Queensland Indigenous Land and Sea Rangers Program Australian Government Indigenous Rangers – Working on Country Queensland Biosecurity Strategy 2018-2023 Nest to Ocean Turtle Protection Program	**Enhance implementation of strategic pest control programs** • Partner with Traditional Owners to implement co-designed and co-delivered pest control programs on land and in-water sea country management arrangement. • Enhance control of crown-of-thorns starfish on key reefs, including reefs of high ecological and economic value. • Implementation of an integrated research program for crown-of-thorns starfish to identify root causes of outbreaks to reduce likelihood of future outbreaks and improve adaptive management. • Implement strategic control of pest predators of sea turtles through the Nest to Ocean program. • Manage terrestrial and aquatic pests and weeds for coastal ecosystem values.	M3: Indigenous heritage goals are considered, integrated and progressed in partnership (IH6, IH7). M7. Outbreaks of disease, introduced species and pests are reduced. M12: Potential Reef restoration and adaptation interventions are developed and deployed on a risk-basis. E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E5: Comprehensive monitoring, evaluation and reporting supports informed and agile management responses.
Support rehabilitation and recovery of key habitats and species **Threats:** Modifying coastal habitats Damage to reef structure Barriers to flow Fragmentation of cultural knowledge Acid sulfate soils	*Great Barrier Reef Blueprint for Resilience* Queensland Land Restoration Fund Reef Trust and Reef Trust Partnership *Reef 2050 Water Quality Improvement Plan 2017-2022* Wetlands in the Great Barrier Reef Catchments Strategy 2016-21 Reef Restoration and Adaptation Program Reef Islands Initiative	**Pilot and implement restoration interventions for coral reefs and other key habitats:** • Remediate impacted habitats following marine incidents where feasible and deliver the Douglas Shoal Environmental Remediation Project. • Support localised and scalable restoration activities that are cost effective, feasible and in accordance with legislation and best-practice policies (for example, coral gardening). • Expand the restoration of key island ark refuges to protect critical habitats. **Assist species and ecosystems recovery** • Improve coordination of incident response programs to assist wildlife affected by marine incidents (e.g. oil spills).	M3: Indigenous heritage goals are considered, integrated and progressed in partnership (IH7, IH8, IH9, IH12). M4. The flow of water to the Reef is further managed through targeted catchment restoration to mitigate water quality impacts. M11: Targeted Marine Park management reduces local and regional risks and supports ecosystem resilience.

Priority work area 5: Protect, rehabilitate and adapt			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
		• Implement relevant EPBC Act conservation plans (i.e. recovery plan, conservation advice, threat abatement plan, wildlife conservation plan). **Enhance rehabilitation of key coastal and catchment ecosystems** • Identify, prioritise, remove or remediate artificial barriers to flow and increase connectivity through fish passages in catchment and estuarine areas. • Incentivise land restoration to increase uptake through the Land Restoration Fund. • Fast-track coastal and catchment rehabilitation projects by streamlining approval processes, facilitating discussion between government agencies and proponents and simplifying regulatory barrier. • Implement a coordinated and prioritised program of on-ground restoration activities to restore refugial waterholes, wetlands and bird habitat and fish nursery habitat. • Partner with Traditional Owner and Aboriginal organisations to co-design and co-deliver on-ground rehabilitation programs. • Increase understanding and pre-emptive planning for potential impacts from sea-level rise (including inland migration of wetlands).	M12: Potential Reef restoration and adaptation interventions are developed and deployed on a risk-basis. E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base.
Support the adaptation of species and habitats to a changing climate **Threats:** Altered weather patterns	*Great Barrier Reef Blueprint for Resilience* Reef Restoration and Adaptation Program	**Pilot and trial innovations to assist species and habitats to adapt to climate change:** • Understand and respond to heat impacts on sea turtle nesting success. • Develop and test intervention options to help the key habitats and species adapt to, and recover from, the effects of climate change (including small-scale in-field deployments and further research to develop full-scale in-field deployments).	M11: Targeted Marine Park management reduces local and regional risks and supports ecosystem resilience. M12: Potential Reef restoration and adaptation interventions are developed and deployed on a risk-basis.

Priority work area 5: Protect, rehabilitate and adapt			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Sea level rise Sea-temperature increase Ocean acidification Altered ocean currents Genetic modification		• Undertake a national research and development effort (the Reef Restoration and Adaptation Program) to help coral reefs more rapidly adapt to rising ocean temperatures. • Use risk-based processes that are socially and culturally responsible, and open to public scrutiny, in the development and testing of intervention options.	E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E5: Comprehensive monitoring, evaluation and reporting supports informed and agile management responses.
Conserve historic and cultural heritage sites **Threats:** Altered weather patterns Illegal activities Fragmentation of cultural knowledge Behaviour impacting heritage values	Queensland Heritage Register Reef Joint Field Management Program Historic Shipwrecks Program *Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park*	**Implement historic heritage site conservation:** • Protect and conserve historic ship and aircraft wrecks for future generations. • Identify, map and monitor historic ship and aircraft wrecks and heritage values in priority sections of the Reef. **Implement cultural heritage site conservation:** • Partner with Traditional Owner groups to protect Indigenous cultural heritage sites.	M3: Indigenous heritage goals are considered, integrated and progressed in partnership (IH2, IH3, IH4, IH5).

CROSS-CUTTING ENABLER 1: Coordination and empowerment

The Reef's future depends on the collective efforts of governments, industry, land managers, scientists, Traditional Owners and the wider community. Collaboration and innovative management approaches are needed to deliver the changes needed to secure the Reef's future. Efforts under this cross-cutting enabler will build on the strong and productive relationships already in place. The focus will be on forging new partnerships and fostering open and productive communication, engagement and outreach across the Reef and its catchment. A key priority is to strengthen partnerships with Traditional Owners and build their knowledge into Reef protection and management efforts; this is important to keeping the culture, heritage and environment of the Reef alive and strong.

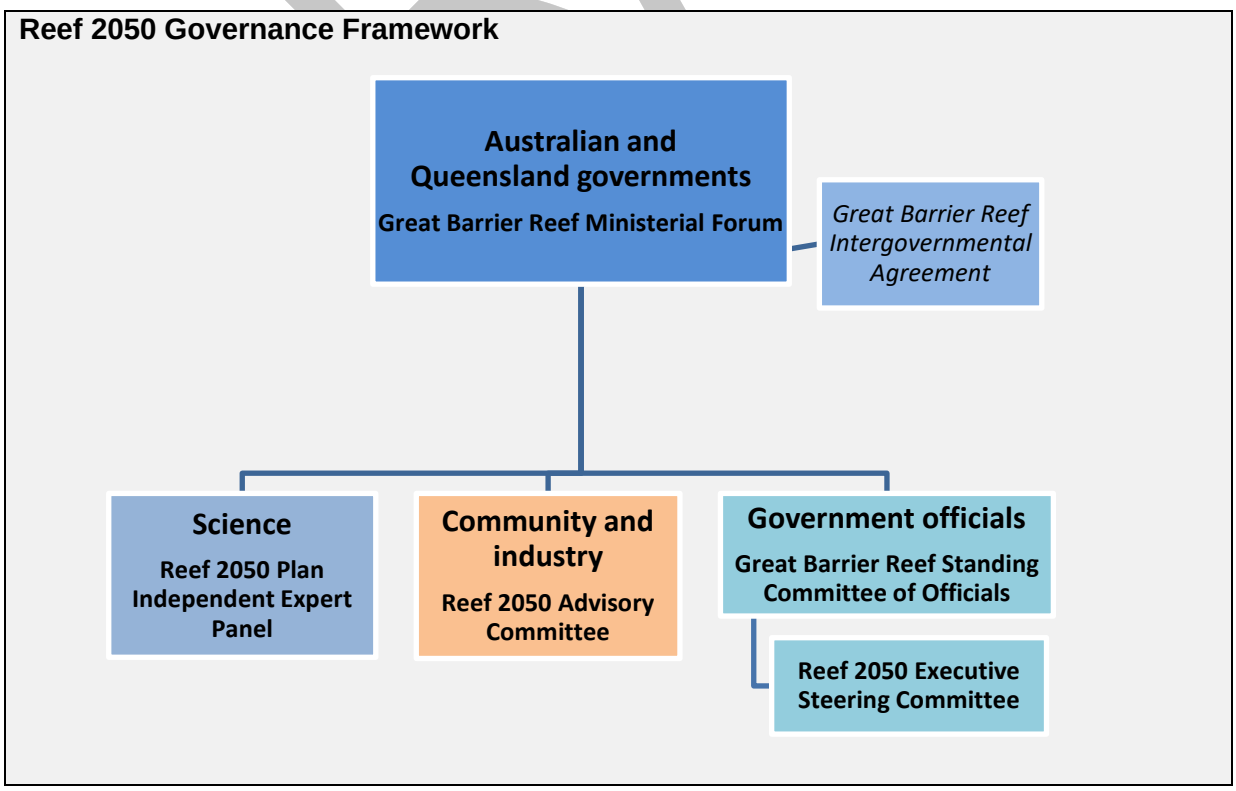
Governance

Since 2015 the Plan has provided a sound framework for improving the management of the Reef's values through stronger governance, planning and resourcing.[26] Efforts under this cross-cutting enabler will continue to build on these strong foundations and the effective coordination already present between Commonwealth, state and local governments.

While not specifically part of Reef 2050 governance, the Plan's operation also benefits from well-established advisory and consultative networks established by the Marine Park Authority, including Local Marine Advisory Committees. Regional partnerships like Reef Alliance also support local decision-making, priority setting and accountability.

Increasing Traditional Owner participation and capacity in Reef sea country governance is a priority. In response to the stated aspirations and advice received from Reef Traditional Owners, the Plan commits to putting in place an appropriate development process and secretariat to underpin longer-term and Traditional Owner-led work towards increased participation and a voice in governance processes for Reef protection and management (Great Barrier Reef Sea Country Alliance).

Reef 2050 Governance Framework



Australian and Queensland government ministers

The Plan is a schedule to the Great Barrier Reef Intergovernmental Agreement between the Australian and Queensland governments. Its implementation is overseen by the Great Barrier Reef Ministerial Forum, which has a membership of two ministers from each government with responsibilities relevant to the management of the Reef.

Implementation of the Plan is undertaken in partnership with industry, land managers, scientists, Traditional Owners and community organisations. Decision-making and delivery of actions under the Plan is guided by advice from the Reef 2050 Plan Independent Expert Panel, the Reef 2050 Advisory Committee and relevant government departments and agencies.

Advisory bodies – science, community and industry

The Reef 2050 Plan Independent Expert Panel includes members with scientific (biophysical, heritage, social and economic) expertise. It also advises the Australian Government Minister for the Environment on funding priorities for the Reef Trust.

The Reef 2050 Advisory Committee includes members from a range of industry bodies and non-government organisations, Traditional Owners and community representatives. Sectors represented include the agricultural industry, ports, shipping, commercial and recreational fishers, tourism, the resources industry, and natural resource managers. It provides strategic advice on the implementation of Reef 2050 Plan actions, advises on stakeholder priorities, and helps highlight any emerging cross-sectoral issues that need to be addressed.

