



Australian Government



Queensland Government



Reef 2050 Long-Term Sustainability Plan

2021–2025

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Cataloguing data

This publication (and any material sourced from it) should be attributed as:

Reef 2050 Long-Term Sustainability Plan 2021–2025, Commonwealth of Australia 2021.

ISBN: 978-1-76003-429-0

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Aerial of Hardy Reef: Jumbo Aerial Photography (© Commonwealth of Australia (GBRMPA))

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Acknowledgement of Country

We acknowledge the continuing management and custodianship of Country across the Great Barrier Reef Region by its Traditional Owners whose rich cultures, heritage values, traditions, enduring connections and shared management efforts continue to protect land, sea and sky Country for future generations. We pay our respect to their Elders, past, present and emerging.

We recognise the continuous living culture of Aboriginal and Torres Strait Islander peoples – their diverse languages, customs and traditions, knowledges and systems – and the deep relationship and responsibility to Country as integral to their identity and culture.

We thank Traditional Owners for their enduring stewardship and protection of the Great Barrier Reef for thousands of generations – and for their ongoing guidance and partnership in the shared efforts to protect the Great Barrier Reef.



Mangroves at Woody Island: C. Jones (© Commonwealth of Australia (GBRMPA)).

Aboriginal people and Torres Strait Islander people are the first peoples of Australia. An Aboriginal or Torres Strait Islander is a person of Aboriginal or Torres Strait Islander descent who identifies as an Aboriginal or Torres Strait Islander and is accepted as such by the community in which he or she lives. In this Plan, the terms 'Aboriginal and Torres Strait Islander' and 'Indigenous' are used interchangeably, depending on context, but mean the same thing.

Traditional Owners are the Aboriginal and Torres Strait Islander people who have ongoing traditional and cultural association with the land and sea Country of the Great Barrier Reef, and possess rights and interests under Traditional Laws, Customary Lore and Australian and Queensland government laws.



Colourful reef fish swim amongst *Acropora* corals: A. Chin (© Commonwealth of Australia (GBRMPA))

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Ministers' Foreword

The iconic Great Barrier Reef is one of the natural wonders of the world and part of the Australian identity.

Its great beauty, nature, and amazing diversity are cherished, and its value to our nation prized. It is culturally important as sea Country for the Reef's First Nations Peoples.

However, our Great Barrier Reef World Heritage Area is under threat. From 2016 to 2020, it has sustained three unprecedented mass coral bleaching events because of marine heatwaves due to climate change.

These events, combined with other major impacts to the Reef, have affected the communities and industries that depend on it for their livelihoods and way of life.

The COVID-19 pandemic has also significantly impacted these communities and industries.

We know Australians are passionate about the Great Barrier Reef and ensuring it remains a living natural and cultural wonder of the world.

The Australian and Queensland governments have introduced legislation and invested more than \$3 billion over 10 years to support the Reef 2050 Long-Term Sustainability Plan.

Our investment is already delivering outcomes—helping us control outbreaks of coral-eating crown-of-thorns starfish, improving water quality, doubling the on-ground joint field management program, addressing plastic pollution and rehabilitating island, coastal and reef habitats.

This revised Reef 2050 Plan is the result of the Plan's first five-yearly comprehensive review. It has been updated to address the findings of the 2019 Great Barrier Reef Outlook Report and ensure it continues to contain the right priorities and actions to support the health and resilience of the Reef.

It provides a pathway for accelerated action to conserve the Reef's Outstanding Universal Value, and we are committed to investing the time, effort and resources required to implement it.

In particular, we will reduce our greenhouse gas emissions as part of global efforts to rapidly address climate change, increase efforts to reduce land-based pollutant run-off, ensure our use of the Reef and its catchment is sustainable and culturally sensitive, seek greater involvement of Traditional Owners, and rehabilitate areas where possible.

The strength of this Plan is the result of consultation and the partnership involving governments, Traditional Owners of the Great Barrier Reef, industry, land managers, scientists and the community. Our success depends on us all working together and committing to protecting and nurturing our Great Barrier Reef.

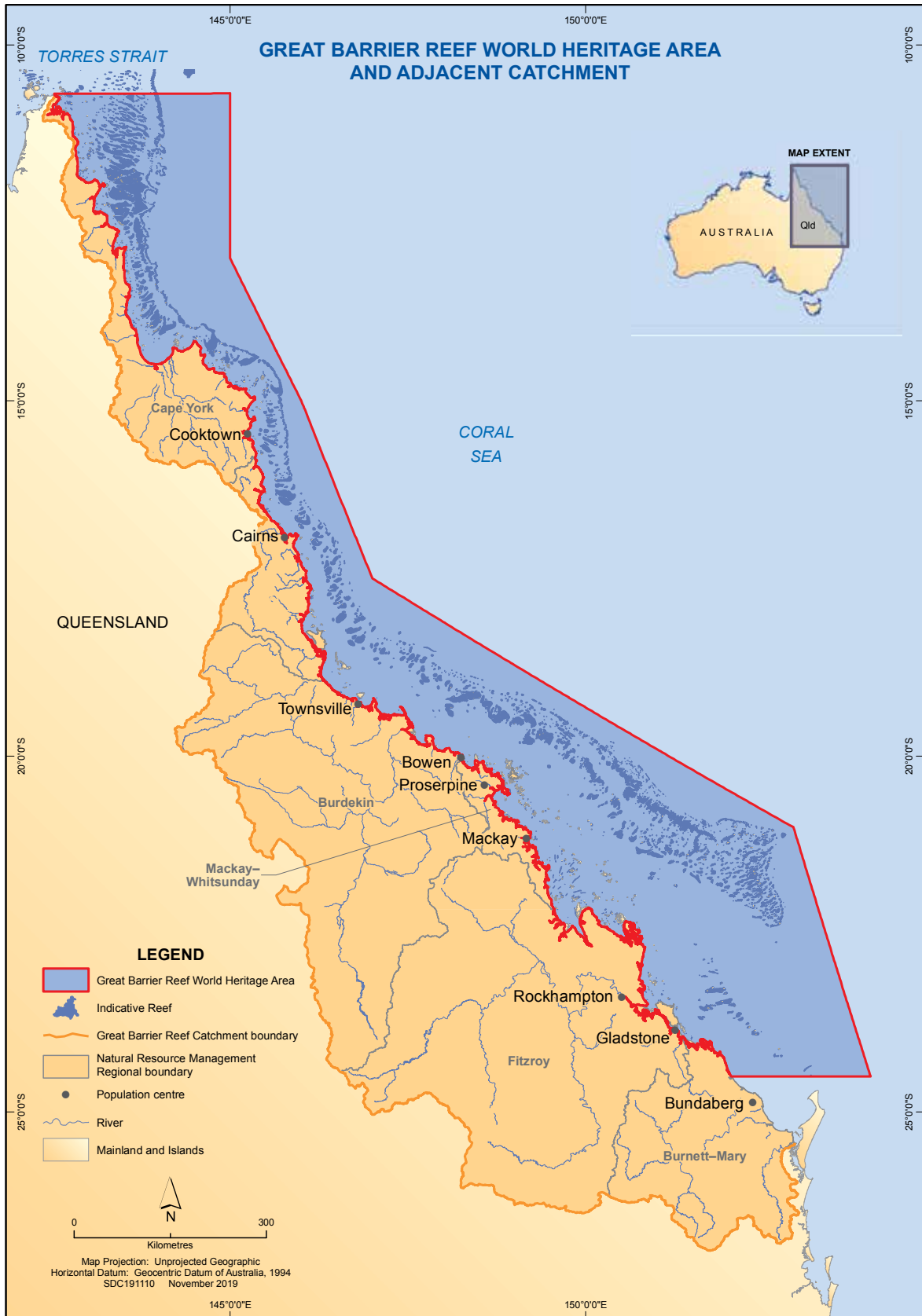


The Hon Sussan Ley MP
Australian Government Minister for the Environment



The Hon Meaghan Scanlon MP
Queensland Government Minister for the
Environment and the Great Barrier Reef
and Minister for Science and Youth Affairs

Figure 1 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 1,050 islands. Appendix B describes the difference between the World Heritage Area, the Great Barrier Reef Region and the Great Barrier Reef Marine Park.

1. Context

1.1 What is the Great Barrier Reef?

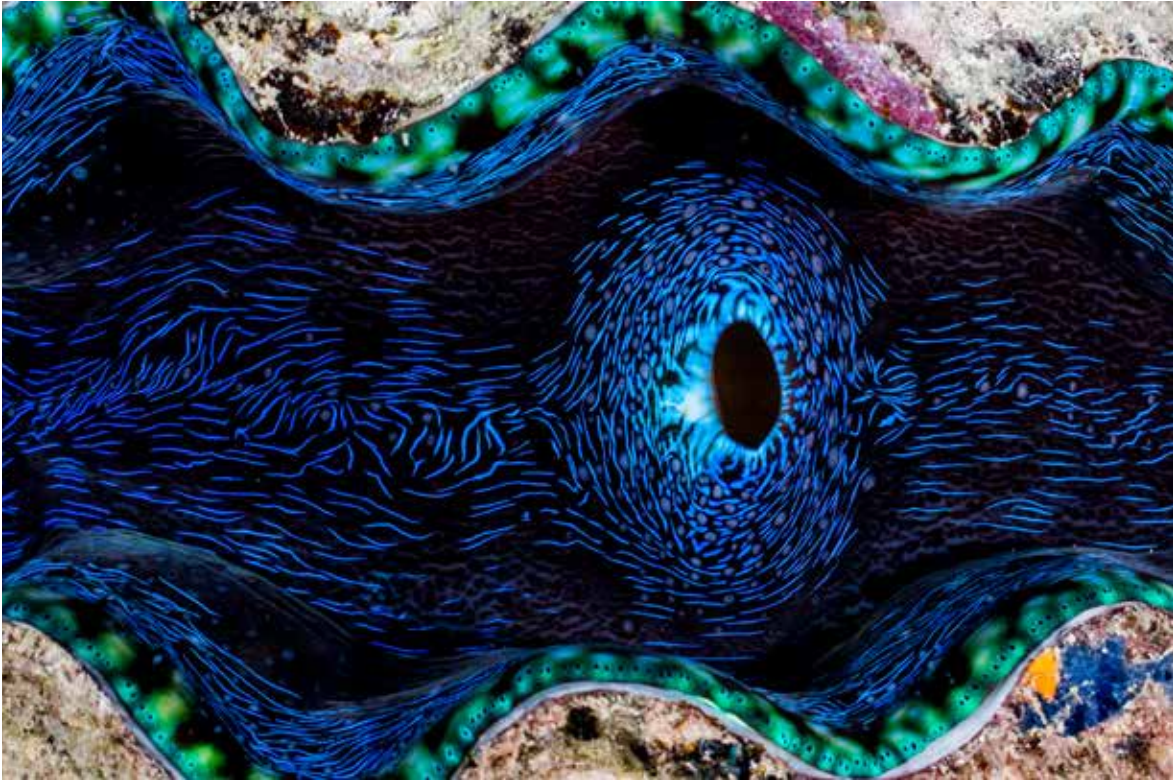
The Great Barrier Reef (the Reef) is a network of almost 3,000 coral reefs and a diverse array of non-reef habitats stretching 2,300 kilometres along the east coast of Queensland. The Great Barrier Reef World Heritage Area covers an area of 348,000 square kilometres and has connections to the Torres Strait north of Cape York, the Coral Sea Marine Park to the east,

and the Great Sandy Strait, adjacent to the K'gari (Fraser Island) World Heritage Area, in the south (Figure 1; Appendix B).

The Reef provides some of the most spectacular scenery on earth and is of exceptional natural beauty. It covers a vast area producing an unparalleled natural wonder visible from space.



Aerial view of Nara Inlet, Hook Island: Jumbo Aerial Photography (© Commonwealth of Australia (GBRMPA))



Close view of a Giant Clam (*Tridacna derasa*): J. Sumerling (© Commonwealth of Australia (GBRMPA))

The Reef as we know it today has been there for around 10,000 years, when sea-level rise at the end of the last ice age caused a large coastal area, including the continental shelf, to become part of the sea and the Reef established itself. This environmental change impacted Traditional Owner livelihoods and cosmologies and is embedded in Dreaming stories that have been handed down by Reef Traditional Owners who lived through the Reef's evolution.

It is important to recognise that the Reef ecosystem is more than coral reefs. 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. It contains vegetated islands and important coastal areas, including wetlands, beaches, saltmarshes and mangroves. The Reef and many of its species, particularly fish, seabirds and marine reptiles, depend on its connections to these coastal habitats. This network of habitats also provides important blue carbon sites. Mangroves, tidal marshes and seagrass meadows around the

world are known to have vast stores of carbon that have been accumulating for thousands of years. It also overlaps with 2 of Australia's wetlands of international importance as designated under the Ramsar Convention.

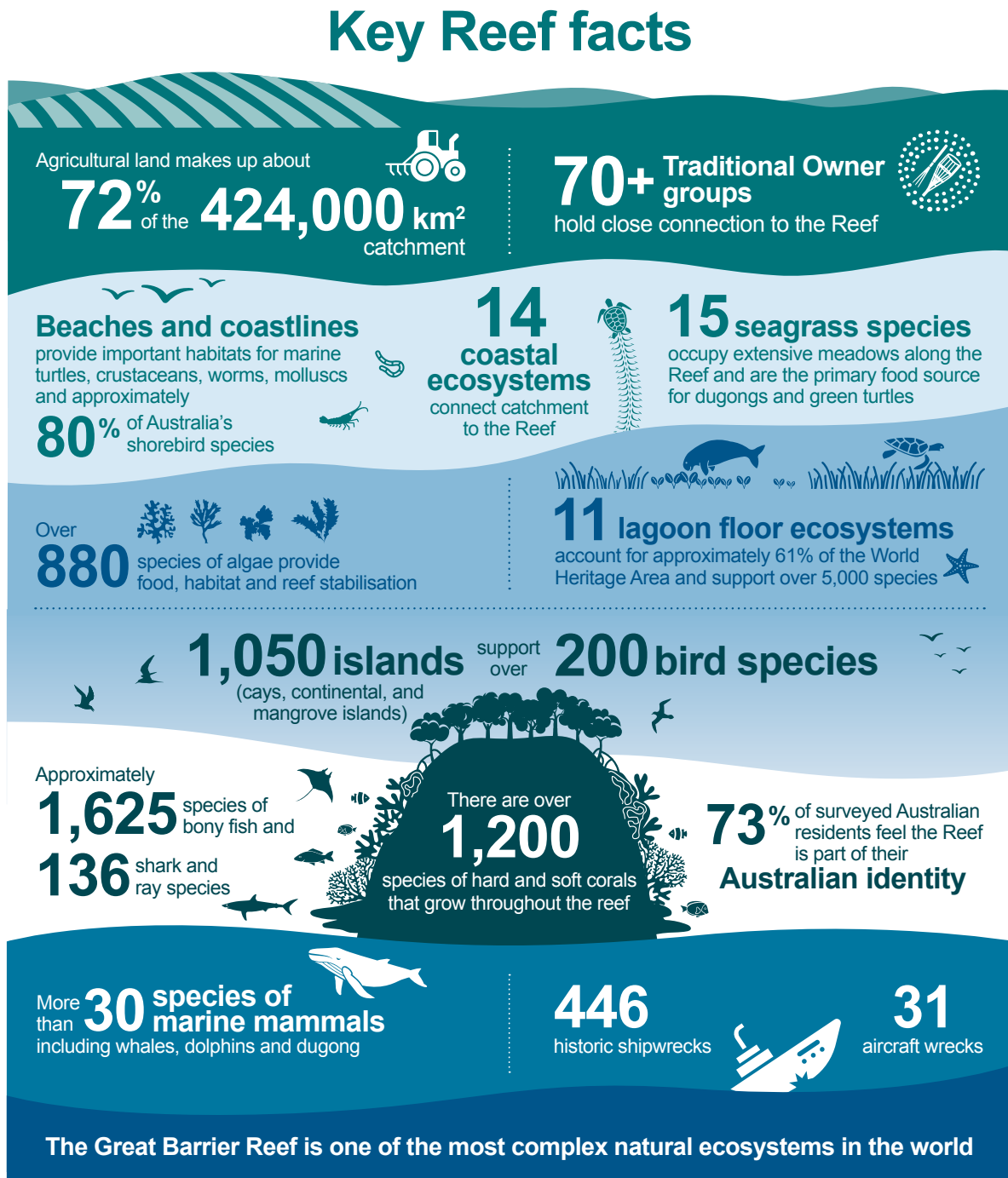
Thirty-five catchments drain into the Reef across a 424,000 square kilometre catchment. More than 1 million people live in the Reef catchment. Land use is largely rural, with small urban centres along the coastal strip, particularly between Cooktown and the southern boundary of the World Heritage Area. The catchment includes World Heritage-listed tropical rainforests, wetlands, large rivers and tropical savannahs. The dominant agricultural use is grazing (77%), with crops such as sugar cane (1.4%) on the coastal floodplain.

The Reef and its catchment are rich in Indigenous cultural heritage, which is fundamentally linked to the history and condition of land and sea, and reflected by totems – natural objects, plants or animals inherited by Traditional Owners as a spiritual

emblem. Clan groups have a connection to and caretaking responsibilities for their totems. There are also non-Indigenous historic heritage sites, including shipwrecks, lightstations and aircraft wrecks, which contribute to the Reef's broader heritage.

The Reef is more than the sum of its parts. It is the interconnectedness of all these different habitats and values, and how they work together, that makes the Reef so special (Figure 2).

Figure 2 Key Reef facts



1.2 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. It is a place of Outstanding Universal Value and was listed as a World Heritage Area in 1981. The Reef meets all 4 of the UNESCO natural criteria for World Heritage listing (see [Great Barrier Reef – UNESCO World Heritage Centre](#)). It is recognised for its natural beauty and natural phenomena, outstanding ecological and biological processes, and important habitats for conservation of biodiversity; and for containing major stages of the earth's evolutionary history. [UNESCO estimates](#) that 3 Australian World

Heritage sites – the Great Barrier Reef, Shark Bay and the Ningaloo coast – contain 40% of the blue carbon stored across all marine world heritage sites.

The Reef is an intrinsic part of culture for Traditional Owners, who continue to care for their sea Country and benefit from use of the Reef's resources and places of cultural significance. More than 70 Traditional Owner groups have long, continuing relationships with the Reef and its catchment stretching back over 60,000 years. For Traditional Owners, its value is immeasurable – intertwined with identity, self and culture. Strong social and economic connections with the Reef are also evident among the broader community. People rely on or use the Reef for their livelihoods, recreation and wellbeing (Figure 3).

Figure 3 Key uses of the Great Barrier Reef and its catchment





Dugong feeding on seagrass: D. Perrine (© Commonwealth of Australia (GBRMPA))

The Reef is critical to the tourism industry and the millions of coastal residents and visitors who use the World Heritage Area. It supports approximately 64,000 jobs and contributes around \$6.4 billion to the Australian economy each year, mostly through tourism (figures reflect economic benefits prior to COVID-19 pandemic impacts on the international tourism industry (Deloitte 2017)). As an asset, its value has been estimated at \$56 billion.

The Reef supports a range of Reef-dependent commercial (e.g. tourism, fishing) and non-commercial (e.g. recreation, research) uses that collectively form an important part of the social and economic fabric of communities in the catchment. Other 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.

1.3 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 the *Great Barrier Reef outlook report 2014*. It concluded the size of the Reef is becoming a less effective buffer to broadscale and cumulative threats and the long-term outlook for the Reef's ecosystem had deteriorated from poor to very poor. The greatest threat to the Reef is climate change, with the other main threats being land-based run-off, coastal development and direct human use, such as illegal fishing and bycatch (Figure 4).

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 (IPCC 2019, p. 8). Extreme temperature events contributed to by global warming are increasing in frequency and severity. In recent years, marine heatwaves caused widespread coral bleaching in 2016, 2017 and 2020. Comprehensive mortality surveys showed that 29% of shallow coral died in 2016, leading to mortality in other species including fish and invertebrates. This, coupled with an ongoing crown-of-thorns starfish outbreak, has depleted live coral cover in many areas (GBRMPA 2019a, pp. 24–25).

Global warming caused by greenhouse gases is also changing weather patterns, altering ocean currents and causing sea-level rise within the Reef. The east Australian current (which flows southwards through the Reef) now extends approximately 350 kilometres south of where it reached historically, also influenced by global warming. Increased carbon dioxide emissions are causing Reef waters to acidify: this reduces the ability of corals and other reef-building organisms to grow carbonate shell material and increases the risk of them dissolving. For corals, this lessens their ability

to withstand and recover from cyclones, which are projected to be fewer but more intense (BoM 2020, p. 22). Changing weather patterns, sea-level rise and altered ocean conditions also affect the land, species and people through coastal erosion and habitat inundation – for example, in marine turtle nesting sites, causing hatchlings to die.

The [Paris Agreement](#) (United Nations 2015) aims to strengthen the global response to the threat of climate change and 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 to 1.5°C above pre-industrial levels. [The High Level Panel for a Sustainable Ocean Economy](#), of which Australia is a member, has stated the health of the ocean and the livelihoods that depend on it requires ambitious emissions reductions, consistent with the Paris Agreement goal of pursuing efforts to limit global temperature increases to 1.5°C (HLPSOE n.d., p. 11). This is a significant challenge. Australia's *State of the Climate 2020* report stated that, globally, the averaged air temperature at the earth's surface has already warmed by over 1°C since 1850, and Australia's land temperatures have already warmed on average by 1.44°C ± 0.24°C since national records began in 1910 (BoM 2020, pp. 2–3).

Coral reefs are projected to decline by a further 70% to 90% this century at global temperatures of 1.5°C above pre-industrial levels, with even larger losses at global temperatures of 2°C above pre-industrial levels (IPCC 2018). The Director of the UNESCO World Heritage Centre has stated that most World Heritage-listed coral reef sites may be lost if global temperature increase cannot be limited to 1.5°C above pre-industrial levels (Rössler 2020, p. 5).

The United Nations Human Rights Council (United Nations 2018, p.2) recognises that Indigenous peoples are among the first to face the direct consequences of climate change, due to their dependence on, and close relationship with, the environment and its resources.

The long-term outlook for the Reef is **critically dependent on limiting global temperature rise to the maximum extent possible, as quickly as possible** (GBRMPA 2019b).

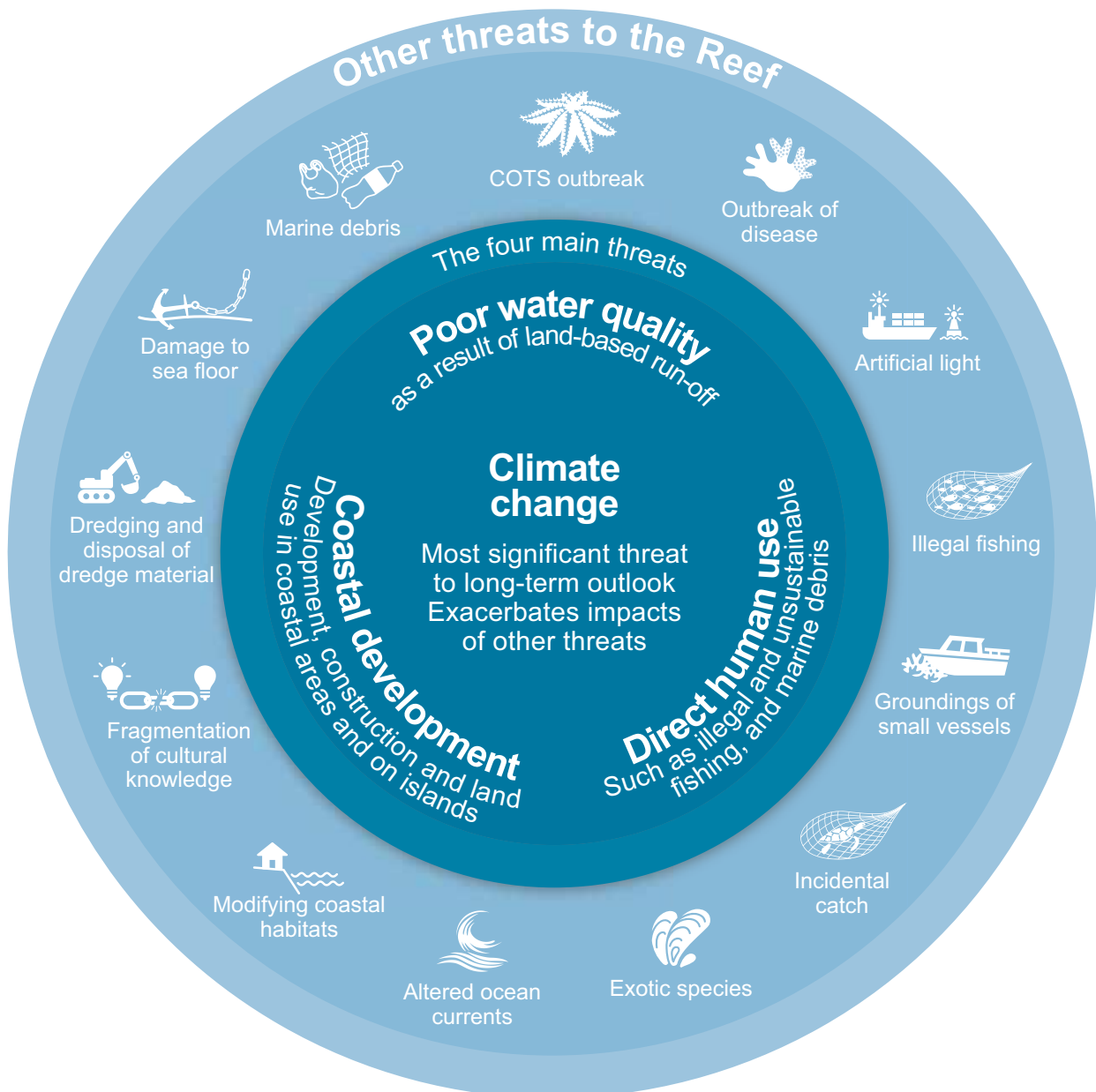
Regionally, **land-based run-off threatens coastal habitats, including seagrass, estuaries** and coral reefs. Sediment and nutrient pollution from agricultural run-off, and to a lesser extent urban and industrial activities, are the main sources of poor water quality impacting the Reef. Excess sediment and nutrients reduce light penetration into the water, which affects the growth of important species that need light to photosynthesise, like seagrass. Sediment can smother animals and plants, and nutrients promote the growth of algae which compete for space with corals.

Pesticides also adversely affect water quality, particularly in coastal and estuarine areas (Bartley et al. 2017, p. 10).

The increasing pressures from expanding coastal communities, including associated **coastal development**, have a wide range of direct and cumulative impacts. In addition, **impacts from human use** include illegal fishing, fishing impacts on species of conservation concern, marine debris and artificial light. These pose a high risk to the Reef and have a cumulative negative impact when combined with other threats.

Figure 4 Threats to the Reef

Threats identified in the 2019 Outlook Report: key areas the Reef 2050 Plan seeks to address



2. Vision

The Reef 2050 Plan’s vision for the Reef in 2050 is that: **The Great Barrier Reef is sustained as a living natural and cultural wonder of the world.**

The Reef is under significant pressure. The challenge to sustain the Reef for future generations is big and 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. Strong local, national and global action is required if the vision is to be realised.

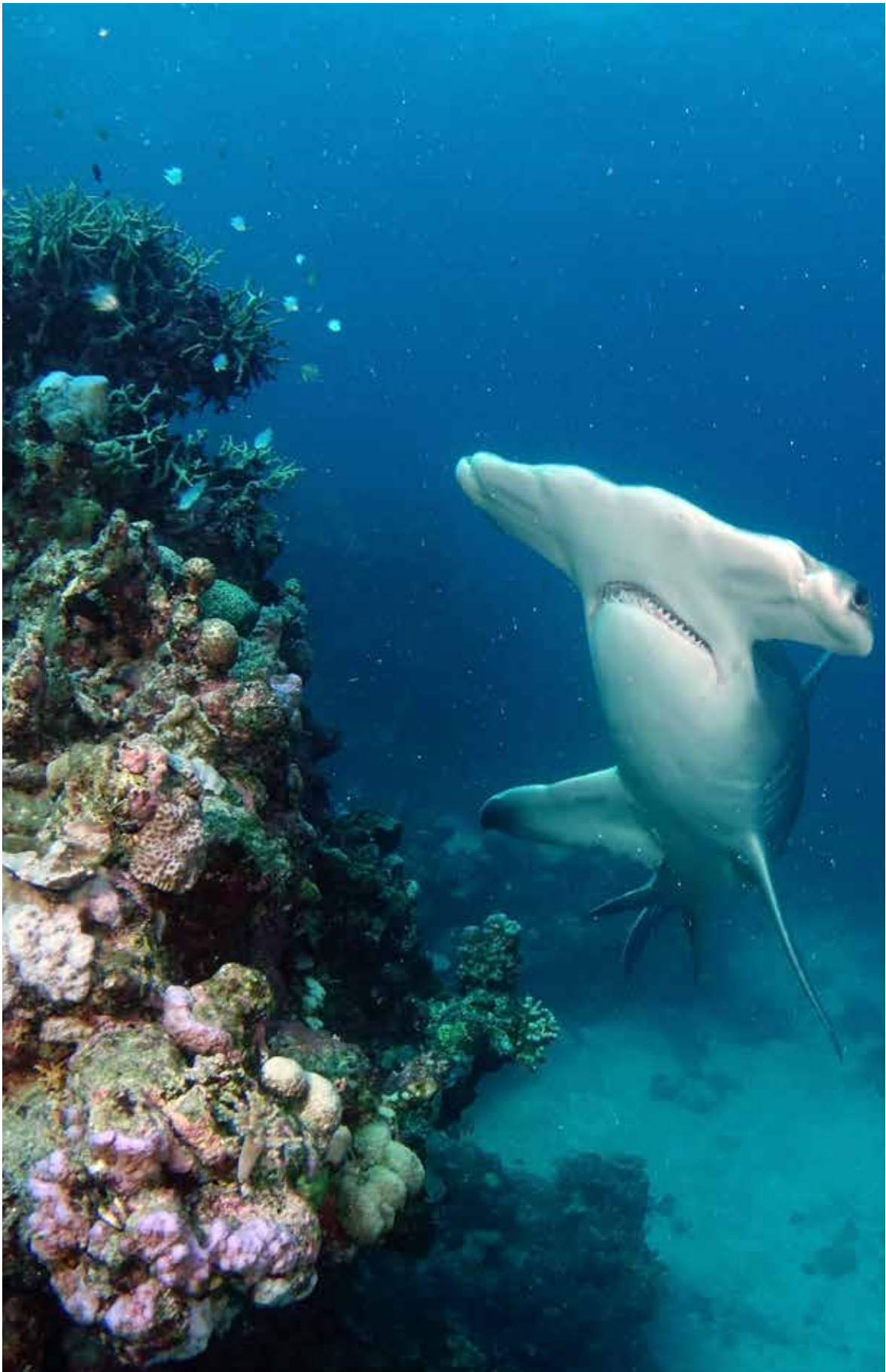
This vision reflects the Outstanding Universal Value of the Reef and its international importance. The Australian and Queensland governments recognise that complete restoration of the Reef to its condition at the time of World

Heritage listing in 1981 is not likely. The Reef 2050 Plan (the Plan) aims to create a future in which the Reef is in a better condition and is sustained for future generations.

Limiting global temperature rise to the maximum extent possible, and certainly within the temperature goal of the Paris Agreement, is critical to improving the outlook for the Reef. Strengthening actions now to reduce pressures and developing interventions to support adaptation can help the Reef but must be combined with concerted global action to reduce greenhouse gas emissions as quickly as possible.



Aerial of Cape Gloucester, north Airlie Beach: Jumbo Aerial Photography (© Commonwealth of Australia (GBRMPA))



Hammerhead shark, at Knife Reef, in the Townsville region: C. Jones (© Commonwealth of Australia (GBRMPA))

3. About the Plan

The Plan commenced in 2015 and is Australia’s overarching long-term strategy for protecting and managing the Reef to support its health and resilience. It sets out the vision for the Reef that Australians will strive to achieve as custodians of this World Heritage icon.

Governments, industry, land managers, scientists, Traditional Owners and the community all have a role to play in helping to protect and sustain the Reef. This collective effort is a central concept of the Plan, recognising that achieving its ambitions will depend on strong collaboration and lasting partnerships.



Eye on the Reef diver surveying the health of the reef: R. Beeden (© Commonwealth of Australia (GBRMPA))

The Plan provides a strategic framework for action and is intended to guide governments, key sectors and individuals on actions they can take to contribute to improving the Reef's future. The Plan outlines the priority areas for investment and confirms the substantial financial commitment and on-ground contributions provided by governments, industries and communities.

The Australian and Queensland governments together are investing more than \$3 billion over the decade from 2014–15 to 2023–24 to deliver the Plan (see Enabler D: Investment and Appendix D). Industry, community, Traditional Owners and other organisations also contribute to protecting the Reef through their efforts and investments.

Key achievements in the first 5 years of the Plan have reduced pressures on the Reef, built Reef resilience and strengthened partnerships for the future. This includes delivering the Reef 2050 Water Quality Improvement Plan to address all land-based sources of water pollution entering the Reef; legislative and regulatory reforms to reduce land clearing and run-off from agricultural land and industrial activities; ending the disposal of capital dredge spoil in the World Heritage Area, and limiting port development to existing priority ports; releasing the Reef Knowledge System; developing and implementing the Great Barrier Reef Blueprint for Resilience; and investing in the Reef Restoration and Adaptation Program, a collaborative effort to help the Reef survive climate change. Further achievements from the first 5 years are provided in Reef 2050 Plan [annual reports](#).

3.1 Scope

The Plan addresses the local and regional pressures over which people in Australia and Queensland have direct control. It addresses the protection and management of both natural and cultural values of the World Heritage Area, including species and habitats, ecological processes, Traditional Owner values and historic heritage. This 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, the Torres Strait and the Coral Sea. It also includes Australia's international engagement to influence the reduction of impacts on the Reef that come from international sources.

The Plan also deals with human dimensions: the social, cultural and economic benefits derived from the Reef; and people's connection to the Reef. It includes steps to increase involvement of Traditional Owners in protecting and managing the Reef and to empower all communities to take stronger action to protect the Reef.

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, and tourism market fluctuations – are outside the scope of the Plan. While the Plan includes goals and actions to limit the impacts of climate change on the Reef, setting targets and policy mechanisms for Australia's contribution to global emissions reduction is addressed through national and state sectoral-wide measures designed to meet Australia's international commitments, including under the Paris Agreement.

3.2 2020 review and update

To ensure the Plan remains current, it is reviewed and updated every 5 years. In 2018, a mid-term review of the Plan refined the actions and laid the foundations for this more comprehensive review. The 2020 review involved collaboration with the Reef 2050 Plan Independent Expert Panel, Reef 2050 Advisory Committee and a group of Reef Traditional Owners. It was also informed by the results of public consultation.