The Terms of Reference and meeting Communiques for the advisory bodies are available at: http://environment.gov.au/marine/gbr/reef2050/advisory-bodies

Australian and Queensland government officials

Day-to-day management and implementation of the Plan is coordinated by a joint secretariat of officers from the Australian Government Department of Agriculture, Water and the Environment; the Great Barrier Reef Marine Park Authority; and the Queensland Government Office of the Great Barrier Reef. This includes senior executive oversight by an Executive Steering Committee from these three agencies and by the Standing Committee of Officials comprised of senior officials from the Australian and Queensland governments. The joint secretariat provides support to the Great Barrier Reef Ministerial Forum, the Reef 2050 Plan Independent Expert Panel and the Reef 2050 Advisory Committee.

Box 5: Reef 2050 Governance Framework

Empower and partner with industry and community

A strong record of community engagement and an adaptive approach is an enduring feature of the Reef's management. Collaboration between land managers, natural resource managers and the conservation sector has long been used to deliver Reef protection outcomes. Regional Report Card Partnerships, which bring together industry, farmers and fishers, scientists, tourism operators, Traditional Owners and volunteer community groups, are vital for monitoring the condition of regional waterways. Cooperation between governments is a centrepiece of Reef management, as is evidenced by the award-winning 40-year Reef Joint Field Management Program between the Australian and Queensland governments.

Initiatives that facilitate communication between industry and community aim to catalyse efforts across sectors to maximise the potential for impact; for example, roadshows, roundtables and workshops under the Reef Trust Partnership. The Plan supports a range of solutions to drive behavioural change including incentive-based programs and industry-led delivery of best practice standards, market mechanisms and initiatives. For example, Project Pioneer – Innovation in Grazing Management, supported by the Reef Trust, conservation organisations and universities, is seen as a model in incentivising graziers to innovate land management practices and decrease sediment run-off across the Reef catchment.

Stewardship is a core principle to be fostered across all stakeholders and partners, to improve the sustainability of industries dependent on or associated with the Reef. Sustaining a comprehensive approach that includes coordinated activities, education, outreach and awareness-raising with the community and partners will play a role in securing the Reef's future. Co-design, co-delivery and the use of locally-driven methodologies all help create local ownership and embed partnership. Successful examples already in operation include the environmental monitoring undertaken by port authorities, the Reef Guardians program, citizen science programs like Eye on the Reef and the Reef Citizen Science Alliance. There are also partnerships between government and non-government organisations, for example the Reef Trust's $5 million program to tackle marine debris delivered by Tangaroa Blue Foundation in partnership with Conservation Volunteers Australia.

Support the recognition of Indigenous heritage

Improving involvement of Traditional Owners in protecting and managing the Reef is a priority for the Australian and Queensland governments. All Reef 2050 partners and stakeholders have a role to play in considering and supporting Traditional Owner rights and aspirations. These rights are recognised in the *UN Declaration on the Rights of Indigenous Peoples*, the *Convention on Biological Diversity* articles 8(j) and 10(c) and related guidelines, and the *Human Rights Act 2019* (Queensland).

The Plan applies a broad definition of Indigenous heritage. The Indigenous heritage goals (Box 3) are linked to actions across all priority work areas and will be considered, integrated and progressed in partnership under a broad management goal (M3).

Progress continues to be made in securing formal recognition of Traditional Owner rights and interests and development of local capacities to govern and manage sea country. For example, through the Marine Park Authority's Traditional Use of Marine Resources program, 17 groups work in partnership to implement sustainable Traditional Use of Marine Resources Agreements covering 25 per cent of the Marine Park coastline. Capacity building at local and regional levels is foundational to achieving other aspirations and is supported by Australian Government initiatives including the Capacity Building for Indigenous Rangers Strategy, as well as Indigenous-led regional approaches like Empowered Communities and Pama Futures.

Innovative partnerships between government, non-government organisations and the private sector are also avenues for supporting Traditional Owner aspirations. The $42 million allocated for Traditional Owner Reef protection actions under the Reef Trust Partnership provides an unprecedented opportunity for Reef Traditional Owners to action key recommendations and priorities for land and sea country management. The Reef Trust Partnership funding includes $10 million committed to scope and design a Traditional Owner Reef Futures Fund to support sustained funding for Traditional Owner engagement, governance and leadership activities.

Cross-cutting enabler 1: Coordination and empowerment			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Governance	Current legislative framework for the Reef (see Appendix A) Reef 2050 Governance Framework (see Box 5)	**Strengthen local advisory and consultative networks** • Strengthen partnerships at a regional level to support delivery of strategic actions identified in the priority work areas under the Plan. • Facilitate coordination between local councils and researchers to improve alignment of investment outcomes with research needs. **Enhance Traditional Owner governance** • Increase Traditional Owner participation and capacity in sea country governance and Reef governance bodies. • Establish a Great Barrier Reef Traditional Owner-led Sea Country Alliance development process in 2020. • Establish a Great Barrier Reef Traditional Owner-led Sea Country Alliance Secretariat in 2021.	M3: Indigenous heritage goals are considered, integrated and progressed in partnership (IH2, IH13, IH14, IH15). E3: Governance systems are effective and coherent.
Empower and partner with industry and community	Reef 2050 Water Quality Improvement Plan 2017-2022 International Coral Reef Initiative (ICRI) Reef Trust Partnership Reef Joint Field Management Program Crown-of-thorns Starfish Control Program Reef HQ Aquarium Reef Guardians program Master Reef Guide program Eye on the Reef program	**Foster partnerships and innovation** • Governments work in partnership with experts, industry, community and non-government sectors. • Local governments, industries and community organisations educate and deliver initiatives to help their communities reduce emissions. • Promote the uptake of new approaches to drive behavioural changes that positively affect the Reef and catchment. **Foster stewardship** • Celebrate good environmental deeds and increase understanding of how the behaviour of individuals and communities can affect the Reef. • Collaborate with Reef users to partner on citizen science initiatives like the 2019-20 state-wide recreational fishing survey as well as issuing more than 2500 recreational fishing logbooks. • Increase co-design, co-delivery and related locally-driven methodologies to foster local ownership and embed partnership in Reef protection and management.	M3: Indigenous heritage goals are considered, integrated and progressed in partnership (IH3). E1. The vulnerability of sectors and economies dependent on Reef health is reduced, and users of the Reef are preparing for changes to the Reef. E2. Science and knowledge are advanced and decisions are informed by the best available evidence-base. E4. Communities, industries and governments adopt stewardship behaviours.

Cross-cutting enabler 1: Coordination and empowerment			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
	Local Marine Advisory Committees Regional report card partnerships Major Integrated Projects in the Wet Tropics and Burdekin regions Fishery Working Groups under the *Queensland Sustainable Fisheries Strategy 2017-2027*	**Support local and Traditional Owner-led approaches** • Support local approaches to pest mitigation, including supporting local councils in invasive weed and animal control methods specifically tailored to their local regions. • Support park and natural resource managers to draw on Traditional Owner-led approaches.	
Support the recognition of Indigenous heritage	Queensland Government Tracks to Treaty – A Path to Treaty program *Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park* Capacity Building for Indigenous Rangers (Jobs, Land and Economy Program) Indigenous Advancement Strategy Prescribed Body Corporate Capacity-Building PAMA Futures Empowered Communities NESP Indigenous Engagement and Participation Strategy Guidelines	**Prioritise investment** • Use *Traditional Owners of the Great Barrier Reef: The Next Generation of Reef 2050 Actions* (final report from the Reef 2050 Traditional Owner Aspirations Project) to inform program and investment priorities. • Increase the co-design and co-delivery opportunities for Traditional Owners and other stakeholders. **Enhance agreement-making and capacity building** • Increase implementation and enhancement of sea country agreements including Traditional Use of Marine Resource Agreements. • Support Traditional Owners to identify, assess, map and store knowledge of their heritage values. • Expand programs to build capacity for and support caring for country. • Increase training opportunities to expand caring for country skillset into compliance, monitoring and evaluation. **Improve coordination** • Improve policy coordination between government agencies on policy matters that influence progress towards Indigenous heritage goals but sit outside the Reef 2050 framework.	M3. Indigenous heritage goals are considered, integrated and progressed in partnership (all: IH1 through IH16). E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E3: Governance systems are effective and coherent.

Cross-cutting enabler 1: Coordination and empowerment			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
	NESP Tropical Water Quality Hub Indigenous Engagement and Participation Strategy Reef Trust Partnership	**Secure independent resourcing** • Secure more sources of independent resourcing to support capacity building priorities and Reef protection activities, for example partnerships with philanthropic and non-government organisations.	

CROSS-CUTTING ENABLER 2: Science and knowledge

Science is essential for identifying solutions that can be integrated into management actions quickly in response to changes in the Reef. Evidence-based decision making is paramount. Bringing together science, traditional knowledge, industry knowledge and intergenerational community knowledge offers the best opportunity to design and implement responses that meet the needs of a rapidly changing Reef environment.

Making knowledge integrated and accessible, and supporting its translation into policies, programs and decision making is a focus under this cross-cutting enabler. This is complemented by a comprehensive understanding of the condition of the Reef and its catchment, how people use the Reef, how this is changing and whether actions to improve its health are working – see cross-cutting enabler 3 (Monitoring, evaluation and adaptive management).

A range of organisations contribute to science and research about the Reef (Box 6). In addition, many science strategies identify knowledge gaps and provide direction for research, development and innovation for aspects of Reef management.

Reef science and research landscape

- Australian Institute of Marine Science
- Australian Research Council Centre of Excellence for Coral Reef Studies
- Bureau of Meteorology
- Industry research organisations
- National Environmental Science Program
- Commonwealth Scientific and Industrial Research Organisation
- Geoscience Australia
- Queensland Government departments
- Museums
- Multiple universities
- Australian Institute of Aboriginal and Torres Strait Islander Studies

Box 6: Reef science and research landscape

Undertake strategic research planning

Identifying key strategic research areas at the Plan scale is important to support a whole-of-system approach to decision making (Box 7). Research and monitoring programs need to focus on how outputs can be used to deliver a response (for example, to improve the health of a value or maximise the effectiveness of governance or management actions). This requires a coordinated, strategic research planning process that crosses institutional and disciplinary boundaries, supported by investment in research leadership.

Strategic research areas:

- Understanding the dynamics of managing the complex ecological and human interdependent Reef system through a whole-of-system approach.
- Using Traditional Owner, experiential and western knowledge systems, understand and quantify the links between pressures, management actions, interventions, and the subsequent responses and benefits to human and ecological systems.
- Understanding the condition, vulnerability, and resilience of the Reef's interconnected human and ecological systems to current and future pressures (individual, multiple and cumulative).
- Understanding and ability to predict and project condition and trend for key values, and identify tipping points.
- Understanding ecological and socio-ecological adaptive capacity to unprecedented changes and community capacity and motivations for action in the context of these changes.
- Developing improved monitoring and evaluation approaches and systems modelling tools to underpin future integrated decision support systems, including the Reef 2050 Integrated Monitoring and Reporting Program and the Reef Restoration and Adaptation Program.

Box 7: Strategic research areas

Recognise and embed traditional knowledge

It is important to respect and value the knowledge of the Reef held by Aboriginal and Torres Strait Islander peoples through their continuing relationships with the Reef and its catchment stretching back over 60,000 years. Bringing together traditional knowledge and scientific knowledge contributes to innovations in delivery for improved management outcomes. Two-way knowledge transfer opportunities are required, and need to be founded in principles of respect, meaningful engagement and reciprocity between researchers, individuals and communities. Frameworks like the Australian Institute of Aboriginal and Torres Strait Islander Studies' Guidelines for Ethical Research in Indigenous Australian Studies provide best-practice guidance for research with Indigenous peoples or on Indigenous land and waters.

Enable uptake of scientific evidence and knowledge

Reef and catchment policy makers, managers and stakeholders must have access to and be able to use high quality and relevant science and knowledge effectively and appropriately. To achieve this, multiple lines of scientific and expert findings need to be integrated and presented in an accessible manner that fills relevant knowledge gaps and informs decisions.

Engagement and collaboration with policy and management end-users, other stakeholders and Traditional Owners need to be built into research program and/or project design (i.e. co-design at the most appropriate level). This requires a shift in research investment guidelines to support time for collaboration in project design and budgets. It will also require greater time investment by managers in the research design process with research program leads and stakeholders to maximise development of effective on-ground solutions. For example, scientists and farmers in the Reef catchment are collaborating to pilot and test innovative on-farm water treatment systems such as bioreactors, which use organic material to remove nitrogen from water. Such innovations have the potential to reduce nutrient pollution from farmland for a relatively low cost while maintaining farm productivity.

The urgency required to develop new solutions for the Reef means research needs to be more coordinated, more available and understandable. Strengthening collaboration between research providers, government and stakeholder organisations is a focus of this cross-cutting enabler, building on the Reef knowledge and coordination role performed by CSIRO. This aims to strengthen knowledge brokerage, knowledge translation and communication. Efforts will also focus on more science synthesis to bring together the range of research underway around focussed topics relevant to protecting and managing the Reef.

Knowledge systems and tools can facilitate science/management relationships for the Reef, including:

- networking software or databases to link researchers with the right end-users
- feedback systems that report the impact of research back to researchers and institutions
- systems to demonstrate decision-making is based on relevant and high-quality science
- a structured knowledge management system to enable access to the best available scientific, traditional and intergenerational knowledge to guide management decisions.

Cross-cutting enabler 2: Science and knowledge			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Undertake strategic research planning	Reef 2050 Water Quality Research, Development and Innovation Strategy The Marine Park Authority's Science Strategy and Information Needs Wetlands in the Great Barrier Reef Catchments Strategy 2016-21 Fisheries Queensland Monitoring and Research Plan (Sustainable fisheries)	**Strengthen partnerships and processes** • Foster science/management partnerships and research leadership focusing on priority management needs. • Coordinate strategic research planning across institutions, agencies and disciplines. • Enhance whole-of-system understanding and decision-making. • Invest in robust approaches for collating and synthesising the weight-of-evidence to support policy and management decision-making (rigorous and relevant science).	E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E5: Comprehensive monitoring, evaluation and reporting supports informed and agile management responses.
Recognise and embed traditional knowledge	Queensland Indigenous Land and Sea Rangers Program Australian Government Indigenous Rangers – Working on Country Queensland Department of Environment and Science Gurra Gurra Framework *Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park* Reef Trust Partnership Australian Institute of Marine Science Indigenous Partnerships CSIRO Indigenous Engagement Strategy Guidelines for Ethical Research in Indigenous Australian Studies (Australian Institute of Aboriginal and Torres Strait Islander Studies)	**Manage knowledge** • Traditional Owners develop Indigenous Knowledge Management Systems for collecting, handling and / or sharing of Indigenous heritage and knowledge information. **Build and strengthen partnerships to embed knowledge** • Science and research institutions commit to genuine engagement with Traditional Owners in planning research activities to include co-design opportunities, identify co-benefit outcomes and attain free, prior and informed consent from Traditional Owners for scientific research (in compliance with AIATSIS Guidelines for Ethical Research in Indigenous Australian Studies and other codes of ethics). • Policy makers and managers incorporate traditional knowledge into decision making to complement western science knowledge. • Implement the amended *Biodiscovery Act 2004* (Queensland) including enhanced Traditional Owner consent provisions.	M3: Indigenous heritage goals are considered, integrated and progressed in partnership (IH4, IH5). E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E5: Comprehensive monitoring, evaluation and reporting supports informed and agile management responses.

Cross-cutting enabler 2: Science and knowledge			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Enable uptake of scientific evidence and knowledge	Water Quality Science Synthesis Workshops Australian Institute of Marine Science Strategy 2025 Reef Restoration and Adaptation Program	**Develop guidance for effective practices, for:** • inter-and transdisciplinary science particularly between and within biophysical, social and Indigenous sciences. • co-design and co-development of research programs and projects with Traditional Owners, end-users and stakeholders (including policy officers, managers, industry and landholders). • inclusion of Traditional Owner knowledge, landholder experiences and information collected through citizen science. **Synthesise and communicate scientific evidence to non-technical audiences** • Hold topical synthesis workshops to bring together Reef knowledge between policy, management, Traditional Owners, scientists and industry. • Develop topical or theme-based scientific consensus statements to provide clear messaging about where there is clear consensus and what evidence has been used for decision-making, to improve trust in the science. • Develop a common communications strategy across research organisations with links to the Reef 2050 communications network focused on effective, clear and consistent communication of science to end-users, stakeholders and the community. • Develop systems and tools to facilitate science/management relationships and improve access and transparency of research.	M3: Indigenous heritage goals are considered, integrated and progressed in partnership (IH5). E2: Decisions are informed by the best available evidence-base.

CROSS-CUTTING ENABLER 3: Monitoring, evaluation and adaptive management

Managers and stakeholders need up-to-date, reliable information on the Reef's condition and the driving forces and pressures impacting it. Conditions can change rapidly; information needs to be in an accessible and usable format to enable agile responses. Monitoring and evaluation are essential to determine if management actions are effective and if they need to be adapted to achieve the desired objectives.

Integrate and improve monitoring and reporting

A range of research and monitoring programs are already in place to measure progress against objectives and management goals and inform adaptive management. A comprehensive assessment of these monitoring programs was undertaken as part of the development of the Reef 2050 Integrated Monitoring and Reporting Program. This assessment identified monitoring gaps and made recommendations to improve monitoring, data management capability and integration across different programs. These monitoring gaps will be prioritised and form a key aspect of work under this cross-cutting enabler.

Many of the monitoring programs are well established with decades of long-term data, for example the AIMS long-term monitoring program, Paddock to Reef program, Eye on the Reef program and the Integrated Marine Observing System. These are expected to continue as mainstays of future monitoring of the Reef. Once fully developed, the Reef 2050 Integrated Monitoring and Reporting Program will provide access to up-to-date, reliable information to better support planning and responsive management.

Indigenous heritage monitoring is an important focus area under the Reef 2050 Integrated Monitoring and Reporting Program, with the Strong Peoples – Strong Country Indigenous Heritage Monitoring Framework connecting the health of the Reef and its catchment to the quality of life enjoyed by Traditional Owners. It provides a Traditional Owner-led approach for systematic monitoring of the condition of Indigenous heritage values, which are important to understanding Reef health. This reflects the Traditional Owner worldview that their quality of life is connected inseparably to and underpinned by their land and sea country. This framework will facilitate the measurement of progress against the Plan's Indigenous heritage objectives and Indigenous heritage goals, as well as parts of the *Aboriginal and Torres Strait Islander Heritage Strategy for the Marine Park*.

Evaluate and adapt management

The adaptive management approach to implementing the Plan will be strengthened by the continued development of the Reef 2050 Integrated Monitoring and Reporting Program linked to the Plan's outcomes framework. Adaptive management of the Reef means using evidence-based, iterative decision-making that allows managers to prepare and respond in a dynamic environment as understanding of the Reef improves.

Consistent with the adaptive management approach, the Plan will be reviewed and updated every five years. This means cyclic reviews of the Plan will be informed by and can respond to five-yearly Outlook Reports, which will be released a year ahead of scheduled reviews of the Plan. These five-yearly reviews of the Plan will also be informed by the best available science and other reports including the Reef Water Quality Report Cards, and reporting on progress towards the Plan's objectives and management goals.

Some established management programs and strategies under the Plan already have standalone monitoring, evaluation and reporting frameworks. These programs include the Reef Joint Field Management Program, the *Great Barrier Reef Blueprint for Resilience*, the *Reef 2050 Water Quality Improvement Plan 2017-22*, and the *Queensland Sustainable Fisheries Strategy 2017-2027.* Reporting under the Plan will not duplicate these established reporting frameworks but will be informed by them (specifically, the targets within these programs and strategies).

Cross-cutting enabler 3: Monitoring, evaluation and adaptive management			
Responding to the challenge	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Integrate and improve monitoring and reporting	Reef 2050 Integrated Monitoring and Reporting Program Paddock to Reef program Strong Peoples – Strong Country Indigenous Heritage Monitoring Framework Australian Institute of Marine Science long-term monitoring program Integrated Marine Observing System	**Implement the Reef 2050 Integrated Monitoring and Reporting Program** • Invest in monitoring to fill priority gaps that support reporting against this Plan and adaptive management of the Reef. • Integrate the Paddock to Reef program and other existing monitoring systems with the Reef 2050 Integrated Monitoring and Reporting Program. • Invest in a Traditional Owner-led approach for systematic monitoring of the condition of Indigenous heritage values and measuring progress towards Indigenous heritage goals. • Finalise and implement the Reef 2050 Integrated Monitoring and Reporting Program Business Strategy.	M3. Indigenous heritage goals are considered, integrated and progressed in partnership (IH13). E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E3. Governance systems are effective and coherent. E5: Comprehensive monitoring, evaluation and reporting supports informed and agile management responses.
Evaluate and adapt management	Reef 2050 Plan (this Plan) Reef 2050 Integrated Monitoring and Reporting Program Paddock to Reef program Strong Peoples – Strong Country Indigenous Heritage Monitoring Framework	**Report on progress towards objectives and management goals, and adapt responses if required to achieve the Plan's vision** • Conduct performance reporting under the Plan, incorporating findings from relevant standalone programs and strategies. • Adapt management actions to achieve the desired objectives. • Further develop synthesis tools and reporting products to integrate and disseminate monitoring results and improve access to evidence linked to the Plan's outcomes framework.	M1 through to M12 (including all Indigenous heritage goals). E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E3. Governance systems are effective and coherent. E5: Comprehensive monitoring, evaluation and reporting supports informed and agile management responses.

CROSS-CUTTING ENABLER 4: Investment

Investment supports the effective and successful delivery of the Plan. The Australian and Queensland governments, along with their many partners, are making substantial investments to implement the Plan. There has been a significant increase in investment in the Reef since the Plan was first released in 2015.

The priority for future investment is to ensure the priority work areas and cross-cutting enablers are resourced to achieve the Plan's management goals, objectives, outcome and vision. This requires sustaining investment in Reef programs and activities, improving the effectiveness and efficiency of delivery and investing in innovative ways to protect the Reef. It also means growing the partnership approach to foster investment from multiple sources including government (Commonwealth, state and local), industry, community and philanthropic donors.

In 2015, the *Reef 2050 Plan Investment Baseline* projected that the Australian and Queensland governments would invest around $2 billion over the decade from 2014-15 to 2023-24 on implementation of the Plan. Efforts have been accelerated since that time, and together the Australian and Queensland governments' investment is now calculated to be more than $2.7 billion over these 10 years.

This investment funds marine park management, scientific research, habitat restoration, improvements to water quality, maritime safety and the sustainability of commercial and recreational fisheries, among other activities.