The review has resulted in key changes to the Plan, including:

- responding to the findings of the 2019 Outlook Report so that the Plan continues to address the threats posing the highest risk to the Reef

- greater consideration of climate change and its impact on the Reef, recognising this is essential to achieve the Plan's vision
- increased reflection on and inclusion of Traditional Owner aspirations
- more focus on empowering all communities to take stronger action to protect the Reef
- a new framework that provides a clearer explanation of what outcomes the Plan seeks to coordinate and achieve, and how progress will be evaluated
- a reframing of the Plan as a more strategic document, with detailed operational actions removed
- incorporating investment information within the Plan.

The updated Plan maintains and builds on existing obligations relating to the World Heritage Area and activities undertaken in it.

3.3 Time frame and review

The Plan sets out the vision, outcome and objectives for the Reef through to 2050, with goals and strategic actions over 5 years to 2025.

It is an adaptive document, and will be reviewed and updated every 5 years. The Plan will also be reviewed, and if necessary updated, to address new information or priorities for Reef protection, including in response to decisions from the World Heritage Committee or corrective measures identified through World Heritage reactive monitoring missions.

3.4 Implementing the Plan: Building on strong foundations

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. The [Great Barrier Reef Intergovernmental Agreement](#)

has facilitated collaboration between successive Australian and Queensland governments since 1979. The Great Barrier Reef Marine Park Authority is an agency dedicated to managing the Reef and has been providing worldleading marine park management for over 45 years.

A comprehensive suite of legislation, policies and programs is in place to protect the Outstanding Universal Value and other natural, cultural and Traditional Owner 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* (Cth) and the *Marine Parks Act 2004* (Qld). The Great Barrier Reef Marine Park is protected as a matter of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999*.

There are a number of established work programs that identify priorities, provide detail on actions and time frames, monitor progress and/or assign responsibility for delivery of Reef 2050 actions at a more detailed operational level. These include:

- Reef Joint Field Management Program
- Great Barrier Reef Marine Park Authority Corporate Plan
- Reef 2050 Water Quality Improvement Plan 2017–2022
- Wetlands in the Great Barrier Reef Catchments Management Strategy 2016–2021 Reef 2050 Integrated Monitoring and Reporting Program
- Paddock to Reef Integrated Monitoring, Modelling and Reporting Program (Paddock to Reef program)
- Reef Restoration and Adaptation Program.

Other established work programs have a broader national or statewide scope or a particular industry focus and contribute to the Plan's outcome – for example:

- Queensland Sustainable Fisheries Strategy 2017–2027

- North-East Shipping Management Plan
- Indigenous Land and Sea Ranger programs
- Australian and Queensland government climate change policies and programs.

These work programs support the adaptive management approach underpinning the Plan, by providing flexibility to adjust the scale and speed of implementation of actions in response to changing needs of the Reef.

The Australian and Queensland governments will engage with and support Traditional Owner-led development of a Traditional Owner Reef 2050 Implementation Plan. This implementation plan will build on existing reports and studies and will be completed in a time frame guided by Traditional Owners

to ensure they have the time they need to consider, develop and implement this work.

As the Reef 2050 Plan is implemented, there may be other areas that would benefit from an integrated implementation plan.

Oversight of delivery of the Plan will continue under a collaborative arrangement, with strong consultative and governance arrangements (see Enabler A: Collaboration and partnerships).

In addition to the specific actions in the Plan, decision makers will have regard to the principles in Box 1 and the Reef 2050 [Net Benefit](#) and [Cumulative Impact Management](#) policies when making decisions about the management and protection of the World Heritage Area.



Environmental best practices by the Burdekin Shire Council, a Reef Guardian Council:
M. Knapton (© Commonwealth of Australia (GBRMPA))

BOX 1 Reef 2050 Plan principles for decision making
Maintaining and protecting Outstanding Universal Value in every action

- Protecting the Outstanding Universal Value of the World Heritage Area is the prime consideration when planning, development and management decisions are made.
- Values and ecological processes in poor condition are restored and values and ecological processes in good condition are maintained.
- Economic growth is sustainable and consistent with protecting Outstanding Universal Value.

Basing decisions on the best available science

- Decisions are based on the full range of knowledge, including scientific understanding, Traditional Owner and community knowledge.
- Decisions take into consideration information on the current and emerging risks associated with climate change.
- Management is adaptive and continually improving, informed by the outcomes of monitoring programs.

Delivering a net benefit to the ecosystem

- Decisions are underpinned by the principles of ecologically sustainable development, including the precautionary principle.
- Impacts are avoided and residual impacts mitigated.
- Offsets are considered only where impacts cannot be avoided or mitigated.
- Actions that restore ecosystem health and resilience – delivering an overall improvement in the Reef’s condition – are fostered.

Adopting a partnership approach to management

- Governance arrangements are transparent and accountable.
- Decisions continue to support a wide range of opportunities for sustainable economic, social and cultural activities, including traditional use.
- Traditional Owner rights* are inherent not permitted.
- Management is cooperative, empowering partners, fostering stewardship and building strong community support. Delivery of local and regional actions is informed through engagement with Traditional Owners, industry, regional bodies, local governments and the community.
- Innovation in management is fostered.

* Traditional Owners have unique rights to their Country under Traditional Law and Lore.

3.5 Reporting

Regular reporting provides transparency about what is being delivered and tracks progress toward achieving the Plan’s objectives and goals. As the Reef 2050 Integrated Monitoring and Reporting Program is further developed, it will provide Reef managers with greater integrated access to information, to guide management decisions and help track progress against the Plan. The program will also drive better alignment between existing programs while helping to fill monitoring and modelling knowledge gaps.

The separate *Reef 2050 objectives and goals* document provides detail on the indicators that form the basis for measuring progress under each objective and goal.

Enabler C: Monitoring, evaluation and adaptive management provides further information on how monitoring and reporting informs adaptive management of the Reef.

Reporting under the Plan will include:

- annual reports on activities
- an outcomes report on progress towards the objectives and goals to inform the next 5-year review of the Plan.

Monitoring and reporting information will be publicly available through the [Reef Knowledge System](#), which has been developed under the Reef 2050 Integrated Monitoring and Reporting Program.



Eye on the Reef training in the Whitsunday Region: M. Knapton (© Commonwealth of Australia (GBRMPA))

4. Outcomes framework

The Plan’s Outcomes Framework (Figure 5 and Figure 6) show how the elements of the Plan work together to guide effort and investment to protect and sustain the Outstanding Universal Value of the Reef.

The aspirational **vision** reflects the Outstanding Universal Value of the Reef and its international importance. It also reflects the desire to maintain a functioning Reef ecosystem from now to 2050 and beyond.

The **outcome** *Healthy Reef, Healthy People* recognises the fundamental interconnectivity of the Reef and its Traditional Owners, and the interconnected, social, cultural, economic and environmental values of the Reef and the communities that depend on it. A sustainable relationship between people and the Reef is essential to achieving the vision. 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 contribute to declines in the health of the Reef, Reef management is also about people management.

Objectives to guide measurement against a selection of attributes of *Healthy Reef, Healthy People* are set for elements of the Reef’s habitats, species, Indigenous heritage and human dimensions (Box 2). They are supported by indicators to measure success and apply from local to Reef-wide scales.

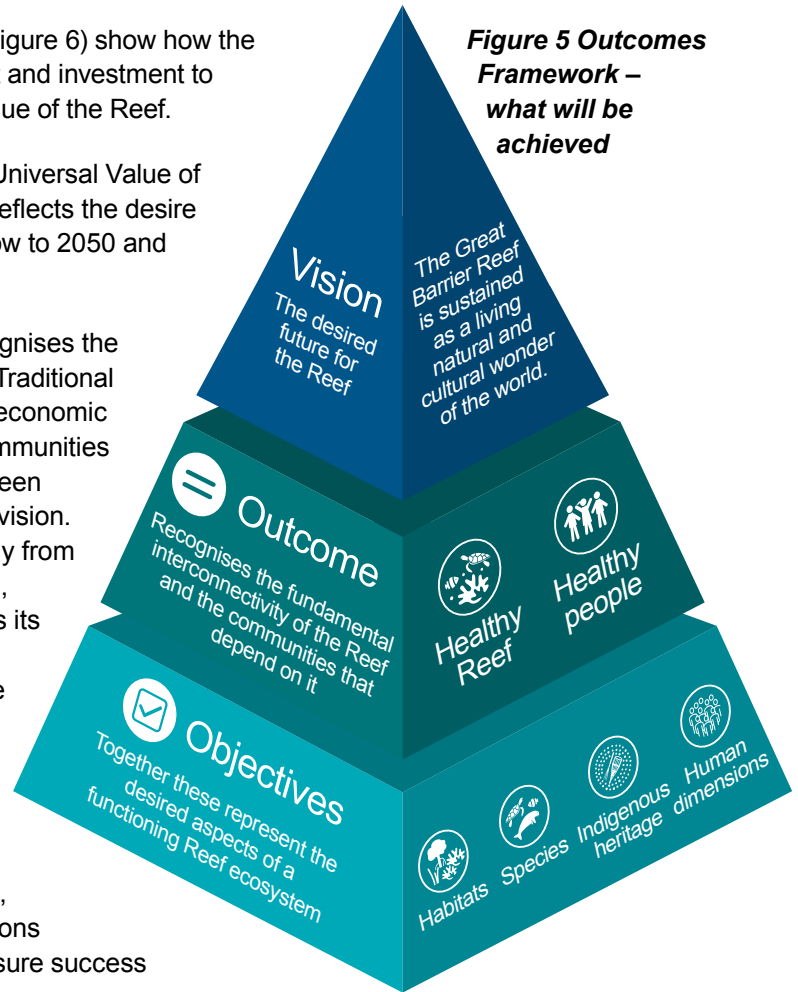


Figure 5 Outcomes Framework – what will be achieved



Kite surfing at Green Island, in Far North Queensland: D. Chaplin, Pine Creek Pictures (© Commonwealth of Australia (GBRMPA))

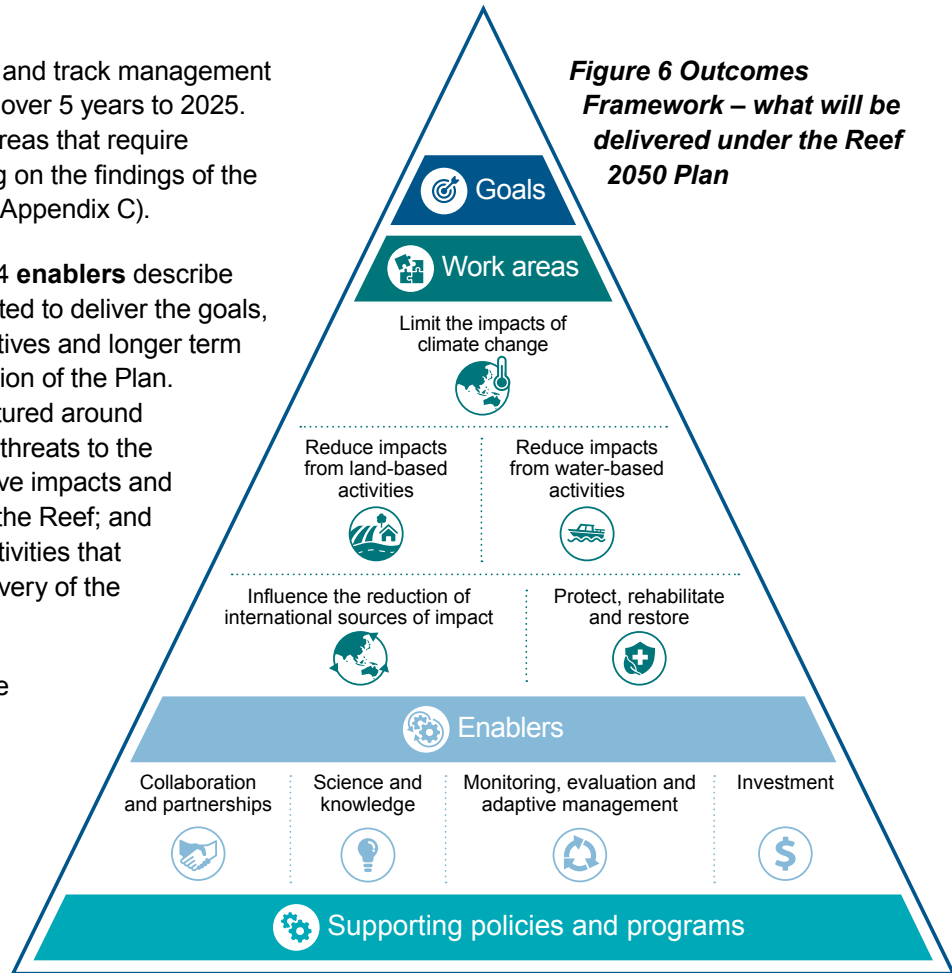
Goals are set to drive and track management efforts under the Plan over 5 years to 2025. They guide action in areas that require strengthening, drawing on the findings of the 2019 Outlook Report (Appendix C).

Five **work areas** and 4 **enablers** describe what will be implemented to deliver the goals, and achieve the objectives and longer term 2050 outcome and vision of the Plan.

Work areas are structured around efforts to address key threats to the Reef, reduce cumulative impacts and protect and conserve the Reef; and **enablers** deal with activities that underpin effective delivery of the **work areas**.

Information on how the **objectives** and **goals** will be monitored and assessed is provided in the *Reef 2050 Plan objectives and goals* document.

Figure 6 Outcomes Framework – what will be delivered under the Reef 2050 Plan



BOX 2 Reef 2050 Plan objectives

Objectives

These objectives apply from now to 2050 and beyond, and have supporting indicators to measure success. Achieving the Reef 2050 Plan objectives will only result from urgent and sustained effort to address cumulative impacts to the Reef.

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 owned and managed by Traditional Owners and 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 appropriate 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 and social benefits.
- People maintain or grow their attachment to the Great Barrier Reef.
- People and communities take individual and collective action to maintain Reef resilience.
- Intangible and tangible historic and cultural heritage and contemporary cultural values remain intact.
- Governance systems are inclusive, coherent and adaptive.



Colony of Frigatebirds nesting on Raine Island: M. Turner (© Commonwealth of Australia (GBRMPA))



Queensland Government scientists measure water quality and quantity in the Burdekin region. (© Queensland Government)

5. Work areas and enablers

The following sections detail what is being done under the Plan for each **work area** and **enabler**. Each section provides:

- an overview of what the issue is and why it is important for the long-term health of the Reef
- **goals** and **strategic actions** for 2021–2025, with dot points describing key elements of delivery
- other **supporting policies and programs** not referenced in the overview or strategic actions
- the **threats** identified in the 2019 Outlook Report that this work is responding to (noting that threats from climate change intensify the effect of other threats).

The 5 **work areas** are:

1. Limit the impacts of climate change
2. Reduce impacts from land-based activities
3. Reduce impacts from water-based activities
4. Influence the reduction of international sources of impact
5. Protect, rehabilitate and restore.

The 4 **enablers** that underpin effective delivery of the work areas are:

1. Collaboration and Partnerships
2. Science and Knowledge
3. Monitoring, Evaluation and Adaptive Management
4. Investment.

Efforts to protect specific elements of the Reef ecosystem are often spread across strategic actions under multiple work areas and are supported by all enablers. An example showing how dugongs are protected is in Box 3.

BOX 3

Effort across work areas helps protect dugong

Protection of dugong is addressed through action taken in each of the **work areas**, supported by the **enablers**:

- **Work area 1:** contribute to global efforts to reduce greenhouse gas emissions to mitigate the impact of climate change, which impacts dugong both directly (e.g. increased severe weather events) and indirectly (e.g. habitat loss)
- **Work area 2:** reduce land-based run-off to improve water quality to support healthy seagrass meadows – a primary food source for dugong
- **Work area 3:** reduce pressures including vessel strike, outbreaks of disease and reduced bycatch, and support Traditional Owners in species monitoring, protection and traditional use
- **Work area 4:** foster international cooperation to protect migratory species so that dugong habitat is protected and conserved throughout their range
- **Work area 5:** coordinate incident response programs to assist affected wildlife.



5.1 WORK AREA 1

Limit the impacts of climate change

The biggest threat to the health of the Reef is global warming and subsequent climate change. This is a global problem that requires a global solution, and Australia has a role to play in mitigation (reducing emissions) and adaptation (increasing the resilience of the Reef and associated communities and industries). Our efforts to protect, rehabilitate and support the Reef's adaptation through strong site-based management of local and regional pressures are within our direct control. They will be most effective when combined with concerted national and global action to reduce greenhouse gas emissions.

Australia is committed to the [Paris Agreement](#) and to taking practical and ambitious action to reduce emissions. Australia has exceeded its 2020 target by an estimated 459 million tonnes. Australia's first Paris Agreement Nationally Determined Contribution (NDC) sets a target to reduce emissions by 26 to 28% below 2005 levels by 2030. Australia is on track to achieve emission reductions by up to 35% under a high-technology uptake scenario. In October 2021, Australia communicated its [Long-Term](#)

[Emissions Reduction Plan](#) to the United Nations Framework Convention on Climate Change and updated and enhanced its NDC to include a net zero emissions by 2050 target and seven low emissions technology stretch goals.

The Queensland Government has committed to reducing Queensland's carbon emissions by 30% on 2005 levels by 2030 and achieving zero net emissions by 2050. The Queensland Government has launched its [Climate Action Plan](#) guiding action to 2030 to deliver on its targets, building on the action already taken under the Queensland Climate Change Response.