*Australian and Queensland Government Reef funding 2014-15 to 2023-24**
(at 1 December 2019; refer Appendix D for more detail)

Source	**All figures in AUD $m**
Australian Government Reef Programs	875.199^
Australian Government Reef Science	388.606
Great Barrier Reef Marine Park Authority	400.941
Australian Maritime Safety Authority	270.901
Queensland Government Reef Programs	498.759
Queensland Sustainable Fisheries Programs	41.852
Maritime Safety Queensland	280.000
Total	**2756.258**

* Funding not determined through to 2023-24 for all programs.
^ Funding includes $443.3 million for the Reef Trust – Great Barrier Reef Foundation Partnership. Funding is being expended over six years through to 30 June 2024.

In addition to direct Reef investment, there is also significant government investment in climate initiatives. The Australian Government is investing $3.5 billion through the Climate Solutions Package on measures to meet Australia's 2030 emissions reduction target under the Paris Agreement. This package includes the $2 billion Climate Solutions Fund, an expansion of the Snowy Mountains Scheme (hydroelectricity), helping households and businesses improve energy efficiency, and development of a National Electric Vehicle Strategy. The Queensland Government is investing in climate transition and adaptation, including through a $500 million Land Restoration Fund.

The Clean Energy Finance Corporation is financing clean energy projects in the Reef catchment through its $1 billion Reef Funding Program. As of December 2019, the Corporation reported that almost $400 million had been committed towards 350 projects with a total value of more than $1.6 billion.

The Reef continues to benefit from additional investment from local governments, industry, non-government organisations, private and philanthropic donors, and the community. This includes financial and in-kind contributions, as well as volunteer efforts.

Local government authorities invest more than $200 million a year in urban stormwater treatment, waterways and coastal foreshore rehabilitation, among many other actions. The private, community and philanthropic sectors continue to invest in the Reef through awareness raising, community education, on-ground works, monitoring, planning and outreach activities.

Prioritisation of investment under the Plan to date has been underpinned by the 2016 *Reef 2050 Investment Framework*. The Framework identified six priority areas for increased investment: water quality improvement, field management, crown-of-thorns starfish control, integrated monitoring and reporting, Traditional Owner actions, and fisheries actions. Investment in each of these areas has increased since 2016. These six areas will continue as the priorities for investment with the addition of a seventh: Reef Restoration and Adaptation.

Investment principles

Australian and Queensland government investment is directed towards activities that contribute to achievement of the Plan's objectives and management goals. Investment decisions are guided by the following investment principles:

1. *Additionality and complementarity* – investments will build on and align with existing efforts. This may include opportunities to mitigate any emerging threats or accelerating current threats to the Reef.

   An example of this is the $443.3 million Reef Trust Partnership. The Partnership is boosting investments in known priority areas, funding innovation to do things differently and leveraging additional investment.

2. *Clear outcomes* – investments will be focused on delivering results that achieve the Plan's objectives and management goals.

   For example, the actions funded under *Queensland Sustainable Fisheries Strategy 2017-2027* deliver the fisheries related commitments under the Plan.

3. *Cost-effectiveness* – investments will be well-planned, cost-effective and contribute to lasting results.

   For example, the Reef Trust Reverse Tenders are addressing barriers to change by enabling cane farmers across the Wet Tropics and Burdekin regions to implement their own cost-effective approaches for improving fertiliser application on their farms. In addition to providing considerable cost savings for participating farmers, as of June 2019, the program has achieved a reduction of over 1900 tonnes in applied fertiliser being lost from cane farms – meaning less run-off of dissolved inorganic nitrogen into the Reef.

4. *Collaboration and partnerships* – investments will consider opportunities for co-investment, strategic collaborations and partnerships. This includes a focus on opportunities for co-design and co-delivery with Traditional Owners.

   An example of this is the Marine Park Authority's Traditional Use of Marine Resources program. Through this program 17 clans and tribes work in partnership to implement sustainable Traditional Use of Marine Resources Agreements across 25 per cent of the Marine Park coastline.

5. *Evidence-based and scientifically robust* – investments will be informed by the best available science and knowledge.

   This is being implemented through measures like the Water Quality Science Synthesis Workshops. These workshops bring together scientists, practitioners, policy makers and program managers to ensure Reef policies and programs remain relevant and are based on the best available science.

6. *Innovation* – investments will support innovation and continuous improvement.

   For example, the Reef Restoration and Adaptation Program will undertake a long-term research and development program to develop, test and risk-assess novel interventions to help keep the Reef resilient and sustain critical ecological functions as well as the Reef's social and economic values.

Strategies to boost investment

There are a range of options available to boost and diversify funding for Reef activities. Some of these include:

1. Use volunteers and stewards effectively and acknowledge their effort.
2. Leverage non-financial resources for greater impact.
3. Identify potential co-benefits that could be achieved through complementary funding sources, partnerships and in-kind assistance.
4. Develop and support innovative financing mechanisms (for example, Reef Credits).
5. Foster private and philanthropic partnerships.
6. Invest in innovation and science to improve methods and results (for example, to reduce future funding needs or maximise the effectiveness of investments).
7. Be transparent about where funds are being invested, to support future funding decisions (examples include the *Reef 2050 Water Quality Improvement Plan 2017-2022* and its investment table, Reef 2050 Plan reporting, the annual work plan for the Reef Trust Partnership, and the Reef Joint Field Management Program annual report summaries).
8. Use tools to guide investment (for example, the Paddock to Reef Projector, the Reefonomics tool and the regional Water Quality Improvement Plans).

Cross-cutting enabler 4: Investment			
Responding to the challenge (investment priorities)	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Water quality improvement **Contributes to:** Priority work area 2 (land-based activities) All other cross-cutting enablers	*Reef 2050 Water Quality Improvement Plan 2017-2022* Queensland Reef Water Quality Program Reef Trust and Reef Trust Partnership	**Current:** • The Australian and Queensland governments are investing more than $600 million between 2014-15 and 2023-24. This includes $261 million through the Queensland Reef Water Quality Program and $201 million through the Reef Trust Partnership. **Future:** • Continue to invest in the implementation of the Reef 2050 Water Quality Improvement Plan, including delivering timely, best practice, land management over a wide area to improve water quality. • Continue to invest in projects to reduce pollutants and sediment flowing into the Reef, remediate eroded gullies and streambanks, and work with landowners to improve their land management practices.	M2: Integrated planning across catchment and Reef reduces cumulative impacts. M3. Indigenous heritage goals are considered, integrated and progressed in partnership (IH1). M4: The flow of water to the Reef is further managed through targeted catchment restoration to mitigate water quality impacts. M5: Reef 2050 Water Quality Improvement Plan targets and ambient water quality guidelines are met. E4: Communities, industries and governments adopt stewardship behaviours.
Field Management **Contributes to:** Priority work area 3 (water-based activities) Priority work area 5 (protect, rehabilitate, adapt) All other cross-cutting enablers	Reef Joint Field Management Program	**Current:** • Across 10 years more than $274 million is being invested by the Australian and Queensland governments in the Reef Joint Field Management Program (2014-24). This includes an additional $93.5 million the Australian and Queensland governments are providing over seven years to expand the Program. The Australian and Queensland governments' current commitment for the Reef Joint Field Management Program for 2024-25 and beyond is $38.2 million annually. **Future:** • Continue to invest in delivery of practical on-ground actions to protect, maintain and restore the marine and island ecosystems of the Reef.	M11: Targeted Marine Park management reduces local and regional risks and supports ecosystem resilience. E3: Governance systems are effective and coherent. E4: Communities, industries and governments adopt stewardship behaviours.

Cross-cutting enabler 4: Investment			
Responding to the challenge (investment priorities)	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Integrated monitoring and reporting **Contributes to:** All other cross-cutting enablers	Reef 2050 Integrated Monitoring and Reporting Program	**Current:** • Funding under the Reef Trust Partnership of $40 million, as well as contributions from implementation partners, are supporting the implementation of the Reef 2050 Integrated Monitoring and Reporting Program. The Program will provide knowledge and guidance to Reef managers and help track the progress towards the Plan's objectives and management goals. **Future:** • Invest in coordinated and integrated monitoring, modelling and reporting for the Reef and its catchment.	M3. Indigenous heritage goals are considered, integrated and progressed in partnership (IH4, IH5). E2: Science and knowledge are advanced and decisions are informed by the best available evidence-base. E5: Comprehensive monitoring, evaluation and reporting supports informed and agile management responses.
Crown-of-thorns starfish control **Contributes to:** Priority work area 5 (protect, rehabilitate, adapt) All other cross-cutting enablers	Crown-of-thorns Starfish Control Program	**Current:** • The total funding directed towards crown-of-thorns starfish control from 2012-13 until 2019-20 is $46.9 million. • As part of the Australian Government's Reef Trust Partnership, a further $57.8 million has been committed towards crown-of-thorns starfish control work and research from 2019-20 until 2023-24 under the Reef Trust Partnership. **Future:** • Invest in protecting corals through the Crown-of-thorns Starfish Control Program and research into outbreak prevention and alternative control methods.	M3. Indigenous heritage goals are considered, integrated and progressed in partnership (IH8, IH9, IH10, IH12). M7: Outbreaks of disease, introduced species and pests are reduced. M12: Potential Reef restoration and adaptation interventions are developed and deployed on a risk-basis.
Traditional Owner actions **Contributes to:** Priority work area 2 (land-based activities) Priority work area 3 (water-based activities)	*Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park* Traditional Use of Marine Resources Agreements Queensland Indigenous Land and Sea Rangers Program	**Current:** • Under the Reef Trust Partnership, $42 million is being invested to create opportunities for greater engagement of Traditional Owners in the Reef. • Traditional Owner Actions, including those relating to increased capacity and participation in Reef governance, are also funded by a variety non-Reef specific Australian and Queensland government programs.	M3: Indigenous heritage goals are considered, integrated and progressed in partnership (all: IH1 through IH16). E4: Communities, industries and governments adopt stewardship behaviours.

Cross-cutting enabler 4: Investment			
Responding to the challenge (investment priorities)	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Priority work area 5 (protect, rehabilitate, adapt) All other cross-cutting enablers	Australian Government Indigenous Rangers – Working on Country Australian Government Indigenous Protected Area Program Reef Trust Partnership	**Future:** • The $42 million from the Reef Trust Partnership includes $10 million to establish a Traditional Owner funding facility (Futures Fund). - The Futures Fund will offer independent resourcing and long-term support for the development of a Reef-wide Sea Country Alliance and engagement framework. - Development of a Sea Country Alliance will be Traditional-Owner led aiming to increase capacity and provide opportunities for expanded Traditional Owner participation in governance related to the Reef. • Use *Traditional Owners of the Great Barrier Reef: The Next Generation of Reef 2050 Actions* (final report from the Reef 2050 Traditional Owner Aspirations Project) to inform program and investment priorities.	
Fisheries actions **Contributes to:** Priority work area 3 (water-based activities) All other cross-cutting enablers	Queensland Sustainable Fisheries Strategy 2017-2027	**Current:** • $30 million over four years is being invested by the Queensland Government to support reforms under the Queensland Sustainable Fisheries Strategy, released in 2017. **Future:** • Continue to invest in additional monitoring and compliance and roll out new technologies to support a world class fisheries management system under the Queensland Sustainable Fisheries Strategy.	**Contributes to management goals**: M3. Indigenous heritage goals are considered, integrated and progressed in partnership (IH8). M6: The threats associated with fishing are reduced. E1: The vulnerability of sectors and economies dependent on Reef health is reduced, and users of the Reef are preparing for changes to the Reef.

Cross-cutting enabler 4: Investment			
Responding to the challenge (investment priorities)	**Major policies / programs**	**Strategic actions**	**Measuring progress**
Reef restoration and adaptation **Contributes to:** Priority work area 5 (protect, rehabilitate, adapt) Cross-cutting enabler 2 (science and knowledge) Cross-cutting enabler 3 (monitoring, evaluation and adaptive management)	Reef Restoration and Adaptation Program	**Current:** • The Reef Restoration and Adaptation Program has been established to identify and develop new methods to help with the large-scale protection of the Reef's ecology, social and economic values. - The program has three phases – scoping and feasibility, research and development and implementation. - The first phase funded by a $6 million government investment has now been completed. The program is currently transitioning into the research and development program. - The initial four-year intensive program of research and development will be funded by a combination of Reef Trust Partnership funding ($100 million; ten per cent of which will be allocated to Traditional Owner led restoration and adaptation activities) and research and scientific contributions from consortium partners ($50 million). The Great Barrier Reef Foundation proposes to raise another $100 million in philanthropic donations from the private sector, with research and development providers committing to a matching $50 million in-kind investments, lifting overall investment to $300 million. **Future:** • Invest in ongoing research and development and the implementation of new adaptation and restoration interventions being delivered from the Reef Restoration and Adaptation Program, as needed to support achievement of the Plan's objectives.	M3. Indigenous heritage goals are considered, integrated and progressed in partnership (IH4, IH5, IH6, IH7, IH8, IH9, IH12). M12: Potential Reef restoration and adaptation interventions are developed and deployed on a risk-basis. E2: Decisions are informed by the best available evidence-base.

CONCLUSION

Ongoing protection of the Reef's Outstanding Universal Value is a key priority for the Australian and Queensland governments.

There is currently a critical window of opportunity to take the actions needed to sustain the Reef. Concerted global action to address climate change needs to be combined with stronger management of other pressures. Limiting global temperature rise to the maximum extent possible, and certainly within the objectives of the Paris Agreement, is critical to improve the outlook for the Reef.

Actions taken now by governments, industry, land managers, scientists, Traditional Owners and the community are essential to improving the Reef's future.

The Plan will be implemented using an adaptive management approach, underpinned by the best available science and knowledge to guide ongoing action and investment. Responses to the challenges faced by the Reef will be adjusted as needed, informed by monitoring of the Reef and evaluation of management actions.

The Australian and Queensland governments are committed to working together and with all partners towards a Healthy Reef and Healthy People, so that *the Great Barrier Reef is sustained as a living natural and cultural wonder of the world*.

GLOSSARY

Adaptive management: a systematic and agile process for continually improving or transforming management policies and practices by learning from the outcomes of operational programs. Adaptive management of the Reef means using evidence-based, iterative decision-making that allows managers to prepare and respond in a dynamic environment as understanding of the Reef improves.

Biodiversity: the variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. (Convention on Biological Diversity)

Catchment areas: land that is bounded by natural features like hills or mountains from which all run-off water flows to a low point. This low point will be a dam, a location on a river, or the mouth of a river where the water enters a bay or the ocean.

Climate change: any change in the climate, lasting for several decades or longer, including changes in temperature, rainfall or wind patterns.

Condition: the 'health' of a species or ecosystem, which includes factors such as the level of disturbance from a natural state, population size, genetic diversity, and interaction with invasive species and diseases. (State of the Environment Reporting, Department of Agriculture, Water and the Environment)

Connectivity: the extent to which a species or population can move among landscape elements in a mosaic of habitat types.

Cumulative impacts - changes to the environment caused by the combined impact of past, present and future human activities and natural processes.

Dredging: digging, excavating or removing material from waterways to deepen channels, create harbours, and keep channels and approaches to ports at defined depths. Dredging can either be capital dredging, for new channels and berths, or maintenance dredging, necessary to maintain existing and approved dredging areas. (Queensland Ports Association Fact Sheet, November 2013)

Ecosystem: a dynamic complex of plant, animal and microorganism communities and their non-living environment interacting as a functional unit. (Convention on Biological Diversity)

Global warming: the gradual increase in the overall temperature of the earth's atmosphere generally attributed to the greenhouse effect caused by increased levels of carbon dioxide, chlorofluorocarbons (CFCs), and other pollutants from human activities.

Great Barrier Reef (the Reef): in this document the Great Barrier Reef or the Reef, is taken to mean the Great Barrier Reef ecosystem.

Great Barrier Reef Intergovernmental Agreement: an agreement between the Commonwealth of Australia and the State of Queensland relating to the protection and management of the Reef. The agreement was signed in 2009 by the Prime Minister of the Commonwealth of Australia and the Premier of the State of Queensland, and updated in 2015.

Great Barrier Reef Ministerial Forum: oversees implementation of the *Great Barrier Reef Intergovernmental Agreement 2015*.

Great Barrier Reef Region: the area described in Schedule 1 of the *Great Barrier Reef Marine Park Act 1975*. See also Appendix B.

Historic heritage values: these relate to the occupation and use of the World Heritage Area since the arrival of European settlers and other migrants. It can include buildings, monuments, gardens, industrial sites, landscapes, cultural landscapes, archaeological sites, groups of buildings and precincts, or places that embody a specific cultural or historic value.

Indicators: physical, chemical, biological or socio-economic measures that best represent the key elements of a complex ecosystem or an environmental issue.

Indigenous heritage: physical (tangible) and non-physical (intangible) expressions of Traditional Owners' relationships with country, people, beliefs, knowledge, law, language, symbols, ways of living, sea, land and objects; all of which arise from Indigenous spirituality, including heritage places (sites) and/or values.

Indigenous heritage goals: these reflect the aspirations outlined by the many frameworks, products and reports created by Reef Traditional Owners in recent years. The goals take a broad definition of Indigenous heritage, in line with the Strong Peoples – Strong Country Integrated Monitoring Framework, which will be used to measure progress. The Indigenous heritage goals are nested under management goal M3, which states they are to be considered, integrated and progressed in partnership.

Integrity: for World Heritage properties, integrity relates to the 'wholeness and intactness' of the property and how it conveys the values it holds. Integrity can also relate to the size of the property (sufficient size to continue to represent the values) and to any threats affecting the property.

Knowledge broker: an intermediary (an organisation or a person) that aims to develop relationships and networks with, among and between producers and users of knowledge by providing linkages, knowledge sources and, in some cases, knowledge itself, (e.g. technical know-how, market insights, research evidence) to organisations in its network.

Landscape: describes how societies shape the land and are, in turn, shaped by it. Local, Indigenous or traditional knowledge systems bridge the gap between biological and cultural diversities and guide the development of landscapes. Article 8(j) of the Convention on Biological Diversity gives particular recognition to this cultural dimension of biodiversity, as do all of UNESCO's cultural conventions. (Convention on Biological Diversity; UNESCO Declaration on Cultural Diversity)

Management goals: the results the Plan aims to achieve by 2025; a measure of progress in addressing key pressures on the Reef.

Matters of national environmental significance: those matters protected under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Objectives: the results the Plan aims to achieve for the Reef through to 2050, in order to deliver the Plan's outcome and vision. The objectives will apply from local to Reef-wide scales and were selected to represent desired aspects of a functioning Reef between 2020 and 2050.

Outcome: what the Plan aims to achieve by 2050 in order to deliver the vision.

Outstanding Universal Value: cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity.

Program logic: a thinking tool that helps structure strategic plans. It helps identify cause and effect relationships between short term activities (0-5 years, the Plan's Strategic Actions), intermediate outcomes (the Plan's management goals) and long-term outcomes (the Plan's objectives) to achieve a long-term aspiration (the Plan's vision). There are many names for similar process thinking tools including theory of change, program theory and outcomes logic mapping.

Port facilities: for the purposes of the Plan, port facilities refers to commercial port infrastructure, rather than marinas or harbours.

Reef 2050 Water Quality Improvement Plan (formerly known as the Reef Water Quality Protection Plan): a collaborative program of coordinated projects and partnerships designed to improve the quality of water in the Reef through improved land management in Reef catchments.

Reef Trust: the Australian Government's flagship program to support delivery of the Plan. The Reef Trust provides cost effective and strategic investment to address the key threats to the Reef. More than $700 million has been committed through the Reef Trust to improve water quality, restore coastal ecosystem health, control crown-of-thorns starfish and protect threatened and migratory species in the Great Barrier Reef Region.

Stewardship: local environmental stewardship refers to the actions taken by individuals, groups or networks, with various motivations and levels of capacity, to protect, care for or responsibly use the environment in pursuit of environmental and/or social outcomes in diverse social-ecological contexts.

Strategic actions: high-level actions that enhance or complement delivery of established policies/programs, or new high-level actions that need effort and prioritisation.

Theory of Change: see **program logic**

Water quality: refers to the chemical, physical, biological and radiological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and/or to any human need or purpose.

Water quality improvement plans: designed to identify the main issues that impact aquatic ecosystems from land-based activities and prioritise management actions to reduce the discharge of pollutants within a natural resource management region. Water quality improvement plans are non-legislative regional planning instruments and can inform the development of Healthy Waters Management Plans.

World Heritage Area: in the context of this plan, this refers to the Great Barrier Reef World Heritage Area. See also Appendix B.

World Heritage Convention: a global instrument for the protection of cultural and natural heritage that aims to promote cooperation among nations to protect heritage around the world that is of such Outstanding Universal Value that its conservation is important for current and future generations.

Vision – the aspiration for the Reef in 2050: *The Great Barrier Reef is sustained as a living natural and cultural wonder of the world.*

APPENDICES

APPENDIX A: Legislative Framework for the Great Barrier Reef World Heritage Area

The principal Acts relevant to the World Heritage Area are the *Great Barrier Reef Marine Park Act 1975*, the *Marine Parks Act 2004* (Queensland), and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The main object of the *Great Barrier Reef Marine Park Act 1975* is:

> *To provide for the long-term protection and conservation of the environment, biodiversity and heritage values of the Great Barrier Reef Region.*

The Act establishes the Great Barrier Reef Marine Park Authority as an independent statutory authority and defines the Great Barrier Reef Region. It enabled the declaration of the Great Barrier Reef Marine Park, which allows ecologically sustainable use consistent with the Reef's protection and conservation.

This Commonwealth marine protected area is complemented by the Queensland Great Barrier Reef Coast Marine Park that provides protection for Queensland tidal lands and waters, and the Commonwealth Coral Sea Marine Park, which extends from the outer boundary. Additional legislation is used to regulate other uses, for example commercial and recreational fisheries (including across the Great Barrier Reef Marine Park) and shipping. The *Sustainable Ports Development Act 2015* (Queensland) restricts capital dredging to four major ports along the Great Barrier Reef coast and prohibits the disposal of dredge material from capital dredging into the World Heritage Area.