Climate adaptation is about taking action to support the resilience of the environment, communities and the economy to deal with the impacts of climate change. Strategies for climate resilience and adaptation have been developed at national, Queensland and Great Barrier Reef levels – [National Climate Resilience and Adaptation Strategy](#), [Queensland Climate Adaptation Strategy](#) and the Marine Park Authority's [Great Barrier Reef Blueprint for Resilience](#).



Colourful reefscape view of corals and fish, in the Great Barrier Reef: C. Jones, (© Commonwealth of Australia (GBRMPA))



Goals and strategic actions 2021–2025

Goals	Strategic actions
<p>Australia contributes to an effective global response to climate change through the Paris Agreement, to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels</p>	<p>1.1 Contribute to global efforts to reduce greenhouse gas emissions</p> <ul style="list-style-type: none"> • Meet Australia’s emissions reduction targets and other international commitments under the Paris Agreement. • Deliver Australia’s Long-Term Emissions Reduction Plan to achieve net zero emissions by 2050 • Implement the Technology Investment Roadmap and the annual Low Emissions Technology Statements and position Australia as a global leader in low-emissions technologies. • Implement the Queensland Climate Action Plan 2020–2030 to deliver on Queensland’s 2030 and 2050 climate targets. • Deliver on-ground actions to restore and conserve blue carbon ecosystems in Australia and use experience on blue carbon and ocean accounting to share with international partners. • Adopt business practices and technologies that reduce emissions and increase productivity, through industry-led initiatives and government–industry partnerships <p>1.2 Foster partnerships and stewardship for climate mitigation</p> <ul style="list-style-type: none"> • Support Reef communities and industries to demonstrate leadership in the transition to a lower emissions economy. • Communicate the implications of climate change for the Reef and the emissions reduction outcomes required to secure the Reef’s future, to encourage additional effort to reduce emissions. • Deliver the Queensland Land Restoration Fund by investing in carbon farming projects, in partnership with landholders, that deliver greenhouse gas savings with water quality, biodiversity and social co-benefits in Reef catchments. • Support Indigenous savannah fire management and Aboriginal carbon farming through carbon markets. • Progress Australia’s international climate mitigation and adaptation partnerships, including through the International Partnership for Blue Carbon and Asia–Pacific Rainforest Summit. • Continue Australia’s support for regional initiatives to support Indo–Pacific neighbours to meet their Nationally Determined Contributions through protection of seagrass and mangrove ecosystems (including pilot projects in Papua New Guinea, Fiji and Indonesia).



Goals	Strategic actions
<p>The capacity of Reef communities, Traditional Owners and industries to adapt to a changing climate is increased</p>	<p>1.3 Improve information and planning for community and industry climate adaptation</p> <ul style="list-style-type: none"> • Implement the National Climate Resilience and Adaptation Strategy 2021–2025 to ensure Australia can better anticipate, manage and adapt to climate change. • Review and enhance the Great Barrier Reef Blueprint for Resilience to incorporate additional climate adaptation actions. • Improve access to the latest climate science and adaptation information to support government, business and communities in managing climate risks. • Partner with Traditional Owner groups to incorporate climate change adaptation into land and sea Country planning. <p>1.4 Build community and industry capacity and capability to adapt to climate change</p> <ul style="list-style-type: none"> • Local governments, community organisations and industries deliver education and practical initiatives to help their communities and sectors reduce emissions and adapt to climate change. • Strengthen local government climate adaptation risk assessment and planning capability. • Work with local councils, industries and communities to improve climate resilience through sectoral adaptation plans.
<p>Species and habitats are supported to adapt to a changing climate</p>	<p>1.5 Trial innovations to assist species and habitats to adapt to climate change</p> <ul style="list-style-type: none"> • Develop and test intervention options to help the key habitats and species adapt to the effects of climate change (including small-scale in-field deployments and further research to develop full-scale in-field deployments of intervention options). • Deliver a national research and development effort (the Reef Restoration and Adaptation Program) to help coral reefs more rapidly adapt to rising ocean temperatures. • Understand and respond to impacts of heat and changes in sea level on marine turtle nesting and emergence success and feminisation of hatchlings.

Supporting policies and programs

- [Clean Energy Finance Corporation Reef Funding Program](#)
- [Decarbonisation of the Great Barrier Reef Islands Program](#)
- [IUCN Global Standards for Nature-based Solutions](#)
- [National Disaster Risk Reduction Framework](#)
- [Policy on Great Barrier Reef interventions](#)

Threats being addressed

- Altered ocean currents
- Altered weather patterns
- Ocean acidification
- Sea-level rise
- Sea-temperature increase



5.2 WORK AREA 2

Reduce impacts from land-based activities

The 2019 Outlook Report identified that inshore water quality is improving but too slowly to protect the local ecosystem. This reflects the system-wide challenge and significant time lags between program implementation and cleaner water flowing to the Reef.

This work area focuses on efforts to improve water quality by accelerating action to reduce land-based impacts from both rural and urban areas. It also involves working with Traditional Owners to achieve clean freshwater and saltwater, improving coastal planning, reducing impacts from coastal development and encouraging responsible stewardship and conservation efforts within the communities living in Reef catchments. It addresses direct and cumulative impacts.

A separate planning and reporting framework has been prepared for water quality, which sits as a nested plan under this overarching Reef 2050 Plan – the [Reef 2050 Water Quality Improvement Plan 2017–2022](#). Agriculture is the major land use and the main source of water pollution (Bartley et al. 2017) in the Reef catchment and is therefore a major focus for action and funding. While urban areas are small compared to the scale of agriculture within the Reef catchment, they are generally located closer to the Reef coast. Urban land uses can be intensive point sources of water pollution (e.g. stormwater, industrial discharge and sewage treatment plants).

Reducing plastic pollution from land-based sources is covered by this work area, along with reducing impacts from land-based light pollution. Most rubbish that ends up as marine debris comes from land-based sources. It has been found along the coastline, on islands and in some of the most remote ocean areas of the Reef. Marine debris can be eaten by wildlife

or entangle them, impacting their health and potentially causing death. Artificial light from urban and industrial areas can disrupt critical behaviours in wildlife, including fish, seabirds and shorebirds, and can reduce marine turtle nesting success.

Strong coastal planning and policy can help minimise impacts from predicted population growth and subsequent development and intensive land use along the Reef coast. It also provides direction and guidance for how communities can protect coastal processes and resources adjacent to the Reef.

Improving and integrating knowledge about the flow of water across the catchment, and connections between land and sea, is also important for minimising impacts. This helps to give a more complete understanding of how the catchment functions in a whole-of-system sense. For example, natural wetlands have an important function of nutrient processing and can reduce pollutants before they reach the sea. The [Wetlands in the Great Barrier Reef Catchments Management Strategy 2016–2021](#) sits as a nested strategy under this Plan.

Effective delivery requires collaborative understanding about how the catchment operates and the priorities for its management. This includes co-design and co-delivery of programs with Traditional Owners, community groups, local councils and industry sectors such as tourism and farmers to reduce the impacts of catchment activities on the Reef.

In addition, direct community actions have an important role to play in reducing the spread of weeds and pests, minimising impacts of recreational activities including fishing and four-wheel driving, removing rubbish and protecting shoreline ecosystems and cultural sites.



Goals and strategic actions 2021–25

Goals	Strategic actions
<p>The quality of water is improved through increased effective land management practices in catchments</p>	<p>2.1 Implement the Reef 2050 Water Quality Improvement Plan to meet its targets and undertake a 5-yearly review</p> <ul style="list-style-type: none"> • Ensure full compliance with the Reef Protection Regulations. • Update the Scientific Consensus Statement in 2022 and deliver supporting communication products. • Deliver an independent review of the agricultural land management practice adoption target. • Review and update the Reef 2050 Water Quality Improvement Plan. • Increase efforts to improve agricultural land management practices and stewardship to achieve environmental and economic outcomes. • Increase Traditional Owner-led co-designed and co-delivered water quality projects and programs. • Integrate traditional knowledge and cultural values of healthy water into program delivery for water quality improvement. • Improve urban water management, including through the Urban Water Stewardship Framework and Reef Councils Rescue Plan for cleaner wastewater, stormwater and road run-off. • Implement new treatment systems technologies to reduce run-off. • Integrate climate change considerations, including impacts from acid sulfate soils, coastal erosion and permanent inundation resulting from sea-level rise, into planning and delivery. • Update regional water quality improvement plans to guide actions and community stewardship and develop stronger regional partnerships. • Undertake conservation activities in less disturbed catchments to prevent future water quality issues. • Reduce plastic pollution through implementation of Queensland Government regulation of single-use plastics.



Grazing in the Fitzroy region of the Great Barrier Reef catchment (© Queensland Government)



Goals	Strategic actions
<p>Integrated catchment-to-Reef management reduces cumulative impacts</p>	<p>2.2 Implement the Wetlands in the Great Barrier Reef Catchments Management Strategy and undertake a review</p> <ul style="list-style-type: none"> • Review and update the Wetlands in the Great Barrier Reef Catchments Management Strategy. • Deliver an integrated catchment-to-Reef framework to manage the multiple environmental and cultural values of the catchment and wetlands. • Increase Traditional Owner-led co-designed and co-delivered catchment management and wetland projects and programs. • Integrate traditional knowledge and cultural values of healthy water into program delivery for integrated catchment management. • Improve alignment and linkages between actions taken in the catchment and resulting effects in waterways connected to the inshore marine ecosystem. • Improve agricultural and urban land management practices and stewardship to deliver catchment and wetland outcomes. • Improve understanding of catchment values and how water moves across the catchment to the Reef to inform management and decision making, including through the Walking the Landscape framework. • 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.
<p>Lighting and recreational impacts on sensitive shoreline ecosystems and cultural sites are reduced</p>	<p>2.3 Improve practices in sensitive shoreline ecosystems</p> <ul style="list-style-type: none"> • Improve the management of urban port, tourism and industrial light near marine turtle nesting areas through planning mechanisms, local stewardship and consistent guidance. • Pilot and trial innovations in marine turtle-sensitive lighting. • Enhance compliance in relation to activities being undertaken in protected areas. • Improve compliance with requirements for protecting historic and Indigenous cultural sites, supported by cultural values mapping and land and sea Country planning. • Improve community stewardship and support environmental volunteering in shoreline ecosystems and cultural sites.



Supporting policies and programs

- [Australian Government](#) and [Queensland Government](#) Indigenous Ranger programs
- [Indigenous Land Use Agreements](#) and [Protected Area Program](#)
- [National Plastics Plan 2021](#)
- [National Waste Policy Action Plan 2019](#)
- [Queensland Plastic Pollution Reduction Plan](#)
- [Queensland Land Restoration Fund](#)
- [Queensland Reef Water Quality Program](#)
- [Queensland State Planning Policy](#) and regional plans
- [Reef Guardian Councils](#), [Reef Guardian Schools](#) and other council education and awareness programs
- [Reef Trust](#) and [Reef Trust Partnership](#)

Threats being addressed

- Acid sulfate soils
- Artificial light
- Atmospheric pollution
- Behaviour impacting heritage values
- Damage to reef structure
- Damage to seafloor
- Discarded catch
- Disposal of dredge material
- Dredging
- Exotic species
- Extraction from spawning aggregations
- Extraction of herbivores
- Fragmentation of cultural knowledge
- Extraction of particle feeders (e.g. scallops)
- Extraction of predators (e.g. sharks)
- Foundational capacity gaps
- Grounding – large vessel
- Grounding – small vessel
- Illegal activities – other
- Illegal fishing and poaching
- Incidental catch of species of conservation concern
- Incompatible uses
- Marine debris
- Modifying coastal habitats
- Noise pollution
- Nutrient run-off
- Outbreak of disease
- Outbreak of other species
- Pesticide run-off
- Sea-level rise
- Sediment run-off
- Spill – large chemical
- Spill – large oil
- Spill – small
- Terrestrial discharge
- Vessel strike
- Vessel waste discharge
- Wildlife disturbance



5.3 WORK AREA 3

Reduce impacts from water-based activities

This work area focuses on reducing direct impacts to the Reef from water-based and island activities that occur in and adjacent to the World Heritage Area. People use the Reef in a variety of ways, and many of these uses are dependent on a healthy Reef. Reef-dependent uses include commercial and recreational fishing, tourism, traditional/cultural use, boating, research and education. Other uses are Reef associated: ports, shipping and defence activities. Over the next 20 years, the population living near the Reef is anticipated to continue increasing. If not managed appropriately, this will intensify the associated impacts from the use of the Reef.

This work area seeks to protect the Reef's outstanding universal value and ensure uses are ecologically sustainable while providing social, cultural and economic benefits. The Great Barrier Reef Marine Park Authority was established under the *Great Barrier Marine Park Act 1975* as an independent statutory authority to protect Reef values and manage the marine park. Since then, a comprehensive suite of management tools, including a world-leading [Zoning Plan](#), has been developed to facilitate multiple use and manage the impacts of water-based activities (see also Appendix A). Management of the Reef will continue to improve upon this solid foundation. Strong Australian and Queensland government joint management arrangements for the Reef have also been in place for over 40 years through the [Reef Joint Field Management Program](#). This delivers practical, on-ground marine and island national park management activities across the Australian and Queensland marine parks.

Efforts under this work area will encourage partnerships and collaboration with Reef-dependent industries (marine tourism and fishing) and Reef-associated industries (including shipping and adjacent ports)

to reduce impacts on species, habitats, ecosystem processes and heritage values. Programs that create awareness, foster compliance and stewardship and promote a community culture of custodianship for Reef protection are an important component.

Working in partnership with Traditional Owners to manage sea Country will be a focus and is essential to keep Indigenous heritage strong, safe and healthy.

Sustainable management of commercial and recreational fisheries is a critical component of this work area, including reducing impacts from illegal fishing and on non-target species. This includes the full implementation of the [Queensland Sustainable Fisheries Strategy 2017–2027](#) and delivering new approaches to reduce and monitor impacts related to fishing.

The Plan continues the integrated approach to ports management and shipping. The 2019 Outlook Report found that planning systems for ports had been subject to major reforms under the Plan and shipping was one of the strongest areas of management effectiveness. Existing measures include restricting new port activities and development to within established ports and prohibiting transshipment of bulk materials outside port extents. Capital dredging is restricted to 4 major ports along the Reef coast and disposal of capital dredge material is prohibited in the World Heritage Area and Marine Park. It is important to maintain these commitments and avoid, reduce and mitigate remaining impacts.

Prevention of new pest and disease incursions is also covered in this work area. Controlling existing introduced species and pests, including outbreaks of the coral-eating crown-of-thorns starfish, is covered in Work area 5: Protect, rehabilitate and restore.

Goals and strategic actions 2021–2025

Goals	Strategic actions
<p>Biodiversity and heritage protection are enhanced and ecosystem resilience is supported through strengthened efforts to ensure water-based activities are sustainable</p>	<p>3.1 Improve policy, planning, strategy and decision making in relation to water-based activities</p> <ul style="list-style-type: none"> • Deliver a proactive, contemporary and risk-based approach to marine parks policy, planning and regulation that will protect key values and enable ecologically sustainable use for a changed and changing Reef. • Maintain and enhance complementary spatial planning in the marine parks, on islands and along the coast to protect natural and cultural values and ensure cumulative impacts in these areas are considered and appropriate management arrangements are in place. • Incorporate a resilience-based management approach when planning and implementing targeted Great Barrier Reef Marine Park management actions. • Review, enhance and implement the Great Barrier Reef Blueprint for Resilience. • Identify and promote new management measures to ensure shipping within the Great Barrier Reef Marine Park, Torres Strait and Coral Sea is operated to the highest standard, including exploring Vessel Arrival Schemes, through the North East Shipping Management Plan. • Strengthen inter-agency planning and partnerships around incident response, particularly for maritime incidents such as vessel groundings. <p>3.2 Expand and maintain in-park presence to protect the Reef and enhance user compliance with rules and regulations</p> <ul style="list-style-type: none"> • Deliver an expanded Reef Joint Field Management Program to check for changes on islands and in the water, respond to incidents, welcome and educate Reef users and uphold compliance and the integrity of marine protection. <p>3.3 Foster partnerships and collaboration with Reef users to encourage uptake of stewardship actions and behaviours</p> <ul style="list-style-type: none"> • Encourage and support stewardship actions and behaviours that reduce impacts of water-based activities by partnering and collaborating with Traditional Owners, the tourism and other industries, research providers, local councils, government agencies, Reef users and interested stakeholders. • Increase knowledge and awareness of the Reef's biodiversity and heritage values so Reef users understand and connect themselves to the potential impacts of water-based activities.



Goals	Strategic actions
<p>Traditional Owners are supported to continue to manage sea Country</p>	<p>3.4 Strengthen Traditional Owner management of sea Country through agreements and partnerships</p> <ul style="list-style-type: none"> • Expand Indigenous land and sea ranger programs to additional areas to deliver on-ground activities including compliance, marine monitoring and species protection and management. • Collaborate with Traditional Owners to keep Indigenous heritage strong, safe and healthy through full implementation of the Marine Park Authority's Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park. • Implement an enhanced and expanded Traditional Use of Marine Resources Agreements program to strengthen the protection and conservation of biodiversity and Indigenous cultural values. • Increase the number of formal agreements and partnerships with Traditional Owner organisations to manage sea Country in partnership with management agencies.
<p>The threats associated with legal and illegal fishing are reduced</p>	<p>3.5 Reform fisheries management and compliance to contemporary best practice</p> <ul style="list-style-type: none"> • Prioritise actions to implement a modern, responsive fisheries management approach through the Queensland Sustainable Fisheries Strategy 2017–2027 in consultation with stakeholders. • Deliver a strengthened compliance program that maximises the benefits of zoning plans and reduces the occurrence of and impacts from illegal fishing. <p>3.6 Implement measures that reduce impacts from fishing activities, verify data and improve understanding to strengthen management of fishing activities</p> <ul style="list-style-type: none"> • Deliver protected species and bycatch management strategies for fisheries within the Great Barrier Reef based on ecological risk assessments, with priority given to the mesh net fishery and the trawl fishery. • Use a harvest strategy approach for each fishery to build and maintain fished stock biomass to achieve the maximum economic yield (proxy 60% unfished biomass) to meet fishery objectives and promote resilience to adverse environmental conditions. • Implement rules under harvest strategies and other measures that ensure ecological risks from fishing (beyond fishery species) are mitigated. • Implement stock rebuilding measures that provide for timely recovery of depleted fish stocks and prevent overfishing and depletion of targeted species. • Develop and implement robust systems of independent data validation for the mesh net and trawl fisheries, including independent verification of levels of interaction with species of conservation concern, potentially including electronic monitoring.



Goals	Strategic actions
	<ul style="list-style-type: none"> • Undertake a proof of concept for independent data validation, including electronic monitoring, for commercial mesh net and trawl fisheries. • Improve understanding of the population dynamics of species at risk from commercial fishing; and seabed habitats and associated species in deepwater trawled habitats in the southern Great Barrier Reef Marine Park. • Improve data and understanding of recreational and commercial fishing catch and effort and broader ecosystem impacts to inform management arrangements and protection of Reef values. • Support development and encourage the adoption of new technologies that improve understanding and reduce the ecological impact of fishing activities. • Develop and encourage responsible commercial and recreational fishing practices in partnership with fishers.
<p>Noise pollution and artificial light impacts from sources within and adjacent to the Marine Park are reduced</p>	<p>3.7 Investigate and implement measures that reduce noise and light impacts</p> <ul style="list-style-type: none"> • Improve understanding of the impacts of noise pollution and mitigate impacts based on severity of risk to Reef values. • Investigate the potential light impacts of commercial vessels and ships transiting through the Marine Park, including at anchor and in ports. • Pursue at the international level the review and update of guidelines to reduce the impacts of underwater noise from shipping on marine life. • Investigate and where feasible implement measures that reduce artificial light impacts from marine vessels and infrastructure.
<p>New outbreaks of disease are reduced and incursions of introduced species and pests are prevented</p>	<p>3.8 Enhance marine and island pest surveillance and prevention (including biosecurity)</p> <ul style="list-style-type: none"> • Deliver innovative surveillance and control to prevent pest and invasive species establishing and spreading within estuarine, marine and island environments. • Strengthen management of biosecurity risks, including through compliance with international guidelines, from international and domestic vessels, particularly in relation to ballast water and biofouling from commercial and recreational vessels. • Deliver community education on pest species identification to enable early detection. • Expand marine pest biosecurity research and development in partnership with ports, the shipping industry and communities.
<p>Marine debris, rubbish pollution and at-sea disposal of waste is reduced</p>	<p>3.9 Implement domestic measures that reduce marine debris and manage waste disposal</p> <ul style="list-style-type: none"> • Implement effective waste reception facilities at marinas and ports along the Reef coastline to reduce at-sea disposal. • Implement measures that reduce ship-sourced waste in accordance with the International Maritime Organisation (IMO) Action Plan to address marine plastic litter from ships. • Investigate and implement measures that reduce the amount of abandoned, lost or otherwise discarded fishing and boating gear.



Supporting policies and programs

- [Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park](#)
- [Australian Government and Queensland Government Indigenous Ranger programs](#)
- [Charter Fishing Action Plan 2018–2021](#)
- [Dredging and dredge spoil material disposal policy](#)
- [Great Barrier Reef Marine Park Authority Policy and Planning Strategic Roadmap](#)
- [High Standard Tourism Operators and Master Reef Guide program](#)
- [Maintenance Dredging Strategy](#)
- [Master planning for priority ports](#)
- [Northern Australia Quarantine Strategy](#)
- [Queensland Biosecurity Strategy 2018–2023](#)
- [Queensland Government Transshipping Policy](#)
- [Threat abatement plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans](#)

Threats being addressed

- Acid sulfate soils
- Altered ocean currents
- Altered weather patterns
- Artificial light
- Atmospheric pollution
- Behaviour impacting heritage values
- Damage to reef structure
- Damage to seafloor
- Discarded catch
- Disposal of dredge material
- Dredging
- Exotic species
- Extraction from spawning aggregations
- Extraction of herbivores
- Extraction of particle feeders (e.g. scallops)
- Extraction of predators (e.g. sharks)

- Foundational capacity gaps
- Fragmentation of cultural knowledge
- Grounding – small vessel
- Grounding – large vessel
- Illegal fishing and poaching
- Illegal activities – other
- Incidental catch of species of conservation concern
- Incompatible uses
- Marine debris
- Modifying coastal habitats
- Noise pollution
- Ocean acidification
- Outbreak of disease
- Outbreak of other species
- Sea level rise
- Sea temperature increase
- Spill – large chemical
- Spill – large oil
- Spill – small
- Vessel strike
- Vessel waste discharge
- Wildlife disturbance



Gudjuda Indigenous Land and Sea Rangers
(© Queensland Government)



5.4 WORK AREA 4

Influence the reduction of international sources of impact

This work area focuses on Australia's international engagement to influence actions that reduce the impacts on the Reef that come from international sources, excluding climate change, which is covered in Work area 1: Limit the impacts of climate change. Specifically, it addresses marine debris that enters the Reef from outside Australia; and protecting internationally migratory species.

Australia works through various international conventions, 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 complements domestic efforts within the catchment (Work area 2: Reduce impacts

from land-based activities) and from on-water activities (Work area 3: Reduce impacts from water-based activities). It also includes research to understand and quantify the source and volume of debris in the Reef, which was identified by the 2019 Outlook Report as a knowledge gap.

The Reef provides critical habitat for migratory species such as whales, dugongs, marine turtles, sharks and shorebirds that migrate to or pass through Reef waters. Australia 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 Work area 5: Protect, rehabilitate and restore.

Goals and strategic actions 2021–2025

Goals	Strategic actions
<p>Australia actively engages in international forums and agreements to minimise international sources of impact to the Reef</p>	<p>4.1 Foster international efforts to reduce marine debris entering the Reef</p> <ul style="list-style-type: none"> • Continue to engage in relevant international agreements, conventions, programs and partnerships to reduce marine plastics and other pollutants such as ghost nets. • 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 of marine debris and microplastics to the Reef. • Work with governments, industries, other partners and the international community to reduce the amount of lost or discarded fishing gear through source reduction initiatives and clean-up activities. <p>4.2 Promote international cooperation for the protection of migratory species</p> <ul style="list-style-type: none"> • Continue to engage in relevant international agreements, conventions, programs and partnerships to protect migratory species, including the strong management of critical habitat. • Promote collaborative international research to identify and address migratory species knowledge gaps (for example, seabird and shorebird condition and trend as identified in the 2019 Outlook Report).



Supporting policies and programs

- [Pacific Regional Action Plan: Marine Litter 2018–2025](#) and [Pacific Ocean Litter Project](#)
- [G20 Implementation Framework for Actions on Marine Plastic Litter](#)
- [Commonwealth Blue Charter](#)
- [High Level Panel for a Sustainable Ocean Economy](#)
- [APEC Roadmap on Marine Debris](#)
- [International Maritime Organization \(IMO\) Action Plan to address marine plastic litter from ships](#)
- [International Coral Reef Initiative](#)
- [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](#)
- [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](#)

Threats being addressed

- Behaviour impacting heritage values
- Damage to reef structure
- Marine debris
- Outbreak of disease (cumulative effect of many factors)
- Modifying coastal habitats
- Wildlife disturbance
- Pollution



Brown booby bird (young and parent) at Raine Island: R. Quincey (© Commonwealth of Australia (GBRMPA))

5.5 WORK AREA 5

Protect, rehabilitate and restore

Work areas 1 to 4 are focused on reducing the pressures and impacts on the Reef and its catchment, now and in the future. This work area focuses on controlling established pests and outbreaks and interventions including activities to restore or rehabilitate habitats and heritage sites.

Introduced species like feral pigs and goats have a detrimental impact on wetland and island habitats and prey on Reef species. Their impacts are of particular concern for habitats and species that are highly vulnerable or of high ecological or cultural value. However, not all pest species are introduced. Crown-of-thorns starfish are native coral predators on the Reef that can reach densities where they eat live coral tissue faster than it can recover (GBRMPA 2019a, p. 74).

Actively rehabilitating island, wetland, coastal, seagrass, coral and fish habitats can help repair damage, minimise harm and vulnerability to future degradation, and support climate change resilience.

Conservation of historic and cultural heritage sites is included in this work area. The 2019 Outlook Report found that many historic and cultural heritage features and values have not been systematically identified, and there is a lack of evidence regarding the condition and trend across historically and culturally significant sites. Some sites can be of shared significance to Indigenous and non-Indigenous people – for example, historic shipwrecks – but may hold different values and significance. Cultural heritage also includes submerged landscapes resulting from changes in sea levels.

Goals and strategic actions 2021–2025

Goals	Strategic actions
<p>Outbreaks of pests, introduced species and disease are reduced</p>	<p>5.1 Strengthen strategic management of established pests, introduced species and disease</p> <ul style="list-style-type: none"> Partner with Traditional Owners to implement co-designed and co-delivered pest control programs, including by Indigenous land and sea ranger programs. Enhance crown-of-thorns starfish control on key reefs, including reefs of high ecological and economic value. Undertake 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. Control pest predators of marine turtles through the Nest to Ocean Turtle Protection Program. Support local approaches to pest mitigation, including supporting local councils in invasive weed and animal control methods specifically tailored to their local regions.



Goals	Strategic actions
<p>Key habitats are being actively rehabilitated or restored</p>	<p>5.2 Pilot and implement interventions that support the resilience of coral reefs, seagrass, other marine habitats and islands</p> <ul style="list-style-type: none"> • Trial new remediation techniques to help key habitats and species recover from incidents and the effects of climate change. • Capture learnings from the Douglas Shoal Environmental Remediation Project to inform responses to marine incidents. • Support localised and scalable Reef intervention activities that are cost effective, feasible and in accordance with legislation and best-practice policies. • Expand the rehabilitation of key island ark refuges to protect critical habitats and vulnerable species, including Raine Island and Lady Elliot Island. <p>5.3 Enhance protection, rehabilitation and restoration of key coastal and catchment ecosystems</p> <ul style="list-style-type: none"> • Identify, prioritise, remove or remediate artificial barriers to water flow and increase connectivity through fish passages in catchment and estuarine areas. • Encourage land rehabilitation through incentives including the Queensland Land Restoration Fund and Reef Credit Scheme. • Implement a coordinated and prioritised program of on-ground activities to protect and restore refugial waterholes, wetlands, bird habitats and fish nursery habitats. • Partner with Traditional Owner and Indigenous organisations to co-design and co-deliver land and sea Country rehabilitation programs. • Increase understanding of and pre-emptive planning for potential impacts from sea-level rise (including inland migration of wetlands).
<p>Historic and cultural heritage sites are being conserved</p>	<p>5.4 Implement historic heritage site conservation</p> <ul style="list-style-type: none"> • Identify, map and monitor historic ship and aircraft wrecks and other sites with heritage values in priority sections of the Reef. • Protect and conserve sites with heritage values, including historic ship and aircraft wrecks, for future generations. <p>5.5 Implement cultural heritage site conservation</p> <ul style="list-style-type: none"> • Partner with Traditional Owner groups to protect Indigenous cultural heritage sites. • Improve protection of shared heritage sites (Indigenous and non-Indigenous contact) through collaborative partnerships.



Supporting policies and programs

- [Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park](#)
- [Australian Government and Queensland Government](#) Indigenous Ranger programs
- Australian Government Indigenous Protected Areas Program ([Department of Agriculture, Water and the Environment](#) and [National Indigenous Australians Agency](#))
- [Australian Historic Shipwrecks Program](#)
- [Be Pest Free](#) – Great Barrier Reef Islands Biosecurity
- [Crown-of-thorns Starfish Control Program](#)
- [Great Barrier Reef Marine Park Commonwealth Heritage Listed Places and Properties Heritage Strategy 2018–2021](#)
- [Indigenous Land Use Agreements and Protected Areas Program](#)
- [Policy on Great Barrier Reef interventions](#)
- [Queensland Heritage Register](#)
- [Reef Aid](#)
- [Reef Councils Rescue Plan](#)
- [Reef Islands Initiative](#)
- [Reef Joint Field Management Program](#)
- [Reef Trust](#) and [Reef Trust Partnership](#)

Threats being addressed

- Acid sulfate soils
- Altered ocean currents
- Altered weather patterns
- Barriers to flow
- Behaviour impacting heritage values
- Damage to reef structure
- Damage to seafloor
- Exotic species
- Extraction of herbivores
- Extraction of predators
- Foundational capacity gaps
- Fragmentation of cultural knowledge
- Genetic modification
- Grounding – large vessel
- Grounding – small vessel
- Illegal activities
- Modifying coastal habitats
- Ocean acidification
- Outbreak of crown-of-thorns starfish
- Outbreak of disease
- Outbreak of other species
- Sea level rise
- Sea temperature increase
- Sediment run-off
- Spill – large chemical
- Spill – large oil
- Spill – small



Compliance Marine Parks vessel, Reef Ranger: S. Harman (© Commonwealth of Australia (GBRMPA))

5.6 ENABLER A

Collaboration and partnerships

The enduring commitment from governments, industry, land managers, scientists, Traditional Owners and the wider community to work together reflects a shared belief that this is ‘our Reef, our responsibility’.

Collaboration and partnerships, supported by sound governance arrangements, are critical to the effective delivery of the Plan. This section addresses governance arrangements for the Plan, industry and community partnership and engagement, and activities to incorporate Traditional Owner heritage, rights and responsibilities into all facets of management. The Australian Government, the Great Barrier Reef Marine Park Authority and the Queensland Government lead implementation of the Reef 2050 Plan. The actions build on the solid foundations already in place and address areas where more needs to be done.

Improving involvement of Traditional Owners in protecting and managing the Reef is a priority for the Australian and Queensland governments. Traditional Owner 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 \(Qld\)](#). The National Partnership Agreement on [Closing the Gap](#) and the Queensland Government’s [Tracks to Treaty](#)

program reflect government commitments to a new way of working with Aboriginal and Torres Strait Islander peoples in full and genuine partnership.

A broad societal shift towards reconciliation is necessary to enable achievement of Traditional Owner aspirations for the Reef. All Reef 2050 partners and stakeholders have a role to play. Reflecting this, the Plan has a strong emphasis on actions that recognise Traditional Owner rights and interests; and work towards increased participation, voice and capacity in governance processes for Reef protection and management.

The Reef 2050 Governance Framework outlined in Box 4 brings together government, science, community, Traditional Owner and industry perspectives to support implementation of the Plan. It has provided a sound framework for improving the management of the Reef’s values through stronger governance, planning and resourcing since 2015. It will continue to operate as the governance oversight model for the Plan.

In addition to the Governance Framework, many of the important initiatives covered in the Plan have their own well-established governance, advisory and consultative mechanisms. These will continue to operate.



Environmental best practices by the Burdekin Shire Council, a Reef Guardian Council: R. Parsons (© Commonwealth of Australia (GBRMPA))



BOX 4 Reef 2050 Plan Governance Framework

The Plan is a schedule to the [Great Barrier Reef Intergovernmental Agreement](#) between the Australian and Queensland governments. Its implementation is overseen by the **minister with responsibility for Reef matters from each of the Australian and Queensland governments**.

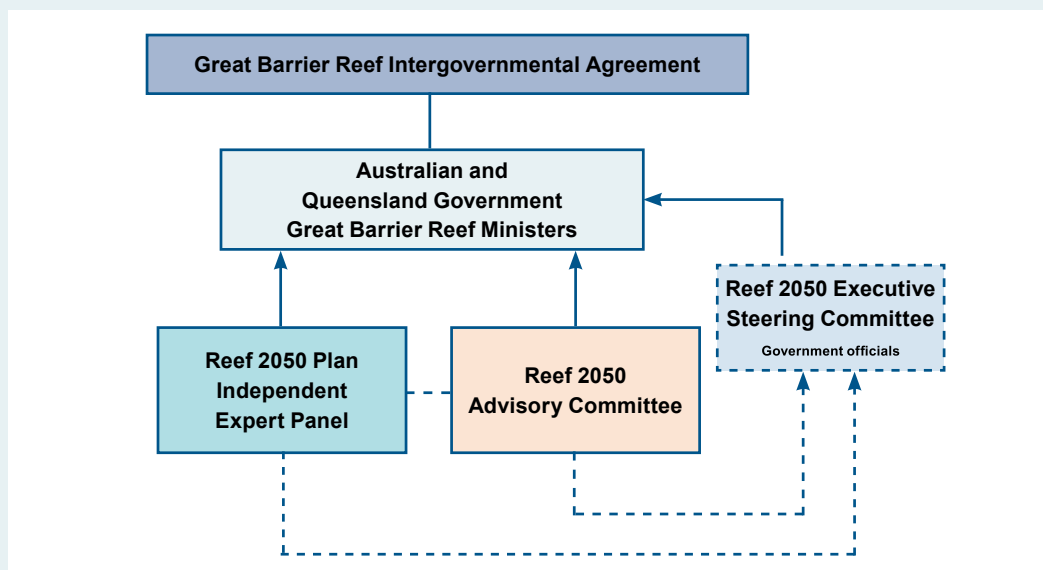
Decision making and delivery of actions under the Plan are guided by advice from the **Reef 2050 Plan Independent Expert Panel**, the **Reef 2050 Advisory Committee** and relevant government departments and agencies.