A broad suite of law applies in coastal and catchment areas to protect and manage the natural environment including native vegetation, native plants and animals, national parks and other protected areas, declared fish habitat areas, wetlands, waterways, water extraction, agriculture, water quality, air quality and cultural heritage. Land development is subject to the *Planning Act 2016* (Queensland) and *State Development and Public Works Organisation Act 1972* (Queensland) and different levels of environmental assessment apply, depending on the nature and potential impact of the proposed development.

The EPBC Act is the Australian Government's central piece of national environmental law. It reflects the role of the Commonwealth to address matters of national environmental significance, provide a nationally coordinated approach to managing the environment and meet international commitments. The Great Barrier Reef Marine Park and the Great Barrier Reef World Heritage Area are listed as matters of national environmental significance under the EPBC Act. Where the Marine Park and/or World Heritage Area may be significantly impacted by development on the land or in the water, the EPBC Act is triggered either directly or through bilateral agreement arrangements with the Queensland Government for assessment.

The combined body of law comprehensively protects the Great Barrier Reef and provides the legal foundation for the range of management tools employed to protect and manage the World Heritage Area. The Australian and Queensland Governments regularly review and update legislation as required to ensure that new threats and issues are efficiently and effectively addressed as they arise.

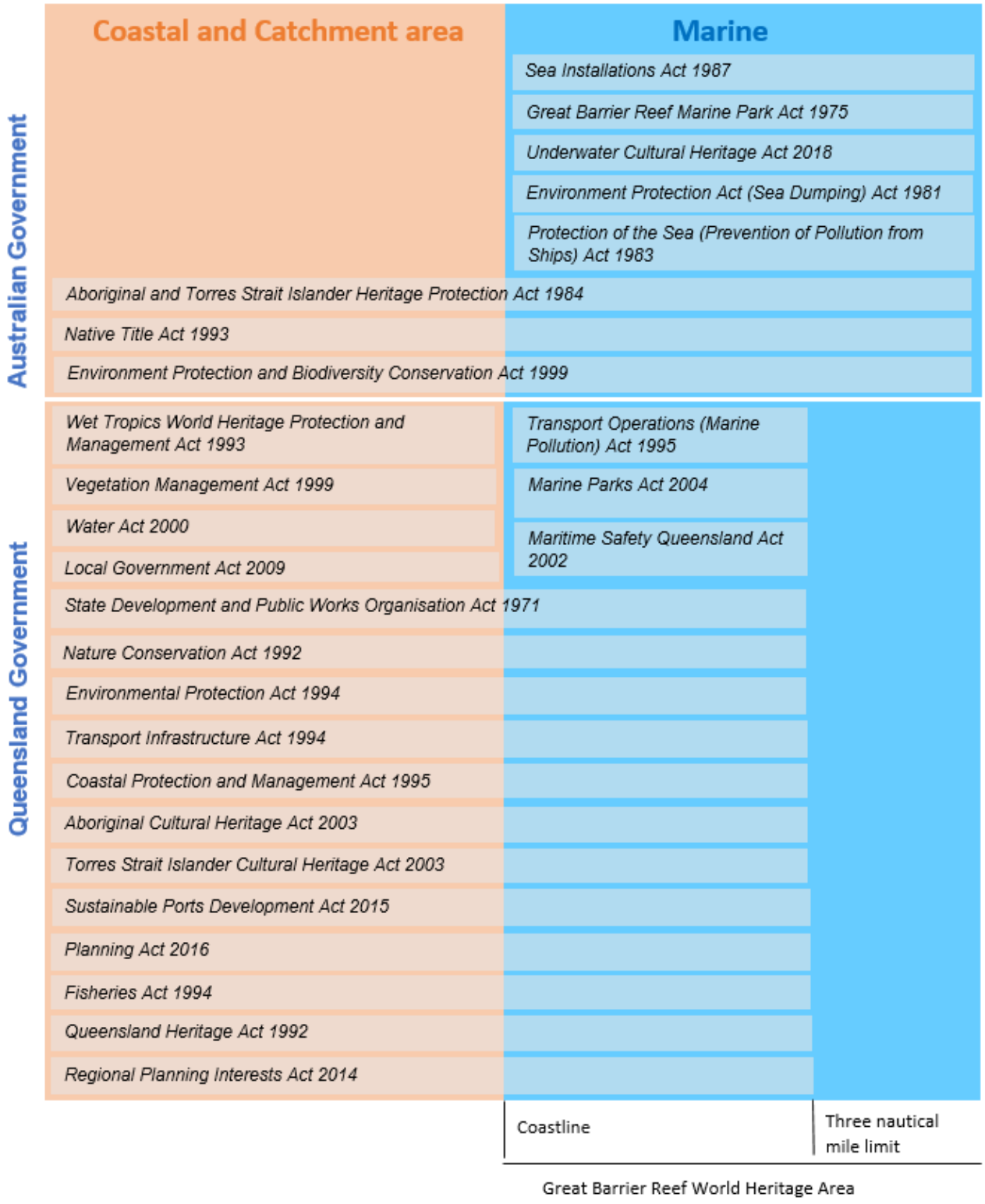


Figure 8: Primary Australian and Queensland government legislation used to protect and manage the Reef.

Management of the World Heritage Area is also guided by Australia's obligations under the World Heritage Convention and other international conventions and agreements. These include:

- *Convention on Biological Diversity, 1992*
- *Convention on International Trade in Endangered Species of Wild Fauna and Flora, 1973*
- *Convention on the Conservation of Migratory Species of Wild Animals, 1979 (Bonn Convention)*
- *Convention on Wetlands of International Importance, 1971* (Ramsar Convention)
- *China–Australia Migratory Bird Agreement, 1986*
- *International Convention for the Prevention of Pollution from Ships, 1973* (MARPOL)
- *Japan–Australia Migratory Bird Agreement, 1974*
- *Republic of Korea–Australia Migratory Bird Agreement, 2007*
- *United Nations Convention on the Law of the Sea, 1982*
- *United Nations Framework Convention on Climate Change, 1992*
- *The 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972* (London Protocol)
- *UNESCO Convention on the Protection of the Underwater Cultural Heritage, 2001*

APPENDIX B: The Great Barrier Reef World Heritage Area, Great Barrier Reef Region, and Great Barrier Reef Marine Park

Great Barrier Reef World Heritage Area	Great Barrier Reef Region	Great Barrier Reef Marine Park
348,000km^2	346,000km^2	344,400km^2
Inscribed 1981	Established 1975	Declared in sections between 1979 and 2011; amalgamated into one section in 2003
Includes: • all islands within outer boundary (about 1050) • all waters seaward of low water mark (including internal waters of Queensland and port waters) • all 12 trading ports	Includes: • approximately 70 Commonwealth islands • all waters seaward of low water mark (excluding Queensland internal waters) Does NOT include: • internal waters of Queensland • Queensland islands (about 980)	Includes: • approximately 70 Commonwealth islands • all waters seaward of low water mark (excluding Queensland internal waters) Does NOT include • internal waters of Queensland • Queensland islands (about 980) • 13 coastal exclusion areas

APPENDIX C: Statement of Outstanding Universal Value for the Great Barrier Reef World Heritage Area

Outstanding Universal Value is the central concept of the World Heritage Convention. To be considered of Outstanding Universal Value, a property needs to:

- meet one or more of 10 criteria set out in the Convention;
- meet the conditions of integrity;
    - Integrity relates to the 'wholeness and intactness' of the heritage property and how it conveys the values it holds. Integrity can also relate to the size of the property (sufficient size to continue to represent the values) and to any threats affecting the property (will the values continue to exist?).
- if a cultural property, meet the conditions of authenticity; and
- have an adequate system of protection and management to safeguard its future

This retrospective statement for the Great Barrier Reef was approved by the World Heritage Committee in 2012.

Statement of Outstanding Universal Value

Great Barrier Reef – Property ID 154

Brief synthesis: As the world's most extensive coral reef ecosystem, the Great Barrier Reef is a globally outstanding and significant entity. Practically the entire ecosystem was inscribed as World Heritage in 1981, covering an area of 348,000 square kilometres and extending across a contiguous latitudinal range of 14° (10°S to 24°S). The Great Barrier Reef (hereafter referred to as GBR) includes extensive cross-shelf diversity, stretching from the low water mark along the mainland coast up to 250 kilometres offshore. This wide depth range includes vast shallow inshore areas, mid-shelf and outer reefs, and beyond the continental shelf to oceanic waters over 2,000 metres deep.

Within the GBR there are some 2,500 individual reefs of varying sizes and shapes, and over 900 islands, ranging from small sandy cays and larger vegetated cays, to large rugged continental islands rising, in one instance, over 1,100 metres above sea level. Collectively these landscapes and seascapes provide some of the most spectacular maritime scenery in the world.

The latitudinal and cross-shelf diversity, combined with diversity through the depths of the water column, encompasses a globally unique array of ecological communities, habitats and species. This diversity of species and habitats, and their interconnectivity, make the GBR one of the richest and most complex natural ecosystems on earth. There are over 1,500 species of fish, about 400 species of coral, 4,000 species of mollusk, and some 240 species of birds, plus a great diversity of sponges, anemones, marine worms, crustaceans, and other species. No other World Heritage property contains such biodiversity. This diversity, especially the endemic species, means the GBR is of enormous scientific and intrinsic importance, and it also contains a significant number of threatened species. At time of inscription, the IUCN evaluation stated "...if only one coral reef site in the world were to be chosen for the World Heritage List, the Great Barrier Reef is the site to be chosen".

Criterion (vii): The GBR 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.

From the air, the vast mosaic patterns of reefs, islands and coral cays produce an unparalleled aerial panorama of seascapes comprising diverse shapes and sizes. The Whitsunday Islands provide a magnificent vista of green vegetated islands and spectacular sandy beaches spread over azure waters. This contrasts with the vast mangrove forests in Hinchinbrook Channel, and the rugged vegetated mountains and lush rainforest gullies that are periodically cloud-covered on Hinchinbrook Island.

On many of the cays there are spectacular and globally important breeding colonies of seabirds and marine turtles, and Raine Island is the world’s largest green turtle breeding area. On some continental islands, large aggregations of over-wintering butterflies periodically occur.

Beneath the ocean surface, there is an abundance and diversity of shapes, sizes and colours; for example, spectacular coral assemblages of hard and soft corals, and thousands of species of reef fish provide a myriad of brilliant colours, shapes and sizes. The internationally renowned Cod Hole near Lizard Island is one of many significant tourist attractions. Other superlative natural phenomena include the annual coral spawning, migrating whales, nesting turtles, and significant spawning aggregations of many fish species.

Criterion (viii): The GBR, extending 2,000 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.

During glacial periods, sea levels dropped, exposing the reefs as flat-topped hills of eroded limestone. Large rivers meandered between these hills and the coastline extended further east. During interglacial periods, rising sea levels caused the formation of continental islands, coral cays and new phases of coral growth. This environmental history can be seen in cores of old massive corals.

Today the GBR forms the world’s largest coral reef ecosystem, ranging from inshore fringing reefs to mid-shelf reefs, and exposed outer reefs, including examples of all stages of reef development. The processes of geological and geomorphological evolution are well represented, linking continental islands, coral cays and reefs. 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.

One-third of the GBR lies beyond the seaward edge of the shallower reefs; this area comprises continental slope and deep oceanic waters and abyssal plains.

Criterion (ix): 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.

Ongoing erosion and accretion of coral reefs, sand banks and coral cays combine with similar processes along the coast and around continental islands. Extensive beds of Halimeda algae represent active calcification and accretion over thousands of years.