The **Reef 2050 Plan Independent Expert Panel** includes members with scientific (biophysical, heritage, social and economic) expertise. It provides advice to relevant Australian and Queensland government ministers on matters related to the Great Barrier Reef, including implementation and review of the Plan. It also advises the Australian Government Minister for the Environment on funding priorities for the Reef Trust.

The **Reef 2050 Advisory Committee** includes members and observers from a range of industry bodies and non-government organisations, local government, and Traditional Owner and community representatives. Sectors represented include local government, agriculture, ports, shipping, resources, commercial and recreational fishing, tourism, conservation, research and natural resource management. It provides strategic advice on the implementation of 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 on the Australian Government Department of Agriculture, Water and the Environment website.

Day-to-day management of the Plan is coordinated by a **joint team of officials** from the Australian Government Department of Agriculture, Water and the Environment; the Great Barrier Reef Marine Park Authority; and the Queensland Government Department of Environment and Science. This includes senior executive oversight by a **Reef 2050 Executive Steering Committee** with a member from all 3 agencies.





Goals and strategic actions 2021–2025

Goals	Strategic actions
<p>Adoption of best-practice voluntary compliance and stewardship behaviours is maintained and increased</p>	<p>A.1 Foster connection, education and stewardship of the Reef</p> <ul style="list-style-type: none"> • Connect and engage the national and international community in understanding and appreciating the benefits that the Reef brings, how individual and community behaviour is linked to Reef health, and the shared responsibility for its protection. • Build motivation, capacity and capability of extension and education providers, including natural resource management groups, to support efforts under the Reef 2050 Plan. • Partner with tourism operators, Traditional Owners and Reef users to promote responsible Reef practices through site stewardship, citizen science and education. • Support incentive-based programs and industry-led program delivery to drive behaviour change, including by celebrating successes. • Promote the uptake of innovative approaches that positively affect the Reef and catchment. • Support and collaborate on citizen science initiatives that deliver new knowledge, partnerships or impact for the Reef.
<p>Collaboration and effective partnerships between managers, partners and stakeholders are maintained and enhanced</p>	<p>A.2 Foster partnerships for Reef protection</p> <ul style="list-style-type: none"> • Support programs that bring together managers, partners and stakeholders and coordinate effort to maximise efficiencies, resources and the potential for impact. • Strengthen partnerships at a regional level to support delivery of strategic actions under the Plan. • Increase use of co-design, co-delivery and related locally driven methods to foster local ownership and embed partnership in Reef protection and management. • Implement accredited cultural competency training of Reef 2050 partners and stakeholders as best practice. • Use Traditional Owner-led approaches to support local councils, park and natural resource managers to strengthen partnerships with Traditional Owners for catchment and coastal management. • Secure more sources of independent resourcing to support capacity-building priorities and Reef protection activities – for example, Traditional Owner partnerships with philanthropic and non-government organisations.
<p>Traditional Owner Indigenous heritage, rights and responsibilities are incorporated into all facets of management</p>	<p>A.3 Formally recognise Traditional Owner customary rights and interests</p> <ul style="list-style-type: none"> • Improve policy coordination and consistency between government agencies and partners to support, deliver progress and realise Traditional Owner aspirations. • Reef 2050 partners and stakeholders formally recognise and respect the customary use of biological resources, in accordance with traditional cultural practices that are compatible with conservation or cultural use requirements. • Increase access and benefit-sharing initiatives through agreements with Traditional Owners about conservation management and cultural use of biological resources. • Support Traditional Owners to improve their capacity to generate economic benefits from use and management of their traditional estates.



Goals	Strategic actions
	<p>A.4 Increase opportunities for Traditional Owner co-management and co-governance of the Reef</p> <ul style="list-style-type: none"> • Establish a Great Barrier Reef Sea Country Alliance. • Increase Traditional Owner participation, voice and capacity in sea Country governance and Reef governance bodies. • Increase the use of formal and informal agreements with Traditional Owners to address management of ecosystems within their traditional estate, including but not limited to Traditional Use of Marine Resource Agreements. <p>A.5 Increase and strengthen capacity and involvement of Traditional Owners in protecting and managing the Reef</p> <ul style="list-style-type: none"> • Expand programs to develop local and regional capacity of Traditional Owners to govern and manage sea Country, including through Traditional Use of Marine Resource Agreements. • Increase capacity of Australian and Queensland government Indigenous land and sea rangers through training, professional development and peer-to-peer learning. • Increase training opportunities to expand the caring for Country skill set into compliance, monitoring and evaluation. • Support Traditional Owners to improve their capacity to generate economic benefits from use and management of their traditional estates. • Increase co-design and co-delivery of Reef programs involving Traditional Owners and Indigenous land and sea rangers. • 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 priorities.

Supporting policies and programs

- [Capacity Building for Indigenous Rangers \(Jobs, Land and Economy Program\)](#)
- [Empowered Communities](#)
- [Eye on the Reef program](#)
- [Fishery Working Groups under the Queensland Sustainable Fisheries Strategy 2017–2027](#)
- [Indigenous Advancement Strategy: Prescribed Body Corporate Capacity-Building](#)
- [Local Marine Advisory Committees](#)
- [Our Knowledge, Our Way Guidelines \(CSIRO\)](#)
- [PAMA Futures](#)
- [Queensland Department of Environment and Science Gurra Gurra Framework 2020–2026](#)
- [Reef Citizen Science Alliance](#)
- [Reef Guardian Councils and Schools](#)
- [Reef HQ Aquarium](#)

5.7 ENABLER B

Science and knowledge

The best available science and knowledge is required to manage the Reef – to protect values, reduce threats and improve its current and long-term outlook. Ongoing research and innovation is central to identifying solutions that can be integrated into management actions quickly in response to changes in the Reef. Policy makers, managers and stakeholders rely on credible, contemporary scientific information and other knowledge to develop policies, refine current management tools and to develop novel approaches. It is also critical to effective design and delivery of monitoring and evaluation programs (see Enabler C: Monitoring, evaluation and adaptive management).

Science and research institutions play a crucial role in science delivery and the oversight of science quality assurance. This includes government agencies, museums, universities and industry research organisations. 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. Two-way knowledge transfer should be founded on principles of respect; free, prior and informed consent (FPIC); and meaningful engagement and reciprocity between scientists, individuals and communities.

Efforts under this enabler also focus research on priorities for management, integrating knowledge and making it accessible, including to non-technical audiences. Strengthening collaboration between scientists, government, Traditional Owners and other end users is addressed. Actions to protect and retain traditional knowledge are also included.

There are 8 strategic research areas under the Plan (Box 5).

BOX 5 Reef 2050 Plan strategic research areas

- 1) Understanding the dynamics of managing the complex ecological and human interdependent Reef system through a whole-of-system approach.
- 2) Using Traditional Owner, experiential and other knowledge systems to further understand and quantify the links between pressures, management actions, interventions, responses and benefits to human and ecological systems.
- 3) Understanding the condition, vulnerability, and resilience of the Reef's interconnected human and ecological systems to current and future pressures (individual, multiple and cumulative).
- 4) Optimising ability to quantify and forecast condition and trend for key values, identifying tipping points and key recovery mechanisms.
- 5) Understanding ecological and socio-ecological adaptive capacity to unprecedented changes in the Reef and catchment and the community's capacity and motivation to undertake action.
- 6) Developing and integrating improved monitoring, evaluation and modelling approaches to underpin decision support systems, including the Reef 2050 Integrated Monitoring and Reporting Program and the Reef Restoration and Adaptation Program.
- 7) Gaining a contemporary spatial understanding of use patterns within the World Heritage Area at subregional scales.
- 8) Developing remote technologies to assist with monitoring, management, surveillance and compliance automation within the World Heritage Area.



Goals and strategic actions 2021–2025

Goals	Strategic actions
<p>Science and knowledge are advanced, easily accessible and able to be used in decisions</p>	<p>B.1 Focus research on priority management needs</p> <ul style="list-style-type: none"> • Foster science/management partnerships and research leadership focusing on priority management needs. • Coordinate strategic research planning and sharing of research findings across institutions, agencies and disciplines. • Take a rigorous approach to collating and synthesising the weight of evidence to support policy and management decision making. • Use the Reef 2050 strategic research areas (Box 5) and the Reef 2050 Water Quality Research, Development and Innovation Strategy 2017–2022 to complement and guide research program decisions. <p>B.2 Strengthen engagement of policy makers, managers, Traditional Owners and stakeholders in science and research</p> <ul style="list-style-type: none"> • Develop guidance for effective collaboration between biophysical and social sciences and traditional knowledge. • Build co-design and co-development approaches into research program and/or project design through partnerships with policy makers, Traditional Owners, managers and other stakeholders. • Science and research institutions commit to genuine engagement with Traditional Owners, attaining free, prior and informed consent from Traditional Owners for scientific research, and respecting existing governance structures (such as Elders, Councils, and spokespeople with cultural authority for the community group). • Policy makers and managers work in partnership with Traditional Owners to incorporate traditional knowledge into decision making alongside ‘mainstream’ science, including through negotiated agreements (e.g. data sharing agreements). • Implement Traditional Owner free prior and informed consent provisions in biodiscovery. • Recognise Indigenous cultural intellectual property and the rights of Aboriginal and Torres Strait Islander Peoples in respect of their traditional knowledge. • Improve inclusion of communities, landholders, and Traditional Owners through effective science communication and involvement in citizen science. <p>B.3 Synthesise and communicate scientific evidence to non-technical audiences</p> <ul style="list-style-type: none"> • Hold topical synthesis workshops to bring together Reef knowledge across policy, management, Traditional Owners, scientists and industry. • Develop topical or theme-based scientific consensus statements and synthesis products to consolidate evidence. • Improve coordination among Reef 2050 partners for 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.

Goals	Strategic actions
<p>Traditional knowledge is protected and retained</p>	<p>B.4 Recognise and embed traditional knowledge in Reef science and research</p> <ul style="list-style-type: none"> • Traditional Owners control their own Indigenous Knowledge Management Systems for collecting, handling and/or sharing of Indigenous heritage and knowledge where agreements are in place. • Reef 2050 partners develop a consistent framework of Traditional Owner protocols for managing information and agreements relating to traditional knowledge for adoption. • Support Traditional Owners to identify, assess, map, monitor and store knowledge of their cultural values.

Supporting policies and programs

- [Australian Institute of Marine Science Indigenous Partnerships Policy](#)
- [Australian Institute of Marine Science Strategy 2025](#)
- [Australian Research Council National Competitive Grants Program](#)
- [Bureau of Meteorology programs](#)
- [CSIRO Indigenous Engagement Strategy and Our Knowledge, Our Way Guidelines](#)
- [Fisheries Queensland Monitoring and Research Plan \(Sustainable fisheries\)](#)
- [Geoscience Australia programs](#)
- [Great Barrier Reef Marine Park Authority Science and Knowledge Needs](#)
- [National Environmental Science Program](#)
- [Reef 2050 Water Quality Research, Development and Innovation Strategy 2017–2022](#)
- [Reef Restoration and Adaptation Program](#)



Green Turtle on Raine Island during the nesting season, pink spot indicates that it has been tagged: M. Turner
 (© Commonwealth of Australia (GBRMPA))



5.8 ENABLER C

Monitoring, evaluation and adaptive management

Managers and stakeholders need up-to-date, reliable and accessible information on the Reef's condition and the driving forces and pressures impacting it. Monitoring and evaluation are essential to determine if management actions are effective and if they need to be changed to achieve the desired objectives. 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 improves. Monitoring, reporting and evaluation is also needed to test if efforts are on track with delivering against the goals and objectives in this Plan.

Section 3.5 outlined the reporting approach for this Plan through the [Reef 2050 Integrated Monitoring and Reporting Program](#) and its front-end portal, the [Reef Knowledge System](#). This program will also integrate relevant Reef-based monitoring and modelling programs so that managers can easily access the most up-to-date information needed to inform resilience-based management and reporting. As it develops, it may also link to the Paddock to Reef Integrated Monitoring, Modelling and Reporting Program.

Many monitoring programs are well established, with long-term datasets. But there are monitoring gaps and a need to improve monitoring, data management capability and integration across different programs. These [monitoring gaps have been prioritised](#). Addressing these and continuously identifying and addressing priority knowledge gaps will form a key aspect of work under this enabler.

Indigenous heritage monitoring is an important focus area under the Reef 2050 Plan, with the

[Strong Peoples – Strong Country Monitoring Framework](#) connecting the health of the Reef and its catchment to the quality of life enjoyed by Aboriginal and Torres Strait Islander peoples. It provides a Traditional Owner-led approach for systematic monitoring of the condition of Indigenous cultural values, which are important to understanding Reef health. 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 Marine Park Authority's [Aboriginal and Torres Strait Islander Heritage Strategy for the Marine Park](#). Work under this framework will be integrated into the Reef 2050 Integrated Monitoring and Reporting Program over time.

Consistent with the adaptive management approach, the Plan will be reviewed and updated every 5 years and as needed to address new information or priorities for Reef protection (see section 3.3). This means cyclic reviews of the Plan will be informed by and can respond to 5-yearly outlook reports, which will be released a year ahead of scheduled reviews of the Plan. These 5-yearly reviews will also be informed by the Reef 2050 Plan Outcomes Report on progress towards the Plan's objectives and goals and [Reef Water Quality Report Cards](#).

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 and the *Reef 2050 Water Quality Improvement Plan 2017–2022*. Reporting under the Plan will not duplicate these established reporting frameworks but will be informed by them.

Goals and strategic actions 2021–2025

Goals	Strategic actions
<p>Comprehensive monitoring, evaluation and reporting supports informed and agile management responses</p>	<p>C.1 Strengthen coordination, integration and implementation of Reef monitoring and modelling activities</p> <ul style="list-style-type: none"> • Finalise and deliver the 5-year Reef 2050 Integrated Monitoring and Reporting Program business strategy. • Invest in monitoring to fill priority gaps identified by the Reef 2050 Integrated Monitoring and Reporting Program that support reporting against this Plan and inform adaptive management of the Reef. • Undertake the 5-yearly review of the Paddock to Reef program. • Investigate building closer links between the Paddock to Reef program and the Reef 2050 Integrated Monitoring and Reporting Program. • Support Traditional Owner-led approaches for systematic monitoring of the condition of Reef values and measuring progress against the Plan. • Support and improve inclusion of Traditional Owner monitoring activities in established monitoring programs. • Increase formal and informal partnerships between Traditional Owners and Reef partners to ensure key Reef heritage values are identified, documented, protected and monitored. • Further develop frameworks for consistent reporting on industry and community stewardship. • Invest in predictive scenario modelling (e.g. for evaluations) and in ongoing ground-truthing and improvement of modelled data (e.g. on state of the system, values, pressures, decision flows) as situations change. <p>C.2 Strengthen evaluation and adaptive management responses</p> <ul style="list-style-type: none"> • Develop performance criteria to assess progress toward the Plan's goals. • Use performance reporting under the Plan, including information on progress towards objectives and goals, to inform decision making. • Evaluate effectiveness of policies and programs and develop decision support tools to inform adaptive management responses as required. • Develop tools and reporting products to better integrate and disseminate monitoring results and improve access to evidence demonstrating progress in implementing the Plan. • Review and update the Plan every 5 years and as needed to address new information or priorities for Reef protection.

Supporting policies and programs

- [Australian Institute of Marine Science Long-term Monitoring Program](#)
- Citizen Science initiatives, for example [MangroveWatch](#) and [Seagrass-watch](#)
- [Eye on the Reef program](#)
- [Great Barrier Reef Marine Monitoring Program](#)
- [Integrated Marine Observing System](#)
- [Paddock to Reef Integrated Monitoring, Modelling and Reporting Program](#)
- [Social and Economic Long-Term Monitoring Program](#)
- [Reef Water Quality Report Cards](#)
- [Regional Report Card Partnerships](#)



5.9 ENABLER D

Investment

Investment supports the effective and successful delivery of the Plan. This section provides an overview of current investment, identifies priority areas for investment and outlines the principles that guide investment decisions under the Plan.

The Australian and Queensland governments and Reef 2050 delivery partners are investing substantially, and there have been significant increases in investment in the Reef since the Plan commenced in 2015. Australian and Queensland government investment to implement the Plan stands at \$3 billion over 10 years for the period 2014–15 to 2023–24 (see breakdown in Table 1 and Appendix D). Both governments are committed to investing the time, effort and resources required to implement the Plan. Additional investment will be determined through future government budget processes, and updates will be provided as part of annual reporting on the Plan.

Climate change investments also contribute to Reef health. The Australian Government is committed to achieving net zero emissions by

2050 and will invest more than \$21 billion in low emissions technologies over the decade to 2030. These technologies will underpin further emissions reductions in Australia. This includes funding for clean energy and low emissions projects in the Reef catchment area through the Clean Energy Finance Corporation [Reef Funding Program](#). Other climate change investments include the Australian Climate Service (\$210 million), and the Queensland Government [Land Restoration Fund](#). Climate-related investments stemming from broader state and national programs are not included in calculations of Australian and Queensland government Reef funding.

Local governments are also a significant investor in work that directly and indirectly contributes to Reef protection – for example, wastewater and urban stormwater treatment, waterway and coastal foreshore rehabilitation, plastic pollution and litter reduction, and community education. The Local Government Association of Queensland estimates local governments have invested more than \$1.1 billion in activities that protect the Reef since 2015 (LGAQ, 2021).

Table 1 Australian and Queensland Government Reef funding (2014–15 to 2023–24)

Source	\$m (AUD)
Australian Government Reef programs [^]	877.199
Reef Science	465.401
Great Barrier Reef Marine Park Authority	469.817
Australian Maritime Safety Authority	267.305
Queensland Government Reef programs [#]	620.732
Queensland Sustainable Fisheries programs [*]	76.838
Maritime Safety Queensland	275.000
Total	3052.292

Figures current at November 2021.

Funding not determined through to 2023–24 for all programs.

[^] Funding includes \$443.3 million for the Reef Trust – Great Barrier Reef Foundation Partnership.

[#] Includes a portion of an additional \$270.1 million allocated over five years 2021–22 to 2025–26 while actual annual allocations may be different.

^{*}Sustainable fisheries programs funding is statewide.



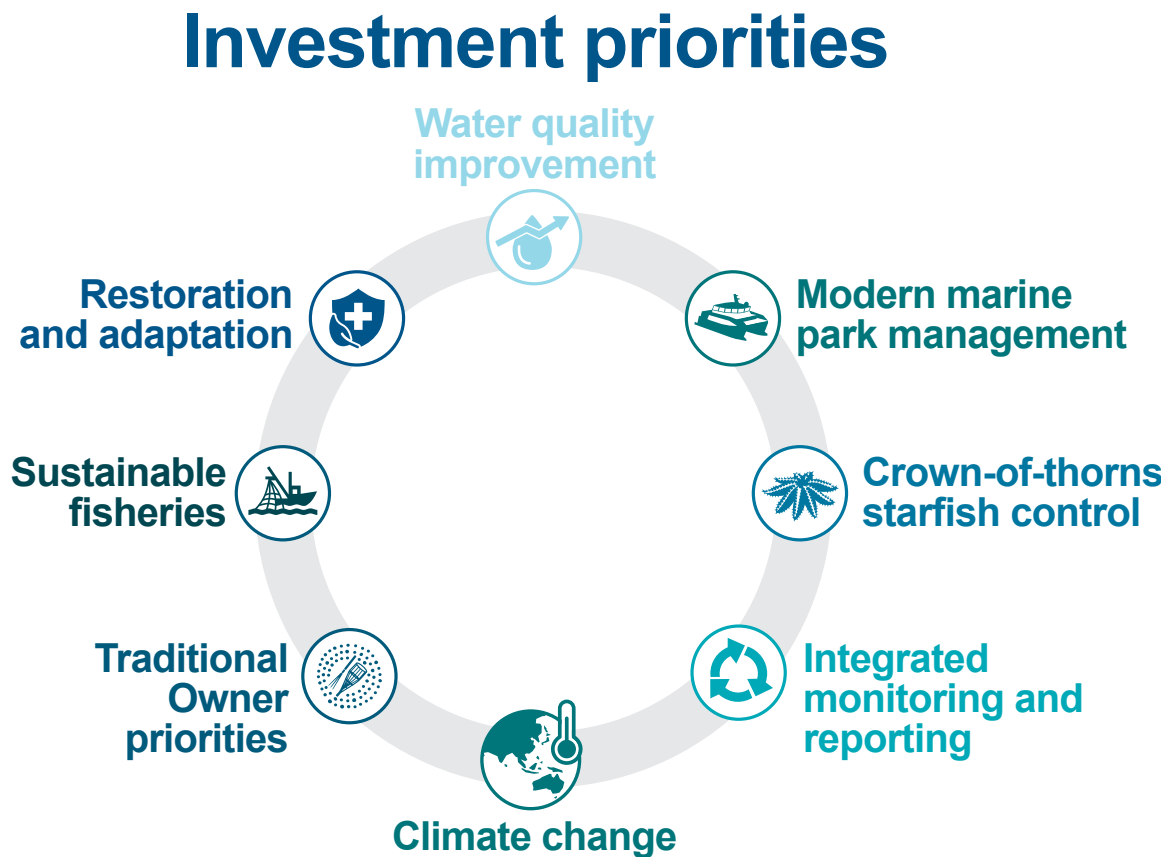
Through an increasing focus on partnership and innovative financing, there are opportunities to boost, diversify and increase the impact of investment in the Reef. Financial and non-financial resources from diverse sources can be leveraged to achieve greater outcomes and co-benefits. New and innovative funding mechanisms are being developed to provide new ways to finance projects to benefit the Reef – for example, the [Reef Credit Scheme](#).

When making or seeking investment for actions under this Plan, governments and other partners in the delivery of the Plan should be guided by the following investment principles:

- **Additionality and complementarity** – investments will build on and align with existing efforts and capitalise on new opportunities.
- **Clear outcomes** – investments will be focused on delivering the Plan’s strategic actions and achieving its objectives and goals.
- **Cost effectiveness** – investments will be well planned and cost effective and will contribute to lasting results.
- **Collaboration and partnerships** – investments will consider opportunities for co-investment, strategic collaborations and partnerships, including a focus on opportunities for co-design and co-delivery with Traditional Owners.
- **Evidence based and scientifically robust** – investments will be informed by the best available science and knowledge.
- **Innovation and agility** – investments will support innovation and continuous improvement and address emerging issues and accelerating threats.

There are **8 priority areas for investment** under this Plan (Figure 7). Five of these investment priorities were identified in the 2016 [Reef 2050 Investment Framework](#) and remain a priority. The 2016 framework also identified field management as an investment priority. Since

Figure 7 Reef 2050 Plan investment priorities





then, governments have provided a substantial funding increase for the Joint Field Management Program, leading to more vessels and staff on the water and ongoing funding for the program.

Three additional investment priorities have been identified: climate change, modern marine park management, and Reef restoration and adaptation. Seven of the priority areas are Reef-specific. Climate change investment is primarily undertaken to reduce emissions and address climate impacts at state, national and global levels and also benefits the Reef.

Note: The main work areas that relate to each of these priorities are shown in *italics*. All enablers are important for each priority area for investment.

- **Climate change** – the biggest threat to the current and future health of the Reef is climate change. Investment to reduce emissions and climate impacts at a state, national and global level also benefit the Reef. (*Work area 1*)
- **Water quality improvement** – poor water quality is a system-wide challenge, with action needed to reduce nutrient, pesticide and sediment loads impacting the ecosystems of the Reef. (*Work area 2*)
- **Integrated monitoring and reporting** – integrated modelling, monitoring and reporting for the Reef and its adjacent catchments guide adaptive management decisions, track progress and inform investment. (*Enabler 3*)
- **Crown-of-thorns starfish control** – preventing future outbreaks is key to protecting coral cover and enhancing the capacity of the Reef to recover from disturbances such as coral bleaching and tropical cyclones. (*Work area 5*)
- **Traditional Owner priorities** – partner with Traditional Owners to respect and deliver on their rights, obligations and aspirations for the Reef, including through formal and informal agreements (e.g. Traditional Use of Marine Resources Agreement Program). (*All*)
- **Sustainable fisheries** – target investment in sustainable fisheries management to improve the health and resilience of the Reef as well as the social and ecological sustainability and economic viability of the fishing industry. (*Work area 3*)
- **Modern marine park management** – ensure that foundational management of the Great Barrier Reef remains world leading by modernising management tools to support the future needs of the Reef and those who use the marine parks. Governments have invested significantly in park management, and it is important that future investment supports leading practices. (*Work areas 3 and 5*)
- **Restoration and adaptation** – invest in research, development and deployment of at-scale interventions on the Great Barrier Reef to help it adapt to, and recover from, the effects of climate change and other disturbances. (*Work areas 1 and 5*)

Goals and strategic actions 2021–2025

Goals	Strategic actions
<p>Investment supports delivery of the Reef 2050 Plan</p>	<p>D.1 Deliver existing commitments to maximise outcomes under the Plan</p> <ul style="list-style-type: none"> • <i>Climate change</i>: Implement Australia’s Long-Term Emissions Reduction Plan and the Technology Investment Roadmap, and its Low Emissions Technology Statements, with the 2021 Statement guiding \$21 billion of Australian Government investment to 2030. • <i>Climate change</i>: Implement the Queensland Renewable Energy and Hydrogen Jobs Fund (\$2 billion), Renewable Energy Zones across Queensland (\$145 million), Queensland Hydrogen Industry Development Fund (\$25 million), and Land Restoration Fund and implement the Queensland Climate Action Plan 2020–2030.



Goals	Strategic actions
	<ul style="list-style-type: none"> • <i>Water quality improvement:</i> Implement joint \$667 million Australian and Queensland government investment to deliver the Reef 2050 Water Quality Improvement Plan 2017–2022, including \$270.1 million through the Queensland Reef Water Quality Program and \$201 million through the Reef Trust – Great Barrier Reef Foundation Partnership (Reef Trust Partnership). • <i>Modern marine park management:</i> Deliver the \$274 million Australian and Queensland government Reef Joint Field Management Program, including the expansion and practical on-ground actions to protect, maintain and rehabilitate the marine and island ecosystems of the Reef. • <i>Integrated monitoring and reporting:</i> Deliver the \$40 million Reef Integrated Monitoring and Reporting Program through the Reef Trust Partnership, together with major contributions for existing programs from implementing partners. • <i>Integrated monitoring and reporting:</i> Continue to deliver the Paddock to Reef Integrated Monitoring, Modelling and Reporting program as part of the Australian and Queensland governments joint investment in water quality. • <i>Crown-of-thorns starfish control:</i> Deliver the \$57.8 million funding boost to the Crown-of-thorns Starfish Control Program through the Reef Trust Partnership to continue to control coral-eating starfish on high-value reefs. • <i>Traditional Owner priorities:</i> Deliver the \$51.8 million in Reef Trust Partnership investment to create opportunities and support greater engagement of Traditional Owners, including \$10 million for a Traditional Owner funding facility to secure independent long-term resourcing. • <i>Traditional Owner priorities:</i> Deliver the \$24 million investment to expand the Queensland Indigenous Land and Sea Rangers Program. • <i>Sustainable fisheries:</i> Deliver \$42.5 million Queensland Government investment over 4 years to support reforms under the Queensland Sustainable Fisheries Strategy 2017–2027. • <i>Restoration and adaptation:</i> Deliver the Reef Restoration and Adaptation Program, to identify and develop an innovative suite of safe, acceptable interventions to help the Great Barrier Reef resist, adapt to and recover from the impacts of climate change (\$100 million from the Reef Trust Partnership and \$50 million in contributions from consortium partners). <p>D.2 Ensure future investment supports priority activities and successful implementation of the Plan</p> <ul style="list-style-type: none"> • Regularly update investment information. • Use evaluations of the success of actions and programs to inform future investment priorities. • <i>Climate change:</i> Invest to reduce emissions and climate impacts at a state, national and global level, and invest in adaptation at a Reef-wide scale. • <i>Water quality improvement:</i> Invest in projects to reduce pollutants and sediment flowing into the Reef and to improve catchment health, as informed by the evaluation of past investments.



Goals	Strategic actions
	<ul style="list-style-type: none"> • <i>Integrated monitoring and reporting:</i> Fund ongoing support for improvement, maintenance and implementation of the Reef 2050 Integrated Monitoring and Reporting Program. • <i>Crown-of-thorns starfish control:</i> Invest in crown-of-thorns starfish control, outbreak prevention and alternative control methods research to protect coral cover. • <i>Traditional Owners priorities:</i> Invest in actions that support the achievement of Reef Traditional Owner aspirations, including working with Traditional Owners to increase capacity and opportunities to expand participation in Reef governance and management, and expanding the Queensland Indigenous Land and Sea Rangers Program and Traditional Use of Marine Resource Agreements program. • <i>Sustainable fisheries:</i> Invest in the implementation of the Queensland Sustainable Fisheries Strategy 2017–2027 and improving the sustainability of fisheries including additional monitoring and compliance and the rollout of new technologies to support a world class fisheries management system. • <i>Modern marine park management:</i> Invest in modernising management tools and delivering a contemporary policy, planning and regulatory framework that protects key values and enables ecologically sustainable use of the marine parks. • <i>Restoration and adaptation:</i> Invest in ongoing research and development and the implementation of at-scale Reef restoration and adaptation interventions. <p>D.3 Identify new opportunities for investment to address emerging issues</p> <ul style="list-style-type: none"> • Invest in innovation and science to improve methods and results so that the effectiveness of investments is maximised. • Use purpose-built tools to identify and guide future investments. • Invest in Reef protection to achieve co-benefits and identify opportunities to derive co-benefits for the Reef from other programs. <p>D.4 Boost investment through partnerships, co-investment and innovative financing</p> <ul style="list-style-type: none"> • Develop and support financing mechanisms, building from innovative examples such as the Reef Credit Scheme, as well as partnership and co-investment examples from the Clean Energy Finance Corporation Reef Funding Program. • Pursue and support collaborative investment options, including joint government investments and philanthropic and private partnerships. • Leverage non-financial resources for greater impact, including through community volunteering, citizen science initiatives and in-kind contributions.



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

Term	Definition
Adaptation (species)	The process by which a species becomes fitted to its environment (including environmental changes due to climate change). It is the result of natural selection acting upon heritable variation over several generations.
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	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 and wind patterns.
Co-design (with Traditional Owners)	An agreed collaborative approach to design a plan, project or initiative by working with identified parties such as Traditional Owners, other First Nations people, community and stakeholders in culturally grounded ways, ensuring that there is recognition for Traditional Owner equal power sharing, influence, cultural knowledge and decision-making in the process.
Co-delivery (with Traditional Owners)	Ensuring that implementation or delivery of a co-designed plan, project or initiative incorporates Traditional Owner leadership with support from community and stakeholders in culturally grounded ways.
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.
Cosmology	Aboriginal cosmology is the origin and general structure of the universe based in Aboriginal knowledge, lore, and science. It stretches from the beginnings of the universe to current scientific practices implemented by Aboriginal people today. The spiritual connection to Country is foundational to understanding Aboriginal cosmology.

Term	Definition
Country	A person's land, sea, sky, rivers, sites, seasons, plants and animals; and place of heritage, belonging and spirituality is called 'Country'. The term 'Country' refers to an interdependent relationship between Traditional Owners and their ancestral lands and seas.
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 be either 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)
Elder	A highly respected Aboriginal or Torres Strait Islander person held in esteem by their community for their cultural knowledge and community service. Elders have an important role to play in decision-making within their community.
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, as updated in 2015 and from time to time.
Healthy	The ability for the value to maintain its key characteristics and self-renewal capacity.
Historic heritage	Relates 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, including heritage places (sites) and/or cultural values, all of which arise from Indigenous spirituality.

Term	Definition
Interventions	An action, or actions, actively undertaken on land or in water to support ecosystem recovery, build resilience and achieve conservation benefits for the Great Barrier Reef.
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 and their operational guidelines. (UN Convention on Biological Diversity; UNESCO Declaration on Cultural Diversity)
Outstanding universal value	Cultural and/or natural significance that is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity.
Port facilities	For the purposes of this Plan, refers to commercial port infrastructure rather than marinas or harbours.
Reef 2050 Water Quality Improvement 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. Formerly known as the Reef Water Quality Protection Plan.
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.
Rehabilitation	The process of reinstating a level of ecosystem functionality on degraded sites where ecological restoration is not the aspiration, as a means of enabling ongoing provision of ecosystem goods and services.
Resilience	The ability of an environmental component to cope with change and remain in a desirable functioning state. It includes the ability to absorb impacts and continue functioning; and recover, reorganise or build capacity to learn and adapt between events.
Restoration	The process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. (Note: single species and habitat restoration can be considered complementary to, and an important component of, ecological restoration.)
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.
Totems	Natural objects, plants or animals inherited by Traditional Owners as a spiritual emblem.

Term	Definition
Traditional estate	An area inherited from ancestors and belonging to a descent-based group of people. It includes the land and waters, the resources located in it and cultural and intellectual property rights.
Traditional Owner	In this Plan, Traditional Owner refers to the Traditional Owners of the Great Barrier Reef land and sea Country. Traditional Owners are the Aboriginal and Torres Strait Islander people who have ongoing traditional and cultural association with the land and sea, and possess rights and interests under Traditional Laws, Customary Lore and Australian and Queensland government laws.
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.
Regional 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. Regional water quality improvement plans are non-legislative regional planning instruments and can inform the development of Healthy Waters Management Plans.
Integrated catchment management	Reflects the interdependencies between catchments, wetlands and the broader reef ecosystem, thus demanding a management approach that considers the connected system as a whole rather than addressing parts of the system in isolation.
World Heritage Area	In the context of this Plan, refers to the Great Barrier Reef World Heritage Area. See also Appendix B.

Appendices

Appendix A: Legislative framework for the Great Barrier Reef World Heritage Area

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

The main object of the *Great Barrier Reef Marine Park Act 1975* (Cth) 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 establishment 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, which provides protection for Queensland tidal lands and waters; and the Commonwealth Coral Sea Marine Park, which extends east from the Great Barrier Reef Marine Park 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* (Qld) restricts capital dredging to 4 major ports along the Great Barrier Reef coast, prohibits the disposal of dredge material from capital dredging into the World Heritage Area and also restricts new port development (e.g. port facilities) in and adjoining the World Heritage Area to current port extents. The *Great Barrier Reef Marine Park Regulations 2019* (Cth) further restrict the disposal of capital dredge spoil within the Great Barrier Reef Marine Park.