Biologically the unique diversity of the GBR reflects the maturity of an ecosystem that has evolved over millennia; evidence exists for the evolution of hard corals and other fauna. Globally significant marine faunal groups include over 4,000 species of molluscs, over 1,500 species of fish, plus a great diversity of sponges, anemones, marine worms, crustaceans, and many others. The establishment of vegetation on the cays and continental islands exemplifies the important role of birds, such as the Pied Imperial Pigeon, in processes such as seed dispersal and plant colonisation.

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.

Criterion (x): The enormous size and diversity of the GBR 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.

As the world's most complex expanse of coral reefs, the reefs contain some 400 species of corals in 60 genera. There are also large ecologically important inter-reefal areas. The shallower marine areas support half the world's diversity of mangroves and many seagrass species. The waters also provide major feeding grounds for one of the world's largest populations of the threatened dugong. At least 30 species of whales and dolphins occur here, and it is a significant area for humpback whale calving.

Six of the world’s seven species of marine turtle occur in the GBR. As well as the world’s largest green turtle breeding site at Raine Island, the GBR also includes many regionally important marine turtle rookeries.

Some 242 species of birds have been recorded in the GBR. Twenty-two seabird species breed on cays and some continental islands, and some of these breeding sites are globally significant; other seabird species also utilize the area. The continental islands support thousands of plant species, while the coral cays also have their own distinct flora and fauna.

Key to the criteria

(vii) contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance

(viii) be outstanding examples representing major stages of earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features

(ix) be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals

(x) contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.

APPENDIX D: Reef funding 2014-15 to 2023-24

All figures in AUD $m	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Australian Government Reef Programs											
Reef 2050			2.090	9.438	8.891	8.891	7.736	7.736	9.700		**54.482**
Reef Trust	7.702	15.865	35.554	486.422	34.161	42.175	34.650	25.853	21.670		**704.052**
Reef Program	29.650	32.850	10.100	10.150							**82.750**
Other Reef Funding	15.507	10.426	5.986	1.996							**33.915**
Sub-total	**52.859**	**59.141**	**53.730**	**508.006**	**43.052**	**51.066**	**42.386**	**33.589**	**31.370**	**0.000**	**875.199**
Australian Government Reef Science											
National Environment Science Program (Tropical Water Quality Hub)	2.200	5.630	5.400	5.400	5.400	5.400	2.550				**31.980**
Australian Institute of Marine Science	15.100	15.100	15.100	29.100	39.200	34.800	37.400	40.100	42.800	45.200	**313.900**
Australian Research Council	6.437	6.409	6.304	6.778	6.956	5.994	3.403	0.385	0.060	0.000	42.726
Sub-total	**23.737**	**27.139**	**26.804**	**41.278**	**51.556**	**46.194**	**43.353**	**40.485**	**42.860**	**45.200**	**388.606**
Great Barrier Reef Marine Park Authority											
Reef Joint Field Management Program (Australian Government funding)	8.372	8.372	9.767	14.859	11.965	12.740	16.576	19.428	18.99	18.99	**140.059**
Great Barrier Reef Marine Park Authority	18.773	19.845	22.411	24.830	41.256	33.086	33.369	33.550	33.762		**260.882**
Sub-total	**27.145**	**28.217**	**32.178**	**39.689**	**53.221**	**45.826**	**49.945**	**52.978**	**52.752**	**18.990**	**400.941**
Australian Maritime Safety Authority											
Sub-total	**23.459**	**24.185**	**21.088**	**24.888**	**27.533**	**28.927**	**29.703**	**29.838**	**30.340**	**30.940**	**270.901**
Australian Government Total	**127.200**	**138.682**	**133.800**	**613.861**	**175.362**	**172.013**	**165.387**	**156.890**	**157.322**	**95.130**	**1935.647**
Queensland Government Reef Programs											
Queensland Government Reef Water Quality Program	35.000	33.425	47.145	43.308	61.493	69.962	39.000	35.000			**364.333**
Reef Joint Field Management Program (Queensland Government funding)	8.372	8.372	8.766	8.779	13.279	12.709	16.468	19.227	19.227	19.227	**134.426**
Sub-total	**43.372**	**41.797**	**55.911**	**52.087**	**74.772**	**82.671**	**55.468**	**54.227**	**19.227**	**19.227**	**498.759**
Queensland Sustainable Fisheries Programs											
		7.001	**2.674**	**6.439**	**7.697**	**9.541**	**8.500**				**41.852**
Maritime Safety Queensland											
	28.000	**28.000**	**28.000**	**28.000**	**28.000**	**28.000**	**28.000**	**28.000**	**28.000**	**28.000**	**280.000**
Queensland Total	**71.372**	**76.798**	**86.585**	**86.526**	**110.469**	**120.212**	**91.968**	**82.227**	**47.227**	**47.227**	**820.611**
TOTAL	**198.572**	**215.480**	**220.385**	**700.387**	**285.831**	**292.225**	**257.355**	**239.117**	**204.549**	**142.357**	**2756.258**
Cumulative total	**198.572**	**414.052**	**634.437**	**1334.824**	**1620.655**	**1912.880**	**2170.235**	**2409.352**	**2613.901**	**2756.258**	

KEY

	Shows years prior to the commitment of funds and after allocated funding has finished.
	To be determined – funding allocations to be considered in future budgets

Notes

Australian Government Reef Programs	
Reef 2050	2023-24 funding will be determined as part of future Australian Government budget processes.
Reef Trust	$2.1 million provided by Queensland Government in 2016-17 for the Reef Trust Phase IV Enhanced Efficiency Fertiliser Project with expenditure to occur from 2016-17 to 2019-20 is reported under Queensland Government investment (and not in Reef Trust). 2017-18, funding includes $443.3 million for the Reef Trust Partnership. Funding will be expended over six-years until 30 June 2024. 2023-24 funding will be determined as part of future Australian Government budget processes.
Reef Program	Reef Program ended in 2017-18. Future Reef funding was allocated to the Reef Trust.
Other Reef Funding	Includes a range of Reef projects undertaken between 2014-15 and 2017-18: • Natural Heritage Trust Reef projects. • Systems Repair and Urban Water Quality Grants (Biodiversity Fund). • $9.375 million for e-Reefs coastal information system (Total project value is $12.5 million and commenced in 2013-14).
Australian Government Reef Science	
National Environment Science Program (Tropical Water Quality Hub)	The National Environmental Science Program (NESP) is a long-term environment and climate research program with funding of $145 million from 2015 to 2021. The current program provides Australian Government funding of $31.98 million to The Tropical Water Quality Hub. The National Environmental Science Program is scheduled for completion in 2021. The Australian Government has announced $149 million for a second phase of the program from 2021-2026, which includes funding for a Marine and Coastal Hub. The program also has cross-cutting missions, including research to help protected area managers in land and oceans.
Australian Institute of Marine Science	The Australian Institute of Marine Science invests a considerable proportion of its scientific effort in research that supports the health and resilience of the Great Barrier Reef. This covers a wide range of activities which can be summarised as: detailed reef monitoring; field work and experimentation; research and development; and partnerships and international engagement.
Australian Research Council (ARC)	The Australian Research Council Centre of Excellence for Coral Reef Studies undertakes world-best integrated research for sustainable use and management of coral reefs. Includes ARC Centre of Excellence for Coral Reef Studies and other ARC funded projects relating the Reef.

Great Barrier Reef Marine Park Authority	
Reef Joint Field Management Program (Australian Government funding)	The Great Barrier Reef Marine Park Authority and the Queensland Government co-fund the Reef Joint Field Management Program. Through the 2018 Budget, the Australian Government boosted funding of the Reef Joint Field Management Program by $42.685 million from 2018-19 until 2023-24.
Great Barrier Reef Marine Park Authority	Funding for this item includes Departmental Appropriation and Environmental Management Charge (EMC). The EMC is a charge associated with most commercial activities, including tourism operations, non-tourist charter operations, and facilities, operating under a permit issued by the Marine Park Authority. Funding for this item does not include Reef HQ sales or permits. 2023-24 funding will be determined as part of future Australian Government budget processes.
Australian Maritime Safety Authority	
	The Australian Maritime Safety Authority, together with the Marine Park Authority and Maritime Safety Queensland, administer a suite of measures that regulate all ship activities within the region.

Additional Australian Government funding for the Reef is provided through:

- The Bureau of Meteorology (BOM) is Australia's national weather, marine, climate and water information agency. BOM's operational services, including weather and ocean forecasts, climate outlooks including ocean temperature outlooks for the Reef lagoon, flood and streamflow forecasts and tropical cyclone warnings, and they provide critical support to communities and agencies in the Great Barrier Reef region. BOM is part of the eReefs project.
- The Commonwealth Scientific and Industrial Research Organisation (CSIRO) provides significant investments in understanding water quality and how agricultural practices affect sediment and nutrient loss, as well as developing practical solutions for land managers to reduce these losses.

Queensland Government Reef Programs	
Queensland Government Reef Water Quality Program	$2.1 million provided by Queensland Government in 2016-17 for the Reef Trust Phase IV Enhanced Efficiency Fertiliser Project with expenditure to occur from 2016-17 to 2019-20 is reported under Queensland Government investment (and not captured in the Reef Trust). **TBD**- 2023-24 funding will be determined as part of future Queensland Government budget processes. Since 2015, the Queensland Government has invested approximately $570 million into initiatives targeted solely at the protection of the Reef. In addition, the Queensland Government delivers a range of other programs that apply to the whole state of Queensland, with the Great Barrier Reef and its catchment making up a significant proportion of the state. The Queensland Reef Water Quality Program is invested through three Queensland Government agencies, the Department of Environment and Science, the Department of Agriculture and Fisheries and the Department of Natural Resources, Mines and Energy.
Reef Joint Field Management Program (Queensland Government funding)	The Queensland Government and the Great Barrier Reef Marine Park Authority co-fund the Reef Joint Field Management Program. The Queensland Government contributed more than $8 million per year to the program until additional funding was announced in 2018 which will see the Queensland Government's contribution grow to more than $19 million by 2021.
Queensland Sustainable Fisheries Programs	
	2023-24 funding will be determined as part of future Queensland Government budget processes. The Queensland Government Department of Agriculture and Fisheries developed and commenced implementation of the Queensland Sustainable Fisheries Strategy.
Maritime Safety Queensland	
	Maritime Safety Queensland is responsible for improving maritime safety in Queensland waters, minimising vessel-sourced waste, responding to marine pollution incidents, and providing essential maritime services such as aids to navigation and vessel traffic services. Maritime Safety Queensland operates the Great Barrier Reef and Torres Strait vessel traffic service, which aims to improve navigational safety, reduce the risk of maritime incidents and respond quickly to incidents that do occur within those regions. The Great Barrier Reef and Torres Strait vessel traffic service is supported by a User Guide which was published in 2017.

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Reef 2050 Plan

Consultation on the Reef 2050 Long-Term Sustainability Plan *Factsheet*

Have your say

The Reef 2050 Long-Term Sustainability Plan (the Plan) is Australia's overarching long-term strategy for protecting and managing the Great Barrier Reef to support its health and resilience.

The updated Plan has been released for a six-week public consultation process closing on **30 September 2020**. The Australian and Queensland governments want to hear your views on the updated Reef 2050 Plan to ensure it contains the right priorities and actions to support the health and resilience of the Reef.