The *Environmental Protection Act 1994* (Qld) prohibits the transshipment of bulk materials within the Great Barrier Reef Marine Park outside of port extents. This legislation also regulates agricultural activities such as intensive cropping and industrial activities such as mining and sewage treatment to achieve improved Reef water quality outcomes, specifically to reduce sediment and nutrient runoff or emissions.

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, water quality, air quality and cultural heritage. Queensland legislation considered most relevant for protecting and managing the Great Barrier Reef is referenced in Figure 8.

The EPBC Act is the Australian Government's central piece of national environmental legislation. It recognises an appropriate role for the Commonwealth by focussing Commonwealth involvement on matters of national environmental significance, it strengthens intergovernmental co-operation in managing the environment and assists co-operative implementation of Australia's international environmental responsibilities. The Great Barrier Reef Marine Park and the Great Barrier Reef World Heritage Area are matters of national environmental significance protected under the EPBC Act.¹ Any actions on the land or in the water that have or are likely to have a significant impact on the environment in the Great Barrier Reef Marine Park, or have or are likely to have a significant impact

¹ The Great Barrier Reef is also subject to further protections under the EPBC Act as a National Heritage place and a Commonwealth marine area.

on the world heritage values of the Great Barrier Reef World Heritage Area, are prohibited unless approval is granted or approval is determined not to be necessary under the EPBC Act.² Before a decision can be made on whether to approve an action, the impacts of the action are assessed under an environmental impact assessment process. The EPBC Act provides for a number of methods of assessment, including assessment by the Queensland Government in accordance with the bilateral agreement arrangements between the Australian and Queensland governments.

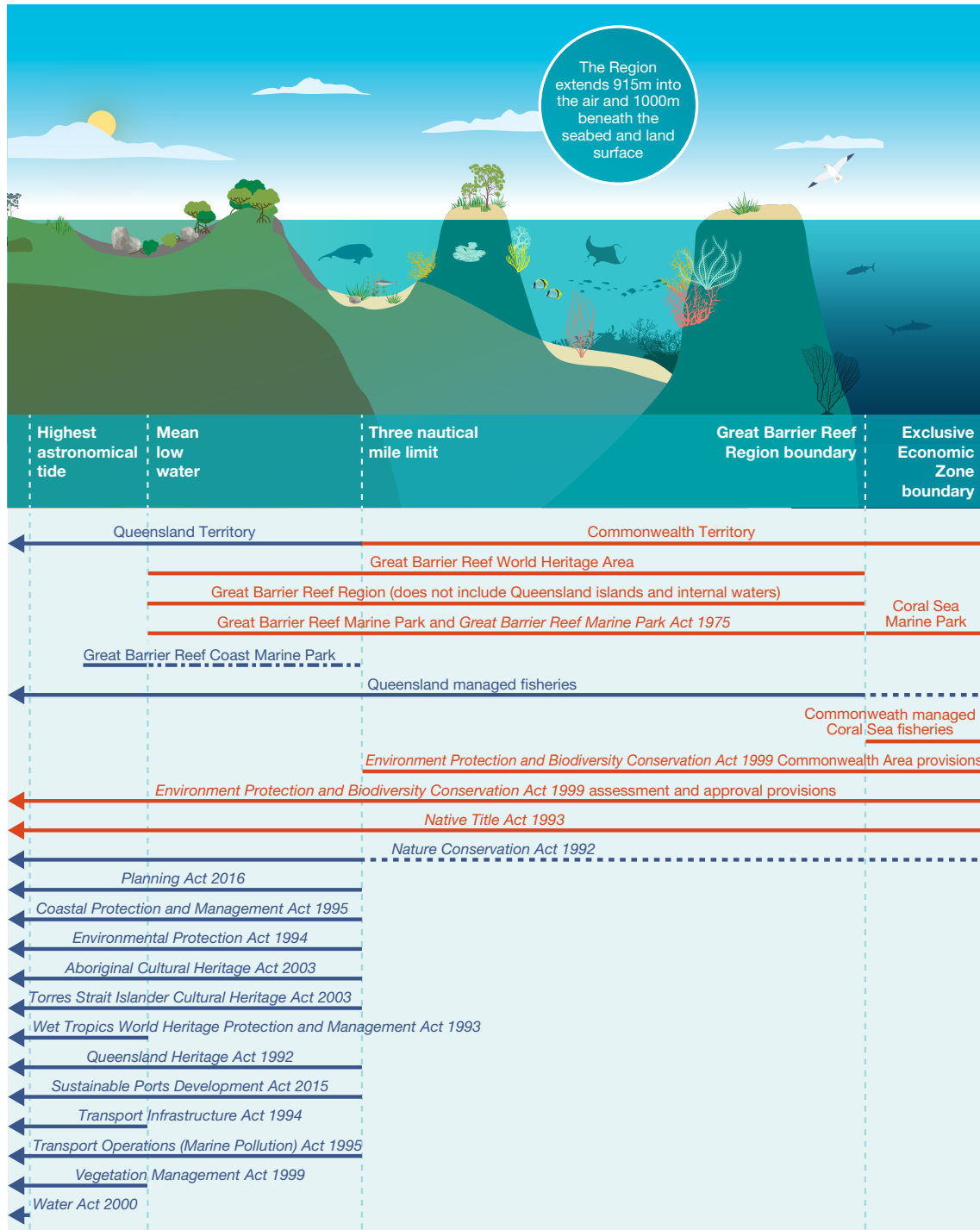
The combined body of law comprehensively protects the Great Barrier Reef and provides the legal foundation for the range of management tools employed to protect and manage the World Heritage Area. The Australian and Queensland governments regularly review and update legislation as required to ensure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

Management of the World Heritage Area is also guided by Australia's obligations under the Convention Concerning the Protection of World Cultural and Natural Heritage (1972) and other international agreements to which Australia is a party. These include:

- Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment, 1974 (Japan–Australia Migratory Bird Agreement)
- Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment, 1986 (China–Australia Migratory Bird Agreement)
- Agreement between the Government of Australia and the Government of the Republic of Korea on the Protection of Migratory Birds, 2007 (Republic of Korea – Australia Migratory Bird Agreement)
- 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 especially as Waterfowl Habitat, 1971 (Ramsar Convention)
- International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL)
- United Nations Convention on the Law of the Sea, 1982
- United Nations Framework Convention on Climate Change, 1992
- UNESCO Convention on the Protection of the Underwater Cultural Heritage, 2001
- The Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal, 1989.
- The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 and its 1996 Protocol (London Convention and Protocol)

² Actions that would have or are likely to have a significant impact on the national heritage values of the Great Barrier Reef National Heritage place or the Commonwealth marine environment in the Great Barrier Reef would also be prohibited unless approval was granted or approval was determined not to be necessary under the EPBC Act.

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



The Great Barrier Reef Region encompasses both Commonwealth (red) and Queensland (blue) jurisdictions. Queensland territory extends from the land to the three nautical mile limit. A Commonwealth and state intergovernmental agreement to jointly manage marine parks and island national parks ensures integrated field management of the Great Barrier Reef Marine Park and the abutting Great Barrier Reef Coast Marine Park. The dashed line indicates that the Great Barrier Reef Coast Marine Park includes the Queensland-owned islands that lie within the Great Barrier Reef Region. The dotted lines indicate the possible extent of the relevant legislation or jurisdiction (for example, depending on species or fishery). Fisheries management within the Great Barrier Reef Region is regulated by the Queensland Government. The assessment and approval provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) apply throughout the Great Barrier Reef Region. However, the provisions in the EPBC Act that apply to and regulate activities in Commonwealth reserves apply only in the Coral Sea Marine Park.

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

Area of Reef	Great Barrier Reef World Heritage Area	Great Barrier Reef Region	Great Barrier Reef Marine Park
Size	348,000 km ²	346,000 km ²	344,400 km ²
Date	Inscribed 1981	Established 1975	Declared in sections between 1979 and 2001; amalgamated into one section by proclamation in 2004
Includes	<ul style="list-style-type: none"> • all islands within outer boundary • (about 1,050) • all waters seaward of low water mark (including internal waters of Queensland and port waters) • all 12 trading ports 	<ul style="list-style-type: none"> • approximately 70 Commonwealth islands • all waters seaward of low water mark (excluding Queensland internal waters) • 12 coastal exclusion areas (12 trading ports) and maritime port infrastructure • does NOT include: <ul style="list-style-type: none"> – internal waters of Queensland – Queensland islands (about 980) 	<ul style="list-style-type: none"> • approximately 70 Commonwealth islands • all waters seaward of low water mark • does NOT include: <ul style="list-style-type: none"> – internal waters of Queensland – Queensland islands (about 980) – 12 coastal exclusion areas (trading ports)

Appendix C: Reef 2050 Plan goals

- Australia contributes to an effective global response to climate change through the Paris Agreement, to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels
- The capacity of Reef communities, Traditional Owners and industries to adapt to a changing climate is increased
- Species and habitats are supported to adapt to a changing climate
- The quality of water is improved through increased effective land management practices in catchments
- Integrated catchment-to-Reef management reduces cumulative impacts
- Lighting and recreational impacts on sensitive shoreline ecosystems and cultural sites are reduced
- Biodiversity and heritage protection are enhanced and ecosystem resilience is supported through strengthened efforts to ensure water-based activities are sustainable
- Traditional Owners are supported to continue to manage sea Country
- The threats associated with legal and illegal fishing are reduced
- Noise pollution and artificial light impacts from sources within and adjacent to the Marine Park are reduced
- New outbreaks of disease are reduced and incursions of introduced species and pests are prevented
- Marine debris, rubbish pollution and at-sea disposal of waste is reduced
- Australia actively engages in international forums and agreements to minimise international sources of impact to the Reef
- Outbreaks of pests, introduced species and disease are reduced
- Key habitats are being actively rehabilitated or restored
- Historic and cultural heritage sites are being conserved
- Adoption of best-practice voluntary compliance and stewardship behaviours is maintained and increased
- Collaboration and effective partnerships between managers, partners and stakeholders are maintained and enhanced
- Traditional Owner Indigenous heritage, rights and responsibilities are incorporated into all facets of management
- Science and knowledge are advanced, easily accessible and able to be used in decisions
- Traditional knowledge is protected and retained
- Comprehensive monitoring, evaluation and reporting supports informed and agile management responses
- Investment supports delivery of the Reef 2050 Plan

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	9,432	8,671	8,729	7,876	7,984	9,700	TBD	54,482
Reef Trust	7,702	15,865	37,554	485,722	31,212	25,401	36,249	29,853	34,494	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	-	-	-	0,226	0,887	0,887	35,915
Subtotal	52,859	59,141	55,730	507,300	39,883	34,130	44,125	38,063	45,081	0,887	877,199
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
National Environment Science Program - Phase 2 (Marine and Coastal Hub)	-	-	-	-	-	-	-	TBD	TBD	TBD	TBD
Australian Institute of Marine Science	15,100	15,100	15,100	29,100	39,200	38,500	42,500	45,600	46,100	46,300	332,600
Australian Research Council (Centre of Excellence for Coral Reef Studies)	6,437	6,409	6,304	6,778	6,956	8,210	5,910	3,684	2,557	0,926	54,171
CSIRO	3,922	5,627	5,621	9,709	8,886	7,149	5,736	-	-	-	46,65
Subtotal	27,659	32,766	32,425	50,987	60,442	59,259	56,696	49,284	48,657	47,226	465,401
Great Barrier Reef Marine Park Authority											
Joint Field Management Program (Australian Government funding)	8,372	8,372	9,961	14,859	11,965	12,740	16,576	19,428	18,990	19,059	140,322
Great Barrier Reef Marine Park Authority	18,773	19,845	22,411	24,830	41,256	42,833	56,683	36,066	33,751	33,047	329,495
Subtotal	27,145	28,217	32,372	39,689	53,221	55,573	73,259	55,494	52,741	52,106	469,817
Australian Maritime Safety Authority											
Subtotal	23,459	24,185	21,088	24,888	27,448	28,620	28,832	29,191	29,588	30,006	267,305
Australian Government total	131,122	144,309	141,615	622,864	180,994	177,582	202,912	172,032	176,067	130,225	2,079,722

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
Queensland Government Reef programs											
Queensland Government Reef Water Quality Program	35,000	33,425	47,145	43,374	68,916	58,214	63,456	36,776	50,000	50,000	486,306
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
Subtotal	43,372	41,797	55,911	52,153	82,195	70,923	79,924	56,003	19,227	19,227	620,732
Queensland Sustainable Fisheries programs											
Subtotal	-	7,001	2,674	6,439	7,697	9,541	8,500	14,311	13,175	7,500	76,838
Maritime Safety Queensland											
Subtotal	28,000	28,000	28,000	28,000	28,000	28,000	23,000	28,000	28,000	28,000	275,000
Queensland total	71,372	76,798	86,585	86,592	117,892	108,464	111,424	84,003	47,227	47,227	972,570
TOTAL	202,494	221,107	228,200	709,456	298,886	286,046	314,336	256,035	223,294	177,452	3,052,292
Cumulative total	202,494	423,601	651,801	1,361,257	1,660,143	1,946,189	2,260,525	2,516,560	2,739,854	3,052,292	

Figures current at November 2021.

KEY

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

Reef funding notes

Reef programs	Description
Reef 2050	<ul style="list-style-type: none"> 2023–24 funding will be determined as part of future Australian Government budget processes.
Reef Trust	<ul style="list-style-type: none"> \$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 6 years until 30 June 2024. 2023–24 funding will be determined as part of future Australian Government budget processes.
Reef Program	<ul style="list-style-type: none"> Reef Program ended in 2017–18. Future Reef funding was allocated to the Reef Trust.
Other Reef funding	<ul style="list-style-type: none"> Includes a range of Reef projects undertaken between 2014–15 and 2017–18: <ul style="list-style-type: none"> 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). Includes \$2M (2021–22 to 2023–24) for onground works and administration of the Raine Island Recovery Project announced as part of the \$100 million Oceans Leadership Package in 2021
National Environmental Science Program (NESP) (Tropical Water Quality Hub)	<ul style="list-style-type: none"> NESP is a long-term commitment by the Australian Government for environment and climate research. The first phase invested \$145 million (2014–2015 to 2020–2021) into 6 research hubs, including \$31.98 million to the Tropical Water Quality Hub. The second phase of NESP will invest \$149 million (2020–21 to 2026–27) into 4 new research hubs, including a new Marine and Coastal Hub. The program also has cross-cutting research missions, including one to support management of Australia's protected places and heritage. <ul style="list-style-type: none"> \$18.967 million is allocated to the Marine and Coastal Hub (which replaces the Tropical Water Quality Hub) for 2021–22 to 2023–24 to fund research, some of which will be applicable to the Great Barrier Reef. Allocations for Great Barrier Reef-related research will be defined as research planning progresses.
Australian Institute of Marine Science	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> Funding from the ARC is awarded through a competitive peer review selection exercise across all disciplines, including funding for the ARC Centre of Excellence for Integrated Coral Reef Studies.

Reef programs	Description
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	<ul style="list-style-type: none"> Includes 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. CSIRO has a wide-ranging portfolio of Reef research activities that relate to social, terrestrial and marine systems. CSIRO co-invests in externally funded work, as well as directly funding work through its Future Science Platforms. Figures for 2020–21 are an underestimate, as CSIRO anticipates significant new work (e.g. Reef Restoration and Adaptation Program) entraining additional co-investment from CSIRO.
Australian Maritime Safety Authority	<ul style="list-style-type: none"> 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.
Reef Joint Field Management Program (Australian Government funding)	<ul style="list-style-type: none"> The Great Barrier Reef Marine Park Authority and the Queensland Government co-fund the Reef Joint Field Management Program. The Great Barrier Reef Marine Park Authority contributed more than \$8 million per year to the program until additional funding was announced in 2018 which will see the annual contribution grow to more than \$19 million by 2021–22.
Great Barrier Reef Marine Park Authority	<ul style="list-style-type: none"> Funding for this item includes departmental appropriation, the Environmental Management Charge (EMC) and injections for the renewal of Reef HQ Aquarium. The EMC is a charge associated with most commercial activities, including tourism operations, non-tourist charter operations and facilities, that operate under a permit issued by the Great Barrier Reef Marine Park Authority. Funding for this item does not include Reef HQ sales or permits.
Queensland Government Reef Water Quality Program	<ul style="list-style-type: none"> The Queensland Government has allocated an additional \$270.1 million for the Queensland Reef Water Quality Program over five years 2021–22 to 2025–26. This amount has been pro-rated at \$50 million per year in both 2022–23 and 2023–24, noting actual annual allocations may be different. \$2.1 million provided by the 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). 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 Reef and its catchment making up a significant proportion of the state. The Queensland Reef Water Quality Program is invested through 3 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)	<ul style="list-style-type: none"> 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 that will see the Queensland Government’s annual contribution grow to more than \$19 million by 2021–22.

Reef programs	Description
Queensland Sustainable Fisheries Programs	<ul style="list-style-type: none"> The Queensland Government Department of Agriculture and Fisheries developed and commenced implementation of the Queensland Sustainable Fisheries Strategy 2017–2027.
Maritime Safety Queensland	<ul style="list-style-type: none"> 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 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 Reef and Torres Strait vessel traffic service is supported by a User Guide, which was published in 2017.

Additional Australian Government funding for the Reef is provided through the Bureau of Meteorology, Australia's national weather, marine, climate and water information agency. The Bureau of Meteorology's operational services include weather and ocean forecasts; and climate outlooks, including ocean temperature outlooks for the Reef lagoon, flood and streamflow forecasts and tropical cyclone warnings. It also provides critical support to communities and agencies in the Great Barrier Reef Region. The Bureau of Meteorology is part of the eReefs project.

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