You can complete a survey and/or upload a submission on the Have Your Say website at: https://haveyoursay.awe.gov.au/reef-2050-plan

The Australian and Queensland governments are acutely aware of the significant impact the COVID-19 pandemic is having on the community. While government efforts are heavily focused on responding to the pandemic, Australians remain passionate about maintaining momentum with actions to support a healthy Great Barrier Reef. In turn, this can support economic recovery. That is why consultation on this Plan is being held now.

The Great Barrier Reef

The World Heritage listed Great Barrier Reef (the Reef) is a diverse and unique ecosystem stretching 2300 kilometres along the east coast of Queensland. It is one of the best known and most complex natural systems on Earth. The Reef contains a unique range of ecological communities, habitats and species. Its biodiversity, sheer size and interconnected nature were some of the reasons it was listed as a World Heritage Area. It is a place of Outstanding Universal Value and has immense community and economic relevance. The Reef is critical to the tourism industry and millions of coastal residents. The Reef supports approximately 64,000 jobs and contributes around $6.4 billion to the Australian economy each year. The Reef is under significant pressure. The *Great Barrier Reef Outlook Report 2019* concluded that the future outlook for the Reef's ecosystem has deteriorated from poor to very poor. Climate change is the most serious and pervasive threat to the Reef. The Reef has been impacted by three mass coral bleaching events within the last five years. These climate change impacts are being amplified by other threats including land-based run-off from agricultural, urban and industrial sources.

The Reef 2050 Long-Term Sustainability Plan

Since the Plan was launched in 2015, significant progress has been made. This includes improving water quality, tackling outbreaks of coral-eating crown-of-thorns starfish, doubling the Reef Joint Field Management Program and rehabilitating island and coastal habitats.

The Plan is supported by expert advice from the Reef 2050 Advisory Bodies – the Reef 2050 Plan Independent Expert Panel and the Reef 2050 Advisory Committee.

The Plan is being implemented using an adaptive management approach, underpinned by the best available science and knowledge to guide ongoing action and investment. Together the Australian and Queensland governments are investing more than $2.7 billion from 2014-15 to 2023-24 to implement the Plan.

Everyone has a role to play in helping the Reef. The Australian and Queensland governments are working with local governments, industry, land managers, scientists, Traditional Owners and the community to deliver on priority actions to protect the Reef.

Review and update of the Plan

The Plan is being updated to ensure it focuses on the key threats to the Reef and contains the right priorities and actions to manage those threats and support the health and resilience of the Reef. The updated Plan, which has been released for public consultation, is the result of the first five-yearly review, and builds on a mid-term review that was completed in 2018.

The Plan addresses the local and regional pressures over which people in Australia and Queensland have direct control: land-based run-off, coastal development and direct human use of the Reef. It also acknowledges the importance of local, state and national contributions to reducing global greenhouse gas emissions, while recognising that global efforts to address climate change are critical for the Reef's long-term health.

The Plan includes a new vision and outcomes framework. The updated vision for the Reef in 2050 is: *The Great Barrier Reef is sustained as a living natural and cultural wonder of the world.* The outcome sought is *Healthy Reef, Healthy People.*

The Plan sets 20 objectives and 17 management goals which will focus effort and investment to achieve this vision. More information on how these will be measured is available in the *Reef 2050 Objectives and Management Goals* supporting document.

The 'Responding to the challenge' chapter describes how these objectives and management goals will be achieved, and includes five *priority work areas* and four *cross-cutting enablers*. Each section describes the work that will be undertaken and includes a table detailing the response, major policies and programs, strategic actions and how progress will be measured.

The five *priority work areas* are:

- limit the impacts of climate change
- reduce impacts from land-based activities
- reduce impacts from water-based activities
- influence the reduction of international sources of impact
- protect, rehabilitate and adapt.

The four *cross-cutting enablers* that are essential to effective delivery are:

- coordination and empowerment
- science and knowledge
- monitoring, evaluation and adaptive management
- investment.

A healthy Reef is a productive reef. In addition to its intrinsic ecological value, the Reef is of significant economic importance. Continuing efforts and investment in the Reef and its communities can help to support economic recovery during the COVD-19 pandemic.

Further information

Read the updated Plan and *Reef 2050 Objectives and Management Goals* supporting document here: https://haveyoursay.awe.gov.au/reef-2050-plan

Email: reef2050consultation@awe.gov.au

Attachment 6

KEY ACHIEVEMENTS SINCE DECEMBER 2019

MONTH	ACHIEVEMENT	ADDITIONAL INFORMATION
December 2019	A$46 million for farmers and organisations to improve Great Barrier Reef water quality through agriculture practice change and landscape remediation	https://minister.awe.gov.au/ley/media-releases/46-million-improve-great-barrier-reef-water-quality
	Reef HQ Aquarium A$26.9 million upgrade, including upgraded educational exhibits and the turtle hospital A further $13.2 million was committed for upgrades 2020 bringing total investment to $40.1 million	https://minister.awe.gov.au/ley/media-releases/reef-hqs-269-million-upgrade
	Be Reef Smart campaign launched to help manage the Reef and save marine life	https://www.gbrmpa.gov.au/access-and-use/responsible-reef-practices
	A$100 million announced for the Land Restoration Fund, including for practical solutions to improve outcomes across Queensland, including the Great Barrier Reef catchment zones	https://statements.qld.gov.au/statements/89136 https://www.qld.gov.au/environment/climate/climate-change/land-restoration-fund/funded-projects
	Reef protection regulations in place to address land-based sources of water pollution flowing into the Reef from sugarcane production	https://www.qld.gov.au/environment/agriculture/sustainable-farming/reef/reef-regulations
January 2020	Citizen Science funding to improve the health of, and protect, the Great Barrier Reef	https://statements.qld.gov.au/statements/89176
February 2020	A$5 million to establish biodiversity refuges in the Whitsunday Islands	https://minister.awe.gov.au/ley/media-releases/biodiversity-refuges-whitsundays
	Funding for the National Environmental Science Program (including working with Traditional Owners and communities to manage the impacts of changing climate on Australian World Heritage sites; work on improving coral condition; and compiling research efforts on the Crown-of-Thorns starfish)	https://minister.awe.gov.au/ley/media-releases/funding-national-environmental-science-program-builds-climate-and-environment-evidence-base
April 2020	Launch of the A$150 million research and development phase of the Reef Restoration and Adaptation Program - to help preserve and restore the Great Barrier Reef in the face of rising ocean temperatures and coral bleaching	https://minister.awe.gov.au/ley/media-releases/150-million-drive-innovations-boost-reef-resilience
	A$12.6 million for farmers to improve Reef water quality by reducing sediment, nutrients and pesticide run-off	https://www.philthompson.com.au/media-release-12-6-m-for-farmers-to-protect-reef-water-quality/
	24 tonnes of marine debris cleared from Great Barrier Reef beaches under ReefClean project	https://minister.awe.gov.au/ley/media-releases/24-tonnes-marine-debris-cleared-great-barrier-reef

Attachment 6

KEY ACHIEVEMENTS SINCE DECEMBER 2019

May 2020	Legislation proposed to phase out single-use plastics in Queensland	https://www.qld.gov.au/environment/pollution/management/waste/recovery/reduction/plastic-pollution/single-use-plastic-products-ban
June 2020	Launch of online campaigns to reduce marine litter in the Reef	https://minister.awe.gov.au/ley/media-releases/reefclean-goes-digital-ditch-marine-litter
	A$1.8 million boost to engage reef communities in monitoring and reporting on water quality and waterway health in regional reef catchments	https://minister.awe.gov.au/ley/media-releases/supporting-healthy-waterways-great-barrier-reef
	Two-year pilot sees reduction of hundreds of tonnes of nitrogen used on farms	https://minister.awe.gov.au/ley/media-releases/two-year-pilot-sees-reduction-hundreds-tonnes-nitrogen-used-farms
July 2020	A$28.6 million to help control coral-eating Crown of Thorns Starfish	https://minister.awe.gov.au/ley/media-releases/crown-thorns-starfish-control-secured
	A$10 million to deliver nature-based jobs and priority actions to improve the quality of water entering the Reef	https://statements.qld.gov.au/statements/90203
	Reef Guardian Councils committed to another four years in the program	https://www.gbrmpa.gov.au/our-partners/reef-guardian-councils
	Raine Island Recovery Project Team delivers green turtle recovery and key species monitoring activities	https://parks.des.qld.gov.au/raineisland#:~:text=The%20Raine%20Island%20Recovery%20Project%20is%20the%20first,flown%20over%20the%20the%20island%20for%20aerial%20research
August 2020	Public invited to have their say on the draft updated Reef 2050 Long-Term Sustainability Plan	https://haveyoursay.awe.gov.au/reef-2050-plan
September 2020	A$25 million Great Barrier Reef Island Resorts Rejuvenation Program including green initiatives at resorts throughout the Reef and clean-up of a derelict resort site and returning it to national park	https://www.dtis.qld.gov.au/our-work/great-barrier-reef
	A$2 million to restore Queensland's Bowling Green Bay Ramsar wetland	https://minister.awe.gov.au/ley/media-releases/2m-restore-queenslands-bowling-green-bay-ramsar-wetland
	Scientists and sugarcane growers work together to successfully reduce nitrogen runoff	https://minister.awe.gov.au/ley/media-releases/sweet-victory-sugarcane-growers
	Fisheries legislation changed to help ensure the sustainability of Queensland's commercial fishing industry	https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/fisheries-reforms

Attachment 6

KEY ACHIEVEMENTS SINCE DECEMBER 2019

October 2020	Boost for Reef protection, jobs and tourism by engaging operators in reef monitoring and conservation work in the Great Barrier Reef	https://minister.awe.gov.au/ley/media-releases/617-million-boost-environment-jobs-and-tourism
	Great Reef Census launched to collect under water images across 100 priority reefs to help inform key management and research decisions	https://minister.awe.gov.au/ley/media-releases/census-shine-light-great-barrier-reef
	A$28 million to help protect iconic species and improve the health of the Great Barrier Reef's ecosystems	https://minister.awe.gov.au/ley/media-releases/joint-media-release-28-million-support-jobs-and-protect-queenslands-environment
	First Reef Credits issued to improve water quality	https://www.reefcredit.org/
	Reef Knowledge System publicly released, bringing together information from Reef and catchment monitoring programs, and providing a snapshot of progress under the Reef 2050 Plan	https://reefiq.gbrmpa.gov.au/ReefKnowledgeSystem
November 2020	Reef regeneration trial underway on the Great Barrier Reef: Loose coral fragments used to build new stable areas of live coral habitat	https://www.gbrmpa.gov.au/news-room/latest-news/latest-news/field-management/2020/reef-regeneration-trial-underway-on-the-great-barrier-reef
December 2020	Reef regulations in place to establish minimum practice standards for cattle grazing and banana production	https://www.qld.gov.au/environment/agriculture/sustainable-farming/reef/reef-regulations
	Great Barrier Reef Interventions Policy released to guide matters related to restoration and/or adaptation interventions within the Great Barrier Reef	https://elibrary.gbrmpa.gov.au/jspui/handle/11017/3674
January 2021	Comprehensive progress update on actions (between July 2019 to June 2020) under the Reef 2050 Plan released	https://fieldcapture.ala.org.au/home/projectExplorer#reportView-heading